Appendix A

Visual Impact Assessment (VIA)

VISUAL IMPACT ASSESSMENT

Bell Road at I-80 Interchange Project

(For Minor Level VIA)

October 12, 2020

California Department of Transportation

District 03, Placer County, Interstate 80
PM R20.9 to PM R21.3
Project ID #318000305
EA #03-4H430

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District #3

Statement of Compliance: Produced in compliance with National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements, as appropriate, to meet the level of analysis and documentation that has been determined necessary for this project.

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VISUAL IMPACT ASSESSMENT
Bell Road at I-80 Interchange Project

PURPOSE OF STUDY AND ASSESSMENT METHOD

The purpose of this visual impact assessment (VIA) is to document potential visual impacts caused by the proposed project and propose measures to lessen any detrimental impacts that are identified. Visual impacts are demonstrated by identifying visual resources in the project area, measuring the amount of change that would occur as a result of the project, and predicting how the affected public would respond to or perceive those changes. This visual impact assessment follows the guidance outlined in the publication *Visual Impact Assessment for Highway Projects* published by the Federal Highway Administration (FHWA) in March 1981 and in January 2015.

PROJECT DESCRIPTION

Placer County (County), in cooperation with the California Department of Transportation (Caltrans), proposes to address capacity and safety concerns at the interchange along Bell Road in the County at the Interstate 80 (I-80) eastbound (EB) and westbound (WB) ramp intersections, including Bowman Road on the west and Musso Road on the east. These improvements are identified as the Bell Road at I-80 Interchange Project (project). Placer County is the lead agency under the California Environmental Quality Act (CEQA) and Caltrans is the lead agency under the National Environmental Policy Act (NEPA).

Project Background

Placer County began studying the project area in 2005 when Bell Road was widened between I-80 and SR 49 to determine if any mitigation was required at the interchange. A cooperative agreement with Caltrans was executed on October 11, 2018 to continue mitigation efforts at this interchange.

Commuter traffic uses the Bell Road corridor to avoid congestion along the State Route (SR) 49 corridor, and at the SR 49 and I-80 interchange. Traffic consists mostly of North Placer County and Western Nevada County residents that commute to Western Placer County and Sacramento County for work. Since 2005, Grass Valley and Nevada City have increased in population and there have been several infill communities constructed along SR 49 between Grass Valley and Auburn. In anticipation of this additional volume, Bell Road was widened to four lanes; however, the Bell Road at I-80 interchange remains a bottleneck for traffic during AM and PM peak hours. As a result, traffic builds up to the I-80 off-ramps and impacts the mainline flows on I-80.

In response to the deficient traffic operations and safety concerns, several Build Alternatives were considered for the project in the Project Initiation Document (PID) phase within a Project Study Report / Project Development Support (PSR/PDS) document. The PSR/PDS was approved by Caltrans on April 18, 2020. Three build alternatives and a No-Build Alternative were proposed in the PSR/PDS. The Build Alternatives evaluated were the following:

- **Build Alternative 1**: Signalization of the stop controlled intersections with overcrossing widening;
- **Build Alternative 2**: Roundabouts at the I-80 EB and WB ramp intersections, including Bowman Road on the west and Musso Road on the east; and
- **Build Alternative 3**: Roundabout at the WB off-ramp and reconstruction of the EB on-ramp to a loop on-ramp.

It was determined that Build Alternatives 1 and 3 would not be viable design options to evaluate further and were ultimately rejected in the PID process. Build Alternative 2 was determined to best meet the safety purpose of the project for all modes of travel, while addressing future mobility needs. This alternative is further referenced as the Build Alternative in this document.

Project Need and Purpose

Purpose:

The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the interchange. The secondary purpose of this project is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

Need:

Congestion in the project area during the AM and PM peak hours has affected the efficiency of the interchange to the point where the traffic is backing up onto the mainline. This condition is an operational and safety concern for Placer County and Caltrans that needs to be addressed.

Project Alternatives

No Build Alternative

The No-Build Alternative is the analysis scenario in which no improvements to the Bell Road at I-80 interchange are made. This alternative leaves the existing lane geometrics and intersection controls in place. Under existing conditions, the Bell Road/I-80 EB and WB off-ramps are stop controlled. The Bell Road/Bowman Road intersection is controlled by a signal and the three-way Bell Road/Musso Road intersection is stop controlled on the Bell Road approach. The Bell Road at I-80 interchange intersections are approximately 130 feet to 380 feet apart.

The No Build Alternative does not meet the project purpose and need, nor does it address the current congestion problem.

Build Alternative

The Build Alternative would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. The roundabouts would be designed to accommodate future growth “Year 2045.” To adequately accommodate queues and delays, both roundabouts would be hybrid roundabouts, which include a combination of single and multi-lanes.

Roundabout improvements at the Bell Road at I-80 interchange would include, but not be limited to, the following:

- A 10-foot shared use path separated from the roadway with a five-foot minimum landscaped buffer for pedestrian safety and to guide pedestrians to correct crossing locations;
- Crosswalks and Americans with Disabilities Act (ADA) accessible ramps along pedestrian facilities; and
- Vehicular speeds ranging from 15 to 30 mph after project buildout within the interchange.

Pedestrian and Bicycle Safety

The 10-foot shared-use path would convey pedestrian and bicycle traffic through the intersection and provide the opportunity for cyclists to exit the bicycle lane via a bicycle ramp and navigate the intersection on the shared-use path and through the crosswalks. Cyclists would also have the option to exit the bicycle lane and enter the roadway to ride with vehicle traffic through the roundabout.

Crosswalks would be split into two separate crossings through the provision of the pedestrian refuges at the splitter islands. These two-stage crossings would reduce the amount of sustained time a pedestrian is in potential conflict with motorized vehicles by limiting the length of each crossing and limiting each crossing to one direction of vehicle travel at a time.

Erosion Control Measures

Any ground cover disturbed by the overall project would be seeded or otherwise protected from any potential erosion. In addition, the following erosion control measures are proposed during the construction phase:

- Temporary silt fences;
- Temporary storm drain inlet protection;
- Temporary covers on slopes and stockpiles;
- Temporary concrete washout facilities;
- Temporary construction site entrances; and
- Fiber rolls.

Lighting and Signage

The project would provide enhanced lighting to improve roadway visibility for drivers during nighttime hours. Lighting is anticipated to be installed at ramp merges and diverges along the shoulders of I-80. The pole lighting would be supported on a cast-in-drilled-hole concrete pile (with a typical diameter of 2.5 feet and length of five feet).

Existing local guide signs and regulatory signs would likely be removed and replaced. Additional guide signs would be placed per the California Manual on Uniform Traffic Control Devices (CA MUTCD). Overhead signs would be installed along southbound Bell Road approaching Bowman Road, at the I-80 WB off-ramp, and along the EB off-ramp for direction through the roundabout.

Retaining Walls

The roundabout incorporating Musso Road and Bell Road would require the construction of a retaining wall south of Musso Road. The wall would be approximately 270 feet long with a maximum height of 20 feet. The type of wall is still being determined; however, a soil nail wall with a concrete vehicular barrier is the current type proposed.

The roundabout incorporating Bowman Road and Bell Road would require the construction of a retaining wall north of Bowman Road. The wall would be approximately 440 feet long and have a maximum height of 14 feet. The type of wall is still being determined, but a concrete Type 1 cantilever retaining wall is the current type selection.

For the retaining wall(s) that are public facing (currently only the retaining wall south of Musso Road), an earth-toned, natural-looking wall treatment would be applied (see Minimization Measure VIS-3).

Construction

Construction is currently anticipated to begin by Summer 2022. Construction would be phased in order to maintain local access to I-80. Construction lay down areas would be at two different locations. For construction of the Bowman Road and Bell Road roundabout, staging could be located at the vacant parcel located east of Bell Road, south of Bowman Road and north of I-80 WB off-ramp. Staging for the Musso Road and Bell Road roundabout could occur at the vacant parcel located east of Bell Road, north of Musso Road and south of I-80 EB on-ramp.

PROJECT LOCATION AND SETTING

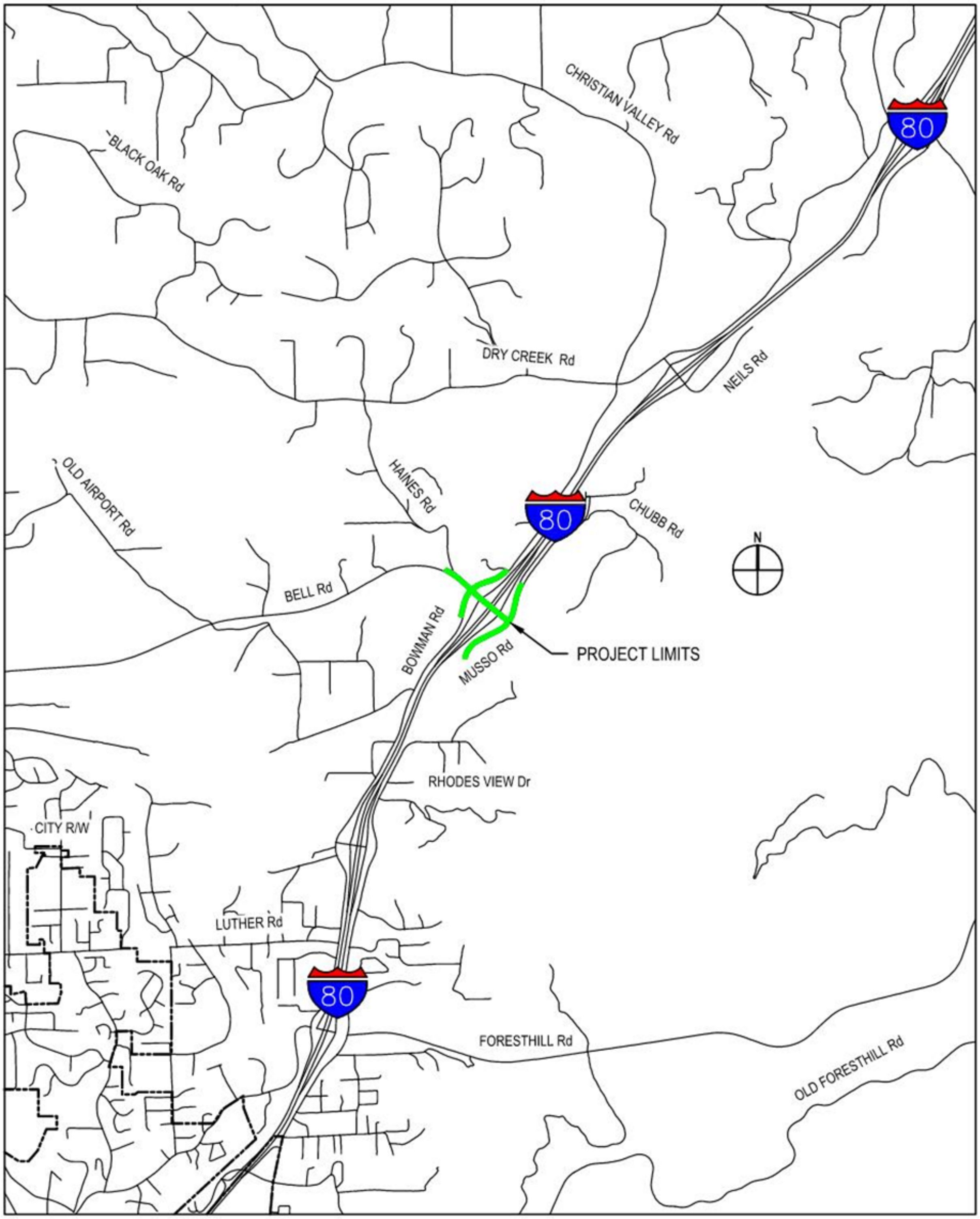
The project location and setting provides the context for determining the type and severity of changes to the existing visual environment. The project setting is referred to as the corridor or project corridor, which is defined as the area of land that is visible from, adjacent to, and outside the highway right-of-way, and is determined by topography, vegetation, and viewing distance.

The proposed project is located along Bell Road at the I-80 interchange within the southeastern portion of Placer County, California, around 38.9460113 latitude and -121.0473178 longitude and between post miles R20.9 and R21.3. The project area is located in a rural setting, surrounded by open space land, agriculture, commercial properties, and residential neighborhoods (Placer County 2013). The project region lies in the Sacramento Valley of northern California and within the transition zone between the flat Sacramento Valley and the Sierra Nevada and Lake Tahoe region. The rolling Sierra Nevada foothills largely comprise the easternmost portion of the region.

The Draft Natural Environment Study – Minimal Impacts prepared by De Novo Planning Group for the proposed project (De Novo Planning Group 2020) stated that the region is characterized by tree-dominated habitat (montane hardwood-conifer, montane hardwood, blue oak-foothill pine, valley oak woodland, and valley foothill riparian areas), herbaceous-dominated habitat (annual grassland and pasture areas), and developed habitat (cropland, vineyard, and urban areas). The project corridor is located in a rural area. Vegetation within the project area is largely limited to the roadway shoulders and areas substantially disturbed by human activities and is characterized by compacted soil, non-native annual herbaceous vegetation, and a considerable amount of bare ground and gravel turnouts/parking facilities. The project site does not contain permanently irrigated ornamental landscape areas.

Transportation facilities are the dominant visual features in the project vicinity, including I-80, Bell Road, Bowman Road, and Musso Road as well as other local roadways. The project site is not located near a state scenic highway or other designated scenic corridor (Caltrans 2020). See Figure 1 for a Vicinity Map of the project area.

Figure 1 – Vicinity Map



VISUAL RESOURCES AND RESOURCE CHANGE

Visual resources of the project setting are defined and identified below by assessing *visual character* and *visual quality* in the project corridor. *Resource change* is assessed by evaluating the visual character and the visual quality of the visual resources that comprise the project corridor before and after the construction of the proposed project.

The visual character of the proposed project would be compatible with the existing visual character of the corridor area. Four (4) views along the exiting existing corridor have been identified on Figure 2: Existing Conditions Map with photographs of the existing project site. Of these views, two (2) have been identified as *Key Views.* The change in the visual character and quality of these *Key Views* are further discussed in *Key Views* discussion section.

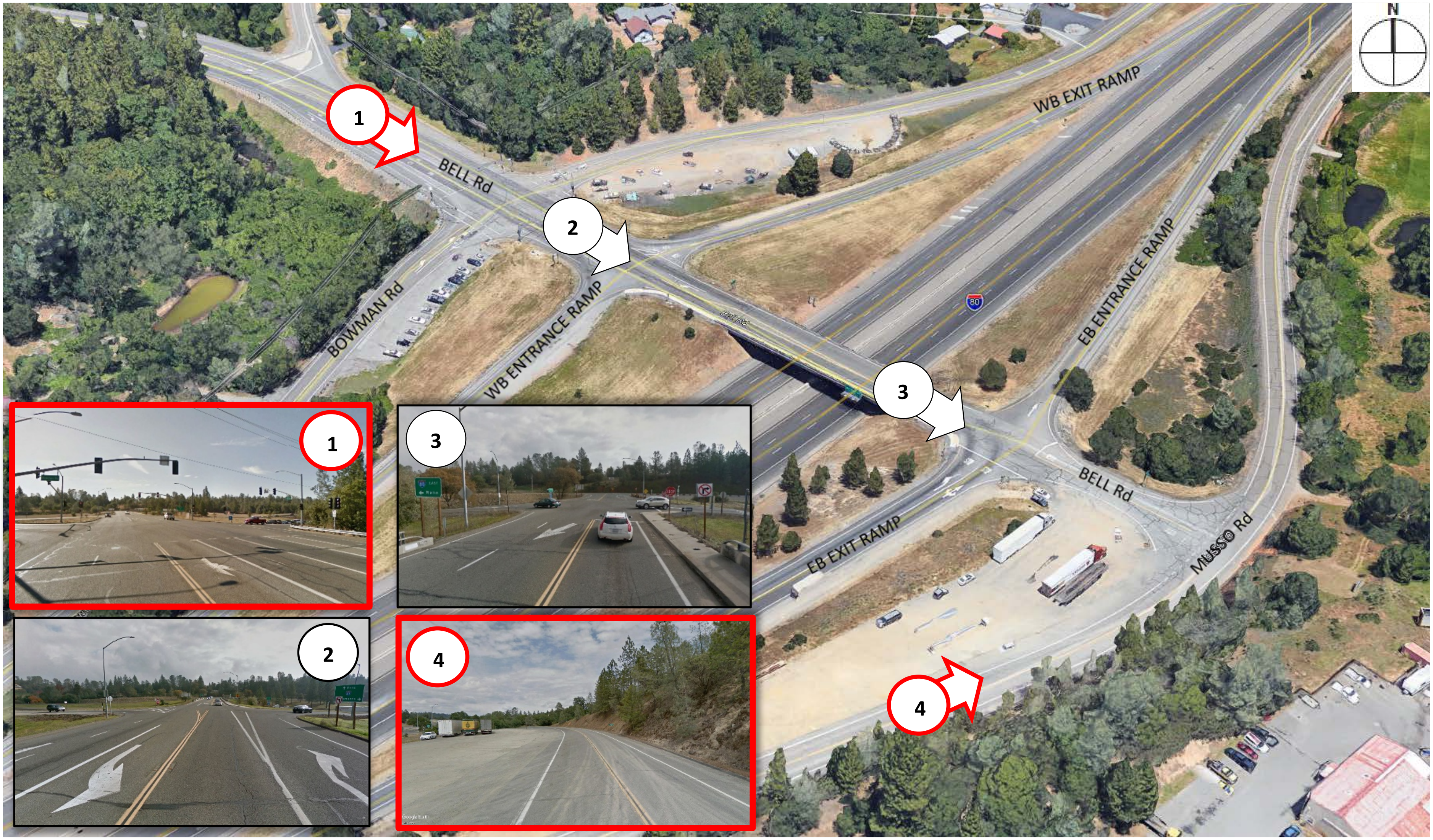
Summary of Visual Resource Change

The proposed project would introduce two roundabouts with overhead lighting, paved raised medians with landscaping features, crosswalks, and additional road signage and warning features to alert drivers to the roundabouts ahead. The "form" and "line" of the interchange would differ from the existing interchange due to the larger footprint, circular roundabouts, retaining walls, and raised medians (see Figure 3 for the Build Alternative Environmental Study Area). The Bowman Road/Bell Road and Bell Road/ I-80 WB ramp intersections (views 1 and 2, Figure 2) would be consolidated into a six (6) leg roundabout. The Musso Road/Bell Road intersections (view 4, Figure 2) would be consolidated with the Bell Road/I-80 WB and EB ramps intersections (views 3, Figure 2), forming a five (5) leg roundabout. In addition, landscaped/hardscaped areas would introduce different colors and texture to the intersection and would be seen as an aesthetic enhancement. The roadway color for both intersection improvements would be black asphalt and smooth in texture similar to the existing roadway.

The visual quality, comprised of vividness, intactness, and unity, of the existing corridor and intersection would not be significantly altered by the proposed project. The vividness of the corridor between the road surface and the Right-of-way is considered moderately low due to the bare gravel surfaces with ruderal vegetation, as this area is largely limited to the roadway shoulders and areas substantially disturbed by human activities. Trees surround the project area are not expected to be impacted by the project. The proposed project would involve the construction of roundabouts that would result in a different configuration than the traffic signal and stop-controlled intersections. However, the project would integrate an attractive design in the central islands of the roundabouts, the medians, and splitter islands using a combination of permeable inert materials. Combinations of inert materials (rock boulders, cobble rock mulch, gravel rock mulch, and wood mulch) would be used to create interesting ground level patterns while providing weed, dust, and erosion control. Areas outside of the sidewalks would be treated with a native grass and forb hydroseed mix. In addition to the grass selected for the hydroseed mix, flowering herbaceous plants were selected for their visual quality and floral resource benefit to the western bumblebee that may be present in the project area due to existing habitat. This design would enhance the visual quality of the existing corridor, and would improve the vividness by creating unity in the project area through harmonious visual patterns and materials. The proposed landscape concept design is provided as Attachment A.

The visual resource change would be moderate-low. The visual character would be enhanced by adding a more attractive landscaping design utilizing consistent textures, colors, and surfaces within the existing project area (see Attachment A). Minimization Measures VIS-1 through VIS-5 would minimize potential impacts associated with the additional lighting, the construction of the retaining walls, and any vegetation removal.

Figure 2 – Existing Conditions Map



NOTE: Views 1 & 4 are highlighted as *Key Views*. See Key View Section for a detailed description of the visual resource change for these views.

Figure 3 – Build Alternative Environmental Study Area

Key Views

The visual resource changes at I-80 Westbound and Eastbound entrance and exit ramp intersections at Bell Road are consistent with the description above. These intersections (views 2 and 3, Figure 2) are in areas where the existing visual resources are defined by impermeable road surface, ruderal vegetation, and gravel turnouts. There would be minimal impacts to vegetation and desired views. Of the existing views, the majority of the visual impacts would occur at the Musso / Bell Road intersection (view 4, Figure 2) and Bowman /Bell Road intersection (view 1, Figure 2).

VIEW 1: BOWMAN / BELL ROAD

The most noticeable visual resource changes one would see when approaching the intersection of Bowman / Bell Road if driving in a southeasterly direction along Bell Road would be the geometric change to the approach of the intersection, the location of the intersection, and the physical change from a signalized intersection to a roundabout. The surrounding vegetation outside of the right-of-way would remain relatively intact. Where previously one would approach the intersection in a straight line, with the proposed improvements, a person approaching the proposed intersection you would curve slightly to the right, then left, and then enter the roundabout at a reduced speed. Each curve in the road geometry would provide a slightly new view of the preserved forest landscape on either side of the road. The solid paved road surface would be broken by a median in the center of the road and splitter island to the south near the roundabout. The intersection would be larger and slightly further down the road. The roundabout would include a central island and facilitate traffic control for both Bowman Road and the westbound entrance and exit ramps at Bell Road. The medians, central island, and splitter islands would have an inert material surface of different shape, size, and pattern. A 10-foot shared-use path would flank either side of the road and a pedestrian crosswalk with signs to alert drivers would be located just before the roundabout. A retaining wall would be located to the along the southern edge of the shared-use bike lane; however, the face of this wall would be below you, facing opposite of the roadway. There would be additional lighting and signs. These additional pole lights and signs would be minimal and would be offset by the removal of the existing signal poles and mast arms.

VIEW 4: MUSSO / BELL ROAD

Similarly to the Bowman / Bell Road intersection, the most noticeable visual resource changes one would see while approaching the intersection of Musso / Bell Road if driving in a Northeasterly direction along Musso Road would be the geometric change of the approach to the intersection, the location of the intersection, a new retaining wall to the east, and the physical change from a signalized intersection to a roundabout. As with the project as a whole, the surrounding vegetation outside of the right-of-way would remain relatively intact. As you approached the intersection you would notice a more exaggerated left curve as you begin to enter the roundabout. The solid paved road surface would be broken by a median in the center of the road. The intersection would be larger and shifted to the left as it would include a central island and facilitate traffic control for both Musso Road and the eastbound entrance and exit ramps at Bell Road. The medians, central island, and splitter islands would have an inert material surface of different shape, size, and pattern. A 440 foot long retaining wall would be to the east leading up to the intersection. It would max out at a height of 14 feet. The vertical face of the wall would be roughened and have an earth-tone color to minimize the visual impact of the structure. A pedestrian crosswalk with signs to alert drivers would be located just before the roundabout and a 10-foot shared-use path would flank either side of the roundabout. There would be additional lighting and signs. The additional lighting and glare would be minimized by shielding and downcasting the light.

VIEWERS AND VIEWER RESPONSE

Neighbors (people with views to the road) and *highway users* (people with views from the road) would be slightly affected by the proposed project.

Neighbors

The number of neighbors near the project is low; the project site is primarily surrounded by open space and agricultural areas with some commercial and residential properties, including a mobile home parking lot near the east side of the project site (Placer County 2013). Based on Caltrans' five levels of viewer response (low, moderate-low, moderate, moderate-high, or high), the viewer exposure and sensitivity response for the neighbors would be low. The local neighbors would have the highest awareness of the project improvements due to proximity; however, views of the interchange are generally obstructed by trees and local topography. Trees surrounding the project site are not expected to be impacted, and only minimal vegetation would need to be removed due to the wider intersections to accommodate the roundabouts (see Figure 3). The project is expected to enhance the project area by adding a more attractive landscaping design utilizing consistent textures, colors, and surfaces within the existing project area.

Highway Users

The viewer exposure for highway users would be low. With the creation of curving roadways for the roundabouts, the views would be consistently changing. Due to the volume of traffic on these routes, a large number of highway users would view the project, but the viewing duration for the proposed project would be shorter than for the existing condition because drivers would not need to stop at a traffic signal or at stop-controlled intersections.

The viewer sensitivity of the highway users would be low. Currently, highway users can experience a wait time at the traffic signal at the Bowman Road/Bell Road intersection, increasing their awareness of the commercial uses, asphalt paving, and signage. With the addition of free movements and landscape/hardscape features, highway users would be more likely to notice the natural character of the vegetation and the curving geometry of the roadway. The focus of views would also change; currently, views are straight and broad. The views created by the proposed project would be focused, spanning a narrower frame.

VISUAL IMPACT

Visual impacts are determined by assessing changes to the visual resources and predicting viewer response to those changes.

Build Alternative

The visual impacts of the proposed project would be short-term and moderate-low. The largest impact would be the visual and physical disruption caused by the demolition of the existing intersection and the construction of the roundabouts.

During construction, motorists would see heavy construction equipment and exposed soils during grading activities, temporary traffic control features (such as signage and orange cones), lighting, and construction workers.

The new impervious surfaces would be contiguous to existing roadway surfaces. There would be a change in the approach to these intersections from a straight approach to a curved approach. The number of signs would increase; however, intersection signal controls would be removed. All non-paved, disturbed soil surfaces would receive erosion control seeding or covered using different shapes, colors, and patterns of gravel, cobble, and other permeable inert material. All areas outside of the construction footprint would preserve the existing vegetation and no unsightly views would be exposed.

Retaining walls would be introduced and would receive a natural-looking wall treatment to all sides facing the public view. Currently, only the retaining wall south of Musso Road would be angled where it would be public facing.

Light or glare would moderately change with the addition of permanent lighting for safety and visibility at the interchange as well as the addition of asphalt and concrete areas. The potential glare from impervious surfaces would be a moderate change to existing conditions.

No-Build Alternative

Under the No-Build Alternative, no improvements to the interchange would be made and the visual corridor would remain the same as the existing.

AESTHETICS IMPACT AND ANALYSIS

In accordance with the CEQA guidelines addressing aesthetics impacts the following questions have been considered:

a) Would the project have a substantial adverse effect on the scenic vista?
b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?
c) Would the project substantially degrade the existing visual character or quality of public views of the site and its surrounding?
d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Scenic Vistas

The project would have a less than significant impact to the existing scenic vistas. With the exception of lighting poles and retaining walls, all changes to the intersection would occur at ground level and have minimal impact to existing scenic views. Signal control poles and devices would be removed. Visual impacts occurring at ground level would be minimized in accordance with Minimization Measure VIS-1.

Vegetation would be preserved to the extent possible and no tree removal is anticipated. If trees are to be removed that impact scenic vistas, replanting would occur in accordance with applicable jurisdictional requirements. This is further discussed in Minimization Measure VIS-2.

Public facing retaining walls would be treated with a roughened wall surface to soften the verticality of the wall face by providing visual texture and reducing the amount of smooth surface that can reflect light and visually impact existing views. This is further described in Minimization Measure VIS-3.

Scenic Highway Resources

The project is not within a designated State scenic highway and, therefore, would have no impact to scenic highway resources.

Visual Character or Quality of Public Views

The project would have a less than significant impact to the visual character or quality of public views. Visual impacts due to project construction would be short-term and would cease upon project completion. The construction footprint would be minimal as possible to ensure the preservation of existing vegetation and tree. Vegetation areas temporarily disturbed by construction would be reseeded and temporary irrigation would be installed if needed. Minimization Measures VIS-1, VIS-2, and VIS-4 would reduce potential adverse impacts to the visual character or quality of public views.

Light and Glare

The project would have a less than significant impact to light and glare. To minimize light pollution, the lights would be shielded and downcast, compliant with Caltrans standards. Signal control devices emitting light would be removed. The proposed project would have a minor effect on day or nighttime views of the area. Additional avoidance and minimization measure to reduce or prevent light and glare are described in Minimization Measures VIS-4 and VIS-5.

AVOIDANCE AND MINIMIZATION MEASURES

Avoidance or minimization measures have been identified and can lessen visual impacts caused by the Build Alternative. Also, the inclusion of aesthetic features in the project design previously discussed can help generate public acceptance of a project. This section describes additional avoidance and/or minimization measures to address specific visual impacts. These would be designed and implemented with concurrence of the District Landscape Architect.

The following measures to avoid or minimize visual impacts would be incorporated into the project:

- **Minimization Measure VIS-1: Use Native Species for Erosion Control Seed Mix and Decorative Inert Material Patterns.** Exposed surfaces that are not subject to paving would be either seeded in accordance with Caltrans standards regarding erosion control or covered using various inert materials to form aesthetically pleasing patterns. The seed mix used would only include California native plants. A native grass and forb seed mix would be used in areas disturbed that are on the outside perimeter of the proposed work area. The islands, median, and backup areas between the road and sidewalks would be covered using different shapes, colors, and patterns of gravel, cobble, and other permeable inert material. Location of inert materials are subject to approval to meet Caltrans safety standards. See Attachment A for Landscape Concept and identification of treatment areas.
- **Minimization Measure VIS-2: Vegetation Preservation.** Vegetation clearing would only occur within the delineated project boundaries in an effort to minimize the impacts. Trees located in areas along the edge of the construction zone would be trimmed whenever possible and only those trees that lie within the active construction areas would be removed. It is anticipated that little to no tree removal would be required. If tree removal is required, the project would follow all applicable jurisdictional requirements for tree replacement.
- **Minimization Measure VIS-3: Implement Retaining Wall Aesthetics.** A roughened wall surface softens the verticality of the wall face by providing visual texture and reducing the amount of smooth surface that can reflect light. Choosing earth-toned colors for the wall surface is less distracting to viewers and helps the wall blend with the planted vegetation as it matures. Adding a design motif to the wall face that reflects natural materials reduces visual monotony, softens verticality, and is more pleasing to viewers than a plain wall surface.

  Based on the project area, a more natural-looking wall treatment would be applied on the retaining wall(s) that would be public facing.

- **Minimization Measure VIS-4: Temporary Construction Lighting**. At a minimum, the construction contractor would minimize project-related light and glare to the maximum extent feasible, given safety considerations. The number of nighttime lights used would be minimized to the greatest extent possible.
- **Minimization Measure VIS-5: Overhead Street Lighting.** All overhead street lighting would be limited to the minimum required for driver safety and would be designed in accordance with Caltrans' standards. All lighting would cause the minimum impact possible to the surrounding environment.

CONCLUSIONS

With the implementation of the minimization measures identified above, the proposed project would result in moderate-low visual impacts for all users. The visual character and quality of the existing interchange would ultimately be improved.

The project benefits include:

- Improving the aesthetic quality of the interchange;
- Using native seeding and natural materials, such as stone and wood, to match the natural context of the area;
- Providing pedestrian and bicycle facilities where none currently exist; and
- Creating stormwater treatment areas as possible.

In contrast, the No-Build Alternative would maintain existing conditions with a low level of service and no pedestrian or bicycle facilities.

REFERENCES

California Department of Transportation (Caltrans). 2020. Link: *List of Officially Designated County Scenic Highways*. (File "OD_County_Scenic_Hwys_2015.pdf") <https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways>. (accessed May 8, 2020).

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ATTACHMENTS

A. Landscape Concept

ATTACHMENT A

Landscape Concept

Landscape Concept - MATERIAL IMAGES & NOTES

NATIVE EROSION CONTROL SEED MIX - HERBACEOUS PLANTS

COMMON YARROW
FOOTHILL PENSTEMON
MINIATURE LUPINE
SULPHUR BUCKWHEAT
CALIFORNIA POPPY
CALIFORNIA GOLDFIELDS

HYDROSEED PALETTE NOTES:

These images (common names indicated) reflect the general character of the plant materials tentatively proposed for the seed mix.

The seed mix provided is TENTATIVE and may expand or contract as the final design is developed.

In addition to the grass selected for the hydroseed mix, flowering herbaceous plants were selected for their floral resource benefit to the western bumblebee.

NATIVE EROSION CONTROL SEED MIX - GRASSES

CALIFORNIA BROME
SMALL FESCUE
PURPLE NEEDLEGRASS
BLUE WILD RYE
CALIFORNIA MELIC

DESIGN INTENT

The Landscape Architect's approach is to create an attractive design in the central islands, medians, splitter islands, and bike ramp islands using a combination of permeable inert materials. No irrigated planting is proposed.

Combinations of inert materials (rock boulders, cobble rock mulch, gravel rock mulch, and wood mulch) will be used to create interesting ground level patterns while providing weed and dust control.

Areas outside of the sidewalks will be treated with a native grass and forb hydroseed mix.

A few options showing different materials and patterns are shown to solicit reviewer feedback and direction on the preferred treatment of these areas.

INERT MATERIAL / MULCHES

$\frac{3}{4}$" SONOMA GOLD GRAVEL MULCH
$\frac{1}{4}$" - $\frac{3}{4}$" RIVER ROCK
4" - 8" COBBLE ROCK
PERMEABLE ROCK BLANKET
WHITE GRANITE BOULDERS
WOOD CHIP MULCH

INERT MATERIAL NOTES:

The inert material choices are TENTATIVE and may expand or contract as the final design is developed.

See Sheet 002 Overview and Treatment Options for inert material use alternatives for the medians, center island, splitter islands, and bike ramp islands. Location of inert materials are subject to approval to meet Caltrans safety standards.

BELL ROAD ROUNDABOUTS PROJECT

Auburn, California

001

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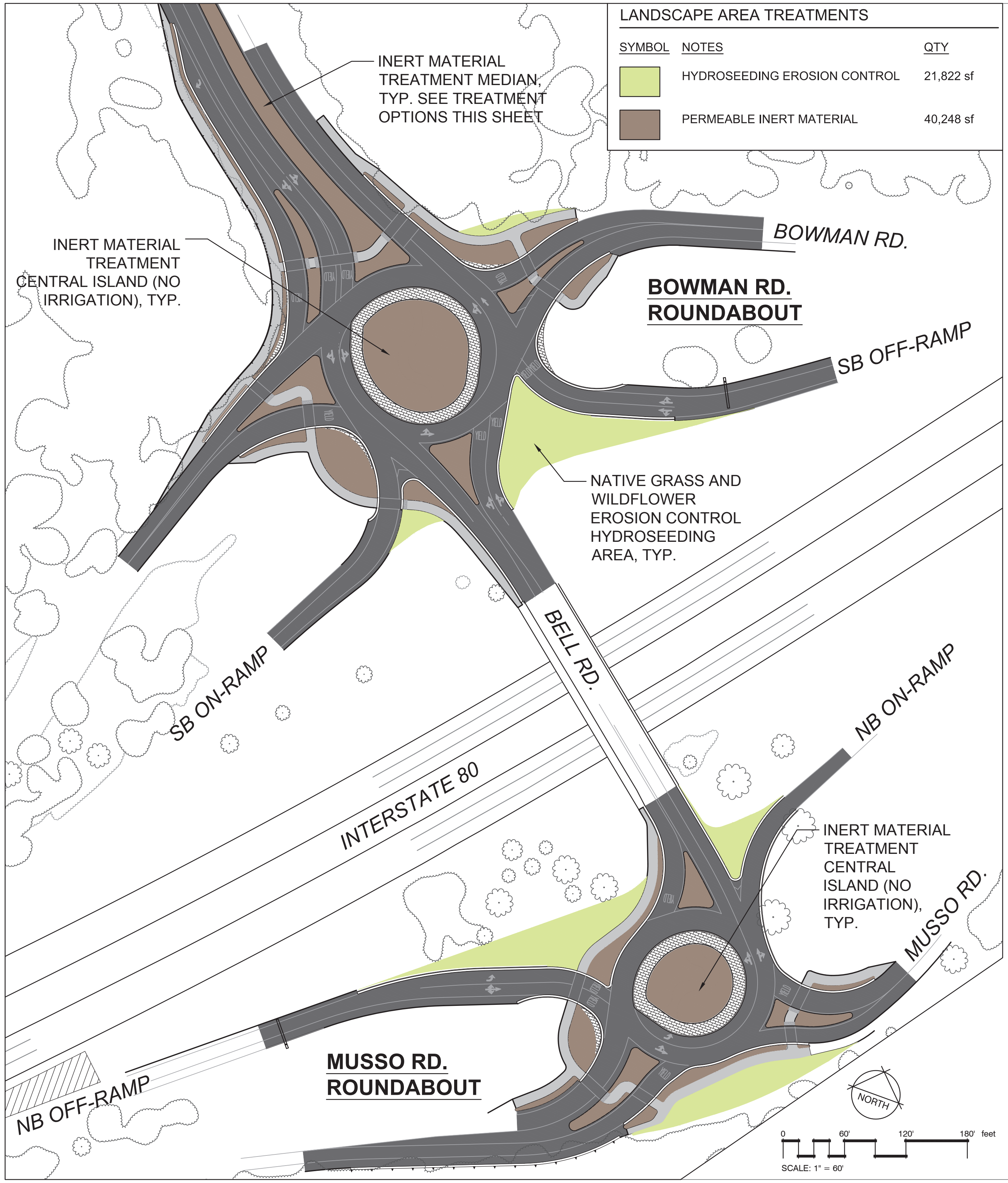
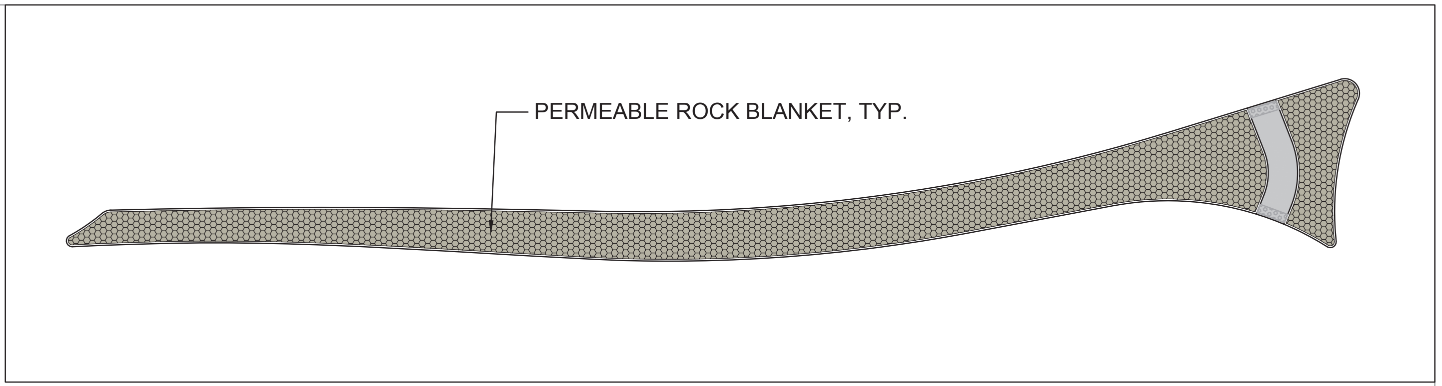
GHD Inc. June, 2020 2638EX025.dwg

Landscape Concept - OVERVIEW & TREATMENT OPTIONS

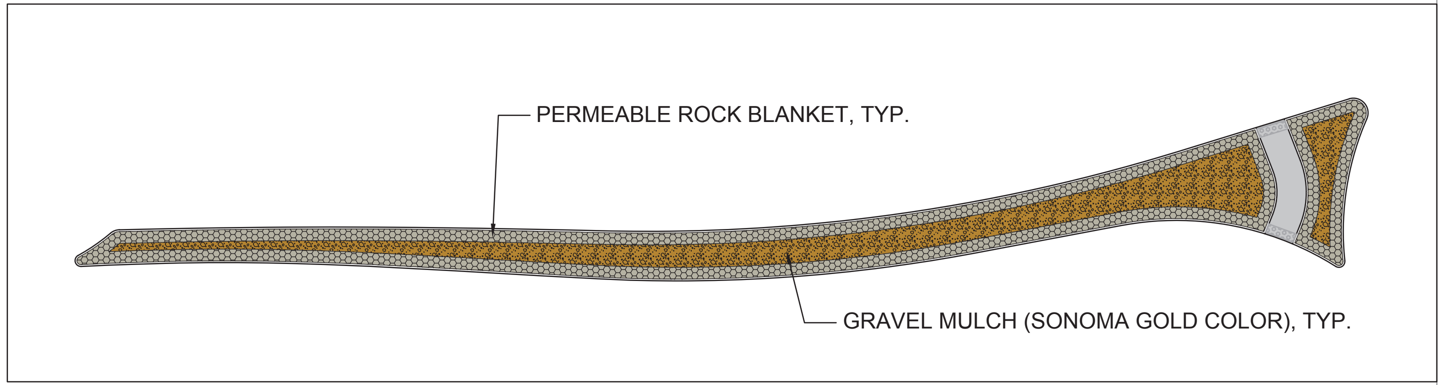


LANDSCAPE AREA TREATMENTS

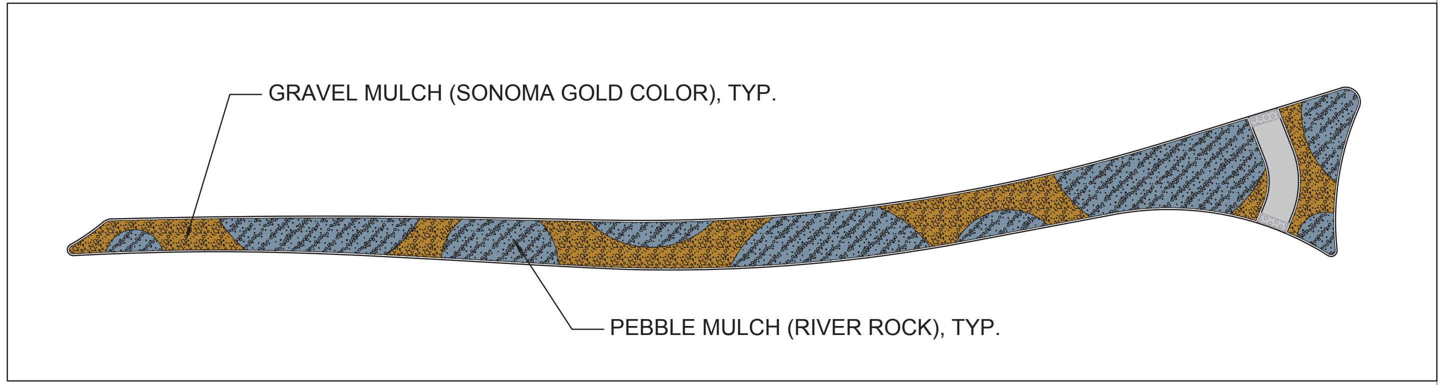
SYMBOL	NOTES	QTY
🟩	HYDROSEEDING EROSION CONTROL	21,822 sf
🟫	PERMEABLE INERT MATERIAL	40,248 sf



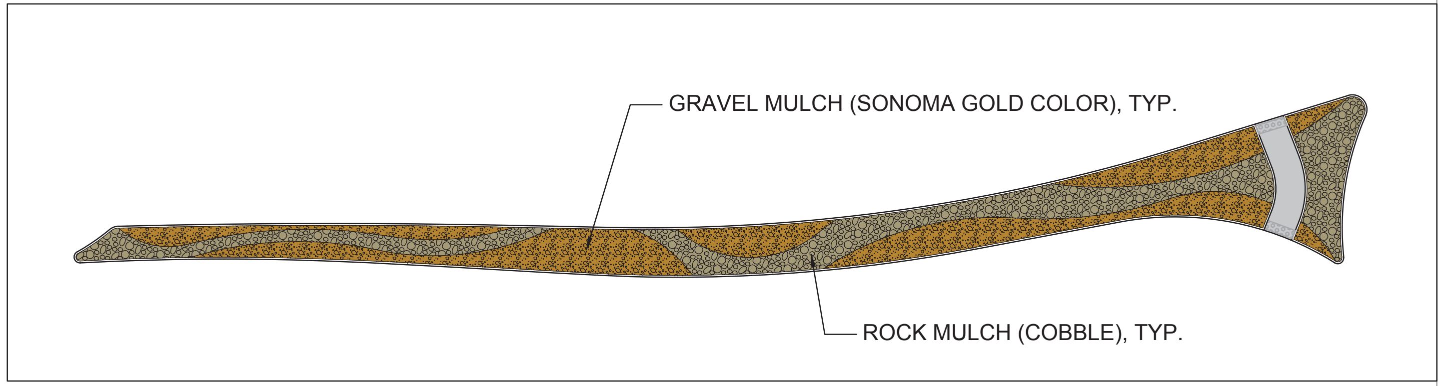
INERT MATERIAL OPTION 1 - PERMEABLE ROCK BLANKET



INERT MATERIAL OPTION 2 - LOOSE GRAVE MULCH WITH PERMEABLE ROCK BLANKET BORDER



INERT MATERIAL OPTION 3 - LOOSE GRAVEL AND ROCK IN A CIRCULAR PATTERN



INERT MATERIAL OPTION 4 - LOOSE GRAVEL AND ROCK IN A FREEFORM SINUOUS PATTERN

BELL ROAD ROUNDABOUTS PROJECT **002**

Auburn, California

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June, 2020

2638EX025.dwg

Appendix B

Construction Emissions Analysis Memo

Memorandum

May 21, 2020

To:	Caltrans District 3 Environmental Management	Project:	Bell Road at I-80 Interchange Project
Attn:	Tracy Robinson, Caltrans Environmental Planner		
From:	Chryss Meier, Environmental Scientist, GHD Inc.	EA No.:	03-4H430
CC:	Kyle Friedrich, Placer County Heather Anderson, GHD Inc.	File No.:	2020-05 03-4H430 AIR CONSTRUCTION EMISSIONS MEMORANDUM.DOCX
Subject:	Air Quality Construction Emissions Analysis and Analysis for Federal Conformity		

Introduction

GHD has prepared this memorandum to summarize the results of construction-generated air emission modeling for criteria air pollutants and greenhouse gas (GHG) emissions associated with the proposed Bell Road at I-80 Interchange Project. Additionally, this memorandum addresses project applicability and conformance with Federal Clean Air Act (CAA) Transportation Conformity regulations.

Transportation Conformity is a process established under the CAA to ensure that transportation planning, improvement programs, and projects are consistent with plans to achieve and maintain National Ambient Air Quality Standards. Specific requirements are set by U.S. Environmental Protection Agency (U.S. EPA) regulations in 40 CFR 93, U.S. EPA and U.S. Department of Transportation guidance documents, and local regulations and procedures established by Metropolitan Planning Organizations and Air Pollution Control Districts.

Air Quality Regulatory Framework

The project site is located in the Sacramento Valley Air Basin portion of Placer County. Table 1 (Project Area Attainment Status) summarizes the U.S. Environmental Protection Agency's national area designations for the relevant criteria pollutants in Placer County. The County is currently designated as nonattainment for the ozone 8-hour standard and the particulate matter, particles of 2.5 micrometers or smaller ($PM_{2.5}$), standard. The County is designated as unclassified/attainment for nitrogen dioxide, carbon monoxide, and unclassified for particulate matter, particles of 10 micrometers or smaller (PM_{10}). The conformity process does not address pollutants for which the area is attainment/unclassified, mobile source air toxics, other toxic air contaminants or hazardous air pollutants, or greenhouse gases.

Table 1 — Project Area Attainment Status

Criteria Pollutant	Federal Attainment Status
Ozone (O_3)	Nonattainment
Nitrogen Dioxide (NO_2)	Unclassified/Attainment-
Carbon Monoxide (CO)	Unclassified/Attainment
Particulate Matter (PM_{10})	Unclassified
Particulate Matter ($PM_{2.5}$)	Nonattainment

Source: CARB 2018, U.S. EPA 2020

Project Exemption

The Bell Road at I-80 Interchange Project is exempt from air quality conformity analysis requirements per 40 CFR §93.126 (Exempt Projects), which states:

Notwithstanding the other requirements of this subpart, highway and transit projects of the types listed in table 2 of this section are exempt from the requirement to determine conformity. Such projects may proceed toward implementation even in the absence of a conforming transportation plan and TIP. A particular action of the type listed in table 2 of this section is not exempt if the MPO in consultation with other agencies (see §93.105(c)(1)(iii)), the EPA, and the FHWA (in the case of a highway project) or the FTA (in the case of a transit project) concur that it has potentially adverse emissions impacts for any reason. States and MPOs must ensure that exempt projects do not interfere with TCM implementation.

Table 2 (Applicable Exempt Project Types) summarizes the exempt project types for which the Bell Road at I-80 Interchange Project is consistent. The project qualifies as an exempt safety project as it corrects, improves, or eliminates a hazardous location or feature; has shoulder improvements; includes traffic control devices and operating assistance other than signalization projects; adds medians; and has lighting improvements. The project also qualifies as an exempt air quality project as it includes bicycle and pedestrian facilities.

Table 2 — Applicable Exempt Project Types

40 CFR §93.126 Exempt Project Type	
Safety	Projects that correct, improve, or eliminate a hazardous location or feature
Safety	Shoulder improvements
Safety	Traffic control devices and operating assistance other than signalization projects
Safety	Adding medians
Safety	Lighting improvements
Air Quality	Bicycle and pedestrian facilities

Source: 40 CFR §93.126, Table 2

Based on the summary above, the project is exempt from air quality conformity analysis requirements. As stated by CFR §93.126, projects found to be exempt may proceed toward implementation even in the absence of a conforming transportation plan and Transportation Improvement Program (TIP).

Thresholds of Significance

1.1 Criteria Air Pollutants

Pursuant to Placer County Air Pollution Control District (PCAPCD) regulations, the project would have a significant impact on air quality if it would result in project-generated emissions in excess of the following:

- Reactive Organic Gases (ROG) – 82 pounds per day (lbs/day);
- Oxides of Nitrogen (NO_x) – 82 lbs/day
- Particulate Matter (PM_{10}) – 82 lbs/day

1.2 GHG Emissions

The PCAPCD's adopted thresholds of significance for construction-related GHG emissions is 10,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year.

Emissions Modeling and Parameters

The proposed project would result in the generation of short-term construction-related air emissions, including fugitive dust and exhaust emissions from construction equipment. Fugitive dust, sometimes referred to as windblown dust or PM_{10}, would be generated during excavation, grading, and hauling activities. Both fugitive dust and construction equipment exhaust emissions would be temporary and transitory in nature. Dust and emissions would be reduced and controlled according to Caltrans 2018 Standard Specifications, under Section 10-5 "Dust Control", Section 14-9 "Air Quality", and Section 18 "Dust Palliatives".

The potential construction-generated emissions for the project were quantified using Sacramento Metropolitan Air Quality Management District's (SMAQMD's) Roadway Construction Emissions Model (version 9.0.0). Construction parameters included a construction start year of 2022, and a duration of 17 months. The emissions model data input and output are provided as Attachment A to this memorandum.

Emissions Output

The construction-generated emissions output is summarized in Table 3 (Project Construction-Generated Air Pollutant Emissions) below. The construction emissions associated with the project do not exceed the PCAPCD's daily thresholds of significance for any of the three applicable criteria air pollutants. Additionally, construction-generated GHG emissions associated with the project would be less than the PCAPCD's annual threshold for GHGs. Therefore, construction generated emissions associated with the project would result in a less than significant impact.

Table 3 — Project Construction-Generated Air Pollutant Emissions

Parameter	Pollutant (rate)			
	ROG (lbs/day)	NO_X (lbs/day)	PM_{10} (lbs/day)	GHG ($MTCO_2e$/yr)
Project Construction Emissions	5.04	53.46	6.27	1,108
PCAPCD Thresholds of Significance	82	82	82	10,000
Significant Impact?	No	No	No	No

References

California Air Resources Board (CARB). 2018. Area Designations for National Ambient Air Quality Standards Map Series. October.

U.S. Environmental Protection Agency (U.S. EPA). 2020. Nonattainment Areas for Criteria Pollutants (Green Book). Website: https://www.epa.gov/green-book. Accessed: May 5, 2020.

ATTACHMENT A

Emissions Modeling

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> Bell Road at I-80 Interchange Project Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.99	9.63	9.97	4.43	0.43	4.00	1.22	0.39	0.83	0.02	1,954.87	0.58	0.02	1,975.34
Grading/Excavation	5.04	44.80	53.46	6.27	2.27	4.00	2.88	2.05	0.83	0.10	9,436.36	2.87	0.10	9,536.46
Drainage/Utilities/Sub-Grade	2.89	28.64	28.06	5.26	1.26	4.00	2.00	1.16	0.83	0.06	5,457.83	1.18	0.05	5,503.36
Paving	1.24	17.07	11.75	0.63	0.63	0.00	0.56	0.56	0.00	0.03	2,595.08	0.74	0.03	2,621.99
Maximum (pounds/day)	5.04	44.80	53.46	6.27	2.27	4.00	2.88	2.05	0.83	0.10	9,436.36	2.87	0.10	9,536.46
Total (tons/construction project)	0.64	6.04	6.59	0.92	0.29	0.64	0.39	0.26	0.13	0.01	1,209.60	0.34	0.01	1,221.72

Notes:	
Project Start Year ->	2022
Project Length (months) ->	17
Total Project Area (acres) ->	6
Maximum Area Disturbed/Day (acres) ->	0
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	200	0
Grading/Excavation	0	0	0	0	800	0
Drainage/Utilities/Sub-Grade	0	0	0	0	560	0
Paving	0	0	0	0	400	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Bell Road at I-80 Interchange Project Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.02	0.18	0.19	0.08	0.01	0.07	0.02	0.01	0.02	0.00	36.56	0.01	0.00	33.51
Grading/Excavation	0.42	3.77	4.50	0.53	0.19	0.34	0.24	0.17	0.07	0.01	794.07	0.24	0.01	728.02
Drainage/Utilities/Sub-Grade	0.16	1.61	1.57	0.30	0.07	0.22	0.11	0.07	0.05	0.00	306.18	0.07	0.00	280.09
Paving	0.03	0.48	0.33	0.02	0.02	0.00	0.02	0.02	0.00	0.00	72.79	0.02	0.00	66.72
Maximum (tons/phase)	0.42	3.77	4.50	0.53	0.19	0.34	0.24	0.17	0.07	0.01	794.07	0.24	0.01	728.02
Total (tons/construction project)	0.64	6.04	6.59	0.92	0.29	0.64	0.39	0.26	0.13	0.01	1209.60	0.34	0.01	1,108.33

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 9.0.0
Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a
yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Bell Road at I-80 Interchange Project	
Construction Start Year	2022	Enter a Year between 2014 and 2040 (inclusive)
Project Type	2	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	17.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.50	miles
Total Project Area	5.75	acres
Maximum Area Disturbed/Day	0.20	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E2 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			
Asphalt	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			

Mitigation Options

On-road Fleet Emissions Mitigation		Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation		Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		1.70		1/1/2022
Grading/Excavation		7.65		2/22/2022
Drainage/Utilities/Sub-Grade		5.10		10/13/2022
Paving		2.55		3/18/2023
Totals (Months)	17			

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00
Miles/round trip: Paving		30.00		0	0.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.03	0.11	0.05	0.02	1,732.09	0.00	0.27	1,813.27
Paving (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

Asphalt Hauling Emissions **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00
Miles/round trip: Paving		30.00		0	0.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.03	0.11	0.05	0.02	1,732.09	0.00	0.27	1,813.27
Paving (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Worker commute default values can be overridden in cells D121 through D126.

Worker Commute Emissions	User Override of Worker			
User Input	Commute Default Values	Default Values		
Miles/ one-way trip		20	Calculated	Calculated
One-way trips/day		2	Daily Trips	Daily VMT
No. of employees: Grubbing/Land Clearing		5	10	200.00
No. of employees: Grading/Excavation		20	40	800.00
No. of employees: Drainage/Utilities/Sub-Grade		14	28	560.00
No. of employees: Paving		10	20	400.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.02	1.00	0.08	0.05	0.02	0.00	328.72	0.00	0.01	330.96
Grading/Excavation (grams/mile)	0.02	1.00	0.08	0.05	0.02	0.00	328.72	0.00	0.01	330.96
Draining/Utilities/Sub-Grade (grams/mile)	0.02	0.96	0.08	0.05	0.02	0.00	323.29	0.00	0.01	325.42
Paving (grams/mile)	0.02	0.91	0.07	0.05	0.02	0.00	317.66	0.00	0.01	319.68
Grubbing/Land Clearing (grams/trip)	1.11	2.85	0.32	0.00	0.00	0.00	70.54	0.08	0.03	82.43
Grading/Excavation (grams/trip)	1.11	2.85	0.32	0.00	0.00	0.00	70.54	0.08	0.03	82.43
Draining/Utilities/Sub-Grade (grams/trip)	1.07	2.80	0.30	0.00	0.00	0.00	69.42	0.07	0.03	80.99
Paving (grams/trip)	1.04	2.75	0.29	0.00	0.00	0.00	68.26	0.07	0.03	79.50
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.03	0.50	0.04	0.02	0.01	0.00	146.50	0.00	0.00	147.74
Tons per const. Period - Grubbing/Land Clearing	0.00	0.01	0.00	0.00	0.00	0.00	2.74	0.00	0.00	2.76
Pounds per day - Grading/Excavation	0.13	2.02	0.18	0.08	0.03	0.01	585.99	0.01	0.02	590.98
Tons per const. Period - Grading/Excavation	0.01	0.17	0.01	0.01	0.00	0.00	49.31	0.00	0.00	49.73
Pounds per day - Drainage/Utilities/Sub-Grade	0.09	1.35	0.12	0.06	0.02	0.00	403.42	0.01	0.01	406.77
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.08	0.01	0.00	0.00	0.00	22.63	0.00	0.00	22.82
Pounds per day - Paving	0.06	0.93	0.08	0.04	0.02	0.00	283.14	0.01	0.01	285.42
Tons per const. Period - Paving	0.00	0.03	0.00	0.00	0.00	0.00	7.94	0.00	0.00	8.01
Total tons per construction project	0.02	0.28	0.02	0.01	0.00	0.00	82.62	0.00	0.00	83.32

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated	User Override of	Default Values	Calculated
User Input	Default # Water Trucks	Number of Water Trucks	Round Trips/Vehicle/Day	Round Trips/Vehicle/Day	Trips/day	Miles/Round Trip	Miles/Round Trip	Daily VMT
Grubbing/Land Clearing - Exhaust		0		5	0		8.00	0.00
Grading/Excavation - Exhaust		0		5	0		8.00	0.00
Drainage/Utilities/Subgrade		0		5	0		8.00	0.00
Paving		0		5	0		8.00	0.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.03	0.11	0.05	0.02	1,732.09	0.00	0.27	1,813.27
Paving (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.20	4.00	0.07	0.83	0.02
Fugitive Dust - Grading/Excavation		0.20	4.00	0.34	0.83	0.07
Fugitive Dust - Drainage/Utilities/Subgrade		0.20	4.00	0.22	0.83	0.05

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Crawler Tractors	0.49	2.31	6.01	0.23	0.21	0.01	759.03	0.25
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Excavators	0.40	6.51	3.55	0.17	0.16	0.01	1,000.03	0.32
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
	Grubbing/Land Clearing	pounds per day	0.95	9.13	9.92	0.41	0.38	0.02	1,808.38	0.57
	Grubbing/Land Clearing	tons per phase	0.02	0.17	0.19	0.01	0.01	0.00	33.82	0.01

Grading/Excavation	Default Number of Vehicles	Mitigation Option Override of	Default		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
Override of Default Number of Vehicles	*Program-estimate*	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0		Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Crawler Tractors	0.49	2.31	6.01	0.23	0.21	0.01	759.03	0.25
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Excavators	0.61	9.77	5.33	0.26	0.24	0.02	1,500.05	0.49
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Graders	0.83	3.44	10.52	0.33	0.31	0.01	1,282.56	0.41
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Rollers	0.33	3.72	3.45	0.20	0.18	0.01	508.21	0.16
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rubber Tired Loaders	0.29	1.53	3.02	0.10	0.09	0.01	605.66	0.20
	2		Model Default Tier	Scrapers	1.64	12.75	17.89	0.70	0.64	0.03	2,940.59	0.95
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		Model Default Tier	Tractors/Loaders/Backhoes	0.66	8.95	6.70	0.36	0.33	0.01	1,204.96	0.39
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
	Grading/Excavation	pounds per day	4.91	42.78	53.28	2.19	2.02	0.09	8,850.37	2.85
	Grading/Excavation	tons per phase	0.41	3.60	4.48	0.18	0.17	0.01	744.76	0.24

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Air Compressors	0.26	2.42	1.81	0.10	0.10	0.00	375.26	0.02
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Generator Sets	0.32	3.67	2.82	0.14	0.14	0.01	623.04	0.03
	1		Model Default Tier	Graders	0.40	1.71	4.96	0.16	0.15	0.01	641.07	0.21
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Plate Compactors	0.04	0.21	0.25	0.01	0.01	0.00	34.48	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pumps	0.34	3.73	2.86	0.15	0.15	0.01	623.04	0.03
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rough Terrain Forklifts	0.11	2.29	1.44	0.05	0.04	0.00	333.78	0.11
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Scrapers	0.80	6.26	8.62	0.34	0.31	0.02	1,470.21	0.48
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Tractors/Loaders/Backhoes	0.47	6.70	4.82	0.25	0.23	0.01	904.21	0.29
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
Drainage/Utilities/Sub-Grade	pounds per day	2.81	27.29	27.95	1.20	1.14	0.05	5,054.41	1.17
Drainage/Utilities/Sub-Grade	tons per phase	0.16	1.53	1.57	0.07	0.06	0.00	283.55	0.07

Paving	Default Number of Vehicles	Mitigation Option Override of	Default		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
Override of Default Number of Vehicles	*Program-estimate*	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pavers	0.19	2.88	1.88	0.09	0.08	0.00	455.22	0.15
	1		Model Default Tier	Paving Equipment	0.17	2.56	1.60	0.08	0.07	0.00	394.47	0.13
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Rollers	0.31	3.70	3.22	0.18	0.16	0.01	508.22	0.16
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Tractors/Loaders/Backhoes	0.45	6.69	4.61	0.23	0.21	0.01	904.73	0.29
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Paving	pounds per day	1.18	16.14	11.67	0.59	0.54	0.02	2,311.94	0.74
	Paving	tons per phase	0.03	0.45	0.33	0.02	0.02	0.00	64.85	0.02
Total Emissions all Phases (tons per construction period) =>			0.62	5.75	6.56	0.28	0.26	0.01	1,126.98	0.34

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.01	767.22
0.00	0.00
0.01	1,010.81
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	49.56
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

N2O pounds/day	CO2e pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.02	1,827.60
0.00	34.18

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.01	767.22
0.00	0.00
0.01	1,516.22
0.00	0.00
0.00	0.00
0.01	1,296.37
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	513.68
0.00	0.00
0.00	0.00
0.01	612.20
0.03	2,972.29
0.00	49.56
0.00	0.00
0.00	0.00
0.00	0.00
0.01	1,217.92
0.00	0.00
0.00	0.00

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

0.08	8,945.48
0.01	752.76

N2O pounds/day	CO2e pounds/day
0.00	0.00
0.00	376.69
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	625.14
0.01	647.98
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	34.65
0.00	0.00
0.00	625.19
0.00	0.00
0.00	337.38
0.00	0.00
0.00	0.00
0.01	1,486.06
0.00	49.56
0.00	0.00
0.00	0.00
0.00	0.00
0.01	913.94
0.00	0.00
0.00	0.00
N2O pounds/day	CO2e pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.04	5,096.60
0.00	285.92

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	460.13
0.00	398.72
0.00	0.00
0.00	0.00
0.00	0.00
0.00	513.69
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	49.56
0.00	0.00
0.00	0.00
0.00	0.00
0.01	914.46
0.00	0.00
0.00	0.00
N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.02	2,336.57
0.00	65.54
0.01	1,138.40

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

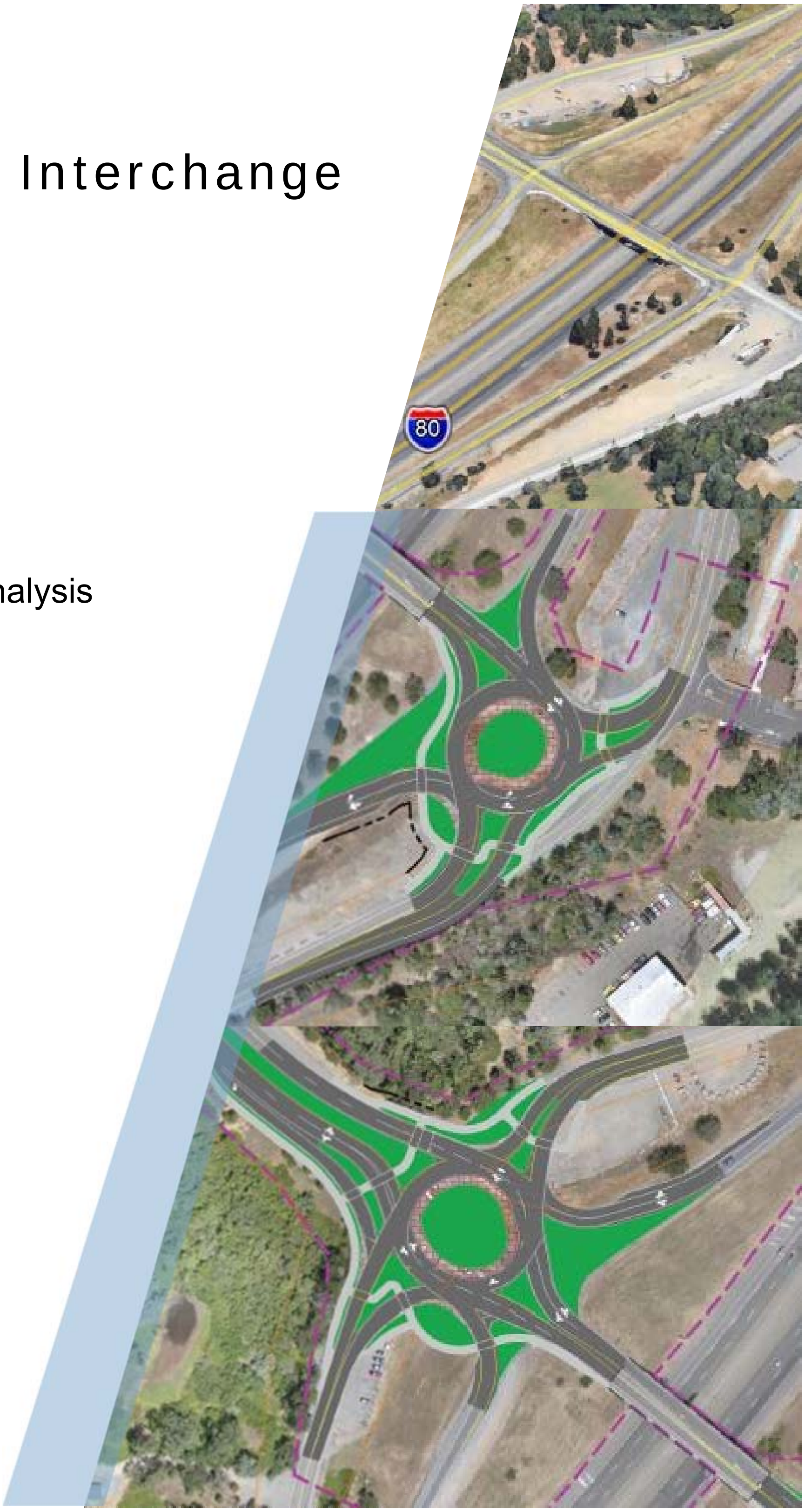
Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET

Appendix C

Transportation Operations Analysis Report (TOAR)

Bell Road at I-80 Interchange Project



03-PLA-80-R20.9/R21.3
03-4H430

Transportation Operations Analysis Report

Prepared for:

Placer County

Final

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Appendix Index

1. Introduction

This report presents the results of a traffic operations analysis performed by GHD for Placer County (County). The term "project," as used in this report, refers to the proposed improvements to an interchange along Bell Road in the County at the I-80 eastbound (EB) and westbound (WB) ramp intersections and the immediately adjacent intersections at Bowman Road on the west and Musso Road on the east.

Under existing conditions, the Bell Road/I-80 EB and WB off-ramps are stop controlled. The Bell Road/Bowman Road intersection is controlled by a signal and the three-way Bell Road/Musso Road intersection is stop controlled on the Bell Road approach. Traffic consists mostly of northern Placer County and western Nevada County residents commuting to and from work in south Placer County and the rest of the Sacramento region. Bell Road has become an alternative route to avoid traffic congestion along the State Route (SR) 49 corridor, including the I-80/SR 49 interchange in the City of Auburn. Due to the continued growth in this traffic, and its associated congestion in this corridor, including along Bell Road, Placer County has continued to make improvements to Bell Road, including widening to four lanes from its SR 49 intersection to Bowman Road, just short of the Bell Road/I-80 interchange. As a result, Bell Road at the I-80 interchange is now the "bottleneck" for traffic during AM and PM peak hours. During these peak periods, traffic queues on the I-80 off-ramps and impacts the mainline flows on I-80.

In response to the deficient traffic operations and safety concerns, several Build Alternatives were considered for the project and presented in the Project Initiation Document (PID) phase within the Project Study Report / Project Development Support (PSR/PDS) document. The PSR/PDS was approved by Caltrans on April 18, 2020. Three build alternatives and a No-Build Alternative were proposed in the PSR/PDS. The Build Alternatives evaluated were the following:

- **Build Alternative 1**: Signalization of the stop controlled off-ramp intersections with overcrossing widening;
- **Build Alternative 2**: Roundabouts at the I-80 EB and WB ramp intersections, including the Bowman Road intersection on the west and the Musso Road intersection on the east; and
- **Build Alternative 3**: Roundabout at the WB off-ramp and reconstruction of the EB on-ramp to a loop on-ramp.

It was determined that Build Alternatives 1 and 3 would not be viable design options to evaluate further and were ultimately rejected in the PID process. Build Alternative 2 was determined to best meet the safety purpose of the project for all modes of travel, while addressing future mobility needs. This alternative is further referenced as the Build Alternative in this document.

This report examines the traffic operations for existing conditions, No Build Alternative, and Build Alternative for the Opening Year (2025) and Design Year (2045) Conditions.

1.1 Need and Purpose

Between 2014 and 2018, several collisions were recorded at the project site. The majority of the collisions were due to rear ending or sideswiping another vehicle and hitting an object (typically collisions with vehicles or other objects such as signs, poles, etc.). The primary collision factors were unsafe speed, improper turning, and automobile right of way (typically collisions where the party at fault did not yield properly to another vehicle).

Also, congestion in the project area during the AM and PM peak hours has significantly impacted the efficiency of the existing Bell Road at I-80 interchange, which is resulting in vehicles backing up onto the mainline. This condition is an operational and safety issue that needs to be addressed.

The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the Bell Road at I-80 interchange and accommodate projected traffic associated with future development. Also, the purpose is to improve operations and enhance mobility for all travel modes at the interchange.

1.2 Previous Studies

Placer County began studying the project area in 2005 when Bell Road was widened between I-80 and SR 49 to determine if improvements to the I-80 interchange would be required to maintain acceptable traffic operations in the future. A cooperative agreement with Caltrans was executed on October 11, 2018 to formally coordinate with Caltrans to identify and select improvements to the interchange.

1.2.1 Project Study Report/Project Development Support (PSR/PDS)

Following the signing of the Cooperative Agreement with Caltrans, a PSR/PDS was developed for the project, which was approved on April 18, 2020. The PSR/PDS initially proposed three build alternatives based on the original study conducted in 2005 and a No-Build Alternative for the Bell Road at I-80 interchange.

- Build Alternative 1 included the widening of the existing I-80 overcrossing structure to accommodate an additional through lane and provide standard shoulders. The two stop controlled off-ramps at the interchange would be signalized, and the existing Bowman Road signal would be synchronized with the new signals to reduce queue length and improve circulation through the interchange. The main benefit of this alternative would be that the project footprint would fit within the existing right-of-way. However, in order to widen the overcrossing, falsework would need to be installed in the I-80 mainline, which would impact traffic. Also, per the Caltrans Highway Design Manual (HDM) Chapter 504.3 (3), the minimum distance (curb return to curb return) between ramp intersections and local road intersections shall be 400 feet. The existing intersections at the interchange range from approximately 130 feet to 380 feet apart. When intersections are closely spaced, the traffic operations are often inhibited by short queue storage lengths, and signal phasing. It is also difficult to provide proper signing and delineation. Therefore, Alternative 1 was determined to not be a viable design option and was removed from consideration.
- Build Alternative 2 included the construction of a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a second five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. Roundabouts would reduce the queueing on both off-ramps by improving flow through the interchange. The roundabouts would be designed to accommodate future growth to “Year 2045.” This alternative would not require the widening of the existing overcrossing structure and would not require I-80 mainline interruption. Build Alternative 2 was determined to best meet the safety purpose of the project for all modes of travel as it eliminated queue back on the off-ramps onto mainline I-80 and would not require any mainline disruption during construction. This alternative is further referenced as the Build Alternative in this document.
- Build Alternative 3 would remove the existing EB on/off-ramps and replace them with an EB loop on-ramp and a Caltrans standard EB off-ramp. To accommodate the EB off-ramp, Musso Road

would have to be realigned, which would require significant right of way acquisition (approximately 4 acres). The intersection of Bell Road and Bowman Road would be replaced with a roundabout. The construction costs were the highest of the three evaluated alternatives, and it would still result in a similar issue as Alternative 1. The Bowman Road and Bell Road intersection and the Musso Road and Bell Road intersection would still remain within 400 feet of the I-80 ramps, and therefore, would not meet the minimum HDM requirement for intersection spacing. Therefore, Alternative 3 was determined to not be a viable design option and was removed from consideration.

1.2.2 Future Growth Rate and Forecasting Methodology Memorandum

A Future Growth Rate and Forecasting Methodology Memorandum was prepared by GHD to determine the growth rate and the appropriate tool (Travel Demand Model) that would be used to determine the traffic forecasts at the study intersections for the project. The purpose of obtaining these traffic forecasts was to assure the design of the proposed Build Alternative improvements would achieve acceptable traffic operations upon a proposed opening of the improvements in 2025 and adequately maintain acceptable operations through 2045. The methodology outlined in the memorandum was approved by the County and Caltrans on April 1, 2020, and is further utilized in this report.

2. Existing Conditions

The following section presents the existing conditions with respect to the study roadways, project site, and land uses.

2.1 Study Area Roadways

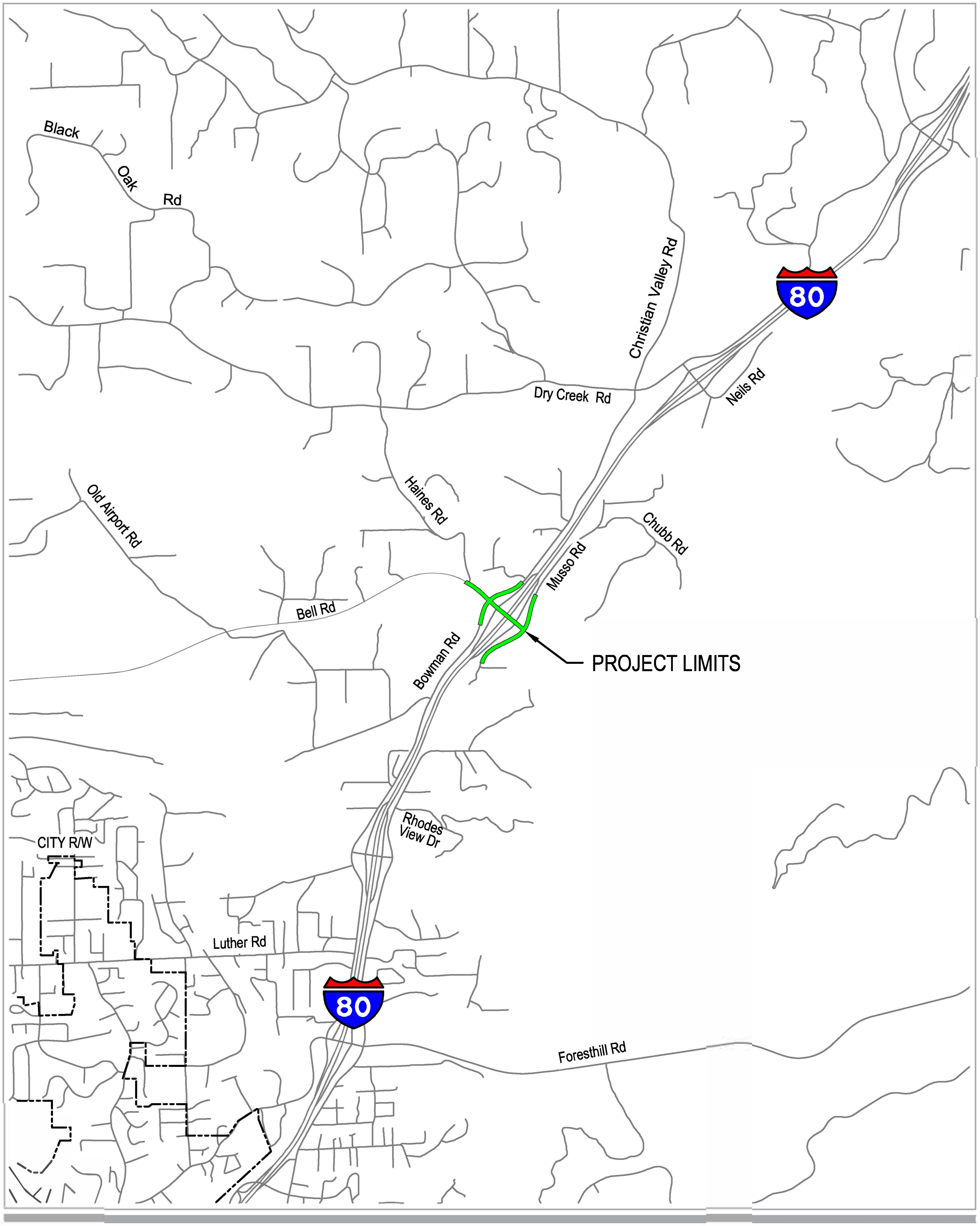
Roadways that provide vehicle circulation within the general vicinity of the project area are Bell Road, I-80, Musso Road, and Bowman Road. Figure 2.1 shows the study intersections and the surrounding area. The following brief descriptions present characteristics unique to the roadways providing access to the interchange along Bell Road at I-80.

Interstate 80 (I-80)

I-80, in the project vicinity, is a six-lane, divided freeway extending through Auburn to the south and Colfax to the north. As a major freeway, I-80 provides east-west interstate access from the San Francisco Bay Area to Nevada and beyond across the United States. Within the project area, I-80 extends in a northeast-southwest direction. I-80 consists of three 12-foot lanes in each direction with a posted speed limit of 65 miles per hour (mph). I-80 is a Terminal Access Route for Surface Transportation Assistance Act (STAA) trucks.

Bell Road

Bell Road is a four lane, Minor Arterial roadway that extends in a northwest-southeast direction and has a speed limit of 55 miles per hour (mph) within the project vicinity. It is a County-owned facility that links the Auburn urban area along SR 49 to the rest of the County and I-80. Bell Road is able to accommodate STAA trucks.



Placer County
BELL ROAD AT I-80 ROUNDABOUTS

VICINITY MAP

Project No. **11195697**
Report No.
Date **APRIL 2020**

FIGURE 2.1

Filename: N:\US\Roseville\Projects\561\11195697\Digital_Design\Traffic Graphics\11195697_TG001.dwg Plot Date: 7 April 2020 - 2:16 PM
Source:

Musso Road

Musso Road is a two-lane roadway that provides access to local and rural businesses/properties on the southeastern side of I-80. The speed limit is not posted but advisory speeds for curves show 30 mph. Musso Road terminates approximately 1,000 feet to the southwest and 3,000 feet to the northeast of Bell Road. The railroad, I-80, and the creek border Musso Road and therefore, use is not likely to change significantly in the future.

Bowman Road

Bowman Road is a two-lane roadway that traverses in the northeastern-southwestern direction, largely paralleling I-80 in the vicinity of Bell Road. To the northeast, Bowman Road provides access to residences and transitions into Christian Valley Road. To the southwest, Bowman Road provides access to business, residences, and schools. Bowman Road terminates into I-80 WB at the Auburn Ravine Rd/Foresthill Rd interchange. Ultimately, Bowman Road is slated to be improved with Class II bike lanes as per the adopted County bicycle master plan.

2.2 Traffic Volumes

Existing (2019) Peak Hour Data

To obtain an existing conditions traffic base, AM and PM peak hour intersection turn movement traffic counts were collected at the following study intersections on Tuesday, May 21, 2019:

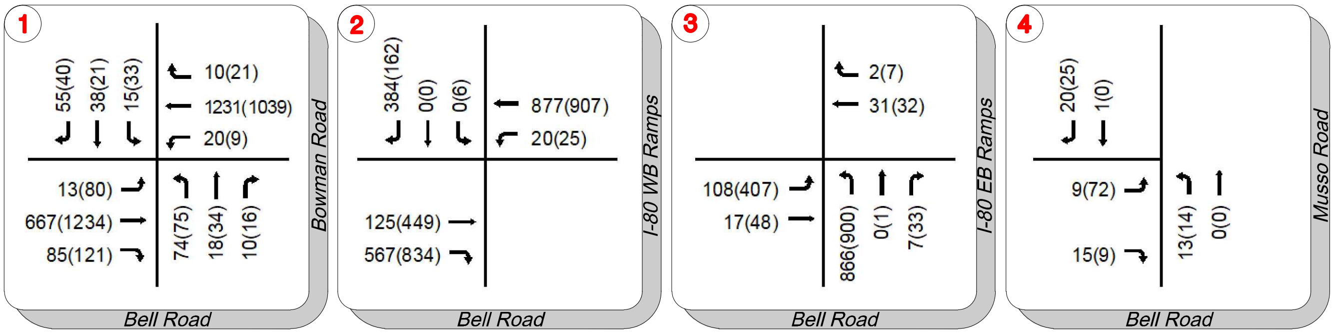
1. Bell Road / Bowman Road;
2. Bell Road / I-80 WB on/off-ramps;
3. Bell Road / I-80 EB on/off-ramps; and
4. Bell Road / Musso Road.

Figure 2.2 presents the existing peak hour traffic volumes. Additional information is provided in Appendix A (Traffic Data and Volumes).

2.2.1 Placer County Government Center Master Plan Update

The Placer County Government Center (PCGC) is a 200 acre development that analyzed the Bell Road at I-80 interchange as part of their Master Plan Update dated November 2018. The existing turning movement counts included in the PCGC Master Plan Update were compared to the counts collected for the project in May 2019. When compared, the two sets of traffic counts present different travel patterns and traffic demand during the AM and PM peak hours. In the AM peak hour, the PCGC volume set was approximately 10% higher for the intersection of Bowman Road and Bell Road, and a combined 6.3% higher for the interchange. In the PM peak hour, the PCGC volume set was approximately 1.1% higher for the intersection of Bowman Road and Bell Road, and a combined -1.4% lower for the interchange. The greatest variance between the two volume sets was the Northbound AM peak hour volume for Bowman Road.

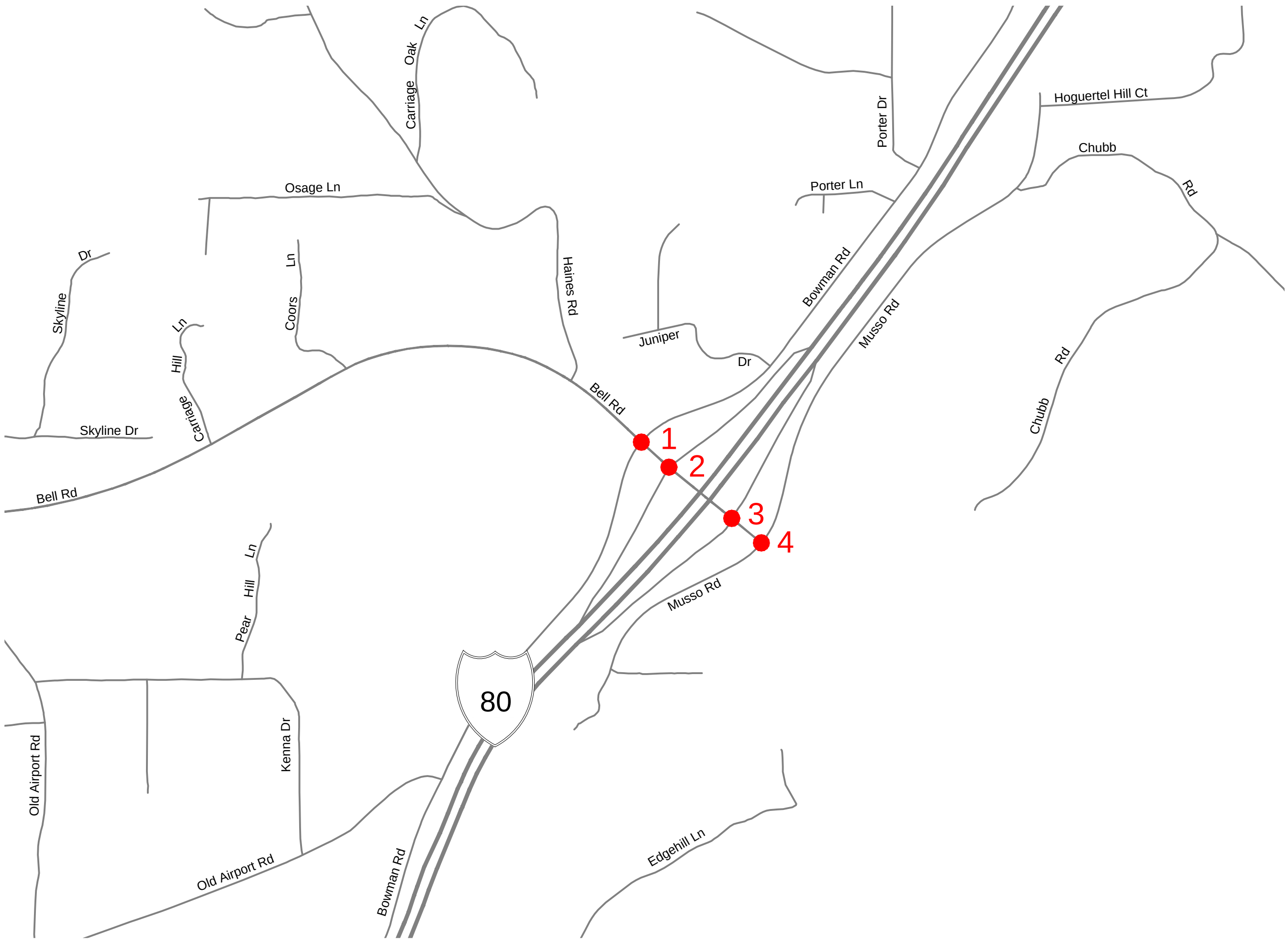
To assure that the preferred design concept would accommodate this distinct travel pattern, additional analysis was conducted and the associated results are presented within Section 6 of this report.



LEGEND:

XX - AM PEAK HOUR TRAFFIC VOLUMES

(XX) - PM PEAK HOUR TRAFFIC VOLUMES



Placer County
BELL ROAD AT I-80 ROUNDABOUTS

EXISTING PEAK HOUR TRAFFIC VOLUMES

Project No. **11195697**
Report No.
Date **MAY 2020**

FIGURE 2.2

Filename: N:\US\Roseville\Projects\561\11195697\Digital_Design\Traffic Graphics\11195697_TG001.dwg Plot Date: 11 May 2020 - 4:06 PM

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2.3 Level of Service Methodology

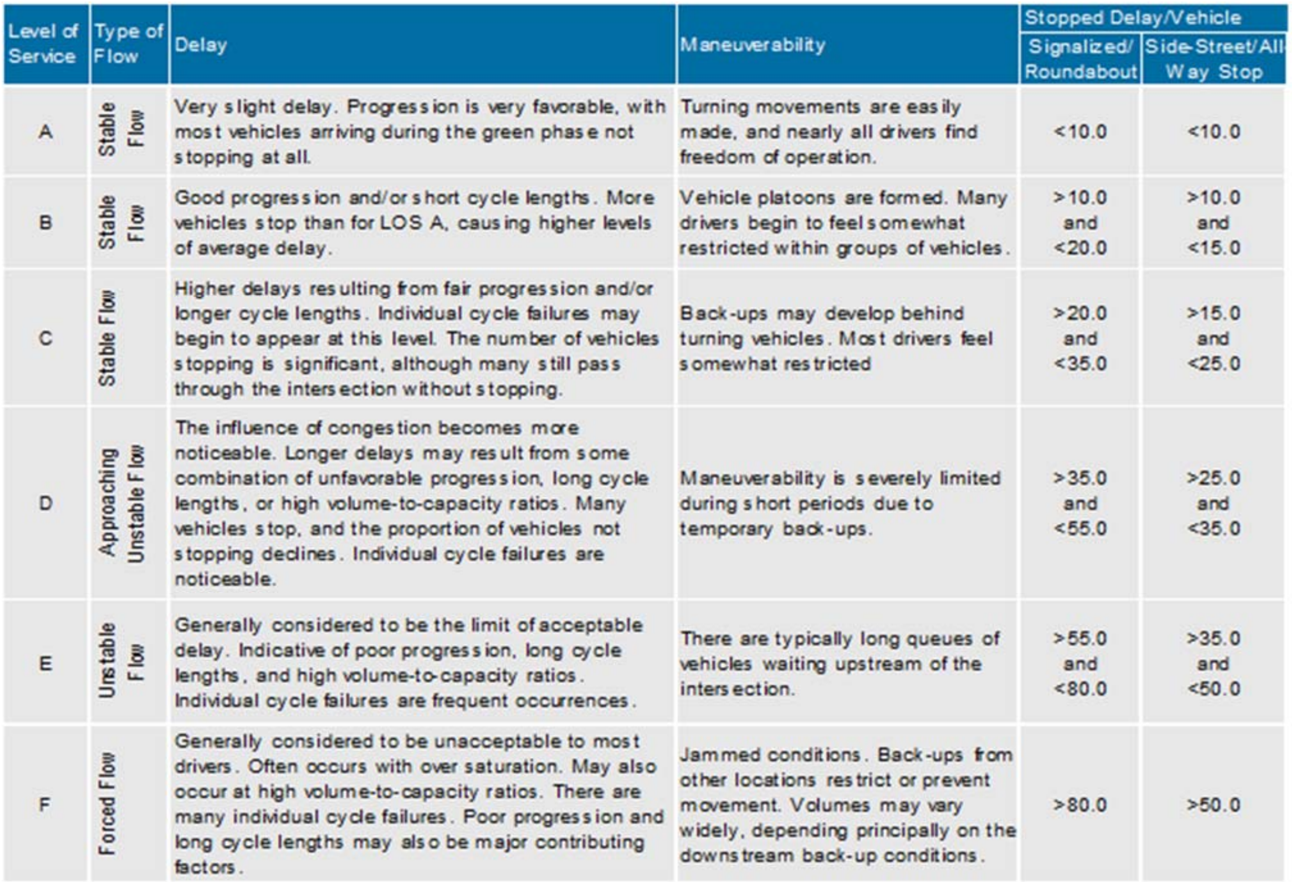
Traffic operations are quantified through the determination of "Level of Service" (LOS). LOS is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection, representing progressively worsening traffic operations as determined by vehicle delay or congestion. LOS “A” represents free-flow operating conditions and LOS “F” represents over-capacity conditions. LOS was calculated for all study intersection control types using the methods documented in the Transportation Research Board Publication *Highway Capacity Manual, Sixth Edition* (HCM 6th Edition).

For signalized and all-way stop-controlled intersections, intersection delays and LOS are average values for all intersection movements. For TWSC intersections, the intersection delays and LOS are represented by the worst approach.

All signalized and side-street stop-controlled intersection operations analyses will be conducted using procedures and methodologies contained in the HCM 6th Edition. These methodologies will be applied using the Synchro/SimTraffic simulation software. Roundabout operations will be analyzed using the Caltrans’ SIDRA Settings and Related Parameters.

Table 2.1 presents the intersection level of service criteria.

Table 2.1 Intersection Level of Service Criteria



Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle	
				Signalized/ Roundabout	Side-Street/All Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	<10.0	<10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and <20.0	>10.0 and <15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20.0 and <35.0	>15.0 and <25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and <55.0	>25.0 and <35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and <80.0	>35.0 and <50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	>80.0	>50.0

2.4 Agency LOS Guidelines and Policies

Placer County

The Placer County General Plan has specific goals, policies, and programs relevant to transportation and circulation for roadways and highways. The following policies are relevant to this study:

> *3.A.7. The County shall develop and manage its roadway system to maintain the following minimum levels of service (LOS), or as otherwise specified in a community or specific plan).*
>
> *a. LOS "C" on rural roadways, except within one-half mile of state highways where the standard shall be LOS "D".*
>
> *b. LOS "C" on urban/suburban roadways except within one-half mile of state highways where the standard shall be LOS "D".*

Caltrans

Caltrans' Guide for the Preparation of Traffic Impact Studies contains the following policy pertaining to the LOS standards within Caltrans jurisdiction:

> *Caltrans endeavors to maintain a target LOS at the transition between LOS “C” and LOS “D” on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS.*

Due to the tight spacing of the two Placer County intersections to the Caltrans controlled intersections, the LOS threshold has been identified as LOS D for the purpose of this study. Table 2.1 presents the Intersection LOS criteria.

2.5 Technical Analysis Parameters and Assumptions

A Peak Hour Factor (PHF) will be calculated based on the traffic counts conducted for this study for each analysis location. These PHF’s will be used for existing conditions. For Opening and Design year, the worst PHF will be used for the roundabout analysis.

A peak hour truck percentage for all intersection will be derived from the existing traffic counts. The intersection saturation flow rate is assumed to be 1,900 passenger cars per hour per lane. All other parameters not stated are assumed to be default unless otherwise stated in the Caltrans’ SIDRA Settings and Related Parameters. Existing signal timings for the intersection of Bowman Road/Bell Road will be used within all analysis scenarios where appropriate. Table 2.2 presents the key technical parameters and assumptions that will be used for this project analysis.

Table 2.2 – Key Technical Analysis Parameters and Assumptions

Technical Parameters	Assumption
1. Intersection Peak Hour Factor (PHF)	Intersection Overall, based on Existing Counts
2. Intersection Heavy Vehicle Percentage	Intersection Overall, based on Existing Counts, min. 2%
3. Signal Timings	Based on current County signal timing plans
4. Saturation Flow Rate	1,900 passenger cars per hour per lane

2.6 Collision Summary

Collision data was provided through Caltrans Traffic Accident Surveillance and Analysis System (TASAS) – Transportation Systems Network (TSN) Reports for I-80 and the on- and off-ramps to Bell Road in the project area. Statewide Integrated Traffic Records System (SWITRS) was also used for collision data along Bell Road, Musso Road, and Bowman Road. To capture the collision patterns and any trends within the study area, the most recent five years were obtained from SWITRS (January 1, 2014 – December 31, 2018). This data was then compared to the overlapping years with Caltrans data for I-80 for a comprehensive account of collisions as well as to the published statewide rates on similar facilities (published by Caltrans), which is consistent with the Placer County TAAS manual.

2.6.1 Study Area Collisions

Table 2.3 shows how the collision severity compares to the total number of collisions for the study area. In this case, the study area refers to the area surrounding and influenced by the interchange. There was one fatality (along I-80) and thirteen injury collisions recorded during the five-year period. The highest amount of collisions were recorded in 2016 with 16 collisions. For the five-year period, the injury collisions comprised 26% of total collisions, whereas, the property damage only (PDO) collisions comprised 72% of the total collisions. Approximately 10% of the total recorded collisions occurred during the peak hours between 8:00 AM and 9:00 AM as well as between 5:00 PM and 6:00 PM. Countywide, per the statewide rates on similar facilities, the total accident rate is 1.17, whereas the F+I is 0.46. This interchange in particular has a worst case total average accident rate of 0.98 and an F+I of 0.33 which occurs on the westbound off-ramp.

Table 2.3 Collisions and Severity (2014-2018)

Year	Total Collisions	Severity		
		Fatal	Injury	PDO
2014	5	1	0	4
2015	11	0	2	9
2016	16	0	7	9
2017	7	0	3	4
2018	11	0	1	10
Total	**50**	**1**	**13**	**36**

In diagnosing the possible cause and overall trends for the collisions, the primary collision factor was quantified for the same five-year period. As shown in Table 2.4, the leading factor for collisions was unsafe speed (30% of total collisions), followed by other hazardous violation (18%), improper turning (14%), and automobile right of way (14%). Automobile right of way typically refers to a collision where the party at fault did not yield properly to another vehicle.

Table 2.4 Primary Collision Factor (2014-2018)

Year	Primary Collision Factor								
	DUI	Unsafe Speed	Unsafe Lane Change	Improper Turning	Automobile Right of Way	Traffic Signals and Signs	Other Hazardous Violation	Other Than Driver	Unsafe Starting/ Backing
2014	1	2	0	1	1	0	0	0	0
2015	2	3	0	0	0	0	4	1	1
2016	0	6	0	3	5	0	2	0	0
2017	0	2	0	0	1	0	2	1	1
2018	1	2	2	3	0	1	1	1	0
Total	**4**	**15**	**2**	**7**	**7**	**1**	**9**	**3**	**2**

In further diagnosis, the collision types were quantified. As shown in Table 2.5, the majority of collisions were rear-end (34%), sideswipe (22%), and hit object (20%).

Rear-end collisions suggest vehicles were not maintaining proper following distance or speed differential from vehicles turning/merging on and off Bell Road and I-80 in the study area. Sideswipe and hit object collisions are generally due to driver inattention, unsafe speed, and lane changing.

Table 2.5 Collision Type (2014-2018)

Year	Collision Type					
	Sideswipe	Rear End	Broadside	Hit Object	Overturn	Other
2014	1	2	0	1	1	0
2015	3	3	0	4	0	1
2016	0	7	6	3	0	0
2017	1	3	1	1	0	1
2018	6	2	1	1	1	0
Total	**11**	**17**	**8**	**10**	**2**	**2**

2.6.2 Bell Road Intersection Collisions

Table 2.6 displays the Bell Road intersection collisions in the study area for the past five years. There was a total of nineteen intersection collisions. The highest amount of collisions were recorded in 2016 with six collisions.

Table 2.6 Bell Road Intersection Collisions (2014-2018)

Intersection	Year					
	2014	2015	2016	2017	2018	Total Collisions
Bell Road & Bowman Road	2	1	2	2	3	10
Bell Road & I-80 WB Ramps	0	0	2	0	0	2
Bell Road & I-80 EB Ramps	0	2	2	0	1	5
Bell Road & Musso Road	1	0	0	1	0	2
Total	**3**	**3**	**6**	**3**	**4**	**19**

Table 2.7 shows how the collision severity compares to the total number of collisions for the study intersections. There were six injury collisions and no fatalities recorded during the five-year period. Three of those collisions were at the intersection of Bell Road and Bowman Road. For the five-year period, the

injury collisions comprised 32% of total collisions, whereas, the PDO collisions comprised 68% of the total collisions.

Table 2.7 Bell Road Intersection Collisions – Collision Severity

Year	Total Collisions	Severity		
		Fatal	Injury	PDO
Bell Road & Bowman Road	10	0	3	7
Bell Road & I-80 WB Ramps	2	0	0	2
Bell Road & I-80 EB Ramps	5	0	2	3
Bell Road & Musso Road	2	0	1	1
Total	**19**	**0**	**6**	**13**

In diagnosing the possible cause and overall trends for the collisions, the primary collision factor was quantified for the same five-year period. As shown in Table 2.8, the leading factor for collisions was unsafe speed (37% of total collisions), followed by improper turning (21%), and automobile right of way (21%).

Table 2.8 Bell Road Intersection Collisions – Primary Collision Factor

Intersection	Primary Collision Factor					
	Unsafe Speed	Improper Turning	Automobile Right of Way	Traffic Signals and Signs	Other Hazardous Violation	Unsafe Starting/ Backing
Bell Road & Bowman Road	5	1	2	1	0	1
Bell Road & I-80 WB Ramps	0	1	1	0	0	0
Bell Road & I-80 EB Ramps	2	1	0	0	1	1
Bell Road & Musso Road	0	1	1	0	0	0
Total	**7**	**4**	**4**	**1**	**1**	**2**

In further diagnosis, the collision types were quantified. As shown in Table 2.9, the types of collisions consisted of rear-end (42%), broadside (26%), sideswipe (16%), and hit object (16%).

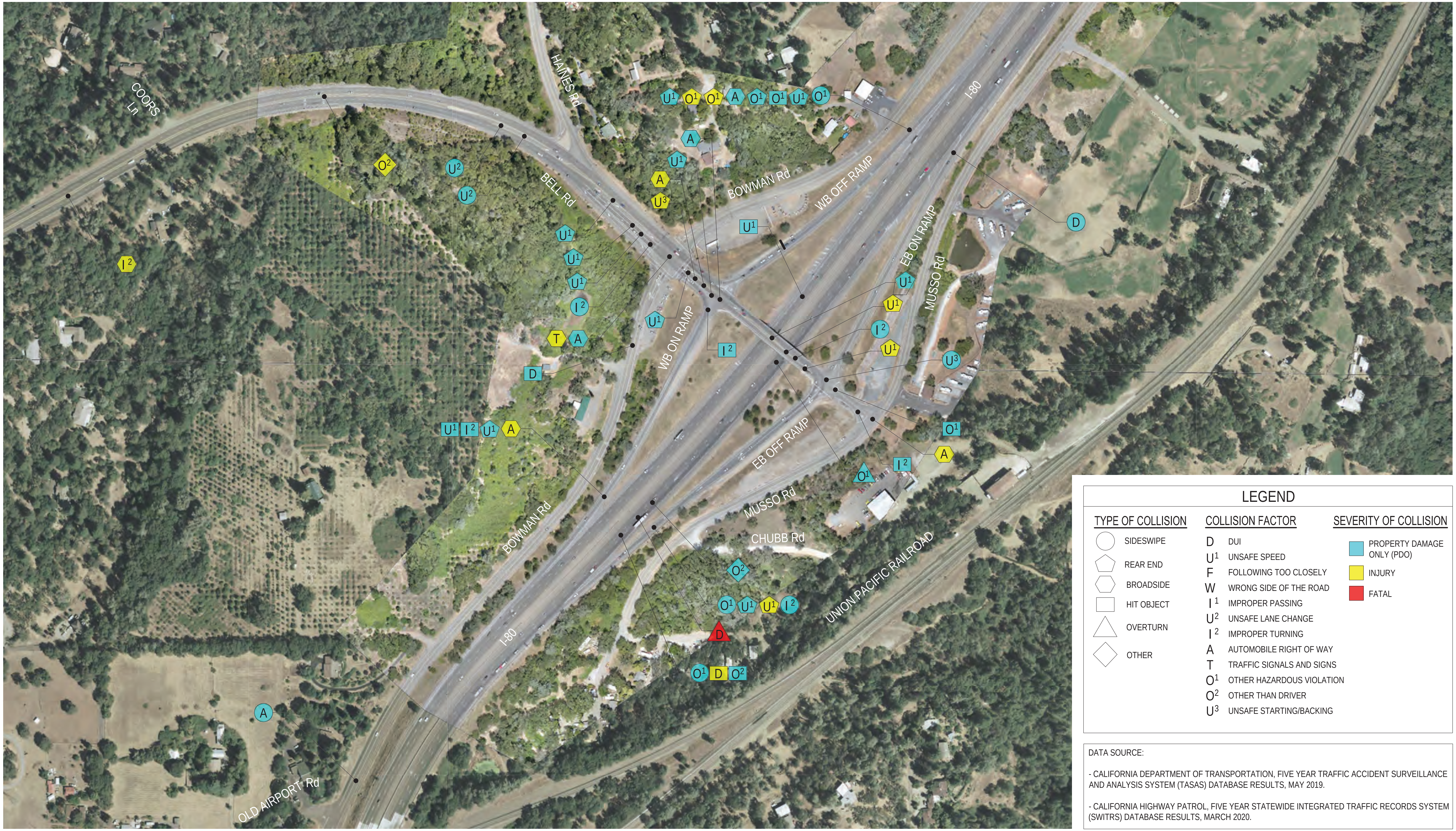
As stated previously, rear-end collisions suggest vehicles were not maintaining proper following distance or speed differential from vehicles turning on and off the Bell Road intersections. The majority of these collisions occurred at the Bell Road and Bowman Road intersection, which is currently controlled by a traffic signal. Rear-ends are a typical collision type at signalized intersections due to the stop and go conditions.

Table 2.9 Bell Road Intersection Collisions – Collision Type

Intersection	Collision Type			
	Sideswipe	Rear End	Broadside	Hit Object
Bell Road & Bowman Road	1	6	3	0
Bell Road & I-80 WB Ramps	0	0	1	1
Bell Road & I-80 EB Ramps	2	2	0	1
Bell Road & Musso Road	0	0	1	1
Total	**3**	**8**	**5**	**3**

2.6.3 Density and Severity Map

To provide a visual representation of the collisions between Year 2014 and 2018, all collisions were mapped in ArcGIS for the study area. Figure 2.3 shows the concentration of collisions along Bell Road near the WB and EB ramps. The one fatality collision occurred along the I-80 mainline. Several injury collisions occurred near the study intersections.



LEGEND

TYPE OF COLLISION

- ○ SIDESWIPE
- ⬠ REAR END
- ⬡ BROADSIDE
- □ HIT OBJECT
- △ OVERTURN
- ◇ OTHER

COLLISION FACTOR

D	DUI
U^1	UNSAFE SPEED
F	FOLLOWING TOO CLOSELY
W	WRONG SIDE OF THE ROAD
I^1	IMPROPER PASSING
U^2	UNSAFE LANE CHANGE
I^2	IMPROPER TURNING
A	AUTOMOBILE RIGHT OF WAY
T	TRAFFIC SIGNALS AND SIGNS
O^1	OTHER HAZARDOUS VIOLATION
O^2	OTHER THAN DRIVER
U^3	UNSAFE STARTING/BACKING

SEVERITY OF COLLISION

- 🟦 PROPERTY DAMAGE ONLY (PDO)
- 🟨 INJURY
- 🟥 FATAL

DATA SOURCE:

- CALIFORNIA DEPARTMENT OF TRANSPORTATION, FIVE YEAR TRAFFIC ACCIDENT SURVEILLANCE AND ANALYSIS SYSTEM (TASAS) DATABASE RESULTS, MAY 2019.

- CALIFORNIA HIGHWAY PATROL, FIVE YEAR STATEWIDE INTEGRATED TRAFFIC RECORDS SYSTEM (SWITRS) DATABASE RESULTS, MARCH 2020.

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1 inch = 300 ft.

Placer County
BELL ROAD AT I-80 ROUNDABOUTS

COLLISION DATA EXHIBIT

Project No. 11195697
Report No.
Date APRIL 2020

Figure 2.3

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2.7 Intersection Operations

Existing weekday AM and PM peak hour intersection traffic operations were quantified utilizing the existing traffic volumes and intersection lane geometrics and control. Table 2.10 presents a summary of the existing conditions. Figure 2.4 provides a visual of the existing lane geometrics and control.

Table 2.10 Existing Conditions Level of Service

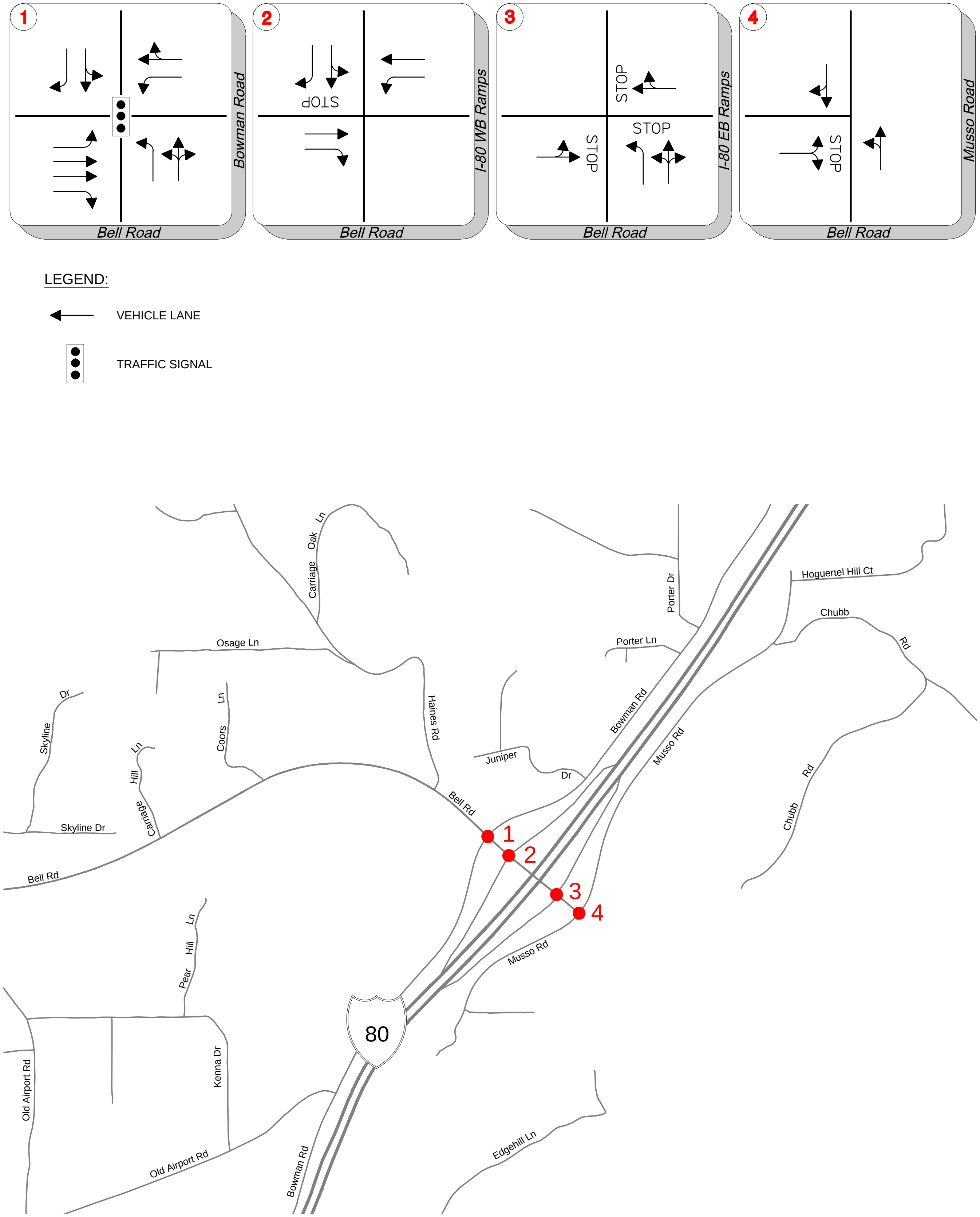
#	Intersection	Control Type^{1,2}	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd	Signal	D	11.7	B	11.8	B
	Eastbound		D	8.3	A	10.4	B
	Westbound		D	11.3	B	11.3	B
	Northbound		D	25.1	C	23.3	C
	Southbound		D	25.2	C	23.6	C
2	**I-80 WB Ramps/Bell Rd**	**TWSC**	**D**	**OVR**	**F**	28.5	D
	Eastbound		D	0.0	A	0.0	A
	Westbound		D	0.2	A	0.3	A
	Southbound		**D**	**OVR**	**F**	28.5	D
3	**I-80 EB Ramps/Bell Rd**	**AWSC**	**D**	32.5	D	**98.7**	**F**
	Eastbound		**D**	11.5	B	**58.9**	**F**
	Westbound		D	9.1	A	10.7	B
	Northbound		**D**	**36.4**	**E**	**121.7**	**F**
4	Musso Rd/Bell Rd	TWSC	D	8.8	A	9.1	A
	Eastbound		D	8.8	A	9.1	A
	Northbound		D	7.4	A	7.3	A
	Southbound		D	0.0	A	0.0	A

Notes:
1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

As presented in Table 2.10, the intersections of I-80 WB and EB ramps currently exceed the threshold for acceptable traffic operations during the AM and PM peak hours, respectively. The Bell Road and I-80 WB ramps intersection has approximately 400 vehicles attempting to make a right turn at the two way stop controlled (TWSC) intersection against a conflicting volume of approximately 900 vehicles travelling west during the AM peak hour. This conflict causes a significant delay on the ramp. There is also the potential for increased collision frequency on the I-80 mainline if vehicle queuing caused by insufficient capacity at the interchange extends beyond the storage capacity of the ramp.

The Bell Road and I-80 EB ramps intersection is an all way stop controlled (AWSC) intersection, and during the PM peak hour, the high volume at the intersection causes significant delay for all of the approaches and more specifically, the off-ramp approach. This results in an unacceptable overall LOS and queue lengths. There is the potential for increased collision frequency on the I-80 mainline if vehicle queuing caused by insufficient capacity at the interchange extends beyond the storage capacity of the ramp.

The Bowman Road signalized intersection currently operates at an acceptable LOS. The Musso Road intersection operates at an acceptable LOS due to the low traffic volumes at the intersection. The full Synchro/SimTraffic reports are available in Appendix C.



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Placer County
BELL ROAD AT I-80 ROUNDABOUTS

EXISTING LANE GEOMETRICS AND CONTROL

Project No. **11195697**
Report No.
Date **APRIL 2020**

FIGURE 2.4

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3. Design Year Conditions

3.1 Future Growth Rate and Forecasting Methodology

The following Travel Demand Models were considered for this project:

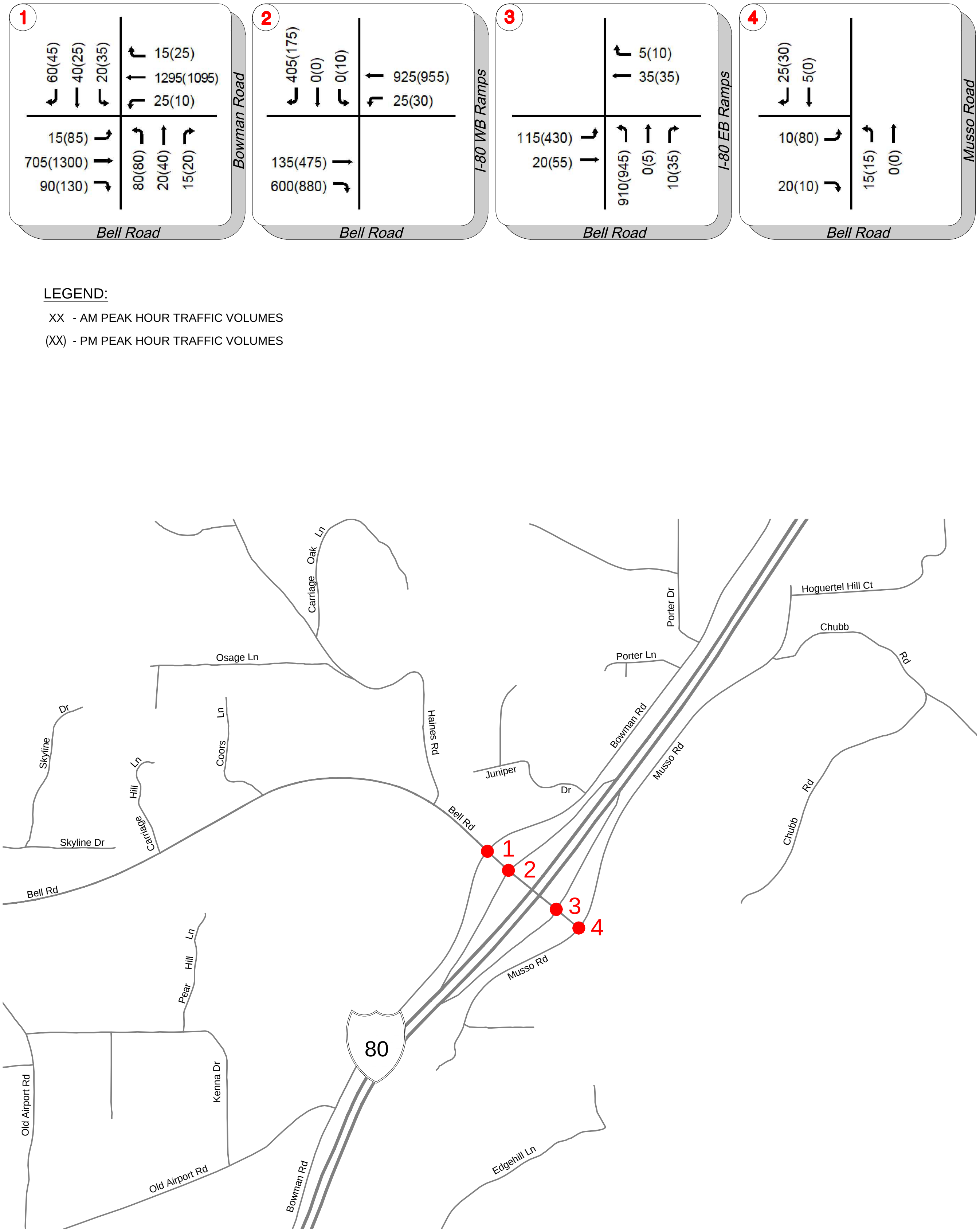
- The Sacramento Area Council of Governments (SACOG) Regional Travel Demand Model – SACSIM (SACSIM) is an activity-based model covering the six-county SACOG area. It is a multi-modal model forecasting travel by automobile, public transit, rail, bicycling, and walking. The model was calibrated for 2016 conditions and forecasts 2040 volume data.
- North Auburn Sub-Area Travel Demand Forecasting Model 2018 (Placer County model) was developed on the previous version of the SACOG's SACMET model, which was subsequently updated with the SACSIM model. The model was calibrated for 2018 conditions and forecasts 2040 daily volumes and AM and PM peak hour volumes.

The *Future Growth Rate and Forecasting Methodology Memorandum* prepared for the project (see Appendix B) concluded that based on the model validation by screenline and link-level analysis, both model forecasts reasonably replicate existing conditions within the model limitations specified within the *Travel Model Validation and Reasonableness Checking Manual* provided by the Federal Highway Administration (FHWA). Both models could be used to forecast future volumes at the study intersection.

The models were then compared against the historical growth rate and it was determined that neither model is projecting growth that reasonably reflects the current growth trends. The project development team (PDT) agreed to proceed with the following forecasting methodology to derive Year 2045 forecasts:

- The Bell Road growth would be rounded to 1% per year, which will result in approximately 25% growth through the design year. Although the study area includes the frontage roads (Bowman Road and Musso Road) that are not expected to attract development, and not expected to see a significant volume increase, all turning movements at study intersections will be increased by 25%.
- To understand the sensitivity of geometry to the design alternatives, traffic forecasts that reflect an average condition between the models will be utilized. The average growth rate between the two models is 2% per year, which results in 50% growth through the design year. To test the sensitivity of volumes to geometry, all turning movements to and from the Bell Road and EB and WB ramps will be increased by 50% while all other turning movements will be increased by 25% based on direction from the PDT.
- For Year 2025 conditions, the Bell Road growth would be rounded to 1% per year, which will result in approximately 6% growth. Although the traffic along the frontage roads (Bowman Road and Musso Road) have not increased when compared to the historical data, all turning movements at study intersections will be increased by 6%.

Figure 3.1 and Figure 3.2 present the design traffic volumes for Year 2025 and Year 2045.



LEGEND:

XX - AM PEAK HOUR TRAFFIC VOLUMES

(XX) - PM PEAK HOUR TRAFFIC VOLUMES

N

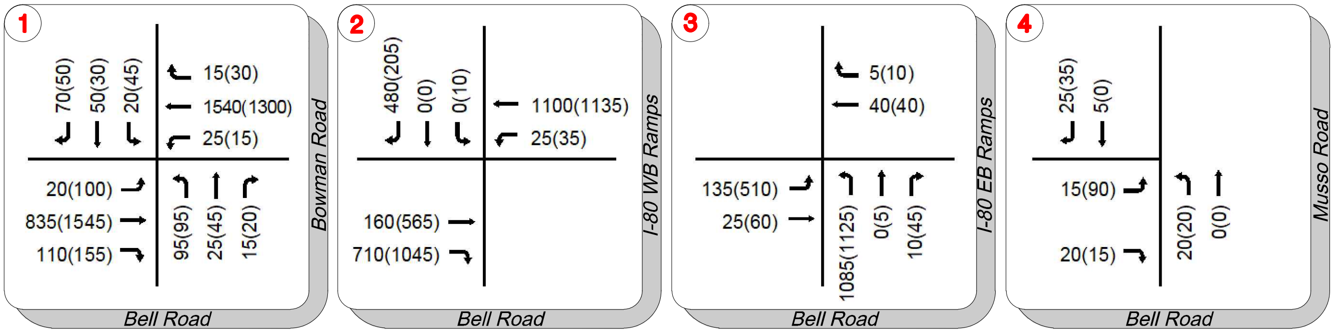
Placer County
BELL ROAD AT I-80 ROUNDABOUTS

DESIGN YEAR 2025 PEAK HOUR TRAFFIC VOLUMES

Project No. **11195697**
Report No.
Date **MAY 2020**

FIGURE 3.1

Source:



LEGEND:

XX - AM PEAK HOUR TRAFFIC VOLUMES

(XX) - PM PEAK HOUR TRAFFIC VOLUMES

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Placer County
BELL ROAD AT I-80 ROUNDABOUTS

DESIGN YEAR 2045 PEAK HOUR TRAFFIC VOLUMES

Project No. **11195697**
Report No.
Date **MAY 2020**

FIGURE 3.2

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4. No Build Conditions

The No Build Alternative is the analysis scenario in which no improvements to the Bell Road at I-80 interchange are made before the projected opening year, Year 2025, and the design year, Year 2045. The LOS calculation reports for No Build Conditions are located in Appendix C (Synchro and SimTraffic Reports).

4.1 Year 2025 No Build Conditions

Year 2025 No Build Conditions refers to traffic operations at the study intersection approximately five years in the future. Table 4.1 presents the weekday AM and PM intersection LOS for the study intersections. Per Table 4.1, with no improvements at Bell Road at I-80 interchange, the LOS will continue to degrade to LOS F in both the AM and PM peak hour.

Table 4.1 Year 2025 No Build Intersection Level of Service

#	Intersection	Control Type^{1,2}	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd	Signal	D	12.5	B	12.4	B
	Eastbound		D	8.7	A	10.8	B
	Westbound		D	12.1	B	11.8	B
	Northbound		D	27.2	C	24.8	C
	Southbound		D	27.3	C	25.5	C
2	**I-80 WB Ramps/Bell Rd**	**TWSC**	**D**	**OVR**	**F**	34.4	D
	Eastbound		D	0.0	A	0.0	A
	Westbound		D	0.3	A	0.4	A
	Southbound		**D**	**OVR**	**F**	34.4	D
3	**I-80 EB Ramps/Bell Rd**	**AWSC**	**D**	**40.8**	**E**	**120.6**	**F**
	Eastbound		**D**	11.8	B	**76.9**	**F**
	Westbound		D	9.8	A	10.8	B
	Northbound		**D**	**46.4**	**E**	**147.2**	**F**
4	Musso Rd/Bell Rd	TWSC	D	8.9	A	9.2	A
	Eastbound		D	8.9	A	9.2	A
	Northbound		D	7.5	A	7.3	A
	Southbound		D	0.0	A	0.0	A

Notes:
1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal
3. **Bold** = Unacceptable Conditions
4. OVR = Delay over 300 seconds

Table 4.2 displays the 95th percentile queue lengths from *Sim Traffic* for each study intersection for the 2025 No Build Conditions. With no improvements and increased delays, the queues increased when compared to existing conditions. Per Table 4.2, there are several queues that are projected to exceed available storage and impact downstream intersection/mainline operations.

Table 4.2 Year 2025 No Build Queuing Characteristics

#	Intersection	Available Storage	AM Peak Hour 95th Percentile Queues	PM Peak Hour 95th Percentile Queues
1	Bowman Rd/Bell Rd			
	EB Left	275	29	81
	EB Through		194	404
	EB Right	305	32	215
	WB Left	70	45	40
	WB Through	125	**131**	**151**
	WB Through-Right	125	**294**	**276**
	NB Left		64	80
	NB Left-Through-Right	95	39	63
	SB Left-Through	95	64	67
	SB Right		51	46
2	I-80 WB Ramps/Bell Rd			
	EB Through		-	27
	EB Right		6	8
	WB Left	50	**87**	**83**
	WB Through	350	111	182
	SB Left-Through-Right	600	**1007**	**1087**
3	I-80 EB Ramps/Bell Rd			
	EB Left-Through	350	65	**376**
	WB Through-Right		52	53
	NB Left	600	209	**825**
	NB Left-Through-Right	350	174	**582**
4	Musso Rd/Bell Rd			
	EB Left-Right		49	47
	NB Left-Through		7	7

Notes:

1. **Bold Red** = Unacceptable Conditions

2. The full length of some queues exceed what is reported due to limited available storage, spillback into adjacent intersections, and onto freeway mainline.

3. Ramp storage does not include require deceleration lengths.

4.2 Year 2045 No Build Conditions

Year 2045 No Build Conditions captures the future conditions with no improvements. Table 4.3 presents the weekday AM and PM LOS for the year 2045 No Build Alternative. The intersection LOS at I-80 and Bell Road continues to degrade to worse LOS F conditions in the AM and PM peak hour. This is below the acceptable standard for Placer County and Caltrans. In addition, with the projected increase in traffic on both off-ramps, the TWSC controlled intersections will not be able to accommodate the projected traffic demand and cause excessive queues potentially impacting mainline operations.

Table 4.3 Year 2045 No Build Intersection Level of Service

#	Intersection	Control Type^{1,2}	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd	Signal	D	13.6	B	14.5	B
	Eastbound		D	9.0	A	12.3	B
	Westbound		D	13.1	B	13.8	B
	Northbound		D	32.1	C	31.8	C
	Southbound		D	32.1	C	32.2	C
2	**I-80 WB Ramps/Bell Rd**	**TWSC**	**D**	**OVR**	**F**	**146.4**	**F**
	Eastbound		D	0.0	A	0.0	A
	Westbound		D	0.2	A	0.5	A
	Southbound		**D**	**OVR**	**F**	**146.4**	**F**
3	**I-80 EB Ramps/Bell Rd**	**AWSC**	**D**	**51.6**	**F**	**140.3**	**F**
	Eastbound		**D**	12.0	B	**90.9**	**F**
	Westbound		D	9.9	A	10.8	B
	Northbound		**D**	**59.1**	**F**	**169.8**	**F**
4	Musso Rd/Bell Rd	TWSC	D	8.9	A	9.3	A
	Eastbound		D	8.9	A	9.3	A
	Northbound		D	7.4	A	7.3	A
	Southbound		D	0.0	A	0.0	A

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

Table 4.4 presents the 95th percentile queues for the study intersections for the 2045 No Build Conditions. There are several queues that are projected to exceed available storage and degrade downstream intersection/mainline operations.

Table 4.4 Year 2045 No Build Queuing Characteristics

#	Intersection	Available Storage	AM Peak Hour 95th Percentile Queues	PM Peak Hour 95th Percentile Queues
1	Bowman Rd/Bell Rd			
	EB Left	275	29	362
	EB Through		247	1559
	EB Right	305	41	**517**
	WB Left	70	45	47
	WB Through	125	**160**	**163**
	WB Through-Right	125	**294**	**276**
	NB Left		84	117
	NB Left-Through-Right	95	44	90
	SB Left-Through	95	64	**96**
	SB Right		65	63
2	I-80 WB Ramps/Bell Rd			
	EB Through		-	172
	EB Right		9	25
	WB Left	50	**134**	**105**
	WB Through	350	277	236
	SB Left-Through-Right	500	**1007**	**1087**
3	I-80 EB Ramps/Bell Rd			
	EB Left-Through	350	82	**553**
	WB Through-Right		59	55
	NB Left	500	227	**1120**
	NB Left-Through-Right	350	221	**624**
4	Musso Rd/Bell Rd			
	EB Left-Right		56	47
	NB Left-Through		10	7

Notes:

1. **Bold Red** = Unacceptable Conditions

2. The full length of some queues exceed what is reported due to limited available storage, spillback into adjacent intersections, and onto freeway mainline.

3. Ramp storage does not include require deceleration lengths.

5. Build Conditions

In order to reduce traffic congestion and enhance safety, Build Alternative 2 (Two Roundabouts) has been selected for further evaluation for the Bell Road at I-80 interchange improvements. This Build Alternative would replace the existing study intersections with two modern, yield-controlled, single and multi-lane roundabouts. A six-legged roundabout would be constructed at Bell Road that would include the Bowman Road intersection and the I-80 WB ramps intersection. A five-legged roundabout would be constructed at Bell Road that would include the I-80 EB ramps intersection and the Musso Road intersection. To adequately accommodate queues and delays, both roundabouts have been designed as hybrid roundabouts. A hybrid roundabout includes a combination of single and multi-lanes.

As discussed in Section 1.2 (Previous Studies), two other build alternatives were rejected during the PID phase in the PSR/PDS prepared for the project.

5.1 Year 2025 Build Alternative Conditions

The current configuration at the project site includes two intersections (Bowman Road/Bell Road and I-80 WB Ramps/Bell Road) to the west and two intersections (I-80 EB Ramps/Bell Rd and Musso Road/Bell Road) to the east. The Build Alternative would improve the existing intersections along Bell Road at I-80 with a six-legged roundabout on the west, incorporating Bowman Road and the I-80 WB ramps, and a five-legged roundabout on the east, incorporating Musso Road and the I-80 EB ramps.

Table 5.1 presents the study intersections LOS for the Build Alternative in 2025. The roundabouts at the Bell Road at I-80 interchange are projected to operate at LOS A for the AM and PM peak hours. The LOS calculation reports for Build Conditions are located in Appendix D (SIDRA Reports).

Table 5.1 Year 2025 Build Alternative Intersection LOS

#	Intersection	Control Type^{1,2}	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd/I-80 WB Ramps	RNDBT	D	7.6	A	7.5	A
	NB Bowman		D	7.8	A	12.4	B
	WB Bell		D	6.2	A	6.4	A
	SW Off-Ramp		D	13.2	B	8.8	A
	SB Bowman		D	10.6	B	8.4	A
	EB Bell		D	5.8	A	7.5	A
2	Consolidated with Intersection 1						
3	I-80 EB Ramps/Bell Rd/Musso Rd	RNDBT	D	7.7	A	8.3	A
	NW Musso		D	8.2	A	8.7	A
	SW Musso		D	8.6	A	8.5	A
	EB Bell		D	3.8	A	6.0	A
	NE Off-Ramp		D	8.2	A	9.4	A
4	Consolidated with Intersection 3						

Notes:
1. RNDBT = Roundabout
2. LOS = Delay based on average of all approaches for RNDBT

Table 5.2 displays the 95th percentile queue lengths for the Build Alternative in 2025. All queue lengths provided from SIDRA analysis are well within the storage length.

Table 5.2 Year 2025 Build Alternative Queue Characteristics

#	Intersection	Available Storage	AM Peak Hour 95th Percentile Queues	PM Peak Hour 95th Percentile Queues
1	Bowman Rd/Bell Rd/I-80 WB Off-Ramp			
	NB Bowman Lane 1		24	40
	WB Bell Lane 1		77	71
	WB Bell Lane 2	115	79	73
	SWB Off-Ramp Lane 1	165	61	20
	SWB Off-Ramp Lane 2		63	21
	SB Bowman Lane 1		30	20
	EB Bell Lane 1		20	86
	EB Bell Lane 2		91	134
	EB Bell Lane 3	335	9	12
2	*Merged with Intersection 1*			
3	I-80 EB Ramps/Bell Rd/Musso Rd			
	NWB Musso Lane 1		6	6
	SWB Musso Lane 1		9	7
	EB Bell Lane 1		21	74
	NEB Off-Ramp Lane 1		115	131
	NEB Off-Ramp Lane 2	190	71	67
4	*Merged with Intersection 3*			

5.2 Year 2045 Build Alternative Conditions

This traffic analysis evaluates the Year 2045 conditions with the Build Alternative. Table 5.3 presents the AM and PM peak hour LOS for the Build Alternative in Year 2045. The Bell Road at I-80 interchange is projected to operate at LOS A conditions during the AM and PM peak hour.

Table 5.3 Year 2045 Build Alternative Intersection LOS

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd/I-80 WB Ramps	RNDBT	D	7.6	A	8.5	A
	NB Bowman		D	7.9	A	16.2	B
	WB Bell		D	6.5	A	7.1	A
	SW Off-Ramp		D	12.2	B	9.0	A
	SB Bowman		D	11.1	B	9.2	A
	EB Bell		D	5.9	A	8.6	A
2	Consolidated with Intersection 1						
3	I-80 EB Ramps/Bell Rd/Musso Rd	RNDBT	D	7.2	A	9.7	A
	NW Musso		D	7.4	A	9.6	A
	SW Musso		D	7.7	A	9.4	A
	EB Bell		D	3.6	A	6.3	A
	NE Off-Ramp		D	7.7	A	11.4	B
4	Consolidated with Intersection 3						

Notes:
1. RNDBT = Roundabout
2. LOS = Delay based on average of all approaches for RNDBT

As presented in Table 5.4, the 2045 95th percentile queues with the Build Alternative are all within the storage length and are considered acceptable.

Table 5.4 Year 2045 Build Alternative Queue Characteristics

#	Intersection	Available Storage	AM Peak Hour 95th Percentile Queues	PM Peak Hour 95th Percentile Queues
1	Bowman Rd/Bell Rd/I-80 WB Off-Ramp			
	NB Bowman Lane 1		27	62
	WB Bell Lane 1		86	88
	WB Bell Lane 2	115	89	93
	SWB Off-Ramp Lane 1	165	63	25
	SWB Off-Ramp Lane 2		68	27
	SB Bowman Lane 1		36	26
	EB Bell Lane 1		22	110
	EB Bell Lane 2		100	173
	EB Bell Lane 3	335	11	14
2	*Merged with Intersection 1*			
3	I-80 EB Ramps/Bell Rd/Musso Rd			
	NWB Musso Lane 1		6	7
	SWB Musso Lane 1		9	9
	EB Bell Lane 1		21	91
	NEB Off-Ramp Lane 1		115	218
	NEB Off-Ramp Lane 2	190	71	100
4	*Merged with Intersection 3*			

5.3 Year 2045 – Sensitivity Analysis for Year 2019 Counts

This traffic analysis evaluates the average condition between the SACOG Regional Travel Demand Model and Placer County model. These two models have an average growth rate of 2% per year or 50% growth over a 20 year period. This growth rate was applied to all movements to and from the EB and WB ramps as well as the EB and WB through movements at Bowman Road and Bell Road. All other turn movements were increased by 1% per year or 25% over 20 years. The side street growth rate was based on conversations with the County about projected growth among the side streets (i.e. Musso Road and Bowman Road).

Table 5.5 presents the AM and PM peak hour LOS for the Build Alternative in Year 2045 – Sensitivity Analysis conditions. The Bell Road at I-80 interchange is projected to operate at LOS A conditions during the AM and LOS B during the PM peak hour.

Table 5.5 Year 2045 Sensitivity Analysis for 2019 Counts - Build Alternative Intersection LOS

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd/I-80 WB Ramps	RNDBT	D	10.0	A	10.1	B
	NB Bowman		D	9.6	A	22.9	C
	WB Bell		D	7.7	A	7.9	A
	SW Off-Ramp		D	19.4	B	10.6	B
	SB Bowman		D	15.4	B	10.2	B
	EB Bell		D	7.1	A	10.5	B
2	Consolidated with Intersection 1						
3	I-80 EB Ramps/Bell Rd/Musso Rd	RNDBT	D	8.8	A	13.8	B
	NW Musso		D	8.8	A	13.5	B
	SW Musso		D	9.1	A	12.7	B
	EB Bell		D	3.8	A	7.2	A
	NE Off-Ramp		D	9.4	A	17.0	B
4	Consolidated with Intersection 3						

Notes:
1. RNDBT = Roundabout
2. LOS = Delay based on average of all approaches for RNDBT

As presented in Table 5.6, the 2045 95th percentile queues with the Build Alternative are all within the storage length and are considered acceptable, except for WB Bell Road lane 2 at the intersection of Bowman Road/Bell Road/I-80 WB Ramps and the North EB off-ramp lane 2 at the I-80 EB Ramps/Bell Road/Musso Road intersection. Based on the assumption of 25 feet storage per vehicle, the projected queue spillback for these movements is approximately less than two vehicles.

For the spillback at WB Bell Road lane 2, the one or two vehicles will have ample storage in the WB Lane 1 and will not have an impact to upstream intersection operations at the EB ramps.

For the spillback at EB off-ramp lane 2, the one or two vehicles will have ample storage in the EB Lane 1 and will not impact mainline operations.

Table 5.6 Year 2045 Sensitivity Analysis for 2019 Counts - Build Alternative Queue Characteristics

#	Intersection	Available Storage	AM Peak Hour 95th Percentile Queues	PM Peak Hour 95th Percentile Queues
1	Bowman Rd/Bell Rd/I-80 WB Off-Ramp			
	NB Bowman Lane 1		34	81
	WB Bell Lane 1		116	106
	WB Bell Lane 2	115	**120**	112
	SWB Off-Ramp Lane 1	165	107	31
	SWB Off-Ramp Lane 2		122	35
	SB Bowman Lane 1		52	28
	EB Bell Lane 1		26	131
	EB Bell Lane 2		138	237
	EB Bell Lane 3	335	11	13
2	*Merged with Intersection 1*			
3	I-80 EB Ramps/Bell Rd/Musso Rd			
	NWB Musso Lane 1		6	11
	SWB Musso Lane 1		8	13
	EB Bell Lane 1		24	121
	NEB Off-Ramp Lane 1		135	348
	NEB Off-Ramp Lane 2	190	110	**229**
4	*Merged with Intersection 3*			

6. Placer County Government Center (PCGC) Master Plan Volume Analysis

The PCGC Master Plan Update, dated November 2018, studied the Bell Road at I-80 interchange and intersection of Bowman Road/Bell Road. The intersection turning movement counts presented within that study were used as a baseline to develop the Year 2025, Year 2045 forecasts, and conduct this Sensitivity Analysis of “Plus Project” conditions. The methodology described in Section 3.1 of this report was used to development the volume sets used in the Year 2025, Year 2045, and Sensitivity Analysis associated with PCGC existing volumes.

6.1 Year 2025 PCGC Build Alternative Conditions

Table 6.1 presents the study intersections LOS for the Build Alternative in 2025. The roundabouts at the Bell Road at I-80 interchange are projected to operate at LOS A for the AM and PM peak hours.

Table 6.1 Year 2025 PCGC Build Alternative Intersection LOS

				AM Peak Hour		PM Peak Hour	
#	Intersection	Control Type[1,2]	Target LOS	Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd/I-80 WB Ramps	RNDBT	D	8.5	A	8.5	A
	NB Bowman		D	9.1	A	17.7	B
	WB Bell		D	6.8	A	6.9	A
	SW Off-Ramp		D	15.8	B	10.5	B
	SB Bowman		D	12.7	B	9.2	A
	EB Bell		D	6.0	A	7.5	A
2	Consolidated with Intersection 1						
3	I-80 EB Ramps/Bell Rd/Musso Rd	RNDBT	D	8.5	A	8.3	A
	NW Musso		D	9.2	A	8.7	A
	SW Musso		D	9.4	A	8.7	A
	EB Bell		D	4.0	A	6.3	A
	NE Off-Ramp		D	9.2	A	9.4	A
4	Consolidated with Intersection 3						

Notes:

1. RNDBT = Roundabout
2. LOS = Delay based on average of all approaches for RNDBT

Table 6.2 displays the 95th percentile queue lengths for the Build Alternative in 2025. All queues lengths provided from SIDRA analysis are well within the storage length.

Table 6.2 Year 2025 PCGC Build Alternative Queue Characteristics

			AM Peak Hour	PM Peak Hour
#	Intersection	Available Storage	95th Percentile Queues	95th Percentile Queues
1	Bowman Rd/Bell Rd/I-80 WB Ramps			
	NB Bowman Lane 1		33	87
	WB Bell Lane 1		84	73
	WB Bell Lane 2	115	87	78
	SWB Off-Ramp Lane 1	165	76	31
	SWB Off-Ramp Lane 2		79	32
	SB Bowman Lane 1		43	24
	EB Bell Lane 1		25	89
	EB Bell Lane 2		101	129
	EB Bell Lane 3	335	18	8
2	*Merged with Intersection 1*			
3	I-80 EB Ramps/Bell Rd/Musso Rd			
	NWB Musso Lane 1		8	6
	SWB Musso Lane 1		10	9
	EB Bell Lane 1		26	84
	NEB Off-Ramp Lane 1		132	126
	NEB Off-Ramp Lane 2	190	80	65
4	*Merged with Intersection 3*			

6.2 Year 2045 PCGC Build Alternative Conditions

Table 6.3 presents the AM and PM peak hour LOS for the Build Alternative in Year 2045. The Bell Road at I-80 interchange is projected to operate at LOS A conditions during the AM peak hour. The intersection of Bowman Road/Bell Road/I-80 WB ramps is projected to operate at LOS B and the intersection of I-80 EB Ramps/Bell Road/Musso Road is projected to operate at LOS A during the PM peak hour.

Table 6.3 Year 2045 PCGC Build Alternative Intersection LOS

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd/I-80 WB Ramps	RNDBT	D	8.5	A	10.4	B
	NB Bowman		D	9.4	A	28.9	C
	WB Bell		D	7.1	A	7.9	A
	SW Off-Ramp		D	14.8	B	11.5	B
	SB Bowman		D	13.5	B	10.4	B
	EB Bell		D	6.0	A	8.7	A
2	Consolidated with Intersection 1						
3	I-80 EB Ramps/Bell Rd/Musso Rd	RNDBT	D	7.9	A	9.8	A
	NW Musso		D	8.2	A	9.6	A
	SW Musso		D	8.5	A	9.5	A
	EB Bell		D	3.8	A	6.7	A
	NE Off-Ramp		D	8.5	A	11.5	B
4	Consolidated with Intersection 3						

Notes:
1. RNDBT = Roundabout
2. LOS = Delay based on average of all approaches for RNDBT

As presented in Table 6.4, the 2045 95th percentile queues with the Build Alternative are all within the storage length and are considered acceptable.

Table 6.4 Year 2045 PCGC Build Alternative Queue Characteristics

#	Intersection	Available Storage	AM Peak Hour	PM Peak Hour
			95th Percentile Queues	95th Percentile Queues
1	Bowman Rd/Bell Rd/I-80 WB Ramps			
	NB Bowman Lane 1		38	149
	WB Bell Lane 1		95	94
	WB Bell Lane 2	115	99	102
	SWB Off-Ramp Lane 1	165	79	41
	SWB Off-Ramp Lane 2		88	45
	SB Bowman Lane 1		51	31
	EB Bell Lane 1		26	113
	EB Bell Lane 2		111	166
	EB Bell Lane 3	335	20	9
2	*Merged with Intersection 1*			
3	I-80 EB Ramps/Bell Rd/Musso Rd			
	NWB Musso Lane 1		6	7
	SWB Musso Lane 1		9	11
	EB Bell Lane 1		25	103
	NEB Off-Ramp Lane 1		125	211
	NEB Off-Ramp Lane 2	190	76	99
4	*Merged with Intersection 3*			

6.3 Year 2045 Sensitivity Analysis for PCGC counts

Table 6.5 presents the AM and PM peak hour LOS for the Build Alternative in Year 2045 PCGC Sensitivity Analysis conditions. The Bell Road at I-80 interchange is projected to operate at LOS B conditions during the AM and PM peak hour except for the intersection of I-80 EB Ramps/Bell Road/Musso Road, which is projected to operate at LOS A.

Table 6.5 Year 2045 Sensitivity Analysis for PCGC Counts - Build Alternative Intersection LOS

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	Bowman Rd/Bell Rd/I-80 WB Ramps	RNDBT	D	12.3	B	13.4	B
	NB Bowman		D	12.1	B	53.1	D
	WB Bell		D	8.6	A	8.8	A
	SW Off-Ramp		D	28.3	C	14.5	B
	SB Bowman		D	21.4	C	11.7	B
	EB Bell		D	7.4	A	10.6	B
2	Consolidated with Intersection 1						
3	I-80 EB Ramps/Bell Rd/Musso Rd	RNDBT	D	10.0	A	13.8	B
	NW Musso		D	10.0	A	13.4	B
	SW Musso		D	10.5	B	12.8	B
	EB Bell		D	4.1	A	7.6	A
	NE Off-Ramp		D	10.9	B	17.2	B
4	Consolidated with Intersection 3						

Notes:
1. RNDBT = Roundabout
2. LOS = Delay based on average of all approaches for RNDBT

As presented in Table 6.6, the 2045 95th percentile queues with the Build Alternative are all within the storage length and are considered acceptable, except for WB Bell Road lane 2 at the intersection of Bowman Road/Bell Road/I-80 WB Ramps and the North EB off-ramp lane 2 at the I-80 EB Ramps/Bell Road/Musso Road intersection. Based on the assumption of 25 feet storage per vehicle, the projected queue spillback for these movements is approximately less than two vehicles.

For the spillback at WB Bell Road lane 2, the one or two vehicles will have ample storage in the WB Lane 1, and will not have an impact to upstream intersection operations at the EB ramps.

For the spillback at EB off-ramp lane 2, the one or two vehicles will have ample storage in the EB Lane 1, and will not impact mainline operations.

Table 6.6 Year 2045 Sensitivity Analysis for PCGC Counts - Build Alternative Queue Characteristics

#	Intersection	Available Storage	AM Peak Hour 95th Percentile Queues	PM Peak Hour 95th Percentile Queues
1	Bowman Rd/Bell Rd/I-80 WB Ramps			
	NB Bowman Lane 1		51	235
	WB Bell Lane 1		129	114
	WB Bell Lane 2	115	**135**	**121**
	SWB Off-Ramp Lane 1	165	150	57
	SWB Off-Ramp Lane 2		176	64
	SB Bowman Lane 1		78	35
	EB Bell Lane 1		32	134
	EB Bell Lane 2		155	223
	EB Bell Lane 3	335	20	8
2	*Merged with Intersection 1*			
3	I-80 EB Ramps/Bell Rd/Musso Rd			
	NWB Musso Lane 1		8	10
	SWB Musso Lane 1		11	15
	EB Bell Lane 1		31	136
	NEB Off-Ramp Lane 1		190	335
	NEB Off-Ramp Lane 2	190	140	**221**
4	*Merged with Intersection 3*			

7. Conclusions

This transportation analysis is consistent with the guidelines established in the Highway Design Manual (HDM) for safety and operations improvement projects. The analysis indicates that if no improvements are made to the Bell Road at I-80 interchange, the interchange is projected to continue to degrade and operate at LOS F for Year 2025 conditions for both the AM and PM peak hours. In Year 2045, the intersection will further degrade and the gaps for the I-80 WB off-ramp will be exacerbated. This results in excessive queuing being projected onto the mainline I-80 as drivers would not be able to find adequate gaps to turn onto Bell Road.

The current safety analysis of the past five years (2014-2018) shows several collisions were recorded at the project site. The majority of the collisions were due to rear ending or sideswiping another vehicle and hitting an object (typically collisions with vehicles or other objects such as signs, poles, etc.). The primary collision factors were unsafe speed, improper turning, and automobile right of way (typically collisions where the party at fault did not yield properly to another vehicle). In addition to these known collision factors, existing and forecasted traffic congestion in the project area during the AM and PM peak hours will significantly impact the efficiency of the Bell Road at I-80 interchange. This results in traffic backing up onto the mainline, which has the potential to cause additional collisions near the ramp and along mainline.

