Town of Truckee
Planning Division

Estates Meadows Project

Initial Study/Mitigated Negative Declaration

September 2021

Prepared by

RANEY PLANNING & MANAGEMENT, INC.
1501 Sports Drive, Suite A, Sacramento, CA 95834

TABLE OF CONTENTS

A. BACKGROUND **1**
B. BACKGROUND AND INTRODUCTION **2**
C. PROJECT DESCRIPTION **3**
D. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED **16**
E. DETERMINATION **16**
F. ENVIRONMENTAL CHECKLIST **18**

I. AESTHETICS. *19*
II. AGRICULTURE AND FOREST RESOURCES. *22*
III. AIR QUALITY. *24*
IV. BIOLOGICAL RESOURCES. *33*
V. CULTURAL RESOURCES. *47*
VI. ENERGY. *50*
VII. GEOLOGY AND SOILS. *54*
VIII. GREENHOUSE GAS EMISSIONS. *59*
IX. HAZARDS AND HAZARDOUS MATERIALS. *62*
X. HYDROLOGY AND WATER QUALITY. *65*
XI. LAND USE AND PLANNING. *70*
XII. MINERAL RESOURCES. *71*
XIII. NOISE. *72*
XIV. POPULATION AND HOUSING. *79*
XV. PUBLIC SERVICES. *80*
XVI. RECREATION. *82*
XVII. TRANSPORTATION. *83*
XVIII. TRIBAL CULTURAL RESOURCES. *89*
XIX. UTILITIES AND SERVICE SYSTEMS. *90*
XX. WILDFIRE. *93*
XXI. MANDATORY FINDINGS OF SIGNIFICANCE. *94*

G. SOURCES **96**

APPENDICES:

Appendix A: Air Quality and GHG Modeling Results
Appendix B: Biological Survey Report
Appendix C: Wetland Delineation, Wetland Analysis, and Supplemental Impact Analysis
Appendix D: Geotechnical Engineering Report
Appendix E: Preliminary Drainage Report
Appendix F: Environmental Noise Assessment

INITIAL STUDY
September 2021

A. BACKGROUND

1. Project Title: Estates Meadows Project

2. Lead Agency Name and Address: Town of Truckee, Planning Division, 10183 Truckee Airport Road, Truckee, CA 96161

3. Contact Person and Phone Number: Yumie Dahn, Senior Planner, (530) 582-2918

4. Project Location: 10020 Estates Drive, Truckee, CA 96161, APN: 019-450-047

6. Project Sponsor: Kristi Isham, Cascade Housing Association, P.O. Box 182, Springfield, OR 97477, (541) 726-6187

7. Existing Land Use Designation: High Density Residential, 6-12 dwelling units per acre (du/acre)

9. Existing Zoning Designation: Residential Multi-Family, 15 du/acre (RM-15)

11. Potentially Required Approvals from Other Public Agencies: None

12. Surrounding Land Uses and Setting:

    The project site consists of a portion of an approximately 10.4-acre parcel located at 10020 Estates Drive in the Town of Truckee, CA, within Nevada County, (Assessor's Parcel Number [APN] 019-450-047). The parcel is divided by Estates Drive, which separates the parcel into the 2.1-acre project site, located south of the roadway, and the 8.3-acre portion of the parcel located north of the roadway, which is developed with the Truckee Donner Senior Apartments. The project site is currently undeveloped and includes a portion of the Truckee Meadows Wetlands. Surrounding existing land uses include multi-family residences to the north and east, the Truckee River Regional Park to the west, and a pond and the Ponderosa Golf Course to the south. The site is designated High Density Residential, 6-12 du/acre in the Town of Truckee 2025 General Plan and the site is zoned Residential Multi-Family, 15 du/acre (RM-15).

13. Project Description Summary:

    The Estates Meadows project (proposed project) would subdivide the existing 10.4-acre Truckee Donner Senior Apartments parcel into two parcels and develop the 2.1-acre southerly parcel (Parcel A) south of Estates Drive, with a 30-unit affordable housing community. The affordable housing community will consist of three, three-story residential buildings with 15 one-bedroom units, seven two-bedroom units, and eight three-bedroom units. The proposed project will also include a community building consisting of a community room, manager's office, bike storage, and laundry room. One-hundred percent of the units will be affordable to 50-60 percent median income households.

14. Status of Native American Consultation Pursuant to Public Resources Code Section 21080.3.1:

    In compliance with Assembly Bill (AB) 52 (Public Resources Code Section 21080.3.1), project notification letters were distributed to the T'si Akim Maidu, the United Auburn Indian Community of the Auburn Rancheria, and the Washoe Tribe. The letters were distributed on December 3, 2020, and requests to consult have not been received to date.

B. BACKGROUND AND INTRODUCTION

This Initial Study/Mitigated Negative Declaration (IS/MND) identifies and analyzes the potential environmental impacts of the proposed project. The information and analysis presented in this document is organized in accordance with the order of the California Environmental Quality Act (CEQA) checklist in Appendix G of the CEQA Guidelines. Where the analysis provided in this document identifies potentially significant environmental effects of the project, mitigation measures are prescribed.

The mitigation measures prescribed for environmental effects described in this IS/MND would be implemented in conjunction with the project, as required by CEQA. The mitigation measures would be incorporated into the project through conditions of approval. The Town of Truckee would adopt a Mitigation Monitoring/Reporting Program for the project in conjunction with approval of the project.

On November 16, 2006, the Town of Truckee adopted a comprehensive update to the Town's General Plan and certified an associated Environmental Impact Report (EIR).[1] The General Plan EIR is a program EIR, prepared pursuant to Section 15168 of the CEQA Guidelines (Title 14, California Code of Regulations, Sections 15000 et seq.). The General Plan EIR analyzed full implementation of the General Plan and identified measures to mitigate the significant adverse impacts associated with the General Plan to the maximum extent feasible.

Pursuant to Section 15152 of the CEQA Guidelines, a project which is consistent with the General Plan and zoning of the agency may tier from the analysis contained in the General Plan EIR, incorporating by reference the general discussions from the broader EIR. The negative declaration on a later project should limit analysis to effects which:

1) Were not examined as significant effects on the environment in the prior EIR; or

---

[1] Town of Truckee. *Town of Truckee General Plan.* Adopted November 16, 2006.
Town of Truckee. *Town of Truckee Draft Environmental Impact Report.* July 2006.

2) Are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means.

Given that the proposed project would be consistent with the site's current General Plan land use designation, the environmental analysis contained in this IS/MND tiers, where applicable, from the General Plan EIR, in accordance with CEQA Guidelines Section 15152.

C. PROJECT DESCRIPTION

The following provides a description of the project site's current location and setting, as well as the proposed project components and discretionary actions required for the project.

Project Location and Setting

The project site is located at 10020 Estates Drive in the Town of Truckee, California. The Town of Truckee is located within the Lake Tahoe region of California, just east of Donner Pass, within the valley of the Truckee River and surrounding upland areas. Truckee is in the eastern part of Nevada County, approximately 12 miles north of Lake Tahoe and 30 miles west of Reno.

The area surrounding the project site is located in a generally urban and urban park/residential area. The area to the north of the project site contains the Truckee Donner Senior Apartments, the Truckee Pines Apartments, and a neighborhood of single-family homes, known as the Ponderosa Fairway Estates. Additionally, Ponderosa Golf Course and the Truckee Regional Park are located to the south and the west of the project site, respectively. The Truckee River is located northwest of the project site. The Truckee Tahoe Airport is located approximately one mile southeast of the project site, and State Route (SR) 267, which runs southeast from Interstate 80 (I-80) to Lake Tahoe, is located approximately one mile northeast of the project site (see Figure 1).

The 10.4-acre parcel, on which the project site is located, is bisected by Estates Drive, with the northern portion of the parcel containing the Truckee Donner Senior Apartments, and the southern portion containing the project site (see Figure 2). The net acreage of the parcel is 9.6 acres, excluding Estates Drive and a public access easement located along the west side of the parcel. The 2.1-acre project site is currently undeveloped, but has been previously disturbed by grading activities. The land within the project site consists primarily of non-native grasses with a few small pine saplings scattered throughout. Two berms have been previously constructed along the eastern and southern borders of the site. Additionally, wetlands are present in the east, southwest corner, and along the southern border of the project site. The land bordering the east and west of the project site consists of ruderal, unvegetated, previously disturbed land, while the land to the south consists of a pond and wet meadows.

Project Components

The proposed project would include the development of 30 units of affordable housing spread between three, three-story buildings, (Buildings A, B, and C), with a maximum building height of 40 feet. In addition, a single-story community building (Building D) would be included in the development of the proposed project. The proposed buildings and associated parking surfaces have been arranged in such a way as to avoid the on-site wetlands. Further information regarding the proposed project's potential impacts to the wetlands located on the project site is provided in Section IV, Biological Resources, of this IS/MND.

One-hundred percent of the residential units would be affordable to 50-60 percent median income households, and would consist of 15 one-bedroom units, seven two-bedroom units, and eight three-bedroom units.

Figure 1
Regional Project Location

Figure 2
Project Location

Building A would include six one-bedroom units, two two-bedroom units, and three three-bedroom units; Building B would consist of six one-bedroom units and four two-bedroom units; and Building C would consist of three one-bedroom units, two two-bedroom units, and four three-bedroom units. Building D is proposed to be 1,430 square-feet (sf), and would include a community room, manager's office, bike storage, and a laundry room.

As discussed above, Buildings A, B, and C would each be three stories; however, the buildings vary slightly in elevation. For example, Building A, which utilizes shallower pitched shed roofs, and has a variety of roof planes and ridge lines, has a height at just under 40 feet at its highest point (see Figure 3), while Building B, which is a narrow building and has a moderate roof pitch of 4:12, has an elevation of 37 feet (see Figure 4). Building C would be approximately 38 feet at its highest point (see Figure 5), and due to being only one story, Building D would be just under 20 feet high (see Figure 6). The Town Development Code's maximum building height requirements allow for three stories, or 35 feet, whichever is less, within the RM-15 zone. Because the proposed buildings would be approximately five feet above the Town's maximum height requirement at their highest elevation, approval of a Planned Development would be required for the development of the proposed project, as discussed in further detail below.

Access to the proposed project would be provided by Estates Drive, located to the north of the project site (see Figure 7). The project includes the dedication of a 60-foot-wide public road easement for Estates Drive. A central parking lot would be located in the middle of the project site, with two entrance/exit points located along Estates Drive. This would provide parking for all units, resulting in a total of 50 parking spaces, which includes four American Disability Act (ADA) accessible spaces. Additionally, 18 spaces of bike parking would be included in the bike storage space located in Building D. The project would also construct a six-foot sidewalk along the property's Estates Drive frontage.

Landscaping proposed for the project would include evergreen trees, deciduous trees, various types of shrubs and perennials, as well as native grasses to be located around the proposed buildings and parking area. A play area and art grove would be located in the southwestern portion of the site, west of Building D, and a turf area would be located in the northwestern portion of the project site, west of Building A (see Figure 8). In addition, all wetland areas would be fenced off with a split rail permanent protective fence to prevent disturbance.

Utilities

The proposed project would connect to existing utility lines within the project area. Water and electricity would be provided by Truckee Donner Public Utilities District (TDPUD), while natural gas would be provided by Southwest Gas Corporation. Water supply would be provided to the project site through a new connection to the existing eight-inch water main in Estates Drive, which would be located on the northwest corner of the project site. Sewer would be provided by Truckee Sanitary District. Sewer service for the project site would be provided by way of a connection to the existing eight-inch sewer service main located in Estates Drive, near the southwest corner of the project site. Additionally, the project site is located in the service area for the Truckee Fire Protection District (TFPD) and the Truckee-Tahoe Unified School District (TTUSD).

New stormwater infrastructure within the project site would include two vegetated swales along the northern boundary of the project site to collect, treat, and attenuate stormwater runoff (see Figure 9). Further discussion of the proposed project's stormwater infrastructure is included in Section X, Hydrology and Water Quality, of this IS/MND.

Figure 3
Exterior Elevations: Building A

Figure 4
Exterior Elevations: Building B

Figure 5
Exterior elevations: Building C

Figure 6
Exterior Elevations: Building D

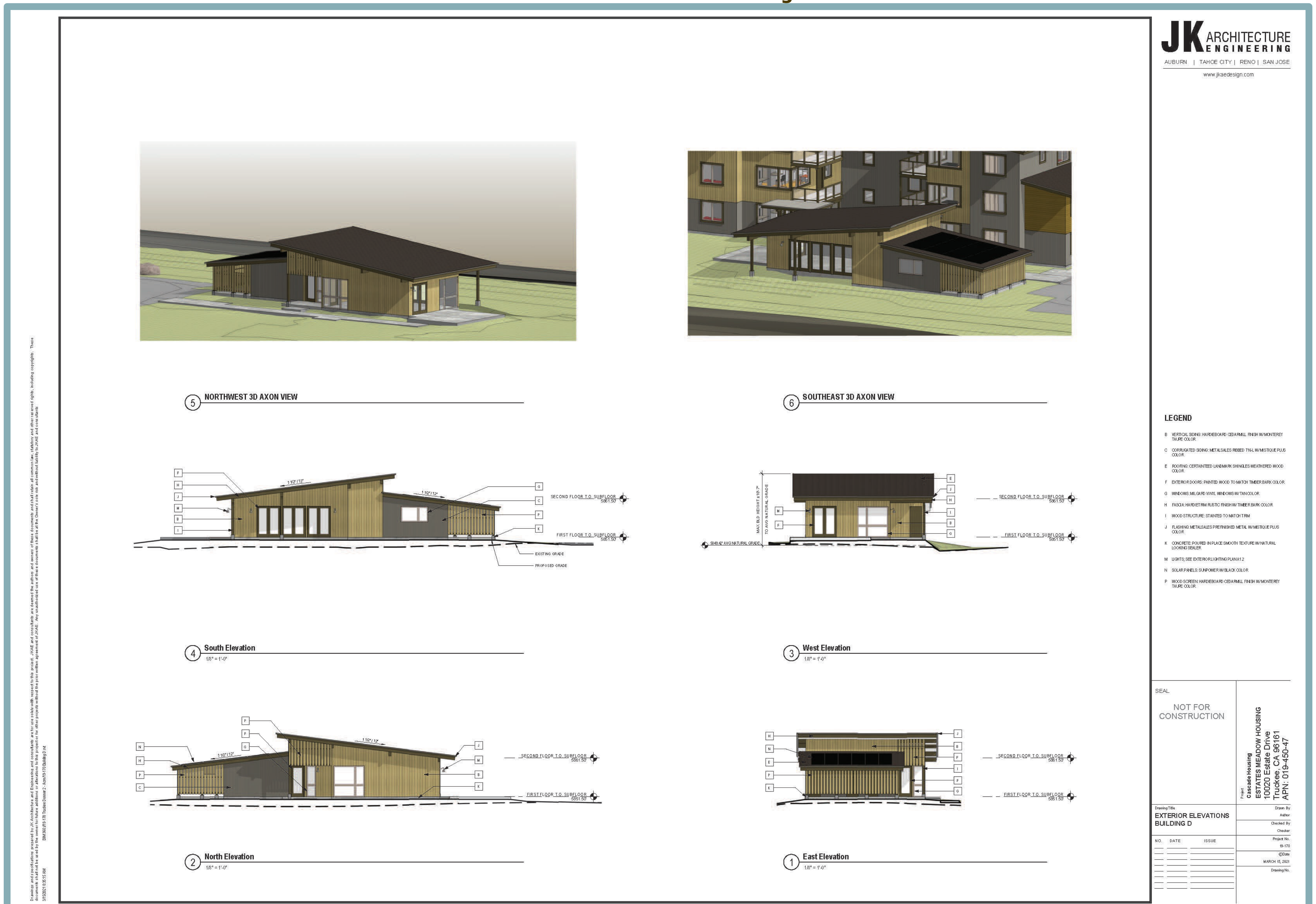


Figure 7
Tentative Parcel Map

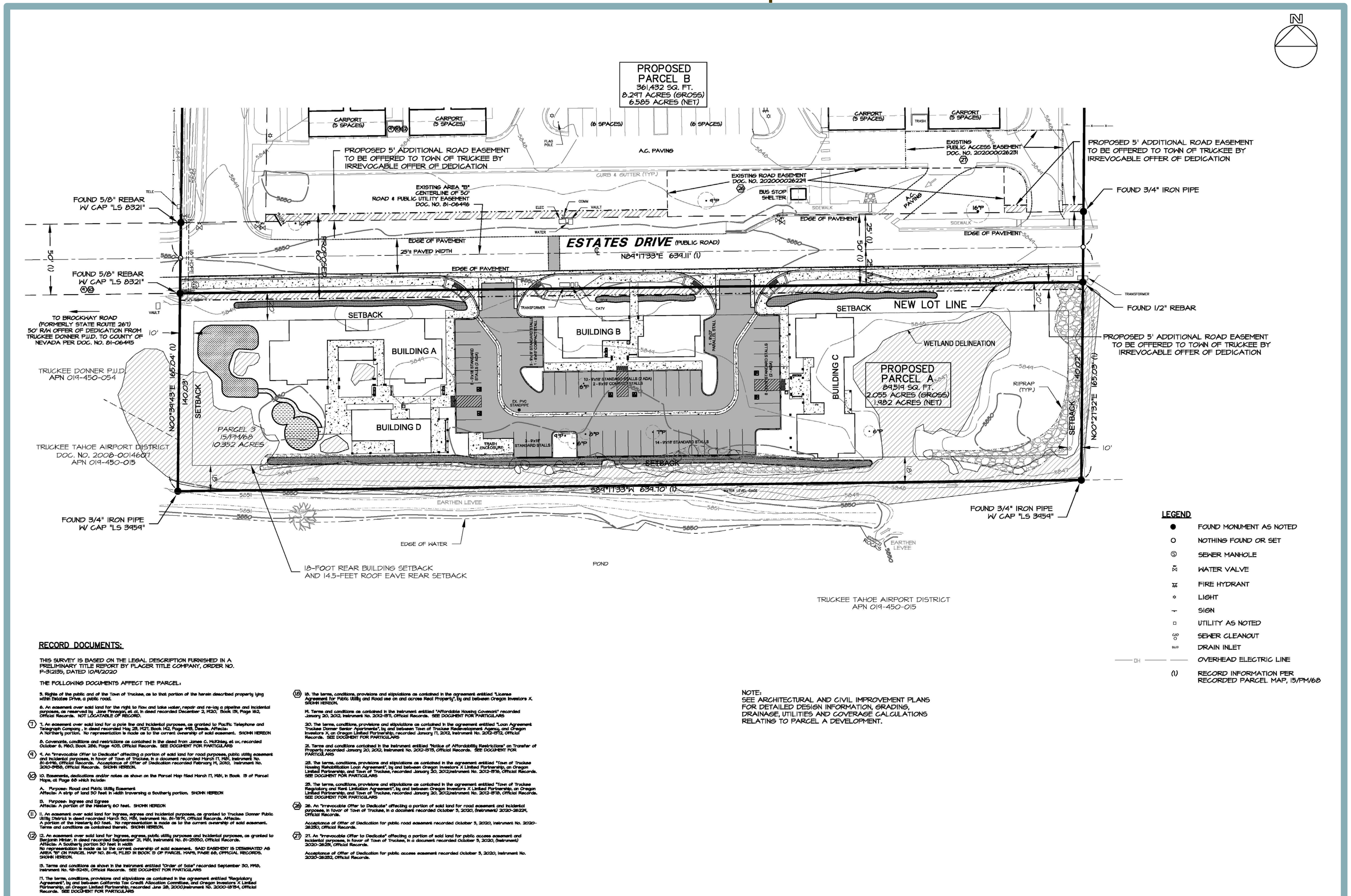
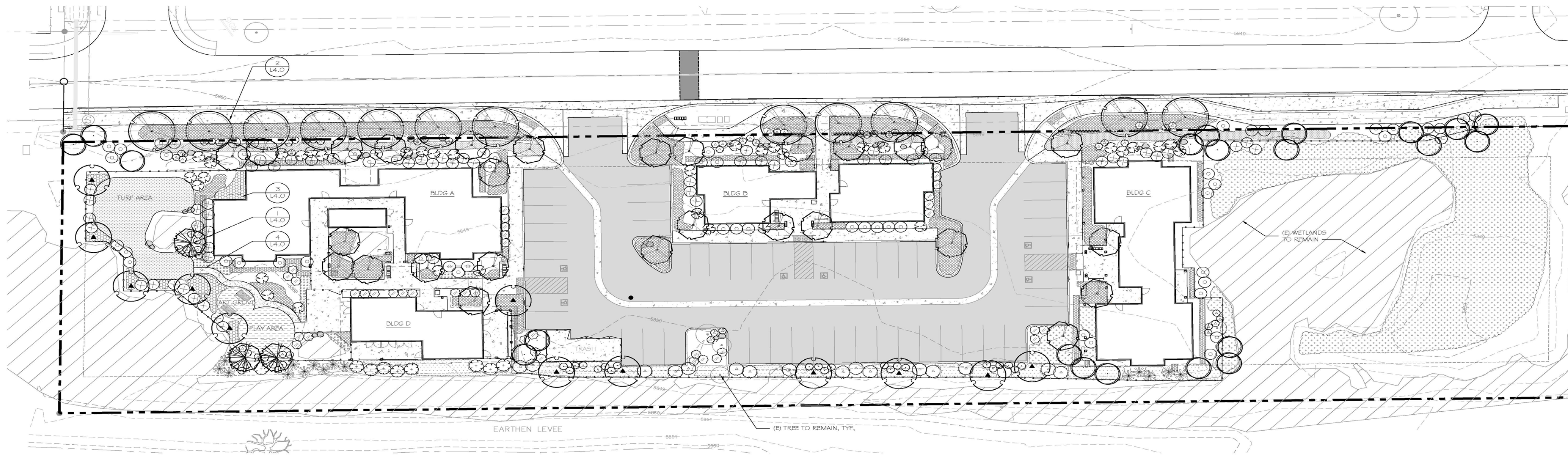


Figure 8
Landscaping Plan



PLANT LEGEND

SYMBOL	SCIENTIFIC NAME	COMMON NAME	QTY	SIZE	WUCOLS
TREE					
	Acer ginnala	Amur Maple	12	15 Gal	Medium
	Acer rubrum 'Armstrong'	Armstrong Red Maple	12	24" Box	Medium
	Malus x 'Snowdrift'	Snowdrift Flowering Crabapple	28	15 Gal	Medium
	Pinus jeffreyi	Jeffrey Pine	3	24" Box	Low
	Populus tremuloides	Quaking Aspen	21	15 Gal	Naturalized
	Existing Pine to Remain		4		Low
SHRUBS					
	Pinus mugo mugo	Dwarf Mugo Pine	35	5 Gal	Low
	Prunus besseyi	Western Sand Cherry	59	5 Gal	Medium
	Prunus cistena	Purple-Leaf Plum	57	5 Gal	Medium
	Ribes roezlii	Sierra Gooseberry	63	1 Gal	Low
	Spiraea j. 'Goldflame'	Goldflame Spirea	38	1 Gal	Low
RIPERIAN TRANSITION SHRUBS					
	Cornus stolonifera	Red-Twig Dogwood	9	5 Gal	High
	Ribes nevadense	Sierra Currant	61	5 Gal	Medium
	Salix purpurea	Purple Willow	15	5 Gal	High
	Symphoricarpos mollis	Creeping Snowberry	28	5 Gal	Low
SEED MIXES AND GROUND COVERS					
	Lavandula a. 'Munstead'	Munstead Lavander	18" O.C.	1 Gal	Low
	Rubus parvifolius	Thimbleberry	3' O.C.	1 Gal	High
	Perennial Mix*		24" O.C.	1 Gal	Medium
	Forest Understory Seed Mix**		17.75 lbs/acre		Medium
	Riparian Re-veg Mix***		14.50 lbs/acre		High
	Synthetic Turf				Low

*PERENNIAL MIX (TO BE PLACED W/ L.A. PRESENT)

Aquilegia caerulea	Rocky Mtn. Columbine
Aquilegia formosa	Western Columbine
Coreopsis g. 'Sunburst'	Sunburst Coreopsis
Lupinus hyb. 'Russell'	Russell Hybrid Lupine
Oenothera caespitosa	White Evening Primrose
Sedum 'Autumn Joy'	Autumn Joy Sedum

**FOREST UNDERSTORY SEED MIX

Festuca idahoensis 'Joseph'	Joseph Idaho Fescue	5 lb.
Koeleria macrantha	Prairie Junegrass	3 lb.
Poa secunda	Sandberg Bluegrass	2 lb.
Purshia tridentada	Mountain Sagebrush	2 lb.
Linum lewisii	Blue Flax	1 lb.
Balsamorhiza sagittata	Arrowleaf Balsamroot	1 lb.
Lupinus argenteus	Silvery Lupine	1 lb.
Penstemon eatonii	Firecracker Penstemon	1 lb.
Eriogonum umbellatum	Sulphur Flower	.5 lb.
Paeonia brownii	Western Peony	.5 lb.
Artemisia tridentata	Mountain Sagebrush	.5 lb.
Ribes cereum	Wax Currant	.25 lb.
		17.75 lbs/acre

***RIPARIAN RE-VEG MIX

Elymus glaucus	Blue Wildrye	4 lb.
Festuca idahoensis	Blue Bunchgrass	4 lb.
Hordeum brachyantherum	Meadow Barley	2 lb.
Elymus triticoides	Creeping Wildrye	2 lb.
Deschampsia cespitosa	Tufted Hairgrass	1.5 lb.
Ribes sanguineum	Red Currant	.5 lb.
Aquilegia formosa	Western Columbine	.25 lb.
Mimulus lewisii	Monkey Flower	.25 lb.
		14.5 lbs/acre

NOTE: PER TOWN OF TRUCKEE
DISTURBED AREAS. ALL DISTURBED AREAS OF A PROJECT SITE NOT INTENDED FOR A SPECIFIC USE, INCLUDING PAD SITES IN SHOPPING CENTERS HELD FOR FUTURE DEVELOPMENT, SHALL BE LANDSCAPED WITH TREES, SHRUBS, HERBACEOUS PERENNIALS, AND GROUNDCOVER. NATIVE PLANTS ADAPTED TO THE SPECIFIC MICROCLIMATE ARE PREFERRED. HOWEVER, WELL-ADAPTED, NONINVASIVE, MAY BE CONSIDERED APPROPRIATE FOR USE. TREES AND SHRUBS SHALL BE PROVIDED AT A RATE OF ONE TREE AND FOUR SHRUBS FOR EVERY 100 SQUARE FEET OF LANDSCAPED AREAS OR FRACTION THEREOF. DISTURBED AREAS INCLUDE AREAS ON THE PROJECT SITE THAT ARE NOT ASSOCIATED WITH THE PROJECT BUT WERE DISTURBED BY PREVIOUS GRADING ACTIVITIES, STRUCTURES AND/OR SUBSTANTIAL REMOVAL OF VEGETATION ON THE SITE.

LANDSCAPE REQUIREMENTS	REQUIRED
STREET FRONTAGE- 1 TREE / 20 LF & 1 SHRUB / 5 LF	640'= 32 TREES / 128 SHRUBS
REAR PROPERTY LINE AT PARKING LOT - 1 TREE / 20 LF & 1 SHRUB / 5 LF	237'= 12 TREES / 48 SHRUBS
PARKING LOT PLANTING- 2 TREES & 4 SHRUBS PER 5 PARKING SPACES	51 SPACES = 22 TREES, 44 SHRUBS
TOTAL LANDSCAPE REQUIRED 24" BOX = 20% / 5 GAL = 70%	66 TREES / 220 SHRUBS 13- 24" BOX / 154- 5 GAL
TOTAL LANDSCAPE PROPOSED	
TREES- PRESERVE 4 PINES 76 NEW TREES- 15 / 24" BOX (20% OF REQUIRED), 61 / 15 GAL	TOTAL 81 TREES
SHRUBS- PRESERVE EXISTING PLANTS ALONG PROPERTY AS POSSIBLE. 365 SHRUBS- 264 / 5 GAL (72% OF REQUIRED) & 101 / 1 GAL	TOTAL 365 SHRUBS

PLANTING NOTES

INSPECTIONS:
1. ALL LOCAL CODES SHALL BE MET. CONTRACTOR TO NOTIFY USA TO DETERMINE UNDERGROUND UTILITY LOCATIONS PRIOR TO COMMENCEMENT.
2. PLAN IS DIAGRAMMATIC ONLY. EXACT LOCATION OF SHRUBS AND TREES SHALL BE DETERMINED IN THE FIELD WITH LANDSCAPE ARCHITECT. ALL PLANT MATERIAL MUST BE INSPECTED AND APPROVED BY LANDSCAPE ARCHITECT OR OWNER PRIOR TO PLANTING.

SCHEDULING:
3. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING LANDSCAPE ARCHITECT A MINIMUM OF 48 HOURS IN ADVANCE FOR THE FOLLOWING SITE OBSERVATIONS AND OR MEETINGS, SUBJECT TO OWNER'S APPROVAL:
   A. PRE CONSTRUCTION MEETING WITH ALL PARTIES.
   B. PLANT MATERIALS ON SITE, PRIOR TO INSTALLATION.
   C. OPEN TRENCH, MAINLINE (WITH VALVES ATTACHED) PRESSURE TEST.
   D. FINAL PROJECT WALK-THRU.
4. CONTRACTOR SHALL COORDINATE AND PROVIDE ALL INCIDENTAL WORK WITH OTHER TRADES, I.E., PAVING, PLUMBING, ELECTRICAL ETC.

GRADING:
5. ALL PLANTING AREA GRADES AND PLANT MATERIAL SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO ANY PLANT INSTALLATION. CALL 48 HOURS PRIOR TO ANY WORK AND AFTER ALL MATERIALS ARE ON SITE.
6. SMOOTH TRANSITION BETWEEN FINISH GRADE, SIDEWALK AND HEADERS SHALL BE REQUIRED PRIOR TO PLANTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING POSITIVE DRAINAGE IN ALL ORNAMENTAL PLANTING AREAS.

SOIL AMMENDMENT:
7. ALL PLANTING AREAS SHALL BE CULTIVATED TO A MINIMUM DEPTH OF 6 INCHES, WITH REMOVAL OF ALL DEBRIS, WEEDS AND ROCK EXCEEDING 3 INCHES IN DIAMETER. IMPORT TOPSOIL SHALL BE ADDED TO ALL PARKING LOT ISLANDS AND TO ELEVATE GRADE. SUCH SOIL SHALL BE FRIABLE. AS MUCH AS POSSIBLE, NATIVE TOPSOIL IS TO BE STOCKPILED AND REPLACED. AMEND SOIL WITH 6 CY ORGANIC AMENDMENT PER 1000 S.F.

PLANTING:
8. DIG THE PLANTING HOLE TWICE THE DIAMETER OF THE CONTAINER AND NO DEEPER, (SEE DETAIL). WET SOIL PRIOR TO PLANTING. PLACE PLANT IN THE HOLE SLIGHTLY HIGHER THAN THE SURROUNDING GRADE. BACK FILL WITH A 50:50 MIXTURE OF "PLANTING MIX", (SEE BELOW) AND THE NATIVE SOIL. SOIL TO BE MIXED THOROUGHLY. FIRM THE BACK FILL, PLACE A SMALL WELL AROUND THE PERIMETER OF THE HOLE AND WATER THOROUGHLY BY HAND. COMMENCE WITH THE REGULAR WATERING SCHEDULE IMMEDIATELY.

REVEGETATION:
9. TO REVEGETATE DISTURBED AREAS, TILL AND MULCH SOIL TO 8" PRIOR TO SEED APPLICATION.

SUBSTITUTIONS:
10. CONTRACTOR SHALL MAKE ALL ATTEMPTS TO ACQUIRE SPECIFIED PLANT MATERIAL. SUBSTITUTIONS WILL BE CONSIDERED AFTER CONTRACTOR PROVIDES, IN WRITING, FROM AT LEAST THREE SUPPLIERS, THAT PROPOSED PLANT MATERIAL IS NOT AVAILABLE. THESE LETTERS AND PROPOSED SUBSTITUTIONS MUST BE RECEIVED BY THE LANDSCAPE ARCHITECT A MINIMUM OF TWO WEEKS PRIOR TO THE ONSET OF DEMOLITION AND OR CONSTRUCTION.

FERTILIZER:
11. GRANULAR FERTILIZER IN BALANCED FORMULA SHALL BE USED FOR ALL PRE-PLANT APPLICATIONS.

IRRIGATION:
12. ALL AREAS SHALL HAVE 100% COVERAGE WITH AUTOMATIC LOW-FLOW IRRIGATION SYSTEM.

MULCH:
13. MULCH ALL PLANTING AREAS WITH A 2 INCH DEPTH OF COARSELY CHIPPED, FIR OR PINE BARK, I.E.. "WALK-ON BARK" MULCH UNLESS OTHERWISE INDICATED. CONTRACTOR SHALL SUBMIT A SAMPLE TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO PURCHASE.

MAINTENANCE:
14. ALL PLANTED AREAS SHALL BE MAINTAINED FOR A PERIOD OF SIXTY DAYS FOLLOWING COMPLETION OF INSTALLATION AND APPROVAL BY THE LANDSCAPE ARCHITECT. CONTRACTOR SHALL GUARANTEE ALL TREES AND SHRUBS FOR A PERIOD OF ONE YEAR FOLLOWING THE END OF THE MAINTENANCE PERIOD AND FINAL WRITTEN ACCEPTANCE BY THE LANDSCAPE ARCHITECT.
15. ALL WORK SHOWN IS NEW AND PART OF THIS CONTRACT UNLESS NOTED AS EXISTING. PROTECT ALL EXISTING WORK TO REMAIN UNLESS NOTED OTHERWISE.

DAMAGES:
16. CONTRACTOR SHALL PROMPTLY REPAIR ALL DAMAGES TO EXISTING SITE AT NO COST TO OWNER.

CLEANUP:
17. UPON COMPLETION, REMOVE ALL EXTRANEOUS MATERIALS AND DEBRIS, SWEEP AND WASH THE AREA CLEAN, REMOVE ALL PLANT LABELS FROM NURSERY.

WINTERIZATION:
18. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR DRAINING IRRIGATION SYSTEM IN PREPARATION FOR THE FIRST WINTER AFTER CONSTRUCTION HAS BEEN COMPLETED. INSTRUCT OWNER'S REPRESENTATIVES IN PROPER PROCEDURES. WINTERIZATION SHALL PROCEED AS FOLLOWS:
   1. CLOSE THE GATE VALVE IN IRRIGATION MAIN LINE LOCATED AT THE WATER METER.
   2. INSERT A QUICK COUPLING QUILL, CONNECTED TO AIR COMPRESSORS, INTO THE QUICK COUPLING VALVE LOCATED AT THE WATER METER.
   3. FOLLOWING START OF THE AIR COMPRESSOR, PROGRAM IRRIGATION CONTROLLER THROUGH THREE (3) COMPLETE CYCLES OR UNTIL ALL WATER HAS BEEN FORCED OUT OF SYSTEM.
   4. INSERT A QUICK COUPLING QUILL INTO QUICK COUPLING VALVE AT DEAD END RUNS OF MAIN LINE TO FORCE OUT ALL REMAINING TRAPPED WATER.
   5. REMOVE THE COMPRESSOR, LEAVING THE GATE VALVE TO IRRIGATION SYSTEM CLOSED.

Figure 9
Stormwater Treatment Plan

Snow Storage
All development and proposed land uses that are planned with off-street parking and circulation areas shall be designed and constructed to provide snow storage areas in compliance with the minimum standards of the Town of Truckee Development Code, Section 18.30.130. As shown in Figure 10, the proposed project would include approximately 938 sf of snow storage area on site. The remaining 7,739 sf of snow storage required for the proposed project would be located on Parcel B, north of the project site, which currently has an excess of 23,660 sf of snow storage space.

Discretionary Actions
The proposed project requires the following approvals from the Town of Truckee:

- Development Permit;
- Minor Use Permit;
- Planned Development; and
- Tentative Subdivision map.

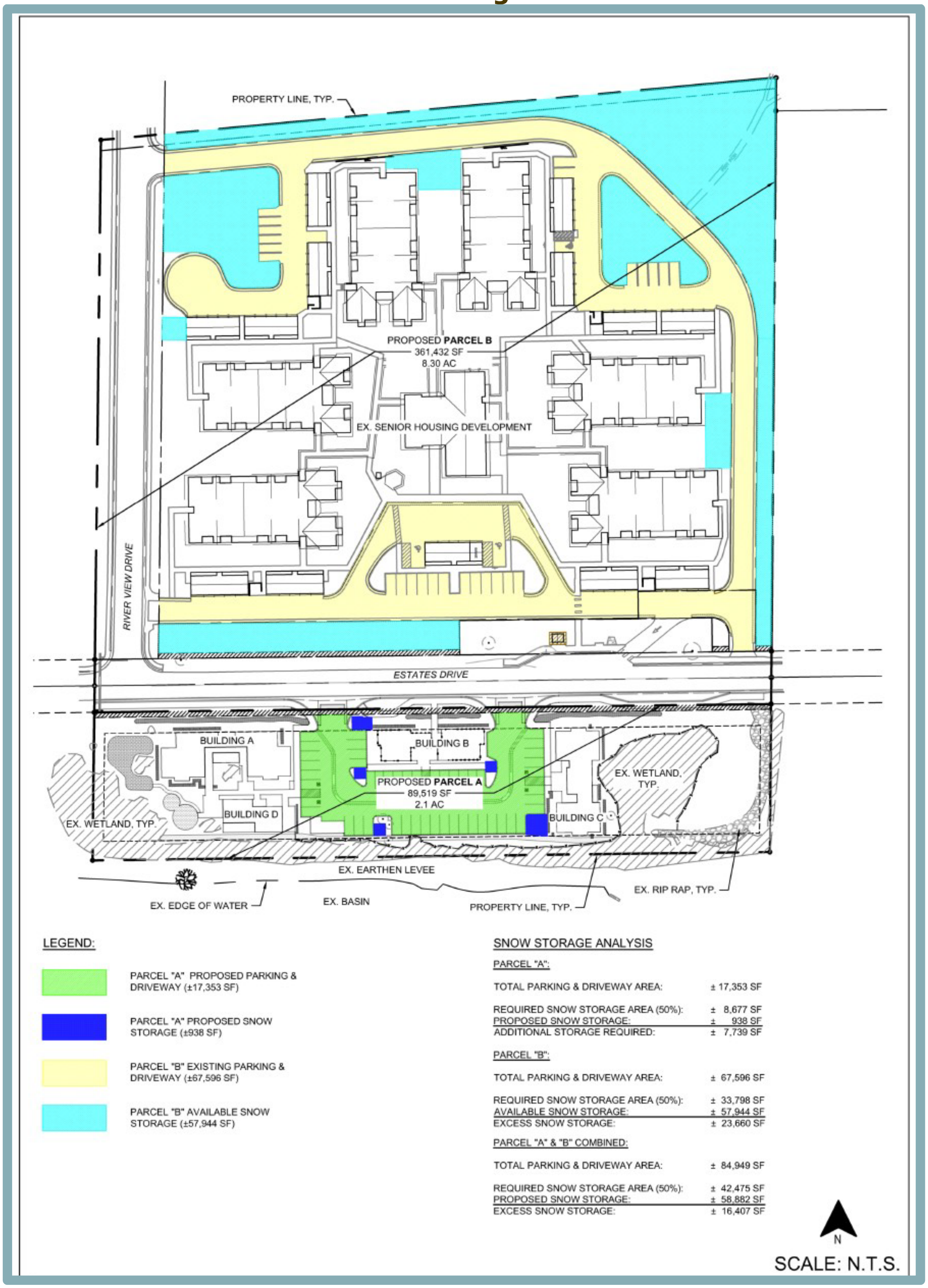
Each approval is discussed below.

Development Permit
Development permits are required for all permitted commercial, industrial, and public uses that include 7,500 sf of floor area (5,000 sf in Downtown zoning districts) or disturb more than 26,000 sf of ground area, and for all permitted multi-family residential projects with 11 or more dwelling units. Because the proposed project would include a multi-family residential project with more than 11 dwelling units in the RM-15 zoning district and disturbance of more than 26,000 sf of ground area, a Development Permit would be required.

Minor Use Permit
The proposed project would require approval of a Minor Use Permit from the Town of Truckee. According to Section 18.30.050(F) of the Development Code, developments located within 200 feet of any wetlands shall require the approval of a Minor Use Permit in compliance with Chapter 18.76 and the criteria set forth in Section 18.46.040. The proposed project would include development within 200 feet of the wetlands located on the project site; thus, approval of a Minor Use Permit would be required.

Planned Development
According to Chapter 18.78 of the Town's Development Code, a Planned Development may be requested by a property owner for any residential development project in any residential zoning district. The approval of a Planned Development may adjust or modify, where necessary and justifiable, all applicable development standards identified in the Development Code, with the exception of the standards laid out in Section 18.78.020. The proposed project would require approval of a Planned Development to allow a reduction in parking requirements from 66 parking spaces to 50 spaces, increase allowed building height from 35 feet to 40 feet, a reduction in the rear yard setback from 20 feet to 18 feet (to building) with eaves up to 14.5 feet from the property line, and a reduction in the front yard setback from 20 feet to 15 feet.

Figure 10
Snow Storage Plan



Tentative Subdivision Map

A Tentative Subdivision Map is required to divide the project site into two separate parcels; Parcel A, the 2.1-acre undeveloped area south of Estates Drive, which would be developed with the proposed project, and Parcel B, the 8.4-acre previously developed area to the north of Estates Drive. The Tentative Subdivision Map would also dedicate the public access easement for Estates Drive.

D. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is “Potentially Significant Impact” as indicated by the checklist on the following pages.

☐	**Aesthetics**	☐	**Agriculture and Forest Resources**	☐	**Air Quality**
✖	**Biological Resources**	✖	**Cultural Resources**	☐	**Energy**
✖	**Geology and Soils**	☐	**Greenhouse Gas Emissions**	☐	**Hazards and Hazardous Materials**
✖	**Hydrology and Water Quality**	☐	**Land Use and Planning**	☐	**Mineral Resources**
☐	**Noise**	☐	**Population and Housing**	☐	**Public Services**
☐	**Recreation**	✖	**Transportation**	✖	**Tribal Cultural Resources**
☐	**Utilities and Service Systems**	☐	**Wildfire**	☐	**Mandatory Findings of Significance**

E. DETERMINATION

On the basis of this initial study:

☐ I find that the Proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

✗ I find that although the Proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the Proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Yumie Dahn	09/17/2021
Signature	Date
Yumie Dahn, Senior Planner	Town of Truckee
Printed Name	For

F. ENVIRONMENTAL CHECKLIST

The following checklist contains the environmental checklist form presented in Appendix G of the CEQA Guidelines. The checklist form is used to describe the impacts of the proposed project. A discussion follows each environmental issue identified in the checklist. For this checklist, the following designations are used:

Potentially Significant Impact: An impact that could be significant, and for which no mitigation has been identified. If any potentially significant impacts are identified, an EIR must be prepared.

Less Than Significant with Mitigation Incorporated: An impact that requires mitigation to reduce the impact to a less-than-significant level.

Less-Than-Significant Impact: Any impact that would not be considered significant under CEQA relative to existing standards.

No Impact: The project would not have any impact.

I. AESTHETICS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?	☐	☐	✖	☐
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	☐	☐	✖	☐
c. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	✖	☐
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	✖	☐

Discussion

a, b. Examples of typical scenic vistas include mountain ranges, ridgelines, or bodies of water as viewed from a highway, public space, or other area designated for the express purpose of viewing and sightseeing. The mountain landscape dominates the built environment in Truckee. Scenic views in the area include surrounding mountain peaks and ridgelines, and sweeping vistas of the forested hillsides, meadows, and the river valley in which the Town lies. In general, a project's impact to a scenic vista would occur if development of the project would substantially change or remove a scenic vista.

While Figure CC-1 of the General Plan does not identify any scenic vistas located near the project site, it does designate the portion of I-80 where it passes through the Town as a scenic corridor. However, this portion of I-80 is not officially designated as a State Scenic Highway.[2] The Town's scenic corridor designation recognizes the high scenic value of the landscape along this thoroughfare, and the need to actively protect the corridor from the encroachment of visually incompatible development and advertising signage that could impair the scenic quality within the roadway's viewshed.[3] However, the project site is not visible from I-80 due to existing intervening vegetation and development within the Town, which obstructs views of the project site from I-80. Furthermore, the Truckee Development Code, Section 18.46.080, Scenic Corridor Standards, identifies areas that are subject to the Town's Scenic Corridor Development Standards, as being those areas that extend 300 feet on each side of the Interstate 80 right-of-way (except those areas located within the Downtown Study Area as shown on the General Plan Land Use Diagram). The site is located approximately one mile east of I-80, well outside of the 300-foot corridor range set by Section 18.46.080, Scenic Corridor Standards, of the Town's Development Code. Thus, the proposed project would not have a significant impact on a State Scenic Highway.

Based on the above, development of the proposed project would not have a substantial adverse effect on a scenic vista and would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway. Thus, a ***less-than-significant*** impact would occur.

2 California Department of Transportation. *California Scenic Highway Mapping System*. Available at: https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=2e921695c43643b1aaf7000dfcc19983. Accessed March 2021.

3 Town of Truckee. *Town of Truckee 2025 General Plan* [pg 3-9]. Adopted November 16, 2006.

c. The project site currently consists primarily of non-native grasses, with wetlands located along the eastern and southwestern borders of the project site, and a few pine saplings scattered throughout. The project site is surrounded by multi-family residences to the north and east, the Truckee River Regional Park to the west, and a pond and the Ponderosa Golf Course to the south. In addition, the project site is located in an area that can be seen from the Brockway Road Corridor, which is south of the project site. The Brockway Road Corridor is identified by the Town's General Plan as being a location for substantial amounts of new development. The development in this area would occur mostly as infill development and would include the development of Joerger Ranch Specific Plan into a new commercial center for Truckee. The General Plan EIR identifies a series of goals, policies, and actions that would regulate the design and character of development along the Brockway Road Corridor, which would render potential impacts to visual character as less than significant. The project is consistent with relevant goals related to visual character and quality, such as Policies P7.1 through P7.5, related to clustering development to avoid significant natural areas.

Currently, the neighborhood surrounding the project site consists of previously constructed residential and recreational uses. The project site has been anticipated for residential development by the Town as it is designated High Density Residential, 6-12 du/acre by the Town's General Plan and zoned Residential Multi-Family, 15 du/acre (RM-15). Three of the buildings proposed for development would be three stories high, with the tallest building having a maximum height of just under 40 feet. The Town Development Code's maximum building height requirements allow for three stories, or 35 feet, whichever is less, within the RM-15 zone. As such, the proposed buildings would be approximately five feet above the Town's maximum height requirement at their highest elevation; thus, approval of a Planned Development would be required for the development of the proposed project, which would allow for an increase in the maximum building height requirement of the project site from 35 feet to 40 feet. The additional height would not block scenic resources as viewed from the Brockway Road Corridor, as the area beyond the site is developed with the Truckee Donner Senior Apartments. Looking the other way (south), the proposed three-story buildings would block views of the existing pond that are currently afforded to the Senior Apartments; however, only a few units have open views toward the south given that the covered parking structures for the apartments block the majority of apartment views.

In addition, CEQA (Public Resources Code, Section 21000 et seq.) case law has established that only public views, not private views, are protected under CEQA. For example, in *Association for Protection etc. Values v. City of Ukiah* (1991) 2 Cal.App.4th 720 [3 Cal. Rptr.2d 488] the court determined that "we must differentiate between adverse impacts upon particular persons and adverse impacts upon the environment of persons in general. As recognized by the court in *Topanga Beach Renters Assn. v. Department of General Services* (1976) 58 Cal.App.3d 188 [129 Cal.Rptr. 739]: '[A]ll government activity has some direct or indirect adverse effect on some persons. The issue is not whether [the project] will adversely affect particular persons but whether [the project] will adversely affect the environment of persons in general.'" Such a conclusion is consistent with the thresholds of significance established in Appendix G of the CEQA Guidelines.

The proposed project would also be required to comply with Section 18.24, Design Guidelines, of the Town's Development Code, which sets forth design standards and guidelines governing scenic quality. Compliance with such standards and guidelines would ensure that the proposed project does not conflict with applicable zoning and other regulations governing scenic quality.

Based on the above, compliance with the applicable goals, policies, and actions of the Town's General Plan, as well as Section 18.24 of the Town's Development Code, and approval of a Planned Development would ensure the proposed project would not conflict with applicable zoning or other regulations governing scenic quality, and a ***less-than-significant*** impact would occur.

d. Development of the proposed uses would involve new sources of light and glare associated with lighting fixtures within the proposed buildings and parking areas. Headlights from vehicles driving within the project site would also result in sources of light and glare. However, such sources of light and glare would not be substantially more intensive than what currently occurs within the surrounding area. Additionally, light and glare are generated by vehicles traveling on Estates Drive in the project vicinity, as well as the Truckee Donner Senior Apartments to the north.

All outdoor lighting would be required to comply with the Town's Development Code, Section 18.30.060, Exterior Lighting and Night Sky, which outlines safe lighting practices while minimizing light pollution. Section 18.30.060 requires the project to use shielded lighting fixtures, and pedestrian-scale lighting fixtures. Furthermore, Section G, Outdoor Lighting Standards, states, "All light fixtures, including security lighting, shall be aimed and shielded so that the direct illumination shall be confined to the property boundaries of the source. Particular care is to be taken to assure that the direct illumination does not fall onto or across any public or private street or road." Compliance with the Town's standards would ensure that project effects on the nighttime lighting environment are minimized.

Given the general consistency of the proposed project with surrounding development and compliance with the Town's lighting standards, implementation of the proposed project would result in a ***less-than-significant*** impact related to creating a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

II. AGRICULTURE AND FOREST RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	✖
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	✖
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	✖
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	✖
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	✖

Discussion

a, e. The project site currently consists primarily of non-native grasses, with wetlands located along the eastern and southwestern borders of the project site, and a few pine saplings scattered throughout. As such, the site is not currently being used for agricultural purposes.

Per the California Department of Conservation Farmland Mapping and Monitoring Program, the project site is located in an area which has not been mapped for agricultural resources.[4] According to the Town of Truckee's General Plan Land Use map, the Town does not currently include any areas designated for agricultural uses. Due to the lack of farmland mapping or designated agricultural areas, as well as the developed nature of the area, the project site is not considered Farmland. Therefore, the proposed project would not convert Prime Farmland, Unique Farmland or Farmland of Statewide importance to a non-agricultural use, or otherwise result in the loss of Farmland to non-agricultural use, and ***no impact*** would occur.

b. As noted above, the project site is currently zoned RM-15 and designated High Density Residential by the Town's General Plan. Agricultural production is not considered a permitted or conditionally permitted use under either the RM-15 zoning or High Density Residential land use designation. In addition, the project site is not under a Williamson Act contract. Therefore, the proposed project would not conflict with existing zoning for agricultural use, or a Williamson Act contract, and ***no impact*** would occur.

c, d. The project site is not considered forest land (as defined in Public Resources Code Section 12220[g]), timberland (as defined by Public Resources Code Section 4526) and is not zoned Timberland Production (as defined by Government Code Section 51104[g]). In

[4] California Department of Conservation. *California Important Farmland Finder*. Available at: https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed April 2021.

addition, due to the lack of forest on-site, the project would not result in the loss of forest land or conversion of forest land to non-forest use. Therefore, the proposed project would have ***no impact*** with regard to conversion of forest land or any potential conflict with forest land, timberland, or Timberland Production zoning.

III. AIR QUALITY. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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?	☐	☐	✖	☐

Discussion

a, b. The Town of Truckee is located in the Mountain Counties Air Basin (MCAB), and is under the jurisdiction of the Northern Sierra Air Quality Management District (NSAQMD). In addition to the Truckee area, the NSAQMD has jurisdiction over an area encompassing Nevada, Plumas, and Sierra counties. Topography and meteorological conditions vary widely in the areas under the NSAQMD's jurisdiction and air quality conditions can be heavily influenced by local factors. Consequently, air quality conditions within the MCAB vary, resulting in differing attainment status designations for State and federal ambient air quality standards (AAQS) within various portions of the MCAB. The attainment status for ozone, fine particulate matter 2.5 microns in diameter ($PM_{2.5}$), respirable particulate matter 10 microns in diameter (PM_{10}), and carbon monoxide (CO) AAQS are presented in Table 1.

Table 1
Attainment of AAQS within NSAQMD

Pollutant	State Designation	Federal Designation
Ozone (O_3)	Nevada County: Nonattainment (due to overwhelming transport) Sierra and Plumas County: Unclassified	**2008 Standard** • Western Nevada County: Serious Nonattainment • Sierra, Plumas, and Eastern Nevada County: Unclassifiable **2015 Standard** • Western Nevada County: Moderate Nonattainment • Sierra Plumas, Eastern Nevada County: Unclassifiable
PM_{10}	Nevada, Sierra, and Plumas Counties: Nonattainment	Unclassified
$PM_{2.5}$	Portola area in Plumas County: Nonattainment Nevada, Sierra, and remainder of Plumas County: Unclassified	**2012 Annual Standard** • Portola area in Plumas County: Nonattainment • Nevada, Sierra, and Remainder of Plumas County: Unclassifiable/Attainment **2012 24-hour Standard** • Unclassifiable/Attainment

Continued on next page

Table 1
Attainment of AAQS within NSAQMD

Pollutant	State Designation	Federal Designation
CO	Plumas County: Attainment Nevada, Sierra County: Unclassified	Unclassifiable/Attainment

Source: NSAQMD. Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects. August 15, 2019.

Ozone is a secondary pollutant generated from ozone precursor gases, primarily oxides of nitrogen (NO_X) and reactive organic gases (ROG), which react with sunlight to create ozone. Reductions in ozone are accomplished through reducing precursor emissions. Western Nevada County is designated as nonattainment for the federal 8-hour ozone standard and all of Nevada County is designated as being in nonattainment for the State 1-hour ozone standard. Ozone exceedances in Nevada County are primarily due to transport of emissions from the broader Sacramento area and San Francisco Bay Area. As a result, the NSAQMD has jurisdiction over a relatively small portion of the pollutants causing nonattainment within the MCAB. Nevertheless, because portions of the MCAB have been designated as nonattainment, NSAQMD is preparing a federally enforceable State Implementation Plan (SIP) for western Nevada County in accordance with the Clean Air Act. The only current attainment plan adopted by NSAQMD is for the City of Portola. The attainment plan demonstrates that the City of Portola $PM_{2.5}$ nonattainment area will reach attainment by December of 2021. Given that the attainment plan only applies to the City of Portola and surrounding areas of Plumas County, the proposed project would not affect implementation of the attainment plan.

The SIP is an air quality attainment plan designed to reduce emissions of ozone precursors sufficient to attain the federal ozone standard by the earliest practicable date. The SIP under preparation will include various pollution control strategies. Overall emissions of ozone precursors must be reduced in western Nevada County (consistent with Reasonable Further Progress requirements specified in the Clean Air Act) until attainment is reached. Most of the reductions are expected to come from motor vehicles throughout the MCAB, Sacramento region, and San Francisco Bay Area becoming cleaner and from State regulations mandating further emissions reductions. Failure to submit and implement the SIP in a timely manner could result in federal sanctions, including the loss of federal highway funds, greater emission offset ratios for new sources, and other requirements that the U.S. Environmental Protection Agency (USEPA) may deem necessary.

The NSAQMD has established significance thresholds associated with development projects for emissions of the ozone precursors ROG and NO_x, as well as for PM_{10}. Adopted NSAQMD rules and regulations, as well as the thresholds of significance, have been developed with the intent to ensure continued attainment of AAQS, or to work towards attainment of AAQS for which the area is currently designated nonattainment. The thresholds, expressed in pounds per day (lbs/day), are listed in Table 2 below.

Table 2
NSAQMD Thresholds (lbs/day)

NO_X	ROG	PM_{10}
Level A		
<24 lbs/day	<24 lbs/day	<79 lbs/day
Level B		
24-136 lbs/day	24-136 lbs/day	79-136 lbs/day
Level C		
>136 lbs/day	>136 lbs/day	>136 lbs/day
Source: NSAQMD. Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects. August 15, 2019.		

As shown in the table, NSAQMD has developed a tiered approach to determine significance levels based on a range of emissions levels. All projects, Level A or greater, are required to implement the following basic measures recommended by NSAQMD:

- Alternatives to open burning of vegetative material will be used unless otherwise deemed infeasible by the NSAQMD. Among suitable alternatives are chipping, mulching, or conversion to biomass fuel; and
- Grid power shall be used (as opposed to diesel generators) for job site power needs where feasible during construction.

Projects that fall within the Level B emissions level thresholds require implementation of additional measures recommended by NSAQMD for consideration in order to result in a less-than-significant impact. Projects that exceed Level C emission level thresholds are required to implement further additional measures sufficient to reduce emissions to a level below significant. If, even after implementation of all such mitigation measures, a project would result in emissions in excess of the Level C thresholds, impacts would be considered significant and unavoidable.

The proposed project's construction and operational emissions were quantified using the California Emissions Estimator Model (CalEEMod) software version 2016.3.2 – a State-wide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions, including greenhouse gas (GHG) emissions, from land use projects. The model applies inherent default values for various land uses, including construction data, trip generation rates, vehicle mix, trip length, average speed, compliance with the California Building Standards Code (CBSC), etc. Where project-specific information is available, such information should be applied in the model. Accordingly, the proposed project's modeling assumes the following inherent site design features and project-specific information:

- Construction would begin in August 2021;[5]
- Construction would occur over an approximately two-year period;
- A total of 880 cubic yards (CY) of soil/material would be exported during site preparation;
- Approximately 500 CY of soil would be imported during site grading;

5 It is noted that when the air quality analysis was conducted, project construction was anticipated to commence in August 2021. While this is no longer the case, the analysis conducted for this Initial Study is conservative because construction fleets and electricity generation are becoming more efficient over time due to state regulations; thus, modeling construction at an earlier start date provides a more conservative analysis.

- The proposed residences would not include hearths/fireplaces;
- The project would comply with the Model Water Efficient Landscape Ordinance (MWELO) and the 2019 CALGreen Code; and
- The project would comply with all applicable provisions of the 2019 CBSC, including meeting 100 percent of electricity demand through on-site renewable energy generation.

The proposed project's estimated emissions associated with construction and operations are presented and discussed in further detail below. A discussion of the proposed project's contribution to cumulative air quality conditions is provided below as well. All emissions modeling results are included in Appendix A to this IS/MND.

Construction Emissions

According to the CalEEMod results, the proposed project would result in maximum unmitigated construction emissions as shown in Table 3. As shown in the table, the proposed project's construction emissions would be within the Level A thresholds for ROG, NO_X, and PM_{10}.

Table 3
Maximum Unmitigated Construction Emissions (lbs/day)

Pollutant	Proposed Project Emissions	Threshold Level
ROG	6.34	Level A
NO_X	21.24	Level A
PM_{10}	7.58	Level A
Source: CalEEMod, April 2021 (see Appendix A).		

As presented above, all projects, including the proposed project, are required to comply with the basic measures recommended by NSAQMD, which would help to reduce the construction emissions from the levels presented in Table 3. In addition, all development projects under the jurisdiction of the NSAQMD are required to prepare a Dust Control Plan pursuant to Rule 226 (Dust Control). The proposed project's required implementation of the Dust Control Plan would help to further minimize construction-related emissions of fugitive dust, which is a component of PM_{10}, from the levels presented in Table 3. With implementation of the Dust Control Plan, the actual emissions of PM_{10} would be lower than the levels presented in Table 3.

Based on the above, a less-than-significant impact related to construction emissions of criteria pollutants would occur.

Operational Emissions

According to the CalEEMod results, the proposed project would result in maximum unmitigated operational criteria air pollutant emissions as shown in Table 4.

Table 4
Maximum Unmitigated Operational Emissions (lbs/day)

Pollutant	Proposed Project Emissions	Threshold Level
ROG	1.52	Level A
NO_X	2.74	Level A
PM_{10}	1.21	Level A

Source: CalEEMod, April 2021 (see Appendix A).

As shown in the table, the proposed project's operational emissions would be within threshold Level A. Consequently, the proposed project would be considered to result in a less-than-significant impact related to operational emissions.

Cumulative Emissions

Due to the dispersive nature and regional sourcing of air pollutants, air pollution is already largely a cumulative impact. The nonattainment status of regional pollutants, including ozone and PM, is a result of past and present development, and, thus, cumulative impacts related to these pollutants could be considered cumulatively significant.

To improve air quality and attain the health-based standards, reductions in emissions are necessary within nonattainment areas. Adopted NSAQMD rules and regulations, as well as the thresholds of significance, have been developed with the intent to ensure continued attainment of AAQS, or to work towards attainment of AAQS for which the area is currently designated nonattainment, consistent with applicable air quality plans. As future attainment of AAQS is a function of successful implementation of NSAQMD's planning efforts, by exceeding the NSAQMD's Level C thresholds for construction or operational emissions, a project could contribute to the region's nonattainment status for ozone and PM emissions and could be considered to conflict with or obstruct implementation of the NSAQMD's air quality planning efforts.

As discussed above, the proposed project would result in construction and operational emissions that would be within the Level A threshold. Therefore, the proposed project would not be considered to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment, and the project's incremental contribution to cumulative emissions would be considered less than significant.

Conclusion

Because both construction and operation of the proposed project would result in Level A emissions of all criteria pollutants, pursuant to NSAQMD guidelines, the proposed project could be considered to result in emissions that would not conflict with or obstruct implementation of the applicable regional air quality plans. Thus, a ***less-than-significant*** impact would occur during construction of the proposed project.

c. Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and/or duration of exposure to air pollutants. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Sensitive receptors are typically defined as facilities where sensitive receptor population groups (i.e., children, the elderly, the acutely ill, and the chronically ill) are likely to be located. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics. The area to the north of the project site contains the Truckee Donner Senior Apartments, the Truckee Pines Apartments, and a neighborhood of single-family homes, known as the Ponderosa Fairway Estates. As such, the nearest existing sensitive receptors to the project site would be the Truckee Donner Senior Apartments, located approximately 100 feet north of the project site, across Estates Drive.

The major pollutant concentrations of concern are localized CO emissions, toxic air contaminant (TAC) emissions, and criteria pollutant emissions, which are addressed in further detail below.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. High levels of localized CO concentrations are only expected where background levels are high, and traffic volumes and congestion levels are high. Emissions of CO are of potential concern, as the pollutant is a toxic gas that results from the incomplete combustion of carbon-containing fuels such as gasoline or wood.

Although NSAQMD does not have an established threshold for CO emissions, daily maximum CO emissions are provided in order to inform the public. Maximum unmitigated daily construction and operational emissions of CO are provided in Table 5 below.

Table 5
Maximum Unmitigated Emissions of CO (lbs/day)

Project Phase	CO Emissions
Construction	17.53
Operations	8.19

Source: CalEEMod, April 2021 (see Appendix A).

Although NSAQMD does not have an established threshold for CO, the nearby air pollution control district, Placer County Air Pollution Control District (PCAPCD), who has authority over a portion of the MCAB, has a screening level for localized CO impacts. Consistent with previous practice, the Town of Truckee has elected to use the PCAPCD screening threshold for this environmental review. According to the PCAPCD screening levels, a project could result in a significant impact if the project would result in CO emissions from vehicle operations in excess of 550 lbs/day, and if the project would increase vehicle trips such that the peak hour level of service (LOS) at an intersection would degrade from an acceptable LOS to an unacceptable LOS or if project-generated trips would result in an increase in delay by 10 seconds or more at an intersection that already operates at an unacceptable LOS. As shown in Table 5, CO emissions associated with the proposed project would be well below the PCAPCD's 550 lbs/day screening level. In addition, as discussed in Section XVII, Transportation, of this IS/MND, the addition of project traffic to local roadways would not result in any conflicts with established operations standards for the study intersections in the project vicinity. Based on the nearby PCAPCD's screening levels for localized CO impacts, the proposed project would not be expected to result in substantial localized CO concentrations. Therefore, the proposed project would not be considered to expose sensitive receptors to substantial concentrations of localized CO.