The analysis of the selected Build Alternative indicates that with the proposed improvements, congestion issues currently experienced by motorists at the interchange will be addressed. The interchange study intersections are projected to operate during the AM and PM peak hours at LOS B or better conditions in both Years 2025 and 2045. In addition, the projected 95% queues for both Year 2025 and 2045 conditions will be accommodated within the provided storage. Also, with improved traffic operations in both Year 2025 and 2045, safety should also be improved, reducing the current number of collisions and their severity.

For the Year 2045 LOS for either models or methodology for the AM and PM peak hour is projected to be no worse than LOS B. All queues are projected to not impact upstream intersections despite the one or two vehicle spillback for the WB Lane 2 approach at Bowman Road/Bell Road/I-80 WB off-ramp. Those vehicles will have ample storage space in Lane 1 before impacting upstream intersection operations.

Lastly, analysis performed using the PCGC volume data resulted in the Build Alternative operating at LOS B or better through Year 2045 conditions. The Year 2045 Sensitivity Analysis indicates the Build Alternative would be able to withstand a 50% increase in current traffic volumes and still operate at LOS B. All queues are projected to not impact upstream intersections despite the one or two vehicle spillback for the WB Lane 2 approach at Bowman Road/Bell Road/I-80 WB off-ramp. Those vehicles will have ample storage space in Lane 1 before impacting the intersection operations.

The intersection of Bell Road at the I-80 EB off-ramp and Musso Road is currently operating with a high level of driver familiarity due to a heavy local utilization for commuter traffic in and out of northern Auburn. The intersection is stop-controlled, and provides a nonstandard merge section (less than 90 feet advance warning distance) onto the Bell Road overcrossing, upon exiting the I-80 EB off-ramp. With the proposed configuration of a roundabout at this intersection, the geometry would provide a longer merge section and the appropriate length for the advance warning distance to meet the Manual on Uniform Traffic Control Devices (MUTCD) standards for the natural path speed of the approach. Upon crossing the Bell Road overcrossing, the drivers would encounter the roundabout at Bell Road/Bowman Road/I-80 WB ramps, which is projected to have low conflicting vehicle volumes and will not queue back into the merge. With all the improvements, and the low projected conflicting vehicle volumes on the Bowman/I-80 WB ramps side of the Bell Road overcrossing, the merge section is anticipated to operate more efficiently and effectively than it does today.

In summary, the selected Build Alternative, regardless of the recognized/available models or methodologies used, corrects the existing deficiencies at the study area intersections at the Bell Road/I-80 interchange and will operate at acceptable LOS conditions upon opening in Year 2025 and maintain similar acceptable conditions through the Year 2045.

APPENDIX A

Traffic Data and Volumes

Prepared by National Data & Surveying Services

Musso Rd & Bell Rd

Peak Hour Turning Movement Count

ID: 19-07211-001
City: Auburn

Day: Tuesday
Date: 05/21/2019

	PEAK HOURS	COUNT PERIODS
AM	08:00 AM - 09:00 AM	05:30 AM - 10:30 AM
NOON	NONE	NONE
PM	05:00 PM - 06:00 PM	03:00 PM - 06:30 PM

Musso Rd SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	16	1	0	0	9
NOON	0	0	0	0	0
PM	23	0	0	0	72
	0	1	0	0	

Bell Rd EASTBOUND

	AM	NOON	PM	
⇦	25	0	38	
↶	0	0	2	0
↱	9	0	72	0
→	0	0	0	0.5
↴	15	0	9	0.5

Bell Rd WESTBOUND

		PM	NOON	AM
↰	0	0	0	0
←	0	0	0	0
↲	0	0	0	0
↷	0	0	0	0
⇨		0	0	0

Musso Rd NORTHBOUND

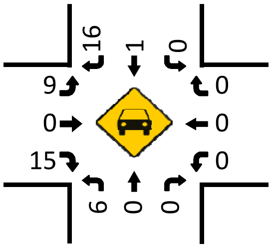
	⇩	↶	↰	↑	↱
		0	0	1	0
PM	9	0	13	0	0
NOON	0	0	0	0	0
AM	16	0	9	0	0

CONTROL

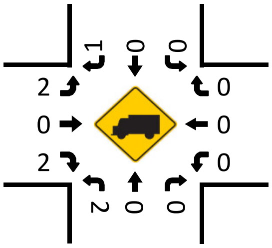
1-Way Stop(EB)

	AM	NOON	PM
TEV	50	0	119
PHF	0.74		0.90

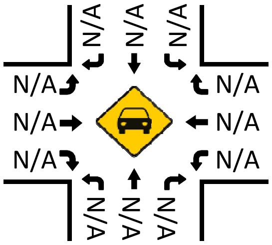
Total Vehicles (AM)



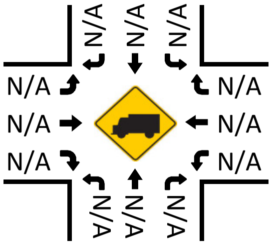
HT (AM)



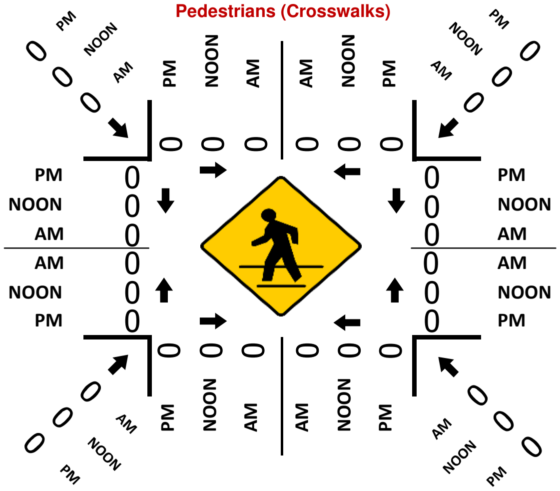
Total Vehicles (Noon)



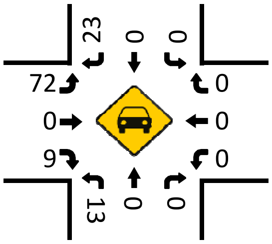
HT (NOON)



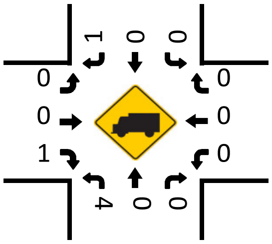
Pedestrians (Crosswalks)



Total Vehicles (PM)



HT (PM)



Prepared by National Data & Surveying Services

I-80 NB Ramps & Bell Rd

Peak Hour Turning Movement Count

ID: 19-07211-002
City: Auburn

Day: Tuesday
Date: 05/21/2019

	PEAK HOURS	COUNT PERIODS
AM	07:15 AM - 08:15 AM	05:30 AM - 10:30 AM
NOON	NONE	NONE
PM	04:30 PM - 05:30 PM	03:00 PM - 06:30 PM

I-80 NB Ramps — SOUTHBOUND

	↲	↓	↳	U	⇧
AM	0	0	0	0	110
NOON	0	0	0	0	0
PM	0	0	0	0	407
	0	0	0	0	

Bell Rd — EASTBOUND

		AM	NOON	PM
⇦		897	0	933
U	0	0	0	0
↱	0	108	0	399
→	1	8	0	43
↴	0	0	0	0

Bell Rd — WESTBOUND

		PM	NOON	AM
↰	0.5	7	0	2
←	0.5	35	0	31
↲	0	0	0	0
U	0	0	0	0
⇨		76	0	11

I-80 NB Ramps — NORTHBOUND

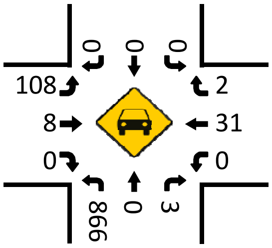
	⇩	U	↰	↑	↱
		0	1.3	0.3	0.3
PM	0	0	898	1	33
NOON	0	0	0	0	0
AM	0	0	866	0	3

CONTROL

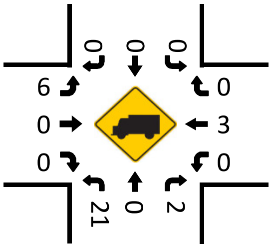
3-Way Stop(NB/EB/WB)

	AM	NOON	PM
TEV	1018	0	1416
PHF	0.78		0.98

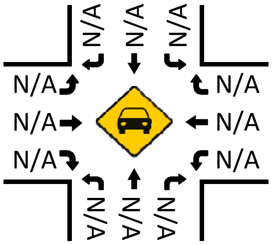
Total Vehicles (AM)



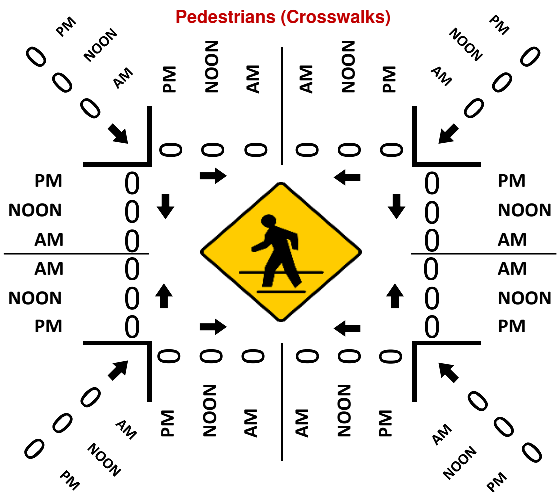
HT (AM)



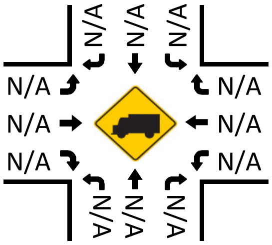
Total Vehicles (Noon)



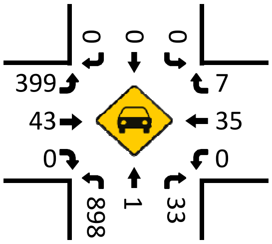
Pedestrians (Crosswalks)



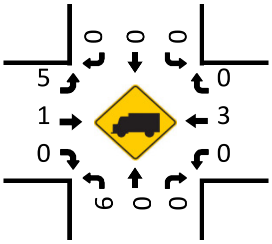
HT (NOON)



Total Vehicles (PM)



HT (PM)



Prepared by National Data & Surveying Services

I-80 SB Ramps & Bell Rd

Peak Hour Turning Movement Count

ID: 19-07211-003
City: Auburn

Day: Tuesday
Date: 05/21/2019

PEAK HOURS		COUNT PERIODS
07:15 AM - 08:15 AM	AM	05:30 AM - 10:30 AM
NONE	NOON	NONE
04:30 PM - 05:30 PM	PM	03:00 PM - 06:30 PM

I-80 SB Ramps — SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	384	0	0	0	0
NOON	0	0	0	0	0
PM	160	0	6	0	0
	0.5	0.5	0	0	

Bell Rd — EASTBOUND

	AM	NOON	PM	
⇦	1258	0	1067	
↶	0	0	0	0
↱	0	0	0	0
→	112	0	449	1
↴	552	0	834	1

Bell Rd — WESTBOUND

		PM	NOON	AM
0	⬑	0	0	0
1	←	907	0	874
1	↲	25	0	19
0	↷	0	0	0
	⇨	455	0	112

CONTROL

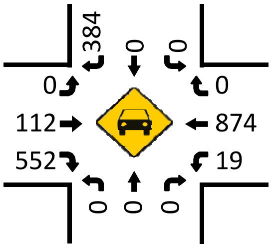
1-Way Stop(SB)

	AM	NOON	PM
TEV	1941	0	2381
PHF	0.86		0.95

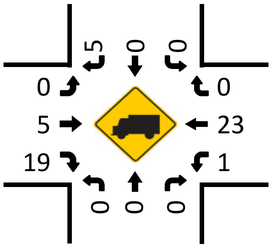
I-80 SB Ramps — NORTHBOUND

	⇩	↶	↰	↑	↱
		0	0	0	0
PM	859	0	0	0	0
NOON	0	0	0	0	0
AM	571	0	0	0	0

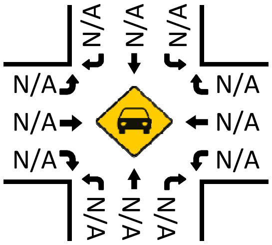
Total Vehicles (AM)



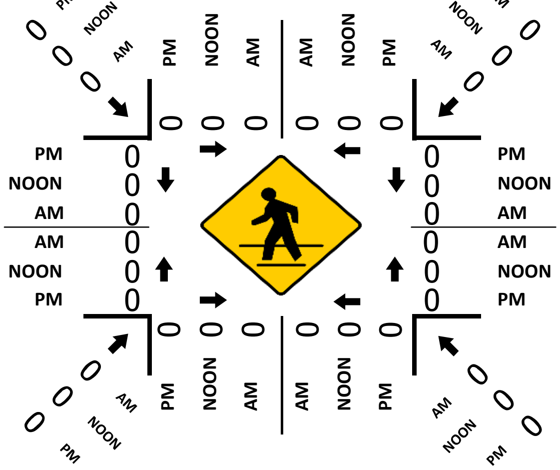
HT (AM)



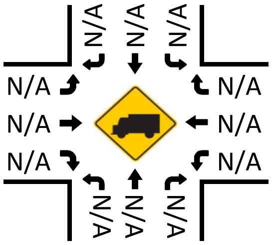
Total Vehicles (Noon)



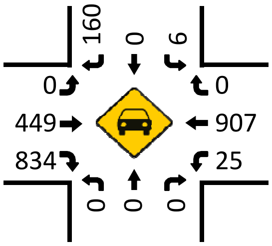
Pedestrians (Crosswalks)



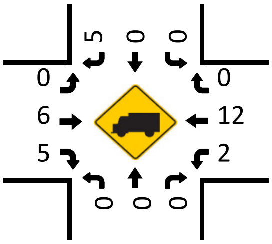
HT (NOON)



Total Vehicles (PM)



HT (PM)



Prepared by National Data & Surveying Services

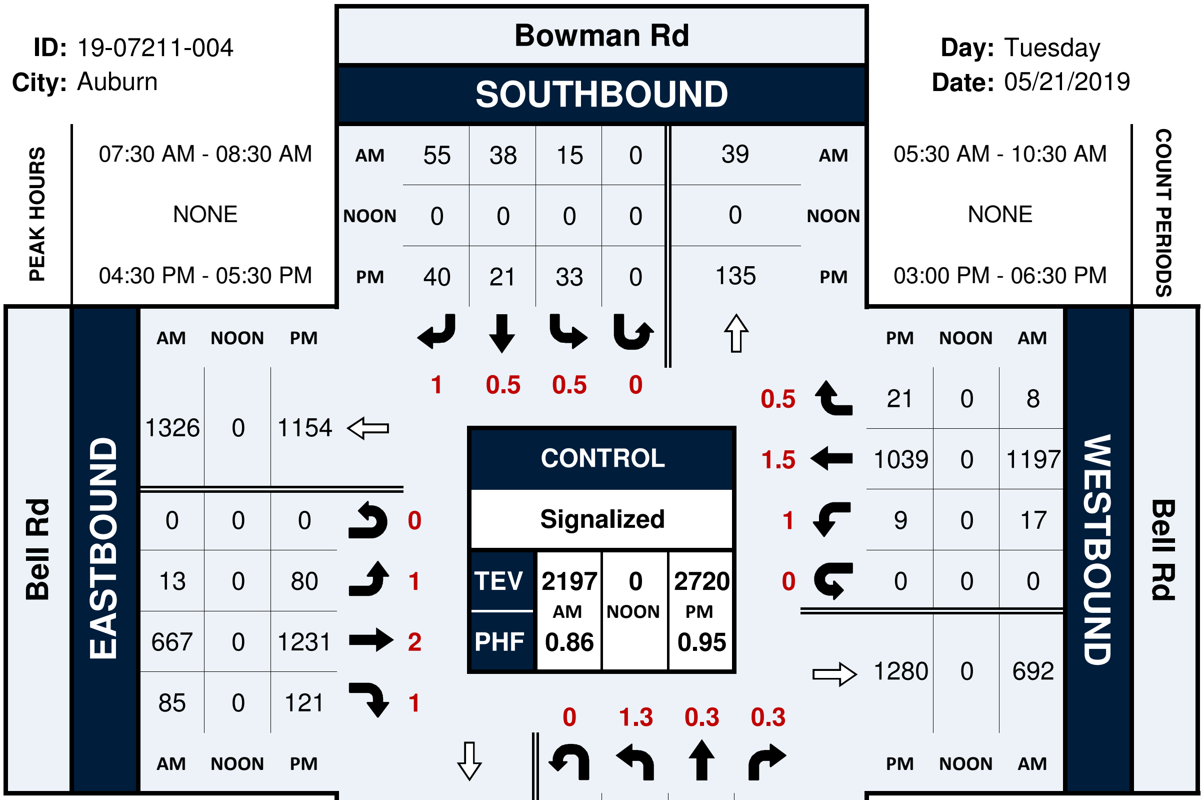
Bowman Rd & Bell Rd

Peak Hour Turning Movement Count

ID: 19-07211-004
City: Auburn

Day: Tuesday
Date: 05/21/2019

	PEAK HOURS	COUNT PERIODS
AM	07:30 AM - 08:30 AM	05:30 AM - 10:30 AM
NOON	NONE	NONE
PM	04:30 PM - 05:30 PM	03:00 PM - 06:30 PM



Bowman Rd

SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	55	38	15	0	39
NOON	0	0	0	0	0
PM	40	21	33	0	135
	1	0.5	0.5	0	

Bell Rd

WESTBOUND

		PM	NOON	AM
0.5	↰	21	0	8
1.5	←	1039	0	1197
1	↙	9	0	17
0	↶	0	0	0
	⇨	1280	0	692

Bell Rd

EASTBOUND

		AM	NOON	PM
⇦		1326	0	1154
↷	0	0	0	0
↱	1	13	0	80
→	2	667	0	1231
↴	1	85	0	121

CONTROL

Signalized

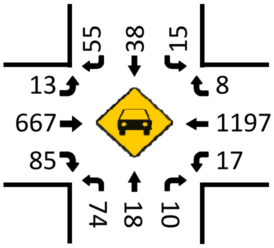
	AM	NOON	PM
TEV	2197	0	2720
PHF	0.86		0.95

NORTHBOUND

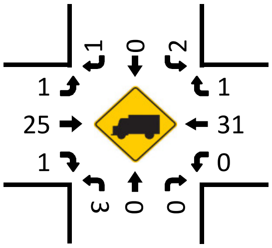
Bowman Rd

	⇩	↶	↰	↑	↱
		0	1.3	0.3	0.3
PM	151	0	75	34	16
NOON	0	0	0	0	0
AM	140	0	74	18	10

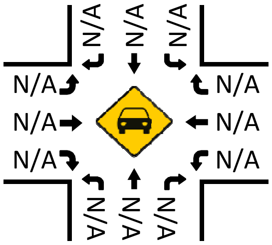
Total Vehicles (AM)



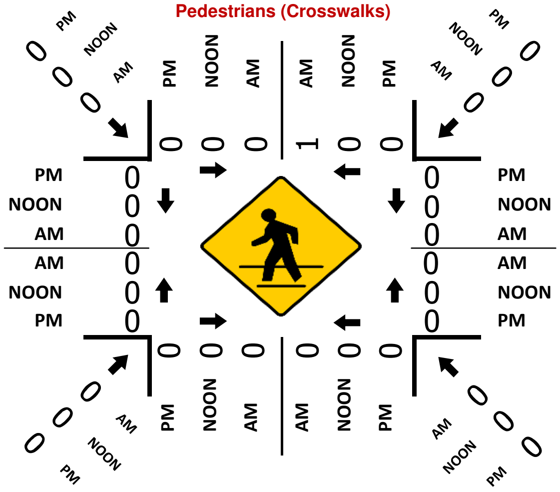
HT (AM)



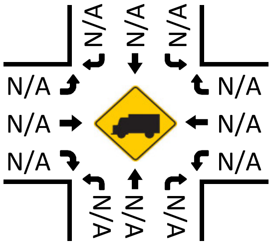
Total Vehicles (Noon)



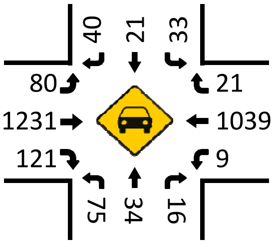
Pedestrians (Crosswalks)



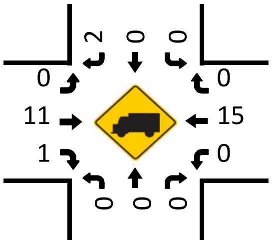
HT (NOON)



Total Vehicles (PM)



HT (PM)



APPENDIX B

Future Growth Rate and Forecasting Methodology Memorandum

Memorandum

February 24, 2020

To:	Caltrans District 3 Division of Traffic Planning	Project:	Bell Road at I-80 Roundabouts Project
From:	Heather Anderson, PE Kamesh Vedula, PE, TE	Ref/Job No.:	11195697
CC:	Zach Stinger, EIT	File No.:	11195697MEM001.DOCX
Subject:	Future Growth Rate and Forecasting Methodology		

1. Introduction

This memorandum has been prepared by GHD to determine the growth rate and the appropriate tool (Travel Demand Model) that shall be used to determine the 2045 traffic forecasts at the study intersections for the Bell Road at I-80 Roundabouts Project (project) in Placer County. Two different traffic models provide forecasts for the study area. The purpose of obtaining these traffic forecasts is to assist in the design of potential improvements at the study intersection that could be completed and open for use by 2025 and be adequate through 2045.

1.1 Travel Demand Models

The Sacramento Area Council of Governments (SACOG) Regional Travel Demand Model – SACSIM and North Auburn Sub-Area Travel Demand Forecasting Model 2018 (modified version of SACMET) model provide forecasts for the study area.

SACSIM predicts how people in the six-county SACOG region travel on a typical weekday, including where they go, when they make trips, why they make trips, what travel mode or modes they use, and much more. The model forecasts 2016 and 2040 volumes.

North Auburn Sub-Area Travel Demand Forecasting Model 2018 (Placer County model) is developed on the previous version of the SACOG's SACMET model, which was subsequently updated with the SACSIM model. The model forecasts 2018 and 2040 daily volumes and AM and PM peak hour volumes.

1.2 Need and Purpose

The purpose of this memorandum is to obtain the methodology of the traffic forecasts for the study intersection from Caltrans District 3 Division of Traffic Forecasting for the Opening Year (2025) and Design Year (2045). The forecasts will be utilized to evaluate traffic operations for the study alternatives, which will improve operations at the study intersection. This memorandum presents methodology and results for the following:

- Validation of the base model network using ADT data and screen-line crossing analysis; and
- Traffic Volume Forecasting Methodology for Opening Year (2025) and Ultimate Design Year (2045).

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2. Project Description and Study Area

The project proposes to construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the Interstate 80 (I-80) westbound ramps intersection as well as a five-legged roundabout at Bell Road that includes the I-80 eastbound ramps intersection and the Musso Road intersection. The roundabouts will be designed to accommodate future growth "2045" (see Figure 2.1 for a Vicinity Map). Additional nearby facilities were also included in the model validation.

2.1 Project Study Area Roadways

Roadways that provide vehicle circulation within the general vicinity of the project area are Bell Road, I-80, Dry Creek Road, Auburn Ravine Road, and State Route (SR) 49.

Interstate 80

I-80, in the project vicinity, is a six-lane, divided freeway extending through Auburn to the south and Colfax to the north. As a major freeway, I-80 provides north-south access from the Bay Area to Nevada. Within the project area, I-80 extends in a northeast-southwest direction and I-80 has an Average Daily Traffic (ADT) of 52,000 vehicles.

Bell Road

Bell Road is a four-lane, divided roadway that extends in a northwest-southeast direction within the project vicinity. At I-80, Bell Road has an interchange with standard on and off ramps. Within the project area, Bell Road has an ADT of 16,000 vehicles.

Dry Creek Road

Dry Creek Road is a two-lane roadway that extends in an east-west direction north of the project area. It can be used as an alternate route to I-80 from SR 49 in place of Bell Road. Near the project area, Dry Creek Road has an ADT of 2,000 vehicles.

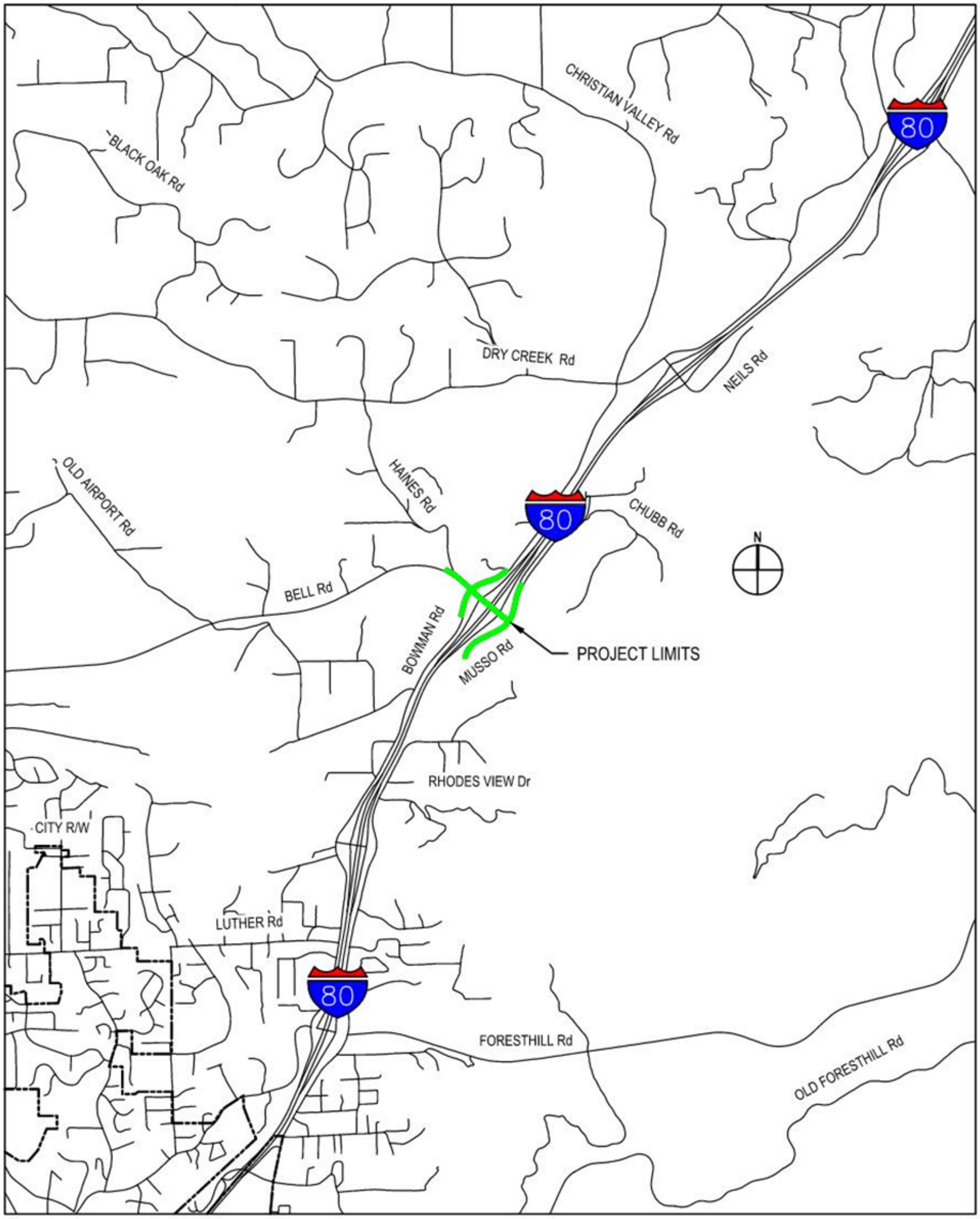
Auburn Ravine Road

Auburn Ravine Road is a two-lane collector that extends in an east-west direction south of the project area. It can be used as an alternate route to I-80 from SR 49 in place of Bell Road. Near the I-80 interchange, Auburn Ravine Road has an ADT of 12,000 vehicles.

State Route 49

SR 49 is a four-lane highway with a two-way left-turn lane that extends in a north-south direction west of the project area. Near the project area, SR 49 has an ADT of 30,000 vehicles.

Figure 2.1: Vicinity Map



3. Model Validation Methodology and Guidelines

Two different travel demand models provide forecasts for the study area. The validation of two models was conducted using the screenline validation technique recommended within the *Travel Model Validation and Reasonableness Checking Manual Second Edition* produced by the Federal Highway Administration (FHWA) in September 2010. As these are regional models, a screenline validation is the best method to check model calibration.

3.1 Screenline Validation

The screenline model validation exercise performs a comparison of observed counts that were recorded by Caltrans 2017 Average Annual Daily Traffic (AADT) and existing peak hour counts where available to the total directional ADT volumes projected for Year 2016 by the SACSIM model and Year 2008 for the Placer County model at the screenline.

The purpose of this screenline validation test is to determine the reasonableness of traffic model volumes within the immediate study area. This test establishes the validity of the travel forecasts within the selected subarea of the SACSIM model.

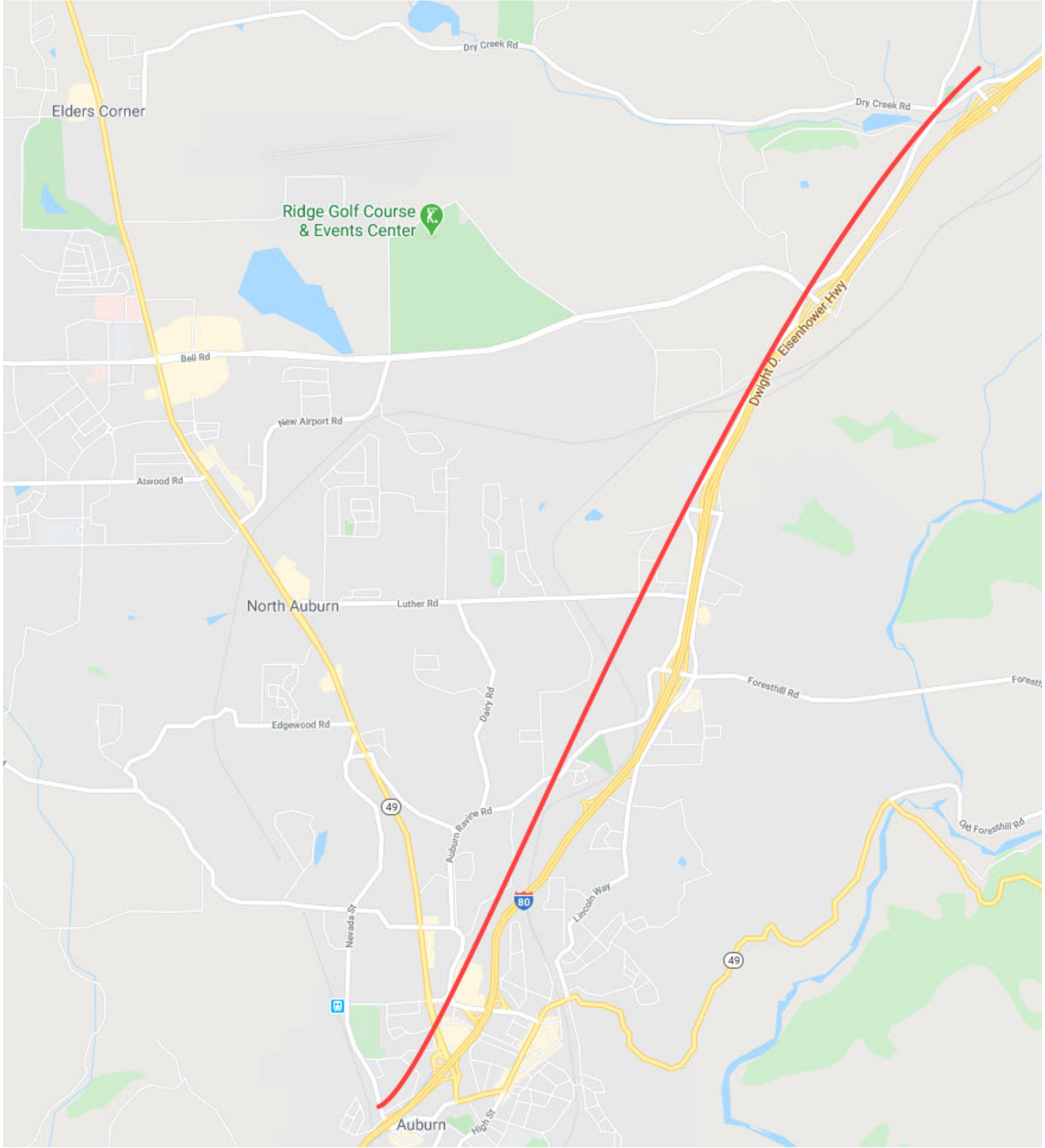
Only the ADT data was available at the screenline for all Caltrans facilities. For Bell Road, Dry Creek Road, and Auburn Ravine Road, the peak hour counts collected for this study and previous studies were available. A factor of 10 (industry standard) was applied to convert the peak hour counts to ADT. The screenline validation was performed through a comparison of available ADT data to model ADT data. The following section presents the methodology followed in performing the screenline validation of the model.

3.1.1 Threshold Criteria for Screenline Validation

The location for the placement of the screenline was determined such that all inbound and outbound ADTs along major roadways were captured. Figure 3.1 presents the location of the screenline used in this analysis.

As mentioned within the previous section, the screenline validation methodology was conducted per the Caltrans' Travel Forecasting Guidelines published by Caltrans (November 1992). The thresholds used within this screenline analysis are based on Figure 3.2, which presents the *Maximum Desirable Deviation in Total Screenline Volumes* as provided within Figure 3-9 of the Travel Forecasting Guidelines published by Caltrans in November 1992.

Figure 3.1: Screenline Location



3.1.2 Model Performance for Screenline Validation

Table 3.1 and Table 3.2 present a summary of the results obtained for the screenline evaluated during the validation as well as spot checks for select locations of the Placer County model and the SACSIM model, respectively. As presented, the sum of ADT for all four major connectors from SR 49 to I-80 (Bell Road, Dry Creek Road, Auburn Ravine Road, and SR 49) are totaled, compared, and measured against the established "Threshold Criteria." Elm Road is also included, however, there is no recorded count data to compare to the model, so it is not part of the total screenline results. The count data for Auburn Ravine Road was obtained from the Bohemia Retail Traffic Impact Analysis Report (TIAR).

Table 3.1: Summary of Screenline Validation Results for the County Model

Roadway	Location	SacSIM Model (2016)	Count	Source	Percent Error	Threshold Criteria	Percent Error < Threshold Criteria
Bell Road	West of I-80	15,777	23,500	Peak Hour Counts (2019)			
Dry Creek Road	West of I-80	1,100	5,300	Peak Hour Counts (2019)			
Auburn Ravine Road	West of I-80	12,952	2,720	Peak Hour Counts (2008)			
Elm Ave[1]	West of I-80	10,647	2,720	Peak Hour Counts (2008)			
SR 49	North of I-80	39,181	30,000	Caltrans AADT (2017)			
Sum	Screenline	79,657	64,240	-	19.4%	30.0%	TRUE

1. Volumes for Elm Avenue (W/O I-80) were not available. Review of the surrounding land uses suggest that this interchange has destinations comparable to Auburn Ravine Road IC. For the purposes of this memo, volumes for Elm Avenue from will be assumed to be same as Auburn Ravine Road.

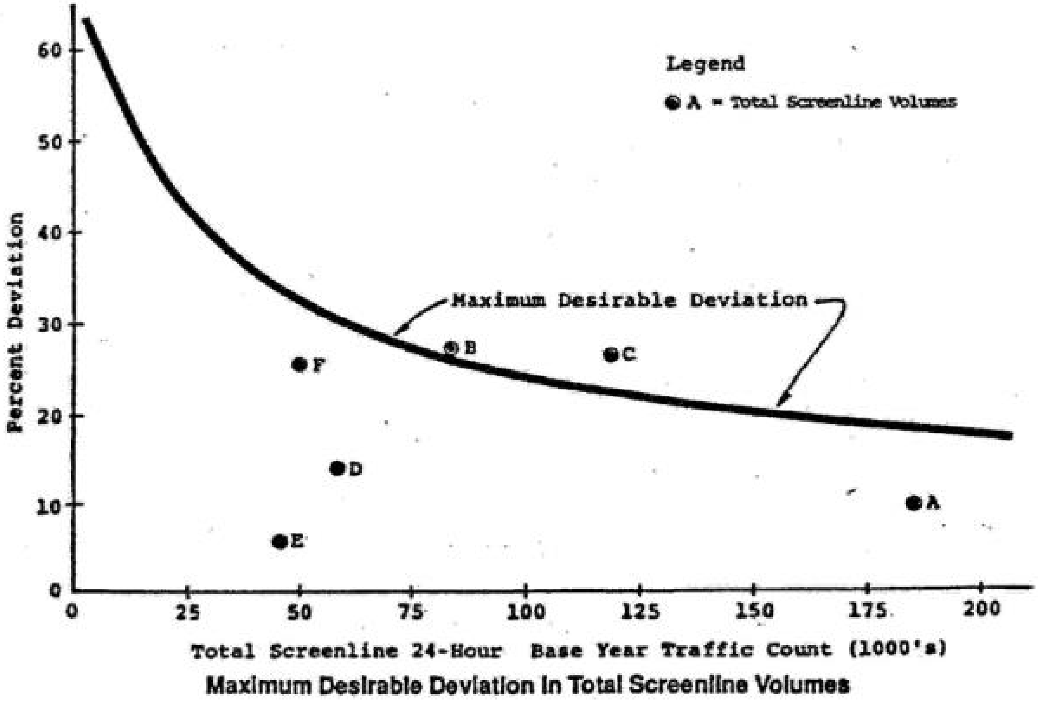
Table 3.2: Summary of Screenline Validation Results for the SACSIM Model

Roadway	Location	County Model (2018)	Count	Source	Percent Error	Threshold Criteria	Percent Error < Threshold Criteria
Bell Road	West of I-80	17,101	23,500	Peak Hour Counts (2019)			
Dry Creek Road	West of I-80	1,840	5,300	Peak Hour Counts (2019)			
Auburn Ravine Road	West of I-80	10,078	2,720	Peak Hour Counts (2008)			
Elm Ave[1]	West of I-80	17,454	2,720	Peak Hour Counts (2008)			
SR 49	North of I-80	28,493	30,000	Caltrans AADT (2017)			
Sum	Screenline	74,966	64,240	-	14.3%	30.0%	TRUE

1. Volumes for Elm Avenue (W/O I-80) were not available. Review of the surrounding land uses suggest that this interchange has destinations comparable to Auburn Ravine Road IC. For the purposes of this memo, volumes for Elm Avenue from will be assumed to be same as Auburn Ravine Road.

The threshold criteria presented in Table 3.1 and Table 3.2 were estimated using the validation curve presented in Figure 3.2. The percent error between the observed Caltrans 2017 AADT and the Placer County model ADT is below the threshold criteria of 30%, thereby indicating that the model is validated within the thresholds for screenline analysis. The percent error between the observed Caltrans 2017 AADT and the SACSIM model ADT is below the threshold criteria of 30%, thereby indicating that the model is validated within the thresholds for screenline analysis.

Figure 3.2: Maximum Desirable Deviation in Total Screenline Volumes (Figure 3-9 in *Travel Forecasting Guidelines*, Caltrans, Nov. 1992)



4. Conclusions of Model Validation

Based on the above summaries for model validation by screenline and link-level analysis, it is concluded that both models' forecasts reasonably replicate existing conditions within the model limitations specified within the *Travel Model Validation and Reasonableness Checking Manual* provided by the FHWA. Based on the validation analysis, it can be concluded that both models can be used to forecast future volumes at the study intersection.

5. Historical Data

The historical counts used in this memorandum were collected on July 1, 2008 for the Timberline at Auburn Continuing Care Retirement Community Transportation Impact Analysis Report. These historical counts were then compared to the existing counts collected on May 21, 2019 for the project. Additionally, the counts collected in 2018 for the Placer County Government Center Environmental Impact Report are included for comparison purposes. With the exception of the RV resort and a few residential uses, Bell Road to the east of the interchange does not serve significant traffic generating uses. As such, the focus area for the data comparison were the volumes on Bell Road west of the interchange and the sum of all the entering and exiting volumes for both AM and PM periods at the study intersections (study area). Table 5.1 below presents the growth between the historical counts and the existing counts.

Table 5.1: Historical Comparison

Segment	2008 Volume (VPH)	2018 Volume (VPH)	2019 Volume (VPH)	Cumulative Growth over 11 Years	Yearly Growth
Study Area	11,440	12,164	11,774	2.9%	0.3%
Bell Road (AM)	2,050	2,289	2,125	3.7%	0.3%
Bell Road (PM)	2,369	2,602	2,589	9.3%	0.8%

The average observed cumulative growth on Bell Road over 11 years is 3.7% during the AM peak period and 9.3% during the PM peak period. The study area grows by an average of 2.9% over 11 years. The 0.8% PM peak hour growth rate per year, when extrapolated to 25 years, results in a cumulative growth rate of 20%. Conservatively rounding the Bell Road growth to 1% per year will result in approximately 25% growth through the design year. The study area includes the frontage roads (Bowman Road and Musso Road), which are not expected to attract development, and as a result, not expected to see a significant volume increase. Considering the conservative PM peak hour growth trends, it can be concluded that volumes at this interchange are expected to increase in the range of 20% to 25% through the design year.

In addition to the historical counts that were previously collected, the closest available Caltrans AADT along I-80 were compared to understand the growth trends along the mainline. Table 5.2 below presents the growth on I-80 between 2008 and 2017.

Table 5.2: I-80 Mainline Growth

Segment	1997 Caltrans ADT South	2017 Caltrans ADT North	20 year Growth	Yearly Growth
I-80 Btw. Lincoln Way and Auburn Ravine Rd	51,000	62,400	22.4%	2.5%
I-80 Btw. Auburn Ravine Rd and Bowman Rd	50,000	57,400	14.8%	1.6%
I-80 Btw. Bowman and Bell Rd	49,000	61,200	24.9%	2.8%
I-80 Btw. Bell Rd and Dry Creek Rd	47,000	51,900	10.4%	1.2%
I-80 Btw. Dry Creek Rd and Clipper Gap	45,000	49,000	8.9%	1.0%
I-80 Btw. Clipper Gap and Applegate Rd	43,000	42,000	-2.3%	-0.3%
Average	-	-	13.2%	1.5%

As shown in Table 5.2, the observed growth over 20 years along mainline I-80 in the study area on average is 1.5% per year.

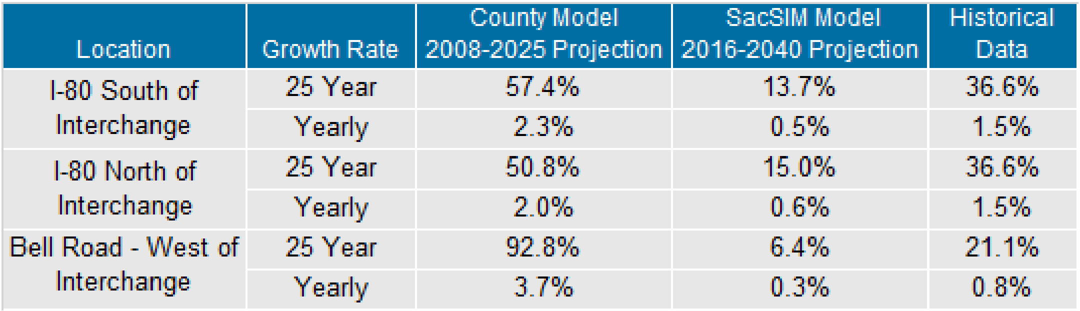
The major I-80/SR 65 interchange project includes forecasts on I-80. A review of the forecasts on mainline I-80 east of SR 65 indicate a 1.22% growth on mainline I-80. This is comparable to the 1.5% historical growth rate on I-80 identified in Table 5.2. Based on this data, the cumulative growth on mainline I-80 is expected to be in the range of 30% to 37% through the design year.

With a baseline set up of the growth that has occurred over the previous decade, this data can be utilized to establish the appropriate model for deriving the traffic forecasts for the study area.

6. Growth Rate Comparison

The Placer County model and the SACSIM model were compared to the historical growth to determine which model projects growth that reflect current trends. As discussed in Section 5 above, the cumulative growth for Bell Road is expected to be around 20% to 25%, and Mainline I-80 is expected to be around 30% to 38% over a 25 year period. A comparison of the historical to the model growth rates is presented in Table 6.1. For the Placer County model, PM peak hour forecasts were used for Bell Road, while daily forecasts were used for I-80 mainline. For the SACSIM model, daily forecasts were used for deriving the growth rate on Bell Road and I-80 mainline.

Table 6.1: Projected Growth Rates Comparison



Location	Growth Rate	County Model 2008-2025 Projection	SacSIM Model 2016-2040 Projection	Historical Data
I-80 South of Interchange	25 Year	57.4%	13.7%	36.6%
	Yearly	2.3%	0.5%	1.5%
I-80 North of Interchange	25 Year	50.8%	15.0%	36.6%
	Yearly	2.0%	0.6%	1.5%
Bell Road - West of Interchange	25 Year	92.8%	6.4%	21.1%
	Yearly	3.7%	0.3%	0.8%

Based on the results of the comparison, neither model is projecting growth that reasonably reflects the current growth trends. The SACSIM model is a regional model that under predicts growth when compared to existing travel growth and trends on Bell Road and mainline I-80. The Placer County model has a much higher growth rate along Bell Road and mainline I-80 when compared to the historical data. Since the traffic growth and trends from the Placer County model differ significantly from the historical trends, it is likely that the future forecasts reflect the full buildout of land uses, which occur over a period beyond the design year for this project.

7. Forecasting Methodology for Year 2045 Conditions

The following sections present the core methodology that will be used in forecasting turning movement volumes for the weekday AM and PM peak hours and mainline volumes for Design Year 2045 Conditions.

7.1 Volume Forecasting Methodology for I-80 Mainline

As noted previously, a review of mainline I-80 forecasts from the major I-80/SR 65 interchange study are comparable to the 1.5% historical growth rate. As such, a 1.5% growth rate per year, which results in a cumulative growth rate of 37% through the design year, will be utilized to forecast mainline I-80 volumes at this interchange.

7.2 Volume Forecasting Methodology for Study Intersections

Based on the results of the comparison, neither model is projecting growth that reasonably reflects the current growth trends. Conservatively rounding the Bell Road growth to 1% per year will result in approximately 25% growth through the design year. Although the study area includes the frontage roads (Bowman Road and Musso Road) that are not expected to attract development, and not expected to see a significant volume increase, all turning movements at study intersections will be increased by 25%.

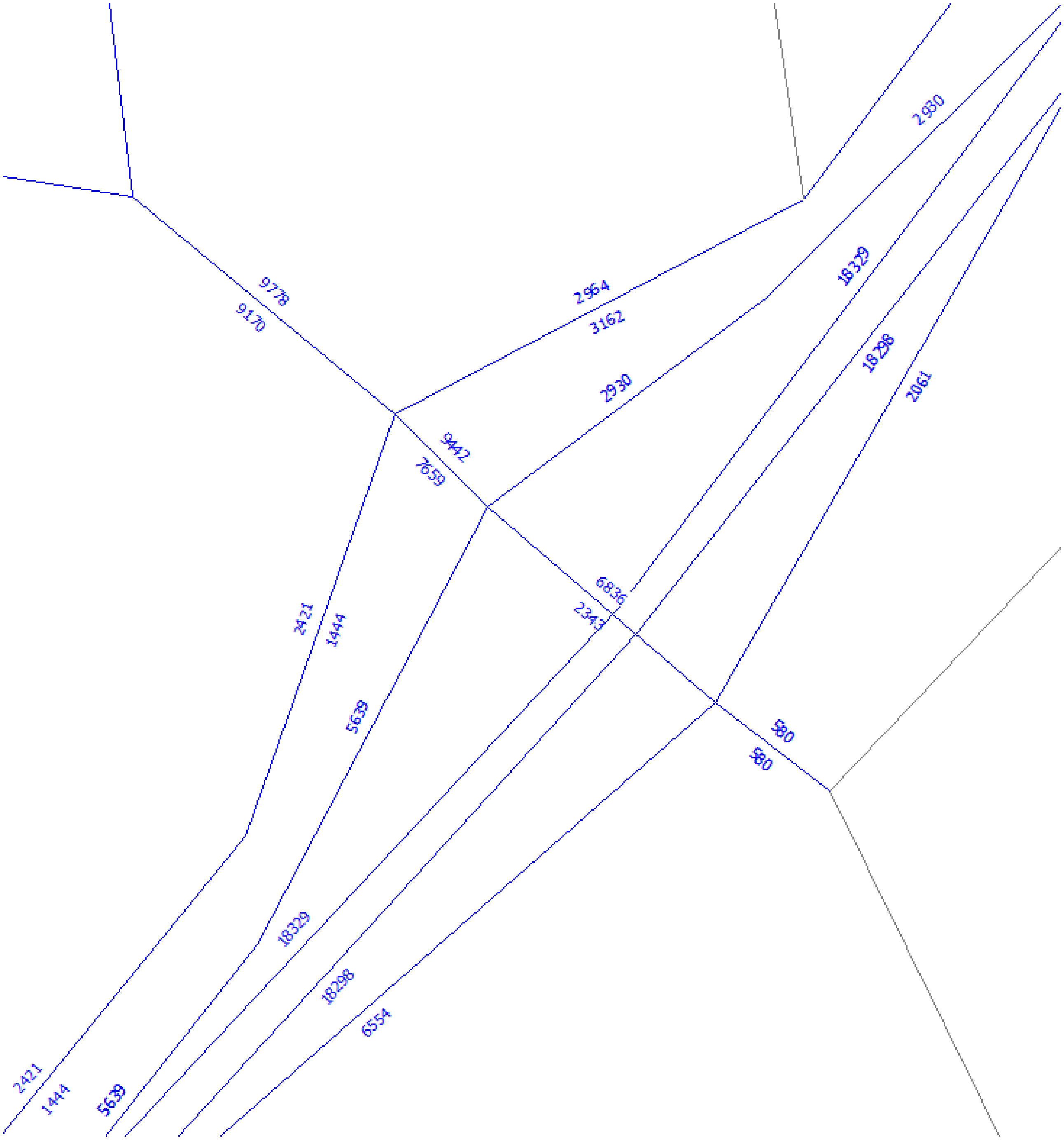
7.3 Sensitivity Analysis for Study Intersections

Based on the results of the comparison, neither model is projecting growth that reasonably reflects the current growth trends. While the Placer County model is over projecting growth, the SACSIM model is under projecting growth.

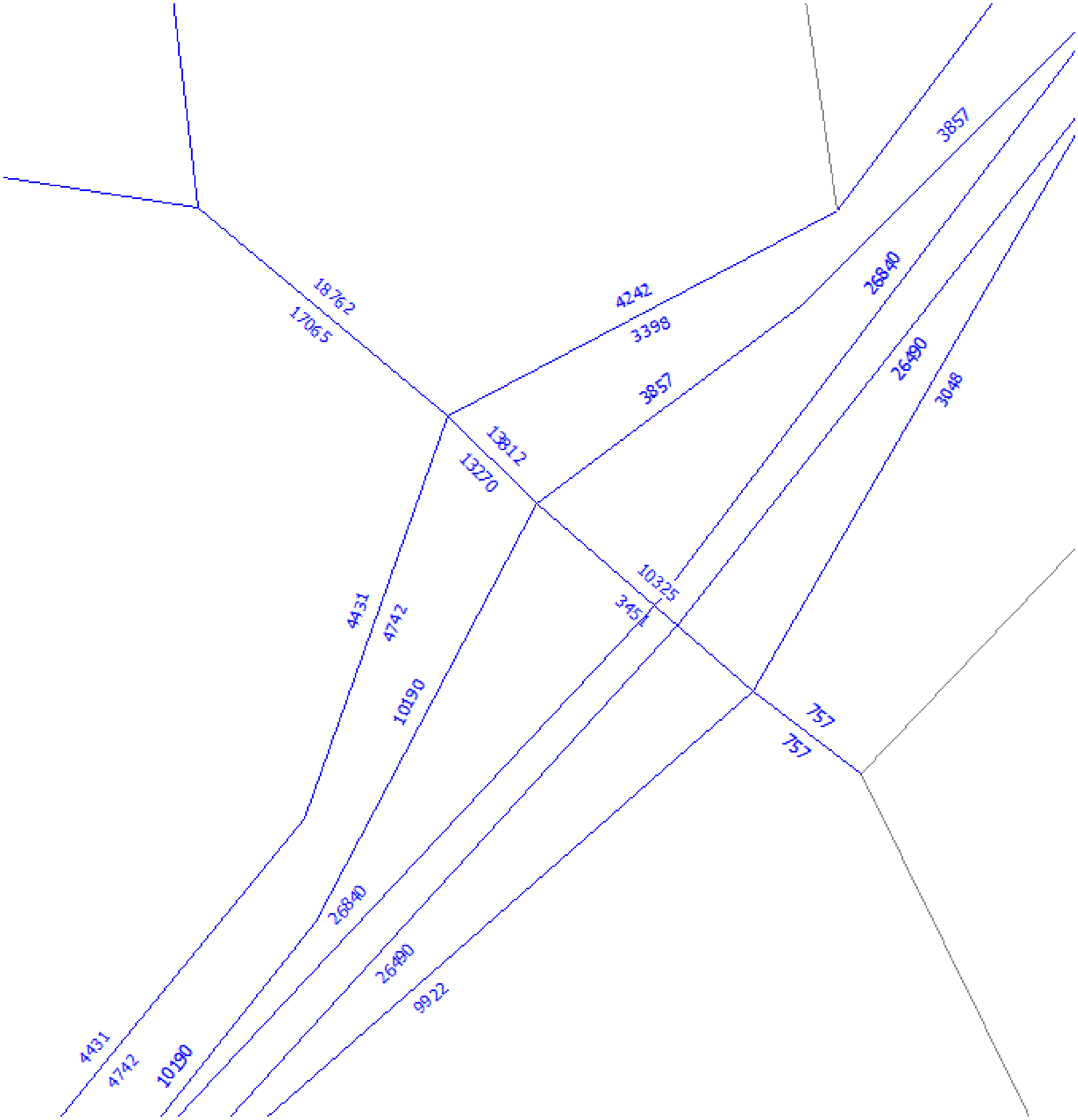
To understand the sensitivity of geometry to the design alternatives, traffic forecasts that reflect an average condition between the models will be utilized. The average growth rate between the two models is 2% per year, which results in 50% growth through the design year. To test the sensitivity of volumes to geometry, all turning movements at study intersections will be increased by 50%.

Appendix

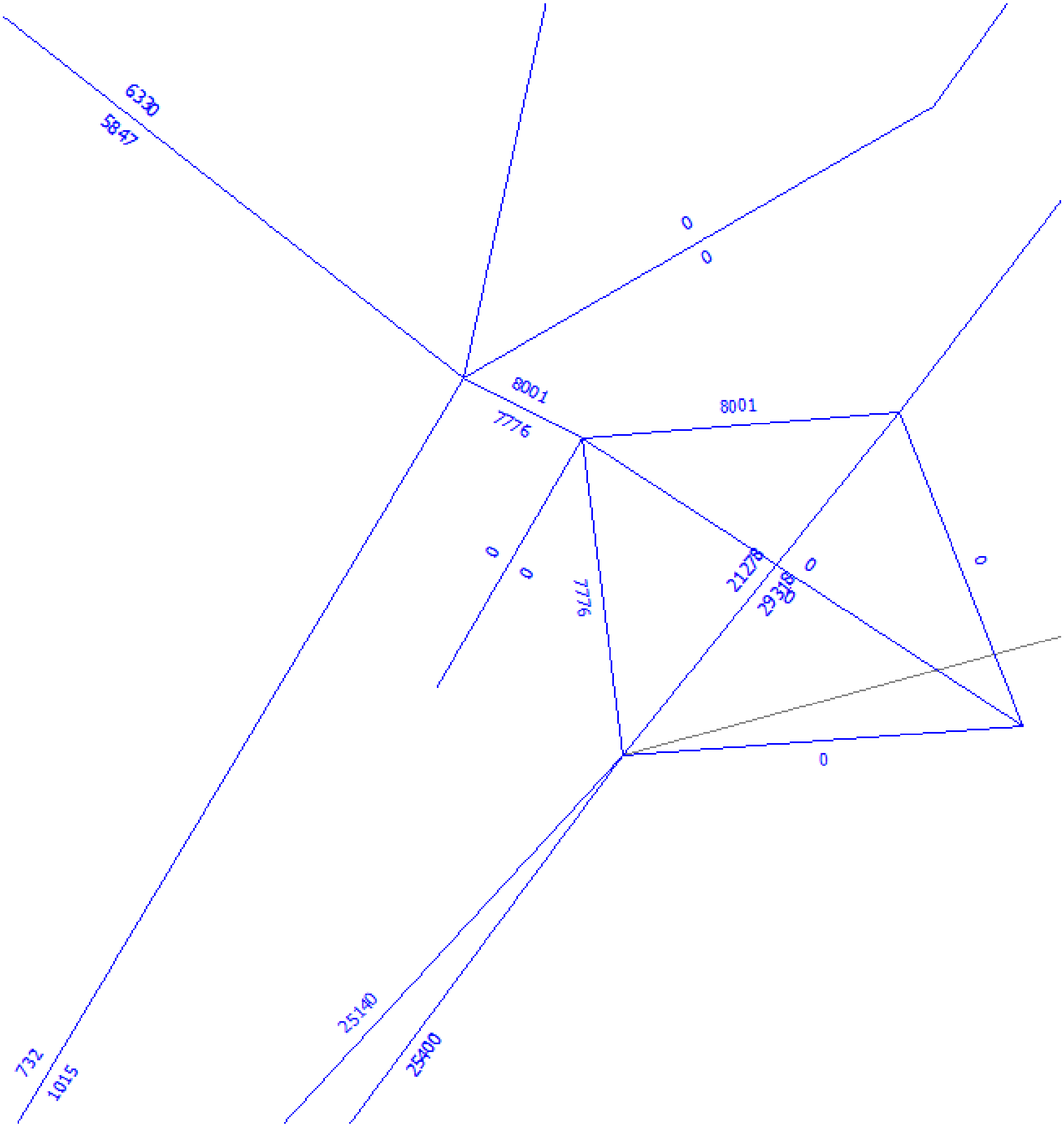
2018 County Model Daily Outputs



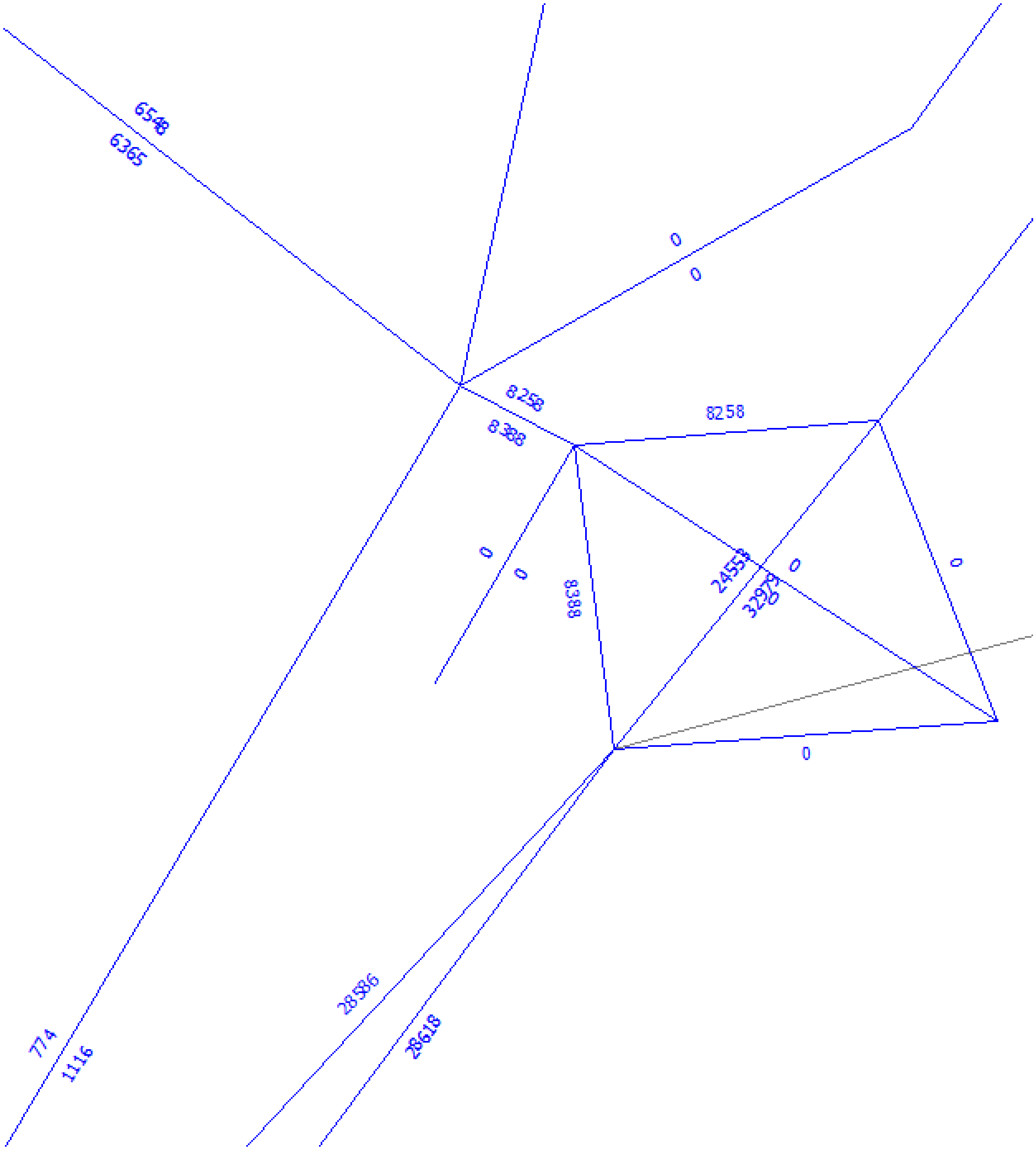
2040 County Model Daily Outputs



2016 SacSIM Model Daily Outputs



2040 SacSIM Model Daily Outputs



APPENDIX C

Synchro and SimTraffic Reports

HCM 6th Signalized Intersection Summary
1: Bowman Rd & Bell Rd

AM Peak Hour
Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	✥			↰↑	↱
Traffic Volume (veh/h)	13	667	85	20	1231	10	74	18	10	15	38	55
Future Volume (veh/h)	13	667	85	20	1231	10	74	18	10	15	38	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	15	776	99	23	1431	12	60	58	12	17	44	64
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	26	1814	809	38	1868	16	120	101	21	35	91	108
Arrive On Green	0.01	0.51	0.51	0.02	0.52	0.52	0.07	0.07	0.07	0.07	0.07	0.07
Sat Flow, veh/h	1767	3526	1572	1767	3583	30	1767	1491	309	510	1320	1572
Grp Volume(v), veh/h	15	776	99	23	704	739	60	0	70	61	0	64
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1850	1767	0	1800	1830	0	1572
Q Serve(g_s), s	0.4	7.2	1.7	0.7	16.7	16.8	1.7	0.0	2.0	1.7	0.0	2.1
Cycle Q Clear(g_c), s	0.4	7.2	1.7	0.7	16.7	16.8	1.7	0.0	2.0	1.7	0.0	2.1
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.17	0.28		1.00
Lane Grp Cap(c), veh/h	26	1814	809	38	919	965	120	0	122	126	0	108
V/C Ratio(X)	0.57	0.43	0.12	0.60	0.77	0.77	0.50	0.00	0.57	0.48	0.00	0.59
Avail Cap(c_a), veh/h	504	5359	2390	504	2680	2813	672	0	684	869	0	747
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.7	7.9	6.6	25.5	10.0	10.0	23.7	0.0	23.8	23.6	0.0	23.8
Incr Delay (d2), s/veh	6.9	0.1	0.0	5.5	1.0	1.0	1.2	0.0	1.6	1.1	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.6	0.3	0.3	3.7	3.9	0.7	0.0	0.8	0.7	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.7	8.1	6.7	31.0	11.1	11.0	24.9	0.0	25.3	24.7	0.0	25.7
LnGrp LOS	C	A	A	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		890			1466			130			125	
Approach Delay, s/veh		8.3			11.3			25.1			25.2	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	3.8	33.4		7.7	4.1	33.1		7.7
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	18.8		4.0	2.7	9.2		4.1
Green Ext Time (p_c), s	0.0	8.7		0.2	0.0	4.3		0.2

Intersection Summary	
HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	58.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✣	
Traffic Vol, veh/h	0	125	567	20	877	0	0	0	0	0	0	384
Future Vol, veh/h	0	125	567	20	877	0	0	0	0	0	0	384
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	145	659	23	1020	0	0	0	0	0	0	447

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	804	0	0	1541	1870	1020
Stage 1	-	-	-	-	-	-	1066	1066	-
Stage 2	-	-	-	-	-	-	475	804	-
Critical Hdwy	-	-	-	4.13	-	-	6.43	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.43	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.43	5.53	-
Follow-up Hdwy	-	-	-	2.227	-	-	3.527	4.027	3.327
Pot Cap-1 Maneuver	0	-	-	816	-	0	126	72	~ 286
Stage 1	0	-	-	-	-	0	329	298	-
Stage 2	0	-	-	-	-	0	624	394	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	816	-	-	122	0	~ 286
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	0	-
Stage 1	-	-	-	-	-	-	329	0	-
Stage 2	-	-	-	-	-	-	607	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.2	$ 301.3
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	816	-	286
HCM Lane V/C Ratio	-	-	0.028	-	1.561
HCM Control Delay (s)	-	-	9.5	-	$ 301.3
HCM Lane LOS	-	-	A	-	F
HCM 95th %tile Q(veh)	-	-	0.1	-	26.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Intersection Delay, s/veh	32.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↑↱		↰	↰↑↱				
Traffic Vol, veh/h	108	17	0	0	31	2	866	0	7	0	0	0
Future Vol, veh/h	108	17	0	0	31	2	866	0	7	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	138	22	0	0	40	3	1110	0	9	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	11.5	9.7	36.4
HCM LOS	B	A	E

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	98%	86%	0%
Vol Thru, %	0%	0%	14%	94%
Vol Right, %	0%	2%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	433	440	125	33
LT Vol	433	433	108	0
Through Vol	0	0	17	31
RT Vol	0	7	0	2
Lane Flow Rate	555	564	160	42
Geometry Grp	7	7	2	2
Degree of Util (X)	0.876	0.887	0.273	0.072
Departure Headway (Hd)	5.68	5.661	6.126	6.151
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	638	637	587	581
Service Time	3.435	3.416	4.157	4.202
HCM Lane V/C Ratio	0.87	0.885	0.273	0.072
HCM Control Delay	35.7	37.1	11.5	9.7
HCM Lane LOS	E	E	B	A
HCM 95th-tile Q	10.3	10.7	1.1	0.2

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰	↱	
Traffic Vol, veh/h	9	15	13	0	1	20
Future Vol, veh/h	9	15	13	0	1	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	12	20	18	0	1	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	51	15	28	0	-	0
Stage 1	15	-	-	-	-	-
Stage 2	36	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.25	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.335	-	-	-
Pot Cap-1 Maneuver	926	1028	1505	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	915	1028	1505	-	-	-
Mov Cap-2 Maneuver	915	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	954	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	8.8		7.4		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1505	-	982	-	-
HCM Lane V/C Ratio	0.012	-	0.033	-	-
HCM Control Delay (s)	7.4	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 6th Signalized Intersection Summary
1: Bowman Rd & Bell Rd

PM Peak Hour
Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	✥			↰	↱
Traffic Volume (veh/h)	80	1234	121	9	1039	21	75	34	16	33	21	40
Future Volume (veh/h)	80	1234	121	9	1039	21	75	34	16	33	21	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	1299	127	9	1094	22	66	54	17	35	22	42
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	107	1807	806	17	1631	33	126	97	30	67	42	96
Arrive On Green	0.06	0.51	0.51	0.01	0.46	0.46	0.07	0.07	0.07	0.06	0.06	0.06
Sat Flow, veh/h	1781	3554	1585	1781	3563	72	1781	1364	429	1114	700	1585
Grp Volume(v), veh/h	84	1299	127	9	546	570	66	0	71	57	0	42
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1857	1781	0	1793	1815	0	1585
Q Serve(g_s), s	2.3	13.9	2.1	0.2	11.8	11.8	1.8	0.0	1.9	1.5	0.0	1.3
Cycle Q Clear(g_c), s	2.3	13.9	2.1	0.2	11.8	11.8	1.8	0.0	1.9	1.5	0.0	1.3
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.24	0.61		1.00
Lane Grp Cap(c), veh/h	107	1807	806	17	813	850	126	0	127	110	0	96
V/C Ratio(X)	0.78	0.72	0.16	0.54	0.67	0.67	0.52	0.00	0.56	0.52	0.00	0.44
Avail Cap(c_a), veh/h	545	5798	2586	545	2899	3031	727	0	731	925	0	808
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.7	9.3	6.4	24.2	10.4	10.4	22.0	0.0	22.0	22.3	0.0	22.2
Incr Delay (d2), s/veh	4.6	0.4	0.1	9.5	0.7	0.7	1.2	0.0	1.4	1.4	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.8	0.4	0.1	2.8	2.9	0.7	0.0	0.7	0.6	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.4	9.7	6.5	33.7	11.1	11.1	23.2	0.0	23.5	23.8	0.0	23.4
LnGrp LOS	C	A	A	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1510			1125			137			99	
Approach Delay, s/veh		10.4			11.3			23.3			23.6	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	28.4		7.6	3.5	30.9		7.1				
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1				
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0				
Max Q Clear Time (g_c+I1), s	4.3	13.8		3.9	2.2	15.9		3.5				
Green Ext Time (p_c), s	0.1	5.6		0.2	0.0	9.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			11.8									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

2: I-80 WB Ramps & Bell Rd

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✣	
Traffic Vol, veh/h	0	449	834	25	907	0	0	0	0	6	0	162
Future Vol, veh/h	0	449	834	25	907	0	0	0	0	6	0	162
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	473	878	26	955	0	0	0	0	6	0	171

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	1351	0	0				1919	2358	955
Stage 1	-	-	-	-	-	-				1007	1007	-
Stage 2	-	-	-	-	-	-				912	1351	-
Critical Hdwy	-	-	-	4.12	-	-				6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-				5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-				3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	509	-	0				74	36	313
Stage 1	0	-	-	-	-	0				353	319	-
Stage 2	0	-	-	-	-	0				392	219	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	509	-	-				70	0	313
Mov Cap-2 Maneuver	-	-	-	-	-	-				70	0	-
Stage 1	-	-	-	-	-	-				353	0	-
Stage 2	-	-	-	-	-	-				372	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	28.5
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	509	-	325
HCM Lane V/C Ratio	-	-	0.052	-	0.544
HCM Control Delay (s)	-	-	12.5	-	28.5
HCM Lane LOS	-	-	B	-	D
HCM 95th %tile Q(veh)	-	-	0.2	-	3.1

Intersection	
Intersection Delay, s/veh	98.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↑↱		↰	↰↑↱				
Traffic Vol, veh/h	407	48	0	0	32	7	900	1	33	0	0	0
Future Vol, veh/h	407	48	0	0	32	7	900	1	33	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	522	62	0	0	41	9	1154	1	42	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	58.9	10.7	121.7
HCM LOS	F	B	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	93%	89%	0%
Vol Thru, %	0%	0%	11%	82%
Vol Right, %	0%	7%	0%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	468	466	455	39
LT Vol	468	432	407	0
Through Vol	0	1	48	32
RT Vol	0	33	0	7
Lane Flow Rate	600	597	583	50
Geometry Grp	7	7	2	2
Degree of Util (X)	1.184	1.165	0.989	0.095
Departure Headway (Hd)	7.106	7.019	6.101	6.971
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	516	520	595	517
Service Time	4.806	4.719	4.126	4.971
HCM Lane V/C Ratio	1.163	1.148	0.98	0.097
HCM Control Delay	125.4	118	58.9	10.7
HCM Lane LOS	F	F	F	B
HCM 95th-tile Q	21.9	21.2	14.4	0.3

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗			↖↑	↑↗	
Traffic Vol, veh/h	72	9	14	0	0	25
Future Vol, veh/h	72	9	14	0	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	10	16	0	0	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	46	14	28	0	-	0
Stage 1	14	-	-	-	-	-
Stage 2	32	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	964	1066	1585	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	954	1066	1585	-	-	-
Mov Cap-2 Maneuver	954	-	-	-	-	-
Stage 1	999	-	-	-	-	-
Stage 2	991	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	9.1		7.3		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1585	-	965	-	-
HCM Lane V/C Ratio	0.01	-	0.093	-	-
HCM Control Delay (s)	7.3	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	✥			↰↑	↱
Traffic Volume (veh/h)	15	705	90	25	1295	15	80	20	15	20	40	60
Future Volume (veh/h)	15	705	90	25	1295	15	80	20	15	20	40	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	17	820	105	29	1506	17	66	60	17	23	47	70
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	29	1866	832	46	1923	22	128	101	29	44	91	116
Arrive On Green	0.02	0.53	0.53	0.03	0.54	0.54	0.07	0.07	0.07	0.07	0.07	0.07
Sat Flow, veh/h	1767	3526	1572	1767	3571	40	1767	1391	394	600	1226	1572
Grp Volume(v), veh/h	17	820	105	29	743	780	66	0	77	70	0	70
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1848	1767	0	1785	1826	0	1572
Q Serve(g_s), s	0.6	8.2	1.9	0.9	19.4	19.4	2.1	0.0	2.4	2.1	0.0	2.5
Cycle Q Clear(g_c), s	0.6	8.2	1.9	0.9	19.4	19.4	2.1	0.0	2.4	2.1	0.0	2.5
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.22	0.33		1.00
Lane Grp Cap(c), veh/h	29	1866	832	46	949	995	128	0	130	135	0	116
V/C Ratio(X)	0.58	0.44	0.13	0.64	0.78	0.78	0.51	0.00	0.59	0.52	0.00	0.60
Avail Cap(c_a), veh/h	460	4893	2183	460	2447	2565	613	0	619	792	0	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	8.3	6.8	27.8	10.6	10.6	25.7	0.0	25.9	25.7	0.0	25.9
Incr Delay (d2), s/veh	6.6	0.1	0.1	5.4	1.1	1.0	1.2	0.0	1.6	1.1	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.9	0.4	0.4	4.6	4.8	0.8	0.0	1.0	0.9	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.8	8.4	6.9	33.2	11.7	11.7	26.9	0.0	27.5	26.9	0.0	27.7
LnGrp LOS	C	A	A	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		942			1552			143			140	
Approach Delay, s/veh		8.7			12.1			27.2			27.3	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.0	37.0		8.3	4.5	36.5		8.4				
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1				
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0				
Max Q Clear Time (g_c+I1), s	2.6	21.4		4.4	2.9	10.2		4.5				
Green Ext Time (p_c), s	0.0	9.6		0.2	0.0	4.7		0.3				

Intersection Summary			
HCM 6th Ctrl Delay			12.5
HCM 6th LOS			B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

2: I-80 WB Ramps & Bell Rd

Intersection	
Int Delay, s/veh	77.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✥	
Traffic Vol, veh/h	0	135	600	25	925	0	0	0	0	0	0	405
Future Vol, veh/h	0	135	600	25	925	0	0	0	0	0	0	405
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	157	698	29	1076	0	0	0	0	0	0	471

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	855	0	0				1640	1989	1076
Stage 1	-	-	-	-	-	-				1134	1134	-
Stage 2	-	-	-	-	-	-				506	855	-
Critical Hdwy	-	-	-	4.13	-	-				6.43	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-				5.43	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.43	5.53	-
Follow-up Hdwy	-	-	-	2.227	-	-				3.527	4.027	3.327
Pot Cap-1 Maneuver	0	-	-	781	-	0				110	60	~ 265
Stage 1	0	-	-	-	-	0				306	276	-
Stage 2	0	-	-	-	-	0				603	373	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	781	-	-				106	0	~ 265
Mov Cap-2 Maneuver	-	-	-	-	-	-				106	0	-
Stage 1	-	-	-	-	-	-				306	0	-
Stage 2	-	-	-	-	-	-				581	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	$ 397
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	781	-	265
HCM Lane V/C Ratio	-	-	0.037	-	1.777
HCM Control Delay (s)	-	-	9.8	-	$ 397
HCM Lane LOS	-	-	A	-	F
HCM 95th %tile Q(veh)	-	-	0.1	-	31.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	40.8
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↑↱		↰	↰↑↱				
Traffic Vol, veh/h	115	20	0	0	35	5	910	0	10	0	0	0
Future Vol, veh/h	115	20	0	0	35	5	910	0	10	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	147	26	0	0	45	6	1167	0	13	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	11.8	9.8	46.4
HCM LOS	B	A	E

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	98%	85%	0%
Vol Thru, %	0%	0%	15%	88%
Vol Right, %	0%	2%	0%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	464	456	135	40
LT Vol	464	446	115	0
Through Vol	0	0	20	35
RT Vol	0	10	0	5
Lane Flow Rate	595	584	173	51
Geometry Grp	7	7	2	2
Degree of Util (X)	0.951	0.929	0.297	0.088
Departure Headway (Hd)	5.751	5.724	6.17	6.169
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	631	631	583	580
Service Time	3.509	3.483	4.196	4.215
HCM Lane V/C Ratio	0.943	0.926	0.297	0.088
HCM Control Delay	48.5	44.2	11.8	9.8
HCM Lane LOS	E	E	B	A
HCM 95th-tile Q	13.1	12.2	1.2	0.3

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	⋎			↰	↱	
Traffic Vol, veh/h	10	20	15	0	5	25
Future Vol, veh/h	10	20	15	0	5	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	14	27	20	0	7	34

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	64	24	41	0	-	0
Stage 1	24	-	-	-	-	-
Stage 2	40	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.25	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.335	-	-	-
Pot Cap-1 Maneuver	910	1016	1489	-	-	-
Stage 1	966	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	898	1016	1489	-	-	-
Mov Cap-2 Maneuver	898	-	-	-	-	-
Stage 1	953	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	7.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1489	-	973	-	-
HCM Lane V/C Ratio	0.014	-	0.042	-	-
HCM Control Delay (s)	7.5	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	✣			↰↑	↱
Traffic Volume (veh/h)	85	1300	130	10	1095	25	80	40	20	35	25	45
Future Volume (veh/h)	85	1300	130	10	1095	25	80	40	20	35	25	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	89	1368	137	11	1153	26	74	57	21	37	26	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	1863	831	20	1675	38	135	99	37	65	46	96
Arrive On Green	0.06	0.52	0.52	0.01	0.47	0.47	0.08	0.08	0.08	0.06	0.06	0.06
Sat Flow, veh/h	1781	3554	1585	1781	3553	80	1781	1304	480	1067	750	1585
Grp Volume(v), veh/h	89	1368	137	11	577	602	74	0	78	63	0	47
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1856	1781	0	1784	1817	0	1585
Q Serve(g_s), s	2.6	15.6	2.4	0.3	13.3	13.3	2.1	0.0	2.2	1.8	0.0	1.5
Cycle Q Clear(g_c), s	2.6	15.6	2.4	0.3	13.3	13.3	2.1	0.0	2.2	1.8	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.27	0.59		1.00
Lane Grp Cap(c), veh/h	114	1863	831	20	838	875	135	0	136	111	0	96
V/C Ratio(X)	0.78	0.73	0.16	0.55	0.69	0.69	0.55	0.00	0.57	0.57	0.00	0.49
Avail Cap(c_a), veh/h	509	5412	2414	509	2706	2826	678	0	679	865	0	754
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.2	9.7	6.5	25.8	10.9	10.9	23.4	0.0	23.4	24.0	0.0	23.9
Incr Delay (d2), s/veh	4.2	0.4	0.1	8.3	0.8	0.7	1.3	0.0	1.4	1.7	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	3.4	0.5	0.2	3.3	3.5	0.8	0.0	0.9	0.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	10.1	6.6	34.2	11.6	11.6	24.7	0.0	24.9	25.7	0.0	25.3
LnGrp LOS	C	B	A	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1594			1190			152			110	
Approach Delay, s/veh		10.8			11.8			24.8			25.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.4	30.8		8.1	3.6	33.5		7.3
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0
Max Q Clear Time (g_c+I1), s	4.6	15.3		4.2	2.3	17.6		3.8
Green Ext Time (p_c), s	0.1	6.1		0.3	0.0	9.9		0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✥	
Traffic Vol, veh/h	0	475	880	30	955	0	0	0	0	10	0	175
Future Vol, veh/h	0	475	880	30	955	0	0	0	0	10	0	175
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	500	926	32	1005	0	0	0	0	11	0	184

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	1426	0	0				2032	2495	1005
Stage 1	-	-	-	-	-	-				1069	1069	-
Stage 2	-	-	-	-	-	-				963	1426	-
Critical Hdwy	-	-	-	4.12	-	-				6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-				5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-				3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	477	-	0				63	29	293
Stage 1	0	-	-	-	-	0				330	298	-
Stage 2	0	-	-	-	-	0				370	201	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	477	-	-				59	0	293
Mov Cap-2 Maneuver	-	-	-	-	-	-				59	0	-
Stage 1	-	-	-	-	-	-				330	0	-
Stage 2	-	-	-	-	-	-				345	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.4	34.4
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	477	-	310
HCM Lane V/C Ratio	-	-	0.066	-	0.628
HCM Control Delay (s)	-	-	13.1	-	34.4
HCM Lane LOS	-	-	B	-	D
HCM 95th %tile Q(veh)	-	-	0.2	-	4

Intersection	
Intersection Delay, s/veh	120.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱		↰	✥				
Traffic Vol, veh/h	430	55	0	0	35	10	945	5	35	0	0	0
Future Vol, veh/h	430	55	0	0	35	10	945	5	35	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	551	71	0	0	45	13	1212	6	45	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	76.9	10.8	147.2
HCM LOS	F	B	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	92%	89%	0%
Vol Thru, %	0%	1%	11%	78%
Vol Right, %	0%	7%	0%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	491	494	485	45
LT Vol	491	454	430	0
Through Vol	0	5	55	35
RT Vol	0	35	0	10
Lane Flow Rate	630	633	622	58
Geometry Grp	7	7	2	2
Degree of Util (X)	1.245	1.235	1.056	0.11
Departure Headway (Hd)	7.253	7.161	6.116	6.893
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	504	513	603	518
Service Time	4.953	4.861	4.089	4.964
HCM Lane V/C Ratio	1.25	1.234	1.032	0.112
HCM Control Delay	149.4	145	76.9	10.8
HCM Lane LOS	F	F	F	B
HCM 95th-tile Q	24.6	24.3	17.5	0.4

Intersection						
Int Delay, s/veh	6.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰	↱	
Traffic Vol, veh/h	80	10	15	0	0	30
Future Vol, veh/h	80	10	15	0	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	11	17	0	0	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	51	17	33	0	-	0
Stage 1	17	-	-	-	-	-
Stage 2	34	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	958	1062	1579	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	988	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	947	1062	1579	-	-	-
Mov Cap-2 Maneuver	947	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	988	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	9.2		7.3		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1579	-	959	-	-
HCM Lane V/C Ratio	0.011	-	0.104	-	-
HCM Control Delay (s)	7.3	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	✥			↰	↱
Traffic Volume (veh/h)	20	835	110	25	1540	15	95	25	15	20	50	70
Future Volume (veh/h)	20	835	110	25	1540	15	95	25	15	20	50	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	22	908	120	27	1674	16	73	69	16	22	54	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	35	2019	900	42	2061	20	133	110	25	40	99	120
Arrive On Green	0.02	0.57	0.57	0.02	0.58	0.58	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	1767	3526	1572	1767	3578	34	1767	1457	338	529	1300	1572
Grp Volume(v), veh/h	22	908	120	27	824	866	73	0	85	76	0	76
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1849	1767	0	1795	1829	0	1572
Q Serve(g_s), s	0.8	10.1	2.4	1.0	25.4	25.4	2.7	0.0	3.1	2.7	0.0	3.2
Cycle Q Clear(g_c), s	0.8	10.1	2.4	1.0	25.4	25.4	2.7	0.0	3.1	2.7	0.0	3.2
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.19	0.29		1.00
Lane Grp Cap(c), veh/h	35	2019	900	42	1016	1065	133	0	135	139	0	120
V/C Ratio(X)	0.62	0.45	0.13	0.65	0.81	0.81	0.55	0.00	0.63	0.55	0.00	0.63
Avail Cap(c_a), veh/h	389	4138	1846	389	2069	2171	519	0	527	671	0	577
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.1	8.4	6.7	33.0	11.5	11.5	30.4	0.0	30.6	30.3	0.0	30.6
Incr Delay (d2), s/veh	6.5	0.1	0.0	6.2	1.2	1.2	1.3	0.0	1.8	1.2	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.5	0.5	0.5	6.5	6.9	1.1	0.0	1.3	1.2	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	8.5	6.8	39.2	12.7	12.7	31.7	0.0	32.4	31.6	0.0	32.6
LnGrp LOS	D	A	A	D	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1050			1717			158			152	
Approach Delay, s/veh		9.0			13.1			32.1			32.1	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.4	45.3		9.2	4.6	45.0		9.3
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0
Max Q Clear Time (g_c+I1), s	2.8	27.4		5.1	3.0	12.1		5.2
Green Ext Time (p_c), s	0.0	11.8		0.3	0.0	5.3		0.3

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	123.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✥	
Traffic Vol, veh/h	0	160	710	25	1100	0	0	0	0	0	0	480
Future Vol, veh/h	0	160	710	25	1100	0	0	0	0	0	0	480
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	174	772	27	1196	0	0	0	0	0	0	522

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	946	0	0	1810	2196	1196
Stage 1	-	-	-	-	-	-	1250	1250	-
Stage 2	-	-	-	-	-	-	560	946	-
Critical Hdwy	-	-	-	4.13	-	-	6.43	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.43	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.43	5.53	-
Follow-up Hdwy	-	-	-	2.227	-	-	3.527	4.027	3.327
Pot Cap-1 Maneuver	0	-	-	721	-	0	86	45	~ 226
Stage 1	0	-	-	-	-	0	269	243	-
Stage 2	0	-	-	-	-	0	570	339	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	721	-	-	83	0	~ 226
Mov Cap-2 Maneuver	-	-	-	-	-	-	83	0	-
Stage 1	-	-	-	-	-	-	269	0	-
Stage 2	-	-	-	-	-	-	549	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.2	$ 636.7
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	721	-	226
HCM Lane V/C Ratio	-	-	0.038	-	2.309
HCM Control Delay (s)	-	-	10.2	-	$ 636.7
HCM Lane LOS	-	-	B	-	F
HCM 95th %tile Q(veh)	-	-	0.1	-	41.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Intersection	
Intersection Delay, s/veh	51.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱		↰	✥				
Traffic Vol, veh/h	135	25	0	0	40	5	1085	0	10	0	0	0
Future Vol, veh/h	135	25	0	0	40	5	1085	0	10	0	0	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	153	28	0	0	45	6	1233	0	11	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	12	9.9	59.1
HCM LOS	B	A	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	98%	84%	0%
Vol Thru, %	0%	0%	16%	89%
Vol Right, %	0%	2%	0%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	543	553	160	45
LT Vol	543	543	135	0
Through Vol	0	0	25	40
RT Vol	0	10	0	5
Lane Flow Rate	616	628	182	51
Geometry Grp	7	7	2	2
Degree of Util (X)	0.99	1.005	0.312	0.088
Departure Headway (Hd)	5.783	5.762	6.185	6.217
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	629	628	584	577
Service Time	3.538	3.516	4.201	4.25
HCM Lane V/C Ratio	0.979	1	0.312	0.088
HCM Control Delay	57.3	60.9	12	9.9
HCM Lane LOS	F	F	B	A
HCM 95th-tile Q	14.7	15.5	1.3	0.3

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰↑	↑↱	
Traffic Vol, veh/h	15	20	20	0	5	25
Future Vol, veh/h	15	20	20	0	5	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	17	23	23	0	6	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	66	20	34	0	-	0
Stage 1	20	-	-	-	-	-
Stage 2	46	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.25	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.335	-	-	-
Pot Cap-1 Maneuver	908	1021	1497	-	-	-
Stage 1	970	-	-	-	-	-
Stage 2	944	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	894	1021	1497	-	-	-
Mov Cap-2 Maneuver	894	-	-	-	-	-
Stage 1	955	-	-	-	-	-
Stage 2	944	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	7.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1497	-	962	-	-
HCM Lane V/C Ratio	0.015	-	0.041	-	-
HCM Control Delay (s)	7.4	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰	↰↑↱			↰↑	↱
Traffic Volume (veh/h)	100	1545	155	15	1300	30	95	45	20	45	30	50
Future Volume (veh/h)	100	1545	155	15	1300	30	95	45	20	45	30	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	105	1626	163	16	1368	32	84	69	21	47	32	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	2068	922	27	1849	43	142	109	33	75	51	110
Arrive On Green	0.08	0.58	0.58	0.02	0.52	0.52	0.08	0.08	0.08	0.07	0.07	0.07
Sat Flow, veh/h	1781	3554	1585	1781	3549	83	1781	1376	419	1081	736	1585
Grp Volume(v), veh/h	105	1626	163	16	684	716	84	0	90	79	0	53
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1855	1781	0	1795	1816	0	1585
Q Serve(g_s), s	3.9	23.9	3.2	0.6	20.3	20.4	3.1	0.0	3.3	2.9	0.0	2.2
Cycle Q Clear(g_c), s	3.9	23.9	3.2	0.6	20.3	20.4	3.1	0.0	3.3	2.9	0.0	2.2
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.23	0.59		1.00
Lane Grp Cap(c), veh/h	136	2068	922	27	926	967	142	0	143	126	0	110
V/C Ratio(X)	0.77	0.79	0.18	0.59	0.74	0.74	0.59	0.00	0.63	0.63	0.00	0.48
Avail Cap(c_a), veh/h	394	4195	1871	394	2098	2190	526	0	530	670	0	585
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.7	10.9	6.6	33.1	12.6	12.7	30.1	0.0	30.2	30.7	0.0	30.3
Incr Delay (d2), s/veh	3.5	0.5	0.1	7.2	0.9	0.8	1.5	0.0	1.7	1.9	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	6.0	0.7	0.3	5.8	6.1	1.3	0.0	1.4	1.2	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.3	11.4	6.7	40.3	13.5	13.5	31.6	0.0	31.9	32.6	0.0	31.6
LnGrp LOS	C	B	A	D	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1894			1416			174			132	
Approach Delay, s/veh		12.3			13.8			31.8			32.2	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.2	41.3		9.5	4.0	45.4		8.8
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0
Max Q Clear Time (g_c+I1), s	5.9	22.4		5.3	2.6	25.9		4.9
Green Ext Time (p_c), s	0.1	8.2		0.3	0.0	13.5		0.3

Intersection Summary	
HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✥	
Traffic Vol, veh/h	0	565	1045	35	1135	0	0	0	0	10	0	205
Future Vol, veh/h	0	565	1045	35	1135	0	0	0	0	10	0	205
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	595	1100	37	1195	0	0	0	0	11	0	216

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	1695	0	0				2414	2964	1195
Stage 1	-	-	-	-	-	-				1269	1269	-
Stage 2	-	-	-	-	-	-				1145	1695	-
Critical Hdwy	-	-	-	4.12	-	-				6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-				5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-				3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	376	-	0				36	14	227
Stage 1	0	-	-	-	-	0				264	239	-
Stage 2	0	-	-	-	-	0				303	148	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	376	-	-				32	0	227
Mov Cap-2 Maneuver	-	-	-	-	-	-				32	0	-
Stage 1	-	-	-	-	-	-				264	0	-
Stage 2	-	-	-	-	-	-				273	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.5	146.4
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	376	-	203
HCM Lane V/C Ratio	-	-	0.098	-	1.115
HCM Control Delay (s)	-	-	15.6	-	146.4
HCM Lane LOS	-	-	C	-	F
HCM 95th %tile Q(veh)	-	-	0.3	-	10.8

Intersection	
Intersection Delay, s/veh	140.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↑↱		↰	↰↑↱				
Traffic Vol, veh/h	510	60	0	0	40	10	1125	5	45	0	0	0
Future Vol, veh/h	510	60	0	0	40	10	1125	5	45	0	0	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	580	68	0	0	45	11	1278	6	51	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	90.9	10.8	169.8
HCM LOS	F	B	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	92%	89%	0%
Vol Thru, %	0%	1%	11%	80%
Vol Right, %	0%	8%	0%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	585	590	570	50
LT Vol	585	540	510	0
Through Vol	0	5	60	40
RT Vol	0	45	0	10
Lane Flow Rate	665	670	648	57
Geometry Grp	7	7	2	2
Degree of Util (X)	1.299	1.293	1.101	0.109
Departure Headway (Hd)	7.337	7.239	6.118	6.911
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	499	510	609	518
Service Time	5.037	4.939	4.029	4.961
HCM Lane V/C Ratio	1.333	1.314	1.064	0.11
HCM Control Delay	171.2	168.4	90.9	10.8
HCM Lane LOS	F	F	F	B
HCM 95th-tile Q	27.1	27.1	19.9	0.4

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰↑	↑↱	
Traffic Vol, veh/h	90	15	20	0	0	35
Future Vol, veh/h	90	15	20	0	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	17	22	0	0	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	64	20	39	0	-	0
Stage 1	20	-	-	-	-	-
Stage 2	44	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	942	1058	1571	-	-	-
Stage 1	1003	-	-	-	-	-
Stage 2	978	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	929	1058	1571	-	-	-
Mov Cap-2 Maneuver	929	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	978	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	7.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1571	-	945	-	-
HCM Lane V/C Ratio	0.014	-	0.123	-	-
HCM Control Delay (s)	7.3	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

HCM 6th Signalized Intersection Summary
1: Bowman Rd & Bell Rd

AM Peak Hour
Year 2045 Conditions - Sensitivity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰	↰↑↱			↰↑	↱
Traffic Volume (veh/h)	20	1005	130	30	1850	15	115	30	15	25	60	85
Future Volume (veh/h)	20	1005	130	30	1850	15	115	30	15	25	60	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	22	1092	141	33	2011	16	87	86	16	27	65	92
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	33	2243	1000	43	2301	18	139	120	22	44	105	128
Arrive On Green	0.02	0.64	0.64	0.02	0.64	0.64	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	1767	3526	1572	1767	3585	28	1767	1522	283	537	1292	1572
Grp Volume(v), veh/h	22	1092	141	33	988	1039	87	0	102	92	0	92
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1850	1767	0	1805	1829	0	1572
Q Serve(g_s), s	1.2	15.7	3.4	1.8	43.7	44.0	4.6	0.0	5.3	4.7	0.0	5.5
Cycle Q Clear(g_c), s	1.2	15.7	3.4	1.8	43.7	44.0	4.6	0.0	5.3	4.7	0.0	5.5
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.16	0.29		1.00
Lane Grp Cap(c), veh/h	33	2243	1000	43	1132	1188	139	0	142	148	0	128
V/C Ratio(X)	0.67	0.49	0.14	0.77	0.87	0.87	0.62	0.00	0.72	0.62	0.00	0.72
Avail Cap(c_a), veh/h	277	2942	1312	277	1471	1544	369	0	377	477	0	410
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.8	9.2	7.0	46.5	14.0	14.0	42.8	0.0	43.1	42.6	0.0	43.0
Incr Delay (d2), s/veh	8.6	0.1	0.0	10.0	4.5	4.4	1.7	0.0	2.5	1.6	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.5	0.9	0.9	13.8	14.6	2.0	0.0	2.4	2.1	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.3	9.3	7.0	56.5	18.5	18.4	44.5	0.0	45.6	44.2	0.0	45.8
LnGrp LOS	E	A	A	E	B	B	D	A	D	D	A	D
Approach Vol, veh/h		1255			2060			189			184	
Approach Delay, s/veh		9.9			19.1			45.1			45.0	
Approach LOS		A			B			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	67.5		11.7	5.3	67.0		11.9
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	46.0		7.3	3.8	17.7		7.5
Green Ext Time (p_c), s	0.0	15.6		0.3	0.0	7.0		0.4

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	262.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✥	
Traffic Vol, veh/h	0	190	855	30	1320	0	0	0	0	0	0	580
Future Vol, veh/h	0	190	855	30	1320	0	0	0	0	0	0	580
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	207	929	33	1435	0	0	0	0	0	0	630

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	1136	0	0				2173	2637	1435
Stage 1	-	-	-	-	-	-				1501	1501	-
Stage 2	-	-	-	-	-	-				672	1136	-
Critical Hdwy	-	-	-	4.13	-	-				6.43	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-				5.43	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.43	5.53	-
Follow-up Hdwy	-	-	-	2.227	-	-				3.527	4.027	3.327
Pot Cap-1 Maneuver	0	-	-	611	-	0				51	23	~ 163
Stage 1	0	-	-	-	-	0				203	184	-
Stage 2	0	-	-	-	-	0				506	276	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	611	-	-				48	0	~ 163
Mov Cap-2 Maneuver	-	-	-	-	-	-				48	0	-
Stage 1	-	-	-	-	-	-				203	0	-
Stage 2	-	-	-	-	-	-				479	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.2	$ 1346.7
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	611	-	163
HCM Lane V/C Ratio	-	-	0.053	-	3.868
HCM Control Delay (s)	-	-	11.2		$ 1346.7
HCM Lane LOS	-	-	B	-	F
HCM 95th %tile Q(veh)	-	-	0.2	-	62.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	119.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↑↱		↰	↰↑↱				
Traffic Vol, veh/h	165	30	0	0	50	5	1300	0	15	0	0	0
Future Vol, veh/h	165	30	0	0	50	5	1300	0	15	0	0	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	188	34	0	0	57	6	1477	0	17	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	12.8	10	139.8
HCM LOS	B	A	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	98%	85%	0%
Vol Thru, %	0%	0%	15%	91%
Vol Right, %	0%	2%	0%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	663	652	195	55
LT Vol	663	637	165	0
Through Vol	0	0	30	50
RT Vol	0	15	0	5
Lane Flow Rate	753	741	222	62
Geometry Grp	7	7	2	2
Degree of Util (X)	1.248	1.222	0.378	0.108
Departure Headway (Hd)	5.965	5.937	6.148	6.245
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	610	615	592	579
Service Time	3.698	3.67	4.118	4.231
HCM Lane V/C Ratio	1.234	1.205	0.375	0.107
HCM Control Delay	145	134.6	12.8	10
HCM Lane LOS	F	F	B	A
HCM 95th-tile Q	28.5	27	1.8	0.4

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰↑	↑↱	
Traffic Vol, veh/h	15	25	20	0	5	30
Future Vol, veh/h	15	25	20	0	5	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	17	28	23	0	6	34

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	69	23	40	0	-	0
Stage 1	23	-	-	-	-	-
Stage 2	46	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.25	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.335	-	-	-
Pot Cap-1 Maneuver	904	1017	1490	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	944	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	890	1017	1490	-	-	-
Mov Cap-2 Maneuver	890	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	944	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	8.9		7.5		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1490	-	965	-	-
HCM Lane V/C Ratio	0.015	-	0.047	-	-
HCM Control Delay (s)	7.5	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	✥			↰↑	↱
Traffic Volume (veh/h)	120	1855	185	15	1560	35	115	55	25	50	35	60
Future Volume (veh/h)	120	1855	185	15	1560	35	115	55	25	50	35	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	126	1953	195	16	1642	37	102	84	26	53	37	63
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	2286	1020	26	2024	46	151	116	36	77	54	114
Arrive On Green	0.09	0.64	0.64	0.01	0.57	0.57	0.08	0.08	0.08	0.07	0.07	0.07
Sat Flow, veh/h	1781	3554	1585	1781	3553	80	1781	1370	424	1070	747	1585
Grp Volume(v), veh/h	126	1953	195	16	820	859	102	0	110	90	0	63
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1856	1781	0	1794	1817	0	1585
Q Serve(g_s), s	6.4	40.4	4.6	0.8	34.2	34.4	5.2	0.0	5.5	4.5	0.0	3.6
Cycle Q Clear(g_c), s	6.4	40.4	4.6	0.8	34.2	34.4	5.2	0.0	5.5	4.5	0.0	3.6
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.24	0.59		1.00
Lane Grp Cap(c), veh/h	157	2286	1020	26	1012	1057	151	0	152	131	0	114
V/C Ratio(X)	0.80	0.85	0.19	0.62	0.81	0.81	0.67	0.00	0.72	0.69	0.00	0.55
Avail Cap(c_a), veh/h	288	3063	1366	288	1531	1600	384	0	387	489	0	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.5	13.1	6.7	45.5	15.9	16.0	41.2	0.0	41.4	42.1	0.0	41.6
Incr Delay (d2), s/veh	3.6	1.8	0.1	8.5	1.6	1.6	2.0	0.0	2.4	2.4	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	11.8	1.2	0.4	11.2	11.8	2.3	0.0	2.5	2.0	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	14.9	6.8	54.0	17.6	17.6	43.2	0.0	43.8	44.5	0.0	43.2
LnGrp LOS	D	B	A	D	B	B	D	A	D	D	A	D
Approach Vol, veh/h		2274			1695			212			153	
Approach Delay, s/veh		15.9			17.9			43.5			43.9	
Approach LOS		B			B			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.2	58.9		12.0	4.4	65.7		10.8
Change Period (Y+Rc), s	3.0	6.0		4.1	3.0	6.0		4.1
Max Green Setting (Gmax), s	15.0	80.0		20.0	15.0	80.0		25.0
Max Q Clear Time (g_c+I1), s	8.4	36.4		7.5	2.8	42.4		6.5
Green Ext Time (p_c), s	0.1	11.4		0.4	0.0	17.3		0.3

Intersection Summary	
HCM 6th Ctrl Delay	19.0
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	43.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✥	
Traffic Vol, veh/h	0	675	1255	40	1365	0	0	0	0	10	0	245
Future Vol, veh/h	0	675	1255	40	1365	0	0	0	0	10	0	245
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Stop
Storage Length	-	-	0	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	711	1321	42	1437	0	0	0	0	11	0	258

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	2032	0	0				2893	3553	1437
Stage 1	-	-	-	-	-	-				1521	1521	-
Stage 2	-	-	-	-	-	-				1372	2032	-
Critical Hdwy	-	-	-	4.12	-	-				6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-				5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-				3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	278	-	0				18	6	~ 163
Stage 1	0	-	-	-	-	0				199	181	-
Stage 2	0	-	-	-	-	0				236	101	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	278	-	-				15	0	~ 163
Mov Cap-2 Maneuver	-	-	-	-	-	-				15	0	-
Stage 1	-	-	-	-	-	-				199	0	-
Stage 2	-	-	-	-	-	-				200	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.6	$ 607.5
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	278	-	124
HCM Lane V/C Ratio	-	-	0.151	-	2.165
HCM Control Delay (s)	-	-	20.2	-	$ 607.5
HCM Lane LOS	-	-	C	-	F
HCM 95th %tile Q(veh)	-	-	0.5	-	22.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	242.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱		↰	✥				
Traffic Vol, veh/h	615	75	0	0	50	15	1350	5	50	0	0	0
Future Vol, veh/h	615	75	0	0	50	15	1350	5	50	0	0	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	699	85	0	0	57	17	1534	6	57	0	0	0
Number of Lanes	0	1	0	0	1	0	1	1	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	182.1	10.8	282.5
HCM LOS	F	B	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	92%	89%	0%
Vol Thru, %	0%	1%	11%	77%
Vol Right, %	0%	7%	0%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	702	703	690	65
LT Vol	702	648	615	0
Through Vol	0	5	75	50
RT Vol	0	50	0	15
Lane Flow Rate	798	799	784	74
Geometry Grp	7	7	2	2
Degree of Util (X)	1.569	1.551	1.342	0.141
Departure Headway (Hd)	7.827	7.736	5.613	6.665
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	471	479	651	541
Service Time	5.527	5.436	3.613	4.665
HCM Lane V/C Ratio	1.694	1.668	1.204	0.137
HCM Control Delay	286.6	278.5	182.1	10.8
HCM Lane LOS	F	F	F	B
HCM 95th-tile Q	39.6	39	36.3	0.5

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰	↱	
Traffic Vol, veh/h	110	15	25	0	0	40
Future Vol, veh/h	110	15	25	0	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	17	28	0	0	45

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	79	23	45	0	-	0
Stage 1	23	-	-	-	-	-
Stage 2	56	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	924	1054	1563	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	967	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	907	1054	1563	-	-	-
Mov Cap-2 Maneuver	907	-	-	-	-	-
Stage 1	982	-	-	-	-	-
Stage 2	967	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	7.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1563	-	922	-	-
HCM Lane V/C Ratio	0.018	-	0.154	-	-
HCM Control Delay (s)	7.3	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	37	49	221	46	52	143	261	64	56	69	68
Average Queue (ft)	8	12	88	12	13	75	185	29	15	29	26
95th Queue (ft)	27	35	170	31	40	128	301	56	40	59	50
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)						1	1				
Queuing Penalty (veh)						4	6				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)			0		0	6		0		0	0
Queuing Penalty (veh)			0		0	1		0		0	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	WB	WB	B14	B14	SB
Directions Served	R	L	T		T	LTR
Maximum Queue (ft)	18	44	103	73	78	1033
Average Queue (ft)	1	12	8	8	10	994
95th Queue (ft)	8	37	58	44	48	1027
Link Distance (ft)	132		197	146	146	977
Upstream Blk Time (%)			0			99
Queuing Penalty (veh)			1			0
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		0	1			
Queuing Penalty (veh)		4	0			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	WB	NB	NB
Directions Served	LT	TR	L	LTR
Maximum Queue (ft)	91	46	239	225
Average Queue (ft)	40	22	111	75
95th Queue (ft)	68	48	195	170
Link Distance (ft)	146	115	899	
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				350
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	60	9
Average Queue (ft)	17	0
95th Queue (ft)	48	5
Link Distance (ft)	115	605
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 16

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	106	116	349	206	40	142	245	78	78	73	67
Average Queue (ft)	37	47	147	21	7	98	182	32	25	29	20
95th Queue (ft)	78	95	263	101	27	150	289	66	60	60	49
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)						2	1				
Queuing Penalty (veh)						9	8				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)			0		0	13		0	0	0	0
Queuing Penalty (veh)			1		0	1		0	0	0	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	EB	WB	WB	B14	B14	SB
Directions Served	T	R	L	T		T	LTR
Maximum Queue (ft)	5	14	54	184	49	73	937
Average Queue (ft)	0	0	18	25	3	7	702
95th Queue (ft)	4	5	48	108	22	37	1166
Link Distance (ft)	132	132		191	156	156	977
Upstream Blk Time (%)				0		0	31
Queuing Penalty (veh)				2		0	0
Storage Bay Dist (ft)			50				
Storage Blk Time (%)			2	2			
Queuing Penalty (veh)			15	0			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	B14	WB	NB	NB
Directions Served	LT	T	TR	L	LTR
Maximum Queue (ft)	248	126	59	750	520
Average Queue (ft)	135	15	26	274	216
95th Queue (ft)	243	79	54	647	501
Link Distance (ft)	156	191	115	900	
Upstream Blk Time (%)	18	0		2	
Queuing Penalty (veh)	85	0		0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				19	12
Queuing Penalty (veh)				105	59

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	56	9
Average Queue (ft)	30	0
95th Queue (ft)	47	6
Link Distance (ft)	115	605
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 284

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	41	63	229	54	56	138	245	84	54	81	70
Average Queue (ft)	9	18	104	13	17	79	176	31	16	32	25
95th Queue (ft)	29	47	194	32	45	131	294	64	39	64	51
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)						0	0				
Queuing Penalty (veh)						3	3				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)			0		0	6		0		0	0
Queuing Penalty (veh)			0		0	2		0		0	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	WB	WB	B14	B14	SB
Directions Served	R	L	T		T	LTR
Maximum Queue (ft)	10	46	96	83	92	1021
Average Queue (ft)	0	14	8	9	14	993
95th Queue (ft)	6	41	54	46	57	1007
Link Distance (ft)	132		224	122	122	977
Upstream Blk Time (%)					0	100
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		0	0			
Queuing Penalty (veh)		4	0			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	WB	NB	NB
Directions Served	LT	TR	L	LTR
Maximum Queue (ft)	76	56	268	233
Average Queue (ft)	40	24	120	79
95th Queue (ft)	65	52	209	174
Link Distance (ft)	122	115	900	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				350
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	58	14
Average Queue (ft)	22	0
95th Queue (ft)	49	7
Link Distance (ft)	115	605
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 12

Queuing and Blocking Report
Year 2025 Conditions

04/21/2020

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	100	217	480	323	66	141	239	109	89	82	63
Average Queue (ft)	42	68	210	47	10	105	203	37	29	35	20
95th Queue (ft)	81	201	404	215	40	151	276	80	63	67	46
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)					0	2	2				
Queuing Penalty (veh)					0	12	12				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)		0	4			14		1	0	0	0
Queuing Penalty (veh)		0	5			1		1	0	0	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	EB	WB	WB	B14	B14	SB
Directions Served	T	R	L	T		T	LTR
Maximum Queue (ft)	41	21	70	229	54	72	1020
Average Queue (ft)	2	1	21	34	4	7	967
95th Queue (ft)	27	8	54	142	29	40	1087
Link Distance (ft)	132	132		204	143	143	977
Upstream Blk Time (%)	0			1		0	83
Queuing Penalty (veh)	0			7		0	0
Storage Bay Dist (ft)			50				
Storage Blk Time (%)			3	2			
Queuing Penalty (veh)			24	1			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	B14	WB	NB	NB
Directions Served	LT	T	TR	L	LTR
Maximum Queue (ft)	236	208	59	878	545
Average Queue (ft)	154	31	29	362	274
95th Queue (ft)	251	125	53	825	582
Link Distance (ft)	143	204	115	900	
Upstream Blk Time (%)	32	1		7	
Queuing Penalty (veh)	159	4		0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				30	24
Queuing Penalty (veh)				163	117

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	60	18
Average Queue (ft)	30	1
95th Queue (ft)	47	7
Link Distance (ft)	115	605
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 506

Queuing and Blocking Report
Year 2045 Conditions

04/21/2020

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	29	61	278	55	38	143	239	111	47	68	75
Average Queue (ft)	9	23	140	17	14	105	205	42	19	34	33
95th Queue (ft)	29	60	247	41	39	160	280	84	44	62	65
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)						2	1				
Queuing Penalty (veh)						17	11				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)			0			13		1		0	0
Queuing Penalty (veh)			0			3		1		0	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	WB	WB	B14	B14	SB
Directions Served	R	L	T		T	LTR
Maximum Queue (ft)	11	52	244	111	138	996
Average Queue (ft)	1	17	44	24	35	991
95th Queue (ft)	9	49	169	85	108	1002
Link Distance (ft)	132		197	150	150	978
Upstream Blk Time (%)			1	0	1	100
Queuing Penalty (veh)			10	0	3	0
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		1	2			
Queuing Penalty (veh)		8	1			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	WB	NB	NB
Directions Served	LT	TR	L	LTR
Maximum Queue (ft)	87	66	234	223
Average Queue (ft)	48	30	153	123
95th Queue (ft)	82	59	227	221
Link Distance (ft)	150	115	900	
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				350
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	60	9
Average Queue (ft)	24	1
95th Queue (ft)	56	10
Link Distance (ft)	115	605
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 54

Queuing and Blocking Report
Year 2045 Conditions

04/21/2020

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	404	1266	1280	380	61	146	230	137	110	109	82
Average Queue (ft)	138	835	934	225	14	129	202	61	45	53	26
95th Queue (ft)	362	1559	1492	517	47	163	265	117	90	96	63
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)		13	17		0	5	3				
Queuing Penalty (veh)		0	0		0	34	22				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)		21	34		0	18		3	1	4	0
Queuing Penalty (veh)		21	52		1	3		4	0	2	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	EB	WB	WB	B14	B14	SB
Directions Served	T	R	L	T		T	LTR
Maximum Queue (ft)	131	40	79	256	78	87	1009
Average Queue (ft)	63	2	27	71	6	9	989
95th Queue (ft)	172	25	63	187	42	49	1018
Link Distance (ft)	132	132		202	143	143	977
Upstream Blk Time (%)	7	0		1	0	0	98
Queuing Penalty (veh)	59	0		8	1	1	0
Storage Bay Dist (ft)			50				
Storage Blk Time (%)			6	4			
Queuing Penalty (veh)			68	2			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	B14	WB	NB	NB
Directions Served	LT	T	TR	L	LTR
Maximum Queue (ft)	247	269	64	955	545
Average Queue (ft)	213	159	28	858	530
95th Queue (ft)	255	298	55	1120	624
Link Distance (ft)	143	202	115	900	
Upstream Blk Time (%)	85	19		63	
Queuing Penalty (veh)	488	107		0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				94	90
Queuing Penalty (veh)				575	508

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	63	13
Average Queue (ft)	31	0
95th Queue (ft)	47	6
Link Distance (ft)	115	605
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1957

Queuing and Blocking Report
Year 2045 Conditions - Sensitivity Analysis

04/21/2020

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	62	694	861	379	103	150	247	125	100	116	100
Average Queue (ft)	15	195	394	99	21	128	220	57	30	48	33
95th Queue (ft)	42	797	931	344	62	170	254	103	68	91	71
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)		1	2		0	9	8				
Queuing Penalty (veh)		0	0		0	84	76				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)			13		1	20		3	0	3	0
Queuing Penalty (veh)			18		6	6		3	0	3	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	WB	WB	B14	B14	SB
Directions Served	R	L	T		T	LTR
Maximum Queue (ft)	21	91	292	187	215	1014
Average Queue (ft)	1	27	172	119	136	991
95th Queue (ft)	10	72	349	215	233	1005
Link Distance (ft)	132		193	155	155	978
Upstream Blk Time (%)			9	5	11	100
Queuing Penalty (veh)			122	33	75	0
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		4	13			
Queuing Penalty (veh)		49	4			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	WB	NB	NB
Directions Served	LT	TR	L	LTR
Maximum Queue (ft)	126	64	798	516
Average Queue (ft)	63	30	520	375
95th Queue (ft)	108	57	1025	641
Link Distance (ft)	155	115	901	
Upstream Blk Time (%)	0		9	
Queuing Penalty (veh)	0		0	
Storage Bay Dist (ft)				350
Storage Blk Time (%)			44	39
Queuing Penalty (veh)			294	250

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	65	14
Average Queue (ft)	27	1
95th Queue (ft)	56	7
Link Distance (ft)	115	605
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1022

Queuing and Blocking Report
Year 2045 Conditions - Sensitivity Analysis

04/21/2020

Intersection: 1: Bowman Rd & Bell Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	366	1326	1323	380	66	146	249	175	145	135	129
Average Queue (ft)	185	1296	1296	212	12	130	196	77	58	57	33
95th Queue (ft)	455	1314	1312	511	42	160	272	139	115	107	80
Link Distance (ft)		1275	1275			132	132	770			690
Upstream Blk Time (%)		50	61		0	7	6				
Queuing Penalty (veh)		0	0		0	56	45				
Storage Bay Dist (ft)	275			305	70				95	85	
Storage Blk Time (%)		45	34		1	19		7	2	6	0
Queuing Penalty (veh)		54	64		5	3		9	1	4	0

Intersection: 2: I-80 WB Ramps & Bell Rd

Movement	EB	EB	WB	WB	B14	B14	SB
Directions Served	T	R	L	T		T	LTR
Maximum Queue (ft)	167	49	90	246	56	75	1026
Average Queue (ft)	122	2	30	93	4	10	988
95th Queue (ft)	194	15	68	222	35	50	1051
Link Distance (ft)	132	132		193	151	151	977
Upstream Blk Time (%)	15	0		1	0	0	97
Queuing Penalty (veh)	143	0		17	0	1	0
Storage Bay Dist (ft)			50				
Storage Blk Time (%)			9	7			
Queuing Penalty (veh)			118	3			

Intersection: 3: I-80 EB Ramps & Bell Rd

Movement	EB	B14	WB	NB	NB
Directions Served	LT	T	TR	L	LTR
Maximum Queue (ft)	257	241	68	954	545
Average Queue (ft)	231	197	32	926	545
95th Queue (ft)	255	247	59	949	545
Link Distance (ft)	151	193	115	899	
Upstream Blk Time (%)	99	29	0	90	
Queuing Penalty (veh)	676	198	0	0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				100	100
Queuing Penalty (veh)				729	674

Intersection: 4: Musso Rd & Bell Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	63	18
Average Queue (ft)	31	1
95th Queue (ft)	49	8
Link Distance (ft)	115	605
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2801

APPENDIX D

SIDRA Reports

LANE SUMMARY

Site: 101 [Yr 2025 AM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2025 AM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bowman Rd															
Lane 1[d]	134	3.0	134	3.0	667	0.200	100	7.8	LOS A	0.9	24.1	Full	350	0.0	0.0
Approach	134	3.0	134	3.0		0.200		7.8	LOS A	0.9	24.1				
East: WB - Bell Rd															
Lane 1	509	3.0	509	3.0	1284	0.397	100	6.6	LOS A	3.0	76.6	Full	400	0.0	0.0
Lane 2[d]	601	3.0	601	3.0	1516	0.397	100	5.9	LOS A	3.1	78.9	Short	90	0.0	NA
Approach	1110	3.0	1110	3.0		0.397		6.2	LOS A	3.1	78.9				
NorthEast: I-80 WB Off Ramp															
Lane 1	231	3.0	231	3.0	535	0.432	100	14.0	LOS B	2.4	60.5	Short	200	0.0	NA
Lane 2[d]	263	3.0	263	3.0	609	0.432	100	12.5	LOS B	2.5	62.8	Full	1000	0.0	0.0
Approach	494	3.0	494	3.0		0.432		13.2	LOS B	2.5	62.8				
North: Bowman Rd															
Lane 1[d]	145	3.0	145	3.0	535	0.272	100	10.6	LOS B	1.2	29.8	Full	750	0.0	0.0
Approach	145	3.0	145	3.0		0.272		10.6	LOS B	1.2	29.8				
West: EB - Bell Rd															
Lane 1	151	3.0	151	3.0	1052	0.144	32[5]	4.7	LOS A	0.8	20.0	Full	400	0.0	0.0
Lane 2[d]	686	3.0	686	3.0	1520	0.451	100	6.6	LOS A	3.6	91.0	Full	400	0.0	0.0
Lane 3	105	3.0	105	3.0	1591	0.066	100	2.8	LOS A	0.4	9.3	Short	200	0.0	NA
Approach	942	3.0	942	3.0		0.451		5.8	LOS A	3.6	91.0				
Intersection	2826	3.0	2826	3.0		0.451		7.6	LOS A	3.6	91.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2025 AM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2025 AM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	26	4.0	26	4.0	482	0.055	100	8.2	LOS A	0.2	5.7	Full	650	0.0	0.0
Approach	26	4.0	26	4.0		0.055		8.2	LOS A	0.2	5.7				
NorthEast: Musso Rd															
Lane 1[d]	39	4.0	39	4.0	482	0.082	100	8.6	LOS A	0.3	8.6	Full	650	0.0	0.0
Approach	39	4.0	39	4.0		0.082		8.6	LOS A	0.3	8.6				
West: Bell Rd															
Lane 1[d]	171	4.0	171	4.0	1318	0.130	100	3.8	LOS A	0.8	20.6	Full	400	0.0	0.0
Approach	171	4.0	171	4.0		0.130		3.8	LOS A	0.8	20.6				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	757	4.0	757	4.0	1367	0.553	100	8.6	LOS A	4.4	114.6	Full	1000	0.0	0.0
Lane 2	473	4.0	473	4.0	1140	0.415	75[5]	7.5	LOS A	2.8	71.3	Short	350	0.0	NA
Approach	1230	4.0	1230	4.0		0.553		8.2	LOS A	4.4	114.6				
Intersection	1467	4.0	1467	4.0		0.553		7.7	LOS A	4.4	114.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2025 PM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2025 PM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	Total	HV						Veh	Dist				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Bowman Rd															
Lane 1[d]	153	2.0	153	2.0	487	0.314	100	12.4	LOS B	1.6	40.0	Full	350	0.0	0.0
Approach	153	2.0	153	2.0		0.314		12.4	LOS B	1.6	40.0				
East: WB - Bell Rd															
Lane 1	473	2.0	473	2.0	1211	0.391	100	6.8	LOS A	2.8	70.6	Full	400	0.0	0.0
Lane 2[d]	569	2.0	569	2.0	1455	0.391	100	6.0	LOS A	2.9	73.4	Short	90	0.0	NA
Approach	1042	2.0	1042	2.0		0.391		6.4	LOS A	2.9	73.4				
NorthEast: I-80 WB Off Ramp															
Lane 1	96	2.0	96	2.0	525	0.183	100	9.4	LOS A	0.8	20.3	Short	200	0.0	NA
Lane 2[d]	109	2.0	109	2.0	597	0.183	100	8.3	LOS A	0.8	21.0	Full	1000	0.0	0.0
Approach	205	2.0	205	2.0		0.183		8.8	LOS A	0.8	21.0				
North: Bowman Rd															
Lane 1[d]	116	2.0	116	2.0	605	0.192	100	8.4	LOS A	0.8	20.3	Full	750	0.0	0.0
Approach	116	2.0	116	2.0		0.192		8.4	LOS A	0.8	20.3				
West: EB - Bell Rd															
Lane 1	568	2.0	568	2.0	1270	0.448	78[5]	7.4	LOS A	3.4	85.8	Full	400	0.0	0.0
Lane 2[d]	889	2.0	889	2.0	1544	0.576	100	8.3	LOS A	5.3	133.9	Full	400	0.0	0.0
Lane 3	137	2.0	137	2.0	1646	0.083	100	2.8	LOS A	0.5	11.6	Short	200	0.0	NA
Approach	1595	2.0	1595	2.0		0.576		7.5	LOS A	5.3	133.9				
Intersection	3111	2.0	3111	2.0		0.576		7.5	LOS A	5.3	133.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2025 PM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2025 PM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	Total	HV						Veh	Dist				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	26	2.0	26	2.0	454	0.056	100	8.7	LOS A	0.2	6.1	Full	650	0.0	0.0
Approach	26	2.0	26	2.0		0.056		8.7	LOS A	0.2	6.1				
NorthEast: Musso Rd															
Lane 1[d]	31	2.0	31	2.0	474	0.065	100	8.5	LOS A	0.3	6.9	Full	650	0.0	0.0
Approach	31	2.0	31	2.0		0.065		8.5	LOS A	0.3	6.9				
West: Bell Rd															
Lane 1[d]	485	2.0	485	2.0	1347	0.360	100	6.0	LOS A	2.9	74.1	Full	400	0.0	0.0
Approach	485	2.0	485	2.0		0.360		6.0	LOS A	2.9	74.1				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	635	2.0	635	2.0	1150	0.552	100	9.7	LOS A	5.2	131.3	Full	1000	0.0	0.0
Lane 2	375	2.0	375	2.0	906	0.414	75[5]	8.8	LOS A	2.7	67.3	Short	350	0.0	NA
Approach	1010	2.0	1010	2.0		0.552		9.4	LOS A	5.2	131.3				
Intersection	1551	2.0	1551	2.0		0.552		8.3	LOS A	5.2	131.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[5] Lane under-utilisation found by the program
[d] Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 AM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2045 AM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: Bowman Rd															
Lane 1[d]	147	3.0	147	3.0	677	0.217	100	7.9	LOS A	1.1	27.4	Full	350	0.0	0.0
Approach	147	3.0	147	3.0		0.217		7.9	LOS A	1.1	27.4				
East: WB - Bell Rd															
Lane 1	556	3.0	556	3.0	1295	0.429	100	7.0	LOS A	3.4	86.0	Full	400	0.0	0.0
Lane 2[d]	678	3.0	678	3.0	1580	0.429	100	6.1	LOS A	3.5	89.4	Short	90	0.0	NA
Approach	1234	3.0	1234	3.0		0.429		6.5	LOS A	3.5	89.4				
NorthEast: I-80 WB Off Ramp															
Lane 1	234	3.0	234	3.0	543	0.431	100	13.8	LOS B	2.4	62.6	Short	200	0.0	NA
Lane 2[d]	310	3.0	310	3.0	719	0.431	100	10.9	LOS B	2.7	68.4	Full	1000	0.0	0.0
Approach	543	3.0	543	3.0		0.431		12.2	LOS B	2.7	68.4				
North: Bowman Rd															
Lane 1[d]	158	3.0	158	3.0	532	0.296	100	11.1	LOS B	1.4	35.9	Full	750	0.0	0.0
Approach	158	3.0	158	3.0		0.296		11.1	LOS B	1.4	35.9				
West: EB - Bell Rd															
Lane 1	174	3.0	174	3.0	1139	0.153	32[5]	4.5	LOS A	0.9	21.9	Full	400	0.0	0.0
Lane 2[d]	761	3.0	761	3.0	1597	0.476	100	6.7	LOS A	3.9	100.4	Full	400	0.0	0.0
Lane 3	120	3.0	120	3.0	1666	0.072	100	2.7	LOS A	0.4	10.5	Short	200	0.0	NA
Approach	1054	3.0	1054	3.0		0.476		5.9	LOS A	3.9	100.4				
Intersection	3136	3.0	3136	3.0		0.476		7.6	LOS A	3.9	100.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 AM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2045 AM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	Total	HV						Veh	Dist				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	23	4.0	23	4.0	526	0.043	100	7.4	LOS A	0.2	4.6	Full	650	0.0	0.0
Approach	23	4.0	23	4.0		0.043		7.4	LOS A	0.2	4.6				
NorthEast: Musso Rd															
Lane 1[d]	34	4.0	34	4.0	526	0.065	100	7.7	LOS A	0.3	7.0	Full	650	0.0	0.0
Approach	34	4.0	34	4.0		0.065		7.7	LOS A	0.3	7.0				
West: Bell Rd															
Lane 1[d]	170	4.0	170	4.0	1386	0.123	100	3.6	LOS A	0.8	19.5	Full	400	0.0	0.0
Approach	170	4.0	170	4.0		0.123		3.6	LOS A	0.8	19.5				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	782	4.0	782	4.0	1450	0.539	100	8.0	LOS A	4.3	109.9	Full	1000	0.0	0.0
Lane 2	480	4.0	480	4.0	1186	0.404	75[5]	7.1	LOS A	2.7	68.8	Short	350	0.0	NA
Approach	1261	4.0	1261	4.0		0.539		7.7	LOS A	4.3	109.9				
Intersection	1489	4.0	1489	4.0		0.539		7.2	LOS A	4.3	109.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 PM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2045 PM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bowman Rd															
Lane 1[d]	174	2.0	174	2.0	427	0.407	100	16.2	LOS B	2.4	61.5	Full	350	0.0	0.0
Approach	174	2.0	174	2.0		0.407		16.2	LOS B	2.4	61.5				
East: WB - Bell Rd															
Lane 1	548	2.0	548	2.0	1203	0.455	100	7.7	LOS A	3.5	88.2	Full	400	0.0	0.0
Lane 2[d]	684	2.0	684	2.0	1502	0.455	100	6.7	LOS A	3.7	92.9	Short	90	0.0	NA
Approach	1232	2.0	1232	2.0		0.455		7.1	LOS A	3.7	92.9				
NorthEast: I-80 WB Off Ramp															
Lane 1	101	2.0	101	2.0	490	0.206	100	10.3	LOS B	1.0	24.6	Short	200	0.0	NA
Lane 2[d]	136	2.0	136	2.0	658	0.206	100	8.0	LOS A	1.1	27.4	Full	1000	0.0	0.0
Approach	237	2.0	237	2.0		0.206		9.0	LOS A	1.1	27.4				
North: Bowman Rd															
Lane 1[d]	132	2.0	132	2.0	581	0.226	100	9.2	LOS A	1.0	26.0	Full	750	0.0	0.0
Approach	132	2.0	132	2.0		0.226		9.2	LOS A	1.0	26.0				
West: EB - Bell Rd															
Lane 1	674	2.0	674	2.0	1298	0.519	79[5]	8.3	LOS A	4.3	109.5	Full	400	0.0	0.0
Lane 2[d]	1058	2.0	1058	2.0	1613	0.656	100	9.7	LOS A	6.8	172.5	Full	400	0.0	0.0
Lane 3	163	2.0	163	2.0	1723	0.095	100	2.8	LOS A	0.5	13.7	Short	200	0.0	NA
Approach	1895	2.0	1895	2.0		0.656		8.6	LOS A	6.8	172.5				
Intersection	3668	2.0	3668	2.0		0.656		8.5	LOS A	6.8	172.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 PM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2045 PM]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Musso Rd															
Lane 1[d]	26	2.0	26	2.0	416	0.061	100	9.6	LOS A	0.3	7.1	Full	650	0.0	0.0
Approach	26	2.0	26	2.0		0.061		9.6	LOS A	0.3	7.1				
NorthEast: Musso Rd															
Lane 1[d]	36	2.0	36	2.0	440	0.081	100	9.4	LOS A	0.4	9.3	Full	650	0.0	0.0
Approach	36	2.0	36	2.0		0.081		9.4	LOS A	0.4	9.3				
West: Bell Rd															
Lane 1[d]	571	2.0	571	2.0	1414	0.404	100	6.3	LOS A	3.6	90.6	Full	400	0.0	0.0
Approach	571	2.0	571	2.0		0.404		6.3	LOS A	3.6	90.6				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	763	2.0	763	2.0	1166	0.654	100	12.0	LOS B	8.6	217.9	Full	1000	0.0	0.0
Lane 2	436	2.0	436	2.0	889	0.491	75[5]	10.3	LOS B	3.9	100.0	Short	350	0.0	NA
Approach	1199	2.0	1199	2.0		0.654		11.4	LOS B	8.6	217.9				
Intersection	1832	2.0	1832	2.0		0.654		9.7	LOS A	8.6	217.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 AM - Bell Rd/I-80 WB Ramps/Bowman Rd - Sensitivity]

Network: N101 [Year 2045 AM - Sensitivity Analysis]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: Bowman Rd															
Lane 1[d]	147	3.0	147	3.0	579	0.253	100	9.6	LOS A	1.3	34.1	Full	350	0.0	0.0
Approach	147	3.0	147	3.0		0.253		9.6	LOS A	1.3	34.1				
East: WB - Bell Rd															
Lane 1	663	3.0	663	3.0	1291	0.514	100	8.3	LOS A	4.5	115.5	Full	400	0.0	0.0
Lane 2[d]	809	3.0	809	3.0	1575	0.514	100	7.2	LOS A	4.7	119.9	Short	90	0.0	NA
Approach	1473	3.0	1473	3.0		0.514		7.7	LOS A	4.7	119.9				
NorthEast: I-80 WB Off Ramp															
Lane 1	271	3.0	271	3.0	450	0.603	100	22.5	LOS C	4.2	106.5	Short	200	0.0	NA
Lane 2[d]	375	3.0	375	3.0	622	0.603	100	17.2	LOS B	4.8	122.1	Full	1000	0.0	0.0
Approach	647	3.0	647	3.0		0.603		19.4	LOS B	4.8	122.1				
North: Bowman Rd															
Lane 1[d]	158	3.0	158	3.0	423	0.373	100	15.4	LOS B	2.0	51.8	Full	750	0.0	0.0
Approach	158	3.0	158	3.0		0.373		15.4	LOS B	2.0	51.8				
West: EB - Bell Rd															
Lane 1	201	3.0	201	3.0	1133	0.177	31[5]	4.8	LOS A	1.0	26.1	Full	400	0.0	0.0
Lane 2[d]	913	3.0	913	3.0	1589	0.575	100	8.2	LOS A	5.4	137.8	Full	400	0.0	0.0
Lane 3	120	3.0	120	3.0	1664	0.072	100	2.7	LOS A	0.4	10.7	Short	200	0.0	NA
Approach	1234	3.0	1234	3.0		0.575		7.1	LOS A	5.4	137.8				
Intersection	3658	3.0	3658	3.0		0.603		10.0	LOS A	5.4	137.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 AM - Bell Rd/I-80 EB Ramps/Musso Rd - Sensitivity]

Network: N101 [Year 2045 AM - Sensitivity Analysis]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Musso Rd															
Lane 1[d]	23	4.0	23	4.0	448	0.051	100	8.8	LOS A	0.2	5.6	Full	650	0.0	0.0
Approach	23	4.0	23	4.0		0.051		8.8	LOS A	0.2	5.6				
NorthEast: Musso Rd															
Lane 1[d]	34	4.0	34	4.0	448	0.076	100	9.1	LOS A	0.3	8.4	Full	650	0.0	0.0
Approach	34	4.0	34	4.0		0.076		9.1	LOS A	0.3	8.4				
West: Bell Rd															
Lane 1[d]	205	4.0	205	4.0	1386	0.148	100	3.8	LOS A	0.9	24.4	Full	400	0.0	0.0
Approach	205	4.0	205	4.0		0.148		3.8	LOS A	0.9	24.4				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	864	4.0	864	4.0	1419	0.609	100	9.4	LOS A	5.2	134.7	Full	1000	0.0	0.0
Lane 2	647	4.0	647	4.0	1182	0.548	90[7]	9.4	LOS A	4.2	109.5	Short	350	0.0	NA
Approach	1511	4.0	1511	4.0		0.609		9.4	LOS A	5.2	134.7				
Intersection	1773	4.0	1773	4.0		0.609		8.8	LOS A	5.2	134.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane under-utilisation specified by the user
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 PM - Bell Rd/I-80 WB Ramps/Bowman Rd - Sensitivity]

Network: N101 [Year 2045 PM - Senstivity Analysis]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bowman Rd															
Lane 1[d]	165	2.0	165	2.0	338	0.488	100	22.9	LOS C	3.2	81.0	Full	350	0.0	0.0
Approach	165	2.0	165	2.0		0.488		22.9	LOS C	3.2	81.0				
East: WB - Bell Rd															
Lane 1	621	2.0	621	2.0	1214	0.512	100	8.6	LOS A	4.2	106.4	Full	400	0.0	0.0
Lane 2[d]	774	2.0	774	2.0	1511	0.512	100	7.4	LOS A	4.4	111.8	Short	90	0.0	NA
Approach	1395	2.0	1395	2.0		0.512		7.9	LOS A	4.4	111.8				
NorthEast: I-80 WB Off Ramp															
Lane 1	109	2.0	109	2.0	436	0.251	100	12.3	LOS B	1.2	30.7	Short	200	0.0	NA
Lane 2[d]	151	2.0	151	2.0	600	0.251	100	9.3	LOS A	1.4	34.6	Full	1000	0.0	0.0
Approach	260	2.0	260	2.0		0.251		10.6	LOS B	1.4	34.6				
North: Bowman Rd															
Lane 1[d]	125	2.0	125	2.0	525	0.238	100	10.2	LOS B	1.1	28.2	Full	750	0.0	0.0
Approach	125	2.0	125	2.0		0.238		10.2	LOS B	1.1	28.2				
West: EB - Bell Rd															
Lane 1	745	2.0	745	2.0	1297	0.574	77[5]	9.3	LOS A	5.2	131.1	Full	400	0.0	0.0
Lane 2[d]	1205	2.0	1205	2.0	1615	0.746	100	12.2	LOS B	9.3	236.7	Full	400	0.0	0.0
Lane 3	155	2.0	155	2.0	1726	0.090	100	2.7	LOS A	0.5	13.1	Short	200	0.0	NA
Approach	2105	2.0	2105	2.0		0.746		10.5	LOS B	9.3	236.7				
Intersection	4050	2.0	4050	2.0		0.746		10.1	LOS B	9.3	236.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 PM - Bell Rd/I-80 EB Ramps/Musso Rd - Sensitivity]

Network: N101 [Year 2045 PM - Senstivity Analysis]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Musso Rd															
Lane 1[d]	25	2.0	25	2.0	301	0.083	100	13.5	LOS B	0.4	10.5	Full	650	0.0	0.0
Approach	25	2.0	25	2.0		0.083		13.5	LOS B	0.4	10.5				
NorthEast: Musso Rd															
Lane 1[d]	35	2.0	35	2.0	332	0.105	100	12.7	LOS B	0.5	13.0	Full	650	0.0	0.0
Approach	35	2.0	35	2.0		0.105		12.7	LOS B	0.5	13.0				
West: Bell Rd															
Lane 1[d]	670	2.0	670	2.0	1414	0.474	100	7.2	LOS A	4.8	120.7	Full	400	0.0	0.0
Approach	670	2.0	670	2.0		0.474		7.2	LOS A	4.8	120.7				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	836	2.0	836	2.0	1090	0.767	100	17.1	LOS B	13.7	348.4	Full	1000	0.0	0.0
Lane 2	574	2.0	574	2.0	831	0.690	90[7]	16.9	LOS B	9.0	229.4	Short	350	0.0	NA
Approach	1410	2.0	1410	2.0		0.767		17.0	LOS B	13.7	348.4				
Intersection	2140	2.0	2140	2.0		0.767		13.8	LOS B	13.7	348.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane under-utilisation specified by the user
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2025 AM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2025 AM]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: Bowman Rd															
Lane 1[d]	169	3.0	169	3.0	634	0.266	100	9.1	LOS A	1.3	33.2	Full	350	0.0	0.0
Approach	169	3.0	169	3.0		0.266		9.1	LOS A	1.3	33.2				
East: WB - Bell Rd															
Lane 1	531	3.0	531	3.0	1241	0.428	100	7.2	LOS A	3.3	84.2	Full	400	0.0	0.0
Lane 2[d]	632	3.0	632	3.0	1477	0.428	100	6.4	LOS A	3.4	87.2	Short	115	0.0	NA
Approach	1163	3.0	1163	3.0		0.428		6.8	LOS A	3.4	87.2				
NorthEast: I-80 WB Off Ramp															
Lane 1	243	3.0	243	3.0	491	0.494	100	16.8	LOS B	2.9	75.5	Short	165	0.0	NA
Lane 2[d]	280	3.0	280	3.0	567	0.494	100	14.9	LOS B	3.1	79.2	Full	1000	0.0	0.0
Approach	523	3.0	523	3.0		0.494		15.8	LOS B	3.1	79.2				
North: Bowman Rd															
Lane 1[d]	174	3.0	174	3.0	502	0.348	100	12.7	LOS B	1.7	42.8	Full	750	0.0	0.0
Approach	174	3.0	174	3.0		0.348		12.7	LOS B	1.7	42.8				
West: EB - Bell Rd															
Lane 1	180	3.0	180	3.0	1046	0.172	36[5]	5.0	LOS A	1.0	24.8	Full	400	0.0	0.0
Lane 2[d]	727	3.0	727	3.0	1512	0.481	100	7.0	LOS A	4.0	101.1	Full	400	0.0	0.0
Lane 3	192	3.0	192	3.0	1590	0.121	100	3.2	LOS A	0.7	18.0	Short	335	0.0	NA
Approach	1099	3.0	1099	3.0		0.481		6.0	LOS A	4.0	101.1				
Intersection	3128	3.0	3128	3.0		0.494		8.5	LOS A	4.0	101.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2025 AM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2025 AM]

PCGC Master Plan Update Volumes

Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	Total	HV						Veh	Dist				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	33	4.0	33	4.0	442	0.074	100	9.2	LOS A	0.3	8.0	Full	650	0.0	0.0
Approach	33	4.0	33	4.0		0.074		9.2	LOS A	0.3	8.0				
NorthEast: Musso Rd															
Lane 1[d]	39	4.0	39	4.0	443	0.089	100	9.4	LOS A	0.4	9.6	Full	650	0.0	0.0
Approach	39	4.0	39	4.0		0.089		9.4	LOS A	0.4	9.6				
West: Bell Rd															
Lane 1[d]	211	4.0	211	4.0	1318	0.160	100	4.0	LOS A	1.0	26.3	Full	400	0.0	0.0
Approach	211	4.0	211	4.0		0.160		4.0	LOS A	1.0	26.3				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	804	4.0	804	4.0	1331	0.604	100	9.8	LOS A	5.1	131.8	Full	1000	0.0	0.0
Lane 2	498	4.0	498	4.0	1100	0.453	75[5]	8.2	LOS A	3.1	80.1	Short	190	0.0	NA
Approach	1303	4.0	1303	4.0		0.604		9.2	LOS A	5.1	131.8				
Intersection	1586	4.0	1586	4.0		0.604		8.5	LOS A	5.1	131.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2025 PM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2025 PM]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	Total	HV						Veh	Dist				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Bowman Rd															
Lane 1[d]	263	2.0	263	2.0	499	0.527	100	17.7	LOS B	3.4	86.8	Full	350	0.0	0.0
Approach	263	2.0	263	2.0		0.527		17.7	LOS B	3.4	86.8				
East: WB - Bell Rd															
Lane 1	440	2.0	440	2.0	1101	0.399	100	7.4	LOS A	2.9	73.3	Full	400	0.0	0.0
Lane 2[d]	539	2.0	539	2.0	1351	0.399	100	6.4	LOS A	3.1	77.6	Short	115	0.0	NA
Approach	979	2.0	979	2.0		0.399		6.9	LOS A	3.1	77.6				
NorthEast: I-80 WB Off Ramp															
Lane 1	128	2.0	128	2.0	494	0.259	100	11.2	LOS B	1.2	30.5	Short	165	0.0	NA
Lane 2[d]	146	2.0	146	2.0	563	0.259	100	10.0	LOS A	1.3	31.8	Full	1000	0.0	0.0
Approach	274	2.0	274	2.0		0.259		10.5	LOS B	1.3	31.8				
North: Bowman Rd															
Lane 1[d]	121	2.0	121	2.0	565	0.214	100	9.2	LOS A	0.9	23.7	Full	750	0.0	0.0
Approach	121	2.0	121	2.0		0.214		9.2	LOS A	0.9	23.7				
West: EB - Bell Rd															
Lane 1	579	2.0	579	2.0	1275	0.454	81[5]	7.4	LOS A	3.5	88.7	Full	400	0.0	0.0
Lane 2[d]	863	2.0	863	2.0	1542	0.560	100	8.1	LOS A	5.1	128.7	Full	400	0.0	0.0
Lane 3	89	2.0	89	2.0	1630	0.055	100	2.6	LOS A	0.3	7.6	Short	335	0.0	NA
Approach	1532	2.0	1532	2.0		0.560		7.5	LOS A	5.1	128.7				
Intersection	3168	2.0	3168	2.0		0.560		8.5	LOS A	5.1	128.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2025 PM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2025 PM]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	Total	HV						Veh	Dist				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	26	2.0	26	2.0	454	0.056	100	8.7	LOS A	0.2	6.1	Full	650	0.0	0.0
Approach	26	2.0	26	2.0		0.056		8.7	LOS A	0.2	6.1				
NorthEast: Musso Rd															
Lane 1[d]	41	2.0	41	2.0	477	0.086	100	8.7	LOS A	0.4	9.2	Full	650	0.0	0.0
Approach	41	2.0	41	2.0		0.086		8.7	LOS A	0.4	9.2				
West: Bell Rd															
Lane 1[d]	526	2.0	526	2.0	1347	0.390	100	6.3	LOS A	3.3	84.0	Full	400	0.0	0.0
Approach	526	2.0	526	2.0		0.390		6.3	LOS A	3.3	84.0				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	604	2.0	604	2.0	1120	0.540	100	9.6	LOS A	4.9	125.7	Full	1000	0.0	0.0
Lane 2	355	2.0	355	2.0	876	0.405	75[5]	8.9	LOS A	2.6	65.4	Short	190	0.0	NA
Approach	959	2.0	959	2.0		0.540		9.4	LOS A	4.9	125.7				
Intersection	1551	2.0	1551	2.0		0.540		8.3	LOS A	4.9	125.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 AM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2045 AM]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bowman Rd															
Lane 1[d]	185	3.0	185	3.0	638	0.289	100	9.4	LOS A	1.5	38.1	Full	350	0.0	0.0
Approach	185	3.0	185	3.0		0.289		9.4	LOS A	1.5	38.1				
East: WB - Bell Rd															
Lane 1	577	3.0	577	3.0	1248	0.463	100	7.7	LOS A	3.7	94.8	Full	400	0.0	0.0
Lane 2[d]	711	3.0	711	3.0	1536	0.463	100	6.7	LOS A	3.9	99.2	Short	115	0.0	NA
Approach	1288	3.0	1288	3.0		0.463		7.1	LOS A	3.9	99.2				
NorthEast: I-80 WB Off Ramp															
Lane 1	246	3.0	246	3.0	492	0.499	100	16.9	LOS B	3.1	79.1	Short	165	0.0	NA
Lane 2[d]	331	3.0	331	3.0	662	0.499	100	13.3	LOS B	3.4	88.3	Full	1000	0.0	0.0
Approach	576	3.0	576	3.0		0.499		14.8	LOS B	3.4	88.3				
North: Bowman Rd															
Lane 1[d]	185	3.0	185	3.0	492	0.375	100	13.5	LOS B	2.0	50.6	Full	750	0.0	0.0
Approach	185	3.0	185	3.0		0.375		13.5	LOS B	2.0	50.6				
West: EB - Bell Rd															
Lane 1	201	3.0	201	3.0	1132	0.178	35[5]	4.8	LOS A	1.0	26.2	Full	400	0.0	0.0
Lane 2[d]	804	3.0	804	3.0	1588	0.506	100	7.1	LOS A	4.4	111.4	Full	400	0.0	0.0
Lane 3	212	3.0	212	3.0	1673	0.127	100	3.1	LOS A	0.8	19.5	Short	335	0.0	NA
Approach	1217	3.0	1217	3.0		0.506		6.0	LOS A	4.4	111.4				
Intersection	3451	3.0	3451	3.0		0.506		8.5	LOS A	4.4	111.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 AM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2045 AM]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	Total	HV						Veh	Dist				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	28	4.0	28	4.0	488	0.058	100	8.2	LOS A	0.2	6.4	Full	650	0.0	0.0
Approach	28	4.0	28	4.0		0.058		8.2	LOS A	0.2	6.4				
NorthEast: Musso Rd															
Lane 1[d]	40	4.0	40	4.0	489	0.081	100	8.5	LOS A	0.3	9.0	Full	650	0.0	0.0
Approach	40	4.0	40	4.0		0.081		8.5	LOS A	0.3	9.0				
West: Bell Rd															
Lane 1[d]	210	4.0	210	4.0	1386	0.152	100	3.8	LOS A	1.0	25.0	Full	400	0.0	0.0
Approach	210	4.0	210	4.0		0.152		3.8	LOS A	1.0	25.0				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	827	4.0	827	4.0	1414	0.585	100	9.0	LOS A	4.8	125.0	Full	1000	0.0	0.0
Lane 2	503	4.0	503	4.0	1147	0.438	75[5]	7.8	LOS A	3.0	76.7	Short	190	0.0	NA
Approach	1330	4.0	1330	4.0		0.585		8.5	LOS A	4.8	125.0				
Intersection	1608	4.0	1608	4.0		0.585		7.9	LOS A	4.8	125.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 PM - Bell Rd/I-80 WB Ramps/Bowman Rd]

Network: N101 [Year 2045 PM]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bowman Rd															
Lane 1[d]	305	2.0	305	2.0	436	0.700	100	28.9	LOS C	5.9	149.1	Full	350	0.0	0.0
Approach	305	2.0	305	2.0		0.700		28.9	LOS C	5.9	149.1				
East: WB - Bell Rd															
Lane 1	510	2.0	510	2.0	1076	0.474	100	8.7	LOS A	3.7	94.0	Full	400	0.0	0.0
Lane 2[d]	653	2.0	653	2.0	1377	0.474	100	7.3	LOS A	4.0	101.7	Short	115	0.0	NA
Approach	1163	2.0	1163	2.0		0.474		7.9	LOS A	4.0	101.7				
NorthEast: I-80 WB Off Ramp															
Lane 1	139	2.0	139	2.0	448	0.311	100	13.2	LOS B	1.6	40.7	Short	165	0.0	NA
Lane 2[d]	187	2.0	187	2.0	603	0.311	100	10.2	LOS B	1.8	44.5	Full	1000	0.0	0.0
Approach	326	2.0	326	2.0		0.311		11.5	LOS B	1.8	44.5				
North: Bowman Rd															
Lane 1[d]	142	2.0	142	2.0	540	0.263	100	10.4	LOS B	1.2	31.2	Full	750	0.0	0.0
Approach	142	2.0	142	2.0		0.263		10.4	LOS B	1.2	31.2				
West: EB - Bell Rd															
Lane 1	679	2.0	679	2.0	1288	0.527	82[5]	8.5	LOS A	4.4	112.8	Full	400	0.0	0.0
Lane 2[d]	1026	2.0	1026	2.0	1599	0.642	100	9.4	LOS A	6.5	165.7	Full	400	0.0	0.0
Lane 3	105	2.0	105	2.0	1708	0.062	100	2.6	LOS A	0.3	8.9	Short	335	0.0	NA
Approach	1811	2.0	1811	2.0		0.642		8.7	LOS A	6.5	165.7				
Intersection	3747	2.0	3747	2.0		0.700		10.4	LOS B	6.5	165.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 PM - Bell Rd/I-80 EB Ramps/Musso Rd]

Network: N101 [Year 2045 PM]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Musso Rd															
Lane 1[d]	26	2.0	26	2.0	415	0.061	100	9.6	LOS A	0.3	7.2	Full	650	0.0	0.0
Approach	26	2.0	26	2.0		0.061		9.6	LOS A	0.3	7.2				
NorthEast: Musso Rd															
Lane 1[d]	41	2.0	41	2.0	442	0.092	100	9.5	LOS A	0.4	10.7	Full	650	0.0	0.0
Approach	41	2.0	41	2.0		0.092		9.5	LOS A	0.4	10.7				
West: Bell Rd															
Lane 1[d]	617	2.0	617	2.0	1414	0.437	100	6.7	LOS A	4.0	102.8	Full	400	0.0	0.0
Approach	617	2.0	617	2.0		0.437		6.7	LOS A	4.0	102.8				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	732	2.0	732	2.0	1131	0.647	100	12.1	LOS B	8.3	210.9	Full	1000	0.0	0.0
Lane 2	416	2.0	416	2.0	856	0.485	75[5]	10.5	LOS B	3.9	98.6	Short	190	0.0	NA
Approach	1148	2.0	1148	2.0		0.647		11.5	LOS B	8.3	210.9				
Intersection	1832	2.0	1832	2.0		0.647		9.8	LOS A	8.3	210.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 AM - Bell Rd/I-80 WB Ramps/Bowman Rd - Sensitivity]

Network: N101 [Year 2045 AM - Sensitivity Analysis]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bowman Rd															
Lane 1[d]	185	3.0	185	3.0	530	0.349	100	12.1	LOS B	2.0	51.4	Full	350	0.0	0.0
Approach	185	3.0	185	3.0		0.349		12.1	LOS B	2.0	51.4				
East: WB - Bell Rd															
Lane 1	692	3.0	692	3.0	1243	0.556	100	9.2	LOS A	5.0	129.0	Full	400	0.0	0.0
Lane 2[d]	852	3.0	852	3.0	1531	0.556	100	8.0	LOS A	5.3	134.9	Short	115	0.0	NA
Approach	1543	3.0	1543	3.0		0.556		8.6	LOS A	5.3	134.9				
NorthEast: I-80 WB Off Ramp															
Lane 1	287	3.0	287	3.0	397	0.722	100	33.0	LOS C	5.9	149.8	Short	165	0.0	NA
Lane 2[d]	404	3.0	404	3.0	559	0.722	100	25.0	LOS C	6.9	176.4	Full	1000	0.0	0.0
Approach	690	3.0	690	3.0		0.722		28.3	LOS C	6.9	176.4				
North: Bowman Rd															
Lane 1[d]	185	3.0	185	3.0	372	0.497	100	21.4	LOS C	3.1	78.3	Full	750	0.0	0.0
Approach	185	3.0	185	3.0		0.497		21.4	LOS C	3.1	78.3				
West: EB - Bell Rd															
Lane 1	234	3.0	234	3.0	1123	0.208	34[5]	5.1	LOS A	1.2	31.6	Full	400	0.0	0.0
Lane 2[d]	967	3.0	967	3.0	1576	0.614	100	8.9	LOS A	6.1	155.2	Full	400	0.0	0.0
Lane 3	212	3.0	212	3.0	1670	0.127	100	3.1	LOS A	0.8	19.8	Short	335	0.0	NA
Approach	1413	3.0	1413	3.0		0.614		7.4	LOS A	6.1	155.2				
Intersection	4016	3.0	4016	3.0		0.722		12.3	LOS B	6.9	176.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 AM - Bell Rd/I-80 EB Ramps/Musso Rd - Sensitivity]

Network: N101 [Year 2045 AM - Sensitivity Analysis]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	28	4.0	28	4.0	402	0.071	100	10.0	LOS B	0.3	8.0	Full	650	0.0	0.0
Approach	28	4.0	28	4.0		0.071		10.0	LOS B	0.3	8.0				
NorthEast: Musso Rd															
Lane 1[d]	40	4.0	40	4.0	403	0.099	100	10.5	LOS B	0.4	11.2	Full	650	0.0	0.0
Approach	40	4.0	40	4.0		0.099		10.5	LOS B	0.4	11.2				
West: Bell Rd															
Lane 1[d]	250	4.0	250	4.0	1386	0.180	100	4.1	LOS A	1.2	31.1	Full	400	0.0	0.0
Approach	250	4.0	250	4.0		0.180		4.1	LOS A	1.2	31.1				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	920	4.0	920	4.0	1379	0.667	100	11.0	LOS B	7.4	190.0	Full	1000	0.0	0.0
Lane 2	682	4.0	682	4.0	1137	0.600	90[7]	10.8	LOS B	5.4	140.0	Short	190	0.0	NA
Approach	1602	4.0	1602	4.0		0.667		10.9	LOS B	7.4	190.0				
Intersection	1920	4.0	1920	4.0		0.667		10.0	LOS B	7.4	190.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[7] Lane under-utilisation specified by the user
[d] Dominant lane on roundabout approach

LANE SUMMARY

Site: 101 [Yr 2045 PM - Bell Rd/I-80 WB Ramps/Bowman Rd - Sensitivity]

Network: N101 [Year 2045 PM - Senstivity Analysis]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: Bowman Rd															
Lane 1[d]	295	2.0	295	2.0	346	0.853	100	53.1	LOS D	9.3	235.2	Full	350	0.0	0.0
Approach	295	2.0	295	2.0		0.853		53.1	LOS D	9.3	235.2				
East: WB - Bell Rd															
Lane 1	580	2.0	580	2.0	1090	0.532	100	9.7	LOS A	4.5	113.5	Full	400	0.0	0.0
Lane 2[d]	740	2.0	740	2.0	1390	0.532	100	8.2	LOS A	4.8	121.1	Short	115	0.0	NA
Approach	1320	2.0	1320	2.0		0.532		8.8	LOS A	4.8	121.1				
NorthEast: I-80 WB Off Ramp															
Lane 1	155	2.0	155	2.0	397	0.392	100	16.8	LOS B	2.2	56.5	Short	165	0.0	NA
Lane 2[d]	215	2.0	215	2.0	548	0.392	100	12.8	LOS B	2.5	63.5	Full	1000	0.0	0.0
Approach	370	2.0	370	2.0		0.392		14.5	LOS B	2.5	63.5				
North: Bowman Rd															
Lane 1[d]	140	2.0	140	2.0	492	0.285	100	11.7	LOS B	1.4	34.7	Full	750	0.0	0.0
Approach	140	2.0	140	2.0		0.285		11.7	LOS B	1.4	34.7				
West: EB - Bell Rd															
Lane 1	745	2.0	745	2.0	1277	0.584	79[5]	9.6	LOS A	5.3	134.1	Full	400	0.0	0.0
Lane 2[d]	1170	2.0	1170	2.0	1592	0.735	100	11.9	LOS B	8.8	222.9	Full	400	0.0	0.0
Lane 3	100	2.0	100	2.0	1706	0.059	100	2.5	LOS A	0.3	8.4	Short	335	0.0	NA
Approach	2015	2.0	2015	2.0		0.735		10.6	LOS B	8.8	222.9				
Intersection	4140	2.0	4140	2.0		0.853		13.4	LOS B	9.3	235.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

LANE SUMMARY

Site: 102 [Yr 2045 PM - Bell Rd/I-80 EB Ramps/Musso Rd - Sensitivity]

Network: N101 [Year 2045 PM - Senstivity Analysis]

PCGC Master Plan Update Volumes
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
SouthEast: Musso Rd															
Lane 1[d]	25	2.0	25	2.0	304	0.082	100	13.4	LOS B	0.4	10.4	Full	650	0.0	0.0
Approach	25	2.0	25	2.0		0.082		13.4	LOS B	0.4	10.4				
NorthEast: Musso Rd															
Lane 1[d]	40	2.0	40	2.0	336	0.119	100	12.8	LOS B	0.6	14.8	Full	650	0.0	0.0
Approach	40	2.0	40	2.0		0.119		12.8	LOS B	0.6	14.8				
West: Bell Rd															
Lane 1[d]	715	2.0	715	2.0	1414	0.506	100	7.6	LOS A	5.4	136.0	Full	400	0.0	0.0
Approach	715	2.0	715	2.0		0.506		7.6	LOS A	5.4	136.0				
SouthWest: I-80 EB Off Ramp															
Lane 1[d]	803	2.0	803	2.0	1055	0.761	100	17.2	LOS B	13.2	335.0	Full	1000	0.0	0.0
Lane 2	547	2.0	547	2.0	798	0.685	90[7]	17.2	LOS B	8.7	221.1	Short	190	0.0	NA
Approach	1350	2.0	1350	2.0		0.761		17.2	LOS B	13.2	335.0				
Intersection	2130	2.0	2130	2.0		0.761		13.8	LOS B	13.2	335.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane under-utilisation specified by the user
d Dominant lane on roundabout approach

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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Appendix D

Natural Environment Study (NES)

Natural Environment Study

(Minimal Impacts)

Bell Road at I-80 Interchange Project

3-PLA-80-R20.9/R21.3

03-4H430

October 2020

STATE OF CALIFORNIA
Department of Transportation
County of Placer

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For individuals with sensory disabilities, this document is available in Braille, large print, on audiocassette, or computer disk. To obtain a copy in one of these alternate formats, please call or write to Caltrans, Attn: Tracy Robinson, Caltrans District 3 703 B. St., Marysville, CA 95901, and (530) 741-4588, or use the California Relay Service 1 (800) 735-2929 (TTY), 1 (800) 735-2929 (Voice) or 711."