TAC Emissions

Another category of environmental concern is TACs. The CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (Handbook) provides recommended setback distances for sensitive land uses from major sources of TACs, including, but not limited to, freeways and high traffic roads, distribution centers, and rail yards. The California Air Resources Board (CARB) has identified diesel particulate matter (DPM) from diesel-fueled engines as a TAC; thus, high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Health risks associated with TACs are a function of both the concentration of emissions and the duration of exposure, where the higher the concentration and/or the longer the period of time that a sensitive receptor is exposed to pollutant concentrations would correlate to a higher health risk.

The proposed project does not include any operational activities that would be considered a substantial source of TACs. Accordingly, operations of the proposed project would not expose sensitive receptors to excess concentrations of TACs.

Short-term, construction-related activities could result in the generation of TACs, specifically DPM, from on-road haul trucks and off-road equipment exhaust emissions. Construction is temporary and occurs over a relatively short duration in comparison to the operational lifetime of the proposed project. Health risks are typically associated with exposure to high concentrations of TACs over extended periods of time (e.g., 30 years or greater), whereas the construction period associated with the proposed project would likely be limited to approximately two years. All construction equipment and operation thereof would be regulated per the In-Use Off-Road Diesel Vehicle Regulation, which is intended to help reduce emissions associated with off-road diesel vehicles and equipment, including DPM. Because construction equipment on-site would not operate for long periods of time and would be used at varying locations within each site, associated emissions of DPM would not occur at the same location (or be evenly spread throughout the entire project site) for long periods of time. Furthermore, the prevailing wind direction in the Town of Truckee is from the west.[6] As a result, during the construction period, the wind would primarily blow construction exhaust and DPM in the eastward direction and not directly towards the nearby sensitive receptors, which are located to the north.

Due to the temporary nature of construction and the relatively short duration of potential exposure to associated emissions, the potential for any one sensitive receptor in the area to be exposed to concentrations of pollutants for a substantially extended period of time would be low. Thus, construction of the proposed project would not be expected to expose any nearby sensitive receptors to substantial pollutant concentrations.

Criteria Pollutants

The NSAQMD thresholds of significance were established with consideration given to the health-based air quality standards established by the Federal and State AAQS, and are designed to aid the district in achieving attainment of such AAQS.[7] Although the NSAQMD's thresholds of significance are intended to aid achievement of the AAQS for

---

6 Weather Spark. *Average Weather in Truckee California, United States*. Available at: https://weatherspark.com/y/1377/Average-Weather-in-Truckee-California-United-States-Year-Round#:~:text=The%20predominant%20average%20hourly%20wind,of%2056%25%20on%20July%2023.. Accessed April 21, 2021.

7 Northern Sierra Air Quality Management District. ***Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects***. August 18, 2009.

which the MCAB is in nonattainment, the thresholds of significance do not represent a level above which individual project-level emissions would directly result in public health impacts. Nevertheless, a project's compliance with the NSAQMD's thresholds of significance provides an indication that criteria pollutants released as a result of project implementation would not inhibit attainment of the health-based AAQS. Because project-related emissions would not exceed the NSAQMD thresholds for criteria pollutant emissions and, thus, would not inhibit attainment of the federal and State AAQS, the criteria pollutants emitted during project implementation would not be anticipated to result in measurable health impacts to sensitive receptors. Accordingly, the proposed project would not expose sensitive receptors to excess concentrations of criteria pollutants.

Conclusion

Based on the above discussion, the proposed project would not expose any sensitive receptors to excess concentrations of localized CO, TACs, or criteria pollutants during operations of the project. Consequently, the proposed project would result in a ***less-than-significant*** impact related to the exposure of sensitive receptors to substantial pollutant concentrations.

d. Emissions of principal concern include emissions leading to odors, emission that have the potential to cause dust, or emissions considered to constitute air pollutants. Air pollutants have been discussed in sections "a" through "c" above. Therefore, the following discussion focuses on emissions of odors and dust.

Emissions such as those leading to odor have the potential to adversely affect people. Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, quantitative analysis to determine the presence of a significant odor impact is difficult. Typical odor-generating land uses include, but are not limited to, wastewater treatment plants, landfills, and composting facilities. The proposed project would not introduce any such land uses.

Construction activities often include diesel-fueled equipment and heavy-duty trucks, which could create odors associated with diesel fumes that may be considered objectionable. However, construction is temporary and construction equipment would operate intermittently throughout the course of a day, and would likely only occur over portions of the site at a time. In addition, all construction equipment and operation thereof would be regulated per the In-Use Off-Road Diesel Vehicle Regulation. Project construction would also be required to comply with all applicable NSAQMD rules and regulations, particularly associated with permitting of air pollutant sources. The aforementioned regulations would help to minimize air pollutant emissions, as well as any associated odors related to operation of construction equipment. Considering the short-term nature of construction activities, as well as the regulated and intermittent nature of the operation of construction equipment, the proposed project would not be expected to create objectionable odors affecting a substantial number of people.

Furthermore, the NSAQMD regulates objectionable odors through Rule 205 (Nuisance), which prohibits any person or source from emitting air contaminants or other material that result in any of the following: cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; endanger the comfort, repose, health, or safety of any such persons or the public; or have a natural tendency to cause injury or damage to business or property. Rule 205 is enforced based on complaints. If complaints are received, the NSAQMD is required to investigate the complaint, as well as determine and ensure a solution for the source of the complaint, which could include operational modifications. Thus, although not anticipated, if odor complaints are made during construction or operation of the project, the NSAQMD would ensure that such odors are addressed and any potential odor effects eliminated.

With respect to dust, as noted previously, the proposed project would be required to comply with all applicable NSAQMD rules and regulations. Specifically, implementation of a Dust Control Plan pursuant to District Rule 906, and Section 18.30.030 of the Town's Development Code, which provides dust suppression requirements, would be sufficient to reduce potential emissions of dust during construction. Following project construction, vehicles operating within the project site would be limited to paved areas of the site, and non-paved areas would be landscaped. Thus, project operations would not include sources of dust that could adversely affect a substantial number of people.

For the aforementioned reasons, construction and operation of the proposed project would not result in emissions (such as those leading to odors) adversely affecting a substantial number of people, and a ***less-than-significant*** impact would result.

IV. BIOLOGICAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	✖	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	✖	☐	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	✖	☐	☐
d. Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☐	☐	✖	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	✖	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	✖

Discussion

a. The following discussion is based primarily on a Biological Survey Report prepared for the proposed project by EcoSynthesis, Inc. (see Appendix B).[8]

Special-status species include those plant and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal and State Endangered Species Acts. Both acts afford protection to listed and proposed species. In addition, California Department of Fish and Wildlife (CDFW) Species of Special Concern, which are species that face extirpation in California if current population and habitat trends continue are considered special-status species. Although CDFW Species of Special Concern and Fully Protected Species generally do not have special legal status, they are given special consideration under CEQA. In addition to regulations for special-status species, most birds in the U.S., including non-status species, are protected by the Migratory Bird Treaty Act (MBTA) of 1918. Under the MBTA, destroying active nests, eggs, and young is illegal. In addition, plant species on California Native Plant Society (CNPS) Lists 1 and 2 are considered special-status plant species and are protected under CEQA.

The Biological Survey Report included a search of the California Natural Diversity Database (CNDDB) within a five-mile radius of the project site. The intent of the database review was to identify documented occurrences of special-status species in the vicinity of the project area, to determine their locations relative to the project site, and to evaluate

[8] EcoSynthesis, Inc. *Estates Drive Site Biological Survey Report.* September 18, 2020.

whether the site meets the habitat requirements of such species. Based on the results of the CNDDB search, several special-status plant and wildlife species are known to occur within the project region. As demonstrated in Table 1 of the Biological Survey Report (see Appendix B to IS/MND), the majority of species are not expected to occur on-site due to lack of suitable habitat(s).

EcoSynthesis conducted site surveys on October 9, 2019, July 17, 2020, and August 26, 2020. Opportunistic wildlife observations were made in the course of wetland and botanical field work on site, but no species-specific surveys targeted at any special status wildlife species were conducted. Notwithstanding the context of these limitations, no special-status species of wildlife were observed during the present study.

The potential for special-status species to occur on the project site is discussed in further detail below.

Special-Status Plants

Special-status plants generally occur in relatively undisturbed areas within vegetation communities such as vernal pools, marshes and swamps, chenopod scrub, seasonal wetlands, riparian scrub, chaparral, alkali playa, dunes, and areas with unusual soil characteristics.

According to the Biological Survey Report, potentially suitable habitat occurs within the project site for three of the nine special-status plant species known to occur in the area. The species include the three-tip Sagebrush, Donner Pass buckwheat, and Plumas Ivesia.

Three-tip Sagebrush

The three-tip Sagebrush is identified by the plant’s leaves, rather than flower or fruits, so the plant is definitively identifiable at any time from approximately April through October or November. Nearly all regional records of the three-tip Sagebrush are found on high, exposed rock ridges and slopes; however, there is one record in the Lake Van Norden area, just outside the edge of a meadow. As such, the project site was systematically searched at a time of year when the three-tip sagebrush would be evident and definitively identifiable, and the species was not found within the project site. Therefore, the three-tip sagebrush would not be adversely affected by the proposed project.

Donner Pass Buckwheat

The Donner Pass buckwheat grows on a specific type of volcanic-derived soil. Most of the occurrences of the plant are on steep slopes or open ridges; however, there are records of the plant being found in western Truckee, at a site similar to the project site. As such, the project site could be considered potentially suitable habitat for the Donner Pass buckwheat. Donner Pass buckwheat is identified by the inflorescences of the plant, which are relatively persistent after the July to September flowering dates; however, the plant can be definitively identified from the leaves alone. The project site was systematically searched at a time of year when the Donner Pass buckwheat would be evident and definitively identifiable, and the species was not found within the project site. Therefore, the Donner Pass buckwheat would not be adversely affected by the proposed project.

Plumas Ivesia

The Plumas Ivesia is found in several locations around Truckee, in modest to major occurrences in Martis Valley and on the Waddle Ranch open space area, and in an even more extensive and populous occurrence at Sardine Meadow, north of Stampede Reservoir. Other scattered occurrences of Plumas Ivesia are found throughout parts of Truckee, even in partially disturbed sites within otherwise urbanized areas. The species occurs most often on volcanic soils in meadows that are not quite wetlands, similar to portions of the project site. As such, the project site was systematically searched at a time of year when the Plumas Ivesia would be evident and definitively identifiable, and the species was not found within the project site. Therefore, Plumas Ivesia would not be adversely affected by the proposed project.

Special-Status Wildlife

Although the project site does not contain suitable habitat for a majority of special-status wildlife species known to occur in the vicinity, four species have a marginal potential to occur on the project site. The species that have been determined to have marginal potential to occur on the project site include Willow Flycatcher, Sierra Nevada Yellow-Legged Frog, Southern long-toed salamander, and Morrison's and Western Bumble Bees.

Willow Flycatcher

Willow flycatcher is listed as endangered by the State of California, and nests in willow or similar riparian shrublands with surface water (ponds or very wet marshes; not merely mesic grass or sedge meadows) present throughout the breeding season. Most records in the greater Truckee region are in relatively extensive riparian habitat. Birds of this species in migration use generally similar habitats as they do for nesting (Sedgwick, 2020).

A comment to Town staff from Truckee River Watershed Council (TWRC) references an observation of a juvenile flycatcher (*Empidonax traillii*) on the adjoining wetland restoration site south of the project site. The bird is stated to have been a willow flycatcher. No other information about this observation is available, which would be necessary in order to fully assess its accuracy and significance for environmental review of the Estates Drive project. The reason being that willow flycatcher is in a genus of birds (*Empidonax*) that is notoriously difficult to identify, not only to species level but even to genus. The authoritative Birds of the World website maintained by Cornell Laboratory of Ornithology states, "As are most members of the genus Empidonax, Willow Flycatcher is difficult to identify in the field, and without vocal cues is nearly impossible to distinguish from Alder Flycatcher, whose habitats often overlap those of the Willow." The vocal cues referred to in this quote are ordinarily only made by birds during the breeding season, on a breeding territory.

In the professional opinion of EcoSynthesis, the reported flycatcher is likely a migrating individual in transit. Migrating birds do not make the species' diagnostic vocalizations and may be ones not normally found in a given area, so the range of possible species is greater. In short, it may be more correct to regard this observation as merely an Empidonax or Contopus flycatcher pending additional and more detailed observation.

Notwithstanding, suitable nesting habitat for willow flycatcher does occur in contiguous willow clumps on the south side of the off-site pond, over 100 feet from the project site. However, given the distance from the project site, and the moderately high tolerance of vehicles on Brockway Road and of pedestrians, dogs, and bicyclists on the Brockway Trail that would be a precondition for any bird to select the aforementioned habitat as a nesting site, there would be no significant wildlife disturbance impact expected to result from the project. Further, this IS/MND includes preconstruction nesting bird survey requirements to ensure that any nesting birds on-site, or within 100 feet of the project site, would not be adversely affected by project construction activities.

Sierra Nevada Yellow-Legged Frog (SNYLF)

The SNYLF breeds in perennial ponds or generally slow-moving flowing water, and is highly aquatic, rarely straying more than a few feet from water except in special cases such as very wet marshes around or intervening between breeding ponds. Though there is a suitable breeding pond to the south of the project site, there are no reported occurrences of SNYLF within the pond. Additionally, the only potentially suitable habitat within the project site is the ditch-like wetland along the southern parcel boundary, which is outside the project development footprint. Thus, disturbance of the SNYLF is not likely to occur due to the proposed project.

Southern Long-toed Salamander

The Southern long-toed salamander can occur in a wide variety of habitats from forest to semi-arid shrubland or grassland. Breeding habitat for the Southern long-toed salamander contains perennial or very long-seasonal water bodies due to the larvae being aquatic. As adults, the species live in moist underground sites such as under logs or boulders with moist soil. As such, the only suitable terrestrial habitat within the project site would be under the boulders that form the berm adjacent to the wetland along the southern property boundary, which is outside the project development footprint. Additionally, the Southern long-toed salamander would only occur within the project site if the offsite pond was used for breeding habitat, which is unlikely due to the urban setting of the surrounding area. As such, disturbance of the Southern long-toed salamander is not anticipated.

Morrison's and Western Bumble Bees

The Morrison's and Western Bumble Bees nest underground, or in or under organic material on the ground. Thus, suitable nesting habitat for these species could exist almost everywhere that is not paved. However, the reported occurrences of these species pre-date 1960 and the essential habitat characteristic for these bees is the presence of abundant flower resources of reasonably high species diversity, so that there are foraging opportunities throughout the entire season of activity. The project site has a very limited number of such forb or shrub species, and almost none of the highly preferred genera used by these species. As such, disturbance of the Morrison's and Western Bumble Bees is not likely to occur with project development.

Nesting Raptors and Migratory Birds

The project site contains existing trees and brush that could be used by migratory birds protected by the MBTA. Ground surface disturbance during construction activities could adversely affect the nesting success of migratory birds (i.e., lead to the abandonment of active nests) or result in mortality of individual birds, which would constitute a violation of State and federal laws. According to the Biological Survey Report, no trees suitable for raptor or owl nesting are present on-site, nor are there suitable day roosting sites for special-status or other bat species present within the project site. However, the potential occurs for migratory birds protected under the MBTA to nest in the trees located within the project site. Thus, in the event that such species occur on the project site during the breeding season, project construction activities could result in a substantial adverse effect to species protected under the MBTA.

Conclusion

Based on the above, the proposed project could have an adverse effect, either directly or through habitat modifications, on migratory birds which could be considered species identified as special-status species in local or regional plans, policies, or regulations, or by the CDFW or the U.S. Fish and Wildlife Service (USFWS), and a ***potentially significant*** impact could result.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

IV-1. A preconstruction nesting bird survey for migratory bird species shall be conducted by a qualified biologist within seven days prior to the beginning of any construction or grading activity if construction commences within the avian nesting season (May 1st through August 15st). The preconstruction survey shall cover the entire project site and publicly accessible areas within 100 feet of the project site boundaries. The results of the preconstruction nesting bird survey shall be submitted to the Town of Truckee. If nests are not found during the survey, further measures shall not be required. If any active nests are found, a non-disturbance buffer zone of 100 feet shall be marked with a continuous run of brightly colored tape or exclusion fencing and no construction activity shall occur within the buffer zone until a qualified biologist has confirmed that the nest is no longer occupied. Trees containing nests that must be removed as a result of project implementation shall be removed during the non-breeding season (late August to April).

In the event that construction extends beyond one calendar year with start-up on or after May 1 of the second year, the nesting bird survey and no-disturbance buffer zone (if warranted) shall be repeated.

b, c. The following discussion is based primarily on a Wetland Delineation,[9] a Wetland Analysis,[10] and a Supplemental Impact Analysis[11] prepared for the proposed project by EcoSynthesis, Inc. (see Appendix C).

The three parameter Wetland Delineation included a search of the USFWS National Wetlands Inventory (NWI), as well as a field survey which included several visits to the project site during the summer of 2019. Field work was carried out according to the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987) and Regional Supplement for the Western Mountains, Valleys, and Coast (WMVC) Region, Version 2.0 (ERDC, 2010).

The NWI identified two separate aquatic resource areas located along the southern boundary of the project site. The NWI classifies the area to the southwest as PUBHx Freshwater Pond Habitat, and the area to the southeast as PEM1A Freshwater Emergent Wetland (see Figure 11). Additionally, the field survey conducted for the Wetland Delineation identified four separate areas of Freshwater Emergent Wetland located within the project site (see Figure 12), totaling approximately 0.4403-acre.

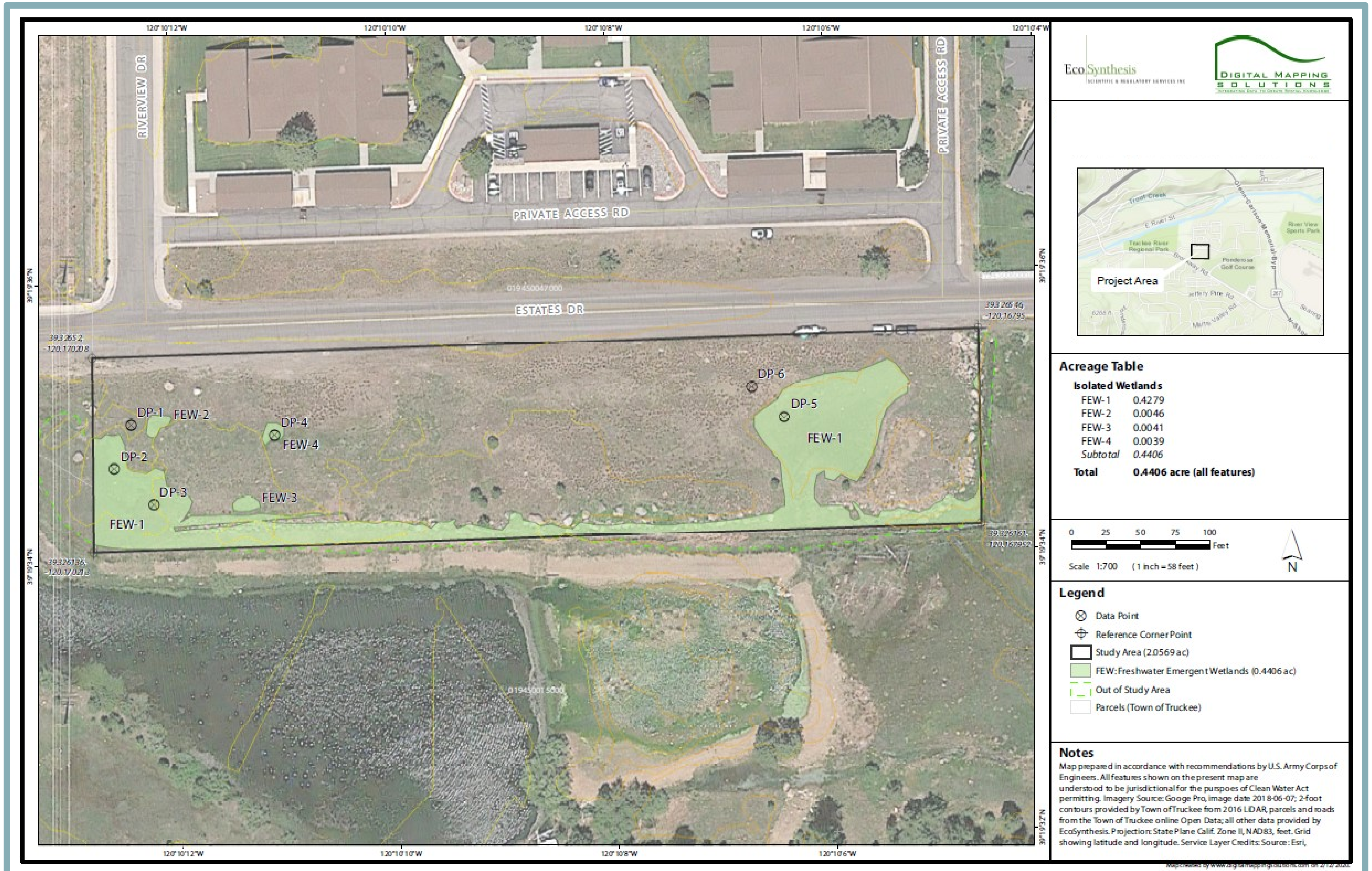
---

9 EcoSynthesis, Inc. *Estates Drive Site Wetland Delineation.* February 5, 2020.
10 EcoSynthesis, Inc. *Estates Drive Site Wetland Analysis.* April 24, 2021.
11 Ecosynthesis, Inc. *Estate Meadows Project Supplemental Impact Analysis*. July 20, 2021.

Figure 11
NWI Wetlands Map

EcoSynthesis SCIENTIFIC & REGULATORY SERVICES, INC.	Estates Drive Site Wetland Delineation Project site (approximate)	Feature labeled PEM1Kx in upper right corner is second constructed basin referred to in text in Section 3.1.3. North Scale approximately 1:9,000

Figure 12
On-Site Wetlands



According to EcoSynthesis, the proposed project has been designed to avoid direct impact on all delineated wetland features. However, development will occur in close proximity to the wetlands that were identified on the project site, so there is potential for significant indirect impacts to occur. As such, a Wetland Analysis and associated Supplement was conducted by EcoSynthesis to assess any potential impacts the proposed project would have on the wetland areas identified within the project vicinity. The wetland analysis identified three categories of potential impacts:

- possibility of increase or decrease in water quantity (whether surface flow or groundwater);
- possibility of short-term impacts to water quality during construction and
- possibility of long-term impacts to water quantity and quality during operation

The potential (or lack thereof) for significant indirect wetland impacts is best understood in the context of the physical setting prior to project development. The site is nearly horizontal over nearly all of its area, with a topographic channel extending along the entire southern boundary and extending slightly past it. Three very small isolated wetlands are located on-site, none of which exceeds 0.005-acre in area. Under conditions of surplus hydrology, the remaining wetland areas (two large lobes of one large contiguous wetland) flow very slowly toward the south, and the channel in turn drains eastward and then ultimately northward, though not ever actually reaching the Truckee River, to the best of EcoSynthesis' ability to make this determination.

The channel is separated from the pond and other wetlands located southward, toward Brockway Road, by a high enough berm that there is not, under any known or plausible circumstances, an immediate surface water connection between the project site and the wetland restoration area to the south. Except for the areas of direct wetland connection, the channel is also separated from the development areas by another berm that incorporates a number of large boulders.

Construction Impacts

Soils within the project site are high in clay and underlain by soil horizons and/or bedrock that restricts percolation of free-soil water. Disruption of soil profiles by heavy construction equipment could result in generation of sediment that could then be carried to on- or off-site wetlands by precipitation runoff. Disruption may include mere disturbance of the soil surface such as fragmentation of soil aggregates, as well as compaction throughout the project site of high-clay-content soil, which would reduce infiltration and increase runoff and erosion. The latter effect is greatly exacerbated when clayey soils have high water content.

Pervious areas within the project site would function operationally as areas to infiltrate runoff that originally emanated from impervious structural improvements. For infiltration to occur, any portions of the site outside the final impervious footprint that are subject to heavy equipment traffic or laydown of heavy materials must either be protected from compaction throughout the construction period, or compaction must be remediated by deep ripping to the depth that compaction has resulted, typically one to two feet, but possibly more.

Building C would be located very close to a wetland that would be preserved. During site clearing and construction of the building foundation, the potential exists for equipment to encroach into the wetland, or for grading for expansive soil remediation or construction of forms to extend into the wetland. Even after the foundation is constructed and the trench backfilled, equipment used to erect the remainder of the structure or place siding or roofing would be required to travel outside the building's exterior, which given the close proximity, means traveling through the wetland itself. As such, construction of the proposed project could result in a significant impact to the on-site wetlands.

Long-Term Impacts to Water Quantity

The most obvious way in which alteration of water quantity could adversely affect a wetland feature would be the reduction of water supply such that wetland hydrology (inundation or near-surface saturation for a prolonged period of time) no longer occurs under normal precipitation circumstances. Even with a lesser alteration that does not entirely eliminate the occurrence of wetland hydrology, reduction in the period during which wetland hydrology is present can alter the composition of the wetland plant community. Additionally, in some circumstances, increased water, or a change in the season that it arrives, can also result in an adverse impact by changing the hydrology in a way that is more favorable for a common wetland plant community that differs from the pre-existing one which may be less common or may support some uncommon species.

Wetland hydrology may be derived from incident precipitation (including melting snowpack), point or sheet flow run-on from adjacent areas, or from groundwater. The Estates Meadows site is primarily flat such that for nearly the entire wetland area, run-on from the adjacent watershed is likely to be only a limited, albeit non-zero, proportion of its hydrological support. The extreme western end of the wetland extends off site, where it may receive a small amount of inflow from adjacent uplands, but this is still likely a small proportion because the parcel to the west is also very flat and is underlain by the same soils.

Surface indicators (tributaries or even minor rills) do not suggest that concentrated surface flow occurs on the site. Some limited surface sheet flow may occur over short distances, but given the very flat topography, this is likely to be only a modest contributor to wetland hydrology of any of the delineated features.

In principle, ground water balance in a wetland may vary from a surplus at the wettest times, with lateral subsurface flow out of a wetland into surrounding soil, to a deficit at other times (lateral flow from surrounding soil back into the wetland). However, subsurface flow rates are determined by gradient, permeability of soil, and, where there is an impervious soil layer, cross-sectional area above it. At the Estates Meadows site, there is practically no gradient at all, soils are largely clay or clay loam with weak to moderate structure except, in some areas, a thin superficial layer of sandy loam. Thus, the soils are not highly transmissive when moist. Given these factors, ground water movement is probably not a major component of the wetland hydrology at the site.

Supplementing this physical understanding of site hydrology, it is possible to infer, with a sufficient level of accuracy for impact analysis, the main sources of hydrology for wetlands that support different types of wetlands, based in part on knowledge of a site's soils and topography and in part on the character of the wetland vegetation. For example, as a rule, small depressional wetlands that support predominantly annual native forb species (vernal pools) are supported primarily by incident precipitation that pools in the topographic depression and evaporates as temperatures warm. Such an area occurs on the project site surrounding the data point numbered DP-2, shown on the on-site wetlands map (see Figure 12).

Though the great majority of the wetlands on the Estates Meadows site are contiguous, vegetation varies somewhat in different areas, which indicates that the hydrology differs somewhat as well. The two large lobes of the contiguous wetland support vegetation that is suggestive of being supported hydrologically primarily by incident precipitation, with minor contribution from sheet flow from closely adjacent areas. This vegetation includes an area of predominantly vernal pool vegetation in the western lobe and the near-monoculture of creeping spike-rush in the eastern lobe.

As explained above, the hydrology of those two portions of the large mapped wetland is probably primarily derived from incident precipitation, but this is not the exclusive source and even the minor proportion that may be water from the adjacent watershed might be important in maintaining the existing plant community composition. However, in both cases, as well as the two nearby non-contiguous wetlands FEW-2 and FEW-3, areas of undeveloped watershed are avoided by the design of the project, so that adverse impacts on water quantity to support the present character of vegetation in nearly all of the wetland area within the site would not be anticipated to result from the project.

Additionally, in EcoSynthesis' professional opinion, pervious vegetated areas that will remain within the project site would provide substantial capacity for infiltration of water from impervious areas such as the roofs of the proposed buildings. A combination of impervious rooftop disconnection and vegetated swales would be implemented as part of the proposed project to achieve substantially similar drainage patterns to the existing on-site conditions (see Figure 9).

Of all wetland areas on site, the only one whose potential watershed is significantly reduced is FEW-4, which would be surrounded by concrete walkways and, beyond those, buildings. This 0.0039-acre wetland is dominated by Nebraska sedge with a lesser component (about 30 percent relative cover) of vernal pool annuals. Nebraska sedge is generally indicative of at least a moderately prolonged period of wetland hydrology, whereas the vernal pool species suggest early springtime inundation followed by drying out of the soil early in the summer. Overall, the plants indicate an intermediate hydrologic regime.

That being the case, it is possible that the moderate loss of hydrology from reduction of the watershed size could result in enough change to alter the vegetation composition of the wetland, which could be considered a potentially significant impact pursuant to CEQA.

Long-Term Impacts to Water Quality

The project design routes runoff from most impervious surfaces, in particular from the driveways and parking areas, into vegetated swales that serve to store, disperse, treat, and infiltrate the urban runoff. As discussed above, the wetland areas, all of which are avoided, derive their hydrologic support from incident precipitation (including melting snowpack) and from adjacent watersheds that will not have vehicle traffic.

The section on water quantity discusses possible contribution of drainage from concrete walkways and/or rooftops to the isolated wetland area FEW-4. Because the walkways would not be used by motor vehicles, there would not be a significant water quality concern from allowing this drainage from impervious areas to enter the preserved wetland (see below).

As previously discussed, runoff from rooftops (through rooftop disconnection) or residential impervious surfaces would be directed to pervious landscape areas for water quality treatment and infiltration into underlying soils. The remaining areas of the project site, such as the parking lot, which could potentially contain urban pollutants related to motor vehicles, would be graded to drain into the two proposed vegetated swales along the project's northern boundary, which would allow for flows in excess of the proposed on-site stormwater facilities to discharge into the natural discharge points at the northeast and northwest corners of the project site. Thus, overall drainage patterns on the project site are not anticipated to be substantially altered through development of the proposed project.

Accordingly, degradation of wetland water quality of any water body from urban runoff would not be expected to result from the project; there is no anticipated significant impact on water quality.

Conclusion

Based on the above, the proposed project could have a substantial adverse effect on a riparian habitat or other sensitive natural community, including a protected wetland, due to the potential loss of hydrologic support from the reduction of the watershed size for wetland area FEW-4. Thus, a ***potentially significant*** impact would occur.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

IV-2. *Prior to approval of improvement plans, the plans shall show that the concrete walkways in the area immediately surrounding wetland FEW-4 are graded to drain into the avoided wetland/upland area, and to the extent feasible, snow from the same proximal walkways should be cleared into the avoided area, supplementing the area's hydrology in a manner analogous to preserving a larger surrounding watershed. The requirements of this mitigation measure shall be verified by the Town of Truckee during review and approval of project improvement plans.*

IV-3 *Excavation shall not occur at any time under any circumstances within any delineated wetland area.*

Erosion and sediment control measures shall be implemented during project construction, including but not limited to installation of filter fencing between the main on-site wetland (FEW-1, which extends along the entire southern site boundary and has large lobes in both the eastern and western portions of the site) and areas of equipment or vehicle travel, or soil disturbance. At a minimum, filter fencing installation shall be common with an extent of orange exclusion fencing in the eastern portion of the site. Fencing shall be installed prior to arrival of excavating equipment (other than that needed for the installation itself) and maintained in good *functional condition throughout the entire period of construction through completion of landscaping of pervious areas.*

In addition to the filter fencing, sediment controls shall be installed around temporary stockpiles of any soil materials or unwashed sand or drain rock. Standard drainage inlet protections and other measures shall be included in the project's stormwater pollution prevention plan (SWPPP). All sediment controls and other SWPPP provisions shall be monitored for functional deficiencies in accordance with the NPDES Construction General Permit requirements, as follows: weekly inspections, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be Qualified SWPPP Practitioners (QSP). Written inspection checklists shall remain on-site with the SWPPP in accordance with NPDES permit requirements.

The requirements of this mitigation measure shall be included on the project improvements plans prior to their approval by the Town of Truckee.

IV-4 *Equipment or vehicles shall not be operated within any wetland area using "meadow mats" (e.g., DURA-BASE, or other functional equivalent) from October 15-May 1 (wet season). Equipment or vehicles may be operated within a wetland area outside of this period if the entirety of the possible travel surface is protected with meadow mats and the following requirements are met:*

- *Meadows mats shall be installed prior to any disturbance of wetlands, under the supervision of a wetland scientist;*
- *Orange exclusion fencing shall be installed around the meadow mats, as directed by the wetland scientist;*
- *Meadow mats shall be removed prior to October 15th of each year, under the supervision of a wetland scientist;*
- *Meadow mats shall not be used during rain events. Use of meadows mats after a rain event can only occur with confirmation from a wetland scientist that the wetland is dry and stable. The weekly QSP report shall include inspection data from the wetland scientist and confirmation that all conditions are satisfied. Written inspection checklists shall remain on-site with the SWPPP in accordance with NPDES permit requirements;*
- *The contractor shall perform daily, routine inspections of meadow mats;*
- *Spot inspections shall also be conducted by a wetland scientist and the Town, both of whom shall have the ability to stop construction at any time, if there is evidence of wetland damage, or improper use of meadows mats. If disturbance has occurred in the wetland, the following actions shall be implemented under supervision of a wetland scientist:*
    - *Restoration of soil and/or topography to pre-disturbance conditions, and if deemed necessary by the wetland scientist, seeding or planting during autumn following the*

disturbance (October) to restore vegetation to pre-disturbance conditions.

- *One season of monitoring shall be conducted by a wetland scientist to verify that the wetland has been restored to pre-disturbance conditions. Proof of successful restoration shall be provided to the Town of Truckee.*

- *Meadow mats shall be removed at the earliest date possible when all work occurring on-site that requires use of the mats has been completed.*

To the maximum extent feasible, non-wetland soil areas intended for future landscaping and pervious function shall also be protected by meadow mats if equipment travel is to occur while the soil is moist, wet, or saturated. If not feasible, then soil areas subject to equipment travel shall be deep ripped prior to landscaping.

Because construction will be occurring in closer proximity to wetlands than is usual and the measures needed for protection of the wetlands are somewhat more stringent than normal, a preconstruction meeting including on-site construction supervision staff, Town representation, and a knowledgeable wetland scientist shall be held to ensure that measures are rigorously implemented but are refined for compatibility with construction practicalities, if needed.

The requirements of this mitigation measure shall be included on the project improvements plans prior to their approval by the Town of Truckee.

d. Wildlife movement corridors are routes that animals regularly use and follow during seasonal migration, dispersal from native ranges, daily travel within home ranges, and inter-population movements. Movement corridors in California are typically associated with valleys, ridgelines, and rivers and creeks supporting riparian vegetation. The proposed project is located near other existing development, including the Truckee Donner Senior Apartments to the north, and vehicle traffic along Estates Drive would be expected to discourage wildlife movements to and from the site. In addition, two man-made berms are located along the southern and western boundaries of the project site. As such, the existing setting of the surrounding area limits the potential for use of the project site as a wildlife movement corridor. In addition, the project site does not contain streams or other waterways that could be used by migratory fish or as a wildlife corridor for other wildlife species.

Notwithstanding the above, on-site wetlands would remain with the development of the proposed project. The southerly wetlands on the project site form a continuous connection along the southern boundary of the project site, such that wildlife would be able to move through the southern portion of the site after development of the project.

Based on the above, the proposed project would not interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites. Thus, a ***less-than-significant*** impact would occur.

e. According to Sheet C2.1 of the project plans, project development would require removal of three small (6-8-inch) trees along the southern site boundary. Three similarly situated and sized trees would be retained.

The proposed project would be required to comply with the tree preservation requirements set forth in Section 18.30.155(G) of the Town Development Code, as well as Section 18.30.155(H) related to tree protection procedures for those trees that are not proposed for removal, including the placement of fencing at the dripline of the trees.

The proposed landscape plan would offset the loss of three trees by planting 73 deciduous trees, three evergreen trees, and various types of shrubs and perennials, as well as native grasses around the proposed buildings and parking area. In addition, four existing pine trees would remain on site.

Given required compliance with the Town's standards related to tree protection, and the proposed landscape plantings, which would more than offset the removal of three trees, a ***less-than-significant*** impact would occur related to conflicting with local policies or ordinances protecting biological resources.

f. The project site is not located within an area that is subject to an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan. Therefore, the proposed project would have ***no impact*** related to a conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.

V. CULTURAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☐	✖	☐
b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?	☐	✖	☐	☐
c. Disturb any human remains, including those interred outside of dedicated cemeteries.	☐	✖	☐	☐

Discussion

The following is based primarily on a Cultural Resource Inventory prepared for the proposed project by Susan Lindstrom, Consulting Archaeologist for the proposed project.[12]

a. An archeological field reconnaissance was conducted as part of the Cultural Resource Inventory by Dr. Lindstrom on July 13, 2020. The archeological field reconnaissance entailed systematically walking over the entire area in north-south transects no greater than 30 feet apart looking for all evidence of prior human activity. In many cases, some ground cover modification was performed to allow for the detection of the smallest of cultural resources likely to occur in the project area. A minimum of 16 north-south-trending transects were walked, along with a final east-west trending transect through the center of the parcel.

The only items identified were modern refuse, including small trash bag pockets deposited by scavenging animals near the center of the parcel, wire rope, a metal strap, barbed wire fragment, and a few pieces of glass. As such, the archeological field reconnaissance did not find any evidence of historical resources within the project area. Therefore, the proposed project would have a ***less-than-significant*** impact related to the substantial adverse change of a historical resource.

b-c. As part of the Cultural Resource Inventory prepared for the proposed project, a records search and literature review were conducted. The records search results identified two prehistoric resource sites that exist outside the project area, within a 1/16-mile radius of the project site. However, the Cultural Resource Inventory concluded that no previously recorded cultural resources exist within the project area.

Correspondence regarding the proposed project was sent by Dr. Lindstrom to the Native American Heritage Commission (NAHC), the Washoe Tribe, and the Colfax-Todds Valley Consolidated Tribe. This informal Tribal outreach is separate from the Tribal notification conducted by the Town under AB 52 (see Section XVIII, Tribal Cultural Resources, of this IS/MND). A response was received from the NAHC indicating that the Sacred Lands File search produced negative results for the project site. In addition, no responses were received from either tribe.

As discussed above, an archeological field reconnaissance was also conducted as part of the Cultural Resource Inventory, which included the minor modification of ground cover, to allow for the detection of all evidence of prior human activity including archeological remains. The archeological field reconnaissance did not find any cultural resources within

---

12 Susan Lindstrom, Consulting Archaeologist. *Cascade Housing Project Cultural Resource Inventory.* July 2020.

the project area. Additionally, according to the field reconnaissance, the entire project area has been subject to prior disturbance where ground surface has been graded and bulldozed.

Although the project area has been subject to a records search and a systematic surface archaeological investigation, there is a remote possibility that unknown archaeological resources, including human remains, could be uncovered during ground-disturbing activities at the proposed project site. Therefore, if previously unknown resources are encountered during construction activities, the proposed project could cause a substantial adverse change in the significance of a unique archaeological resource pursuant to CEQA Guidelines Section 15064.5 and/or disturb human remains, including those interred outside of dedicated cemeteries, during construction. Therefore, impacts are considered ***potentially significant***.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

V-1. *Prior to grading permit issuance, the developer shall submit plans to the Town of Truckee for review and approval which indicate (via notation on the improvement plans) that if unknown cultural resources, including unique historical, archeological, or paleontological resources, are encountered during site grading or other site work, all such work shall be halted immediately within 200 feet and the developer shall immediately notify the Town of Truckee Community Development Department of the discovery. In such case, the developer shall be required, at their own expense, to retain the services of a qualified archaeologist, paleontologist, or historian, as applicable, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology for the purpose of recording, protecting, or curating the discovery as appropriate. The archaeologist, paleontologist, or historian shall be required to submit a report of the findings and method of curation or protection of the resources to the Town of Truckee Community Development Department for review and approval. Further grading or site work within the area of discovery shall not be allowed until the preceding work has occurred.*

V-2. *If human remains, or remains that are potentially human, are found during construction, all work shall be halted immediately within 200 feet, and a professional archeologist shall ensure reasonable protection measures are taken to protect the discovery from disturbance. The archaeologist shall notify the Nevada County Coroner (per §7050.5 of the State Health and Safety Code). The provisions of §7050.5 of the California Health and Safety Code, §5097.98 of the California Public Resources Code, and Assembly Bill 2641 will be implemented. If the Coroner determines the remains are Native American and not the result of a crime scene, then the Coroner will notify the Native American Heritage Commission (NAHC), which then will designate a Native American Most Likely Descendant (MLD) for the project (§5097.98 of the Public Resources Code). The designated MLD will have 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. If the applicant does not agree with the recommendations of the MLD, the NAHC can* *mediate (§5097.94 of the Public Resources Code). If an agreement is not reached, the qualified archaeologist or MLD must rebury the remains where they will not be further disturbed (§5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center, using an open space or conservation zoning designation or easement, or recording a reinternment document with the county in which the property is located (AB 2641). Work cannot resume within the no-work radius until the lead agency, through consultation as appropriate, determines that the treatment measures have been completed to the Town's satisfaction.*

VI. ENERGY. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	✖	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	✖	☐

Discussion

a, b. The main forms of available energy supply are electricity, natural gas, and oil. A description of the 2019 California Green Building Standards Code and the Building Energy Efficiency Standards, with which the proposed project would be required to comply, as well as discussions regarding the project's potential effects related to energy demand during construction and operations are provided below.

California Green Building Standards Code

The 2019 California Green Building Standards Code, otherwise known as the CALGreen Code (California Code of Regulations Title 24, Part 11), is a portion of the California CBSC, which became effective with the rest of the CBSC on January 1, 2020. The purpose of the CAL Green Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices. The CALGreen standards regulate the method of use, properties, performance, types of materials used in construction, alteration repair, improvement and rehabilitation of a structure or improvement to property. The provisions of the code apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout California. Requirements of the CALGreen Code include, but are not limited to, the following measures:

- Compliance with relevant regulations related to future installation of Electric Vehicle charging infrastructure in residential and non-residential structures;
- Indoor water use consumption is reduced through the establishment of maximum fixture water use rates;
- Outdoor landscaping must comply with the California Department of Water Resources' MWELO, or a local ordinance, whichever is more stringent, to reduce outdoor water use;
- Diversion of 65 percent of construction and demolition waste from landfills; and
- Mandatory use of low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particle board.

Building Energy Efficiency Standards

The 2019 Building Energy Efficiency Standards is a portion of the CBSC, which expands upon energy efficiency measures from the 2016 Building Energy Efficiency Standards resulting in a seven percent reduction in energy consumption from the 2016 standards for residential structures. Energy reductions relative to previous Building Energy Efficiency Standards would be achieved through various regulations including requirements for the use of high efficacy lighting, improved water heating system efficiency, and high-performance attics and walls.

One of the improvements included within the 2019 Building Energy Efficiency Standards is the requirement that certain residential developments, including some single-family and low-rise residential developments, include on-site solar energy systems capable of producing 100 percent of the electricity demanded by the residences. Certain residential developments, including developments that are subject to substantial shading, rendering the use of on-site solar photovoltaic systems infeasible, are exempted from the foregoing requirement; however, such developments are subject to all other applicable portions of the 2019 Building Energy Efficiency Standards. Once rooftop solar electricity generation is factored in, homes built under the 2019 standards will use approximately 53 percent less energy than those under the 2016 standards.

Construction Energy Use

Construction of the proposed project would involve increased energy demand and consumption related to use of oil in the form of gasoline and diesel fuel for construction worker vehicle trips, hauling and materials delivery truck trips, and operation of off-road construction equipment. In addition, diesel-fueled portable generators may be necessary to provide additional electricity demands for temporary lighting, welding, and for supplying energy to areas of the site where energy supply cannot be met via a hookup to the existing electricity grid.

Even during the most intense period of construction, due to the different types of construction activities (e.g., site preparation, grading, building construction), only portions of the project site would be disturbed at a time, with operation of construction equipment occurring at different locations on the project site, rather than a single location. In addition, all construction equipment and operation thereof would be regulated per the CARB In-Use Off-Road Diesel Vehicle Regulation, which is intended to reduce emissions from in-use, off-road, heavy-duty diesel vehicles in California by imposing limits on idling, requiring all vehicles to be reported to CARB, restricting the addition of older vehicles into fleets, and requiring fleets to reduce emissions by retiring, replacing, or repowering older engines, or installing exhaust retrofits. The In-Use Off-Road Diesel Vehicle Regulation would subsequently help to improve fuel efficiency and reduce GHG emissions. Technological innovations and more stringent standards are being researched, such as multi-function equipment, hybrid equipment, or other design changes, which could help to reduce demand on oil and emissions associated with construction.

The CARB has prepared the *2017 Climate Change Scoping Plan Update* (2017 Scoping Plan),[13] which builds upon previous efforts to reduce GHG emissions and is designed to continue to shift the California economy away from dependence on fossil fuels. Appendix B of the 2017 Scoping Plan includes examples of local actions (municipal code changes, zoning changes, policy directions, and mitigation measures) that would support the State's climate goals. The examples provided include, but are not limited to, enforcing idling time restrictions for construction vehicles, utilizing existing grid power for electric energy rather than operating temporary gasoline/diesel-powered generators, and increasing use of electric and renewable fuel-powered construction equipment. The In-Use Off-Road Diesel Vehicle Regulation described above, with which the proposed project must comply, would be consistent with the intention of the 2017 Scoping Plan and the recommended actions included in Appendix B of the 2017 Scoping Plan.

[13] California Air Resources Board. *The 2017 Climate Change Scoping Plan Update.* November 2017.

Based on the above, the temporary increase in energy use occurring during construction of the proposed project would not result in a significant increase in peak or base demands or require additional capacity from local or regional energy supplies. In addition, the proposed project would be required to comply with all applicable regulations related to energy conservation and fuel efficiency, which would help to reduce the temporary increase in demand.

Operational Energy Use

Following implementation of the proposed project, Truckee Donner Public Utilities District would provide electricity to the project site, and natural gas would be provided by Southwest Gas. Energy use associated with operation of the proposed project would be typical of residential uses, requiring electricity and natural gas for interior and exterior building lighting, heating, ventilation, and air conditioning (HVAC), electronic equipment, machinery, refrigeration, appliances, security systems, and more. Maintenance activities during operations, such as landscape maintenance, would involve the use of electric or gas-powered equipment. In addition to on-site energy use, the proposed project would result in transportation energy use associated with vehicle trips generated by the proposed residential development.

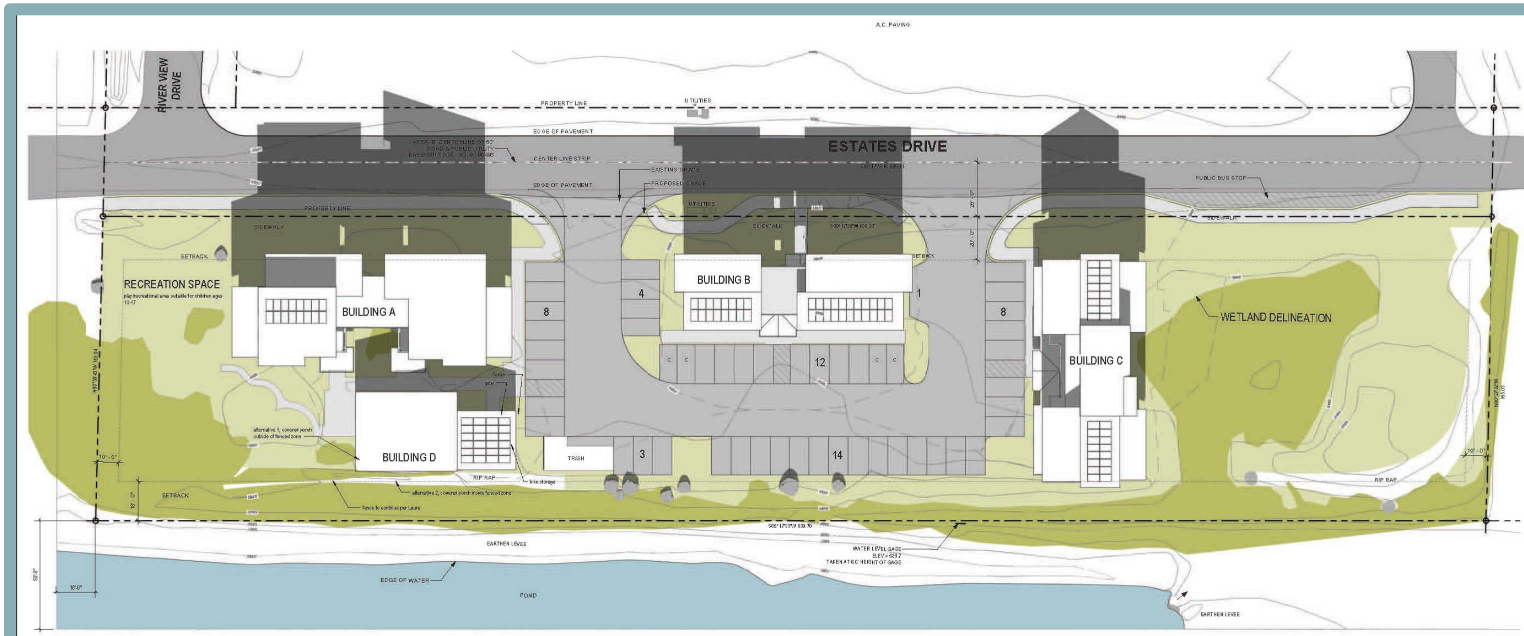
The proposed project would be subject to all relevant provisions of the CBSC, including the Building Energy Efficiency Standards and CALGreen Code. Adherence to the CALGreen Code and the Building Energy Efficiency Standards would ensure that the proposed structures would consume energy efficiently. Required compliance with the CBSC would ensure that the building energy use associated with the proposed project would not be wasteful, inefficient, or unnecessary. In addition, rooftop solar would be added to all four buildings included in the proposed project. Buildings A, B, and D are oriented along the east-west axis of the project site for optimal solar gain, and Building D is designed to be a lower height than Building A to allow for sunlight to hit Building A (see Figure 13).

With regard to transportation energy use, the proposed project would comply with all applicable regulations associated with vehicle efficiency and fuel economy. Further discussion of Vehicle Miles Traveled (VMT) associated with the proposed project is provided in Section XVII, Transportation, of this IS/MND.

Conclusion

Based on the above, construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources or conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Thus, a ***less-than-significant*** impact would occur.

Figure 13
Solar Evaluation



Shadow Diagram

1" = 20'-0"

SOLAR EVALUATION:

A) IDENTIFICATION OF BUILDING ORIENTATION FOR MAXIMUM SOLAR GAIN:

THE BUILDINGS A, B & D ARE ORIENTED ALONG THE EAST-WEST AXIS FOR OPTIMAL SOLAR GAIN.

B) APPROPRIATE LANDSCAPING:

SEE LANDSCAPE DRAWINGS

C) LOT SIZE AND SHAPE:

THE LOT IS LONGEST ON THE EAST-WEST AXIS, ALLOWING FOR BUILDINGS TO BE SPREAD ACROSS THE EAST-WEST AXIS AND MAXIMIZE EACH BUILDINGS SOLAR OPPORTUNITIES.

D) BUILDING HEIGHT:

BUILDING D IS DESIGNED TO BE A LOWER HEIGHT THAN BUILDING A TO ALLOW FOR SUNLIGHT TO HIT BUILDING A.

E) ROOF EAVE DESIGN:

ROOF EAVES ARE DESIGNED TO HELP BLOCK SUMMER SUN BUT ALLOW FOR SUNLIGHT TO ENTER THE BUILDINGS IN THE WINTER MONTHS.

F) SOLAR PROTECTION AND STREET LAYOUT:

THERE IS NO SUBSTANTIAL NON-PROTECTED GLAZING ON THE SOUTH ELEVATIONS THAT COULD POTENTIALLY CAUSE OVERHEATING.

G) POTENTIAL IMPACTS TO ADJACENT PROPERTIES:

THE SHADOWS CAST BY THE PROPOSED BUILDINGS DO EXTEND OUT INTO ESTATES DR. BUT DO NOT IMPACT THE EXISTING BUILDINGS ACROSS THE STREET.

VII. GEOLOGY AND SOILS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	✖	☐
ii. Strong seismic ground shaking?	☐	☐	✖	☐
iii. Seismic-related ground failure, including liquefaction?	☐	✖	☐	☐
iv. Landslides?	☐	✖	☐	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	✖	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	✖	☐	☐
d. Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	✖	☐	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	✖
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	✖	☐	☐

Discussion

The following analysis is based primarily on a Geotechnical Engineering Report prepared for the proposed project by NV5 (Appendix D).[14]

ai-ii. According to the Geotechnical Engineering Report, the project site is located near several active and potentially active faults, listed in Table 6, below.

Table 6
Active and Potentially Active Faults in the Project Vicinity

Fault Name	Approximate Distance from Project Site	Status
Polaris Fault	1.6 miles northeast	Active
West Tahoe – Dollar Point Fault	3.3 miles southeast	Potentially Active
Dog Valley Fault	5.3 miles northwest	Active
Agate Bay Fault	6.4 miles southeast	Potentially Active
Tahoe Sierra Frontal Fault Zone	6.6 miles southwest	Potentially Active
North Tahoe Fault	12.7 miles southwest	Active
West Tahoe Fault	17 miles south-southeast	Active
Source: NV5. Geotechnical Engineering Report. October 5, 2020.		

[14] NV5. *Geotechnical Engineering Report*. October 5, 2020.

In addition, a group of both active and potentially active unnamed faults are located southeast of Truckee, approximately 1.4 to 2.4 miles from the project site. However, the project site is not located within a State-designated Alquist-Priolo Fault Zone, and no faults are mapped as crossing or trending towards the project site. Earthquakes centered on regional faults in the area, such as the West Tahoe Fault, that are located further away from the project site would likely result in higher ground motion than earthquakes centered on smaller faults that are located closer to the project site.

An earthquake of moderate to high magnitude generated by the above faults could cause considerable ground shaking at the project site. However, the proposed buildings would be properly engineered in accordance with the CBSC, which includes engineering standards appropriate for the seismic area in which the project site is located. According to the Geotechnical Engineering Report, the project site is located within Seismic Design Category D. Projects designed in accordance with the CBSC should be able to: 1) resist minor earthquakes without damage, 2) resist moderate earthquakes without structural damage but with some nonstructural damage, and 3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance with the design standards is verified by the Town prior to the issuance of building permits. Proper engineering of the proposed buildings would ensure that the project would not be subject to substantial risks related to seismic ground shaking.

Based on the above, a ***less-than-significant*** impact would occur related to seismic surface rupture and strong seismic ground shaking.

aiii, aiv,
c, d. The proposed project's potential effects related to liquefaction, landslides, lateral spreading, subsidence, and expansive soils are discussed in detail below.

Liquefaction

Liquefaction is a phenomenon where loose, saturated, granular soil deposits lose a significant portion of their shear strength due to excess pore water pressure buildup. Soil liquefaction results from loss of strength during cyclic loading, such as that which is imposed by earthquake ground shaking. Soils most susceptible to liquefaction are clean, loose, saturated, uniformly graded, and fine-grained sediment.

Based on the results of the subsurface investigation done by NV5, near-surface soil at the site consists of existing fill, under which is very dense clayey gravel with sand or hard gravelly fat clay with sand, often intermixed with varying amounts of gravel, cobbles, and boulders, which has a low potential for liquefaction.[15] As such, development of the site would not expose persons or structures to substantial adverse effects from ground failure, including liquefaction.

Landslides

Seismically-induced landslides are triggered by earthquake ground shaking. The risk of landslide hazard is greatest in areas with steep, unstable slopes. Due to the relatively level topography of the project site and general surrounding area, the potential for slope instability is considered low. Thus, landslides are not likely to occur on- or off-site as a result of the proposed project.

---

15 NV5. *Geotechnical Engineering Report*. [pg. 4-5]. October 5, 2020.

Lateral Spreading

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically, lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. The project site does not contain any open faces that would be considered susceptible to lateral spreading. In addition, as noted above, the site is not anticipated to be subject to substantial liquefaction hazards. Therefore, the potential for lateral spreading to pose a risk to the proposed development is relatively low.

Subsidence and Expansive Soils

When subsurface earth materials move, the movement can cause the gradual settling or sudden sinking of ground. The phenomenon of settling or sinking ground is referred to as subsidence, or settlement. Expansive soils are soils which undergo significant volume change with changes in moisture content. Specifically, such soils shrink and harden when dried and expand and soften when wetted, potentially resulting in damage to building foundations.

Based on bulk soil samples collected from four exploratory test pits (TPs) excavated on the project site, three Unified Soil Classification System (USCS) soil classifications were found within the project site. TP-1 and TP-4 both included soils classified as Gravelly Fat Clay with Sand, while TP-2 and TP-3 included soils classified as Clayey Gravel with sand. According to the Geotechnical Engineering Report, the Clayey Gravel with sand found in TP-2 and TP-3 has very low potential for expansion. However, it was concluded that the clay soils found in TP-1 and TP-4 have moderate potential for expansion.

Additionally, approximately one to two feet of loose to medium dense existing fill was encountered across the site during the subsurface exploration conducted by NV5. Due to the potential for excessive settlement, the fill within the project site would not be suitable for support of structures or pavement. The Geotechnical Engineering Report concluded that structures and pavement should be founded on underlying native non-expansive coarse-grained soil, or the existing fill should be removed and replaced with compacted structural fill. However, without the removal of the existing fill within the project site, the proposed project has the potential to create substantial direct or indirect risks to life or property related to being located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), or be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project.

Conclusion

Based on the above discussion, the proposed project would not result in potential hazards or risks related to liquefaction, landslides, or lateral spreading. However, the potential exists for subsidence to occur due to the project site being located on moderately expansive soil. Therefore, the proposed project could create substantial direct or indirect risks to life or property and a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

VII-1. *Prior to approval of any building permits, all engineering recommendations provided in the site-specific Geotechnical Engineering Report prepared for* *the proposed project by NV5 shall be incorporated into project improvement plans, prepared by a licensed civil engineer. The project plans shall include, but not necessarily be limited to, slabs on grade supported by a uniform layer of imported non-expansive engineered fill, applicable drying of near surface soils prior to compaction as engineered fill, applicable stabilization of the bottom of excavations due to wet soil conditions, and site demolition activities, which shall include removal of all surface obstructions not intended to be incorporated into final site design. The site demolition activities shall also specify that undocumented fill, and/or utility lines encountered during demolition and construction shall be property removed and the resulting excavations backfilled with imported non-expansive engineered fill. Compliance with all recommendations specified in the Geotechnical Engineering Report shall be verified by a licensed geotechnical engineer; and proof of compliance shall be provided to the Town Engineer.*

b. Issues related to erosion and degradation of water quality during construction are discussed in Section X, Hydrology and Water Quality, of this IS/MND, under question 'a'. As noted therein, the proposed project would not result in substantial soil erosion or the loss of topsoil. Thus, a ***less-than-significant*** impact would occur.

e. The proposed project would include connection to the existing sewer infrastructure. As such, the construction or operation of septic tanks or other alternative wastewater disposal systems is not included as part of the project. Therefore, ***no impact*** regarding the capability of soil to adequately support the use of septic tanks or alternative wastewater disposal systems would occur.

f. The Town's General Plan EIR indicates that known paleontological resources exist approximately four miles southwest of Downtown Truckee and approximately five miles northeast of Truckee, near the Boca Reservoir. The two resources located near the Boca Reservoir were from the Quaternary period and the Pleistocene epoch, whereas the resource southwest of Downtown Truckee is from the Quaternary period and the Holocene epoch. The Town's General Plan EIR concluded that with implementation of the policies under Goal CC-19, which is intended to identify and protect paleontological resources from Truckee's early history, impacts related to disturbance of paleontological resources would be less than significant. Furthermore, the Town's General Plan does not note the existence of any unique geologic features within the Town. Consequently, implementation of the proposed project would not be anticipated to have the potential to result in direct or indirect destruction of unique geologic features.

Although the proposed project would not have the potential to result in the destruction of unique geologic features, previously unknown paleontological resources could exist within the project site. Thus, ground-disturbing activity, such as grading, trenching, or excavating associated with implementation of the proposed project, could have the potential to disturb or destroy unknown resources. Therefore, the proposed project could result in the direct or indirect destruction of a unique paleontological resource, and a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

VII-2. Implement Mitigation Measure V-1.

VIII. GREENHOUSE GAS EMISSIONS. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	✖	☐
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gasses?	☐	☐	✖	☐

a, b. Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. Therefore, the cumulative global emissions of GHGs contributing to global climate change can be attributed to every nation, region, and city, and virtually every individual on Earth. An individual project's GHG emissions are at a micro-scale level relative to global emissions and effects to global climate change; however, an individual project could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. As such, impacts related to emissions of GHG are inherently considered cumulative impacts.

Implementation of the proposed project would cumulatively contribute to increases of GHG emissions. Estimated GHG emissions attributable to future development would be primarily associated with increases of carbon dioxide (CO_2) and, to a lesser extent, other GHG pollutants, such as methane (CH_4) and nitrous oxide (N_2O) associated with area sources, mobile sources or vehicles, utilities (electricity and natural gas), water usage, wastewater generation, and the generation of solid waste. The primary source of GHG emissions for the project would be mobile source emissions. The common unit of measurement for GHG is expressed in terms of annual metric tons of CO_2 equivalents ($MTCO_2e$/yr).

In September 2006, Assembly Bill (AB) 32, the California Climate Solutions Act of 2006, was enacted. Among other requirements, AB 32 required the CARB to identify the State-wide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020, and to develop and implement a Scoping Plan. On September 8, 2016, AB 197 and Senate Bill (SB) 32 were enacted with the goal of providing further control over GHG emissions in the State. SB 32 built on previous GHG reduction goals by requiring that the CARB ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by the year 2030.

The proposed project is located within the jurisdictional boundaries of NSAQMD, which does not currently have any established thresholds for GHG emissions. However, NSAQMD prefers that GHG emissions are quantified for decision-makers and the public to consider. Similar to the NSAQMD, the Town of Truckee does not have adopted GHG emission thresholds. Thus, this Initial Study takes the reasonable approach of applying thresholds of the nearby air pollution control districts of PCAPCD and Sacramento Metropolitan Air Quality Management District (SMAQMD). The PCAPCD and SMAQMD thresholds of significance were adopted to aid in compliance with the Statewide goals established by AB 32 and SB 32, and are presented in Table 7.

Table 7 GHG Thresholds of Significance ($MTCO_2e/yr$)		
Air District	**Construction Threshold**	**Operational Threshold**
PCAPCD	10,000	1,100
SMAQMD	1,100	1,100
Sources: PCAPCD. CEQA Handbook Thresholds of Significance Justification Report. October 2016. SMAQMD. CEQA Guide, SMAQMD Thresholds of Significance Table. May 2015.		

GHG emissions resulting from construction and operations of the proposed project were modeled using the CalEEMod emissions model under the same assumptions as discussed in Section III, Air Quality, of this IS/MND. Each phase of the proposed project and the associated GHG emissions is discussed below, and all modeling outputs are included in the Appendix A to this IS/MND.

Construction

Construction of the proposed project would occur over the course of approximately two years. It should be noted that construction GHG emissions are a one-time release and are, therefore, not typically expected to generate a significant contribution to global climate change. As discussed above, neither NSAQMD nor the Town of Truckee has adopted thresholds of significance for construction-related GHG emissions. Therefore, the total emissions have been compared to the thresholds of significance used by the nearby air districts, PCAPCD and SMAQMD. The maximum unmitigated GHG emissions from construction of the proposed project are presented in Table 8 below.

Table 8 Unmitigated Construction GHG Emissions	
Construction Emissions	**Maximum Annual GHG Emissions ($MTCO_2e/yr$)**
Total Emissions	241.87
PCAPCD Threshold	10,000.00
SMAQMD Threshold	1,100.00
Exceeds Thresholds?	**NO**
Source: CalEEMod, April 2021 (see Appendix).	