Summary

The proposed project would address capacity and safety concerns at the interchange along Bell Road in Placer County (County) at the Interstate 80 (I-80) eastbound (EB) and westbound (WB) ramp intersections, including Bowman Road on the west and Musso Road on the east. These improvements are identified as the Bell Road at I-80 Interchange Project (project). The County proposes to construct a six-legged roundabout, on the northwest side of I-80, at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a second five-legged roundabout, on the southeast side of I-80, at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection.

The region is characterized by Montane Hardwood-Conifer, Montane Hardwood, Blue oak-Foothill Pine, Valley Oak Woodland, Valley Foothill Riparian, Annual Grassland, Pasture, Cropland, Vineyard, and Urban areas.

The Biological Study Area (BSA) is within the Coon Creek watershed, which contains potential habitat for the California Central Valley Steelhead and Chinook Salmon. The closest tributary to Coon Creek is Dry Creek, which is 0.5 miles to the north of the BSA. Being within the Coon Creek watershed, all runoff from the BSA ultimately makes its way to Coon Creek and downstream creeks/rivers that are designated as Essential Fish Habitat/Critical Habitat for these fish species. It is noted that the BSA is not accessible to anadromous fish, nor does it contain any Essential Fish Habitat/Critical Habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon. Furthermore, there are no wetlands or other jurisdictional waters in the BSA).

A nine-quad search of federal, state, and California Native Plant Society (CNPS) records lists twenty animal and fourteen plant species that are federal or state listed as Endangered, Threatened, Fully Protected, Candidate, Species of Special Concern, Rare, or CNPS rare plant rank of 1B.2, 1B.3, or 2B.3. None of these records occur within the BSA. The evaluation concluded that only one of these species has the potential to occur within the BSA.

It was also noted that given the available quality habitat in the vicinity of the BSA for special status birds, and the quality roosting habitat for bats, combined with their high mobility of these species, it is possible for these species to traverse the BSA at times. It is also possible that nests and/or roosts for these species be established within proximately to the BSA. The Bell Road at I-80 overcrossing was identified as potential roosting habitat for bats, and nesting habitat for cliff swallow, although there was no evidence of current or remnant roosting or nesting activities. Avoidance and minization measures are included that require preconstruction surveys for bird nests and bat roosts under the Bell Road at I-80 overcrossing, and in the vicinity of the BSA.

A search of the National Marine Fisheries Service (NMFS) species list for the Auburn 7.5 minute quadrange (Figure 4 USGS Map) indicates that critical habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon are present in the regional vicinity.

The western bumble bee, which is a California Candidate species, has potential habitat present within the BSA. The habitat is not considered high quality for this species given there are no meadows or grasslands with abundant floral resources; however, there are linear strips of grassland habitat with floral resources along the roadways within the BSA. These areas are low-quality fragments of habitat and project construction will require some disturbance to these grassland strips.

1 - Introduction

History

I-80, in the project vicinity, is a six-lane, divided freeway extending through Auburn to the southwest and Colfax to the northeast. As a major freeway, I-80 provides east-west interstate access from the San Francisco Bay Area to Nevada and beyond across the United States. Within the project area, I-80 extends in a northeast-southwest direction. I-80 consists of three 12-foot lanes in each direction with a posted speed limit of 65 miles per hour (mph). I-80 is a Terminal Access Route for Surface Transportation Assistance Act (STAA) trucks.

Bell Road is a four lane, Minor Arterial roadway that extends in a northwest-southeast direction and has a speed limit of 55 miles per hour (mph) within the project vicinity. It is a County-owned facility that links the Auburn urban area along SR 49 to the rest of the County and I-80.

Musso Road is a two-lane roadway that provides access to local and rural businesses / properties on the southeastern side of I-80. Musso Road terminates approximately 1,000 feet to the southwest and 3,000 feet to the northeast of Bell Road. The railroad, I-80, and the creek border Musso Road and therefore, use is not likely to change significantly in the future.

Bowman Road is a two-lane roadway that traverses in the northeastern-southwestern direction, largely paralleling I-80 in the vicinity of Bell Road. To the northeast, Bowman Road provides access to residences and transitions into Christian Valley Road. To the southwest, Bowman Road provides access to business, residences, and schools. Bowman Road terminates into I-80 WB at the Auburn Ravine Rd/Foresthill Rd interchange. Ultimately, Bowman Road is slated to be improved with Class II bike lanes as per the adopted County bicycle master plan.

The project is located in a rural setting, surrounded by open space land, agriculture, commercial properties, and residential neighborhoods.

Project Purpose and Need.

Purpose

The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the interchange. The secondary purpose of this project is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

Need

Congestion in the project area during the AM and PM peak hours has affected the efficiency of the interchange to the point where the traffic is backing up onto the mainline. This condition is an operational and safety concern for Placer County and Caltrans that needs to be addressed.

Project Description

Project Location: The project is located within the southeastern portion of Placer County, California, around 38.9460113 latitude and -121.0473178 longitude and between post miles R20.9 and R21.3 (see Figure 1). The project site is approximately two miles east of the Auburn Airport and north of Auburn's city limits (see Figure 2).

Project Description: The proposed project would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. The roundabouts would be designed to accommodate future growth "2045." Intersection geometrics and pedestrian crossings would be consistent with the National Cooperative Highway Research Program (NCHRP) Report 672 entitled "Roundabouts: An Information Guide, 2nd Edition" (Guide).

Roundabout improvements at the Bell Road at I-80 interchange would include, but not be limited to, the following:

- A 10-foot shared use path separated from the roadway with a five-foot minimum landscaped buffer for pedestrian safety and to guide pedestrians to correct crossing locations;
- Crosswalks and Americans with Disabilities Act (ADA) accessible ramps along pedestrian facilities; and
- Vehicular speeds ranging from 15 to 30 mph after project buildout within the interchange.

Pedestrian and Bicycle Safety: The 10-foot shared-use path would convey pedestrian and bicycle traffic through the intersection and provide the opportunity for cyclists to exit the bicycle lane via a bicycle ramp and navigate the intersection on the shared-use path and through the crosswalks. Cyclists would also have the option to exit the bicycle lane and enter the roadway to ride with vehicle traffic through the roundabout.

Crosswalks would be split into two separate crossings through the provision of the pedestrian refuges at the splitter islands. These two-stage crossings would reduce the amount of sustained time a pedestrian is in potential conflict with motorized vehicles by limiting the length of each crossing and limiting each crossing to one direction of vehicle travel at a time.

Pedestrian crossings would be a minimum of one car length from the circulatory roadway, and the pedestrian refuges at the splitter islands would be at least six feet wide, consistent with the NCHRP Guide.

Lighting and Signage*:* The project would provide enhanced lighting to improve roadway visibility for drivers during nighttime hours. Lighting is anticipated to be installed at ramp merges and diverges along the shoulders of I-80. The pole lighting would be supported on a cast-in-drilled-hole concrete pile (with a typical diameter of 2.5 feet and length of five feet). New conduits, trenching, and power service connections would be required to install lighting along the shoulders.

Existing local guide signs and regulatory signs would likely be removed and replaced. Additional guide signs would be placed per the California Manual on Uniform Traffic Control Devices (CA MUTCD). Overhead signs would be installed along southbound Bell Road approaching Bowman Road, at the I-80 WB off-ramp, and along the EB off-ramp for direction through the roundabout.

Retaining Walls: The roundabout incorporating Musso Road and Bell Road would require the construction of a retaining wall south of Musso Road. The wall would be approximately 270 feet long with a maximum height of 20 feet. The type of wall is still being determined, but a soil nail wall with a concrete vehicular barrier is the current type selection.

The roundabout incorporating Bowman Road and Bell Road would require the construction of a retaining wall north of Bowman Road. The wall would be up to 440 feet long and have a maximum height of 14 feet. The type of wall is still being finalized, but a concrete Type 1 cantilever retaining wall is the current type selection.

Park-and-Ride Lot: A county-owned park-and-ride lot is located north of I-80 between the westbound I-80 on-ramp and Bowman Road. The park-and-ride lot has approximately 45 parking spaces, and provides patrons the option to park their cars for the day for free and connect to van pools. The lot would be slightly reconfigured to maximize spaces and better provide better opportunity for utilization.

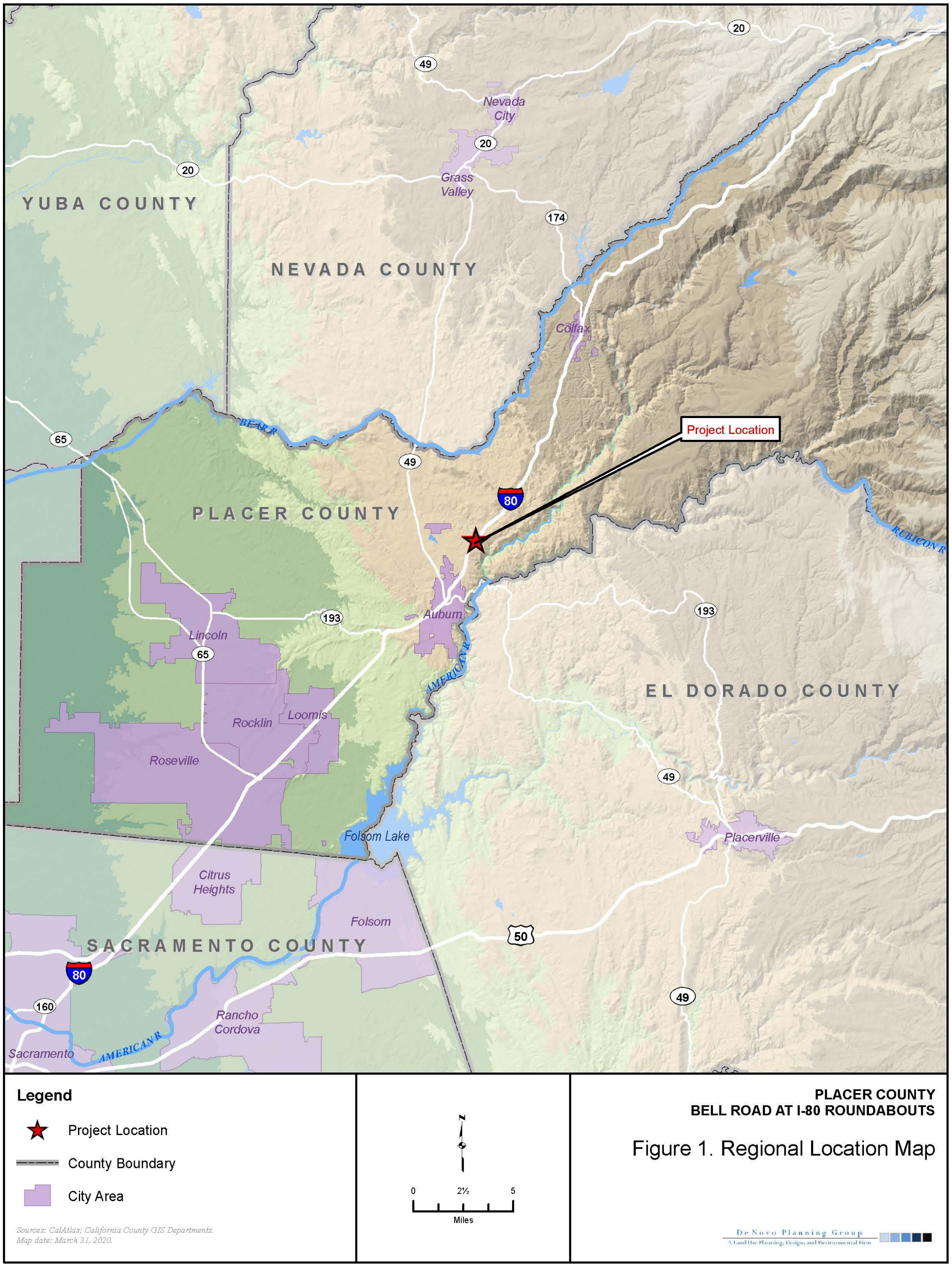
Depth of Excavation: Excavation would be required throughout the project in order to construct retaining walls, utilities, and overhead signs. A minimum depth of five feet would be required for improvements to underground utilities. A maximum excavation depth of 25 feet would be required to install the two overhead signs. A maximum excavation depth of 15 feet would be required to install the two retaining walls on the project.

Project Design Alternatives: A No-Build Alternative and one Build Alternative were analyzed for this project. The No-Build Alternative assumes existing lane geometrics and intersection control. The Build Alternative consists of yield-controlled roundabouts with modified lane geometrics. An alternative involving signalized intersections with a widened overcrossing structure as well as an alternative involving a roundabout at the WB off-ramp and the reconstruction of the EB on-ramp to a loop on-ramp were also considered as part of the Project Initiation Document (PID) phase. These two alternatives were ultimately rejected due to the lower overall Level of Service (LOS) that would be able to be achieved, the higher project costs, and the additional right-of-way that would be required to construct.

<u>No-Build Alternative:</u> The No-Build Alternative leaves the existing lane geometrics and intersection controls in place. Under existing conditions, the Bell Road/Bowman Road

intersection is controlled by a signal and the Bell Road/Musso Road intersection is stop controlled when traveling southbound along Bell Road. The Bell Road/WB I-80 off-ramp is stop controlled and the Bell Road/EB I-80 off-ramp and northbound Bell Road travel way is stop controlled. The Bell Road at I-80 interchange intersections are approximately 130 feet to 380 feet apart. The no build alternative is rejected.

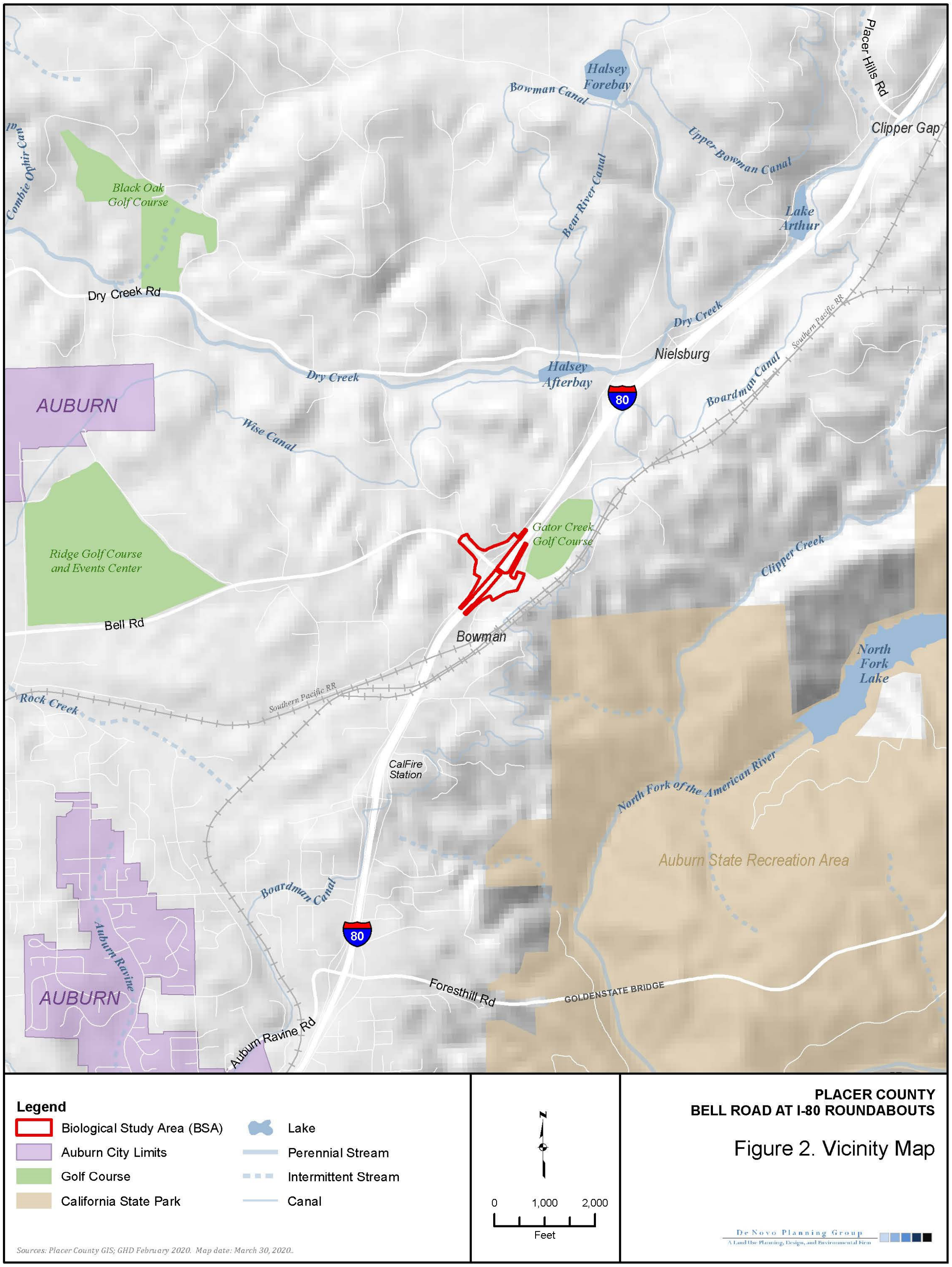
Build Alternative: This alternative would replace the existing study intersections with two modern, yield-controlled, single and multi-lane roundabouts designed to accommodate the Ultimate Design Year traffic forecast volumes. The Build Alternative best meets the safety purpose of the project for all modes of travel, while addressing future mobility needs.



Sources: CalAtlas; California County GIS Departments.
Map date: March 31, 2020.

PLACER COUNTY
BELL ROAD AT I-80 ROUNDABOUTS

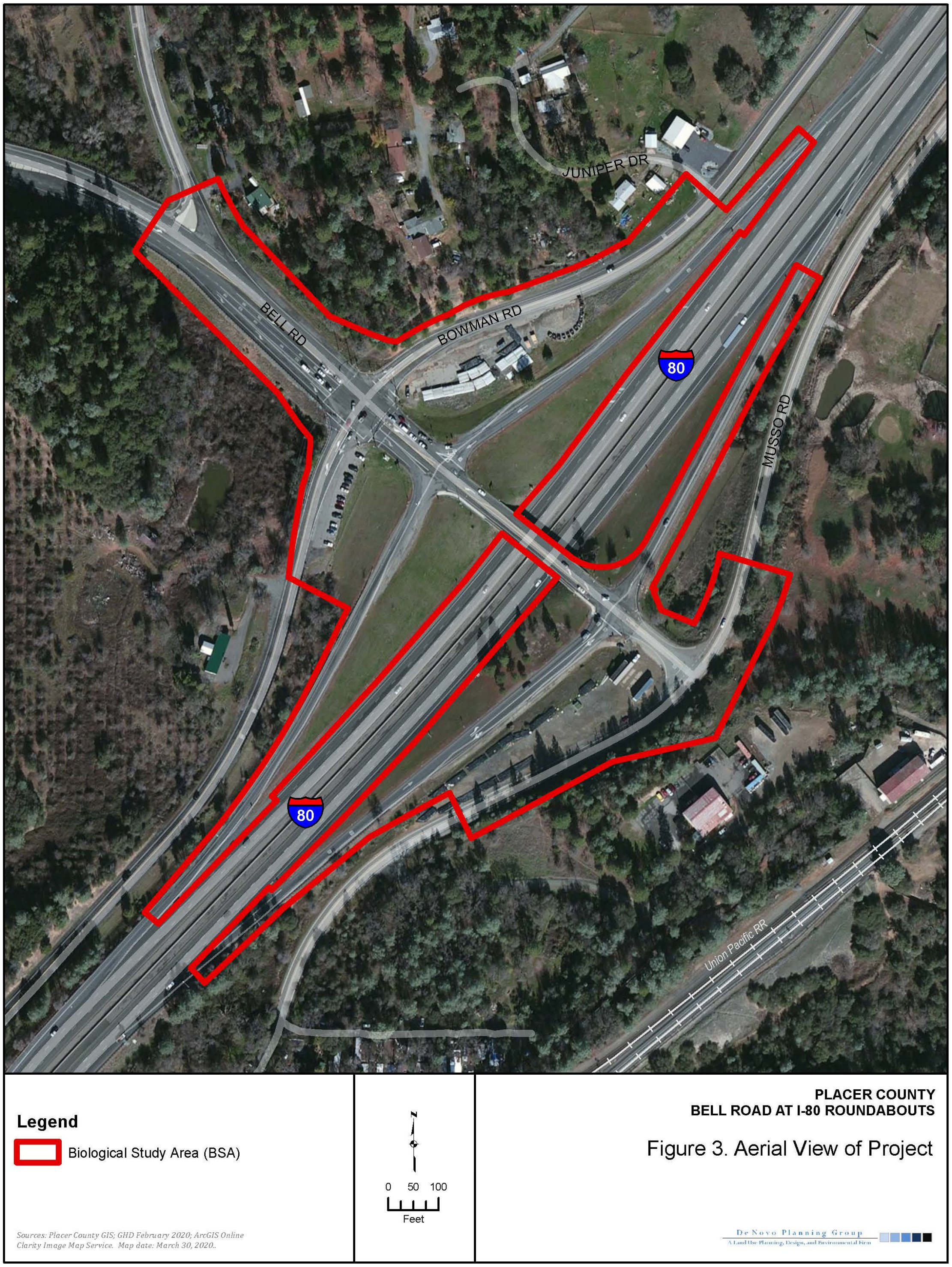
Figure 1. Regional Location Map



PLACER COUNTY
BELL ROAD AT I-80 ROUNDABOUTS

Figure 2. Vicinity Map

Sources: Placer County GIS; GHD February 2020. Map date: March 30, 2020..



PLACER COUNTY
BELL ROAD AT I-80 ROUNDABOUTS

Figure 3. Aerial View of Project

Sources: Placer County GIS; GHD February 2020; ArcGIS Online Clarity Image Map Service. Map date: March 30, 2020.

2 - Study Methods

REGULATORY REQUIREMENTS

There are a number of regulatory agencies whose responsibility includes the oversight of the natural resources of the state and nation including the California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board, and the National Marine Fisheries Service (NMFS. These agencies often respond to declines in the quantity and quality of a particular habitat or plant or animal species by developing protective measures for those species or habitat type. The following is an overview of the federal, state and local regulations that are applicable to transportation projects.

- *Federal Endangered Species Act.*
- *Migratory Bird Treaty Act.*
- *Clean Water Act – Section 404 and 401.*
- *Department of Transportation Act - Section 4(f).*
- *National Environmental Policy Act*
- *Fish and Game Code §2050-2097 - California Endangered Species Act.*
- *Fish and Game Code §1900-1913 California Native Plant Protection Act.*
- *Fish and Game Code §3503, 3503.5, 3800 - Predatory Birds.*
- *Fish and Game Code § 3511- "Fully Protected" Bird Species*
- *Fish and Game Code §1601-1603 – Streambed Alteration.*
- *Public Resources Code § 21000 - California Environmental Quality Act.*

STUDIES REQUIRED

Studies completed or planned for the project satisfy the requirements of federal and state guidance and ordinances that protect biological resources. Qualified biological staff conducted studies in accordance with all applicable survey protocols and guidelines. Studies were conducted to identify and determine possible effects to sensitive habitats and species. Results of literature and database searches were used to determine the potential for presence of special status plant and animal species. Field surveys include the following:

- General habitat evaluation, to determine whether suitable habitat exists for special status plant and animal species.
- Botanical field surveys, focused plant surveys to determine presence or absence of special status plants within the project limits.
- Surveys for nesting migratory and nongame birds.
- General wildlife observations.
- VELB exit hole surveys and distance to planned excavation.

Literature Search

De Novo Planning Group conducted a literature review and database search to gather information regarding sensitive plants, animals, and habitats. The purpose of the literature and database review is to identify species known to occur within the region based on historic range, observations, and habitat requirements. The literature and database sources included the California Natural Diversity Data Base (CNDDB RareFind 5) administered by the California Department of Fish and Wildlife, the Environmental Conservation Online System (ECOS) administered by the United States Fish and Wildlife Service, and the Inventory of Rare and Endangered Plants administered by the California Native Plant Society. The information obtained from these sources are listed in the Appendix. The results of the literature and database reviews is presented in Section 3 Environmental Setting. There is no Essential Fish Habitat within the BSA, although the BSA is within the Coon Creek watershed which contains Essential Fish Habitat for anadromous fish.

Survey Methods

Steve McMurtry, Principal Biologist with De Novo Planning Group, performed a field survey on May 30, 2019. The survey was conducted on foot to systematically inspect and record existing conditions, including habitat and the potential for special status species. The survey included traversing the BSA on foot using transects of approximately 10 feet apart. The survey was done under clear skies, approximately 75 degrees Fahrenheit, with less than five miles per hour winds. The botanical survey focused on those CNPS rare plant rank species 1 through 4 with the potential to be present. The survey was within the floristic season. The season was a normal to high precipitation year and flowering was present.

Tools used included a Trimble GeoExplorer XH Handheld (sub-foot unit), 30-meter tape measure, diameter tape, spade, Munsell color chart, Vortex 20-60x80 spotting scope, and Bushnell 10x42 binoculars. The survey also included performing a windshield survey along roadways within an approximately two-mile radius of the BSA. The purpose of the survey was to document the biological conditions within the BSA and vicinity. Aerial photographs of the BSA were also examined to assess any changes that have occurred from historical aerial photos.

Habitat was recorded. The BSA was inspected for the presence, or potential for presence of wildlife. This included inspecting the trees for signs of remnant nests to the extent possible. The aquatic area to the west of the BSA was inspected for its aquatic habitat functions, including the habitat quality for fish and amphibians.

Personal Survey Dates

Steve McMurtry, Principal Biologist with De Novo Planning Group, performed a field survey on May 30, 2019. Mr. McMurtry is a Principal Biologist with approximately 19 years of experience in the Sierra Nevada, Central Valley, and Central Coast.

Agency Coordination and Professional Contacts

GHD Inc. (Heather Anderson and Katherine Wall) have been the primary liaison communication/coordinating between the NES-MI preparer De Novo Planning Group (Steve McMurtry) and Caltrans (Mohan Bonala, PE, Masum A Patwary, and Julia Green). GHD Inc. has also facilitated all Project Development Team (PDT) meetings with Placer County, Caltrans, and the Engineering team. Caltrans (Shawn Duffy, Associate Environmental Planner/Biologist) reviewed/commented on the NES-MI administrative draft document. De Novo Planning Group (Steve McMurtry) and Caltrans (Shawn Duffy) communicated/coordinated on the administrative draft comments.

Limitations That May Influence Results

A May 30, 2019 field survey was performed by Steve McMurtry, Principal Biologist with De Novo Planning Group. The survey focused on those CNPS rare plant rank species 1 through 4 with the potential to be present. The survey was within the floristic season. The season was a normal to high precipitation year and flowering was present.

3 - Results: Environmental Setting

The BSA is located along Bell Road in the foothills of the Sierra Nevada Mountains, just east of the City of Auburn in unincorporated Placer County. Land use surrounding the BSA consists of mostly undevelopable open space land due to topographic conditions.

Description of the Existing Biological and Physical Conditions

STUDY AREA

Physical Conditions

The BSA is on the Auburn quad (T13N, R8E, Section 26), and is in the Upper Coon-Upper Auburn Hydrologic Unit (Hydrologic Unit Code 18020161). The BSA is 38°56'43.69" north, 121° 2'48.29" west. Elevation in the BSA is approximately 1,561 feet above sea level. Soils in the BSA are mostly Xerorthents, cut and fill areas, derived from a mixture of mine spoils and earthy fill.

The BSA is mostly composed of the I-80, including the Bell Road overcrossing and on- and off-ramps. The BSA also includes Bell Road, which intersects with the I-80 and two frontage roads—Musso Road and Bowman Road.

I-80, in the project vicinity, is a six-lane, divided freeway extending through Auburn to the southwest and Colfax to the northeast. As a major freeway, I-80 provides east-west interstate access from the San Francisco Bay Area to Nevada and beyond across the United States. Within the project area, I-80 extends in a northeast-southwest direction. I-80 consists of three

12-foot lanes in each direction with a posted speed limit of 65 miles per hour (mph). I-80 is a Terminal Access Route for Surface Transportation Assistance Act (STAA) trucks.

Bell Road is a four lane, Minor Arterial roadway that extends in a northwest-southeast direction and has a speed limit of 55 miles per hour (mph) within the project vicinity. It is a County-owned facility that links the Auburn urban area along SR 49 to the rest of the County and I-80.

Musso Road is a two-lane roadway that provides access to local and rural businesses / properties on the southeastern side of I-80. Musso Road terminates approximately 1,000 feet to the southwest and 3,000 feet to the northeast of Bell Road. The railroad, I-80, and the creek border Musso Road and therefore, use is not likely to change significantly in the future.

Bowman Road is a two-lane roadway that traverses in the northeastern-southwestern direction, largely paralleling I-80 in the vicinity of Bell Road. To the northeast, Bowman Road provides access to residences and transitions into Christian Valley Road. To the southwest, Bowman Road provides access to business, residences, and schools. Bowman Road terminates into I-80 WB at the Auburn Ravine Rd/Foresthill Rd interchange. Ultimately, Bowman Road is slated to be improved with Class II bike lanes as per the adopted County bicycle master plan.

The project is located in a rural setting, surrounded by open space land, agriculture, commercial properties, and residential neighborhoods.

Biological Conditions in the Study Area

The BSA includes the Project Impact Area (PIA) and approximately “100 feet beyond the County ROW.” There are five distinct tree-dominated habitats, two herbaceous-dominated habitats, and three developed habitats present within the BSA, and in the general vicinity. These include: Montane Hardwood-Conifer, Montane Hardwood, Blue oak-Foothill Pine, Valley Oak Woodland, Valley Foothill Riparian, Annual Grassland, Pasture, Cropland, Vineyard, and Urban.

The following tree-dominated and herbaceous dominated habitat descriptions are provided by the California Wildlife Habitat Relationship System.

Tree-Dominated Habitat.

Montane Hardwood-Conifer. Montane Hardwood-Conifer is transitional between dense coniferous forests and montane hardwood, mixed chaparral, or open woodlands and savannahs. Montane Hardwood-Conifer merges with many other habitats at its upper and lower ecotones. These habitats include Valley-Foothill Hardwood, Valley-Foothill Hardwood-Conifer, Valley-Foothill Riparian, Closed-Cone Pine-Cypress, Montane Hardwood, Mixed Conifer, Douglas-fir, Redwood, Montane Riparian, Montane Chaparral, and Mixed Chaparral. The habitat is an area of vegetational and floristic diversity with large numbers of endemic species.

Montane Hardwood-Conifer habitat includes both conifers and hardwoods, and at least one-third of the trees must be conifer and at least one-third must be broad-leaved. The habitat often occurs in a mosaic-like pattern with small pure stands of conifers interspersed with small stands of broad-leaved trees. This diverse habitat consists of a broad spectrum of mixed, vigorously growing conifer and hardwood species. Typically, conifers to 65 m (200 ft) in height form the upper canopy and broad-leaved trees 10 to 30 m (30 to 100 ft) in height comprise the lower canopy.

Species composition varies substantially among different geographic areas. Common associates in Montane Hardwood-Conifer in the northern Sierra Nevada include California black oak, big leaf maple, white alder, dogwood, Douglas-fir, incense-cedar and ponderosa pine.

Tree species observed in the vicinity include interior live oak (quercus wislizinii), black oak (quercus kellogii), blue oak (quercus douglasii), grey pine (pinus sabiniana), ponderosa pine (pinus ponderosa), Oregon ash (fraxinus latifolia) and California buckeye (aesculus californica). There are also areas that are more open as they transition into a herbaceous-dominated habitat. These areas contain similar tree composition, but also contain the understory herbaceous-dominated plant composition described below.

Montane Hardwood. A typical montane hardwood habitat is composed of a pronounced hardwood tree layer, with an infrequent and poorly developed shrub stratum, and a sparse herbaceous layer. On better sites, individual trees or clumps of trees may be only 3 to 4 m (10 to 13 ft) apart. On poorer sites, spacing increases to 8 to 10 m (26 to 33 ft). Where trees are closely spaced, crowns may close but seldom overlap. Tree heights tend to be uniform at most ages in mature stands where hardwoods occur, but subordinate to conifers. Mature oaks on better sites and in canyons range between 17 and 30 m (56 and 98 fl) tall and up to 150 cm (59) in) diameter at breast height (dbh). On poorer sites, mature trees typically are 10 to 15 m (33 to 49 ft) tall with boles up to 65 cm (26 in) in dbh, with dome-shaped crowns almost as wide as the trees are tall. Snags and downed woody material generally are sparse throughout the montane hardwood habitat.

In the Sierra Nevada ranges, steep, rocky south slopes of major river canyons often are clothed extensively by canyon live oak and scattered old-growth Douglas-fir. Elsewhere, higher elevation overstory associates are typical mixed conifer and California black oak; lower elevation associates are foothill pine, knobcone pine, Pacific madrone, and scrubby California-laurel. Associated understory vegetation includes Oregon-grape, currant, wood rose, snowberry, manzanita, poison-oak, and a few forbs and grasses.

Blue oak-Foothill Pine. Blue oak and foothill pine typically comprise the overstory of this habitat, with blue oak usually most abundant. Stands dominated by foothill pine tend to lose their blue oak, which is intolerant of shade. In the foothills of the Sierra Nevada, tree species typically associated with this habitat are interior live oak and California buckeye. Interior live oak sometimes dominates the overstory, especially in rocky areas and on north-facing slopes at higher elevations.

This habitat is typically diverse in structure both vertically and horizontally, with a mix of hardwoods, conifers, and shrubs. The shrub component is typically composed of several species that tend to be clumped, with interspersed patches of Annual Grassland. Woodlands of this type generally have small accumulations of dead and downed woody material and relatively few snags, compared with other tree habitats in California. Most existing stands of this type are in mature stages, with canopy cover ranging from 10 to 59 percent. Individual trees seldom exceed 125 cm (49 in) dbh, and exceptionally may reach 30 m (100 ft) in height.

At lower elevations, where blue oaks make up most of the canopy, the understory tends to be primarily annual grasses and forbs. At higher elevations where foothill pines and even interior live oaks sometimes comprise the canopy, the understory usually includes patches of shrubs in addition to the annual grasses and forbs. Shrub species include Ceanothus spp. manzanita spp., , California coffeeberry, poison-oak, silver lupine, blue elder, California yerba santa, rock gooseberry, and California redbud.

Valley Oak Woodland. This habitat varies from savanna-like to forest-like stands with partially closed canopies, comprised mostly of winter-deciduous, broad-leaved species. Denser stands typically grow in valley soils along natural drainages. Tree density decreases with the transition from lowlands to the less fertile soils of drier uplands. Similarly, the shrub layer is best developed along natural drainages, becoming insignificant in the uplands with more open stands of oaks. Valley oak stands with little or no grazing tend to develop a partial shrub layer of bird disseminated species, such as poison-oak, toyon, and coffeeberry. Ground cover consists of a well-developed carpet of annual grasses and forbs. Mature valley oaks with well-developed crowns range in height from 15 to 35 m (49 to 115 ft).

Canopies of these woodlands are dominated almost exclusively by valley oaks. Tree associates in the Central Valley include California sycamore, Hinds black walnut, interior live oak, boxelder, and blue oak. The shrub understory consists of poison-oak, blue elder, California wild grape, toyon, California coffeeberry, and California blackberry. Various sorts of wild oats, brome, barley, ryegrass, and needlegrass dominate the ground cover. Foothill pine and coast live oak are associated with VOWs along the Coast Range.

Valley Foothill Riparian. Valley-foothill riparian habitats are found in valleys bordered by sloping alluvial fans, slightly dissected terraces, lower foothills, and coastal plains. They are generally associated with low velocity flows, flood plains, and gentle topography. Valleys provide deep alluvial soils and a high-water table. The substrate is coarse, gravelly or rocky soils more or less permanently moist, but probably well aerated. Average precipitation ranges from 15 to 76 cm (6-30 in), with little or no snow. The growing season is 7 to 11 months. Valley Foothill Riparian habitats are characterized by hot, dry summers, mild and wet winters. Potential evaporation during the warmest months is often greater than precipitation. Low rainfall and streamflow result in water scarcity in many parts of the area.

Transition to adjacent non-riparian vegetation is usually abrupt, especially near agriculture. The Valley-Foothill Riparian habitat is found in association with Riverine, Annual Grassland, Oak Woodland and Agriculture. It may intergrade upstream with Montane Riparian.

Canopy height is approximately 30 m (98 ft) in a mature riparian forest, with a canopy cover of 20 to 80 percent. Most trees are winter deciduous. There is a subcanopy tree layer and an understory shrub layer. Lianas (usually wild grape) frequently provide 30 to 50 percent of the ground cover and festoon trees to heights of 20 to 30 m (65 to 98 ft). Herbaceous vegetation constitutes about one percent of the cover, except in openings where tall forbs and shade-tolerant grasses occur. Generally, the understory is impenetrable and includes fallen limbs and other debris.

Dominant species in the canopy layer are cottonwood, California sycamore and valley oak. Subcanopy trees are white alder, boxelder and Oregon ash. Typical understory shrub layer plants include wild grape, wild rose, California blackberry, blue elderberry, poison oak, buttonbush, and willows. The herbaceous layer consists of sedges, rushes, grasses, miner's lettuce, Douglas sagewort, poison-hemlock, and hoary nettle.

Herbaceous-Dominated Habitat.

Annual Grassland. Annual Grassland habitats are open grasslands composed primarily of annual plant species. Many of these species also occur as understory plants in Valley Oak Woodland (VOW) and other habitats. Structure in Annual Grassland depends largely on weather patterns and livestock grazing. Dramatic differences in physiognomy, both between seasons and between years, are characteristic of this habitat. Fall rains cause germination of annual plant seeds. Plants grow slowly during the cool winter months, remaining low in stature until spring, when temperatures increase and stimulate more rapid growth. Large amounts of standing dead plant material can be found during summer in years of abundant rainfall and light to moderate grazing pressure.

Introduced annual grasses are the dominant plant species in this habitat. These include wild oats, soft chess, ripgut brome, red brome, wild barley, and foxtail fescue. Common forbs include broadleaf filaree, redstem filaree, turkey mullein, true clovers, bur clover, popcorn flower, and many others. California poppy, the State flower, is found in this habitat. Perennial grasses, found in moist, lightly grazed, or relic prairie areas, include purple needlegrass and Idaho fescue. Vernal pools, found in small depressions with a hardpan soil layer, support downingia, meadowfoam, and other species. Species composition is also related to precipitation. Perennial grasses are more common on northern sites with mean annual rainfall greater than 150 cm (60 in). Soft chess and broadleaf filaree are common in areas with 65-100 cm (25-40 in) of rainfall, and red brome and redstem filaree are common on southern sites with less than 25 cm (10 in) of precipitation.

Annual Grassland habitat occurs in patches of various sizes throughout the state. Within the region the most sensitive native species tend to occur in vernal pools or special soils (i.e. grabbro/ultra maffic/serpentine). Non-native grasslands have replaced most native perennial grasslands in the region and throughout most of California. Vernal pools, and other aquatic habitats, occur within annual grassland, although none were seen in these habitats located within the BSA. The herbaceous-dominated habitats is a common habitat type in the regional vicinity.

Herbaceous-dominated habitat is characterized by a wide variety of plants including: wild oats, ripgut brome, soft chess, filaree, cut-leaf filaree, Mediterranean barley, Italian rye, medusa-head, and winter vetch, fiddleneck, scarlet pimpernel, black mustard, California brodiaea, field owls clover, star thistle, cut-leaf geranium, birdfoot deer vetch, miniature lupine, jointed wild radish, wild radish, milk thistle, rose clover, and cocklebur. This plant community is both native and non-native, annuals and perennials that are common throughout the Sierra Nevada Foothills.

Pasture. Pasture vegetation is a mix of perennial grasses and legumes that normally provide 100 percent canopy closure. Height of vegetation varies, according to season and livestock stocking levels, from a few inches to two or more feet on fertile soils before grazing. Old or poorly drained pastures may have patches of weeds in excess of two feet in height.

The mix of grasses and legumes varies according to management practices such as seed mixture, fertilization, soil type, irrigation, weed control, and the type of livestock on the pasture. Plant species seeded in pastures also vary with geographic area. In northern California, ryegrasses, tall fescue, Dallisgrass, Ladino clover, Salina strawberry clover, and trefoils are preferred. Many California farmers include irrigated pasture in their crop rotation system.

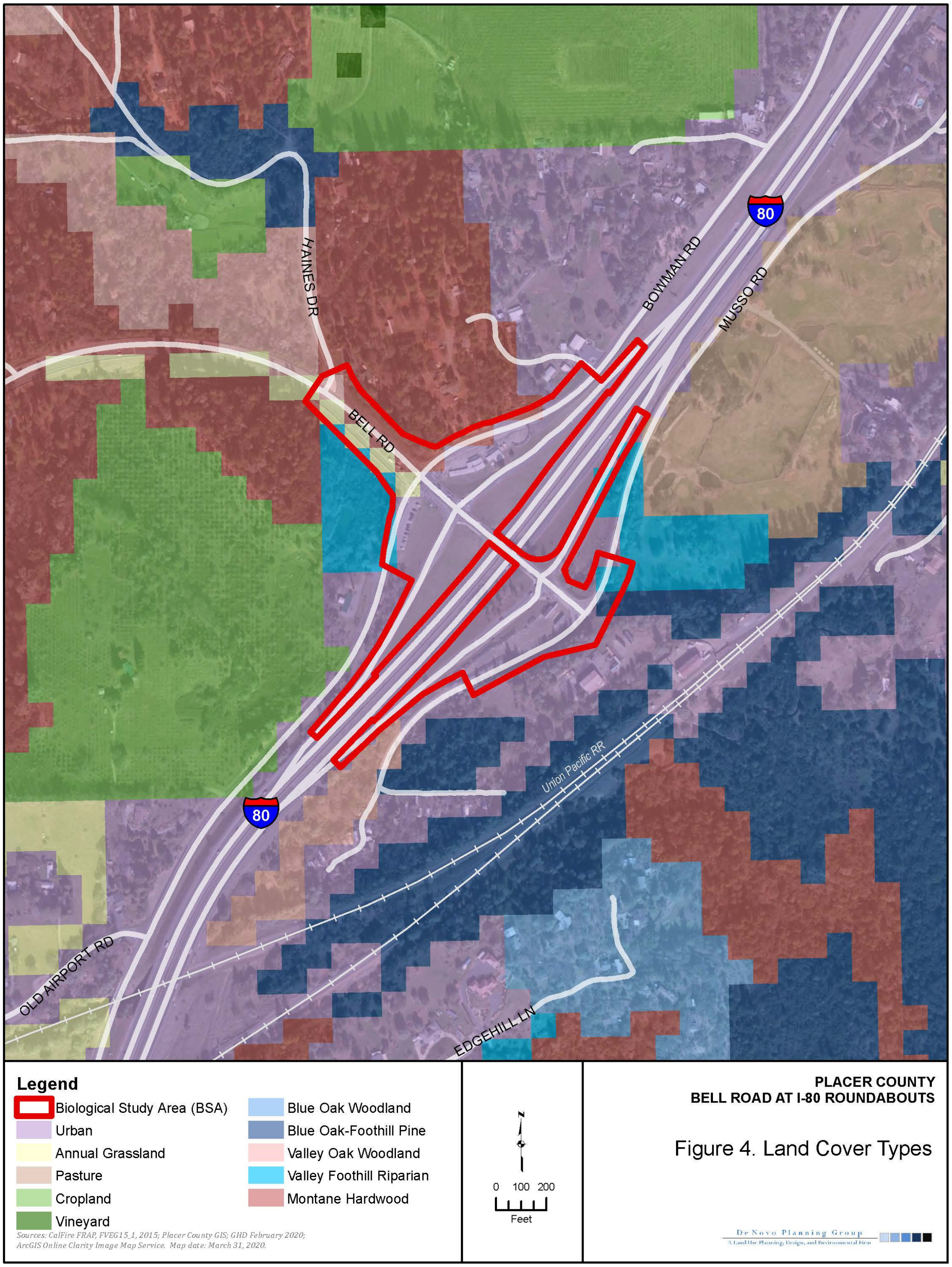
Developed Habitat.

Cropland. Cropland habitats do not conform to normal habitat stages. Instead, cropland is regulated by the crop cycle in California. These habitats can either be annual or perennial, vary according to location in the state, and germinate at various times of the year. In addition, the crop rotation system is used extensively. The system rotates crop types (usually between annual and perennials) to conserve soil nutrients, thus maintaining soil productivity. Vegetation in this habitat includes a variety of sizes, shapes, and growing patterns. Most croplands support annuals, planted in spring and harvested during summer or fall.

Vineyard. Vineyards are composed of single species planted in rows, usually supported on wood and wire trellises. vines are normally intertwined in the rows but open between rows. Rows under the vines are usually sprayed with herbicides to prevent growth of herbaceous plants. Between rows of vines, grasses and other herbaceous plants may be planted or allowed to grow as a cover crop to control erosion.

Urban. The structure of urban vegetation varies, with five types of vegetative structure defined: tree grove, street strip, shade tree/lawn, lawn, and shrub cover. The juxtaposition of urban vegetation types within cities can produce a rich mosaic with considerable edge areas. The overall mosaic may be more valuable as wildlife habitat than the individual units in that mosaic.

Urban areas also include developed areas such as buildings, roadways, and road shoulders, all of which can be described as barren. Some of the rural developed areas within the region also contain woodland and/or herbaceous-dominated habitat intermixed with the developed areas.



PLACER COUNTY
BELL ROAD AT I-80 ROUNDABOUTS

Figure 4. Land Cover Types

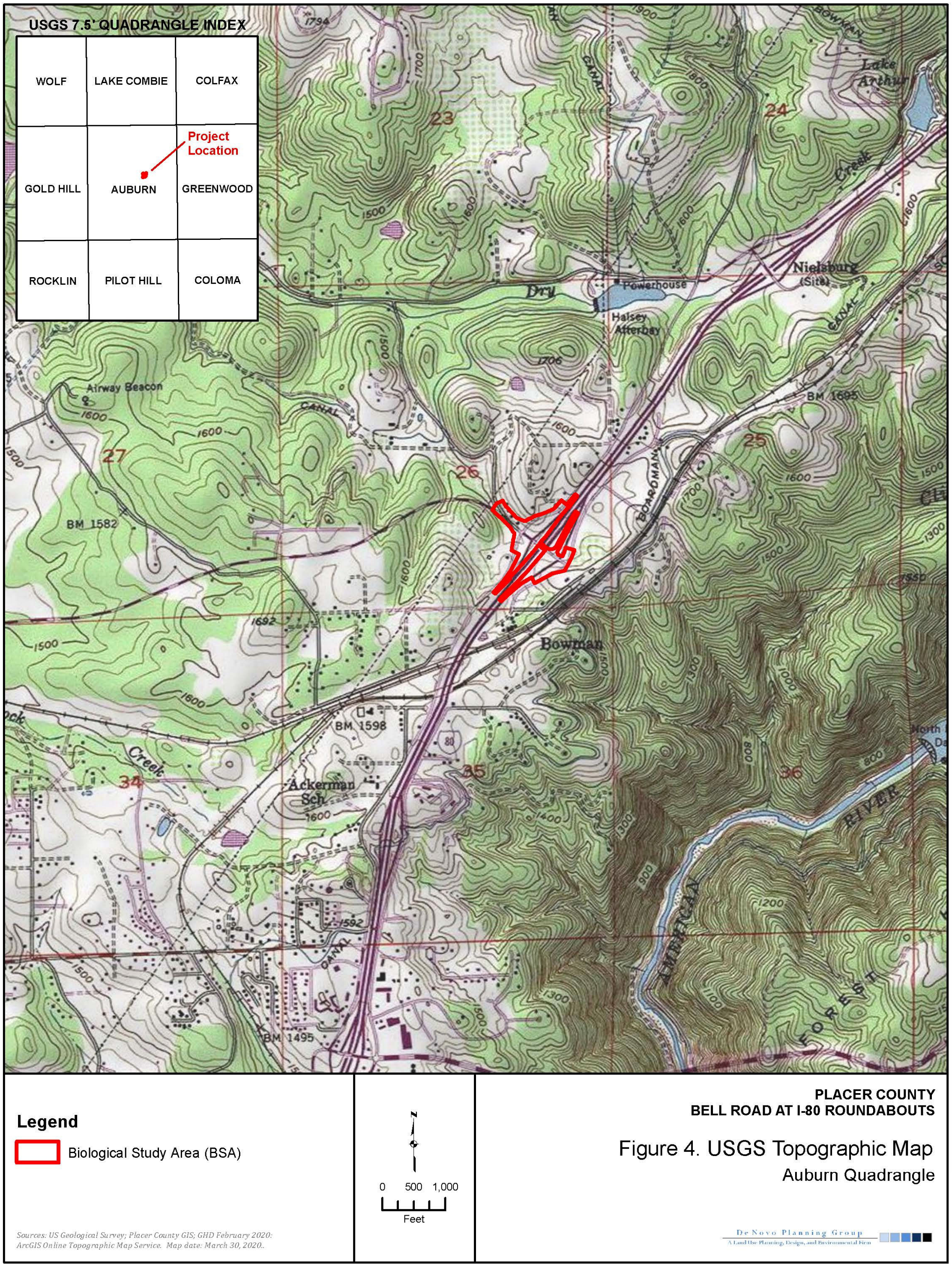
Sources: CalFire FRAP, FVEG15_1, 2015; Placer County GIS; GHD February 2020; ArcGIS Online Clarity Image Map Service. Map date: March 31, 2020.

Habitat Connectivity

The BSA is located in a rural area and the scope and footprint of the Project are small compared to the surrounding available habitat. The Project does not substantially increase the footprint of I-80, Bell Road, Musso Road, or Bowman Road, and as a result it does not significantly change existing wildlife movement corridors.

The BSA is located in an area that contains both resident and migratory black-tailed deer. The BSA itself does not present the topographic or vegetative characteristics that make is a high travel route or feeding area, but it is expected that black-tailed deer will travel through the BSA at times similar to areas throughout the region. The project design does not pose any new obstructions that prevent travel through the BSA.

A search of the NMFS species list for the Auburn 7.5 minute quadrange (Figure 4 USGS Map) indicates that critical habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon are present in the regional vicinity. The BSA is within the Coon Creek watershed (Figure 5 Hydrology Map), and Coon Creek is potential habitat for anadromous fish including the California Central Valley Steelhead and Chinook Salmon. The closest tributary to Coon Creek is Dry Creek, which is 0.5 miles to the north of the BSA. There are historical antecdotal accounts of anadromous fish spawning in Coon Creek, but there is a lack of sampling and published reports currently. Nevertheless, being within the Coon Creek watershed, all runoff from the BSA ultimately makes its way to Coon Creek (potential habitat) and downstream creeks/rivers that are known spawning grounds for anadromous fish. Water quality can affect the success of these fish within their downstream Essential Fish Habitat/Critical Habitat. It is noted that the BSA is not accessible to anadromous fish, nor does it contain any Essential Fish Habitat/Critical Habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon. However, construction and operational activities have the potential to adversely degrade water quality in Coon Creek and downstream tributaries. The project will be required to prepare a Stormwater Pollution Prevention Plan (SWPPP), which will include best management practices that ensure construction and operational water quality is not degraded downstream.



PLACER COUNTY
BELL ROAD AT I-80 ROUNDABOUTS

Figure 4. USGS Topographic Map
Auburn Quadrangle

Sources: US Geological Survey; Placer County GIS; GHD February 2020; ArcGIS Online Topographic Map Service. Map date: March 30, 2020.

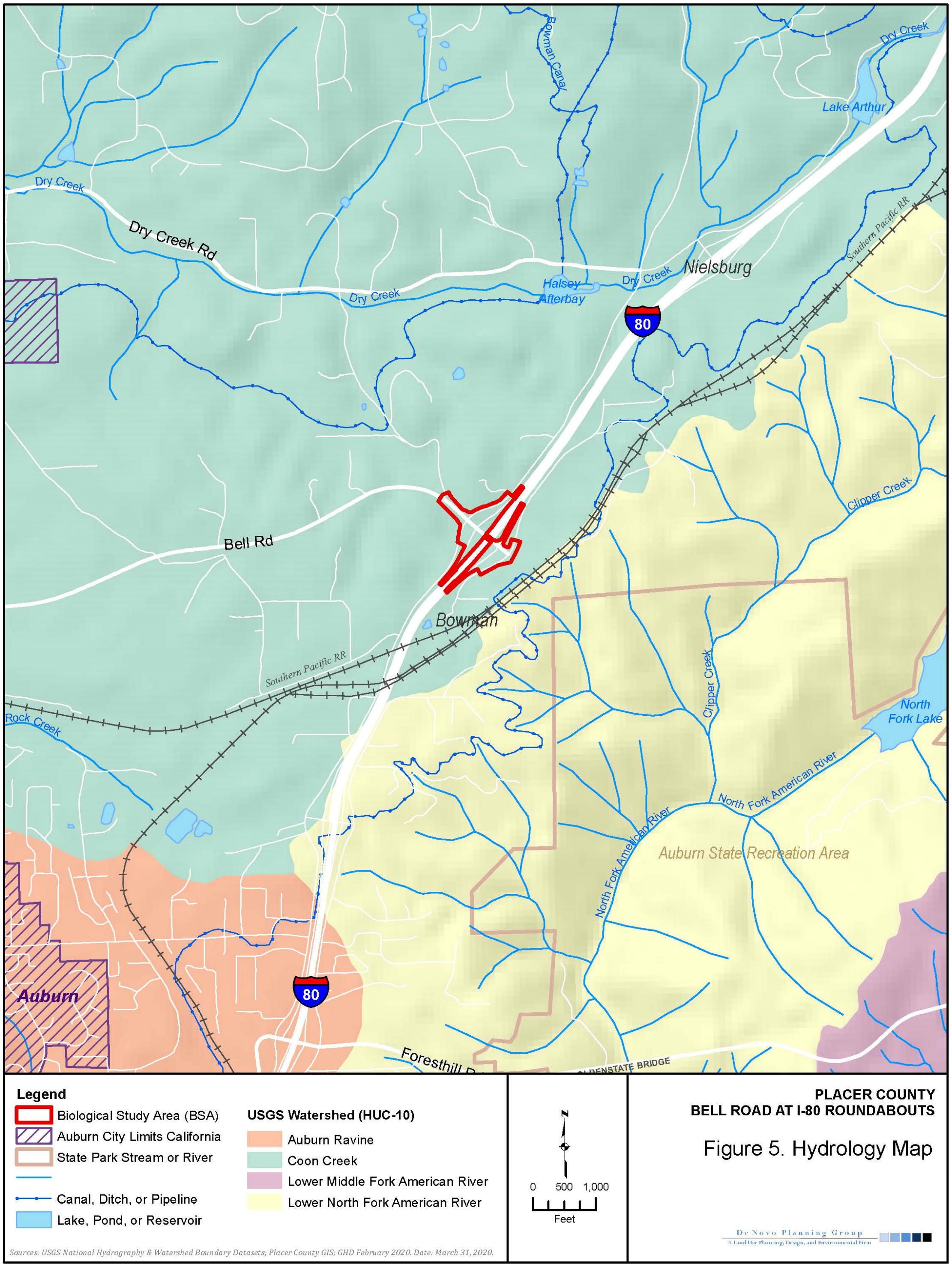


Figure 5. Hydrology Map

Sources: USGS National Hydrography & Watershed Boundary Datasets; Placer County GIS; GHD February 2020. Date: March 31, 2020.

REGIONAL SPECIES AND HABITATS AND NATURAL COMMUNITIES OF CONCERN

There are numerous special-status species known to occur within the region. Some species require localized micro-habitats, while others are highly mobile and may occur throughout the region.

Within a nine-quad search, the CNDDB lists 20 animal species that are federal or state listed as Endangered, Threatened, Fully Protected, Candidate, or Species of Special Concern. None of these species are documented within the BSA.

The USFWS Official Species List for the project identifies two additional federal listed species as potentially occurring in the region. In addition, the NMFS lists two federal listed species, a critical habitat, and an essential fish habitat as occuring within a one quad search. One of those listed was included in the CNDDB search.

Within a nine-quad search, the CNDDB lists five plant species that are federal or state listed as Endangered, Threatened, or Rare, and an additional seven plant species that are not federal or state listed but have a CNPS rare plant rank of 1B.2, 1B.3, or 2B.3.

Within a nine-quad search, the CNPS Inventory of Rare and Endangered Plants lists fourteen species with a CNPS rare plant rank of 1B.2, 1B.3., or 2B.3. Of these, twelve are the same plant species in the CNDDB list, and two species were not listed in the CNDDB.

The CNDDB search, USFWS Official Species List, and CNPS Inventory search are each provided in the Appendix. In total, there are 20 special status animal species and fourteen special status plant species. Table 1 below provides each of the species identified in the database searches.

Table 1: Listed, Proposed Species, Natural Communities, and Critical Habitat Potentially Occurring or Known to Occur in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
Animals					
American peregrine falcon	*Falco peregrinus anatum*	-/-/FP	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape or a depression or ledge in an open site.	A	Federal: N/A State: Will not result in take. Species is known within the region, but essential cliff nesting habitat is absent. This species is highly mobile and it is possible that this species traverse through the BSA during foraging. The BSA does not contain high quality foraging opportunities for this species. There was no evidence of active nesting or residual nests. Preconstruction surveys for nesting birds in the vicinity of the BSA is necessary prior to construction.
bald eagle	*Haliaeetus leucocephalus*	-/SE/FP	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	A	Federal: N/A State: Will not result in take. Species is known within the region, but essential foraging habitat is not present within the immediate vicinity of the BSA. This species is highly mobile and it is possible that this species traverse through the BSA at times. There was no evidence of active nesting or residual nests, however, it is possible that this species establishes a nest in the vicinity of the BSA given the density of large trees. Preconstruction surveys for nesting birds in the vicinity of the BSA is necessary prior to construction.
bank swallow	*Riparia riparia*	-/ST/-	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	A	Federal: N/A State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
California black rail	*Laterallus jamaicensis coturniculus*	-/ST/FP	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	A	Federal: N/A State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
California red-legged frog	*Rana draytonii*	FT/-/SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	A	Federal: No Effect State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
chinook salmon - Central Valley spring-run ESU	*Oncorhynchus tshawytscha*	FT/ST/-	Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel. Water temps >27 C are lethal to adults. Federal listing refers to populations spawning in Sacramento River and tributaries.	A	Federal: No Effect State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. It is noted that the BSA is within Coon Creek Watershed, which contains potential habitat for this species. The closest tributary to Coon Creek is Dry Creek approximately 0.5 miles to the north. There is no habitat for this species in the BSA. Storm water pollution prevention measures are necessary to prevent downstream water quality impacts on this species.
coast horned lizard	*Phrynosoma blainvillii*	-/-/SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	A	Federal: N/A State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Delta smelt	*Hypomesus transpacificus*	FT/SE/-	Sacramento-San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait & San Pablo Bay. Seldom found at salinities > 10 ppt. Most often at salinities < 2ppt.	A	Federal: No Effect State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
fisher - West Coast DPS	*Pekania pennanti*	-/ST/SSC	Intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Uses cavities, snags, logs and rocky areas for cover and denning. Needs large areas of mature, dense forest.	A	Federal: N/A State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
foothill yellow-legged frog	*Rana boylii*	-/SE/SSC	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	A	Federal: N/A State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
pallid bat	*Antrozous pallidus*	-/-/SSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts in rock outcrops, hollow trees, abandoned mines, barns, and attics.	A	Federal: N/A State: Will not result in take. Species is known within the region and is highly mobile. It is possible that this species traverse through the BSA at times. There was no evidence of roosts, however, it is possible that this species establishes a roost within the BSA in the future. Additionally, it is possible that there are roosts in the vicinity given the quality habitat throughout the region. Preconstruction surveys for active roosts within the BSA is necessary prior to construction.
purple martin	*Progne subis*	-/-/SSC	Inhabits woodlands, low elevation coniferous forest of Douglas-fir, ponderosa pine, and Monterey pine. Nests in old woodpecker cavities mostly; also, in human-made structures. Nest often located in tall, isolated tree/snag.	A	Federal: N/A State: Will not result in take. Species is known within the region and is highly mobile. It is possible that this species traverse through the BSA at times. There was no evidence of active nesting or residual nests, however, it is possible that this species establishes a nest in the vicinity of the BSA given the density of trees. Preconstruction surveys for nesting birds in the vicinity of the BSA is necessary prior to construction.
steelhead - Central Valley DPS	*Oncorhynchus mykiss*	FT/-/-	Populations in the Sacramento and San Joaquin Rivers and their tributaries. Free of heavy sedimentation with adequate flow and cool, clear water. Gravel that is between 0.5 to 6.0 inches in diameter, dominated by 2 to 3-inch gravel. Escape cover such as logs, undercut banks, and deep pools for spawning adults.	A	Federal: No Effect State: N/A Appropriate habitat is not present on or adjacent to the biological study area. It is noted that the BSA is within Coon Creek Watershed, which contains potential habitat for this species. The closest tributary to Coon Creek is Dry Creek approximately 0.5 miles to the north. There is no habitat for this species in the BSA. Storm water pollution prevention measures are necessary to prevent downstream water quality impacts on this species.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
Townsend's big-eared bat	*Corynorhinus townsendii*	-/-/SSC	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	A	Federal: N/A State: Will not result in take. Species is known within the region and is highly mobile. It is possible that this species traverse through the BSA at times. There was no evidence of roosts, however, it is possible that this species establishes a roost within the BSA in the future. Additionally, it is possible that there are roosts in the vicinity given the quality habitat throughout the region. Preconstruction surveys for active roosts within the BSA is necessary prior to construction.
tricolored blackbird	*Agelaius tricolor*	-/ST/SSC	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	A	Federal: N/A State: Will not result in take. Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT/-/-	Occurs only in the Central Valley of California, in association with blue elderberry (Sambucus mexicana). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	A	Federal: No Effect State: N/A Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
vernal pool fairy shrimp	*Branchinecta lynchi*	FT/-/-	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	A	Federal: No Effect State: N/A Appropriate habitat is not present on or adjacent to the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
western bumble bee	*Bombus occidentalis*	-/SC/-	Once common & widespread, species has declined precipitously from central CA to southern B.C., perhaps from disease. They live in a variety of habitats, including flowering grasslands, savannas and alpine meadows.	HP	Federal: N/A State: Will not result in take. This species is highly mobile and may be found within the BSA at times.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
western pond turtle	*Emys marmorata*	-/-/SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	A	Federal: NA State: Will not result in take. This species predominately occurs in aquatic areas, which are absent from the BSA. It is noted that this species has a seasonal migration and it is not uncommon to find this species nesting in upland areas. However, the BSA does not have any quality upland nesting areas for this species.
white-tailed kite	*Elanus leucurus*	-/-/FP	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	A	Federal: NA State: Will not result in take. Species is known within the region and is highly mobile. It is possible that this species traverse through the BSA at times. There was no evidence of active nesting or residual nests, however, it is possible that this species establishes a nest in the vicinity of the BSA given the density of large trees. Preconstruction surveys for nesting birds in the vicinity of the BSA is necessary prior to construction.
Plants					
big-scale balsamroot	*Balsamorhiza macrolepis*	-/-/1B.2	Chaparral, valley and foothill grassland, cismontane woodland. Sometimes on serpentine. 35-1465 m. March to June	A	Federal: N/A State: Will not result in take. Serpentine soil conditions not present within the biological study area. No evidence of this species was observed in the grassland area during field surveys, and no past records were identified in the database records.
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	-/SE/1B.2	Marshes and swamps (freshwater), vernal pools. Clay soils; usually in vernal pools, sometimes on lake margins. 4-2410 m April to August	A	Federal: N/A State: Will not result in take. Appropriate mesic conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
chaparral sedge	*Carex xerophila*	-/-/1B.2	Chaparral, cismontane woodland, lower montane coniferous forest. Serpentinite, gabbroic. 275-770 m. March to June	A	Federal: N/A State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
El Dorado bedstraw	*Galium californicum ssp. sierrae*	FE/SR/1B.2	Cismontane woodland, chaparral, lower montane coniferous forest. In pine-oak woodland or chaparral. Restricted to gabbroic or serpentine soils. 130-595 m. May to June	A	Federal: No Effect State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
El Dorado County mule ears	*Wyethia reticulata*	-/-/1B.2	Chaparral, cismontane woodland, lower montane coniferous forest, clay or gabbroic substrate. April to August	A	Federal: N/A State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Jepson's coyote-thistle	*Eryngium jepsonii*	-/-/1B.2	Vernal pools, valley and foothill grassland. Clay. 3-305 m. April to August	A	Federal: N/A State: Will not result in take. Appropriate mesic conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Jepson's onion	*Allium jepsonii*	-/-/1B.2	Chapparal, cismontane woodland, lower montane coniferous forest. On serpentine soils in Sierra foothills, volcanic soil on Table Mtn. On slopes and flats; usually in an open area. 355-1130 m. April to August	A	Federal: N/A State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Layne's ragwort	*Packera layneae*	FT/SR/1B.2	Chaparral, cismontane woodland. Ultramafic soil (serpentine or gabbro); occasionally along streams. 205-1060 m. April to August	A	Federal: No Effect State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Oval-leaved viburnum	*Viburnum ellipticum*	-/-/2B.3	Chaparral, cismontane woodland, lower montane coniferous forest. 215-1400 m. May to June	A	Federal: N/A State: Will not result in take. Appropriate habitat conditions exist in the vicinity, but not within the BSA. No evidence of this species was observed during field surveys, and no past records were identified in the database records.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
Parry's horkelia	*Horkelia parryi*	-/-/1B.2	Chaparral, cismontane woodland. Openings in chaparral or woodland; especially known from the Ione formation in Amador County. 85-1115 m. April to September	A	Federal: N/A State: Will not result in take. Appropriate habitat conditions exist in the vicinity, but not within the BSA. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Pine Hill ceanothus	*Ceanothus roderickii*	FE/SR/1B.1	Chaparral, cismontane woodland. Gabbroic or serpentine soils; often in "historically disturbed" areas with an ensemble of other rare plants. 260-630 m. April to June	A	Federal: No Effect State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Red Hills soaproot	*Chlorogalum grandiflorum*	-/-/1B.2	Cismontane woodland, chaparral, lower montane coniferous forest. Occurs frequently on serpentine or gabbro, but also on non-ultramafic substrates; often on "historically disturbed" sites. 265-1695 m. May to June	A	Federal: N/A State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Sierra blue grass	*Poa sierrae*	-/-/1B.3	Lower montane coniferous forest. Shady, moist, rocky slopes. Often in canyons. 365-1915 m. April to June	A	Federal: N/A State: Will not result in take. Appropriate habitat conditions exist in the vicinity, but not within the BSA. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Stebbins' morning-glory	*Calystegia stebbinsii*	FE/SE/1B.1	Chaparral, cismontane woodland. On red clay soils of the Pine Hill formation; gabbro or serpentine; open areas. 300-705 m. April to June	A	Federal: No Effect State: Will not result in take. Appropriate soil conditions is not present within the biological study area. No evidence of this species was observed during field surveys, and no past records were identified in the database records.
Critical Habitat					
CCV Steelhead Critical Habitat				A	Federal: No Effect State: N/A No fish bearing waters within the BSA.
Essential Fish Habitat					
Chinook Salmon EFH				A	Federal: No Effect State: N/A No fish bearing waters within the BSA.

Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is, or may be present. The species may be present. Present [P] - the species is present. Critical Habitat [CH] - project footprint is located within a designated critical habitat unit, but does not necessarily mean that appropriate habitat is present. Status: Federal Endangered (FE); Federal Threatened (FT); Federal Proposed (FP, FPE, FPT); Federal Candidate (FC), Federal Species of Concern (FSC); State Endangered (SE); State Threatened (ST); Fully Protected (FP); State Rare (SR); State Species of Special Concern (SSC); California Native Plant Society (CNPS) 1B = rare, threatened, or endangered in California and elsewhere, 2 = rare, threatened, or endangered in California, but more common elsewhere, .1 = seriously endangered in California (over 80% of occurrences threatened-high degree and immediacy of threat), .2 = fairly endangered in California (20-80% occurrences threatened), and .3 = not very endangered in California (<20% of occurrences threatened).

4 - Results: Biological Resources, Discussion of Impacts & Mitigation

Habitats and Natural Communities of Special Concern

The project will not impact any woodland, riparian, or aquatic habitat.

Special Status Plant Species

There are fourteen special-status plant that were identified in the records search for the regional vicinity. These include: big-scale balsamroot (*Balsamorhiza macrolepis*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), chaparral sedge (*Carex xerophila*), El Dorado bedstraw (*Galium californicum ssp. Sierrae*), El Dorado County mule ears (*Wyethia reticulata*), Jepson's coyote-thistle (*Eryngium jepsonii*), Jepson's onion (*Allium jepsonii*), Layne's ragwort (*Packera layneae*), Oval-leaved viburnum (*Viburnum ellipticum*), Parry's horkelia (*Horkelia parryi*), Pine Hill ceanothus (*Ceanothus roderickii*), Red Hills soaproot (*Chlorogalum grandiflorum*), Sierra blue grass (*Poa sierrae*), Stebbins' morning-glory (*Calystegia stebbinsii*). Each of these species was deemed to be Absent from the BSA due to a combination of no observations during the focused plant surveys and the absence of appropriate habitat within the BSA. Lastly, there are no records of these species being documented within the BSA.

Special Status Animal Species

There are twenty special-status animals that were identified in the records search for the regional vicinity. These include: American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), bank swallow (*Riparia riparia*), California black rail (*Laterallus jamaicensis coturniculus*), California red-legged frog (*Rana draytonii*), chinook salmon - Central Valley spring-run ESU (*Oncorhynchus tshawytscha*), coast horned lizard (*Phrynosoma blainvillii*), Delta smelt (*Hypomesus transpacificus*), fisher - West Coast DPS (*Pekania pennant*), foothill yellow-legged frog (*Rana boylii*), pallid bat (*Antrozous pallidus*), purple martin (*Progne subis*), steelhead - Central Valley DPS (*Oncorhynchus mykiss*), Townsend's big-eared bat (*Corynorhinus townsendii*), tricolored blackbird (*Agelaius tricolor*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp (*Branchinecta lynchi*), western bumble bee (*Bombus occidentalis*), western pond turtle (*Emys marmorata*), white-tailed kite (*Elanus leucurus*).

With the exception of the western bumble bee, which is discussed below in more detail, each of these species was deemed to be Absent from the BSA due to the absence of appropriate habitat, combined with the lack of any records of these species being present on or in the vicinity. It is noted that given the available quality habitat in the vicinity of the BSA for special status birds, and the quality roosting habitat for bats, combined with the high mobility of these species, it is possible for these species to traverse the BSA at times. It is also possible that nests and/or roosts for these species be established under the Bell Road at I-80 overcrossing within the BSA, or in other areas that are proximate to the BSA. As such, special status birds and bats are discussed below in more detail.

DISCUSSION OF NESTING RAPTORS

Suitable nesting habitat for common raptor species, in addition to some special-status raptor species (bald eagle, while tailed kite), is present in the Montane Hardwood-Conifer, Montane Hardwood, Blue oak-Foothill Pine, Valley Oak Woodland, and Valley Foothill Riparian habitats located in the vicinity of the BSA. Common raptor species with potential to nest within the BSA include, but would not be limited to, red-tailed hawk, red-shouldered haw, cooper's hawk, and great horned owl. Other less common raptor species that could be found nesting in these areas include bald eagle, white-tailed kite, sharp-shinned hawk, northern goshawks, and osprey.

Survey Results

Appropriate nesting habitat for these species is not present within the BSA. From the BSA, trees within the adjacent habitat were surveyed with optics to look for evidence of nesting. There was no evidence of active or remnant nests located in the immediate vicinity. It is noted that the absence of nests during the survey does not preclude a raptor from establishing a nest in these areas in a future nesting season.

Project Effects

The proposed project will not directly impact suitable nesting habitat for raptor species. Implementation of the following Avoidance and Minimization Measures will ensure that the proposed project will not indirectly impact nesting raptors or their young. There are no critical habitats within the project limits.

Avoidance and Minimiation Measures

To avoid and minimize effects to nesting bird species, the proposed project activities shall be compliance with the following measures:

1. Pre-construction Survey: If project activities must occur during the nesting season (February 1 - September 30), a qualified biologist will conduct pre-construction surveys for active raptor and migratory bird nests within 7 days prior to the onset of these

activities. For migratory birds and raptors, the survey area will include the biological study area (BSA), as well as adjacent habitat that is visible with optics from the BSA. If no active nests are found within the survey area, no further mitigation is required.

2. Establish Buffers: Should any active nests be discovered within the biological survey area (BSA), the biologist will determine the appropriate construction setback distances based on applicable CDFW guidelines and/or the biology of the affected species. Construction-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist has determined that the young have fledged.

DISCUSSION OF MIGRATORY BIRDS

The project is within the Pacific Flyway, which is a migratory travel route for millions of birds, and more than 350 species. Migratory birds travel this avian flyway each year from the Bering Strait to South America. Many of the birds travel from the north to overwinter in California, including the Central Valley region which is just west of the BSA. The birds overwintering arrive as early as August. Other birds travel south to overwinter, and arrive back in California as early as February to nest/breed.

Survey Results

The timing of the survey coincided with those migratory birds that breed in California, and did not coincide with wintering birds. One migratory bird that could be expected to nest in the BSA is the cliff swallow. They are very common nesters throughout the Central Valley and Sierra foothills, and are typically found nesting under bridges/overcrossings. Nesting cliff swallows were not observed within the project limits nesting under the Bell Road at I-80 overcrossing; however, it is well know that this species can skip around to different nesting sites over five year periods to avoid parasite infestations. As such, given the presence of the overcrossing, combined with bridges/overcrossings being the most common cliff swallow nesting grounds, future nesting by this species is possible within the BSA. The nesting season is generally February 1 - September 30.

The BSA provides very limited nesting opportunities for other migratory birds, although it is noted that there is high quality nesting habitat for birds in the vicinity in the wooded areas. The wooded habitat in the vicinity is not within the BSA, and was not surveyed on foot given private property access restrictions. It would be expected that a variety of birds occupy, and nest in the adjacent habitats. There was no evidence of active or remnant nests located in the immediate vicinity, although observations of smaller bird nests are more difficult using optics from a distance. It is noted that the absence of nests during the survey does not preclude a bird from establishing a nest in these areas in a future nesting season.

Project Effects

The Bell Road at I-80 overcrossing provides nesting habitat for Cliff swallows. There was not observable remnants of cliff swallow nesting, although that does not preclude this species from establishing nests in the future. The nesting season is generally February 1 - September 30. With the implementation of appropriate avoidance and minimization measures, the proposed project would have no effect on cliff swallows if they were to establish a colony.

In addition to the cliff swallows that could nest within the BSA, there are a variety of migratory birds that could find nesting opportunities in the wooded areas immediately adjacent to the BSA. Implementation of the following Avoidance and Minimization Measures will ensure that the proposed project will not indirectly impact migratory birds or their young.

Avoidance and Minimiation Measures

To avoid and minimize effects to migratory birds, the proposed project activities shall be compliance with the Measures 1 and 2 (previously listed).

DISCUSSION OF BATS

There are a vareity of bat species that are known throughout the region including the Mexican free-tailed, big brown bats, little brown bat, pallid bat, red bat, Townsend's big-eared bat, and Yuma myotis amoung others. The mobility of these mammals is remarkable, and allows them to occupy a wide range of habitats and to migrate seasonally. They are found from the lowest elevations in the Central Valley to the high elevations of the Sierra Nevada. They roost in rock crevices and caves, under loose bark, in or under bridges, in attics and tree cavities, and within buildings and other structures.

The maternal roosting period is generally in early spring and extends through the summer (generally April and August). Non-mateernal roosting sites can vary between day and night. Some bat species are migratory, and some hibernate.

Survey Results

No bats were observed within the BSA under the Bell Road at I-80 overcrossing. Surveying of adjacent areas outside the BSA is not practical within access.

Project Effects

Bats will utilize the crevices in bridges for roosting. While no bats, or bat sign (i.e. guano), was observed under the Bell Road at I-80 overcrossing, it would not be entirely uncommon for bats to establish a roost under the overcrossing at a future time. When work is performed between during the maternal roosting season (April-August), preconstruction surveys are necessary.

With the implementation of avoidance, preconstruction surveys, and establishment of buffers if necessary, there would be no impact.

Avoidance and Minimiation Measures

To avoid and minimize effects to this species, the proposed project activities shall be compliance with the following measures:

3. Bats: To avoid effects to bats, a qualified biologist will conduct pre-construction surveys for bats within the crevices of the overcrossing structure within 7 days prior to the onset of construction activities. If no evidence of bats are found under the Bell Road at I-80 overcrossing, no further mitigation is required.
    a. If it is determined that bats are using the overcrossing structure, it should be determined by the biologist whether the use is for maternal roosting (generally April – August).
        i. If it is a non-maternal roost site:
            1. If the final design doesn’t call for any disturbance to the overcrossing, than nothing further would be necessary.
            2. If any disturbance to the overcrossing is necessary, exclusionary devices will be installed so the bats cannot use the overcrossing for roosting during construction and will relocate. These devices should only be installed during the non maternal and non-mating season (generally September – February). After the exclusionary devices have been installed, the contractor must wait seven days before work can commence. By waiting the seven days, the bats can exit the overcrossing and relocate. Installed exclusionary devices are designed to allow bats to exit, but there is not an ability to re-enter. Once these devices have been installed, they must be maintained by the contractor and kept in good working order. Work on the overcrossing deck can occur anytime without work window restrictions.
        ii. If it is a maternal roost site:
            1. If the final design doesn’t call for any disturbance to the overcrossing, than it will still be necessary to conduct construction worker awareness, establish orange fencing to keep activities away from the roost, and continue with monitoring to ensure that there is no disturbance that could jepardize the roost.

2. If any disturbance to the overcrossing is necessary, construction must be performed after the maternal roosting season is complete (Sept-Feb)

DISCUSSION OF WESTERN BUMBLE BEE (BOMBUS OCCIDENTALIS)

Bumble bees, as a whole, are threatened by a number of factors including agricultural intensification, habitat loss and degradation, pesticide and herbicide use, pathogens from managed pollinators, competition with non-native bees, climate change, genetic factors, and loss of host species. It is anticipated that without protective measures, the western bumble bee is likely to go extinct in California, which has prompted the CDFW to list the species as a Candidate.

Distribution the western bumble bee was historically broadly distributed across the west coast of North America from southern British Columbia to central California, east through Alberta and western South Dakota, and south to Arizona and New Mexico. In California, it has been documented in Alameda, Alpine, Butte, Calaveras, Contra Costa, Del Norte, El Dorado, Fresno, Humboldt, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sen Benito, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Tehama, Trinity, Tulare, Yolo, and Yuba counties.

Identification: The western bumble bee is most easily distinguished from other Bombus species based on hair coloration. Note, however, that coloration in this species can be highly variable, and eight female and seven male color forms have been described. There are two prominent color forms of this species most likely to be encountered in California. Those found in the mountains ("occidentalis" form) are likely to have bright white coloration on the posterior end of the abdomen; this character is unusual and obvious. The "occidentalis" form (without any yellow on T1-4) is found throughout in the eastern part of the state in the Sierra-Cascade Range from near Yosemite to Oregon and west along the northern tier of counties into Humboldt County.

> Queens: The queen is 20 to 21 mm in length. Their hair is entirely black on the head sometimes with a minority of yellow or gray hairs mixed in above the antennae. Their hair is yellow on the front part of the thorax (scutum), usually with black, or a minority of yellow hairs at the back of the thorax (scutellum). The majority of the hairs between and below the wings are black. On the abdomen, the first two tergal (dorsal plate) segments (T1-T2) are black. If T3 is entirely yellow, then T4 is black, T5 white. If T3 is black, or with a minority of yellow, T4 and T5 are white.
>
> Workers: The worker is 9 to 15 mm in length. Their hair is entirely black on the head sometimes with a minority of yellow or grayish hairs mixed in above the antennae. Their hair is yellow on the front part of the thorax (scutum), usually with black, or a minority of

yellow hairs at the back of the thorax (scutellum). The majority of the hairs between and below the wings are black. On the abdomen, the first tergal (T1-dorsal plate) segment is black. T2 has at least some black on it centrally and anteriorly. If T3 is entirely yellow, the white hairs on T4 (if applicable) and T5 seen in queens will be replaced with yellowish orange hairs. If T3 with at most a minority of yellow hairs, T4 and T5 are white.

Males: The male is 13 to 17 mm in length. The hair on the head is pale yellowish on the front of the face. The top of the head has pale yellowish hairs medially, with some black hairs, especially laterally. The hair on the front of the thorax is pale yellowish. The hair on T1 is black with at least some black centrally and anteriorly on T2. If T3 is black the basal part of the fourth abdominal segment is black, with the remainder, as well as segments five to seven, whitish – although sometimes a yellowish orange. If T3 is entirely yellow, T5 is black basally, and the remainder, as well as T6-T7 are yellowish orange.

<u>Habitat Requirements</u>: Meadows and grasslands with abundant floral resources are the appropriate habitat for this species. While this species was historically known throughout the mountains and northern coast of California, it is now largely confined to high elevation sites and a small handful of records on the northern California coast.

Nest Sites: Reports of nests are primarily in underground cavities such as old squirrel or other animal nests and in open west-southwest slopes bordered by trees, although a few nests have been reported from above-ground locations such as in logs among railroad ties. Thus, nesting sites may be limited by rodent abundance. Nest tunnels have been reported to be up to 2.1 m long for this species and the nests may be lined with grass or bird feathers. Colonies can contain as many as 1,685 workers and produce up to 360 new queens; this colony size is considered large relative to many other species of bumble bees.

Floral Resources: Bumble bees are generalist foragers and have been reported visiting a wide variety of flowering plants. This species has a very short tongue, and thus is best suited to forage at open flowers with short corollas and has also been documented 'nectar robbing' – biting through the corolla tube and drinking nectar through the hole without contacting the anthers, or stigma of the plant – several species of flowers with longer corolla tubes. Bumble bees require plants that bloom and provide adequate nectar and pollen throughout the colony's life cycle, which is from early February to late November. The plant genera most commonly associated with observations or collections from California include Cirsium, Erigonum, Solidago, "Aster", Ceanothus, Centaurea, and Penstemon. These floral associations do not necessarily represent preference for these plants over other flowering plants, but rather may represent the abundance of these flowers in the landscape.

Overwintering Sites: Very little is known about the hibernacula, or overwintering sites utilized by most bumble bees, although it has been reported that hibernacula can be beneath trees and in mounds of soil.

Phenology: The flight period for queens in California is from early February to late November, peaking in late June and late September. The flight period for workers and males in California is from early April to early November; worker abundance peaks in early August, and male abundance peaks in early September.

Survey Results

*T*here are no recorded sites for western bumble bee within the regional vicinity. The site survey did not reveal any nest sites within the BSA. There are floral resources within the BSA along the existing roadways, which provides some foraging habitat for any bumble bees that may live in the region. No western bumble bees were observed within the BSA, however, given this species high mobility and the presence of floral resources it is possible that this species forages within the BSA at times.

Project Impacts

Due to the inherent vulnerability of many bumble bee species and importance of supporting wild bee populations for pollination services, the CDFW petition to list this species included five general conservation practices:

1. Identify, protect, enhance, and restore natural high-quality habitats to include suitable forage, nesting and overwintering sites.
2. Promote farming practices that increase of nitrogen-fixing fallow (legumes) and other pollinator-friendly plants along field margins.
3. Restrict pesticide use on or near each species' habitat, particularly while treated plants are in flower.
4. Minimize exposure of wild bees to diseases transferred from managed bees.
5. Avoid honey bee introduction to high-quality native bee habitat.

The BSA is not considered high quality habitat for this species. For example, there are no meadows or grasslands with abundant floral resources; however, there are linear strips of grassland habitat with floral resources along the roadways within the BSA. These areas are low-quality fragments of habitat and project construction will require some disturbance to these grassland strips. Once the construction is completed, however, the project will include a replanting of grassland vegetation in all areas disturbed. The replanting will require a seed mixture of regionally appropriate, native plants, of common native species found within the project habitats. These are the same species that are most commonly-currently successful. Including grasses, forbs, and wildflowers.

The BSA does not include any farming, pesticide use, or introduction of managed bees (i.e. honey bees). These conservation practices are not applicable to the proposed project.

Avoidance and Minimization Measures

There are three things that bumble bees need in the landscape to thrive: flowers on which to forage, somewhere to nest, and a place to overwinter. Each of these habitat requirements is vital for different phases of the bees' annual life cycle.

Implementation of the following avoidance and minimization measure will minimize project effects on the western bumble bee:

4. Replanting/Erosion Control: All areas disturbed during construction activities shall be replaced with a careful selection of regionally appropriate native species of grasses, forbe, and wildflowers for erosion control. Plant genera to consider include Ceanothus.

5 - Conclusions & Regulatory Determination

FEDERAL ENDANGERED SPECIES ACT CONSULTATION SUMMARY

No FESA consultation has occurred to date. Caltrans is the designated federal lead agency, and is responsible for any Section 7 consultation if necessary.

An official letter and list was obtained from the USFWS, April 2020 (Appendix B). The list included two animal species – California Red-legged Frog and the Delta Smelt. The BSA does not contain appropriate habitat for either species, and there are no records of these species occurring in the BSA. In addition, a CNDDB search identified three additional federal listed species. The BSA does not contain appropriate habitat for these species, and there are no records of these species occurring in the BSA. Implementation of the proposed project will have no effect on these species.

A search of the NMFS species list for the Auburn 7.5 minute quadrange (Figure 4 USGS Map) indicates that California Central Valley Steelhead and Chinook Salmon are present in the regional vicinity. In addition, the NMFS species list indicates that critical habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon are present in the regional vicinity. More specifically, the BSA is within the Coon Creek watershed (Figure 5 Hydrology Map), and Coon Creek is potential habitat for anadromous fish including the California Central Valley Steelhead and Chinook Salmon. There are historical antecdotal accounts of anadromous fish spawning in Coon Creek, but there is a lack of sampling and published reports currently. The closest tributary to Coon Creek is Dry Creek, which is 0.5 miles to the north of the BSA. Nevertheless, being within the Coon Creek watershed, all runoff from the BSA ultimately makes its way to Coon Creek (potential habitat) and downstream creeks/rivers that are known spawning grounds for anadromous fish. Water quality can affect the spawning success of these fish within their downstream Essential Fish Habitat/Critical Habitat. It is noted that the BSA is not accessible to anadromous fish, nor does it contain any Essential Fish Habitat/Critical Habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon. However, construction and operational activities have the potential to adversely degrade water quality in downstream tributaries if precautions are not taken. The project will be required to prepare a Stormwater Pollution Prevention Plan (SWPPP), which will include best management practices that ensure construction and operational water quality is not degraded downstream. The SWPPP must be approved by the Regional Water Quality Control Board, and is designed to meet certain standards for preventng water pollution through otherwise normal activities. The project would not have any direct effects on these species. Implementation of the proposed project with the implementation of a SWPPP will have no effect on these species.

The USFWS official letter did not identify any federal listed plants, however, a nine-quad search of the CNDDB lists four plant species that are federal listed. A focused plant survey for these species revealed that they are not present. Implementation of the proposed project will have no effect on these species.

ESSENTIAL FISH HABITAT CONSULTATION SUMMARY

As stated above, a search of the NMFS species list indicates critical habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon are present in Coon Creek. The closest tributary to Coon Creek is Dry Creek, which is 0.5 miles to the north of the BSA. It is noted that being within the Coon Creek watershed, all runoff from the BSA ultimately makes its way to the downstream Essential Fish Habitat and Critical Habitat for these anadromous Fish and water quality can affect the spawning success of these fish within their downstream Essential Fish Habitat/Critical Habitat. It is noted that the BSA is not accessible to anadromous fish, nor does it contain any Essential Fish Habitat/Critical Habitat for California Central Valley Steelhead and Essential Fish Habitat for the Chinook Salmon.

The project will be required to prepare a Stormwater Pollution Prevention Plan (SWPPP), which will include best management practices that ensure construction and operational water quality is not degraded downstream. The SWPPP must be approved by the Regional Water Quality Control Board, and is designed to meet certain standards for preventng water pollution through otherwise normal activities. The project would not have any direct effects on Essential Fish Habitat/Critical Habitat.

WETLANDS AND OTHER WATERS COORDINATION SUMMARY

There are no wetlands or waters of the US/state within the BSA limits.

INVASIVE SPECIES

Invasive plants are a subset of nonnative plants that spread into undisturbed ecosystems and generally negatively impact native plants and alter ecosystem processes (Cal-IPC 2006). There are two species in the BSA rated as “High” by Cal-IPC relative to their ecological impact, invasive potential, and ecological distribution: yellow star-thistle (Centaurea solstitialis), and red brome (Bromus madritensis ssp. rubens).

Yellow star-thistle is a deep-taprooted winter annual or short-lived perennial that spreads by seed. Human activities are the primary mechanisms for the long-distance movement of yellowstar thistle seed. Once at a new location, seed is transported in lesser amounts and over short to medium distances by animals and humans. Seed heads readily adhere to clothing, hair, and fur (Bossard et al. 2000). Plants are highly competitive and typically develop dense, impenetrable stands that displace desirable vegetation in natural areas, rangelands, roadsides, and other places.

Yellow star-thistle is considered one of the most serious rangeland weeds in the western United States (DiTomaso and Healy 2007a). Yellow star-thistle interferes with grazing and lowers yield and forage quality of rangelands. It also reduces land value and limits access to recreational areas (Bossard et al. 2000). Within the BSA, yellow star-thistle occurs in low abundance in the grassland community along the roadways.

Red brome is a cool-season annual that occurs in open disturbed areas, roadsides, fields, rangelands, agronomic crops, orchards, forestry sites, and many natural plant communities. Red brome spreads by seed through wind and food caching by rodents. This species spreads greater distances with water and soils movements, by clinging to animals and to the shoes and clothing of humans, and through recreational, agricultural, and construction activities. It is among the numerous European annual grasses that have displaced much of the native grassland vegetation throughout California. It is highly flammable when dry, increasing the frequency and spread of wildfire in certain communities (DiTomaso and Healy 2007b). Red brome occurs in low abundance in the grassland community along the roadways.

These invasive plant species rated “High” are common in Placer County. The limited scope of this Project precludes effective eradication of these invasive species from the BSA and the County. By revegetating disturbed areas with native species, the Project would reduce the spread of these species in the BSA.

To reduce the spread of invasive plant species, all mud and debris will be washed off construction equipment prior to entering the site. Areas disturbed during construction will be revegetated with native species to reduce the spread of invasive plants in the BSA.

OTHER

One migratory bird that could be expected to nest in the BSA is the cliff swallow. They are very common nesters throughout the Central Valley and Sierra foothills, and are typically found nesting under bridges. Nesting cliff swallows were not observed within the project limits nesting under the Bell Road at I-80 overcrossing; however, it is well know that this species can skip around to different nesting sites over five year periods to avoid parasite infestations. As such, given the presence of the Bell Road at I-80 overcrossing, combined with bridges/overcrossings being the most common cliff swallow nesting grounds, future nesting by this species is possible within the BSA. Implementation of the Avoidance and Minimization Measures will ensure that the proposed project will not adversely effect nesting cliff swallows or their young.

The BSA provides very limited nesting opportunities for other migratory birds, although it is noted that there is high quality nesting habitat for birds in the vicinity in the wooded areas. The wooded habitat in the vicinity is not within the BSA, but it would be expected that a variety of birds occupy, and nest in the adjacent habitats. Implementation of the Avoidance and

Minimization Measures will ensure that the proposed project will not adversely effect nesting migratory birds or their young.

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Appendix (CNDDB, USFS List, CNPS Inventory)

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Wolf (3912112) OR Lake Combie (3912111) OR Colfax (3912018) OR Gold Hill (3812182) OR Auburn (3812181) OR Greenwood (3812088) OR Rocklin (3812172) OR Pilot Hill (3812171) OR Coloma (3812078))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)
 AND (Federal Listing Status IS (Endangered OR Threatened OR Proposed Endangered OR Proposed Threatened OR Candidate) OR State Listing Status IS (Endangered OR Threatened OR Rare OR Candidate Endangered OR Candidate Threatened))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
Bombus occidentalis western bumble bee	IIHYM24250	None	Candidate Endangered	G2G3	S1	
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Oncorhynchus mykiss irideus pop. 11 steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Pekania pennanti fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
Rana boylii foothill yellow-legged frog	AAABH01050	None	Endangered	G3	S3	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	

Record Count: 10

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Information Expires 1/3/2021

Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database

Query Criteria: Quad IS (Wolf (3912112) OR Lake Combie (3912111) OR Colfax (3912018) OR Gold Hill (3812182) OR Auburn (3812181) OR Greenwood (3812088) OR Rocklin (3812172) OR Pilot Hill (3812171) OR Coloma (3812078))
 AND Other Status Contains (CDFW_FP-Fully Protected OR CDFW_SSC-Species of Special Concern OR NMFS_SC-Species of Concern)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Pekania pennanti fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Progne subis purple martin	ABPAU01010	None	None	G5	S3	SSC
Rana boylii foothill yellow-legged frog	AAABH01050	None	Endangered	G3	S3	SSC

Record Count: 12

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Wolf (3912112) OR Lake Combie (3912111) OR Colfax (3912018) OR Gold Hill (3812182) OR Auburn (3812181) OR Greenwood (3812088) OR Rocklin (3812172) OR Pilot Hill (3812171) OR Coloma (3812078))
 AND CNPS List IS (1A OR 1B OR 1B.1 OR 1B.2 OR 1B.3 OR 2A OR 2B OR 2B.1 OR 2B.2 OR 2B.3)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Allium jepsonii Jepson's onion	PMLIL022V0	None	None	G2	S2	1B.2
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2	S2	1B.2
Calystegia stebbinsii Stebbins' morning-glory	PDCON040H0	Endangered	Endangered	G1	S1	1B.1
Carex xerophila chaparral sedge	PMCYP03M60	None	None	G2	S2	1B.2
Ceanothus roderickii Pine Hill ceanothus	PDRHA04190	Endangered	Rare	G1	S1	1B.1
Chlorogalum grandiflorum Red Hills soaproot	PMLIL0G020	None	None	G3	S3	1B.2
Galium californicum ssp. sierrae El Dorado bedstraw	PDRUB0N0E7	Endangered	Rare	G5T1	S1	1B.2
Gratiola heterosepala Boggs Lake hedge-hyssop	PDSCR0R060	None	Endangered	G2	S2	1B.2
Packera layneae Layne's ragwort	PDAST8H1V0	Threatened	Rare	G2	S2	1B.2
Poa sierrae Sierra blue grass	PMPOA4Z310	None	None	G3	S3	1B.3
Viburnum ellipticum oval-leaved viburnum	PDCPR07080	None	None	G4G5	S3?	2B.3
Wyethia reticulata El Dorado County mule ears	PDAST9X0D0	None	None	G2	S2	1B.2

Record Count: 12

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: April 01, 2020
Consultation Code: 08ESMF00-2020-SLI-1513
Event Code: 08ESMF00-2020-E-04749
Project Name: Bell Rd Roundabouts Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

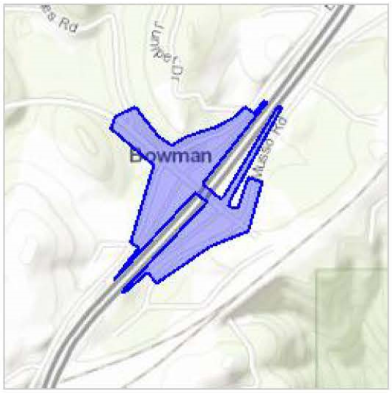
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code:	08ESMF00-2020-SLI-1513
Event Code:	08ESMF00-2020-E-04749
Project Name:	Bell Rd Roundabouts Project
Project Type:	** OTHER **
Project Description:	The proposed project would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. The roundabouts would be designed to accommodate future growth "2045." Figure 2 on the following page shows the current project environmental study area. Intersection geometrics and pedestrian crossings would be consistent with the National Cooperative Highway Research Program (NCHRP) Report 672 entitled "Roundabouts: An Information Guide, 2nd Edition" (Guide).

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.94525715948512N121.04727493542576W



Counties: Placer, CA

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Amphibians

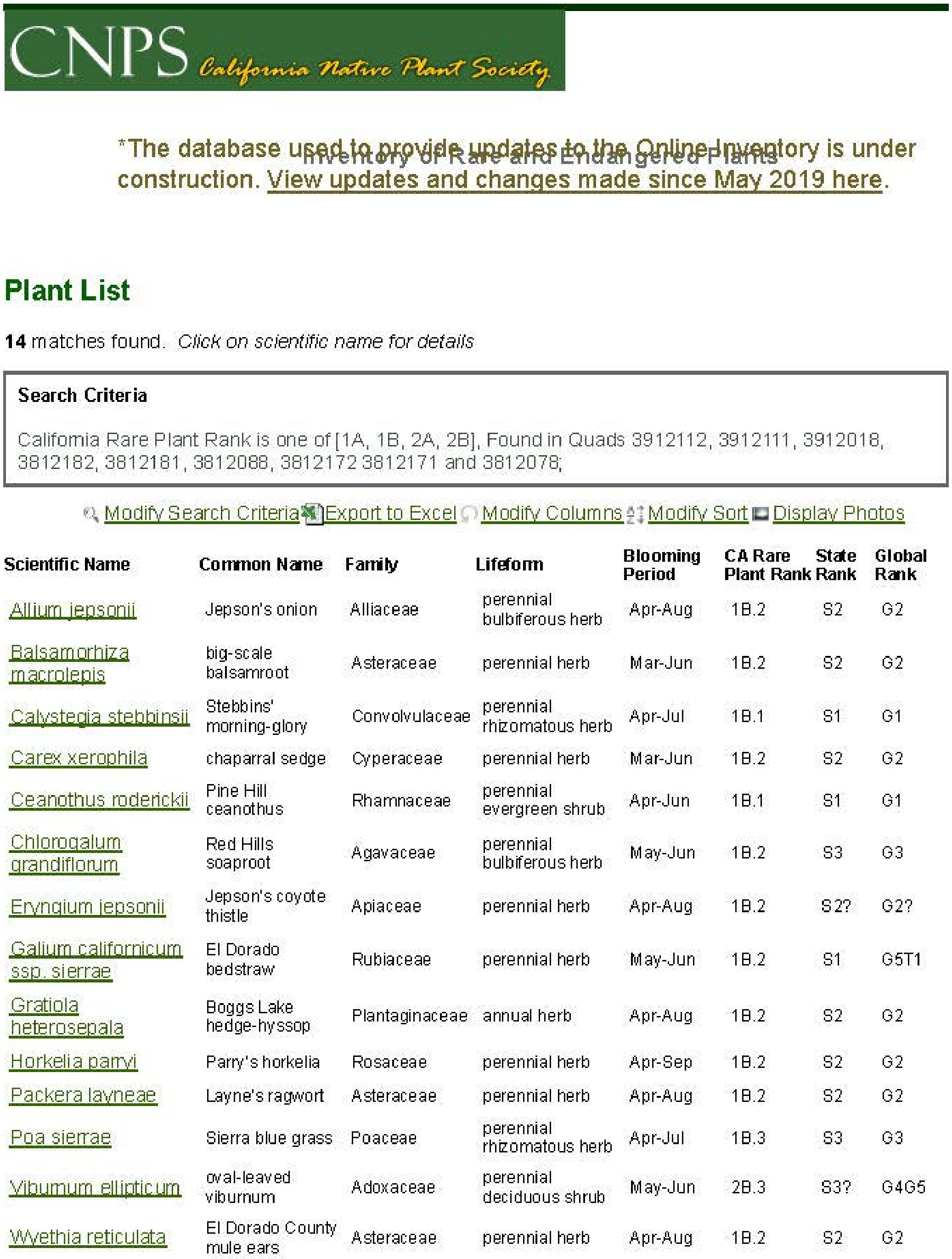
NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.



CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

14 matches found. *Click on scientific name for details*

Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B], Found in Quads 3912112, 3912111, 3912018, 3812182, 3812181, 3812088, 3812172 3812171 and 3812078;

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Allium jepsonii	Jepson's onion	Alliaceae	perennial bulbiferous herb	Apr-Aug	1B.2	S2	G2
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Calystegia stebbinsii	Stebbins' morning-glory	Convolvulaceae	perennial rhizomatous herb	Apr-Jul	1B.1	S1	G1
Carex xerophila	chaparral sedge	Cyperaceae	perennial herb	Mar-Jun	1B.2	S2	G2
Ceanothus roderickii	Pine Hill ceanothus	Rhamnaceae	perennial evergreen shrub	Apr-Jun	1B.1	S1	G1
Chlorogalum grandiflorum	Red Hills soaproot	Agavaceae	perennial bulbiferous herb	May-Jun	1B.2	S3	G3
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Galium californicum ssp. sierrae	El Dorado bedstraw	Rubiaceae	perennial herb	May-Jun	1B.2	S1	G5T1
Gratiola heterosepala	Boggs Lake hedge-hyssop	Plantaginaceae	annual herb	Apr-Aug	1B.2	S2	G2
Horkelia parryi	Parry's horkelia	Rosaceae	perennial herb	Apr-Sep	1B.2	S2	G2
Packera layneae	Layne's ragwort	Asteraceae	perennial herb	Apr-Aug	1B.2	S2	G2
Poa sierrae	Sierra blue grass	Poaceae	perennial rhizomatous herb	Apr-Jul	1B.3	S3	G3
Viburnum ellipticum	oval-leaved viburnum	Adoxaceae	perennial deciduous shrub	May-Jun	2B.3	S3?	G4G5
Wyethia reticulata	El Dorado County mule ears	Asteraceae	perennial herb	Apr-Aug	1B.2	S2	G2

Suggested Citation

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 20 July 2020].

Search the Inventory

- Simple Search
- Advanced Search
- Glossary

Information

- About the Inventory
- About the Rare Plant Program
- CNPS Home Page
- About CNPS
- Join CNPS

Contributors

- The Calflora Database
- The California Lichen Society
- California Natural Diversity Database
- The Jepson Flora Project
- The Consortium of California Herbaria
- CalPhotos

Questions and Comments

rareplants@cnps.org

Appendix E

Geotechnical Design and Material Report

GEOTECHNICAL DESIGN AND MATERIALS REPORT
BELL ROAD AT I-80 INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA
03-PLA-80, PM 20.9 TO 21.3 EA: 03-4H430

For

GHD
943 Reserve Drive
Roseville, CA 94678

Prepared By:

PARIKH CONSULTANTS, INC.
1497 N. Milpitas Blvd, Milpitas, CA 95035
(408) 452-9000

October 2, 2020

PARIKH Project No. 2019-125-GDR

GHD
943 Reserve Dr, Suite 100
Roseville, CA 95678

Job No.: 2019-125-GDR
October 2nd, 2020.

Attn: Ms. Heather Anderson, P.E.

Sub: GEOTECHNICAL DESIGN AND MATERIALS REPORT
BELL ROAD AT I-80 INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA
03-PLA-80, PM 20.9 to 21.3 EA: 03-4H430

Dear Ms. Anderson:

Transmitted herewith is the Geotechnical Materials Report for the subject project. The report was prepared in accordance with the scope of work outlined in our agreement.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning our findings or conclusions, please feel free to contact this office.

Very truly yours,
PARIKH CONSULTANTS, INC.

Gary Parikh

Gary Parikh, P.E., G.E., 666
Project Manager

Attachment: Geotechnical Design and Materials Report

"Approved as to impact on State facilities and conformance with applicable State standards and practices, and the technical oversight were performed as described in the California Department of Transportation A&E Consultant Services Manual."

Caltrans____

Title____

Date____

Caltrans____

Title____

Date____

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GEOTECHNICAL DESIGN AND MATERIALS REPORT
BELL ROAD AT I-80 INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA
03-PLA-80, PM 20.9 to 21.3 EA: 03-4H430

1 INTRODUCTION

This report presents the results of our geotechnical engineering investigation for the proposed "Bell Road at I-80 Interchange Project" hereinafter referred to as "PROJECT" in Placer County, California. The work was performed in general accordance with the scope of work outlined in our agreement with GHD (Designer). The project is located within the southeastern portion of Placer County, California, around 38.9460113 latitude and -121.0473178 longitude and between post miles R20.9 and R21.3. The project site is approximately two miles east of the Auburn Airport and north of Auburn's city limits. The location of the project is shown on the Project Location Map, Plate No. 1.

Retaining walls, embankments, overhead sign structures and structural pavement sections are proposed in this project. This report presents geotechnical recommendation only for the proposed structural pavement sections for the widening and foundation recommendations for the overhead sign structures. Separate Foundation Report for the retaining walls will be submitted.

The investigation included review of readily available geologic literature pertaining to the site, site reconnaissance, obtaining representative soil bulk samples and logging soil materials encountered in soil borings, laboratory testing of the representative soil samples, performing engineering analyses, and preparation of this report.

The purpose of this report is to document subsurface geotechnical conditions, provide analyses of anticipated site conditions as they pertain to the project described herein, and to recommend design and construction criteria for the roadway structural pavement of the project.

The report is intended for use by the project roadway design engineer, construction personnel, bidders and contractors for information and reference purposes only and should not be construed as project specifications.

2 EXISTING FACILITIES, PROJECT DESCRIPTION AND PROPOSED IMPROVEMENTS

2.1 Existing Facilities

Existing structures within the project limit are listed in the following table.

TABLE 1- EXISTING STRUCTURES WITHIN THE PROJECT LIMIT

PM	Bridge No.	Structure
21.13	19-0126	Bell Road Overcrossing

2.2 Project Description

The proposed project would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. The roundabouts would be designed to accommodate future growth “2045”. Intersection geometrics and pedestrian crossings would be consistent with the National Cooperative Highway Research Program (NCHRP) Report 672 entitled “Roundabouts: An Information Guide, 2nd Edition” (Guide).

Roundabout improvements would include, but not be limited to, the following:

- A 10-foot shared use path separated from the roadway with a five-foot minimum landscaped buffer for pedestrian safety and to guide pedestrians to correct crossing locations;
- Crosswalks and Americans with Disabilities Act (ADA) accessible ramps along pedestrian facilities, and
- Vehicular speeds ranging from 15 to 30 mph after project buildout within the interchange.

Pedestrian and Bicycle Safety

The 10-foot shared-use path would convey pedestrian and bicycle traffic through the intersection and provide the opportunity for cyclists to exit the bicycle lane via a bicycle ramp and navigate the intersection on the shared-use path and through the crosswalks. Cyclists would also have the option to exit the bicycle lane and enter the roadway to ride with vehicle traffic through the roundabout.

Crosswalks would be split into two separate crossings through the provision of the pedestrian refuges at the splitter islands. These two-stage crossings would reduce the amount of sustained time a pedestrian is in potential conflict with motorized vehicles by limiting the length of each crossing and limiting each crossing to one direction of vehicle travel at a time.

Pedestrian crossings would be a minimum of one car length from the circulatory roadway, and the pedestrian refuges at the splitter islands would be at least six feet wide, consistent with the NCHRP Guide.

3 PERTINENT REPORTS AND INVESTIGATION

The available documents, including the as-built data and the foundation reports, are listed below.

1. Foundation Recommendations, Haines Road Overcrossing, Bridge No. 19-126, by Caltrans, dated August 15, 1969.
2. General Plan, Haines Road Overcrossing, Bridge No. 19-126, by Caltrans, dated June 18, 1969.
3. As-built Log of Test Boring, Haines Road Overcrossing, Bridge No 19-0126 dated April 22, 1969.

4 PHYSICAL SETTING

4.1 Climate

The climate in the project area is characterized by moderate climatic conditions. This consists of cold winters, warm summers, small daily and seasonal temperature ranges. Based on the statistical data from National Oceanic & Atmospheric Administration, average total annual precipitation in the project area is around 37.2 inches (94.5 cm). Extreme temperature ranges from average minimum temperature of 38ºF (3.3ºC) in December and January to average maximum temperature of 91ºF (32.8ºC) in July and August. Most of the rainfall is recorded in December with the average total precipitation of 6.73 inches (17.1 cm). July is the month with the least average rainfall precipitation of 0.0 inch.

4.2 Topography and Drainage

Site topography is hilly and lays in the Sierra Nevada foothills. Site drainage appears to flow out to the north-west towards an outlet in the north-west quadrant contained by Bowman Road and Bell Road; then to Wise Canal and Rock Creek Dam.

Inspection of historical aerial photographs (1952) and topographic maps (1953) show that land use after initial clearing appears to be for orchards.

Most of the Project site appears to have been significantly altered from the natural topography by the construction of I-80 and the auxiliary roads and ramps. A cardboard box dump is located on the north side of the Project site contained between Bowman Road and the I-80 WB off-ramp. The Auburn RV Resort is located east of the Project site adjacent to Musso Road. The Southern Pacific Railway runs from south-west to north-east approximately 900 feet east of the Project center. The Bowman Park and Ride is located on the west side of the project adjacent to the east side of Bowman Road. General current land use in the Project area is semi-rural residential and farm lots.

4.3 Man-Made and Natural Features of Engineering and Construction Significance

Man-made features within and in the vicinity of the project site that have potential engineering significance to this project include:

- Pacific Gas & Electric Company (PG&E) overhead electric lines;
- PG&E six-inch iron distribution line; and
- Placer County Water Agency (PCWA) 24-inch ductile iron pipe with air vacuum release valve (AVRV).

The project is currently expected to require the relocation of two PG&E electrical poles and one PCWA valve/vault. It is also expected to adjust to grade two other PCWA valves/vaults.

5 EXPLORATION

5.1 Drilling and Sampling

Based on the plans and discussions with the designer, nine (9) soil borings were drilled to the depths between the depth of 5 feet and 41.2 feet. Approximate locations of these borings are shown on the Site Plan (Plate No. 2).

The borings were advanced with a truck mounted drill rig using 4.5-inch diameter hollow stem augers and rotary wash drilling. The borings were drilled under the technical supervision of our engineer, who classified and logged the soils encountered during drilling and supervised the collection of soil samples for visual examination and laboratory testing. The boring locations, stations, and relevant information are summarized in Table 2. The Log of Test Boring (LOTB) are attached in Appendix A.

TABLE 2 - SUMMARY OF BORINGS

Boring No.	Station (feet)	Boring Depth (feet)	Approximate Ground Elevation (feet)
R-19-001	“F3” Line 44+25 7’ Lt.	28.0	1564.0
A-19-003	“F3” Line 38+05 1’ Lt.	40.0	1553.0
A-19-004	“K” Line 154+60 10’ Rt.	41.2	1552.0
R-19-005	“K” Line 164+60 20’ Lt.	35.2	1575.0
A-19-006	“F4” Line 34+85 74’ Lt.	40.5	1562.0
A-19-009	“M3” Line 6+00 5’ Rt.	5.0	1555.0
A-19-010	“M1” Line 08+65 5’ Lt.	5.0	1557.0
A-19-011	“K” Line 164+60 50’ Rt.	5.0	1573.0
R-20-012	“M3” Line 03+00 5’ Rt.	41.5	1552.0

5.2 Geologic Mapping

Geologic mapping was conducted over parts of the site to determine lithologies and collect structural data on contacts, faults, fractures, joints, and veins. This data was used to create Plate Nos. 3 and 4 highlighting relevant geological features.

5.3 Geophysical Studies

The subject was considered and was determined to be not significant for the project.

5.4 Instrumentation

The subject was considered and was unnecessary for this project.

5.5 Exploration Notes

The description of the soils encountered in the boreholes are summarized in Table 3. In general, unusual conditions were not encountered during drilling. Caving of the drilled holes was not observed during drilling.

6 GEOTECHNICAL TESTING

6.1 In-Situ Testing

In-situ testing consists of recording blow counts during sampling (using both Modified California sampler and Standard Penetration Test sampler). Based on our previous experience, when correlating standard penetration data in similar soils, the blow counts for the Modified California Sampler may be converted to equivalent SPT blow counts by multiplying a conversion factor of 0.65. Based on the average values of the SPT-N values for the soil materials encountered in the field exploration, the subsurface soils are classified generally as loose to very dense cohesionless soils and interbedded layers of stiff to hard cohesive soils and weathered bedrock. The in-situ test results are presented on the LOTB attached in Appendix A.

6.2 Laboratory Testing

Laboratory tests were performed on selected samples in the laboratory to evaluate the physical and engineering properties of the subsoils. The tests performed for the study include the following: Laboratory determination of Moisture (California Test Method 226), Unit Weight (ASTM D7263-09), Atterberg Limits (California Test Method 204), Grain Size Analysis (California Test Method 202), Resistivity and pH Test (California Test Method 643), Sulfate Content (California Test Method 417), Chloride Content (California Test Method 422) and R-value Tests (California Test Method T-301). The laboratory test results are attached in Appendix B.

7 GEOTECHNICAL CONDITIONS

7.1 Geology

The project site is located Sierra Nevada Geomorphic Province of California and within the Jura-Triassic Arc Belt tectonostratigraphic terrane of the Sierra Nevada; a belt of disrupted ophiolite, serpentinite mélange, and ultramafic rocks accreted to north America no later than mid Jurassic.

The Preliminary Geologic Map of the Sacramento 30´ by 60´ Quadrangle, California, indicates that the site is underlain by metasedimentary rock (ms) of the Foothill Melange and described as being a chaotic mixture of metasedimentary and metavolcanic rocks of varying lithologies and ages, including bodies of gabbroic and ultramafic rocks, and lenses of carbonate rocks. Plate No. 3 shows the geology of the Project region.

Geologic mapping and drilling indicate that several rock types underlie the Project with different physical and structural characteristics. Plates No 3 shows examples of the rock types and structural features. Rocks on the north side of the Project in the vicinity of A-19-001 include andesite and altered/silicified volcanic. Andesite is intensely to moderately weathered, depending on the depth from the original pre-cut surface; is moderately hard and intensely fractured. Silicified volcanic rocks lay within a fault zone about 110 feet wide trending at about 345° and dipping moderately to the west. The fault zone and resultant fluid flow is responsible for the intense silicification of the original volcanic rock, the type of which is not clear as the original textures have been masked or destroyed. The rocks present as fresh, very hard, and moderately fractured.

Rocks in the south-east part of the Project in the vicinity of A-19-006, 007, 008, and 011 consists of metamorphosed volcanic rocks. Rocks are fine grained; moderately to intensely weathered; moderately hard to moderately soft; and intensely fractured. These rocks are exposed at or close to the surface where cuts have been made.

Depth to bedrock across the Project varies from the surface to greater than 30 feet in areas of fill.

7.2 Subsurface Soil Conditions

Based on the available boring data, the subsurface soil conditions at pavement widening area are described in the table below:

TABLE 3 - SUMMARY OF SUBSURFACE SOIL CONDITIONS AT PAVEMENT WIDENING LOCATIONS

Boring No.	Depth (ft)	Description
R-19-001	28	Very dense silty sand up to 5 feet underlain by intensely weathered to fresh igneous rock to the maximum explored depth of 28 feet (Elev. 1536) from the existing surface.
A-19-003	40	Dense clayey sand and clayey sand with gravel fill up to 14 feet underlain by medium dense to very dense clayey sand with gravel and clayey gravel with sand interbedded with stiff lean clay to the maximum explored depth of 40 feet (Elev. 1513) from the existing surface.
R-19-005	35.2	Loose to very dense poorly graded sand and clayey sand fill up to 20 feet underlain by very dense clayey sand with gravel and metamorphic rock to the maximum explored depth of 35.2 feet (Elev. 1539.8) from the existing surface.
A-19-009	5	Silty sand with clay up to 5 feet below surface.
A-19-010	5	Silty sand up to 5 feet below surface.
A-19-011	5	Silty sand with gravel up to 5 feet below surface.

The subsurface soil conditions at overhead sign locations are described in the table below:

TABLE 4 - SUMMARY OF SUBSURFACE SOIL CONDITIONS AT OVEHEAD SIGN LOCATION

Structure	Reference Boring	General Subsurface Soil Conditions
Sign OS-1	A-19-006	Sandy lean clay up to 3 feet underlain by medium dense to very dense clayey sand and silty sand with gravel to 15 feet, underlain by intensely weathered igneous rock to the maximum explored depth of 40.5 feet (elevation 1521.5 feet) from the existing surface.
Sign OS-2	R-20-012	Stiff sandy lean clay up to depth of 5.5 feet followed by slightly to intensely weathered metamorphic rock up to the maximum explored depth of 41.5 feet (elevation 1510.5 feet) from the existing surface.
Sign OS-3	A-19-004	Medium dense to dense clayey sand with gravel fill up to 19 feet underlain by medium dense to very dense clayey sand with gravel with interbedded layers of very stiff to hard sandy lean clay layers to the maximum explored depth of 41.2 (elevation 1510.8 feet).

Due to limitations inherent in geotechnical investigations, it is neither uncommon to encounter unforeseen variations in the subsurface soil conditions during construction nor is it practical to determine all such variations during an acceptable program of drilling and sampling for a project of this scope. Such variations, when encountered, generally require additional engineering services to attain a properly constructed project. We, therefore, recommend that a contingency fund be provided to accommodate any additional charges resulting from technical services that may be required during construction.

7.3 Water

7.3.1 Surface Water

The surface water/drainage generally follows the ground topography and is discharged to the local drainage systems.

7.3.1.1 Scour

The subject was considered and was determined to be not applicable for the proposed project since no open water body passes through the site.

7.3.1.2 Erosion

The existing slopes have established landscaping to help control erosion. Therefore, erosion is not a concern for this project.

7.3.2 Groundwater

Groundwater was encountered between 31 and 35 feet below the existing surface (elevation between 1517.0 and 1527.0 feet).

In our opinion, the groundwater level is anticipated to vary with the passage of time due to seasonal groundwater fluctuation, surface and subsurface flows, ground surface run-off, change in the water level in the nearby creeks and other environmental factors which may not have been present at the time of our investigation.

7.4 Project Site Seismicity

7.4.1 Ground Motions

The Project lies within a seismically active area. Plate No. 4 shows faults in the Project region and according to the California Geological Survey Fault Activity Map of California, the faults are late Quaternary (<700,000yrs). Table 5 shows data for the closest faults to the Project site. Each of the faults shown in Plate 4 and listed in Table 5 are part of the Foothills Fault System which is the dominant structural feature of the western Sierra Nevada.

TABLE 5 – EARTHQUAKE DATA

Fault & Fault ID	Maximum Magnitude, M_{Max}	Fault Type	Approx. Distance Rx (miles)
DeWitt - 423	6.3	normal	2.95
Deadman - 422	6.2	normal	3.75
Highway 49 - 424	6.2	normal	4.92
Spencerville - 81	6.5	normal	9.45

Fault distances are derived from the California Geological Survey Fault Activity Map of California.
R_x = Horizontal distance to the fault trace or surface projection of the top of rupture plane

7.4.2 Ground Rupture

The Project does not lay within an Alquist-Priolo Earthquake Fault Zone, and the USGS Quaternary fault and fold database for the United States shows the Project is not within 1,000 feet of an un-zoned fault that is less than Latest Pleistocene (<15,000 years) in age. The potential for surface fault rupture is low. Statements within this paragraph do not preclude the existence of unknown active faults.

8 GEOTECHNICAL ANALYSES AND DESIGN

8.1 Dynamic Analysis

8.1.1 Seismic considerations

The recommended design response spectrum for the proposed overcrossing structure was determined using the Caltrans ARS Online tool (V3.0) which is based on Caltrans Seismic Design Criteria (SDC V2.0).

For SDC 2.0, the Design Spectrum is based on the USGS 975-year uniform hazard spectrum only. Effective December 1, 2019, the USGS hazard spectrum is based on the 2014 National Hazard Map per memorandum from the State Bridge Engineer. The updated Design Spectrum continues the use of near fault adjustment factors and basin amplification factors. The only change to these factors is the use of the Campbell-Bozorgnia (2014) and Chiou-Youngs (2014) basin amplification factors, updated from their 2008 models.

The development of the design ARS curve is based on several input parameters, including site location (longitude/latitude), average shear wave velocity for the top 30m/100 feet (V_{s30}m), and other site parameters, such as fault characteristics and site-to-fault distances.

Average shear wave velocities for the top 100 feet of soils at the site were estimated by using established correlations and procedure provided in Caltrans Methodology for Developing Design Response Spectrum for use in Seismic Design Recommendations (2012). Shear wave velocity calculations are attached in Appendix C.

Based on the subsurface data, the site is classified as “Class S2 Soil” per Caltrans Seismic Design Criteria (SDC, Version 2.0). The site locations and the relevant parameters are summarized in the table below, and the recommended design curve is presented on Plate No. 5.

TABLE 6– RECOMMENDED GROUND MOTION PARAMETERS FOR GEOTECHNICAL DESIGN

Relevant Borings	**Site Parameter**			**Design Ground Motion Parameter (Return Period = 975 years)**		
	Locations		**Shear-Wave Velocity V_{s30},m/sec**	**Horizontal Peak Ground Acceleration (HPGA)(1), g**	**Mean Earthquake M, Moment Magnitude**	**Mean Site-to-Fault/ Rupture Surface Distance (2) Rrup, km**
	Latitudes degrees	**Longitude, degrees**				
R-19-001, A-19-003, A-19-004, R-19-005, A-19-006	38.9451	-121.0469	300	0.21	6.48	50.21

1. Based on the Caltrans web tool ARS Online (Version 3.0.2)
2. Based on hazard de-aggregation analysis for the design HPGA using the web based USGS
3. Uniform Hazard Tool (Edition: Dynamic: Conterminous U.S. 2014 (Update)(V4.2.0)).
4. No adjustments were applied for near fault and basin effects.

8.1.2 Liquefaction Potential

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary but essentially total loss of shear strength under the reversing, cyclic shear stresses associated with earthquake shaking. Submerged cohesionless sands and silts of low relative density are the type of soils, which usually are susceptible to liquefaction. Clays are generally not susceptible to liquefaction.

We performed liquefaction analyses based on the available boring data per Youd et al. (2001). As indicated by studies in soil liquefaction engineering (Bray, 2006), soils with sufficient fines content so as to separate the coarser particles and control behavior, liquefaction appears to occur in soils where these fines are either non-plastic or are low plasticity silts and/or silty clays (PI<12% and LL<37%), and with high water content relative to their liquid limit (W%>0.85LL).

Based on our analysis, liquefaction potential does not exist at the site. Liquefaction analysis results are attached in Appendix C.

8.2 Cuts and Excavations

Based on our understanding of the proposed project, the project will require cut for the soil nail wall construction and roadway widening.

8.2.1 Stability

Global stability of soil nail wall will be discussed in retaining wall foundation report.

8.2.2 Rippability

The proposed excavations are anticipated to be in roadway fill and native soils. Based on the investigation, rippability does not appear to be a concern for construction of the roadway.

8.2.3 Grading Factor

Source of the project fill may include the fill generated from the cuts (as long as the on-site native soil meets the project specifications) planned for the project. Fill may also be imported from outside borrow sources. The source of borrow is unknown at the time of report preparation. Based on previous experience, for preliminary estimate, a grading factor of 0.9 may be assumed for import materials.

8.3 Embankments (Fill for Retaining Wall)

Based on the information provided by the designer we understand that 8-9 feet of new fill is expected for Retaining Wall No. 2 fill for roadway widening. Stability and settlement of the new fill will be discussed in the retaining wall foundation report.

8.4 Earth Retaining System

Based on the plans provided by the designer, the project includes two (2) retaining walls. The recommendations for the earth retaining structures will be provided in separate foundation report.

8.5 Minor Structures

8.5.1 Single Post Overhead Signs

Based on the information provided by the designer, the project includes three (3) overhead sign structures. We understand that overhead sign structure foundations will be standard per 2018 Caltrans Standard Plans. The locations and details of the sign posts are summarized in the following table.

TABLE 6 – LOCATIONS OF OVERHEAD SIGN STRUCTURES

Sign Post	Post Type	CIDH Diameter (ft)	Pile Length (ft)	Location	Reference Boring
OS-1	V	4.5	19	"M2" Line 36+02.14	A-19-006
OS-2	VI	5	22	"M3" Line 42+98.28	R-19-012
OS-3	VIII	5	25	"K" Line 153+09.75	A-19-004

The subsurface soil conditions, the sign structure details and the discussions for foundation recommendations of each proposed overhead sign structures are provided below.

Overhead Sign Structure "OS-1", "M2" Sta. 36+02.14

The foundation recommendation for Overhead Sign Structure "OS-1" is based on the boring information of boring A-19-006. The boring data indicates that the foundation soil materials generally consist of sandy lean clay up to 3 feet underlain by medium dense to very dense clayey sand and silty sand with gravel to 15 feet, underlain by intensely weathered igneous rock to the maximum explored depth of 40.5 feet (elevation 1521.5 feet) from the existing surface. Groundwater was encountered at 35 feet (Elev. 1527) during our field exploration. Corrosion test indicates that the subsurface soil at the proposed overhead sign location is not corrosive.

Based on our evaluation of liquefaction potential, the liquefaction potential for the subsurface soil conditions at the proposed overhead sign location does not exist.

The sign will be truss overhead, and post type will be Type V and supported on a 4.5 feet diameter CIDH pile. Based on the subsurface soil conditions in the vicinity of the proposed overhead sign location, the Caltrans Standard Plan (S8) foundation depth of 19 feet is feasible at this location.

Overhead Sign Structure "OS-2", "M3" Sta. 42+98.28

The foundation recommendation for Overhead Sign Structure "OS-2" is based on the boring information of boring R-20-012. The boring data indicates that the foundation soil materials generally consist of stiff sandy lean clay up to depth of 5.5 feet followed by slightly to intensely weathered metamorphic rock up to the maximum explored depth of 41.5 feet (elevation 1510.5 feet) from the existing surface. Groundwater was encountered at 35 feet (Elev. 1517) during our field exploration. Corrosion test indicates that the subsurface soil at the proposed overhead sign location is corrosive, since the pH is less than 5.5.

Based on our evaluation of liquefaction potential, the liquefaction potential for the subsurface soil conditions at the proposed overhead sign location does not exist.

The sign will be truss overhead, and post type will be Type VI and supported on a 5 feet diameter CIDH pile. Based on the subsurface soil conditions in the vicinity of the proposed overhead sign location, the Caltrans Standard Plan (S8) foundation depth of 22 feet is feasible at this location.

Overhead Sign Structure "OS-3", "K" Sta. 153+09.75

The foundation recommendation for Overhead Sign Structure "OS-1" is based on the boring information of boring A-19-004. After we drilled boring A-19-004, Sign Structure "OS-1" location is moved by approximately 150 feet northwest direction. We encountered about 19 feet of existing fill in boring A-19-004. Based on overall topography at this location, existing fill height at new overhead sign location may be less than 19 feet. The boring data indicates that the foundation soil materials generally consist of medium dense to dense clayey sand with gravel fill up to 19 feet underlain by medium dense to very dense clayey sand with gravel with interbedded layers of very stiff to hard sandy lean clay layers to the maximum explored depth of 41.2 (elevation 1510.8 feet). Groundwater was not encountered during our field exploration. Corrosion test indicates that the subsurface soil at the proposed overhead sign location is not corrosive.

Based on our evaluation of liquefaction potential, the liquefaction potential for the subsurface soil conditions at the proposed overhead sign location does not exist.

The sign will be truss overhead, and post type will be Type VIII and supported on a 5 feet diameter CIDH pile. Based on the subsurface soil conditions in the vicinity of the proposed overhead sign location, the Caltrans Standard Plan (S8) foundation depth of 25 feet is feasible at this location.

8.6 Corrosion

The corrosion investigation for this project was also performed on the selected sample from the boring drilled in 2019 in general accordance with the provisions of California Test Methods 417, 422 and 643. A summary of the corrosion test results is presented in the following table.

TABLE 7 - SUMMARY OF CORROSION TEST RESULTS

Boring No.	Depth (ft)	Min. Resistivity (ohm-cm)	pH	Sulfate (ppm)	Chloride (ppm)
R-19-001	5.0	5630	6.31	10.0	4.0
A-19-003	20.0	5090	5.01	1.8	8.1
A-19-004	10.0	1470	6.67	66.0	3.0
A-19-006	10.0	5900	6.09	2.8	2.4
R-20-012	10.0	12060	3.75	0.2	8.8

According to Caltrans Corrosion Guidelines (Version 3.0, March 2018), Caltrans considers a site to be corrosive to foundation element if one of the following conditions exists for the representative soil samples taken at the site:

- Chloride concentration is greater than or equal to 500 ppm,
- Sulfate concentration is greater than or equal to 1500 ppm,
- pH is 5.5 or less.

Based on the test results, the on-site soils at boring A-19-003 and R-20-012 locations are classified as corrosive per Caltrans corrosion guidelines, since pH is less than 5.5. Since the geology at the site is similar and the proposed structures are located close to each other, the project site should be considered corrosive per Caltrans corrosion guidelines. The minimum cement factor and cover thickness should be per AASHTO LRFD Specification (Section 5.10).

9 STRUCTURAL PAVEMENT SECTIONS

New pavement will be constructed on existing grade and on import borrow materials. For the pavement design, we have collected bulk samples along the project limit. Three (3) bulk samples were collected between the depths of 0 to 5 feet below the existing surface to determine the design R-value. We also collected bulk samples between the depth of 0-5 feet from the retaining wall and overhead sign borings. Sample locations are shown on attached Site Plan. Seven (7) R-value tests were performed on selected samples and the test results are summarized in the following table.

TABLE 8 - SUMMARY OF R-VALUE AND TEST RESULTS

Boring No.	Location	Description	R-
R-19-001	"F3" Line 44+25 7' Lt.	Silty Sand with Gravel (SM)	26
A-19-003	"F3" Line 38+05 1' Lt.	Clayey Sand with Gravel (SC)	34
A-19-004	"K" Line 154+60 10' Rt.	Clayey Sand (SC)	18
A-19-006	"F4" Line 34+85 74' Lt.	Sandy Lean Clay (CL) and Clayey Sand (SC)	11
A-19-009	"M3" Line 6+00 5' Rt.	Silty Sand with Clay (SM)	21
A-19-010	"M1" Line 08+65 5' Lt.	Silty Sand (SM)	34
A-19-011	"K" Line 164+60 50' Rt.	Silty Sand with gravel (SM)	53

As shown in the above table, R-value varies between 11 and 53 at the proposed new pavements section area. An R-value of 15 was used for the pavement design to account for the subgrade variation. Imported material should have minimum R-value of 15. In addition, the recommended minimum R-value for Aggregate Base (AB, Class 2) is 78 and Aggregate Subbase (AS, Class 2) is 50.

The Traffic Index (TI) values of 20-year and 40-year design life for each segment of roadway used for the pavement design were provided by the designer. The pavement design was performed in accordance to standard Caltrans procedures as outlined in Highway Design Manual, Section 630. The recommended flexible structural pavement sections for 20-year design life are tabulated in the following table.

TABLE 9 – RECOMMENDED FLEXIBLE STRUCTURAL PAVEMENT SECTIONS (20-YR DESIGN LIFE)

Location	Traffic Index (T.I)	R-value Used in Design	Flexible Structural Pavement Section (ft) (20-Yr Design Life)		
			RHMA-G*	HMA	AB
Bell Road at Bowman Road	12.5	15	0.20	0.45	2.10
Bell Road at Musso Road	11.5		0.20	0.40	1.90
I-80 On & Off-Ramps at Bell Road	11.5		0.20	0.40	1.90

*If RHMA-G is not required, it can be replaced by HMA for 20-Yr Design Life
TI - Traffic Index
RHMA-G – Rubberized Hot Mix Asphalt – gap-graded
HMA - Hot Mix Asphalt (Type A)
AB - Aggregate Base (Class 2) with R-value of 78

The recommended flexible structural pavement sections for 40-year design life are tabulated in the following table.

TABLE 10 – RECOMMENDED FLEXIBLE STRUCTURAL PAVEMENT SECTIONS (40-YR DESIGN LIFE)

Location	Traffic Index (T.I)	R-value Used in Design	Flexible Structural Pavement Section (ft) (40-Yr Design Life)**			
			OGFC	RHMA-G	HMA	AB
Bell Road at Bowman Road	13.5	15	0.10	0.20	1.50	0.50
Bell Road at Musso Road	12.5		0.10	0.20	1.35	0.50
I-80 On & Off-Ramps at Bell Road	12.5		0.10	0.20	1.35	0.50

** Per HDM, November 20, 2017, Section 633.1 (3) (b) Subgrade Enhancement Geotextile (SEGT) is recommended for 40-Year design life.
TI - Traffic Index
OGFC – Open Graded Friction Course
RHMA-G – Rubberized Hot Mix Asphalt – gap-graded
HMA - Hot Mix Asphalt (Type A)
AB - Aggregate Base (Class 2) with R-value of 78

The recommended rigid structural pavement sections are tabulated in the following table.

TABLE 11 – RECOMMENDED RIGID STRUCTURAL PAVEMENT SECTIONS

Location	TI	Rigid Pavement Structural Depth per HDM (ft)
Bell Road at Bowman Road	13.5	1.10 JPCP 0.25 HMA-A 0.70 AS
Bell Road at Musso Road	12.5	1.05 JPCP 0.25 HMA-A 0.70 AS
I-80 On & Off-Ramps at Bell Road	12.5	1.05 JPCP 0.25 HMA-A 0.70 AS

Note: TI: Traffic Index; HMA-A: Hot Mix Asphalt (Type A); JPCP: Joined Plain Concrete Pavement; AS: Class 2 Aggregate Subbase

10 MATERIAL SOURCES

There are several commercial sources of asphalt, concrete, and aggregate products in the vicinity of the project area. Some of the available commercial suppliers in the vicinity of the project area are listed in the table below:

TABLE 12- SOURCES OF IMPORTED BORROW

Source	Location	Approx. Haul Distance (One way, miles)
USC Supply SB/DVBE Construction Material Supply	12305 Locksley Ln, Auburn, CA 95602	3.3
A & A Concrete Supply	890 Grass Valley Hwy, Auburn, CA 95603	4.0

11 MATERIAL DISPOSAL

Project may require off-haul of some of the excavated material that cannot be used on site. Prior to excavating, materials should be tested for contamination in accordance with the recommendations of the environmental report. Asbestos, if encountered, will require special handling and disposal. Disposal of ADL and other contaminated material (if any) is beyond the scope of this report.

12 CONSTRUCTION CONSIDERATIONS

12.1 Construction Advisories

The following sections are written primarily for the engineer responsible for the preparation of plans and specifications. Since these sections identify potential construction issues related to the project, it may also be of use to the Agency's representatives involved in the monitoring of construction activity. The field investigation performed by PARIKH primarily addresses design issues and was not planned specifically to identify construction issues.

The majority of the project consists of roadway widening and pavement construction; therefore traffic control is required to maintain traffic flow along roads during construction. The contractor should verify the utility lines at the project site, be aware of the existing conditions and plan the construction activities accordingly to minimize the construction impact on the integrity of the existing utilities.

In our opinion, conventional equipment may be used to excavate the on-site soil materials. The materials to be excavated may consist of mainly loose to very dense sand and gravels, very stiff to hard clays with gravels and fresh to intensely weathered igneous and metamorphic rock at some locations. Localized subgrade pumping may be encountered during earthwork construction depending on the weather, moisture condition of the subsurface soils, and surface drainage conditions. Equipment mobility may also be difficult if the subgrade is wet. Under such circumstances, the subgrade soils may require reworking, moisture conditioning, aeration, or over-excavation and replacing with dry granular fill to facilitate earthwork construction. It is possible that unknown old buried utilities or abandoned structures, concrete rubble etc. are located along the alignment. It might require special equipment and additional efforts to remove these buried objects.

Prospective contractors for the project must be directed to evaluate construction-related issues on the basis of their own knowledge and experience in the local area, on the basis of similar projects in other localities, or on the basis of field investigation on the site performed by them, taking into account their proposed construction methods and procedures. In addition, construction activities related to excavation and lateral earth support must conform to safety requirements of Occupational Safety Health Administration (OSHA) and other applicable municipal and State regulatory agencies.