As shown above, construction of the proposed project would result in maximum annual GHG emissions far below both applicable thresholds of significance.

Operations

The estimated unmitigated operational GHG emissions at full buildout of the proposed project in the year 2023 are presented in Table 9 below. Because NSAQMD has not adopted operational GHG thresholds, the total emissions were compared to both PCAPCD and SMAQMD operational GHG thresholds of significance. As shown in the table, the proposed project's maximum unmitigated operational GHG emissions fall well below both PCAPCD's and SMAQMD's 1,100 $MTCO_2e/yr$ threshold. As such, the implementation of the project would not conflict with achievements of the Statewide GHG reduction goals established by AB 32 and SB 32.

Table 9 Unmitigated Operational GHG Emissions	
Operational Emissions	**Annual GHG Emissions ($MTCO_2e$/yr)**
Emissions	276.66
PCAPCD Threshold	1,100.00
SMAQMD Threshold	1,100.00
Exceeds Thresholds?	**NO**
Source: CalEEMod, April 2021 (see Appendix).	

Conclusion

Based on the above, both sources of emissions would fall under the applicable thresholds of significance. Therefore, the proposed project would not be considered to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and a ***less-than-significant*** impact would occur.

IX. HAZARDS AND HAZARDOUS MATERIALS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	✖	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☐	☐	✖	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	✖
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	✖
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	✖	☐
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	✖	☐
g. Expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires?	☐	☐	✖	☐

Discussion

a. Residential developments are not typically associated with the routine transport, use, disposal, or generation of substantial amounts of hazardous materials. On-site maintenance may involve the use of common household cleaning products, fertilizers, and herbicides, any of which could contain potentially hazardous chemicals; however, such products would be expected to be used in accordance with label instructions. Due to the regulations governing use of such products and the amount anticipated to be used on the site, routine use of such products would not represent a substantial risk to public health or the environment. Therefore, the project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, and a ***less-than-significant*** impact would occur.

b. The project site is vacant and consists primarily of ruderal vegetation. Known hazards (e.g., underground storage tanks, abandoned wells, structures containing lead-based paint or asbestos) are not located on-site. According to the California Department of Toxic Substances Control Envirostor Database, hazardous material sites do not exist at the project site or in the project vicinity.

Construction activities associated with the proposed project would involve the use of heavy equipment, which would contain fuels and oils, and various other products such as concrete, paints, and adhesives. Small quantities of potentially toxic substances (e.g., petroleum and other chemicals used to operate and maintain construction equipment) would be used at the project site and transported to and from the site during construction. However, the project contractor would be required to comply with all California Health and

Safety Codes and local Town ordinances regulating the handling, storage, and transportation of hazardous and toxic materials. Thus, construction of the proposed project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment.

During project operation, hazardous materials use would be limited to landscaping products such as fertilizer and pesticides/herbicides. Such chemicals would be utilized in limited quantities according to label instructions.

Because the proposed project would involve limited use of hazardous materials, primarily limited to the construction phase of the project, during which the contractor would be required to adhere to all relevant guidelines and ordinances regulating the handling, storage, and transportation of hazardous materials, the project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment, and a ***less-than-significant*** impact would occur.

c. Schools are not located within one-quarter mile of the project site. The nearest school is Forest Charter School, located approximately 2.5 miles northwest of site. Therefore, the proposed project would result in ***no impact*** related to hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

d. According to the Department of Toxic Substances Control, the project site is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.[16] Thus, the proposed project would not create a significant hazard to the public or the environment, and ***no impact*** would occur.

e. The nearest public airport to the project site is the Truckee Tahoe Airport, located approximately one mile to the southeast. According to the Truckee Tahoe Airport Land Use Compatibility Plan (LUCP), the project site is located within Zone D, which is designated "Primary Traffic Pattern Zone", and identified for moderate noise impacts and low safety risks.[17] About 20 to 30 percent of general aviation accidents take place in Zone D, but the large area encompassed means a low likelihood of accident occurrence in any given location. From a safety perspective, prohibited uses within Zone D consist of uses which would be considered hazards to flight. According to the LUCP, hazards to flight include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations. Land use development that may cause the attraction of birds to increase is also prohibited. As such, the proposed project would not be considered a hazard to flight, and would therefore not be a prohibited land use within Zone D. With regard to the moderate noise impact, the Land Use Compatibility Plan states that high-density residential is allowed. Further discussion of noise-related impacts is provided in Section XIII, Noise, of this IS/MND. Therefore, a ***less-than-significant*** impact would occur related to a safety hazard or excessive noise for people residing or working in the

16 Department of Toxic Substances Control. *Hazardous Waste and Substances Site List (Cortese).* Available at: https://www.envirostor.dtsc.ca.gov/public/. Accessed March 2021.

17 Truckee Tahoe Airport Land Use Commission. *Truckee Tahoe Airport Land Use Compatibility Plan* [page 2-47]. October 27, 2016.

project area associated with the project being located within an airport land use plan or within two miles of a public airport or public use airport.

f. The proposed project would not alter the existing circulation system in the surrounding area. During operation, the proposed project would provide adequate access for emergency vehicles and would not interfere with potential evacuation or response routes used by emergency response teams. During construction of the proposed project, all construction equipment would be staged on-site so as to prevent obstruction of local and regional travel routes in the Town that could be used as evacuation routes during emergency events. As a result, the project would have a ***less-than-significant*** impact with respect to impairing the implementation of or physically interfering with an adopted emergency response plan or emergency evacuation plan.

g. Issues related to wildfire hazards are further discussed in Section XX, Wildfire, of this IS/MND. As noted therein, per the Town's General Plan,[18] the entire Truckee area is considered to be in a high fire hazard severity zone, as defined by the California Department of Forestry (CAL FIRE). Additionally, according to Figure SAF-4 of the General Plan, "Community Areas at Risk from Wildland Fire", the project site is mapped in an area of "Very High" fire risk. However, according to CAL FIRE's online Fire Hazard Severity Zones Viewer, the project site is located within a Non-Very High Fire Hazard Severity Zone, within a Local Responsibility area.[19] Additionally, the proposed project would be required to comply with all applicable requirements of the California Fire Code through the installation of fire sprinkler systems, fire hydrants, and other applicable requirements. The proposed project would also be situated near existing roads, water lines, and other utilities, which would reduce risks related to wildfire. Thus, the potential for wildland fires to reach the project site would be low. Based on the above, the proposed project would not expose people or structures to the risk of loss, injury or death involving wildland fires, and a ***less-than-significant*** impact would occur.

---

18 Town of Truckee. *Truckee 2025 General Plan Safety Element* [pg. 9-7]. Adopted November 16, 2006

19 California Department of Forestry and Fire Protection. *Map of CAL FIRE's Fire Hazard Severity Zones in Local Responsibility Areas – Truckee*. Available at: https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/. Accessed March 2021.

X. HYDROLOGY AND WATER QUALITY. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	✖	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	✖	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i. Result in substantial erosion or siltation on- or off-site;	☐	✖	☐	☐
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	✖	☐	☐
iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	✖	☐	☐
iv. Impede or redirect flood flows?	☐	☐	✖	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	✖	☐
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	✖	☐

Discussion

a. During the early stages of construction activities, topsoil would be exposed due to grading and excavation of the site. After grading and prior to overlaying the ground surface with impervious surfaces and structures, the potential exists for wind and water erosion to discharge sediment and/or urban pollutants into stormwater runoff, which could adversely affect water quality.

The State Water Resources Control Board (SWRCB) regulates stormwater discharges associated with construction activities where clearing, grading, or excavation results in a land disturbance of one or more acres. Given that the proposed project would disturb more than one acre of land, the proposed construction activities would be subject to applicable SWRCB regulations. For example, the project shall comply the Statewide Construction General Permit No. 2009-009-DWQ (or most current permit). Prior to building (grading) permit issuance, the applicant shall provide the WDID number issued by the SWRCB, and prepare a Storm Water Pollution Prevention Plan (SWPPP). Additionally, the Town's Development Code, Section 18.30.050, Drainage and Storm Water Runoff, requires drainage and erosion control plans be submitted to the Town for review, and Section 18.30.050 requires a SWPPP to be prepared for the proposed project. A SWPPP describes Best Management Practices (BMPs) to control or minimize pollutants from entering stormwater and must address both grading/erosion impacts and non-point source pollution impacts of the development project, including post-construction impacts. The Town of Truckee requires all development projects to use BMPs to treat runoff. This would include implementation of both temporary and permanent BMPs, in accordance with the Town's Erosion Prevention Standards, to ensure that the water quality of the adjacent drainage is not adversely impacted. Temporary construction phase BMPs are anticipated to include silt fencing, straw wattles, staging areas, tree protection fencing, dust control, and other miscellaneous provisions as required by the regulatory agencies. It should be noted that BMPs would ensure that water quality is not degraded during the construction of the proposed project. In addition to the stormwater treatment BMPs, other permanent BPMs include soil stabilization, revegetation, and landscaping of all non-hardscaped disturbed areas of the project site.

The proposed would replace or create approximately 38,799 sf of impervious surfaces, and thus, would not be subject to hydromodification. However, Site Design Measures (SDMs) would be implemented on-site to treat storm water runoff, in accordance with SWRQB regulations. As discussed under question 'ci' through 'cii', runoff from rooftops (through rooftop disconnection) or residential impervious surfaces would be directed to pervious landscape areas for infiltration into underlying soils. The remaining areas of the project site, such as the parking lot, would be graded to drain into the two proposed vegetated swales along the project's northern boundary, which would allow for flows in excess of the proposed on-site stormwater facilities to discharge into the natural discharge points at the northeast and northwest corners of the project site. Thus, overall drainage patterns on the project site are not anticipated to be substantially altered through development of the proposed project.

Based on the above, the proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. Thus, a ***less-than-significant*** impact would occur.

b, e. Water supplies for the project site would be provided by the TDPUD. Per the District's 2015 Urban Water Management Plan (UWMP), all of the District's water supply is obtained through the pumping of groundwater from the Martis Valley Groundwater Basin (MVGB). According to the UWMP, the anticipated maximum demand at buildout is approximately 4,217 million gallons per year (mgy).[20] With a total water supply of at least 7,820 mgy, adequate water supply exists to meet the projected buildout. For the purposes of the UWMP analysis, buildout of the TDPUD service area is assumed to include continued operations of all existing land uses, as well as development of all currently vacant parcels consistent with their respective jurisdiction's General Plans. Consequently, development of the project site was generally included in the UWMP analysis.

The UWMP states that because of the large amount of water in storage in relation to the projected buildout demand, the District would have adequate supply to meet normal year, single dry year, and multiple dry years demand. Considering that the UWMP anticipated buildout of all currently undeveloped parcels within the Town, and that the available water supply far exceeds anticipated demand, adequate water supply exists to serve the project without resulting in a significant decrease in the available water supplies such that the project may interfere with management of the MVGB.

Stormwater falling on undeveloped portions of the project site currently sheet flows overland to existing drainage features or percolates into on-site soils. The proposed project would include the development of impervious surfaces, which would result in

[20] Truckee Donner Public Utilities District. *Truckee Water System 2015 Urban Water Management Plan* [page 6-7]. June 2016.

decreased percolation of stormwater within developed areas of the site. However, overall drainage patterns on the project site are not anticipated to be substantially altered through development of the proposed project. As discussed under questions 'ci' through 'cii', a combination of impervious rooftop disconnection and vegetated swales would be implemented as part of the proposed project to achieve similar drainage patterns to the existing on-site conditions and allow for stormwater infiltration into underlying soils. Stormwater runoff routed to the vegetated swales, in excess of the design storm, would sheet flow towards the natural discharge points at the northeast and northwest corners of the project site, similar to existing on-site conditions. Consequently, the proposed project would not result in substantial interference with groundwater recharge in the area.

Based on the above, the project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Therefore, the proposed project would result in a ***less-than-significant*** impact with respect to substantially decreasing groundwater supplies or interfering substantially with groundwater recharge such that the project would impede sustainable groundwater management of the basin.

ci-iii. According to the Preliminary Drainage Report prepared for the project site by JK Architecture and Engineering (see Appendix E),[21] implementation of the proposed project would result in the addition of approximately 0.81-acre of impervious surface area within the project site.

The Town of Truckee Public Improvement and Engineering Standards (TOT Standards) include requirements relative to drainage design for projects. These, in addition to project specific design criteria, and those of the Town of Truckee Storm Water Quality Plan (TOT SWQP), as approved by the Regional Water Quality Control Board, largely comprise the overall design requirements to which the proposed project shall adhere. The various conditions and requirements can be summarized in the following basic criteria:

- Drainage pipes shall be sized for the 10-year storm event and assessed for the 100-year event;
- Collected runoff from impervious surfaces shall be treated on-site as determined by the TOT SWQP during final design;
- Storm drainage facilities will be designed to provide groundwater recharge, attenuate peak flows, and minimize risk of erosion;
- Maintain pre-project watershed boundaries and drainage patterns;
- Flow concentrations shall not cause property damage or erosion;
- Energy dissipaters shall be included in outfall designs; and
- All construction activities and permanent improvements shall include BMPs for the protection of water resources.

With respect to existing hydrological conditions at the site, according to the Wetland Delineation report, there is no run-on into the site from the offsite wetland/pond area located to the south of the project site, due to the continuous berm along the entire length of the parcel boundary.[22] At the northwest corner of the site there is an existing 18-inch culvert that collects surface water from the northwest corner of the site and Estates Drive. The culvert crosses under Estates Drive to the north into a drainage channel that ultimately

---

[21] JK Architecture Engineering. *Preliminary Drainage Report for Estates Meadows Housing Project*. March 2021.
[22] EcoSynthesis. *Estates Drive Site Wetland Delineation*. February 5, 2020.

reaches a detention basin at the end of Riverview Drive. Runoff falling on the eastern portion of the site currently drains towards the site's northeast corner, where it sheet flows off-site.

As shown in Figure 9, the project site would be divided into three Drainage Management Areas (DMAs). DMA 1 and DMA 2 would each include a vegetated swale along the northern boundary of the project site, while DMA 3 would include an infiltration trench which would connect to the vegetated swales through a storm drain. Impervious rooftop disconnection would be implemented as part of the proposed project which would direct runoff from the rooftops of the four proposed buildings to the pervious landscaped/vegetated areas by allowing water to sheet flow off of the roof onto an armored dripline and then to flow to the established vegetated area. The remaining areas of the project site, such as the parking lot, would be graded to drain into the proposed vegetated swales along the northern portion of the project site, which in turn would be graded to drain at the required minimum slope of 0.5 percent in the eastern and western directions to allow for flows in excess of the proposed on-site stormwater facilities to discharge into the natural discharge points at the northeast and northwest corners of the project site.

The vegetated swales would be sized with adequate capacity to attenuate post-development peak flows to equal or less than the pre-development flows, and to treat stormwater runoff from impervious surfaces, per Town of Truckee requirements.

The Preliminary Drainage Report prepared by JK Architecture and Engineering in March 2021 for the proposed project demonstrates that the proposed project would adequately manage the stormwater runoff from the project site. All on-site treatment areas would be adequately sized and comply with the Town of Truckee Post-Construction SWQP. However, without preparation of a final drainage report to verify the adequacy of the final drainage system design, the proposed project could result in a ***potentially significant*** impact with respect to substantially altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion, siltation, or flooding on- or off-site, creating or contributing runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or providing substantial additional sources of polluted runoff.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

X-1. *In conjunction with the submittal of project improvement plans, the developer shall submit a Final Drainage report that includes pre- and post-development hydrology calculations, as well as calculations for the required treatment areas to ensure that the on-site drainage system complies with the Town of Truckee Post-Construction Storm Water Quality Plan/State Municipal Phase 2 Stormwater General Permit, and any other applicable regulations at time of permit issuance. The drainage report shall be submitted to the Town of Truckee for review and approval.*

civ. Per Figure 4.7-1, Areas Subject to Flooding, of the Town's General Plan EIR, the project site is not located within a 100-year or 500-year floodplain. Additionally, the project site is located within Federal Emergency Management Agency (FEMA) Flood Insurance Rate

Map (FIRM) Panel 06057C0533E, which is within Zone X, and considered an area of minimal flood hazard.[23] Thus, the proposed project would not include development within a Special Flood Hazard Area and would not be subject to project-specific design features related to flood hazards. Therefore, development of the proposed project would not impede or redirect flood flows, and a ***less-than-significant*** impact would result.

d. As discussed under question 'civ' above, development of the project would not impede or redirect flood flows. Tsunamis are defined as sea waves created by undersea fault movement, whereas a seiche is a long-wavelength, large-scale wave action set up in a closed body of water such as a lake or reservoir.

The project site is not located in proximity to a coastline and would not be potentially affected by flooding risks associated with tsunamis. The project site is located approximately 3.8 miles from Donner Lake which could be prone to seiches due to seismic activity. Given the distance from Donner Lake, the project site is not anticipated to be exposed to the impacts of seiches. Based on the above, the proposed project would not pose a risk related to the release of pollutants due to project inundation due to flooding, tsunami, or seiche, and a ***less-than-significant*** impact would occur.

23 FEMA. FEMA Flood Map Service Center. Available at: https://msc.fema.gov/portal/home. Accessed March 2021.

XI. LAND USE AND PLANNING. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	✖	☐
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	✖	☐

Discussion

a. A project risks dividing an established community if the project would introduce infrastructure or alter land use so as to change the land use conditions in the surrounding community, or isolate an existing land use. Existing land uses in the project vicinity include multi-family residences to the north and east, the Truckee River Regional Park to the west, and a pond and the Ponderosa Golf Course to the south. The proposed project would be compatible with the existing residential uses north of the project site. Additionally, the proposed project is consistent with the Land Use and Zoning designations of the project site, and would not isolate an existing land use. Therefore, the proposed project would not physically divide an established community and a ***less-than-significant*** impact would occur.

b. The project site is currently designated High Density Residential per the Town's General Plan and is zoned RM-15. Land designated High Density Residential is often located near existing development and provides infill development with access to community services and existing infrastructure. The proposed project includes three individual residential buildings consisting of 30 total units. The proposed project density is 14 du/ac, which is consistent with the site's current General Plan land use designation.

In addition, as discussed in detail throughout this IS/MND, the proposed project would not conflict with Town policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, including, but not limited to, the Town's noise standards and applicable SWRCB regulations related to stormwater. In addition, as discussed throughout this IS/MND, the proposed project would not result in any significant environmental effects that could not be mitigated to a less-than-significant level by the mitigation measures provided herein.

Therefore, the proposed project would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and a ***less-than-significant*** impact would occur.

XII. MINERAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	✖	☐
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	✖	☐

Discussion

a, b. Per the Town's General Plan EIR, mineral resources within the Town of Truckee primarily include alluvial deposits along the Truckee River Valley, while some resources are associated with volcanic features. Aggregate mining operations in the Town of Truckee are currently limited to the aggregate mining area in the far southeast portion of Truckee. According to Figure 4.5-2 of the General Plan EIR, the project site is not located in an area with important mineral resources.[24] Therefore, the proposed project would not result in the loss of availability of a known mineral resource that would be of value to the region and residents of the State or result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Thus, a ***less-than-significant*** impact to mineral resources would occur.

24 Town of Truckee. *Town of Truckee 2025 General Plan EIR* [4.5-10]. April 2014.

XIII. NOISE. *Would the project result in:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	✖	☐
b. Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	✖	☐
c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	✖	☐

Discussion

The following discussion is based primarily on an Environmental Noise Assessment prepared for the proposed project by j.c. brennan & associates, Inc. (see Appendix F).[25]

a. The following sections present information regarding sensitive noise receptors in proximity to the project site, the existing noise environment, and the potential for the proposed project to result in impacts during project construction and operation. The following terms are referenced in the sections below:

- Decibel (dB): A unit of sound energy intensity. An A-weighted decibel (dBA) is a decibel corrected for the variation in frequency response to the typical human ear at commonly encountered noise levels. All references to decibels (dB) in this section will be A-weighted unless noted otherwise.
- Day-Night Average Level (L_{dn}): The average sound level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 PM to 7:00 AM) hours.
- Equivalent Sound Level (L_{eq}): The average sound level over a given time-period.
- Maximum Sound Level (L_{max}): The maximum sound level over a given time-period.
- Median Sound Level (L_{50}): The sound level exceeded 50 percent of the time over a given time-period.
- Community Noise Equivalent Level (CNEL): The 24-hour average noise level with noise occurring during evening (7:00 PM to 10:00 PM) hours weighted by a factor of three and nighttime hours weighted by a factor of ten prior to averaging.

Sensitive Noise Receptors

Some land uses are considered more sensitive to noise than others, and, thus, are referred to as sensitive noise receptors. Land uses often associated with sensitive noise receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise. The nearest sensitive receptors include the existing Truckee Donner Senior Apartments, located just north of Estates Drive,

25 j.c. brennan & associates, Inc. *Truckee Workforce Housing Environmental Noise Assessment.* September 20, 2020.

approximately 50-100 feet from the proposed project and associated construction activities, and the Truckee Pines Apartments, located east of the Truckee Donner Senior Apartments, and approximately 300 feet from the project site.

Existing Noise Environment

The primary noise sources in the project vicinity include roadway traffic along Brockway Road, aircraft overflights from the Truckee Tahoe Airport, and distant train noise. Based upon the distance to the Union Pacific Railroad (UPRR) track (approximately 1,700 feet), and observations by j.c. brennan & associates, the UPRR operations are not a contributor to the overall noise environment.

To quantify the ambient noise environment at the project site, j.c. brennan & associates, Inc. conducted continuous (24-hour) noise level measurements on the project site. The long-term (24-hour) noise measurement site was selected to determine the existing background noise levels of all noise sources in the area, and the temporal distribution of roadway traffic along Brockway Road over a 24-hour period. Noise measurements were conducted on June 24-25, 2020. Table 10 below provides a summary of the noise measurement results.

Table 10
Existing Ambient Noise Monitoring Results

Site	Location	Duration	24-hr L_{dn}/ CNEL	Average Measured Hourly Noise Levels (dBA)					
				Daytime (7 AM to 10 PM)			Nighttime (10 PM to 7 AM)		
				L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
Continuous 24-Hour Noise Measurement Results									
A	Central portion of the project site	24-hours	59.1	55.3	53.3	68.6	51.6	47.9	68.6

Source: j.c. brennan & associates, Inc., 2020.

Standards of Significance

The Town's General Plan exterior standards for residential uses range between 60 dB and 65 dB L_{dn}/CNEL. The lower standard of 60 dB L_{dn}/CNEL is considered the "Normally Acceptable" standard and the 65 dB L_{dn}/CNEL is the "Conditionally Acceptable" standard. Noise Element Policy 1.3 states that the Town shall enforce the California Noise Insulation Standards for interior noise levels attributable to exterior sources for all proposed new single- and multi-family residences (45 dB L_{dn}/CNEL).

In addition to the noise standards in the General Plan, the Town's Development Code includes noise level performance criteria applicable to non-transportation noise sources. Specifically, Table 3-8 of the Town's Development Code, provides the noise level performance criteria for sensitive land uses, such as residential and hospital uses. It should be noted that according to Section 18.44.070 of the Town's Development Code, such criteria do not apply to construction noise sources associated with non-single-family residential construction (such as the nearest sensitive receptors to the project site; i.e., multi-family residential uses to the north and east of the project site), provided that the activities do not take place before 7:00 AM or after 9:00 PM on any day, except Sunday, or before 9:00 AM or after 6:00 PM.

In practice, a noise impact may be considered significant if the project would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. Research into the human perception of changes in sound level indicates the following: a 3 dB change is barely perceptible; a 5 dB change is clearly perceptible; and a 10 dB change is perceived as being twice or half as loud.[26] For the purpose of this analysis, a 5 dB increase in overall noise levels is considered to be significant.

Impact Analysis

The following sections provide an analysis of potential noise impacts associated with construction and operation of the proposed project.

Construction Noise

During construction of the proposed project, heavy-duty equipment would be used for demolition, grading, excavation, paving, and building construction, which would result in temporary noise level increases. Project haul truck traffic on local roadways would also result in a temporary noise level increase during construction activities. Noise levels would vary depending on the type of equipment used, how the equipment is operated, and how well the equipment is maintained. In addition, noise exposure at any single point outside the project site would vary depending on the proximity of construction activities to that point. Standard construction equipment, such as graders, backhoes, loaders, and haul trucks would be used on-site. Construction activities would be temporary in nature and are anticipated to occur during normal daytime work hours.

Table 11 shows maximum noise levels associated with typical construction equipment. Based on the table, activities involved in typical construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet. Based upon the predicted noise levels shown in Table 11, the maximum noise levels would range between 78 dB and 90 dB at the nearest residences.

Table 11
Construction Equipment Noise

Type of Equipment	Maximum Level, dB at 50 feet
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Pneumatic Tools	85

Source: Federal Highway Administration, Roadway Construction Noise Model User's Guide, January 2006.

[26] j.c. brennan & associates, Inc. *Truckee Workforce Housing Environmental Noise Assessment*. September 20, 2020.

Construction of the proposed project would be required to comply with limited construction hours set forth within Section 18.44.070 of the Town's Development Code. The project would also comply with General Plan Policy 3.13, which includes standard construction noise control measures to be included as requirements at construction sites in order to minimize construction noise impacts. For example, construction noise control measures set forth in Policy 3.13 include, but are not be limited to, locating stationary noise generating equipment as far as possible from sensitive receptors in the project vicinity and adding mufflers to noise generating equipment to reduce noise levels. Therefore, construction noise associated with the proposed project would be less-than-significant.

Project Operational Noise

Operations associated with the proposed project would generate noise primarily associated with vehicle traffic on local roadways.

To predict the increase in traffic noise levels associated with the proposed project, the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. Traffic volumes for Brockway Road were obtained from the Town of Truckee General Plan. The results of the traffic noise calculations are shown in Table 12, below.

Table 12
Predicted Traffic Noise Levels and Project-Related Traffic Noise Level Increases (Existing Scenarios)

Roadway	Distance to Existing Plus Project Traffic Noise Contours		Predicted L_{dn}/CNEL at 75 feet from the Roadway Centerlines (dB)				
	65 dB CNEL	60 dB CNEL	Existing	Existing + Project	Change	Criteria	Significant
Brockway Road	80-feet	172-feet	65	65	0	>+5	No

Source: j.c. brennan & associates, Inc. 2020.

Table 12 compares the existing and the existing plus project scenarios. For the traffic noise calculations, a trip generation rate of 10 trips per unit was used. Therefore, the project would result in an additional 300 vehicle trips per day. All 300 of the vehicle trips were assigned to Brockway Road for the existing plus project scenario. The calculated traffic noise levels are at a reference distance of 75-feet from the roadway centerlines. The distances to the 60 dB and 65 dB L_{dn}/CNEL contours are also shown. Based upon Table 12, the project site is located well outside of the 60 dB L_{dn}/CNEL contour. In addition, the project will not result in a significant increase in roadway traffic along Brockway Road. Thus, impacts related to project traffic noise would be less than significant.

Conclusion

As described above, the proposed project would not result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan, the Town's noise ordinance, or applicable standards of other agencies. Therefore, the proposed project would result in a ***less-than-significant*** impact.

b. Similar to noise, vibration involves a source, a transmission path, and a receiver. However, noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration depends on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration is measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of peak particle velocities (PPV) in inches per second (in/sec). Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of PPV. Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 13, which was developed by the California Department of Transportation (Caltrans), shows that the vibration levels that would normally be required to result in damage to structures range from 0.2 to 0.6 in/sec PPV. The general threshold at which human annoyance could occur is 0.10 in/sec PPV.

Table 13
Effects of Vibration on People and Buildings

PPV			
mm/sec	**in/sec**	**Human Reaction**	**Effect on Buildings**
0.15 to 0.30	0.006 to 0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10 to 15	0.4 to 0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

***Source:** Caltrans. Transportation Related Earthborne Vibrations. TAV-02-01-R9601. February 20, 2002.*

The primary vibration-generating activities associated with the proposed project would occur during grading, placement of underground utilities, and construction of foundations. Table 14 shows the typical vibration levels produced by construction equipment at various distances. The most substantial source of groundborne vibrations associated with project construction would be the use of vibratory compactors. Use of vibratory compactors/rollers could be required during construction of the proposed on-site drive aisles and parking areas.

Table 14
Vibration Levels for Various Construction Equipment

Type of Equipment	PPV at 25 feet (in/sec)	PPV at 50 feet (in/sec)	PPV at 100 feet (in/sec)
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210	0.074	0.026

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006.

The proposed project would only cause elevated vibration levels during construction, as the proposed project would not involve any uses or operations that would generate substantial groundborne vibration. Although noise and vibration associated with the construction phases of the project would add to the noise and vibration environment in the immediate project vicinity, construction activities would be temporary in nature and would occur during normal daytime working hours. In addition, the proposed construction activities would occur at distances nearly equal to or greater than 50-100 feet from the nearest existing buildings. Therefore, per the vibration levels shown in Table 14, groundborne vibration levels at the nearest buildings would be less than the 0.20 in/sec PPV threshold established by Caltrans for architectural damage to buildings.

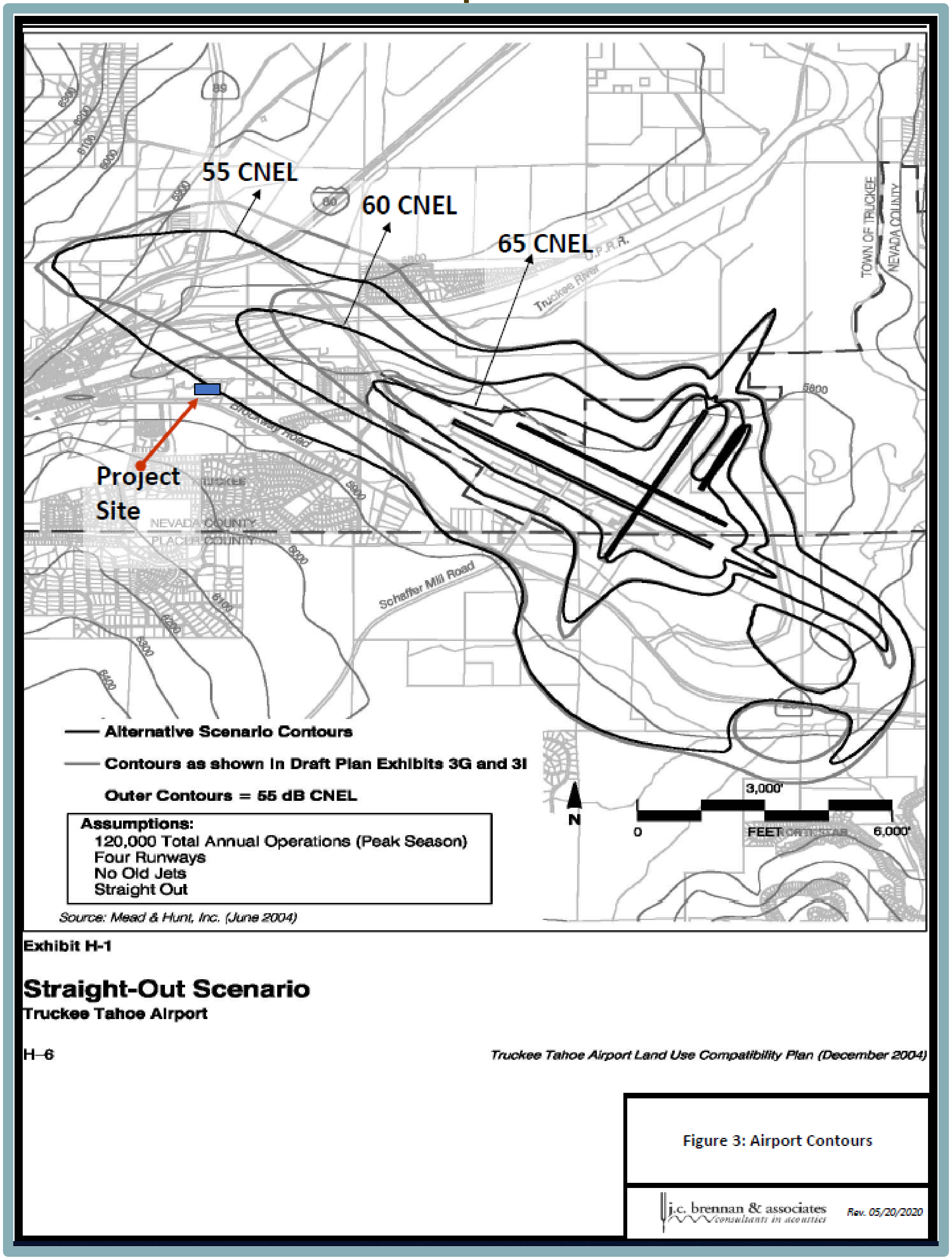
Based on the above, the proposed project would not expose people to or generate excessive groundborne vibration or groundborne noise levels, and a ***less-than-significant*** impact would occur.

c. The nearest public airport to the site is the Truckee Tahoe Airport, located approximately one mile to the southeast of the project site. According to the Truckee Tahoe Airport Land Use Compatibility Plan, the project site is located in Zone D, which is designated a “Primary Traffic Pattern Zone,” [27] and is identified for moderate noise impacts. The project site is located adjacent to the Truckee Tahoe Airport 55 dB CNEL noise contour (see Figure 14); thus, the project is not subjected to aircraft noise levels exceeding the Town of Truckee noise level criteria.