12.2 Cast-In-Drilled-Hole (CIDH) Concrete Pile

a) Caltrans standard specifications and standard special provisions (SSP) for “Cast-in-Place Concrete Piling” should be used for the construction of CIDH concrete piles. Access tubes for acceptance testing should be provided in all CIDH concrete piles that are 24 inches in diameter or larger for construction quality control, except when the holes are dry or when the holes are dewatered without the use of temporary casing to control groundwater. The acceptance test should include Gamma- Gamma Logging and may also include cross-hole sonic logging for verification. Gamma-Gamma Logging should be performed in accordance with California Test Method 233 Standard (CT-233) to check the homogeneity of CIDH concrete piles.

b) Due to the presence of granular material, raveling or caving is anticipated, which may require additional drilling and cleaning effort and may increase the concrete volume for the piles. If groundwater encountered, wet placement construction method shall be used for the construction of the CIDH concrete pile. It is prudent to make the contractor aware of these conditions so that appropriate steps can be taken to comply with the standards and maintain the integrity of the CIDH concrete pile.

c) The use of temporary steel casing and/or slurry displacement method of construction may be necessary during pile foundation construction. This should be consistent with any other special conditions required by the Regulatory Agency. Caltrans Standard Specifications and SSPs should be used for construction and quality assurance procedures.

d) Hard drilling may be expected, since very dense sand and gravels, very stiff to hard clays with gravels and fresh to intensely weathered igneous and metamorphic rock were encountered at the site. As shown in the LOTBs, fill and alluvial soils were encountered at shallower depth, underlain by bedrock at most of the locations. Very dense sand layers, underlain by bedrock, was encountered from elevation 1554 feet (about 8 feet from the surface) at sign location OS-1 (Boring A-19-006). Bedrock was encountered from elevation 1547 feet (about 5 feet from the surface) at sign location OS-2 (Boring R-20-012). Therefore, as discussed above hard drilling condition is expected at these two sign locations. Based on boring A-19-004, medium dense to very dense clayey sand with gravel fill is encountered up to elevation 1533 feet (about 19 feet) underlain by hard lean clay and medium dense to very dense clayey sand at OS-3 location. As discussed in Section 8.5.1, after we drilled boring A-19-004, Sign Structure "OS-1" location is moved by approximately 150 feet northwest direction. We encountered about 19 feet of existing fill in boring A-19-004. Based on overall topography at this location (uphill toward northwest direction), existing fill height at new overhead sign location may be less than 19 feet. If the fill height is less than 19 feet, hard drilling condition may be expected at OS-3 location also. Contractor should study the available data including the challenging subsurface soil conditions and groundwater conditions before starting the construction at these locations to avoid long-term closure and traffic impacts.

e) It is recommended that the specifications set certain criteria for qualifications and previous work experience requirements to pre-qualify the potential contractors. The intent is to help select qualified contractors to reduce construction issues.

f) All pile excavations should be observed by the geotechnical engineer or regulatory agency prior to the placement of reinforcement and concrete so that if conditions differ from those anticipated, appropriate recommendations can be made.

12.3 Construction Considerations that Influence Specifications

The contractor should verify the existing utility line conditions. These locations should not be used for stockpiling of construction materials. Any utility conflicts with proposed construction should also be reviewed prior to construction.

12.4 Construction Monitoring and Instrumentation

The construction monitoring and instrumentation subject was considered and was determined to be not applicable for the project.

12.5 Hazardous Waste Considerations

The project environmental site investigation report should be referred to for further details about any hazardous materials within the project.

12.6 Differing Site Conditions

The soil conditions described in this report are based on available boring data. It should be noted that these borings depict subsurface soil conditions and groundwater conditions only at the locations drilled and at the time drilled. Because of the variability from place to place within soils in general, and the nature of geologic depositions, subsurface soil conditions and groundwater conditions could change between the explored boring locations.

Early communication should be made between the Resident Engineer, the Contractor and the Geotechnical Engineer as soon as conditions that differ from those established in this report are recognized by any of the parties. Additional recommendations could thereby be provided if such conditions arise.

13 RECOMMENDATIONS AND SPECIFICATIONS

13.1 Summary of Recommendations

If the designer has questions or concerns with any of these recommendations, or, if conditions are found to be different during construction, the Geotechnical Engineer who prepared this report should be contacted. Additional fieldwork, analysis or changes in recommendations may be required during the construction phase. These services may be provided under a separate authorization, as necessary. Refer to Table 9, 10 and 11 for the design structural pavement sections. The design TI values were provided by the designer. (Ref: Section 9).

13.2 Recommended Materials Specifications

13.2.1 Standard Specifications

Unless otherwise stated in the special provisions, all materials specifications should conform to Caltrans Standard Specifications, 2018, including but not limited to the following: Earthwork, Hot-Mix Asphalt, Lean Concrete Base, Aggregate Base and Aggregate Subbase.

13.2.2 Special Provisions

Note that there are most-current standard special provisions (2018) available. The up-to-date SSPs for all pavement-related items should be used.

Imported Borrow: Imported material should be in accordance with the specifications set forth in Caltrans Section 19. In particular, for new roadway construction, the material placed within 4 feet of the finish pavement subgrade should meet the following requirements:

1. Free of organic or other deleterious materials.
2. An R-value of not less than 15.

Aggregate Base: Aggregate Base (Class 2) shall conform to the provisions in Section 26 of the Caltrans Standard Specifications, 2018.

Aggregate Subbase: Aggregate Subbase (Class 2) shall conform to the provisions in Section 25 of the Caltrans Standard Specifications, 2018 and to the Special Provisions.

Aggregate Subbase (Class 2) shall be clean and free from organic matter and other deleterious substances. The percentage composition by weight of Class

2 aggregate subbase shall conform to the following grading as determined by California Test Method No. 202.

GRADATION REQUIREMENT (PERCENT PASSING)

Sieve Sizes	Operating Range	Contract Compliance
3”	100	100
2 1/2 “	90 - 100	87 - 100
No. 4	40 -90	35 –95
No. 200	0 -25	0 -29

Aggregate Subbase (Class 2) shall also conform to the quality requirements given on the following table:

QUALITY REQUIREMENTS

California Test Method	Operating Range	Contract Compliance
Sand Equivalent (217)	21 Min.	18 Min.
Resistance (R-value) (301)	--	50 Min.

14 INVESTIGATION LIMITATIONS

Our services consist of professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices and are based on our field exploration and the assumption that the soil conditions do not deviate from observed conditions. No warranty, expressed or implied, of merchantability or fitness, is made or intended in connection with our work or by the furnishing of oral or written reports or findings. The scope of our services did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in structures, soil, surface water, groundwater or air, below or around this site. Unanticipated soil conditions are commonly encountered and cannot be fully determined by taking soil samples and excavating test borings; different soil conditions may require that additional expenditures be made during construction to attain a properly constructed project. Some contingency fund is thus recommended to accommodate these possible extra costs.

This report has been prepared for the proposed “Bell Road at I-80 Interchange Project” as described earlier, to assist the engineer in the design of this project. In the event any changes in the design or location of the facilities are planned, or if any variations or undesirable conditions are encountered during construction, our findings and recommendations shall not be considered valid unless the changes or variations are reviewed and our recommendations modified or approved by us in writing.

This report is issued with the understanding that it is the designer's responsibility to ensure that the information and recommendations contained herein are incorporated into the project and that necessary steps are also taken to see that the recommendations are carried out in the field. The findings in this report are valid as of the present date. However, changes in the soil conditions can occur with the passage of time, whether they are due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or from the broadening of knowledge. Accordingly, the findings in this report might be invalidated, wholly or partially, by changes outside of our control.

Respectfully Submitted,
PARIKH CONSULTANTS, INC.

Kandeep Saravanapavan, P.E., G.E. 3040
Senior Project Engineer

Y. David Wang, Ph.D., P.E. 52911
Senior Engineer

REFERENCES

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2. California Department of Transportation, Caltrans Deterministic PGA Map and ARS Online Report (V3.0.2).

3. California Department of Transportation, Highway Design Manual, Chapter 600, 2018.

4. California Department of Transportation, 2018, Standard Specifications.

5. California Department of Transportation Division of Engineering Services Materials Engineering and Testing Services Corrosion and Structural Concrete Field Investigation Branch Corrosion Guidelines Version 3.0, March 2018.

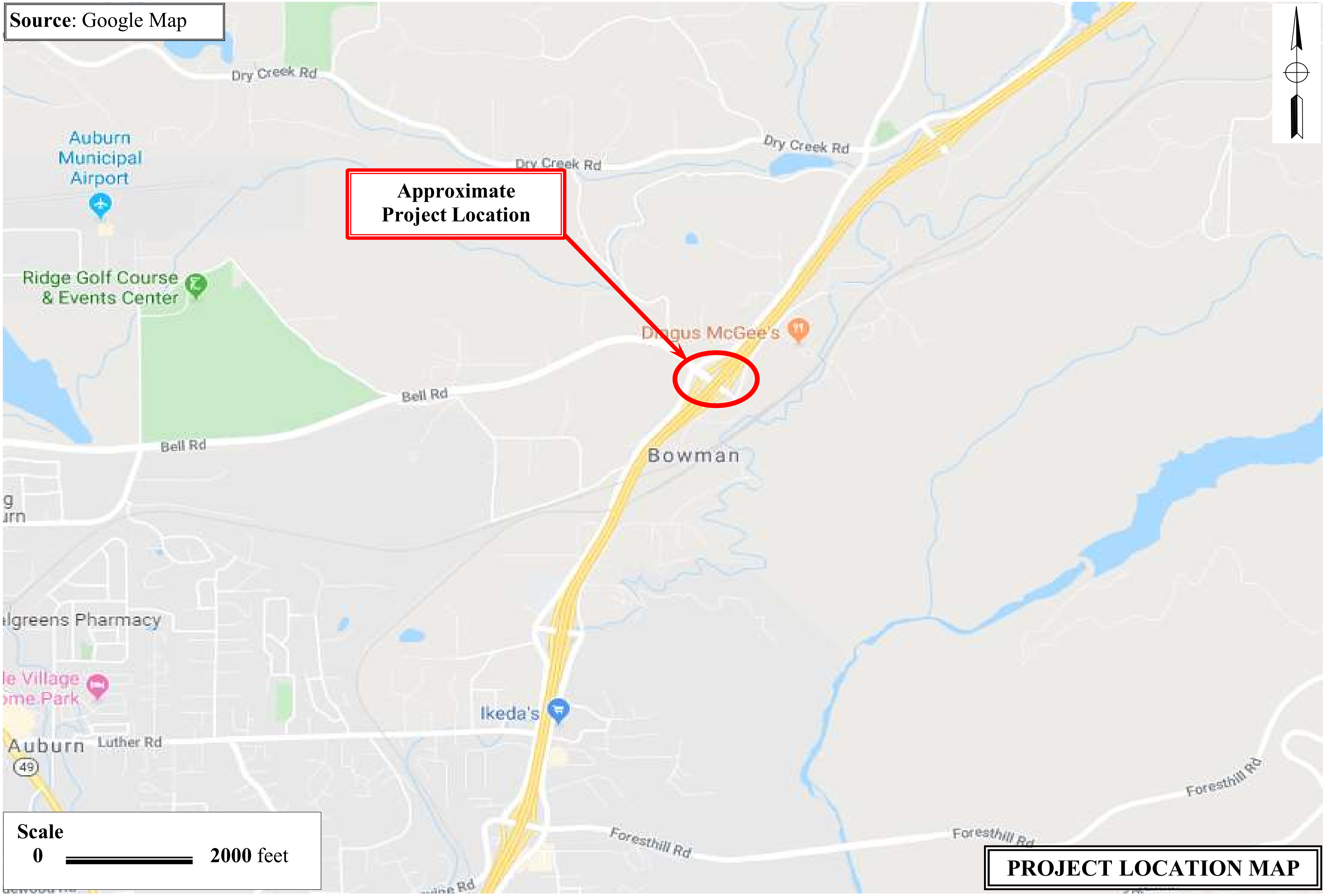
6. Gutierrez, C.I., 2011, Preliminary Geologic Map of the Sacramento 30´ by 60´ Quadrangle, California. California Department of Conservation, California Geological Survey.

7. Jennings, C.W., and Bryant, W.A., 2010. Fault activity map of California: California Geological Survey Geologic Data Map No. 6, map scale 1:750,000.

8. United States Department of Agriculture, Natural Resources Conservation Service, 2019. “Soil Survey Geographic (SSURGO) Database for Placer County, California, Western Part, ca620.” Accessed June 8, 2020. https://websoilsurvey.sc.egov.usda.gov/.

9. United States Geological Survey, 2006. “Quaternary fault and fold database for the United States.” Accessed April 28, 2019. http//earthquake.usgs.gov/hazards/qfaults/.

Source: Google Map



PROJECT LOCATION MAP

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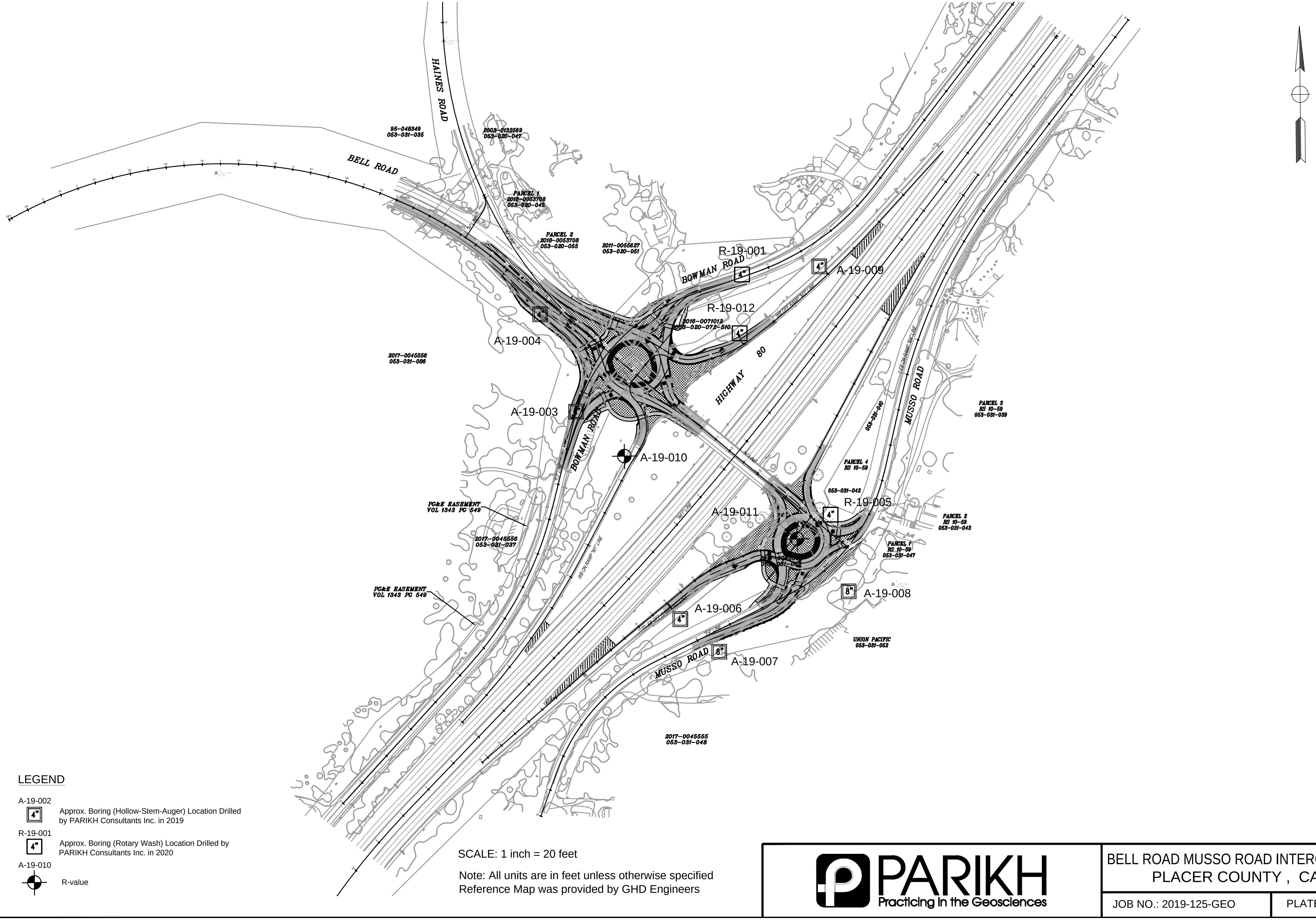
BELL ROAD MUSSO ROAD INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA

JOB NO.:2019-125-GEO	PLATE NO.: 1

SITE PLAN



LEGEND

A-19-002

4" Approx. Boring (Hollow-Stem-Auger) Location Drilled by PARIKH Consultants Inc. in 2019

R-19-001

4" Approx. Boring (Rotary Wash) Location Drilled by PARIKH Consultants Inc. in 2020

A-19-010

R-value

SCALE: 1 inch = 20 feet

Note: All units are in feet unless otherwise specified
Reference Map was provided by GHD Engineers

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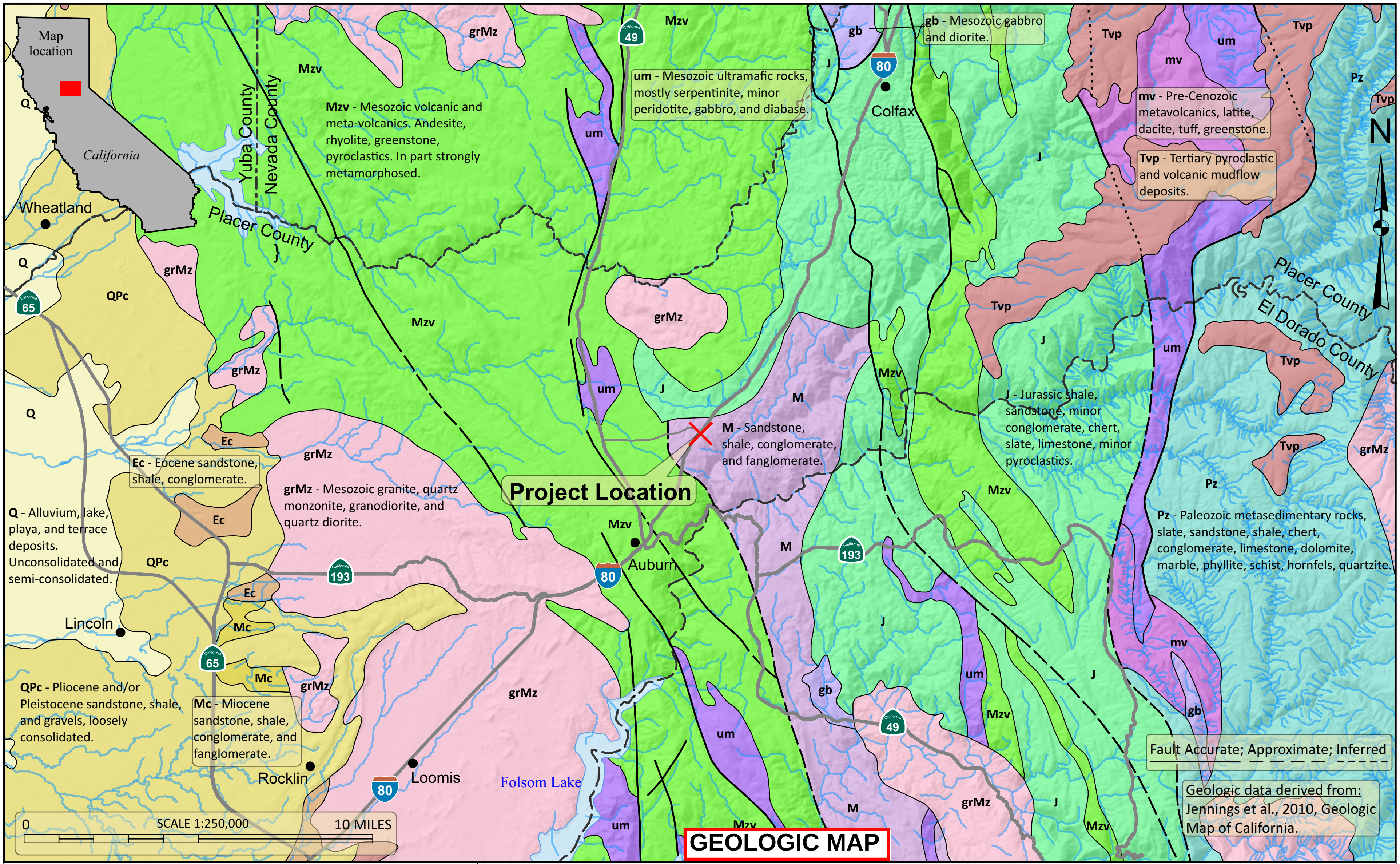
BELL ROAD MUSSO ROAD INTERCHANGE PROJECT
PLACER COUNTY , CALIFORNIA

JOB NO.: 2019-125-GEO

PLATE NO: 2



GEOLOGIC MAP

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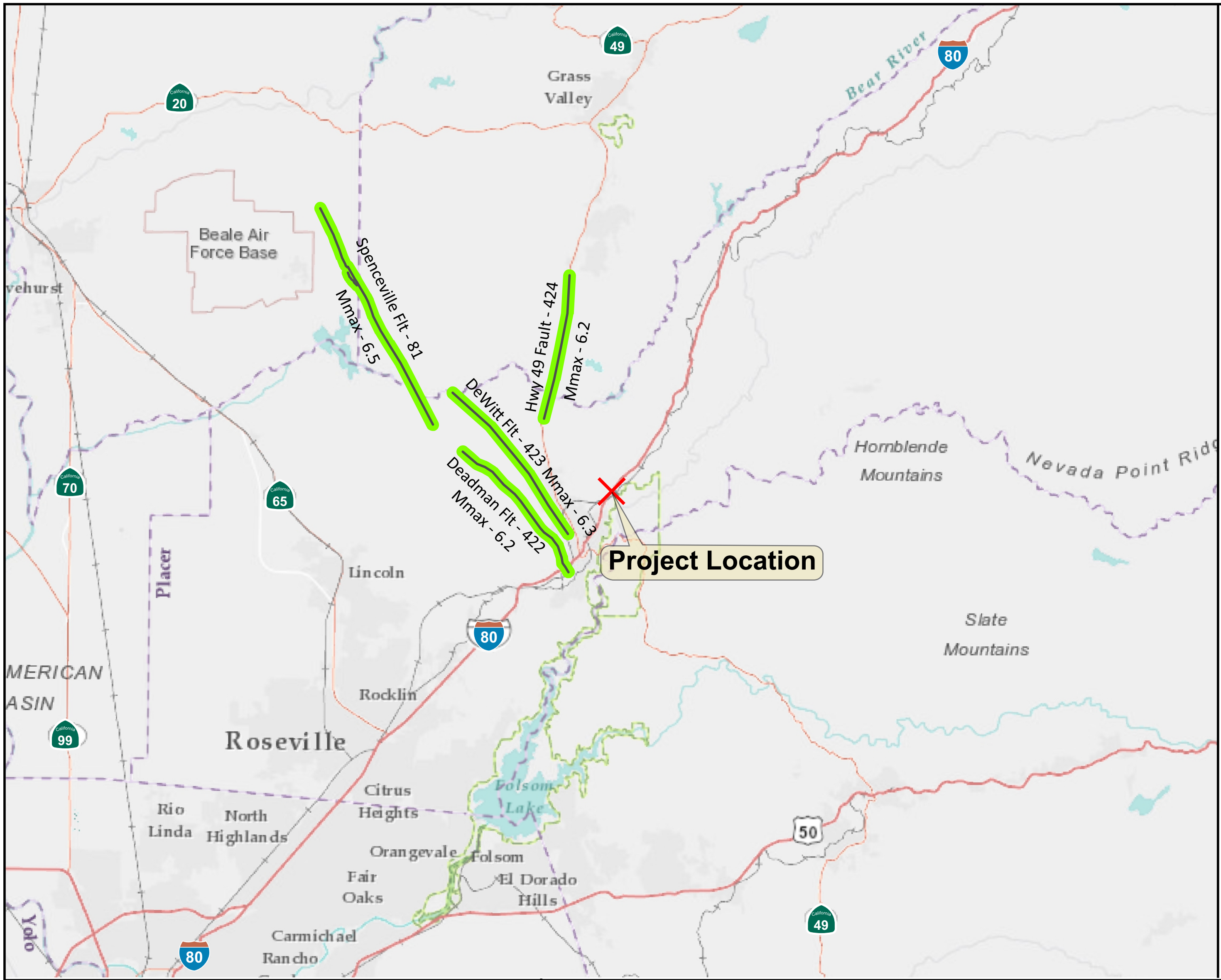
BELL ROAD MUSSO ROAD INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA

JOB No.: 2019-125-GEO	PLATE No.: 3



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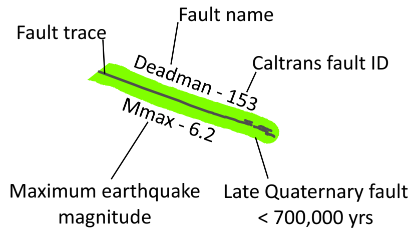
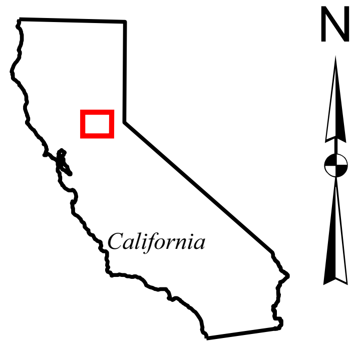


Map Location



Fault data derived from:
Jennings and Bryant, 2010,
Fault activity map of California.

Basemap Sources: Esri, HERE, Garmin, OpenStreetMap contributors, and the GIS User Community.

FAULT MAP

0 Scale 1:500k 15
MILES

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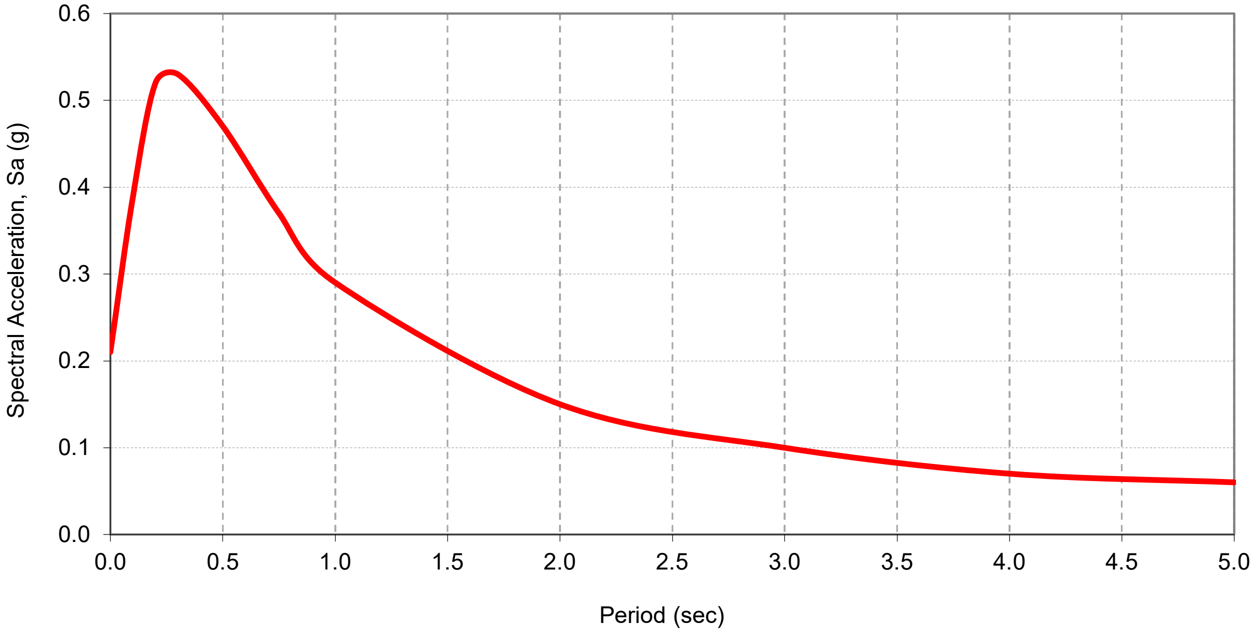
BELL ROAD MUSSO ROAD INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA

JOB NO.: 2019-125-GEO

PLATE No.: 4

RECOMMENDED ACCELERATION RESPONSE SPECTRUM

(5% Damping)



Site Information

Latitude:	38.9451
Longitude	-121.0469
V_{S30} (m/s) =	300
Mean Magnitude (for PGA)	6.48
Near Fault Factor, Derived from USGS Unified Hazard Site (km) =	50.21

Recommended Response Spectrum				
Period (sec)	Spectral Acceleration (2014) (g)	Adjusted for Near Fault Effect	Adjusted For Basin Effect	Design Spectral Acceleration (2014) (g)
0.0	0.21	1	1	0.210
0.1	0.39	1	1	0.390
0.2	0.52	1	1	0.520
0.3	0.53	1	1	0.530
0.5	0.47	1	1	0.470
0.75	0.37	1	1	0.370
1.0	0.29	1	1	0.290
2.0	0.15	1	1	0.150
3.0	0.1	1	1	0.100
4.0	0.07	1	1	0.070
5.0	0.06	1	1	0.060

Source:

1. Caltrans ARS Online tool (V.3.0.2, https://arsonline.dot.ca.gov/)
2. USGS Unified Hazard Tool (https://earthquake.usgs.gov/hazards/interactive/)
3. Caltrans SDC 2.0 was adopted September 1, 2019. Design Spectrum is based on the USGS 975 year uniform hazard spectrum only.

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BELL ROAD MUSSO ROAD INTERCANGE PROJECT
PLACER COUNTY, CALIFORNIA

Project No.: 2019-125-GEO | **Plate No.: 5**

APPENDIX A

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	PLA	80			

GEOTECHNICAL PROFESSIONAL DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
GEOTECHNICAL
STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of scanned copies of this plan sheet.

PARIKH CONSULTANTS, INC.
1497 N MILPITAS BLVD.
MILPITAS, CA 95035

PLACER COUNTY DEPARTMENT OF PUBLIC WORKS
3091 COUNTY CENTER DR # 220
AUBURN, CA 95603

DRAFT

NOTES:

Standard Penetration Test Sampler: I.D. = 1.4"; O.D. = 2"
Modified California Sampler: I.D. = 2.5"; O.D. = 3" Hammer
Assembly: A 140 lb hammer with
a 30" drop (Automatic Hammer)

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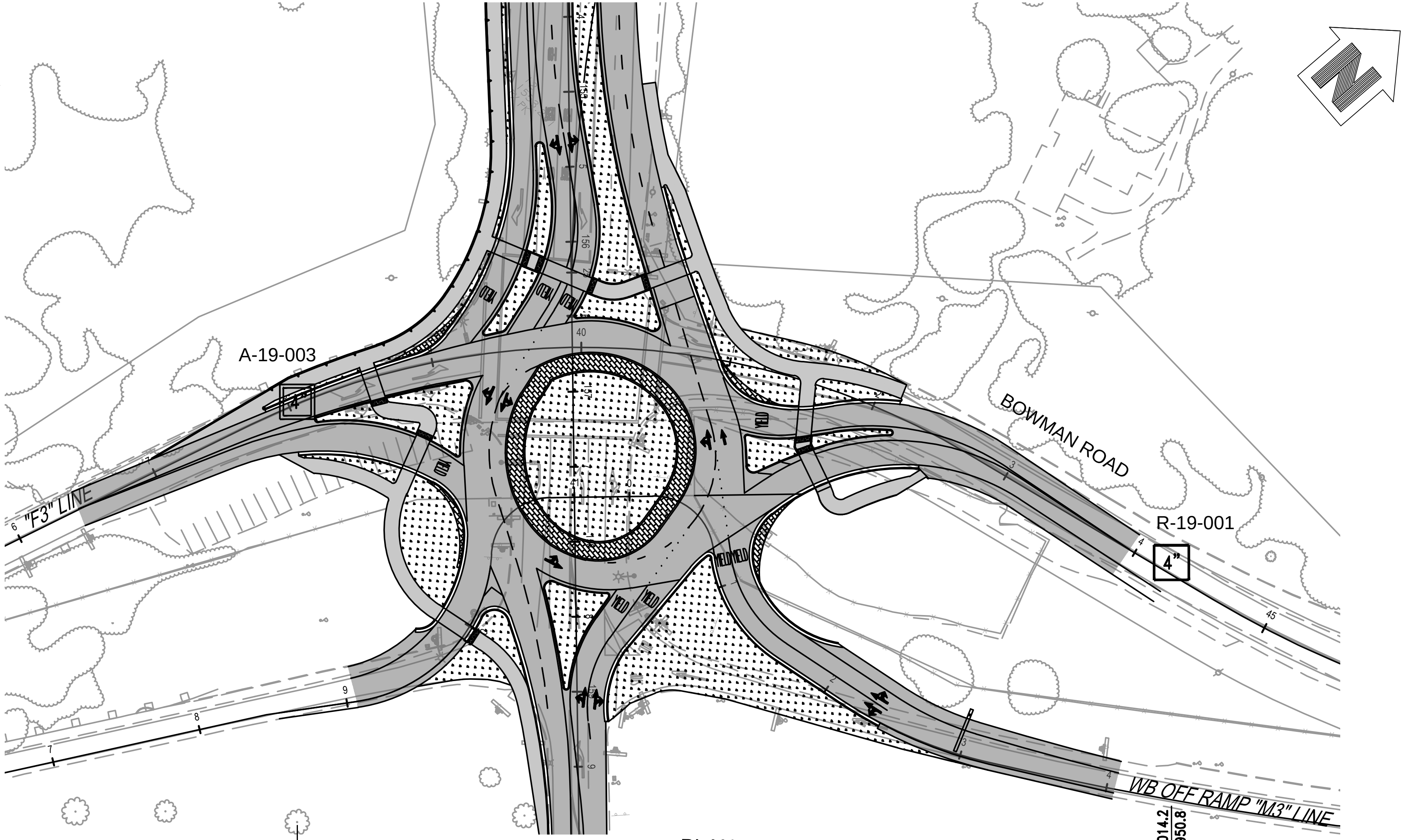
See Caltrans 2018 Standard Plans A10F, A10G for Soil Legend.

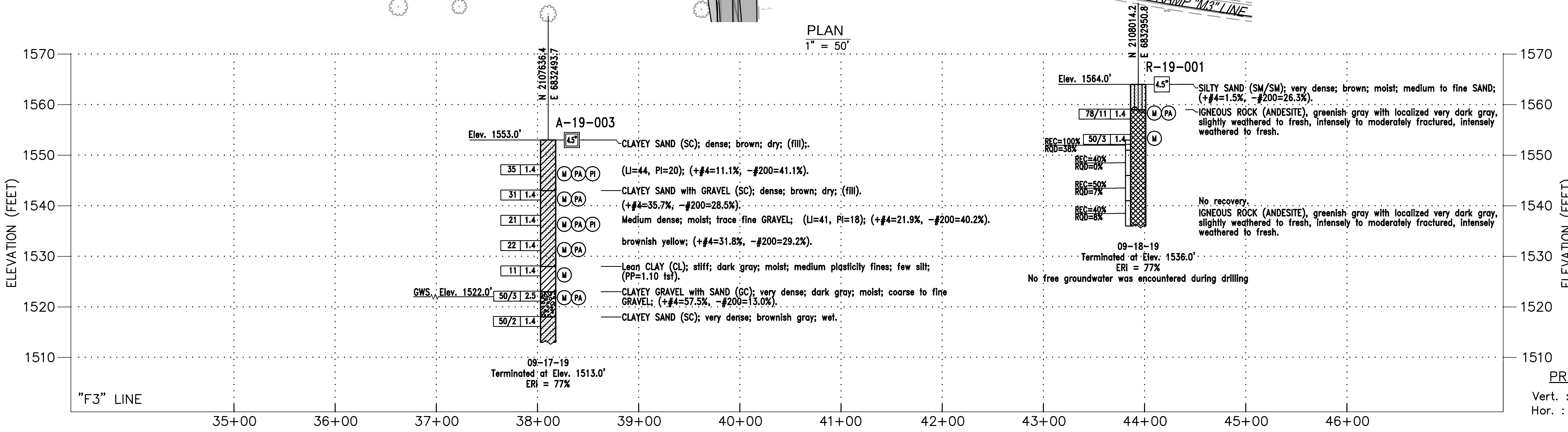
All dimensions are in feet unless otherwise shown

BOREHOLE LOCATION TABLE

Hole ID	Alignment Name	Station and Offset
A–19–003	"F3" Line	38+05 1' Lt.
R–19–001	"F3" Line	44+25 7' Lt.



PLAN
1" = 50'



PROFILE
Vert. : 1" = 10'
Hor. : 1" = 50'

DESIGN OVERSIGHT

SIGN OFF DATE

DRAWN BY	KIM OUYANG
CHECKED BY	KANDEEP SARAVANAPAVAN

KRISHNA A. & VIGRIL S.
FIELD INVESTIGATION BY:
DATE: SEP 2019 & MAY 2020

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

KANDEEP SARAVANAPAVAN
PROJECT ENGINEER

BRIDGE NO.

POST MILES

BELL ROAD MUSSO ROAD INTERCHANGE PROJECT

LOG OF TEST BORINGS 1 OF 4

GS GEOTECHNICAL LOG OF TEST BORINGS SHEET (ENGLISH) (REV. 03/14/12)

ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS
0 1 2 3

UNIT: X
PROJECT NUMBER & PHASE: X
CONTRACT NO.: X

DISREGARD PRINTS BEARING
EARLIER REVISION DATES

REVISION DATES

SHEET OF

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	PLA	80			

GEOTECHNICAL PROFESSIONAL DATE

PLANS APPROVAL DATE

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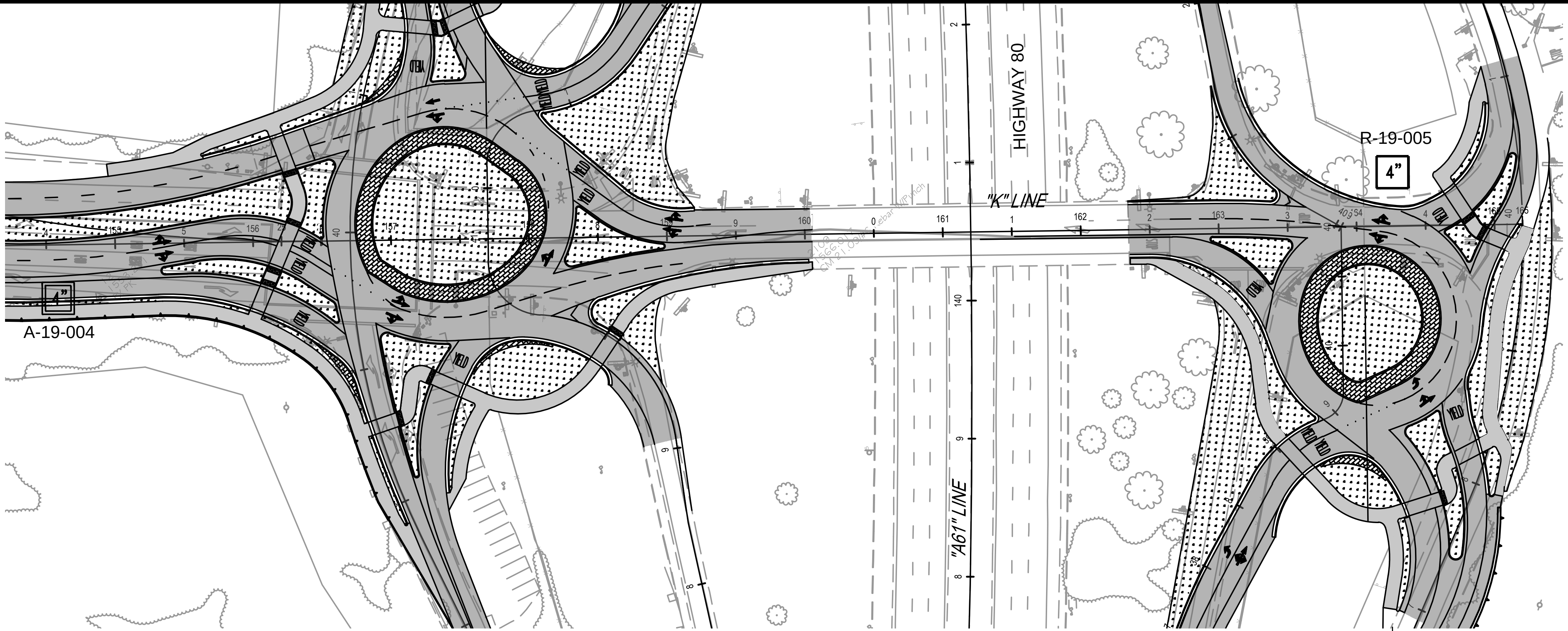
REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
GEOTECHNICAL
STATE OF CALIFORNIA

DRAFT

PARIKH CONSULTANTS, INC.
1497 N MILPITAS BLVD.
MILPITAS, CA 95035

PLACER COUNTY DEPARTMENT OF PUBLIC WORKS
3091 COUNTY CENTER DR # 220
AUBURN, CA 95603



PLAN
1" = 50'

NOTES:

Standard Penetration Test Sampler: I.D. = 1.4"; O.D. = 2"
Modified California Sampler: I.D. = 2.5"; O.D. = 3" Hammer Assembly: A 140 lb hammer with a 30" drop (Automatic Hammer)

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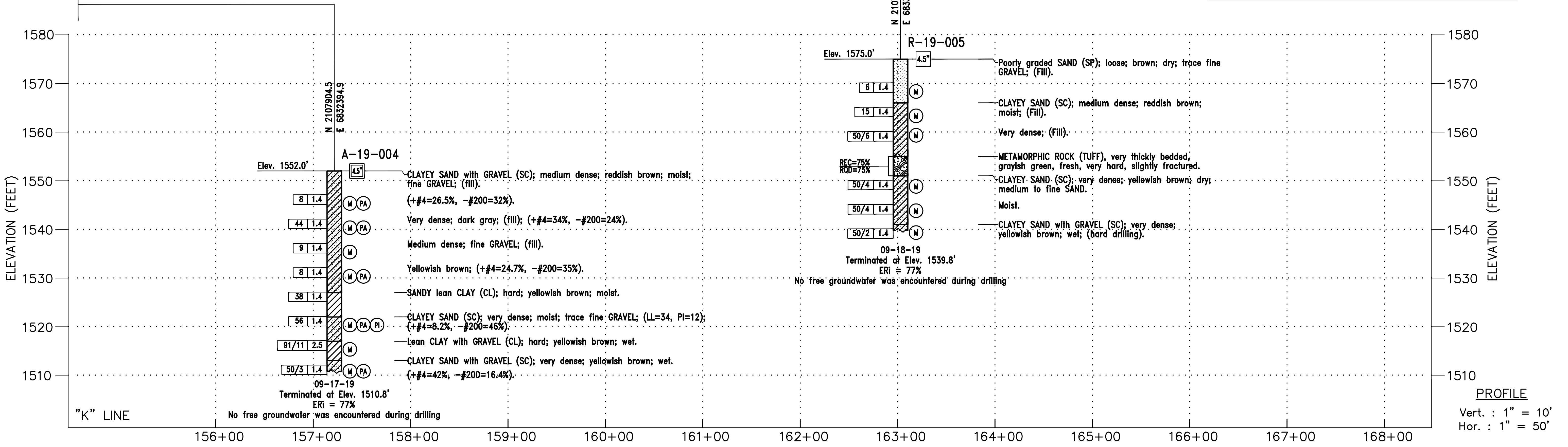
All dimensions are in feet unless otherwise shown

BOREHOLE LOCATION TABLE

Hole ID	Alignment Name	Station and Offset
A-19-004	"K" Line	154+60 10' Rt.
R-19-005	"K" Line	164+60 20' Lt.



PROFILE
Vert. : 1" = 10'
Hor. : 1" = 50'

DESIGN OVERSIGHT

SIGN OFF DATE

DRAWN BY	KIM OUYANG
CHECKED BY	KANDEEP SARAVANAPAVAN

KRISHNA A. & VIGRIL S.
FIELD INVESTIGATION BY:
DATE: SEP 2019 & MAY 2020

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

KANDEEP SARAVANAPAVAN
PROJECT ENGINEER

BRIDGE NO.
POST MILES

BELL ROAD MUSSO ROAD INTERCHANGE PROJECT

LOG OF TEST BORINGS 2 OF 4

GS GEOTECHNICAL LOG OF TEST BORINGS SHEET (ENGLISH) (REV. 03/14/12)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 1 2 3

UNIT: X
PROJECT NUMBER & PHASE: X
CONTRACT NO.: X

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES
SHEET OF

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	PLA	80			

GEOTECHNICAL PROFESSIONAL DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
GEOTECHNICAL
STATE OF CALIFORNIA

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MILPITAS, CA 95035

PLACER COUNTY DEPARTMENT OF PUBLIC WORKS
3091 COUNTY CENTER DR # 220
AUBURN, CA 95603

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NOTES:

Standard Penetration Test Sampler: I.D. = 1.4"; O.D. = 2"
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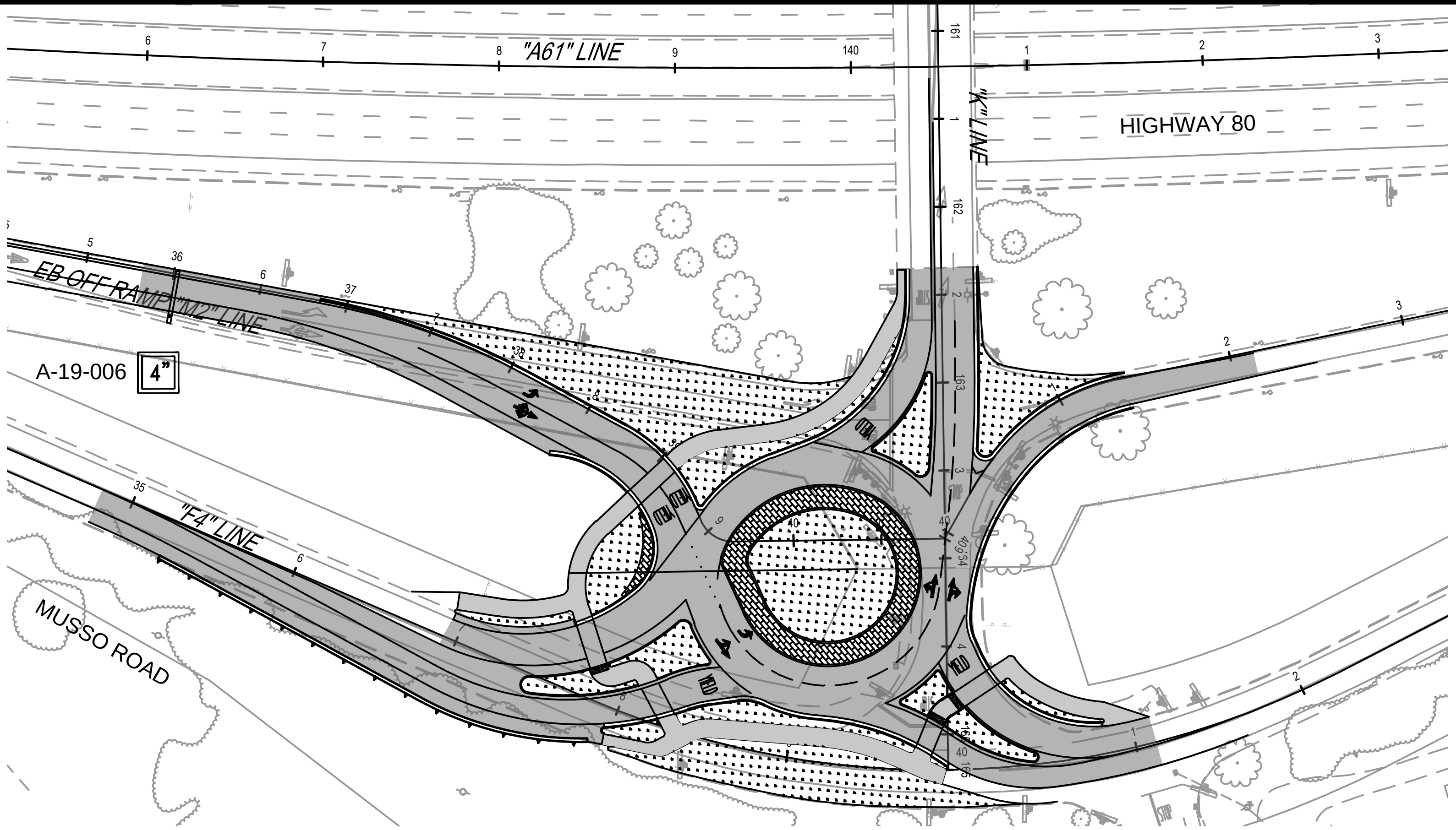
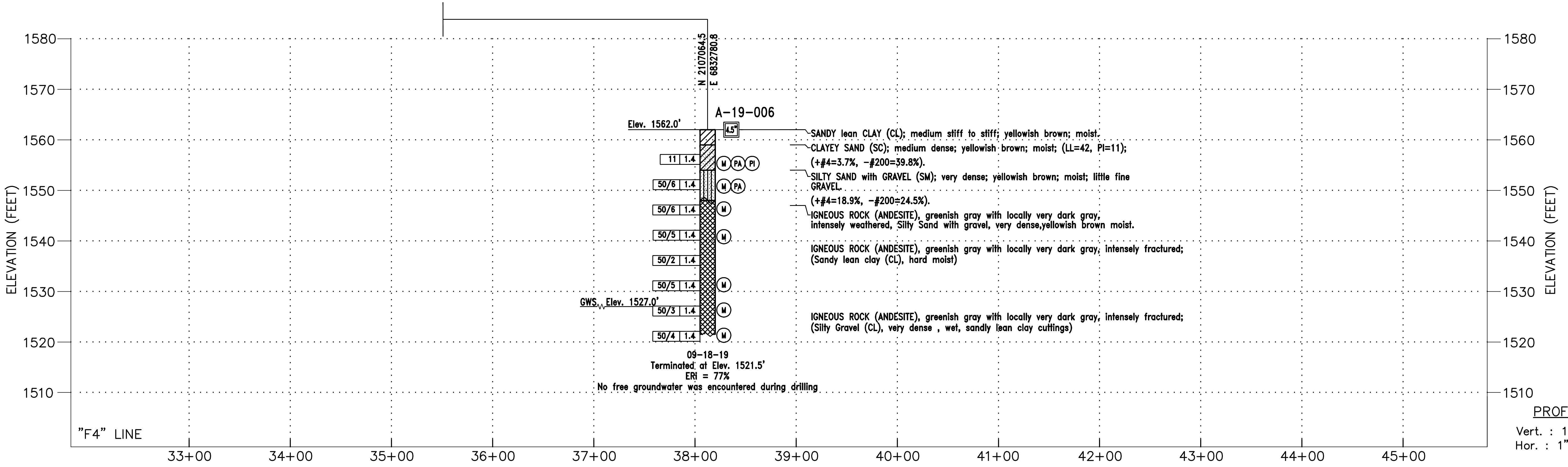
All dimensions are in feet unless otherwise shown

BOREHOLE LOCATION TABLE

Hole ID	Alignment Name	Station and Offset
A-19-006	"F4" Line	34+85 74' Lt.



PLAN
1" = 50'



PROFILE
Vert. : 1" = 10'
Hor. : 1" = 50'

DESIGN OVERSIGHT	DRAWN BY	KIM OUYANG	KRISHNA A. & VIGRIL S. FIELD INVESTIGATION BY:
SIGN OFF DATE	CHECKED BY	KANDEEP SARAVANAPAVAN	DATE: SEP 2019 & MAY 2020

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

KANDEEP SARAVANAPAVAN
PROJECT ENGINEER

BRIDGE NO.
POST MILES

BELL ROAD MUSSO ROAD INTERCHANGE PROJECT

LOG OF TEST BORINGS 3 OF 4

GS GEOTECHNICAL LOG OF TEST BORINGS SHEET (ENGLISH) (REV. 03/14/12)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 1 2 3

UNIT: X
PROJECT NUMBER & PHASE: X
CONTRACT NO.: X

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES SHEET OF

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	PLA	80			

GEOTECHNICAL PROFESSIONAL DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
GEOTECHNICAL
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MILPITAS, CA 95035

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3091 COUNTY CENTER DR # 220
AUBURN, CA 95603

DRAFT

NOTES:

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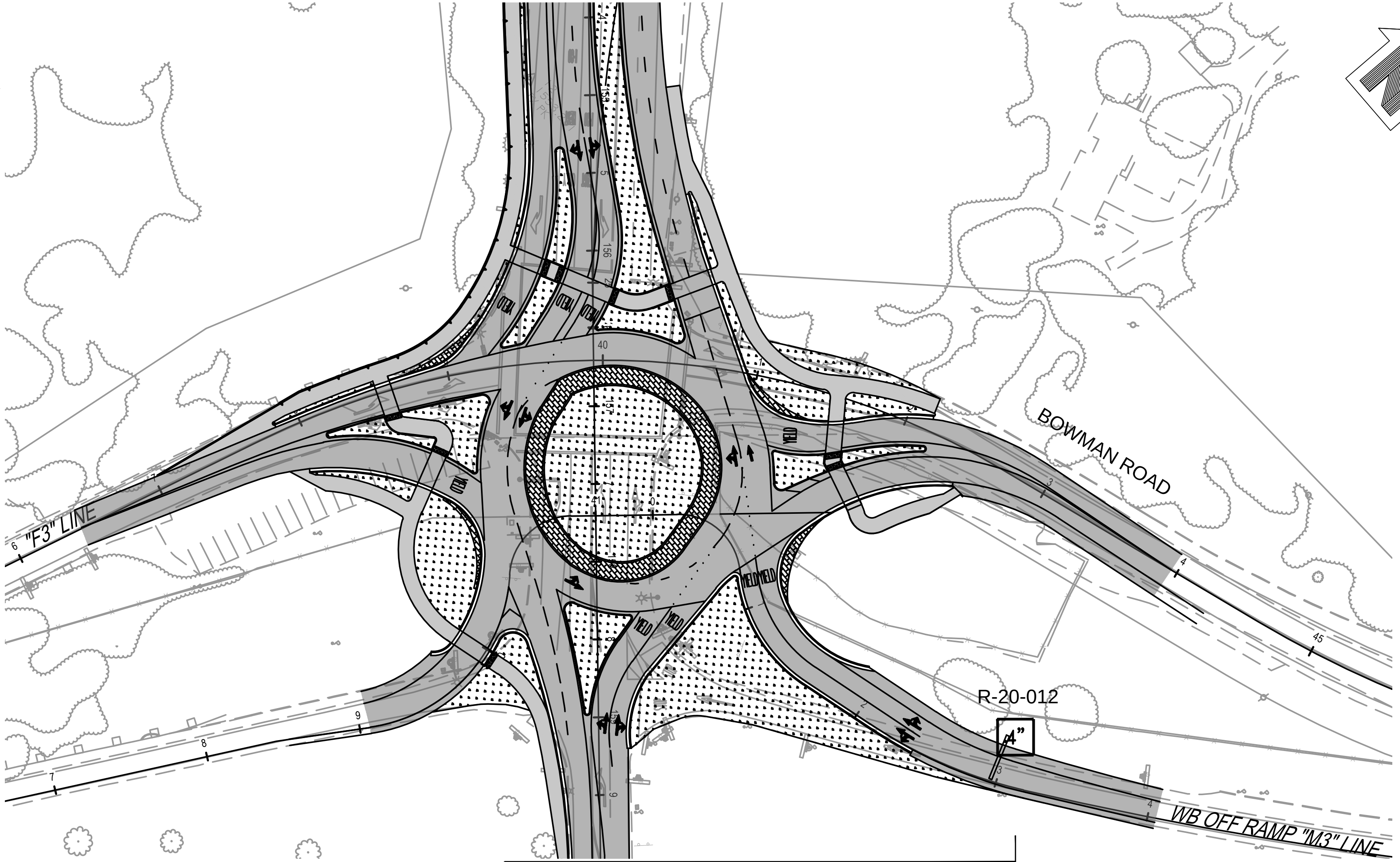
See Caltrans 2018 Standard Plans A10F, A10G for Soil Legend.

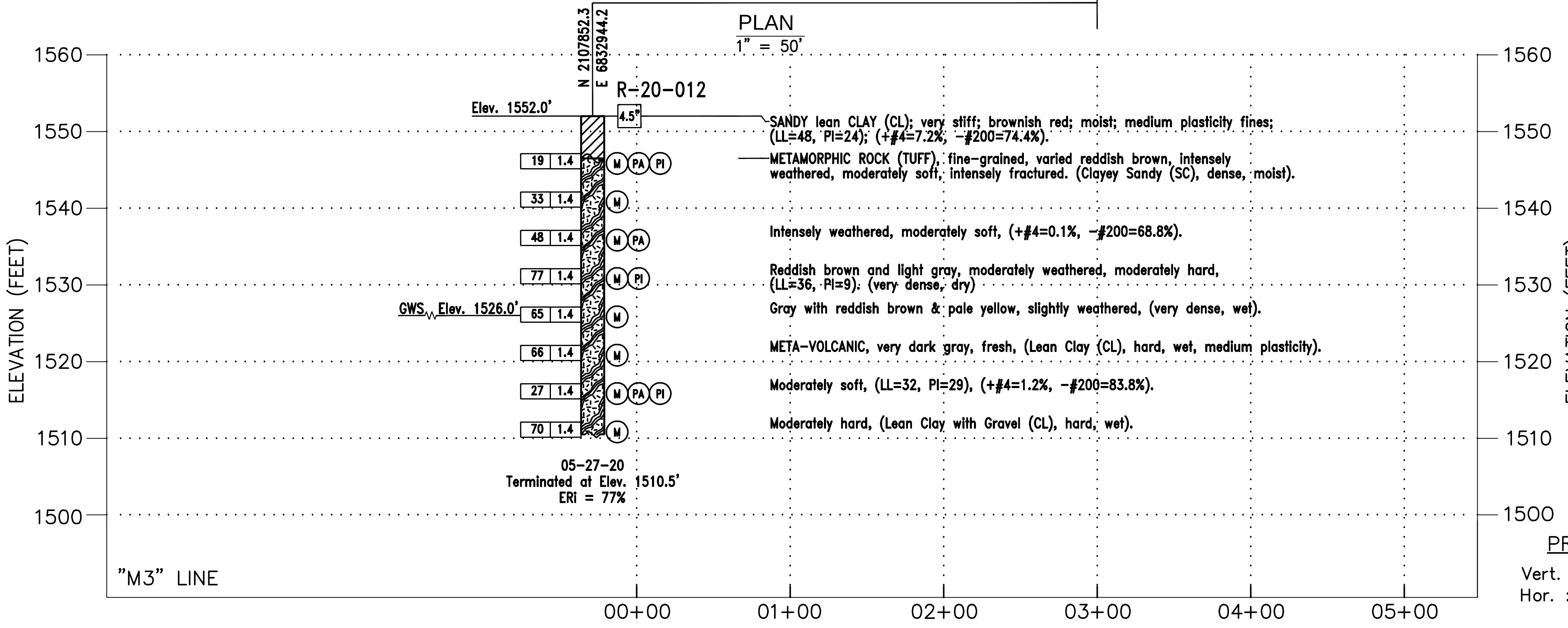
All dimensions are in feet unless otherwise shown

BOREHOLE LOCATION TABLE

Hole ID	Alignment Name	Station and Offset
R-20-012	"M3" Line	03+00 5' Rt.



PLAN
1" = 50'



SANDY lean CLAY (CL); very stiff; brownish red; moist; medium plasticity fines; (LL=48, PI=24); (+#4=7.2%, −#200=74.4%).

METAMORPHIC ROCK (TUFF), fine-grained, varied reddish brown, intensely weathered, moderately soft, intensely fractured. (Clayey Sandy (SC), dense, moist).

Intensely weathered, moderately soft, (+#4=0.1%, −#200=68.8%).

Reddish brown and light gray, moderately weathered, moderately hard, (LL=36, PI=9). (very dense, dry)

Gray with reddish brown & pale yellow, slightly weathered, (very dense, wet).

META-VOLCANIC, very dark gray, fresh, (Lean Clay (CL), hard, wet, medium plasticity).

Moderately soft, (LL=32, PI=29), (+#4=1.2%, −#200=83.8%).

Moderately hard, (Lean Clay with Gravel (CL), hard, wet).

05-27-20
Terminated at Elev. 1510.5'
ERi = 77%

PROFILE
Vert. : 1" = 10'
Hor. : 1" = 50'

DESIGN OVERSIGHT

SIGN OFF DATE

DRAWN BY KIM OUYANG

CHECKED BY KANDEEP SARAVANAPAVAN

KRISHNA A. & VIGRIL S.
FIELD INVESTIGATION BY:
DATE: SEP 2019 & MAY 2020

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

KANDEEP SARAVANAPAVAN
PROJECT ENGINEER

BRIDGE NO.

POST MILES

BELL ROAD MUSSO ROAD INTERCHANGE PROJECT

LOG OF TEST BORINGS 4 OF 4

GS GEOTECHNICAL LOG OF TEST BORINGS SHEET (ENGLISH) (REV. 03/14/12)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 1 2 3

UNIT: X
PROJECT NUMBER & PHASE: X
CONTRACT NO.: X

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES | SHEET | OF

FILE => $REQUEST

USERNAME => $USER
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

APPENDIX B

Borehole	Sample Number	Depth	Classi-fication	Water Content	Dry Density	Liquid Limit	Plastic Limit	Plasticity Index	% > Sieve 4	% < Sieve 200	Unconfined Shear Strength (tsf)
A-19-003	1	6.0	SC	8.9	-	44	24	20	11.1	41.1	
A-19-003	2	11.0	SC	6.9	-				35.7	28.5	
A-19-003	3	16.0	SC	11.5	-	41	23	18	21.9	40.2	
A-19-003	4	21.0	SC	17.3	-				31.8	29.2	
A-19-003	5	26.0	CL	22.0	-						
A-19-003	6	30.5	GC	5.8	-				57.5	13.0	
A-19-003	7	35.0	GC	-	-						
A-19-004	1	6.0	SC	13.0	-				26.5	32.0	
A-19-004	2	11.0	SC	11.5	-				34.0	24.0	
A-19-004	3	16.0	SC	5.8	-						
A-19-004	4	21.0	SC	19.1	-				24.7	35.0	
A-19-004	5	31.0	SC	18.2	-	34	22	12	8.2	46.0	
A-19-004	6	36.0	CL	21.8	-						
A-19-004	7	40.5	SC	14.1	-				42.0	16.4	
A-19-006	1	6.0	SM	23.9	-	42	32	10	3.7	39.8	
A-19-006	2	10.5	SM	13.7	-				18.9	24.5	
A-19-006	3	15.0	SM	14.0	-						
A-19-006	4	20.5	CL	16.5	-						
A-19-006	5	30.0	CL	14.7	-						
A-19-006	6	35.0	GM	12.7	-						
A-19-006	7	40.0	SM	20.3	-						
R-19-001	1	5.0	SM	12.8	-				1.5	26.3	
R-19-001	2	10.0	SM	4.3	-						
R-19-005	1	6.0	SP	6.6	-						
R-19-005	2	11.0	SC	9.3	-						
R-19-005	3	15.0	SC	10.9	-						
R-19-005	C1	20.0	-	-	-						
R-19-005	4	25.5	SC	16.7	-						
R-19-005	5	30.5	SC	19.3	-						
R-19-005	6	35.0	SC	15.3	-						
R-20-012	1	5.5	CL	19.1	-	48	24	24	7.2	74.4	
R-20-012	2	10.5	-	20.1	-						
R-20-012	3	15.5	-	21.3	-				0.1	68.8	
R-20-012	4	20.5	-	17.4	-	36	27	9			
R-20-012	5	25.5	-	20.1	-						
R-20-012	6	30.5	-	13.6	-						
R-20-012	7	35.5	-	24.9	-	32	29	3	1.2	83.8	
R-20-012	8	40.5	-	17.9	-						

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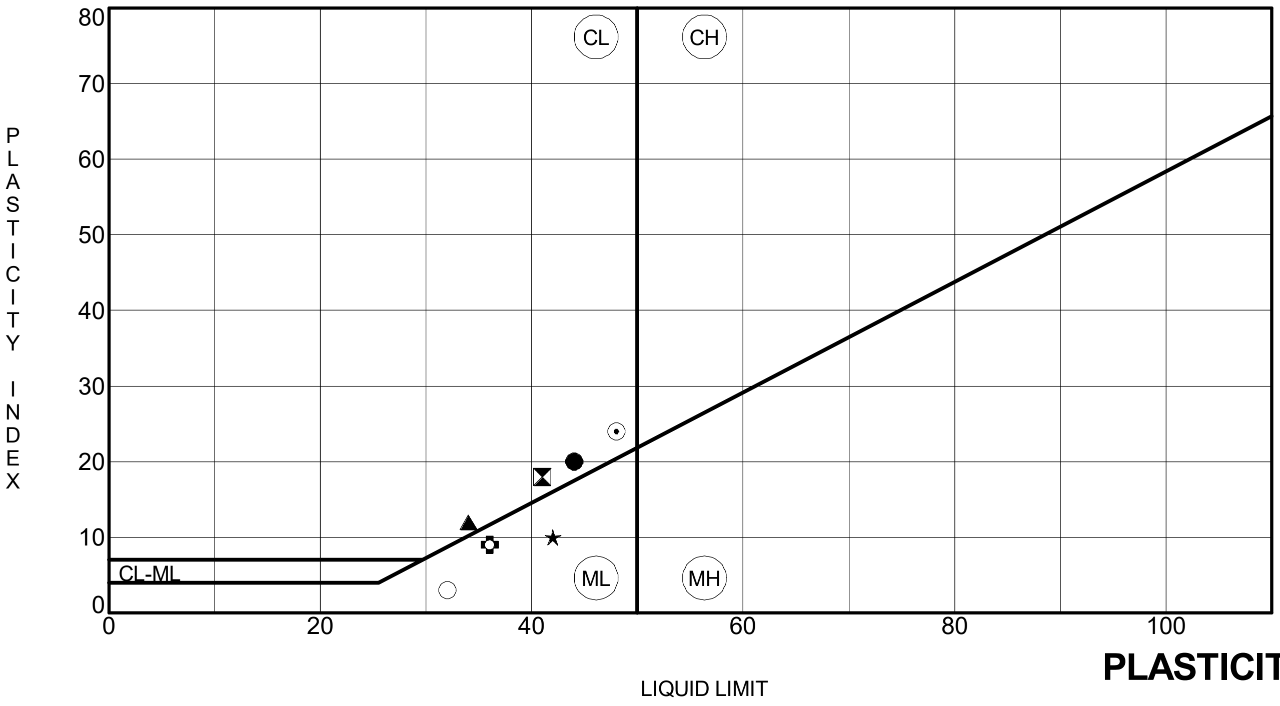
BELL ROAD MUSSO ROAD INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA

JOB NO: 2019-125-GEO

PLATE NO: B-1



PLASTICITY

	BOREHOLE	SAMPLE #	DEPTH	LL	PL	PI	Fines	Classification
●	**A-19-003**	**1**	**6.0**	**44**	**24**	**20**	**41**	**CLAYEY SAND**
⧗	**A-19-003**	**3**	**16.0**	**41**	**23**	**18**	**40**	**CLAYEY SAND with GRAVEL**
▲	**A-19-004**	**5**	**31.0**	**34**	**22**	**12**	**46**	**CLAYEY SAND**
★	**A-19-006**	**1**	**6.0**	**42**	**32**	**10**	**40**	**CLAYEY SAND**
⊙	**R-20-012**	**1**	**5.5**	**48**	**24**	**24**	**74**	**SANDY lean CLAY**
✿	**R-20-012**	**4**	**20.5**	**36**	**27**	**9**		**META MORPHOIC ROCK (TUFF)**
○	**R-20-012**	**7**	**35.5**	**32**	**29**	**3**	**84**	**META MORPHOIC ROCK (TUFF)**

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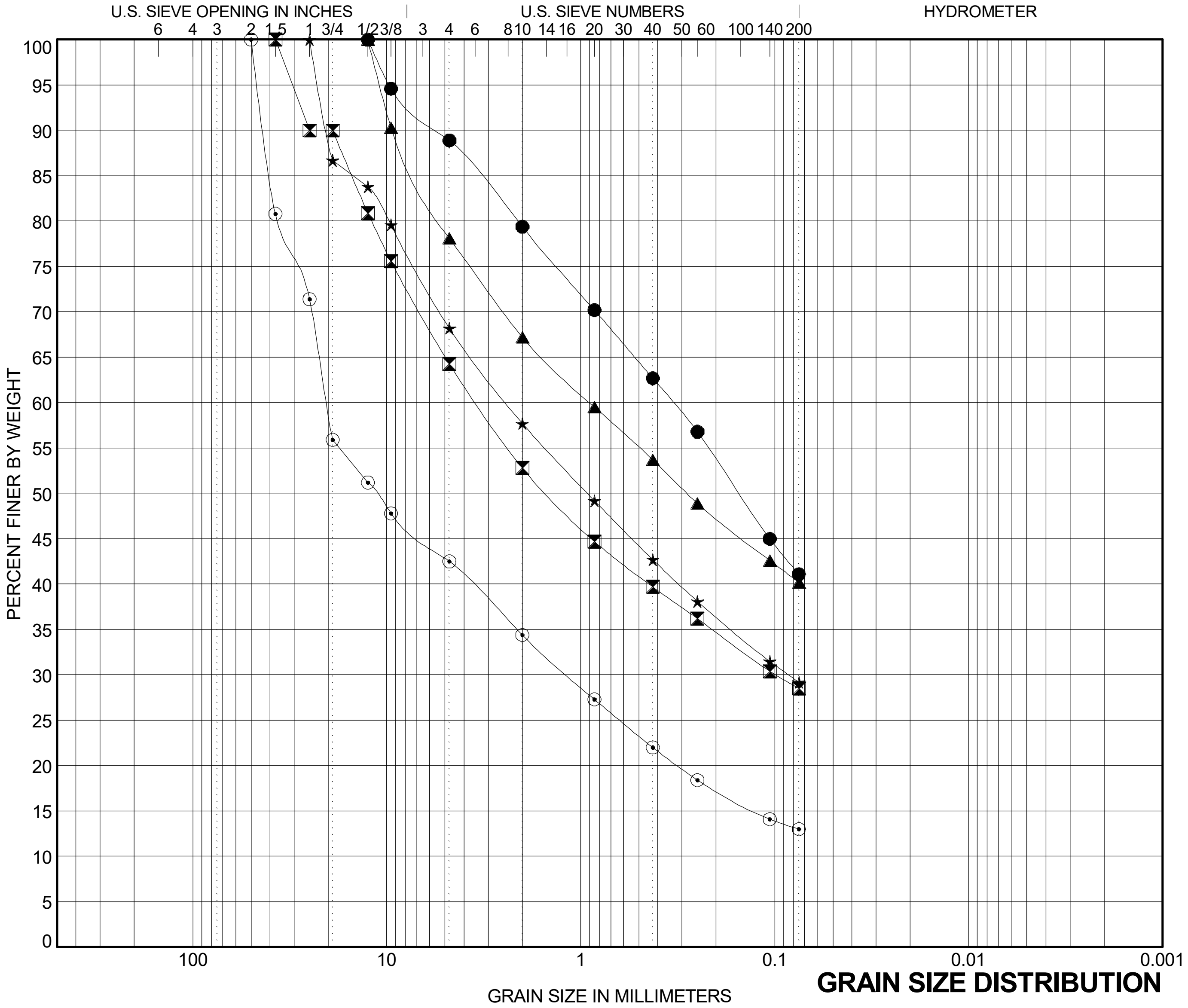
BELL ROAD MUSSO ROAD INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA

JOB NO: 2019-125-GEO

PLATE NO: B-2



GRAIN SIZE DISTRIBUTION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING	SAMPLE #	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **A-19-003**	**1**	**6.0**	**CLAYEY SAND**	**44**	**24**	**20**		
⧗ **A-19-003**	**2**	**11.0**	**CLAYEY SAND with GRAVEL**					
▲ **A-19-003**	**3**	**16.0**	**CLAYEY SAND with GRAVEL**	**41**	**23**	**18**		
★ **A-19-003**	**4**	**21.0**	**CLAYEY SAND with GRAVEL**					
⊙ **A-19-003**	**6**	**30.5**	**CLAYEY SAND with GRAVEL**					

BORING	SAMPLE #	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **A-19-003**	**1**	**6.0**	**12.5**	**0.333**			**11.1**	**47.8**	**41.1**	
⧗ **A-19-003**	**2**	**11.0**	**37.5**	**3.437**	**0.099**		**35.7**	**35.8**	**28.5**	
▲ **A-19-003**	**3**	**16.0**	**12.5**	**0.899**			**21.9**	**37.9**	**40.2**	
★ **A-19-003**	**4**	**21.0**	**25**	**2.417**	**0.085**		**31.8**	**39.0**	**29.2**	
⊙ **A-19-003**	**6**	**30.5**	**50**	**20.431**	**1.177**		**57.5**	**29.5**	**13.0**	

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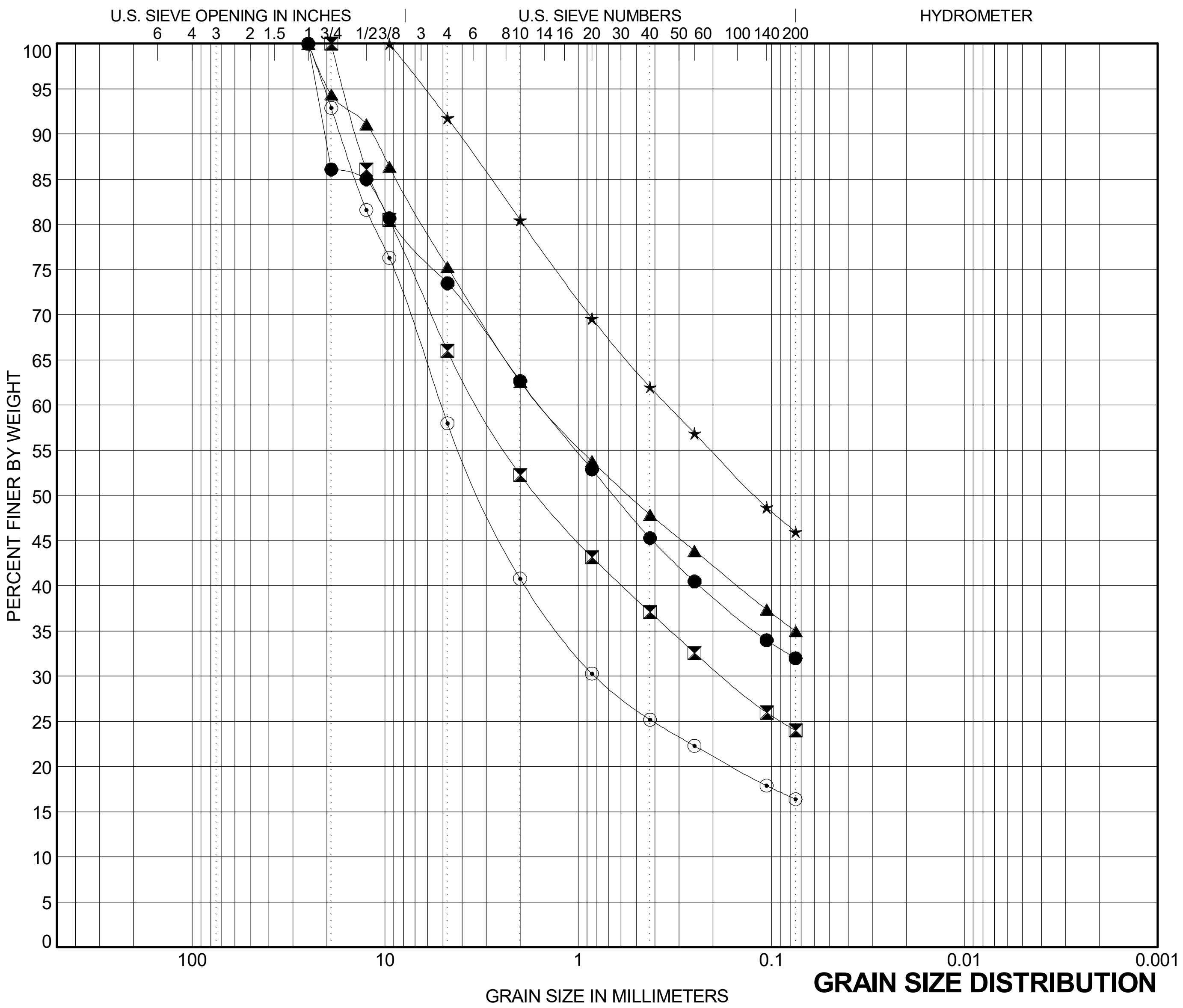
PLACER COUNTY, CALIFORNIA

JOB NO: 2019-125-GEO

PLATE NO: B-3A



GRAIN SIZE DISTRIBUTION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING		SAMPLE #	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**A-19-004**	**1**	**6.0**	**CLAYEY SAND with GRAVEL**					
⧗	**A-19-004**	**2**	**11.0**	**CLAYEY SAND with GRAVEL**					
▲	**A-19-004**	**4**	**21.0**	**CLAYEY SAND with GRAVEL**					
★	**A-19-004**	**5**	**31.0**	**CLAYEY SAND**	**34**	**22**	**12**		
⊙	**A-19-004**	**7**	**40.5**	**CLAYEY SAND with GRAVEL**					

BORING		SAMPLE #	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**A-19-004**	**1**	**6.0**	**25**	**1.58**			**26.5**	**41.5**	**32.0**	
⧗	**A-19-004**	**2**	**11.0**	**19**	**3.252**	**0.178**		**34.0**	**42.0**	**24.0**	
▲	**A-19-004**	**4**	**21.0**	**25**	**1.553**			**24.7**	**40.3**	**35.0**	
★	**A-19-004**	**5**	**31.0**	**9.5**	**0.345**			**8.2**	**45.8**	**46.0**	
⊙	**A-19-004**	**7**	**40.5**	**25**	**5.124**	**0.816**		**42.0**	**41.6**	**16.4**	

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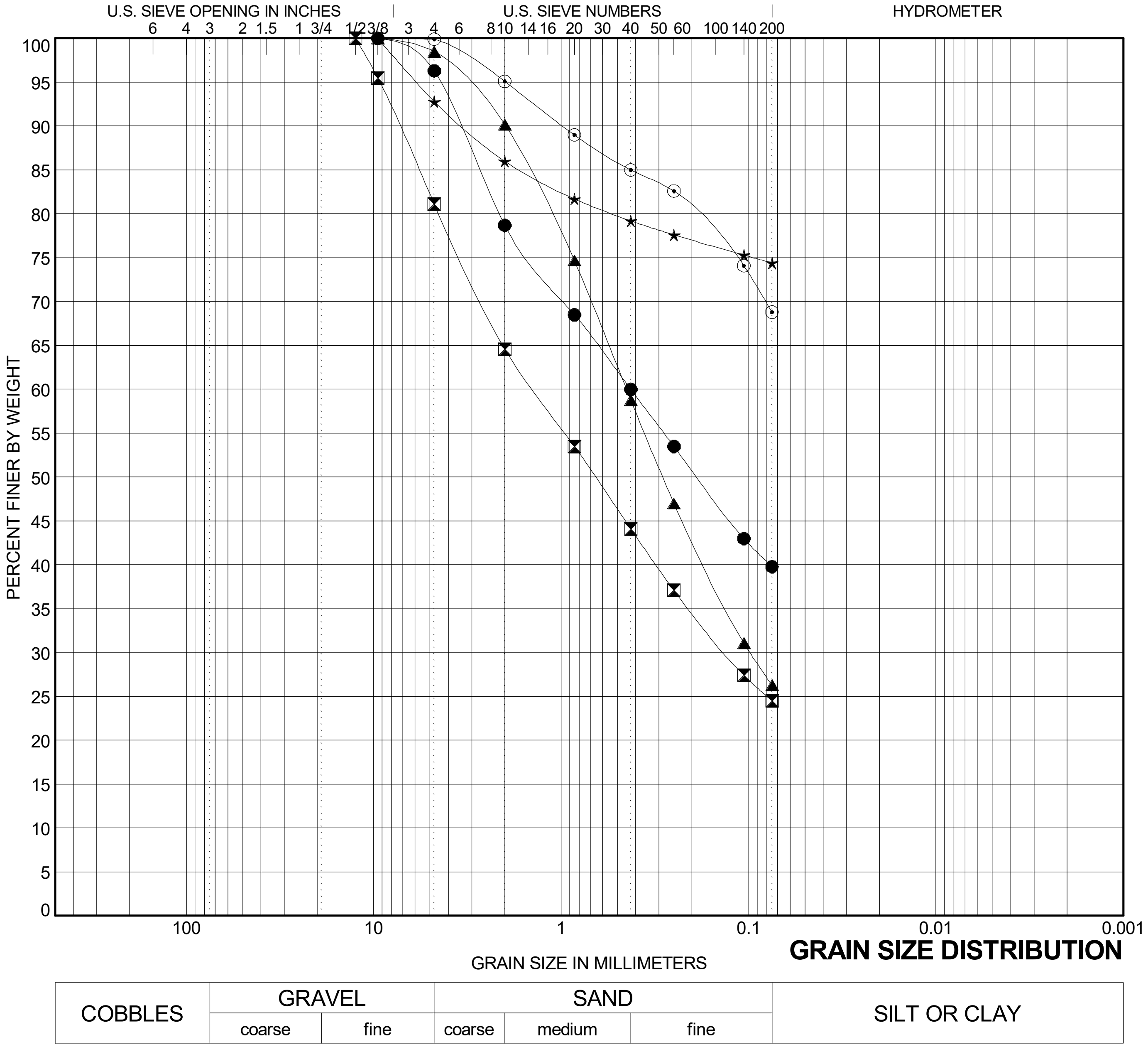
PLACER COUNTY, CALIFORNIA

JOB NO: 2019-125-GEO

PLATE NO: B-3B



GRAIN SIZE DISTRIBUTION

BORING	SAMPLE #	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **A-19-006**	**1**	**6.0**	**CLAYEY SAND**	**42**	**32**	**10**		
⧗ **A-19-006**	**2**	**10.5**	**SILTY SAND with GRAVEL**					
▲ **R-19-001**	**1**	**5.0**	**SILTY SAND**					
★ **R-20-012**	**1**	**5.5**	**SANDY lean CLAY**	**48**	**24**	**24**		
⊙ **R-20-012**	**3**	**15.5**	**META MORPHOIC ROCK (TUFF)**					

BORING	SAMPLE #	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **A-19-006**	**1**	**6.0**	**9.5**	**0.425**			**3.7**	**56.5**	**39.8**	
⧗ **A-19-006**	**2**	**10.5**	**12.5**	**1.403**	**0.133**		**18.9**	**56.6**	**24.5**	
▲ **R-19-001**	**1**	**5.0**	**9.5**	**0.448**	**0.098**		**1.5**	**72.2**	**26.3**	
★ **R-20-012**	**1**	**5.5**	**9.5**				**7.2**	**18.4**	**74.4**	
⊙ **R-20-012**	**3**	**15.5**	**9.5**				**0.1**	**31.1**	**68.8**	

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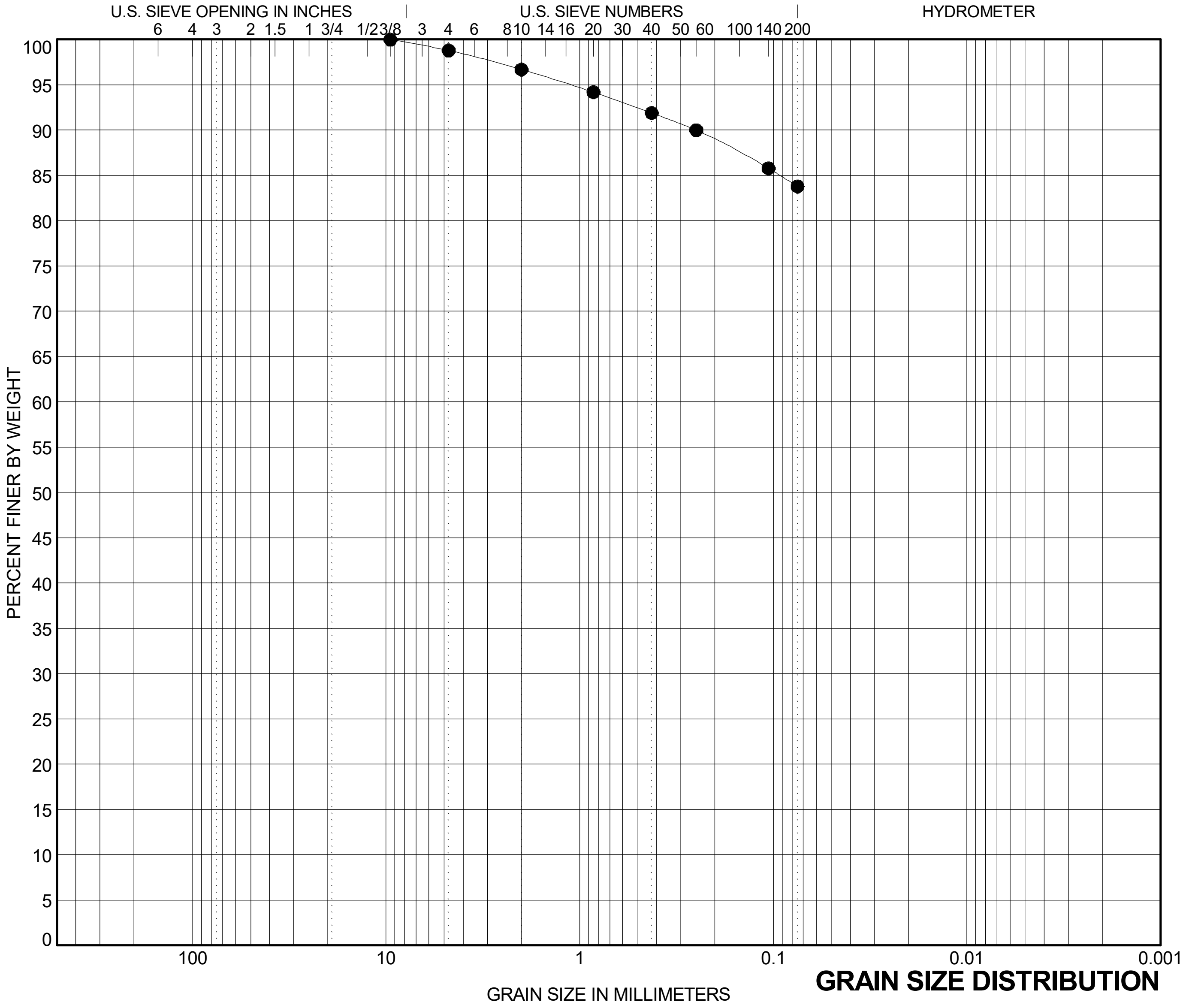
PLACER COUNTY, CALIFORNIA

JOB NO: 2019-125-GEO

PLATE NO: B-3C



GRAIN SIZE DISTRIBUTION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING	SAMPLE #	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**R-20-012**	**7**	**35.5**	**META MORPHOIC ROCK (TUFF)**	**32**	**29**	**3**		

	BORING	SAMPLE #	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**R-20-012**	**7**	**35.5**	**9.5**				**1.2**	**15.0**	**83.8**	

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BELL ROAD MUSSO ROAD INTERCHANGE PROJECT
PLACER COUNTY, CALIFORNIA

JOB NO: 2019-125-GEO

PLATE NO: B-3D

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/13/2019
Date Submitted 11/08/2019

To: Nasir Ahmad
Parikh Consultants, Inc.
2360 Qume Dr. Suite A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2019-125-GEO Site ID : A19-001 1@5FT.
Thank you for your business.

* For future reference to this analysis please use SUN # 80930-169064.

EVALUATION FOR SOIL CORROSION

Soil pH	6.31	
Minimum Resistivity	5.63 ohm-cm (x1000)	
Chloride	4.0 ppm	00.00040 %
Sulfate	10.0 ppm	00.00100 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

PLATE NO.: B-4A

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 12/06/2019
Date Submitted 12/02/2019

To: Nasir Ahmad
Parikh Consultants, Inc.
2360 Qume Dr. Suite A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2019-125-GEO Site ID : A-19-003 4@20FT.
Thank you for your business.

* For future reference to this analysis please use SUN # 81050-169280.

EVALUATION FOR SOIL CORROSION

Soil pH	5.01	
Minimum Resistivity	5.09 ohm-cm (x1000)	
Chloride	8.1 ppm	00.00081 %
Sulfate	1.8 ppm	00.00018 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

PLATE NO.: B-4B

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/13/2019
Date Submitted 11/08/2019

To: Nasir Ahmad
Parikh Consultants, Inc.
2360 Qume Dr. Suite A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager \

The reported analysis was requested for the following location:
Location : 2019-125-GEO Site ID : A19-004 2@10FT.
Thank you for your business.

* For future reference to this analysis please use SUN # 80930-169066.

EVALUATION FOR SOIL CORROSION

Soil pH	6.67		
Minimum Resistivity	1.47	ohm-cm (x1000)	
Chloride	3.0 ppm	00.00030	%
Sulfate	66.0 ppm	00.00660	%

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

PLATE NO.: B-4C

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/13/2019
Date Submitted 11/08/2019

To: Nasir Ahmad
Parikh Consultants, Inc.
2360 Qume Dr. Suite A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2019-125-GEO Site ID : A19-006 2@10FT.
Thank you for your business.

* For future reference to this analysis please use SUN # 80930-169065.

EVALUATION FOR SOIL CORROSION

Soil pH	6.09	
Minimum Resistivity	5.90 ohm-cm (x1000)	
Chloride	2.4 ppm	00.00024 %
Sulfate	2.8 ppm	00.00028 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

PLATE NO.: B-4D

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 07/01/2020
Date Submitted 06/25/2020

To: Nasir Ahmad
Parikh Consultants, Inc.
1497 N.Milpitas Blvd.
Milpitas, CA 95035

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2019-125-GEO Site ID : A-20-012 2@10FT.
Thank you for your business.

* For future reference to this analysis please use SUN # 82448-172245.

EVALUATION FOR SOIL CORROSION

Soil pH	3.75	
Minimum Resistivity	12.06 ohm-cm (x1000)	
Chloride	8.8 ppm	00.00088 %
Sulfate	0.2 ppm	00.00002 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

PLATE NO.: B-4E

R-VALUE REPORT

Parikh Consultants, Inc. **ASTM D2844 or CTM 301** (408) 452-9000

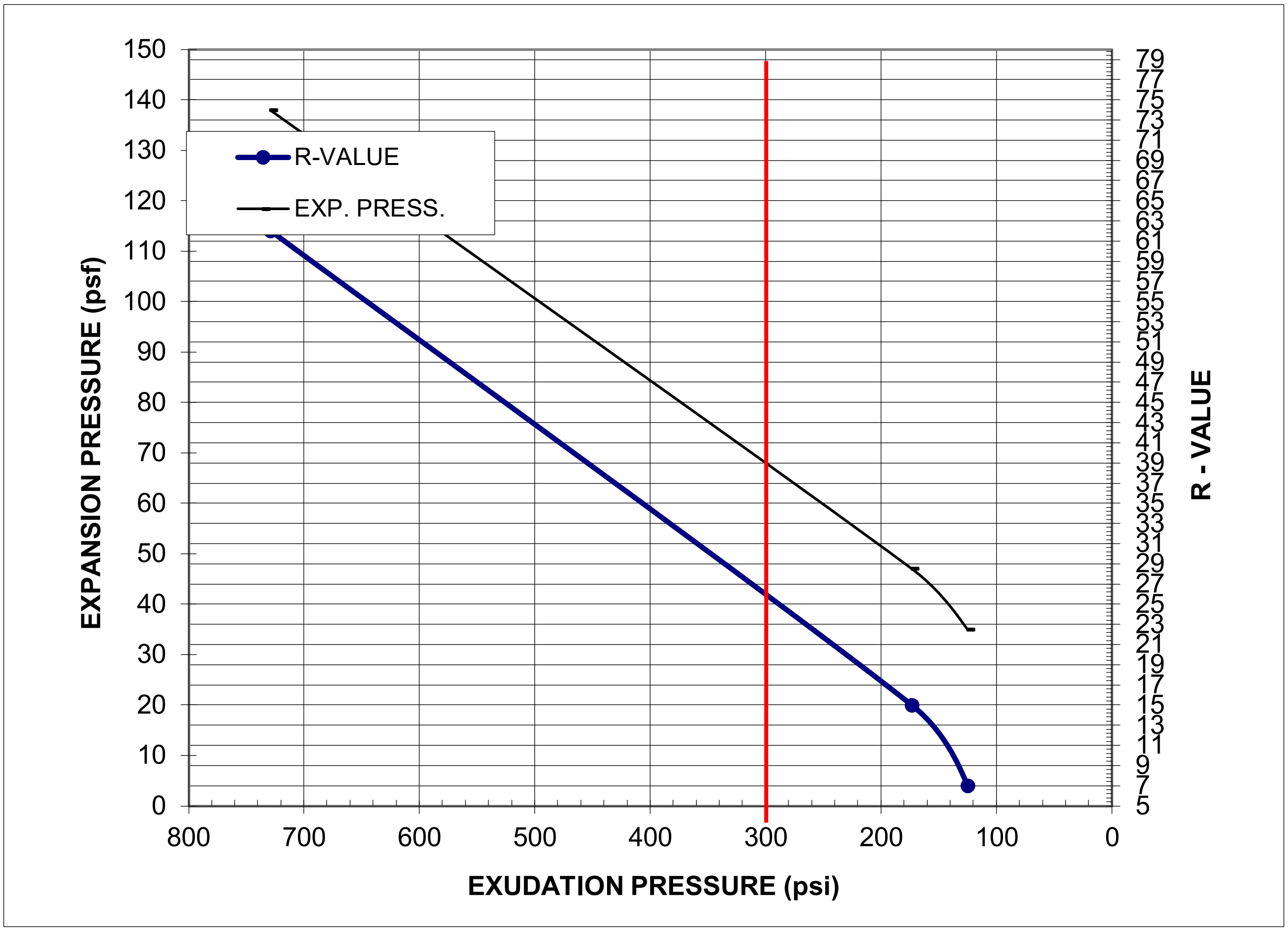
Project Name: Bell Road Musso Road Interchange Date: 10/30/19

Client: GHD Project #: 2019-125-GEO

Sample #: A-19-001 Depth: 0-5 ft Lab #:

Sample Date:

Material : Silty Sand with gravel Sampled By:



Specimen No.	A	B	C
Exudation Pressure, psi	125	173	729
Expansion Pressure, psf	35	47	138
R-Value	7	15	62
Moisture Content at Test, %	14.2	13.2	9.9
Dry Density at Test, pcf	122.4	128.5	128.6

R-Value @ 300 psi Exudation Pressure = 26

Expansion Pressure @300 psi Exudation, psf = **68**

Minimum R-Value Requirement:

Comments:

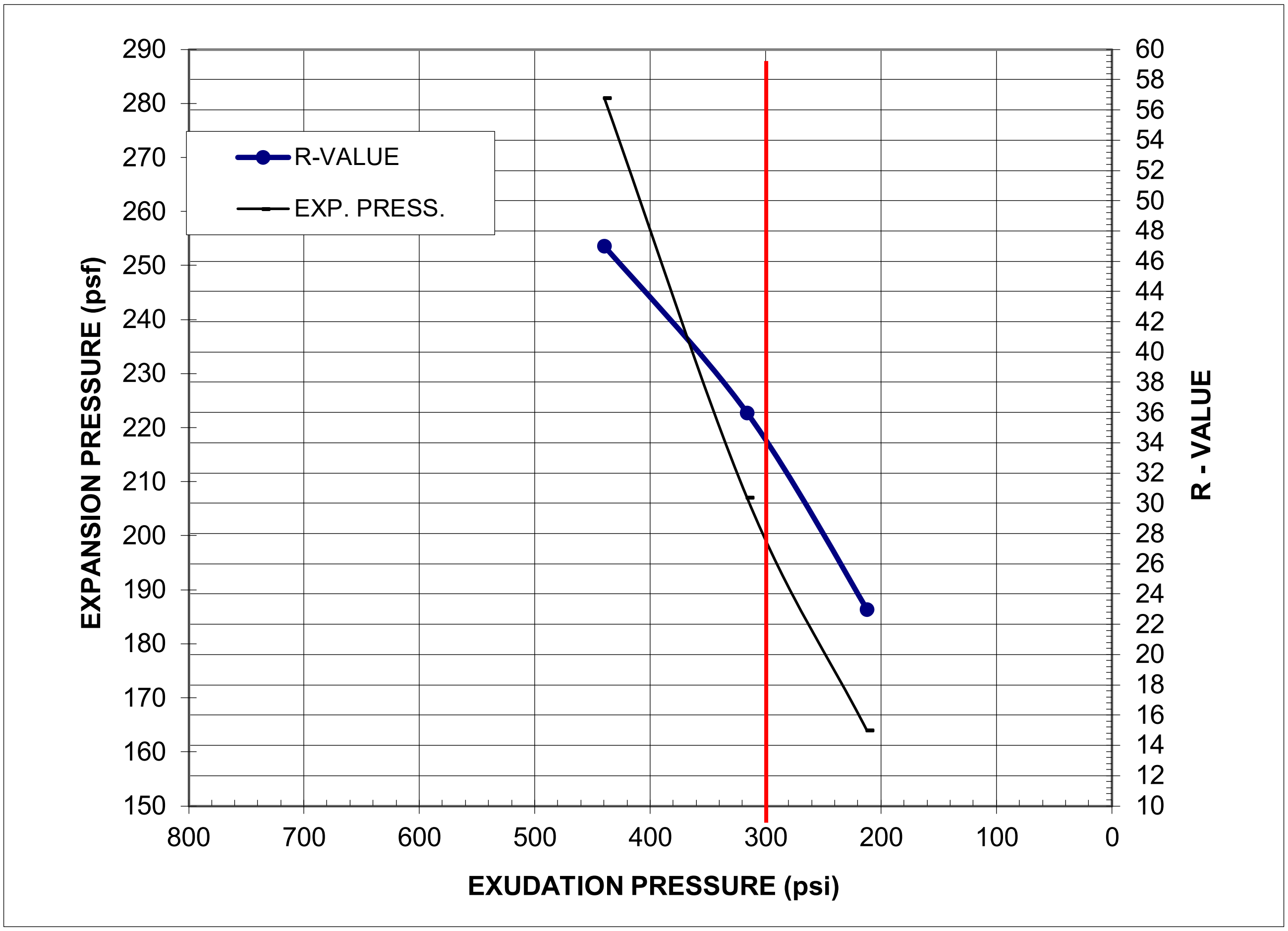
Reported By : Nasir Ahmad

Plate No: B-5A

R-VALUE REPORT

Parikh Consultants, Inc. **ASTM D2844 or CTM 301** (408) 452-9000

Project Name:	Bell Road Musso Road Interchange	Date:	10/21/19
Client:	GHD	Project #:	2019-125-GEO
Sample #:	A-19-003 Depth: 0-5 ft	Lab #:	
		Sample Date:	
Material :	Clayey Sand with Gravel	Sampled By:	



Specimen No.	A	B	C
Exudation Pressure, psi	212	316	440
Expansion Pressure, psf	164	207	281
R-Value	23	36	47
Moisture Content at Test, %	11.0	10.1	9.2
Dry Density at Test, pcf	123.4	126.4	128.3

R-Value @ 300 psi Exudation Pressure = 34

Expansion Pressure @300 psi Exudation, psf = **200**

Minimum R-Value Requirement:

Comments:

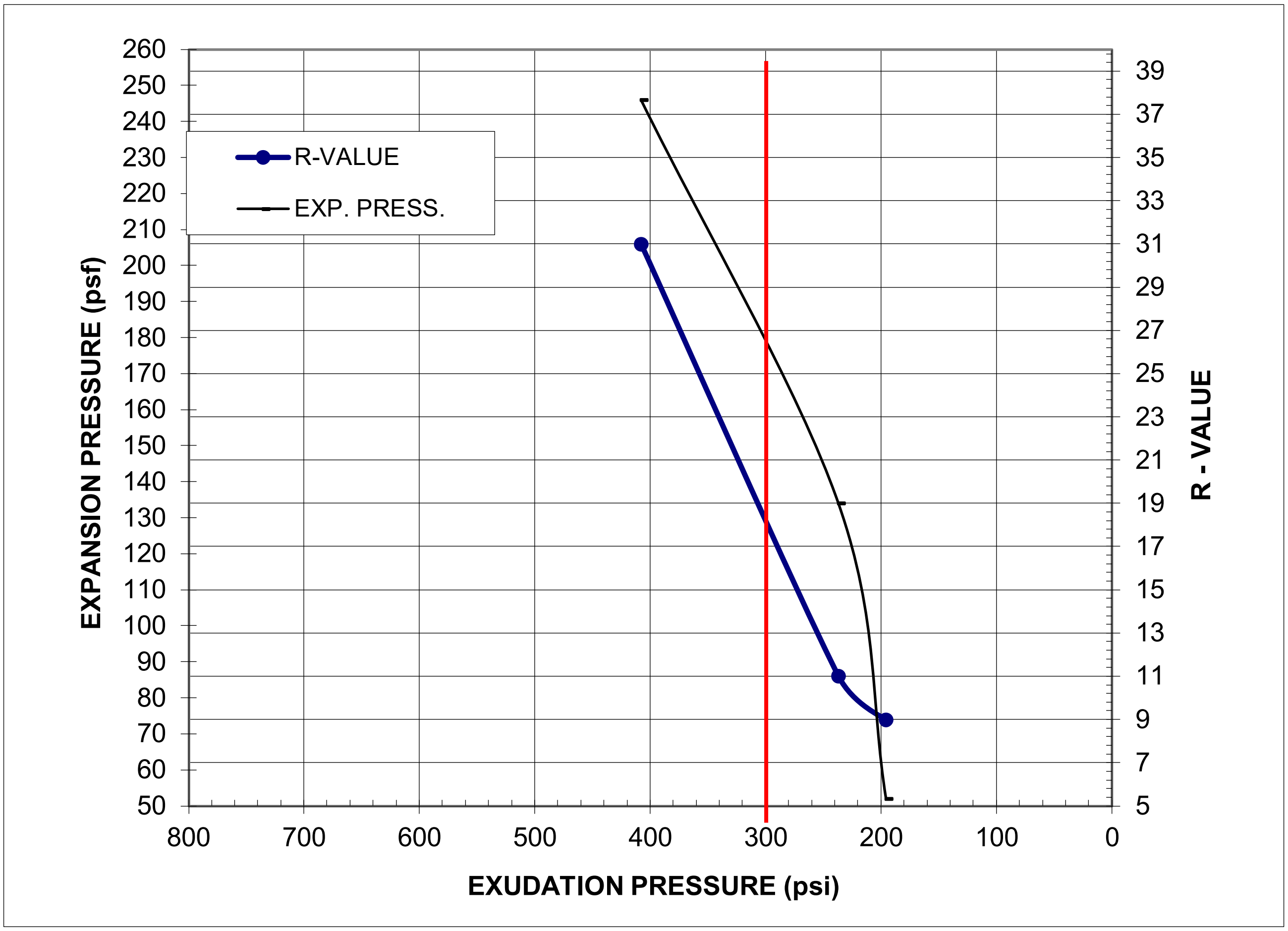
Reported By : Nasir Ahmad

Plate No: B-5B

R-VALUE REPORT

Parikh Consultants, Inc. **ASTM D2844 or CTM 301** (408) 452-9000

Project Name:	Bell Road Musso Road Interchange	Date:	10/21/19
Client:	GHD	Project #:	2019-125-GEO
Sample #:	A-19-004 Depth: 0-5 ft	Lab #:	
		Sample Date:	
Material :	Clayey Sand	Sampled By:	



Specimen No.	A	B	C
Exudation Pressure, psi	196	237	408
Expansion Pressure, psf	52	134	246
R-Value	9	11	31
Moisture Content at Test, %	16.3	15.3	14.4
Dry Density at Test, pcf	113.8	117.6	120.8

R-Value @ 300 psi Exudation Pressure = 18

Expansion Pressure @300 psi Exudation, psf = **180**

Minimum R-Value Requirement:

Comments:

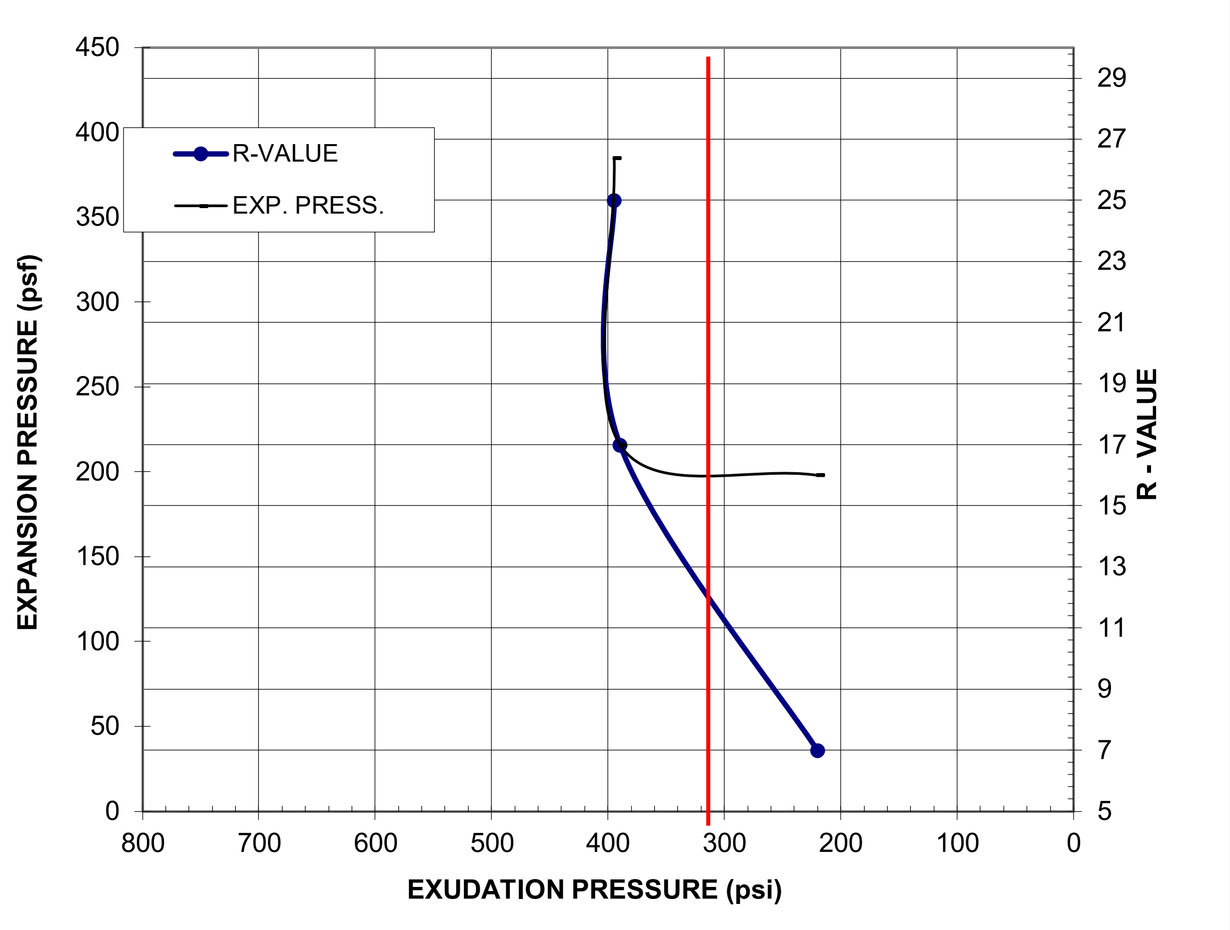
Reported By : Nasir Ahmad

Plate No: B-5C

R-VALUE REPORT

Parikh Consultants, Inc. **ASTM D2844 or CTM 301** (408) 452-9000

Project Name:	Bell Road Musso Road Interchange	Date:	10/30/19
Client:	GHD	Project #:	2019-125-GEO
Sample #:	A-19-006 Depth: 0-5 ft	Lab #:	
		Sample Date:	
Material :	Sandy lean Clay and clayey sand	Sampled By:	



Specimen No.	A	B	C
Exudation Pressure, psi	220	390	395
Expansion Pressure, psf	198	216	385
R-Value	7	17	25
Moisture Content at Test, %	26.0	22.9	21.8
Dry Density at Test, pcf	98.7	105.6	105.6

R-Value @ 300 psi Exudation Pressure = 11

Expansion Pressure @300 psi Exudation, psf = **200**

Minimum R-Value Requirement:

Comments:

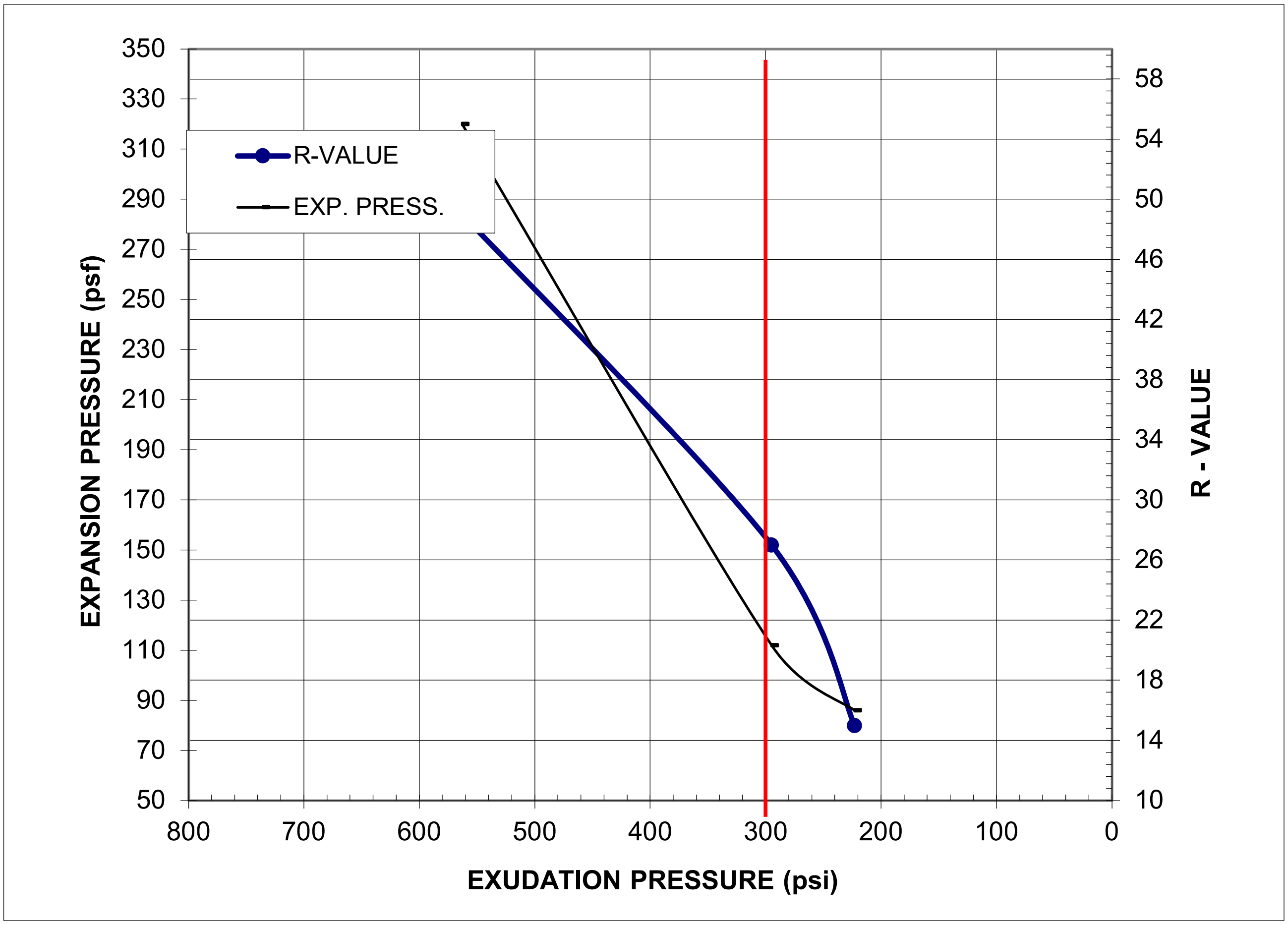
Reported By : Nasir Ahmad

Plate No: B-5D

R-VALUE REPORT

Parikh Consultants, Inc. **ASTM D2844 or CTM 301** (408) 452-9000

Project Name:	Bell Road Musso Road Interchange	Date:	10/31/19
Client:	GHD	Project #:	2019-125-GEO
Sample #:	A-19-009 Depth: 0-5 ft	Lab #:	
		Sample Date:	
Material :	Silty Sand with clay	Sampled By:	



Specimen No.	A	B	C
Exudation Pressure, psi	222.99	295	563
Expansion Pressure, psf	86	112	320
R-Value	15	27	49
Moisture Content at Test, %	18.2	17.3	15.4
Dry Density at Test, pcf	111.6	114.7	117.3

R-Value @ 300 psi Exudation Pressure = 21

Expansion Pressure @300 psi Exudation, psf = **110**

Minimum R-Value Requirement:

Comments:

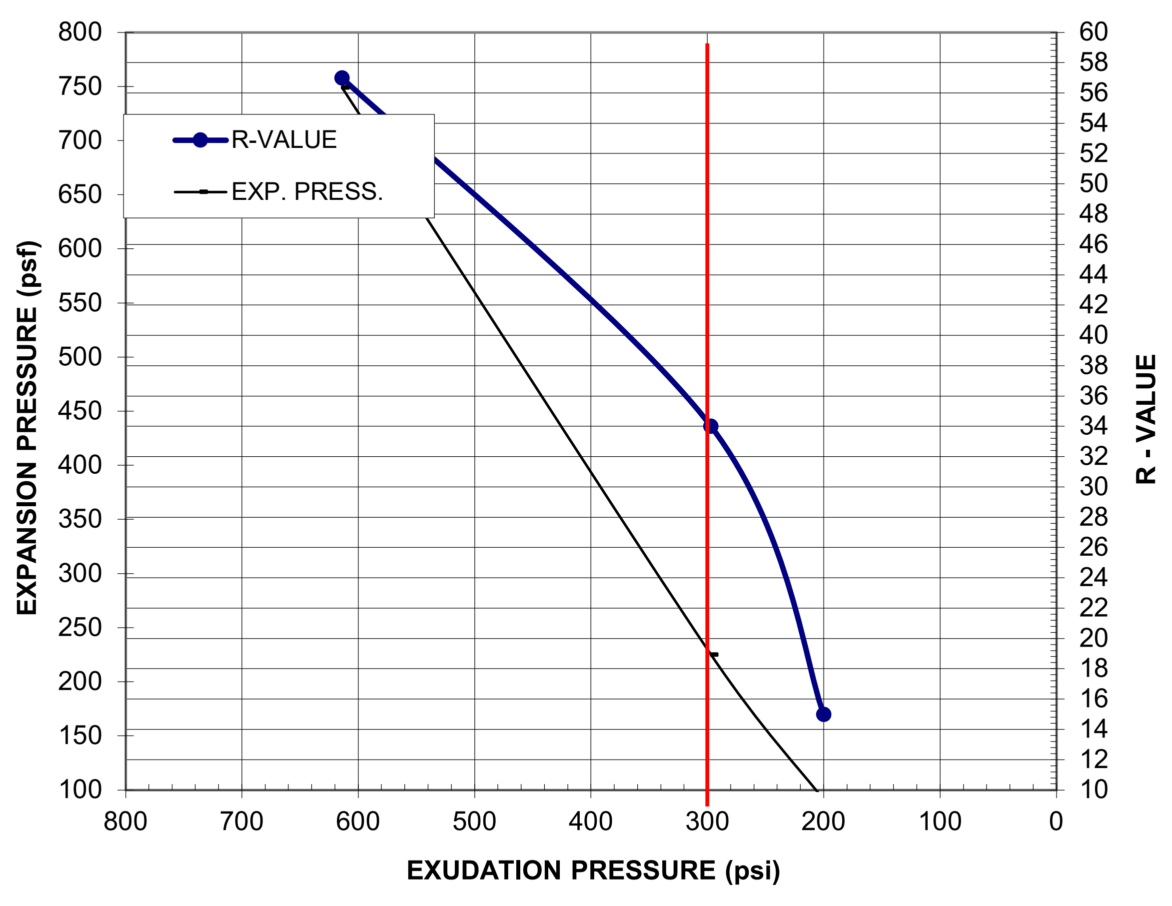
Reported By : Nasir Ahmad

Plate No: B-5E

R-VALUE REPORT

Parikh Consultants, Inc. **ASTM D2844 or CTM 301** (408) 452-9000

Project Name:	Bell Road Musso Road Interchange	Date:	10/31/19
Client:	GHD	Project #:	2019-125-GEO
Sample #:	A-19-010 Depth: 0-5 ft	Lab #:	
		Sample Date:	
Material :	Silty Sand	Sampled By:	



Specimen No.	A	B	C
Exudation Pressure, psi	200	297	614
Expansion Pressure, psf	91	225	749
R-Value	15	34	57
Moisture Content at Test, %	17.6	16.1	14.6
Dry Density at Test, pcf	115.0	116.7	119.8

R-Value @ 300 psi Exudation Pressure = 34

Expansion Pressure @300 psi Exudation, psf = **240**

Minimum R-Value Requirement:

Comments:

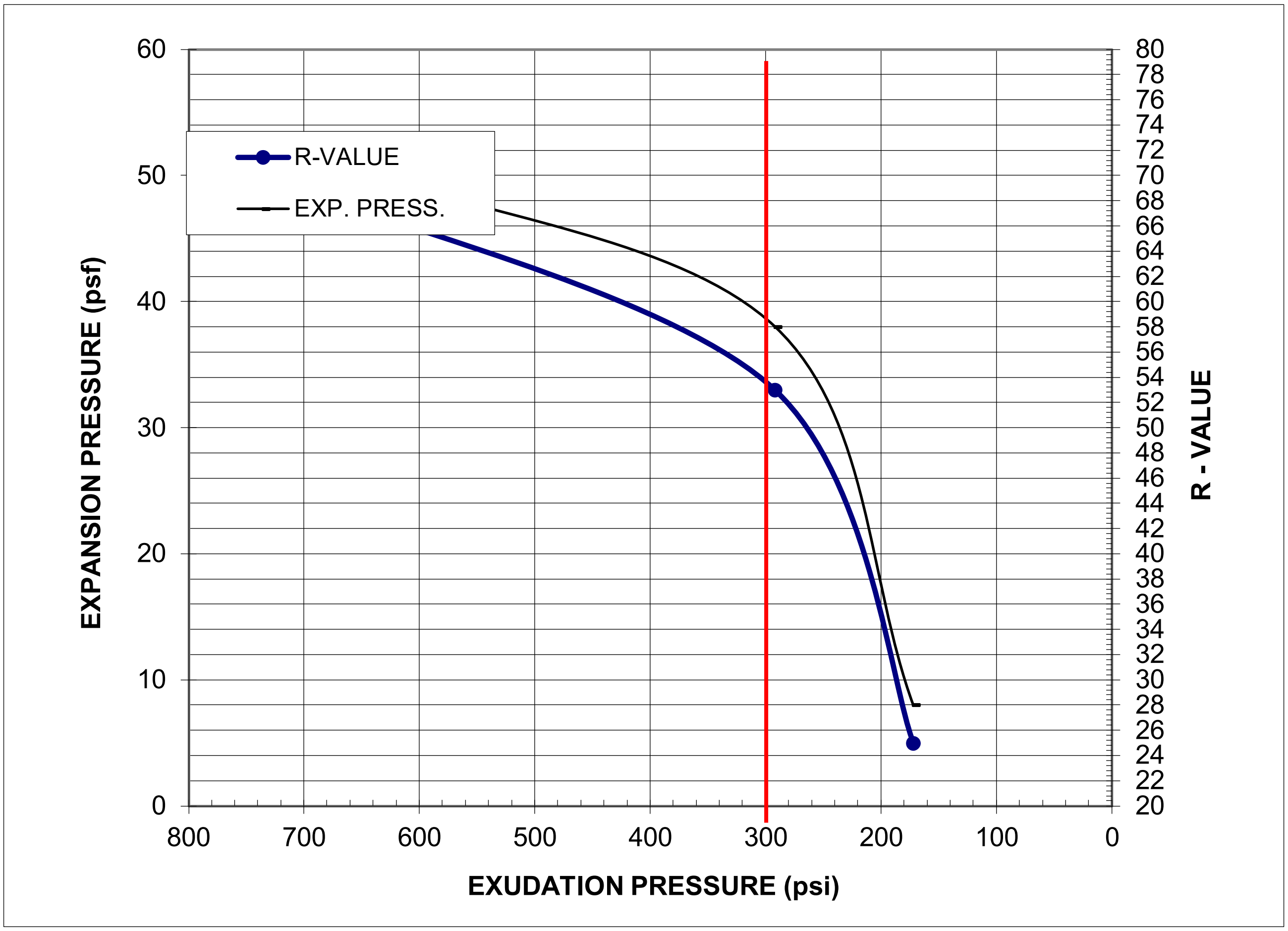
Reported By : Nasir Ahmad

Plate No: B-5F

R-VALUE REPORT

Parikh Consultants, Inc. **ASTM D2844 or CTM 301** (408) 452-9000

Project Name:	Bell Road Musso Road Interchange	Date:	10/22/19
Client:	GHD	Project #:	2019-125-GEO
Sample #:	A-19-011 Depth: 0-5 ft	Lab #:	
		Sample Date:	
Material :	Silty Sand with Gravel	Sampled By:	



Specimen No.	A	B	C
Exudation Pressure, psi	172	292	671
Expansion Pressure, psf	8	38	51
R-Value	25	53	68
Moisture Content at Test, %	15.8	14.9	13.1
Dry Density at Test, pcf	117.8	119.4	119.7

R-Value @ 300 psi Exudation Pressure = 53

Expansion Pressure @300 psi Exudation, psf = **38**

Minimum R-Value Requirement:

Comments:

Reported By : Nasir Ahmad

Plate No: B-5G

APPENDIX C

PAVEMENT DESIGN

PER HIGHWAY DESIGN MANUAL, CHAP. 600

PROJECT NAME: *Bell Road Interchange Project*
PROJECT NO.: *2019-125-GDR*
STRUCTURE.: *Bell Road at Bowman Road*

Design Case: AC over AB (20-Yr Design Life)

Design TI= ***12.5***
R_{BS}= ***15***
R_{AB}= 78

$GE_{AC+AB} = 0.0032*TI*(100-R_{BS}) =$ 3.40

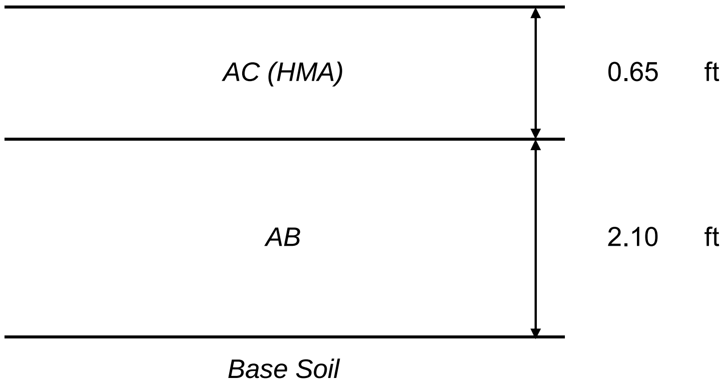
$GE_{AC} = 0.0032*TI*(100-R_{AB}) =$ 0.88
=> GE'_{AC} = 1.08 (add 0.2 ft safety factor)
AC Thickness = 0.63 ft

=> AC Thickness = **0.65** ft (round up to the nearest 0.05 ft)
$G_{f,\ AC}$ = 1.72
GE_{AC} = 1.11

$GE_{AB} = GE_{AC+AB} - GE_{AC} =$ 2.29
AB thickness= 2.08 ft

=> AB Thickness= **2.10** ft (round up to the nearest 0.05 ft)
GE_{AB}= 2.31 $G_{f,\ AB}$=1.1

Design Section:



PAVEMENT DESIGN

PER HIGHWAY DESIGN MANUAL, CHAP. 600

PROJECT NAME: *Bell Road Interchange Project*
PROJECT NO.: *2019-125-GDR*
STRUCTURE.: *Bell Road at Musso Road*

Design Case: AC over AB (20-Yr Design Life)

Design TI= ***11.5***
R_{BS}= ***15***
R_{AB}= 78

$GE_{AC+AB} = 0.0032*TI*(100-R_{BS}) =$ 3.13

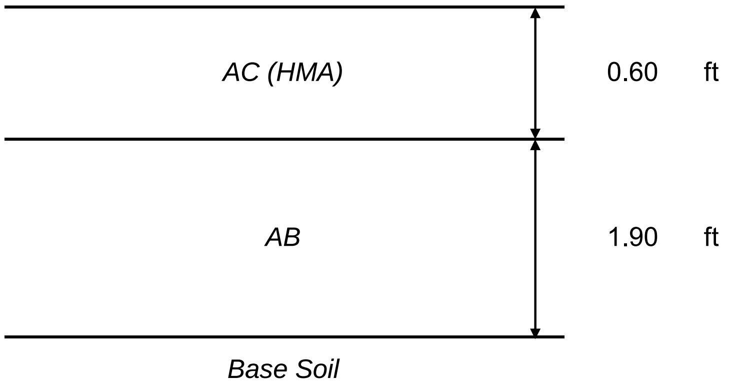
$GE_{AC} = 0.0032*TI*(100-R_{AB}) =$ 0.81
=> GE'_{AC} = 1.01 (add 0.2 ft safety factor)
AC Thickness = 0.58 ft

=> AC Thickness = **0.60** ft (round up to the nearest 0.05 ft)
$G_{f, AC}$ = 1.74
GE_{AC} = 1.04

$GE_{AB} = GE_{AC+AB} - GE_{AC} =$ 2.08
AB thickness= 1.89 ft

=> AB Thickness= **1.90** ft (round up to the nearest 0.05 ft)
GE_{AB}= 2.09 $G_{f, AB}$=1.1

Design Section:



PAVEMENT DESIGN

PER HIGHWAY DESIGN MANUAL, CHAP. 600

PROJECT NAME: *Bell Road Interchange Project*
PROJECT NO.: *2019-125-GDR*
STRUCTURE.: *I-80 On & Off-Ramps at Bell Road*

Design Case: AC over AB (20-Yr Design Life)

Design TI= ***11.5***
R_{BS}= ***15***
R_{AB}= 78

$GE_{AC+AB} = 0.0032*TI*(100-R_{BS}) =$ 3.13

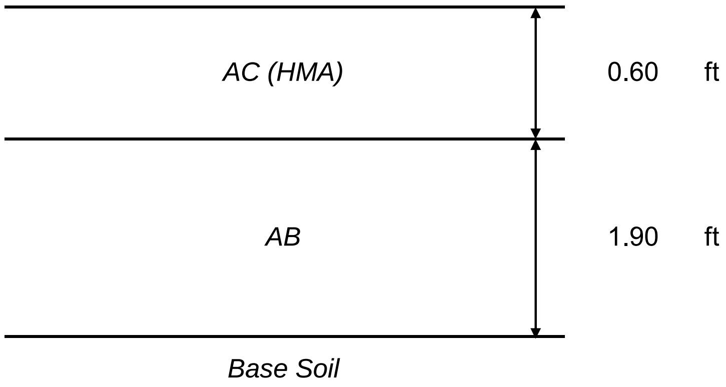
$GE_{AC} = 0.0032*TI*(100-R_{AB}) =$ 0.81
=> GE'_{AC} = 1.01 (add 0.2 ft safety factor)
AC Thickness = 0.58 ft

=> AC Thickness = **0.60** ft (round up to the nearest 0.05 ft)
$G_{f,\ AC}$ = 1.74
GE_{AC} = 1.04

$GE_{AB} = GE_{AC+AB} - GE_{AC} =$ 2.08
AB thickness= 1.89 ft

=> AB Thickness= **1.90** ft (round up to the nearest 0.05 ft)
GE_{AB}= 2.09 $G_{f,\ AB}$=1.1

Design Section:



PAVEMENT DESIGN

PER HIGHWAY DESIGN MANUAL, CHAP. 600

PROJECT NAME:	*Bell Road Interchange Project*
PROJECT NO.:	*2019-125-GDR*
STRUCTURE.:	*Bell Road at Bowman Road*

Design Case: Full depth AC (40-Yr Design Life)

Design TI= ***13.5***

R_{BS}= ***15***

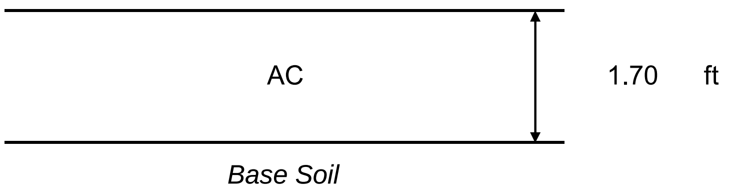
$GE_{AC} = 0.0032*TI*(100-R_{BS}) =$ 3.67

=> GE'_{AC}= 3.77 (add 0.1 ft safety factor)

=> AC Thickness= 1.67

=> AC Thickness= **1.70** ft (round up to the nearest 0.05 ft)

Design Section:



0.5’ AB and Subgrade Enhancement Geotextile (SEGT) is added to above section according to HDM for 40-Yr Life Design

PAVEMENT DESIGN

PER HIGHWAY DESIGN MANUAL, CHAP. 600

PROJECT NAME: *Bell Road Interchange Project*
PROJECT NO.: *2019-125-GDR*
STRUCTURE.: *Bell Road at Musso Road*

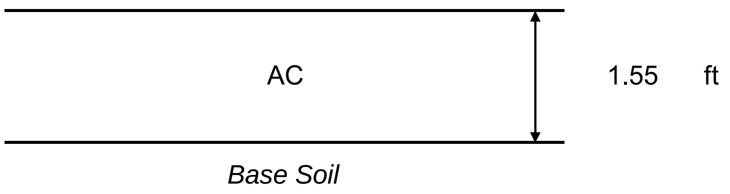
Design Case: Full depth AC (40-Yr Design Life)

Design TI= ***12.5***
R_{BS}= ***15***

$GE_{AC} = 0.0032*TI*(100-R_{BS}) =$ 3.40
=> GE'_{AC}= 3.50 (add 0.1 ft safety factor)
=> AC Thickness= 1.53

=> AC Thickness= **1.55** ft (round up to the nearest 0.05 ft)

Design Section:



0.5’ AB and Subgrade Enhancement Geotextile (SEGT) is added to above section according to HDM for 40-Yr Life Design

PAVEMENT DESIGN

PER HIGHWAY DESIGN MANUAL, CHAP. 600

PROJECT NAME:	*Bell Road Interchange Project*
PROJECT NO.:	*2019-125-GDR*
STRUCTURE.:	*I-80 On & Off-Ramps at Bell Road*

Design Case: Full depth AC (40-Yr Design Life)

Design TI= ***12.5***

R_{BS}= ***15***

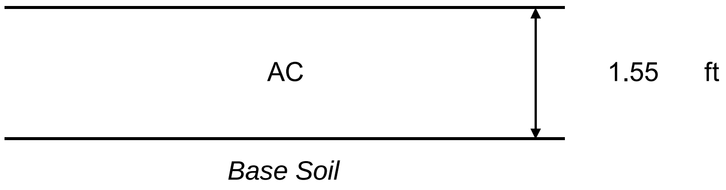
$GE_{AC} = 0.0032*TI*(100-R_{BS}) =$ 3.40

=> GE'_{AC}= 3.50 (add 0.1 ft safety factor)

=> AC Thickness= 1.53

=> AC Thickness= **1.55** ft (round up to the nearest 0.05 ft)

Design Section:



0.5’ AB and Subgrade Enhancement Geotextile (SEGT) is added to above section according to HDM for 40-Yr Life Design

SOIL STRENGTH PARAMETERS & V_{s30}

Calc By: Krishna
Date: 1/3/20

PROJECT NAME: ***Bell Road Musso Road Interchnage Project***
PROJECT NO.: ***2019-125-GEO***
STRUCTURE:
BORING NO.: ***A-19-001***

BOREHOLE DIA (in)= 4.5
GW DEPTH (ft)= 30

HAMMER ENERGY = 77%
DRILLING RODS (Y/N)= Y

SOIL GROUPS
1. SANDS & GRAVELS
2. CLAYS AND PLASTIC SILTS
3. NON TO LOW PLASTIC SILTS
4. YOUNG SEDIMENTARY ROCKS
5. LIQUEFIABLE SANDS (RESIDUAL STRENGTH)
6. LIQUEFIABLE SILTS (RESIDUAL STRENGTH)

Nd 103
N_{30} 136

V_{sd} (m/s) *324*
V_{s30} (m/s) *428*

Correlation 1) Caltrans

Sample No	Layer Thickness		Sample Depth (ft)	Soil Type	Field Blow Count	Sampler Type	Unit Weight (pcf)	σ_v (psf)	σ_v' (psf)	SPT-$N_{eq.}$	N_{60} CE Corr.	N_{60} CR,CB,CS Corr.	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60,\ CS}$	Correlated Strength Parameters			Lab Test Results	Vs
	from	to															ϕ (°)	c (psf)	S_r (psf)	c (psf)	(m/s)
1	0.0	7.0	6	1	80	SPT	125	750	750	80	102.7	106.8	1.63	174.4	26%	200.5	54				207
2	7.0	11.0	10	1	80	SPT	125	1250	1250	80	102.7	113.4	1.26	143.5		143.5	51				234
3	11.0	16	15	4	80	SPT	125	1875	1875	80	102.7	113.4	1.03	117.2			48				478
4	16.0	21	20	4	80	SPT	125	2500	2500	80	102.7	126.8	0.89	113.4			46				478
5	21.0	28	25	4	80	SPT	125	3125	3125	80	102.7	126.8	0.80	101.4			45				478

Note:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner), C_N (Overburden) are per Youd 2001
2. For fine-grained materials, the correlation between blow-counts and shear is based on NAVFAC DM 7.1.
3. The phi angle was estimated based on Meyerhof (1956).
4. Residual Strength (Sr) is based on Caltrans "Guidelines on Foundation Loading and Deformation Due to Liquefaction Induced Lateral Spreading", Caltrans 2011
5. The Vs were correlated based on N_{60} for Soil Types 1,3, 4; based on N_{60} or c_{lab} for Soil Type 2 and based on Sr for Soil Types 5 & 6 per Caltrans Guidelines (2012).
6. Spreadsheet Revision Date: 10/29/13

SOIL STRENGTH PARAMETERS & V_{s30}

Calc By: Krishna
Date: 1/3/20

PROJECT NAME: ***Bell Road Musso Road Interchnage Project***
PROJECT NO.: ***2019-125-GEO***
STRUCTURE:
BORING NO.: ***A-19-003***

SOIL GROUPS
1. SANDS & GRAVELS
2. CLAYS AND PLASTIC SILTS
3. NON TO LOW PLASTIC SILTS
4. YOUNG SEDIMENTARY ROCKS
5. LIQUEFIABLE SANDS (RESIDUAL STRENGTH)
6. LIQUEFIABLE SILTS (RESIDUAL STRENGTH)

BOREHOLE DIA (in)= 4.5
GW DEPTH (ft)= 31

HAMMER ENERGY = 77%
DRILLING RODS (Y/N)= Y

Nd	34	V_{sd} (m/s)	*232*
N_{30}	43	V_{s30} (m/s)	*294*
		Correlation	1) Caltrans

Sample No	Layer Thickness from	Layer Thickness to	Sample Depth (ft)	Soil Type	Field Blow Count	Sampler Type	Unit Weight (pcf)	σ_v (psf)	σ_v' (psf)	SPT-$N_{eq.}$	N_{60} CE Corr.	N_{60} CR,CB,CS Corr.	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	Correlated Strength Parameters ϕ (°)	Correlated Strength Parameters c (psf)	Correlated Strength Parameters S_r (psf)	Lab Test Results c (psf)	Vs (m/s)
1	0.0	10.0	6	1	35	SPT	125	750	750	35	44.9	46.7	1.63	76.3	41%	96.5	46				192
2	10.0	15.0	11	1	31	SPT	125	1375	1375	31	39.8	44.0	1.21	53.0	29%	65.2	43				218
3	15.0	20	16	1	21	SPT	125	2000	2000	21	27.0	33.3	1.00	33.3	40%	44.9	39				230
4	20.0	25	21	1	22	SPT	125	2625	2625	22	28.2	34.9	0.87	30.4	32%	40.5	38				246
5	25.0	30	26	2	11	SPT	125	3250	3250	11	14.1	15.9	0.78	12.5				1765			229
6	30.0	35	30.5	1	80	MC	125	3812.5	3813	52	66.7	66.7	0.72	48.3	58%	63.0	39				292
7	35.0	40	35	1	80	SPT	125	4375	4125	80	102.7	133.5	0.70	92.9		92.9	43				310

Note:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner), C_N (Overburden) are per Youd 2001
2. For fine-grained materials, the correlation between blow-counts and shear is based on NAVFAC DM 7.1.
3. The phi angle was estimated based on Meyerhof (1956).
4. Residual Strength (Sr) is based on Caltrans "Guidelines on Foundation Loading and Deformation Due to Liquefaction Induced Lateral Spreading", Caltrans 2011
5. The Vs were correlated based on N_{60} for Soil Types 1,3, 4; based on N_{60} or c_{lab} for Soil Type 2 and based on Sr for Soil Types 5 & 6 per Caltrans Guidelines (2012).
6. Spreadsheet Revision Date: 10/29/13

SOIL STRENGTH PARAMETERS & V_{s30}

Calc By: Krishna
Date: 1/3/20

PROJECT NAME: ***Bell Road Musso Road Interchnage Project***
PROJECT NO.: ***2019-125-GEO***
STRUCTURE:
BORING NO.: ***A-19-004***

SOIL GROUPS
1. SANDS & GRAVELS
2. CLAYS AND PLASTIC SILTS
3. NON TO LOW PLASTIC SILTS
4. YOUNG SEDIMENTARY ROCKS
5. LIQUEFIABLE SANDS (RESIDUAL STRENGTH)
6. LIQUEFIABLE SILTS (RESIDUAL STRENGTH)

BOREHOLE DIA (in)= 4.5
GW DEPTH (ft)= 45

HAMMER ENERGY = 77%
DRILLING RODS (Y/N)= Y

Nd 19
N_{30} 24

V_{sd} (m/s) *235*
V_{s30} (m/s) *297*

Correlation 1) Caltrans

Sample No	Layer Thickness		Sample Depth (ft)	Soil Type	Field Blow Count	Sampler Type	Unit Weight (pcf)	σ_v (psf)	σ_v' (psf)	SPT-$N_{eq.}$	N_{60} CE Corr.	N_{60} CR,CB,CS Corr.	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	Correlated Strength Parameters			Lab Test Results	Vs
	from	to															ϕ (°)	c (psf)	S_r (psf)	c (psf)	(m/s)
1	0.0	7.0	6	1	8	SPT	125	750	750	8	10.3	9.5	1.63	15.5	32%	23.0	37				166
2	7.0	13.0	11	1	44	SPT	125	1375	1375	44	56.5	62.4	1.21	75.3	24%	87.5	45				226
3	13.0	18	16	1	9	SPT	125	2000	2000	9	11.6	12.3	1.00	12.3		12.3	35				212
4	18.0	25	21	1	8	SPT	125	2625	2625	8	10.3	10.7	0.87	9.4	35%	16.2	33				223
5	25.0	30	26	2	38	SPT	125	3250	3250	38	48.8	63.4	0.78	49.7	46%			6096			304
6	30.0	35	31	1	56	SPT	125	3875	3875	56	71.9	93.4	0.72	67.1		67.1	41				295
7	35.0	39	36	2	80	MC	125	4500	4500	52	66.7	66.7	0.67	44.5	16%			8342			345
8	39.0	41.2	40.5	1	80	SPT	125	5062.5	5063	80	102.7	133.5	0.63	83.9		83.9	42				326

Note:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner), C_N (Overburden) are per Youd 2001
2. For fine-grained materials, the correlation between blow-counts and shear is based on NAVFAC DM 7.1.
3. The phi angle was estimated based on Meyerhof (1956).
4. Residual Strength (Sr) is based on Caltrans "Guidelines on Foundation Loading and Deformation Due to Liquefaction Induced Lateral Spreading", Caltrans 2011
5. The Vs were correlated based on N_{60} for Soil Types 1,3, 4; based on N_{60} or c_{lab} for Soil Type 2 and based on Sr for Soil Types 5 & 6 per Caltrans Guidelines (2012).
6. Spreadsheet Revision Date: 10/29/13

SOIL STRENGTH PARAMETERS & V_{s30}

Calc By: Krishna
Date: 1/3/20

PROJECT NAME: ***Bell Road Musso Road Interchnage Project***
PROJECT NO.: ***2019-125-GEO***
STRUCTURE:
BORING NO.: ***A-19-005***

SOIL GROUPS
1. SANDS & GRAVELS
2. CLAYS AND PLASTIC SILTS
3. NON TO LOW PLASTIC SILTS
4. YOUNG SEDIMENTARY ROCKS
5. LIQUEFIABLE SANDS (RESIDUAL STRENGTH)
6. LIQUEFIABLE SILTS (RESIDUAL STRENGTH)

BOREHOLE DIA (in)= 4.5
GW DEPTH (ft)= 45
HAMMER ENERGY = 77%
DRILLING RODS (Y/N)= Y

Nd	21	V_{sd} (m/s)	*225*
N_{30}	27	V_{s30} (m/s)	*291*
		Correlation	1) Caltrans

Sample No	Layer Thickness		Sample Depth (ft)	Soil Type	Field Blow Count	Sampler Type	Unit Weight (pcf)	σ_v (psf)	σ_v' (psf)	SPT-$N_{eq.}$	N_{60} CE Corr.	N_{60} CR,CB,CS Corr.	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60,\ CS}$	Correlated Strength Parameters			Lab Test Results	Vs
	from	to															φ (°)	c (psf)	S_r (psf)	c (psf)	(m/s)
1	0.0	9.0	6	1	6	SPT	125	750	750	6	7.7	6.8	1.63	11.2		11.2	35				162
2	9.0	15.0	11	1	15	SPT	125	1375	1375	15	19.3	20.4	1.21	24.6		24.6	38				204
3	15.0	20	15	1	80	SPT	125	1875	1875	80	102.7	113.4	1.03	117.2		117.2	48				257
4	20.0	24	21	1	80	SPT	125	2625	2625	80	102.7	126.8	0.87	110.7		110.7	46				279
5	24.0	29	26	1	80	SPT	125	3250	3250	80	102.7	133.5	0.78	104.7		104.7	45				293
6	29.0	34	30.5	1	80	SPT	125	3812.5	3813	80	102.7	133.5	0.72	96.7		96.7	44				304
7	34.0	35.2	35	1	80	SPT	125	4375	4375	80	102.7	133.5	0.68	90.2		90.2	43				314

Note:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner), C_N (Overburden) are per Youd 2001
2. For fine-grained materials, the correlation between blow-counts and shear is based on NAVFAC DM 7.1.
3. The phi angle was estimated based on Meyerhof (1956).
4. Residual Strength (Sr) is based on Caltrans "Guidelines on Foundation Loading and Deformation Due to Liquefaction Induced Lateral Spreading", Caltrans 2011
5. The Vs were correlated based on N_{60} for Soil Types 1,3, 4; based on N_{60} or c_{lab} for Soil Type 2 and based on Sr for Soil Types 5 & 6 per Caltrans Guidelines (2012).
6. Spreadsheet Revision Date: 10/29/13

SOIL STRENGTH PARAMETERS & V_{s30}

Calc By: Krishna
Date: 1/3/20

PROJECT NAME: ***Bell Road Musso Road Interchnage Project***
PROJECT NO.: ***2019-125-GEO***
STRUCTURE:
BORING NO.: ***A-19-006***

SOIL GROUPS
1. SANDS & GRAVELS
2. CLAYS AND PLASTIC SILTS
3. NON TO LOW PLASTIC SILTS
4. YOUNG SEDIMENTARY ROCKS
5. LIQUEFIABLE SANDS (RESIDUAL STRENGTH)
6. LIQUEFIABLE SILTS (RESIDUAL STRENGTH)

BOREHOLE DIA (in)= 4.5
GW DEPTH (ft)= 35
HAMMER ENERGY = 77%
DRILLING RODS (Y/N)= Y

Nd 46
N_{30} 58
V_{sd} (m/s) *261*
V_{s30} (m/s) *330*
Correlation 1) Caltrans

Sample No	Layer Thickness from	Layer Thickness to	Sample Depth (ft)	Soil Type	Field Blow Count	Sampler Type	Unit Weight (pcf)	σ_v (psf)	σ_v' (psf)	SPT-$N_{eq.}$	N_{60} CE Corr.	N_{60} CR,CB,CS Corr.	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	Correlated Strength Parameters ϕ (°)	Correlated Strength Parameters c (psf)	Correlated Strength Parameters S_r (psf)	Lab Test Results c (psf)	Vs (m/s)
1	0.0	8.0	6	1	11	SPT	125	750	750	11	14.1	13.8	1.63	22.6	40%	32.1	39				171
2	8.0	14.0	10.5	1	80	SPT	125	1312.5	1313	80	102.7	113.4	1.23	140.0	25%	160.4	50				237
3	14.0	20.5	15	1	80	SPT	125	1875	1875	80	102.7	113.4	1.03	117.2		117.2	48				257
4	20.5	25	20.5	2	80	SPT	125	2562.5	2563	80	102.7	126.8	0.88	112.0				12833			347
5	25.0	29	25	2	80	SPT	125	3125	3125	80	102.7	126.8	0.80	101.4				12833			359
6	29.0	35	30	2	80	SPT	125	3750	3750	80	102.7	133.5	0.73	97.5				12833			370
7	35.0	39	35	1	80	SPT	125	4375	4375	80	102.7	133.5	0.68	90.2		90.2	43				314
8	39.0	40.5	40	1	80	SPT	125	5000	4688	80	102.7	133.5	0.65	87.2		87.2	42				320

Note:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner), C_N (Overburden) are per Youd 2001
2. For fine-grained materials, the correlation between blow-counts and shear is based on NAVFAC DM 7.1.
3. The phi angle was estimated based on Meyerhof (1956).
4. Residual Strength (Sr) is based on Caltrans "Guidelines on Foundation Loading and Deformation Due to Liquefaction Induced Lateral Spreading", Caltrans 2011
5. The Vs were correlated based on N_{60} for Soil Types 1,3, 4; based on N_{60} or c_{lab} for Soil Type 2 and based on Sr for Soil Types 5 & 6 per Caltrans Guidelines (2012).
6. Spreadsheet Revision Date: 10/29/13

LIQUEFACTION POTENTIAL ANALYSIS (SPT procedures per Youd et al, 2001)

PROJECT NAMI ***Bell Road Musso Road Interchnage Project***
PROJECT NO. ***2019-125-GEO***
BORING NO. ***A-19-001***

SOIL GROUPS
1. GRAVELS, SANDS AND NONPLASTIC SILTS
2. CLAYS AND PLASTIC SILTS

FAULT INFO
a_{max} (g)= 0.21
FAULT M_w = 6.48

GW DEPTH (ft)= 30

BOREHOLE DIA (in)= 4.5
HAMMER ENERGY = 77%

CUT(-)/FILL(+) (ft) = 0
DESIGN GW DEPTH (ft)= 30 *(below OG)*

MSF = 1.45

SOIL STRATA							*LIQUEFACTION RESISTANCE ($CRR_{7.5}$)*												*CYCLIC STRESS RATIO (CSR)*				*F.S.=($CRR_{7.5}$/CSR)*MSF*Ks*Ka*			*POST-LIQ. SETTLEMENT*	
Layer Thickness from	to	Sample No	Depth (ft)	Soil Type	Blow Count	Sampler Type	SPT-$N_{eq.}$	C_E	C_R	C_S	C_B	N_{60}	σ_v' (psf)	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	$CRR_{7.5}$	σ_v (psf)	σ_v' (psf)	r_d	CSR	Ks	Ka	F.S.	Vol. Strain (%)	ΔD (in)
0	7.0	1	6	1	80	SPT	80.0	1.3	0.80	1.2	1.00	98.6	690.0	1.7	167.6	26%	192.5		690.0	690.0	1.0	0.1	1.0	1.0			
7.0	11.0	2	10	1	80	SPT	80.0	1.3	0.85	1.2	1.00	104.7	1165.0	1.3	137.2		137.2		1165.0	1165.0	1.0	0.1	1.0	1.0			
11.0	16.0	3	15	1	80	SPT	80.0	1.3	0.95	1.2	1.00	117.0	1765.0	1.1	124.6		124.6		1765.0	1765.0	1.0	0.1	1.0	1.0			
16.0	21.0	4	20	1	80	SPT	80.0	1.3	0.95	1.2	1.00	117.0	2365.0	0.9	107.6		107.6		2365.0	2365.0	1.0	0.1	0.9	1.0			
21.0	28.0	5	25	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	2965.0	0.8	101.2		101.2		2965.0	2965.0	0.9	0.1	0.9	1.0			

Notes:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner) are per Youd et al. (2001).
2. For correction of overburden, $C_N = (1/\sigma_v')^{0.5}$ with a maximum value of 1.7.
3. The influence of Fines Contents are expressed by the following correction: $(N_1)_{60cs} = a + b\,(N_1)_{60}$
   where a and b = coefficients determined from the following relationships
   for FC $\leq$ 5% a = 0, b = 1.0
   for 5% < FC < 35% a = exp(1.76-(190/FC^2)), b = (0.99+($FC^{1.5}$/1000))
   for FC $\geq$ 35% a = 5.0, b = 1.2
4. For $(N_1)_{60,cs}$ greater than 30, clean granular soils are too dense to liquefy and are classed as non-liquefiable.