Additionally, an overflight easement shall be required for operations of the Truckee Tahoe Airport. Overflight easements provide the right of flight in the airspace above a property and allow the generation of noise associated with aircraft overflight. Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels associated with airports, and a ***less-than-significant*** impact would occur.

[27] Truckee Tahoe Airport Land Use Commission. *Truckee Tahoe Airport Land Use Compatibility Plan* [page 2-47]. October 27, 2016.

Figure 14
Truckee Tahoe Airport Noise Contours



XIV. POPULATION AND HOUSING. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure)?	☐	☐	✖	☐
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	✖	☐

Discussion

a. The proposed project would include the construction of three separate residential buildings, consisting of 30 affordable housing units. According to the U.S. Census Bureau, as of 2019, the average household size in Truckee was estimated at 2.72 persons per household.[28] Using this average household size, the proposed project would result in an estimated population of 82 residents. According to the U.S. Census Bureau, the entire town has an estimated total population of 16,735. The estimated 82 residents would equate to less than one percent of the entire town's population.

Given that the proposed project would be consistent with the land use and zoning designations of the project site, the proposed project would not result in unplanned population growth. In addition, the proposed development of affordable housing units would add to the housing stock in the Town of Truckee. Furthermore, as discussed in Section XIX, Utilities and Services Systems, of this IS, adequate utility infrastructure and services exist to meet the additional demand that would be created by the project. Similarly, as discussed in Section XV, Public Services, public service providers, such as local police and fire departments, would be capable of accommodating the demands of the proposed project. Therefore, the proposed project would not induce substantial unplanned population growth either directly or indirectly, and a ***less-than-significant*** impact would occur.

b. The proposed project would not require the demolition of any existing residences or any other structures within the project site. Furthermore, the proposed project would develop 30 affordable housing units, adding to the housing stock and available housing options within the Town of Truckee. As such, the proposed project would not displace a substantial number of existing housing or people and would not necessitate the construction of replacement housing elsewhere. Therefore, a ***less-than-significant*** impact would occur.

[28] U.S. Census Bureau. *QuickFacts: Truckee town, California.* Available at: https://www.census.gov/quickfacts/truckeetowncalifornia. Accessed March 2021.

XV. PUBLIC SERVICES. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Fire protection?	☐	☐	✖	☐
b. Police protection?	☐	☐	✖	☐
c. Schools?	☐	☐	✖	☐
d. Parks?	☐	☐	✖	☐
e. Other Public Facilities?	☐	☐	✖	☐

Discussion

a-e. Fire protection services are currently provided to the surrounding area by the Truckee Fire Protection District (TFPD). The TFPD is comprised of 40 full-time and 10 part-time firefighters and paramedics. TFPD Station 91 is the nearest station to the project site and is located approximately one mile to the west at 10049 Donner Pass Road. Additionally, the Truckee Police Department provides law enforcement services to the project area. The Truckee Police Department is located at Town Hall at 10183 Truckee Airport Road, approximately 1.9 miles southeast of the project site. The Town of Truckee 2025 General Plan EIR determined that buildout of the General Plan would increase the overall demand on fire and law enforcement services. The project site has been previously anticipated for residential development. While some increase in demand for fire and law enforcement services could occur as a result of the increase in population associated with development of the proposed project, due to the relatively low number of units, the increase would not be considered substantial and could be met by current service providers, without the need for expanding existing facilities or constructing new facilities, the construction of which could cause significant environmental effects.

Public school services for the proposed project would be provided by the Tahoe Truckee Unified School District (TTUSD). The current residential developer fee rate for TTUSD for residential uses is $3.69 per sf of living area.[29] Given that the project would result in approximately 26,381 sf of living area, it is anticipated that the applicant would be required to pay approximately $97,345.89 in developer fees. The developer fees would be used by the TTUSD to address the current facility needs. According to SB 50, payment of the necessary school impact fees for the project would be considered full and satisfactory CEQA mitigation. Proposition 1A/SB 50 prohibits local agencies from using the inadequacy of school facilities as a basis for denying or conditioning approvals of any "[…] legislative or adjudicative act […] involving […] the planning, use, or development of real property" (Government Code 65996(b)). As such, payment of developer fees would be considered sufficient to reduce any potential impacts related to the provision of school services.

Section 18.58.180, Multi-Family Residential Projects, of the Development Code requires that any residential development over 10 units provide common open space areas and

---

29 Tahoe Truckee Unified School District. *Developer Fees.* Available at: https://www.ttusd.org/Page/328#:~:text=The%20current%20residential%20developer%20fee,of%20living%20area. Accessed March 2021.

common recreational amenities to serve the residents and guests of the development. The project site would include various common areas including a play area, an art grove, and a turf area. While the proposed project would not include any designated parkland, the project site is located approximately 0.5-mile from the nearest park, Truckee River Regional Park. In addition, as stated in the Town's General Plan, the Town strives to maintain at least five acres of parkland for every 1,000 residents. According to the Town's General Plan, in 2004, the population of Truckee was approximately 15,000, and the Town provided approximately eight acres of parkland per 1,000 residents (i.e., a total of 120 acres). Since 2004, the Town has grown to have approximately 16,735 residents, and has added the Truckee Recreation and Aquatic Center (approximately 1.5 acres). As such, just over seven acres of parkland per 1,000 residents is available and the Town is still well within their goal of maintaining five acres of parkland per 1,000 residents. Additionally, the proposed project is anticipated to generate approximately 82 new residents, which is a relatively small number of new residents, and therefore the proposed project would not be anticipated to increase the population such that the Town's parkland requirement would no longer be met.

Based on the above, the proposed project would have a ***less-than-significant*** impact related to the need for new or physically altered fire protection, law enforcement, schools, parks, or other public facilities, the construction of which could cause significant environmental impacts.

XVI. RECREATION. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	✖	☐
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	✖	☐

Discussion

a, b. As discussed in Section XIV, Population and Housing, the proposed project would include the development of three residential buildings consisting of approximately 30 units, which would result in approximately 82 new residents. As discussed above, the proposed project would be required to comply with Section 18.58.180 of the Town's Development Code which requires new residential developments over 10 units to provide common open space areas and common recreational amenities. While the proposed project would not include the dedication of parkland, the project would include various amenities that would provide residents with outdoor recreational activities. For example, the proposed project would include a play area, an art grove, and a turf area. Furthermore, the project applicant would be required to pay a development fee to the Truckee Donner Recreation and Parks District.

Currently, the Town of Truckee includes an ample amount of community and recreation facilities. For example, the proposed project would be located within 0.5-mile of the Truckee River Regional Park. Additionally, the Town of Truckee includes recreation facilities run by the Truckee Donner Recreation and Park District, such as the Recreation and Aquatic Center and the Community Arts Center. Both the Recreation Center and Community Arts Center are located approximately 2.2 miles north of the project site. Additional community and recreation facilities in the Town of Truckee include the Donner Memorial State Park, Meadow Park, Riverview Sports Park, Truckee Community Pool, and Truckee Bike Park, and a total of 101 miles of bike trails and facilities. Due to the ample amount of existing recreational facilities in the Town of Truckee, the proposed project would not substantially increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Based on the above, the proposed project would not result in population growth that could result in increased use of existing recreational facilities, nor would the proposed project include or require construction or expansion of recreational facilities which might have an adverse physical effect on the environment. Thus, a ***less-than-significant*** impact would occur.

XVII. TRANSPORTATION. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	✖	☐
b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	✖	☐
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	✖	☐	☐
d. Result in inadequate emergency access?	☐	✖	☐	☐

Discussion

a. It is instructive to begin this section with an overview of relatively recent developments pertaining to how transportation impact significance is evaluated pursuant to CEQA.

Traditionally, lead agencies used LOS to assess the significance of such impacts, with greater levels of congestion considered to be more significant than lesser levels. Mitigation measures typically took the form of capacity-increasing improvements, which often had their own environmental impacts (e.g., biological resources). Depending on circumstances, and an agency's tolerance for congestion (e.g., as reflected in its general plan), LOS D, E, or F often represented significant environmental effects. In 2013, however, the Legislature passed legislation with the intention of ultimately doing away with LOS in most instances as a basis for environmental analysis under CEQA. Enacted as part of SB 743 (2013), Public Resources Code Section 21099, subdivision (b)(1), directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed CEQA Guidelines addressing "criteria for determining the significance of transportation impacts of projects within transit priority areas. Those criteria shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. In developing the criteria, [OPR] shall recommend potential metrics to measure transportation impacts that may include, but are not limited to, vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated. The office may also establish criteria for models used to analyze transportation impacts to ensure the models are accurate, reliable, and consistent with the intent of this section."

Subdivision (b)(2) of Section 21099 further provides that "[u]pon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion *shall not be considered a significant impact on the environment* pursuant to [CEQA], except in locations specifically identified in the guidelines, if any." (Italics added.)

Pursuant to Senate Bill 743, the Natural Resources Agency promulgated CEQA Guidelines Section 15064.3 in late 2018. It became effective in early 2019 and mandated Statewide by law on July 1, 2020. Subdivision (a) of that section provides that "[g]enerally, vehicle miles traveled is the most appropriate measure of transportation impacts. For the purposes of this section, 'vehicle miles traveled' refers to the amount and distance of automobile travel attributable to a project. Other relevant considerations may include the effects of the project on transit and nonmotorized travel. Except as provided in subdivision (b)(2) below (regarding roadway capacity), a project's effect on automobile delay shall not constitute a significant environmental impact."

LOS is still currently used by the Town for purposes of determining consistency with adopted general plan goals and policies related to LOS, but is no longer used for determining significant impacts under CEQA.

Truckee General Plan LOS Standards

As stated in the Truckee 2025 General Plan, the Town's LOS standards are as follows:

> *Policy P2.1 – Establish and maintain a Level of Service D or better on road segments and for total intersection movements in portions of the Town outside of the Downtown Study Area. Establish and maintain a Level of Service E or better on arterial and collector road segments and for total intersection movements within the Downtown Specific Plan Area. Throughout the Town, individual turning movements at unsignalized intersections shall not be allowed to reach LOS F and to exceed a cumulative vehicle delay of four vehicle hours. Both of these conditions shall be met for traffic operations to be considered unacceptable.*

Based on the above, LOS D is considered acceptable for road segments and total intersection movements at the study intersections in the project vicinity, and for unsignalized intersections, individual turning movements shall not reach LOS F and exceed a cumulative vehicle delay of four vehicle hours.

Intersections and Roadway Segments in Project Vicinity

The following discussion is based primarily on the cumulative (2032) traffic analysis prepared for the Joerger Ranch Specific Plan.[30] Given the proposed project's consistency with the Truckee General Plan, the cumulative traffic analysis conducted for Joerger Ranch would have accounted for vehicle trips associated with buildout of Estates Meadows, as well as other reasonably foreseeable cumulative development.

For the purposes of this IS/MND, the following study intersections, which were identified for analysis in the Joerger Ranch Specific Plan Traffic Impact Analysis (Traffic Study), will be examined due to their proximity to the proposed project:

1. Brockway Road/Palisades Drive; and
2. Brockway Road/Martis Valley Road.

In addition, the following roadway segment, which was analyzed in the Traffic Study, will be examined for the purposes of this IS/MND:

1. Brockway Road, Between Martis Valley Road and Palisades Drive

Future Cumulative Conditions

The LOS under Future Cumulative Plus Joerger Ranch Project conditions was analyzed in the Traffic Study. The study intersections and roadway segment nearest to the Estates

[30] LSC Transportation Consultants, Inc. *Joerger Ranch Specific Plan – Traffic Impact Analysis.* September 4, 2013.

Meadows project would operate at acceptable levels under Future Cumulative conditions with and without the Joerger Ranch Project, as discussed below.

Brockway Road/Palisades Drive

The Brockway Road/Palisades Drive intersection is a signalized intersection, and per the Town's LOS standards, is required to maintain LOS E or better. According to the Traffic Study, the Brockway Road/ Palisades Drive intersection would operate at LOS A under Cumulative No Project conditions. With the addition of the Joeger Ranch project, the intersection would operate at LOS B. Therefore, the intersection would operate at acceptable levels under Future Cumulative conditions with and without the Joerger Ranch Project.

Brockway Road/Martis Valley Road

The Brockway Road/Martis Valley Road intersection is controlled by a roundabout, and per the Town's LOS standards, is required to maintain LOS D or better. According to the Traffic Study, the intersection would operate at LOS B under Cumulative No Project conditions. With the addition of the Joeger Ranch project, the intersection would operate at LOS C. Therefore, the intersection would operate at acceptable levels under Future Cumulative conditions with and without the Joerger Ranch Project.

Brockway Road between Martis Valley Road and Palisades Drive

The road segment located on Brockway Road, between Martis Valley Road and Palisades Drive, is a minor arterial roadway, and per the Town's LOS standards, is required to maintain LOS D or better. According to the Traffic Study, the roadway segment has a maximum allowable peak-hour volume of 1,420 vehicles per lane to obtain the LOS threshold. Under future Cumulative Plus Project conditions, the peak-hour two-way volume would be 1,771 vehicles, and the peak-hour peak-direction volume would be 1,006 vehicles. Therefore, the roadway would operate at acceptable levels under Future Cumulative conditions with and without the Joerger Ranch Project.

Conclusion

As previously discussed, given the proposed project is consistent with the project site's General Plan land use designation, the potential increases in traffic due to residential uses on the project site would have been analyzed within the Joerger Ranch Specific Plan Traffic Study under the Future Cumulative scenario. Thus, it can be concluded that the proposed project would not result in a conflict with the Town's General Plan LOS policy.

Pedestrian, Bicycle, and Transit Facilities

The proposed project's potential impacts related to pedestrian, bicycle, and transit facilities are discussed below.

Pedestrian Facilities

Pedestrian facilities in the project area include sidewalks, crosswalks, and pedestrian signals. Roadways in the study area that have been developed to their ultimate width generally provide sidewalks on both sides of the street.

The proposed project would also provide sidewalk improvements along its Estates Drive frontage, which would represent its share of the pedestrian network in the vicinity. Other proximate development, should it come forward, would be responsible for completing the remaining portions of the pedestrian network.

Bicycle Facilities

Currently, the Town of Truckee includes 18 miles of Class I paved trails, 38 miles of Class II bike lanes, and 32 miles of Class III bike routes. The Town also includes 13 miles of dirt trails, resulting in a total of 101 miles.[31] The Truckee Trails and Bikeway Master Plan would increase the network of bike lanes and bike routes by connecting to existing paved and dirt trails. Ultimately, the Truckee Trails and Bikeway Master Plan would result in the development of 67 miles of additional dirt trails, paved trails, bike lanes, and bike routes. The proposed project includes a total of 18 bicycle parking spaces, which is 15 more than the required three by Section 18.48.090 of the Town's Development Code, and 18 interior bicycle storage spaces. Given that the proposed project would provide bicycle parking areas and the Town has a substantial amount of bicycle trails for the public, the proposed project would not conflict with a program, plan or ordinance addressing bicycle facilities, including the Truckee Trails and Bikeway Master Plan.

Transit Facilities

Placer County operates Tahoe Area Regional Transit (TART) that provides transit service between Truckee and Tahoe City along the SR 89 corridor. The Town of Truckee operates Truckee TART that includes the Truckee Local Route, operating within Truckee, and the Truckee TART Night Service, operating between Truckee and the Northstar and Squaw Valley Resorts . Service is provided seven days a week. Two TART bus stops are located in the vicinity of the project site; one stop is located approximately 100 feet to the north of the project site, across Estates Drive at the Truckee Donner Senior Apartments.

Truckee Dial-A-Ride also operates within the Town of Truckee as a curb-to-curb demand response service to persons with disabilities with ADA certification and the general public. Service is provided between 7:00 AM and 7:00 PM Monday through Friday, and 9:00 AM to 5:00 PM on Saturdays. Based on the above, adequate transit facilities would be available to serve the future residents of the proposed project. Additionally, the proposed project would not conflict with existing or planned transit facilities.

Conclusion

Based on the above, the proposed project would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities, and a ***less-than-significant*** impact could occur.

b. Section 15064.3 of the CEQA Guidelines provides specific considerations for evaluating a project's transportation impacts. Pursuant to Section 15064.3, analysis of VMT attributable to a project is the most appropriate measure of transportation impacts. Other relevant considerations may include the effects of the project on transit and non-motorized travel. The Town of Truckee adopted VMT thresholds of significance on June 23, 2020, pursuant to Section Guidelines 15064.7(b). The Town of Truckee's thresholds of significance are based upon the Governor's OPR's *Technical Advisory on Evaluating Transportation Impacts In CEQA*, which includes screening thresholds to identify when a lead agency may screen out VMT impacts.[32]

The Town of Truckee VMT Thresholds identify different project types that are assumed to cause a less-than-significant transportation impact and a detailed VMT study is not

31 Town of Truckee. *Truckee Trails and Bikeway Master Plan* [Appendix A]. September 2015.

32 Governor's Office of Planning and Research. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. December 2018.

necessary. Among the project types is affordable housing, as defined by Section 18.210.020 of the Town of Truckee Development Code or any income restricted households. According to OPR, adding affordable housing to an area generally improves the jobs-housing match, in turn shortening commutes and reducing VMT because low-wage workers in particular are more likely to choose a residential location close to their workplace if one is available. Additionally, even in areas where the existing jobs-housing match is closer to optimal, affordable housing is still shown to generate less VMT than market-rate housing.[33] The proposed project would generate 30 new residential units, 100 percent of which would be affordable housing. Therefore, consistent with the Town of Truckee's Thresholds, the presumption can be made that the proposed project would have a less-than-significant impact on VMT.[34]

Based on the above, the proposed project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b), and a ***less-than-significant*** impact would occur.

c, d. The existing Estates Drive roadway would provide access to the central project parking lot through two access points located along the northern project site boundary. These driveways into the project would be constructed in accordance with Town of Truckee standards. Additionally, the proposed drive aisles within the parking areas would be sufficiently sized to accommodate emergency vehicle access throughout the site.

Construction traffic associated with the proposed project would include heavy-duty vehicles associated with transport of construction material, as well as daily construction employee trips to and from the site that would share the area roadways with normal vehicle traffic, creating potential conflicts with other roadway users. Although construction traffic could affect traffic flows, traffic control measures would be implemented during construction activities to control traffic flows in the project area. Implementation of traffic control measures would ensure that construction traffic does not conflict with other roadway users.

Nonetheless, a traffic control plan has not been submitted and approved by the Town of Truckee. Therefore, the proposed project could substantially increase hazards due to a design feature or incompatible uses or result in temporary inadequate emergency access, and a ***potentially significant*** impact would occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

XVII-1. *Prior to the commencement of construction, a construction signing and traffic control plan shall be provided to the Town of Truckee for review and approval. The construction signing and traffic control plan shall include (but not necessarily be limited to) items such as:*

- *Guidance on the number and size of trucks per day entering and leaving the project site;*

---

[33] Governor's Office of Planning and Research. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. December 2018.

[34] Town of Truckee. *California Environmental Quality Act VMT Thresholds of Significance*. June 23, 2020.

- *Identification of arrival/departure times that would minimize traffic impacts;*
- *Approved truck circulation patterns;*
- *Locations of staging areas;*
- *Locations of employee parking and methods to encourage carpooling and use of alternative transportation;*
- *Methods for partial/complete street closures (e.g., timing, signage, location and duration restrictions);*
- *Criteria for use of flaggers and other traffic controls;*
- *Preservation of safe and convenient passage for bicyclists and pedestrians through/around construction areas;*
- *Monitoring for roadbed damage and timing for completing repairs;*
- *Limitations on construction activity during peak/holiday weekends and special events;*
- *Preservation of emergency vehicle access;*
- *Removing traffic obstructions during emergency evacuation events; and*
- *Providing a point of contact for local residents and guests to obtain construction information, have questions answered, and convey complaints.*

XVIII. TRIBAL CULTURAL RESOURCES. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).	☐	✖	☐	☐
b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	✖	☐	☐

Discussion

a, b. As discussed in Section V, Cultural Resources, of this IS/MND the Cultural Resources Study prepared for the proposed project included a records search and literature review. In addition, the NAHC was contacted by letter on June 19, 2020 and a response was received on June 22, 2020, which indicated that the NAHC Sacred Lands File (SLF) search produced negative results for the project site.

In compliance with AB 52 (Public Resources Code Section 21080.3.1), the Town of Truckee distributed project notification letters to the T'si Akim Maidu, the United Auburn Indian Community of the Auburn Rancheria, and the Washoe Tribe. The letters were distributed on December 3, 2020, and requests to consult have not been received to date.

Although the project area has been subject to a records search and a systematic surface archaeological investigation, and tribal cultural resources were not discovered on the project site, unknown tribal cultural resources have the potential to be uncovered during ground-disturbing activities at the proposed project site. Therefore, the proposed project could result in a substantial adverse change in the significance of a tribal cultural resource. Thus, impacts could be considered ***potentially significant***.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

XVIII-1. Implement Mitigation Measures V-1 and V-2.

XIX. UTILITIES AND SERVICE SYSTEMS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	✖	☐
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	✖	☐
c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	✖	☐
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	✖	☐
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	✖	☐

Discussion

a-c. Electricity, natural gas, telecommunications, water, and sanitary sewer services would be provided by way of new connections to existing infrastructure in the project area. Electricity and water services for the proposed project would be provided by the TDPUD. Brief discussions of the water, sewer service, stormwater drainage, electrical, natural gas, and telecommunications facilities that would serve the proposed project are included below.

Water

As previously mentioned under Section X, Hydrology and Water Quality, water supplies for the project site are supplied by the TDPUD. Per the District's 2015 UWMP, the anticipated maximum demand at buildout of the service area is approximately 4,217 mgy.[35] With a total water supply of at least 7,820 mgy, water supply greatly exceeds the anticipated demand at buildout of the TDPUD service area. The water demand projections presented in the 2015 UWMP are based on continued operation of all existing developments as well as buildout of all vacant parcels. Considering that the UWMP anticipated buildout of all currently undeveloped parcels within theTown, and that the available water supply far exceeds anticipated demand, adequate water supply exists to serve the project without resulting in a significant decrease in the available water supplies such that the project may interfere with management of the MVGB.

Given that the groundwater basin has adequate capacity,[36] the proposed project would not significantly impact the District's water supply. As such, the District would have

35 Truckee Donner Public Utilities District. *Truckee Water System 2015 Urban Water Management Plan* [page 6-7]. June 2016.
36 Truckee Donner Public Utilities District. *Truckee Water System 2015 Urban Water Management Plan*. June 2016.

sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. Furthermore, all infrastructure required to provide water supply to the project would be developed by a connection to the existing eight-inch water main located at the northeast corner of the project site, so the proposed project would not require major relocation or expansion of any water supply infrastructure.

Sewer Service

Sewer services would be provided to the site by the Truckee Sanitary District (TSD). TSD services an area of approximately 38-square miles through the operation and maintenance of a wastewater collection system that includes over 300 miles of sewer pipelines. Collected sewage is conveyed to the Tahoe Truckee Sanitation Agency (TTSA) Water Reclamation Plant, located adjacent to the Truckee River and Tahoe Truckee Airport. The TTSA previously upgraded and expanded wastewater facilities to increase handling capacity and meet the projected demands up to the year 2025 from buildout of the Town's General Plan. Given that the proposed project is consistent with the Town's land use and zoning designations for the project site, the proposed project's wastewater demand would have been included in TTSA's planning and design efforts. In addition, all infrastructure required to provide sewer service to the project would be developed by way of a connection to the existing eight-inch sewer service main located on Estates Drive, near the southwest corner of the project site. As such, the proposed project would not require major relocation or expansion of any sewer service infrastructure as adequate sewer service capacity exists to serve the project.

Stormwater Systems

The proposed project would include the construction of vegetated swales along the northern boundary of the project site. The physical effects of the proposed expansion to the on-site stormwater system have been discussed throughout this IS/MND. Based on the conclusions of the Preliminary Drainage Report, the proposed on-site stormwater system would be properly sized to handle stormwater under the 10- and 100-year events, and off-site expansion or relocation would not be required. In addition, Mitigation Measure X-1 requires the project applicant to submit a Final Drainage Report to ensure that on-site drainage systems comply with the Town of Truckee Post-Construction Storm Water Quality Plan.

Other Utilities

Electric, natural gas and telecommunications utilities would be provided by way of connections to existing infrastructure located within the immediate project vicinity. The proposed project would not require major upgrades to, or extension of, existing infrastructure. Thus, impacts to electricity, natural gas, and telecommunications infrastructure would be less than significant.

Conclusion

Given that the utility infrastructure within the project vicinity has been designed with adequate capacity to accommodate demand from the proposed project, the increase in residents would not be substantial enough to require the construction of new utility infrastructure. Therefore, the project would result in a ***less-than-significant*** impact related to the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

d, e. Solid waste, recyclable materials, and compostable material collection within the project area is operated by the Tahoe Truckee Sierra Disposal. All solid waste is disposed and/or processed at the waste facility at the Eastern Regional Landfill Material Recovery Facility. The Eastern Regional Landfill Material Recovery Facility covers seven acres of land and currently handles 445 tons of waste per day, although the permit for the site allows up to 600 tons of waste per day to be managed at the facility. Pursuant to the CALGreen Code, at least 65 percent diversion of construction waste is required for projects permitted after January 1, 2017. Because the landfill is not operating at maximum capacity and the project would only create a temporary increase in the amount of waste during construction activities, the proposed project would not result in a significant impact related to solid waste generation.

With respect to operational solid waste generation, the nature of the proposed project would not be expected to generate substantial amounts of solid waste due to the relatively small scale of the project. In addition, the proposed project would be required to comply with all applicable provisions of Section 18.30.150, Solid Waste/Recyclable Materials Storage, of the Town's Development Code.

Therefore, the proposed project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals and would comply with federal, State, and local management and reduction statutes and regulations related to solid waste. Therefore, a ***less-than-significant*** impact would occur.

XX. WILDFIRE. *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	✖
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	✖
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	✖
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	✖

Discussion

a-d. Per the Town's General Plan,[37] the entire Truckee area is considered to be in a high fire hazard severity zone, as defined by CAL FIRE. Additionally, according to Figure SAF-4 of the General Plan, "Community Areas at Risk from Wildland Fire", the project site is mapped in an area of "Very High" fire risk. However, according to CAL FIRE's online Fire Hazard Severity Zones Viewer, the project site is located within a Non-Very High Fire Hazard Severity Zone, within a Local Responsibility area.[38] Additionally, the proposed project would be required to comply with all applicable requirements of the California Fire Code through the installation of fire sprinkler systems, fire hydrants, and other applicable requirements. The proposed project would also be situated near existing roads, water lines, and other utilities, which would reduce risks related to wildfire. Thus, the potential for wildland fires to reach the project site would be low. Based on the above, the proposed project would not expose people or structures to the risk of loss, injury or death involving wildland fires, and a ***less-than-significant*** impact would occur.

---

37 Town of Truckee. *Truckee 2025 General Plan Safety Element* [pg. 9-7]. Adopted November 16, 2006

38 California Department of Forestry and Fire Protection. *Map of CAL FIRE's Fire Hazard Severity Zones in Local Responsibility Areas – Truckee*. Available at: https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/. Accessed March 2021.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE.	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	✖	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	✖	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	✖	☐

Discussion

a. As discussed in Section IV, Biological Resources, of this IS/MND, while a limited potential exists for nesting raptors and migratory birds protected by the MBTA to occur on-site, Mitigation Measure IV-1 would ensure that any impacts related to special-status species would be reduced to a less-than-significant level. In addition, Mitigation Measures IV-2 through IV-4 include several protective measures that must be implemented prior to and during construction to ensure protection of on-site wetlands. The project site is not known to contain a previous archaeological site or contain any cultural resources. However, a limited potential exists for cultural resources to occur beneath the ground surface. As such, Mitigation Measures V-1 and V-2 ensure that in the event that prehistoric resources are discovered within the project site, such resources would be protected in compliance with the requirements of CEQA and other State standards.

Considering the above, the proposed project would not degrade the quality of the environment, substantially reduce or impact the habitat of fish or wildlife species, cause fish or wildlife populations to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. Therefore, a ***less-than-significant*** impact would occur.

b. The proposed project, in conjunction with other development within the Town of Truckee, could incrementally contribute to cumulative impacts in the area. However, as demonstrated in this IS/MND, all potential environmental impacts that could occur as a result of project implementation would be reduced to a less-than-significant level through compliance with the mitigation measures included in this IS/MND, as well as applicable General Plan policies, Development Code standards, and other applicable local and State regulations.

Therefore, when viewed in conjunction with other closely related past, present, or reasonably foreseeable future projects, development of the proposed project would not result in a cumulatively considerable contribution to cumulative impacts in the Town of Truckee, and the project's incremental contribution to cumulative impacts would be ***less than significant***.

c. As described in this IS/MND, the proposed project would comply with all applicable General Plan policies, Development Code standards, other applicable local and State regulations, in addition to the mitigation measures included herein. Additionally, as discussed in Section III, Air Quality, Section IX, Hazards and Hazardous Materials, and Section XIII, Noise, of this IS/MND, the proposed project would not cause substantial effects to human beings, including effects related to exposure to air pollutants, and hazardous materials. Therefore, the proposed project would result in a ***less-than-significant*** impact.

G. SOURCES

The following documents are referenced information sources used for the purposes of this Initial Study:

1. California Air Resources Board. *The 2017 Climate Change Scoping Plan Update.* November 2017.
2. California Department of Forestry and Fire Protection. *Map of CAL FIRE's Fire Hazard Severity Zones in Local Responsibility Areas – Truckee*. Available at: https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/. Accessed March 2021.
3. California Department of Forestry and Fire Protection. *Map of CAL FIRE's Fire Hazard Severity Zones in Local Responsibility Areas – Truckee*. Available at: https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/. Accessed March 2021.
4. California Department of Transportation. *California Scenic Highway Mapping System*. Available at: https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=2e921695c43643b1aaf7000dfcc19983. Accessed March 2021.
5. Department of Toxic Substances Control. *Hazardous Waste and Substances Site List (Cortese).* Available at: https://www.envirostor.dtsc.ca.gov/public/. Accessed March 2021.
6. EcoSynthesis, Inc. *Estates Drive Site Biological Survey Report.* September 18, 2020.
7. EcoSynthesis, Inc. *Estates Drive Site Wetland Analysis.* April 24, 2021.
8. EcoSynthesis, Inc. *Estates Drive Site Wetland Delineation.* February 5, 2020.
9. Ecosynthesis, Inc. *Estates Meadows Project Supplemental Impact Analysis*. July 20, 2021.
10. FEMA. *FEMA Flood Map Service Center*. Available at: https://msc.fema.gov/portal/home. Accessed March 2021.
11. Governor's Office of Planning and Research. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. December 2018.
12. j.c. brennan & associates, Inc. *Environmental Noise Assessment.* September 20, 2020.
13. JK Architecture Engineering. *Preliminary Drainage Report for Estates Meadows Housing Project*. March 2021.
14. LSC Transportation Consultants, Inc. *Joerger Ranch Specific Plan – Traffic Impact Analysis.* September 4, 2013.
15. Northern Sierra Air Quality Management District. *Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects*. August 18, 2009.
16. NV5. *Geotechnical Engineering Report*. October 5, 2020.
17. Susan Lindstrom, Consulting Archaeologist. *Cultural Resource Inventory.* July 2020.
18. Tahoe Truckee Unified School District. *Developer Fees*. Available at: https://www.ttusd.org/Page/328#:~:text=The%20current%20residential%20developer%20fee,of%20living%20area. Accessed March 2021.
19. Town of Truckee. *Town of Truckee 2025 General Plan*. Adopted November 16, 2006.
20. Town of Truckee. *Town of Truckee 2025 General Plan Draft Environmental Impact Report.* July 2006.
21. Town of Truckee. *Truckee Trails and Bikeway Master Plan*. September 2015.
22. Town of Truckee. *California Environmental Quality Act VMT Thresholds of Significance*. June 23, 2020.
23. Truckee Donner Public Utilities District. *Truckee Water System 2015 Urban Water Management Plan*. June 2016.
24. Truckee Tahoe Airport Land Use Commission. *Truckee Tahoe Airport Land Use Compatibility Plan*. October 27, 2016.