Reference:
Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER Workshops on Evaluation of Liquefaction Resistance of Soils, Youd, et al., ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2001, Vol. 127 No. 10

LIQUEFACTION POTENTIAL ANALYSIS (SPT procedures per Youd et al, 2001)

PROJECT NAMI ***Bell Road Musso Road Interchnage Project***
PROJECT NO. ***2019-125-GEO***
BORING NO. ***A-19-003***

SOIL GROUPS
1. GRAVELS, SANDS AND NONPLASTIC SILTS
2. CLAYS AND PLASTIC SILTS

FAULT INFO
a_{max} (g)= 0.21
FAULT M_w = 6.48

GW DEPTH (ft)= 31

BOREHOLE DIA (in)= 4.5
HAMMER ENERGY = 77%

CUT(-)/FILL(+) (ft) = 0
DESIGN GW DEPTH (ft)= 31 *(below OG)*

MSF = 1.45

SOIL STRATA							*LIQUEFACTION RESISTANCE ($CRR_{7.5}$)*												*CYCLIC STRESS RATIO (CSR)*				*F.S.=($CRR_{7.5}$/CSR)*MSF*Ks*Ka*			*POST-LIQ. SETTLEMENT*	
Layer Thickness from	to	Sample No	Depth (ft)	Soil Type	Blow Count	Sampler Type	SPT-$N_{eq.}$	C_E	C_R	C_S	C_B	N_{60}	σ_v' (psf)	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	$CRR_{7.5}$	σ_v (psf)	σ_v' (psf)	r_d	CSR	Ks	Ka	F.S.	Vol. Strain (%)	ΔD (in)
0	10.0	1	6	1	35	SPT	35.0	1.3	0.80	1.2	1.00	43.1	690.0	1.7	73.3	41%	93.0		690.0	690.0	1.0	0.1	1.0	1.0			
10.0	15.0	2	11	1	31	SPT	31.0	1.3	0.85	1.2	1.00	40.6	1270.0	1.3	50.9	29%	62.8		1270.0	1270.0	1.0	0.1	1.0	1.0			
15.0	20.0	3	16	1	21	SPT	21.0	1.3	0.95	1.2	1.00	30.7	1870.0	1.0	31.8	40%	43.1		1870.0	1870.0	1.0	0.1	1.0	1.0			
20.0	25.0	4	21	1	22	SPT	22.0	1.3	0.95	1.2	1.00	32.2	2470.0	0.9	29.0	32%	38.7		2470.0	2470.0	1.0	0.1	0.9	1.0			
25.0	30.0	5	26	2	11	SPT	11.0	1.3	1.00	1.2	1.00	16.9	3070.0	0.8	13.7												
30.0	35.0	6	30.5	1	80	MC	52.0	1.3	1.00	1.0	1.00	66.7	3610.0	0.7	49.7	58%	64.6		3610.0	3610.0	0.9	0.1	0.8	1.0			
35.0	40.0	7	35	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	3900.4	0.7	88.2		88.2		4150.0	3900.4	0.9	0.1	0.8	1.0	NON-LIQ.		

Notes:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner) are per Youd et al. (2001).
2. For correction of overburden, $C_N = (1/\sigma_v')^{0.5}$ with a maximum value of 1.7.
3. The influence of Fines Contents are expressed by the following correction: $(N_1)_{60cs} = a + b\,(N_1)_{60}$
where a and b = coefficients determined from the following relationships
for FC $\leq$ 5% a = 0, b = 1.0
for 5% < FC < 35% a = exp(1.76-(190/FC^2)), b = (0.99+($FC^{1.5}$/1000))
for FC $\geq$ 35% a = 5.0, b = 1.2
4. For $(N_1)_{60,cs}$ greater than 30, clean granular soils are too dense to liquefy and are classed as non-liquefiable.

Reference:
Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER Workshops on Evaluation of Liquefaction Resistance of Soils, Youd, et al., ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2001, Vol. 127 No. 10

9/22/2020

LIQUEFACTION POTENTIAL ANALYSIS (SPT procedures per Youd et al, 2001)

PROJECT NAMI ***Bell Road Musso Road Interchnage Project***
PROJECT NO. ***2019-125-GEO***
BORING NO. ***A-19-004***

SOIL GROUPS
1. GRAVELS, SANDS AND NONPLASTIC SILTS
2. CLAYS AND PLASTIC SILTS

FAULT INFO
a_{max} (g)= 0.21
FAULT M_w = 6.48

GW DEPTH (ft)= 45

BOREHOLE DIA (in)= 4.5
HAMMER ENERGY = 77%

CUT(-)/FILL(+) (ft) = 0
DESIGN GW DEPTH (ft)= 45 *(below OG)*

MSF = 1.45

SOIL STRATA							*LIQUEFACTION RESISTANCE ($CRR_{7.5}$)*												*CYCLIC STRESS RATIO (CSR)*				*F.S.=($CRR_{7.5}$/CSR)*MSF*Ks*Ka*			*POST-LIQ. SETTLEMENT*	
Layer Thickness from	to	Sample No	Depth (ft)	Soil Type	Blow Count	Sampler Type	SPT-$N_{eq.}$	C_E	C_R	C_S	C_B	N_{60}	σ_v' (psf)	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	$CRR_{7.5}$	σ_v (psf)	σ_v' (psf)	r_d	CSR	Ks	Ka	F.S.	Vol. Strain (%)	ΔD (in)
0	7.0	1	6	1	8	SPT	8.0	1.3	0.80	1.2	1.00	9.9	690.0	1.7	16.8	32%	24.4		690.0	690.0	1.0	0.1	1.0	1.0			
7.0	13.0	2	11	1	44	SPT	44.0	1.3	0.85	1.2	1.00	57.6	1285.0	1.2	71.9	24%	83.8		1285.0	1285.0	1.0	0.1	1.0	1.0			
13.0	18.0	3	16	1	9	SPT	9.0	1.3	0.95	1.2	1.00	13.2	1885.0	1.0	13.6		13.6		1885.0	1885.0	1.0	0.1	1.0	1.0			
18.0	25.0	4	21	1	8	SPT	8.0	1.3	0.95	1.2	1.00	11.7	2485.0	0.9	10.5	35%	17.6		2485.0	2485.0	1.0	0.1	0.9	1.0			
25.0	30.0	5	26	2	38	SPT	38.0	1.3	1.00	1.2	1.00	58.5	3085.0	0.8	47.1	46%											
30.0	35.0	6	31	1	56	SPT	56.0	1.3	1.00	1.2	1.00	86.2	3685.0	0.7	63.5		63.5		3685.0	3685.0	0.9	0.1	0.8	1.0			
35.0	39.0	7	36	2	80	MC	52.0	1.3	1.00	1.0	1.00	66.7	4285.0	0.7	45.6	16%											
39.0	41.2	8	40.5	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	4826.5	0.6	79.3		79.3		4826.5	4826.5	0.8	0.1	0.7	1.0			

Notes:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner) are per Youd et al. (2001).
2. For correction of overburden, $C_N = (1/\sigma_v')^{0.5}$ with a maximum value of 1.7.
3. The influence of Fines Contents are expressed by the following correction: $(N_1)_{60cs} = a + b\ (N_1)_{60}$
   where a and b = coefficients determined from the following relationships
   for $FC \leq 5\%$ $a = 0$, $b = 1.0$
   for $5\% < FC < 35\%$ $a = \exp(1.76-(190/FC^2))$, $b = (0.99+(FC^{1.5}/1000))$
   for $FC \geq 35\%$ $a = 5.0$, $b = 1.2$
4. For $(N_1)_{60,cs}$ greater than 30, clean granular soils are too dense to liquefy and are classed as non-liquefiable.

Reference:
Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER Workshops on Evaluation of Liquefaction Resistance of Soils, Youd, et al., ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2001, Vol. 127 No. 10

LIQUEFACTION POTENTIAL ANALYSIS (SPT procedures per Youd et al, 2001)

PROJECT NAMI ***Bell Road Musso Road Interchnage Project***
PROJECT NO. ***2019-125-GEO***
BORING NO. ***A-19-005***

SOIL GROUPS
1. GRAVELS, SANDS AND NONPLASTIC SILTS
2. CLAYS AND PLASTIC SILTS

FAULT INFO
a_{max} (g)= 0.21
FAULT M_w = 6.48

GW DEPTH (ft)= 45

BOREHOLE DIA (in)= 4.5
HAMMER ENERGY = 77%

CUT(-)/FILL(+) (ft) = 0
DESIGN GW DEPTH (ft)= 45 *(below OG)*

MSF = 1.45

SOIL STRATA							*LIQUEFACTION RESISTANCE ($CRR_{7.5}$)*													*CYCLIC STRESS RATIO (CSR)*				*F.S.=($CRR_{7.5}$/CSR)*MSF*Ks*Ka*			*POST-LIQ. SETTLEMENT*	
Layer Thickness from	to	Sample No	Depth (ft)	Soil Type	Blow Count	Sampler Type	SPT-$N_{eq.}$	C_E	C_R	C_S	C_B	N_{60}	σ_v' (psf)	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	$CRR_{7.5}$	σ_v (psf)	σ_v' (psf)	r_d	CSR	Ks	Ka	F.S.	Vol. Strain (%)	ΔD (in)
0	9.0	1	6	1	6	SPT	6.0	1.3	0.80	1.2	1.00	7.4	690.0	1.7	12.6	41%	20.1		690.0	690.0	1.0	0.1	1.0	1.0			
9.0	15.0	2	11	1	15	SPT	15.0	1.3	0.85	1.2	1.00	19.6	1275.0	1.3	24.6	29%	32.7		1275.0	1275.0	1.0	0.1	1.0	1.0			
15.0	20.0	3	15	1	80	SPT	80.0	1.3	0.95	1.2	1.00	117.0	1755.0	1.1	124.9	40%	154.9		1755.0	1755.0	1.0	0.1	1.0	1.0			
20.0	24.0	4	21	1	80	SPT	80.0	1.3	0.95	1.2	1.00	117.0	2475.0	0.9	105.2	32%	128.0		2475.0	2475.0	1.0	0.1	0.9	1.0			
24.0	29.0	5	26	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	3075.0	0.8	99.4		99.4		3075.0	3075.0	0.9	0.1	0.8	1.0			
29.0	34.0	6	30.5	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	3615.0	0.7	91.6	58%	115.0		3615.0	3615.0	0.9	0.1	0.8	1.0			
34.0	35.2	7	35	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	4155.0	0.7	85.5		85.5		4155.0	4155.0	0.9	0.1	0.7	1.0			

Notes:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner) are per Youd et al. (2001).
2. For correction of overburden, $C_N = (1/\sigma_v')^{0.5}$ with a maximum value of 1.7.
3. The influence of Fines Contents are expressed by the following correction: $(N_1)_{60cs} = a + b\ (N_1)_{60}$
   where a and b = coefficients determined from the following relationships
   for FC $\leq$ 5%   a = 0,   b = 1.0
   for 5% < FC < 35% $a = \exp(1.76-(190/FC^2))$, $b = (0.99+(FC^{1.5}/1000))$
   for FC $\geq$ 35%   a = 5.0,   b = 1.2
4. For $(N_1)_{60,cs}$ greater than 30, clean granular soils are too dense to liquefy and are classed as non-liquefiable.

Reference:
Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER Workshops on Evaluation of Liquefaction Resistance of Soils, Youd, et al., ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2001, Vol. 127 No. 10

9/22/2020

LIQUEFACTION POTENTIAL ANALYSIS (SPT procedures per Youd et al, 2001)

PROJECT NAMI ***Bell Road Musso Road Interchnage Project***
PROJECT NO. ***2019-125-GEO***
BORING NO. ***A-19-006***

SOIL GROUPS
1. GRAVELS, SANDS AND NONPLASTIC SILTS
2. CLAYS AND PLASTIC SILTS

FAULT INFO
a_{max} (g)= 0.21
FAULT M_w = 6.48

GW DEPTH (ft)= 35

BOREHOLE DIA (in)= 4.5
HAMMER ENERGY = 77%

CUT(-)/FILL(+) (ft) = 0
DESIGN GW DEPTH (ft)= 45 *(below OG)*

MSF = 1.45

SOIL STRATA							*LIQUEFACTION RESISTANCE ($CRR_{7.5}$)*												*CYCLIC STRESS RATIO (CSR)*				*F.S.=($CRR_{7.5}$/CSR)*MSF*Ks*Ka*			*POST-LIQ. SETTLEMENT*	
Layer Thickness from	to	Sample No	Depth (ft)	Soil Type	Blow Count	Sampler Type	SPT-$N_{eq.}$	C_E	C_R	C_S	C_B	N_{60}	σ_v' (psf)	C_N	$(N_1)_{60}$	F.C.	$(N_1)_{60, CS}$	$CRR_{7.5}$	σ_v (psf)	σ_v' (psf)	r_d	CSR	Ks	Ka	F.S.	Vol. Strain (%)	ΔD (in)
0	8.0	1	6	1	11	SPT	11.0	1.3	0.80	1.2	1.00	13.6	690.0	1.7	23.0	40%	32.6		690.0	690.0	1.0	0.1	1.0	1.0			
8.0	14.0	2	10.5	1	80	SPT	80.0	1.3	0.85	1.2	1.00	104.7	1220.0	1.3	134.1	25%	153.8		1220.0	1220.0	1.0	0.1	1.0	1.0			
14.0	20.5	3	15	1	80	SPT	80.0	1.3	0.95	1.2	1.00	117.0	1760.0	1.1	124.8		124.8		1760.0	1760.0	1.0	0.1	1.0	1.0			
20.5	25.0	4	20.5	2	80	SPT	80.0	1.3	0.95	1.2	1.00	117.0	2420.0	0.9	106.4												
25.0	29.0	5	25	2	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	2960.0	0.8	101.3												
29.0	35.0	6	30	2	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	3560.0	0.7	92.3												
35.0	39.0	7	35	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	4160.0	0.7	85.4		85.4		4160.0	4160.0	0.9	0.1	0.7	1.0			
39.0	40.5	8	40	1	80	SPT	80.0	1.3	1.00	1.2	1.00	123.2	4449.0	0.7	82.6		82.6		4761.0	4761.0	0.9	0.1	0.7	1.0			

Notes:
1. The correction factors C_E (Energy Ratio), C_B (Borehole Diameter), C_R (Rod Length) and C_S (Sampling Method-liner) are per Youd et al. (2001).
2. For correction of overburden, $C_N = (1/\sigma_v')^{0.5}$ with a maximum value of 1.7.
3. The influence of Fines Contents are expressed by the following correction: $(N_1)_{60cs} = a + b\ (N_1)_{60}$
where a and b = coefficients determined from the following relationships
for FC $\leq$ 5% a = 0, b = 1.0
for 5% < FC < 35% a = $\exp(1.76-(190/FC^2))$, b = $(0.99+(FC^{1.5}/1000))$
for FC $\geq$ 35% a = 5.0, b = 1.2
4. For $(N_1)_{60,cs}$ greater than 30, clean granular soils are too dense to liquefy and are classed as non-liquefiable.

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9/22/2020

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Latitude

Decimal degrees

38.9451

Longitude

Decimal degrees, negative values for western longitudes

-121.0469

Site Class

259 m/s (Site class D)

Spectral Period

Peak Ground Acceleration

Time Horizon

Return period in years

975

Hazard Curve

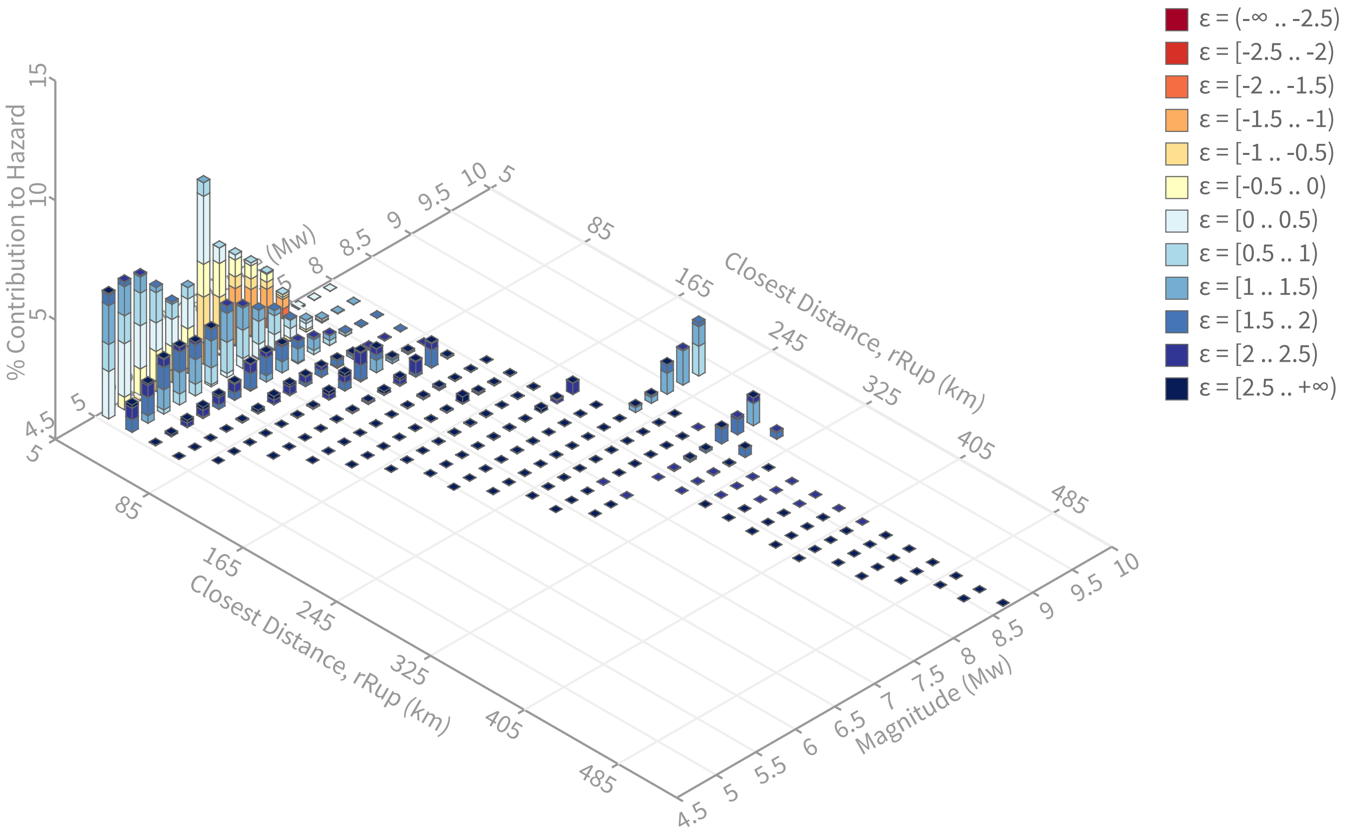
Please select “Edition”, “Location” & “Site Class” above to compute a hazard curve.

Compute Hazard Curve

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 975 yrs
Exceedance rate: 0.001025641 yr^{-1}
PGA ground motion: 0.21184104 g

Recovered targets

Return period: 1044.726 yrs
Exceedance rate: 0.00095718877 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.62 %

Mean (over all sources)

m: 6.48
r: 50.21 km
ε_0: 0.7 σ

Mode (largest m-r bin)

m: 6.3
r: 11.82 km
ε_0: -0.26 σ
Contribution: 7.59 %

Mode (largest m-r-ε_0 bin)

m: 6.3
r: 15.51 km
ε_0: 0.26 σ
Contribution: 2.84 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	**Type**	**r**	**m**	**ε_0**	**lon**	**lat**	**az**	**%**
UC33brAvg_FM31 (opt)	Grid							34.42
PointSourceFinite: -121.047, 39.013		8.86	5.64	-0.08	121.047°W	39.013°N	0.00	2.29
PointSourceFinite: -121.047, 39.004		8.25	5.55	-0.10	121.047°W	39.004°N	0.00	1.85
PointSourceFinite: -121.047, 39.013		8.85	5.64	-0.09	121.047°W	39.013°N	0.00	1.57
PointSourceFinite: -121.047, 39.076		14.49	5.76	0.48	121.047°W	39.076°N	0.00	1.53
PointSourceFinite: -121.047, 39.004		8.24	5.56	-0.10	121.047°W	39.004°N	0.00	1.17
PointSourceFinite: -121.047, 39.102		16.70	5.89	0.57	121.047°W	39.102°N	0.00	1.10
PointSourceFinite: -121.047, 39.138		20.15	5.95	0.80	121.047°W	39.138°N	0.00	1.04
UC33brAvg_FM32 (opt)	Grid							34.38
PointSourceFinite: -121.047, 39.013		8.86	5.64	-0.08	121.047°W	39.013°N	0.00	2.29
PointSourceFinite: -121.047, 39.004		8.25	5.55	-0.10	121.047°W	39.004°N	0.00	1.85
PointSourceFinite: -121.047, 39.013		8.86	5.64	-0.09	121.047°W	39.013°N	0.00	1.57
PointSourceFinite: -121.047, 39.076		14.50	5.76	0.48	121.047°W	39.076°N	0.00	1.53
PointSourceFinite: -121.047, 39.004		8.25	5.56	-0.10	121.047°W	39.004°N	0.00	1.17
PointSourceFinite: -121.047, 39.102		16.70	5.89	0.57	121.047°W	39.102°N	0.00	1.10
PointSourceFinite: -121.047, 39.138		20.15	5.95	0.80	121.047°W	39.138°N	0.00	1.04
UC33brAvg_FM32	System							11.84
Swain Ravine - Spenceville [3]		6.80	6.75	-1.23	121.113°W	38.907°N	233.77	4.38
Swain Ravine - Spenceville [1]		14.39	6.30	0.32	121.021°W	38.817°N	171.18	1.29
Great Valley 03 Mysterious Ridge [7]		93.13	7.24	1.59	122.063°W	38.685°N	252.15	1.01
UC33brAvg_FM31	System							9.31
Swain Ravine - Spenceville [3]		6.80	6.80	-1.25	121.113°W	38.907°N	233.77	3.25
sub0_ch_bot.in	Interface							4.69
Cascadia Megathrust - whole CSZ Characteristic		232.04	9.13	1.18	122.945°W	40.376°N	315.00	4.69
sub0_ch_mid.in	Interface							2.43
Cascadia Megathrust - whole CSZ Characteristic		286.07	8.93	1.61	123.829°W	40.347°N	304.08	2.43

Appendix F

Climate Change Technical Memorandum

Technical Memorandum

September 4, 2020

To:	Caltrans District 3 Environmental Management	Project:	Bell Road at I-80 Interchange Project
Attn:	Tracy Robinson, Caltrans Environmental Planner		
From:	Chryss Meier, Environmental Scientist, GHD	EA No.:	03-4H430
CC:	Mohan Bonala, Caltrans Kyle Friedrich, Placer County Heather Anderson, GHD	File No.:	2020-09-04_03-4H430_DRAFT CLIMATE CHANGE.DOCX
Subject:	Climate Change Technical Memorandum		

Introduction

GHD Inc. (GHD) has prepared this memorandum to summarize climate change issues associated with the proposed Bell Road at I-80 Interchange Project. The following discussion presents an overview of climate change terms, the regulatory setting, environmental setting, project analysis, greenhouse gas reduction strategies, and adaptation strategies applicable to the project.

Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (GHG) emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization in 1988 led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF_6), and various hydrofluorocarbons (HFCs). CO_2 is the most abundant GHG; while it is a naturally occurring component of Earth’s atmosphere, fossil-fuel combustion is the main source of additional, human-generated CO_2.

Two terms are typically used when discussing how we address the impacts of climate change: “greenhouse gas mitigation” and “adaptation.” Greenhouse gas mitigation covers the activities and policies aimed at reducing GHG emissions to limit or “mitigate” the impacts of climate change. Adaptation, on the other hand, is concerned with planning for and responding to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels). This analysis will include a discussion of both terms.

REGULATORY SETTING

This section outlines federal and state efforts to comprehensively reduce GHG emissions from transportation sources.

Federal

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level.

The National Environmental Policy Act (NEPA) (42 United States Code [USC] Part 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

The Federal Highway Administration (FHWA) recognizes the threats that extreme weather, sea-level change, and other changes in environmental conditions pose to valuable transportation infrastructure and those who depend on it. FHWA therefore supports a sustainability approach that assesses vulnerability to climate risks and incorporates resilience into planning, asset management, project development and design, and operations and maintenance practices (FHWA 2019). This approach encourages planning for sustainable highways by addressing climate risks while balancing environmental, economic, and social values—“the triple bottom line of sustainability” (FHWA n.d.). Program and project elements that foster sustainability and resilience also support economic vitality and global efficiency, increase safety and mobility, enhance the environment, promote energy conservation, and improve the quality of life.

Various efforts have been promulgated at the federal level to improve fuel economy and energy efficiency to address climate change and its associated effects. The most important of these was the Energy Policy and Conservation Act of 1975 (42 USC Section 6201) and Corporate Average Fuel Economy (CAFE) Standards. This act establishes fuel economy standards for on-road motor vehicles sold in the United States. Compliance with federal fuel economy standards is determined through the CAFE program based on each manufacturer’s average fuel economy for the portion of its vehicles produced for sale in the United States.

Energy Policy Act of 2005, 109th Congress H.R.6 (2005–2006): This act sets forth an energy research and development program covering: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) the establishment of the Office of Indian Energy Policy and Programs within the Department of Energy; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.

The U.S. EPA in conjunction with the National Highway Traffic Safety Administration (NHTSA) is responsible for setting GHG emission standards for new cars and light-duty vehicles to significantly increase the fuel economy of all new passenger cars and light trucks sold in the United States. Fuel efficiency standards directly influence GHG emissions.

State

California has been innovative and proactive in addressing GHG emissions and climate change by passing multiple Senate and Assembly bills and executive orders (EOs) including, but not limited to, the following:

EO S-3-05 (June 1, 2005): The goal of this EO is to reduce California’s GHG emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by 2020, and (3) 80 percent below year 1990 levels by 2050. This goal was further reinforced with the passage of Assembly Bill (AB) 32 in 2006 and Senate Bill (SB) 32 in 2016.

Assembly Bill (AB) 32, Chapter 488, 2006, Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 codified the 2020 GHG emissions reduction goals outlined in EO S-3-05, while further mandating that the California Air Resources Board (ARB) create a scoping plan and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.” The Legislature also intended that the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020 (Health and Safety Code [H&SC] Section 38551(b)). The law requires ARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

EO S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard (LCFS) for California. Under this EO, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by the year 2020. ARB re-adopted the LCFS regulation in September 2015, and the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the governor's 2030 and 2050 GHG reduction goals.

Senate Bill (SB) 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires ARB to set regional emissions reduction targets for passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use, and housing policies to plan how it will achieve the emissions target for its region.

SB 391, Chapter 585, 2009, California Transportation Plan: This bill requires the State’s long-range transportation plan to identify strategies to address California’s climate change goals under AB 32.

EO B-16-12 (March 2012) orders State entities under the direction of the Governor, including ARB, the California Energy Commission, and the Public Utilities Commission, to support the rapid commercialization of zero-emission vehicles. It directs these entities to achieve various benchmarks related to zero-emission vehicles.

EO B-30-15 (April 2015) establishes an interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050. It further orders all state agencies with jurisdiction over sources of GHG emissions to implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets. It also directs ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent ($MMTCO_2e$).[1] Finally, it requires the Natural Resources Agency to update the state's climate adaptation strategy, *Safeguarding California*, every 3 years, and to ensure that its provisions are fully implemented.

SB 32, Chapter 249, 2016, codifies the GHG reduction targets established in EO B-30-15 to achieve a mid-range goal of 40 percent below 1990 levels by 2030.

SB 1386, Chapter 545, 2016, declared "it to be the policy of the state that the protection and management of natural and working lands … is an important strategy in meeting the state's greenhouse gas reduction goals, and would require all state agencies, departments, boards, and commissions to consider this policy when revising, adopting, or establishing policies, regulations, expenditures, or grant criteria relating to the protection and management of natural and working lands."

AB 134, Chapter 254, 2017, allocates Greenhouse Gas Reduction Funds and other sources to various clean vehicle programs, demonstration/pilot projects, clean vehicle rebates and projects, and other emissions-reduction programs statewide.

SB 743**,** Chapter 386 (September 2013): This bill changes the metric of consideration for transportation impacts pursuant to CEQA from a focus on automobile delay to alternative methods focused on vehicle miles travelled, to promote the state's goals of reducing greenhouse gas emissions and traffic related air pollution and promoting multimodal transportation while balancing the needs of congestion management and safety.

SB 150**,** Chapter 150, 2017, Regional Transportation Plans: This bill requires ARB to prepare a report that assesses progress made by each MPO in meeting their established regional greenhouse gas emission reduction targets.

EO B-55-18 (September 2018) sets a new statewide goal to achieve and maintain carbon neutrality no later than 2045. This goal is in addition to existing statewide targets of reducing GHG emissions.

EO N-19-19 (September 2019) advances California's climate goals in part by directing the California State Transportation Agency to leverage annual transportation spending to reverse the trend of increased fuel consumption and reduce GHG emissions from the transportation sector. It orders a focus on transportation investments near housing, managing congestion, and

---

[1] GHGs differ in how much heat each trap in the atmosphere (global warming potential, or GWP). CO_2 is the most important GHG, so amounts of other gases are expressed relative to CO_2, using a metric called "carbon dioxide equivalent" (CO_2e). The global warming potential of CO_2 is assigned a value of 1, and the GWP of other gases is assessed as multiples of CO_2.

encouraging alternatives to driving. This EO also directs ARB to encourage automakers to produce more clean vehicles, formulate ways to help Californians purchase them, and propose strategies to increase demand for zero-emission vehicles.

ENVIRONMENTAL SETTING

The proposed project is located in a rural area characterized by a population generally dispersed throughout small town communities of mixed-use development surrounded by large areas of open expanses consisting of agriculture, native vegetation, and low-density development. Interstate 80 (I-80) is the main transportation route to and through the area for both passenger and commercial vehicles. I-80 is a critical national goods movement corridor connecting the Western United States with important economic centers and ports in the San Francisco Bay Area. It is one of the busiest east-west routes in the US (PCTPA 2019). The nearest alternate route is SR-49, almost three miles to the west.

Commuter traffic uses the Bell Road corridor to avoid congestion along the State Route (SR) 49 corridor, and at the SR-49 and I-80 interchange. Traffic consists mostly of northern Placer County and western Nevada County residents commuting to and from work in south Placer County and the rest of the Sacramento region. Bell Road also serves the Auburn Municipal Airport and the Placer County DeWitt Government Center. Since 2005, Grass Valley and Nevada City have increased in population and there have been several infill communities constructed along SR-49 between Grass Valley and Auburn. In anticipation of this additional volume, Bell Road was widened to four lanes, however, the Bell Road at I-80 interchange remains a bottleneck for traffic during AM and PM peak hours. As a result, traffic builds up to the I-80 off-ramps and impacts the mainline flows on I-80.

Between 2014 and 2018, several collisions were recorded at the project site. The primary collision factors were unsafe speed, improper turning, and automobile right of way. Also, congestion in the project area during the AM and PM peak hours has significantly impacted the efficiency of the existing Bell Road at I-80 interchange, which is resulting in traffic backing up onto the mainline. Pedestrian facilities are provided on the project site to link existing park-and-ride facilities and cross I-80. However, those pedestrian facilities do not provide circulation or access to off-site pedestrian facilities. There are no other bicycle or transit facilities on the project site.

The Placer County Transportation Planning Agency (PCTPA) guides transportation development in the project area. Intersection improvements at the proposed project site were identified in the Placer County 2040 Final Regional Transportation Plan (RTP) as a System Management, Operations, and ITS project. The project description provided in the RTP was the following:

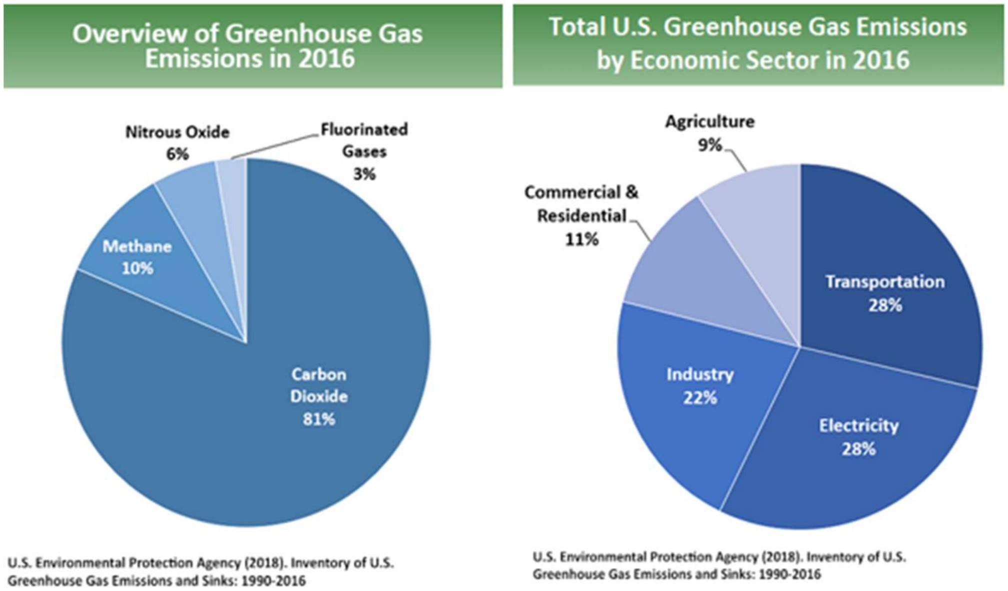
> *PLA25671, Bell Road at I-80 Roundabouts.*
>
> *The project will replace the existing traffic signal and all-way stop control at the Bell Road / Interstate 80 interchange with two roundabouts. PE Only. Total Project Cost is $7.5 million. (Emission Benefits in kg/day: ROG 0.25, NOx 0.19, PM2.5 0.01). Toll Credits for ENG*

The project will improve overall operations, circulation, and accessibility for drivers and cyclists at the existing Bell Road at I-80 Interchange. The project will not increase capacity for the roadway. The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the Bell Road at I-80 interchange and accommodate projected traffic associated with future development. Also, the purpose is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

National GHG Inventory

A GHG emissions inventory estimates the amount of GHG emissions discharged into the atmosphere by specific sources over a period of time, such as a calendar year. Tracking annual GHG emissions allows countries, states, and smaller jurisdictions to understand how emissions are changing and what actions may be needed to attain emission reduction goals. U.S. EPA is responsible for documenting GHG emissions nationwide, and the ARB does so for the state, as required by H&SC Section 39607.4.

The U.S. EPA prepares a national GHG inventory every year and submits it to the United Nations in accordance with the Framework Convention on Climate Change. The inventory provides a comprehensive accounting of all human-produced sources of GHGs in the United States, reporting emissions of CO_2, CH_4, N_2O, HFCs, perfluorocarbons, SF_6, and nitrogen trifluoride. It also accounts for emissions of CO_2 that are removed from the atmosphere by “sinks” such as forests, vegetation, and soils that uptake and store CO_2 (carbon sequestration). Figure 1 shows the 2016 emissions inventory for the U.S. The 1990–2016 inventory found that of 6,511 $MMTCO_2e$ GHG emissions in 2016, 81% consist of CO_2, 10% are CH_4, and 6% are N_2O; the balance consists of fluorinated gases (U.S. EPA 2018). In 2016, GHG emissions from the transportation sector accounted for nearly 28.5% of U.S. GHG emissions.



U.S. Environmental Protection Agency (2018). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016

U.S. Environmental Protection Agency (2018). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016

Figure 1. U.S. 2016 Greenhouse Gas Emissions

State GHG Inventory

ARB collects GHG emissions data for transportation, electricity, commercial/residential, industrial, agricultural, and waste management sectors each year. It then summarizes and highlights major annual changes and trends to demonstrate the state's progress in meeting its GHG reduction goals. The 2019 edition of the GHG emissions inventory found total California emissions of 424.1 $MMTCO_2e$ for 2017, with the transportation sector responsible for 41% of total GHGs. It also found that overall statewide GHG emissions declined from 2000 to 2017 despite growth in population and state economic output (ARB 2019a). Figure 2 shows the 2017 emissions inventory for California. Figure 3 shows the change in California GDP, Population, and GHG Emissions between 2000 and 2017.

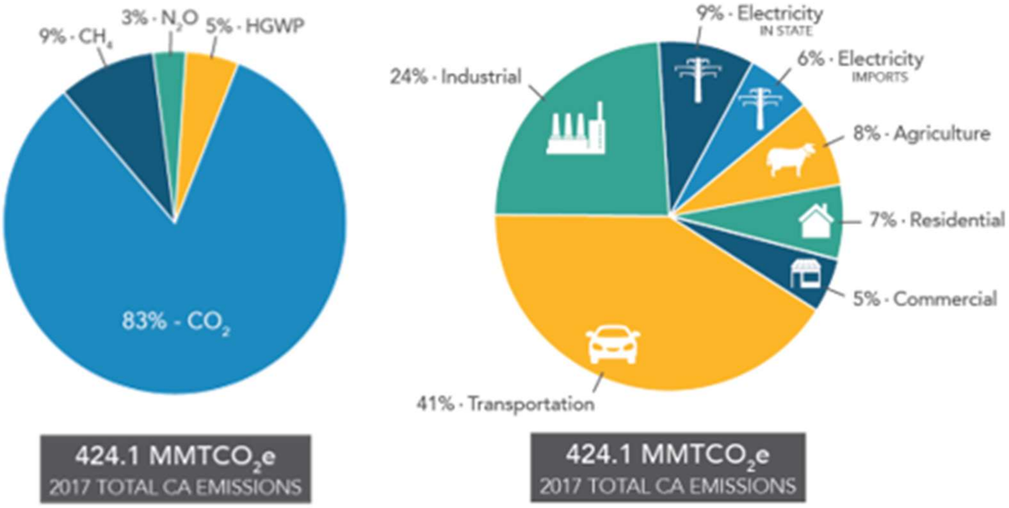
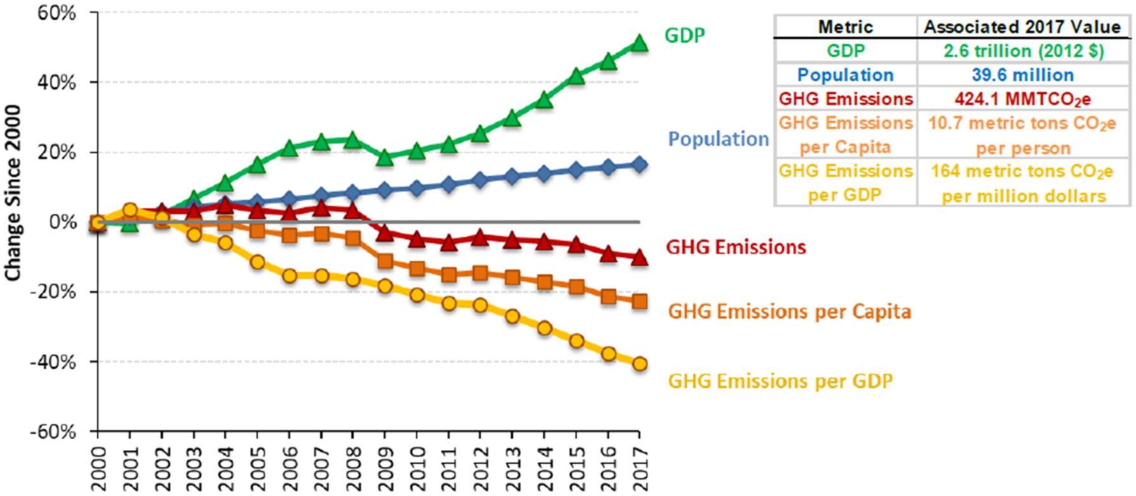


Figure 2. California 2017 Greenhouse Gas Emissions



Metric	Associated 2017 Value
GDP	2.6 trillion (2012 $)
Population	39.6 million
GHG Emissions	424.1 MMTCO$_2$e
GHG Emissions per Capita	10.7 metric tons CO$_2$e per person
GHG Emissions per GDP	164 metric tons CO$_2$e per million dollars

Figure 3. Change in California GDP, Population, and GHG Emissions since 2000 (*Source*: ARB 2019b)

AB 32 required ARB to develop a Scoping Plan that describes the approach California will take to achieve the goal of reducing GHG emissions to 1990 levels by 2020, and to update it every 5 years. ARB adopted the first scoping plan in 2008. The second updated plan, *California's 2017 Climate Change Scoping Plan*, adopted on December 14, 2017, reflects the 2030 target established in EO B-30-15 and SB 32. The AB 32 Scoping Plan and the subsequent updates contain the main strategies California will use to reduce GHG emissions.

Regional Plans

ARB sets regional targets for California's 18 MPOs to use in their Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) to plan future projects that will cumulatively achieve GHG reduction goals. Targets are set at a percent reduction of passenger vehicle GHG emissions per person from 2005 levels.

Placer County is part of a larger metropolitan planning jurisdiction (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties), which is coordinated by the Sacramento Area Council of Governments (SACOG). SACOG is designated by the federal government as the MPO for the Sacramento region. Placer County has its own state designation as a Regional Transportation Planning Agency (RTPA) that is responsible for developing its own transportation plans. The Placer County Transportation Planning Agency's (PCTPA) two most recent RTPs are incorporated into SACOG's regional planning processes through the Metropolitan Transportation Plan (MTP). The proposed project is included in the adopted 2020 MTP/SCS as PLA25671 (see description on page 5 above). The regional passenger vehicle GHG emissions reduction target for SACOG is 19 percent below 2005 levels by 2035 (ARB 2020). The 2020 MTP/SCS demonstrates a 19 percent reduction from the 2005 baseline, with a detailed breakdown of the emission reductions contained in Appendix E, Plan Performance, of the MTP/SCS.

The following MTP/SCS policies and supporting actions are applicable to the project:

> POLICY 20: Prioritize cost effective safety improvements that will help the region eliminate fatal transportation related accidents.
>
> POLICY 22: Invest in bicycle and pedestrian infrastructure to encourage healthy, active transportation trips and provide recreational opportunities for residents and visitors.
>
> POLICY 25: Prioritize investments in transportation improvements that reduce greenhouse gas emissions and vehicle miles traveled.

Placer County recently adopted the Placer County Sustainability Plan (PCSP), A Greenhouse Gas Emission Reduction Plan and Adaptation Strategy. The PCSP differentiates emission inventories, reduction goals, and reduction strategies for community-wide sectors and County operations sectors. For community-wide sectors, the PCSP shows that in 2005, unincorporated Placer County's residents, businesses, and visitors emitted 1,440,910 $MTCO_2e$ in total. Transportation was the largest source of emissions, generating 525,440 $MTCO_2e$, or 36 percent of all community-wide emissions. Community-wide emissions in 2015 totaled 1,203,260 $MTCO_2e$, a substantial decline from 2005 levels, although the relative size of the sectors remained similar. Transportation activity was again the largest source of emissions, generating 503,610 $MTCO_2e$, or 42 percent of community emissions (Placer County, 2020). The PCSP sets the following emission reduction targets for community-wide emissions.

> Year 2030 – 6.0 $MTCO_2e$ per person
>
> Year 2050 – 2.0 $MTCO_2e$ per person

For County operations sectors, there was a total of 40,520 $MTCO_2e$ of GHG emissions in 2005. Solid waste was the largest sector, generating 15,720 $MTCO_2e$, or 39 percent of this total. County operations emissions increased to 49,390 $MTCO_2e$ in 2015, although as with community emissions, there was little change in the relative size of each sector. As per-capita targets are not appropriate for government operations emissions, there is not a 2030 or 2050 target for government operations. The County will continue to implement and update the PCSP to ensure sustained GHG reductions from County operations.

The PCSP identifies 67 local strategies to reduce community-wide emissions and 46 strategies to reduce government operations emissions. As a transportation infrastructure project, the project is unique in that it is a County-operated facility that supports community-wide transportation and transit activity. The following voluntary community-wide PCSP strategies are relevant to the project:

Strategy WW-6: Encourage all existing properties to adopt water-efficient landscaping strategies, including more efficient irrigation systems and plants with lower water needs, consistent with the Water Efficient Landscaping Ordinance (WELO).

Strategy T-5: Partner with incorporated communities and regional agencies to develop bikeways and trails between communities.

Action Item 2: Implement the PCTPA's Placer County Regional Bikeway Plan in coordination with Placer County Transportation Planning Agency, Placer County Department of Public Works, and the TRPA's Linking Tahoe Active Transportation Plan.

Action Item 7: Implement pedestrian and bike safety infrastructure such as signage, traffic controls, and visible street paint.

Strategy T-11: Encourage active transportation use by increasing street and roadway safety through infrastructure improvements.

Action Item 2: Implement speed management strategies, where feasible and appropriate, to slow vehicle speeds in support of active transportation.

Action Item 3: Explore opportunities to fill gaps in sidewalks and bicycle facilities.

Action Item 4: Implement the Bikeway Master Plan and Parks and Trails Master Plan.

The following County operations PCSP strategies are relevant to the project:

Strategy GO E-5: Upgrade streetlights and traffic signals to advanced energy efficient bulbs.

Strategy GO WW-3: Conserve water through continued water-efficient landscaping on County properties.

Strategy GO WW-7: Develop and implement a water efficiency policy of a 20 percent reduction for all County facilities.

Strategy GO T-5: Prohibit the idling of on- and off-road fleet vehicles when the vehicle is not moving or when the off-road equipment is not performing any work for more than five minutes in any one-hour period.

PROJECT ANALYSIS

GHG emissions from transportation projects can be divided into those produced during operation of the SHS and those produced during construction. The primary GHGs produced by the transportation sector are CO_2, CH_4, N_2O, and HFCs. CO_2 emissions are a product of the combustion of petroleum-based products, like gasoline, in internal combustion engines. Relatively small amounts of CH_4 and N_2O are emitted during fuel combustion. In addition, a small amount of HFC emissions are included in the transportation sector.

The CEQA Guidelines generally address greenhouse gas emissions as a cumulative impact due to the global nature of climate change (Pub. Resources Code, § 21083(b)(2)). As the California Supreme Court explained, “because of the global scale of climate change, any one project's contribution is unlikely to be significant by itself” (Cleveland National Forest Foundation *v.* San Diego Assn. of Governments (2017) 3 Cal.5th 497, 512). In assessing cumulative impacts, it must be determined if a project’s incremental effect is “cumulatively considerable” (CEQA Guidelines Sections 15064(h)(1) and 15130).

To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. Although climate change is ultimately a cumulative impact, not every individual project that emits greenhouse gases must necessarily be found to contribute to a significant cumulative impact on the environment.

Operational Emissions

The primary purpose of the proposed project is to maximize the existing infrastructure to efficiently convey traffic safely through the interchange. The secondary purpose of this project is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange. The project would achieve these goals by replacing the existing study intersections with two modern, yield-controlled, single and multi-lane roundabouts designed to accommodate the Ultimate Design Year traffic forecast volumes. Specifically, the County would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a second five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. A literature review by the Insurance Institute for Highway Safety found that roundabouts can reduce fuel consumption by 23 to 34% and CO2 emissions by approximately 23 to 37% (IIHS 2018). The project design also best meets the safety purpose of the project for all modes of travel, while addressing future mobility needs.

The project will not increase the vehicle capacity of the roadway. This type of project generally causes minimal or no increase in operational GHG emissions. Because the project would not increase the number of travel lanes at the project intersections, no increase in vehicle miles traveled (VMT) would occur as result of project implementation. While some GHG emissions during the construction period would be unavoidable (see discussion below), there would be improved traffic flow through the intersection and an associated reduction in future idling during project operation. As such, the project may result in a reduction in operational GHG emissions as compared to continued use of the project intersection without project improvements. Additionally, there would likely be long-term GHG benefits from improved operation and smoother pavement surfaces.

Construction Emissions

Construction GHG emissions would result from material processing, on-site construction equipment, and traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be offset to some degree by longer intervals between maintenance and rehabilitation activities.

Construction period GHG emissions were quantified using Sacramento Metropolitan Air Quality Management District's (SMAQMD's) Roadway Construction Emissions Model (version 9.0.0). Construction parameters included a construction start year of 2022, and a duration of 17 months. Total construction-generated CO2 gas emissions were estimated to be 1,209 total tons (1,108 $MTCO_2e$, consisting of CO_2, CH_4, N_2O). The construction-generated GHG emissions for the project equals 37 $MTCO_2e$ per year when annualized over an assumed 30-year period.

Project-level GHG reduction strategies are identified in the Greenhouse Gas Reduction Strategies in the next section. An Initial Study/Negative Declaration is anticipated to be the appropriate form of California Environmental Quality Act (CEQA) documentation for the project; however, specific measures have not yet been identified or required through a project-specific CEQA document.

Additionally, all construction contracts include Caltrans Standard Specifications Section 7-1.02A and 7-1.02C, Emissions Reduction, which require contractors to comply with all laws applicable to the project and to certify they are aware of and will comply with all ARB emission reduction regulations; and Section 14-9.02, Air Pollution Control, which requires contractors to comply with all applicable air pollution control rules, regulations, ordinances, and statutes. Certain common regulations, such as equipment idling restrictions, that reduce construction vehicle emissions also help reduce GHG emissions.

CEQA Conclusion

While the proposed project will result in GHG emissions during construction, it is anticipated that the project will not result in an increase in operational GHG emissions. The proposed project does not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. With implementation of construction GHG-reduction measures, GHG impacts would be less than significant.

Caltrans is firmly committed to implementing measures to help reduce GHG emissions. These measures are outlined in the following section.

GREENHOUSE GAS REDUCTION STRATEGIES

Statewide Efforts

Major sectors of the California economy, including transportation, will need to reduce emissions to meet the 2030 and 2050 GHG emissions targets. As shown in Figure 4, Former Governor Edmund G. Brown promoted GHG reduction goals that involved: (1) reducing today's petroleum use in cars and trucks by up to 50 percent; (2) increasing from one-third to 50 percent our electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farms and rangelands, forests, and wetlands so they can store carbon; and (6) periodically updating the state's climate adaptation strategy, *Safeguarding California: Reducing Climate Risk* (2014).

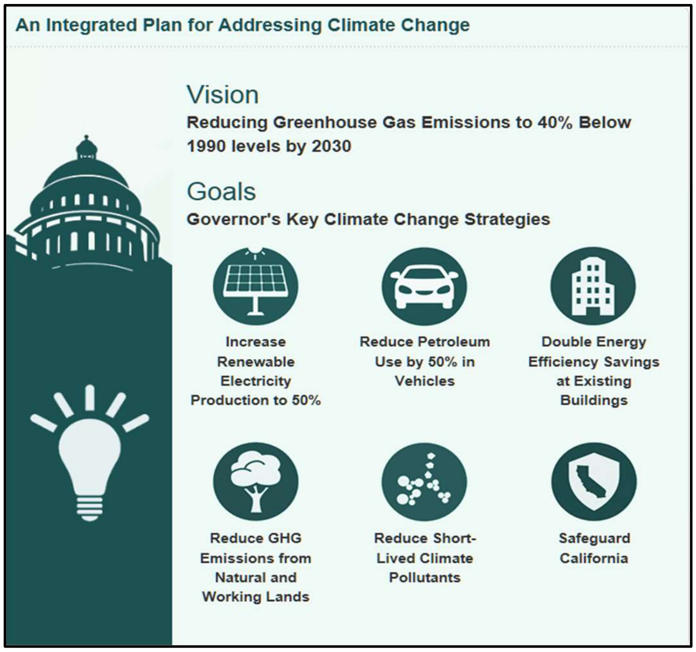


Figure 4. California Climate Strategy

The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that the state build on past successes in reducing criteria and toxic air pollutants from transportation and goods movement. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of vehicle miles traveled (VMT). A key state goal for reducing GHG emissions is to reduce today's petroleum use in cars and trucks by up to 50 percent by 2030 (State of California 2019).

In addition, SB 1386 (Wolk 2016) established as state policy the protection and management of natural and working lands and requires state agencies to consider that policy in their own decision making. Trees and vegetation on forests, rangelands, farms, and wetlands remove carbon dioxide from the atmosphere through biological processes and sequester the carbon in above- and below-ground matter.

Caltrans Activities

Caltrans continues to be involved on the Governor's Climate Action Team as the ARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. EO B-30-15, issued in April 2015, and SB 32 (2016), set an interim target to cut GHG emissions to 40 percent below 1990 levels by 2030. The following major initiatives are underway at Caltrans to help meet these targets.

CALIFORNIA TRANSPORTATION PLAN (CTP 2040)

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. In 2016, Caltrans completed the *California Transportation Plan 2040*, which establishes a new model for developing ground transportation systems, consistent with CO_2 reduction goals. It serves as an umbrella document for all the other statewide transportation planning documents. Over the next 25 years, California will be working to improve transit and reduce long-run repair and maintenance costs of roadways and developing a comprehensive assessment of climate-related transportation demand management and new technologies rather than continuing to expand capacity on existing roadways.

SB 391 (Liu 2009) requires the CTP to meet California's climate change goals under AB 32. Accordingly, the CTP 2040 identifies the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the state's transportation needs. While MPOs have primary responsibility for identifying land use patterns to help reduce GHG emissions, CTP 2040 identifies additional strategies in Pricing, Transportation Alternatives, Mode Shift, and Operational Efficiency.

CALTRANS STRATEGIC MANAGEMENT PLAN

The Strategic Management Plan, released in 2015, creates a performance-based framework to preserve the environment and reduce GHG emissions, among other goals. Specific performance targets in the plan that will help to reduce GHG emissions include:

- Increasing percentage of non-auto mode share
- Reducing VMT
- Reducing Caltrans' internal operational (buildings, facilities, and fuel) GHG emissions

FUNDING AND TECHNICAL ASSISTANCE PROGRAMS

In addition to developing plans and performance targets to reduce GHG emissions, Caltrans also administers several sustainable transportation planning grants. These grants encourage local and regional multimodal transportation, housing, and land use planning that furthers the region's RTP/SCS; contribute to the State's GHG reduction targets and advance transportation-related

GHG emission reduction project types/strategies; and support other climate adaptation goals (e.g., *Safeguarding California*).

CALTRANS POLICY DIRECTIVES AND OTHER INITIATIVES

Caltrans Director's Policy 30 (DP-30) Climate Change (June 22, 2012) is intended to establish a Department policy that will ensure coordinated efforts to incorporate climate change into Departmental decisions and activities. *Caltrans Activities to Address Climate Change* (April 2013) provides a comprehensive overview of Caltrans' statewide activities to reduce GHG emissions resulting from agency operations.

Project-Level GHG Reduction Strategies

The following measures will also be implemented in the project to reduce GHG emissions and potential climate change impacts from the project.

Project Initial Study and Negative Declaration

An Initial Study/Negative Declaration (IS/ND) is the anticipated form of document to be prepared under the California Environmental Quality Act (CEQA). The project design as a roundabout would improve traffic flow. Vehicles are not required to idle as long as at a signal or stop sign because they are not required to stop or queue while passing through a roundabout. This helps reduce fuel consumption and vehicle emissions.

Avoidance/minimization measures to minimize energy use and reduce emissions of construction-generated greenhouse gas emissions are anticipated in the IS/ND; however, the IS/ND is currently in preparation.

2040 RTP FEIR Mitigation Measures

Mitigation Measure 3.5-3: Consistent with Appendix F of the CEQA Guidelines, the agencies implementing RTP projects should:

- Promote measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal. As the individual RTP projects are designed there should be an explanation as to why certain measures were incorporated in the RTP project and why other measures were dismissed.

- Site, orient, and design projects to minimize energy consumption, increase water conservation, and reduce solid-waste.

- Promote efforts to reduce peak energy demand in the design and operation of RTP projects.

- Promote the use of alternate fuels (particularly renewable ones) or energy systems for RTP projects.

- Promote efforts to recycle materials used in the construction (including demolition phase) of RTP projects.

Mitigation Measure 3.7-1: The implementing agencies shall develop a traffic control plan for construction projects to reduce the effects of construction on the roadway system throughout the construction period. As part of the traffic control plan, project proponents shall coordinate with emergency service providers to ensure that emergency routes are identified and remain available during construction activities.

ADAPTATION

Reducing GHG emissions is only one part of an approach to addressing climate change. Caltrans must plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and their intensity, and in the frequency and intensity of wildfires. Flooding and erosion can damage or wash out roads; longer periods of intense heat can buckle pavement and railroad tracks; storm surges combined with a rising sea level can inundate highways. Wildfire can directly burn facilities and indirectly cause damage when rain falls on denuded slopes that landslide after a fire. Effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. Accordingly, Caltrans must consider these types of climate stressors in how highways are planned, designed, built, operated, and maintained.

Federal Efforts

Under NEPA assignment, Caltrans is obligated to comply with all applicable federal environmental laws and FHWA NEPA regulations, policies, and guidance.

The U.S. Global Change Research Program (USGCRP) delivers a report to Congress and the president every 4 years, in accordance with the Global Change Research Act of 1990 (15 U.S.C. ch. 56A § 2921 et seq). The *Fourth National Climate Assessment*, published in 2018, presents the foundational science and the "human welfare, societal, and environmental elements of climate change and variability for 10 regions and 18 national topics, with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways." Chapter 12, "Transportation," presents a key discussion of vulnerability assessments. It notes that "asset owners and operators have increasingly conducted more focused studies of particular assets that consider multiple climate hazards and scenarios in the context of asset-specific information, such as design lifetime" (USGCRP 2018).

The U.S. DOT Policy Statement on Climate Adaptation in June 2011 committed the federal Department of Transportation to "integrate consideration of climate change impacts and adaptation into the planning, operations, policies, and programs of DOT in order to ensure that taxpayer resources are invested wisely, and that transportation infrastructure, services and operations remain effective in current and future climate conditions" (U.S. DOT 2011).

FHWA order 5520 (*Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events,* December 15, 2014) established FHWA policy to strive to identify the risks of climate change and extreme weather events to current and planned transportation systems. FHWA has developed guidance and tools for transportation planning that foster resilience to climate effects and sustainability at the federal, state, and local levels (FHWA 2019).

State Efforts

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system. *California's Fourth Climate Change Assessment* (2018) is the state's effort to "translate the state of climate science into useful information for action" in a variety of sectors at both statewide and local scales. It adopts the following key terms used widely in climate change analysis and policy documents:

- *Adaptation* to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
- *Adaptive capacity* is the "combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities."
- *Exposure* is the presence of people, infrastructure, natural systems, and economic, cultural, and social resources in areas that are subject to harm.
- *Resilience* is the "capacity of any entity – an individual, a community, an organization, or a natural system – to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience". Adaptation actions contribute to increasing resilience, which is a desired outcome or state of being.
- *Sensitivity* is the level to which a species, natural system, or community, government, etc., would be affected by changing climate conditions.
- *Vulnerability* is the "susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt." Vulnerability can increase because of physical (built and environmental), social, political, and/or economic factor(s). These factors include, but are not limited to: ethnicity, class, sexual orientation and identification, national origin, and income inequality. Vulnerability is often defined as the combination of sensitivity and adaptive capacity as affected by the level of exposure to changing climate.

Several key state policies have guided climate change adaptation efforts to date. Recent state publications produced in response to these policies draw on these definitions.

EO S-13-08, issued by then-governor Arnold Schwarzenegger in November 2008, focused on sea-level rise and resulted in the *California Climate Adaptation Strategy* (2009), updated in 2014 as *Safeguarding California: Reducing Climate Risk* (Safeguarding California Plan). The

Safeguarding California Plan offers policy principles and recommendations and continues to be revised and augmented with sector-specific adaptation strategies, ongoing actions, and next steps for agencies.

EO S-13-08 also led to the publication of a series of sea-level rise assessment reports and associated guidance and policies. These reports formed the foundation of an interim *State of California Sea-Level Rise Interim Guidance Document* (SLR Guidance) in 2010, with instructions for how state agencies could incorporate "sea-level rise (SLR) projections into planning and decision making for projects in California" in a consistent way across agencies. The guidance was revised and augmented in 2013. *Rising Seas in California – An Update on Sea-Level Rise Science* was published in 2017 and its updated projections of sea-level rise and new understanding of processes and potential impacts in California were incorporated into the *State of California Sea-Level Rise Guidance Update* in 2018.

EO B-30-15, signed in April 2015, requires state agencies to factor climate change into all planning and investment decisions. This EO recognizes that effects of climate change other than sea-level rise also threaten California's infrastructure. At the direction of EO B-30-15, the Office of Planning and Research published *Planning and Investing for a Resilient California: A Guidebook for State Agencies* in 2017, to encourage a uniform and systematic approach to addressing climate change adaptation. Representatives of Caltrans participated in the multi-agency, multidisciplinary technical advisory group that developed this guidance on how to integrate climate change into planning and investment.

AB 2800 (Quirk 2016) created the multidisciplinary Climate-Safe Infrastructure Working Group, which in 2018 released its report, *Paying it Forward: The Path Toward Climate-Safe Infrastructure in California*. The report provides guidance to agencies on how to address the challenges of assessing risk in the face of inherent uncertainties still posed by the best available science on climate change. It also examines how state agencies can use infrastructure planning, design, and implementation processes to address the observed and anticipated climate change impacts.

Caltrans Adaptation Efforts

CALTRANS VULNERABILITY ASSESSMENTS

Caltrans is conducting climate change vulnerability assessments to identify segments of the State Highway System vulnerable to climate change effects including precipitation, temperature, wildfire, storm surge, and sea-level rise. The approach to the vulnerability assessments was tailored to the practices of a transportation agency, and involves the following concepts and actions:

- *Exposure* – Identify Caltrans assets exposed to damage or reduced service life from expected future conditions.
- *Consequence* – Determine what might occur to system assets in terms of loss of use or costs of repair.

- *Prioritization* – Develop a method for making capital programming decisions to address identified risks, including considerations of system use and/or timing of expected exposure.

The climate change data in the assessments were developed in coordination with climate change scientists and experts at federal, state, and regional organizations at the forefront of climate science. The findings of the vulnerability assessments will guide analysis of at-risk assets and development of adaptation plans to reduce the likelihood of damage to the State Highway System, allowing Caltrans to both reduce the costs of storm damage and to provide and maintain transportation infrastructure that meets the needs of all Californians.

Project Adaptation Analysis

The following climate change vulnerability assessments and adaptation documents were consulted for assessing the project's vulnerability to climate change impacts and potential to exacerbate those impacts:

- Caltrans Climate Change Vulnerability Assessment; District 3 Technical Report (Caltrans 2019).

- Placer County Sustainability Plan (Placer County 2020).

As described in the Caltrans Climate Change Vulnerability Assessment for District 3, extreme weather impacts in District 3, including within Placer County, are anticipated to include heavy precipitation events that could result in additional flooding and slip-out, increased extent and severity of wildfire; and indirect effects of fire such as landslides on steep slopes. Additionally, the assessment discusses the potential for sea-level rise and storm surges with the Sacramento-San Joaquin Delta.

As part of preparation of the PCSP, the County prepared a 2018 Climate Change Vulnerability Assessment that assesses the climate-related hazards in Placer County and how they are projected to change over time. The PCSP also builds on the 2016 Local Hazard Mitigation Plan by assessing the long-term potential for harm from climate-related hazards and identifying GHG emission reduction strategies and adaptation strategies necessary to implement the goals and objectives outlined in the Local Hazard Mitigation Plan.

The PCSP identifies existing adaptation strategies for a more resilient county, as well as provides new adaptation strategies. Existing adaptation strategies applicable to the project include:

> <u>Extreme Heat</u>
>
> 10. Encourage jurisdictions and Caltrans to use lighter colored pavement with increased reflectivity in pavement rehabilitation projects, to reduce the urban heat island effect. (2036 Regional Transportation Plan)

Flooding and Dam Inundation

19. Policy 4.F.4. The County shall require evaluation of potential flood hazards prior to approval of development projects. The County shall require proponents of new development to submit accurate topographic and flow characteristics information and depiction of the 100-year floodplain boundaries under fully developed, unmitigated runoff conditions. (PFE)

Wildfires

44. Policy 8.C.1. The County shall ensure that development in high-fire-hazard areas is designed and constructed in a manner that minimizes the risk from fire hazards and meets all applicable state and County fire standards. (HSE)

46. Policy 8.C.7. The County shall work with local fire protection agencies, the California Department of Forestry and Fire Protection, and the U.S. Forest Service to promote the maintenance of existing fuel breaks and emergency access routes for effective fire suppression. (HSE)

Additionally, the PCSP includes the following applicable strategy:

> **Strategy EH-5:** Use light-colored pavement for road construction and repair activities as feasible.

Climate-change risk analysis involves uncertainties as to the timing and intensity of potential risks; this uncertainty is inherent in projections and modeling future conditions. However, the Caltrans Climate Change Vulnerability Assessment for District 3 uses the most recent generation of GHG scenarios produced by the Intergovernmental Panel on Climate Change (IPCC), which is the leading international body recognized for its work in quantifying the potential effects of climate change.

SEA-LEVEL RISE

The proposed project is outside the coastal zone and not in an area subject to sea-level rise. Accordingly, direct impacts to transportation facilities due to projected sea-level rise are not expected.

FLOODPLAINS

The project site is located outside of the 100-year floodplain, in a FEMA Zone X (area of minimal flood hazard), and does not contain a bridge or culvert that would be susceptible to damage from increased flooding associated with future climate change scenarios. The project site is within an area identified as having a 0.0-4.9% change in the 100-year storm precipitation depth in by 2025, and a 5.0-9.9% change by 2055 and 2085 (Caltrans 2019). Therefore, it is not anticipated that the project site would be subject to a substantial increase in 100-year storm precipitation depths. Furthermore, the project would not substantially increase impervious surfaces in the area, have features that would redirect flows, or otherwise exacerbate potential flooding through changes in grade or slope.

WILDFIRE

The project is located in a State Responsibility Area classified as having a “high” and “moderate” fire hazard (California Department of Forestry and Fire Protection [CALFIRE] 2019). The project site is an exposed roadway within an area identified as High Level of Concern by 2025, 2055, and 2085 by Caltrans (Caltrans 2019). In addition to direct effects of wildfires on transportation facilities, wildfires can indirectly contribute to:

- Landslide and flooding exposure, by burning off soil-stabilizing land cover and reducing the capacity of the soils to absorb rainfall.

- Wildfire smoke, which can affect visibility and the health of the public and Caltrans staff.

Operationally, the project does not exacerbate wildfire risks. The project is located at existing intersections and it does not include new development in a previously unoccupied area. The intersections accommodate projected traffic and the project is not anticipated to induce unplanned growth.

During construction, there is a potential for higher fire risk due to use of heavy construction equipment on-site and adjacency to grasslands. Implementation of Caltrans Standard Specifications and Best Management Practices would avoid impacts.

Stormwater runoff volumes and rates during operation of the project are not anticipated to be substantially different than the existing volumes and rates, and the final design of stormwater drainage would be consistent with Caltrans Standards. Post-fire slope instability is not anticipated because exposed slopes would be revegetated/hydroseeded in accordance with Caltrans Standard Specifications. The project would not be exposed to significant risks, including downslope or downstream flooding or landslides as a result of runoff, post-fire slope instability, or drainage changes.

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Appendix G

Preliminary Site Investigation – Aerially Deposited Lead (ADL) Report

Bell Road at Interstate 80 Roundabouts Project
Placer County, California
03-PLA-80 - PM R 21.3-R 20.9

Preliminary Site Investigation-Aerially Deposited Lead Study

Prepared for:

COUNTY OF Placer

Department of Public Works

Prepared by:

WRECO

July 2020

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Bell Road at Interstate 80 Roundabouts Project
Placer County, California
03-PLA-80 - PM R 21.3-R 20.9

Preliminary Site Investigation-Aerially Deposited Lead Study

Submitted to: **Placer County Department of Public Works**

This report has been prepared by or under the supervision of the following Professional Geologist. The Registered Professional Geologist attests to the technical information contained herein and has judged the qualifications of any technical specialists providing environmental data upon which recommendations, conclusions, and decisions are based.

Melissa McAssey
Professional Geologist #8132

7/16/2020
Date

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Executive Summary

The Bell Road at Interstate 80 (I-80) Roundabouts Project (Project) is situated at the Bell Road and I-80 interchange, located north of the City of Auburn (City), in Placer County (County), California. The Project area consists of the I-80 interchange at Bell Road, along Musso Road (to the east) and Bowman Road (to the west), which is approximately 2 miles east of the Auburn Airport and 1.7 miles north of the City limits. The proposed work includes the construction of roundabouts on both the eastern and western sides of the I-80 to allow for easier access that will cause less traffic, especially during peak commuting hours. This report presents the results of the Preliminary Site Investigation (PSI) - Aerially Deposited Lead (ADL) Study conducted by WRECO for the proposed Project.

The current stop-controlled intersection, at both the eastbound and westbound on/off ramps at Bell Road, causes vehicles to impact I-80, which is the primary concern of the California Department of Transportation (Caltrans) and Placer County. The Placer County Department of Public Works is proposing these modifications to improve traffic delays and driver safety, and the roundabouts were deemed the most efficient and cost-effective way to mitigate traffic and require significant bridge or road widening.

WRECO conducted the Initial Site Assessment (ISA) in September 2019, and some potential Recognized Environmental Conditions (REC) were identified:

- Utility poles (treated wood - arsenic, copper, chromium, creosote, and pentachlorophenol) along the roadways (Musso Road, Bowman Road, and I-80) have pole-mounted transformers, which may contain polychlorinated biphenyls (PCB);
- Historical agricultural practices (pesticides, metals) and the existing golf course (fertilizer) in the adjacent area could have potential impact on the exposed soil at the Project area;
- Potential lead-based paint in the traffic striping on the roadway;
- Potential ADL in exposed soil along the roadway from historical vehicle emissions during the leaded gasoline era; and
- Naturally Occurring Asbestos (NOA) from ultramafic rock formations, occur within 1- 5 miles of the Project area.

The PSI-ADL Study was performed in accordance with the American Society for Testing and Materials (ASTM) International Standard E1903-11, *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process*, and Caltrans District 3 ADL study standards successfully applied in this region by WRECO. The PSI-ADL Study was completed to verify the presence/absence of RECs, to evaluate the available options for soil disposal or reuse, and to provide specific guidance for waste management and worker safety during construction.

On September 18-19, 2019, WRECO collected shallow soil samples from three geotechnical borings (A-19-001, A-19-006, and A-19-007). On September 30, 2019, WRECO conducted a site investigation that included sampling 16 borings to 5-feet below ground surface (ft bgs) using a Direct Push Technology (DPT) rig with an acetate liner. The acetate liner was cut into specific depth intervals (0-1’, 1-2’, and 2-3’), per Caltrans standards for ADL testing, and analyzed for lead and pH using Environmental Protection Agency (EPA) Methods 6020 and 9045, respectively. An encroachment permit was obtained from Caltrans (0319-NSV0415) for the PSI work.

Detectable lead concentrations for sampling depth 0-1 ft ranged from 0.64 to 40 milligrams per kilogram (mg/kg); 1-2 ft ranged from 0.23 to 17 mg/kg; and 2-3 ft ranged from 0.41 to 40 mg/kg. The detectable lead concentrations did not exceed the Soluble Threshold Limit Concentration (STLC) value of 5 milligrams per liter (mg/L). The geotechnical bulk sample, A-19-001, had a lead concentration of 3.6 mg/kg and a pH of 7.3. The pH values ranged from 4.8 to 8.3. These pH values are within threshold (greater than 2 and less than 12.5) for state and federal waste criteria for reuse. Detectable lead concentrations did not exceed the Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESL) for residential, construction worker, and commercial/industrial exposure.

The analytical data for lead in the soil samples was analyzed using statistical evaluation using the EPA’s ProUCL Version 5.1. The 95% Upper Confidence Limit (UCL) was calculated for each depth that was sampled for lead, to determine soil reuse and disposal options. The average detectable lead concentrations evaluated for the Project area were: 21.57 (0-1 ft), 10.10 (1-2 ft), and 15.19 mg/kg (2-3 ft). Since the 95% UCLs are less than the lead total threshold limit concentration (TTLC) of 1,000 mg/kg and below the California EPA soil guidance of 80 mg/kg, the shallow soil can be reused in the Project area.

Under the Department of Toxic Substances Control (DTSC) June 2016 *Statewide Agreement for Caltrans for Reuse of Aerially Deposited Lead-Contaminated Soils* (Agreement), “ADL contaminated soil” is defined as excavated soil, based on a 95% UCL, that contains total lead concentrations greater than 80 mg/kg and a standard threshold limit concentration (STLC) of lead greater than or equal to 5 milligrams per liter (mg/L). “Clean Soil” is defined as soil, based on a 95% UCL, containing total lead less than or equal to 80 mg/kg and STLC of lead less than 5 mg/L, and no other constituents at concentrations that pose an unacceptable threat to human health or the environment. Soil containing ADL can be reused under the DTSC Agreement must always be at least 5 feet above the highest groundwater elevation and, depending on lead concentrations, may need to be covered with at least 1 foot of clean soil or a pavement structure. If the soil sample results were below the limits set, then there are no cover requirements, and the soil is non-Hazardous.

Seven composite soil samples had additional analyses performed that included organochlorine pesticides (OCP) with PCBs (EPA Method 8082/8081A); organophosphorus pesticides (OPP) (EPA Method 8141); semi-volatile organic compounds (SVOC) with polyaromatic hydrocarbons (PAH) (EPA Method 8270); Resource Conservation and Recovery Act (RCRA) 8 metals; and NOA (California Air Resources Board [CARB] 435/ Polarized Light Microscopy [PLM] EPA 600/R-93/116).

Four composite samples had detectable OCP concentrations of DDE that ranged from 0.0014 to 0.32 mg/kg, DDT that ranged from 0.0020 to 0.047 mg/kg, dieldrin was detected in one boring (B-1) at 0.00062 mg/kg, DDD was detected in one boring (B-3) at 0.0070 mg/kg, and chlordane was detected in one boring (B-13) at 0.0058 mg/kg. Two composite samples had detectable PCB concentrations of PCB-1260 that ranged from 0.0017 to 0.0022 mg/kg. One composite sample (B-

14,) had a detectable SVOC concentration of pyrene at 0.012 mg/kg. The detectable concentrations did not exceed the STLC values for the constituents of concern (COC), and can be pre-classified as Non-Hazardous. Detectable concentrations did not exceed the RWQCB ESL for residential, construction worker, and commercial/industrial exposure.

Five composite samples had detectable RCRA 8 Metals concentrations of arsenic that ranged from 1.6 to 17 mg/kg; barium that ranged from 22 to 430 mg/kg; cadmium that ranged from 0.083 to 0.21 mg/kg; chromium that ranged from 19 to 64 mg/kg; lead that ranged from 0.69 to 34 mg/kg; mercury that ranged from 0.012 to 0.017 mg/kg; selenium that ranged from 0.11 to 0.46 mg/kg; and silver that ranged from 0.030 to 0.035 mg/kg. Three of the samples exceeded 10 times the STLC for chromium (50 mg/L), and were further analyzed using California Waste Extraction Test (CA WET). Laboratory results indicated that STLC chromium concentrations ranged from 0.053 to 0.11 mg/L, which are below the STLC regulatory limit of 5 mg/L, and the soil can be pre-classified as non-hazardous (with respect to chromium). The arsenic results exceeded the ESL for residential, commercial/industrial, and construction worker exposure limits (cancer risk). The chromium results exceeded the ESLs for residential, commercial/industrial, and construction worker exposure limits for Cr VI (cancer risk); however, below ESLs for Cr III and VI (non-cancer hazard), as there are no values for total chromium. The soil in the areas near B-2, B-3, and B-14 should be managed for worker safety during construction for both arsenic and chromium.

Six composite samples were analyzed for Naturally Occurring Asbestos (NOA) by polar light microscopy (PLM) analysis using EPA Method 600/R-93/116 with CARB 435 Prep. No detectable amounts of NOA were identified in the soil samples.

The contractor(s) should prepare a project-specific Lead Compliance Plan (CCR Title 8, §1532.1, “Lead in Construction” standard) to minimize worker exposure to lead-containing soil along Bell Road and should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-containing soil.

PSI Recommendations

Material	Description	Recommended Actions
ADL in shallow soil	Detectable lead concentrations in shallow soil within the Project area ranged from 0.23 to 40 mg/kg, which are below the regulatory limit of 80 mg/kg. Therefore, the soil is pre-classified as Non-Hazardous.	Manage ADL waste per: • Caltrans-DTSC *Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils* (June 2016) for re-use and disposal. • **Caltrans Standard Special Provisions (SSP) 7-1.02K(6)(j)(iii) (DOCX) (10/19/2018) - Earth Material Containing Lead** - Requires a lead compliance plan for soil disturbance when lead concentrations are non-hazardous. • **Caltrans Standard Specification 14-11.08 -** Regulated Material Containing Aerially Deposited Lead (2018). **Caltrans Standard Specification 14-11.09** - Minimal Disturbance of Regulated Material Containing Aerially Deposited Lead (2018).

Material	Description	Recommended Actions
Arsenic and Chromium in shallow soil	Detectable Arsenic concentrations (1.6 and 17 mg/kg) in the Project area did not exceed 10 times the STLC regulatory limit (5 mg/L) and can be pre-classified as Non-Hazardous. Detectable chromium concentrations (19 to 64 mg/kg) in the Project area did exceed 10 times the STLC regulatory limit and three samples were analyzed using CA WET. The concentrations were below the STLC regulatory limit; therefore, the soil can be pre-classified as Non-Hazardous. However, the Arsenic and Chromium concentrations in soil exceeded the RWQCB ESLs and soil in these areas need to be managed for worker safety.	Worker Safety Training will need to include exposure to Arsenic and Chromium in soil (above RWQCB ESL levels). Dispose of excavated soils as Non-hazardous waste at Class II unit or Class III landfill depending on facility acceptance standard, consistent with CCR Title 22 §66262.11 waste classification.
Asphalt and Concrete (AC)	All asphalt (AC) and concrete removed during roundabout construction can be reclaimed and recycled.	• All asphalt concrete (AC) materials should be recycled per the Caltrans directive for reclaimed AC (AB 1306), in accordance with the January 27, 1993 Memorandum on "Department of Fish and Game Agreement on AC Grindings, Chunks and Pieces." • Caltrans Asphalt-Concrete and Portland Cement Concrete Grindings Reuse Guidance (2007). • **Caltrans SSP 60-2.01A (DOCX) (10/19/2018)** - Use for removing structures or portions of structures, including bridges, retaining walls, sound walls, and other concrete or masonry structures. **Caltrans SSP 60-2.02 (DOCX) (10/19/2018)** - Use for bridge removal work.
Utility Poles (treated wood) with transformers (PCBs) along Bell Road	Potential arsenic, copper, chromium, creosote, and pentachlorophenol may be present in treated wood used for utility poles. Potential PCBs in pole-mounted electrical transformers along the Project area.	Treated wood removed from the Project area would be managed in accordance with Title 22, Division 4.5, Chapter 34 of the California Code of Regulations. Abate transformers prior to construction; PG&E manages the electric lines and transformers.
Traffic Striping	Potential lead and lead-chromate are associated with traffic striping. Implementation of improvements may require the removal and disposal of yellow traffic striping and pavement marking materials (paint, thermoplastic, permanent tape, and temporary tape). Yellow paints made prior to 1995 may exceed hazardous waste criteria under Title 22 CCR and require disposal in a Class I disposal site.	Abate striping prior to construction following Caltrans SSP: • **Caltrans SSP 14-11.12 (DOCX) (10/19/2018) - Remove Yellow Traffic Stripe and Pavement Marking with Hazardous Waste Residue** - Requires proper management of hazardous waste residue and a lead compliance plan. • **Caltrans SSP 36-4 (DOCX) (10/19/2018) - Containing Lead from Paint and Thermoplastic** - Requires a lead compliance plan for removal when residue is definitely non-hazardous.

Material	Description	Recommended Actions
		Caltrans SSP 84-9.03C (DOCX) (10/19/2018) - **Remove Traffic Stripes and Pavement Markings Containing Lead -** Requires a lead compliance plan for removal when residue is definitely non-hazardous. Used for new yellow paints and all other colors of paint.
Arsenic and Chromium in shallow soil	Detectable Arsenic concentrations (1.6 and 17 mg/kg) in the Project area did not exceed 10 times the STLC regulatory limit (5 mg/L) and can be pre-classified as Non-Hazardous. Detectable chromium concentrations (19 to 64 mg/kg) in the Project area did exceed 10 times the STLC regulatory limit and three samples were analyzed using CA WET. The concentrations were below the STLC regulatory limit; therefore, the soil can be pre-classified as Non-Hazardous. However, the Arsenic and Chromium concentrations in soil exceeded the RWQCB ESLs and soil in these areas need to be managed for worker safety.	Worker Safety Training will need to include exposure to Arsenic and Chromium in soil (above RWQCB ESL levels). Dispose of excavated soils as Non-hazardous waste at Class II unit or Class III landfill depending on facility acceptance standard, consistent with CCR Title 22 §66262.11 waste classification.

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Acronyms

AAI	All Appropriate Inquires
AC	Asphalt Concrete
ADL	aerially deposited lead
APCD	air pollution control district
APN	Assessor Parcel Number
ASTM	American Society for Testing and Materials
ATCM	Airborne Toxic Control Measure
bgs	below ground surface
CA WET	California Waste Extraction Test
Cal/OSHA	California Division of Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCR	California Code of Regulations
CFR	Code of Federal Regulation
CGS	California Geologic Society
COC	Constituents of Concern
County	County of Placer
DFG	Department of Fish and Game
DOT	Department of Transportation
DPT	Direct Push Technology
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EB	eastbound
EPA	Environmental Protection Agency
ESL	Environmental Screening Levels
ft	feet
I-80	Interstate 80
ICP/MS	Inductively Coupled Plasma/Mass Spectrometry
ISA	Initial Site Assessment
LBNL	Lawrence Berkeley National Laboratory
mg/kg	milligrams per kilograms
mg/L	milligrams per liter
ND	non-detectable
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOA	naturally occurring asbestos
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
PLM	Polarized Light Microscopy
Project	Bell Road at Interstate 80 Roundabouts Project
PSI	Preliminary Site Investigation
RCRA	Resource Conservation Recovery Act
REC	Recognized Environmental Condition
RWQCB	Regional Water Quality Control Board

SR	State Route
SSP	Standard Special Provisions
STLC	soluble threshold limit concentration
SVOC	Semi Volatile Organic Compounds
TCLP	toxicity characteristic leaching procedure
TTLC	total threshold limit concentration
TWW	treated wood waste
UCL	upper confidence limit
USGS	United States Geological Survey
WB	westbound

1 INTRODUCTION

This report presents the results of the Preliminary Site Investigation (PSI)–Aerially Deposited Lead (ADL) Study conducted by WRECO, on behalf of the Placer County Department of Public Works for the Bell Road at Interstate 80 (I-80) Roundabouts Project (Project) in Placer County (County), California. The Project area consists of the I-80 interchange at Bell Road along Musso Road (to the east) and Bowman Road (to the west), and is designed to mitigate traffic onto and off of the I-80. The traffic impact to the mainline I-80 is a concern for the California Department of Transportation (Caltrans) and Placer County DPW, and the proposed roundabouts are intended to improve traffic delays as well as driver safety, without having to widen the Bell Road bridge over I-80.The Project area is approximately 2 miles east of the Auburn Airport and 1.7 miles north of Auburn's city limits. The Project Vicinity Map and Project Location Map are shown in Figure 1 and Figure 2, respectively.

On September 18–19 and 30, 2019, WRECO conducted a subsurface investigation that included shallow soil sampling of three geotechnical and 16 borings in areas proposed for excavation/soil disturbance along Bell Road and the I-80 on/off-ramps. The PSI-ADL Study was performed to verify the presence/absence of Recognized Environmental Conditions (REC) identified in the Initial Site Assessment (ISA) Report (WRECO, 2019), evaluate the available options for soil disposal or reuse, and to provide guidance for waste management and worker safety during construction.

1.1 Project Description

The proposed project would address capacity and safety concerns at the interchange along Bell Road in Placer County (County) at the Interstate 80 (I-80) eastbound (EB) and westbound (WB) ramp intersections, including Bowman Road on the west and Musso Road on the east. These improvements are identified as the Bell Road at I-80 Interchange Project (Project). The County proposes to construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a second five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection.

1.1.1 Project Location

The Project is located within the southeastern portion of Placer County, California, around 38.9460113 latitude and -121.0473178 longitude and between post miles R20.9 and R21.3 (see Figure 1). The Project site is approximately 2 miles east of the Auburn Airport and north of Auburn's city limits.

1.1.2 Project Setting

I-80, in the Project vicinity, is a six-lane, divided freeway extending through Auburn to the south and Colfax to the north. As a major freeway, I-80 provides east-west access from the Bay Area to Nevada. Within the Project area, I-80 extends in a northeast-southwest direction. I-80 consists of three 12-foot lanes in each direction.

Bell Road is a County-owned facility that acts as a north-south Major Collector Street, linking a vital urban area north of Auburn to the rest of the County and State Route (SR) 49. In the vicinity of the Project, Bell Road consists of a two-lane to four-lane roadway with a posted speed limit of 55 miles per hour (mph).

Musso Road is a low-speed, two-lane facility that dead ends on both the eastern and western side of the interchange with low speeds and accesses local and rural businesses/properties. The railroad, I-80, and the creek border Musso Road and therefore, use is not likely to change significantly in the future.

Bowman Road is a two-lane facility that runs parallel to I-80 within the County and connects to the interchange to the east and west of Bell Road and beyond. Ultimately, Bowman Road is slated to be the bicycle connection in the area per the County bicycle master plan.

The Project is located in a rural setting, surrounded by open space land, agriculture, commercial properties, and residential neighborhoods.

1.1.3 Purpose and Need

Need

Between 2014 and 2018, several collisions were recorded at the Project site. The majority of the collisions were due to rear ending or sideswiping another vehicle and hitting an object (typically collisions with vehicles or other objects such as signs, poles, etc.). The primary collision factors were unsafe speed, improper turning, and automobile right-of-way. Improving the existing interchange with a roundabout would reduce rear-end and hit object collisions due to the design configuration.

Also, congestion in the Project area during the AM and PM peak hours has significantly impacted the efficiency of the existing Bell Road at I-80 interchange, which is resulting in traffic backing up onto the mainline. This condition is an operational and safety issue that needs to be addressed.

Purpose

The primary purpose of the proposed project is to maximize the existing infrastructure to efficiently convey traffic safely through the interchange. The secondary purpose of this project is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

1.1.4 Project Design Alternatives

A No-Build Alternative and one Build Alternative were analyzed for this Project. The No-Build Alternative assumes existing lane geometrics and intersection control. The Build Alternative consists of yield-controlled roundabouts with modified lane geometrics. An alternative involving signalized intersections with a widened overcrossing structure as well as an alternative involving a roundabout at the WB off-ramp and the reconstruction of the EB on-ramp to a loop on-ramp were also considered as part of the Project Initiation Document (PID) phase. These two alternatives were ultimately rejected due to the lower overall Level of Service (LOS) that would be able to be achieved, the higher project costs, and the additional right-of-way that would be required to construct.

No-Build Alternative

The No-Build Alternative leaves the existing lane geometrics and intersection controls in place. Under existing conditions, the Bell Road/Bowman Road intersection is controlled by a signal and the Bell Road/Musso Road intersection is stop controlled when traveling southbound along Bell Road. The Bell Road/WB I-80 off-ramp is stop controlled and the Bell Road/EB I-80 off-ramp and northbound Bell Road travel way is stop controlled. The Bell Road at I-80 interchange intersections are approximately 130 feet to 380 feet apart.

Build Alternative

This alternative would replace the existing study intersections with two modern, yield-controlled, single and multi-lane roundabouts designed to accommodate the Ultimate Design Year traffic forecast volumes. The Build Alternative best meets the safety purpose of the Project for all modes of travel, while addressing future mobility needs.

1.1.5 Proposed Project

The proposed project would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. The roundabouts would be designed to accommodate future growth “2045.” Figures 2 and 3 on the following page shows the current project environmental study area. Intersection geometrics and pedestrian crossings would be consistent with the National Cooperative Highway Research Program (NCHRP) Report 672 entitled “Roundabouts: An Information Guide, 2nd Edition” (Guide).

Roundabout improvements at the Bell Road at I-80 interchange would include, but not be limited to, the following:

- A 10-foot, shared-use path separated from the roadway with a five-foot minimum landscaped buffer for pedestrian safety and to guide pedestrians to correct crossing locations;
- Crosswalks and Americans with Disabilities Act (ADA) accessible ramps along pedestrian facilities; and
- Vehicular speeds ranging from 15 to 30 mph after Project buildout within the interchange.

Pedestrian and Bicycle Safety

The 10-foot, shared-use path would convey pedestrian and bicycle traffic through the intersection and provide the opportunity for cyclists to exit the bicycle lane via a bicycle ramp and navigate the intersection on the shared-use path and through the crosswalks. Cyclists would also have the option to exit the bicycle lane and enter the roadway to ride with vehicle traffic through the roundabout.

Crosswalks would be split into two separate crossings through the provision of the pedestrian refuges at the splitter islands. These two-stage crossings would reduce the amount of sustained time a pedestrian is in potential conflict with motorized vehicles by limiting the length of each crossing and limiting each crossing to one direction of vehicle travel at a time.

Pedestrian crossings would be a minimum of one car length from the circulatory roadway, and the pedestrian refuges at the splitter islands would be at least 6 feet wide, consistent with the NCHRP Guide.

Erosion Control

Any ground cover disturbed by the overall project would be seeded or otherwise protected from any potential erosion.

In addition, the following erosion control measures are proposed during the construction phase:

- Temporary silt fences;
- Temporary storm drain inlet protection;
- Temporary covers on slopes and stockpiles;
- Temporary concrete washout facilities;
- Temporary construction site entrances; and
- Fiber rolls.

Lighting and Signage

The Project would provide enhanced lighting to improve roadway visibility for drivers during nighttime hours. Lighting is anticipated to be installed at ramp merges and diverges along the shoulders of I-80. The electroliers would be supported on a cast-in-drilled-hole concrete pile (with a typical diameter of 2.5 feet and length of 5 feet). New conduits, trenching, and power service connections would be required to install lighting along the shoulders.

Existing local guide signs and regulatory signs would likely be removed and replaced. Additional guide signs would be placed per the California Manual on Uniform Traffic Control Devices (CA MUTCD). Overhead signs would be installed along southbound Bell Road approaching Bowman Road, at the I-80 WB off-ramp, and along the EB off-ramp for direction through the roundabout.

Retaining Walls

The roundabout incorporating Musso Road and Bell Road would require the construction of a retaining wall south of Musso Road. The wall would be approximately 270 feet long with a maximum height of 20 feet. The type of wall is still being determined, and a soil nail wall with a concrete vehicular barrier is the current type selection.

The roundabout incorporating Bowman Road and Bell Road will require the construction of a retaining wall north of Bowman Road. The wall would be approximately 440 feet long and have a maximum height of 14 feet. The type of wall is still being determined, but a concrete Type 1 cantilever retaining wall is the current type selection.

Right-of-Way

Approximately 0.7 acres (0.1 acres of temporary construction easement [TCE] and 0.6 acres of partial fee acquisition) of additional right of way would be required to construct the project. The right of way acquisition would be required at three privately owned parcels located at APN 053-

020-055-000 (TUDSBURY), APN 053-020-072-510 (BORN), and APN 053-031-063-000 (MUSSO). The project would require at least a partial fee acquisition and temporary construction easement for all parcels. Two parcels (APN 053-020-072-510 and APN 053-031-063-000) may require a full fee acquisition depending on the negotiations with the owners. All three parcels are generally vacant land.

Utilities

The following is a preliminary list of utilities within the construction limits:

- Pacific Gas & Electric Company (PG&E) overhead electric lines;
- PG&E six-inch iron distribution line; and
- Placer County Water Agency 24-inch ductile iron pipe with air vacuum release valve (AVRV).

Constructing the Project may require relocation of the PG&E poles for the overhead electric lines.

Depth of Excavation

Excavation would be required throughout the Project in order to construct landscaping, utilities, and overhead signs. A minimum depth of 5 feet would be required for improvements to underground utilities. A maximum excavation depth of 25 feet would be required to install the overhead signs. A maximum excavation depth of 15 feet would be required to install the two retaining walls on the Project.

Construction

Construction is currently anticipated to begin by Summer 2022. Construction would be phased in order to maintain local access to I-80. Construction lay down areas would be at two different locations. For construction of the Bowman Road and Bell Road roundabout, staging could be located at the vacant parcel located east of Bell Road, south of Bowman Road and north of I-80 WB off-ramp. Staging for the Musso Road and Bell Road roundabout could occur at the vacant parcel located east of Bell Road, north of Musso Road and south of I-80 EB on-ramp.

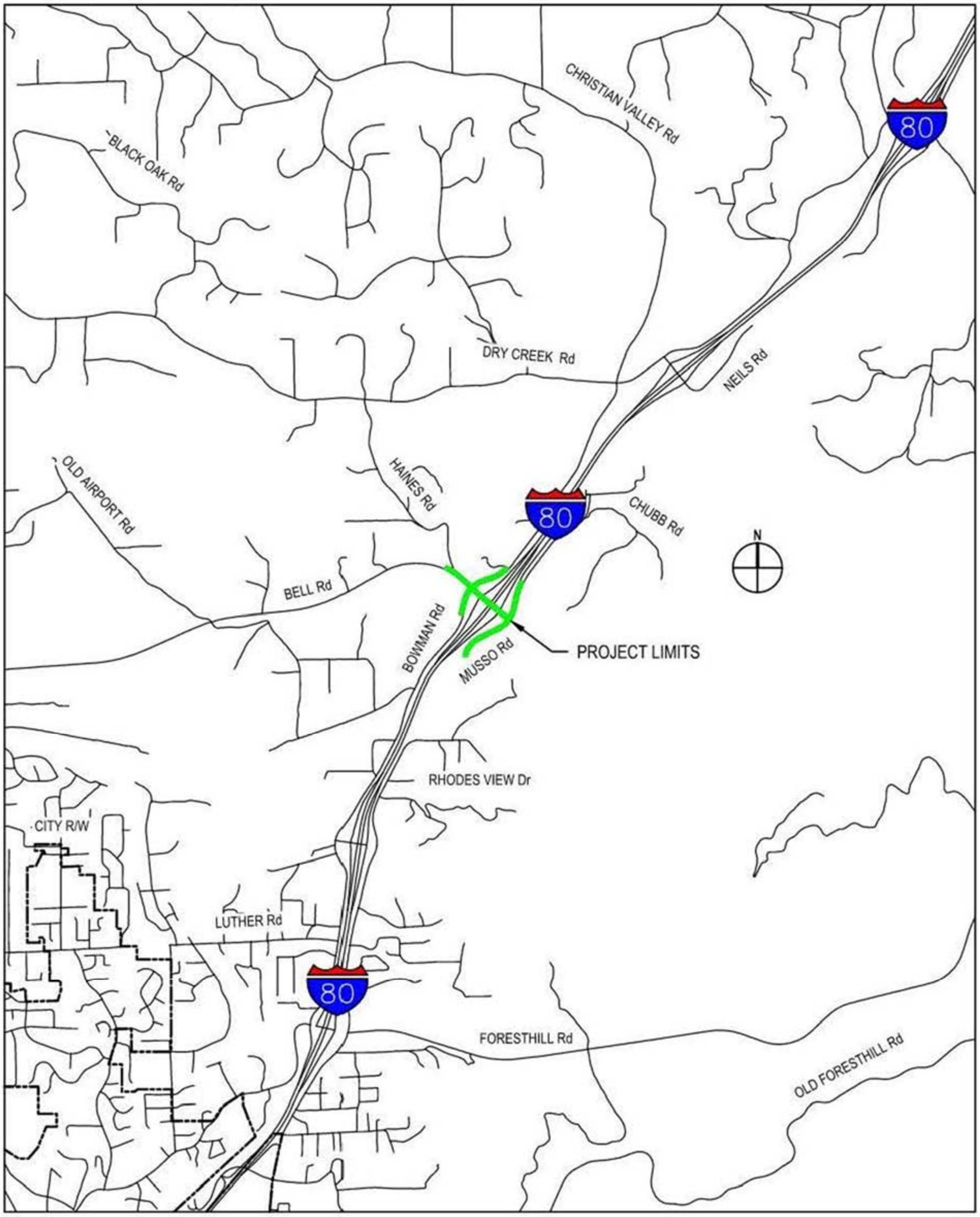

Figure 1. Project Vicinity Map

Source: GHD

Figure 2. Project Location Map

Source: Google Earth

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1.2 Current Land Use

The Project area is located in a rural setting, surrounded by open space land, agriculture, commercial properties, and residential neighborhoods. The proposed work includes the construction of roundabouts on both the eastern and western sides of I-80 to allow for easier access that will cause less traffic, especially during peak commuting hours.

The Project area is surrounded by residential properties, open space/agricultural property, and an RV Park. The Assessor Parcel Number (APN) Map as shown in Figure 3:

- From the west to northwest of the proposed westbound on/off ramp - roundabout:
    - APN 053-020-055: open space;
    - APN 053-020-051: (245 Juniper Drive) a residential single-family parcel;
    - APN 053-020-022: (199 Juniper Drive) a residential single-family parcel;
    - APN 053-020-064: a residential single-family parcel;
    - APN 053-020-041: (115 Juniper Drive) a residential single-family parcel.
- From the west to southwest of the proposed westbound on/off ramp - roundabout:
    - APN 053-031-086; (440 Keena Drive) a residential-agricultural parcel;
    - APN 053-031-037: a residential-agricultural parcel.
- From the east to southeast of the proposed eastbound on/off ramp - roundabout:
    - APN 053-031-052: (14310 Musso Road) a heavy commercial parcel;
    - APN 053-031-048: (14130 Musso Road) a residential-agricultural parcel.
- From the east to northeast of the proposed eastbound on/off ramp - roundabout:
    - APN 053-031-047: a residential-agricultural parcel;
    - APN 053-031-043 and 053-031-039: (14400 Musso Road) Auburn RV Resort;
    - APN 053-020-049: (14450 Musso Road) an open space parcel (part of RV Resort);
    - APN 053-140-030: (14500 Musso Road) an open space parcel (part of RV Resort).

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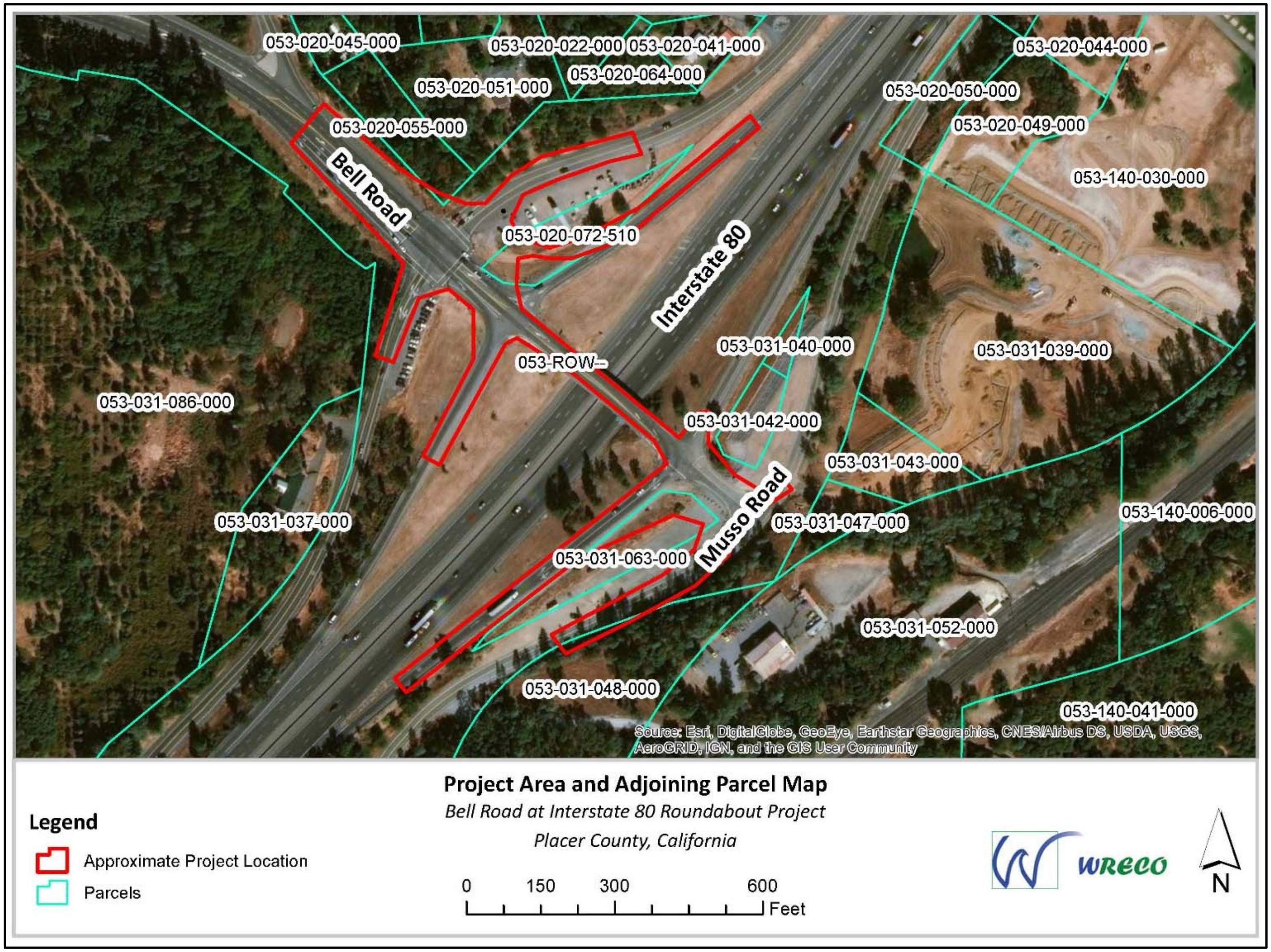

Figure 3. Project Area and Adjoining Parcels

Source: WRECO, ESRI, and County of Placer

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1.3 ISA Findings and Recommendations

The ISA was required as part of Caltrans District 3 environmental review, consistent with Caltrans' *Local Assistance Procedures Manual* and Caltrans' *Standard Environmental Reference Environmental Handbook* Volume 1, Chapter 10 "Guidelines for Hazardous Materials, Hazardous Waste, and Contamination." The industry standard for preparing an ISA is found in the American Society of Testing and Materials (ASTM) International E1527- 13, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process." The ISA was conducted in accordance with the Environmental Protection Agency Standards (EPA) and Practices for All Appropriate Inquiries (AAI) (EPA, 2015). The AAI needs to be included as part of the process of evaluating a property's environmental conditions and assessing potential liability for any contamination. The intention of the ISA is to identify potential issues that may impact the Project with respect to the range of potential contaminants within the scope of Comprehensive Environmental Response, Compensation and Liability Act (United States Code, 1980).

WRECO staff conducted a Project area reconnaissance visit on July 8, 2019. The Project areas and adjoining properties were inspected, and photographs were taken of specific features within and adjacent to the footprint of the Project. WRECO staff reviewed the proposed roundabouts location and impact from construction.

According to historical research and records, the surrounding properties adjacent to the Project area were utilized for agriculture from the late 1930s to the mid-1970s, when residential and commercial development began. By the early 1980s, the surrounding area consisted of mostly residential housing, commercial properties, and open space. The Gator Creek Golf Course (14520 Musso Road) was constructed to the northeast of I-80, adjacent to the Auburn RV Resort (14400 Musso Road). Most of the land surrounding the Project area is now primarily a residential neighborhood.

From the site reconnaissance, potential RECs within the Project area include the following:

- Utility poles along the roadways (Musso Road, Bowman Road, and I-80) have pole-mounted transformers, which may contain polychlorinated biphenyls (PCB);
- Historical agricultural practices (pesticides, metals) and the existing golf course (fertilizer) in the adjoining property to the Project area;
- Potential lead-based paint (LBP) in the traffic striping on the roadway; and
- Potential aerially deposited lead (ADL) in exposed soil along the roadway from historical vehicle emissions during the leaded gasoline era.

From the site reconnaissance, the adjoining properties indicated these existing RECs:

- Pesticides and metals from historical agricultural use; fertilizer from the Gator Creek Golf Course (14520 Musso Road) located northeast of the Project area (adjoining the EB I-80 on/off ramps);
- Property at 14330 Musso Road (12.3 acres), used as a towing facility, contains warehouses for storage, vehicles and storage containers on the property (petroleum hydrocarbons); and
- The Auburn RV Resort (14400 Musso Road) has full hookups (including sanitary sewer), that is a potential source of releases to the subsurface.

Based on the findings of the ISA, a PSI was recommended to sample shallow soil in the areas of proposed construction/soil disturbance for the roundabout construction. Shallow soil has the potential to contain pesticides, metals/aerially deposited lead (ADL), polychlorinated biphenyls (PCB), semi-volatile organic compounds (SVOC), polynuclear aromatic hydrocarbons (PAH), and naturally occurring asbestos (NOA).

2 PROJECT AREA SETTING

The Project is located at the interchange of Bell Road and I-80 and is approximately 2 miles east of the Auburn Airport and 1.7 miles north of Auburn's city limits. The Project is located in the southeastern portion of Placer County, north of the city of Auburn. The area surrounding the Project is characterized by a mixture of residential areas and open space/agricultural land. The Project will consist of installing roundabouts at the intersections of Bowman Road and Musso Road with Bell Road and the on/off-ramps of I-80.

2.1 Physical Setting

2.1.1 Topography

Based on the ISA report information, the average elevation of the Project area is 1,536 feet (ft) above mean sea level (AMSL). The United States Geological Survey (USGS), Sacramento, California Topographic Quadrangle map was reviewed. The Project area has slopes that generally range from 5 to 30 percent trending toward the Project area. Outside of the immediate Project location, the topography slopes to the southeast, towards the North Fork American River.

2.1.2 Regional Geology

The Project site is located within the physiographic unit referred to as the Sierra Nevada Geomorphic Province (Norris and Webb, 1990). This province encompasses the Sierra Nevada Mountains and foothills, which surround an area approximately 400 miles long bounded by the Basin and Range to the east, Cascade Range to the north, Great Valley to the west, and Mojave Desert to the south. The Coast Ranges and Transverse Ranges meet at the southernmost extremity of the Sierra Nevada. The Sierra Nevada is composed of a tilted fault block with a high and rugged eastern scarp and a gentle western slope that extends under the sediments of the Great Valley. Deep river canyons dissect the western slope, and the higher Sierra have been sculpted by glacial activity.

The geology of the Sierra Nevada records four distinct periods as the west coast of North America grew westward. The oldest rocks were formed in a stable marine environment west of the North American Coast and are now found as metamorphosed pendants above younger Sierra Nevada Granite. Approximately 400 million years ago, a sequence of island arcs was accreted onto the margin of North America and are now found within the Sierra Foothills including the Mother Lode Belt. From approximately 210 to 90 million years ago, subduction west of the Sierra resulted in the emplacement of massive amounts of intrusive granitic rocks forming the Sierra Nevada Batholith and metamorphosing overlying rocks. Granitic intrusion shifted eastward beginning around 80 to 90 million years ago, and the Sierra eroded to low mountains. Beginning around 20 million years ago, transform motion began along the plate boundary west of the Sierra resulting in extension of the Basin and Range west of the Sierra Nevada and tilting of the Sierra Nevada block forming the modern Sierra Nevada Range.

Extensive volcanism associated with extension of the Basin and Range mantled portions of the Sierra and filled many of the river drainages with lava and volcanic debris. Erosion of the uplifted Sierra Nevada block removed most of the overlying metamorphic rocks, covering the massive

Sierra Nevada Batholith and leaving isolated areas of metamorphic rocks including pendants in the High Sierra and the Foothills Metamorphic Belt on the western side of the province in the north.

From the ISA report information, the geologic information in the general area of the Project is identified as Eugeosynclinal Deposits of the Mesozoic Era, Lower Jurassic and Upper Triassic System, and Lower Mesozoic Series. The Regional Geologic Map is provided as Figure 4.

2.1.3 Local Geology and Soils

The Geologic Map of the Sacramento Quadrangle depicts the Project area underlain by crystalline limestone and dolomite. Most of the rocks surrounding the Project area are volcanic in nature and are often from the mélange terrane. Most of the rock types are from the late Triassic to early Jurassic period (approximately 200 million years ago).

Based on the ISA report information, the subsurface soils in the Project area generally consists of silty-clay, sand, and sandy-gravel to a depth of approximately 15 ft bgs. Below 15 ft, sediments were primarily described as Saprolite, which is a chemically weathered rock that represents deep weathering of the bedrock surface.

Three dominant soil compositions in the general vicinity of the Project: Auburn Series, Boomer Series, and Mariposa Series.

- Auburn Series consists of shallow to moderately deep, well-drained soils. This series is formed from weathered amphibole schist materials. These soils have a moderately high hydraulic conductivity and are found primarily in the Sierra Nevada Foothills. The Auburn Series has a slope ranging from 2 to 75 percent.
- Boomer series consists of deep and very deep, well drained soils that formed from weathered metavolcanic igneous rocks. This series has slow to very rapid runoff with moderately slow permeability. The Boomer series is common in northern California. They have a slope ranging anywhere from 2 to 75 percent.
- Mariposa Series is a moderately deep, well-drained soil that formed from metasedimentary rocks. This series has a moderately high saturated conductivity and is common in the Sierra Nevada Mountains in California. The Mariposa Series' slope also ranges anywhere from 2 to 75 percent (NRCS, 2019).

2.1.4 Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) can occur in serpentine rock and in its parent material, ultramafic rock. These rock types are abundant in the Sierra foothills. NOA has been identified in Placer County and ultramafic rocks have been generally mapped along the eastern side of the Sierra Nevada foothills. The most common forms of naturally-occurring fibrous minerals with NOA are chrysotile, actinolite, and tremolite. A review of the "General Location Guide for Ultramafic Rocks in California – Areas Likely to Contain Naturally Occurring Asbestos" (CGS, 2000) indicated that NOA has been mapped to the west of the Project area in Auburn.

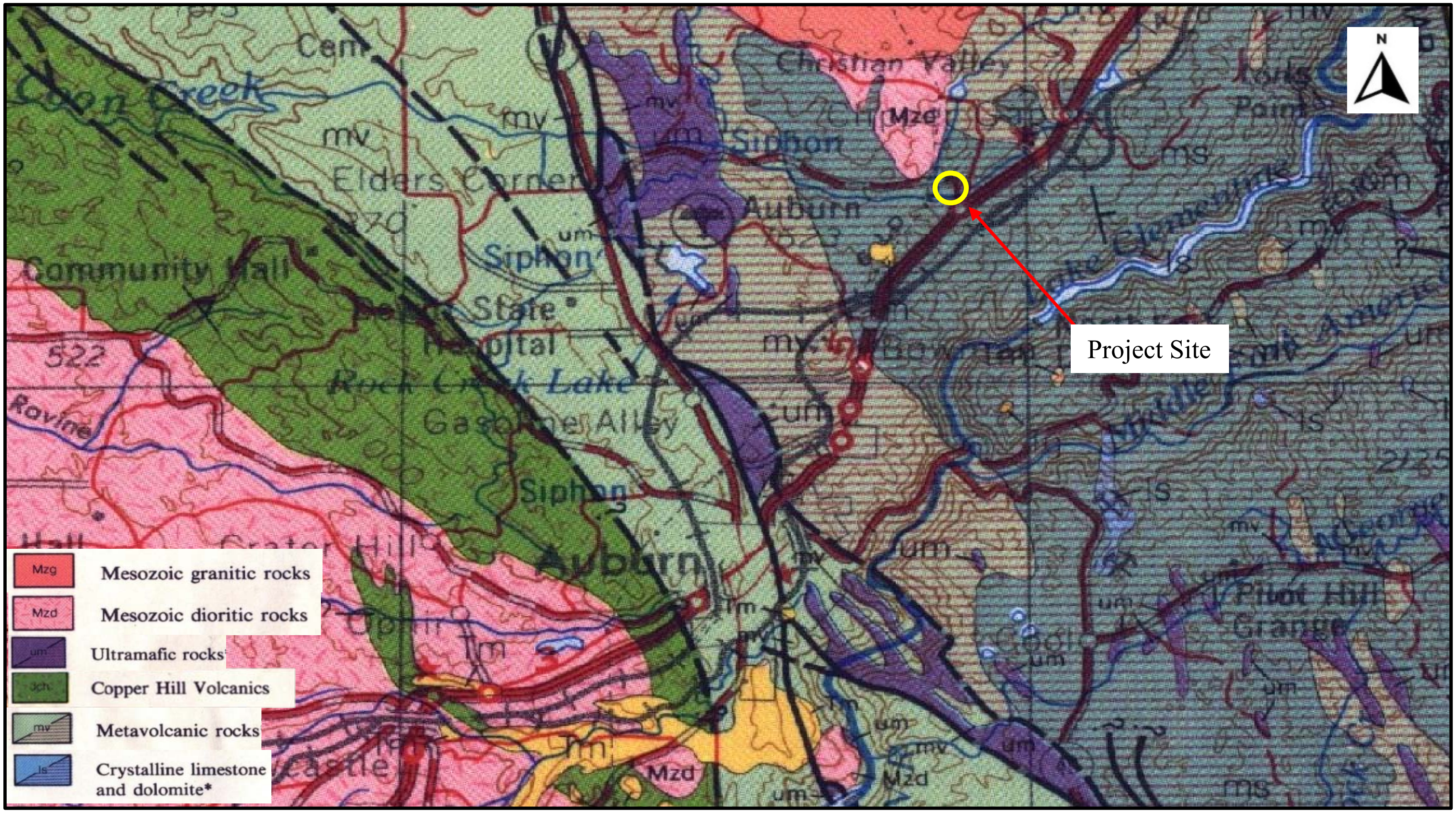

Figure 4. Regional Geologic Map

Source: Wagner, Jennings, Bedrossian, and Bortugno

2.1.5 Groundwater Hydrology

The Project is situated in an undefined groundwater basin of the Sacramento River Hydrologic Region, within the American River-North Fork American Watershed (514.51). The American River Watershed originates at the crest of the Sierra Nevada just west of Lake Tahoe, within Tahoe and El Dorado National Forest boundaries. The American River has three main forks: North, Middle, and South. The North Fork American River is 287 square miles, 85 miles long, and originates in eastern Placer County in the Tahoe National Forest. It flows west and then southwest, passing the town of Colfax and through Clementine/North Fort Reservoir; it receives the Middle Fork American 4 miles below the North Fork Reservoir Dam near the town of Auburn and meanders past the site of the abandoned Auburn Dam (Figure 5).

The watershed is part of the northern Sierra Nevada, which is generally composed of metamorphic rocks intruded by isolated granites. The Mehrten Formation and the Shoo Fly Complex each underlie nearly one-quarter of the watershed. The Mehrten Formation consists of volcanic and reworked rocks that are prone to mass wasting at the contact with the underlying Valley Springs Formation. The Shoo Fly Complex primarily underlies the middle portion of the watershed and consists of metasedimentary rocks considered to be among the oldest in the Sierra Nevada (570 to 440 million years old). Granitic rocks make up approximately 14 percent of the North Fork/Middle Fork American River watershed, primarily underlying the headwaters of the Rubicon River. The lower portion of the North Fork/Middle Fork American River watershed is dominated by the Calaveras Complex (metavolcanic rocks), Mariposa Formation (metavolcanic, metasedimentary, and metamorphic rocks), and Clipper Gap Formation (sedimentary rocks probably formed by ancient debris flows). Together, these three geologic units make up approximately 14 percent of the entire watershed (Tetra Tech, 2007).

Deep river canyons occur throughout the watershed where the North Fork and Middle Fork American rivers have entrenched into the underlying bedrock. Metamorphic rocks, which tend to be less resistant to erosion than the granitic rocks that dominate other watersheds in the Sierra Nevada, underlie much of the watershed. The geology of the North Fork/Middle Fork American River watershed is complex and includes many units. In general, they range from metamorphic rocks formed during the Jurassic (approximately 200 to 144 million years old); to volcanics and plutonic rocks dating 115 to 87 million years old; to recent glacial deposits as old as 2.5 million years; to modern landslide, scree, and other mass wasting deposits and water lain alluvium (Tetra Tech, 2007).

Based on a review of GeoTracker groundwater monitoring data near the Project area, depth to groundwater ranges from 10-40 ft bgs, and groundwater flow direction is generally to the west (GeoTracker, 2019).

2.1.6 Surface Water Hydrology

The Project area is located in the Sacramento River Hydrologic Region within the American River – North Fork American – Clementine Watershed (514.51), within the Sierra Nevada foothills. The nearest surface water bodies are North Fork American River, located approximately 1.56 miles east of the Project area; Dry Creek, approximately 0.71 mile north of the Project area; Clipper Creek, approximately 0.90 mile east of the Project area; Campbell Creek, approximately 0.27 mile east of the Project area; and Rocket Creek, located approximately 0.37 mile northwest of the Project area. Placer County has a permit to redirect water from the North Fork American River that may not exceed 120,000 acre-foot annually. This is a large source of water for the County that is specifically from surface water rivers.

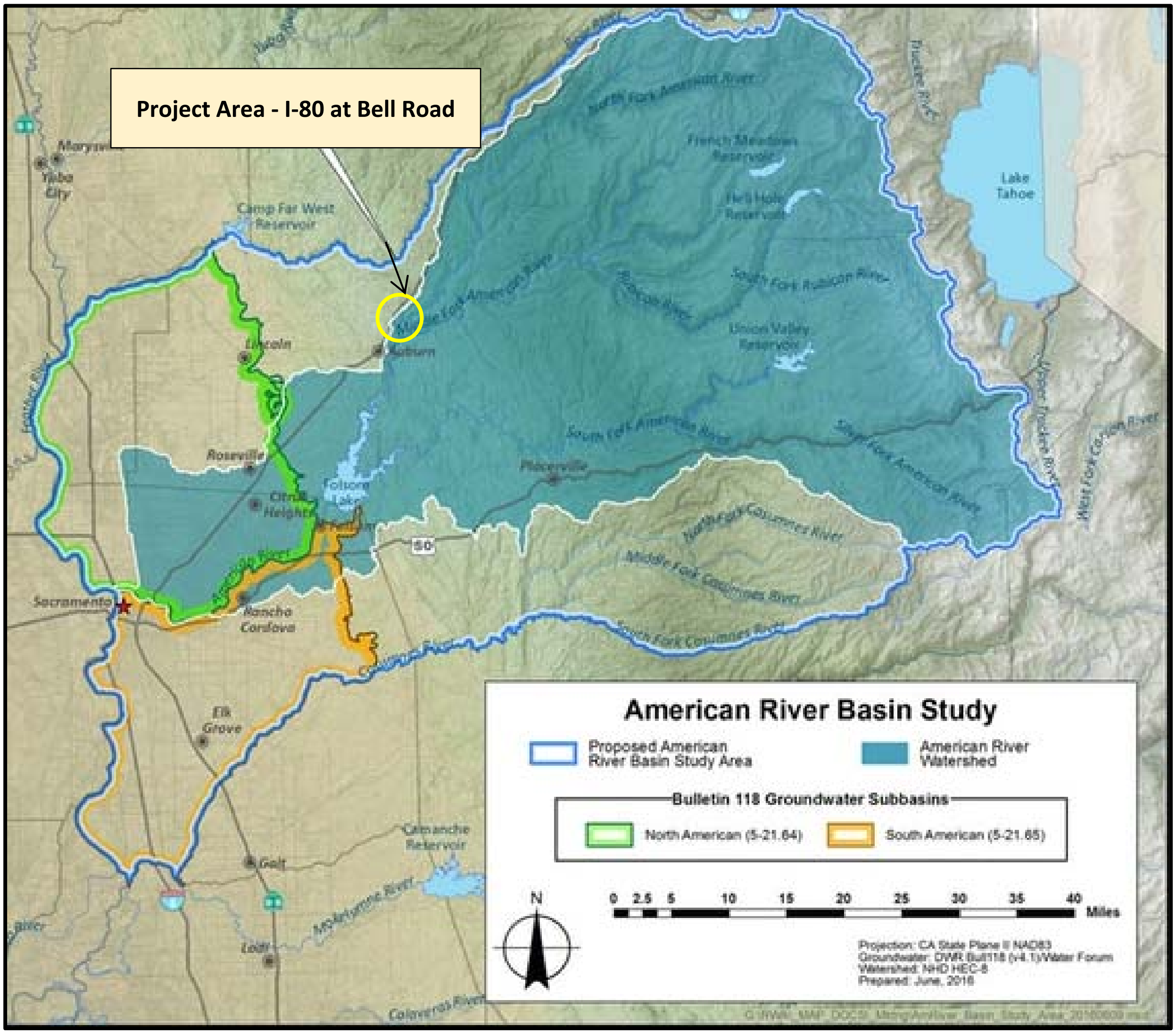

Figure 5. American River Basin and Watershed

Source: Placer County Water Agency

3 PSI-ADL STUDY

3.1 Soil Sampling Methods and Procedures

On September 18-19, and 30, 2019, WRECO conducted a site investigation that included collecting shallow soil samples from three geotechnical borings (A-19-001, A-19-006, and A-19-007) and 16 borings, respectively, in areas proposed for excavation/soil disturbance. Soil sample A-19-001 was collected as a bulk composite sample, and borings A-19-006 and A-19-007 were collected at three depth intervals (0-1 ft, 1-2 ft, and 2-3 ft bgs). The PSI-ADL Study was performed within the landscaped or unpaved areas along the on/off ramps of the I-80, Bell Road, and Musso Road, to verify the presence/absence of RECs identified in the ISA, evaluate the options for soil disposal or reuse, and to provide guidance for waste management and worker safety during construction.

Prior to field work being performed, the sample locations were marked in white paint, and USA North 811 was contacted to mark utilities near the boring locations. An encroachment permit from Caltrans (0319-NSV0415) was obtained to work in the right-of-way of the I-80 on/off ramps and a copy is provided in Appendix A. The limited shallow soil investigation was performed using direct push technology (DPT) methods to take continuous core soil samples at specific locations. DPT uses a hydraulically operated percussion hammer along with vehicle weight to advance the sampling barrel with an acetate liner used to contain the soil sample.

The geotechnical borings, overseen by Parikh, were drilled using a track Central Mine Equipment (CME) 75 rig, operated by Geo-X Drilling. WRECO collected shallow soil samples from three geotechnical borings, A-19-001, A-19-006, and A-19-007, that were completed to approximately 40 ft bgs. The bulk samples from A-19-001 were placed into large Ziploc bags, labeled, and placed into an ice chest with ice. Shallow soil samples were collected from A-19-006 and A-19-007 using a modified split spoon sampler to 5 ft bgs, and segregated per sample depth (0-1 ft, 1-2 ft, and 2-3 ft bgs).

Penecore of Woodland, California used a Geoprobe® 6712 Track Rig to advance 16 soil borings (B-1 through B-16) around the Project area using a 5-foot continuous core sampler with an acetate liner. Because the diameter of the DPT is only 2.25 inches, minimal drill cuttings were generated, thereby lowering the amount of investigation derived waste produced. Soil samples were contained in the 5-foot acetate liner, and the liner was cut at specific intervals of 0-1, 1-2, and 2-3 ft, capped at each end with a Teflon sheet and plastic lid, labeled, and placed into an ice chest with ice. The chain of custody was completed in the field and relinquished to laboratory staff upon delivery to Eurofins Scientific Laboratory in Sacramento, California.

Soil encountered during sampling consisted of silty-clay, sand, and sandy-gravel. The borings were backfilled with grout and capped with native soil. All the soil samples collected were analyzed for lead using EPA Method 6020 and pH using EPA Method 9045C. Select composite sample were analyzed for organophosphorus pesticides (OPP) using EPA Method 8141A, PCBs/organochlorine pesticides (OCP) using EPA Method 8082/8081A, Resource Conservation and Recovery Act (RCRA) (8} metals using EPA Method 6000/7000, SVOCs /polyaromatic hydrocarbons (PAH) using EPA Method 8270C, and naturally occurring asbestos (NOA) using California Air Resources Board (CARB) Method 435/Polarized Light Microscopy (PLM) EPA Method 600/R-93/116. Soil boring locations are shown in Figure 6, and boring/sample numbers, sampling intervals, and COCs are summarized in Table 1.

Table 1. Sampling Locations, Intervals, and Analyses

Boring/ Sample Number	Sampling Interval	Contaminants of Concern
B-1	0-1, 1-2, and 2-3 ft	pH (EPA 9045C), Lead (EPA 6020)
B-2		pH (EPA 9045C), Lead and Arsenic (EPA 6020)
B-3		pH (EPA 9045C), Lead (EPA 6020)
B-4		
B-5		
B-6		pH (EPA 9045C), Lead and Arsenic (EPA 6020)
B-7		pH (EPA 9045C), Lead (EPA 6020)
B-8		
B-9		
B-10		pH (EPA 9045C), Lead and Arsenic (EPA 6020)
B-11		pH (EPA 9045C), Lead (EPA 6020)
B-12		
B-13		
B-14		
B-15		pH (EPA 9045C), Lead and Arsenic (EPA 6020)
B-16		pH (EPA 9045C), Lead (EPA 6020)
B-1-Comp	0-3 ft	SVOC/PAHs (EPA 8270), PCBs (EPA 8082), Organophosphorus Pesticides (EPA 8141A), Organochlorine Pesticides (EPA 8081A), and RCRA 8 Metals (EPA 6020 Inductively Coupled Plasma/Mass Spectrometry [ICP/MS])
B-2-Comp		SVOC/PAHs (EPA 8270), PCBs (EPA 8082), Organophosphorus Pesticides (EPA 8141A), Organochlorine Pesticides (EPA 8081A), RCRA 8 Metals (EPA 6020 ICP/MS), and NOA (California Air Resources Board [CARB] 435/PLM EPA 600/R-93/116)
B-3-Comp		
B-4-Comp		NOA (CARB 435/PLM EPA 600/R-93/116)
B-13-Comp		SVOC/PAHs (EPA 8270), PCBs (EPA 8082), Organophosphorus Pesticides (EPA 8141A), Organochlorine Pesticides (EPA 8081A), RCRA 8 Metals (EPA 6020 ICP/MS), and NOA (CARB 435/PLM EPA 600/R-93/116)
B-14-Comp		
B-16-Comp		NOA (CARB 435/PLM EPA 600/R-93/116)
A-19-001		pH (EPA 9045C), Lead (EPA 6020)
A-19-006	0-1, 1-2, and 2-3 ft	
A-19-007		

3.2 Analytical Results

Fifty-five soil samples were analyzed for total lead and pH. Detectable lead concentrations for sampling depth 0-1 ft ranged from 0.64 to 40 milligrams per kilogram (mg/kg); 1-2 ft ranged from 0.23 to 17 mg/kg; and 2-3 ft ranged from 0.41 to 40 mg/kg. The geotechnical bulk sample, A-19-001, had a lead concentration of 3.6 mg/kg, and a pH of 7.3. The pH values ranged from 4.8 to 8.3. These values are within threshold (greater than 2 and less than 12.5) for state and federal waste criteria for reuse. Detectable lead concentrations did not exceed the Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESL) for residential, construction worker, and commercial/industrial exposure.

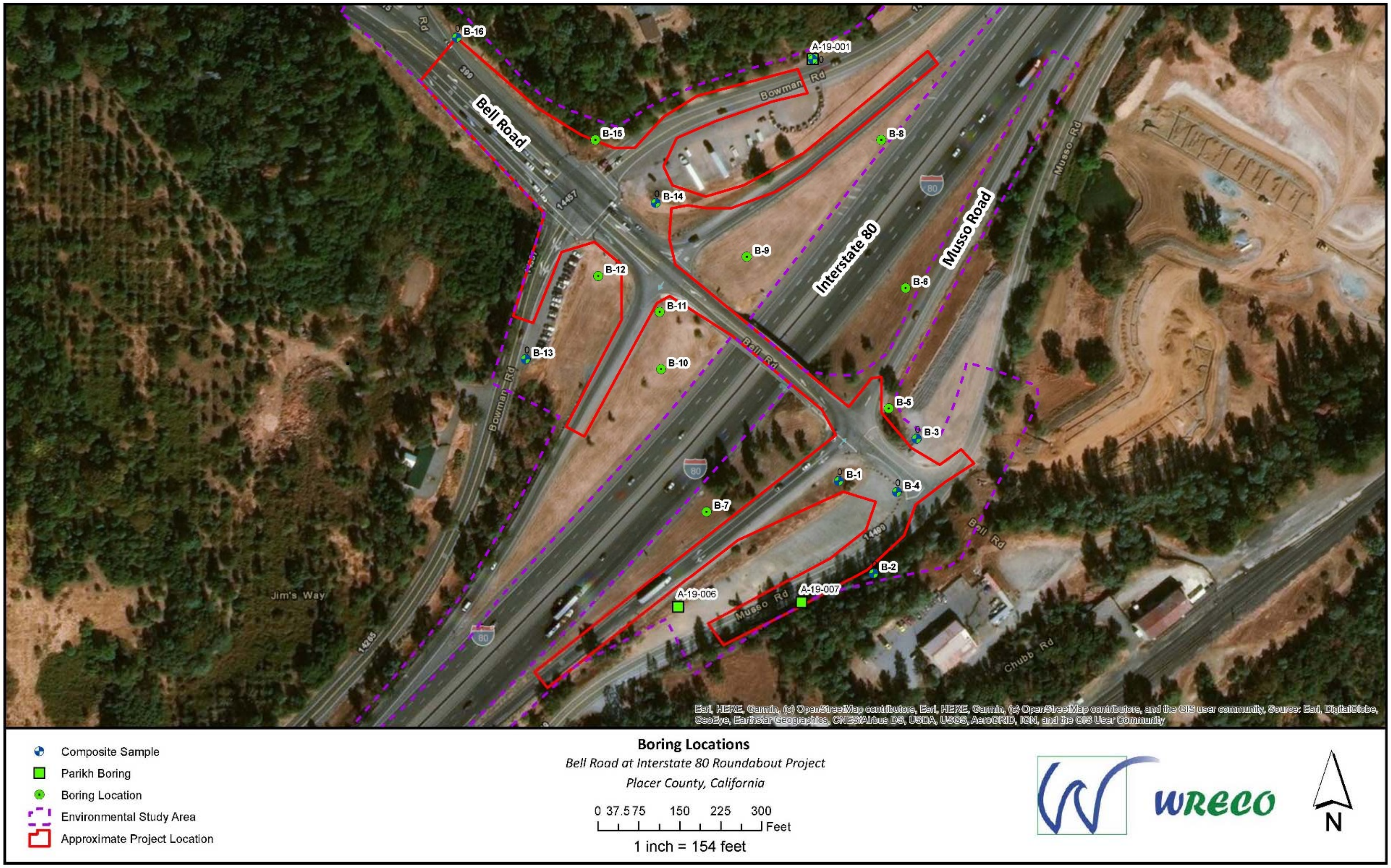

Figure 6. Soil Boring Locations

Source: WRECO and ESRI

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The analytical data for lead in the soil samples was analyzed using statistical evaluation using the EPA's ProUCL Version 5.1. The 95% Upper Confidence Limit (UCL) was calculated for each depth that was sampled for lead, to determine soil reuse and disposal options. The average detectable lead concentrations evaluated for the Project area were: 21.57 (0-1 ft), 10.10 (1-2 ft), and 15.19 mg/kg (2-3 ft). Since the 95% UCLs are less than the lead total threshold limit concentration (TTLC) of 1,000 mg/kg and below the California EPA soil guidance of 80 mg/kg, the shallow soil can be reused in the Project area.

Under the Department of Toxic Substances Control (DTSC) June 2016 Statewide Agreement for Caltrans for Reuse of Aerially Deposited Lead-Contaminated Soils (Agreement), "ADL contaminated soil" is defined as excavated soil, based on a 95% UCL, that contains total lead concentrations greater than 80 mg/kg and a standard threshold limit concentration (STLC) of lead greater than or equal to 5 milligrams per liter (mg/L). "Clean Soil" is defined as soil, based on a 95% UCL, containing total lead less than or equal to 80 mg/kg and STLC of lead less than 5 mg/L, and no other constituents at concentrations that pose an unacceptable threat to human health or the environment. Soil containing ADL can be reused under the DTSC Agreement must always be at least 5 feet above the highest groundwater elevation and, depending on lead concentrations, may need to be covered with at least 1 foot of clean soil or a pavement structure. If the soil sample results were below the limits set, then there are no cover requirements, and the soil is non-Hazardous.

Seven composite soil samples had additional analyses performed that included organochlorine pesticides (OCP) with PCBs (EPA Method 8082/8081A); organophosphorus pesticides (OPP) (EPA Method 8141); semi-volatile organic compounds (SVOC) with polyaromatic hydrocarbons (PAH) (EPA Method 8270); Resource Conservation and Recovery Act (RCRA) 8 metals; and NOA (California Air Resources Board [CARB] 435/ Polarized Light Microscopy [PLM] EPA 600/R-93/116).

Four composite samples had detectable OCP concentrations of DDE that ranged from 0.0014 to 0.32 mg/kg, DDT that ranged from 0.0020 to 0.047 mg/kg, dieldrin was detected in one boring (B-1) at 0.00062 mg/kg, DDD was detected in one boring (B-3) at 0.0070 mg/kg, and chlordane was detected in one boring (B-13) at 0.0058 mg/kg. Two composite samples had detectable PCB concentrations of PCB-1260 that ranged from 0.0017 to 0.0022 mg/kg. One composite sample (B-14,) had a detectable SVOC concentration of pyrene at 0.012 mg/kg. The detectable concentrations did not exceed the STLC values for the constituents of concern (COC), and can be pre-classified as Non-Hazardous. Detectable concentrations did not exceed the RWQCB ESL for residential, construction worker, and commercial/industrial exposure.

Five composite samples had detectable RCRA 8 Metals concentrations of arsenic that ranged from 1.6 to 17 mg/kg; barium that ranged from 22 to 430 mg/kg; cadmium that ranged from 0.083 to 0.21 mg/kg; chromium that ranged from 19 to 64 mg/kg; lead that ranged from 0.69 to 34 mg/kg; mercury that ranged from 0.012 to 0.017 mg/kg; selenium that ranged from 0.11 to 0.46 mg/kg; and silver that ranged from 0.030 to 0.035 mg/kg. Three of the samples exceeded 10 times the STLC for chromium (50 mg/L), and were further analyzed using California Waste Extraction Test (CA WET). Laboratory results indicated that STLC chromium concentrations ranged from 0.053 to 0.11 mg/L, which are below the STLC regulatory limit of 5 mg/L, and the soil can be pre-classified as non-hazardous (with respect to chromium). The arsenic results exceeded the ESL for residential, commercial/industrial, and construction worker exposure limits (cancer risk). The chromium results exceeded the ESLs for residential, commercial/industrial, and construction worker exposure limits for Cr VI (cancer risk); however, below ESLs for Cr III and VI (non-cancer hazard), as there are no values for total chromium. The soil in the areas near B-2, B-3, and B-14 should be managed for worker safety during construction for both arsenic and chromium. Arsenic and chromium concentrations in soil are shown in Figure 7.

Six composite samples were analyzed for Naturally Occurring Asbestos (NOA) by polar light microscopy (PLM) analysis using EPA Method 600/R-93/116 with CARB 435 Prep. No detectable amounts of NOA were identified in the soil samples. The analytical results are summarized in Table 2, Table 3, and NOA results are summarized in Table 4. Laboratory Results for NOA in Soil4, and Laboratory Reports are provided in Appendix B.

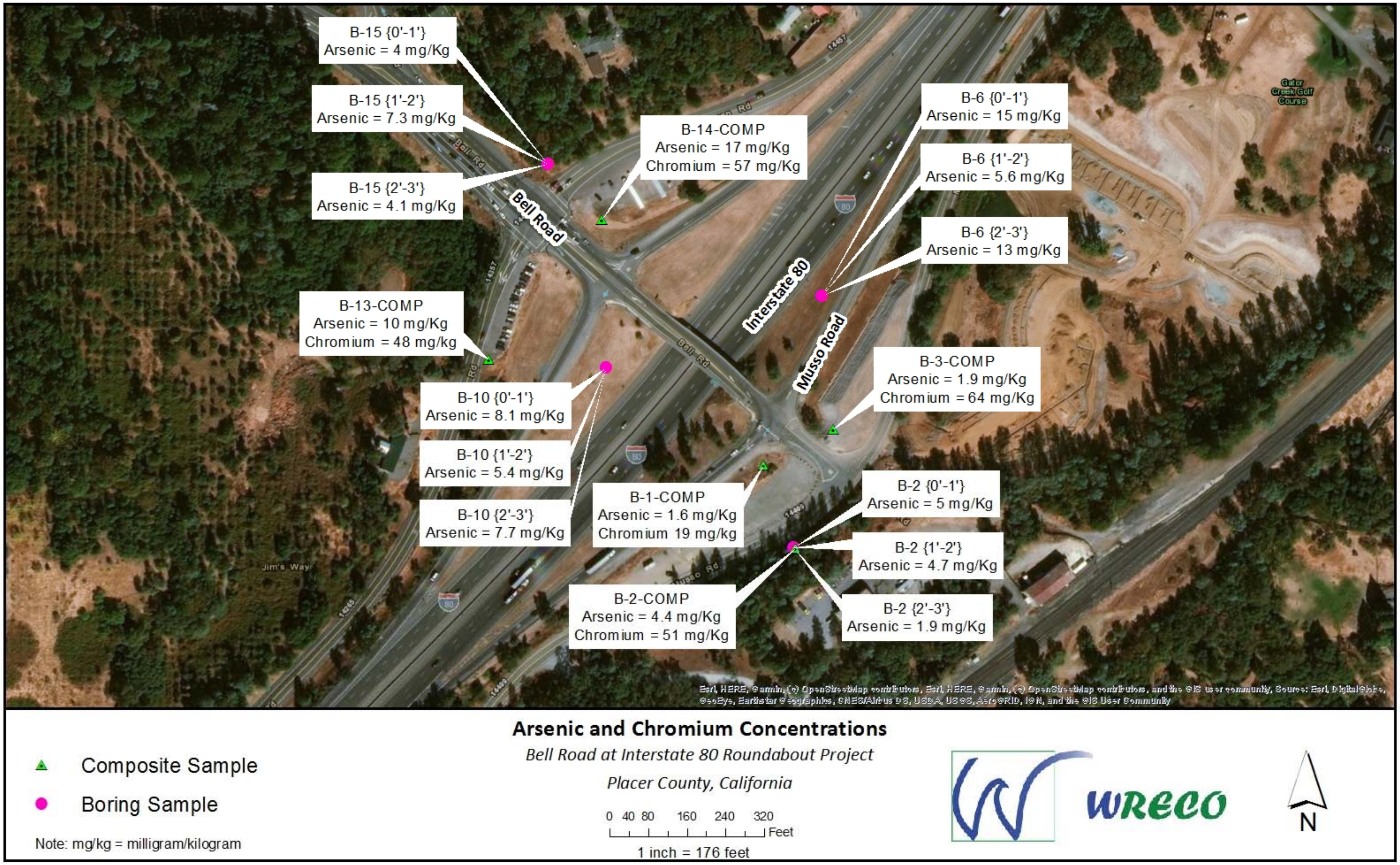

Figure 7. Arsenic and Chromium Results Map

Source: WRECO and ESRI

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Table 2. Analytical Results - Lead, Arsenic, and pH

Boring/ Sample ID	*pH*	*Lead Results (mg/kg)*	*Arsenic Results (mg/kg)*	*Environmental Screening Levels (Lead/Arsenic) (mg/kg)*			*Hazardous Waste Criteria*		*Waste Classification*
				Res.	*Comm/Ind*	*Const Worker*	*STLC (mg/L)*	*TTLC (mg/kg)*	
B-1-0-1	7.0	2.3	--	80	320	160	5	1,000	Non-Hazardous
B-1-1-2	6.6	0.25	--						
B-1-2-3	7.2	0.48	--						
B-2-0-1	5.7	10	5.0	80/**0.067**	320/**0.31**	160/**0.98**	5	1,000/500	
B-2-1-2	5.8	3.8	4.7						
B-2-2-3	6.4	1.9	1.9						
B-3-0-1	6.4	21	--	80	320	160	5	1,000	
B-3-1-2	6.8	1.4	--						
B-3-2-3	6.9	3.2	--						
B-4-0-1	6.5	6.0	--						
B-4-1-2	6.1	0.23	--						
B-4-2-3	6.5	0.41	--						
B-5-0-1	8.1	0.64	--						
B-5-1-2	8.3	0.58	--						
B-5-2-3	4.8	8.9	--						
B-6-0-1	--	38	15	80/**0.067**	320/**0.31**	160/**0.98**	5	1,000/500	
B-6-1-2	5.5	7.5	5.6						
B-6-2-3	5.7	33	13						
B-7-0-1	5.9	40	--	80	320	160	5	1,000	
B-7-1-2	6.3	6.3	--						
B-7-2-3	6.7	1.1	--						
B-8-0-1	5.7	29	--						
B-8-1-2	6.2	5.4	--						
B-8-2-3	5.5	40	--						
B-9-0-1	6.3	8.0	--						
B-9-1-2	6.5	17	--						
B-9-2-3	6.0	5.8	--						
B-10-0-1	6.0	27	8.1	80/**0.067**	320/**0.31**	160/**0.98**	5	1,000/500	
B-10-1-2	6.0	2.4	5.4						
B-10-2-3	6.2	3.8	7.7						
B-11-0-1	5.9	1.9	--	80	320	160	5	1,000	
B-11-1-2	6.9	9.9	--						
B-11-2-3	6.9	2.7	--						
B-12-0-1	7.5	18	--						
B-12-1-2	7.0	11	--						
B-12-2-3	6.9	8.7	--						
B-13-0-1	5.4	3.7	--						
B-13-1-2	5.1	4.1	--						
B-13-2-3	6.8	20	--						
B-14-0-1	6.4	8.5	--						
B-14-1-2	6.5	10	--						
B-14-2-3	6.3	2.2	--						
B-15-0-1	7.2	6.5	4.0	80/**0.067**	320/**0.31**	160/**0.98**	5	1,000/500	
B-15-1-2	8.1	12	7.3						
B-15-2-3	8.0	6.3	4.1						
B-16-0-1	7.7	11	--	80	320	160	5	1,000	
B-16-1-2	7.7	14	--						
B-16-2-3	7.5	10	--						
A-19-001	7.3	3.6	--						
A-19-006 0-1	6.5	4.6	--						
A-19-006 1-2	6.0	1.7	--						
A-19-006 2-3	6.0	2.4	--						

Boring/ Sample ID	*pH*	*Lead Results (mg/kg)*	*Arsenic Results (mg/kg)*	*Environmental Screening Levels (Lead/Arsenic) (mg/kg)*			*Hazardous Waste Criteria*		*Waste Classification*
				Res.	*Comm/Ind*	*Const Worker*	*STLC (mg/L)*	*TTLC (mg/kg)*	
A-19-007 0-1	5.5	4.9	--	80	320	160	5	1,000	Non-Hazardous
A-19-007 1-2	5.4	4.9	--						
A-19-007 2-3	5.2	3.2	--						

Note: STLC = Soluble Threshold Limit Concentration; TTLC = Total Threshold Limit Concentration; mg/kg = milligram per kilogram; mg/L = milligram per liter; -- = not analyzed; Lead/arsenic analyzed using EPA 6020; pH analyzed using EPA 9045C; Non-Hazardous waste classification is for disposal at a Class II or III facility.

Table 3. Analytical Results - RCRA (8) Metals, Pesticides, PCBs, and SVOCs

Boring/ Composite Sample	*Analysis*	*Results (mg/Kg)*	*STLC WET (mg/L)*	*Environmental Screening Levels (mg/kg)*			*Hazardous Waste Criteria*		*Waste Classification*
				Res.	*Comm/ Ind*	*Const. Worker*	*TTLC (mg/Kg)*	*STLC (mg/L)*	
B-1	Dieldrin	0.00062	--	0.037	0.16	1.1	8	0.8	Non-Hazardous
	Arsenic	1.6	--	0.067	0.31	0.98	500	5.0	
	Barium	22	--	15,000	220,000	3,000	10,000	100	
	Cadmium	0.11	--	78	1,100	51	100	1	
	Chromium	19	--	160	160	160	2,500	5.0	
	Lead	0.69	--	80	320	160	1,000	5.0	
	Selenium	0.11	--	390	5,800	1,700	100	1	
	Silver	0.0030	--	390	5,800	1,800	500	5	
B-2	Arsenic	4.4	--	0.067	0.31	0.98	500	5.0	
	Barium	430	--	15,000	220,000	3,000	10,000	100	
	Cadmium	0.21	--	78	1,100	51	100	1	
	Chromium	**51**	0.053	160	160	160	2,500	5.0	
	Lead	5.3	--	80	320	160	1,000	5.0	
	Selenium	0.46	--	390	5,800	1,700	100	1	
	Silver	0.033	--	390	5,800	1,800	500	5	
	Mercury	0.012	--	13	190	44	20	0.2	
B-3	4,4-DDD	0.0070	--	2.7	12	81	1	0.1	
	4,4-DDE	0.32	--	1.8	8.3	57	1	0.1	
	4,4-DDT	0.047	--	1.9	8.5	57	1	0.1	
	Arsenic	1.9	--	0.067	0.31	0.98	500	5.0	
	Barium	77	--	15,000	220,000	3,000	10,000	100	
	Cadmium	0.099	--	78	1,100	51	100	1	
	Chromium	**64**	0.11	160	160	160	2,500	5.0	
	Lead	3.3	--	80	320	160	1,000	5.0	
	Selenium	0.20	--	390	5,800	1,700	100	1	
	Mercury	0.017	--	390	5,800	1,800	500	5	
B-13	4,4-DDE	0.0014	--	1.8	8.3	57	1	0.1	
	4,4-DDT	0.0020	--	1.9	8.5	57	1	0.1	
	Chlordane	0.0058	--	0.48	2.2	14	2.5	0.25	
	PCB-1260	0.0017	--	0.23	0.94	5.5	50	5.0	
	Arsenic	10	--	0.067	0.31	0.98	500	5.0	
	Barium	110	--	15,000	220,000	3,000	10,000	100	
	Cadmium	0.083	--	78	1,100	51	100	1	
	Chromium	48	--	160	160	160	2,500	5.0	
	Lead	34	--	80	320	160	1,000	5.0	
	Selenium	0.34	--	390	5,800	1,700	100	1	
	Mercury	0.015	--	390	5,800	1,800	500	5	

Boring/ Composite Sample	*Analysis*	*Results (mg/Kg)*	*STLC WET (mg/L)*	*Environmental Screening Levels (mg/kg)*			*Hazardous Waste Criteria*		*Waste Classification*
				Res.	*Comm/ Ind*	*Const. Worker*	*TTLC (mg/Kg)*	*STLC (mg/L)*	
B-14-Comp	Pyrene	0.012	--	1,800	23,000	5,000	--	--	Non-Hazardous
	4,4-DDE	0.0020	--	1.8	8.3	57	1	0.1	
	4,4-DDT	0.0052	--	1.9	8.5	57	1	0.1	
	PCB-1260	0.0022	--	0.23	0.94	5.5	50	5.0	
	Arsenic	17	--	0.067	0.31	0.98	500	5.0	
	Barium	100	--	15,000	220,000	3,000	10,000	100	
	Cadmium	0.11	--	78	1,100	51	100	1	
	Chromium	**57**	0.071	160	160	160	2,500	5.0	
	Lead	6.2	--	80	320	160	1,000	5.0	
	Selenium	0.39	--	390	5,800	1,700	100	1	
	Silver	0.035	--	390	5,800	1,800	500	5	
	Mercury	0.017	--	390	5,800	1,800	500	5	

[1] = ESLs listed are the lowest cancer risk or non-cancer hazard level; Pesticides (EPA 8081A); PCBs (EPA 8082A); SVOCs (EPA 8270); RCRA 8 Metals (EPA 6020 ICP/MS); -- no data; Bold text = value is over 10 times the STLC and/or TTLC.

3.3 Naturally Occurring Asbestos

The Project area is located within 3 miles of exposed rock that contains NOA, and Placer County is known for soil-containing NOA with ultramafic or serpentinite rock outcrops. The State regulates material containing NOA and material from areas where serpentine or ultramafic rock is present. Material containing NOA is material containing 0.25 % or greater concentration of asbestos. The laboratory homogenized the samples into a composite, for six borings, and analyzed the soil for NOA using CARB Test Method 435/PLM. The analytical results of the % asbestos in the soil samples determine the applicability of the CARB 2002-07-29 Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations and the California Code of Regulations (CCR), Title 17, Section 93105 (d)(1)(A). Based on Part (e) Subpart (2) of ATCM 93105, an asbestos dust mitigation plan is required and must be implemented for a project if NOA is disturbed after the start of construction. Additionally, ATCM 93105 specifies that the Placer County Air Pollution Control District (APCD) must be notified and an asbestos dust mitigation plan submitted to the APCD.

NOA poses a health hazard when it becomes an airborne particulate. As defined in the current CARB rules, serpentine material refers to any material that contains at least 10% serpentine, and asbestos-containing serpentine refers to serpentine materials with an asbestos content greater than 5% as determined by CARB Test Method 435 (CARB 435). Based on the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations for asbestos, construction activities could disturb NOA-laden debris and soil, thereby potentially creating an airborne hazard. Mitigation practices, such as wetting the materials being disturbed and wearing approved respirators with high-efficiency particulate air filters during construction activities, can reduce airborne NOA containing dust.

Specific areas in California are subject to the regulation if they are identified on maps published by the Department of Conservation as ultramafic rock units or if the owner/operator has knowledge of the presence of ultramafic rock, serpentine, or NOA on the site. NOA in the vicinity of north Auburn is shown in Figure 8. Naturally Occurring Asbestos Hazard - North Auburn and Vicinity

A review of the California Geological Survey (CGS) NOA Hazard in the County (CGS, 2008) indicated that NOA is mapped approximately 2.5 miles west of the Project area in Auburn.

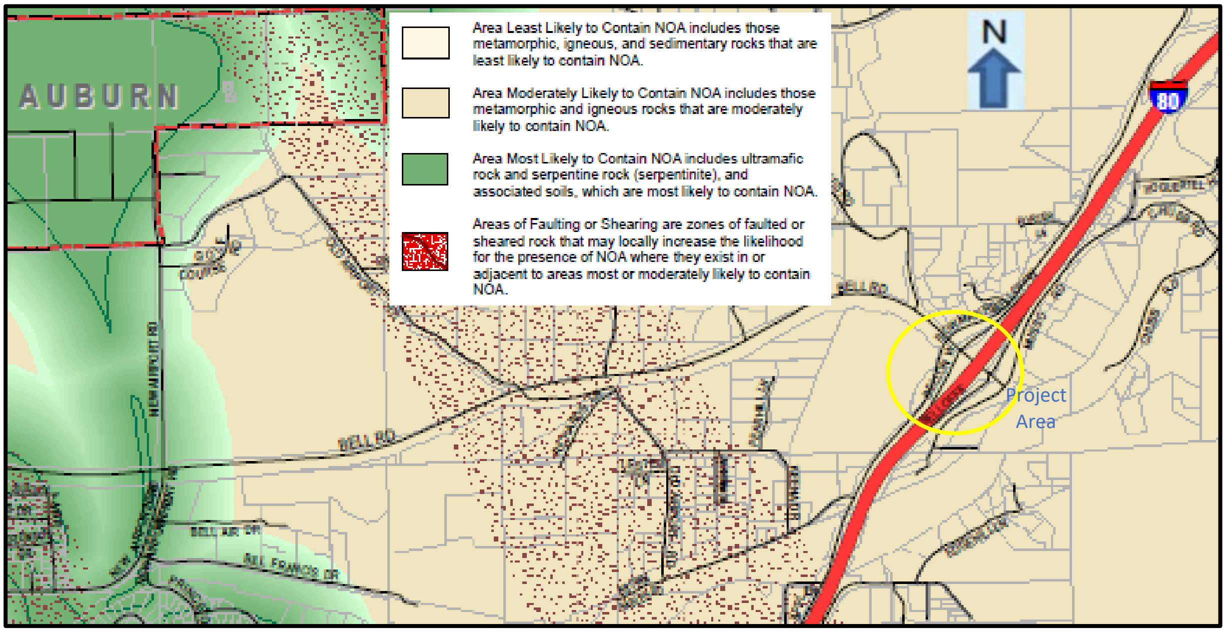

Figure 8. Naturally Occurring Asbestos Hazard - North Auburn and Vicinity

Source: CGS 2008

Representative shallow soil samples were collected and delivered to Eurofins EMLab P&K in San Francisco to analyze the samples for NOA using PLM analysis using EPA Method 600/R-93/116 (with CARB 435 Prep). The analytical method measures the percentage of asbestos with the lower detection limit of 0.25 percent (%). Analytical results indicated that all six samples had non-detectable, non-fibrous results and NOA was not found in the soil from the Project area. The laboratory results are summarized in Table 4 and laboratory reports are provided in Appendix B.

Table 4. Laboratory Results for NOA in Soil

Composite Sample	*Composite Depth*	*Results (%)*	*Appearance*	*Total Points Counted (Asbestos Points Counted)*	*Reporting Limit*
B-2	0-3 ft	ND	Brown Soil	400 (no points)	0.25%
B-3					
B-4					
B-13					
B-14					
B-16					

ND – non-detectable (< 0.25%)

3.4 ADL and the DTSC-Caltrans Agreement

Under the Department of Toxic Substances Control (DTSC) - Caltrans *Statewide Agreement for Reuse of Aerially Deposited Lead-Contaminated Soils*, June 2016 (Agreement), provides guidelines for soil reuse based on lead concentrations in soil. To use the Agreement, a minimum number of samples must be taken from specific depths in ADL risk areas. Based on the Agreement, "ADL-contaminated soil" is defined as excavated soil, based on a 95% upper confidence limit (UCL), that contains total lead concentrations greater than 80 mg/kg and soluble CA WET lead greater than or equal to 5 mg/L; "Clean Soil" is defined as soil, based on a 95% UCL, containing total lead less than or equal to 80 mg/kg and soluble CA WET lead less than 5 mg/L, and not containing other constituents at concentrations that pose an unacceptable threat to human health or the environment. ADL-contaminated soil reused under the DTSC Agreement must always be at least 5 feet above the highest groundwater elevation and, depending on lead concentrations, may need to be covered with at least 1 foot of clean soil or a pavement structure. If the soil sample results were below the limits set, then there are no cover requirements, and the soil is non-hazardous.

Table 5. DTSC Agreement - Soil Cover Limits

Department of Toxic Substances Control Agreement - Minimum Cover Requirements for ADL-contaminated Soil Based on Extractable and Total Lead Concentrations (95% UCL)*			
Limits			
Extractable Lead Concentration		**Total Lead Concentration**	**Minimum Cover Requirements**
Less than 5 mg/L CA-WET	And	Less than 320 mg/kg	No cover requirement
Equal to or below 1.5 mg/L deionized-WET and greater than 5 mg/L CA-WET	Or	Greater than 320 mg/kg but equal to or below 1600 mg/kg	1 ft of clean soil**
Greater than 5 mg/L deionized-WET but equal to or below 150 mg/L deionized-WET	Or	Greater than 1600 mg/kg but equal to or below 3200 mg/kg	Pavement structure
Greater than 150 mg/L deionized-WET	Or	Greater than 3200 mg/kg	Subject to full regulation as hazardous waste

*ADL-contaminated soil having a pH less than or equal to 5.0 may not be managed under the DTSC Agreement and must be properly disposed of

**This is the minimum requirement. Such soil may alternatively be covered by a pavement structure.

3.5 Statistical Evaluation - 95% Upper Confidence Limit

The analytical data for the soil samples was analyzed using statistical evaluation to identify the appropriate handling of soil affected by ADL. During the upcoming Bell Road Interstate 80 Roundabouts Project, soil that exceeded STLC values will need to be excavated, stockpiled, and transported offsite or relocated using methods that tend to standardize soil concentrations.

Statistical methods were applied using the EPA's ProUCL Version 5.1 (ProUCL) statistical software to evaluate the UCL of the arithmetic means of the lead concentrations for each sampling depth. Calculating upper statistical limits, for the 95% UCL of the population mean is defined as the value that when calculated repeatedly for randomly drawn subsets of site data, equals the true mean 95% of the time. Statistical confidence limits are regarded as the classical tool for addressing uncertainties of a distribution mean. The 95% UCLs of the arithmetic mean concentration are used as mean concentrations, because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. For the purpose of making good decisions at a polluted site, which are cost-effective, and protective of human health and the environment, ProUCL was used to calculate rigorous statistical methods. Determining the management of soil-containing ADL (hazardous classifications) using the 95% UCLs, the parameters are as follows:

- If the 95% UCL of the mean for total lead is less than 1,000 mg/kg and less than 5.0 mg/L soluble lead (CA-WET), then the soil is considered non-hazardous and may be disposed of at a Class II or III facility, provided that site-specific disposal facility requirements are satisfied.
- If the 95% UCL of the mean for total lead is less than 1,000 mg/kg and more than 5.0 mg/L soluble lead (CA-WET), then the soil is considered non-RCRA (regulated in the State of California, or California-hazardous) hazardous waste and may be disposed of at a Class I or II facility, provided that site-specific disposal facility requirements are satisfied.
- If the 95% UCL of the mean for total lead is greater than 1,000 mg/kg or less than 5.0 mg/L toxicity characteristic leaching procedure (TCLP), then the soil is considered RCRA hazardous and may be disposed of only at a Class I facility, provided that site-specific disposal facility requirements are satisfied.

The 95% UCL calculations were completed for each of the three depth ranges 0-1 ft, 1-2 ft, and 2-3 ft bgs. The inclusion of outlier values (observation points that are distant from other observations) tends to produce inflated values. Therefore, outlier values were identified and removed from the data set. The three different depth ranges were analyzed for their “goodness-of-fit” test for normal, gamma, or lognormal distribution. The bootstrap method was not used for analysis, because the sample sizes were smaller than that typically recommended for the bootstrap method (<500-1,000 and >15-20) per the ProUCL 5.1 Technical Guide (EPA, 2016).

A gamma distribution was used for sampling depths 0-1 ft and 2-3 ft; a normal distribution was used for sampling depth 1-2 feet. The following average detectable lead concentration results were calculated for each depth: 21.57 (0-1 ft), 10.10 (1-2 ft), and 15.19 mg/kg (2-3 ft). A summary of the 95% UCL results are shown in Table 6, and the spreadsheet with statistical 95% UCL calculations is provided in Appendix C.

Table 6. Summary of 95% UCL for Soil Depth Intervals

Depth Interval	Mean (mg/kg)	Median (mg/kg)	Lead TTLC 95% UCL (mg/kg)	Distribution	Waste Classification
0-1 ft	13.39	8.25	21.57	Gamma	non-hazardous
1-2 ft	7.45	5.85	10.10	Normal	non-hazardous
2-3 ft	8.56	3.50	15.19	Gamma	non-hazardous

Mean = Average Concentration; mg/kg = milligram per kilogram; Calculations for the 95% UCL are provided in Appendix C; * - waste classification is based on concentration being below the TTLC (1,000 mg/kg) value, even if TTLC exceeds 10 times the STLC (50 mg/L) value, staying in the requirements of EPA/DTSC Soil Guidance of 80 mg/kg (residential) exposure levels.

3.6 Hazardous Waste Determination Criteria

Due to the historical use of lead in gasoline formulations, lead contamination is common in surface soils along roadways. ADL-impacted soils are regulated at both the federal and state levels, because they can be classified as federal hazardous waste, or they are subject to state regulations when not classified as federal hazardous waste, and they may represent a health risk to construction workers that will be excavating shallow soil for the Project corridor improvements.

Regulatory criteria to classify a waste as "California Hazardous" for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, § 66261.24.

For solid wastes (soil) containing lead, the waste is classified as California Hazardous when:

- Total lead concentrations equal to or exceeding 1,000 mg/kg, the Total Threshold Limit Concentration (TTLC), are classified as Hazardous waste.
- Soluble lead concentrations (assessed using CA WET procedures) equal to or exceeding 5.0 mg/L, the STLC, are classified as California Hazardous under California law.
- California hazardous materials must be transported under a hazardous waste manifest and disposed of at an appropriately permitted facility.
- Wastes with lead concentrations less than both the TTLC and the STLC are Non-Hazardous waste and may be disposed of at a Class II or III facility, provided that site-specific disposal facility requirements are satisfied.

A waste may have the potential of exceeding the STLC when the waste's total metal content (as TTLC) is greater than or equal to ten times the respective STLC value, since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required.

Criteria to classify a waste as "Resource, Conservation, and Recovery Act (RCRA) Hazardous" are contained in Chapter 40 of the Code of Federal Regulations, § 261.

- According to federal law, as stipulated in the RCRA, wastes that exceed 5.0 mg/L soluble lead, extracted using the federal TCLP, are classified as RCRA Hazardous waste. This material must be disposed of as RCRA Hazardous waste if transported offsite.

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., representative lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or corrosivity. Waste that is classified as either California-hazardous or RCRA-hazardous requires management as a hazardous waste.

Based on the results of the soil sample analyses, all constituents were below their STLC regulatory limits and the soil has been pre-classified as Non-Hazardous.

3.7 Results and Findings

The PSI-ADL Study was performed to verify the presence/absence of RECs, to evaluate the available options for soil disposal or reuse during construction, and to provide specific guidance for waste management and worker safety during construction.

- On September 18-19, 2019, three soil samples were collected from geotechnical borings (A-19-001, A-19-006, and A-19-007) that were drilled at the Project area.
- On September 30, 2019, WRECO conducted the site investigation and 16 shallow soil borings were sampled in areas where excavation/soil disturbance are proposed for the Project.
- Fifty-five soil samples were collected and analyzed for lead and pH. Detectable lead concentrations for sampling depth 0-1 ft ranged from 0.64 to 40 mg/kg; 1-2 ft ranged from 0.23 to 17 mg/kg; and 2-3 ft ranged from 0.41 to 40 mg/kg. The geotechnical bulk sample, A-19-001, had a lead concentration of 3.6 mg/kg and a pH of 7.3. The pH ranged from 4.8 to 8.3. These values are within threshold (greater than 2 and less than 12.5) for state and federal waste criteria for reuse.
- Detectable lead concentrations did not exceed STLC regulatory limits or the RWQCB ESLs for residential, construction worker, and commercial/industrial exposure.
- The analytical data for lead in the soil samples was analyzed using statistical evaluation using the EPA’s ProUCL Version 5.1. The 95% UCL was calculated for each depth that was sampled for lead, and the average detectable lead concentrations were: 21.57 mg/kg (0-1 ft), 10.10 mg/kg (1-2 ft), and 15.19 mg/kg (2-3 ft). Since the 95% UCLs are less than the TTLC for lead (1,000 mg/kg) and below the EPA soil guidance of 80 mg/kg, the shallow soil can be reused in the Project area.
- Seven composite soil samples (B-1, B-2, B-3, B-4, B-13, B-14, and B-16) had additional testing performed for COCs at the Project area. Five composite samples (B-1, B-2, B-3, B-13, and B-14) had no detectable concentrations of organophosphorus pesticides; composite sample B-2 had no detectable concentrations of organochlorine pesticides/PCBs, and SVOCs/PAHs; composite samples B-1, B-3, and B-13, had no detectable concentrations of SVOCs/PAHs.
- Four composite samples (B-1, B-3, B-13, and B-14) had detectable organochlorine pesticides concentrations of DDE that ranged from 0.0014 to 0.32 mg/kg (B-3, B-13, and B-14), DDT ranged from 0.0020 to 0.047 mg/kg (B-3, B-13, and B-14), dieldrin was 0.00062 mg/kg (B-1), DDD was 0.0070 mg/kg (B-3), and chlordane was 0.0058 mg/kg (B-13).
- Two composite samples, B-13 and B-14, had detectable PCB concentrations of PCB-1260 that ranged from 0.0017 to 0.0022 mg/kg.
- One composite sample, B-14, had a detectable SVOC concentration of pyrene that was 0.012 mg/kg.
- Five composite samples B-1, B-2, B-3, B-13, and B-14 were analyzed for RCRA (8) Metals. Detectable arsenic concentrations ranged from 1.6 to 17 mg/kg; barium concentrations ranged from 22 to 430 mg/kg; cadmium concentrations ranged from 0.083 to 0.21 mg/kg; chromium concentrations ranged from 19 to 64 mg/kg; lead concentrations ranged from 0.69 to 34 mg/kg; mercury concentrations ranged from 0.012 to 0.017 mg/kg; selenium concentrations ranged from 0.11 to 0.46 mg/kg; and silver concentrations ranged from 0.030 to 0.035 mg/kg.
- These samples did not exceed the ESLs for residential, commercial/industrial, and construction worker exposure limits (cancer risk), except for arsenic. None of the detectable concentrations exceeded 10 times the STLC values, except for three samples

(B-2, B-3, and B-14) that exceeded the STLC for chromium (50 mg/L). Therefore, soil from these boring locations should be managed for worker safety during construction.

- Three composite samples, B-2 (51 mg/kg), B-3 (64 mg/kg), and B-14 (57 mg/kg), exceeded 10 times the STLC value for chromium (50 mg/L) and were further analyzed using the CA WET. Laboratory results indicated that CA WET chromium concentrations for samples B-2, B-3, and B-14 were 0.053 mg/L, 0.11 mg/L and 0.071 mg/L, respectively. The results are below the STLC regulatory limit of 5 mg/L. Soil from these boring can be pre-classified as Non-Hazardous, and results exceeded the ESLs for residential, commercial/industrial, and construction worker exposure limits (Cr VI - cancer risk); however, the concentrations are below ESLs for Cr III and VI – non-cancer hazard (no values for total Cr).
- Six composite borings (B-2, B-3, B-4, B-13, B-14, and B-16) were analyzed for NOA by PLM analysis using EPA Method 600/R-93/116 (with CARB 435 Prep). No detectable amounts of NOA were identified in the soil samples.

3.8 Conclusions and Recommendations

WRECO analyzed soil for the constituents of concern and screened the results against RWQCB ESLs, that take into consideration risks of direct and indirect exposure to construction workers (as well as residential and commercial/industrial uses). Under most circumstances, the presence of a chemical in soil, soil gas, or groundwater at concentrations below the corresponding ESL can be assumed to not pose a significant threat to human health, water resources, or the environment.

Laboratory results indicate that shallow soil may contain residual low levels of arsenic and chromium. The arsenic concentrations exceeded all RWQCB ESLs. Worker safety measures should follow the California Division of Occupational Safety and Health Administration (Cal/OSHA) regulations to limit exposure and hazards to construction workers during soil disturbance for the bridge construction. The ESLs are criteria that are used for determining human exposure limits and will be used for worker safety requirements during Project construction.

3.8.1 Arsenic in Soil

The Project area is contained within a former agricultural region in the County, and the use of phosphate and micronutrient fertilizers contain potentially harmful trace elements such as arsenic, chromium, and lead. Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.

Background arsenic levels in California tend to be higher than the RWQCB ESLs used for evaluation of a soil's hazardous classification, and various studies have shown much higher levels in soil. The USGS (1984) provided a regional estimate for arsenic of 18 mg/kg and cobalt of 23 mg/kg (both upper estimates). The Lawrence Berkeley National Laboratory (LBNL) (LBNL, 2009) provided upper estimates of background levels (based on statistical analysis) of arsenic and cobalt. The LBNL study indicated concentrations of arsenic and cobalt at 24 mg/kg and 25 mg/kg, respectively. Due to the high capacity of clay and organic matter to adsorb metallic ions, arsenic concentrations tend to be highest in soils that contain high percentages of clay and organic material (e.g., clay and clay loamy soils, organic light [or rich] soils) (Naval Facilities Engineering Command, 2002). Therefore, it is expected that finer-grained depositional environments within the Bay Area would likely have higher natural concentrations of arsenic relative to sandy or gravelly soils.

Background arsenic concentrations in soil in the Bay Area was studied in detail by Dylan Jacques Duvergé. The typical range of concentrations for arsenic in soils is 0.39 to 40 mg/kg with most soils being on the lower end. The type of parent rock is only one of the factors that control metal concentrations in soils. Weathering, biological chemical reactions, and other natural geochemical processes can significantly enrich or deplete the concentrations of certain metals.

3.8.2 Chromium in Soil

The composite samples exceeded the ESLs for residential, commercial/industrial, and construction worker exposure limits (Cr VI - cancer risk); however, the concentrations are below ESLs for Cr III and VI – non-cancer hazard (there are no values for total chromium). Therefore, the soil in these areas need to be managed for worker safety during construction.

3.8.3 Lead in Soil

The lead concentrations in soil were below the regulatory limit of 80 mg/kg and the 95% UCL calculated lower levels in the three depths sampled. None of the detectable lead concentrations exceeded the ESLs for residential, construction worker, or commercial/industrial exposure. The soil in these areas may be pre-classified as non-hazardous. The Caltrans-DTSC Agreement can be utilized for soil reuse at the Project area.

3.8.4 Worker Safety

All on-site personnel shall comply with standards found in the Construction Safety Orders and General Industry Safety Orders as defined by Cal/OSHA. The following federal and state regulations govern the protection of worker safety at potential hazardous material sites:

- OSHA Hazardous Waste Operations and Emergency Response regulations (29 Code of Federal Regulations [CFR] 1910.120)
- Occupations Safety and Health Administration (OSHA) Worker education and training (Hazard Communication Standard) 29 CFR 1910.120, 1915.120, 1917.28, 1918.90, and 1926.59
- General Industry OSHA 29 CFR 1910; 1910.1001 (Asbestos), 1910.1018 (Inorganic Arsenic), 1910.1025 (Lead), 1910 Subpart Z (Toxic and hazardous substances), and 1910.1000 (Air contaminants), and 1926 Subpart D (Occupational health and environmental controls)
- 40 CFR Part 61.145, Subpart M, NESHAPs Inspection prior to Renovation or Demolition
- Construction Industry OSHA 29 CFR 1926; 1926.62 (Lead), 1926 Subpart Z (Toxic and hazardous substances), 1926.1118 (Inorganic Arsenic)
- Hazardous Waste Control Act (California Health and Safety Code, Section 25100 et seq.), CCR Title 26
- HAZWOPER (§ 5192) - Title 8 CCR Division 1, Chapter 4, Subchapter 7, Group 16, Article 109 (Appendices)
- Lead in Construction - 8 CCR 1532.1
- General Industry Safety Orders - 8 CCR 5214 (Inorganic Arsenic)

- Environmental Health Standards for Management of Hazardous Waste - 22 CCR Division 4.5
- Lead Standard for the Construction Industry - 29 CFR 1926.62

Arsenic - Arsenic is a naturally occurring element that is often detected in soil at concentrations that equal or exceed regulatory screening levels for both residential and industrial soil. The DTSC is aware of the ubiquitous nature of arsenic in California soil and generally does not consider concentrations of arsenic within the range of naturally occurring background levels to be a concern. Soil cleanup guidelines for arsenic vary widely in the USA, ranging from 0.039 to 40 mg/ kg. The Project site had arsenic values ranging from 1.6 to 17 mg/kg.

Chromium - Chromium is a naturally occurring element in rocks, animals, plants, soil, and volcanic dust and gases. Chromium occurs in primarily in two valence states, trivalent chromium (Cr III) and hexavalent chromium (Cr VI). Exposure may occur from natural or industrial sources of chromium. Cr III is recognized as a trace element that is essential to both humans and animals. Cr VI compounds are toxic and inhaled Cr VI is recognized as a human carcinogen. The body can detoxify some amount of Cr VI to Cr III. Chromium compounds in soil can be inhaled and result in airway irritation, airway obstruction, and lung, nasal, or sinus cancer. Three samples exceeded 10 times the STLC value for chromium (50 mg/L) and were further analyzed using the CA WET. The CA WET chromium concentrations were below the STLC regulatory limit of 5 mg/L, therefore, soil from these borings can be pre-classified as Non-Hazardous. Results exceeded the ESLs for residential, commercial/industrial, and construction worker exposure limits (Cr VI - cancer risk); however, the concentrations are below ESLs for Cr III and VI – non-cancer hazard (no values for total Cr).

ADL - Aerially deposited lead is typically found within the top 3 feet of soil in unpaved areas within the highway's right-of-way.

- Caltrans Standard Special Provisions (SSP) 7-1.02K(6)(j)(iii) (DOCX) (10/19/2018) - Earth Material Containing Lead - Requires a lead compliance plan for soil disturbance when lead concentrations are non-hazardous.
- Caltrans- DTSC Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils (June 29, 2016) for re-use.
- Caltrans Standard Specification 14-11.08 Regulated Material Containing Aerially Deposited Lead (2018).
- Caltrans Standard Specification 14-11.09 Minimal Disturbance of Regulated Material Containing Aerially Deposited Lead (2018).

Treated Wood Waste (TWW) (Utility Poles) – TWW contains hazardous chemicals that pose a risk to human health and the environment. Arsenic, chromium, copper, creosote, and pentachlorophenol are among the chemicals used to preserve wood and are known to be toxic or carcinogenic.

- Caltrans SSP 14-11.14 (DOCX) (10/19/2018) - Treated Wood Waste - Management of TWW.
- DTSC TWW Management in California, AB 1353 (January 2005), Alternative Management Standards (AMS), 22 CCR Chapter 34

Asphalt and Concrete (AC) – paving materials such as cement, asphalt, and rock products are nonrenewable resources and should be recycled and reclaimed per the Department of Fish and Game (DFG) Code. A Memorandum of Understanding dated January 12, 1993, outlines the interim agreement between the DFG and the Department of Transportation (DOT) regarding the use of asphaltic materials (DOT 2012).

- Section 5650 of the Fish and Game Code (unlawful to deposit asphalt, other petroleum products, or any material deleterious to fish, plant life, or bird life where they can pass into the waters of the State)
- Section 1601 of the Fish and Game Code (prior to construction of a project that will result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the DFG)

All on-site personnel shall comply with standards found in the Construction Safety Orders and General Industry Safety Orders as defined by Cal/OSHA.

3.8.5 Waste Classification and Disposal Options

Waste classification and disposal for Project sites that generate soil containing constituents of concern that exceed regulatory requirements for soil reuse, should follow the decision options shown in Figure 9.

The results from this investigation were consistent with the Caltrans-DTSC Agreement for re-use. The soil is pre-classified as Non-Hazardous, and WRECO recommends that excavated soil at locations and depth ranges sampled in this PSI-ADL Study be reused at the Project area. If soil needs to be disposed, it can be classified as non-hazardous waste at a Class III landfill depending on specific facility acceptance standards.

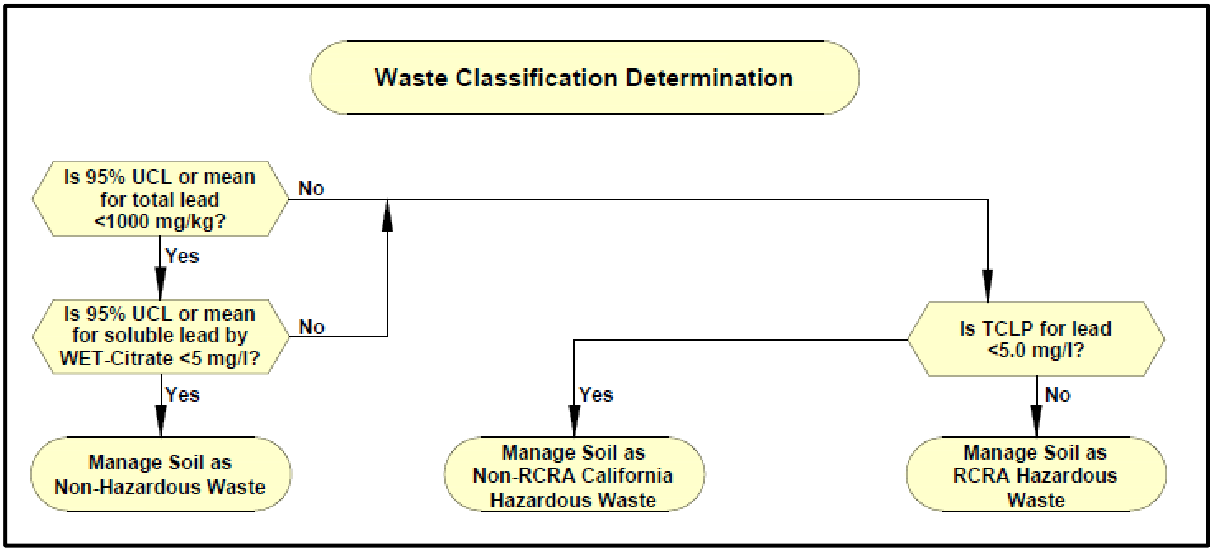

Figure 9. California Waste Classification and Disposal Options

Source: California Environmental Protection Agency

The contractor hired for the Project construction will need to prepare a Project-specific Lead Compliance Plan (CCR Title 8, §1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-containing soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-containing soil.

PSI-ADL RECOMMENDATIONS SUMMARY

Material	Description	Recommended Actions
ADL in shallow soil	Detectable lead concentrations in shallow soil within the Project area ranged from 0.23 to 40 mg/kg, which are below the regulatory limit of 80 mg/kg. Therefore, the soil is pre-classified as Non-Hazardous.	Manage ADL waste per: • Caltrans-DTSC *Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils* (June 2016) for re-use and disposal. • **Caltrans Standard Special Provisions (SSP) 7-1.02K(6)(j)(iii) (DOCX) (10/19/2018) - Earth Material Containing Lead** - Requires a lead compliance plan for soil disturbance when lead concentrations are non-hazardous. • **Caltrans Standard Specification 14-11.08 -** Regulated Material Containing Aerially Deposited Lead (2018). **Caltrans Standard Specification 14-11.09** - Minimal Disturbance of Regulated Material Containing Aerially Deposited Lead (2018).
Arsenic and Chromium in shallow soil	Detectable Arsenic concentrations (1.6 and 17 mg/kg) in the Project area did not exceed 10 times the STLC regulatory limit (5 mg/L) and can be pre-classified as Non-Hazardous. Detectable chromium concentrations (19 to 64 mg/kg) in the Project area did exceed 10 times the STLC regulatory limit and three samples were analyzed using CA WET. The concentrations were below the STLC regulatory limit; therefore, the soil can be pre-classified as Non-Hazardous. However, the Arsenic and Chromium concentrations in soil exceeded the RWQCB ESLs and soil in these areas need to be managed for worker safety.	Worker Safety Training will need to include exposure to Arsenic and Chromium in soil (above RWQCB ESL levels). Dispose of excavated soils as Non-hazardous waste at Class II unit or Class III landfill depending on facility acceptance standard, consistent with CCR Title 22 §66262.11 waste classification.
Asphalt and Concrete (AC)	All asphalt (AC) and concrete removed during roundabout construction can be reclaimed and recycled.	• All asphalt concrete (AC) materials should be recycled per the Caltrans directive for reclaimed AC (AB 1306), in accordance with the January 27, 1993 Memorandum on "Department of Fish and Game Agreement on AC Grindings, Chunks and Pieces." • Caltrans Asphalt-Concrete and Portland Cement Concrete Grindings Reuse Guidance (2007). • **Caltrans SSP 60-2.01A (DOCX) (10/19/2018)** - Use for removing structures or portions of structures, including bridges, retaining walls, sound walls, and other concrete or masonry structures. **Caltrans SSP 60-2.02 (DOCX) (10/19/2018)** - Use for bridge removal work.
Utility Poles (treated wood) with transformers	Potential arsenic, copper, chromium, creosote, and pentachlorophenol may be present in treated wood used for utility poles.	Treated wood removed from the Project area would be managed in accordance with Title 22, Division 4.5, Chapter 34 of the California Code of

Material	Description	Recommended Actions
(PCBs) along Bell Road	Potential PCBs in pole-mounted electrical transformers along the Project area.	Regulations. Abate transformers prior to construction; PG&E manages the electric lines and transformers.
Traffic Striping	Potential lead and lead-chromate are associated with traffic striping. Implementation of improvements may require the removal and disposal of yellow traffic striping and pavement marking materials (paint, thermoplastic, permanent tape, and temporary tape). Yellow paints made prior to 1995 may exceed hazardous waste criteria under Title 22 CCR and require disposal in a Class I disposal site.	Abate striping prior to construction following Caltrans SSP: • **Caltrans SSP 14-11.12 (DOCX) (10/19/2018) - Remove Yellow Traffic Stripe and Pavement Marking with Hazardous Waste Residue** - Requires proper management of hazardous waste residue and a lead compliance plan. • **Caltrans SSP 36-4 (DOCX) (10/19/2018) - Containing Lead from Paint and Thermoplastic** - Requires a lead compliance plan for removal when residue is definitely non-hazardous. **Caltrans SSP 84-9.03C** (DOCX) (10/19/2018) - **Remove Traffic Stripes and Pavement Markings Containing Lead -** Requires a lead compliance plan for removal when residue is definitely non-hazardous. Used for new yellow paints and all other colors of paint.
Arsenic and Chromium in shallow soil	Detectable Arsenic concentrations (1.6 and 17 mg/kg) in the Project area did not exceed 10 times the STLC regulatory limit (5 mg/L) and can be pre-classified as Non-Hazardous. Detectable chromium concentrations (19 to 64 mg/kg) in the Project area did exceed 10 times the STLC regulatory limit and three samples were analyzed using CA WET. The concentrations were below the STLC regulatory limit; therefore, the soil can be pre-classified as Non-Hazardous. However, the Arsenic and Chromium concentrations in soil exceeded the RWQCB ESLs and soil in these areas need to be managed for worker safety.	Worker Safety Training will need to include exposure to Arsenic and Chromium in soil (above RWQCB ESL levels). Dispose of excavated soils as Non-hazardous waste at Class II unit or Class III landfill depending on facility acceptance standard, consistent with CCR Title 22 §66262.11 waste classification.

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4 LIMITATIONS

The scope of a PSI-ADL Study includes verification of potential RECs by collecting shallow soil samples and analyzing them for constituents of concern (COC). The potential exists for unknown contamination to be revealed during project construction through soil disturbance. The PSI-ADL Study for the Project located in Davis, California, was performed in general accordance with the ASTM E1903-11 International Standard.

All readily available materials pertaining to the Project corridor were reviewed prior to performing the investigation and used to help prepare this report. This assessment is not a full-scale environmental site investigation to prove that the Project corridor is environmentally devoid of hazardous or toxic materials. Samples were collected in specific locations for the roundabout construction to determine baseline concentrations of potential COCs.

This PSI-ADL Study consists of professional opinions and recommendations made in accordance with generally-accepted environmental principles and practices. The conclusions are based upon an evaluation of the information gathered and analytical data from the soil samples collected from the Project corridor area. This PSI-ADL Study does not provide any implied or expressed guarantees regarding the characteristics or environmental conditions at the Project area.

The findings and conclusions in this report are based solely on the limited scope of the PSI-ADL Study, and it is not warranted that the Project corridor does not include hazardous materials or petroleum hydrocarbon releases in areas that weren't tested or discussed in this report.

This PSI-ADL Study is not intended to identify ALL hazards or unsafe conditions, or to imply that others do not exist. This soil sampling and testing investigation was planned and implemented based on a mutually agreed scope of work and WRECO's experience in performing this type of assessment.

WRECO has performed this investigation in a professional manner using the degree of skill and care exercised for similar projects under similar conditions, by reputable and competent environmental consultants. WRECO shall not be responsible for conditions or consequences arising from relevant facts that were not identified or disclosed at the time that this investigation was conducted.

WRECO further states that no warranties, expressed or implied are made regarding the quality, fitness, or results to be achieved because of this report or impacted by information not properly disclosed to WRECO at the time of this report. In addition, no responsibility is assumed for the control or correction of conditions or practices existing at the premises of the client.

Verification of material quantities is the responsibility of the contractor that will be performing construction activities at the Project area. It is the responsibility of the construction contractor to determine the appropriate waste management and disposal actions for shallow soil within the Project area. Hazardous materials must be handled in strict accordance with the various federal, state, and local regulations. Failure to abide by these regulations can result in penalties to both the contractor as well as the property owner.

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5 REFERENCES

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Appendix A Caltrans Encroachment Permit

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (REV 6/2012)

Permit No.
0319-NSV0415

Dist/Co/Rte/PM
03-PLA-80 PM R21 to PLA-80 PM R21

Date
June 5, 2019

Fee Paid $ Exempt	Deposit $ N/A
Performance Bond Amount (1) $ N/A	Payment Bond Amount (2) $ N/A
Bond Company	
Bond Number (1)	Bond Number (2)

In compliance with (Check one):

☒ Your application of May 22, 2019

☐ Utility Notice No. ____________ of ____________

☐ Agreement No. ____________ of ____________

☐ R/W Contract No. ____________ of ____________

TO:

Placer County
c/o GHD, Inc.
943 Reserve Drive, Ste. 100
Roseville, CA 95678
Attn: Heather Anderson
916-782-8688

Cooperative Agreement: 03-0663
EA: 034H430

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Perform field investigations, surveys, and data collection for preliminary engineering activities related to the Bell Road and Interstate 80 Roundabout Project in Auburn. In addition to the General and Special Provisions, the following conditions apply:

1. Permittee must arrange an onsite pre-job meeting with the Caltrans representative a minimum of seven (7) working days prior to the start of work to discuss scope of work, work schedule, and traffic control plans.

2. All lane and shoulder closures are not authorized unless submitted on a lane closure request form and approved by Caltrans Traffic Management Center (TMC).

-- CONTINUED ON PAGE 2 --

THIS PERMIT IS NOT A PROPERTY RIGHT AND DOES NOT TRANSFER WITH THE PROPERTY TO A NEW OWNER.

The following attachments are also included as part of this permit *(Check applicable)*:

☒ Yes	☐ No	General Provisions
☐ Yes	☒ No	Utility Maintenance Provisions
☒ Yes	☐ No	Special Provisions TR-0128
☐ Yes	☒ No	A Cal-OSHA permit, if required: Permit No. ____________
☐ Yes	☒ No	As-Built Plans Submittal Route Slip for Locally Advertised Projects
☐ Yes	☒ No	Storm Water Pollution Protection Plan

In addition to fee, the permittee will be billed actual costs for:

☐ Yes	☒ No	Review
☐ Yes	☒ No	Inspection
☒ Yes		Field work

(If any Caltrans effort expended)

☐ Yes ☒ No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before January 1, 2022

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.
No project work shall be commenced until all other necessary permits and environmental clearances have been obtained

Anthony Stevens, Permit Inspector

cc: Chris Seale, Nevada City Maint. Station

APPROVED:

AMARJEET BENIPAL, District Director

BY: for Brigette Haddock

HIKMAT BSAIBESS, District Permit Engineer

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

FM91 1436

PERMISSIONS Conditions Continued:

3. All lane and shoulder closure requests must be submitted to the Caltrans representative via e-mail (closure form filled out) by close of business the Monday preceding the week of the planned work.

4. Permittee must keep a log of all the closures called in to TMC dispatch at 916-859-7900 (10-97 closure up, 10-98 closure down, and 10-22 canceled closure) and the name of the TMC dispatch person. The log must be provided via e-mail to the Caltrans representative at the end of each work week.

5. Caltrans is not a member of Underground Service Alert (USA). It is the responsibility of the permittee to locate and protect all Caltrans utilities including traffic loops within the project limits. Your attention is directed to General Provision #31 for restoration and repair of any damages to state facilities.

6. Notwithstanding General Provision #4, each of your contractors must obtain an encroachment permit (double permit) prior to starting work. There is no fee associated with the double permit.

7. Work must not be performed in fog or inclement weather. If weather or adverse conditions cause a public hazard, work must be immediately discontinued.

8. If construction disrupts pedestrian and bicyclist facilities, your attention is directed to General Provision #13: Pedestrian and Bicyclist Safety.

The Caltrans representative's contact information is:
Anthony Stevens - Cell: (530) 751-6127, Email: anthony.stevens@dot.ca.gov

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION
ENCROACHMENT PERMIT GENERAL PROVISIONS
TR-0045 (REV. 11/2018)

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1. **AUTHORITY:** The California Department of Transportation ("Department") has authority to issue encroachment permits under Division 1, Chapter 3, Article 1, Sections 660 through 734 of the Streets and Highways Code.

2. **REVOCATION:** Encroachment permits are revocable on five (5) business days' notice unless otherwise stated on the permit and except as provided by law for public corporations, franchise holders, and utilities. Notwithstanding the foregoing, in an emergency situation as determined by the Department, an encroachment permit may be revoked immediately. These General Provisions and any applicable Special Provisions are subject to modification or abrogation by the Department at any time. Permittees' joint use agreements, franchise rights, reserved rights or any other agreements for operating purposes in State of California ("State") highway right-of-way may be exceptions to this revocation.

3. **DENIAL FOR NONPAYMENT OF FEES:** Failure to pay encroachment permit fees when due may result in rejection of future applications and denial of encroachment permits.

4. **ASSIGNMENT:** This encroachment permit allows only the Permittee or Permittee's authorized agent to work within or encroach upon the State Highway right-of-way, and the Permittee may not assign this permit.

5. **ACCEPTANCE OF PROVISIONS:** Permittee understands and agrees to accept and comply with these General Provisions, the Special Provisions, any and all terms and/or conditions contained in or incorporated into the encroachment permit, and all attachments to the encroachment permit (collectively "the Permit Conditions"), for any encroachment, work, and/or activity to be performed under this encroachment permit and/or under color of authority of this encroachment permit. Permittee understands and agrees the Permit Conditions are applicable to and enforceable against Permittee as long as the encroachment remains in, under, or over any part of the State Highway right-of-way.

6. **BEGINNING OF WORK:** When traffic is not impacted (see General Provision Number 35), the Permittee must notify the Department's representative two (2) business days before starting permitted work. Permittee must notify the Department's representative if the work is to be interrupted for a period of five (5) business days or more, unless otherwise agreed upon. All work must be performed on weekdays during regular work hours, excluding holidays, unless otherwise specified in this encroachment permit.

7. **STANDARDS OF CONSTRUCTION:** All work performed within State Highway right-of-way must conform to all applicable Departmental construction standards including but not limited to: Standard Specifications, Standard Plans, Project Development Procedures Manual, Highway Design Manual and Special Provisions.

   Other than as expressly provided by these General Provisions, the Special Provisions, the Standard Specifications, Standard Plans, and other applicable Departmental standards, nothing in these General Provisions is intended to give any third party any legal or equitable right, remedy, or claim with respect to these General Provisions or any provision herein. These General Provisions are for the sole and exclusive benefit of the Permittee and the Department.

   Where reference is made in such standards to "Contractor" and "Engineer," these are amended to be read as "Permittee" and "Department's representative," respectively, for purposes of this encroachment permit.

8. **PLAN CHANGES:** Deviations from plans, specifications, and/or the Permit Conditions as defined in General Provision Number 5 are not allowed without prior approval from the Department's representative.

9. **INSPECTION AND APPROVAL:** All work is subject to monitoring and inspection. Upon completion of work, Permittee must request a final inspection for acceptance and approval by the Department. Permittee must not give final construction completion approval to its contractor, until final acceptance and approval is obtained from the Department.

10. **PERMIT AT WORKSITE:** Permittee must keep the permit package or a copy thereof at the work site at all times, and must show it upon request to any Department representative or law enforcement officer. If the permit package, or a copy thereof, is not kept and made available at the work site at all times, the work must be suspended.

11. **CONFLICTING ENCROACHMENTS:** Permittee must yield start of work to ongoing, prior authorized work adjacent to or within the limits of the Permittee's project site. When existing encroachments conflict with Permittee's work, the Permittee must bear all cost for rearrangements (e.g., relocation, alteration, removal, etc.).

12. **PERMITS FROM OTHER AGENCIES:** This encroachment permit is invalidated if the Permittee has not obtained all permits necessary and required by law, including but not limited to permits from the California Public Utilities Commission (CPUC), California Occupational Safety and Health Administration (Cal-OSHA), or any other public agency having jurisdiction. Permittee warrants all such permits have been obtained before beginning work under this encroachment permit.

13. **PEDESTRIAN AND BICYCLIST SAFETY:** A safe minimum continuous passageway of four (4) feet must be maintained through the work area at existing pedestrian or bicycle facilities. At no time must pedestrians be diverted onto a portion of the street used for vehicular traffic. At locations where safe alternate passageways cannot be provided, appropriate signs and barricades must be installed at the limits

of construction and in advance of the limits of construction at the nearest crosswalk or intersection to detour pedestrians to facilities across the street. Attention is directed to Section 7-1.04, *Public Safety*, of the Department's Standard Specifications.

14. **PUBLIC TRAFFIC CONTROL:** As required by law, the Permittee must provide traffic control protection, warning signs, lights, safety devices, etc., and take all other measures necessary for the traveling public's safety. While providing traffic control, the needs of all road users, including but not limited to motorists, bicyclists and pedestrians, including persons with disabilities in accordance with the Americans with Disabilities Act, must be an essential part of the work activity.

    Lane and/or shoulder closures must comply with the Department's Standard Specifications and Standard Plans for traffic control systems, and with the applicable Special Provisions. Where issues are not addressed in the Standard Specifications, Standard Plans, and/or Special Provisions, the California Manual on Uniform Traffic Control Devices (Part 6, *Temporary Traffic Control)* must be followed.

15. **MINIMUM INTERFERENCE WITH TRAFFIC:** Permittee must plan and conduct work so as to create the least possible inconvenience to the traveling public, such that traffic is not unreasonably delayed.

16. **STORAGE OF EQUIPMENT AND MATERIALS:** The storage of equipment or materials is not allowed within State highway right-of-way, unless specified within the Special Provisions of this encroachment permit. If encroachment permit Special Provisions allow for the storage of equipment or materials within the State highway right-of-way, the equipment and material storage must also comply with Section 7-1.04, *Public Safety*, of the Department's Standard Specifications.

17. **CARE OF DRAINAGE:** Permittee must provide alternate drainage for any work interfering with an existing drainage facility in compliance with the Department's Standard Specifications, Standard Plans, and/or as directed by the Department's representative.

18. **RESTORATION AND REPAIRS IN STATE HIGHWAY RIGHT-OF-WAY:** Permittee is responsible for restoration and repair of State highway right-of-way resulting from permitted work (Streets and Highways Code, section 670 et seq.).

19. **STATE HIGHWAY RIGHT-OF-WAY CLEAN UP:** Upon completion of work, Permittee must remove and dispose of all scraps, refuse, brush, timber, materials, etc. off the State highway right-of-way. The aesthetics of the highway must be as it was before work started or better.

20. **COST OF WORK:** Unless stated otherwise in the encroachment permit or a separate written agreement with the Department, the Permittee must bear all costs incurred for work within the State highway right-of-way and waives all claims for indemnification or contribution from the State, the Department, and from the Directors, officers, and employees of the State and/or the Department.

21. **ACTUAL COST BILLING:** When specified in the permit, the Department will bill the Permittee actual costs at the currently set Standard Hourly Rate for encroachment permits.

22. **AS-BUILT PLANS:** When required, Permittee must submit one (1) set of folded as-built plans within thirty (30) calendar days after completion and acceptance of work in compliance with requirements listed as follows:

    a) Upon completion of the work provided herein, the Permittee must submit a paper set of As-Built plans to the Department's representative.
    b) All changes in the work will be shown on the plans, as issued with the permit, including changes approved by Encroachment Permit Rider.
    c) The plans are to be prominently stamped or otherwise noted "AS-BUILT" by the Permittee's representative who was responsible for overseeing the work. Any original plan that was approved with a Department stamp, or by signature of the Department's representative, must be used for producing the As-Built plans.
    d) If construction plans include signing or striping, the dates of signing or striping removal, relocation, or installation must be shown on the As-Built plans when required as a condition of the encroachment permit. When the construction plans show signing and striping for staged construction on separate sheets, the sheet for each stage must show the removal, relocation, and installation dates of the appropriate staged striping and signing.
    e) As-Built plans must contain the Encroachment Permit Number, County, Route, and Post Mile on each sheet.
    f) The As-Built plans must not include a disclaimer statement of any kind that differs from the obligations and protections provided by sections 6735 through 6735.6 of the California Business and Professions Code. Such statements constitute non-compliance with Encroachment Permit requirements, and may result in the Department retaining Performance Bonds or deposits until proper plans are submitted. Failure to comply may also result in denial of future encroachment permits or a provision requiring a public agency to supply additional bonding.

23. **PERMITS FOR RECORD PURPOSES ONLY:** When work in the State highway right-of-way is within an area under a Joint Use Agreement (JUA) or a Consent to Common Use Agreement (CCUA), a fee exempt encroachment permit is issued to the Permittee for the purpose of providing a notice and record of work. The Permittee's prior rights must be preserved without the intention of creating new or different rights or obligations. "Notice and Record Purposes Only" must be stamped across the face of the encroachment permit.

24. **BONDING:** The Permittee must file bond(s), in advance, in the amount(s) set by the Department and using forms acceptable to the Department. The bonds must name the Department as obligee. Failure to maintain bond(s) in full force and effect will result in the Department stopping all work under this encroachment permit and possibly revoking other encroachment permit(s). Bonds are not required of public

corporations or privately owned utilities unless Permittee failed to comply with the provisions and/or conditions of a prior encroachment permit. The surety company is responsible for any latent defects as provided in California Code of Civil Procedure section 337.15. A local public agency Permittee also must comply with the following requirements:

a) In recognition that project construction work done on State property will not be directly funded and paid by State, for the purpose of protecting stop notice claimants and the interests of State relative to successful project completion, the local public agency Permittee agrees to require the construction contractor to furnish both a payment and performance bond in the local public agency's name with both bonds complying with the requirements set forth in Section 3-1.05 *Contract Bonds* of the Department's Standard Specifications before performing any project construction work.
b) The local public agency Permittee must defend, indemnify, and hold harmless the State and the Department, and the Directors, officers, and employees of the State and/or Department, from all project construction related claims by contractors, subcontractors, and suppliers, and from all stop notice and/or mechanic's lien claimants. The local public agency also agrees to remedy, in a timely manner and to the Department's satisfaction, any latent defects occurring as a result of the project construction work.

25. **FUTURE MOVING OF INSTALLATIONS:** Permittee understands and agrees to relocate a permitted installation upon notice by the Department. Unless under prior property right or agreement, the Permittee must comply with said notice at the Permittee's sole expense.

26. **ENVIRONMENTAL:**
a) ARCHAEOLOGICAL/HISTORICAL: If any archaeological or historical resources are identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified archaeologist who must evaluate the site at Permittee's expense, and make recommendations to the Department's representative regarding the continuance of work.

b) HAZARDOUS MATERIALS: If any hazardous waste or materials (such as underground storage tanks, asbestos pipes, contaminated soil, etc.) are identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified hazardous waste/material specialist who must evaluate the site at Permittee's expense, and make recommendations to the Department's representative regarding the continuance of work.

Attention is directed to potential aerially deposited lead (ADL) presence in unpaved areas along highways. It is the Permittee's responsibility to take all appropriate measures to protect workers in conformance with California Code of Regulations Title 8, Section 1532.1, "Lead," and with Cal-OSHA Construction Safety Orders, and to ensure roadway soil management is in compliance with Department of Toxic Substances Control (DTSC) requirements.

27. **PREVAILING WAGES:** Work performed by or under an encroachment permit may require Permittee's contractors and subcontractors to pay appropriate prevailing wages as set by the California Department of Industrial Relations. Inquiries or requests for interpretations relative to enforcement of prevailing wage requirements must be directed to the California Department of Industrial Relations.

28. **LIABILITY, DEFENSE, AND INDEMNITY:** The Permittee agrees to indemnify and save harmless the State, the Department, and the Directors, officers, employees, agents and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind, and description, including but not limited to those brought for or on account of property damage, invasion of privacy, violation or deprivation of a right under a state or federal law, environmental damage or penalty, or injury to or death of any person including but not limited to members of the public, the Permittee, persons employed by the Permittee, and/or persons acting on behalf of the Permittee, arising out of or in connection with: (a) the issuance and/or use of this encroachment permit; and/or (b) the encroachment, work, and/or activity conducted pursuant to this encroachment permit, or under color of authority of this encroachment permit but not in full compliance with the Permit Conditions as defined in General Provision Number 5 ("Unauthorized Work or Activity"); and/or (c) the installation, placement, design, existence, operation, and/or maintenance of the encroachment, work, and/or activity; and/or (d) the failure by the Permittee or anyone acting on behalf of the Permittee to perform the Permittee's obligations under any part of the Permit Conditions as defined in General Provision Number 5, in respect to maintenance or any other obligation; and/or (e) any change to the Department's property or adjacent property, including but not limited to the features or conditions of either of them, made by the Permittee or anyone acting on behalf of the Permittee; and/or (f) a defect or obstruction related to or caused by the encroachment, work, and/or activity whether conducted in compliance with the Permit Conditions as defined in General Provision Number 5 or constituting Unauthorized Work or Activity, or from any cause whatsoever. The duty of the Permittee to indemnify and save harmless includes the duties to defend as set forth in Section 2778 of the Civil Code.

It is the intent of the parties that except as prohibited by law, the Permittee will defend, indemnify, and hold harmless as set forth in this General Provision Number 28 regardless of the existence or degree of fault or negligence, whether active or passive, primary or secondary, on the part of: the State; the Department; the Directors, officers, employees, agents and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors; the Permittee; persons employed by the Permittee; and/or persons acting on behalf of the Permittee.

The Permittee waives any and all rights to any type of expressed or implied indemnity from or against the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors.

The Permittee understands and agrees to comply with the obligations of Titles II and III of the Americans with Disabilities Act in the conduct of the encroachment, work, and/or activity whether conducted pursuant to this encroachment permit or constituting Unauthorized Work or Activity, and further agrees to defend, indemnify, and save harmless the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, penalties, liability, suits, or actions of every name, kind, and description arising out of or by virtue of the Americans with Disabilities Act.

The Permittee understands and agrees the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, are not personally responsible for any liability arising from or by virtue of this encroachment permit.

For the purpose of this General Provision Number 28 and all paragraphs herein, "contractors of the State and/or of the Department" includes contractors under contract to the State and/or the Department, and the subcontractors of such contractors.

This General Provision Number 28 and all paragraphs herein take effect immediately upon issuance of this encroachment permit, and apply before, during, and after the encroachment, work, and/or activity contemplated under this encroachment permit, whether such work is in compliance with the Permit Conditions as defined in General Provision Number 5 or constitutes Unauthorized Work or Activity, except as otherwise provided by California law. The Permittee's obligations to defend, indemnify, and save harmless under this General Provision Number 28 take effect immediately upon issuance of this encroachment permit and have no expiration date, including but not limited to situations in which this encroachment permit expires or is revoked, the work or activity performed under this encroachment permit is accepted or not accepted by the Department, the encroachment, work, and/or activity is conducted in compliance with the Permit Conditions as defined in General Provision Number 5 or constitutes Unauthorized Work or Activity, and/or no work or activity is undertaken by the Permittee or by others on the Permittee's behalf.

29. **NO PRECEDENT ESTABLISHED:** This encroachment permit is issued with the understanding that it does not establish a precedent.

30. **FEDERAL CIVIL RIGHTS REQUIREMENTS FOR PUBLIC ACCOMMODATION:**

a) As part of the consideration for being issued this encroachment permit, the Permittee, on behalf of Permittee and on behalf of Permittee's personal representatives, successors in interest, and assigns, does hereby covenant and agree that:

   i. No person on the grounds of race, color, or national origin may be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
   ii. In connection with the construction of any improvements on said lands and the furnishings of services thereon, no discrimination must be practiced in the selection and retention of first-tier subcontractors in the selection of second-tier subcontractors.
   iii. Such discrimination must not be practiced against the public in their access to and use of the facilities and services provided for public accommodations (such as eating, sleeping, rest, recreation), and operation on, over, or under the space of the State highway right-of-way.
   iv. The Permittee must use the premises in compliance with all other requirements imposed pursuant to Title 15, Code of Federal Regulations, Commerce and Foreign Trade, Subtitle A. Office of the Secretary of Commerce, Part 8 (15 C.F.R. Part 8) and as said Regulations may be amended.

b) In the event of breach of any of the above nondiscrimination covenants, the State and the Department have the right to terminate this encroachment permit and to re-enter and repossess said land and the facilities thereon, and hold the same as if said permit had never been made or issued.

31. **MAINTENANCE OF HIGHWAYS:** By accepting this encroachment permit, the Permittee agrees to properly maintain any encroachment. This assurance requires the Permittee to provide inspection and repair any damage, at Permittee's expense, to State facilities resulting from the encroachment.

32. **SPECIAL EVENTS:** In accordance with subdivision (a) of Streets and Highways Code section 682.5, the Department is not responsible for the conduct or operation of the permitted activity, and the applicant agrees to defend, indemnify, and hold harmless the State, the Department, and the Directors, officers, employees, agents, and contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind and description arising out of any activity for which this encroachment permit is issued.

The Permittee understands and agrees to comply with the obligations of Titles II and III of the Americans with Disabilities Act in the conduct of the event, and further agrees to defend, indemnify, and save harmless the State and the Department, and the Directors, officers, and employees of the State and/or Department, including but not limited to the

Director of the Department and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind and description arising out of or by virtue of the Americans with Disabilities Act.

33. **PRIVATE USE OF STATE HIGHWAY RIGHT-OF-WAY:** State highway right-of-way must not be used for private purposes without compensation to the State. The gifting of public property use and therefore public funds is prohibited under the California Constitution, Article 16.

34. **FIELD WORK REIMBURSEMENT:** Permittee must reimburse the Department for field work performed on Permittee's behalf to correct or remedy hazards or damaged facilities, or to clear refuse, debris, etc. not attended to by the Permittee.

35. **NOTIFICATION OF CLOSURES TO DEPARTMENT AND TRAFFIC MANAGEMENT CENTER (TMC):** The Permittee must notify the Department's representative and the Traffic Management Center (TMC) at least seven (7) days before initiating a lane closure or conducting an activity that may cause a traffic impact. A confirmation notification should occur three (3) days before closure or other potential traffic impact. In emergency situations when the corrective work or the emergency itself may affect traffic, TMC and the Department's representative must be notified as soon as possible.

36. **SUSPENSION OF TRAFFIC CONTROL OPERATION:** The Permittee, upon notification by the Department's representative, must immediately suspend all lane closure operations and any operation that impedes the flow of traffic. All costs associated with this suspension must be borne by the Permittee.

37. **UNDERGROUND SERVICE ALERT (USA) NOTIFICATION:** Any excavation requires compliance with the provisions of Government Code section 4216 et. seq., including but not limited to notice to a regional notification center, such as Underground Service Alert (USA). The Permittee must provide notification to the regional notification center at least forty-eight (48) hours before performing any excavation work within the State highway right-of-way.

38. **COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT (ADA):** All work within the State highway right-of-way to construct and/or maintain any public facility must be designed, maintained, and constructed strictly in accordance with all applicable Federal Access laws and regulations (including but not limited to Section 504 of the Rehabilitation Act of 1973, codified at 29 U.S.C. § 794), California Access laws and regulations relating to ADA, along with its implementing regulations, Title 28 of the Code of Federal Regulations Parts 35 and 36 (28 C.F.R., Ch. I, Part 35, § 35.101 et seq., and Part 36, § 36.101 et seq.), Title 36 of the Code of Federal Regulations Part 1191 (36 C.F.R., Ch. XI, Part 1191, § 1119.1 et seq.), Title 49 of the Code of Federal Regulations Part 37 (49 C.F.R., Ch. A, Part 37, § 37.1 et seq.), the United States Department of Justice Title II and Title III for the ADA, and California Government Code section 4450 et seq., which require public facilities be made accessible to persons with disabilities.

Notwithstanding the requirements of the previous paragraph, all construction, design, and maintenance of public facilities must also comply with the Department's Design Information Bulletin 82, "Pedestrian Accessibility Guidelines for Highway Projects."

39. **STORMWATER:** The Permittee is responsible for full compliance with the following:

- For all projects, the Department's Storm Water Program and the Department's National Pollutant Discharge Elimination System (NPDES) Permit requirements under *Order No. 2012-0011-DWQ, NPDES No CAS000003*; and
- In addition, for projects disturbing one acre or more of soil, with the California Construction General Permit *Order No. 2009-0009-DWQ, NPDES No CAS000002*; and
- In addition, for projects disturbing one acre or more of soil in the Lahontan Region with *Order No. R6T-2016-0010, NPDES No CAG616002.*

For all projects, it is the Permittee's responsibility to install, inspect, repair, and maintain all facilities and devices used for water pollution control practices (Best Management Practices/BMPs) before performing daily work activities.

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Appendix B Laboratory Reports

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eurofins | Environment Testing
TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-54857-2
Client Project/Site: Bell Road Project

For:
WRECO
1243 Alpine Road
Suite 108
Walnut Creek, California 94596

Attn: Ms. Melissa McAssey

Authorized for release by:
10/30/2019 4:55:03 PM

Criselda Caparas, Project Manager I
(925)484-1919
criselda.caparas@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate is outside control limits

GC Semi VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-54857-2

Comments
No additional comments.

Receipt
The samples were received on 10/1/2019 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 5.2º C, 5.8º C and 14.6º C.

GC/MS Semi VOA
Method 8270C: Surrogate recovery for the following samples were outside control limits: B-13-COMP (320-54857-74) and B-14-COMP (320-54857-78). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8270C: The following sample(s) was analyzed outside of analytical holding time.commaMerge&>.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method 8082: The following sample required a tetrabutylammonium sulfite (TBA) clean-up to reduce matrix interferences caused by sulfur: B-14-COMP (320-54857-78).

Method 8082: The following samples required a tetrabutylammonium sulfite (TBA) clean-up to reduce matrix interferences caused by sulfur: B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74) and B-1-COMP (320-54857-77).

Method 8082: The following samples were received outside of holding time: B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74), B-14-COMP (320-54857-78).and B-1-COMP (320-54857-77).

Method 8082: The following samples required a tetrabutylammonium sulfite (TBA) clean-up to reduce matrix interferences caused by sulfur: (LCS 720-274774/2-A), (MB 720-274774/1-A), (720-95587-A-3-G), (720-95587-A-3-E MS) and (720-95587-A-3-F MSD).

Method 8081A: The following samples were received outside of holding time: B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74), B-1-COMP (320-54857-77) and B-14-COMP (320-54857-78).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method 6020: The post digestion spike % recovery for Selenium (Se) associated with batch 320-332694 was outside of control limits. The following sample is impacted: (320-54857-A-29-C PDS).

Method 6020: The internal standard for the matrix spike/matrix spike duplicate (MS/MSD) was outside the acceptance criteria for preparation batch 320-332400 and analytical batch 320-332694. The internal standard for the parent sample was within range, therefore, no further dilutions were performed. Data is being reported. (320-54857-A-29-C SD ^5)

Method 6020: The matrix spike / matrix spike duplicate (MS/MSD) recoveries and precision for preparation batch 320-332400 and analytical batch 320-332694 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: WRECO

Project/Site: Bell Road Project

Job ID: 320-54857-2

Client Sample ID: B-2-COMP

Lab Sample ID: 320-54857-71

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	4.4		0.20	0.15	mg/Kg	1		6020	Total/NA
Barium	430		0.20	0.14	mg/Kg	1		6020	Total/NA
Cadmium	0.21		0.10	0.051	mg/Kg	1		6020	Total/NA
Chromium	51		0.20	0.10	mg/Kg	1		6020	Total/NA
Lead	5.3		0.10	0.061	mg/Kg	1		6020	Total/NA
Selenium	0.46		0.20	0.10	mg/Kg	1		6020	Total/NA
Silver	0.033	J	0.10	0.030	mg/Kg	1		6020	Total/NA
Mercury	0.012	J	0.040	0.0086	mg/Kg	1		7471A	Total/NA

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4,4'-DDD	0.0070	H	0.0020	0.00059	mg/Kg	1		8081A	Total/NA
4,4'-DDE	0.32	H	0.0020	0.00041	mg/Kg	1		8081A	Total/NA
4,4'-DDT	0.047	H	0.0020	0.00040	mg/Kg	1		8081A	Total/NA
Arsenic	1.9		0.20	0.15	mg/Kg	1		6020	Total/NA
Barium	77		0.20	0.14	mg/Kg	1		6020	Total/NA
Cadmium	0.099	J	0.10	0.050	mg/Kg	1		6020	Total/NA
Chromium	64		0.20	0.10	mg/Kg	1		6020	Total/NA
Lead	3.3		0.10	0.060	mg/Kg	1		6020	Total/NA
Selenium	0.20		0.20	0.10	mg/Kg	1		6020	Total/NA
Mercury	0.017	J	0.040	0.0086	mg/Kg	1		7471A	Total/NA

Client Sample ID: B-4-COMP

Lab Sample ID: 320-54857-73

No Detections.

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4,4'-DDE	0.0014	J H	0.0020	0.00041	mg/Kg	1		8081A	Total/NA
4,4'-DDT	0.0020	H	0.0020	0.00040	mg/Kg	1		8081A	Total/NA
Chlordane (technical)	0.0058	J H	0.040	0.0031	mg/Kg	1		8081A	Total/NA
PCB-1260	0.0017	J H	0.050	0.00094	mg/Kg	1		8082	Total/NA
Polychlorinated biphenyls, Total	0.0017	J H	0.050	0.00082	mg/Kg	1		8082	Total/NA
Arsenic	10		0.20	0.14	mg/Kg	1		6020	Total/NA
Barium	110		0.20	0.13	mg/Kg	1		6020	Total/NA
Cadmium	0.083	J	0.10	0.048	mg/Kg	1		6020	Total/NA
Chromium	48		0.20	0.095	mg/Kg	1		6020	Total/NA
Lead	34		0.10	0.057	mg/Kg	1		6020	Total/NA
Selenium	0.34		0.20	0.095	mg/Kg	1		6020	Total/NA
Mercury	0.015	J	0.040	0.0079	mg/Kg	1		7471A	Total/NA

Client Sample ID: B-16-COMP

Lab Sample ID: 320-54857-76

No Detections.

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dieldrin	0.00062	J H	0.0020	0.00058	mg/Kg	1		8081A	Total/NA
Arsenic	1.6		0.20	0.14	mg/Kg	1		6020	Total/NA
Barium	22		0.20	0.13	mg/Kg	1		6020	Total/NA
Cadmium	0.11		0.10	0.048	mg/Kg	1		6020	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: WRECO
Job ID: 320-54857-2
Project/Site: Bell Road Project

Client Sample ID: B-1-COMP (Continued)

Lab Sample ID: 320-54857-77

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	19		0.20	0.095	mg/Kg	1		6020	Total/NA
Lead	0.69		0.10	0.057	mg/Kg	1		6020	Total/NA
Selenium	0.11	J	0.20	0.095	mg/Kg	1		6020	Total/NA
Silver	0.030	J	0.10	0.029	mg/Kg	1		6020	Total/NA

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Pyrene	0.012	J H	0.067	0.0074	mg/Kg	1		8270C	Total/NA
4,4'-DDE	0.0020	H	0.0020	0.00040	mg/Kg	1		8081A	Total/NA
4,4'-DDT	0.0052	H	0.0020	0.00039	mg/Kg	1		8081A	Total/NA
PCB-1260	0.0022	J H	0.050	0.00091	mg/Kg	1		8082	Total/NA
Polychlorinated biphenyls, Total	0.0022	J H	0.050	0.00080	mg/Kg	1		8082	Total/NA
Arsenic	17		0.20	0.15	mg/Kg	1		6020	Total/NA
Barium	100		0.20	0.14	mg/Kg	1		6020	Total/NA
Cadmium	0.11		0.10	0.049	mg/Kg	1		6020	Total/NA
Chromium	57		0.20	0.098	mg/Kg	1		6020	Total/NA
Lead	6.2		0.10	0.059	mg/Kg	1		6020	Total/NA
Selenium	0.39		0.20	0.098	mg/Kg	1		6020	Total/NA
Silver	0.035	J	0.10	0.029	mg/Kg	1		6020	Total/NA
Mercury	0.017	J	0.040	0.0081	mg/Kg	1		7471A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: B-2-COMP
Date Collected: 09/30/19 00:00
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-71
Matrix: Solid

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	H	0.067	0.0074	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Acenaphthylene	ND	H	0.067	0.011	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Anthracene	ND	H	0.067	0.0084	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Benzo[a]anthracene	ND	H	0.33	0.035	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Benzo[a]pyrene	ND	H	0.067	0.013	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Benzo[b]fluoranthene	ND	H	0.067	0.019	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Benzo[g,h,i]perylene	ND	H	0.13	0.039	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Benzo[k]fluoranthene	ND	H	0.067	0.027	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Chrysene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Dibenz(a,h)anthracene	ND	H	0.067	0.029	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Fluoranthene	ND	H	0.067	0.015	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Fluorene	ND	H	0.067	0.0078	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Indeno[1,2,3-cd]pyrene	ND	H	0.067	0.025	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Naphthalene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Phenanthrene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Pyrene	ND	H	0.067	0.0074	mg/Kg		10/18/19 15:34	10/26/19 19:32	1
Pyridine	ND	H	0.13	0.018	mg/Kg		10/18/19 15:34	10/26/19 19:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*62*		*30 - 112*	*10/18/19 15:34*	*10/26/19 19:32*	*1*
Nitrobenzene-d5	*55*		*21 - 98*	*10/18/19 15:34*	*10/26/19 19:32*	*1*
Terphenyl-d14	*64*		*59 - 134*	*10/18/19 15:34*	*10/26/19 19:32*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND	H	0.0020	0.00058	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
4,4'-DDE	ND	H	0.0020	0.00040	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
4,4'-DDT	ND	H	0.0020	0.00039	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Aldrin	ND	H	0.0020	0.00048	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
alpha-BHC	ND	H	0.0020	0.00053	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
beta-BHC	ND	H	0.0020	0.00034	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Chlordane (technical)	ND	H	0.040	0.0031	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
cis-Chlordane	ND	H	0.0020	0.00038	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
delta-BHC	ND	H	0.0020	0.00042	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Dieldrin	ND	H	0.0020	0.00057	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Endosulfan I	ND	H	0.0020	0.00031	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Endosulfan II	ND	H	0.0020	0.00047	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Endosulfan sulfate	ND	H	0.0020	0.00036	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Endrin	ND	H	0.0020	0.00044	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Endrin aldehyde	ND	H	0.0020	0.00060	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Endrin ketone	ND	H	0.0020	0.00032	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
gamma-BHC (Lindane)	ND	H	0.0020	0.00060	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Heptachlor	ND	H	0.0020	0.00044	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Heptachlor epoxide	ND	H	0.0020	0.00034	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Methoxychlor	ND	H	0.0020	0.00065	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
Toxaphene	ND	H	0.040	0.0065	mg/Kg		10/18/19 15:20	10/25/19 20:04	1
trans-Chlordane	ND	H	0.0020	0.00044	mg/Kg		10/18/19 15:20	10/25/19 20:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*73*		*21 - 136*	*10/18/19 15:20*	*10/25/19 20:04*	*1*

Client Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Client Sample ID: B-2-COMP

Lab Sample ID: 320-54857-71
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*69*		*21 - 145*	*10/18/19 15:20*	*10/25/19 20:04*	*1*

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1221	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1232	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1242	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1248	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1254	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1260	ND	H	0.050	0.00092	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
Polychlorinated biphenyls, Total	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1262	ND	H	0.050	0.00092	mg/Kg		10/18/19 15:21	10/25/19 19:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*67*		*45 - 132*	*10/18/19 15:21*	*10/25/19 19:04*	*1*
DCB Decachlorobiphenyl	*69*		*42 - 146*	*10/18/19 15:21*	*10/25/19 19:04*	*1*

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.4**		0.20	0.15	mg/Kg		10/16/19 06:30	10/16/19 23:22	1
Barium	**430**		0.20	0.14	mg/Kg		10/16/19 06:30	10/16/19 23:22	1
Cadmium	**0.21**		0.10	0.051	mg/Kg		10/16/19 06:30	10/16/19 23:22	1
Chromium	**51**		0.20	0.10	mg/Kg		10/16/19 06:30	10/16/19 23:22	1
Lead	**5.3**		0.10	0.061	mg/Kg		10/16/19 06:30	10/16/19 23:22	1
Selenium	**0.46**		0.20	0.10	mg/Kg		10/16/19 06:30	10/16/19 23:22	1
Silver	**0.033**	**J**	0.10	0.030	mg/Kg		10/16/19 06:30	10/16/19 23:22	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.012**	**J**	0.040	0.0086	mg/Kg		10/23/19 11:20	10/23/19 16:00	1

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	H	0.067	0.0073	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Acenaphthylene	ND	H	0.067	0.011	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Anthracene	ND	H	0.067	0.0083	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Benzo[a]anthracene	ND	H	0.33	0.035	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Benzo[a]pyrene	ND	H	0.067	0.013	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Benzo[b]fluoranthene	ND	H	0.067	0.018	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Benzo[g,h,i]perylene	ND	H	0.13	0.039	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Benzo[k]fluoranthene	ND	H	0.067	0.027	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Chrysene	ND	H	0.13	0.064	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Dibenz(a,h)anthracene	ND	H	0.067	0.029	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Fluoranthene	ND	H	0.067	0.014	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Fluorene	ND	H	0.067	0.0077	mg/Kg		10/18/19 15:34	10/26/19 19:58	1

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72

Date Collected: 09/30/19 00:00

Matrix: Solid

Date Received: 10/01/19 09:10

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Indeno[1,2,3-cd]pyrene	ND	H	0.067	0.025	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Naphthalene	ND	H	0.13	0.064	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Phenanthrene	ND	H	0.13	0.064	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Pyrene	ND	H	0.067	0.0073	mg/Kg		10/18/19 15:34	10/26/19 19:58	1
Pyridine	ND	H	0.13	0.017	mg/Kg		10/18/19 15:34	10/26/19 19:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*55*		*30 - 112*	*10/18/19 15:34*	*10/26/19 19:58*	*1*
Nitrobenzene-d5	*49*		*21 - 98*	*10/18/19 15:34*	*10/26/19 19:58*	*1*
Terphenyl-d14	*60*		*59 - 134*	*10/18/19 15:34*	*10/26/19 19:58*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	**0.0070**	**H**	0.0020	0.00059	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
4,4'-DDE	**0.32**	**H**	0.0020	0.00041	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
4,4'-DDT	**0.047**	**H**	0.0020	0.00040	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Aldrin	ND	H	0.0020	0.00048	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
alpha-BHC	ND	H	0.0020	0.00053	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
beta-BHC	ND	H	0.0020	0.00035	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Chlordane (technical)	ND	H	0.040	0.0031	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
cis-Chlordane	ND	H	0.0020	0.00039	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
delta-BHC	ND	H	0.0020	0.00043	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Dieldrin	ND	H	0.0020	0.00057	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Endosulfan I	ND	H	0.0020	0.00031	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Endosulfan II	ND	H	0.0020	0.00047	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Endosulfan sulfate	ND	H	0.0020	0.00037	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Endrin	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Endrin aldehyde	ND	H	0.0020	0.00061	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Endrin ketone	ND	H	0.0020	0.00032	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
gamma-BHC (Lindane)	ND	H	0.0020	0.00061	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Heptachlor	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Heptachlor epoxide	ND	H	0.0020	0.00034	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Methoxychlor	ND	H	0.0020	0.00066	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
Toxaphene	ND	H	0.040	0.0066	mg/Kg		10/18/19 15:20	10/25/19 20:20	1
trans-Chlordane	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/25/19 20:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*71*		*21 - 136*	*10/18/19 15:20*	*10/25/19 20:20*	*1*
Tetrachloro-m-xylene	*60*		*21 - 145*	*10/18/19 15:20*	*10/25/19 20:20*	*1*

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:21	1
PCB-1221	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:21	1
PCB-1232	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:21	1
PCB-1242	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:21	1
PCB-1248	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:21	1
PCB-1254	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:21	1
PCB-1260	ND	H	0.050	0.00093	mg/Kg		10/18/19 15:21	10/25/19 19:21	1
Polychlorinated biphenyls, Total	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:21	1

Client Sample Results

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1262	ND	H	0.050	0.00093	mg/Kg		10/18/19 15:21	10/25/19 19:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*60*		*45 - 132*	*10/18/19 15:21*	*10/25/19 19:21*	*1*
DCB Decachlorobiphenyl	*71*		*42 - 146*	*10/18/19 15:21*	*10/25/19 19:21*	*1*

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.9**		0.20	0.15	mg/Kg		10/16/19 06:30	10/16/19 23:38	1
Barium	**77**		0.20	0.14	mg/Kg		10/16/19 06:30	10/16/19 23:38	1
Cadmium	**0.099**	**J**	0.10	0.050	mg/Kg		10/16/19 06:30	10/16/19 23:38	1
Chromium	**64**		0.20	0.10	mg/Kg		10/16/19 06:30	10/16/19 23:38	1
Lead	**3.3**		0.10	0.060	mg/Kg		10/16/19 06:30	10/16/19 23:38	1
Selenium	**0.20**		0.20	0.10	mg/Kg		10/16/19 06:30	10/16/19 23:38	1
Silver	ND		0.10	0.030	mg/Kg		10/16/19 06:30	10/16/19 23:38	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.017**	**J**	0.040	0.0086	mg/Kg		10/23/19 11:20	10/23/19 16:10	1

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	H	0.067	0.0075	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Acenaphthylene	ND	H	0.067	0.011	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Anthracene	ND	H	0.067	0.0084	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Benzo[a]anthracene	ND	H	0.33	0.035	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Benzo[a]pyrene	ND	H	0.067	0.013	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Benzo[b]fluoranthene	ND	H	0.067	0.019	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Benzo[g,h,i]perylene	ND	H	0.13	0.039	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Benzo[k]fluoranthene	ND	H	0.067	0.027	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Chrysene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Dibenz(a,h)anthracene	ND	H	0.067	0.029	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Fluoranthene	ND	H	0.067	0.015	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Fluorene	ND	H	0.067	0.0079	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Indeno[1,2,3-cd]pyrene	ND	H	0.067	0.026	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Naphthalene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Phenanthrene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Pyrene	ND	H	0.067	0.0075	mg/Kg		10/18/19 15:34	10/26/19 20:23	1
Pyridine	ND	H	0.13	0.018	mg/Kg		10/18/19 15:34	10/26/19 20:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*51*		*30 - 112*	*10/18/19 15:34*	*10/26/19 20:23*	*1*
Nitrobenzene-d5	*44*		*21 - 98*	*10/18/19 15:34*	*10/26/19 20:23*	*1*
Terphenyl-d14	*53*	*X*	*59 - 134*	*10/18/19 15:34*	*10/26/19 20:23*	*1*

Client Sample ID: B-13-COMP

Date Collected: 09/30/19 00:00
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-74
Matrix: Solid

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND	H	0.0020	0.00060	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
4,4'-DDE	**0.0014**	**J H**	0.0020	0.00041	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
4,4'-DDT	**0.0020**	**H**	0.0020	0.00040	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Aldrin	ND	H	0.0020	0.00049	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
alpha-BHC	ND	H	0.0020	0.00054	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
beta-BHC	ND	H	0.0020	0.00035	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Chlordane (technical)	**0.0058**	**J H**	0.040	0.0031	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
cis-Chlordane	ND	H	0.0020	0.00039	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
delta-BHC	ND	H	0.0020	0.00043	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Dieldrin	ND	H	0.0020	0.00058	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Endosulfan I	ND	H	0.0020	0.00031	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Endosulfan II	ND	H	0.0020	0.00048	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Endosulfan sulfate	ND	H	0.0020	0.00037	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Endrin	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Endrin aldehyde	ND	H	0.0020	0.00062	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Endrin ketone	ND	H	0.0020	0.00032	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
gamma-BHC (Lindane)	ND	H	0.0020	0.00062	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Heptachlor	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Heptachlor epoxide	ND	H	0.0020	0.00034	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Methoxychlor	ND	H	0.0020	0.00067	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
Toxaphene	ND	H	0.040	0.0067	mg/Kg		10/18/19 15:20	10/26/19 14:48	1
trans-Chlordane	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/26/19 14:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*90*		*21 - 136*	*10/18/19 15:20*	*10/26/19 14:48*	*1*
Tetrachloro-m-xylene	*83*		*21 - 145*	*10/18/19 15:20*	*10/26/19 14:48*	*1*

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	H	0.050	0.00082	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
PCB-1221	ND	H	0.050	0.00082	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
PCB-1232	ND	H	0.050	0.00082	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
PCB-1242	ND	H	0.050	0.00082	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
PCB-1248	ND	H	0.050	0.00082	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
PCB-1254	ND	H	0.050	0.00082	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
PCB-1260	**0.0017**	**J H**	0.050	0.00094	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
Polychlorinated biphenyls, Total	**0.0017**	**J H**	0.050	0.00082	mg/Kg		10/18/19 15:21	10/25/19 19:38	1
PCB-1262	ND	H	0.050	0.00094	mg/Kg		10/18/19 15:21	10/25/19 19:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*74*		*45 - 132*	*10/18/19 15:21*	*10/25/19 19:38*	*1*
DCB Decachlorobiphenyl	*70*		*42 - 146*	*10/18/19 15:21*	*10/25/19 19:38*	*1*

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**10**		0.20	0.14	mg/Kg		10/16/19 06:30	10/16/19 23:44	1
Barium	**110**		0.20	0.13	mg/Kg		10/16/19 06:30	10/16/19 23:44	1
Cadmium	**0.083**	**J**	0.10	0.048	mg/Kg		10/16/19 06:30	10/16/19 23:44	1
Chromium	**48**		0.20	0.095	mg/Kg		10/16/19 06:30	10/16/19 23:44	1
Lead	**34**		0.10	0.057	mg/Kg		10/16/19 06:30	10/16/19 23:44	1

Client Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	**0.34**		0.20	0.095	mg/Kg		10/16/19 06:30	10/16/19 23:44	1
Silver	ND		0.10	0.029	mg/Kg		10/16/19 06:30	10/16/19 23:44	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.015**	**J**	0.040	0.0079	mg/Kg		10/23/19 11:20	10/23/19 16:13	1

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77
Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	H	0.067	0.0074	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Acenaphthylene	ND	H	0.067	0.011	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Anthracene	ND	H	0.067	0.0083	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Benzo[a]anthracene	ND	H	0.33	0.035	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Benzo[a]pyrene	ND	H	0.067	0.013	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Benzo[b]fluoranthene	ND	H	0.067	0.018	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Benzo[g,h,i]perylene	ND	H	0.13	0.039	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Benzo[k]fluoranthene	ND	H	0.067	0.027	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Chrysene	ND	H	0.13	0.064	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Dibenz(a,h)anthracene	ND	H	0.067	0.029	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Fluoranthene	ND	H	0.067	0.015	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Fluorene	ND	H	0.067	0.0077	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Indeno[1,2,3-cd]pyrene	ND	H	0.067	0.025	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Naphthalene	ND	H	0.13	0.064	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Phenanthrene	ND	H	0.13	0.064	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Pyrene	ND	H	0.067	0.0074	mg/Kg		10/18/19 15:34	10/26/19 20:48	1
Pyridine	ND	H	0.13	0.017	mg/Kg		10/18/19 15:34	10/26/19 20:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*67*		*30 - 112*	*10/18/19 15:34*	*10/26/19 20:48*	*1*
Nitrobenzene-d5	*60*		*21 - 98*	*10/18/19 15:34*	*10/26/19 20:48*	*1*
Terphenyl-d14	*71*		*59 - 134*	*10/18/19 15:34*	*10/26/19 20:48*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND	H	0.0020	0.00060	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
4,4'-DDE	ND	H	0.0020	0.00041	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
4,4'-DDT	ND	H	0.0020	0.00040	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Aldrin	ND	H	0.0020	0.00049	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
alpha-BHC	ND	H	0.0020	0.00054	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
beta-BHC	ND	H	0.0020	0.00036	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Chlordane (technical)	ND	H	0.040	0.0032	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
cis-Chlordane	ND	H	0.0020	0.00039	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
delta-BHC	ND	H	0.0020	0.00043	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Dieldrin	**0.00062**	**J H**	0.0020	0.00058	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Endosulfan I	ND	H	0.0020	0.00032	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Endosulfan II	ND	H	0.0020	0.00048	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Endosulfan sulfate	ND	H	0.0020	0.00038	mg/Kg		10/18/19 15:20	10/26/19 15:06	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77
Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Endrin aldehyde	ND	H	0.0020	0.00062	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Endrin ketone	ND	H	0.0020	0.00033	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
gamma-BHC (Lindane)	ND	H	0.0020	0.00062	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Heptachlor	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Heptachlor epoxide	ND	H	0.0020	0.00035	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Methoxychlor	ND	H	0.0020	0.00067	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
Toxaphene	ND	H	0.040	0.0067	mg/Kg		10/18/19 15:20	10/26/19 15:06	1
trans-Chlordane	ND	H	0.0020	0.00045	mg/Kg		10/18/19 15:20	10/26/19 15:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*94*		*21 - 136*	*10/18/19 15:20*	*10/26/19 15:06*	*1*
Tetrachloro-m-xylene	*75*		*21 - 145*	*10/18/19 15:20*	*10/26/19 15:06*	*1*

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
PCB-1221	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
PCB-1232	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
PCB-1242	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
PCB-1248	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
PCB-1254	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
PCB-1260	ND	H	0.050	0.00092	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
Polychlorinated biphenyls, Total	ND	H	0.050	0.00081	mg/Kg		10/18/19 15:21	10/25/19 19:55	1
PCB-1262	ND	H	0.050	0.00092	mg/Kg		10/18/19 15:21	10/25/19 19:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*69*		*45 - 132*	*10/18/19 15:21*	*10/25/19 19:55*	*1*
DCB Decachlorobiphenyl	*69*		*42 - 146*	*10/18/19 15:21*	*10/25/19 19:55*	*1*

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.6**		0.20	0.14	mg/Kg		10/21/19 06:30	10/21/19 14:23	1
Barium	**22**		0.20	0.13	mg/Kg		10/21/19 06:30	10/21/19 14:23	1
Cadmium	**0.11**		0.10	0.048	mg/Kg		10/21/19 06:30	10/21/19 14:23	1
Chromium	**19**		0.20	0.095	mg/Kg		10/21/19 06:30	10/21/19 14:23	1
Lead	**0.69**		0.10	0.057	mg/Kg		10/21/19 06:30	10/21/19 14:23	1
Selenium	**0.11**	**J**	0.20	0.095	mg/Kg		10/21/19 06:30	10/21/19 14:23	1
Silver	**0.030**	**J**	0.10	0.029	mg/Kg		10/21/19 06:30	10/21/19 14:23	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.040	0.0079	mg/Kg		10/23/19 11:20	10/23/19 16:20	1

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78
Date Collected: 09/30/19 03:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	H	0.067	0.0074	mg/Kg		10/18/19 15:34	10/26/19 21:13	1

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78

Date Collected: 09/30/19 03:30

Matrix: Solid

Date Received: 10/01/19 09:10

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthylene	ND	H	0.067	0.011	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Anthracene	ND	H	0.067	0.0084	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Benzo[a]anthracene	ND	H	0.33	0.035	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Benzo[a]pyrene	ND	H	0.067	0.013	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Benzo[b]fluoranthene	ND	H	0.067	0.019	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Benzo[g,h,i]perylene	ND	H	0.13	0.039	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Benzo[k]fluoranthene	ND	H	0.067	0.027	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Chrysene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Dibenz(a,h)anthracene	ND	H	0.067	0.029	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Fluoranthene	ND	H	0.067	0.015	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Fluorene	ND	H	0.067	0.0078	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Indeno[1,2,3-cd]pyrene	ND	H	0.067	0.025	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Naphthalene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Phenanthrene	ND	H	0.13	0.065	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Pyrene	**0.012**	**J H**	0.067	0.0074	mg/Kg		10/18/19 15:34	10/26/19 21:13	1
Pyridine	ND	H	0.13	0.018	mg/Kg		10/18/19 15:34	10/26/19 21:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*44*		*30 - 112*	*10/18/19 15:34*	*10/26/19 21:13*	*1*
Nitrobenzene-d5	*36*		*21 - 98*	*10/18/19 15:34*	*10/26/19 21:13*	*1*
Terphenyl-d14	*45*	*X*	*59 - 134*	*10/18/19 15:34*	*10/26/19 21:13*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND	H	0.0020	0.00058	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
4,4'-DDE	**0.0020**	**H**	0.0020	0.00040	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
4,4'-DDT	**0.0052**	**H**	0.0020	0.00039	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Aldrin	ND	H	0.0020	0.00047	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
alpha-BHC	ND	H	0.0020	0.00052	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
beta-BHC	ND	H	0.0020	0.00034	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Chlordane (technical)	ND	H	0.040	0.0030	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
cis-Chlordane	ND	H	0.0020	0.00038	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
delta-BHC	ND	H	0.0020	0.00042	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Dieldrin	ND	H	0.0020	0.00056	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Endosulfan I	ND	H	0.0020	0.00030	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Endosulfan II	ND	H	0.0020	0.00047	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Endosulfan sulfate	ND	H	0.0020	0.00036	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Endrin	ND	H	0.0020	0.00044	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Endrin aldehyde	ND	H	0.0020	0.00060	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Endrin ketone	ND	H	0.0020	0.00031	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
gamma-BHC (Lindane)	ND	H	0.0020	0.00060	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Heptachlor	ND	H	0.0020	0.00044	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Heptachlor epoxide	ND	H	0.0020	0.00033	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Methoxychlor	ND	H	0.0020	0.00065	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
Toxaphene	ND	H	0.040	0.0065	mg/Kg		10/18/19 15:20	10/26/19 15:24	1
trans-Chlordane	ND	H	0.0020	0.00044	mg/Kg		10/18/19 15:20	10/26/19 15:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*89*		*21 - 136*	*10/18/19 15:20*	*10/26/19 15:24*	*1*
Tetrachloro-m-xylene	*89*		*21 - 145*	*10/18/19 15:20*	*10/26/19 15:24*	*1*

Client Sample Results

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78

Date Collected: 09/30/19 03:30
Date Received: 10/01/19 09:10
Matrix: Solid

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1221	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1232	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1242	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1248	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1254	ND	H	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1260	**0.0022**	**J H**	0.050	0.00091	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
Polychlorinated biphenyls, Total	**0.0022**	**J H**	0.050	0.00080	mg/Kg		10/18/19 15:21	10/25/19 19:04	1
PCB-1262	ND	H	0.050	0.00091	mg/Kg		10/18/19 15:21	10/25/19 19:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*81*		*45 - 132*	*10/18/19 15:21*	*10/25/19 19:04*	*1*
DCB Decachlorobiphenyl	*75*		*42 - 146*	*10/18/19 15:21*	*10/25/19 19:04*	*1*

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**17**		0.20	0.15	mg/Kg		10/21/19 06:30	10/21/19 14:25	1
Barium	**100**		0.20	0.14	mg/Kg		10/21/19 06:30	10/21/19 14:25	1
Cadmium	**0.11**		0.10	0.049	mg/Kg		10/21/19 06:30	10/21/19 14:25	1
Chromium	**57**		0.20	0.098	mg/Kg		10/21/19 06:30	10/21/19 14:25	1
Lead	**6.2**		0.10	0.059	mg/Kg		10/21/19 06:30	10/21/19 14:25	1
Selenium	**0.39**		0.20	0.098	mg/Kg		10/21/19 06:30	10/21/19 14:25	1
Silver	**0.035**	**J**	0.10	0.029	mg/Kg		10/21/19 06:30	10/21/19 14:25	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.017**	**J**	0.040	0.0081	mg/Kg		10/23/19 11:20	10/23/19 16:23	1

Surrogate Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	FBP (30-112)	NBZ (21-98)	TPHL (59-134)
320-54857-71	B-2-COMP	62	55	64
320-54857-72	B-3-COMP	55	49	60
320-54857-74	B-13-COMP	51	44	53 X
320-54857-77	B-1-COMP	67	60	71
320-54857-78	B-14-COMP	44	36	45 X
LCS 720-274803/2-A	Lab Control Sample	80	80	100
MB 720-274803/1-A	Method Blank	55	47	76

Surrogate Legend

FBP = 2-Fluorobiphenyl
NBZ = Nitrobenzene-d5
TPHL = Terphenyl-d14

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (21-136)	TCX2 (21-145)
320-54857-71	B-2-COMP	73	69
320-54857-72	B-3-COMP	71	60
LCS 720-274773/2-A	Lab Control Sample	94	86
MB 720-274773/1-A	Method Blank	77	78
MB 720-274773/1-A	Method Blank	109	84

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (21-136)	TCX1 (21-145)
320-54857-74	B-13-COMP	90	83
320-54857-77	B-1-COMP	94	75
320-54857-78	B-14-COMP	89	89

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (21-136)	TCX2 (21-145)
LCS 720-274773/2-A	Lab Control Sample	76	78

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX1	DCBP1
Lab Sample ID	Client Sample ID	(45-132)	(42-146)
320-54857-71	B-2-COMP	67	69
320-54857-72	B-3-COMP	60	71
320-54857-74	B-13-COMP	74	70
320-54857-77	B-1-COMP	69	69
320-54857-78	B-14-COMP	81	75
LCS 720-274774/2-A	Lab Control Sample	72	73
MB 720-274774/1-A	Method Blank	68	74

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCBP = DCB Decachlorobiphenyl

QC Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 720-274803/1-A
Matrix: Solid
Analysis Batch: 274852

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 274803

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.067	0.0076	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Acenaphthylene	ND		0.067	0.011	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Anthracene	ND		0.067	0.0086	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Benzo[a]anthracene	ND		0.33	0.036	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Benzo[a]pyrene	ND		0.067	0.013	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Benzo[b]fluoranthene	ND		0.067	0.019	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Benzo[g,h,i]perylene	ND		0.13	0.040	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Benzo[k]fluoranthene	ND		0.067	0.028	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Chrysene	ND		0.13	0.066	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Dibenz(a,h)anthracene	ND		0.067	0.030	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Fluoranthene	ND		0.067	0.015	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Fluorene	ND		0.067	0.0080	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Indeno[1,2,3-cd]pyrene	ND		0.067	0.026	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Naphthalene	ND		0.13	0.066	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Phenanthrene	ND		0.13	0.066	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Pyrene	ND		0.067	0.0076	mg/Kg		10/18/19 15:34	10/21/19 09:31	1
Pyridine	ND		0.13	0.018	mg/Kg		10/18/19 15:34	10/21/19 09:31	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*55*		*30 - 112*	*10/18/19 15:34*	*10/21/19 09:31*	*1*
Nitrobenzene-d5	*47*		*21 - 98*	*10/18/19 15:34*	*10/21/19 09:31*	*1*
Terphenyl-d14	*76*		*59 - 134*	*10/18/19 15:34*	*10/21/19 09:31*	*1*

Lab Sample ID: LCS 720-274803/2-A
Matrix: Solid
Analysis Batch: 274852

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 274803

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Acenaphthene			2.67	2.13		mg/Kg		80	53 - 103		
Acenaphthylene			2.67	2.14		mg/Kg		80	53 - 102		
Anthracene			2.67	2.38		mg/Kg		89	59 - 112		
Benzo[a]anthracene			2.67	2.33		mg/Kg		88	58 - 117		
Benzo[a]pyrene			2.67	2.45		mg/Kg		92	57 - 116		
Benzo[b]fluoranthene			2.67	2.52		mg/Kg		95	57 - 120		
Benzo[g,h,i]perylene			2.67	2.26		mg/Kg		85	52 - 124		
Benzo[k]fluoranthene			2.67	2.39		mg/Kg		89	59 - 122		
Chrysene			2.67	2.30		mg/Kg		86	58 - 115		
Dibenz(a,h)anthracene			2.67	2.40		mg/Kg		90	57 - 116		
Fluoranthene			2.67	2.30		mg/Kg		86	56 - 117		
Fluorene			2.67	2.22		mg/Kg		83	54 - 103		
Indeno[1,2,3-cd]pyrene			2.67	2.32		mg/Kg		87	56 - 117		
Naphthalene			2.67	1.98		mg/Kg		74	51 - 110		
Phenanthrene			2.67	2.31		mg/Kg		87	57 - 106		
Pyrene			2.67	2.46		mg/Kg		92	61 - 121		
Pyridine			5.33	2.44		mg/Kg		46	30 - 110		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl	*80*		*30 - 112*

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 720-274803/2-A
Matrix: Solid
Analysis Batch: 274852

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 274803

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5	*80*		*21 - 98*
Terphenyl-d14	*100*		*59 - 134*

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: MB 720-274773/1-A
Matrix: Solid
Analysis Batch: 274853

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 274773

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		0.0020	0.00061	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
4,4'-DDE	ND		0.0020	0.00042	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
4,4'-DDT	ND		0.0020	0.00041	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Aldrin	ND		0.0020	0.00050	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
alpha-BHC	ND		0.0020	0.00055	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
beta-BHC	ND		0.0020	0.00036	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Chlordane (technical)	ND		0.040	0.0032	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
cis-Chlordane	ND		0.0020	0.00040	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
delta-BHC	ND		0.0020	0.00044	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Dieldrin	ND		0.0020	0.00059	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Endosulfan I	ND		0.0020	0.00032	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Endosulfan II	ND		0.0020	0.00049	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Endosulfan sulfate	ND		0.0020	0.00038	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Endrin	ND		0.0020	0.00046	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Endrin aldehyde	ND		0.0020	0.00063	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Endrin ketone	ND		0.0020	0.00033	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
gamma-BHC (Lindane)	ND		0.0020	0.00063	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Heptachlor	ND		0.0020	0.00046	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Heptachlor epoxide	ND		0.0020	0.00035	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Methoxychlor	ND		0.0020	0.00068	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
Toxaphene	ND		0.040	0.0068	mg/Kg		10/18/19 09:26	10/21/19 15:40	1
trans-Chlordane	ND		0.0020	0.00046	mg/Kg		10/18/19 09:26	10/21/19 15:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*77*		*21 - 136*	*10/18/19 09:26*	*10/21/19 15:40*	*1*
Tetrachloro-m-xylene	*78*		*21 - 145*	*10/18/19 09:26*	*10/21/19 15:40*	*1*

Lab Sample ID: MB 720-274773/1-A
Matrix: Solid
Analysis Batch: 275190

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 274773

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		0.0020	0.00061	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
4,4'-DDE	ND		0.0020	0.00042	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
4,4'-DDT	ND		0.0020	0.00041	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Aldrin	ND		0.0020	0.00050	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
alpha-BHC	ND		0.0020	0.00055	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
beta-BHC	ND		0.0020	0.00036	mg/Kg		10/18/19 09:26	10/26/19 10:15	1

QC Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 720-274773/1-A
Matrix: Solid
Analysis Batch: 275190

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 274773

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	ND		0.040	0.0032	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
cis-Chlordane	ND		0.0020	0.00040	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
delta-BHC	ND		0.0020	0.00044	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Dieldrin	ND		0.0020	0.00059	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Endosulfan I	ND		0.0020	0.00032	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Endosulfan II	ND		0.0020	0.00049	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Endosulfan sulfate	ND		0.0020	0.00038	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Endrin	ND		0.0020	0.00046	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Endrin aldehyde	ND		0.0020	0.00063	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Endrin ketone	ND		0.0020	0.00033	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
gamma-BHC (Lindane)	ND		0.0020	0.00063	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Heptachlor	ND		0.0020	0.00046	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Heptachlor epoxide	ND		0.0020	0.00035	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Methoxychlor	ND		0.0020	0.00068	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
Toxaphene	ND		0.040	0.0068	mg/Kg		10/18/19 09:26	10/26/19 10:15	1
trans-Chlordane	ND		0.0020	0.00046	mg/Kg		10/18/19 09:26	10/26/19 10:15	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*109*		*21 - 136*	*10/18/19 09:26*	*10/26/19 10:15*	*1*
Tetrachloro-m-xylene	*84*		*21 - 145*	*10/18/19 09:26*	*10/26/19 10:15*	*1*

Lab Sample ID: LCS 720-274773/2-A
Matrix: Solid
Analysis Batch: 274853

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 274773

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.0167	0.0140		mg/Kg		84	75 - 128
4,4'-DDE	0.0167	0.0142		mg/Kg		85	76 - 126
4,4'-DDT	0.0167	0.0138		mg/Kg		83	63 - 127
Aldrin	0.0167	0.0129		mg/Kg		78	65 - 120
alpha-BHC	0.0167	0.0127		mg/Kg		76	46 - 122
beta-BHC	0.0167	0.0139		mg/Kg		83	78 - 136
cis-Chlordane	0.0167	0.0136		mg/Kg		82	70 - 120
delta-BHC	0.0167	0.0108		mg/Kg		65	43 - 125
Dieldrin	0.0167	0.0132		mg/Kg		79	72 - 120
Endosulfan I	0.0167	0.0138		mg/Kg		83	62 - 120
Endosulfan II	0.0167	0.0139		mg/Kg		83	65 - 120
Endosulfan sulfate	0.0167	0.0135		mg/Kg		81	72 - 121
Endrin	0.0167	0.0132		mg/Kg		79	68 - 120
Endrin aldehyde	0.0167	0.0150		mg/Kg		90	68 - 120
Endrin ketone	0.0167	0.0130		mg/Kg		78	75 - 136
gamma-BHC (Lindane)	0.0167	0.0132		mg/Kg		79	72 - 120
Heptachlor	0.0167	0.0129		mg/Kg		78	69 - 120
Heptachlor epoxide	0.0167	0.0135		mg/Kg		81	68 - 120
Methoxychlor	0.0167	0.0130		mg/Kg		78	71 - 132
trans-Chlordane	0.0167	0.0134		mg/Kg		81	68 - 120

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 720-274773/2-A
Matrix: Solid
Analysis Batch: 274853

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 274773

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	*76*		*21 - 136*
Tetrachloro-m-xylene	*78*		*21 - 145*

Lab Sample ID: LCS 720-274773/2-A
Matrix: Solid
Analysis Batch: 275190

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 274773

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.0167	0.0146		mg/Kg		87	75 - 128
4,4'-DDE	0.0167	0.0145		mg/Kg		87	76 - 126
4,4'-DDT	0.0167	0.0149		mg/Kg		90	63 - 127
Aldrin	0.0167	0.0136		mg/Kg		82	65 - 120
alpha-BHC	0.0167	0.0135		mg/Kg		81	46 - 122
beta-BHC	0.0167	0.0156		mg/Kg		93	78 - 136
cis-Chlordane	0.0167	0.0148		mg/Kg		89	70 - 120
delta-BHC	0.0167	0.0118		mg/Kg		71	43 - 125
Dieldrin	0.0167	0.0147		mg/Kg		88	72 - 120
Endosulfan I	0.0167	0.0149		mg/Kg		89	62 - 120
Endosulfan II	0.0167	0.0156		mg/Kg		94	65 - 120
Endosulfan sulfate	0.0167	0.0151		mg/Kg		90	72 - 121
Endrin	0.0167	0.0144		mg/Kg		87	68 - 120
Endrin aldehyde	0.0167	0.0154		mg/Kg		92	68 - 120
Endrin ketone	0.0167	0.0162		mg/Kg		97	75 - 136
gamma-BHC (Lindane)	0.0167	0.0145		mg/Kg		87	72 - 120
Heptachlor	0.0167	0.0139		mg/Kg		83	69 - 120
Heptachlor epoxide	0.0167	0.0148		mg/Kg		89	68 - 120
Methoxychlor	0.0167	0.0155		mg/Kg		93	71 - 132
trans-Chlordane	0.0167	0.0145		mg/Kg		87	68 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	*94*		*21 - 136*
Tetrachloro-m-xylene	*86*		*21 - 145*

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 720-274774/1-A
Matrix: Solid
Analysis Batch: 274850

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 274774

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.050	0.00084	mg/Kg		10/18/19 09:31	10/21/19 19:05	1
PCB-1221	ND		0.050	0.00084	mg/Kg		10/18/19 09:31	10/21/19 19:05	1
PCB-1232	ND		0.050	0.00084	mg/Kg		10/18/19 09:31	10/21/19 19:05	1
PCB-1242	ND		0.050	0.00084	mg/Kg		10/18/19 09:31	10/21/19 19:05	1
PCB-1248	ND		0.050	0.00084	mg/Kg		10/18/19 09:31	10/21/19 19:05	1
PCB-1254	ND		0.050	0.00084	mg/Kg		10/18/19 09:31	10/21/19 19:05	1
PCB-1260	ND		0.050	0.00096	mg/Kg		10/18/19 09:31	10/21/19 19:05	1
Polychlorinated biphenyls, Total	ND		0.050	0.00084	mg/Kg		10/18/19 09:31	10/21/19 19:05	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: MB 720-274774/1-A
Matrix: Solid
Analysis Batch: 274850

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 274774

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1262	ND		0.050	0.00096	mg/Kg		10/18/19 09:31	10/21/19 19:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*68*		*45 - 132*	*10/18/19 09:31*	*10/21/19 19:05*	*1*
DCB Decachlorobiphenyl	*74*		*42 - 146*	*10/18/19 09:31*	*10/21/19 19:05*	*1*

Lab Sample ID: LCS 720-274774/2-A
Matrix: Solid
Analysis Batch: 274850

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 274774

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	0.133	0.104		mg/Kg		78	65 - 121
PCB-1260	0.133	0.101		mg/Kg		76	68 - 127

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*72*		*45 - 132*
DCB Decachlorobiphenyl	*73*		*42 - 146*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-330966/1-A
Matrix: Solid
Analysis Batch: 331729

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 330966

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.20	0.15	mg/Kg		10/16/19 06:30	10/16/19 19:53	1
Barium	ND		0.20	0.14	mg/Kg		10/16/19 06:30	10/16/19 19:53	1
Cadmium	ND		0.10	0.050	mg/Kg		10/16/19 06:30	10/16/19 19:53	1
Chromium	ND		0.20	0.10	mg/Kg		10/16/19 06:30	10/16/19 19:53	1
Lead	ND		0.10	0.060	mg/Kg		10/16/19 06:30	10/16/19 19:53	1
Selenium	ND		0.20	0.10	mg/Kg		10/16/19 06:30	10/16/19 19:53	1
Silver	ND		0.10	0.030	mg/Kg		10/16/19 06:30	10/16/19 19:53	1

Lab Sample ID: LCS 320-330966/2-A
Matrix: Solid
Analysis Batch: 331729

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 330966

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	40.0	34.9		mg/Kg		87	80 - 120
Barium	40.0	38.1		mg/Kg		95	80 - 120
Cadmium	20.0	17.4		mg/Kg		87	80 - 120
Chromium	20.0	18.9		mg/Kg		94	80 - 120
Lead	20.0	19.9		mg/Kg		99	80 - 120
Selenium	40.0	32.5		mg/Kg		81	80 - 120
Silver	4.98	3.96		mg/Kg		80	80 - 120

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 320-332400/1-A
Matrix: Solid
Analysis Batch: 332694

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 332400

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.20	0.15	mg/Kg		10/21/19 06:30	10/21/19 13:43	1
Barium	ND		0.20	0.14	mg/Kg		10/21/19 06:30	10/21/19 13:43	1
Cadmium	ND		0.10	0.050	mg/Kg		10/21/19 06:30	10/21/19 13:43	1
Chromium	ND		0.20	0.10	mg/Kg		10/21/19 06:30	10/21/19 13:43	1
Lead	ND		0.10	0.060	mg/Kg		10/21/19 06:30	10/21/19 13:43	1
Selenium	ND		0.20	0.10	mg/Kg		10/21/19 06:30	10/21/19 13:43	1
Silver	ND		0.10	0.030	mg/Kg		10/21/19 06:30	10/21/19 13:43	1

Lab Sample ID: LCS 320-332400/2-A
Matrix: Solid
Analysis Batch: 332694

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332400

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic			40.0	39.8		mg/Kg		100	80 - 120		
Barium			40.0	42.7		mg/Kg		107	80 - 120		
Cadmium			20.0	19.7		mg/Kg		98	80 - 120		
Chromium			20.0	20.8		mg/Kg		104	80 - 120		
Lead			20.0	19.5		mg/Kg		97	80 - 120		
Selenium			40.0	39.8		mg/Kg		99	80 - 120		
Silver			4.98	4.36		mg/Kg		87	80 - 120		

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 320-333020/11-A
Matrix: Solid
Analysis Batch: 333322

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333020

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.040	0.0086	mg/Kg		10/23/19 11:20	10/23/19 15:50	1

Lab Sample ID: LCS 320-333020/12-A
Matrix: Solid
Analysis Batch: 333322

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333020

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.167	0.167		mg/Kg		100	86 - 114		

Lab Sample ID: 320-54857-71 MS
Matrix: Solid
Analysis Batch: 333322

Client Sample ID: B-2-COMP
Prep Type: Total/NA
Prep Batch: 333020

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.012	J	0.172	0.179		mg/Kg		97	86 - 114		

Lab Sample ID: 320-54857-71 MSD
Matrix: Solid
Analysis Batch: 333322

Client Sample ID: B-2-COMP
Prep Type: Total/NA
Prep Batch: 333020

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.012	J	0.167	0.178		mg/Kg		100	86 - 114	1	17

QC Association Summary

Client: WRECO
Job ID: 320-54857-2
Project/Site: Bell Road Project

GC/MS Semi VOA

Prep Batch: 274803

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	3546	
320-54857-72	B-3-COMP	Total/NA	Solid	3546	
320-54857-74	B-13-COMP	Total/NA	Solid	3546	
320-54857-77	B-1-COMP	Total/NA	Solid	3546	
320-54857-78	B-14-COMP	Total/NA	Solid	3546	
MB 720-274803/1-A	Method Blank	Total/NA	Solid	3546	
LCS 720-274803/2-A	Lab Control Sample	Total/NA	Solid	3546	

Analysis Batch: 274852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 720-274803/1-A	Method Blank	Total/NA	Solid	8270C	274803
LCS 720-274803/2-A	Lab Control Sample	Total/NA	Solid	8270C	274803

Analysis Batch: 275210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	8270C	274803
320-54857-72	B-3-COMP	Total/NA	Solid	8270C	274803
320-54857-74	B-13-COMP	Total/NA	Solid	8270C	274803
320-54857-77	B-1-COMP	Total/NA	Solid	8270C	274803
320-54857-78	B-14-COMP	Total/NA	Solid	8270C	274803

GC Semi VOA

Prep Batch: 274773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	3546	
320-54857-72	B-3-COMP	Total/NA	Solid	3546	
320-54857-74	B-13-COMP	Total/NA	Solid	3546	
320-54857-77	B-1-COMP	Total/NA	Solid	3546	
320-54857-78	B-14-COMP	Total/NA	Solid	3546	
MB 720-274773/1-A	Method Blank	Total/NA	Solid	3546	
LCS 720-274773/2-A	Lab Control Sample	Total/NA	Solid	3546	

Prep Batch: 274774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	3546	
320-54857-72	B-3-COMP	Total/NA	Solid	3546	
320-54857-74	B-13-COMP	Total/NA	Solid	3546	
320-54857-77	B-1-COMP	Total/NA	Solid	3546	
320-54857-78	B-14-COMP	Total/NA	Solid	3546	
MB 720-274774/1-A	Method Blank	Total/NA	Solid	3546	
LCS 720-274774/2-A	Lab Control Sample	Total/NA	Solid	3546	

Analysis Batch: 274850

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 720-274774/1-A	Method Blank	Total/NA	Solid	8082	274774
LCS 720-274774/2-A	Lab Control Sample	Total/NA	Solid	8082	274774

Analysis Batch: 274853

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 720-274773/1-A	Method Blank	Total/NA	Solid	8081A	274773

GC Semi VOA (Continued)

Analysis Batch: 274853 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 720-274773/2-A	Lab Control Sample	Total/NA	Solid	8081A	274773

Analysis Batch: 275128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	8081A	274773
320-54857-72	B-3-COMP	Total/NA	Solid	8081A	274773

Analysis Batch: 275139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	8082	274774
320-54857-72	B-3-COMP	Total/NA	Solid	8082	274774
320-54857-74	B-13-COMP	Total/NA	Solid	8082	274774
320-54857-77	B-1-COMP	Total/NA	Solid	8082	274774

Analysis Batch: 275140

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-78	B-14-COMP	Total/NA	Solid	8082	274774

Analysis Batch: 275190

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-74	B-13-COMP	Total/NA	Solid	8081A	274773
320-54857-77	B-1-COMP	Total/NA	Solid	8081A	274773
320-54857-78	B-14-COMP	Total/NA	Solid	8081A	274773
MB 720-274773/1-A	Method Blank	Total/NA	Solid	8081A	274773
LCS 720-274773/2-A	Lab Control Sample	Total/NA	Solid	8081A	274773

Metals

Prep Batch: 330966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	3050B	
320-54857-72	B-3-COMP	Total/NA	Solid	3050B	
320-54857-74	B-13-COMP	Total/NA	Solid	3050B	
MB 320-330966/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-330966/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 331729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	6020	330966
320-54857-72	B-3-COMP	Total/NA	Solid	6020	330966
320-54857-74	B-13-COMP	Total/NA	Solid	6020	330966
MB 320-330966/1-A	Method Blank	Total/NA	Solid	6020	330966
LCS 320-330966/2-A	Lab Control Sample	Total/NA	Solid	6020	330966

Prep Batch: 332400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-77	B-1-COMP	Total/NA	Solid	3050B	
320-54857-78	B-14-COMP	Total/NA	Solid	3050B	
MB 320-332400/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-332400/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Metals

Analysis Batch: 332694

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-77	B-1-COMP	Total/NA	Solid	6020	332400
320-54857-78	B-14-COMP	Total/NA	Solid	6020	332400
MB 320-332400/1-A	Method Blank	Total/NA	Solid	6020	332400
LCS 320-332400/2-A	Lab Control Sample	Total/NA	Solid	6020	332400

Prep Batch: 333020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	7471A	
320-54857-72	B-3-COMP	Total/NA	Solid	7471A	
320-54857-74	B-13-COMP	Total/NA	Solid	7471A	
320-54857-77	B-1-COMP	Total/NA	Solid	7471A	
320-54857-78	B-14-COMP	Total/NA	Solid	7471A	
MB 320-333020/11-A	Method Blank	Total/NA	Solid	7471A	
LCS 320-333020/12-A	Lab Control Sample	Total/NA	Solid	7471A	
320-54857-71 MS	B-2-COMP	Total/NA	Solid	7471A	
320-54857-71 MSD	B-2-COMP	Total/NA	Solid	7471A	

Analysis Batch: 333322

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	7471A	333020
320-54857-72	B-3-COMP	Total/NA	Solid	7471A	333020
320-54857-74	B-13-COMP	Total/NA	Solid	7471A	333020
320-54857-77	B-1-COMP	Total/NA	Solid	7471A	333020
320-54857-78	B-14-COMP	Total/NA	Solid	7471A	333020
MB 320-333020/11-A	Method Blank	Total/NA	Solid	7471A	333020
LCS 320-333020/12-A	Lab Control Sample	Total/NA	Solid	7471A	333020
320-54857-71 MS	B-2-COMP	Total/NA	Solid	7471A	333020
320-54857-71 MSD	B-2-COMP	Total/NA	Solid	7471A	333020

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Client Sample ID: B-2-COMP

Lab Sample ID: 320-54857-71

Date Collected: 09/30/19 00:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.32 g	1 mL	274803	10/18/19 15:34	JMM	TAL PLS
Total/NA	Analysis	8270C		1			275210	10/26/19 19:32	MQL	TAL PLS
Total/NA	Prep	3546			15.66 g	5 mL	274773	10/18/19 15:20	JMM	TAL PLS
Total/NA	Analysis	8081A		1			275128	10/25/19 20:04	LRC	TAL PLS
Total/NA	Prep	3546			15.66 g	5 mL	274774	10/18/19 15:21	JMM	TAL PLS
Total/NA	Analysis	8082		1			275139	10/25/19 19:04	DCH	TAL PLS
Total/NA	Prep	3050B			0.99 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:22	DPM	TAL SAC
Total/NA	Prep	7471A			0.60 g	50 mL	333020	10/23/19 11:20	DPM	TAL SAC
Total/NA	Analysis	7471A		1			333322	10/23/19 16:00	DPM	TAL SAC

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72

Date Collected: 09/30/19 00:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.55 g	1 mL	274803	10/18/19 15:34	JMM	TAL PLS
Total/NA	Analysis	8270C		1			275210	10/26/19 19:58	MQL	TAL PLS
Total/NA	Prep	3546			15.49 g	5 mL	274773	10/18/19 15:20	JMM	TAL PLS
Total/NA	Analysis	8081A		1			275128	10/25/19 20:20	LRC	TAL PLS
Total/NA	Prep	3546			15.49 g	5 mL	274774	10/18/19 15:21	JMM	TAL PLS
Total/NA	Analysis	8082		1			275139	10/25/19 19:21	DCH	TAL PLS
Total/NA	Prep	3050B			1.00 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:38	DPM	TAL SAC
Total/NA	Prep	7471A			0.60 g	50 mL	333020	10/23/19 11:20	DPM	TAL SAC
Total/NA	Analysis	7471A		1			333322	10/23/19 16:10	DPM	TAL SAC

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74

Date Collected: 09/30/19 00:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.28 g	1 mL	274803	10/18/19 15:34	JMM	TAL PLS
Total/NA	Analysis	8270C		1			275210	10/26/19 20:23	MQL	TAL PLS
Total/NA	Prep	3546			15.32 g	5 mL	274773	10/18/19 15:20	JMM	TAL PLS
Total/NA	Analysis	8081A		1			275190	10/26/19 14:48	LRC	TAL PLS
Total/NA	Prep	3546			15.32 g	5 mL	274774	10/18/19 15:21	JMM	TAL PLS
Total/NA	Analysis	8082		1			275139	10/25/19 19:38	DCH	TAL PLS
Total/NA	Prep	3050B			1.05 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:44	DPM	TAL SAC
Total/NA	Prep	7471A			0.65 g	50 mL	333020	10/23/19 11:20	DPM	TAL SAC
Total/NA	Analysis	7471A		1			333322	10/23/19 16:13	DPM	TAL SAC

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77

Date Collected: 09/30/19 07:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.49 g	1 mL	274803	10/18/19 15:34	JMM	TAL PLS
Total/NA	Analysis	8270C		1			275210	10/26/19 20:48	MQL	TAL PLS
Total/NA	Prep	3546			15.2 g	5 mL	274773	10/18/19 15:20	JMM	TAL PLS
Total/NA	Analysis	8081A		1			275190	10/26/19 15:06	LRC	TAL PLS
Total/NA	Prep	3546			15.62 g	5 mL	274774	10/18/19 15:21	JMM	TAL PLS
Total/NA	Analysis	8082		1			275139	10/25/19 19:55	DCH	TAL PLS
Total/NA	Prep	3050B			1.05 g	100 mL	332400	10/21/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			332694	10/21/19 14:23	JMD	TAL SAC
Total/NA	Prep	7471A			0.65 g	50 mL	333020	10/23/19 11:20	DPM	TAL SAC
Total/NA	Analysis	7471A		1			333322	10/23/19 16:20	DPM	TAL SAC

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78

Date Collected: 09/30/19 03:30

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.32 g	1 mL	274803	10/18/19 15:34	JMM	TAL PLS
Total/NA	Analysis	8270C		1			275210	10/26/19 21:13	MQL	TAL PLS
Total/NA	Prep	3546			15.80 g	5 mL	274773	10/18/19 15:20	JMM	TAL PLS
Total/NA	Analysis	8081A		1			275190	10/26/19 15:24	LRC	TAL PLS
Total/NA	Prep	3546			15.80 g	5 mL	274774	10/18/19 15:21	JMM	TAL PLS
Total/NA	Analysis	8082		1			275140	10/25/19 19:04	DCH	TAL PLS
Total/NA	Prep	3050B			1.02 g	100 mL	332400	10/21/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			332694	10/21/19 14:25	JMD	TAL SAC
Total/NA	Prep	7471A			0.64 g	50 mL	333020	10/23/19 11:20	DPM	TAL SAC
Total/NA	Analysis	7471A		1			333322	10/23/19 16:23	DPM	TAL SAC

Laboratory References:

EMLab P&K = EMLab P&K - South San Francisco, 6000 Shoreline Court, Suite 205, South San Francisco, CA 94080, TEL (866)888-6653
TAL PLS = Eurofins TestAmerica, Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
Alaska (UST)	State Program	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	08-09-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-19
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
USEPA UCMR	Federal	CA00044	12-31-20
Utah	NELAP	CA00044	02-29-20
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

Laboratory: Eurofins TestAmerica, Pleasanton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State Program	2496	01-31-20

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8082	3546	Solid	Polychlorinated biphenyls, Total

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Method	Method Description	Protocol	Laboratory
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL PLS
8081A	Organochlorine Pesticides (GC)	SW846	TAL PLS
8082	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL PLS
6020	Metals (ICP/MS)	SW846	TAL SAC
7471A	Mercury (CVAA)	SW846	TAL SAC
Subcontract	CARB 435	None	EMLab P&K
3050B	Preparation, Metals	SW846	TAL SAC
3546	Microwave Extraction	SW846	TAL PLS
7471A	Preparation, Mercury	SW846	TAL SAC

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EMLab P&K = EMLab P&K - South San Francisco, 6000 Shoreline Court, Suite 205, South San Francisco, CA 94080, TEL (866)888-6653

TAL PLS = Eurofins TestAmerica, Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-54857-71	B-2-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-72	B-3-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-73	B-4-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-74	B-13-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-76	B-16-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-77	B-1-COMP	Solid	09/30/19 07:00	10/01/19 09:10	
320-54857-78	B-14-COMP	Solid	09/30/19 03:30	10/01/19 09:10	

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Report for:

Ms. Criselda Caparas
TestAmerica-Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566

Regarding: Project: 320-54857-2; Bell Road Project
EML ID: 2278022

Approved by:

Murali R Putty

Technical Manager
Murali Putty

Dates of Analysis:
Asbestos-CARB 435 (400 pt ct): 10-23-2019

Service SOPs: Asbestos-CARB 435 (400 pt ct) (EM-AS-S-1265)

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received.

Client: TestAmerica-Pleasanton
C/O: Ms. Criselda Caparas
Re: 320-54857-2; Bell Road Project

Date of Sampling: 09-30-2019
Date of Receipt: 10-17-2019
Date of Report: 10-23-2019

ASBESTOS POINT COUNT REPORT: CARB METHOD 435

Location:	B-2-COMP (320-54857-71)		
Total Points Counted:	400		
Lab ID-Version‡:	10831283-1		
Sample Layers	**Asbestos Type**	**Asbestos Points Counted**	**Asbestos Concentration (%)**
Brown Soil	-	-	ND
Layer Totals:		-	-

Comments: No asbestos was detected and no points were counted.

Location:	B-3-COMP (320-54857-72)		
Total Points Counted:	400		
Lab ID-Version‡:	10831284-1		
Sample Layers	**Asbestos Type**	**Asbestos Points Counted**	**Asbestos Concentration (%)**
Brown Soil	-	-	ND
Layer Totals:		-	-

Comments: No asbestos was detected and no points were counted.

Location:	B-4-COMP (320-54857-73)		
Total Points Counted:	400		
Lab ID-Version‡:	10831285-1		
Sample Layers	**Asbestos Type**	**Asbestos Points Counted**	**Asbestos Concentration (%)**
Brown Soil	-	-	ND
Layer Totals:		-	-

Comments: No asbestos was detected and no points were counted.

The analytical sensitivity is 1 asbestos point. The limit of detection is 1 asbestos point divided by the total number of points counted and multiplied by 100.

The results relate only to the items tested. Interpretation is left to the company and/or persons who conducted the field work. The test report shall not be reproduced except in full, without written approval of the laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by any agency of the federal government.

All samples were received in acceptable condition unless otherwise noted. Eurofins EMLab P&K reserves the right to dispose of all samples after a period of thirty (30) days, according to all state and federal guidelines, unless otherwise specified.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

Client: TestAmerica-Pleasanton
C/O: Ms. Criselda Caparas
Re: 320-54857-2; Bell Road Project

Date of Sampling: 09-30-2019
Date of Receipt: 10-17-2019
Date of Report: 10-23-2019

ASBESTOS POINT COUNT REPORT: CARB METHOD 435

Location:	B-13-COMP (320-54857-74)		
Total Points Counted:	400		
Lab ID-Version‡:	10831286-1		
Sample Layers	**Asbestos Type**	**Asbestos Points Counted**	**Asbestos Concentration (%)**
Brown Soil	-	-	ND
Layer Totals:		-	-

Comments: No asbestos was detected and no points were counted.

Location:	B-16-COMP (320-54857-76)		
Total Points Counted:	400		
Lab ID-Version‡:	10831287-1		
Sample Layers	**Asbestos Type**	**Asbestos Points Counted**	**Asbestos Concentration (%)**
Brown Soil	-	-	ND
Layer Totals:		-	-

Comments: No asbestos was detected and no points were counted.

Location:	B-14-COMP (320-54857-78)		
Total Points Counted:	400		
Lab ID-Version‡:	10831288-1		
Sample Layers	**Asbestos Type**	**Asbestos Points Counted**	**Asbestos Concentration (%)**
Brown Soil	-	-	ND
Layer Totals:		-	-

Comments: No asbestos was detected and no points were counted.

The analytical sensitivity is 1 asbestos point. The limit of detection is 1 asbestos point divided by the total number of points counted and multiplied by 100.

The results relate only to the items tested. Interpretation is left to the company and/or persons who conducted the field work. The test report shall not be reproduced except in full, without written approval of the laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by any agency of the federal government.

All samples were received in acceptable condition unless otherwise noted. Eurofins EMLab P&K reserves the right to dispose of all samples after a period of thirty (30) days, according to all state and federal guidelines, unless otherwise specified.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing
TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Geologist: Andrew Smith**	**Site Contact:**	**Date:**
WRECO	**Email:Andrew_Smith@WRECO.com**	**Lab Contact:**	**Carrier:**
1243 Alpine Road, Suite 108	**Tel: 925-639-0013**		
Walnut Creek CA 94596	**Analysis Turnaround Time**		
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS		
Office: 925-941-0017 ext 253	TAT if different from Below ________		
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks		
Site: Bell Road I-80 Place County CA	☐ 1 week		
P O #	☐ 2 days		
	☐ 1 day		

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC /PAHs (8270)	PCBs, Organochlorine Pesticides (8082/8081A)	Organophosphorus Pesticides (8141A)	RCRA 8 Metals with Hg	NOA (CARB 435/PLM EPA 600/R-93/116)	Sample Specific Notes:
*B-1-COMP	9/30/19	_	C	Soil				X	X	X	X		
B-2-COMP	9/30/19	_	C	Soil				X	X	X	X	X	
B-3-COMP	9/30/19	_	C	Soil				X	X	X	X	X	
B-4-COMP	9/30/19	_	C	Soil								X	
B-13-COMP	9/30/19	_	C	Soil				X	X	X	X	X	
**B-14-COMP	9/30/19	_	C	Soil				X	X	X	X	X	instead of B-15-COMP
B-16-COMP	9/30/19	_	C	Soil				~~X~~	~~X~~	~~X~~	~~X~~	ⓧ	

10/16/19

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ________

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ________ Months

Special Instructions/QC Requirements & Comments: * composite samples B-1(0'-1'), B-1(1'-2'), B-1(2'-3') in lab run analyses listed on COC **
Composite samples B-14(0'-1'), B-14 (1'-2') and B-14(2'-3') in lab run analyses listed on COC

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:________ Corr'd:________ Therm ID No.:________

Relinquished by:	Company: WRECO	Date/Time: 10/15/19/1045	Received by: Criselda Caparas	Company: Test America	Date/Time: 10/15/19 1845
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

Login Sample Receipt Checklist

Client: WRECO

Job Number: 320-54857-2

Login Number: 54857
List Number: 1
Creator: Nuval, Mark-Anthony M

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: WRECO

Job Number: 320-54857-2

Login Number: 54857
List Number: 2
Creator: Mullen, Joan

List Source: Eurofins TestAmerica, Pleasanton
List Creation: 10/17/19 12:53 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Environment Testing
TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-54857-1
Client Project/Site: Bell Road Project

For:
WRECO
1243 Alpine Road
Suite 108
Walnut Creek, California 94596

Attn: Ms. Melissa McAssey

Authorized for release by:
10/22/2019 1:45:19 PM

Criselda Caparas, Project Manager I
(925)484-1919
criselda.caparas@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Qualifiers

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-54857-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-54857-1

Comments
No additional comments.

Receipt
The samples were received on 10/1/2019 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 5.2º C, 5.8º C and 14.6º C.

Receipt Exceptions

The following samples were submitted for analysis; however, it was not listed on the Chain-of-Custody (COC): B-1 {0'-1'} (320-54857-1), B-1 {1'-2'} (320-54857-2), B-1 {2'-3'} (320-54857-3), B-2 {0'-1'} (320-54857-4), B-2 {1'-2'} (320-54857-5), B-2 {2'-3'} (320-54857-6), B-3 {0'-1'} (320-54857-7), B-3 {1'-2'} (320-54857-8), B-3 {2'-3'} (320-54857-9), B-4 {0'-1'} (320-54857-10), B-4 {1'-2'} (320-54857-11), B-4 {2'-3'} (320-54857-12), B-5 {0'-1'} (320-54857-13), B-5 {1'-2'} (320-54857-14), B-5 {2'-3'} (320-54857-15), B-6 {0'-1'} (320-54857-16), B-6 {1'-2'} (320-54857-17), B-6 {2'-3'} (320-54857-18), B-7 {0'-1'} (320-54857-19), B-7 {1'-2'} (320-54857-20), B-7 {2'-3'} (320-54857-21), B-8 {0'-1'} (320-54857-22), B-8 {1'-2'} (320-54857-23), B-8 {2'-3'} (320-54857-24), B-9 {0'-1'} (320-54857-25), B-9 {1'-2'} (320-54857-26), B-9 {2'-3'} (320-54857-27), B-10 {0'-1'} (320-54857-28), B-10 {1'-2'} (320-54857-29), B-10 {2'-3'} (320-54857-30), B-11 {0'-1'} (320-54857-31), B-11 {1'-2'} (320-54857-32), B-11 {2'-3'} (320-54857-33), B-12 {0'-1'} (320-54857-34), B-12 {1'-2'} (320-54857-35), B-12 {2'-3'} (320-54857-36), B-13 {0'-1'} (320-54857-37), B-13 {1'-2'} (320-54857-38), B-13 {2'-3'} (320-54857-39), B-14 {0'-1'} (320-54857-40), B-14 {1'-2'} (320-54857-41), B-14 {2'-3'} (320-54857-42), B-15 {0'-1'} (320-54857-43), B-15 {1'-2'} (320-54857-44), B-15 {2'-3'} (320-54857-45), B-16 {0'-1'} (320-54857-46), B-16 {1'-2'} (320-54857-47), B-16 {2'-3'} (320-54857-48), B-1 {3'-4'} (320-54857-49), B-2 {4'-5'} (320-54857-50), B-2 {3'-4'} (320-54857-51), B-3 {3'-4'} (320-54857-52), B-4 {4'-5'} (320-54857-53), B-4 {3'-4'} (320-54857-54), B-5 {3'-4'} (320-54857-55), B-6 {4'-5'} (320-54857-56), B-6 {3'-4'} (320-54857-57), B-7 {3'-4'} (320-54857-58), B-8 {3'-4'} (320-54857-59), B-8 {4'-5'} (320-54857-60), B-9 {4'-5'} (320-54857-61), B-10 {3'-4'} (320-54857-62), B-10 {4'-5'} (320-54857-63), B-11 {3'-4'} (320-54857-64), B-12 {3'-4'} (320-54857-65), B-12{4'-5'} (320-54857-66), B-13 {3'-4'} (320-54857-67), B-14 {3'-4'} (320-54857-68), B-15 {3'-4'} (320-54857-69), B-16 {3'-4'} (320-54857-70), B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-4-COMP (320-54857-73), B-13-COMP (320-54857-74), B-15-COMP (320-54857-75), B-16-COMP (320-54857-76), B-1-COMP (320-54857-77) and B-14-COMP (320-54857-78) Refer to job notes on field sheets. Sample#49-70 not listed on COC.

The container label for the following samples did not match the information listed on the Chain-of-Custody (COC): B-1 {0'-1'} (320-54857-1), B-1 {1'-2'} (320-54857-2), B-1 {2'-3'} (320-54857-3), B-2 {0'-1'} (320-54857-4), B-2 {1'-2'} (320-54857-5), B-2 {2'-3'} (320-54857-6), B-3 {0'-1'} (320-54857-7), B-3 {1'-2'} (320-54857-8), B-3 {2'-3'} (320-54857-9), B-4 {0'-1'} (320-54857-10), B-4 {1'-2'} (320-54857-11), B-4 {2'-3'} (320-54857-12), B-5 {0'-1'} (320-54857-13), B-5 {1'-2'} (320-54857-14), B-5 {2'-3'} (320-54857-15), B-6 {0'-1'} (320-54857-16), B-6 {1'-2'} (320-54857-17), B-6 {2'-3'} (320-54857-18), B-7 {0'-1'} (320-54857-19), B-7 {1'-2'} (320-54857-20), B-7 {2'-3'} (320-54857-21), B-8 {0'-1'} (320-54857-22), B-8 {1'-2'} (320-54857-23), B-8 {2'-3'} (320-54857-24), B-9 {0'-1'} (320-54857-25), B-9 {1'-2'} (320-54857-26), B-9 {2'-3'} (320-54857-27), B-10 {0'-1'} (320-54857-28), B-10 {1'-2'} (320-54857-29), B-10 {2'-3'} (320-54857-30), B-11 {0'-1'} (320-54857-31), B-11 {1'-2'} (320-54857-32), B-11 {2'-3'} (320-54857-33), B-12 {0'-1'} (320-54857-34), B-12 {1'-2'} (320-54857-35), B-12 {2'-3'} (320-54857-36), B-13 {0'-1'} (320-54857-37), B-13 {1'-2'} (320-54857-38), B-13 {2'-3'} (320-54857-39), B-14 {0'-1'} (320-54857-40), B-14 {1'-2'} (320-54857-41), B-14 {2'-3'} (320-54857-42), B-15 {0'-1'} (320-54857-43), B-15 {1'-2'} (320-54857-44), B-15 {2'-3'} (320-54857-45), B-16 {0'-1'} (320-54857-46), B-16 {1'-2'} (320-54857-47), B-16 {2'-3'} (320-54857-48), B-1 {3'-4'} (320-54857-49), B-2 {4'-5'} (320-54857-50), B-2 {3'-4'} (320-54857-51), B-3 {3'-4'} (320-54857-52), B-4 {4'-5'} (320-54857-53), B-4 {3'-4'} (320-54857-54), B-5 {3'-4'} (320-54857-55), B-6 {4'-5'} (320-54857-56), B-6 {3'-4'} (320-54857-57), B-7 {3'-4'} (320-54857-58), B-8 {3'-4'} (320-54857-59), B-8 {4'-5'} (320-54857-60), B-9 {4'-5'} (320-54857-61), B-10 {3'-4'} (320-54857-62), B-10 {4'-5'} (320-54857-63), B-11 {3'-4'} (320-54857-64), B-12 {3'-4'} (320-54857-65), B-12{4'-5'} (320-54857-66), B-13 {3'-4'} (320-54857-67), B-14 {3'-4'} (320-54857-68), B-15 {3'-4'} (320-54857-69), B-16 {3'-4'} (320-54857-70), B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-4-COMP (320-54857-73), B-13-COMP (320-54857-74), B-15-COMP (320-54857-75), B-16-COMP (320-54857-76), B-1-COMP (320-54857-77) and B-14-COMP (320-54857-78). All containers do not list sample time or date, but sample time and date is listed on the Chain of Custody.

The following sample was listed on the Chain of Custody (COC); however, no sample was received: B-14 {0'-1'} (320-54857-40). Sample#40 on COC not received. Client dropped sample off on 10/2/19 at 13:45, no ice, or any cooling agent with sample. Temp of 14.6c.

Metals

Job ID: 320-54857-1 (Continued)

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

Method 6020: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 320-327715 and analytical batch 320-331075 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 6020: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 320-332400 and analytical batch 320-332694 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method 9045C: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples in preparation batch 320-329955 and analytical batch 320-329984 have been qualified, per project instructions, with the "HF" flag to indicate analysis was performed in the laboratory outside the 15 minute timeframe: B-1 {0'-1'} (320-54857-1), B-1 {1'-2'} (320-54857-2), B-1 {2'-3'} (320-54857-3), B-2 {0'-1'} (320-54857-4), B-2 {1'-2'} (320-54857-5), B-2 {2'-3'} (320-54857-6), B-3 {0'-1'} (320-54857-7), B-3 {1'-2'} (320-54857-8), B-3 {2'-3'} (320-54857-9) and B-4 {0'-1'} (320-54857-10).

Method 9045C: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples in 320-330073 have been qualified with the "HF" flag, per project instructions, to indicate analysis was performed in the laboratory outside the 15 minute timeframe. B-4 {1'-2'} (320-54857-11), B-4 {2'-3'} (320-54857-12), B-5 {0'-1'} (320-54857-13), B-5 {1'-2'} (320-54857-14), B-5 {2'-3'} (320-54857-15), B-6 {1'-2'} (320-54857-17), B-6 {2'-3'} (320-54857-18), B-7 {0'-1'} (320-54857-19), B-7 {1'-2'} (320-54857-20) and B-7 {2'-3'} (320-54857-21).

Method 9045C: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples in 320-330323 have been qualified with the "HF" flag per project instructions to indicate analysis was performed in the laboratory outside the 15 minute timeframe: B-8 {0'-1'} (320-54857-22), B-8 {1'-2'} (320-54857-23), B-8 {2'-3'} (320-54857-24), B-9 {0'-1'} (320-54857-25), B-9 {1'-2'} (320-54857-26), B-9 {2'-3'} (320-54857-27), B-11 {0'-1'} (320-54857-31), B-11 {1'-2'} (320-54857-32), B-11 {2'-3'} (320-54857-33) and B-12 {0'-1'} (320-54857-34).

Method 9045C: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples in 320-330744 have been qualified with the "HF" flag per project instructions to indicate analysis was performed in the laboratory outside the 15 minute timeframe: B-12 {1'-2'} (320-54857-35), B-12 {2'-3'} (320-54857-36), B-13 {0'-1'} (320-54857-37), B-13 {1'-2'} (320-54857-38), B-13 {2'-3'} (320-54857-39), B-15 {1'-2'} (320-54857-44), B-15 {2'-3'} (320-54857-45), B-16 {0'-1'} (320-54857-46), B-16 {1'-2'} (320-54857-47) and B-16 {2'-3'} (320-54857-48).

Method 9045C: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples in 320-330784 have been qualified with the "HF" flag per project instructions to indicate analysis was performed in the laboratory outside the 15 minute timeframe: B-14 {0'-1'} (320-54857-40), B-14 {1'-2'} (320-54857-41) and B-14 {2'-3'} (320-54857-42).

Method 9045C: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples 320-331755 have been qualified with the "HF" flag per project instructions to indicate analysis was performed in the laboratory outside the 15 minute timeframe: B-10 {0'-1'} (320-54857-28), B-10 {1'-2'} (320-54857-29), B-10 {2'-3'} (320-54857-30) and B-15 {0'-1'} (320-54857-43).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-1 {0'-1'} — Lab Sample ID: 320-54857-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	2.3		0.10	0.061	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.0	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-1 {1'-2'} — Lab Sample ID: 320-54857-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.25		0.10	0.057	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.6	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-1 {2'-3'} — Lab Sample ID: 320-54857-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.48		0.10	0.048	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.2	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-2 {0'-1'} — Lab Sample ID: 320-54857-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	10		0.10	0.063	mg/Kg	1		6020	Total/NA
Arsenic	5.0		0.20	0.16	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.7	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-2 {1'-2'} — Lab Sample ID: 320-54857-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	3.8		0.10	0.034	mg/Kg	1		6020	Total/NA
Arsenic	4.7		0.20	0.084	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.8	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-2 {2'-3'} — Lab Sample ID: 320-54857-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	1.9		0.10	0.058	mg/Kg	1		6020	Total/NA
Arsenic	1.9		0.20	0.15	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.4	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-3 {0'-1'} — Lab Sample ID: 320-54857-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	21		0.10	0.059	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.4	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-3 {1'-2'} — Lab Sample ID: 320-54857-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	1.4		0.10	0.059	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.8	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-3 {2'-3'} — Lab Sample ID: 320-54857-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	3.2		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.9	HF	0.1	0.1	SU	1		9045C	Soluble

This Detection Summary does not include radiochemical test results.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Detection Summary

Client: WRECO
Project/Site: Bell Road Project
Job ID: 320-54857-1

Client Sample ID: B-4 {0'-1'} Lab Sample ID: 320-54857-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	6.0		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-4 {1'-2'} Lab Sample ID: 320-54857-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.23		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.1	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-4 {2'-3'} Lab Sample ID: 320-54857-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.41		0.10	0.059	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-5 {0'-1'} Lab Sample ID: 320-54857-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.64		0.10	0.063	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	8.1	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-5 {1'-2'} Lab Sample ID: 320-54857-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.58		0.10	0.061	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	8.3	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-5 {2'-3'} Lab Sample ID: 320-54857-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	8.9		0.10	0.057	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	4.8	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-6 {0'-1'} Lab Sample ID: 320-54857-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	38		0.10	0.057	mg/Kg	1		6020	Total/NA
Arsenic	15		0.20	0.14	mg/Kg	1		6020	Total/NA

Client Sample ID: B-6 {1'-2'} Lab Sample ID: 320-54857-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	7.5		0.10	0.056	mg/Kg	1		6020	Total/NA
Arsenic	5.6		0.20	0.14	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-6 {2'-3'} Lab Sample ID: 320-54857-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	33		0.10	0.059	mg/Kg	1		6020	Total/NA
Arsenic	13		0.20	0.15	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.7	HF	0.1	0.1	SU	1		9045C	Soluble

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-7 {0'-1'} Lab Sample ID: 320-54857-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	40		0.10	0.059	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.9	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-7 {1'-2'} Lab Sample ID: 320-54857-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	6.3		0.10	0.057	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.3	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-7 {2'-3'} Lab Sample ID: 320-54857-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	1.1		0.10	0.059	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.7	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-8 {0'-1'} Lab Sample ID: 320-54857-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	29		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.7	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-8 {1'-2'} Lab Sample ID: 320-54857-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	5.4		0.10	0.060	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.2	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-8 {2'-3'} Lab Sample ID: 320-54857-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	40		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-9 {0'-1'} Lab Sample ID: 320-54857-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	8.0		0.10	0.044	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.3	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-9 {1'-2'} Lab Sample ID: 320-54857-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	17		0.10	0.061	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-9 {2'-3'} Lab Sample ID: 320-54857-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	5.8		0.10	0.051	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.0	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-10 {0'-1'} Lab Sample ID: 320-54857-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	27		0.10	0.031	mg/Kg	1		6020	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-10 {0'-1'} (Continued) Lab Sample ID: 320-54857-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	8.1		0.20	0.079	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.0	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-10 {1'-2'} Lab Sample ID: 320-54857-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	2.4		0.10	0.059	mg/Kg	1		6020	Total/NA
Arsenic	5.4	F1	0.20	0.15	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.0	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-10 {2'-3'} Lab Sample ID: 320-54857-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	3.8		0.10	0.058	mg/Kg	1		6020	Total/NA
Arsenic	7.7		0.20	0.14	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.2	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-11 {0'-1'} Lab Sample ID: 320-54857-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	1.9		0.10	0.043	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.9	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-11 {1'-2'} Lab Sample ID: 320-54857-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	9.9		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.9	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-11 {2'-3'} Lab Sample ID: 320-54857-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	2.7		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.9	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-12 {0'-1'} Lab Sample ID: 320-54857-34

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	18		0.10	0.055	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-12 {1'-2'} Lab Sample ID: 320-54857-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	11		0.10	0.061	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.0	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-12 {2'-3'} Lab Sample ID: 320-54857-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	8.7		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.9	HF	0.1	0.1	SU	1		9045C	Soluble

This Detection Summary does not include radiochemical test results.