25. U.S. Census Bureau. *QuickFacts: Truckee town, California.* Available at: https://www.census.gov/quickfacts/truckeetowncalifornia. Accessed March 2021.
26. Weather Spark. *Average Weather in Truckee California, United States*. Available at: https://weatherspark.com/y/1377/Average-Weather-in-Truckee-California-United-States-Year-Round#:~:text=The%20predominant%20average%20hourly%20wind,of%2056%25%20on%20July%2023. Accessed April 2021.

APPENDIX A

AIR QUALITY AND GHG MODELING RESULTS

Estates Meadows

Northern Sierra AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	30.00	Dwelling Unit	2.05	30,000.00	86

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	72
Climate Zone	1			**Operational Year**	2023
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	374.95	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor set for Truckee-Donner Public Utility District

Land Use - Acreage updated to match site plan.

Construction Phase - Phase timing adjusted per AQ questionnaire.

Grading -

Mobile Land Use Mitigation - Sidewalks provided on-site.

Area Mitigation - Per AQ Questionnaire, no hearths would be installed.

Energy Mitigation - Title 24 exceedance applied to reflect compliance with 2019 CBSC.

Water Mitigation - Water conservation strategy applied to reflect compliance with 2019 CalGreen Code and MWELO.

Trips and VMT -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	240.00
tblConstructionPhase	NumDays	220.00	240.00
tblConstructionPhase	NumDays	6.00	40.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	NumDays	3.00	10.00
tblGrading	MaterialExported	0.00	880.00
tblGrading	MaterialImported	0.00	500.00
tblLandUse	LotAcreage	0.79	2.05
tblProjectCharacteristics	CO2IntensityFactor	0	374.95

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2023	1.0341	0.7641	1.5000e-003	0.1487	0.0480	0.1968	0.0708	0.0452	0.1160	0.0000	129.3451	129.3451	0.0287	0.0000	130.0636
2022	0.5861	1.5277	1.5974	2.8600e-003	0.0209	0.0731	0.0940	5.6000e-003	0.0704	0.0760	0.0000	240.8750	240.8750	0.0398	0.0000	241.8693
Maximum	**0.5861**	**1.5277**	**1.5974**	**2.8600e-003**	**0.1487**	**0.0731**	**0.1968**	**0.0708**	**0.0704**	**0.1160**	**0.0000**	**240.8750**	**240.8750**	**0.0398**	**0.0000**	**241.8693**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2023	1.0341	0.7641	1.5000e-003	0.1487	0.0480	0.1968	0.0708	0.0452	0.1160	0.0000	129.3449	129.3449	0.0287	0.0000	130.0635
2022	0.5861	1.5277	1.5974	2.8600e-003	0.0209	0.0731	0.0940	5.6000e-003	0.0704	0.0760	0.0000	240.8747	240.8747	0.0398	0.0000	241.8690
Maximum	**0.5861**	**1.5277**	**1.5974**	**2.8600e-003**	**0.1487**	**0.0731**	**0.1968**	**0.0708**	**0.0704**	**0.1160**	**0.0000**	**240.8747**	**240.8747**	**0.0398**	**0.0000**	**241.8690**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**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**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	8-1-2021	10-31-2021	0.6976	0.6976
2	11-1-2021	1-31-2022	0.7807	0.7807
3	2-1-2022	4-30-2022	0.7171	0.7171
4	5-1-2022	7-31-2022	0.7405	0.7405
5	8-1-2022	9-30-2022	0.4061	0.4061
		Highest	0.7807	0.7807

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0532	0.0393	2.5464	4.2200e-003		0.3270	0.3270		0.3270	0.3270	30.9887	13.3601	44.3488	0.0290	2.4400e-003	45.7989
Energy	6.3000e-004	5.3800e-003	2.2900e-003	3.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	29.8298	29.8298	1.2000e-004	1.1000e-004	29.8668
Mobile	0.0850	0.4712	0.9746	2.8400e-003	0.2034	2.5500e-003	0.2060	0.0546	2.3900e-003	0.0570	0.0000	261.1762	261.1762	0.0127	0.0000	261.4945
Waste						0.0000	0.0000		0.0000	0.0000	2.8013	0.0000	2.8013	0.1656	0.0000	6.9400
Water						0.0000	0.0000		0.0000	0.0000	0.6201	2.5323	3.1524	0.0637	1.5000e-003	5.1929
Total	**2.1388**	**0.5159**	**3.5233**	**7.0900e-003**	**0.2034**	**0.3300**	**0.5334**	**0.0546**	**0.3298**	**0.3845**	**34.4101**	**306.8984**	**341.3086**	**0.2710**	**4.0500e-003**	**349.2930**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1708	2.5700e-003	0.2228	1.0000e-005		1.2300e-003	1.2300e-003		1.2300e-003	1.2300e-003	0.0000	0.3639	0.3639	3.5000e-004	0.0000	0.3726
Energy	6.0000e-004	5.1500e-003	2.1900e-003	3.0000e-005		4.2000e-004	4.2000e-004		4.2000e-004	4.2000e-004	0.0000	5.9694	5.9694	1.1000e-004	1.1000e-004	6.0049
Mobile	0.0847	0.4687	0.9675	2.8200e-003	0.2014	2.5300e-003	0.2039	0.0541	2.3700e-003	0.0564	0.0000	258.8675	258.8675	0.0127	0.0000	259.1838
Waste						0.0000	0.0000		0.0000	0.0000	2.8013	0.0000	2.8013	0.1656	0.0000	6.9400
Water						0.0000	0.0000		0.0000	0.0000	0.4961	2.0258	2.5219	0.0510	1.2000e-003	4.1543
Total	**0.2561**	**0.4764**	**1.1925**	**2.8600e-003**	**0.2014**	**4.1800e-003**	**0.2056**	**0.0541**	**4.0200e-003**	**0.0581**	**3.2974**	**267.2266**	**270.5240**	**0.2296**	**1.3100e-003**	**276.6556**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**88.03**	**7.66**	**66.15**	**59.66**	**1.00**	**98.73**	**61.46**	**1.01**	**98.78**	**84.89**	**90.42**	**12.93**	**20.74**	**15.29**	**67.65**	**20.80**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2021	8/13/2021	5	10	
2	Grading	Grading	8/14/2021	10/8/2021	5	40	
3	Paving	Paving	10/9/2021	10/15/2021	5	5	
4	Building Construction	Building Construction	10/16/2021	9/16/2022	5	240	
5	Architectural Coating	Architectural Coating	10/30/2021	9/30/2022	5	240	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 20

Acres of Paving: 0

Residential Indoor: 60,750; Residential Outdoor: 20,250; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	110.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	63.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	22.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.0000e-003	0.0000	8.0000e-003	8.7000e-004	0.0000	8.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7300e-003	0.0914	0.0538	1.2000e-004		3.5100e-003	3.5100e-003		3.2300e-003	3.2300e-003	0.0000	10.7632	10.7632	3.4800e-003	0.0000	10.8502
Total	**7.7300e-003**	**0.0914**	**0.0538**	**1.2000e-004**	**8.0000e-003**	**3.5100e-003**	**0.0115**	**8.7000e-004**	**3.2300e-003**	**4.1000e-003**	**0.0000**	**10.7632**	**10.7632**	**3.4800e-003**	**0.0000**	**10.8502**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.2000e-004	0.0146	2.3900e-003	4.0000e-005	9.3000e-004	5.0000e-005	9.8000e-004	2.5000e-004	5.0000e-005	3.0000e-004	0.0000	4.2037	4.2037	1.6000e-004	0.0000	4.2079
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.7000e-004	1.5700e-003	0.0000	3.1000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2791	0.2791	1.0000e-005	0.0000	0.2794
Total	**6.4000e-004**	**0.0148**	**3.9600e-003**	**4.0000e-005**	**1.2400e-003**	**5.0000e-005**	**1.3000e-003**	**3.3000e-004**	**5.0000e-005**	**3.9000e-004**	**0.0000**	**4.4828**	**4.4828**	**1.7000e-004**	**0.0000**	**4.4873**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.0000e-003	0.0000	8.0000e-003	8.7000e-004	0.0000	8.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7300e-003	0.0914	0.0538	1.2000e-004		3.5100e-003	3.5100e-003		3.2300e-003	3.2300e-003	0.0000	10.7632	10.7632	3.4800e-003	0.0000	10.8502
Total	**7.7300e-003**	**0.0914**	**0.0538**	**1.2000e-004**	**8.0000e-003**	**3.5100e-003**	**0.0115**	**8.7000e-004**	**3.2300e-003**	**4.1000e-003**	**0.0000**	**10.7632**	**10.7632**	**3.4800e-003**	**0.0000**	**10.8502**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.2000e-004	0.0146	2.3900e-003	4.0000e-005	9.3000e-004	5.0000e-005	9.8000e-004	2.5000e-004	5.0000e-005	3.0000e-004	0.0000	4.2037	4.2037	1.6000e-004	0.0000	4.2079
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.7000e-004	1.5700e-003	0.0000	3.1000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2791	0.2791	1.0000e-005	0.0000	0.2794
Total	**6.4000e-004**	**0.0148**	**3.9600e-003**	**4.0000e-005**	**1.2400e-003**	**5.0000e-005**	**1.3000e-003**	**3.3000e-004**	**5.0000e-005**	**3.9000e-004**	**0.0000**	**4.4828**	**4.4828**	**1.7000e-004**	**0.0000**	**4.4873**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1311	0.0000	0.1311	0.0674	0.0000	0.0674	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0365	0.4043	0.1952	4.1000e-004		0.0183	0.0183		0.0169	0.0169	0.0000	36.2078	36.2078	0.0117	0.0000	36.5005
Total	**0.0365**	**0.4043**	**0.1952**	**4.1000e-004**	**0.1311**	**0.0183**	**0.1494**	**0.0674**	**0.0169**	**0.0842**	**0.0000**	**36.2078**	**36.2078**	**0.0117**	**0.0000**	**36.5005**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	8.3800e-003	1.3700e-003	3.0000e-005	5.3000e-004	3.0000e-005	5.6000e-004	1.5000e-004	3.0000e-005	1.7000e-004	0.0000	2.4076	2.4076	9.0000e-005	0.0000	2.4100
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	8.5000e-004	7.8400e-003	2.0000e-005	1.5700e-003	1.0000e-005	1.5900e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3954	1.3954	6.0000e-005	0.0000	1.3970
Total	**1.3200e-003**	**9.2300e-003**	**9.2100e-003**	**5.0000e-005**	**2.1000e-003**	**4.0000e-005**	**2.1500e-003**	**5.7000e-004**	**4.0000e-005**	**6.0000e-004**	**0.0000**	**3.8030**	**3.8030**	**1.5000e-004**	**0.0000**	**3.8069**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1311	0.0000	0.1311	0.0674	0.0000	0.0674	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0365	0.4043	0.1952	4.1000e-004		0.0183	0.0183		0.0169	0.0169	0.0000	36.2077	36.2077	0.0117	0.0000	36.5005
Total	**0.0365**	**0.4043**	**0.1952**	**4.1000e-004**	**0.1311**	**0.0183**	**0.1494**	**0.0674**	**0.0169**	**0.0842**	**0.0000**	**36.2077**	**36.2077**	**0.0117**	**0.0000**	**36.5005**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	8.3800e-003	1.3700e-003	3.0000e-005	5.3000e-004	3.0000e-005	5.6000e-004	1.5000e-004	3.0000e-005	1.7000e-004	0.0000	2.4076	2.4076	9.0000e-005	0.0000	2.4100
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	8.5000e-004	7.8400e-003	2.0000e-005	1.5700e-003	1.0000e-005	1.5900e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3954	1.3954	6.0000e-005	0.0000	1.3970
Total	**1.3200e-003**	**9.2300e-003**	**9.2100e-003**	**5.0000e-005**	**2.1000e-003**	**4.0000e-005**	**2.1500e-003**	**5.7000e-004**	**4.0000e-005**	**6.0000e-004**	**0.0000**	**3.8030**	**3.8030**	**1.5000e-004**	**0.0000**	**3.8069**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6600e-003	0.0266	0.0294	4.0000e-005		1.4600e-003	1.4600e-003		1.3400e-003	1.3400e-003	0.0000	3.8762	3.8762	1.2300e-003	0.0000	3.9069
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.6600e-003**	**0.0266**	**0.0294**	**4.0000e-005**		**1.4600e-003**	**1.4600e-003**		**1.3400e-003**	**1.3400e-003**	**0.0000**	**3.8762**	**3.8762**	**1.2300e-003**	**0.0000**	**3.9069**

3.4 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.6000e-004	1.4700e-003	0.0000	2.9000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2616	0.2616	1.0000e-005	0.0000	0.2619
Total	**2.0000e-004**	**1.6000e-004**	**1.4700e-003**	**0.0000**	**2.9000e-004**	**0.0000**	**3.0000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2616**	**0.2616**	**1.0000e-005**	**0.0000**	**0.2619**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6600e-003	0.0266	0.0294	4.0000e-005		1.4600e-003	1.4600e-003		1.3400e-003	1.3400e-003	0.0000	3.8762	3.8762	1.2300e-003	0.0000	3.9069
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.6600e-003**	**0.0266**	**0.0294**	**4.0000e-005**		**1.4600e-003**	**1.4600e-003**		**1.3400e-003**	**1.3400e-003**	**0.0000**	**3.8762**	**3.8762**	**1.2300e-003**	**0.0000**	**3.9069**

3.4 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.6000e-004	1.4700e-003	0.0000	2.9000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2616	0.2616	1.0000e-005	0.0000	0.2619
Total	**2.0000e-004**	**1.6000e-004**	**1.4700e-003**	**0.0000**	**2.9000e-004**	**0.0000**	**3.0000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2616**	**0.2616**	**1.0000e-005**	**0.0000**	**0.2619**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0562	0.4408	0.4005	6.9000e-004		0.0225	0.0225		0.0215	0.0215	0.0000	57.1034	57.1034	0.0112	0.0000	57.3843
Total	**0.0562**	**0.4408**	**0.4005**	**6.9000e-004**		**0.0225**	**0.0225**		**0.0215**	**0.0215**	**0.0000**	**57.1034**	**57.1034**	**0.0112**	**0.0000**	**57.3843**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	9.4700e-003	2.4600e-003	2.0000e-005	5.4000e-004	3.0000e-005	5.7000e-004	1.6000e-004	3.0000e-005	1.8000e-004	0.0000	2.2532	2.2532	1.3000e-004	0.0000	2.2563
Worker	3.2500e-003	2.5800e-003	0.0237	5.0000e-005	4.7600e-003	4.0000e-005	4.8000e-003	1.2700e-003	4.0000e-005	1.3000e-003	0.0000	4.2211	4.2211	1.9000e-004	0.0000	4.2259
Total	**3.5800e-003**	**0.0121**	**0.0262**	**7.0000e-005**	**5.3000e-003**	**7.0000e-005**	**5.3700e-003**	**1.4300e-003**	**7.0000e-005**	**1.4800e-003**	**0.0000**	**6.4743**	**6.4743**	**3.2000e-004**	**0.0000**	**6.4822**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0562	0.4408	0.4005	6.9000e-004		0.0225	0.0225		0.0215	0.0215	0.0000	57.1033	57.1033	0.0112	0.0000	57.3842
Total	**0.0562**	**0.4408**	**0.4005**	**6.9000e-004**		**0.0225**	**0.0225**		**0.0215**	**0.0215**	**0.0000**	**57.1033**	**57.1033**	**0.0112**	**0.0000**	**57.3842**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	9.4700e-003	2.4600e-003	2.0000e-005	5.4000e-004	3.0000e-005	5.7000e-004	1.6000e-004	3.0000e-005	1.8000e-004	0.0000	2.2532	2.2532	1.3000e-004	0.0000	2.2563
Worker	3.2500e-003	2.5800e-003	0.0237	5.0000e-005	4.7600e-003	4.0000e-005	4.8000e-003	1.2700e-003	4.0000e-005	1.3000e-003	0.0000	4.2211	4.2211	1.9000e-004	0.0000	4.2259
Total	**3.5800e-003**	**0.0121**	**0.0262**	**7.0000e-005**	**5.3000e-003**	**7.0000e-005**	**5.3700e-003**	**1.4300e-003**	**7.0000e-005**	**1.4800e-003**	**0.0000**	**6.4743**	**6.4743**	**3.2000e-004**	**0.0000**	**6.4822**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1716	1.3509	1.3277	2.3100e-003		0.0650	0.0650		0.0623	0.0623	0.0000	192.1041	192.1041	0.0371	0.0000	193.0307
Total	**0.1716**	**1.3509**	**1.3277**	**2.3100e-003**		**0.0650**	**0.0650**		**0.0623**	**0.0623**	**0.0000**	**192.1041**	**192.1041**	**0.0371**	**0.0000**	**193.0307**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0300e-003	0.0302	7.4800e-003	8.0000e-005	1.8100e-003	8.0000e-005	1.8900e-003	5.2000e-004	7.0000e-005	6.0000e-004	0.0000	7.5214	7.5214	4.1000e-004	0.0000	7.5315
Worker	0.0102	7.7800e-003	0.0717	1.5000e-004	0.0160	1.2000e-004	0.0161	4.2600e-003	1.1000e-004	4.3700e-003	0.0000	13.7250	13.7250	5.7000e-004	0.0000	13.7393
Total	**0.0113**	**0.0380**	**0.0791**	**2.3000e-004**	**0.0178**	**2.0000e-004**	**0.0180**	**4.7800e-003**	**1.8000e-004**	**4.9700e-003**	**0.0000**	**21.2463**	**21.2463**	**9.8000e-004**	**0.0000**	**21.2708**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1716	1.3509	1.3277	2.3100e-003		0.0650	0.0650		0.0623	0.0623	0.0000	192.1039	192.1039	0.0371	0.0000	193.0304
Total	**0.1716**	**1.3509**	**1.3277**	**2.3100e-003**		**0.0650**	**0.0650**		**0.0623**	**0.0623**	**0.0000**	**192.1039**	**192.1039**	**0.0371**	**0.0000**	**193.0304**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0300e-003	0.0302	7.4800e-003	8.0000e-005	1.8100e-003	8.0000e-005	1.8900e-003	5.2000e-004	7.0000e-005	6.0000e-004	0.0000	7.5214	7.5214	4.1000e-004	0.0000	7.5315
Worker	0.0102	7.7800e-003	0.0717	1.5000e-004	0.0160	1.2000e-004	0.0161	4.2600e-003	1.1000e-004	4.3700e-003	0.0000	13.7250	13.7250	5.7000e-004	0.0000	13.7393
Total	**0.0113**	**0.0380**	**0.0791**	**2.3000e-004**	**0.0178**	**2.0000e-004**	**0.0180**	**4.7800e-003**	**1.8000e-004**	**4.9700e-003**	**0.0000**	**21.2463**	**21.2463**	**9.8000e-004**	**0.0000**	**21.2708**

3.6 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0880					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9300e-003	0.0344	0.0409	7.0000e-005		2.1200e-003	2.1200e-003		2.1200e-003	2.1200e-003	0.0000	5.7448	5.7448	3.9000e-004	0.0000	5.7547
Total	**0.0929**	**0.0344**	**0.0409**	**7.0000e-005**		**2.1200e-003**	**2.1200e-003**		**2.1200e-003**	**2.1200e-003**	**0.0000**	**5.7448**	**5.7448**	**3.9000e-004**	**0.0000**	**5.7547**

3.6 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.8000e-004	3.5300e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6279	0.6279	3.0000e-005	0.0000	0.6287
Total	**4.8000e-004**	**3.8000e-004**	**3.5300e-003**	**1.0000e-005**	**7.1000e-004**	**1.0000e-005**	**7.1000e-004**	**1.9000e-004**	**1.0000e-005**	**1.9000e-004**	**0.0000**	**0.6279**	**0.6279**	**3.0000e-005**	**0.0000**	**0.6287**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0880					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9300e-003	0.0344	0.0409	7.0000e-005		2.1200e-003	2.1200e-003		2.1200e-003	2.1200e-003	0.0000	5.7448	5.7448	3.9000e-004	0.0000	5.7547
Total	**0.0929**	**0.0344**	**0.0409**	**7.0000e-005**		**2.1200e-003**	**2.1200e-003**		**2.1200e-003**	**2.1200e-003**	**0.0000**	**5.7448**	**5.7448**	**3.9000e-004**	**0.0000**	**5.7547**

3.6 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.8000e-004	3.5300e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6279	0.6279	3.0000e-005	0.0000	0.6287
Total	**4.8000e-004**	**3.8000e-004**	**3.5300e-003**	**1.0000e-005**	**7.1000e-004**	**1.0000e-005**	**7.1000e-004**	**1.9000e-004**	**1.0000e-005**	**1.9000e-004**	**0.0000**	**0.6279**	**0.6279**	**3.0000e-005**	**0.0000**	**0.6287**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3813					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0199	0.1373	0.1768	2.9000e-004		7.9700e-003	7.9700e-003		7.9700e-003	7.9700e-003	0.0000	24.8942	24.8942	1.6200e-003	0.0000	24.9347
Total	**0.4012**	**0.1373**	**0.1768**	**2.9000e-004**		**7.9700e-003**	**7.9700e-003**		**7.9700e-003**	**7.9700e-003**	**0.0000**	**24.8942**	**24.8942**	**1.6200e-003**	**0.0000**	**24.9347**

3.6 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9600e-003	1.4900e-003	0.0137	3.0000e-005	3.0700e-003	2.0000e-005	3.0900e-003	8.2000e-004	2.0000e-005	8.4000e-004	0.0000	2.6303	2.6303	1.1000e-004	0.0000	2.6331
Total	**1.9600e-003**	**1.4900e-003**	**0.0137**	**3.0000e-005**	**3.0700e-003**	**2.0000e-005**	**3.0900e-003**	**8.2000e-004**	**2.0000e-005**	**8.4000e-004**	**0.0000**	**2.6303**	**2.6303**	**1.1000e-004**	**0.0000**	**2.6331**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3813					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0199	0.1373	0.1768	2.9000e-004		7.9700e-003	7.9700e-003		7.9700e-003	7.9700e-003	0.0000	24.8942	24.8942	1.6200e-003	0.0000	24.9347
Total	**0.4012**	**0.1373**	**0.1768**	**2.9000e-004**		**7.9700e-003**	**7.9700e-003**		**7.9700e-003**	**7.9700e-003**	**0.0000**	**24.8942**	**24.8942**	**1.6200e-003**	**0.0000**	**24.9347**

3.6 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9600e-003	1.4900e-003	0.0137	3.0000e-005	3.0700e-003	2.0000e-005	3.0900e-003	8.2000e-004	2.0000e-005	8.4000e-004	0.0000	2.6303	2.6303	1.1000e-004	0.0000	2.6331
Total	**1.9600e-003**	**1.4900e-003**	**0.0137**	**3.0000e-005**	**3.0700e-003**	**2.0000e-005**	**3.0900e-003**	**8.2000e-004**	**2.0000e-005**	**8.4000e-004**	**0.0000**	**2.6303**	**2.6303**	**1.1000e-004**	**0.0000**	**2.6331**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0847	0.4687	0.9675	2.8200e-003	0.2014	2.5300e-003	0.2039	0.0541	2.3700e-003	0.0564	0.0000	258.8675	258.8675	0.0127	0.0000	259.1838
Unmitigated	0.0850	0.4712	0.9746	2.8400e-003	0.2034	2.5500e-003	0.2060	0.0546	2.3900e-003	0.0570	0.0000	261.1762	261.1762	0.0127	0.0000	261.4945

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	199.50	191.70	175.80	547,606	542,130
Total	199.50	191.70	175.80	547,606	542,130

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	37.30	20.70	42.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.458197	0.039938	0.237821	0.141531	0.033480	0.006066	0.014724	0.057766	0.001864	0.000990	0.005636	0.000605	0.001381

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.6038	23.6038	0.0000	0.0000	23.6038
NaturalGas Mitigated	6.0000e-004	5.1500e-003	2.1900e-003	3.0000e-005		4.2000e-004	4.2000e-004		4.2000e-004	4.2000e-004	0.0000	5.9694	5.9694	1.1000e-004	1.1000e-004	6.0049
NaturalGas Unmitigated	6.3000e-004	5.3800e-003	2.2900e-003	3.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	6.2260	6.2260	1.2000e-004	1.1000e-004	6.2630

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	116671	6.3000e-004	5.3800e-003	2.2900e-003	3.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	6.2260	6.2260	1.2000e-004	1.1000e-004	6.2630
Total		**6.3000e-004**	**5.3800e-003**	**2.2900e-003**	**3.0000e-005**		**4.3000e-004**	**4.3000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**6.2260**	**6.2260**	**1.2000e-004**	**1.1000e-004**	**6.2630**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	111862	6.0000e-004	5.1500e-003	2.1900e-003	3.0000e-005		4.2000e-004	4.2000e-004		4.2000e-004	4.2000e-004	0.0000	5.9694	5.9694	1.1000e-004	1.1000e-004	6.0049
Total		**6.0000e-004**	**5.1500e-003**	**2.1900e-003**	**3.0000e-005**		**4.2000e-004**	**4.2000e-004**		**4.2000e-004**	**4.2000e-004**	**0.0000**	**5.9694**	**5.9694**	**1.1000e-004**	**1.1000e-004**	**6.0049**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	138785	23.6038	0.0000	0.0000	23.6038
Total		**23.6038**	**0.0000**	**0.0000**	**23.6038**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1708	2.5700e-003	0.2228	1.0000e-005		1.2300e-003	1.2300e-003		1.2300e-003	1.2300e-003	0.0000	0.3639	0.3639	3.5000e-004	0.0000	0.3726
Unmitigated	2.0532	0.0393	2.5464	4.2200e-003		0.3270	0.3270		0.3270	0.3270	30.9887	13.3601	44.3488	0.0290	2.4400e-003	45.7989

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0469					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1172					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.8824	0.0368	2.3236	4.2100e-003		0.3258	0.3258		0.3258	0.3258	30.9887	12.9962	43.9850	0.0286	2.4400e-003	45.4263
Landscaping	6.7100e-003	2.5700e-003	0.2228	1.0000e-005		1.2300e-003	1.2300e-003		1.2300e-003	1.2300e-003	0.0000	0.3639	0.3639	3.5000e-004	0.0000	0.3726
Total	**2.0532**	**0.0393**	**2.5464**	**4.2200e-003**		**0.3270**	**0.3270**		**0.3270**	**0.3270**	**30.9887**	**13.3601**	**44.3488**	**0.0290**	**2.4400e-003**	**45.7989**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0469					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1172					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.7100e-003	2.5700e-003	0.2228	1.0000e-005		1.2300e-003	1.2300e-003		1.2300e-003	1.2300e-003	0.0000	0.3639	0.3639	3.5000e-004	0.0000	0.3726
Total	**0.1708**	**2.5700e-003**	**0.2228**	**1.0000e-005**		**1.2300e-003**	**1.2300e-003**		**1.2300e-003**	**1.2300e-003**	**0.0000**	**0.3639**	**0.3639**	**3.5000e-004**	**0.0000**	**0.3726**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	2.5219	0.0510	1.2000e-003	4.1543
Unmitigated	3.1524	0.0637	1.5000e-003	5.1929

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	1.95462 / 1.23226	3.1524	0.0637	1.5000e-003	5.1929
Total		**3.1524**	**0.0637**	**1.5000e-003**	**5.1929**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	1.5637 / 0.985809	2.5219	0.0510	1.2000e-003	4.1543
Total		**2.5219**	**0.0510**	**1.2000e-003**	**4.1543**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.8013	0.1656	0.0000	6.9400
Unmitigated	2.8013	0.1656	0.0000	6.9400

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	13.8	2.8013	0.1656	0.0000	6.9400
Total		**2.8013**	**0.1656**	**0.0000**	**6.9400**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	13.8	2.8013	0.1656	0.0000	6.9400
Total		**2.8013**	**0.1656**	**0.0000**	**6.9400**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Estates Meadows

Northern Sierra AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	30.00	Dwelling Unit	2.05	30,000.00	86

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	72
Climate Zone	1			**Operational Year**	2023
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	374.95	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor set for Truckee-Donner Public Utility District

Land Use - Acreage updated to match site plan.

Construction Phase - Phase timing adjusted per AQ questionnaire.

Grading -

Mobile Land Use Mitigation - Sidewalks provided on-site.

Area Mitigation - Per AQ Questionnaire, no hearths would be installed.

Energy Mitigation - Title 24 exceedance applied to reflect compliance with 2019 CBSC.

Water Mitigation - Water conservation strategy applied to reflect compliance with 2019 CalGreen Code and MWELO.