Detection Summary

Client Sample ID: B-13 {0'-1'} Lab Sample ID: 320-54857-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	3.7		0.10	0.063	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.4	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-13 {1'-2'} Lab Sample ID: 320-54857-38

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.1		0.10	0.059	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.1	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-13 {2'-3'} Lab Sample ID: 320-54857-39

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	20		0.10	0.054	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.8	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-14 {0'-1'} Lab Sample ID: 320-54857-40

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	8.5		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.4	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-14 {1'-2'} Lab Sample ID: 320-54857-41

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	10		0.10	0.037	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-14 {2'-3'} Lab Sample ID: 320-54857-42

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	2.2		0.10	0.057	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.3	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-15 {0'-1'} Lab Sample ID: 320-54857-43

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	6.5		0.10	0.061	mg/Kg	1		6020	Total/NA
Arsenic	4.0		0.20	0.15	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.2	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-15 {1'-2'} Lab Sample ID: 320-54857-44

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	12		0.10	0.059	mg/Kg	1		6020	Total/NA
Arsenic	7.3		0.20	0.15	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	8.1	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-15 {2'-3'} Lab Sample ID: 320-54857-45

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	6.3		0.10	0.043	mg/Kg	1		6020	Total/NA
Arsenic	4.1		0.20	0.11	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	8.0	HF	0.1	0.1	SU	1		9045C	Soluble

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-16 {0'-1'}

Lab Sample ID: 320-54857-46

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	11		0.10	0.052	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.7	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-16 {1'-2'}

Lab Sample ID: 320-54857-47

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	14		0.10	0.042	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.7	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: B-16 {2'-3'}

Lab Sample ID: 320-54857-48

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	10		0.10	0.056	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	7.5	HF	0.1	0.1	SU	1		9045C	Soluble

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: WRECO
Job ID: 320-54857-1
Project/Site: Bell Road Project

Client Sample ID: B-1 {0'-1'}

Lab Sample ID: 320-54857-1

Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	2.3		0.10	0.061	mg/Kg		10/02/19 06:30	10/14/19 15:33	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	7.0	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-1 {1'-2'}

Lab Sample ID: 320-54857-2

Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.25		0.10	0.057	mg/Kg		10/02/19 06:30	10/14/19 15:47	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.6	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-1 {2'-3'}

Lab Sample ID: 320-54857-3

Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.48		0.10	0.048	mg/Kg		10/02/19 06:30	10/14/19 15:50	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	7.2	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-2 {0'-1'}

Lab Sample ID: 320-54857-4

Date Collected: 09/30/19 07:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	10		0.10	0.063	mg/Kg		10/02/19 06:30	10/14/19 16:06	1
Arsenic	5.0		0.20	0.16	mg/Kg		10/02/19 06:30	10/14/19 16:06	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.7	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-2 {1'-2'}

Lab Sample ID: 320-54857-5

Date Collected: 09/30/19 07:33
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	3.8		0.10	0.034	mg/Kg		10/02/19 06:30	10/14/19 16:09	1
Arsenic	4.7		0.20	0.084	mg/Kg		10/02/19 06:30	10/14/19 16:09	1

Client Sample Results

Client Sample ID: B-2 {1'-2'}

Lab Sample ID: 320-54857-5
Date Collected: 09/30/19 07:33
Matrix: Solid
Date Received: 10/01/19 09:10

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.8	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-2 {2'-3'}

Lab Sample ID: 320-54857-6
Date Collected: 09/30/19 07:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1.9		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 16:12	1
Arsenic	1.9		0.20	0.15	mg/Kg		10/02/19 06:30	10/14/19 16:12	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.4	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-3 {0'-1'}

Lab Sample ID: 320-54857-7
Date Collected: 09/30/19 08:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	21		0.10	0.059	mg/Kg		10/02/19 06:30	10/14/19 16:14	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.4	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-3 {1'-2'}

Lab Sample ID: 320-54857-8
Date Collected: 09/30/19 08:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1.4		0.10	0.059	mg/Kg		10/02/19 06:30	10/14/19 16:17	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.8	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-3 {2'-3'}

Lab Sample ID: 320-54857-9
Date Collected: 09/30/19 08:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	3.2		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 16:33	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.9	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-4 {0'-1'}

Lab Sample ID: 320-54857-10
Matrix: Solid
Date Collected: 09/30/19 08:30
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	6.0		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 16:36	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU			10/10/19 12:55	1

Client Sample ID: B-4 {1'-2'}

Lab Sample ID: 320-54857-11
Matrix: Solid
Date Collected: 09/30/19 08:30
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.23		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 16:39	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.1	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-4 {2'-3'}

Lab Sample ID: 320-54857-12
Matrix: Solid
Date Collected: 09/30/19 08:30
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.41		0.10	0.059	mg/Kg		10/02/19 06:30	10/14/19 16:42	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-5 {0'-1'}

Lab Sample ID: 320-54857-13
Matrix: Solid
Date Collected: 09/30/19 09:00
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.64		0.10	0.063	mg/Kg		10/02/19 06:30	10/14/19 16:45	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	8.1	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-5 {1'-2'}

Lab Sample ID: 320-54857-14
Matrix: Solid
Date Collected: 09/30/19 09:00
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.58		0.10	0.061	mg/Kg		10/02/19 06:30	10/14/19 16:48	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	8.3	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-5 {2'-3'}

Lab Sample ID: 320-54857-15

Date Collected: 09/30/19 09:00
Date Received: 10/01/19 09:10

Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	8.9		0.10	0.057	mg/Kg		10/02/19 06:30	10/14/19 17:04	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	4.8	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-6 {0'-1'}

Lab Sample ID: 320-54857-16

Date Collected: 09/30/19 10:00
Date Received: 10/01/19 09:10

Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	38		0.10	0.057	mg/Kg		10/02/19 06:30	10/14/19 17:06	1
Arsenic	15		0.20	0.14	mg/Kg		10/02/19 06:30	10/14/19 17:06	1

Client Sample ID: B-6 {1'-2'}

Lab Sample ID: 320-54857-17

Date Collected: 09/30/19 10:00
Date Received: 10/01/19 09:10

Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	7.5		0.10	0.056	mg/Kg		10/02/19 06:30	10/14/19 17:09	1
Arsenic	5.6		0.20	0.14	mg/Kg		10/02/19 06:30	10/14/19 17:09	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.5	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-6 {2'-3'}

Lab Sample ID: 320-54857-18

Date Collected: 09/30/19 10:00
Date Received: 10/01/19 09:10

Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	33		0.10	0.059	mg/Kg		10/02/19 06:30	10/14/19 17:12	1
Arsenic	13		0.20	0.15	mg/Kg		10/02/19 06:30	10/14/19 17:12	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.7	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-7 {0'-1'}

Lab Sample ID: 320-54857-19

Date Collected: 09/30/19 11:00
Date Received: 10/01/19 09:10

Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	40		0.10	0.059	mg/Kg		10/02/19 06:30	10/14/19 17:15	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.9	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-7 {1'-2'} Lab Sample ID: 320-54857-20

Date Collected: 09/30/19 11:30 **Matrix: Solid**

Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	6.3		0.10	0.057	mg/Kg		10/02/19 06:30	10/14/19 17:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.3	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-7 {2'-3'} Lab Sample ID: 320-54857-21

Date Collected: 09/30/19 11:30 **Matrix: Solid**

Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1.1		0.10	0.059	mg/Kg		10/02/19 06:30	10/14/19 17:45	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.7	HF	0.1	0.1	SU			10/10/19 14:56	1

Client Sample ID: B-8 {0'-1'} Lab Sample ID: 320-54857-22

Date Collected: 09/30/19 12:00 **Matrix: Solid**

Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	29		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 17:47	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.7	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-8 {1'-2'} Lab Sample ID: 320-54857-23

Date Collected: 09/30/19 12:00 **Matrix: Solid**

Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	5.4		0.10	0.060	mg/Kg		10/02/19 06:30	10/14/19 17:50	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.2	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-8 {2'-3'} Lab Sample ID: 320-54857-24

Date Collected: 09/30/19 12:00 **Matrix: Solid**

Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	40		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 18:06	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.5	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample Results

Client Sample ID: B-9 {0'-1'}

Lab Sample ID: 320-54857-25
Date Collected: 09/30/19 01:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	8.0		0.10	0.044	mg/Kg		10/02/19 06:30	10/14/19 18:09	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.3	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-9 {1'-2'}

Lab Sample ID: 320-54857-26
Date Collected: 09/30/19 01:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	17		0.10	0.061	mg/Kg		10/02/19 06:30	10/14/19 18:12	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-9 {2'-3'}

Lab Sample ID: 320-54857-27
Date Collected: 09/30/19 01:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	5.8		0.10	0.051	mg/Kg		10/02/19 06:30	10/14/19 18:14	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.0	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-10 {0'-1'}

Lab Sample ID: 320-54857-28
Date Collected: 09/30/19 01:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	27		0.10	0.031	mg/Kg		10/21/19 06:30	10/21/19 13:50	1
Arsenic	8.1		0.20	0.079	mg/Kg		10/21/19 06:30	10/21/19 13:50	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.0	HF	0.1	0.1	SU			10/17/19 14:13	1

Client Sample ID: B-10 {1'-2'}

Lab Sample ID: 320-54857-29
Date Collected: 09/30/19 01:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	2.4		0.10	0.059	mg/Kg		10/21/19 06:30	10/21/19 13:52	1
Arsenic	5.4	F1	0.20	0.15	mg/Kg		10/21/19 06:30	10/21/19 13:52	1

Client Sample Results

Client Sample ID: B-10 {1'-2'}

Lab Sample ID: 320-54857-29
Date Collected: 09/30/19 01:30
Matrix: Solid
Date Received: 10/01/19 09:10

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.0	HF	0.1	0.1	SU			10/17/19 14:13	1

Client Sample ID: B-10 {2'-3'}

Lab Sample ID: 320-54857-30
Date Collected: 09/30/19 01:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	3.8		0.10	0.058	mg/Kg		10/21/19 06:30	10/21/19 14:20	1
Arsenic	7.7		0.20	0.14	mg/Kg		10/21/19 06:30	10/21/19 14:20	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.2	HF	0.1	0.1	SU			10/17/19 14:13	1

Client Sample ID: B-11 {0'-1'}

Lab Sample ID: 320-54857-31
Date Collected: 09/30/19 02:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1.9		0.10	0.043	mg/Kg		10/02/19 06:30	10/14/19 18:17	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.9	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-11 {1'-2'}

Lab Sample ID: 320-54857-32
Date Collected: 09/30/19 02:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	9.9		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 18:20	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.9	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-11 {2'-3'}

Lab Sample ID: 320-54857-33
Date Collected: 09/30/19 02:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	2.7		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 18:23	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.9	HF	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-12 {0'-1'}

Lab Sample ID: 320-54857-34

Date Collected: 09/30/19 02:15
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**18**		0.10	0.055	mg/Kg		10/02/19 06:30	10/14/19 18:26	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	**7.5**	**HF**	0.1	0.1	SU			10/11/19 15:46	1

Client Sample ID: B-12 {1'-2'}

Lab Sample ID: 320-54857-35

Date Collected: 09/30/19 02:15
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**11**		0.10	0.061	mg/Kg		10/02/19 06:30	10/14/19 18:41	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	**7.0**	**HF**	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-12 {2'-3'}

Lab Sample ID: 320-54857-36

Date Collected: 09/30/19 02:15
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**8.7**		0.10	0.058	mg/Kg		10/02/19 06:30	10/14/19 18:44	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	**6.9**	**HF**	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-13 {0'-1'}

Lab Sample ID: 320-54857-37

Date Collected: 09/30/19 02:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**3.7**		0.10	0.063	mg/Kg		10/02/19 06:30	10/14/19 18:47	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	**5.4**	**HF**	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-13 {1'-2'}

Lab Sample ID: 320-54857-38

Date Collected: 09/30/19 02:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**4.1**		0.10	0.059	mg/Kg		10/02/19 06:30	10/14/19 18:50	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	**5.1**	**HF**	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-13 {2'-3'}

Lab Sample ID: 320-54857-39
Date Collected: 09/30/19 02:30
Date Received: 10/01/19 09:10
Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	20		0.10	0.054	mg/Kg		10/02/19 06:30	10/14/19 18:53	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.8	HF	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-14 {0'-1'}

Lab Sample ID: 320-54857-40
Date Collected: 09/30/19 02:45
Date Received: 10/02/19 13:35
Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	8.5		0.10	0.058	mg/Kg		10/16/19 06:30	10/16/19 23:08	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.4	HF	0.1	0.1	SU			10/14/19 14:02	1

Client Sample ID: B-14 {1'-2'}

Lab Sample ID: 320-54857-41
Date Collected: 09/30/19 02:45
Date Received: 10/01/19 09:10
Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	10		0.10	0.037	mg/Kg		10/02/19 06:30	10/14/19 18:56	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.5	HF	0.1	0.1	SU			10/14/19 14:02	1

Client Sample ID: B-14 {2'-3'}

Lab Sample ID: 320-54857-42
Date Collected: 09/30/19 02:45
Date Received: 10/01/19 09:10
Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	2.2		0.10	0.057	mg/Kg		10/02/19 06:30	10/14/19 18:59	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.3	HF	0.1	0.1	SU			10/14/19 14:02	1

Client Sample ID: B-15 {0'-1'}

Lab Sample ID: 320-54857-43
Date Collected: 09/30/19 03:00
Date Received: 10/01/19 09:10
Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	6.5		0.10	0.061	mg/Kg		10/16/19 06:30	10/16/19 23:10	1
Arsenic	4.0		0.20	0.15	mg/Kg		10/16/19 06:30	10/16/19 23:10	1

Client Sample Results

Client Sample ID: B-15 {0'-1'}

Lab Sample ID: 320-54857-43
Date Collected: 09/30/19 03:00
Matrix: Solid
Date Received: 10/01/19 09:10

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	7.2	HF	0.1	0.1	SU			10/17/19 14:13	1

Client Sample ID: B-15 {1'-2'}

Lab Sample ID: 320-54857-44
Date Collected: 09/30/19 03:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	12		0.10	0.059	mg/Kg		10/16/19 06:30	10/16/19 23:13	1
Arsenic	7.3		0.20	0.15	mg/Kg		10/16/19 06:30	10/16/19 23:13	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	8.1	HF	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-15 {2'-3'}

Lab Sample ID: 320-54857-45
Date Collected: 09/30/19 03:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	6.3		0.10	0.043	mg/Kg		10/16/19 06:30	10/16/19 23:16	1
Arsenic	4.1		0.20	0.11	mg/Kg		10/16/19 06:30	10/16/19 23:16	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	8.0	HF	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-16 {0'-1'}

Lab Sample ID: 320-54857-46
Date Collected: 09/30/19 03:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	11		0.10	0.052	mg/Kg		10/16/19 06:30	10/16/19 23:19	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	7.7	HF	0.1	0.1	SU			10/14/19 11:38	1

Client Sample ID: B-16 {1'-2'}

Lab Sample ID: 320-54857-47
Date Collected: 09/30/19 03:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	14		0.10	0.042	mg/Kg		10/16/19 06:30	10/16/19 23:52	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	7.7	HF	0.1	0.1	SU			10/14/19 11:38	1

Client Sample Results

Client Sample ID: B-16 {2'-3'}

Date Collected: 09/30/19 03:30
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-48

Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	10		0.10	0.056	mg/Kg		10/16/19 06:30	10/16/19 23:55	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	7.5	HF	0.1	0.1	SU			10/14/19 11:38	1

QC Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-327715/1-A
Matrix: Solid
Analysis Batch: 331075

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 327715

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.060	mg/Kg		10/02/19 06:30	10/14/19 14:45	1
Arsenic	ND		0.20	0.15	mg/Kg		10/02/19 06:30	10/14/19 14:45	1

Lab Sample ID: LCS 320-327715/2-A
Matrix: Solid
Analysis Batch: 331075

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 327715

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			20.0	19.7		mg/Kg		98	80 - 120		
Arsenic			40.0	38.3		mg/Kg		96	80 - 120		

Lab Sample ID: 320-54857-1 MS
Matrix: Solid
Analysis Batch: 331075

Client Sample ID: B-1 {0'-1'}
Prep Type: Total/NA
Prep Batch: 327715

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	2.3		19.6	20.0		mg/Kg		90	80 - 120		
Arsenic	3.3	F1	39.2	25.7	F1	mg/Kg		57	80 - 120		

Lab Sample ID: 320-54857-1 MSD
Matrix: Solid
Analysis Batch: 331075

Client Sample ID: B-1 {0'-1'}
Prep Type: Total/NA
Prep Batch: 327715

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	2.3		19.4	19.7		mg/Kg		90	80 - 120	1	20
Arsenic	3.3	F1	38.8	26.5	F1	mg/Kg		60	80 - 120	3	20

Lab Sample ID: MB 320-327716/1-A
Matrix: Solid
Analysis Batch: 331075

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 327716

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.060	mg/Kg		10/02/19 06:30	10/14/19 14:52	1

Lab Sample ID: LCS 320-327716/2-A
Matrix: Solid
Analysis Batch: 331075

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 327716

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			20.0	19.9		mg/Kg		99	80 - 120		

Lab Sample ID: 320-54857-20 MS
Matrix: Solid
Analysis Batch: 331075

Client Sample ID: B-7 {1'-2'}
Prep Type: Total/NA
Prep Batch: 327716

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	6.3		19.1	23.5		mg/Kg		90	80 - 120		

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: 320-54857-20 MSD
Matrix: Solid
Analysis Batch: 331075
Client Sample ID: B-7 {1'-2'}
Prep Type: Total/NA
Prep Batch: 327716

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	6.3		19.4	25.0		mg/Kg		96	80 - 120	6	20

Lab Sample ID: MB 320-330966/1-A
Matrix: Solid
Analysis Batch: 331729
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 330966

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.060	mg/Kg		10/16/19 06:30	10/16/19 19:53	1
Arsenic	ND		0.20	0.15	mg/Kg		10/16/19 06:30	10/16/19 19:53	1

Lab Sample ID: LCS 320-330966/2-A
Matrix: Solid
Analysis Batch: 331729
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 330966

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	20.0	19.9		mg/Kg		99	80 - 120
Arsenic	40.0	34.9		mg/Kg		87	80 - 120

Lab Sample ID: MB 320-332400/1-A
Matrix: Solid
Analysis Batch: 332694
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 332400

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.060	mg/Kg		10/21/19 06:30	10/21/19 13:43	1
Arsenic	ND		0.20	0.15	mg/Kg		10/21/19 06:30	10/21/19 13:43	1

Lab Sample ID: LCS 320-332400/2-A
Matrix: Solid
Analysis Batch: 332694
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332400

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	20.0	19.5		mg/Kg		97	80 - 120
Arsenic	40.0	39.8		mg/Kg		100	80 - 120

Lab Sample ID: 320-54857-29 MS
Matrix: Solid
Analysis Batch: 332694
Client Sample ID: B-10 {1'-2'}
Prep Type: Total/NA
Prep Batch: 332400

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	2.4		19.8	22.8		mg/Kg		103	80 - 120
Arsenic	5.4	F1	39.6	28.7	F1	mg/Kg		59	80 - 120

Lab Sample ID: 320-54857-29 MSD
Matrix: Solid
Analysis Batch: 332694
Client Sample ID: B-10 {1'-2'}
Prep Type: Total/NA
Prep Batch: 332400

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	2.4		19.3	20.1		mg/Kg		92	80 - 120	13	20
Arsenic	5.4	F1	38.5	27.3	F1	mg/Kg		57	80 - 120	5	20

QC Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Method: 9045C - pH

Lab Sample ID: LCS 320-329984/2
Matrix: Solid
Analysis Batch: 329984

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	8.00	8.0		SU		100	98 - 102

Lab Sample ID: LCS 320-330073/2
Matrix: Solid
Analysis Batch: 330073

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	8.00	8.0		SU		100	98 - 102

Lab Sample ID: LCS 320-330323/2
Matrix: Solid
Analysis Batch: 330323

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	8.00	8.0		SU		100	98 - 102

Lab Sample ID: LCS 320-330744/2
Matrix: Solid
Analysis Batch: 330744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	8.00	8.0		SU		100	98 - 102

Lab Sample ID: LCS 320-330784/2
Matrix: Solid
Analysis Batch: 330784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	8.00	8.0		SU		100	98 - 102

Lab Sample ID: LCS 320-331755/2
Matrix: Solid
Analysis Batch: 331755

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	8.00	8.0		SU		99	98 - 102

Lab Sample ID: 320-54857-1 DU
Matrix: Solid
Analysis Batch: 329984

Client Sample ID: B-1 {0'-1'}
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH adj. to 25 deg C	7.0	HF	7.0		SU		0.3	10

Lab Sample ID: 320-54857-11 DU
Matrix: Solid
Analysis Batch: 330073

Client Sample ID: B-4 {1'-2'}
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH adj. to 25 deg C	6.1	HF	6.1		SU		0	10

QC Sample Results

Method: 9045C - pH

Lab Sample ID: 320-54857-22 DU
Matrix: Solid
Analysis Batch: 330323

Client Sample ID: B-8 {0'-1'}
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH adj. to 25 deg C	5.7	HF		5.7		SU				0.5	10

Lab Sample ID: 320-54857-48 DU
Matrix: Solid
Analysis Batch: 330744

Client Sample ID: B-16 {2'-3'}
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH adj. to 25 deg C	7.5	HF		7.5		SU				0.1	10

Lab Sample ID: 320-54857-40 DU
Matrix: Solid
Analysis Batch: 330784

Client Sample ID: B-14 {0'-1'}
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH adj. to 25 deg C	6.4	HF		6.4		SU				0.6	10

Lab Sample ID: 320-54857-30 DU
Matrix: Solid
Analysis Batch: 331755

Client Sample ID: B-10 {2'-3'}
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH adj. to 25 deg C	6.2	HF		6.3		SU				0.8	10

Metals

Prep Batch: 327715

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-1	B-1 {0'-1'}	Total/NA	Solid	3050B	
320-54857-2	B-1 {1'-2'}	Total/NA	Solid	3050B	
320-54857-3	B-1 {2'-3'}	Total/NA	Solid	3050B	
320-54857-4	B-2 {0'-1'}	Total/NA	Solid	3050B	
320-54857-5	B-2 {1'-2'}	Total/NA	Solid	3050B	
320-54857-6	B-2 {2'-3'}	Total/NA	Solid	3050B	
320-54857-7	B-3 {0'-1'}	Total/NA	Solid	3050B	
320-54857-8	B-3 {1'-2'}	Total/NA	Solid	3050B	
320-54857-9	B-3 {2'-3'}	Total/NA	Solid	3050B	
320-54857-10	B-4 {0'-1'}	Total/NA	Solid	3050B	
320-54857-11	B-4 {1'-2'}	Total/NA	Solid	3050B	
320-54857-12	B-4 {2'-3'}	Total/NA	Solid	3050B	
320-54857-13	B-5 {0'-1'}	Total/NA	Solid	3050B	
320-54857-14	B-5 {1'-2'}	Total/NA	Solid	3050B	
320-54857-15	B-5 {2'-3'}	Total/NA	Solid	3050B	
320-54857-16	B-6 {0'-1'}	Total/NA	Solid	3050B	
320-54857-17	B-6 {1'-2'}	Total/NA	Solid	3050B	
320-54857-18	B-6 {2'-3'}	Total/NA	Solid	3050B	
320-54857-19	B-7 {0'-1'}	Total/NA	Solid	3050B	
MB 320-327715/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-327715/2-A	Lab Control Sample	Total/NA	Solid	3050B	
320-54857-1 MS	B-1 {0'-1'}	Total/NA	Solid	3050B	
320-54857-1 MSD	B-1 {0'-1'}	Total/NA	Solid	3050B	

Prep Batch: 327716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-20	B-7 {1'-2'}	Total/NA	Solid	3050B	
320-54857-21	B-7 {2'-3'}	Total/NA	Solid	3050B	
320-54857-22	B-8 {0'-1'}	Total/NA	Solid	3050B	
320-54857-23	B-8 {1'-2'}	Total/NA	Solid	3050B	
320-54857-24	B-8 {2'-3'}	Total/NA	Solid	3050B	
320-54857-25	B-9 {0'-1'}	Total/NA	Solid	3050B	
320-54857-26	B-9 {1'-2'}	Total/NA	Solid	3050B	
320-54857-27	B-9 {2'-3'}	Total/NA	Solid	3050B	
320-54857-31	B-11 {0'-1'}	Total/NA	Solid	3050B	
320-54857-32	B-11 {1'-2'}	Total/NA	Solid	3050B	
320-54857-33	B-11 {2'-3'}	Total/NA	Solid	3050B	
320-54857-34	B-12 {0'-1'}	Total/NA	Solid	3050B	
320-54857-35	B-12 {1'-2'}	Total/NA	Solid	3050B	
320-54857-36	B-12 {2'-3'}	Total/NA	Solid	3050B	
320-54857-37	B-13 {0'-1'}	Total/NA	Solid	3050B	
320-54857-38	B-13 {1'-2'}	Total/NA	Solid	3050B	
320-54857-39	B-13 {2'-3'}	Total/NA	Solid	3050B	
320-54857-41	B-14 {1'-2'}	Total/NA	Solid	3050B	
320-54857-42	B-14 {2'-3'}	Total/NA	Solid	3050B	
MB 320-327716/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-327716/2-A	Lab Control Sample	Total/NA	Solid	3050B	
320-54857-20 MS	B-7 {1'-2'}	Total/NA	Solid	3050B	
320-54857-20 MSD	B-7 {1'-2'}	Total/NA	Solid	3050B	

QC Association Summary

Metals

Prep Batch: 330966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-40	B-14 {0'-1'}	Total/NA	Solid	3050B	
320-54857-43	B-15 {0'-1'}	Total/NA	Solid	3050B	
320-54857-44	B-15 {1'-2'}	Total/NA	Solid	3050B	
320-54857-45	B-15 {2'-3'}	Total/NA	Solid	3050B	
320-54857-46	B-16 {0'-1'}	Total/NA	Solid	3050B	
320-54857-47	B-16 {1'-2'}	Total/NA	Solid	3050B	
320-54857-48	B-16 {2'-3'}	Total/NA	Solid	3050B	
MB 320-330966/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-330966/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 331075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-1	B-1 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-2	B-1 {1'-2'}	Total/NA	Solid	6020	327715
320-54857-3	B-1 {2'-3'}	Total/NA	Solid	6020	327715
320-54857-4	B-2 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-5	B-2 {1'-2'}	Total/NA	Solid	6020	327715
320-54857-6	B-2 {2'-3'}	Total/NA	Solid	6020	327715
320-54857-7	B-3 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-8	B-3 {1'-2'}	Total/NA	Solid	6020	327715
320-54857-9	B-3 {2'-3'}	Total/NA	Solid	6020	327715
320-54857-10	B-4 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-11	B-4 {1'-2'}	Total/NA	Solid	6020	327715
320-54857-12	B-4 {2'-3'}	Total/NA	Solid	6020	327715
320-54857-13	B-5 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-14	B-5 {1'-2'}	Total/NA	Solid	6020	327715
320-54857-15	B-5 {2'-3'}	Total/NA	Solid	6020	327715
320-54857-16	B-6 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-17	B-6 {1'-2'}	Total/NA	Solid	6020	327715
320-54857-18	B-6 {2'-3'}	Total/NA	Solid	6020	327715
320-54857-19	B-7 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-20	B-7 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-21	B-7 {2'-3'}	Total/NA	Solid	6020	327716
320-54857-22	B-8 {0'-1'}	Total/NA	Solid	6020	327716
320-54857-23	B-8 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-24	B-8 {2'-3'}	Total/NA	Solid	6020	327716
320-54857-25	B-9 {0'-1'}	Total/NA	Solid	6020	327716
320-54857-26	B-9 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-27	B-9 {2'-3'}	Total/NA	Solid	6020	327716
320-54857-31	B-11 {0'-1'}	Total/NA	Solid	6020	327716
320-54857-32	B-11 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-33	B-11 {2'-3'}	Total/NA	Solid	6020	327716
320-54857-34	B-12 {0'-1'}	Total/NA	Solid	6020	327716
320-54857-35	B-12 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-36	B-12 {2'-3'}	Total/NA	Solid	6020	327716
320-54857-37	B-13 {0'-1'}	Total/NA	Solid	6020	327716
320-54857-38	B-13 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-39	B-13 {2'-3'}	Total/NA	Solid	6020	327716
320-54857-41	B-14 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-42	B-14 {2'-3'}	Total/NA	Solid	6020	327716
MB 320-327715/1-A	Method Blank	Total/NA	Solid	6020	327715

Metals (Continued)

Analysis Batch: 331075 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-327716/1-A	Method Blank	Total/NA	Solid	6020	327716
LCS 320-327715/2-A	Lab Control Sample	Total/NA	Solid	6020	327715
LCS 320-327716/2-A	Lab Control Sample	Total/NA	Solid	6020	327716
320-54857-1 MS	B-1 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-1 MSD	B-1 {0'-1'}	Total/NA	Solid	6020	327715
320-54857-20 MS	B-7 {1'-2'}	Total/NA	Solid	6020	327716
320-54857-20 MSD	B-7 {1'-2'}	Total/NA	Solid	6020	327716

Analysis Batch: 331729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-40	B-14 {0'-1'}	Total/NA	Solid	6020	330966
320-54857-43	B-15 {0'-1'}	Total/NA	Solid	6020	330966
320-54857-44	B-15 {1'-2'}	Total/NA	Solid	6020	330966
320-54857-45	B-15 {2'-3'}	Total/NA	Solid	6020	330966
320-54857-46	B-16 {0'-1'}	Total/NA	Solid	6020	330966
320-54857-47	B-16 {1'-2'}	Total/NA	Solid	6020	330966
320-54857-48	B-16 {2'-3'}	Total/NA	Solid	6020	330966
MB 320-330966/1-A	Method Blank	Total/NA	Solid	6020	330966
LCS 320-330966/2-A	Lab Control Sample	Total/NA	Solid	6020	330966

Prep Batch: 332400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-28	B-10 {0'-1'}	Total/NA	Solid	3050B	
320-54857-29	B-10 {1'-2'}	Total/NA	Solid	3050B	
320-54857-30	B-10 {2'-3'}	Total/NA	Solid	3050B	
MB 320-332400/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-332400/2-A	Lab Control Sample	Total/NA	Solid	3050B	
320-54857-29 MS	B-10 {1'-2'}	Total/NA	Solid	3050B	
320-54857-29 MSD	B-10 {1'-2'}	Total/NA	Solid	3050B	

Analysis Batch: 332694

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-28	B-10 {0'-1'}	Total/NA	Solid	6020	332400
320-54857-29	B-10 {1'-2'}	Total/NA	Solid	6020	332400
320-54857-30	B-10 {2'-3'}	Total/NA	Solid	6020	332400
MB 320-332400/1-A	Method Blank	Total/NA	Solid	6020	332400
LCS 320-332400/2-A	Lab Control Sample	Total/NA	Solid	6020	332400
320-54857-29 MS	B-10 {1'-2'}	Total/NA	Solid	6020	332400
320-54857-29 MSD	B-10 {1'-2'}	Total/NA	Solid	6020	332400

General Chemistry

Leach Batch: 329955

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-1	B-1 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-2	B-1 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-3	B-1 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-4	B-2 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-5	B-2 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-6	B-2 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-7	B-3 {0'-1'}	Soluble	Solid	DI Leach	

QC Association Summary

General Chemistry (Continued)

Leach Batch: 329955 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-8	B-3 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-9	B-3 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-10	B-4 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-1 DU	B-1 {0'-1'}	Soluble	Solid	DI Leach	

Analysis Batch: 329984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-1	B-1 {0'-1'}	Soluble	Solid	9045C	329955
320-54857-2	B-1 {1'-2'}	Soluble	Solid	9045C	329955
320-54857-3	B-1 {2'-3'}	Soluble	Solid	9045C	329955
320-54857-4	B-2 {0'-1'}	Soluble	Solid	9045C	329955
320-54857-5	B-2 {1'-2'}	Soluble	Solid	9045C	329955
320-54857-6	B-2 {2'-3'}	Soluble	Solid	9045C	329955
320-54857-7	B-3 {0'-1'}	Soluble	Solid	9045C	329955
320-54857-8	B-3 {1'-2'}	Soluble	Solid	9045C	329955
320-54857-9	B-3 {2'-3'}	Soluble	Solid	9045C	329955
320-54857-10	B-4 {0'-1'}	Soluble	Solid	9045C	329955
LCS 320-329984/2	Lab Control Sample	Total/NA	Solid	9045C	
320-54857-1 DU	B-1 {0'-1'}	Soluble	Solid	9045C	329955

Leach Batch: 330048

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-11	B-4 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-12	B-4 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-13	B-5 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-14	B-5 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-15	B-5 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-17	B-6 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-18	B-6 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-19	B-7 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-20	B-7 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-21	B-7 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-11 DU	B-4 {1'-2'}	Soluble	Solid	DI Leach	

Analysis Batch: 330073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-11	B-4 {1'-2'}	Soluble	Solid	9045C	330048
320-54857-12	B-4 {2'-3'}	Soluble	Solid	9045C	330048
320-54857-13	B-5 {0'-1'}	Soluble	Solid	9045C	330048
320-54857-14	B-5 {1'-2'}	Soluble	Solid	9045C	330048
320-54857-15	B-5 {2'-3'}	Soluble	Solid	9045C	330048
320-54857-17	B-6 {1'-2'}	Soluble	Solid	9045C	330048
320-54857-18	B-6 {2'-3'}	Soluble	Solid	9045C	330048
320-54857-19	B-7 {0'-1'}	Soluble	Solid	9045C	330048
320-54857-20	B-7 {1'-2'}	Soluble	Solid	9045C	330048
320-54857-21	B-7 {2'-3'}	Soluble	Solid	9045C	330048
LCS 320-330073/2	Lab Control Sample	Total/NA	Solid	9045C	
320-54857-11 DU	B-4 {1'-2'}	Soluble	Solid	9045C	330048

QC Association Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

General Chemistry

Leach Batch: 330315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-22	B-8 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-23	B-8 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-24	B-8 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-25	B-9 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-26	B-9 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-27	B-9 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-31	B-11 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-32	B-11 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-33	B-11 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-34	B-12 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-22 DU	B-8 {0'-1'}	Soluble	Solid	DI Leach	

Analysis Batch: 330323

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-22	B-8 {0'-1'}	Soluble	Solid	9045C	330315
320-54857-23	B-8 {1'-2'}	Soluble	Solid	9045C	330315
320-54857-24	B-8 {2'-3'}	Soluble	Solid	9045C	330315
320-54857-25	B-9 {0'-1'}	Soluble	Solid	9045C	330315
320-54857-26	B-9 {1'-2'}	Soluble	Solid	9045C	330315
320-54857-27	B-9 {2'-3'}	Soluble	Solid	9045C	330315
320-54857-31	B-11 {0'-1'}	Soluble	Solid	9045C	330315
320-54857-32	B-11 {1'-2'}	Soluble	Solid	9045C	330315
320-54857-33	B-11 {2'-3'}	Soluble	Solid	9045C	330315
320-54857-34	B-12 {0'-1'}	Soluble	Solid	9045C	330315
LCS 320-330323/2	Lab Control Sample	Total/NA	Solid	9045C	
320-54857-22 DU	B-8 {0'-1'}	Soluble	Solid	9045C	330315

Leach Batch: 330729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-35	B-12 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-36	B-12 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-37	B-13 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-38	B-13 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-39	B-13 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-44	B-15 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-45	B-15 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-46	B-16 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-47	B-16 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-48	B-16 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-48 DU	B-16 {2'-3'}	Soluble	Solid	DI Leach	

Analysis Batch: 330744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-35	B-12 {1'-2'}	Soluble	Solid	9045C	330729
320-54857-36	B-12 {2'-3'}	Soluble	Solid	9045C	330729
320-54857-37	B-13 {0'-1'}	Soluble	Solid	9045C	330729
320-54857-38	B-13 {1'-2'}	Soluble	Solid	9045C	330729
320-54857-39	B-13 {2'-3'}	Soluble	Solid	9045C	330729
320-54857-44	B-15 {1'-2'}	Soluble	Solid	9045C	330729
320-54857-45	B-15 {2'-3'}	Soluble	Solid	9045C	330729
320-54857-46	B-16 {0'-1'}	Soluble	Solid	9045C	330729

General Chemistry (Continued)

Analysis Batch: 330744 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-47	B-16 {1'-2'}	Soluble	Solid	9045C	330729
320-54857-48	B-16 {2'-3'}	Soluble	Solid	9045C	330729
LCS 320-330744/2	Lab Control Sample	Total/NA	Solid	9045C	
320-54857-48 DU	B-16 {2'-3'}	Soluble	Solid	9045C	330729

Leach Batch: 330782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-40	B-14 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-41	B-14 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-42	B-14 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-40 DU	B-14 {0'-1'}	Soluble	Solid	DI Leach	

Analysis Batch: 330784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-40	B-14 {0'-1'}	Soluble	Solid	9045C	330782
320-54857-41	B-14 {1'-2'}	Soluble	Solid	9045C	330782
320-54857-42	B-14 {2'-3'}	Soluble	Solid	9045C	330782
LCS 320-330784/2	Lab Control Sample	Total/NA	Solid	9045C	
320-54857-40 DU	B-14 {0'-1'}	Soluble	Solid	9045C	330782

Leach Batch: 331752

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-28	B-10 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-29	B-10 {1'-2'}	Soluble	Solid	DI Leach	
320-54857-30	B-10 {2'-3'}	Soluble	Solid	DI Leach	
320-54857-43	B-15 {0'-1'}	Soluble	Solid	DI Leach	
320-54857-30 DU	B-10 {2'-3'}	Soluble	Solid	DI Leach	

Analysis Batch: 331755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-28	B-10 {0'-1'}	Soluble	Solid	9045C	331752
320-54857-29	B-10 {1'-2'}	Soluble	Solid	9045C	331752
320-54857-30	B-10 {2'-3'}	Soluble	Solid	9045C	331752
320-54857-43	B-15 {0'-1'}	Soluble	Solid	9045C	331752
LCS 320-331755/2	Lab Control Sample	Total/NA	Solid	9045C	
320-54857-30 DU	B-10 {2'-3'}	Soluble	Solid	9045C	331752

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-1 {0'-1'}

Date Collected: 09/30/19 07:00
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.99 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 15:33	DPM	TAL SAC
Soluble	Leach	DI Leach			20.15 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-1 {1'-2'}

Date Collected: 09/30/19 07:00
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.05 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 15:47	DPM	TAL SAC
Soluble	Leach	DI Leach			20.17 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-1 {2'-3'}

Date Collected: 09/30/19 07:00
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.24 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 15:50	DPM	TAL SAC
Soluble	Leach	DI Leach			20.64 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-2 {0'-1'}

Date Collected: 09/30/19 07:30
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.96 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:06	DPM	TAL SAC
Soluble	Leach	DI Leach			19.88 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-2 {1'-2'}

Date Collected: 09/30/19 07:33
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-5
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.78 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:09	DPM	TAL SAC
Soluble	Leach	DI Leach			20.05 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-2 {2'-3'}

Lab Sample ID: 320-54857-6

Date Collected: 09/30/19 07:30

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.03 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:12	DPM	TAL SAC
Soluble	Leach	DI Leach			20.04 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-3 {0'-1'}

Lab Sample ID: 320-54857-7

Date Collected: 09/30/19 08:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.01 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:14	DPM	TAL SAC
Soluble	Leach	DI Leach			19.53 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-3 {1'-2'}

Lab Sample ID: 320-54857-8

Date Collected: 09/30/19 08:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.01 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:17	DPM	TAL SAC
Soluble	Leach	DI Leach			20.38 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-3 {2'-3'}

Lab Sample ID: 320-54857-9

Date Collected: 09/30/19 08:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.03 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:33	DPM	TAL SAC
Soluble	Leach	DI Leach			20.12 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Client Sample ID: B-4 {0'-1'}

Lab Sample ID: 320-54857-10

Date Collected: 09/30/19 08:30

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.03 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:36	DPM	TAL SAC
Soluble	Leach	DI Leach			19.92 g	20 mL	329955	10/10/19 11:17	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329984	10/10/19 12:55	HRB	TAL SAC

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-4 {1'-2'}

Lab Sample ID: 320-54857-11

Date Collected: 09/30/19 08:30
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.03 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:39	DPM	TAL SAC
Soluble	Leach	DI Leach			20.34 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-4 {2'-3'}

Lab Sample ID: 320-54857-12

Date Collected: 09/30/19 08:30
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.02 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:42	DPM	TAL SAC
Soluble	Leach	DI Leach			20.27 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-5 {0'-1'}

Lab Sample ID: 320-54857-13

Date Collected: 09/30/19 09:00
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.95 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:45	DPM	TAL SAC
Soluble	Leach	DI Leach			19.92 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-5 {1'-2'}

Lab Sample ID: 320-54857-14

Date Collected: 09/30/19 09:00
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.98 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 16:48	DPM	TAL SAC
Soluble	Leach	DI Leach			20.27 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-5 {2'-3'}

Lab Sample ID: 320-54857-15

Date Collected: 09/30/19 09:00
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.05 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:04	DPM	TAL SAC
Soluble	Leach	DI Leach			20.07 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-6 {0'-1'}

Lab Sample ID: 320-54857-16
Date Collected: 09/30/19 10:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.05 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:06	DPM	TAL SAC

Client Sample ID: B-6 {1'-2'}

Lab Sample ID: 320-54857-17
Date Collected: 09/30/19 10:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.08 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:09	DPM	TAL SAC
Soluble	Leach	DI Leach			19.67 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-6 {2'-3'}

Lab Sample ID: 320-54857-18
Date Collected: 09/30/19 10:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.01 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:12	DPM	TAL SAC
Soluble	Leach	DI Leach			20.04 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-7 {0'-1'}

Lab Sample ID: 320-54857-19
Date Collected: 09/30/19 11:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.01 g	100 mL	327715	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:15	DPM	TAL SAC
Soluble	Leach	DI Leach			19.98 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-7 {1'-2'}

Lab Sample ID: 320-54857-20
Date Collected: 09/30/19 11:30
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.05 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:31	DPM	TAL SAC
Soluble	Leach	DI Leach			20.66 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Lab Chronicle

Client: WRECO
Job ID: 320-54857-1
Project/Site: Bell Road Project

Client Sample ID: B-7 {2'-3'}

Lab Sample ID: 320-54857-21
Date Collected: 09/30/19 11:30
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.02 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:45	DPM	TAL SAC
Soluble	Leach	DI Leach			20.62 g	20 mL	330048	10/10/19 14:01	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330073	10/10/19 14:56	HRB	TAL SAC

Client Sample ID: B-8 {0'-1'}

Lab Sample ID: 320-54857-22
Date Collected: 09/30/19 12:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.03 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:47	DPM	TAL SAC
Soluble	Leach	DI Leach			20.216 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-8 {1'-2'}

Lab Sample ID: 320-54857-23
Date Collected: 09/30/19 12:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.00 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 17:50	DPM	TAL SAC
Soluble	Leach	DI Leach			20.683 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-8 {2'-3'}

Lab Sample ID: 320-54857-24
Date Collected: 09/30/19 12:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.04 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:06	DPM	TAL SAC
Soluble	Leach	DI Leach			20.393 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-9 {0'-1'}

Lab Sample ID: 320-54857-25
Date Collected: 09/30/19 01:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.35 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:09	DPM	TAL SAC
Soluble	Leach	DI Leach			20.284 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-9 {1'-2'}

Lab Sample ID: 320-54857-26

Date Collected: 09/30/19 01:00
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.98 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:12	DPM	TAL SAC
Soluble	Leach	DI Leach			20.514 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-9 {2'-3'}

Lab Sample ID: 320-54857-27

Date Collected: 09/30/19 01:00
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.18 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:14	DPM	TAL SAC
Soluble	Leach	DI Leach			20.391 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-10 {0'-1'}

Lab Sample ID: 320-54857-28

Date Collected: 09/30/19 01:30
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.91 g	100 mL	332400	10/21/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			332694	10/21/19 13:50	JMD	TAL SAC
Soluble	Leach	DI Leach			20.26 g	20 mL	331752	10/17/19 13:26	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	331755	10/17/19 14:13	HRB	TAL SAC

Client Sample ID: B-10 {1'-2'}

Lab Sample ID: 320-54857-29

Date Collected: 09/30/19 01:30
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.01 g	100 mL	332400	10/21/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			332694	10/21/19 13:52	JMD	TAL SAC
Soluble	Leach	DI Leach			20.43 g	20 mL	331752	10/17/19 13:26	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	331755	10/17/19 14:13	HRB	TAL SAC

Client Sample ID: B-10 {2'-3'}

Lab Sample ID: 320-54857-30

Date Collected: 09/30/19 01:30
Date Received: 10/01/19 09:10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.04 g	100 mL	332400	10/21/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			332694	10/21/19 14:20	JMD	TAL SAC
Soluble	Leach	DI Leach			19.87 g	20 mL	331752	10/17/19 13:26	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	331755	10/17/19 14:13	HRB	TAL SAC

Lab Chronicle

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Client Sample ID: B-11 {0'-1'}

Lab Sample ID: 320-54857-31

Date Collected: 09/30/19 02:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.41 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:17	DPM	TAL SAC
Soluble	Leach	DI Leach			19.620 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-11 {1'-2'}

Lab Sample ID: 320-54857-32

Date Collected: 09/30/19 02:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.04 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:20	DPM	TAL SAC
Soluble	Leach	DI Leach			19.551 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-11 {2'-3'}

Lab Sample ID: 320-54857-33

Date Collected: 09/30/19 02:00

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.04 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:23	DPM	TAL SAC
Soluble	Leach	DI Leach			20.186 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-12 {0'-1'}

Lab Sample ID: 320-54857-34

Date Collected: 09/30/19 02:15

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.09 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:26	DPM	TAL SAC
Soluble	Leach	DI Leach			20.833 g	20 mL	330315	10/11/19 15:03	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330323	10/11/19 15:46	HRB	TAL SAC

Client Sample ID: B-12 {1'-2'}

Lab Sample ID: 320-54857-35

Date Collected: 09/30/19 02:15

Matrix: Solid

Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.98 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:41	DPM	TAL SAC
Soluble	Leach	DI Leach			19.18 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-12 {2'-3'}

Lab Sample ID: 320-54857-36
Date Collected: 09/30/19 02:15
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.04 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:44	DPM	TAL SAC
Soluble	Leach	DI Leach			20.76 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Client Sample ID: B-13 {0'-1'}

Lab Sample ID: 320-54857-37
Date Collected: 09/30/19 02:30
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.96 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:47	DPM	TAL SAC
Soluble	Leach	DI Leach			20.82 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Client Sample ID: B-13 {1'-2'}

Lab Sample ID: 320-54857-38
Date Collected: 09/30/19 02:30
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.02 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:50	DPM	TAL SAC
Soluble	Leach	DI Leach			20.14 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Client Sample ID: B-13 {2'-3'}

Lab Sample ID: 320-54857-39
Date Collected: 09/30/19 02:30
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.12 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:53	DPM	TAL SAC
Soluble	Leach	DI Leach			20.71 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Client Sample ID: B-14 {0'-1'}

Lab Sample ID: 320-54857-40
Date Collected: 09/30/19 02:45
Matrix: Solid
Date Received: 10/02/19 13:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.04 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:08	DPM	TAL SAC
Soluble	Leach	DI Leach			20.79 g	20 mL	330782	10/14/19 13:46	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330784	10/14/19 14:02	HRB	TAL SAC

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: B-14 {1'-2'}

Lab Sample ID: 320-54857-41

Date Collected: 09/30/19 02:45
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.62 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:56	DPM	TAL SAC
Soluble	Leach	DI Leach			20.01 g	20 mL	330782	10/14/19 13:46	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330784	10/14/19 14:02	HRB	TAL SAC

Client Sample ID: B-14 {2'-3'}

Lab Sample ID: 320-54857-42

Date Collected: 09/30/19 02:45
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.06 g	100 mL	327716	10/02/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331075	10/14/19 18:59	DPM	TAL SAC
Soluble	Leach	DI Leach			20.03 g	20 mL	330782	10/14/19 13:46	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330784	10/14/19 14:02	HRB	TAL SAC

Client Sample ID: B-15 {0'-1'}

Lab Sample ID: 320-54857-43

Date Collected: 09/30/19 03:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.99 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:10	DPM	TAL SAC
Soluble	Leach	DI Leach			19.98 g	20 mL	331752	10/17/19 13:26	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	331755	10/17/19 14:13	HRB	TAL SAC

Client Sample ID: B-15 {1'-2'}

Lab Sample ID: 320-54857-44

Date Collected: 09/30/19 03:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.02 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:13	DPM	TAL SAC
Soluble	Leach	DI Leach			19.93 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Client Sample ID: B-15 {2'-3'}

Lab Sample ID: 320-54857-45

Date Collected: 09/30/19 03:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.39 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:16	DPM	TAL SAC
Soluble	Leach	DI Leach			20.08 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Client Sample ID: B-16 {0'-1'}

Date Collected: 09/30/19 03:30
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-46
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.15 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:19	DPM	TAL SAC
Soluble	Leach	DI Leach			19.88 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Client Sample ID: B-16 {1'-2'}

Date Collected: 09/30/19 03:30
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-47
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.43 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:52	DPM	TAL SAC
Soluble	Leach	DI Leach			19.60 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Client Sample ID: B-16 {2'-3'}

Date Collected: 09/30/19 03:30
Date Received: 10/01/19 09:10

Lab Sample ID: 320-54857-48
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.08 g	100 mL	330966	10/16/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			331729	10/16/19 23:55	DPM	TAL SAC
Soluble	Leach	DI Leach			20.21 g	20 mL	330729	10/14/19 10:58	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	330744	10/14/19 11:38	HRB	TAL SAC

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State Program	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	08-09-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
Arkansas DEQ	State Program	88-0691	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-19
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Maine	State Program	CA0004	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
Nevada	State Program	CA00044	07-31-20
New Hampshire	NELAP	2997	04-20-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
USEPA UCMR	Federal	CA00044	12-31-20
Utah	NELAP	CA00044	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

Laboratory: Eurofins TestAmerica, Pleasanton

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State Program	2496	01-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL SAC
9045C	pH	SW846	TAL SAC
3050B	Preparation, Metals	SW846	TAL SAC
DI Leach	Deionized Water Leaching Procedure	ASTM	TAL SAC

Protocol References:

ASTM = ASTM International

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-54857-1	B-1 {0'-1'}	Solid	09/30/19 07:00	10/01/19 09:10	
320-54857-2	B-1 {1'-2'}	Solid	09/30/19 07:00	10/01/19 09:10	
320-54857-3	B-1 {2'-3'}	Solid	09/30/19 07:00	10/01/19 09:10	
320-54857-4	B-2 {0'-1'}	Solid	09/30/19 07:30	10/01/19 09:10	
320-54857-5	B-2 {1'-2'}	Solid	09/30/19 07:33	10/01/19 09:10	
320-54857-6	B-2 {2'-3'}	Solid	09/30/19 07:30	10/01/19 09:10	
320-54857-7	B-3 {0'-1'}	Solid	09/30/19 08:00	10/01/19 09:10	
320-54857-8	B-3 {1'-2'}	Solid	09/30/19 08:00	10/01/19 09:10	
320-54857-9	B-3 {2'-3'}	Solid	09/30/19 08:00	10/01/19 09:10	
320-54857-10	B-4 {0'-1'}	Solid	09/30/19 08:30	10/01/19 09:10	
320-54857-11	B-4 {1'-2'}	Solid	09/30/19 08:30	10/01/19 09:10	
320-54857-12	B-4 {2'-3'}	Solid	09/30/19 08:30	10/01/19 09:10	
320-54857-13	B-5 {0'-1'}	Solid	09/30/19 09:00	10/01/19 09:10	
320-54857-14	B-5 {1'-2'}	Solid	09/30/19 09:00	10/01/19 09:10	
320-54857-15	B-5 {2'-3'}	Solid	09/30/19 09:00	10/01/19 09:10	
320-54857-16	B-6 {0'-1'}	Solid	09/30/19 10:00	10/01/19 09:10	
320-54857-17	B-6 {1'-2'}	Solid	09/30/19 10:00	10/01/19 09:10	
320-54857-18	B-6 {2'-3'}	Solid	09/30/19 10:00	10/01/19 09:10	
320-54857-19	B-7 {0'-1'}	Solid	09/30/19 11:00	10/01/19 09:10	
320-54857-20	B-7 {1'-2'}	Solid	09/30/19 11:30	10/01/19 09:10	
320-54857-21	B-7 {2'-3'}	Solid	09/30/19 11:30	10/01/19 09:10	
320-54857-22	B-8 {0'-1'}	Solid	09/30/19 12:00	10/01/19 09:10	
320-54857-23	B-8 {1'-2'}	Solid	09/30/19 12:00	10/01/19 09:10	
320-54857-24	B-8 {2'-3'}	Solid	09/30/19 12:00	10/01/19 09:10	
320-54857-25	B-9 {0'-1'}	Solid	09/30/19 01:00	10/01/19 09:10	
320-54857-26	B-9 {1'-2'}	Solid	09/30/19 01:00	10/01/19 09:10	
320-54857-27	B-9 {2'-3'}	Solid	09/30/19 01:00	10/01/19 09:10	
320-54857-28	B-10 {0'-1'}	Solid	09/30/19 01:30	10/01/19 09:10	
320-54857-29	B-10 {1'-2'}	Solid	09/30/19 01:30	10/01/19 09:10	
320-54857-30	B-10 {2'-3'}	Solid	09/30/19 01:30	10/01/19 09:10	
320-54857-31	B-11 {0'-1'}	Solid	09/30/19 02:00	10/01/19 09:10	
320-54857-32	B-11 {1'-2'}	Solid	09/30/19 02:00	10/01/19 09:10	
320-54857-33	B-11 {2'-3'}	Solid	09/30/19 02:00	10/01/19 09:10	
320-54857-34	B-12 {0'-1'}	Solid	09/30/19 02:15	10/01/19 09:10	
320-54857-35	B-12 {1'-2'}	Solid	09/30/19 02:15	10/01/19 09:10	
320-54857-36	B-12 {2'-3'}	Solid	09/30/19 02:15	10/01/19 09:10	
320-54857-37	B-13 {0'-1'}	Solid	09/30/19 02:30	10/01/19 09:10	
320-54857-38	B-13 {1'-2'}	Solid	09/30/19 02:30	10/01/19 09:10	
320-54857-39	B-13 {2'-3'}	Solid	09/30/19 02:30	10/01/19 09:10	
320-54857-40	B-14 {0'-1'}	Solid	09/30/19 02:45	10/02/19 13:35	
320-54857-41	B-14 {1'-2'}	Solid	09/30/19 02:45	10/01/19 09:10	
320-54857-42	B-14 {2'-3'}	Solid	09/30/19 02:45	10/01/19 09:10	
320-54857-43	B-15 {0'-1'}	Solid	09/30/19 03:00	10/01/19 09:10	
320-54857-44	B-15 {1'-2'}	Solid	09/30/19 03:00	10/01/19 09:10	
320-54857-45	B-15 {2'-3'}	Solid	09/30/19 03:00	10/01/19 09:10	
320-54857-46	B-16 {0'-1'}	Solid	09/30/19 03:30	10/01/19 09:10	
320-54857-47	B-16 {1'-2'}	Solid	09/30/19 03:30	10/01/19 09:10	
320-54857-48	B-16 {2'-3'}	Solid	09/30/19 03:30	10/01/19 09:10	

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>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Geologist: Andrew Smith**		
WRECO	Email:Andrew_Smith@WRECO.com	**Site Contact:**	**Date:**
1243 Alpine Road, Suite 108	**Tel: 925-639-0013**	**Lab Contact:**	**Carrier:**
Walnut Creek CA 94596	**Analysis Turnaround Time**		
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS		
Office: 925-941-0017 ext 253	TAT if different from Below ________		
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 2 weeks		
Site: Bell Road I-80 Place County CA	☐ 1 week		
P O #	☐ 2 days		
	☐ 1 day		

COC No:
1 of 2 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020								Sample Specific Notes:
B-1(3'-4') Hold	9/30/2019		G	Soil	1			HOLD																	Hold
B-2(4'-5')			G	Soil	1																				Hold
B-2(3'-4')			G	Soil	1																				Hold
B-3(3'-4')			G	Soil	1																				Hold
B-4 (4'-5')			G	Soil	1																				Hold
B-4 (3'-4')			G	Soil	1																				Hold
B-5(3'-4')			G	Soil	1																				Hold
B-6(4'-5')			G	Soil	1																				Hold
B-6 (3'-4')			G	Soil	1																				Hold
B-7 (3'-4')			G	Soil	1																				Hold
B-8(3'-4')			G	Soil	1																				Hold
B-8(4'-5')			G	Soil	1																				Hold

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ________

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for________ Months

Special Instructions/QC Requirements & Comments:

Hold until Further notice

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:________ Corr'd:________ Therm ID No.:________

Relinquished by:	Company: WRECO	Date/Time: 10/2/19 1330	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

	Project Geologist: Andrew Smith			COC No:
Client Contact	Email:Andrew_Smith@WRECO.com	**Site Contact:**	**Date:**	2 of 2 COCs
WRECO	**Tel: 925-639-0013**	**Lab Contact:**	**Carrier:**	TALS Project #:
1243 Alpine Road, Suite 108	**Analysis Turnaround Time**			Sampler:
Walnut Creek CA 94596	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
Andrew Smith Cell Phone: 925-639-0013	TAT if different from Below ______			Walk-in Client:
Office: 925-941-0017 ext 253	☐ 2 weeks			Lab Sampling:
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 1 week			
Site: Bell Road I-80 Place County CA	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-9 (3'-4') Hold	9/30/2019		G	Soil	1													Hold
B-10 (3'-4')			G	Soil	1													Hold
B-10 (4'-5')			G	Soil	1													Hold
B-11 (3'-4')			G	Soil	1													Hold
B-12 (3'-4')			G	Soil	1													Hold
B-12 (4'-5')			G	Soil	1													Hold
B-13 (3'-4')			G	Soil	1													Hold
B-14 (3'-4')			G	Soil	1													Hold
B-15 (3'-4')			G	Soil	1													Hold
B-16 (3'-4')			G	Soil	1													Hold
			~~G~~	~~Soil~~	~~1~~					AS		10/2/19						~~Hold~~
			G	Soil	1													Hold

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for________ Months

Special Instructions/QC Requirements & Comments:

Hold until Further Notice

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:______ Corr'd:______		Therm ID No.:______
Relinquished by:	Company: WRECO	Date/Time: 10/2/19 1320	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Geologist: Andrew Smith**	**Site Contact:**	**Date:**	COC No:
WRECO	Email:Andrew_Smith@WRECO.com	**Lab Contact:**	**Carrier:**	_____ of _____ COCs
1243 Alpine Road, Suite 108	**Analysis Turnaround Time**			TALS Project #:
Walnut Creek CA 94596	☐ CALENDAR DAYS ☐ WORKING DAYS			Sampler:
Andrew Smith Cell Phone: 925-639-0013	TAT if different from Below ______			**For Lab Use Only:**
Office: 925-941-0017 ext 253	☑ 2 weeks			Walk-in Client:
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 1 week			Lab Sampling:
Site: Bell Road I-80 Place County CA	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Tel: 925-639-0013

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-1 {0'-1'}	9/30/19	7.00am		Soil											X	X		
B-1 {1'-2'}	" "	7:00am		Soil											X	X		
				Soil												X	X	
B-1 {2'-3'}	" "	7:00am		Soil											X	X		
B-2 {0'-1'}	" "	7:30am		Soil											X	X		
				Soil										X	X	X		
B-2 {1'-2'}	" "	7:30am		Soil											X	X		
B-2 {2'-3'}	" "	7:30am		Soil											X	X		
B-3 {0'-1'}	" "	8:00am		Soil											X	X		
B-3 {1'-2'}	" "	8:00am		Soil											X	X		
B-3 {2'-3'}	" "	8:00am		Soil											X	X		
~~B-3 {3'-4'}~~				Soil											X	X		

320-54857 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ______ Corr'd: ______		Therm ID No.: ______
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta SAC MAN 10/10/19	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

eived extra containers. MAN 10/1/19 * All containers doesn't have time and date. MAN 10/1/19

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Geologist: Andrew Smith**	**Site Contact:**	**Date:**
WRECO	Email:Andrew_Smith@WRECO.com	**Lab Contact:**	**Carrier:**
1243 Alpine Road, Suite 108	Tel: 925-639-0013		
Walnut Creek CA 94596	**Analysis Turnaround Time**		
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS		
Office: 925-941-0017 ext 253	TAT if different from Below ________		
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks		
Site: Bell Road I-80 Place County CA	☐ 1 week		
P O #	☐ 2 days		
	☐ 1 day		

COC No:
_____ of _____ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	9/30/19 all samples Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-4 {0'-1'}	8:30am →			Soil											X	X		
B-4 {1'-2'}	8:30am →			Soil											X	X		
~~B-4 {2'-3'}~~	~~8:30am~~ →			Soil												X	X	
B-4 {2'-3'}	8:30am →			Soil											X	X		
B-5 {0'-1'}	9:00am →			Soil											X	X		
				Soil										X	X	X		
B-5 {1'-2'}	9:00am →			Soil											X	X		
B-5 {2'-3'}	9:00am →			Soil											X	X		
B-6 {0'-1'}	10:00am →			Soil											X	X		
B-6 {1'-2'}	10:00am →			Soil											X	X		
B-6 {2'-3'}	10:00am →			Soil											X	X		
B-7 {0'-1'}	11:00am →			Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ________

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for ________ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:________ Corr'd:________ Therm ID No.:________

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Geologist: Andrew Smith		COC No:
WRECO	Email:Andrew_Smith@WRECO.com	Site Contact: / Date:	______ of ______ COCs
1243 Alpine Road, Suite 108	Tel: 925-639-0013	Lab Contact: / Carrier:	TALS Project #:
Walnut Creek CA 94596	**Analysis Turnaround Time**		Sampler:
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS		**For Lab Use Only:**
Office: 925-941-0017 ext 253	TAT if different from Below ______		Walk-in Client:
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		Lab Sampling:
Site: Bell Road I-80 Place County CA			Job / SDG No.:
P O #			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020								Sample Specific Notes:
B-7 {1'-2'}	9/30/19	11:30		Soil											X	X									
B-7 {2'-3'}	" "	11:30		Soil											X	X									
	" "			Soil												X	X								
B-8 {0'-1'}	" "	12:00		Soil											X	X									
B-8 {1'-2'}	" "	12:00		Soil											X	X									
	" "	~~12:00~~		Soil										X	X	X									
B-8 {2'-3'}	" "	12:00		Soil											X	X									
B-9 {0'-1'}	" "	1:00		Soil											X	X									
B-9 {1'-2'}	" "	1:00		Soil											X	X									
B-9 {2'-3'}	" "	1:00		Soil											X	X									
				Soil											X	X									
				Soil											X	X									

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by: Oron Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☐ 2 weeks
☐ 1 week
☑ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020								Sample Specific Notes:
B-10 {0'-1'}	9/30/19	1:30		Soil											X	X	X								
B-10 {1'-2'}	9/30/19	1:30		Soil											X	X	X								
B-10 {2'-3'}	"	1:30		Soil											X	X	X								
B-11 {0'-1'}	"	2:00		Soil											X	X									
B-11 {1'-2'}	"	2:00		Soil											X	X									
B-11 {2'-3'}	"	2:00		Soil											X	X									
B-12 {0'-1'}	"	2:15		Soil											X	X									
B-12 {1'-2'}	"	2:15		Soil											X	X									
B-12 {2'-3'}	"	2:15		Soil											X	X									
B-13 {0'-1'}	"	2:30		Soil											X	X									
B-13 {1'-2'}	"	2:30		Soil											X	X									
B-13 {2'-3'}	"	2:30		Soil											X	X									

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______
Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☐ 2 weeks
☐ 1 week
☑ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020	Sample Specific Notes:
* B-14 {0'-1'}	9/30/19	2:45		Soil											X	X		
B-14 {1'-2'}	9/30/19	2:45		Soil											X	X		
B-14 {2'-3'}	9/30/19	2:45		Soil											X	X		
B-15 {0'-1'}	9/30/19	3:00		Soil											X	X	X	
B-15 {1'-2'}	9/30/19	3:00		Soil											X	X	X	
B-15 {2'-3'}	9/30/19	3:00		Soil											X	X	X	
B-16 {0'-1'}	9/30/19	3:30		Soil											X	X		
B-16 {1'-2'}	9/30/19	3:30		Soil											X	X		
B-16 {2'-3'}	9/30/19	3:30		Soil											X	X		
				Soil														
				Soil														
				Soil														

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______
Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

* Sample not received. MAN 10/1/19

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
____ of ____ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-1 {0'-1'}	9/30/19	7:00am		Soil											X	X		
B-1 {1'-2'}	" "	7:00am		Soil											X	X		
				Soil												X	X	
B-1 {2'-3'}	" "	7:00am		Soil											X	X		
B-2 {0'-1'}	" "	7:30am		Soil											X	X		
				Soil										X	X	X		
B-2 {1'-2'}	" "	7:30am		Soil											X	X		
B-2 {2'-3'}	" "	7:30am		Soil											X	X		
B-3 {0'-1'}	" "	8:00am		Soil											X	X		
B-3 {1'-2'}	" "	8:00am		Soil											X	X		
B-3 {2'-3'}	" "	8:00am		Soil											X	X		
~~B-3 {3'-4'}~~				Soil											X	X		

320-54857 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:______ Corr'd:______ Therm ID No.:______		
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac MAN 10/1/19	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

* Received extra containers. MAN 10/1/19

* All containers doesn't have time and date. MAN 10/1/19

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Project Geologist: Andrew Smith

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	9/30/19 all samples Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020								Sample Specific Notes:
B-4 {0'-1'}	8:30am	→		Soil											X	X									
B-4 {1'-2'}	8:30am	→		Soil											X	X									
~~B-4 {2'-3'}~~	~~8:30am~~	→		Soil												X	X								
B-4 {2'-3'}	8:30am	→		Soil											X	X									
B-5 {0'-1'}	9:00am	→		Soil											X	X									
				Soil										X	X	X									
B-5 {1'-2'}	9:00am	→		Soil											X	X									
B-5 {2'-3'}	9:00am	→		Soil											X	X									
B-6 {0'-1'}	10:00am	→		Soil											X	X									
B-6 {1'-2'}	10:00am	→		Soil											X	X									
B-6 {2'-3'}	10:00am	→		Soil											X	X									
B-7 {0'-1'}	11:00am	→		Soil											X	X									

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ______ Corr'd: ______		Therm ID No.: ______
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Geologist: Andrew Smith			COC No:
	Email:Andrew_Smith@WRECO.com	Site Contact:	Date:	____ of ____ COCs
WRECO	Tel: 925-639-0013	Lab Contact:	Carrier:	TALS Project #:
1243 Alpine Road, Suite 108	Analysis Turnaround Time			Sampler:
Walnut Creek CA 94596	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Andrew Smith Cell Phone: 925-639-0013	TAT if different from Below ________			Walk-in Client:
Office: 925-941-0017 ext 253	☑ 2 weeks			Lab Sampling:
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 1 week			
Site: Bell Road I-80 Place County CA	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020								Sample Specific Notes:
B-7 {1'-2'}	9/30/19	11:30		Soil											X	X									
3-7 {2'-3'}	" "	11:30		Soil											X	X									
	" "			Soil												X	X								
B-8 {0'-1'}	" "	12:00		Soil											X	X									
B-8 {1'-2'}	" "	12:00		Soil											X	X									
	" "	~~12:00~~		Soil										X	X	X									
B-8 {2'-3'}	" "	12:00		Soil											X	X									
B-9 {0'-1'}	" "	1:00		Soil											X	X									
B-9 {1'-2'}	" "	1:00		Soil											X	X									
B-9 {2'-3'}	" "	1:00		Soil											X	X									
				Soil											X	X									
				Soil											X	X									

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____________

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for ________ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ________ Corr'd: ________		Therm ID No.: ________
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sae	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

14 13 12 11 10 9 8 7 6 5 4 3 2 1

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

COC No:
_____ of _____ COCs

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☐ 2 weeks
☐ 1 week
☑ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020	Sample Specific Notes:
B-10 {0'-1'}	9/30/19	1:30		Soil											X	X	X	
B-10 {1'-2'}	9/30/19	1:30		Soil											X	X	X	
B-10 {2'-3'}	"	1:30		Soil											X	X	X	
B-11 {0'-1'}	"	2:00		Soil											X	X		
B-11 {1'-2'}	"	2:00		Soil											X	X		
B-11 {2'-3'}	"	2:00		Soil											X	X		
B-12 {0'-1'}	"	2:15		Soil											X	X		
B-12 {1'-2'}	"	2:15		Soil											X	X		
B-12 {2'-3'}	"	2:15		Soil											X	X		
B-13 {0'-1'}	"	2:30		Soil											X	X		
B-13 {1'-2'}	"	2:30		Soil											X	X		
B-13 {2'-3'}	"	2:30		Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______
Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Geologist: Andrew Smith	Site Contact:	Date:	COC No:
WRECO	Email:Andrew_Smith@WRECO.com			____ of ____ COCs
1243 Alpine Road, Suite 108	Tel: 925-639-0013	Lab Contact:	Carrier:	TALS Project #:
Walnut Creek CA 94596	Analysis Turnaround Time			Sampler:
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Office: 925-941-0017 ext 253	TAT if different from Below ______			Walk-in Client:
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 2 weeks ☐ 1 week			Lab Sampling:
Site: Bell Road I-80 Place County CA	☑ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020	Sample Specific Notes:
* B-14 {0'-1'}	9/30/19	2:45		Soil											X	X		
B-14 {1'-2'}	9/30/19	2:45		Soil											X	X		
B-14 {2'-3'}	9/30/19	2:45		Soil											X	X		
B-15 {0'-1'}	9/30/19	3:00		Soil											X	X	X	
B-15 {1'-2'}	9/30/19	3:00		Soil											X	X	X	
B-15 {2'-3'}	9/30/19	3:00		Soil											X	X	X	
B-16 {0'-1'}	9/30/19	3:30		Soil											X	X		
B-16 {1'-2'}	9/30/19	3:30		Soil											X	X		
B-16 {2'-3'}	9/30/19	3:30		Soil											X	X		
				Soil														
				Soil														
				Soil														

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ______ Corr'd: ______		Therm ID No.:
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

* Sample not received. MAN 10/1/19

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

Login Sample Receipt Checklist

Client: WRECO
Job Number: 320-54857-1

Login Number: 54857
List Source: Eurofins TestAmerica, Sacramento
List Number: 1
Creator: Nuval, Mark-Anthony M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Environment Testing
TestAmerica

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ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-54857-4
Client Project/Site: Bell Road Project

For:
WRECO
1243 Alpine Road
Suite 108
Walnut Creek, California 94596

Attn: Ms. Melissa McAssey

Authorized for release by:
11/15/2019 2:50:00 PM

Criselda Caparas, Project Manager I
(925)484-1919
criselda.caparas@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-54857-4

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-54857-4

Comments
No additional comments.

Receipt
The samples were received on 10/1/2019 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 5.2º C, 5.8º C and 14.6º C.

GC Semi VOA
Methods 8141A, 8141B: The continuing calibration verification (CCV) associated with batch 280-477127 recovered outside acceptance criteria, low biased, for Chlormefos on the back column. The recovery of Chlormefos on the front column is in control, therefore, will be reported primarily from the front column.

3 CCV: Front column in control, back column -22.1% limit 15%
14 CCV: Front column in control, back column -20.2% limit 15%
26 CCV: Front column in control, back column -30.1% limit 15%
37 CCV: Front column in control, back column -19.7% limit 15%
48 CCV: Front column in control, back column -22.8% limit 15%

8141 analytical batch 280-477127

Method 8141A: The continuing calibration verification (CCV) associated with batch 280-477127 recovered above the upper control limit, see below for list of analytes per CCV. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74), B-1-COMP (320-54857-77), B-14-COMP (320-54857-78), (CCV 280-477127/14), (CCV 280-477127/26), (CCV 280-477127/37), (CCVIS 280-477127/3), (320-54857-D-71-E MS) and (320-54857-D-71-F MSD).

3 CCV back column:
Fenthion 44.1% limit 15%
Merphos 40.2% limit 15%
Mevinphos 17.2% limit 15%
Ronnel 19.9% limit 15%

14 CCV back column:
Merphos 56.3% limit 15%
Mevinphos 18.2% limit 15%
Ronnel 15.1% limit 15%
Sulfotepp 46% limit 15%

26 CCV back column
Merphos 56% limit 15%

37 CCV front column
Dichlorvos 19% limit 15%
Coumaphos 18.7% limit 15%

37 CCV back column
Merphos 58.5% limit 15%

48 CCV front column
Dichlorvos 21.3% limit 15%

48 CCV back column

Job ID: 320-54857-4 (Continued)

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

Fenthion 19.2% limit 15%
Merphos 69.9% limit 15%
Ronnel 17.3% limit 15%
Sulfotepp 37.7% limit 15%

8141 preparation batch 280-476441 and analytical batch 280-477127

Method 8141A: The continuing calibration verification (CCV) associated with batch 280-477127 recovered outside acceptance criteria, low biased, see specific analytes per CCV below . A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were non-detect for this analyte, the data have been reported. B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74), B-1-COMP (320-54857-77), B-14-COMP (320-54857-78), (CCV 280-477127/14), (CCV 280-477127/26), (CCV 280-477127/37), (CCVIS 280-477127/3), (320-54857-D-71-E MS) and (320-54857-D-71-F MSD)

3 CCV back column:
Methyl parathion -15.1% limit 15%
Phorate -18.1% limit 15%
Simazine -34% limit 15%
Diazinon -18.3% limit 15%
Dimethoate -16.7% limit 15%

14 CCV back column
Malathion -15.8% limit 15%
Methyl parathion -16.9% limit 15%
Simazine -28.1% limit 15%
Diazinon -15.6% limit 15%

26 CCV Front column
Bolstar -20.3% limit 15%
Chlorpyrifos -19.8% limit 15%
Ethyl Parathion -23.2% limit 15%
Merphos -18% limit 15%
Malathion -15.9% limit 15%
Ronnel -15.4% limit 15%
Tetrachlorvinphos (Stirophos) -18.9% limit 15%
Tokuthion -19.8% limit 15%
Methyl parathion -15.9% limit 15%

26 CCV back column
Chlorpyrifos -16.8% limit 15%
Malathion -19.4% limit 15%
Ronnel -15.4% limit 15%
Tetrachlorvinphos (Stirophos) -15.9% limit 15%
Tokuthion -15.6% limit 15%
Methyl parathion -22.5% limit 15%
Phorate -27.5% limit 15%
Simazine -41.4% limit 15%
Thionazin -18.7% limit 15%
Trichloronate -15.7% limit 15%
Diazinon -28.4% limit 15%
Dimethoate -25% limit 15%

37 CCV front column:
Disulfoton -15.3% limit 15%

37 CCV back column

Job ID: 320-54857-4 (Continued)

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

Phorate -16% limit 15%
Diazinon -18.4% limit 15%
Dimethoate -15.9% limit 15%
Simazine -33.4% limit 15%

48 CCV front column
Merphos -19.1% limit 15%

48 CCV back column
Phorate -17% limit 15%
Diazinon -18.4% limit 15%
Simazine -30.8% limit 15%

8141 preparation batch 280-476441 and analytical batch 280-477127

Method 8141A: The continuing calibration verification (CCV) associated with batch 280-477127 recovered outside acceptance criteria, low biased, for Ethyl Parathion on the front column. The recovery of Ethyl Parathion on the back column is in control, therefore, will be reported primarily from the back column for this analyte. B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74), B-1-COMP (320-54857-77), B-14-COMP (320-54857-78), (CCV 280-477127/14), (CCV 280-477127/26), (CCV 280-477127/37), (CCVIS 280-477127/3), (LCS 280-476441/2-A), (MB 280-476441/1-A), (320-54857-D-71-E MS) and (320-54857-D-71-F MSD)

3 CCV: Front column -15.7% limit 15%, back column in control
26 CCV: Front column -23.2% limit 15%, back column in control

8141

Method 8141A: The following samples were diluted due to the nature of the sample matrix: B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74), B-1-COMP (320-54857-77), B-14-COMP (320-54857-78), (320-54857-D-71-E MS) and (320-54857-D-71-F MSD). Elevated reporting limits (RLs) are provided. Method 8141A

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method 6020: The following samples were diluted due to the nature of the sample matrix: B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-14-COMP (320-54857-78), (LB4 320-335762/1-A ^50) and (LCS 320-335762/2-A ^50). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method 3540C: The following samples was prepared outside of preparation holding time due to an unanticipated amount of samples.

B-2-COMP (320-54857-71), B-3-COMP (320-54857-72), B-13-COMP (320-54857-74), B-1-COMP (320-54857-77), B-14-COMP (320-54857-78), (320-54857-D-71 MS) and (320-54857-D-71 MSD)

preparation batch 280-476441
Method: 3540/8141

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

Client Sample ID: B-2-COMP

Lab Sample ID: 320-54857-71

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.053		0.050	0.050	mg/L	50		6020	STLC Citrate

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.11		0.050	0.050	mg/L	50		6020	STLC Citrate

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74

No Detections.

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77

No Detections.

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	0.071		0.050	0.050	mg/L	50		6020	STLC Citrate

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-2-COMP

Lab Sample ID: 320-54857-71

Date Collected: 09/30/19 00:00

Matrix: Solid

Date Received: 10/01/19 09:10

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	ND	H F2	0.067	0.047	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Azinphos-methyl	ND	H F1	0.086	0.086	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Bolstar	ND	H	0.042	0.042	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Chlorpyrifos	ND	H	0.064	0.064	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Coumaphos	ND	H	0.028	0.028	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Demeton, Total	ND	H F1	0.075	0.075	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Diazinon	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Dichlorvos	ND	H	0.044	0.044	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Dimethoate	ND	H	0.070	0.070	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Disulfoton	ND	H F1	0.077	0.077	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
EPN	ND	H	0.037	0.037	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Ethoprop	ND	H F1	0.049	0.049	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Ethyl Parathion	ND	H	0.053	0.053	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Famphur	ND	H	0.032	0.032	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Fensulfothion	ND	H	0.030	0.030	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Fenthion	ND	H	0.033	0.026	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Malathion	ND	H	0.046	0.046	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Merphos	ND	H F1	0.084	0.084	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Methyl parathion	ND	H	0.063	0.063	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Mevinphos	ND	H	0.046	0.046	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Phorate	ND	H	0.057	0.057	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Propazine	ND	H F1	0.086	0.086	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Ronnel	ND	H	0.046	0.029	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Simazine	ND	H	0.067	0.055	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Sulfotepp	ND	H	0.062	0.062	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Thionazin	ND	H	0.023	0.023	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Tokuthion	ND	H	0.039	0.039	mg/Kg		11/04/19 19:05	11/12/19 08:57	10
Trichloronate	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 08:57	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Chlormefos	*44*	*D*	*42 - 132*	*11/04/19 19:05*	*11/12/19 08:57*	*10*
Triphenylphosphate	*56*	*D*	*47 - 161*	*11/04/19 19:05*	*11/12/19 08:57*	*10*

Method: 6020 - Metals (ICP/MS) - STLC Citrate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**0.053**		0.050	0.050	mg/L			11/14/19 18:21	50

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72

Date Collected: 09/30/19 00:00

Matrix: Solid

Date Received: 10/01/19 09:10

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	ND	H	0.067	0.046	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Azinphos-methyl	ND	H	0.086	0.086	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Bolstar	ND	H	0.042	0.042	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Chlorpyrifos	ND	H	0.064	0.064	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Coumaphos	ND	H	0.028	0.028	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Demeton, Total	ND	H	0.074	0.074	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Diazinon	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 10:54	10

Client Sample Results

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72

Date Collected: 09/30/19 00:00
Date Received: 10/01/19 09:10
Matrix: Solid

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorvos	ND	H	0.043	0.043	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Dimethoate	ND	H	0.070	0.070	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Disulfoton	ND	H	0.076	0.076	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
EPN	ND	H	0.036	0.036	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Ethoprop	ND	H	0.049	0.049	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Ethyl Parathion	ND	H	0.052	0.052	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Famphur	ND	H	0.032	0.032	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Fensulfothion	ND	H	0.030	0.030	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Fenthion	ND	H	0.033	0.026	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Malathion	ND	H	0.046	0.046	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Merphos	ND	H	0.083	0.083	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Methyl parathion	ND	H	0.063	0.063	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Mevinphos	ND	H	0.046	0.046	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Phorate	ND	H	0.056	0.056	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Propazine	ND	H	0.085	0.085	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Ronnel	ND	H	0.046	0.028	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Simazine	ND	H	0.067	0.055	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Sulfotepp	ND	H	0.062	0.062	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Thionazin	ND	H	0.023	0.023	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Tokuthion	ND	H	0.039	0.039	mg/Kg		11/04/19 19:05	11/12/19 10:54	10
Trichloronate	ND	H	0.026	0.026	mg/Kg		11/04/19 19:05	11/12/19 10:54	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Chlormefos	*62*	*D*	*42 - 132*	*11/04/19 19:05*	*11/12/19 10:54*	*10*
Triphenylphosphate	*77*	*D*	*47 - 161*	*11/04/19 19:05*	*11/12/19 10:54*	*10*

Method: 6020 - Metals (ICP/MS) - STLC Citrate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**0.11**		0.050	0.050	mg/L			11/14/19 18:33	50

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74

Date Collected: 09/30/19 00:00
Date Received: 10/01/19 09:10
Matrix: Solid

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	ND	H	0.067	0.046	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Azinphos-methyl	ND	H	0.084	0.084	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Bolstar	ND	H	0.041	0.041	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Chlorpyrifos	ND	H	0.063	0.063	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Coumaphos	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Demeton, Total	ND	H	0.073	0.073	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Diazinon	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Dichlorvos	ND	H	0.043	0.043	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Dimethoate	ND	H	0.069	0.069	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Disulfoton	ND	H	0.075	0.075	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
EPN	ND	H	0.036	0.036	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Ethoprop	ND	H	0.048	0.048	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Ethyl Parathion	ND	H	0.052	0.052	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Famphur	ND	H	0.031	0.031	mg/Kg		11/04/19 19:05	11/12/19 12:52	10

Client Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fensulfothion	ND	H	0.030	0.030	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Fenthion	ND	H	0.033	0.025	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Malathion	ND	H	0.045	0.045	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Merphos	ND	H	0.082	0.082	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Methyl parathion	ND	H	0.062	0.062	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Mevinphos	ND	H	0.045	0.045	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Phorate	ND	H	0.056	0.056	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Propazine	ND	H	0.084	0.084	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Ronnel	ND	H	0.046	0.028	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Simazine	ND	H	0.067	0.054	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Sulfotepp	ND	H	0.061	0.061	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Thionazin	ND	H	0.023	0.023	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Tokuthion	ND	H	0.038	0.038	mg/Kg		11/04/19 19:05	11/12/19 12:52	10
Trichloronate	ND	H	0.026	0.026	mg/Kg		11/04/19 19:05	11/12/19 12:52	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Chlormefos	*52*	*D*	*42 - 132*	*11/04/19 19:05*	*11/12/19 12:52*	*10*
Triphenylphosphate	*56*	*D*	*47 - 161*	*11/04/19 19:05*	*11/12/19 12:52*	*10*

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77
Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	ND	H	0.067	0.046	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Azinphos-methyl	ND	H	0.086	0.086	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Bolstar	ND	H	0.042	0.042	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Chlorpyrifos	ND	H	0.064	0.064	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Coumaphos	ND	H	0.028	0.028	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Demeton, Total	ND	H	0.075	0.075	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Diazinon	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Dichlorvos	ND	H	0.043	0.043	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Dimethoate	ND	H	0.070	0.070	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Disulfoton	ND	H	0.077	0.077	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
EPN	ND	H	0.037	0.037	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Ethoprop	ND	H	0.049	0.049	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Ethyl Parathion	ND	H	0.053	0.053	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Famphur	ND	H	0.032	0.032	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Fensulfothion	ND	H	0.030	0.030	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Fenthion	ND	H	0.033	0.026	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Malathion	ND	H	0.046	0.046	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Merphos	ND	H	0.084	0.084	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Methyl parathion	ND	H	0.063	0.063	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Mevinphos	ND	H	0.046	0.046	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Phorate	ND	H	0.057	0.057	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Propazine	ND	H	0.086	0.086	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Ronnel	ND	H	0.046	0.029	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Simazine	ND	H	0.067	0.055	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Sulfotepp	ND	H	0.062	0.062	mg/Kg		11/04/19 19:05	11/12/19 13:31	10

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77
Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thionazin	ND	H	0.023	0.023	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Tokuthion	ND	H	0.039	0.039	mg/Kg		11/04/19 19:05	11/12/19 13:31	10
Trichloronate	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 13:31	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Chlormefos	*54*	*D*	*42 - 132*	*11/04/19 19:05*	*11/12/19 13:31*	*10*
Triphenylphosphate	*69*	*D*	*47 - 161*	*11/04/19 19:05*	*11/12/19 13:31*	*10*

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78
Date Collected: 09/30/19 03:30
Matrix: Solid
Date Received: 10/01/19 09:10

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	ND	H	0.067	0.046	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Azinphos-methyl	ND	H	0.084	0.084	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Bolstar	ND	H	0.041	0.041	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Chlorpyrifos	ND	H	0.063	0.063	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Coumaphos	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Demeton, Total	ND	H	0.073	0.073	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Diazinon	ND	H	0.027	0.027	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Dichlorvos	ND	H	0.043	0.043	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Dimethoate	ND	H	0.069	0.069	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Disulfoton	ND	H	0.075	0.075	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
EPN	ND	H	0.036	0.036	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Ethoprop	ND	H	0.048	0.048	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Ethyl Parathion	ND	H	0.051	0.051	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Famphur	ND	H	0.031	0.031	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Fensulfothion	ND	H	0.030	0.030	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Fenthion	ND	H	0.033	0.025	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Malathion	ND	H	0.045	0.045	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Merphos	ND	H	0.082	0.082	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Methyl parathion	ND	H	0.062	0.062	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Mevinphos	ND	H	0.045	0.045	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Phorate	ND	H	0.055	0.055	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Propazine	ND	H	0.084	0.084	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Ronnel	ND	H	0.046	0.028	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Simazine	ND	H	0.067	0.054	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Sulfotepp	ND	H	0.061	0.061	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Thionazin	ND	H	0.022	0.022	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Tokuthion	ND	H	0.038	0.038	mg/Kg		11/04/19 19:05	11/12/19 14:11	10
Trichloronate	ND	H	0.026	0.026	mg/Kg		11/04/19 19:05	11/12/19 14:11	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Chlormefos	*62*	*D*	*42 - 132*	*11/04/19 19:05*	*11/12/19 14:11*	*10*
Triphenylphosphate	*83*	*D*	*47 - 161*	*11/04/19 19:05*	*11/12/19 14:11*	*10*

Method: 6020 - Metals (ICP/MS) - STLC Citrate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**0.071**		0.050	0.050	mg/L			11/14/19 18:37	50

Surrogate Summary

Method: 8141A - Organophosphorous Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		CMF1	TPP1
Lab Sample ID	Client Sample ID	(42-132)	(47-161)
320-54857-71	B-2-COMP	44 D	56 D
320-54857-71 MS	B-2-COMP	52 D	82 D
320-54857-71 MSD	B-2-COMP	49 D	73 D
320-54857-72	B-3-COMP	62 D	77 D
320-54857-74	B-13-COMP	52 D	56 D
320-54857-77	B-1-COMP	54 D	69 D
320-54857-78	B-14-COMP	62 D	83 D
LCS 280-476441/2-A	Lab Control Sample	53	80
MB 280-476441/1-A	Method Blank	42	70

Surrogate Legend

CMF = Chlormefos
TPP = Triphenylphosphate

1
2
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11
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13
14
15

Method: 8141A - Organophosphorous Pesticides (GC)

Lab Sample ID: MB 280-476441/1-A
Matrix: Solid
Analysis Batch: 477127

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 476441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	ND		0.067	0.0047	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Azinphos-methyl	ND		0.018	0.0087	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Bolstar	ND		0.013	0.0042	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Chlorpyrifos	ND		0.020	0.0065	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Coumaphos	ND		0.013	0.0028	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Demeton, Total	ND		0.039	0.0075	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Diazinon	ND		0.022	0.0027	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Dichlorvos	ND		0.023	0.0044	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Dimethoate	ND		0.022	0.0071	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Disulfoton	ND		0.048	0.0077	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
EPN	ND		0.013	0.0037	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Ethoprop	ND		0.015	0.0049	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Ethyl Parathion	ND		0.018	0.0053	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Famphur	ND		0.013	0.0032	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Fensulfothion	ND		0.025	0.0031	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Fenthion	ND		0.033	0.0026	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Malathion	ND		0.015	0.0046	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Merphos	ND		0.030	0.0084	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Methyl parathion	ND		0.020	0.0064	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Mevinphos	ND		0.015	0.0046	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Phorate	ND		0.020	0.0057	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Propazine	ND		0.067	0.0086	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Ronnel	ND		0.046	0.0029	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Simazine	ND		0.067	0.0056	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Sulfotepp	ND		0.020	0.0063	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Thionazin	ND		0.018	0.0023	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Tokuthion	ND		0.020	0.0039	mg/Kg		11/04/19 19:05	11/12/19 07:38	1
Trichloronate	ND		0.020	0.0027	mg/Kg		11/04/19 19:05	11/12/19 07:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Chlormefos	*42*		*42 - 132*	*11/04/19 19:05*	*11/12/19 07:38*	*1*
Triphenylphosphate	*70*		*47 - 161*	*11/04/19 19:05*	*11/12/19 07:38*	*1*

Lab Sample ID: LCS 280-476441/2-A
Matrix: Solid
Analysis Batch: 477127

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 476441

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Atrazine	0.133	0.100		mg/Kg		75	35 - 123
Azinphos-methyl	0.133	0.110		mg/Kg		82	48 - 126
Bolstar	0.133	0.101		mg/Kg		75	48 - 115
Chlorpyrifos	0.133	0.100		mg/Kg		75	48 - 115
Coumaphos	0.133	0.123		mg/Kg		92	57 - 125
Demeton, Total	0.133	0.0871		mg/Kg		65	38 - 100
Diazinon	0.133	0.0988		mg/Kg		74	43 - 115
Dichlorvos	0.133	0.114		mg/Kg		85	37 - 143
Dimethoate	0.133	0.0959		mg/Kg		72	20 - 115
Disulfoton	0.133	0.0735		mg/Kg		55	31 - 98

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Lab Sample ID: LCS 280-476441/2-A
Matrix: Solid
Analysis Batch: 477127

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 476441

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
EPN			0.133	0.0992		mg/Kg		74	47 - 109
Ethoprop			0.133	0.113		mg/Kg		84	44 - 102
Ethyl Parathion			0.133	0.106		mg/Kg		80	49 - 115
Famphur			0.133	0.102		mg/Kg		77	40 - 115
Fensulfothion			0.133	0.104		mg/Kg		78	49 - 115
Fenthion			0.133	0.120		mg/Kg		90	43 - 110
Malathion			0.133	0.0826		mg/Kg		62	41 - 95
Merphos			0.133	0.0700		mg/Kg		52	10 - 93
Methyl parathion			0.133	0.111		mg/Kg		83	46 - 107
Mevinphos			0.133	0.0760		mg/Kg		57	33 - 95
Phorate			0.133	0.0778		mg/Kg		58	33 - 96
Propazine			0.133	0.112		mg/Kg		84	39 - 122
Ronnel			0.133	0.113		mg/Kg		85	50 - 115
Simazine			0.133	0.104		mg/Kg		78	38 - 115
Sulfotepp			0.133	0.101		mg/Kg		76	42 - 115
Thionazin			0.133	0.0935		mg/Kg		70	40 - 108
Tokuthion			0.133	0.0939		mg/Kg		70	50 - 115
Trichloronate			0.133	0.0991		mg/Kg		74	52 - 110

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Chlormefos	*53*		*42 - 132*
Triphenylphosphate	*80*		*47 - 161*

Lab Sample ID: 320-54857-71 MS
Matrix: Solid
Analysis Batch: 477127

Client Sample ID: B-2-COMP
Prep Type: Total/NA
Prep Batch: 476441

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Atrazine	ND	H F2	0.132	0.0856		mg/Kg		65	35 - 123
Azinphos-methyl	ND	H F1	0.132	0.0905		mg/Kg		69	48 - 126
Bolstar	ND	H	0.132	0.108		mg/Kg		82	48 - 115
Chlorpyrifos	ND	H	0.132	0.117		mg/Kg		88	48 - 115
Coumaphos	ND	H	0.132	0.0977		mg/Kg		74	57 - 125
Demeton, Total	ND	H F1	0.132	0.0866		mg/Kg		66	38 - 100
Diazinon	ND	H	0.132	0.0885		mg/Kg		67	43 - 115
Dichlorvos	ND	H	0.132	0.0876		mg/Kg		66	37 - 143
Dimethoate	ND	H	0.132	0.0827		mg/Kg		63	20 - 115
Disulfoton	ND	H F1	0.132	0.0811		mg/Kg		61	31 - 98
EPN	ND	H	0.132	0.101		mg/Kg		76	47 - 109
Ethoprop	ND	H F1	0.132	0.154	F1	mg/Kg		117	44 - 102
Ethyl Parathion	ND	H	0.132	0.104		mg/Kg		79	49 - 115
Famphur	ND	H	0.132	0.142		mg/Kg		107	40 - 115
Fensulfothion	ND	H	0.132	0.0954		mg/Kg		72	49 - 115
Fenthion	ND	H	0.132	0.101		mg/Kg		77	43 - 110
Malathion	ND	H	0.132	0.0646		mg/Kg		49	41 - 95
Merphos	ND	H F1	0.132	ND	F1	mg/Kg		0	10 - 93
Methyl parathion	ND	H	0.132	0.0984		mg/Kg		75	46 - 107
Mevinphos	ND	H	0.132	0.0776		mg/Kg		59	33 - 95

QC Sample Results

Client: WRECO
Job ID: 320-54857-4
Project/Site: Bell Road Project

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Lab Sample ID: 320-54857-71 MS
Client Sample ID: B-2-COMP
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 477127
Prep Batch: 476441

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phorate	ND	H	0.132	0.0818		mg/Kg		62	33 - 96
Propazine	ND	H F1	0.132	ND	F1	mg/Kg		0	39 - 122
Ronnel	ND	H	0.132	0.103		mg/Kg		78	50 - 115
Simazine	ND	H	0.132	0.0868		mg/Kg		66	38 - 115
Sulfotepp	ND	H	0.132	0.0919		mg/Kg		70	42 - 115
Thionazin	ND	H	0.132	0.0977		mg/Kg		74	40 - 108
Tokuthion	ND	H	0.132	0.103		mg/Kg		78	50 - 115
Trichloronate	ND	H	0.132	0.0979		mg/Kg		74	52 - 110

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Chlormefos	*52*	*D*	*42 - 132*
Triphenylphosphate	*82*	*D*	*47 - 161*

Lab Sample ID: 320-54857-71 MSD
Client Sample ID: B-2-COMP
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 477127
Prep Batch: 476441

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Atrazine	ND	H F2	0.128	0.0575	J F2	mg/Kg		45	35 - 123	39	31
Azinphos-methyl	ND	H F1	0.128	ND	F1	mg/Kg		0	48 - 126	NC	21
Bolstar	ND	H	0.128	0.0926		mg/Kg		72	48 - 115	16	30
Chlorpyrifos	ND	H	0.128	0.0962		mg/Kg		75	48 - 115	19	27
Coumaphos	ND	H	0.128	0.0753		mg/Kg		59	57 - 125	26	26
Demeton, Total	ND	H F1	0.128	ND	F1	mg/Kg		0	38 - 100	NC	51
Diazinon	ND	H	0.128	0.0788		mg/Kg		62	43 - 115	12	29
Dichlorvos	ND	H	0.128	0.0711		mg/Kg		56	37 - 143	21	50
Dimethoate	ND	H	0.128	ND	F1	mg/Kg		0	20 - 115	NC	29
Disulfoton	ND	H F1	0.128	ND	F1	mg/Kg		0	31 - 98	NC	35
EPN	ND	H	0.128	0.0844		mg/Kg		66	47 - 109	18	23
Ethoprop	ND	H F1	0.128	0.130		mg/Kg		102	44 - 102	17	34
Ethyl Parathion	ND	H	0.128	0.0875		mg/Kg		69	49 - 115	17	23
Famphur	ND	H	0.128	0.134		mg/Kg		105	40 - 115	6	23
Fensulfothion	ND	H	0.128	0.0836		mg/Kg		65	49 - 115	13	23
Fenthion	ND	H	0.128	0.0878		mg/Kg		69	43 - 110	14	24
Malathion	ND	H	0.128	0.0594		mg/Kg		46	41 - 95	8	23
Merphos	ND	H F1	0.128	ND	F1	mg/Kg		0	10 - 93	NC	25
Methyl parathion	ND	H	0.128	0.0825		mg/Kg		65	46 - 107	18	23
Mevinphos	ND	H	0.128	0.0649		mg/Kg		51	33 - 95	18	52
Phorate	ND	H	0.128	0.0711		mg/Kg		56	33 - 96	14	44
Propazine	ND	H F1	0.128	ND	F1	mg/Kg		0	39 - 122	NC	30
Ronnel	ND	H	0.128	0.0877		mg/Kg		69	50 - 115	16	29
Simazine	ND	H	0.128	0.0639	J	mg/Kg		50	38 - 115	30	43
Sulfotepp	ND	H	0.128	0.0830		mg/Kg		65	42 - 115	10	37
Thionazin	ND	H	0.128	0.0812		mg/Kg		64	40 - 108	18	41
Tokuthion	ND	H	0.128	0.0910		mg/Kg		71	50 - 115	13	30
Trichloronate	ND	H	0.128	0.0823		mg/Kg		64	52 - 110	17	31

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Lab Sample ID: 320-54857-71 MSD
Matrix: Solid
Analysis Batch: 477127

Client Sample ID: B-2-COMP
Prep Type: Total/NA
Prep Batch: 476441

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Chlormefos	*49*	*D*	*42 - 132*
Triphenylphosphate	*73*	*D*	*47 - 161*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: LB4 320-335762/1-A ^50
Matrix: Solid
Analysis Batch: 338730

Client Sample ID: Method Blank
Prep Type: STLC Citrate

Analyte	LB4 Result	LB4 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.050	0.050	mg/L			11/14/19 18:14	50

Lab Sample ID: LCS 320-335762/2-A ^50
Matrix: Solid
Analysis Batch: 338730

Client Sample ID: Lab Control Sample
Prep Type: STLC Citrate

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium			20.0	21.0		mg/L		105	75 - 125		

Lab Sample ID: 320-54857-71 MS
Matrix: Solid
Analysis Batch: 338730

Client Sample ID: B-2-COMP
Prep Type: STLC Citrate

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium	0.053		20.0	20.8		mg/L		104	75 - 125		

Lab Sample ID: 320-54857-71 MSD
Matrix: Solid
Analysis Batch: 338730

Client Sample ID: B-2-COMP
Prep Type: STLC Citrate

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	0.053		20.0	20.7		mg/L		103	75 - 125	0	20

QC Association Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

GC Semi VOA

Prep Batch: 476441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	3540C	
320-54857-72	B-3-COMP	Total/NA	Solid	3540C	
320-54857-74	B-13-COMP	Total/NA	Solid	3540C	
320-54857-77	B-1-COMP	Total/NA	Solid	3540C	
320-54857-78	B-14-COMP	Total/NA	Solid	3540C	
MB 280-476441/1-A	Method Blank	Total/NA	Solid	3540C	
LCS 280-476441/2-A	Lab Control Sample	Total/NA	Solid	3540C	
320-54857-71 MS	B-2-COMP	Total/NA	Solid	3540C	
320-54857-71 MSD	B-2-COMP	Total/NA	Solid	3540C	

Analysis Batch: 477127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	Total/NA	Solid	8141A	476441
320-54857-72	B-3-COMP	Total/NA	Solid	8141A	476441
320-54857-74	B-13-COMP	Total/NA	Solid	8141A	476441
320-54857-77	B-1-COMP	Total/NA	Solid	8141A	476441
320-54857-78	B-14-COMP	Total/NA	Solid	8141A	476441
MB 280-476441/1-A	Method Blank	Total/NA	Solid	8141A	476441
LCS 280-476441/2-A	Lab Control Sample	Total/NA	Solid	8141A	476441
320-54857-71 MS	B-2-COMP	Total/NA	Solid	8141A	476441
320-54857-71 MSD	B-2-COMP	Total/NA	Solid	8141A	476441

Metals

Leach Batch: 335762

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	STLC Citrate	Solid	CA WET Citrate	
320-54857-72	B-3-COMP	STLC Citrate	Solid	CA WET Citrate	
320-54857-78	B-14-COMP	STLC Citrate	Solid	CA WET Citrate	
LB4 320-335762/1-A ^50	Method Blank	STLC Citrate	Solid	CA WET Citrate	
LCS 320-335762/2-A ^50	Lab Control Sample	STLC Citrate	Solid	CA WET Citrate	
320-54857-71 MS	B-2-COMP	STLC Citrate	Solid	CA WET Citrate	
320-54857-71 MSD	B-2-COMP	STLC Citrate	Solid	CA WET Citrate	

Analysis Batch: 338730

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54857-71	B-2-COMP	STLC Citrate	Solid	6020	335762
320-54857-72	B-3-COMP	STLC Citrate	Solid	6020	335762
320-54857-78	B-14-COMP	STLC Citrate	Solid	6020	335762
LB4 320-335762/1-A ^50	Method Blank	STLC Citrate	Solid	6020	335762
LCS 320-335762/2-A ^50	Lab Control Sample	STLC Citrate	Solid	6020	335762
320-54857-71 MS	B-2-COMP	STLC Citrate	Solid	6020	335762
320-54857-71 MSD	B-2-COMP	STLC Citrate	Solid	6020	335762

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

Client Sample ID: B-2-COMP

Lab Sample ID: 320-54857-71
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3540C			30.19 g	2 mL	476441	11/04/19 19:05	TEH	TAL DEN
Total/NA	Analysis	8141A		10			477127	11/12/19 08:57	TMC	TAL DEN
STLC Citrate	Leach	CA WET Citrate			50.21 g	500 mL	335762	11/04/19 11:20	DPM	TAL SAC
STLC Citrate	Analysis	6020		50			338730	11/14/19 18:21	DPM	TAL SAC

Client Sample ID: B-3-COMP

Lab Sample ID: 320-54857-72
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3540C			30.32 g	2 mL	476441	11/04/19 19:05	TEH	TAL DEN
Total/NA	Analysis	8141A		10			477127	11/12/19 10:54	TMC	TAL DEN
STLC Citrate	Leach	CA WET Citrate			50.00 g	500 mL	335762	11/04/19 11:20	DPM	TAL SAC
STLC Citrate	Analysis	6020		50			338730	11/14/19 18:33	DPM	TAL SAC

Client Sample ID: B-13-COMP

Lab Sample ID: 320-54857-74
Date Collected: 09/30/19 00:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3540C			30.8 g	2 mL	476441	11/04/19 19:05	TEH	TAL DEN
Total/NA	Analysis	8141A		10			477127	11/12/19 12:52	TMC	TAL DEN

Client Sample ID: B-1-COMP

Lab Sample ID: 320-54857-77
Date Collected: 09/30/19 07:00
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3540C			30.21 g	2 mL	476441	11/04/19 19:05	TEH	TAL DEN
Total/NA	Analysis	8141A		10			477127	11/12/19 13:31	TMC	TAL DEN

Client Sample ID: B-14-COMP

Lab Sample ID: 320-54857-78
Date Collected: 09/30/19 03:30
Matrix: Solid
Date Received: 10/01/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3540C			30.82 g	2 mL	476441	11/04/19 19:05	TEH	TAL DEN
Total/NA	Analysis	8141A		10			477127	11/12/19 14:11	TMC	TAL DEN
STLC Citrate	Leach	CA WET Citrate			50.45 g	500 mL	335762	11/04/19 11:20	DPM	TAL SAC
STLC Citrate	Analysis	6020		50			338730	11/14/19 18:37	DPM	TAL SAC

Laboratory References:

TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: WRECO
Job ID: 320-54857-4
Project/Site: Bell Road Project

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

Laboratory: Eurofins TestAmerica, Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	2907.01	10-31-21
A2LA	ISO/IEC 17025	2907.01	10-31-21
Alabama	State Program	40730	09-30-12 *
Alaska (UST)	State	18-001	01-08-20
Arizona	State	AZ0713	12-20-19
Arkansas DEQ	State	19-047-0	06-01-20
California	State	2513	01-08-20
Connecticut	State	PH-0686	09-30-20
Florida	NELAP	E87667-57	06-30-20
Georgia	State	4025-011	01-08-20
Illinois	NELAP	2000172019-1	04-30-20
Iowa	State	IA#370	12-01-20
Kansas	NELAP	E-10166	04-30-20
Louisiana	NELAP	30785	06-30-20
Maine	State	2019011 (231)	03-03-21
Minnesota	NELAP	1545373	12-31-19
Nevada	State	CO000262020-1	07-31-20
New Hampshire	NELAP	205319	04-28-20
New Jersey	NELAP	190002	06-30-20
New York	NELAP	59923	04-01-20
North Carolina (WW/SW)	State	<cert No.>	12-31-19
North Dakota	State	R-034	01-08-20
Oregon	NELAP	4025-011	01-08-20
Pennsylvania	NELAP	013	08-01-20
South Carolina	State	72002001	01-08-20
Texas	NELAP	T104704183-19-17	09-30-20
US Fish & Wildlife	Federal		07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal		03-26-21
USDA	US Federal Programs	P330-18-00099	03-26-21
Utah	NELAP	CO000262019-11	07-31-20
Virginia	NELAP	10490	06-14-20
Washington	State	C583-19	08-05-20
West Virginia DEP	State	354	11-30-19
Wisconsin	State	999615430	08-31-20
Wyoming (UST)	A2LA	2907.01	10-31-21

Laboratory: Eurofins TestAmerica, Pleasanton

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State Program	2496	01-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

Method	Method Description	Protocol	Laboratory
8141A	Organophosphorous Pesticides (GC)	SW846	TAL DEN
6020	Metals (ICP/MS)	SW846	TAL SAC
3540C	Soxhlet Extraction	SW846	TAL DEN
CA WET Citrate	California - Waste Extraction Test with Citrate Leach	CA-WET	TAL SAC

Protocol References:

CA-WET = California Waste Extraction Test, from Title 22

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54857-4

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-54857-71	B-2-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-72	B-3-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-74	B-13-COMP	Solid	09/30/19 00:00	10/01/19 09:10	
320-54857-77	B-1-COMP	Solid	09/30/19 07:00	10/01/19 09:10	
320-54857-78	B-14-COMP	Solid	09/30/19 03:30	10/01/19 09:10	

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Geologist: Andrew Smith**		
WRECO	Email:Andrew_Smith@WRECO.com	**Site Contact:**	**Date:**
1243 Alpine Road, Suite 108	**Tel: 925-639-0013**	**Lab Contact:**	**Carrier:**
Walnut Creek CA 94596	**Analysis Turnaround Time**		
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS		
Office: 925-941-0017 ext 253	TAT if different from Below ______		
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks		
Site: Bell Road I-80 Place County CA	☐ 1 week		
P O #	☐ 2 days		
	☐ 1 day		

COC No: ______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-1 {0'-1'}	9/30/19	7:00am		Soil											X	X		
B-1 {1'-2'}	" "	7:00am		Soil											X	X		
				Soil												X	X	
B-1 {2'-3'}	" "	7:00am		Soil											X	X		
B-2 {0'-1'}	" "	7:30am		Soil											X	X		
				Soil										X	X	X		
B-2 {1'-2'}	" "	7:30am		Soil											X	X		
B-2 {2'-3'}	" "	7:30am		Soil											X	X		
B-3 {0'-1'}	" "	8:00am		Soil											X	X		
B-3 {1'-2'}	" "	8:00am		Soil											X	X		
B-3 {2'-3'}	" "	8:00am		Soil											X	X		
~~B-3 {3'-4'}~~				Soil											X	X		

320-54857 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac MAN 10/1/19	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

eived extra containers. MAN 10/1/19 * All containers doesn't have time and date. MAN 10/1/19

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	9/30/19 all samples Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-4 {0'-1'}	8:30am	→		Soil											X	X		
B-4 {1'-2'}	8:30am	→		Soil											X	X		
~~B-4 {2'-3'}~~	~~8:30am~~	→		Soil												X	X	
B-4 {2'-3'}	8:30am	→		Soil											X	X		
B-5 {0'-1'}	9:00am	→		Soil											X	X		
				Soil										X	X	X		
B-5 {1'-2'}	9:00am	→		Soil											X	X		
B-5 {2'-3'}	9:00am	→		Soil											X	X		
B-6 {0'-1'}	10:00am	→		Soil											X	X		
B-6 {1'-2'}	10:00am	→		Soil											X	X		
B-6 {2'-3'}	10:00am	→		Soil											X	X		
B-7 {0'-1'}	11:00am	→		Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-7 {1'-2'}	9/30/19	11:30		Soil											X	X		
B-7 {2'-3'}	"	11:30		Soil											X	X		
	"			Soil												X	X	
B-8 {0'-1'}	"	12:00		Soil											X	X		
B-8 {1'-2'}	"	12:00		Soil											X	X		
	"	~~12:00~~		Soil										X	X	X		
B-8 {2'-3'}	"	12:00		Soil											X	X		
B-9 {0'-1'}	"	1:00		Soil											X	X		
B-9 {1'-2'}	"	1:00		Soil											X	X		
B-9 {2'-3'}	"	1:00		Soil											X	X		
				Soil											X	X		
				Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sae	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Geologist: Andrew Smith	Site Contact:	Date:	COC No:
WRECO	Email:Andrew_Smith@WRECO.com	Lab Contact:	Carrier:	____ of ____ COCs
1243 Alpine Road, Suite 108	Tel: 925-639-0013			TALS Project #:
Walnut Creek CA 94596	Analysis Turnaround Time			Sampler:
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Office: 925-941-0017 ext 253	TAT if different from Below ______			Walk-in Client:
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 2 weeks			Lab Sampling:
Site: Bell Road I-80 Place County CA	☐ 1 week			
P O #	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020	Sample Specific Notes:
B-10 {0'-1'}	9/30/19	1:30		Soil											X	X	X	
B-10 {1'-2'}	9/30/19	1:30		Soil											X	X	X	
B-10 {2'-3'}	"	1:30		Soil											X	X	X	
B-11 {0'-1'}	"	2:00		Soil											X	X		
B-11 {1'-2'}	"	2:00		Soil											X	X		
B-11 {2'-3'}	"	2:00		Soil											X	X		
B-12 {0'-1'}	"	2:15		Soil											X	X		
B-12 {1'-2'}	"	2:15		Soil											X	X		
B-12 {2'-3'}	"	2:15		Soil											X	X		
B-13 {0'-1'}	"	2:30		Soil											X	X		
B-13 {1'-2'}	"	2:30		Soil											X	X		
B-13 {2'-3'}	"	2:30		Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ______ Corr'd: ______		Therm ID No.: ______
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Geologist: Andrew Smith	Site Contact:	COC No:
	Email:Andrew_Smith@WRECO.com	Date:	_____ of _____ COCs
WRECO	Tel: 925-639-0013	Lab Contact:	Carrier:	TALS Project #:
1243 Alpine Road, Suite 108	Analysis Turnaround Time		Sampler:
Walnut Creek CA 94596	☐ CALENDAR DAYS ☐ WORKING DAYS		For Lab Use Only:
Andrew Smith Cell Phone: 925-639-0013	TAT if different from Below _______		Walk-in Client:
Office: 925-941-0017 ext 253	☐ 2 weeks		Lab Sampling:
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 1 week		
Site: Bell Road I-80 Place County CA	☑ 2 days		Job / SDG No.:
P O #	☐ 1 day		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020	Sample Specific Notes:
* B-14 {0'-1'}	9/30/19	2:45		Soil											X	X		
B-14 {1'-2'}	9/30/19	2:45		Soil											X	X		
B-14 {2'-3'}	9/30/19	2:45		Soil											X	X		
B-15 {0'-1'}	9/30/19	3:00		Soil											X	X	X	
B-15 {1'-2'}	9/30/19	3:00		Soil											X	X	X	
B-15 {2'-3'}	9/30/19	3:00		Soil											X	X	X	
B-16 {0'-1'}	9/30/19	3:30		Soil											X	X		
B-16 {1'-2'}	9/30/19	3:30		Soil											X	X		
B-16 {2'-3'}	9/30/19	3:30		Soil											X	X		
				Soil														
				Soil														
				Soil														

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _______ Corr'd: _______		Therm ID No.: _______
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

* Sample not received. MAN 10/1/19

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ________
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
_____ of _____ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-1 {0'-1'}	9/30/19	7:00am		Soil											X	X		
B-1 {1'-2'}	" "	7:00am		Soil											X	X		
				Soil												X	X	
B-1 {2'-3'}	" "	7:00am		Soil											X	X		
B-2 {0'-1'}	" "	7:30am		Soil											X	X		
				Soil										X	X	X		
B-2{1'-2'}	" "	7:30am		Soil											X	X		
B-2{2'-3'}	" "	7:30am		Soil											X	X		
B-3 {0'-1'}	" "	8:00am		Soil											X	X		
B-3 {1'-2'}	" "	8:00am		Soil											X	X		
B-3 {2'-3'}	" "	8:00am		Soil											X	X		
~~B-3 {3'-4'}~~				Soil											X	X		

320-54857 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ________

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ________ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ________ Corr'd: ________ Therm ID No.: ________

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta SAC MAN 10/1/19	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

*Received extra containers. MAN 10/1/19

* All containers doesn't have time and date. MAN 10/1/19

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Date:
Lab Contact:
Carrier:

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

9/30/19 all samples

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-4 {0'-1'}	8:30am →			Soil											X	X		
B-4 {1'-2'}	8:30am →			Soil											X	X		
~~B-4 {2'-3'}~~	~~8:30am~~ →			Soil												X	X	
B-4 {2'-3'}	8:30am →			Soil											X	X		
B-5 {0'-1'}	9:00am →			Soil											X	X		
				Soil										X	X	X		
B-5 {1'-2'}	9:00am →			Soil											X	X		
B-5 {2'-3'}	9:00am →			Soil											X	X		
B-6 {0'-1'}	10:00am →			Soil											X	X		
B-6 {1'-2'}	10:00am →			Soil											X	X		
B-6 {2'-3'}	10:00am →			Soil											X	X		
B-7 {0'-1'}	11:00am →			Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:______ Corr'd:______ Therm ID No.:______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Geologist: Andrew Smith**			COC No:
WRECO	Email:Andrew_Smith@WRECO.com	**Site Contact:**	**Date:**	____ of ____ COCs
1243 Alpine Road, Suite 108	**Tel: 925-639-0013**	**Lab Contact:**	**Carrier:**	TALS Project #:
Walnut Creek CA 94596	**Analysis Turnaround Time**			Sampler:
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
Office: 925-941-0017 ext 253	TAT if different from Below ____			Walk-in Client:
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks			Lab Sampling:
Site: Bell Road I-80 Place County CA	☐ 1 week			
P O #	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020							Sample Specific Notes:
B-7 {1'-2'}	9/30/19	11:30		Soil											X	X								
B-7 {2'-3'}	"	11:30		Soil											X	X								
	"			Soil												X	X							
B-8 {0'-1'}	"	12:00		Soil											X	X								
B-8 {1'-2'}	"	12:00		Soil											X	X								
	"	~~12:00~~		Soil										X	X	X								
B-8 {2'-3'}	"	12:00		Soil											X	X								
B-9 {0'-1'}	"	1:00		Soil											X	X								
B-9 {1'-2'}	"	1:00		Soil											X	X								
B-9 {2'-3'}	"	1:00		Soil											X	X								
				Soil											X	X								
				Soil											X	X								

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____________

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ________ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ________ Corr'd: ________ Therm ID No.: ________

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sae	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☐ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020	Sample Specific Notes:
B-10 {0'-1'}	9/30/19	1:30		Soil											X	X	X	
B-10 {1'-2'}	9/30/19	1:30		Soil											X	X	X	
B-10 {2'-3'}	" "	1:30		Soil											X	X	X	
B-11 {0'-1'}	" "	2:00		Soil											X	X		
B-11 {1'-2'}	" "	2:00		Soil											X	X		
B-11 {2'-3'}	" "	2:00		Soil											X	X		
B-12 {0'-1'}	" "	2:15		Soil											X	X		
B-12 {1'-2'}	" "	2:15		Soil											X	X		
B-12 {2'-3'}	" "	2:15		Soil											X	X		
B-13 {0'-1'}	" "	2:30		Soil											X	X		
B-13 {1'-2'}	" "	2:30		Soil											X	X		
B-13 {2'-3'}	" "	2:30		Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______
Therm ID No.: ______

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Orion Adah	WRECO	10/1/19 9:10		eta sac	10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O#

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☐ 2 weeks
☐ 1 week
☑ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020	Sample Specific Notes:
* B-14 {0'-1'}	9/30/19	2:45		Soil											X	X		
B-14 {1'-2'}	9/30/19	2:45		Soil											X	X		
B-14 {2'-3'}	9/30/19	2:45		Soil											X	X		
B-15 {0'-1'}	9/30/19	3:00		Soil											X	X	X	
B-15 {1'-2'}	9/30/19	3:00		Soil											X	X	X	
B-15 {2'-3'}	9/30/19	3:00		Soil											X	X	X	
B-16 {0'-1'}	9/30/19	3:30		Soil											X	X		
B-16 {1'-2'}	9/30/19	3:30		Soil											X	X		
B-16 {2'-3'}	9/30/19	3:30		Soil											X	X		
				Soil														
				Soil														
				Soil														

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______
Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

* Sample not received. MAN 10/1/19

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Geologist: Andrew Smith	Site Contact:	Date:	COC No: 1 of 5 COCs
WRECO	Email:Andrew_Smith@WRECO.com	Lab Contact:	Carrier:	TALS Project #:
1243 Alpine Road, Suite 108	Tel: 925-639-0013			Sampler:
Walnut Creek CA 94596	Analysis Turnaround Time			For Lab Use Only:
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS			Walk-in Client:
Office: 925-941-0017 ext 263	TAT if different from Below ______			Lab Sampling:
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Job / SDG No.:
Site: Bell Road I-80 Place County CA				
P O #				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-1 {0'-1'}	9/30/19	7:00am		Soil											X	X		
B-1 {1'-2'}	" "	7:00am		Soil											X	X		
				Soil												X	X	
B-1 {2'-3'}	" "	7:00am		Soil											X	X		
B-2 {0'-1'}	" "	7:30am		Soil					AS 10/2/19 ⟶						~~X~~	X	X	
				Soil										X	X	X		
B-2 {1'-2'}	" "	7:30am		Soil					AS 10/2/19 ⟶						~~X~~	X	X	
B-2 {2'-3'}	" "	7:30am		Soil					AS 10/2/19 ⟶						~~X~~	X	X	
B-3 {0'-1'}	" "	8:00am		Soil											X	X		
B-3 {1'-2'}	" "	8:00am		Soil											X	X		
B-3 {2'-3'}	" "	8:00am		Soil											X	X		
~~B-3 {3'-4'}~~				Soil											X	X		

320-54857 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ______ Corr'd: ______		Therm ID No.: ______
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta SAC	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/26/2018

received extra containers. MAN 10/1/19 * All containers doesn't have time and date. MAN 10/1/19

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins | Environment Testing TestAmerica

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ________
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No: 2 of 5 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

9/30/19 all samples

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-4 {0'-1'}		8:30am →		Soil											X	X		
B-4 {1'-2'}		8:30am →		Soil											X	X		
~~B-4 {2'-3'}~~		~~8:30am~~ →		Soil												X	X	
B-4 {2'-3'}		8:30am →		Soil											X	X		
B-5 {0'-1'}		9:00am →		Soil											X	X		
B-2-comp*				Soil				X	X	X	X	X	X	X	~~X~~	~~X~~	As 10/2/19	Don't Run Pb & PH
B-5 {1'-2'}		9:00am →		Soil											X	X		
B-5 {2'-3'}		9:00am →		Soil											X	X		
B-6 {0'-1'}		10:00am →		Soil						As 10/2/19					~~X~~	X	X	
B-6 {1'-2'}		10:00am →		Soil						As 10/2/19					~~X~~	X	X	
B-6 {2'-3'}		10:00am →		Soil						As 10/2/19					~~X~~	X	X	
B-7 {0'-1'}		11:00am →		Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:
* composite samples B-2(0'-1'), B-2(1'-2'), B-3(2'-3') in LAB, Run Analyses Listed on COC

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94696
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No: 3 of 5 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Lead and Arsenic by EPA 6020	Sample Specific Notes:
B-7 {1'-2'}	9/30/19	11:30		Soil											X	X		
** B-7 {2'-3'}	" "	11:30		Soil											X	X		
B-3-comp	" "			Soil				X	X	X	X	X	X	X	~~x~~	~~x~~	As 10/2/19	
B-8 {0'-1'}	" "	12:00		Soil											X	X		
B-8 {1'-2'}	" "	12:00		Soil											X	X		
** B-4-Comp	" "	~~12:00~~		Soil				X	X	X	X	X	X	x	~~x~~		As 10/2/19	
B-8 {2'-3'}	" "	12:00		Soil											X	X		
B-9 {0'-1'}	" "	1:00		Soil											X	X		
B-9 {1'-2'}	" "	1:00		Soil											X	X		
B-9 {2'-3'}	" "	1:00		Soil											X	X		
* B-13-Comp				Soil				X	X	X	X	X	X	X	~~x~~	~~x~~	As 10/2/19	
				Soil											X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:
** composite samples B-3(0'-1'), B-3(1'-2'), B-3(2'-3') in LAB Run Analyses Listed on coc.
** " " B-4(0'-1'), B-4(1'-2'), B-4(2'-3') in LAB Run " " " "

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:______ Corr'd:______ Therm ID No.:______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta sae	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

* composite B-13(0'-1'), B-13(1'-2'), B-13(2'-3') in LAB RUN Analysis per COC

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

Chain of Custody Record

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

eurofins | Environment Testing TestAmerica

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

COC No: 4 of 5 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
PO #

Project Geologist: Andrew Smith
Email: Andrew_Smith@WRECO.com
Tel: 925-639-0013

Site Contact:
Lab Contact:
Date:
Carrier:

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below ______
☐ 2 weeks
☐ 1 week
☑ 2 days
☐ 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020		Sample Specific Notes:
B-10 {0'-1'}	9/30/19	1:30		Soil									As		~~x~~	x	X	As 10/2/19	Run Lead & As
B-10 {1'-2'}	9/30/19	1:30		Soil									As		~~x~~	x	X	As 10/2/19	'' '' ''
B-10 {2'-3'}	''	1:30		Soil									As		~~x~~	x	X	As 10/2/19	'' '' ''
B-11 {0'-1'}	''	2:00		Soil											X	X			
B-11 {1'-2'}	''	2:00		Soil											X	X			
B-11 {2'-3'}	''	2:00		Soil											X	X			
B-12 {0'-1'}	''	2:15		Soil											X	X			
B-12 {1'-2'}	''	2:15		Soil											X	X			
B-12 {2'-3'}	''	2:15		Soil											X	X			
B-13 {0'-1'}	''	2:30		Soil											X	X			
B-13 {1'-2'}	''	2:30		Soil											X	X			
B-13 {2'-3'}	''	2:30		Soil											X	X			

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:10	Received by:	Company: eta Sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

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TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Geologist: Andrew Smith
WRECO	Email:Andrew_Smith@WRECO.com
1243 Alpine Road, Suite 108	Tel: 925-639-0013
Walnut Creek CA 94598	Analysis Turnaround Time
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS
Office: 925-941-0017 ext 253	TAT if different from Below
Project Name: Bell Road Interstate 80 Roundabouts Project	☐ 2 weeks ☐ 1 week ☑ 2 days ☐ 1 day
Site: Bell Road I-80 Place County CA	
P O #	

Site Contact:
Lab Contact:
Date:
Carrier:

COC No: 5 of 5 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600R-93/116)	Lead by EPA 6020	PH by EPA 9045	lead and Arsenic by EPA 6020					Sample Specific Notes:
* B-14 {0'-1'}	9/30/19	2:45		Soil											X	X						
B-14 {1'-2'}	9/30/19	2:45		Soil											X	X						
B-14 {2'-3'}	9/30/19	2:45		Soil											X	X						
B-15 {0'-1'} ✓	9/30/19	3:00		Soil					As 10/2/19						~~X~~	X	X					
B-15 {1'-2'}	9/30/19	3:00		Soil					As 10/2/19						~~X~~	X	X					
B-15 {2'-3'}	9/30/19	3:00		Soil					As 10/2/19						~~X~~	X	X					
B-16 {0'-1'}	9/30/19	3:30		Soil											X	X						
B-16 {1'-2'}	9/30/19	3:30		Soil											X	X						
B-16 {2'-3'}	9/30/19	3:30		Soil											X	X						
• B-15 - COMP				Soil				X	X	X	X	X	X	X								
• B-16 - COMP				Soil				X	X	X	X	X	X	X								
				Soil																		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:
• composite samples B-15(0'-1'), B-15(1'-2'), B-15(2'-3') in LAB RUN Analyses Listed on COC
•• " " B-16(0'-1'), B-15(1'-2'), B-15(2'-3') in " " " " " "

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: Corr'd: Therm ID No.:

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 10/1/19 9:20	Received by:	Company: eta sac	Date/Time: 10/1/19 910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

* Sample not received. MAN 10/1/19

America, Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Phone: 925-484-1919 Fax: 925-600-3002

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Caparas, Criselda	Carrier Tracking No(s):	COC No: 720-44025.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: criselda.caparas@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 320-54857-4
Address: 4955 Yarrow Street,	Due Date Requested: 11/12/2019			
City: Arvada	TAT Requested (days):			
State, Zip: CO, 80002				
Phone: 303-736-0100(Tel) 303-431-7171(Fax)	PO #:			
Email:	WO #:			
Project Name: Bell Road Project	Project #: 72014724			
Site:	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8141A/3540C Standard 8141 list	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
B-2-COMP (320-54857-71)	9/30/19	Pacific		Solid			X	1	
B-3-COMP (320-54857-72)	9/30/19	Pacific		Solid			X	1	
B-13-COMP (320-54857-74)	9/30/19	Pacific		Solid			X	1	
B-1-COMP (320-54857-77)	9/30/19	07:00 Pacific		Solid			X	1	
B-14-COMP (320-54857-78)	9/30/19	03:30 Pacific		Solid			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 11-15-19 1515	Company: PIS	Received by:	Date/Time: 11-2-19 0905	Company: TA Den
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916-373-5600 Fax: 916-372-1059

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Caparas, Criselda	Carrier Tracking No(s):	COC No: 320-163728.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: criselda.caparas@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 320-54857-4
Address: 4955 Yarrow Street,	**Due Date Requested:** 11/12/2019	**Analysis Requested**		**Preservation Codes:**
City: Arvada	**TAT Requested (days):**			
State, Zip: CO, 80002				
Phone: 303-736-0100(Tel) 303-431-7171(Fax)	PO #:			
Email:	WO #:			
Project Name: Bell Road Project	Project #: 72014724			
Site:	SSOW#:			Other:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Sample Identification - Client ID (Lab ID)	**Sample Date**	**Sample Time**	**Sample Type** (C=comp, G=grab)	**Matrix** (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	**Field Filtered Sample (Yes or No)**	**Perform MS/MSD (Yes or No)**	**8141A/3540C Standard 8141 list**	**Total Number of containers**	**Special Instructions/Note:**
			Preservation Code:						
B-1-COMP (320-54857-77)	9/30/19	07:00 Pacific		Solid			X	1	
B-14-COMP (320-54857-78)	9/30/19	03:30 Pacific		Solid			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification

Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ______ Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:		Time:	Method of Shipment:	
Relinquished by:	Date/Time: 11/1/19 1630	Company: EZA Inc	Received by:	Date/Time: 11-2-19 0905	Company: TA Rn
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 5.1 °C +0 IR 1 JL 11-2-19		

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: WRECO

Job Number: 320-54857-4

Login Number: 54857
List Number: 1
Creator: Nuval, Mark-Anthony M

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: WRECO

Job Number: 320-54857-4

Login Number: 54857
List Number: 3
Creator: Zimmerman, Steven M

List Source: Eurofins TestAmerica, Denver
List Creation: 11/02/19 01:57 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Environment Testing
TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-54437-1
Client Project/Site: Bell Road Project

For:
WRECO
1243 Alpine Road
Suite 108
Walnut Creek, California 94596

Attn: Ms. Melissa McAssey

Authorized for release by:
10/2/2019 3:52:25 PM

Afsaneh Salimpour, Senior Project Manager
(925)484-1919
afsaneh.salimpour@testamericainc.com

Table of Contents

Definitions/Glossary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

Qualifiers

Metals

Qualifier	Qualifier Description
F2	MS/MSD RPD exceeds control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-54437-1

Comments
No additional comments.

Receipt
The samples were received on 9/18/2019 3:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 8.4º C.

Metals
Method(s) 6020: The matrix spike duplicate (MSD) recovery and precision for preparation batch 320-324659 and analytical batch 320-327837 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: WRECO

Job ID: 320-54437-1

Project/Site: Bell Road Project

Client Sample ID: A-19-006 B1 0'-01'

Lab Sample ID: 320-54437-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.6	F2	0.10	0.060	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.5		0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: A-19-006 B1 1'-2'

Lab Sample ID: 320-54437-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	1.7		0.10	0.059	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.0		0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: A-19-006 B1 2'-3'

Lab Sample ID: 320-54437-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	2.4		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	6.0		0.1	0.1	SU	1		9045C	Soluble

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

Client Sample ID: A-19-006 B1 0'-01'

Lab Sample ID: 320-54437-1
Date Collected: 09/18/19 14:00
Matrix: Solid
Date Received: 09/18/19 15:00

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	4.6	F2	0.10	0.060	mg/Kg		09/19/19 06:30	09/30/19 22:46	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.5		0.1	0.1	SU			09/19/19 12:08	1

Client Sample ID: A-19-006 B1 1'-2'

Lab Sample ID: 320-54437-2
Date Collected: 09/18/19 14:00
Matrix: Solid
Date Received: 09/18/19 15:00

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1.7		0.10	0.059	mg/Kg		09/19/19 06:30	09/30/19 23:01	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.0		0.1	0.1	SU			09/19/19 12:08	1

Client Sample ID: A-19-006 B1 2'-3'

Lab Sample ID: 320-54437-3
Date Collected: 09/18/19 14:00
Matrix: Solid
Date Received: 09/18/19 15:00

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	2.4		0.10	0.058	mg/Kg		09/19/19 06:30	09/30/19 23:04	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	6.0		0.1	0.1	SU			09/19/19 12:08	1

QC Sample Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-324659/1-A
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 324659

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.060	mg/Kg		09/19/19 06:30	09/30/19 19:50	1

Lab Sample ID: LCS 320-324659/2-A
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 324659

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	20.0	19.6		mg/Kg		98	80 - 120

Lab Sample ID: 320-54437-1 MS
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: A-19-006 B1 0'-01'
Prep Type: Total/NA
Prep Batch: 324659

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	4.6	F2	19.8	26.0		mg/Kg		108	80 - 120

Lab Sample ID: 320-54437-1 MSD
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: A-19-006 B1 0'-01'
Prep Type: Total/NA
Prep Batch: 324659

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	4.6	F2	19.1	21.1	F2	mg/Kg		86	80 - 120	21	20

Method: 9045C - pH

Lab Sample ID: LCS 320-324753/2
Matrix: Solid
Analysis Batch: 324753

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	8.00	7.9		SU		99	98 - 102

Lab Sample ID: 320-54437-1 DU
Matrix: Solid
Analysis Batch: 324753

Client Sample ID: A-19-006 B1 0'-01'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH adj. to 25 deg C	6.5		6.6		SU		2	10

QC Association Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

Metals

Prep Batch: 324659

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54437-1	A-19-006 B1 0'-01'	Total/NA	Solid	3050B	
320-54437-2	A-19-006 B1 1'-2'	Total/NA	Solid	3050B	
320-54437-3	A-19-006 B1 2'-3'	Total/NA	Solid	3050B	
MB 320-324659/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-324659/2-A	Lab Control Sample	Total/NA	Solid	3050B	
320-54437-1 MS	A-19-006 B1 0'-01'	Total/NA	Solid	3050B	
320-54437-1 MSD	A-19-006 B1 0'-01'	Total/NA	Solid	3050B	

Analysis Batch: 327837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54437-1	A-19-006 B1 0'-01'	Total/NA	Solid	6020	324659
320-54437-2	A-19-006 B1 1'-2'	Total/NA	Solid	6020	324659
320-54437-3	A-19-006 B1 2'-3'	Total/NA	Solid	6020	324659
MB 320-324659/1-A	Method Blank	Total/NA	Solid	6020	324659
LCS 320-324659/2-A	Lab Control Sample	Total/NA	Solid	6020	324659
320-54437-1 MS	A-19-006 B1 0'-01'	Total/NA	Solid	6020	324659
320-54437-1 MSD	A-19-006 B1 0'-01'	Total/NA	Solid	6020	324659

General Chemistry

Analysis Batch: 324753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54437-1	A-19-006 B1 0'-01'	Soluble	Solid	9045C	324789
320-54437-2	A-19-006 B1 1'-2'	Soluble	Solid	9045C	324789
320-54437-3	A-19-006 B1 2'-3'	Soluble	Solid	9045C	324789
LCS 320-324753/2	Lab Control Sample	Total/NA	Solid	9045C	
320-54437-1 DU	A-19-006 B1 0'-01'	Soluble	Solid	9045C	324789

Leach Batch: 324789

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-54437-1	A-19-006 B1 0'-01'	Soluble	Solid	DI Leach	
320-54437-2	A-19-006 B1 1'-2'	Soluble	Solid	DI Leach	
320-54437-3	A-19-006 B1 2'-3'	Soluble	Solid	DI Leach	
320-54437-1 DU	A-19-006 B1 0'-01'	Soluble	Solid	DI Leach	

Lab Chronicle

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

Client Sample ID: A-19-006 B1 0'-01'

Date Collected: 09/18/19 14:00
Date Received: 09/18/19 15:00

Lab Sample ID: 320-54437-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.00 g	100 mL	324659	09/19/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			327837	09/30/19 22:46	JMD	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	324753	09/19/19 12:08	HRB	TAL SAC
Soluble	Leach	DI Leach			20.75 g	20 mL	324789	09/19/19 13:37	HRB	TAL SAC

Client Sample ID: A-19-006 B1 1'-2'

Date Collected: 09/18/19 14:00
Date Received: 09/18/19 15:00

Lab Sample ID: 320-54437-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.01 g	100 mL	324659	09/19/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			327837	09/30/19 23:01	JMD	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	324753	09/19/19 12:08	HRB	TAL SAC
Soluble	Leach	DI Leach			20.01 g	20 mL	324789	09/19/19 13:37	HRB	TAL SAC

Client Sample ID: A-19-006 B1 2'-3'

Date Collected: 09/18/19 14:00
Date Received: 09/18/19 15:00

Lab Sample ID: 320-54437-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.03 g	100 mL	324659	09/19/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			327837	09/30/19 23:04	JMD	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	324753	09/19/19 12:08	HRB	TAL SAC
Soluble	Leach	DI Leach			20.21 g	20 mL	324789	09/19/19 13:37	HRB	TAL SAC

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State Program	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	08-09-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State Program	88-0691	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-19
Louisiana	NELAP	01944	06-30-20
Maine	State Program	CA0004	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State Program	CA00044	07-31-20
New Hampshire	NELAP	2997	04-20-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
USEPA UCMR	Federal	CA00044	12-31-20
Utah	NELAP	CA00044	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

Laboratory: Eurofins TestAmerica, Pleasanton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2496	01-31-20
USDA	US Federal Programs	P330-18-00328	11-06-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL SAC
9045C	pH	SW846	TAL SAC
3050B	Preparation, Metals	SW846	TAL SAC
DI Leach	Deionized Water Leaching Procedure	ASTM	TAL SAC

Protocol References:

ASTM = ASTM International

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: WRECO
Project/Site: Bell Road Project

Job ID: 320-54437-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-54437-1	A-19-006 B1 0'-01'	Solid	09/18/19 14:00	09/18/19 15:00	
320-54437-2	A-19-006 B1 1'-2'	Solid	09/18/19 14:00	09/18/19 15:00	
320-54437-3	A-19-006 B1 2'-3'	Solid	09/18/19 14:00	09/18/19 15:00	

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below
☐ 2 weeks
☐ 1 week
☑ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
of COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Sample Specific Notes:
A-19-006 {B1} 0'-1'	09/18/19	2:00pm		Soil											X	X	
A-19-006 {B1} 1'-2'	09/18/19	2:00pm		Soil											X	X	
A-19-006 {B1} 2'-3'	09/18/19	2:00pm		Soil											X	X	
				Soil													
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				Soil													

320-54437 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: 6.4 Corr'd: 6.4 Therm ID No.: IR 4AC01

Relinquished by:	Company: WRECO	Date/Time: 9/18/19 1500	Received by:	Company: ETA-Sac	Date/Time: 9/18/19 1500
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

Login Sample Receipt Checklist

Client: WRECO

Job Number: 320-54437-1

Login Number: 54437
List Number: 1
Creator: Her, David A

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

Laboratory Job ID: 720-95200-1
Client Project/Site: Bell Road I-80 Roadabouts Project

For:
WRECO
1243 Alpine Road
Suite 108
Walnut Creek, California 94596

Attn: Ms. Melissa McAssey

Authorized for release by:
10/3/2019 12:50:43 PM

Criselda Caparas, Project Manager I
(925)484-1919
criselda.caparas@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Table of Contents

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: WRECO
Project/Site: Bell Road I-80 Roadabouts Project

Job ID: 720-95200-1

Job ID: 720-95200-1

Laboratory: Eurofins TestAmerica, Pleasanton

Narrative

Job Narrative
720-95200-1

Comments
No additional comments.

Receipt
The samples were received on 9/21/2019 9:26 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.8º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: WRECO
Job ID: 720-95200-1
Project/Site: Bell Road I-80 Roadabouts Project

Client Sample ID: A-19-001-BULK(B-0)
Lab Sample ID: 720-95200-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	3.6		0.10	0.062	mg/Kg	1		6020	Total/NA
pH	7.3	HF	0.1	0.1	SU	1		9045C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: A-19-001-BULK(B-0)
Date Collected: 09/18/19 07:00
Date Received: 09/21/19 09:26

Lab Sample ID: 720-95200-1
Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	3.6		0.10	0.062	mg/Kg		09/27/19 06:30	09/30/19 21:34	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1	0.1	SU			09/25/19 11:32	1

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Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-326520/1-A
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 326520

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.060	mg/Kg		09/27/19 06:30	09/30/19 19:18	1

Lab Sample ID: LCS 320-326520/2-A
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 326520

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			20.0	20.9		mg/Kg		104	80 - 120		

Lab Sample ID: 720-95200-1 MS
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: A-19-001-BULK(B-0)
Prep Type: Total/NA
Prep Batch: 326520

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	3.6		20.6	23.1		mg/Kg		95	80 - 120		

Lab Sample ID: 720-95200-1 MSD
Matrix: Solid
Analysis Batch: 327837

Client Sample ID: A-19-001-BULK(B-0)
Prep Type: Total/NA
Prep Batch: 326520

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	3.6		19.8	22.3		mg/Kg		95	80 - 120	3	20

Method: 9045C - pH

Lab Sample ID: 720-95200-1 DU
Matrix: Solid
Analysis Batch: 273473

Client Sample ID: A-19-001-BULK(B-0)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.3	HF		7.7		SU				6	20

QC Association Summary

Metals

Prep Batch: 326520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-95200-1	A-19-001-BULK(B-0)	Total/NA	Solid	3050B	
MB 320-326520/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-326520/2-A	Lab Control Sample	Total/NA	Solid	3050B	
720-95200-1 MS	A-19-001-BULK(B-0)	Total/NA	Solid	3050B	
720-95200-1 MSD	A-19-001-BULK(B-0)	Total/NA	Solid	3050B	

Analysis Batch: 327837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-95200-1	A-19-001-BULK(B-0)	Total/NA	Solid	6020	326520
MB 320-326520/1-A	Method Blank	Total/NA	Solid	6020	326520
LCS 320-326520/2-A	Lab Control Sample	Total/NA	Solid	6020	326520
720-95200-1 MS	A-19-001-BULK(B-0)	Total/NA	Solid	6020	326520
720-95200-1 MSD	A-19-001-BULK(B-0)	Total/NA	Solid	6020	326520

General Chemistry

Analysis Batch: 273473

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-95200-1	A-19-001-BULK(B-0)	Total/NA	Solid	9045C	
LCS 720-273473/1	Lab Control Sample	Total/NA	Solid	9045C	
720-95200-1 DU	A-19-001-BULK(B-0)	Total/NA	Solid	9045C	

Client Sample ID: A-19-001-BULK(B-0)
Lab Sample ID: 720-95200-1
Date Collected: 09/18/19 07:00
Matrix: Solid
Date Received: 09/21/19 09:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.97 g	100 mL	326520	09/27/19 06:30	NIM	TAL SAC
Total/NA	Analysis	6020		1			327837	09/30/19 21:34	JMD	TAL SAC
Total/NA	Analysis	9045C		1	20 g	20 mL	273473	09/25/19 11:32	NAT	TAL PLS

Laboratory References:

TAL PLS = Eurofins TestAmerica, Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: WRECO
Project/Site: Bell Road I-80 Roadabouts Project

Job ID: 720-95200-1

Laboratory: Eurofins TestAmerica, Pleasanton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2496	01-31-20
USDA	US Federal Programs	P330-18-00328	11-06-21

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State Program	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	08-09-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State Program	88-0691	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-19
Louisiana	NELAP	01944	06-30-20
Maine	State Program	CA0004	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State Program	CA00044	07-31-20
New Hampshire	NELAP	2997	04-20-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
USEPA UCMR	Federal	CA00044	12-31-20
Utah	NELAP	CA00044	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: WRECO
Project/Site: Bell Road I-80 Roadabouts Project

Job ID: 720-95200-1

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL SAC
9045C	pH	SW846	TAL PLS
3050B	Preparation, Metals	SW846	TAL SAC

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = Eurofins TestAmerica, Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: WRECO

Project/Site: Bell Road I-80 Roadabouts Project

Job ID: 720-95200-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
720-95200-1	A-19-001-BULK(B-0)	Solid	09/18/19 07:00	09/21/19 09:26	

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

720-95200

eurofins

192501

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
____ of ____ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Sample Specific Notes:
A-19-001 - Bulk {B0} - Hold	09/18/19	7:00am		Soil											X	X	
A-19-001 - S@5' {B-0}	09/18/19	7:00am		Soil											X	X	
				Soil											X	X	
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													

720-95200 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

0-8c

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:______ Corr'd:______ Therm ID No.:______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 09/20/19 1:33pm	Received by: Juan Ghzn	Company: ETA-SAC	Date/Time: 9/20/19 - 1333
Relinquished by:	Company: ETA/SAC	Date/Time: 9/21/19 1630	Received by:	Company: TA	Date/Time: 9/21/19 920
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

720-95200

eurofins

192501

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact
WRECO
1243 Alpine Road, Suite 108
Walnut Creek CA 94596
Andrew Smith Cell Phone: 925-639-0013
Office: 925-941-0017 ext 253
Project Name: Bell Road Interstate 80 Roundabouts Project
Site: Bell Road I-80 Place County CA
P O #

Project Geologist: Andrew Smith
Email:Andrew_Smith@WRECO.com
Tel: 925-639-0013

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
____ of ____ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Sample Specific Notes:
A-19-001 - Bulk {B04} - Hold	09/18/19	7:00am		Soil											X	X	
A-19-001 - S@5' {B-04}	09/18/19	7:00am		Soil											X	X	
				Soil											X	X	
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													

720-95200 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

0.8°c

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:______ Corr'd:______ Therm ID No.:______

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Orion Adah	WRECO	09/20/19 1:33pm	Juan Ghzn	ETA-SAC	9/20/19 - 1333
Relinquished by:	Company: ETA/HC	Date/Time: 9/24/19 1630	Received by:	Company: TA	Date/Time: 9/25/19 920
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

Salimpour, Afsaneh

From: Alec McConnell <alec_mcconnell@wreco.com>
Sent: Tuesday, September 24, 2019 5:42 PM
To: Salimpour, Afsaneh
Cc: Melissa McAssey
Subject: COC Correction WRECO
Attachments: COC Corrected.pdf

-External Email-

Hello Afsaneh,

Please find the new COC attached with the old one crossed out. I have copied Andrew's boss as well as mine (Melissa McAssey). We would like the A-19-001 Bulk Sample to be run and we would like the A-19-001-S@5' to be put on hold please. The documents are attached please email me back confirming that you received this and that it will be done. Thank you so much I appreciate your help.

Warm Regards,

Joseph "Alec" McConnell

Kind Regards,

Alec McConnell | Staff Environmental Scientist
WRECO 1243 Alpine Road, Suite 108, Walnut Creek, CA 94596
O: 925.941.0017 x251 | E: alec_mcconnell@wreco.com | W: www.wreco.com

720-95200 Chain of Custody

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Geologist: Andrew Smith
WRECO	Email:Andrew_Smith@WRECO.com
1243 Alpine Road, Suite 108	Tel: 925-639-0013
Walnut Creek CA 94596	**Analysis Turnaround Time**
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS
Office: 925-941-0017 ext 253	TAT if different from Below ______
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day
Site: Bell Road I-80 Place County CA	
P O #	

Site Contact:
Lab Contact:
Date:
Carrier:

COC No:
_____ of _____ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Run the Bulk Sample please

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045									Sample Specific Notes:
A-19-001 - Bulk {B0} - ~~Hold~~ Run	09/18/19	7:00am		Soil											x	x									
A-19-001 - S@5' {B-0} - Hold	09/18/19	7:00am		Soil											x	x									
				Soil											x	x									
do not Run				Soil																					
the @5' sample				Soil																					
Hold it please				Soil																					
				Soil																					
				Soil																					
				Soil																					
				Soil																					
				Soil																					
				Soil																					

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by: Orion Adah	Company: WRECO	Date/Time: 09/20/19 1:33pm	Received by: Juan	Company: ETA-SAC	Date/Time: 9/20/19 - 1333
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other:

Client Contact			
WRECO	Project Geologist: Andrew Smith	Site Contact:	Date:
1243 Alpine Road, Suite 108	Email:Andrew_Smith@WRECO.com	Lab Contact:	Carrier:
Walnut Creek CA 94596	Tel: 925-639-0013		
Andrew Smith Cell Phone: 925-639-0013	Analysis Turnaround Time		
Office: 925-941-0817 ext 253	☐ CALENDAR DAYS ☐ WORKING DAYS		
Project Name: Bell Road Interstate 80 Roundabouts Project	TAT if different from Below ______		
Site: Bell Road I-80 Place County CA	☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		
P O #			

COC No:
______ of ______ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Sample Specific Notes:
~~A-19-001 - Bulk {B0'} - Hold~~	09/18/19	7:00am		Soil											X	X	
~~A-19-001 - SO5'{B0'}~~	09/18/19	7:00am		Soil											X	X	
				Soil											X	X	
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													
				Soil													

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:______ Corr'd:______ Therm ID No.:______		
Relinquished by: Orion Adah	Company: WRECO	Date/Time: 09/20/19 1:33pm	Received by: Juan Gnzn	Company: ETA-SAC	Date/Time: 9/20/19 - 1333
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Eurofins TestAmerica, Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Phone: 925-484-1919 Fax: 925-600-3002

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Salimpour, Afsaneh F	Carrier Tracking No(s):	COC No: 720-43646.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: afsaneh.salimpour@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 720-95200-1

Address: 880 Riverside Parkway,	**Due Date Requested:** 10/3/2019
City: West Sacramento	**TAT Requested (days):**
State, Zip: CA, 95605	
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:
Email:	WO #:
Project Name: Bell Road Project	Project #: 72014724
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA

M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020/3050B Lead	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
A-19-001-S@5(B-0) (720-95200-2)	9/18/19	07:00 Pacific		Solid			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)
Primary Deliverable Rank: 2
Special Instructions/QC Requirements:

Empty Kit Relinquished by:
Date:
Time:
Method of Shipment:

Relinquished by: ETAPLS	Date/Time: 9/24/19 1750	Company	Received by: Salvador Orozco	Date/Time: 9/24/19 1750	Company ETDSC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 0.8°C

Ver: 01/16/2019

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Eurofins TestAmerica, Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Phone: 925-484-1919 Fax: 925-600-3002

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Salimpour, Afsaneh F	Carrier Tracking No(s):	COC No: 720-43667.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: afsaneh.salimpour@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 720-95200-1
Address: 880 Riverside Parkway,	**Due Date Requested:** 10/3/2019	**Analysis Requested**		**Preservation Codes:**
City: West Sacramento	**TAT Requested (days):**			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: Bell Road Project	Project #: 72014724			
Site:	SSOW#:			Other:

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020/3050B Lead	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
A-19-001-BULK(B-0) HOLD (720-95200-1)	9/18/19	07:00 Pacific		Solid			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ________ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)
Primary Deliverable Rank: 2
Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 9/25/19 1810	Company ETA PCS	Received by:	Date/Time: 9/25/19 - 1810	Company ETA SAC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 4.4°C		

Ver: 01/16/2019

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

eurofins | Environment Testing
TestAmerica

Sacramento
Sample Receiving Notes

Job: ______

Tracking # : N/A

SO / PO / FO / 2-Day / Ground / UPS / [✓ CDO] / Courier
GSO / OnTrac / Goldstreak / USPS / Other ______

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Notes: ______

Therm. ID: AK-10 Corr. Factor: 0

Ice ✓ Wet ✓ Gel ______ Other ______

Cooler Custody Seal: –

Sample Custody Seal: –

Cooler ID: ______

Temp Observed: 4.4°C Corrected: 4.4°C

From: Temp Blank ☑ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
CoC is complete w/o discrepancies?	☑	☐	☐
Samples received within holding time?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Cooler compromised/tampered with?	☐	☑	☐
Samples compromised/tampered with?	☐	☑	☐
Samples w/o discrepancies?	☑	☐	☐
Sample containers have legible labels?	☑	☐	☐
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided.	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐
Sample temp OK?	☑	☐	☐
Sample out of temp?	☐	☑	☐

Initials: JG Date: 9/25/19

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

\\TACORP\CORP\QA\QA_FACILITIES\SACRAMENTO-QA\DOCUMENT-MANAGEMENT\FORMS\QA-812 SAMPLE RECEIVING NOTES.DOC QA-812
TGT 06/19/2019

eurofins | Environment Testing
TestAmerica

Sacramento
Sample Receiving Notes

720-95200 Field Sheet

Job: —

Tracking # : N/A

SO / PO / FO / 2-Day / Ground / UPS / CDO / [✓ Courier]
GSO / OnTrac / Goldstreak / USPS / Other________

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Notes:

Therm. ID: IR/Stem Corr. Factor: 0

Ice ✓ Wet ✓ Gel ____ Other ____

Cooler Custody Seal: —

Sample Custody Seal: —

Cooler ID: —

Temp Observed: 0.8°C Corrected: 0.8°C

From: Temp Blank ☒ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☒
Alkalinity has no headspace?	☐	☐	☒
CoC is complete w/o discrepancies?	☒	☐	☐
Samples received within holding time?	☒	☐	☐
Sample preservatives verified?	☐	☐	☒
Cooler compromised/tampered with?	☐	☒	☐
Samples compromised/tampered with?	☐	☒	☐
Samples w/o discrepancies?	☒	☐	☐
Sample containers have legible labels?	☒	☐	☐
Containers are not broken or leaking?	☒	☐	☐
Sample date/times are provided.	☒	☐	☐
Appropriate containers are used?	☒	☐	☐
Sample bottles are completely filled?	☒	☐	☐
Zero headspace?*	☐	☐	☒
Multiphasic samples are not present?	☒	☐	☐
Sample temp OK?	☒	☐	☐
Sample out of temp?	☐	☒	☐

Initials: So Date: 9/24/19

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

W17B

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Login Sample Receipt Checklist

Client: WRECO
Job Number: 720-95200-1

Login Number: 95200
List Source: Eurofins TestAmerica, Pleasanton
List Number: 1
Creator: Mullen, Joan

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: WRECO

Job Number: 720-95200-1

Login Number: 95200
List Number: 2
Creator: Thompson, Sarah W

List Source: Eurofins TestAmerica, Sacramento
List Creation: 09/24/19 06:13 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.8c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: WRECO
Job Number: 720-95200-1

Login Number: 95200
List Number: 3
Creator: Thompson, Sarah W
List Source: Eurofins TestAmerica, Sacramento
List Creation: 09/26/19 01:11 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.4c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing
TestAmerica

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ANALYTICAL REPORT

Eurofins TestAmerica, Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

Laboratory Job ID: 720-95202-1
Client Project/Site: Bell Road I-80 Roadabouts Project

For:
WRECO
1243 Alpine Road
Suite 108
Walnut Creek, California 94596

Attn: Ms. Melissa McAssey

Authorized for release by:
10/22/2019 10:28:45 PM

Criselda Caparas, Project Manager I
(925)484-1919
criselda.caparas@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Job ID: 720-95202-1

Laboratory: Eurofins TestAmerica, Pleasanton

Narrative

Job Narrative
720-95202-1

Comments
No additional comments.

Receipt
The samples were received on 9/21/2019 9:26 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.8º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method 9045C: The following samples in 320-329123 were received out of holding time. As such, the laboratory had insufficient time remaining to perform the analysis within holding time: A-19-007(B-2)0'-1' (720-95202-1), A-19-007(B-2)1'-2' (720-95202-2) and A-19-007(B-2)2'-3' (720-95202-3). Per project manager notes, an "HF" flag was used.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: WRECO
Job ID: 720-95202-1
Project/Site: Bell Road I-80 Roadabouts Project

Client Sample ID: A-19-007(B-2)0'-1'

Lab Sample ID: 720-95202-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.9		0.10	0.058	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.5	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: A-19-007(B-2)1'-2'

Lab Sample ID: 720-95202-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.9		0.10	0.061	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.4	HF	0.1	0.1	SU	1		9045C	Soluble

Client Sample ID: A-19-007(B-2)2'-3'

Lab Sample ID: 720-95202-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	3.2		0.10	0.056	mg/Kg	1		6020	Total/NA
pH adj. to 25 deg C	5.2	HF	0.1	0.1	SU	1		9045C	Soluble

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: WRECO
Job ID: 720-95202-1
Project/Site: Bell Road I-80 Roadabouts Project

Client Sample ID: A-19-007(B-2)0'-1'
Lab Sample ID: 720-95202-1
Date Collected: 09/19/19 10:20
Matrix: Solid
Date Received: 09/21/19 09:26

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	4.9		0.10	0.058	mg/Kg		10/18/19 06:10	10/21/19 12:05	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	5.5	HF	0.1	0.1	SU			10/07/19 16:11	1

Client Sample ID: A-19-007(B-2)1'-2'
Date Collected: 09/19/19 10:20
Date Received: 09/21/19 09:26

Lab Sample ID: 720-95202-2
Matrix: Solid

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**4.9**		0.10	0.061	mg/Kg		10/18/19 06:10	10/21/19 12:08	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	**5.4**	**HF**	0.1	0.1	SU			10/07/19 16:11	1

Client Sample Results

Client Sample ID: A-19-007(B-2)2'-3'
Lab Sample ID: 720-95202-3
Date Collected: 09/19/19 10:20
Matrix: Solid
Date Received: 09/21/19 09:26

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**3.2**		0.10	0.056	mg/Kg		10/18/19 06:10	10/21/19 12:11	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	**5.2**	**HF**	0.1	0.1	SU			10/07/19 16:11	1

QC Sample Results

Client: WRECO
Job ID: 720-95202-1
Project/Site: Bell Road I-80 Roadabouts Project

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-331621/1-A
Matrix: Solid
Analysis Batch: 332846

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 331621

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.060	mg/Kg		10/18/19 06:10	10/21/19 09:49	1

Lab Sample ID: LCS 320-331621/2-A
Matrix: Solid
Analysis Batch: 332846

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 331621

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			20.0	20.7		mg/Kg		103	80 - 120		

Method: 9045C - pH

Lab Sample ID: LCS 320-329123/2
Matrix: Solid
Analysis Batch: 329123

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
pH adj. to 25 deg C			8.00	8.0		SU		100	98 - 102		

Lab Sample ID: 720-95202-1 DU
Matrix: Solid
Analysis Batch: 329123

Client Sample ID: A-19-007(B-2)0'-1'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH adj. to 25 deg C	5.5	HF		5.5		SU				0.2	10

Metals

Prep Batch: 331621

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-95202-1	A-19-007(B-2)0'-1'	Total/NA	Solid	3050B	
720-95202-2	A-19-007(B-2)1'-2'	Total/NA	Solid	3050B	
720-95202-3	A-19-007(B-2)2'-3'	Total/NA	Solid	3050B	
MB 320-331621/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 320-331621/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 332846

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-95202-1	A-19-007(B-2)0'-1'	Total/NA	Solid	6020	331621
720-95202-2	A-19-007(B-2)1'-2'	Total/NA	Solid	6020	331621
720-95202-3	A-19-007(B-2)2'-3'	Total/NA	Solid	6020	331621
MB 320-331621/1-A	Method Blank	Total/NA	Solid	6020	331621
LCS 320-331621/2-A	Lab Control Sample	Total/NA	Solid	6020	331621

General Chemistry

Leach Batch: 329116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-95202-1	A-19-007(B-2)0'-1'	Soluble	Solid	DI Leach	
720-95202-2	A-19-007(B-2)1'-2'	Soluble	Solid	DI Leach	
720-95202-3	A-19-007(B-2)2'-3'	Soluble	Solid	DI Leach	
720-95202-1 DU	A-19-007(B-2)0'-1'	Soluble	Solid	DI Leach	

Analysis Batch: 329123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-95202-1	A-19-007(B-2)0'-1'	Soluble	Solid	9045C	329116
720-95202-2	A-19-007(B-2)1'-2'	Soluble	Solid	9045C	329116
720-95202-3	A-19-007(B-2)2'-3'	Soluble	Solid	9045C	329116
LCS 320-329123/2	Lab Control Sample	Total/NA	Solid	9045C	
720-95202-1 DU	A-19-007(B-2)0'-1'	Soluble	Solid	9045C	329116

Lab Chronicle

Client: WRECO
Job ID: 720-95202-1
Project/Site: Bell Road I-80 Roadabouts Project

Client Sample ID: A-19-007(B-2)0'-1'

Lab Sample ID: 720-95202-1
Date Collected: 09/19/19 10:20
Matrix: Solid
Date Received: 09/21/19 09:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.03 g	100 mL	331621	10/18/19 06:10	NIM	TAL SAC
Total/NA	Analysis	6020		1			332846	10/21/19 12:05	JMD	TAL SAC
Soluble	Leach	DI Leach			20.29 g	20 mL	329116	10/07/19 15:53	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329123	10/07/19 16:11	HRB	TAL SAC

Client Sample ID: A-19-007(B-2)1'-2'

Lab Sample ID: 720-95202-2
Date Collected: 09/19/19 10:20
Matrix: Solid
Date Received: 09/21/19 09:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.99 g	100 mL	331621	10/18/19 06:10	NIM	TAL SAC
Total/NA	Analysis	6020		1			332846	10/21/19 12:08	JMD	TAL SAC
Soluble	Leach	DI Leach			20.36 g	20 mL	329116	10/07/19 15:53	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329123	10/07/19 16:11	HRB	TAL SAC

Client Sample ID: A-19-007(B-2)2'-3'

Lab Sample ID: 720-95202-3
Date Collected: 09/19/19 10:20
Matrix: Solid
Date Received: 09/21/19 09:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.07 g	100 mL	331621	10/18/19 06:10	NIM	TAL SAC
Total/NA	Analysis	6020		1			332846	10/21/19 12:11	JMD	TAL SAC
Soluble	Leach	DI Leach			20.43 g	20 mL	329116	10/07/19 15:53	HRB	TAL SAC
Soluble	Analysis	9045C		1	20 g	20 mL	329123	10/07/19 16:11	HRB	TAL SAC

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: WRECO
Job ID: 720-95202-1
Project/Site: Bell Road I-80 Roadabouts Project

Laboratory: Eurofins TestAmerica, Pleasanton

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State Program	2496	01-31-20

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State Program	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	08-09-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
Arkansas DEQ	State Program	88-0691	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-19
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Maine	State Program	CA0004	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
Nevada	State Program	CA00044	07-31-20
New Hampshire	NELAP	2997	04-20-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
USEPA UCMR	Federal	CA00044	12-31-20
Utah	NELAP	CA00044	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: WRECO
Project/Site: Bell Road I-80 Roadabouts Project

Job ID: 720-95202-1

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL SAC
9045C	pH	SW846	TAL SAC
3050B	Preparation, Metals	SW846	TAL SAC
DI Leach	Deionized Water Leaching Procedure	ASTM	TAL SAC

Protocol References:

ASTM = ASTM International

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: WRECO

Job ID: 720-95202-1

Project/Site: Bell Road I-80 Roadabouts Project

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
720-95202-1	A-19-007(B-2)0'-1'	Solid	09/19/19 10:20	09/21/19 09:26	
720-95202-2	A-19-007(B-2)1'-2'	Solid	09/19/19 10:20	09/21/19 09:26	
720-95202-3	A-19-007(B-2)2'-3'	Solid	09/19/19 10:20	09/21/19 09:26	

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

19250/

Chain of Custody Record

720-95202

eurofins

19250

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	**Project Geologist: Andrew Smith**	Site Contact:	Date:
WRECO	Email:Andrew_Smith@WRECO.com	Lab Contact:	Carrier:
1243 Alpine Road, Suite 108	Tel: 925-639-0013		
Walnut Creek CA 94596	**Analysis Turnaround Time**		
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS		
Office: 925-941-0017 ext 253	TAT if different from Below ______		
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks		
Site: Bell Road I-80 Place County CA	☐ 1 week		
P O #	☐ 2 days		
	☐ 1 day		

COC No:
_____ of _____ COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Sample Specific Notes:
A-19-007 {B-2} 0'-1'	09/19/19	10:20am		Soil											X	X	
A-19-007 {B-2} 1'-2'	09/19/19	10:20am		Soil											X	X	
A-19-007 {B-2} 2'-3'	09/19/19	10:20am		Soil											X	X	
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720-95202 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:
per Andrew Smith all the sample on Hold
9/24/19 10:54

2.8°c

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd:______ Corr'd:______ Therm ID No.:______

Relinquished by:	Company: WRECO 9:00am	Date/Time: 09/20/19	Received by:	Company: ETA - SAC	Date/Time: 09/20/19 900
Relinquished by:	Company: ETArac	Date/Time: 9/20/19 1630	Received by:	Company:	Date/Time: 9/20/19 9:20
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.26, dated 7/25/2019

Salimpour, Afsaneh

From: Andrew Smith <andrew_smith@wreco.com>
Sent: Wednesday, October 02, 2019 10:59 AM
To: Salimpour, Afsaneh
Cc: Melissa McAssey; Alec McConnell
Subject: Bell Road I-80 Roundabouts sample _A-19-007
Attachments: COC for A-19-007.pdf

-External Email-

Hi Afsaneh,

Please see attached COC with request to run samples:

A-19-007 (B-2) 0-1
A-19-007 (B-2)1-2
A-19-007 (B-2) 2-3

For analysis listed on the COC.

Please call me if you have any questions.

Regards,

Andrew Smith, PG | Associate Environmental Scientist
WRECO 1243 Alpine Road, Suite 108, Walnut Creek, CA 94596
O: 925.941.0017 x253 | W: www.wreco.com

720-95202 Chain of Custody

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[redacted]

>>> Select a Laboratory <<<
#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

eurofins

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Geologist: Andrew Smith		COC No:
WRECO	Email:Andrew_Smith@WRECO.com	Site Contact:	Date:	____ of ____ COCs
1243 Alpine Road, Suite 108	Tel: 925-639-0013	Lab Contact:	Carrier:	TALS Project #:
Walnut Creek CA 94596	Analysis Turnaround Time		Sampler:
Andrew Smith Cell Phone: 925-639-0013	☐ CALENDAR DAYS ☐ WORKING DAYS		For Lab Use Only:
Office: 925-941-0017 ext 253	TAT if different from Below ____		Walk-in Client:
Project Name: Bell Road Interstate 80 Roundabouts Project	☑ 2 weeks		Lab Sampling:
Site: Bell Road I-80 Place County CA	☐ 1 week		
P O #	☑ 2 days		Job / SDG No.:
	☐ 1 day		

AS 10/2/19

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	SVOC (8270C)	PAHs (8270)	PCBs (8082)	Organophosphorus Pesticides (8141A)	Organochlorine Pesticides (8081A)	CAM 17 Metals (6020/7471A)	NOA (CARB 435/PLM EPA 600/R-93/116)	Lead by EPA 6020	PH by EPA 9045	Sample Specific Notes:
A-19-007 {B-2} 0'-1'	09/19/19	10:20am		Soil											x	x	Please Run for Lead & PH AS [illegible]/2/19
A-19-007 {B-2} 1'-2'	09/19/19	10:20am		Soil											x	x	
A-19-007 {B-2} 2'-3'	09/19/19	10:20am		Soil											x	x	
				Soil													
				Soil													
				Soil													
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				Soil													
				Soil													
				Soil													
				Soil													
				Soil													

AS 10/2/19

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

Relinquished by:	Company: WRECO 9:00am	Date/Time: 09/20/19	Received by:	Company: ETA - SAC	Date/Time: 09/20/19 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Eurofins TestAmerica, Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Phone: 925-484-1919 Fax: 925-600-3002

Chain of Custody Record

eurofins
Environment Testing
TestAmerica

Client Information (Sub Contract Lab)
Sampler:
Lab PM: Salimpour, Afsaneh F
Carrier Tracking No(s):
COC No: 720-43733.1
Client Contact: Shipping/Receiving
Phone:
E-Mail: afsaneh.salimpour@testamericainc.com
State of Origin: California
Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.
Accreditations Required (See note): State Program - California
Job #: 720-95202-1
Address: 880 Riverside Parkway,
Due Date Requested: 10/14/2019
City: West Sacramento
TAT Requested (days):
State, Zip: CA, 95605
Phone: 916-373-5600(Tel) 916-372-1059(Fax)
PO #:
Email:
WO #:
Project Name: Bell Road Project
Project #: 72014724
Site:
SSOW#:

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)
Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020/3050B Lead	9045C/DI_LEACH_NP pH	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
A-19-007(B-2)0'-1' (720-95202-1)	9/19/19	10:20 Pacific		Solid			X	X	1	
A-19-007(B-2)1'-2' (720-95202-2)	9/19/19	10:20 Pacific		Solid			X	X	1	
A-19-007(B-2)2'-3' (720-95202-3)	9/19/19	10:20 Pacific		Solid			X	X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ________ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)
Primary Deliverable Rank: 2
Special Instructions/QC Requirements:

Empty Kit Relinquished by:
Date:
Time:
Method of Shipment:

Relinquished by:
Date/Time: 10/2/19 1810
Company: TetAPCS
Received by: Salbock Cayen
Date/Time: 10/2/19 1810
Company: EddSac

Relinquished by:
Date/Time:
Company
Received by:
Date/Time:
Company

Relinquished by:
Date/Time:
Company
Received by:
Date/Time:
Company

Custody Seals Intact: △ Yes △ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 0.4°C

Ver: 01/16/2019

eurofins | **Environment Testing**
TestAmerica

Sacramento
Sample Receiving Notes

720-95202 Field Sheet

Tracking # : N/A

SO / PO / FO / 2-Day / Ground / UPS / CDO / [✓ Courier]
GSO / OnTrac / Goldstreak / USPS / Other__________

Job:____________________

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Notes:____________________

Therm. ID: IR/Stem Corr. Factor: N/A

Ice ✓ Wet ✓ Gel ____ Other ____

Cooler Custody Seal: —

Sample Custody Seal: —

Cooler ID: —

Temp Observed: 0.4°C Corrected: 0.4°C

From: Temp Blank ☑ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☒
Alkalinity has no headspace?	☐	☐	☑
CoC is complete w/o discrepancies?	☑	☐	☐
Samples received within holding time?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Cooler compromised/tampered with?	☐	☑	☐
Samples compromised/tampered with?	☐	☑	☐
Samples w/o discrepancies?	☑	☐	☐
Sample containers have legible labels?	☑	☐	☐
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided.	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Zero headspace?*	☐	☐	☒
Multiphasic samples are not present?	☑	☐	☐
Sample temp OK?	☑	☐	☐
Sample out of temp?	☐	☑	☐

Initials: JG Date: 10/2/19

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

W13-A

\\TACORP\CORP\QA\QA_FACILITIES\SACRAMENTO-QA\DOCUMENT-MANAGEMENT\FORMS\QA-812 SAMPLE RECEIVING NOTES.DOC QA-812
TGT 06/19/2019

Login Sample Receipt Checklist

Client: WRECO

Job Number: 720-95202-1

Login Number: 95202
List Number: 1
Creator: Mullen, Joan

List Source: Eurofins TestAmerica, Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: WRECO

Job Number: 720-95202-1

Login Number: 95202
List Number: 2
Creator: Guzman, Juan

List Source: Eurofins TestAmerica, Sacramento
List Creation: 10/04/19 07:44 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.4C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Appendix C ProUCL 5.1 - 95% Upper Confidence Limit Calculations

	A	B	C	D	E	F	G	H
1		Lead_0-1	D_Lead_0-1	Lead_1-2	D_Lead_1-2	Lead_2-3	D_Lead_2-3	
2		2.3	1	0.25	1	0.48	1	
3		10	1	3.8	1	1.9	1	
4		21	1	1.4	1	3.2	1	
5		6	1	0.23	1	0.41	1	
6		0.64	1	0.58	1	8.9	1	
7		38	1	7.5	1	33	1	
8		40	1	6.3	1	1.1	1	
9		29	1	5.4	1	40	0	
10		8	1	17	1	5.8	1	
11		27	1	24	0	3.8	1	
12		1.9	1	9.9	1	2.7	1	
13		18	1	11	1	8.7	1	
14		3.7	1	4.1	1	20	1	
15		8.5	1	10	1	2.2	1	
16		6.5	1	12	1	6.3	1	
17		11	1	14	1	10	1	
18		4.6	1	1.7	1	2.4	1	
19		4.9	1	4.9	1	3.2	1	

Outlier Tests for Selected Variables excluding nondetects

User Selected Options	
Date/Time of Computation	ProUCL 5.15/1/2020 4:46:57 PM
From File	WorkSheet.xls
Full Precision	OFF

Dixon's Outlier Test for Lead_0-1

Total N = 18

Number NDs = 0

Number Detects = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

Note: NDs excluded from Outlier Test

1. Data Value 40 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.292

For 10% significance level, 40 is not an outlier.

For 5% significance level, 40 is not an outlier.

For 1% significance level, 40 is not an outlier.

2. Data Value 0.64 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.059

For 10% significance level, 0.64 is not an outlier.

For 5% significance level, 0.64 is not an outlier.

For 1% significance level, 0.64 is not an outlier.

Dixon's Outlier Test for Lead_1-2

Total N = 18

Number NDs = 1

Number Detects = 17

10% critical value: 0.438

5% critical value: 0.49

1% critical value: 0.577

Note: NDs excluded from Outlier Test

1. Data Value 17 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.305

For 10% significance level, 17 is not an outlier.

For 5% significance level, 17 is not an outlier.

For 1% significance level, 17 is not an outlier.

2. Data Value 0.23 is a Potential Outlier (Lower Tail)?

	A	B	C	D	E	F	G	H	I	J	K	L
55	Test Statistic: 0.030											
56												
57	For 10% significance level, 0.23 is not an outlier.											
58	For 5% significance level, 0.23 is not an outlier.											
59	For 1% significance level, 0.23 is not an outlier.											
60												
61												
62	**Dixon's Outlier Test for Lead_2-3**											
63												
64	Total N = 18											
65	Number NDs = 1											
66	Number Detects = 17											
67	10% critical value: 0.438											
68	5% critical value: 0.49											
69	1% critical value: 0.577											
70	Note: NDs excluded from Outlier Test											
71												
72	**1. Data Value 33 is a Potential Outlier (Upper Tail)?**											
73												
74	Test Statistic: 0.721											
75												
76	For 10% significance level, 33 is an outlier.											
77	For 5% significance level, 33 is an outlier.											
78	For 1% significance level, 33 is an outlier.											
79												
80	**2. Data Value 0.41 is a Potential Outlier (Lower Tail)?**											
81												
82	Test Statistic: 0.072											
83												
84	For 10% significance level, 0.41 is not an outlier.											
85	For 5% significance level, 0.41 is not an outlier.											
86	For 1% significance level, 0.41 is not an outlier.											
87												

Normal UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.15/1/2020 4:49:12 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%

Lead_0-1

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	0.64	Mean	13.39
Maximum	40	Median	8.25
SD	12.5	SD of logged Data	1.115
Coefficient of Variation	0.933	Skewness	1.098

Normal GOF Test

Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	18.52	95% Adjusted-CLT UCL (Chen-1995)	19.05
		95% Modified-t UCL (Johnson-1978)	18.64

Suggested UCL to Use

Data appear Gamma, May want to try Gamma Distribution

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Lead_1-2

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	0.23	Mean	7.448
Maximum	24	Median	5.85
SD	6.468	SD of logged Data	1.391
Coefficient of Variation	0.868	Skewness	1.042

Normal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
55	5% Lilliefors Critical Value					0.202	Data appear Normal at 5% Significance Level					
56	**Data appear Normal at 5% Significance Level**											
57												
58	**Assuming Normal Distribution**											
59	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
60	95% Student's-t UCL					10.1	95% Adjusted-CLT UCL (Chen-1995)					10.36
61							95% Modified-t UCL (Johnson-1978)					10.16
62												
63	**Suggested UCL to Use**											
64	95% Student's-t UCL					10.1						
65												
66	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
67	Recommendations are based upon data size, data distribution, and skewness.											
68	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
69	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
70												
71												
72	**Lead_2-3**											
73												
74	**General Statistics**											
75	Total Number of Observations					18	Number of Distinct Observations					17
76							Number of Missing Observations					0
77	Minimum					0.41	Mean					8.561
78	Maximum					40	Median					3.5
79	SD					11.26	SD of logged Data					1.272
80	Coefficient of Variation					1.316	Skewness					2.05
81												
82	**Normal GOF Test**											
83	Shapiro Wilk Test Statistic					0.693	**Shapiro Wilk GOF Test**					
84	5% Shapiro Wilk Critical Value					0.897	Data Not Normal at 5% Significance Level					
85	Lilliefors Test Statistic					0.282	**Lilliefors GOF Test**					
86	5% Lilliefors Critical Value					0.202	Data Not Normal at 5% Significance Level					
87	**Data Not Normal at 5% Significance Level**											
88												
89	**Assuming Normal Distribution**											
90	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
91	95% Student's-t UCL					13.18	95% Adjusted-CLT UCL (Chen-1995)					14.3
92							95% Modified-t UCL (Johnson-1978)					13.39
93												
94	**Suggested UCL to Use**											
95	**Data appear Gamma, May want to try Gamma Distribution**											
96												
97	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
98	Recommendations are based upon data size, data distribution, and skewness.											
99	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
100	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
101												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Gamma UCL Statistics for Uncensored Full Data Sets**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.15/1/2020 4:50:03 PM								
5			From File	WorkSheet.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	Lead_0-1											
12												
13	**General Statistics**											
14					Total Number of Observations	18					Number of Distinct Observations	18
15											Number of Missing Observations	0
16					Minimum	0.64					Mean	13.39
17					Maximum	40					Median	8.25
18					SD	12.5					SD of logged Data	1.115
19					Coefficient of Variation	0.933					Skewness	1.098
20												
21	**Gamma GOF Test**											
22					A-D Test Statistic	0.275	**Anderson-Darling Gamma GOF Test**					
23					5% A-D Critical Value	0.763	Data appear Gamma Distributed at 5% Significance Level					
24					K-S Test Statistic	0.123	**Kolmogorov-Smirnov Gamma GOF Test**					
25					5% K-S Critical Value	0.209	Data appear Gamma Distributed at 5% Significance Level					
26	**Data appear Gamma Distributed at 5% Significance Level**											
27												
28	**Gamma Statistics**											
29					k hat (MLE)	1.168					k star (bias corrected MLE)	1.01
30					Theta hat (MLE)	11.47					Theta star (bias corrected MLE)	13.25
31					nu hat (MLE)	42.05					nu star (bias corrected)	36.37
32					MLE Mean (bias corrected)	13.39					MLE Sd (bias corrected)	13.32
33											Approximate Chi Square Value (0.05)	23.57
34					Adjusted Level of Significance	0.0357					Adjusted Chi Square Value	22.58
35												
36	**Assuming Gamma Distribution**											
37					95% Approximate Gamma UCL (use when n>=50)	20.67					95% Adjusted Gamma UCL (use when n<50)	21.57
38												
39	**Suggested UCL to Use**											
40					95% Adjusted Gamma UCL	21.57						
41												
42	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
43	Recommendations are based upon data size, data distribution, and skewness.											
44	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
45	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
46												
47												
48	Lead_2-3											
49												
50	**General Statistics**											
51					Total Number of Observations	18					Number of Distinct Observations	17
52											Number of Missing Observations	0
53					Minimum	0.41					Mean	8.561
54					Maximum	40					Median	3.5

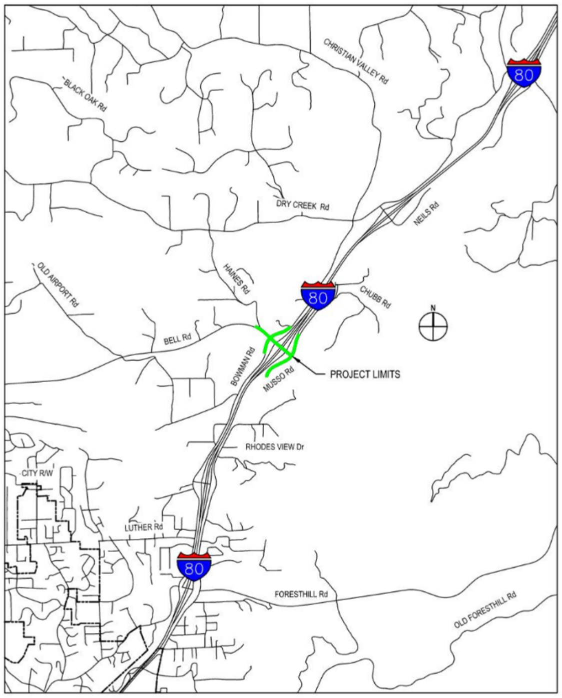
	A	B	C	D	E	F	G	H	I	J	K	L
55					SD	11.26					SD of logged Data	1.272
56					Coefficient of Variation	1.316					Skewness	2.05
57												
58	**Gamma GOF Test**											
59					A-D Test Statistic	0.526	**Anderson-Darling Gamma GOF Test**					
60					5% A-D Critical Value	0.774	Data appear Gamma Distributed at 5% Significance Level					
61					K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**					
62					5% K-S Critical Value	0.211	Data appear Gamma Distributed at 5% Significance Level					
63	**Data appear Gamma Distributed at 5% Significance Level**											
64												
65	**Gamma Statistics**											
66					k hat (MLE)	0.831					k star (bias corrected MLE)	0.73
67					Theta hat (MLE)	10.3					Theta star (bias corrected MLE)	11.73
68					nu hat (MLE)	29.93					nu star (bias corrected)	26.27
69					MLE Mean (bias corrected)	8.561					MLE Sd (bias corrected)	10.02
70											Approximate Chi Square Value (0.05)	15.59
71					Adjusted Level of Significance	0.0357					Adjusted Chi Square Value	14.8
72												
73	**Assuming Gamma Distribution**											
74					95% Approximate Gamma UCL (use when n>=50)	14.43					95% Adjusted Gamma UCL (use when n<50)	15.19
75												
76	**Suggested UCL to Use**											
77					95% Adjusted Gamma UCL	15.19						
78												
79	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
80	Recommendations are based upon data size, data distribution, and skewness.											
81	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
82	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
83												

Appendix H

Air Quality Report

AIR QUALITY REPORT

BELL ROAD AT I-80 INTERCHANGE PROJECT



03-PLA-80-R20.9/R21.4
03-4H430

Prepared for

Placer County
Public Works
3091 County Center Drive, Suite 220
Auburn, CA 95603

May 2021

Version 1.0 (12/15/2017) of Air Quality Report Annotated Outline

This document contains blank pages to accommodate two-sided printing.

AIR QUALITY REPORT

PLACER COUNTY, CALIFORNIA

CALIFORNIA DEPARTMENT OF TRANSPORTATION DISTRICT 3

E.A. 03-4H430

EFIS 318000305

PLA25671 (MTIP ID)

Reviewed by: Choyoungil Date: May 17, 2021

Prepared by: Chrystal Mei Date: May 4, 2021

For individuals with sensory disabilities, this document is available in alternative formats.
Please call or write to the California Department of Transportation, Attn: [CONTACT NAME], or use the California Relay Service TTY number, 711, or 1-800-735-2922.

Version 1.0 (12/15/2017) of Air Quality Report Annotated Outline

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Acronyms and Abbreviations

Term	**Definition**
AADT	Average annual daily traffic
AB	Assembly bill
ADA	Americans with Disabilities Act
ARB	California Air Resources Board
AWSC	All way stop controlled
Cal/EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
County	Placer County
EO	Executive Order
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
ft	Feet
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	Greenhouse gas
GWP	Global warming potential
IAC	Interagency Consultation
ICE	Intersection Control Evaluation
IPCC	International Panel on Climate Change
LOS	Level of service

Term	Definition
mi	Miles
MOVES	Motor Vehicle Emission Simulator
mph	Miles per hour
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
$MTCO_2e$	Metric tons of carbon dioxide equivalent
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NO_2	Nitrogen dioxide
NOA	Naturally occurring asbestos
NO_x	Nitrogen oxide
O_3	Ozone
PCAPCD	Placer County Air Pollution Control District
PCSP	Placer County Sustainability Plan
PCTPA	Placer County Transportation Planning Agency
PID	Project Initiation Document
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
ppm	Parts per million
Protocol	Transportation Project-Level Carbon Monoxide Protocol
PSR/PDS	Project Study Report / Project Development Support
ROGs	Reactive organic gases
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SACOG	Sacramento Area Council of Governments

Term	**Definition**
SB	Senate Bill
SCS	Sustainable communities strategies
SER	Caltrans Standard Environmental Reference
SIP	State Implementation Plan
SO_2	Sulfur dioxide
STAA	Surface Transportation Assistance Act
SWITRS	Statewide Integrated Traffic Records System
TACs	Toxic air contaminants
TASAS	Traffic Accident Surveillance and Analysis System
TIP	Transportation Improvement Program
TOAR	Transportation Operations Analysis Report
TSN	Transportation Systems Network
TWSC	Two-way stop controlled
USC	United States Code
U.S. EPA	United States Environmental Protection Agency
VMT	Vehicle miles traveled
VOCs	Volatile organic compounds
WB	West bound
WELO	Water Efficient Landscaping Ordinance

1. Proposed Project Description

1.1 Introduction

Placer County, in coordination with Caltrans, proposes to improve the interchange along Bell Road at I-80 in Placer County to improve operations/mobility and address safety concerns. The project would involve the I-80 WB and EB ramps, Bowman Road, and Musso Road intersections with Bell Road. The total length of the project is 2,100 linear feet. Placer County is the lead agency under CEQA.

The project would replace the following existing intersections with two modern, yield-controlled, single and multi-lane roundabouts designed to accommodate future growth "Year 2045" traffic forecast volumes.

1. Intersections of Bell Road at Bowman Road and the I-80 WB ramps; and

2. Intersections of Bell Road at Musso Road and the I-80 EB ramps.

Specifically, the County would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. Refer to Figure 2, Environmental Study Area, for the current project design layout.

The project is intended to improve overall operations, circulation, and accessibility for drivers and cyclists at the existing Bell Road at I-80 Interchange. The project design was determined to best meet the safety purpose of the project for all modes of travel as it eliminated queue back on the off-ramps onto mainline I-80 and would not require any mainline disruption during construction.

1.2 Location and Background

The project is located in the Sacramento Valley Air Basin portion of Placer County, near the Bowman community. The Placer County Air Pollution Control District (PCAPCD) has primary responsibility for managing air quality within Placer County. The Placer County Transportation Planning Agency (PCTPA) guides transportation development in the project area. Intersection improvements at the proposed project site were identified in the Placer County 2040 Final Regional Transportation Plan (RTP) as a System Management, Operations, and ITS project. The project description provided in the RTP was the following:

> *PLA25671, Bell Road at I-80 Roundabouts.*
>
> *The project will replace the existing traffic signal and all-way stop control at the Bell Road / Interstate 80 interchange with two roundabouts. PE Only. Total Project Cost is $7.5 million. (Emission Benefits in kg/day: ROG 0.25, NOx 0.19, PM2.5 0.01). Toll Credits for ENG*

The project would replace the following existing intersections with two modern, yield-controlled, single and multi-lane roundabouts designed to accommodate future growth "Year 2045" traffic forecast volumes.

1. Intersections of Bell Road at Bowman Road and the I-80 WB ramps
2. Intersections of Bell Road at Musso Road and the I-80 EB ramps

Figure 1 shows the project vicinity. Figure 2 shows the environmental study area footprint of the proposed project.

Under existing conditions, the Bell Road/I-80 EB and WB off-ramps are stop controlled. The Bell Road/Bowman Road intersection is controlled by a signal and the three-way Bell Road/Musso Road intersection is stop controlled on the Bell Road approach. The project vicinity is shown in Figure 1.

Existing traffic consists mostly of northern Placer County and western Nevada County residents commuting to and from work in south Placer County and the rest of the Sacramento region. Bell Road has become an alternative route to avoid traffic congestion along the State Route (SR) 49 corridor, including the I-80/SR 49 interchange in the City of Auburn. Due to the continued growth in this traffic, and its associated congestion in this corridor, including along Bell Road, Placer County has continued to make improvements to Bell Road, including widening to four lanes from its SR 49 intersection to Bowman Road, just short of the Bell Road/I-80 interchange. As a result, Bell Road at the I-80 interchange is now the "bottleneck" for traffic during AM and PM peak hours. During these peak periods, traffic queues on the I-80 off-ramps and impacts the mainline flows on I-80.

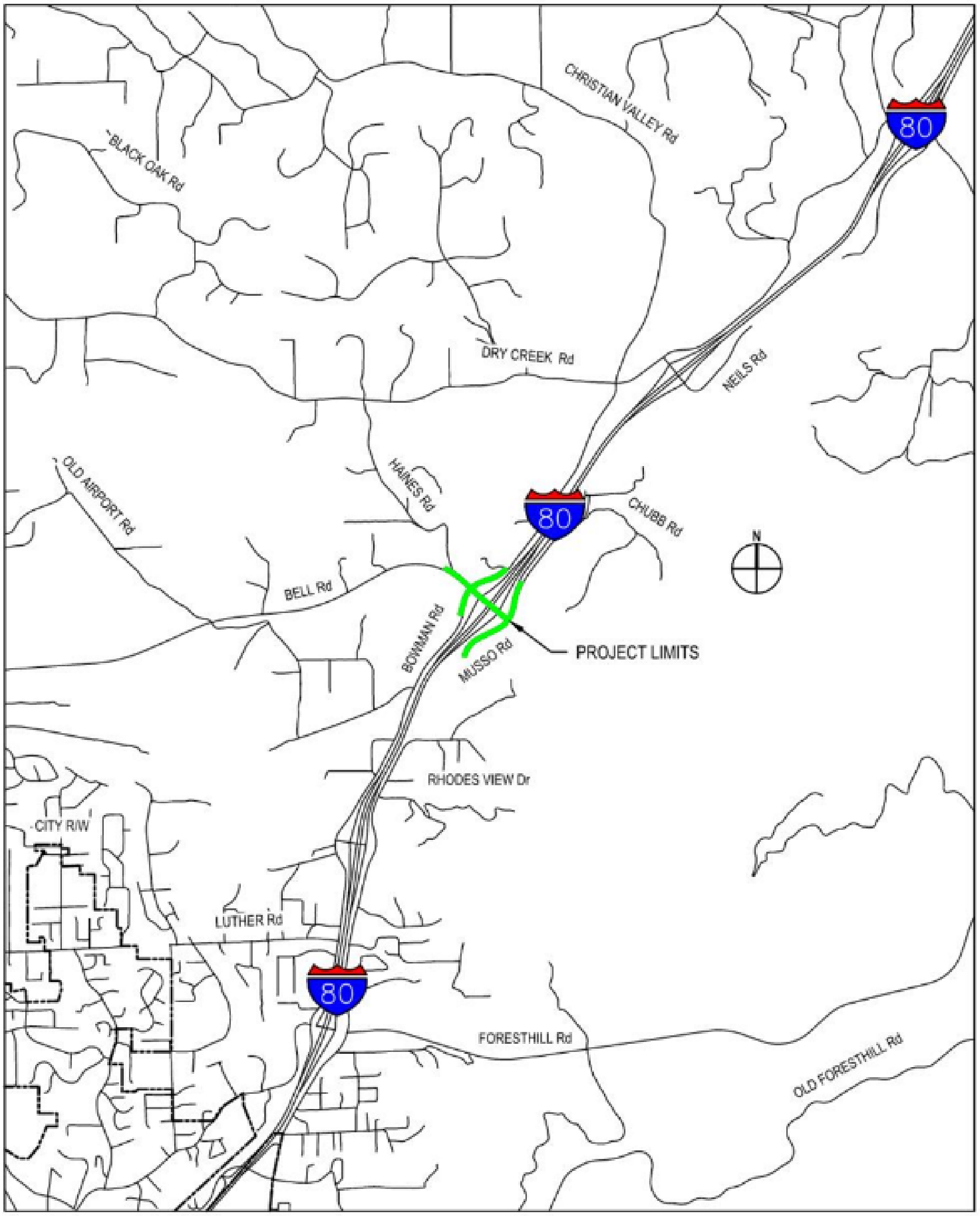


Figure 1. Map of the Project Location.

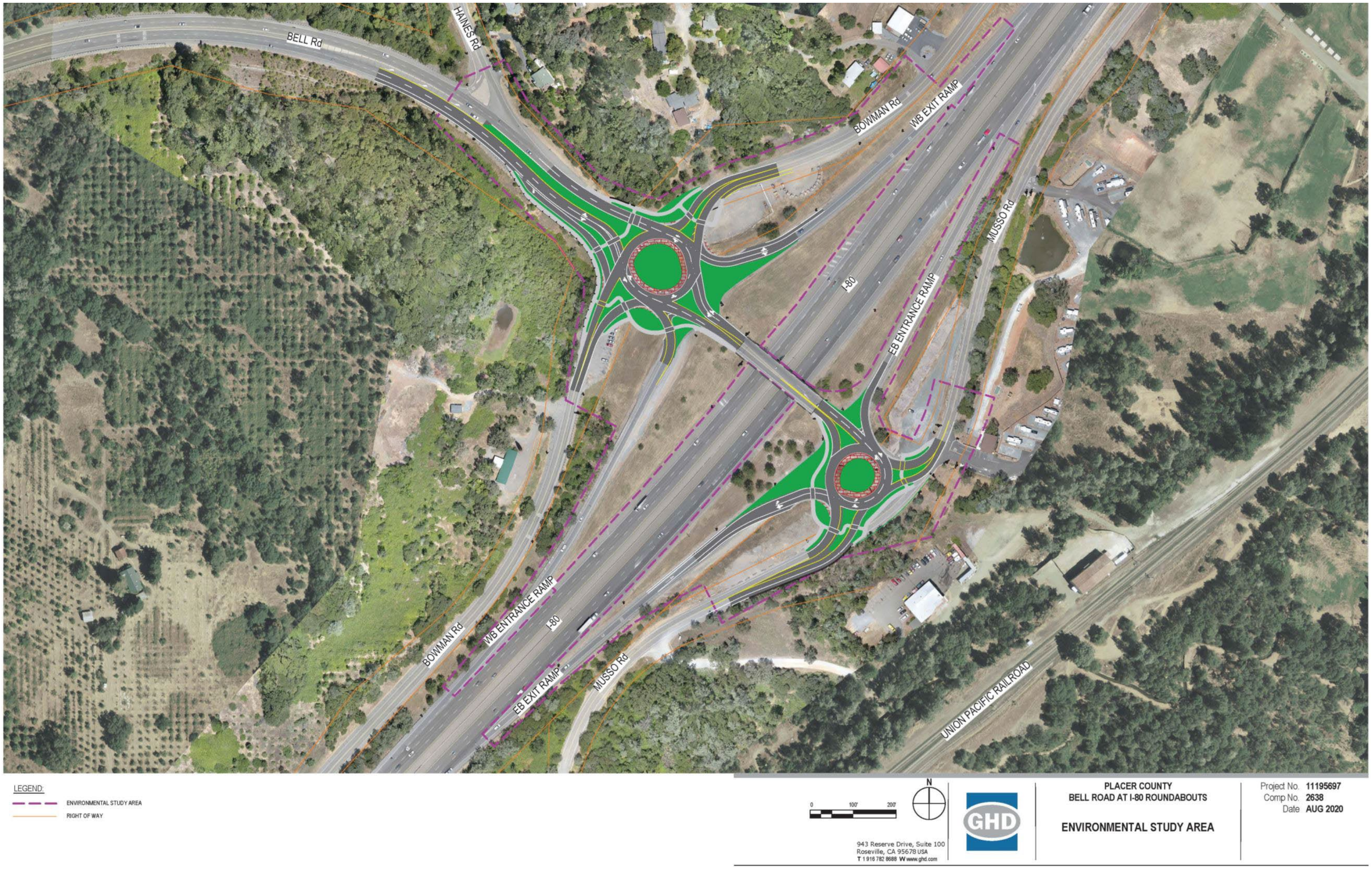


Figure 2. Environmental Study Area

1.3 Purpose and Need

Project Purpose

The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the interchange. The secondary purpose of this project is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

Project Need

Congestion in the project area during the AM and PM peak hours has significantly impacted the efficiency of the interchange to the point where the traffic is backing up onto the mainline. This condition is an operational and safety concern for Placer County and Caltrans that needs to be addressed.

1.4 Baseline and Forecasted Conditions for No-Build and Project Alternatives

The proposed alternatives include the No-Build Alternative and the Build Alternative. In response to the deficient traffic operations and safety concerns, several Build Alternatives were considered for the project and presented in the Project Initiation Document (PID) phase within the Project Study Report / Project Development Support (PSR/PDS) document. The PSR/PDS was approved by Caltrans on April 18, 2020. Three build alternatives and a No-Build Alternative were proposed in the PSR/PDS. The Build Alternatives evaluated were the following:

> **Build Alternative 1**: Signalization of the stop-controlled off-ramp intersections with overcrossing widening;
>
> **Build Alternative 2**: Roundabouts at the I-80 EB and WB ramp intersections, including the Bowman Road intersection on the west and the Musso Road intersection on the east; and
>
> **Build Alternative 3**: Roundabout at the WB off-ramp and reconstruction of the EB on-ramp to a loop on-ramp.

It was determined that Build Alternatives 1 and 3 would not be viable design options to evaluate further and were ultimately rejected in the PID process. Build Alternative 2 was determined to best meet the safety purpose of the project for all modes of travel, while addressing future mobility needs. This alternative is further referenced as the Build Alternative in this document.

1.4.1 Existing Roadways and Traffic Conditions

The baseline year used for analysis is 2019, as it represents the ‘existing conditions’ of the project area and vicinity. Roadways that provide vehicle circulation within the general vicinity of the project area are Bell Road, I-80, Musso Road, and Bowman Road. Figure 1 shows the study intersections and the surrounding area. The following brief descriptions present characteristics unique to the roadways providing access to the interchange along Bell Road at I-80. Traffic information comes from the Intersection Control Evaluation (ICE) and Transportation Operations Analysis Report (TOAR) prepared for the project (GHD 2020a, GHD 2020b).

Interstate 80 (I-80)

I-80, in the project vicinity, is a six-lane, divided freeway extending through Auburn to the south and Colfax to the north. As a major freeway, I-80 provides east-west interstate access from the San Francisco Bay Area to Nevada and beyond across the United States. Within the project area, I-80 extends in a northeast-southwest direction. I-80 consists of three 12-foot lanes in each direction with a posted speed limit of 65 miles per hour (mph). I-80 is a Terminal Access Route for Surface Transportation Assistance Act (STAA) trucks.

Bell Road

Bell Road is a four lane, Minor Arterial roadway that extends in a northwest-southeast direction and has a speed limit of 55 miles per hour (mph) between Bowman Road and to Richardson Drive. Bell Road transitions to a two-lane roadway across the I-80 interchange as well as west of Richardson Drive. It is a County-owned facility that links the Auburn urban area along SR 49 to the rest of the County and I-80. Bell Road is able to accommodate STAA trucks.

Musso Road

Musso Road is a two-lane roadway that provides access to local and rural businesses/properties on the southeastern side of I-80. The speed limit is not posted but advisory speeds for curves show 30 mph. Musso Road terminates approximately 1,000 feet to the southwest and 3,000 feet to the northeast of Bell Road. The railroad, I-80, and the creek border Musso Road and therefore, use is not likely to change significantly in the future.

Bowman Road

Bowman Road is a two-lane roadway that traverses in the northeastern-southwestern direction, largely paralleling I-80 in the vicinity of Bell Road. To the northeast, Bowman Road provides access to residences and transitions into Christian Valley Road. To the southwest, Bowman Road provides access to business, residences, and schools. Bowman Road terminates into I-80 WB at the Auburn Ravine Road/Foresthill Road interchange. Ultimately, Bowman Road is slated to be improved with Class II bike lanes as per the adopted County bicycle master plan.

Intersection Operations

Existing weekday AM and PM peak hour intersection traffic operations were quantified utilizing the existing traffic volumes and intersection lane geometrics and control. Table 1 presents a summary of the existing conditions. Figure 3 provides a visual of the existing lane geometrics and control.

Table 1. Summary of Existing Traffic Conditions (2019).

#	Intersection	Control Type [1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Volume (veh/h)	Delay[1] (s/veh)	LOS[1]	Volume (veh/h)	Delay[1] (s/veh)	LOS[1]
1	Bowman Rd/Bell Road	Signal	D	2,611	11.7	B	2,723	11.8	B
2	I-80 WB Ramps/Bell Rd	TWSC	D	1,973	**OVR**	**F**	2,383	28.5	D
3	I-80 EB Ramps/Bell Rd	AWSC	D	1,031	32.5	D	**1,428**	**98.7**	**F**
4	Musso Rd/Bell Rd	TWSC	D	58	8.8	A	120	9.1	A

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal
3. Bold = Unacceptable Conditions
4. OVR = Delay over 300 seconds

The intersections of Bell Road and the I-80 WB and EB ramps currently exceed the threshold for acceptable traffic operations during the AM and PM peak hours, respectively. During the AM peak hour, the Bell Road and I-80 WB ramps intersection has approximately 400 vehicles attempting to make a right turn at the two way stop controlled (TWSC) intersection against a conflicting volume of approximately 900 vehicles traveling west. This conflict causes a significant delay on the ramp. There is also the potential for increased collision frequency on the I-80 mainline if vehicle queuing caused by insufficient capacity at the interchange extends beyond the storage capacity of the ramp.

The Bell Road and I-80 EB ramps intersection is an all way stop controlled (AWSC) intersection, and during the PM peak hour, the high volume at the intersection causes significant delay for all of the approaches and more specifically, the off-ramp approach. This results in an unacceptable overall Level of Service (LOS) and queue lengths. There is the potential for increased collision frequency on the I-80 mainline if vehicle queuing caused by insufficient capacity at the interchange extends beyond the storage capacity of the ramp.

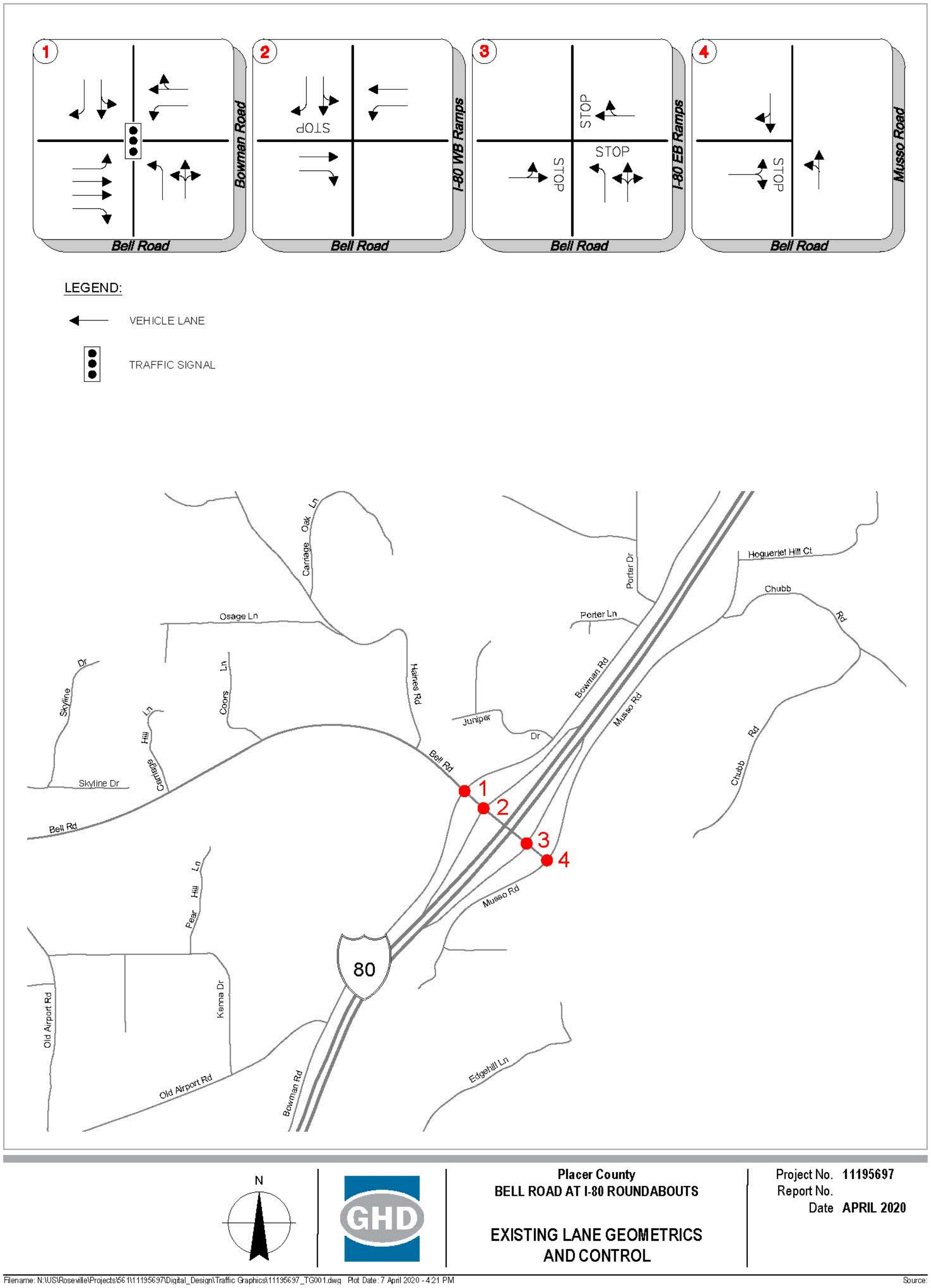


Figure 3. Existing Lane Geometrics and Controls

Collision Data

Collision data was provided through the Caltrans Traffic Accident Surveillance and Analysis System (TASAS) – Transportation Systems Network (TSN) Reports for I-80 and the on- and off-ramps to Bell Road in the project area. The Statewide Integrated Traffic Records System (SWITRS) was also used for collision data along Bell Road, Musso Road, and Bowman Road. To capture the collision patterns and any trends within the study area, the most recent five years were obtained from SWITRS (January 1, 2014 – December 31, 2018). This data was then compared to the overlapping years with Caltrans data for I-80 to generate a comprehensive account of collisions.

Table 2 summarizes the Bell Road intersection collision data in the project area between 2014 through 2018. A total of nineteen intersection collisions were recorded, with the highest annual number (six collisions) occurring in 2016.

Table 2. Bell Road Intersection Collisions (2014-2018)

#	Intersection	Year					
		2014	2015	2016	2017	2018	Total Collisions
1	Bowman Rd/Bell Road	2	1	2	2	3	10
2	I-80 WB Ramps/Bell Rd	0	0	2	0	0	2
3	I-80 EB Ramps/Bell Rd	0	2	2	0	1	5
4	Musso Rd/Bell Rd	1	0	0	1	0	2

Table 3 shows how the collision severity compares to the total number of collisions for the study intersections. There were six injury collisions and no fatalities recorded between 2014 through 2018. Three of those collisions were at the intersection of Bell Road and Bowman Road. For that five-year period, injury collisions comprised 32% of total collisions, whereas property damage only (PDO) collisions comprised 68% of total collisions.

Table 3. Bell Road Intersection Collisions – Collision Severity (2014-2018)

#	Intersection	Total Collisions	Severity		
			Fatal	Injury	PDO
1	Bell Road & Bowman Road	10	0	3	7
2	Bell Road & I-80 WB Ramps	2	0	0	2
3	Bell Road & I-80 EB Ramps	5	0	2	3
4	Bell Road & Musso Road	2	0	1	1
Total		*19*	*0*	*6*	*13*

In diagnosing the possible causes and overall trends for the collisions, the primary collision factor was quantified for the same five-year period. As shown in Table 4, the leading factor for collisions was unsafe speed (37% of total collisions), followed by improper turning (21%), and automobile right of way (21%). Automobile right of way typically refers to a collision where the party at fault did not yield properly to another vehicle.

Table 4. Bell Road Intersection Collisions – Primary Collision Factor (2014-2018)

Intersection	Primary Collision Factor					
	Unsafe Speed	Improper Turning	Automobile Right of Way	Traffic Signals and Signs	Other Hazardous Violation	Unsafe Starting/ Backing
Bell Rd & Bowman Rd	5	1	2	1	0	1
Bell Rd & I-80 WB Ramps	0	1	1	0	0	0
Bell Rd & I-80 EB Ramps	2	1	0	0	1	1
Bell Rd & Musso Rd	0	1	1	0	0	0
Total	***7***	***4***	***4***	***1***	***1***	***2***

Table 5 further quantifies the types of collisions, categorizing incidents into rear-end (42%), broadside (26%), sideswipe (16%), and hit object (16%).

As noted above, rear-end collisions suggest that vehicles were not maintaining proper following distance or speed differential from vehicles turning on and off the Bell Road intersections. The majority of these collisions occurred at the Bell Road and Bowman Road intersection, which is currently controlled by a traffic signal. Rear-end incidents are a typical collision type at signalized intersections due to frequent stop and go conditions.

Table 5. Bell Road Intersection Collisions – Collision Type (2014-2018)

Intersection	**Collision Type**			
	Sideswipe	**Rear End**	**Broadside**	**Hit Object**
Bell Road & Bowman Road	1	6	3	0
Bell Road & I-80 WB Ramps	0	0	1	1
Bell Road & I-80 EB Ramps	2	2	0	1
Bell Road & Musso Road	0	0	1	1
Total	***3***	***8***	***5***	***3***

1.4.2 No-Build Alternative

The No-Build (No Action) Alternative is the analysis scenario in which no improvements to the Bell Road at I-80 interchange are made before the projected opening year, Year 2025, and the design year, Year 2045. The LOS calculation reports for the No Build Alternative are located in the project's TOAR and ICE, provided as Appendix A and Appendix B, respectively.

Consequently, the No-Build Alternative represents future travel conditions in the Bell Road Project study area without the proposed project and is the baseline against which the Build Alternative will be assessed to meet NEPA requirements.

The No Build traffic conditions for year 2025 and 2045 are provided in Table 6 and Table 7 below, respectively. By 2025, with no improvements at the Bell Road at I-80 interchange (No Build), the LOS is forecasted to degrade to LOS F in both the AM and PM peak hour. With no improvements and increased delays, the queues are anticipated to increase when compared to existing conditions. There are several queues that are projected to exceed available storage and impact downstream intersection/mainline operations in the 2025 No Build conditions.

Under the Year 2045 No Build conditions, the intersection LOS at I-80 and Bell Road is forecasted at further degraded LOS F conditions in the AM and PM peak hour. This is below the acceptable standard for Placer County and Caltrans. In addition, with the projected increase in traffic on both off-ramps, the TWSC controlled intersections will not be able to accommodate the projected traffic demand and will be characterized by excessive queues potentially impacting mainline operations. There are several queues that are projected to exceed available storage and degrade downstream intersection/mainline operations in the 2045 No Build conditions.

Table 6. Summary of Future No-Build Traffic Conditions (2025).

#	Intersection	Control Type [1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Volume (veh/h)	Delay[1] (s/veh)	LOS[1]	Volume (veh/h)	Delay[1] (s/veh)	LOS[1]
1	Bowman Rd/Bell Road	Signal	D	2,380	12.5	B	2,890	12.4	B
2	I-80 WB Ramps/Bell Rd	TWSC	D	2,090	**OVR**	**F**	2,525	34.4	D
3	I-80 EB Ramps/Bell Rd	AWSC	D	1,095	**40.8**	**E**	1,515	**120.6**	**F**
4	Musso Rd/Bell Rd	TWSC	D	75	8.9	A	135	9.2	A

Notes:
1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal
3. Bold = Unacceptable Conditions
4. OVR = Delay over 300 seconds

Table 7. Summary of Future No-Build Traffic Conditions (2045).

#	Intersection	Control Type 1,2	Target LOS	AM Peak Hour			PM Peak Hour		
				Volume (veh/h)	Delay[1] (s/veh)	LOS[1]	Volume (veh/h)	Delay[1] (s/veh)	LOS[1]
1	Bowman Rd/Bell Road	Signal	D	2,820	13.6	B	3,430	14.5	B
2	I-80 WB Ramps/Bell Rd	TWSC	D	2,475	**OVR**	**F**	2,995	**146.4**	**F**
3	I-80 EB Ramps/Bell Rd	AWSC	D	1,300	**51.6**	**F**	1,795	**140.3**	**F**
4	Musso Rd/Bell Rd	TWSC	D	85	8.9	A	160	9.3	A

Notes:
1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal
3. Bold = Unacceptable Conditions
4. OVR = Delay over 300 seconds

1.4.3 Project Build Alternative

The Build Alternative would improve the existing intersections along Bell Road at I-80 with a six-legged roundabout on the west, incorporating Bowman Road and the I-80 WB ramps, and a five-legged roundabout on the east, incorporating Musso Road and the I-80 EB Ramps. Refer to Figure 2, Environmental Study Area, for the current project design layout.

Roundabout improvements at the Bell Road at I-80 interchange would include, but not be limited to, the following:

- A 10-foot shared use path separated from the roadway with a five-foot minimum landscaped buffer for pedestrian safety and to guide pedestrians to correct crossing locations;
- Crosswalks and Americans with Disabilities Act (ADA) accessible ramps along pedestrian facilities; and
- Vehicular speeds ranging from 15 to 30 mph after project buildout within the interchange.

The project design was determined to best meet the safety purpose of the project for all modes of travel as it eliminated queue back on the off-ramps onto mainline I-80 and would not require any mainline disruption during construction. The project is intended to improve overall operations, circulation, and accessibility for drivers and cyclists at the existing Bell Road at I-80 Interchange.

The 10-foot shared-use path would convey pedestrian and bicycle traffic through the intersection and provide the opportunity for cyclists to exit the bicycle lane via a bicycle ramp and navigate the intersection on the shared-use path and through the crosswalks. Cyclists would also have the option to exit the bicycle lane and enter the roadway to ride with vehicle traffic through the roundabout.

Crosswalks would be split into two separate crossings through the provision of the pedestrian refuges at the splitter islands. These two-stage crossings would reduce the amount of sustained time a pedestrian is in potential conflict with motorized vehicles by limiting the length of each crossing and limiting each crossing to one direction of vehicle travel at a time.

Additionally, the project would provide enhanced lighting to improve roadway visibility for drivers during nighttime hours. Lighting is anticipated to be installed at ramp merges and diverges along the shoulders of I-80.

The project is not capacity-enhancing.

The project would not increase the vehicle capacity of the roadway. The roundabouts would be designed to accommodate future growth projected to occur in Year 2045. Intersection geometrics and pedestrian crossings would be consistent with the National Cooperative Highway Research Program (NCHRP) Report 672 entitled “Roundabouts: An Information Guide, 2nd Edition” (Guide). Therefore, the project would not result in volume within or adjacent to the intersections. Additionally, the project would result in no changes to the vehicle fleet utilizing the project intersections, nor result in substantive changes miles traveled within the project area, as demonstrated within Section 1.4.4, below.

The project would improve traffic flow.

The Transportation Operations Analysis Report (TOAR) and associated modeling demonstrate that traffic flow would be improved (less delay) under the ‘with project’ scenario. There would be improved traffic flow through the intersection and an associated reduction in queuing and future idling during project operation.

1.4.4 Comparison of Existing/Baseline and Build Alternatives

Multiple operational parameters were evaluated to determine if the project is potentially a Project of Air Quality Concern (POAQC). Specifically, the annual average daily trips (AADT) through the intersections, fleet mix (percent trucks), Level of Service (LOS), delay, and peak hour volumes were evaluated for year 2025 and year 2045 for both the Build and No Build Scenarios. The years 2025 and 2045 analyses are provided in separate subsections below. Data supporting the analysis are from Project’s TOAR and ICE, provided as Appendix A and Appendix B, respectively. As shown within each subsection, The Build Alternative would not be capacity-enhancing, and would have no effect on AADT, percent truck, or peak hour volumes, through the project area. The project would improve LOS and reduce delay, which provides an air quality benefit from reducing idling emissions.

Additionally, PCTPA prepared an independent vehicle miles travelled (VMT) analysis as part of their High Priority Screening for the Placer Sacramento Action Plan. The results of that VMT analysis are provided in Table 8. As shown in the table, the project is anticipated to reduce VMT through the project area.

Table 8. Placer County Transportation Planning Agency VMT Analysis of Project

Lead Agency	Project	Model	Project Description	VMT	Safety	Net Change in VMT Caused by Project Action	Model Assumptions and Notes
Placer County	Bell Road at I-80 Roundabouts Project	Roseville Model (From Placer Ranch TIS)	The County is proposing improvements to the existing I-80 and Bell Road interchange by combining four stop controlled and signalized intersections into two modern, yield controlled, 5- to 6-legged, single and multi-lane roundabouts designed to accommodate forecasted future traffic volumes and provide an alternative access route to the SR/49/I-80 interchange	2-Decreases VMT	Improves Safety	-1,946	Changed speed on Bell Road overcrossing between Ramps to 40 mph (from 35 mph) to reflect reduced delays resulting from RAB vs. stop signs.

Year 2025 Operational Conditions

A comparison of operational conditions under year 2025 No Build and 2025 Build Alternative is provided in Table 9. By 2025, with no improvements at the Bell Road at I-80 interchange (No Build), the LOS is forecasted to degrade to LOS F in both the AM and PM peak hour. With no improvements and increased delays, the queues are anticipated to increase when compared to existing conditions. There are several queues that are projected to exceed available storage and impact downstream intersection/mainline operations in the 2025 No Build conditions.

Under the Build Alternative scenario, the roundabouts at the Bell Road at I-80 interchange are projected to operate at LOS A for the AM and PM peak hours in Year 2025 conditions. All queue lengths would be well within the storage length in, and the Build Alternative would improve flow and pedestrian/bicycle infrastructure, reduce queuing, and decrease potential for collisions. The Build Alternative would not be capacity-enhancing, and would have no effect on peak hour volumes, AADT, or fleet mix (percent trucks), through the project area.

Table 9. Comparison of Year 2025 Alternative Operations

Scenario	Peak Hour	Intersection			
		1	2	3	4
		Bowman Rd/Bell Road	I-80 WB Ramps/Bell Rd	I-80 EB Ramps/Bell Rd	Musso Rd/Bell Rd
Level of Service Comparison					
No Build Alternative	AM Peak Hour	B	**F**	**E**	A
	PM Peak Hour	B	D	**F**	A
Build Alternative	AM Peak Hour	A		A	
	PM Peak Hour	A		A	
Change in LOS under Build Alternative	*AM Peak Hour*	*Improved*		*Improved*	
	PM Peak Hour	*Improved*		*Improved*	
Delay (seconds)					
No Build Alternative	AM Peak Hour	12.5	**OVR**	**40.8**	8.9
	PM Peak Hour	12.4	34.4	**120.6**	9.2
Build Alternative	AM Peak Hour	7.6		7.7	
	PM Peak Hour	7.5		8.3	
Change in in Delay under Build Alternative	*AM Peak Hour*	*Reduced (Improved)*		*Reduced (Improved)*	
	PM Peak Hour	*Reduced (Improved)*		*Reduced (Improved)*	
Volume (veh/s)					
No Build Alternative	AM Peak Hour	2,380	2,090	1,095	75
	PM Peak Hour	2,890	2,525	1,515	135
Build Alternative	AM Peak Hour	2,380 + 2,090		1,095 + 75	
	PM Peak Hour	2,890 + 2,525		1,515 + 135	
Change in Volume under Build Alternative	*AM Peak Hour*	*No Change*		*No Change*	
	PM Peak Hour	*No Change*		*No Change*	
Volume (AADT)					
No Build Alternative	DAILY	32,465	28,365	17,019	1,517
Build Alternative	DAILY	32,465 + 28,365		17,019 + 1,517	
Change in AADT	DAILY	*No Change*		*No Change*	
Fleet Mix (Percent Trucks)					
No Build Alternative	N/A	2%	2%	2%	2%
Build Alternative	N/A	2%		2%	
Change in % Trucks	N/A	*No Change*		*No Change*	
Speed (mph)					
No Build Alternative	N/A	18	2	14	22
Build Alternative	N/A	24		22	

Year 2045 Operational Conditions

A comparison of operational conditions under year 2045 No Build and 2045 Build Alternative is provided in Table 10. Under the Year 2045 No Build conditions, the intersection LOS at I-80 and Bell Road is forecasted at further degraded LOS F conditions in the AM and PM peak hour. This is below the acceptable standard for Placer County and Caltrans. In addition, with the projected increase in traffic on both off-ramps, the TWSC controlled intersections will not be able to accommodate the projected traffic demand and will be characterized by excessive queues potentially impacting mainline operations. There are several queues that are projected to exceed available storage and degrade downstream intersection/mainline operations in the 2045 No Build conditions.

Under the Build scenario in Year 2045, the Bell Road at I-80 interchange is projected to operate at LOS A conditions during the AM peak hour. The intersection of Bowman Road/Bell Road/I-80 WB ramps is projected to operate at LOS B and the intersection of I-80 EB Ramps/Bell Road/Musso Road is projected to operate at LOS A during the PM peak hour. All queue lengths would be well within the storage length, and the project would improve flow and pedestrian/bicycle infrastructure, reduce queuing, and decrease potential for collisions. The Build Alternative would not be capacity-enhancing, and would have no effect on peak hour volumes, AADT, or fleet mix (percent truck) through the project area.

Table 10. Comparison of Year 2045 Alternative Operations

Scenario	Peak Hour	Intersection			
		1	2	3	4
		Bowman Rd/Bell Road	I-80 WB Ramps/Bell Rd	I-80 EB Ramps/Bell Rd	Musso Rd/Bell Rd
Level of Service Comparison					
No Build Alternative	AM Peak Hour	B	**F**	**F**	A
	PM Peak Hour	B	**F**	**F**	A
Build Alternative	AM Peak Hour	A		A	
	PM Peak Hour	A		A	
Change in LOS under Build Alternative	*AM Peak Hour*	*Improved*		*Improved*	
	PM Peak Hour	*Improved*		*Improved*	
Delay (seconds)					
No Build Alternative	AM Peak Hour	13.6	**OVR**	**51.6**	8.9
	PM Peak Hour	14.5	**146.4**	**140.3**	9.3
Build Alternative	AM Peak Hour	7.6		7.2	
	PM Peak Hour	8.5		9.7	
Change in in Delay under Build Alternative	*AM Peak Hour*	*Reduced (Improved)*		*Reduced (Improved)*	
	PM Peak Hour	*Reduced (Improved)*		*Reduced (Improved)*	
Volume (veh/s)					
No Build Alternative	AM Peak Hour	2,820	2,475	1,300	85
	PM Peak Hour	3,430	2,995	1,795	160
Build Alternative	AM Peak Hour	2,820 + 2,475		1,300 + 85	
	PM Peak Hour	3,430 + 2,995		1,795 + 160	
Change in Volume under Build Alternative	*AM Peak Hour*	*No Change*		*No Change*	
	PM Peak Hour	*No Change*		*No Change*	
Volume (AADT)					
No Build Alternative	DAILY	38,531	33,645	20,164	1,797
Build Alternative	DAILY	38,531 + 33,645		20,164 + 1,797	
Change in AADT	DAILY	*No Change*		*No Change*	
Fleet Mix (Percent Trucks)					
No Build Alternative	N/A	2%	2%	2%	2%
Build Alternative	N/A	2%		2%	
Change in % Trucks	N/A	*No Change*		*No Change*	
Speed (mph)					
No Build Alternative	N/A	12	2	14	22
Build Alternative	N/A	24		22	

1.5 Construction Activities and Schedule

Currently, construction is estimated to begin in 2022, and be completed within 17 months. Although construction is planned to last approximately 1.5 years, no construction activities are anticipated to last more than five years at any individual site. Emissions from construction-related activities are thus considered temporary as defined in 40 CFR 93.123(c)(5); and are not required to be included in PM hot-spot analyses to meet conformity requirements.

2. Regulatory Setting

Many statutes, regulations, plans, and policies have been adopted at the federal, state, and local levels to address air quality issues related to transportation and other sources. The proposed project is subject to air quality regulations at each of these levels. This section introduces the pollutants governed by these regulations and describes the regulation and policies that are relevant to the proposed project.

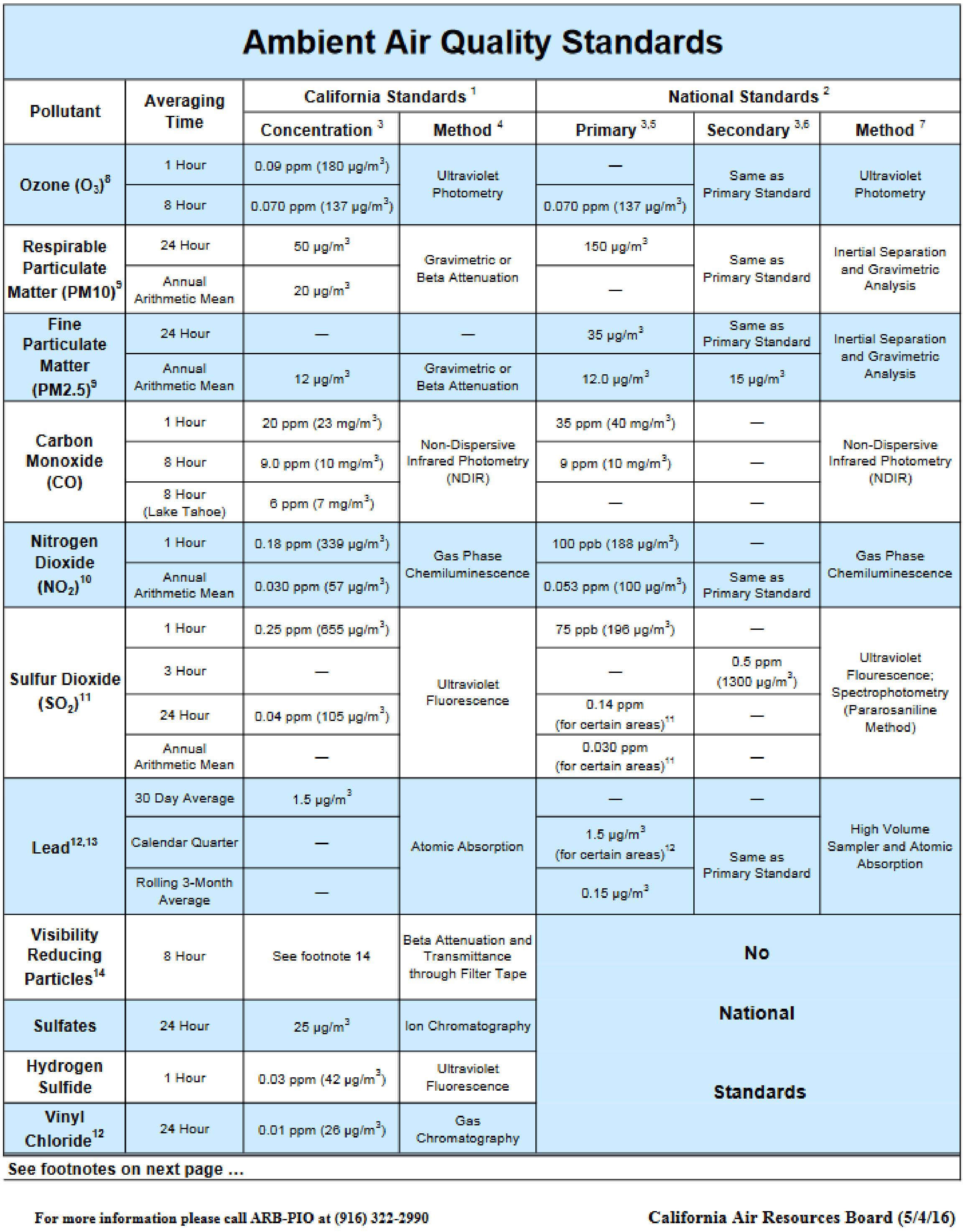
2.1 Pollutant-Specific Overview

Air pollutants are governed by multiple federal and state standards to regulate and mitigate health impacts. At the federal level, there are six criteria pollutants for which National Ambient Air Quality Standards (NAAQS) have been established: CO, Pb, NO_2, O_3, PM ($PM_{2.5}$ and PM_{10}), and SO_2. The U.S. EPA has also identified nine priority mobile source air toxics: 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/). In California, sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride are also regulated.

2.1.1 Criteria Pollutants

The Clean Air Act requires the U.S. EPA to set National Ambient Air Quality Standards (NAAQS) for six criteria air contaminants: ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. It also permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants. Table 11 documents the current air quality standards while Table 12 summarizes the sources and health effects of the six criteria pollutants and pollutants regulated in the state of California.

Table 11. State and Federal Ambient Air Quality Standards.



Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.070 ppm (137 $\mu g/m^3$)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	12.0 $\mu g/m^3$	15 $\mu g/m^3$	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Gas Phase Chemiluminescence	100 ppb (188 $\mu g/m^3$)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)		0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Ultraviolet Fluorescence	75 ppb (196 $\mu g/m^3$)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 $\mu g/m^3$)	
	24 Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 $\mu g/m^3$		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

See footnotes on next page …

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California Air Resources Board (5/4/16)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

   Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

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Table 12. State and Federal Criteria Air Pollutant Effects and Sources.

Pollutant	Principal Health and Atmospheric Effects	Typical Sources
Ozone (O_3)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds (ROG or VOC) and nitrogen oxides (NOx) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.
Respirable Particulate Matter (PM_{10})	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic and other aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke & vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.
Fine Particulate Matter ($PM_{2.5}$)	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the $PM_{2.5}$ size range. Many toxic and other aerosol and solid compounds are part of $PM_{2.5}$.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical and photochemical reactions involving other pollutants including NOx, sulfur oxides (SOx), ammonia, and ROG.
Carbon Monoxide (CO)	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Nitrogen Dioxide (NO_2)	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of stormwater. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.
Sulfur Dioxide (SO_2)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.
Lead (Pb)	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.
Visibility-Reducing Particles (VRP)	Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas. However, some issues and measurement methods are similar.	See particulate matter above. May be related more to aerosols than to solid particles.
Sulfate	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.
Hydrogen Sulfide (H_2S)	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment

		plants, and mines. Some natural sources like volcanic areas and hot springs.
Vinyl Chloride	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes.

2.1.2 Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments of 1990, whereby Congress mandated that the U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. The U.S. EPA has assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of U.S. EPA's Integrated Risk Information System (https://www.epa.gov/iris). In addition, the U.S. EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-hazard contributors from the 2011 National Air Toxics Assessment (https://www.epa.gov/national-air-toxics-assessment). These are *1,3-butadiene*, *acetaldehyde*, *acrolein*, *benzene*, *diesel particulate matter (diesel PM)*, *ethylbenzene*, *formaldehyde*, *naphthalene*, and *polycyclic organic matter*. While the Federal Highway Administration (FHWA) considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future U.S. EPA rules.

The 2007 U.S. EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using U.S. EPA's MOVES2014a model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emission rate for the priority MSATs is projected for the same time period, as shown in Figure 4.

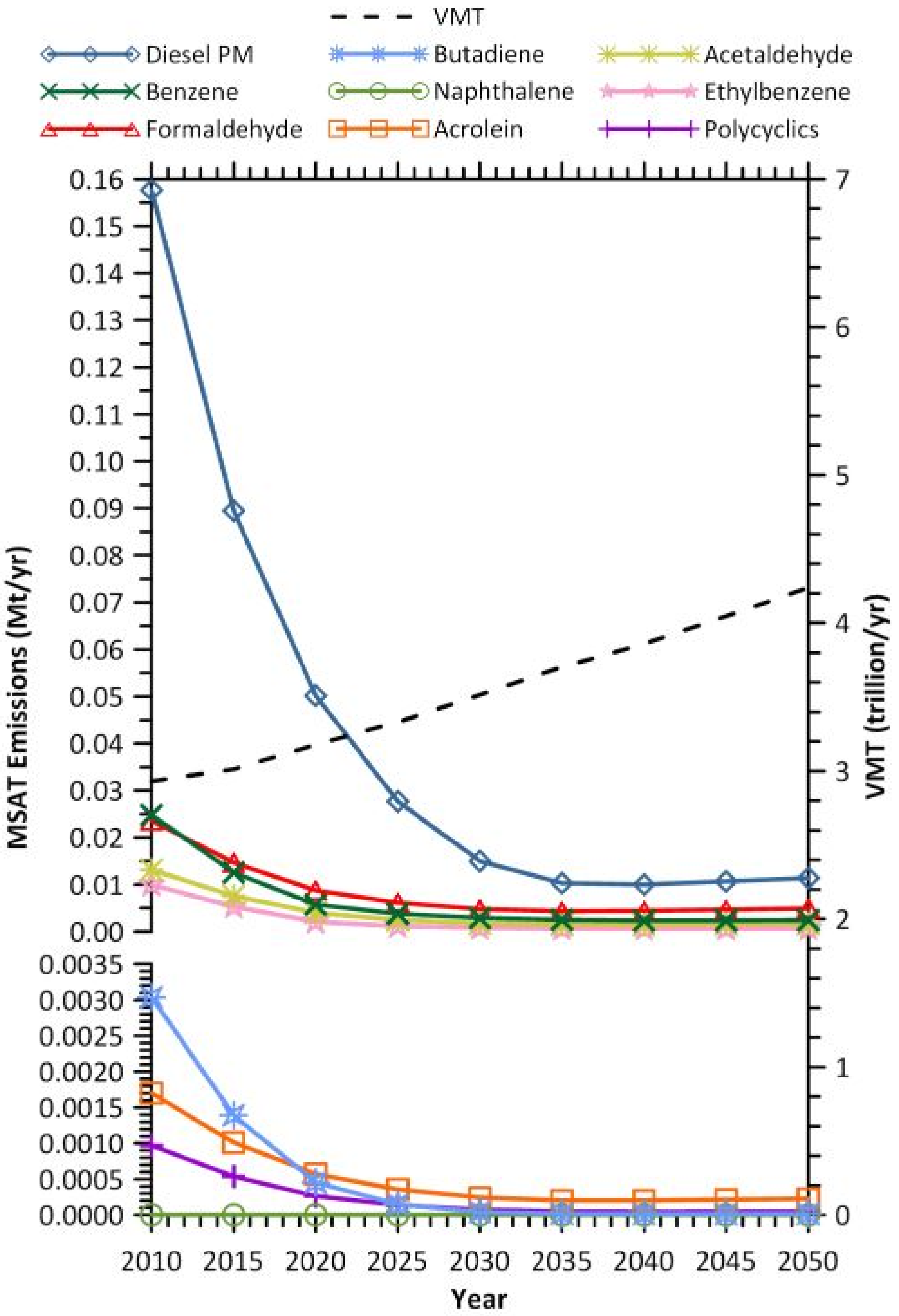

Figure 4. Projected National MSAT Trends, 2010-2050 (Source: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/).

2.1.3 Greenhouse Gases

The term greenhouse gas (GHG) is used to describe atmospheric gases that absorb solar radiation and subsequently emit radiation in the thermal infrared region of the energy spectrum, trapping heat in the Earth's atmosphere. These gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and water vapor, among others. A growing body of research attributes long-term changes in temperature, precipitation, and other elements of Earth's climate to large increases in GHG emissions since the mid-nineteenth century, particularly from human activity related to fossil fuel combustion. Anthropogenic GHG emissions of particular interest include CO_2, CH_4, N_2O, and fluorinated gases.

GHGs differ in how much heat each traps in the atmosphere (global warming potential, or GWP). CO_2 is the most important GHG, so amounts of other gases are expressed relative to CO_2, using a metric called "carbon dioxide equivalent" (CO_2e). The global warming potential of CO_2 is assigned a value of 1, and the warming potential of other gases is assessed as multiples of CO_2. For example, the 2007 International Panel on Climate Change *Fourth Assessment Report* calculates the GWP of CH_4 as 25 and the GWP of N_2O as 298, over a 100-year time horizon.[1] Generally, estimates of all GHGs are summed to obtain total emissions for a project or given time period, usually expressed in metric tons ($MTCO_2e$), or million metric tons ($MMTCO_2e$).[2]

As evidence has mounted for the relationship of climate changes to rising GHGs, federal and state governments have established numerous policies and goals targeted to improving energy efficiency and fuel economy, and reducing GHG emissions. Nationally, electricity generation is the largest source of GHG emissions, followed by transportation. In California, however, transportation is the largest contributor to GHGs.

At the federal level, the National Environmental Policy Act (NEPA) (42 United States Code [USC] Part 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level. However, the U.S. EPA and the National Highway Traffic Safety Administration issued the first corporate fuel economy standards in 2010, requiring cars and light-duty vehicles to achieve certain fuel economy targets by 2016, with the intention of gradually increasing the targets and the range of vehicles to which they would apply.

California has enacted aggressive GHG reduction targets, starting with Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 is California's signature climate change legislation. It set the goal of reducing statewide GHG emissions to 1990 levels by 2020, and required the California Air Resources Board (ARB) to develop a Scoping Plan that describes the approach

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[1] See Table 2.14 in IPCC Fourth Assessment Report: Climate Change 2007 (AR4): The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA. http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf.

[2] See http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools.

California will take to achieve that goal and to update it every 5 years. In 2015, Governor Jerry Brown enhanced the overall adaptation planning effort with Executive Order (EO) B-30-15, establishing an interim GHG reduction goal of 40 percent below 1990 levels by 2030, and requiring state agencies to factor climate change into all planning and investment decisions. SB 32, Chapter 249, 2016, codifies the GHG reduction targets established in EO B-30-15 to achieve a mid-range goal of 40 percent below 1990 levels by 2030.

Senate Bill (SB) 375, the Sustainable Communities and Climate Protection Act of 2008, furthered state climate action goals by mandating coordinated transportation and land use planning through preparation of sustainable communities strategies (SCS). The ARB sets GHG emissions reduction targets for passenger vehicles for each region. Each regional metropolitan planning organization must include in its regional transportation plan an SCS proposing actions toward achieving the regional emissions reduction targets.[3]

With these and other State Senate and Assembly bills and executive orders, California advances an innovative and proactive approach to dealing with GHG emissions and climate change.

2.1.4 Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a toxic air contaminant by the ARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

Asbestos can be released from serpentine and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.

Serpentine may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology has developed a map showing the general location of ultramafic rock in the state (www.conservation.ca.gov/cgs/minerals/hazardous_minerals/asbestos/Pages/index.aspx).

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[3] https://www.arb.ca.gov/cc/sb375/sb375.htm

2.2 Regulations

2.2.1 Federal and California Clean Air Act

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the California Clean Air Act (CCAA) is its companion state law. These laws and related regulations by the U.S. EPA and the (ARB) set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and state ambient air quality standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$), and sulfur dioxide (SO_2). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety, and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (air toxics); some criteria pollutants are also air toxics or may include certain air toxics in their general definition.

2.2.2 Transportation Conformity

The conformity requirement is based on Federal Clean Air Act Section 176(c), which prohibits the U.S. Department of Transportation and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to State Implementation Plan (SIP) for attaining the NAAQS. "Transportation Conformity" applies to highway and transit projects and takes place on two levels: the regional—or, planning and programming level—and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and "maintenance" (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. The U.S. EPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and in some areas (although not in California), sulfur dioxide (SO_2). California has attainment or maintenance areas for all of these transportation-related "criteria pollutants" except SO_2, and also has a nonattainment area for lead (Pb); however, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years (for the RTP), and 4 years (for the FTIP). RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), FHWA, and Federal Transit Administration (FTA), make the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and "open-to-traffic" schedule of a proposed transportation project are the same as described in the RTP and the Transportation Improvement Program (TIP), then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP and the project has a design concept and scope[4] that has not changed significantly from those in the RTP and TIP. If the design concept and scope have changed substantially from that used in the RTP Conformity analysis, RTP and TIP amendments may be needed. Project-level conformity also needs to demonstrate that project analyses have used the latest planning assumptions and U.S. EPA-approved emissions models; the project complies with any control measures in the SIP in PM areas. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

2.2.3 National Environmental Policy Act (NEPA)

NEPA requires that policies and regulations administered by the federal government are consistent with its environmental protection goals. NEPA also requires that federal agencies use an interdisciplinary approach to planning and decision-making for any actions that could impact the environment. It requires environmental review of federal actions including the creation of Environmental Documents that describe the environmental effects of a proposed project and its alternatives (including a section on air quality impacts).

2.2.4 California Environmental Quality Act (CEQA)

CEQA[5] is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA documents address CCAA requirements for transportation projects. While state standards are often more strict than federal standards, the state has no conformity process.

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[4] "Design concept" means the type of facility that is proposed, such as a freeway or arterial highway. "Design scope" refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project.

[5] For general information about CEQA, see: http://resources.ca.gov/ceqa/more/faq.html.

2.2.5 Local

The U.S. EPA has delegated responsibility to air districts to establish local rules to protect air quality. Caltrans' Standard Specification 14-9.02 (Caltrans, 2015) requires compliance with all applicable air quality laws and regulations including local and air district ordinances and rules.

Placer County Air Pollution Control District

The project site is located in the Sacramento Valley Air Basin portion of Placer County, and within the Placer County Air Pollution Control District's (PCAPCD) jurisdiction. The following PCAPCD rules are applicable to the project:

> **Rule 202 Visible Emissions**: A person shall not discharge into the atmosphere from any single source of emissions whatsoever any air contaminant for a period or periods aggregating more than three (3) in any one (1) hour which is:
>
> > a. As dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or
> >
> > b. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Subsection (A) above.
>
> **Rule 217 Cutback and Emulsified Asphalt Paving Materials:** A person shall not discharge to the atmosphere volatile organic compounds (VOCs) caused by the use or manufacture of Cutback or Emulsified asphalts for paving, road construction or road maintenance, unless such manufacture or use complies with the provisions of this Rule.
>
> **Rule 228 Fugitive Dust:** To reduce the amount of particulate matter entrained in the ambient air, or discharged into the ambient air, as a result of anthropogenic (manmade) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions.

3. Affected Environment

The topography of a region can substantially impact air flow and resulting pollutant concentrations. California is divided into 15 air basins with similar topography and meteorology to better manage air quality throughout the state. Each air basin has a local air district that is responsible for identifying and implementing air quality strategies to comply with ambient air quality standards.

The Bell Road at I-80 Interchange Project site is located in proximity to Bowmen community, north of the City of Auburn in Placer County, an area within the Sacramento Valley Air Basin, which includes all or portions of Shasta County, Tehama County, Glenn County, Colusa County, Yolo County, Solano County, Butte County, Sutter County, Yuba County, and Sacramento County. Air quality regulation in Placer County is administered by Placer County Air Pollution Control District. Current and forecasted population for Placer County is as follows (DOF 2020):

- Year 2020, 400,434 persons
- Year 2025, 428,394 persons
- Year 2045, 534,361 persons

The county's economy is largely driven by heath care & social assistance, retail trade, and public administration.

The project site is located in the Sacramento Valley Air Basin portion of Placer County. Table 13 (Project Area Attainment Status) summarizes the U.S. Environmental Protection Agency's national area designations for the relevant criteria pollutants in Placer County. The County is currently designated as nonattainment for the ozone 8-hour standard and the particulate matter, particles of 2.5 micrometers or smaller (PM2.5), standard. The County is designated as unclassified/attainment for nitrogen dioxide, carbon monoxide, and unclassified for particulate matter, particles of 10 micrometers or smaller (PM10). The conformity process does not address pollutants for which the area is attainment/unclassified, mobile source air toxics, other toxic air contaminants or hazardous air pollutants, or greenhouse gases.

Table 13. Project Area Attainment Status

Criteria Pollutant	Federal Attainment Status
Ozone (O3)	Nonattainment
Nitrogen Dioxide (NO2)	Unclassified/Attainment-
Carbon Monoxide (CO)	Unclassified/Attainment
Particulate Matter (PM10)	Unclassified
Particulate Matter (PM2.5)	Nonattainment

3.1 Climate, Meteorology, and Topography

Meteorology (weather) and terrain can influence air quality. Certain weather parameters are highly correlated to air quality, including temperature, the amount of sunlight, and the type of winds at the surface and above the surface. Winds can transport ozone and ozone precursors from one region to another, contributing to air quality problems downwind of source regions. Furthermore, mountains can act as a barrier that prevents ozone from dispersing.

The Auburn Municipal Airport climatological station, maintained by the California ASOS, is located near the project site and is representative of meteorological conditions near the project. Figure 5 shows a wind rose illustrating the predominant wind patterns near the project.[6] The climate of the project area is generally Mediterranean in character, with cool winters (average 36-55 °Fahrenheit in January) and warm, dry summers (average 59-93 °Fahrenheit in July). Temperature inversions are common, affecting localized pollutant concentrations in the winter and enhancing ozone formation in the summer. Mountains with elevations over 6,000 feet in altitude tend to trap pollutants in the region by limiting air flow. Annual average rainfall is 29 inches (at Auburn Municipal Airport), mainly falling during the winter months.

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[6] For project sites with no appropriate wind roses available, describe the general predominant wind patterns in the project area.

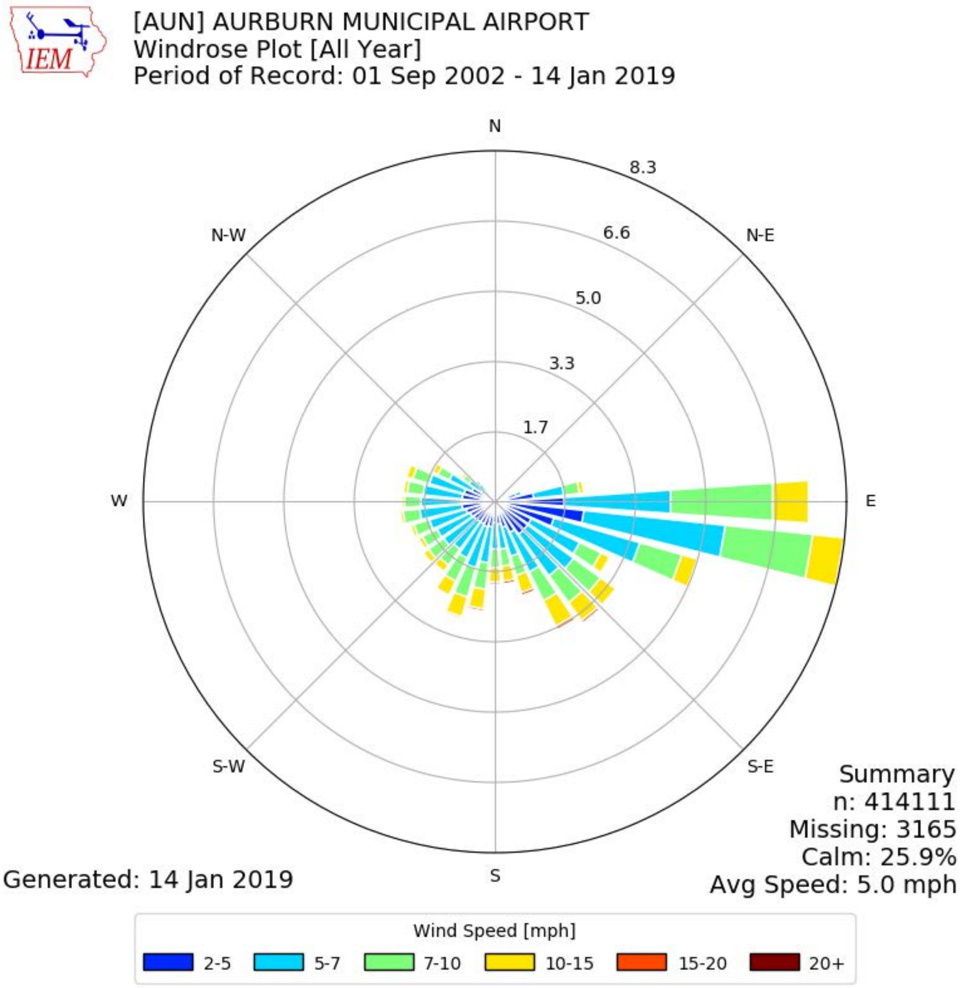

Figure 5. Predominant Wind Patterns Near the Project.

3.2 Existing Air Quality

This section summarizes existing air quality conditions near the proposed project area. It includes attainment statuses for criteria pollutants, describes local ambient concentrations of criteria pollutants for the past 3 years, and discusses MSAT and GHG emissions.

The Auburn-Atwood Road ambient air quality monitoring station (ARB#31815), maintained by PCAPCD, is located approximately 3 miles west of the Project site, and is the monitoring station closest to the Project site. The Auburn-Atwood Road station monitors ozone and PM2.5. The nearest ambient monitoring station that monitors PM10 is the Roseville – N Sunrise station located approximately 18 miles southwest of the project site.

Figure 6. Map of Air Quality Monitoring Stations Located Near the Project.

3.2.1 Criteria Pollutants and Attainment Status

Table 14 lists the state and federal attainment status for all regulated pollutants. The County is currently designated as nonattainment for the ozone 8-hour standard and the particulate matter, particles of 2.5 micrometers or smaller (PM2.5), standard. The County is designated as unclassified/attainment for nitrogen dioxide, carbon monoxide, and unclassified for particulate matter, particles of 10 micrometers or smaller (PM10). Table 15 lists air quality trends in data collected at the Auburn-Atwood station for the past 3 years.

Table 14. State and Federal Attainment Status.

Pollutant	State Attainment Status	Federal Attainment Status
Ozone (O_3)	Nonattainment	Nonattainment – Moderate
Respirable Particulate Matter (PM_{10})	Nonattainment	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Attainment	Nonattainment - Moderate
Carbon Monoxide (CO)	Attainment	Unclassified/Attainment
Nitrogen Dioxide (NO_2)	Attainment	Unclassified/Attainment
Sulfur Dioxide (SO_2)	Attainment	Unclassified/Attainment
Lead (Pb)	Attainment	Unclassified/Attainment
Visibility-Reducing Particles	Unclassified	N/A
Sulfates	Attainment	N/A
Hydrogen Sulfide	Unclassified	N/A
Vinyl Chloride	Unclassified	N/A

Table 15. Air Quality Concentrations for the Past 3 Years

Pollutant	Standard	2017	2018	2019
AUBURN-ATWOOD ROAD STATION				
Ozone				
Max 1-hr concentration		0.111	0.135	0.096
No. days exceeded: State	0.09 ppm	3	12	1
Max 8-hr concentration				
Federal Measurement		0.084	0.115	0.081
State Measurement		0.084	0.116	0.081
No. days exceeded: State	0.070 ppm	30	36	9
Federal	0.070 ppm	28	35	9
$PM_{2.5}$				
Max 24-hr concentration		29.7	91.1	21.1
No. days exceeded: Federal	35 µg/m^3	0.0	11.6	0.0
Max annual concentration		5.6	8.5	7.1
ROSEVILLE – N SUNRISE BLVD STATION				
PM_{10}				
Max 24-hr concentration		66.0	202.2	61.3
No. days exceeded: State	50 µg/m^3	**5**	**16**	**2**
Federal	150 µg/m^3	**0**	**2**	**0**
Max annual concentration		*	*	15.4

Notes: * means there was insufficient data available to determine the value.

Table 16. Status of SIPs Relevant to the Project Area.

Name/Description	Status
2017 Sacramento Regional 2008 8-Hour Ozone Attainment and Further Reasonable Progress Plan, and 2018 Updates to the California State Implementation Plan	CARB adopted the 2018 SIP Update on October 25, 2018
2014 Placer County Reasonably Available Control Technology (RACT) SIP Analysis	CARB adopted the 2017 Plan on February 13, 2014. Submitted to the EPA, April 14, 2014

3.2.2 Mobile Source Air Toxics

There are no rail yards, transit terminals or other facilities near the project that is a source of substantial MSAT emissions. Daily truck traffic estimates on I-80 are available for the I-80/Auburn Ravine Road intersection and the I-80/Clipper Gap intersection, located approximately 1.6 miles west and 2.3 miles east of the project site, respectively. Table 17 shows the annual average truck trips in the project area in year 2018. As shown in the table, less than 7,000 annual average daily truck trips on I-80 occur in the project area.

Table 17. Annual Average Daily Truck Traffic in the Project Area (2018)

Location	Vehicle AADT Total	Truck AADT	Truck Percentage of Total
I-80/Auburn Ravine Road (B)	63,700	6,185	9.71 %
I-80/Auburn Ravine Road (A)	58,500	6,324	10.81 %
I-80/Clipper Gap	45,000	6,813	15.14 %

Source: Caltrans 2019

3.2.3 Greenhouse Gas and Climate Change

CO_2, as part of the carbon cycle, is an important compound for plant and animal life, but also accounted for 84% of California's total GHG emissions in 2015. Transportation, primarily on-road travel, is the single largest source of CO_2 emissions in the state.

The proposed project is located in Placer County, and is included in the Placer County 2040 Final Regional Transportation Plan (RTP) as a System Management, Operations, and ITS project

> *PLA25671, Bell Road at I-80 Roundabouts.*
>
> *The project will replace the existing traffic signal and all-way stop control at the Bell Road / Interstate 80 interchange with two roundabouts. PE Only. Total Project Cost is $7.5 million. (Emission Benefits in kg/day: ROG 0.25, NOx 0.19, PM2.5 0.01). Toll Credits for ENG*

The project will improve overall operations, circulation, and accessibility for drivers and cyclists at the existing Bell Road at I-80 Interchange. The project will not increase capacity for the roadway. The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the Bell Road at I-80 interchange and accommodate projected traffic associated with future development. Also, the purpose is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

ARB sets regional targets for California's 18 MPOs to use in their Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) to plan future projects that will cumulatively achieve GHG reduction goals. Targets are set at a percent reduction of passenger vehicle GHG emissions per person from 2005 levels.

Placer County is part of a larger metropolitan planning jurisdiction (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties), which is coordinated by the Sacramento Area Council of Governments (SACOG). SACOG is designated by the federal government as the MPO for the Sacramento region. Placer County has its own state designation as a Regional Transportation Planning Agency (RTPA) that is responsible for developing its own transportation plans. The Placer County Transportation Planning Agency's (PCTPA) two most recent RTPs are incorporated into SACOG's regional planning processes through the Metropolitan Transportation Plan (MTP). The proposed project is included in the adopted 2020 MTP/SCS as PLA25671 (see description on page 5 above). The regional passenger vehicle GHG emissions reduction target for SACOG is 19 percent below 2005 levels by 2035 (ARB 2020). The 2020 MTP/SCS demonstrates a 19 percent reduction from the 2005 baseline, with a detailed breakdown of the emission reductions contained in Appendix E, Plan Performance, of the MTP/SCS.

The following MTP/SCS policies and supporting actions are applicable to the project:

> **POLICY 20**: Prioritize cost effective safety improvements that will help the region eliminate fatal transportation related accidents.
>
> **POLICY 22**: Invest in bicycle and pedestrian infrastructure to encourage healthy, active transportation trips and provide recreational opportunities for residents and visitors.
>
> **POLICY 25**: Prioritize investments in transportation improvements that reduce greenhouse gas emissions and vehicle miles traveled.

Placer County recently adopted the Placer County Sustainability Plan (PCSP), A Greenhouse Gas Emission Reduction Plan and Adaptation Strategy. The PCSP differentiates emission inventories, reduction goals, and reduction strategies for community-wide sectors and County operations sectors. For community-wide sectors, the PCSP shows that in 2005, unincorporated Placer County's residents, businesses, and visitors emitted 1,440,910 MTCO$_2$e in total. Transportation was the largest source of emissions, generating 525,440 MTCO$_2$e, or 36 percent of all community-wide emissions. Community-wide emissions in 2015 totaled 1,203,260 MTCO$_2$e, a substantial decline from 2005 levels, although the relative size of the sectors remained similar. Transportation activity was again the largest source of emissions, generating 503,610 MTCO$_2$e, or 42 percent of community emissions (Placer County, 2020). The PCSP sets the following emission reduction targets for community-wide emissions.

> Year 2030 – 6.0 MTCO$_2$e per person
>
> Year 2050 – 2.0 MTCO$_2$e per person

For County operations sectors, there was a total of 40,520 $MTCO_2e$ of GHG emissions in 2005. Solid waste was the largest sector, generating 15,720 $MTCO_2e$, or 39 percent of this total. County operations emissions increased to 49,390 $MTCO_2e$ in 2015, although as with community emissions, there was little change in the relative size of each sector. As per-capita targets are not appropriate for government operations emissions, there is not a 2030 or 2050 target for government operations. The County will continue to implement and update the PCSP to ensure sustained GHG reductions from County operations.

The PCSP identifies 67 local strategies to reduce community-wide emissions and 46 strategies to reduce government operations emissions. As a transportation infrastructure project, the project is unique in that it is a County-operated facility that supports community-wide transportation and transit activity. The following voluntary community-wide PCSP strategies are relevant to the project:

> **Strategy WW-6**: Encourage all existing properties to adopt water-efficient landscaping strategies, including more efficient irrigation systems and plants with lower water needs, consistent with the Water Efficient Landscaping Ordinance (WELO).
>
> **Strategy T-5**: Partner with incorporated communities and regional agencies to develop bikeways and trails between communities.
>
> > **Action Item 2**: Implement the PCTPA's Placer County Regional Bikeway Plan in coordination with Placer County Transportation Planning Agency, Placer County Department of Public Works, and the TRPA's Linking Tahoe Active Transportation Plan.
> >
> > **Action Item 7**: Implement pedestrian and bike safety infrastructure such as signage, traffic controls, and visible street paint.
>
> **Strategy T-11**: Encourage active transportation use by increasing street and roadway safety through infrastructure improvements.
>
> > **Action Item 2**: Implement speed management strategies, where feasible and appropriate, to slow vehicle speeds in support of active transportation.
> >
> > **Action Item 3**: Explore opportunities to fill gaps in sidewalks and bicycle facilities.
> >
> > **Action Item 4**: Implement the Bikeway Master Plan and Parks and Trails Master Plan.

The following County operations PCSP strategies are relevant to the project:

> **Strategy GO E-5**: Upgrade streetlights and traffic signals to advanced energy efficient bulbs.
>
> **Strategy GO WW-3**: Conserve water through continued water-efficient landscaping on County properties.

Strategy GO WW-7: Develop and implement a water efficiency policy of a 20 percent reduction for all County facilities.

Strategy GO T-5: Prohibit the idling of on- and off-road fleet vehicles when the vehicle is not moving or when the off-road equipment is not performing any work for more than five minutes in any one-hour period.

3.3 Sensitive Receptors

Sensitive receptors are defined by the ARB as facilities or land uses that include members of the population that are more susceptible to the adverse effects of air pollutants. Sensitive receptor populations include children, the elderly, and people with illnesses. Land uses associated with sensitive receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing, and convalescent facilities.

The nearest location of sensitive receptors includes residences located approximately 75 feet north of the project Environmental Study Area. However, the distance between sensitive receptors and the edge of travel lanes would not substantially change between the No Build Alternative and Build Alternative. On the basis of research showing that the zone of greatest concern near roadways is within 500 feet (or 150 meters), sensitive receptors within 500 feet (or 150 meters) have been identified and are documented in Table 18. Figure 7 shows the locations of sensitive receptors relative to the project site.

Table 18. Sensitive Receptors Located Within 500 feet of the Project Site.

#	Intersection	Nearest Sensitive Receptor	Distance to Receptor[1]	
			No Build Alternative	Build Alternative
1	Bowman Rd/Bell Road	North of intersection	150 feet (Bowman Road)	150 feet (Bowman Road)
2	I-80 WB Ramps/Bell Rd	North of intersection, same as for Intersection 1	350 feet (WB Off-Ramp)	300 Feet (WB Off-Ramp)
3	I-80 EB Ramps/Bell Rd	Southeast of intersection	280 feet (Bell Road)	275 feet (Bell Road)
4	Musso Rd/Bell Rd	Southeast of intersection	120 feet (Musso Road)	120 feet (Musso Road)

Notes:

1. Distance is approximate from edge of building to the closest edge of travel lane within project footprint.

Figure 7. Sensitive Receptors Located Near the Proposed Project.

3.4 Conformity Status

Transportation Conformity is a process set up under the CAA to ensure that transportation planning, transportation improvement programs, and projects are consistent with the plans to achieve and maintain NAAQS. Specific requirements are set by EPA regulations in 40 CFR 93, EPA and U.S. Department of Transportation guidance documents, and local regulations and procedures set up by Metropolitan Planning Organizations and Air Pollution Control Districts.

The project site is located in the Sacramento Valley Air Basin portion of Placer County. The County is currently designated as nonattainment for the federal ozone 8-hour standard and the particulate matter, particles of 2.5 micrometers or smaller (PM2.5), standard. The County is designated as unclassified/attainment for nitrogen dioxide, carbon monoxide, and unclassified for particulate matter, particles of 10 micrometers or smaller (PM10). The conformity process does not address pollutants for which the area is attainment/unclassified, mobile source air toxics, other toxic air contaminants or hazardous air pollutants, or greenhouse gases.

Caltrans has prepared multiple guidance documents to assist in transportation conformity analyses. A primary source of guidance is the Standard Environmental Reference (SER), which is an on-line guidance document to assist state and location agency staff to plan, prepare, submit and evaluate environmental documents for transportation projects. SER Chapter 11 contains specific guidance for air quality analysis, as well as references to state and federal analysis requirements and links to other resource documents.

Under National Environmental Policy Act (NEPA) assignment from the Federal Highway Administration (FHWA), Caltrans assumes the responsibility for its NEPA Actions and decisions, and is obligated to comply with all applicable federal environmental laws and FHWA NEPA regulations, policies, and guidance.

Interagency Consultation (IAC) was conducted, and the Bell Road at I-80 Interchange Project's exemption from air quality conformity analysis was concurred by the EPA. It was determined that the project is exempt per 40 CFR §93.126 Exempt Projects, Table 2 Safety Projects, as detailed in the next section. As stated in 40 CFR §93.126 Exempt Projects:

> *Notwithstanding the other requirements of this subpart, highway and transit projects of the types listed in table 2 of this section are exempt from the requirement to determine conformity. Such projects may proceed toward implementation even in the absence of a conforming transportation plan and TIP. A particular action of the type listed in table 2 of this section is not exempt if the MPO in consultation with other agencies (see §93.105(c)(1)(iii)), the EPA, and the FHWA (in the case of a highway project) or the FTA (in the case of a transit project) concur that it has potentially adverse emissions impacts for any reason. States and MPOs must ensure that exempt projects do not interfere with TCM implementation.*

3.4.1 Interagency Consultation

In order to definitively determine the project's potential exemption, a Conformity Exemption Form, Project Summary for Interagency Consultation (IAC) was submitted to Caltrans District 3 Project Level Conformity Group on August 21, 2020. The IAC review started on December 6, 2020, when the Conformity Exemption Form was circulated to the Project Level Conformity Group. On December 17, 2020, the EPA representative on the Project Level Conformity Group provided EPA's concurrence that the project is exempt under the 40 CFR §93.126 Table 2 –Exempt Projects, Safety category, §93.126 (Exempt Projects), Projects that correct, improve, or eliminate a hazardous location or feature. The Conformity Exemption Assessment and associated EPA concurrence is included as Appendix C to this report.

Table 19. Summary of Interagency Consultation Process.

Date	Format	Participants	Discussion Summary	Outcomes
August 21, 2020	Email	Heather Anderson, GHD Kyle Friedrich, County of Placer	Conformity Exemption Form, Project Summary for Interagency Consultation (IAC) submitted for consideration	IAC Form accepted
December 6, 2020	Email	Shengyi Gao, SACOG Jose Luis Caceres, SACOG Renee DeVere-Oki, SACOG Alexander Fong, Caltrans Antonio Johnson, Caltrans Douglas Coleman, Caltrans Lucas Sanchez, Caltrans Rodney Tavitas, Caltrans Shalanda Christian, Caltrans Youngil Cho, Caltrans Dave Johnston, El Dorado County David Yang, SMAQMD Wright Molly, SMAQMD Janice Lam Snyder SMAQMD Mark Loutzenhiser, SMAQMD Paul Philley, SMAQMD Matt Jones, YSAQMD Sondra Spaethe, FRAQMD Heather Phillips, CARB Jerry Barton, El Dorado CTC John, Ungvarsky, EPA Karina OConnor, EPA Joseph Vaughn, FHWA Kathleen Hanley, Placer County TPA Yu-Shuo Chang, Placer County Kyle Friedrich, County of Placer	Conformity Exemption Form, Project Summary for Interagency Consultation (IAC) circulated to the Project Level Conformity Group	IAC Form circulated

Date	Format	Participants	Discussion Summary	Outcomes
December 17, 2020	Email	Shengyi Gao, SACOG Jose Luis Caceres, SACOG Renee DeVere-Oki, SACOG Alexander Fong, Caltrans Antonio Johnson, Caltrans Douglas Coleman, Caltrans Lucas Sanchez, Caltrans Rodney Tavitas, Caltrans Shalanda Christian, Caltrans Youngil Cho, Caltrans Dave Johnston, El Dorado County David Yang, SMAQMD Wright Molly, SMAQMD Janice Lam Snyder SMAQMD Mark Loutzenhiser, SMAQMD Paul Philley, SMAQMD Matt Jones, YSAQMD Sondra Spaethe, FRAQMD Heather Phillips, CARB Jerry Barton, El Dorado CTC John, Ungvarsky, EPA Karina OConnor, EPA Joseph Vaughn, FHWA Kathleen Hanley, Placer County TPA Yu-Shuo Chang, Placer County Kyle Friedrich, County of Placer	EPA concurs that the project is exempt under the category, projects that correct, improve, or eliminate a hazardous location or feature (Safety).	Project is determined to be exempt.

3.5 NEPA Analysis/Requirement

It is anticipated that a Categorical Exemption (CE) will be prepared to comply with NEPA requirements. The FHWA environmental regulations require a finding, as part of a CE determination, that the project will "not involve significant air, noise, or water quality impacts." In reviewing and approving projects under NEPA, Caltrans is responsible for complying with all applicable federal environmental laws and with FHWA NEPA regulations, policies, and guidance, and is legally responsible and liable for the environmental decisions made on projects under NEPA Assignment. NEPA Assignment does not change federal environmental protection standards.

Estimation data for the Existing Conditions (2019), and Build and No Build under future year scenarios (2025 and 2045) are used to estimate the project's potential to generate a substantial adverse air quality impacts.

As shown within Section 1.4.4, Comparison of Existing/Baseline and Build Alternatives, the Build Alternative would not be capacity-enhancing, and would have no effect on peak hour volumes, AADT, or fleet mix (percent trucks), through the project area. The project would improve LOS and reduce delay, which provides an air quality benefit from reducing idling emissions. Additionally, the PCTPA-prepared VMT analysis demonstrates that the project would reduce VMT through the area. Environmental consequences are detailed within Section 4.

3.6 CEQA Analysis/Requirement

An Initial Study/ Negative Declaration (IS/ND) is being prepared for the project. The thresholds of significance and analysis methodology from the PCAPCD CEQA Handbook were used in assessing the project's potential air quality impacts under CEQA. Per CEQA Guidelines Appendix G, the following air quality questions are examined and answered within the IS/ND.

> **AIR QUALITY**. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:
>
> a) Conflict with or obstruct implementation of the applicable air quality plan?
>
> b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?
>
> c) Expose sensitive receptors to substantial pollutant concentrations?
>
> d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Estimation data for the Existing Conditions (2019), and Build and No Build under future year scenarios (2025 and 2045) are used to estimate the project's potential to generate a substantial adverse air quality impacts.

As shown within Section 1.4.4, Comparison of Existing/Baseline and Build Alternatives, the Build Alternative would not be capacity-enhancing, and would have no effect on peak hour volumes, AADT, or fleet mix (percent trucks), through the project area. The project would improve LOS and reduce delay, which provides an air quality benefit from reducing idling emissions. Additionally, the PCTPA-prepared VMT analysis demonstrates that the project would reduce VMT through the area. Environmental consequences are detailed within Section 4.

4. Environmental Consequences

This section describes the methods, impact criteria, and results of air quality analyses of the proposed project. Analyses in this report were conducted using methodology and assumptions that are consistent with the requirements of NEPA, CEQA, the CAAAs of 1990, and the CCAA of 1988. The analyses also use guidelines and procedures provided in applicable air quality analysis protocols, such as the Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) (Garza et al., 1997), and the FHWA Updated Interim Guidance on Air Toxics Analysis in NEPA Documents (FHWA, 2016).

4.1 Impact Criteria

4.1.1 CEQA

For the purpose of this, the evaluation criteria and significance thresholds summarized below are used to determine if the project would have a significant effect related to air quality. The following questions are from the California Environmental Quality Act (CEQA) Guidelines' Appendix G Environmental Checklist Section III.

Air Quality

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

b) Result in a cumulatively considerable net increase in any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

As part of an effort to attain and maintain ambient air quality standards for ozone and PM10, the PCAPCD has established thresholds of significance for these air pollutants and their precursors. These thresholds apply to both construction period and operational period impacts.

Ozone is not emitted directly into the air, but is a regional pollutant formed by a photochemical reaction in the atmosphere. Reactive organic gases (ROG) and nitrogen oxides (NOx) are ozone precursors that react in the atmosphere in the presence of sunlight to form ozone. Therefore, the PCAPCD does not have a recommended ozone threshold, but has regional thresholds of significance for project-emitted ROG and NOx. Pursuant to PCAPCD regulations, the project would have a significant impact on air quality if it would result in project-generated emissions in excess of the following during construction:

- Reactive Organic Gases (ROG) – 82 pounds per day (lbs/day);
- Oxides of Nitrogen (NOx) – 82 lbs/day
- Particulate Matter (PM10) – 82 lbs/day

Pursuant to PCAPCD regulations, the project would have a significant impact on air quality if it would result in project-generated emissions in excess of the following during operation:

- Reactive Organic Gases (ROG) – 55 pounds per day (lbs/day);
- Oxides of Nitrogen (NOx) – 55 lbs/day
- Particulate Matter (PM10) – 82 lbs/day

c) Expose sensitive receptors to substantial pollutant concentrations?

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Greenhouse Gases

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Pursuant to PCAPCD guidance, the project would have a significant impact for greenhouse gases if it would result in project-generated emissions (construction-only project such as roadway, pipeline, or levee construction) in excess of the following:

- 10,000 MT CO_2e/yr

Basis of Threshold Selection

The PCAPCD provides the following threshold options for assessing greenhouse gas emissions impacts under CEQA:

Brightline Threshold

- 10,000 MT CO_2e/yr

Efficiency Matrix

- 4.5/5.5 (urban/rural) MT CO_2e/capita for residential
- 26.5/27.3 (urban/rural) MT CO_2e/1,000 sf for non-residential)

De minimis Level

- 1,100 MT CO_2e/yr

Per the PCAPCD's handbook, the brightline threshold is the point at which a project would be deemed to have a cumulatively considerable contribution to global climate change. In general, GHG emissions from a project (either the construction or operational phase) that exceed 10,000 MT CO_2e/yr would be deemed to have a cumulatively considerable contribution to global climate change. Furthermore, the PCAPCD states:

> *The Efficiency Matrix and De Minimis level (1,100 MT CO_2e /yr) are* ***only*** *applied to land use projects as they are not applicable for stationary (Industrial) projects and construction-only projects such as roadway, pipeline, or levee construction projects.* (emphasis original to PCAPCD Handbook)

Additionally, the PCAPCD Handbook provides the following guidance for how to determine significance after emissions have been quantified[7]:

> *At this step, the project's total annual GHG emissions should consider all state and federal rules and regulations and should then be compared to the District's GHG operational significance thresholds.*
>
> *1) Total GHG emissions are less than the De Minimis Level of 1,100 MT CO_2e/yr*
> *The project can be considered as less than cumulatively considerable since its contribution is relatively small compared to the cumulative GHG emissions in Placer County. No further GHG analysis will be required. However, the project will still be required to be in compliance with state and local regulations such as building codes and energy efficiency standards.*
>
> *2) Total GHG emissions are between 1,100 MT CO_2e/yr (De Minimis Level) and 10,000 MT CO_2e/yr (Bright-line threshold)*
> *The project is required to conduct an efficiency analysis to further identify if its efficiency would meet one of conditions in Efficiency Matrix based on the proposed location and land use type. If the project cannot meet the associated efficiency condition, the lead agency should identify appropriate mitigation measures for the project.* ***Please note that the Efficiency Matrix is only applied for land use projects with residential and/or commercial components. A stationary project or construction-only project such as roadway construction is not required to meet the efficiency condition.***
>
> *3) Total GHG emissions exceed the Bright-line threshold of 10,000 MT CO_2e/yr The project's related GHG impacts are considered cumulatively considerable and all feasible mitigation measures should be identified to mitigate the project's related GHG emissions.*
> (Emphasis Added)

---

[7] PCAPCD Handbook Section 5.8 (Steps in Determining Significance of Operational Impacts), Step 2 (Comparison of Unmitigated Operational GHG Emissions with the Districts' GHG Significance Thresholds.

Therefore, based on the guidance provided by the PCAPCD and lacking threshold specific for transportation projects, it has been determined that the most appropriate and applicable threshold is PCAPCD's brightline threshold of 10,000 MT CO_2e/yr.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

4.1.2 NEPA

Project-related emissions will have an adverse environmental impact if they result in pollutant emissions levels that either create or worsen a violation of any National Ambient Air Quality Standard (identified in Table 11), contribute to an existing air quality violation, or result in exposure of sensitive receptors to unacceptable levels of air pollutants during project construction or operation.

4.2 Short-Term Effects (Construction Emissions)

4.2.1 Construction Equipment, Traffic Congestion, and Fugitive Dust

Site preparation and roadway construction will involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. During construction, short-term degradation of air quality is expected from the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment powered by gasoline and diesel engines are also anticipated and would include CO, NO_x, VOCs, directly emitted PM_{10} and $PM_{2.5}$, and toxic air contaminants (TACs) such as diesel exhaust particulate matter. Construction activities are expected to increase traffic congestion in the area, resulting in increases in emissions from traffic during the delays. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Under the transportation conformity regulations (40 CFR 93.123(c)(5)), construction-related activities that cause temporary increases in emissions are not required in a hot-spot analysis. These temporary increases in emissions are those that occur only during the construction phase and last five years or less at any individual site. They typically fall into two main categories:

- *Fugitive Dust*: A major emission from construction due to ground disturbance. All air districts and the California Health and Safety Code (Sections 41700-41701) prohibit “visible emissions” exceeding three minutes in one hour – this applies not only to dust but also to engine exhaust. In general, this is interpreted as visible emissions crossing the right-of-way line. PCAPCD Rule 228, Fugitive Dust (PDF), establishes standards to be met by activities generating fugitive dust. Rule 228 addresses fugitive dust generated by construction and grading activities. Among Rule 228 standards to be met is a prohibition on visible dust crossing the property boundary, generation of high levels of visible dust (dust sufficient to obscure vision by 40%), and controls on the track-out of dirt and mud on to public roads. The regulation also establishes minimum dust mitigation and control requirements. When an area to be disturbed is greater than one acre, and if required by a Condition of Approval of a discretionary permit, a dust control plan (DCP) must be submitted to and approved by the District.

  Sources of fugitive dust include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site may deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions may vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

- *Construction equipment emissions*: Diesel exhaust particulate matter is a California-identified toxic air contaminant, and localized issues may exist if diesel-powered construction equipment is operated near sensitive receptors.

Implementation of the following measures, some of which may also be required for other purposes such as storm water pollution control, will reduce air quality impacts resulting from construction activities. Please note that although these measures are anticipated to reduce construction-related emissions, these reductions cannot be quantified at this time.

- The construction contractor must comply with the Caltrans' Standard Specifications in Section 14-9 (2018).
  - Section 14-9.02 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
- Water or a dust palliative will be applied to the site and equipment as often as necessary to control fugitive dust emissions.
- Soil binder will be spread on any unpaved roads used for construction purposes, and on all project construction parking areas.
- Trucks will be washed as they leave the right-of-way as necessary to control fugitive dust emissions.
- Construction equipment and vehicles will be properly tuned and maintained. All construction equipment will use low sulfur fuel as required by CA Code of Regulations Title 17, Section 93114.
- A dust control plan will be developed documenting sprinkling, temporary paving, speed limits, and timely re-vegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
- Equipment and materials storage sites will be located as far away from residential and park uses as practicable. Construction areas will be kept clean and orderly.
- Environmentally sensitive areas will be established near sensitive air receptors. Within these areas, construction activities involving the extended idling of diesel equipment or vehicles will be prohibited, to the extent feasible.
- Track-out reduction measures, such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic, will be used.
- All transported loads of soils and wet materials will be covered before transport, or adequate freeboard (space from the top of the material to the top of the truck) will be provided to minimize emission of dust during transportation.
- Dust and mud that are deposited on paved, public roads due to construction activity and traffic will be promptly and regularly removed to reduce PM emissions.

- To the extent feasible, construction traffic will be scheduled and routed to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.
- Mulch will be installed or vegetation planted as soon as practical after grading to reduce windblown PM in the area.

Fugitive Dust

Fugitive dust, sometimes referred to as windblown dust or PM10, would be generated during excavation, grading, and hauling activities. Fugitive dust emissions would be temporary and transitory in nature. Dust would be reduced and controlled according to Caltrans 2018 Standard Specifications, under Section 10-5 “Dust Control”, Section 14-9 “Air Quality”, and Section 18 “Dust Palliatives”, as well as compliance with PCAPCD’s Rule 228 and Dust Control Plan requirements.

Construction Equipment Emissions

The construction period for the proposed project spans 17 months. Construction emissions were estimated using the latest Sacramento Metropolitan Air Quality Management District’s Road Construction Model (http://www.airquality.org/ceqa/, Version 9.0.0). While the model was developed for Sacramento conditions in terms of fleet emission factors, silt loading, and other model assumptions, it is considered adequate for estimating road construction emissions by the San Joaquin Valley Air Pollution Control District (under its Indirect Source regulations) and the South Coast Air Quality Management District (in its CEQA guidance) and is used for that purpose in this project analysis. The results of the construction emission calculations are included in Appendix D. The emissions presented are based on the best information available at the time of calculations. The emissions represent the peak daily construction emissions that would be generated by each alternative. No construction would occur under the No Build Alternative and, therefore, that alternative was not assessed for this impact.

The potential construction-generated emissions for the project were quantified using Sacramento Metropolitan Air Quality Management District’s (SMAQMD’s) Roadway Construction Emissions Model (version 9.0.0). Construction parameters included a construction start year of 2022, and a duration of 17 months. The emissions model data input and output are provided as Appendix D to this report.

The construction-generated emissions output is summarized in Table 20. The construction emissions associated with the project do not exceed the PCAPCD’s daily thresholds of significance for any of the three applicable criteria air pollutants. Therefore, construction generated emissions associated with the project would result in a less than significant impact.

Table 20. Project Construction-Generated Air Pollutant Emissions

Parameter	ROG (lbs/day)	NOx (lbs/day)	PM_{10} (lbs/day)	GHG (Total $MTCO_2e$)
Project Construction	5.04	53.46	6.27	1,108
PCAPCD Thresholds	82	82	82	10,000

4.2.2 GHG Emissions

Construction GHG emissions would result from material processing, on-site construction equipment, and traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. Total construction-generated CO2 gas emissions were estimated to be 1,209 total tons (1,108 $MTCO_2e$, consisting of CO_2, CH_4, N_2O). The construction-generated GHG emissions for the project equals 37 $MTCO_2e$ per year when annualized over an assumed 30-year period. Construction-generated GHG emissions associated with the project would be less than the PCAPCD's annual threshold for GHGs as shown in the table above.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be offset to some degree by longer intervals between maintenance and rehabilitation activities.

4.2.3 Asbestos

During construction in areas that contain NOA-containing rock formations, asbestos can be released into the air and pose a health hazard. The Department of Conservation, California Geological Survey has published Special Report 190 (2006), which contains mapping of Naturally Occurring Asbestos Hazard, North Auburn and Vicinity. As shown in the map, the project is not located in the 'Area Most Likely to Contain NOA area. The project is located with an area moderately likely to contain NOA. Additionally, the Geotechnical Design and Materials Report for the project identifies that the project is located over sandstone, shale, conglomerate, and fanglomerate, which are not substantial sources of NOA (Parikh Consultants, 2020). Therefore, disturbance of NOA is not a concern for the Project.

In the initial Asbestos National Emission Standards for Hazardous Air Pollutants rule promulgated in 1973, a distinction was made between building materials that would readily release asbestos fibers when damaged or disturbed (friable) and those materials that were unlikely to result in significant fiber release (non-friable). The EPA has since determined that, severely damaged, otherwise non-friable materials can release significant amounts of asbestos fibers. Asbestos has been banned from many building materials under the Toxic Substances Control Act, the Clean Air Act, and the Consumer Product Safety Act. However, most uses of asbestos for building material are not banned. However, the project would not demolish or disturb existing buildings, bridges, or other facilities that may have ACM. Therefore, disturbance of ACM is not a concern for the Project.

4.2.4 Odor

Implementation of the project would not result in major sources of odor. The project type is not one of the common types of facilities known to produce odors (i.e., landfill, coffee roaster, wastewater treatment facility, etc.). Minor odors from the use of equipment during construction activities would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance.

4.3 Long-Term Effects (Operational Emissions)

The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the interchange. The secondary purpose of this project is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

As shown within Section 1.4.4, Comparison of Existing/Baseline and Build Alternatives, the Build Alternative would not be capacity-enhancing, and would have no effect on peak hour volumes, AADT, or fleet mix (percent trucks), through the project area. The project would improve LOS and reduce delay, which provides an air quality benefit from reducing idling emissions. Additionally, the PCTPA-prepared VMT analysis demonstrates that the project would reduce VMT through the area. Therefore, it is not anticipated that the project operations would adversely affect air quality.

The project would not generate any new vehicle trips or include any stationary sources of air pollutants. The primary operational air quality impact would be associated with improvements to traffic flow, which would result in a beneficial air quality impact. Therefore, the operational impact (as demonstrated in the following subsections) would be less than significant.

4.3.1 Consistency with Applicable Air Quality Plan (SIP)

The project is located in the Sacramento Valley Air Basin (SVAB)-portion of Placer County, and is also within the Sacramento Federal Ozone Non-attainment Area. The air districts within the Sacramento ozone planning region, which includes all of Sacramento and Yolo counties and portions of Placer, El Dorado, Solano, and Sutter counties, worked together to develop and adopt the *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan*. The plan was adopted by PCAPCD in 2009, and approved by EPA, effective 2015. The plan’s control strategy relies on the following components:

1. Reductions from existing control measures and adopted rules,
2. Reductions from new state and federal regulations, and
3. Reductions from defined new SIP local and regional measures.

The primary goal of the plan is to reduce ground-level ozone to below state and federal standards. As shown in Impact AIR 2, the project would not result in a cumulatively considerable net increase in any criteria pollutant for which the project region is non-attainment. Therefore, the proposed project would not conflict with the primary goal of the plan. A review of the plan's regional and local control measures indicates that the control measures are not directly applicable to the project, and the project would not disrupt or hinder implementation of any control measure. In addition, the project would not result in a growth in population or jobs in the project area; therefore, the project would not exceed the growth assumptions contained in the plan. Overall, the project would not conflict with or obstruct implementation of the adopted plan. No impact would result.

4.3.2 Cumulatively Considerable Net Increase in Nonattainment Pollutants

Methodology

The project site is located in the Sacramento Valley Air Basin portion of Placer County. As shown in Table 13, the County is currently designated as nonattainment for the ozone 8-hour standard and the particulate matter, particles of 2.5 micrometers or smaller (PM2.5), standard. The County is designated as unclassified/attainment for all other ambient air quality standards. The PCAPCD provides quantitative thresholds for the following pollutants: ROG, NOx, and PM10.

VMT for each intersection was developed using the maximum travel length through the intersection and the AADT for the intersection. The weighted average speed was calculated for the No Build Alternative. The average speed is estimated as 24 MPH for the Bowman Road/Bell/I-80 WB roundabout, and 22 MPH for the I-80 EB Ramps/Bell/Musso roundabout.

EMFAC2021 (v1.0.0) emission rates were generated for the following conditions: Placer County; Years 2019, 2025, and 2045; Annual; EMFAC2007 Categories. Analysis parameters for each scenario are provided in Table 21. The estimated operational emissions for the existing, No Build Alternative, and Build Alternative are provided in Table 22. As shown in the table, the Build Alternative would result in fewer emissions than the No Build Alternative for all pollutants in Year 2025, and all pollutants except PM10 in Year 2045. However, the increase in PM10 emissions in Year 2045 is substantially less than the applicable PCAPCD threshold of significance. The EMFAC tables are provided as Appendix F.

Table 21. EMFAC Input Parameters by Analysis Scenario

Parameter	Scenario			
	No Build Alternative		Build Alternative	
	Bowman Road/Bell/I-80 WB	I-80 EB Ramps/Bell/Musso	Bowman Road/Bell/I-80 WB	I-80 EB Ramps/Bell/Musso
Year 2019				
Vehicle Miles Traveled	14,467	2,645	NA	NA
Average Speed (EMFAC Speed Bin)	11.53 (10)	16.47 (15)	NA	NA
Year 2025				
Vehicle Miles Traveled	15,357	2,844	15,357	2,844
Average Speed (EMFAC Speed Bin)	10.54 (10)	14.65 (15)	24 (25)	22 (20)
Year 2045				
Vehicle Miles Traveled	18,222	3,369	18,222	3,369
Average Speed (EMFAC Speed Bin)	7.34 (5)	14.65 (15)	24 (25)	22 (20)

Table 22. Project Operational Air Pollutant Emissions

Parameter	ROG (lbs/day)	NOx (lbs/day)	PM_{10} (lbs/day)
2019 Existing Emissions			
Existing Conditions	6.57	38.56	1.51
2025 Emissions			
No Build Alternative	3.16	24.89	1.19
Build Alternative	1.30	12.46	1.08
Change in Emissions	*-1.85*	*-12.42*	*-0.11*
2045 Emissions			
No Build Alternative	2.42	25.35	1.15
Build Alternative	0.59	10.54	1.20
Change in Emissions	*-1.83*	*-14.81*	*0.05*
Maximum Change in Emissions			
Maximum Change in Emissions	-1.83	-12.42	0.05
PCAPCD Thresholds	82	82	82

4.3.3 CO Analysis

CEQA Analysis

Localized high levels of CO, referred to as CO hotspots, are associated with traffic congestion and idling or slow-moving vehicles. For evaluating operational impacts, the PCAPCD recommends using the following screening criteria to determine if a project has the potential to contribute to a CO hotspot:

> When a project's CO emissions from vehicle operation are more than 550 lbs/day and if either of the following scenarios is true for any intersection affected by the project traffic, the project should conduct a site-specific CO dispersion modeling analysis to evaluate the potential local CO emission impact at roadway intersections:
>
> - *A traffic study for the project indicates that the peak-hour LOS on one or more streets or at one or more intersections (both signalized and non-signalized) in the project vicinity will be degraded from an acceptable LOS (e.g., A, B, C, or D) to an unacceptable LOS (e.g., E or F); or*
>
> - *A traffic study indicates that the project will substantially worsen an already existing unacceptable peak-hour LOS on one or more streets or at one or more intersections in the project vicinity. "Substantially worsen" includes situations where a delay would increase by 10 seconds or more when project-generated traffic is included.*

The project's Transportation Operations Analysis Report (TOAR) and associated modeling demonstrate that traffic flow would be improved (less delay) under the 'with project' scenario. There would be improved traffic flow through the intersection and an associated reduction in queuing and future idling during project operation. The project would not degrade the LOS or worsen an existing delay, and would not exceed the PCAPCD's screening criteria. Therefore, the project would not result in a CO hotspot.

NEPA Analysis

The CO Protocol was developed for project-level conformity (hot-spot) analysis and was approved for use by the U.S. EPA in 1997. It provides qualitative and quantitative screening procedures, as well as quantitative (modeling) analysis methods to assess project-level CO impacts. The qualitative screening step is designed to avoid the use of detailed modeling for projects that clearly cannot cause a violation, or worsen an existing violation, of the CO standards. Although the protocol was designed to address federal standards, it has been recommended for use by several air pollution control districts in their CEQA analysis guidance documents and should also be valid for California standards because the key criterion (8-hour concentration) is similar: 9 ppm for the federal standard and 9.0 ppm for the state standard.

This analysis utilizes the CO Protocol to determine if the Project would significantly contribute to a localized exceedance of the state or national CO ambient air standards. Sections 3 and 4 of the CO

Protocol describe the methodology for determining whether a CO hot-spot analysis is required. The Protocol provides two conformity requirement decision flowcharts that are designed to assist project sponsors in evaluating the requirements that apply to their project. The flowchart of the CO Protocol applies to new projects and was used here. The flowchart, highlighted to illustrate the Project's analysis, is included as Appendix E of this report. Below is a step-by-step explanation of the flowchart. Each level cited is followed by a response, which in turn determines the next applicable level of the flowchart for the project. Describe the results of following the flowchart.

Protocol Question 1:	3.1.1. Is this project exempt from all emissions analyses? (see Table 1)
Project Answer 1:	Yes
Protocol Result:	3.1.8 Project-level air quality analysis not required.

4.3.4 PM Analysis

Emissions Analysis

The PCAPCD does not have a qualitative or quantitative threshold or methodology of analysis for operational PM10 or PM2.5 hot-spot analysis. Furthermore, the project is exempted from PM hot-spot analysis under the conformity analysis, as shown in Section 3.4.

The purpose of the project is to maximize the existing infrastructure to efficiently convey traffic safely through the Bell Road at I-80 interchange and accommodate projected traffic associated with future development. Also, the purpose is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange.

The project does not propose any additional traffic generating land uses. As shown within Section 1.4.4, Comparison of Existing/Baseline and Build Alternatives, the Build Alternative would not be capacity-enhancing, and would have no effect on peak hour volumes, AADT, or fleet mix (percent trucks), through the project area. The project would improve LOS and reduce delay, which provides an air quality benefit from reducing idling emissions. Additionally, the PCTPA-prepared VMT analysis demonstrates that the project would reduce VMT through the area. Therefore, it is not anticipated that the project operations would adversely affect air quality or result in a PM hotspot.

The project is estimated to have a beneficial effect traffic flow, which would improve intersection operations and reduce queuing. Vehicles are not required to idle as long at a roundabout as at a signal or stop sign because they are not required to stop or queue while passing through a roundabout. This helps reduce fuel consumption and vehicle emissions.

4.3.5 Mobile Source Air Toxics Analysis

FHWA released updated guidance in October 2016 (FHWA, 2016) for determining when and how to address MSAT impacts in the NEPA process for transportation projects. FHWA identified three levels of analysis:

- No analysis for exempt projects or projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; and
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Projects with no impacts generally include those that a) qualify as a categorical exclusion under 23 CFR 771.117, b) qualify as exempt under the FCAA conformity rule under 40 CFR 93.126, and c) are not exempt, but have no meaningful impacts on traffic volumes or vehicle mix.

Projects that have low potential MSAT effects are those that serve to improve highway, transit, or freight operations or movement without adding substantial new capacity or creating a facility that is likely to substantially increase emissions. The large majority of projects fall into this category.

Projects with high potential MSAT effects include those that:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of Diesel Particulate Matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- Are proposed to be located in proximity to populated areas or, in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

The purpose of this project is to address major operational and safety concerns for the project intersections by replacing the existing stop-controlled and signal-controlled intersections at Bell Road at I-80 with roundabouts. As shown in Section 1.4.4, Comparison of Existing/Baseline and Build Alternatives, the project will have no effect on AADT, traffic volumes, or vehicle mix through the intersections. The project is estimated to have a beneficial effect traffic flow, which would improve intersection operations and reduce queuing. Vehicles are not required to idle as long at a roundabout as at a signal or stop sign because they are not required to stop or queue while passing through a roundabout. This helps reduce fuel consumption and vehicle emissions.

A quantification of potential fuel consumption shows the Project’s construction equipment is estimated to require approximately 569,560 gallons of diesel. For operations, existing conditions (2019) consumes an estimated 598,878 gallons of gasoline per year. Operational fuel consumption would decrease to an estimated 579,184 gallons per year under the No Build Alternative in year 2025. However, the 2025 Build Alternative would consume even less operational gasoline, at an estimated 363,163 annual gallons. In year 2045, the difference between the No Build and Build Scenario fuel consumption would be even greater, with the No Build consuming an estimated

720,204 gallons annually, while the Build Scenario would consume an estimated 3,78,265 gallons annually.

This project has been determined to generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special mobile source air toxic (MSAT) concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause a meaningful increase in MSAT impacts of the project from that of the no-build alternative.

Moreover, Environmental Protection Agency (EPA) regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES2014 model forecasts a combined reduction of over 90 percent in the total annual emissions rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 45 percent (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

4.3.6 Greenhouse Gas Emissions Analysis

GHG emissions from transportation projects can be divided into those produced during operation and those produced during construction. The primary GHGs produced by the transportation sector are CO2, CH4, N2O, and HFCs. CO2 emissions are a product of the combustion of petroleum-based products, like gasoline, in internal combustion engines. Relatively small amounts of CH4 and N2O are emitted during fuel combustion. In addition, a small amount of HFC emissions are included in the transportation sector.

The CEQA Guidelines generally address greenhouse gas emissions as a cumulative impact due to the global nature of climate change (Pub. Resources Code, § 21083(b)(2)). As the California Supreme Court explained, "because of the global scale of climate change, any one project's contribution is unlikely to be significant by itself" (Cleveland National Forest Foundation v. San Diego Assn. of Governments (2017) 3 Cal.5th 497, 512). In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (CEQA Guidelines Sections 15064(h)(1) and 15130).

To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. Although climate change is ultimately a cumulative impact, not every individual project that emits greenhouse gases must necessarily be found to contribute to a significant cumulative impact on the environment.

Operational Emissions

The primary purpose of the proposed project is to maximize the existing infrastructure to efficiently convey traffic safely through the interchange. The secondary purpose of this project is to improve operations, reduce delay, and enhance mobility for all travel modes at the interchange. The project would achieve these goals by replacing the existing study intersections with two modern, yield-controlled, single and multi-lane roundabouts designed to accommodate the Ultimate Design Year traffic forecast volumes. Specifically, the County would construct a six-legged roundabout at Bell Road that includes the Bowman Road intersection and the I-80 WB ramps intersection as well as a second five-legged roundabout at Bell Road that includes the I-80 EB ramps intersection and the Musso Road intersection. A literature review by the Insurance Institute for Highway Safety found that roundabouts can reduce fuel consumption by 23% to 34% and CO2 emissions by approximately 23% to 37% (IIHS 2018). The project design also best meets the safety purpose of the project for all modes of travel, while addressing future mobility needs.

This type of project generally causes minimal or no increase in operational GHG emissions. As shown within Section 1.4.4, Comparison of Existing/Baseline and Build Alternatives, the Build Alternative would not be capacity-enhancing, and would have no effect on peak hour volumes, AADT, or fleet mix (percent trucks), through the project area. The project will not increase the vehicle capacity of the roadway. The project would improve LOS and reduce delay, which provides a greenhouse gas benefit from reducing idling emissions. Additionally, the PCTPA-prepared VMT analysis demonstrates that the project would reduce VMT through the area. As such, the project may result in a reduction in operational GHG emissions as compared to continued use of the project intersection without project improvements. Additionally, there would likely be long-term GHG benefits from improved operation and smoother pavement surfaces.

As discussed in the Section 4.3.2, emissions were quantified for the Existing, No Build and Build Scenarios. The emissions output for greenhouse gases is provided in Table 23. As shown in the table, the Build Scenario would result in lower emissions than the Existing conditions and the No Build Scenario.

Table 23. Project Operational Greenhouse Gas Emissions

Parameter	CO2 (annual tons)	CH4 (annual tons)
2019 Existing Emissions		
Existing Conditions	5,869	0.20
2025 Emissions		
No Build Alternative	5,676	0.12
Build Alternative	3,559	0.05
Change in Emissions	*-2,117*	*-0.07*
2045 Emissions		
No Build Alternative	7,058	0.09
Build Alternative	3,707	0.02
Change in Emissions	*-3,351*	*-0.07*

4.4 Cumulative/Regional/Indirect Effects

The geographic scope for assessing cumulative relative to air quality is the Placer County.

By its nature, air pollution is largely a cumulative impact, in that individual projects are rarely sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions may contribute to cumulative adverse air quality impacts. In developing regional thresholds of significance for criteria and precursor air pollutants, PCAPCD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified regional significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Similarly, the CO threshold (the 1-hour and 8-hour state ambient air quality standards) and screening criteria take into account background ambient concentrations and total intersection volumes, respectively. As such, the threshold and screening criteria are cumulative in nature. Finally, consistency with an attainment plan is a cumulative analysis, as it analyzes a project in regards to an adopted plan that is based on growth projections for the region. Therefore, no additional cumulative impacts analysis is required.

The project-level analysis shows that the Project would not conflict with or obstruct implementation of the applicable air quality plan, would not result in a cumulatively considerable net increase in a criteria pollutant for which the area is non-attainment, would not expose sensitive receptors to substantial pollutant concentrations, and would not create objectionable odors. The project-level analysis above also would constitute the cumulative impact analysis, and no additional cumulative impacts analysis is required. Therefore, the Project's contribution to the cumulative impact related to air quality would not be cumulatively considerable.

5. Minimization Measures

5.1 Short-Term (Construction)

The following measures will also be implemented in the project to reduce GHG emissions and potential climate change impacts from the project.

Additionally, all construction contracts include Caltrans Standard Specifications Section 7-1.02A and 7 1.02C, Emissions Reduction, which require contractors to comply with all laws applicable to the project and to certify they are aware of and will comply with all ARB emission reduction regulations; and Section 14-9.02, Air Pollution Control, which requires contractors to comply with all applicable air pollution control rules, regulations, ordinances, and statutes. Certain common regulations, such as equipment idling restrictions, that reduce construction vehicle emissions also help reduce GHG emissions.

Avoidance/minimization measures to minimize energy use and reduce emissions of construction-generated greenhouse gas emissions are anticipated in the IS/ND; however, the IS/ND is currently in preparation.

2040 RTP FEIR Mitigation Measures

> **Mitigation Measure 3.5-3**: Consistent with Appendix F of the CEQA Guidelines, the agencies implementing RTP projects should:
>
> - Promote measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal. As the individual RTP projects are designed there should be an explanation as to why certain measures were incorporated in the RTP project and why other measures were dismissed.
> - Site, orient, and design projects to minimize energy consumption, increase water conservation, and reduce solid-waste.
> - Promote efforts to reduce peak energy demand in the design and operation of RTP projects.
> - Promote the use of alternate fuels (particularly renewable ones) or energy systems for RTP projects.
> - Promote efforts to recycle materials used in the construction (including demolition phase) of RTP projects.
>
> **Mitigation Measure 3.7-1**: The implementing agencies shall develop a traffic control plan for construction projects to reduce the effects of construction on the roadway system throughout the construction period. As part of the traffic control plan, project proponents shall coordinate with emergency service providers to ensure that emergency routes are identified and remain available during construction activities.

5.2 Long-Term (Operational)

No long-term (operational) avoidance, minimization, and mitigation measures are needed to reduce operational air quality impacts or GHG emissions.

The project design as a roundabout would improve traffic flow. Vehicles are not required to idle as long as at a signal or stop sign because they are not required to stop or queue while passing through a roundabout. This helps reduce fuel consumption and vehicle emissions.

6. Conclusions

The project is exempt from Transportation Conformity requirements. -The project-level analysis shows that the project would not conflict with or obstruct implementation of the applicable air quality plan, would not result in a cumulatively considerable net increase in a criteria pollutant for which the area is non-attainment. and would not create objectionable odors. The project would result in lower operational emissions than the No Build scenario and, as such, would not result in an increase in pollutant concentrations. The project would not generate a substantial amount of construction-period fugitive dust, construction equipment emissions, GHG, or odor. Additionally, project construction would not result in a substantial risk of exposure to NOA. Project operations would not generate a CO hotspot, PM hotspot, or adverse MSAT impact. Finally, the project would not result in substantial adverse cumulative air quality or GHG impacts.

7. References

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8. Appendices