Trips and VMT -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	240.00
tblConstructionPhase	NumDays	220.00	240.00
tblConstructionPhase	NumDays	6.00	40.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	NumDays	3.00	10.00
tblGrading	MaterialExported	0.00	880.00
tblGrading	MaterialImported	0.00	500.00
tblLandUse	LotAcreage	0.79	2.05
tblProjectCharacteristics	CO2IntensityFactor	0	374.95

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.3338	21.1764	17.4987	0.0341	6.6634	0.9178	7.5812	3.3970	0.8796	4.2415	0.0000	3,374.3984	3,374.3984	0.8047	0.0000	3,394.5153
2022	6.1196	16.4169	17.1770	0.0309	0.2339	0.7863	1.0202	0.0625	0.7571	0.8196	0.0000	2,868.1999	2,868.1999	0.4730	0.0000	2,880.0240
Maximum	**6.3338**	**21.1764**	**17.4987**	**0.0341**	**6.6634**	**0.9178**	**7.5812**	**3.3970**	**0.8796**	**4.2415**	**0.0000**	**3,374.3984**	**3,374.3984**	**0.8047**	**0.0000**	**3,394.5153**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.3338	21.1764	17.4987	0.0341	6.6634	0.9178	7.5812	3.3970	0.8796	4.2415	0.0000	3,374.3984	3,374.3984	0.8047	0.0000	3,394.5153
2022	6.1196	16.4169	17.1770	0.0309	0.2339	0.7863	1.0202	0.0625	0.7571	0.8196	0.0000	2,868.1999	2,868.1999	0.4730	0.0000	2,880.0240
Maximum	**6.3338**	**21.1764**	**17.4987**	**0.0341**	**6.6634**	**0.9178**	**7.5812**	**3.3970**	**0.8796**	**4.2415**	**0.0000**	**3,374.3984**	**3,374.3984**	**0.8047**	**0.0000**	**3,394.5153**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	46.8856	0.9251	59.1488	0.1028		7.9598	7.9598		7.9598	7.9598	833.1519	353.8683	1,187.0203	0.7732	0.0655	1,225.8780
Energy	3.4500e-003	0.0295	0.0125	1.9000e-004		2.3800e-003	2.3800e-003		2.3800e-003	2.3800e-003		37.6055	37.6055	7.2000e-004	6.9000e-004	37.8289
Mobile	0.5489	2.5229	5.4244	0.0168	1.1936	0.0143	1.2079	0.3193	0.0134	0.3328		1,696.3147	1,696.3147	0.0783		1,698.2720
Total	**47.4379**	**3.4775**	**64.5857**	**0.1198**	**1.1936**	**7.9765**	**9.1701**	**0.3193**	**7.9756**	**8.2950**	**833.1519**	**2,087.7885**	**2,920.9404**	**0.8522**	**0.0662**	**2,961.9788**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.9737	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4566	4.4566	4.2900e-003	0.0000	4.5637
Energy	3.3100e-003	0.0282	0.0120	1.8000e-004		2.2800e-003	2.2800e-003		2.2800e-003	2.2800e-003		36.0554	36.0554	6.9000e-004	6.6000e-004	36.2697
Mobile	0.5471	2.5100	5.3811	0.0166	1.1817	0.0142	1.1958	0.3161	0.0133	0.3294		1,681.3252	1,681.3252	0.0778		1,683.2699
Total	**1.5241**	**2.5668**	**7.8687**	**0.0169**	**1.1817**	**0.0302**	**1.2118**	**0.3161**	**0.0293**	**0.3454**	**0.0000**	**1,721.8371**	**1,721.8371**	**0.0828**	**6.6000e-004**	**1,724.1032**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	96.79	26.19	87.82	85.88	1.00	99.62	86.79	1.00	99.63	95.84	100.00	17.53	41.05	90.29	99.00	41.79

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2021	8/13/2021	5	10	
2	Grading	Grading	8/14/2021	10/8/2021	5	40	
3	Paving	Paving	10/9/2021	10/15/2021	5	5	
4	Building Construction	Building Construction	10/16/2021	9/16/2022	5	240	
5	Architectural Coating	Architectural Coating	10/30/2021	9/30/2022	5	240	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 20

Acres of Paving: 0

Residential Indoor: 60,750; Residential Outdoor: 20,250; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	110.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	63.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	22.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6007	0.0000	1.6007	0.1733	0.0000	0.1733			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457		2,372.883 2	2,372.883 2	0.7674		2,392.069 2
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.6007**	**0.7019**	**2.3026**	**0.1733**	**0.6457**	**0.8190**		**2,372.883 2**	**2,372.883 2**	**0.7674**		**2,392.069 2**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0821	2.8619	0.4485	8.9000e-003	0.1922	9.9600e-003	0.2022	0.0527	9.5300e-003	0.0622		935.7622	935.7622	0.0343		936.6202
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0454	0.0283	0.3196	6.6000e-004	0.0657	5.1000e-004	0.0662	0.0174	4.7000e-004	0.0179		65.7530	65.7530	2.9200e-003		65.8259
Total	**0.1274**	**2.8902**	**0.7681**	**9.5600e-003**	**0.2579**	**0.0105**	**0.2684**	**0.0701**	**0.0100**	**0.0801**		**1,001.5152**	**1,001.5152**	**0.0372**		**1,002.4462**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6007	0.0000	1.6007	0.1733	0.0000	0.1733			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457	0.0000	2,372.8832	2,372.8832	0.7674		2,392.0692
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.6007**	**0.7019**	**2.3026**	**0.1733**	**0.6457**	**0.8190**	**0.0000**	**2,372.8832**	**2,372.8832**	**0.7674**		**2,392.0692**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0821	2.8619	0.4485	8.9000e-003	0.1922	9.9600e-003	0.2022	0.0527	9.5300e-003	0.0622		935.7622	935.7622	0.0343		936.6202
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0454	0.0283	0.3196	6.6000e-004	0.0657	5.1000e-004	0.0662	0.0174	4.7000e-004	0.0179		65.7530	65.7530	2.9200e-003		65.8259
Total	**0.1274**	**2.8902**	**0.7681**	**9.5600e-003**	**0.2579**	**0.0105**	**0.2684**	**0.0701**	**0.0100**	**0.0801**		**1,001.5152**	**1,001.5152**	**0.0372**		**1,002.4462**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5538	0.0000	6.5538	3.3677	0.0000	3.3677			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425		1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5538**	**0.9158**	**7.4695**	**3.3677**	**0.8425**	**4.2102**		**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0118	0.4098	0.0642	1.2700e-003	0.0275	1.4300e-003	0.0289	7.5400e-003	1.3600e-003	8.9000e-003		133.9841	133.9841	4.9100e-003		134.1070
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0567	0.0354	0.3995	8.3000e-004	0.0822	6.3000e-004	0.0828	0.0218	5.8000e-004	0.0224		82.1912	82.1912	3.6500e-003		82.2824
Total	**0.0684**	**0.4452**	**0.4637**	**2.1000e-003**	**0.1097**	**2.0600e-003**	**0.1117**	**0.0293**	**1.9400e-003**	**0.0313**		**216.1754**	**216.1754**	**8.5600e-003**		**216.3894**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5538	0.0000	6.5538	3.3677	0.0000	3.3677			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425	0.0000	1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5538**	**0.9158**	**7.4695**	**3.3677**	**0.8425**	**4.2102**	**0.0000**	**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0118	0.4098	0.0642	1.2700e-003	0.0275	1.4300e-003	0.0289	7.5400e-003	1.3600e-003	8.9000e-003		133.9841	133.9841	4.9100e-003		134.1070
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0567	0.0354	0.3995	8.3000e-004	0.0822	6.3000e-004	0.0828	0.0218	5.8000e-004	0.0224		82.1912	82.1912	3.6500e-003		82.2824
Total	**0.0684**	**0.4452**	**0.4637**	**2.1000e-003**	**0.1097**	**2.0600e-003**	**0.1117**	**0.0293**	**1.9400e-003**	**0.0313**		**216.1754**	**216.1754**	**8.5600e-003**		**216.3894**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371		1,709.1107	1,709.1107	0.5417		1,722.6524
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0633**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**		**1,709.1107**	**1,709.1107**	**0.5417**		**1,722.6524**

3.4 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0850	0.0531	0.5992	1.2400e-003	0.1232	9.5000e-004	0.1242	0.0327	8.8000e-004	0.0336		123.2869	123.2869	5.4700e-003		123.4236
Total	**0.0850**	**0.0531**	**0.5992**	**1.2400e-003**	**0.1232**	**9.5000e-004**	**0.1242**	**0.0327**	**8.8000e-004**	**0.0336**		**123.2869**	**123.2869**	**5.4700e-003**		**123.4236**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371	0.0000	1,709.1107	1,709.1107	0.5417		1,722.6524
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0633**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**	**0.0000**	**1,709.1107**	**1,709.1107**	**0.5417**		**1,722.6524**

3.4 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0850	0.0531	0.5992	1.2400e-003	0.1232	9.5000e-004	0.1242	0.0327	8.8000e-004	0.0336		123.2869	123.2869	5.4700e-003		123.4236
Total	**0.0850**	**0.0531**	**0.5992**	**1.2400e-003**	**0.1232**	**9.5000e-004**	**0.1242**	**0.0327**	**8.8000e-004**	**0.0336**		**123.2869**	**123.2869**	**5.4700e-003**		**123.4236**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831		2,288.935 5	2,288.935 5	0.4503		2,300.193 5
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**		**2,288.935 5**	**2,288.935 5**	**0.4503**		**2,300.193 5**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0117	0.3394	0.0796	8.7000e-004	0.0203	9.5000e-004	0.0213	5.8500e-003	9.1000e-004	6.7600e-003		91.5732	91.5732	4.7400e-003		91.6916
Worker	0.1247	0.0779	0.8788	1.8200e-003	0.1807	1.3900e-003	0.1821	0.0479	1.2800e-003	0.0492		180.8207	180.8207	8.0200e-003		181.0213
Total	**0.1364**	**0.4173**	**0.9584**	**2.6900e-003**	**0.2010**	**2.3400e-003**	**0.2034**	**0.0538**	**2.1900e-003**	**0.0560**		**272.3939**	**272.3939**	**0.0128**		**272.7129**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831	0.0000	2,288.935 5	2,288.935 5	0.4503		2,300.193 5
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**	**0.0000**	**2,288.935 5**	**2,288.935 5**	**0.4503**		**2,300.193 5**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0117	0.3394	0.0796	8.7000e-004	0.0203	9.5000e-004	0.0213	5.8500e-003	9.1000e-004	6.7600e-003		91.5732	91.5732	4.7400e-003		91.6916
Worker	0.1247	0.0779	0.8788	1.8200e-003	0.1807	1.3900e-003	0.1821	0.0479	1.2800e-003	0.0492		180.8207	180.8207	8.0200e-003		181.0213
Total	**0.1364**	**0.4173**	**0.9584**	**2.6900e-003**	**0.2010**	**2.3400e-003**	**0.2034**	**0.0538**	**2.1900e-003**	**0.0560**		**272.3939**	**272.3939**	**0.0128**		**272.7129**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731		2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**		**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0108	0.3220	0.0722	8.7000e-004	0.0203	8.3000e-004	0.0211	5.8400e-003	8.0000e-004	6.6400e-003		90.8897	90.8897	4.5700e-003		91.0038
Worker	0.1167	0.0698	0.7937	1.7600e-003	0.1807	1.3300e-003	0.1821	0.0479	1.2300e-003	0.0492		174.7992	174.7992	7.1100e-003		174.9771
Total	**0.1275**	**0.3917**	**0.8659**	**2.6300e-003**	**0.2010**	**2.1600e-003**	**0.2032**	**0.0538**	**2.0300e-003**	**0.0558**		**265.6889**	**265.6889**	**0.0117**		**265.9809**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731	0.0000	2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**	**0.0000**	**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0108	0.3220	0.0722	8.7000e-004	0.0203	8.3000e-004	0.0211	5.8400e-003	8.0000e-004	6.6400e-003		90.8897	90.8897	4.5700e-003		91.0038
Worker	0.1167	0.0698	0.7937	1.7600e-003	0.1807	1.3300e-003	0.1821	0.0479	1.2300e-003	0.0492		174.7992	174.7992	7.1100e-003		174.9771
Total	**0.1275**	**0.3917**	**0.8659**	**2.6300e-003**	**0.2010**	**2.1600e-003**	**0.2032**	**0.0538**	**2.0300e-003**	**0.0558**		**265.6889**	**265.6889**	**0.0117**		**265.9809**

3.6 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**4.1297**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.6 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0227	0.0142	0.1598	3.3000e-004	0.0329	2.5000e-004	0.0331	8.7200e-003	2.3000e-004	8.9500e-003		32.8765	32.8765	1.4600e-003		32.9130
Total	**0.0227**	**0.0142**	**0.1598**	**3.3000e-004**	**0.0329**	**2.5000e-004**	**0.0331**	**8.7200e-003**	**2.3000e-004**	**8.9500e-003**		**32.8765**	**32.8765**	**1.4600e-003**		**32.9130**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**4.1297**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.6 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0227	0.0142	0.1598	3.3000e-004	0.0329	2.5000e-004	0.0331	8.7200e-003	2.3000e-004	8.9500e-003		32.8765	32.8765	1.4600e-003		32.9130
Total	**0.0227**	**0.0142**	**0.1598**	**3.3000e-004**	**0.0329**	**2.5000e-004**	**0.0331**	**8.7200e-003**	**2.3000e-004**	**8.9500e-003**		**32.8765**	**32.8765**	**1.4600e-003**		**32.9130**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**4.1153**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0212	0.0127	0.1443	3.2000e-004	0.0329	2.4000e-004	0.0331	8.7200e-003	2.2000e-004	8.9400e-003		31.7817	31.7817	1.2900e-003		31.8140
Total	**0.0212**	**0.0127**	**0.1443**	**3.2000e-004**	**0.0329**	**2.4000e-004**	**0.0331**	**8.7200e-003**	**2.2000e-004**	**8.9400e-003**		**31.7817**	**31.7817**	**1.2900e-003**		**31.8140**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**4.1153**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0212	0.0127	0.1443	3.2000e-004	0.0329	2.4000e-004	0.0331	8.7200e-003	2.2000e-004	8.9400e-003		31.7817	31.7817	1.2900e-003		31.8140
Total	**0.0212**	**0.0127**	**0.1443**	**3.2000e-004**	**0.0329**	**2.4000e-004**	**0.0331**	**8.7200e-003**	**2.2000e-004**	**8.9400e-003**		**31.7817**	**31.7817**	**1.2900e-003**		**31.8140**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.5471	2.5100	5.3811	0.0166	1.1817	0.0142	1.1958	0.3161	0.0133	0.3294		1,681.325 2	1,681.325 2	0.0778		1,683.269 9
Unmitigated	0.5489	2.5229	5.4244	0.0168	1.1936	0.0143	1.2079	0.3193	0.0134	0.3328		1,696.314 7	1,696.314 7	0.0783		1,698.272 0

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	199.50	191.70	175.80	547,606	542,130
Total	199.50	191.70	175.80	547,606	542,130

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	37.30	20.70	42.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.458197	0.039938	0.237821	0.141531	0.033480	0.006066	0.014724	0.057766	0.001864	0.000990	0.005636	0.000605	0.001381

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	3.3100e-003	0.0282	0.0120	1.8000e-004		2.2800e-003	2.2800e-003		2.2800e-003	2.2800e-003		36.0554	36.0554	6.9000e-004	6.6000e-004	36.2697
NaturalGas Unmitigated	3.4500e-003	0.0295	0.0125	1.9000e-004		2.3800e-003	2.3800e-003		2.3800e-003	2.3800e-003		37.6055	37.6055	7.2000e-004	6.9000e-004	37.8289

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	319.646	3.4500e-003	0.0295	0.0125	1.9000e-004		2.3800e-003	2.3800e-003		2.3800e-003	2.3800e-003		37.6055	37.6055	7.2000e-004	6.9000e-004	37.8289
Total		**3.4500e-003**	**0.0295**	**0.0125**	**1.9000e-004**		**2.3800e-003**	**2.3800e-003**		**2.3800e-003**	**2.3800e-003**		**37.6055**	**37.6055**	**7.2000e-004**	**6.9000e-004**	**37.8289**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	0.306471	3.3100e-003	0.0282	0.0120	1.8000e-004		2.2800e-003	2.2800e-003		2.2800e-003	2.2800e-003		36.0554	36.0554	6.9000e-004	6.6000e-004	36.2697
Total		**3.3100e-003**	**0.0282**	**0.0120**	**1.8000e-004**		**2.2800e-003**	**2.2800e-003**		**2.2800e-003**	**2.2800e-003**		**36.0554**	**36.0554**	**6.9000e-004**	**6.6000e-004**	**36.2697**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9737	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4566	4.4566	4.2900e-003	0.0000	4.5637
Unmitigated	46.8856	0.9251	59.1488	0.1028		7.9598	7.9598		7.9598	7.9598	833.1519	353.8683	1,187.0203	0.7732	0.0655	1,225.8780

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6420					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	45.9119	0.8966	56.6732	0.1027		7.9461	7.9461		7.9461	7.9461	833.1519	349.4118	1,182.5637	0.7689	0.0655	1,221.3143
Landscaping	0.0746	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4566	4.4566	4.2900e-003		4.5637
Total	**46.8856**	**0.9252**	**59.1488**	**0.1028**		**7.9598**	**7.9598**		**7.9598**	**7.9598**	**833.1519**	**353.8683**	**1,187.0203**	**0.7732**	**0.0655**	**1,225.8780**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6420					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0746	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4566	4.4566	4.2900e-003		4.5637
Total	**0.9737**	**0.0285**	**2.4756**	**1.3000e-004**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**4.4566**	**4.4566**	**4.2900e-003**	**0.0000**	**4.5637**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Estates Meadows

Northern Sierra AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	30.00	Dwelling Unit	2.05	30,000.00	86

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	72
Climate Zone	1			**Operational Year**	2023
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	374.95	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor set for Truckee-Donner Public Utility District

Land Use - Acreage updated to match site plan.

Construction Phase - Phase timing adjusted per AQ questionnaire.

Grading -

Mobile Land Use Mitigation - Sidewalks provided on-site.

Area Mitigation - Per AQ Questionnaire, no hearths would be installed.

Energy Mitigation - Title 24 exceedance applied to reflect compliance with 2019 CBSC.

Water Mitigation - Water conservation strategy applied to reflect compliance with 2019 CalGreen Code and MWELO.

Trips and VMT -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	240.00
tblConstructionPhase	NumDays	220.00	240.00
tblConstructionPhase	NumDays	6.00	40.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	NumDays	3.00	10.00
tblGrading	MaterialExported	0.00	880.00
tblGrading	MaterialImported	0.00	500.00
tblLandUse	LotAcreage	0.79	2.05
tblProjectCharacteristics	CO2IntensityFactor	0	374.95

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.3422	21.2447	17.5354	0.0338	6.6634	0.9179	7.5813	3.3970	0.8797	4.2415	0.0000	3,347.840 1	3,347.840 1	0.8089	0.0000	3,368.061 3
2022	6.1274	16.4464	17.2024	0.0307	0.2339	0.7863	1.0202	0.0625	0.7571	0.8196	0.0000	2,849.048 7	2,849.048 7	0.4732	0.0000	2,860.880 1
Maximum	**6.3422**	**21.2447**	**17.5354**	**0.0338**	**6.6634**	**0.9179**	**7.5813**	**3.3970**	**0.8797**	**4.2415**	**0.0000**	**3,347.840 1**	**3,347.840 1**	**0.8089**	**0.0000**	**3,368.061 3**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.3422	21.2447	17.5354	0.0338	6.6634	0.9179	7.5813	3.3970	0.8797	4.2415	0.0000	3,347.840 1	3,347.840 1	0.8089	0.0000	3,368.061 3
2022	6.1274	16.4464	17.2024	0.0307	0.2339	0.7863	1.0202	0.0625	0.7571	0.8196	0.0000	2,849.048 7	2,849.048 7	0.4732	0.0000	2,860.880 1
Maximum	**6.3422**	**21.2447**	**17.5354**	**0.0338**	**6.6634**	**0.9179**	**7.5813**	**3.3970**	**0.8797**	**4.2415**	**0.0000**	**3,347.840 1**	**3,347.840 1**	**0.8089**	**0.0000**	**3,368.061 3**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	46.8856	0.9251	59.1488	0.1028		7.9598	7.9598		7.9598	7.9598	833.1519	353.8683	1,187.0203	0.7732	0.0655	1,225.8780
Energy	3.4500e-003	0.0295	0.0125	1.9000e-004		2.3800e-003	2.3800e-003		2.3800e-003	2.3800e-003		37.6055	37.6055	7.2000e-004	6.9000e-004	37.8289
Mobile	0.4741	2.6997	5.7397	0.0157	1.1936	0.0144	1.2080	0.3193	0.0135	0.3329		1,592.9422	1,592.9422	0.0814		1,594.9770
Total	**47.3631**	**3.6543**	**64.9010**	**0.1187**	**1.1936**	**7.9766**	**9.1702**	**0.3193**	**7.9757**	**8.2951**	**833.1519**	**1,984.4160**	**2,817.5679**	**0.8553**	**0.0662**	**2,858.6839**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.9737	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4566	4.4566	4.2900e-003	0.0000	4.5637
Energy	3.3100e-003	0.0282	0.0120	1.8000e-004		2.2800e-003	2.2800e-003		2.2800e-003	2.2800e-003		36.0554	36.0554	6.9000e-004	6.6000e-004	36.2697
Mobile	0.4723	2.6849	5.7001	0.0156	1.1817	0.0143	1.1960	0.3161	0.0134	0.3296		1,578.7636	1,578.7636	0.0809		1,580.7866
Total	**1.4493**	**2.7417**	**8.1877**	**0.0159**	**1.1817**	**0.0303**	**1.2119**	**0.3161**	**0.0294**	**0.3455**	**0.0000**	**1,619.2755**	**1,619.2755**	**0.0859**	**6.6000e-004**	**1,621.6200**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	96.94	24.97	87.38	86.61	1.00	99.62	86.78	1.00	99.63	95.83	100.00	18.40	42.53	89.96	99.00	43.27

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/1/2021	8/13/2021	5	10	
2	Grading	Grading	8/14/2021	10/8/2021	5	40	
3	Paving	Paving	10/9/2021	10/15/2021	5	5	
4	Building Construction	Building Construction	10/16/2021	9/16/2022	5	240	
5	Architectural Coating	Architectural Coating	10/30/2021	9/30/2022	5	240	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 20

Acres of Paving: 0

Residential Indoor: 60,750; Residential Outdoor: 20,250; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	110.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	63.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	22.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6007	0.0000	1.6007	0.1733	0.0000	0.1733			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457		2,372.883 2	2,372.883 2	0.7674		2,392.069 2
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.6007**	**0.7019**	**2.3026**	**0.1733**	**0.6457**	**0.8190**		**2,372.883 2**	**2,372.883 2**	**0.7674**		**2,392.069 2**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0853	2.9210	0.5118	8.7000e-003	0.1922	0.0102	0.2024	0.0527	9.7800e-003	0.0624		914.3438	914.3438	0.0386		915.3083
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0476	0.0375	0.3251	6.1000e-004	0.0657	5.1000e-004	0.0662	0.0174	4.7000e-004	0.0179		60.6131	60.6131	2.8300e-003		60.6838
Total	**0.1330**	**2.9585**	**0.8370**	**9.3100e-003**	**0.2579**	**0.0107**	**0.2686**	**0.0701**	**0.0103**	**0.0803**		**974.9569**	**974.9569**	**0.0414**		**975.9921**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6007	0.0000	1.6007	0.1733	0.0000	0.1733			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457	0.0000	2,372.883 2	2,372.883 2	0.7674		2,392.069 2
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.6007**	**0.7019**	**2.3026**	**0.1733**	**0.6457**	**0.8190**	**0.0000**	**2,372.883 2**	**2,372.883 2**	**0.7674**		**2,392.069 2**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0853	2.9210	0.5118	8.7000e-003	0.1922	0.0102	0.2024	0.0527	9.7800e-003	0.0624		914.3438	914.3438	0.0386		915.3083
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0476	0.0375	0.3251	6.1000e-004	0.0657	5.1000e-004	0.0662	0.0174	4.7000e-004	0.0179		60.6131	60.6131	2.8300e-003		60.6838
Total	**0.1330**	**2.9585**	**0.8370**	**9.3100e-003**	**0.2579**	**0.0107**	**0.2686**	**0.0701**	**0.0103**	**0.0803**		**974.9569**	**974.9569**	**0.0414**		**975.9921**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5538	0.0000	6.5538	3.3677	0.0000	3.3677			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425		1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5538**	**0.9158**	**7.4695**	**3.3677**	**0.8425**	**4.2102**		**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0122	0.4182	0.0733	1.2500e-003	0.0275	1.4600e-003	0.0290	7.5400e-003	1.4000e-003	8.9400e-003		130.9174	130.9174	5.5200e-003		131.0555
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0595	0.0469	0.4064	7.6000e-004	0.0822	6.3000e-004	0.0828	0.0218	5.8000e-004	0.0224		75.7664	75.7664	3.5300e-003		75.8548
Total	**0.0718**	**0.4651**	**0.4797**	**2.0100e-003**	**0.1097**	**2.0900e-003**	**0.1118**	**0.0293**	**1.9800e-003**	**0.0313**		**206.6838**	**206.6838**	**9.0500e-003**		**206.9103**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5538	0.0000	6.5538	3.3677	0.0000	3.3677			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425	0.0000	1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5538**	**0.9158**	**7.4695**	**3.3677**	**0.8425**	**4.2102**	**0.0000**	**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0122	0.4182	0.0733	1.2500e-003	0.0275	1.4600e-003	0.0290	7.5400e-003	1.4000e-003	8.9400e-003		130.9174	130.9174	5.5200e-003		131.0555
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0595	0.0469	0.4064	7.6000e-004	0.0822	6.3000e-004	0.0828	0.0218	5.8000e-004	0.0224		75.7664	75.7664	3.5300e-003		75.8548
Total	**0.0718**	**0.4651**	**0.4797**	**2.0100e-003**	**0.1097**	**2.0900e-003**	**0.1118**	**0.0293**	**1.9800e-003**	**0.0313**		**206.6838**	**206.6838**	**9.0500e-003**		**206.9103**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371		1,709.1107	1,709.1107	0.5417		1,722.6524
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0633**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**		**1,709.1107**	**1,709.1107**	**0.5417**		**1,722.6524**

3.4 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0893	0.0704	0.6096	1.1400e-003	0.1232	9.5000e-004	0.1242	0.0327	8.8000e-004	0.0336		113.6496	113.6496	5.3000e-003		113.7822
Total	**0.0893**	**0.0704**	**0.6096**	**1.1400e-003**	**0.1232**	**9.5000e-004**	**0.1242**	**0.0327**	**8.8000e-004**	**0.0336**		**113.6496**	**113.6496**	**5.3000e-003**		**113.7822**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371	0.0000	1,709.1107	1,709.1107	0.5417		1,722.6524
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0633**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**	**0.0000**	**1,709.1107**	**1,709.1107**	**0.5417**		**1,722.6524**

3.4 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0893	0.0704	0.6096	1.1400e-003	0.1232	9.5000e-004	0.1242	0.0327	8.8000e-004	0.0336		113.6496	113.6496	5.3000e-003		113.7822
Total	**0.0893**	**0.0704**	**0.6096**	**1.1400e-003**	**0.1232**	**9.5000e-004**	**0.1242**	**0.0327**	**8.8000e-004**	**0.0336**		**113.6496**	**113.6496**	**5.3000e-003**		**113.7822**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831		2,288.935 5	2,288.935 5	0.4503		2,300.193 5
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**		**2,288.935 5**	**2,288.935 5**	**0.4503**		**2,300.193 5**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0126	0.3428	0.0983	8.5000e-004	0.0203	9.9000e-004	0.0213	5.8500e-003	9.5000e-004	6.7900e-003		88.5817	88.5817	5.3700e-003		88.7159
Worker	0.1310	0.1032	0.8941	1.6800e-003	0.1807	1.3900e-003	0.1821	0.0479	1.2800e-003	0.0492		166.6861	166.6861	7.7800e-003		166.8805
Total	**0.1436**	**0.4460**	**0.9924**	**2.5300e-003**	**0.2010**	**2.3800e-003**	**0.2034**	**0.0538**	**2.2300e-003**	**0.0560**		**255.2678**	**255.2678**	**0.0132**		**255.5964**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831	0.0000	2,288.935 5	2,288.935 5	0.4503		2,300.193 5
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**	**0.0000**	**2,288.935 5**	**2,288.935 5**	**0.4503**		**2,300.193 5**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0126	0.3428	0.0983	8.5000e-004	0.0203	9.9000e-004	0.0213	5.8500e-003	9.5000e-004	6.7900e-003		88.5817	88.5817	5.3700e-003		88.7159
Worker	0.1310	0.1032	0.8941	1.6800e-003	0.1807	1.3900e-003	0.1821	0.0479	1.2800e-003	0.0492		166.6861	166.6861	7.7800e-003		166.8805
Total	**0.1436**	**0.4460**	**0.9924**	**2.5300e-003**	**0.2010**	**2.3800e-003**	**0.2034**	**0.0538**	**2.2300e-003**	**0.0560**		**255.2678**	**255.2678**	**0.0132**		**255.5964**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731		2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**		**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0116	0.3247	0.0889	8.4000e-004	0.0203	8.7000e-004	0.0212	5.8400e-003	8.3000e-004	6.6800e-003		87.8945	87.8945	5.1700e-003		88.0238
Worker	0.1227	0.0924	0.8010	1.6200e-003	0.1807	1.3300e-003	0.1821	0.0479	1.2300e-003	0.0492		161.1288	161.1288	6.8400e-003		161.2999
Total	**0.1343**	**0.4171**	**0.8899**	**2.4600e-003**	**0.2010**	**2.2000e-003**	**0.2032**	**0.0538**	**2.0600e-003**	**0.0558**		**249.0233**	**249.0233**	**0.0120**		**249.3237**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731	0.0000	2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**	**0.0000**	**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0116	0.3247	0.0889	8.4000e-004	0.0203	8.7000e-004	0.0212	5.8400e-003	8.3000e-004	6.6800e-003		87.8945	87.8945	5.1700e-003		88.0238
Worker	0.1227	0.0924	0.8010	1.6200e-003	0.1807	1.3300e-003	0.1821	0.0479	1.2300e-003	0.0492		161.1288	161.1288	6.8400e-003		161.2999
Total	**0.1343**	**0.4171**	**0.8899**	**2.4600e-003**	**0.2010**	**2.2000e-003**	**0.2032**	**0.0538**	**2.0600e-003**	**0.0558**		**249.0233**	**249.0233**	**0.0120**		**249.3237**

3.6 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**4.1297**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.6 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0238	0.0188	0.1626	3.1000e-004	0.0329	2.5000e-004	0.0331	8.7200e-003	2.3000e-004	8.9500e-003		30.3066	30.3066	1.4100e-003		30.3419
Total	**0.0238**	**0.0188**	**0.1626**	**3.1000e-004**	**0.0329**	**2.5000e-004**	**0.0331**	**8.7200e-003**	**2.3000e-004**	**8.9500e-003**		**30.3066**	**30.3066**	**1.4100e-003**		**30.3419**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**4.1297**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.6 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0238	0.0188	0.1626	3.1000e-004	0.0329	2.5000e-004	0.0331	8.7200e-003	2.3000e-004	8.9500e-003		30.3066	30.3066	1.4100e-003		30.3419
Total	**0.0238**	**0.0188**	**0.1626**	**3.1000e-004**	**0.0329**	**2.5000e-004**	**0.0331**	**8.7200e-003**	**2.3000e-004**	**8.9500e-003**		**30.3066**	**30.3066**	**1.4100e-003**		**30.3419**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**4.1153**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0223	0.0168	0.1456	2.9000e-004	0.0329	2.4000e-004	0.0331	8.7200e-003	2.2000e-004	8.9400e-003		29.2961	29.2961	1.2400e-003		29.3273
Total	**0.0223**	**0.0168**	**0.1456**	**2.9000e-004**	**0.0329**	**2.4000e-004**	**0.0331**	**8.7200e-003**	**2.2000e-004**	**8.9400e-003**		**29.2961**	**29.2961**	**1.2400e-003**		**29.3273**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.9108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**4.1153**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0223	0.0168	0.1456	2.9000e-004	0.0329	2.4000e-004	0.0331	8.7200e-003	2.2000e-004	8.9400e-003		29.2961	29.2961	1.2400e-003		29.3273
Total	**0.0223**	**0.0168**	**0.1456**	**2.9000e-004**	**0.0329**	**2.4000e-004**	**0.0331**	**8.7200e-003**	**2.2000e-004**	**8.9400e-003**		**29.2961**	**29.2961**	**1.2400e-003**		**29.3273**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.4723	2.6849	5.7001	0.0156	1.1817	0.0143	1.1960	0.3161	0.0134	0.3296		1,578.7636	1,578.7636	0.0809		1,580.7866
Unmitigated	0.4741	2.6997	5.7397	0.0157	1.1936	0.0144	1.2080	0.3193	0.0135	0.3329		1,592.9422	1,592.9422	0.0814		1,594.9770

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	199.50	191.70	175.80	547,606	542,130
Total	199.50	191.70	175.80	547,606	542,130

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	37.30	20.70	42.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.458197	0.039938	0.237821	0.141531	0.033480	0.006066	0.014724	0.057766	0.001864	0.000990	0.005636	0.000605	0.001381

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	3.3100e-003	0.0282	0.0120	1.8000e-004		2.2800e-003	2.2800e-003		2.2800e-003	2.2800e-003		36.0554	36.0554	6.9000e-004	6.6000e-004	36.2697
NaturalGas Unmitigated	3.4500e-003	0.0295	0.0125	1.9000e-004		2.3800e-003	2.3800e-003		2.3800e-003	2.3800e-003		37.6055	37.6055	7.2000e-004	6.9000e-004	37.8289

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	319.646	3.4500e-003	0.0295	0.0125	1.9000e-004		2.3800e-003	2.3800e-003		2.3800e-003	2.3800e-003		37.6055	37.6055	7.2000e-004	6.9000e-004	37.8289
Total		**3.4500e-003**	**0.0295**	**0.0125**	**1.9000e-004**		**2.3800e-003**	**2.3800e-003**		**2.3800e-003**	**2.3800e-003**		**37.6055**	**37.6055**	**7.2000e-004**	**6.9000e-004**	**37.8289**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	0.306471	3.3100e-003	0.0282	0.0120	1.8000e-004		2.2800e-003	2.2800e-003		2.2800e-003	2.2800e-003		36.0554	36.0554	6.9000e-004	6.6000e-004	36.2697
Total		**3.3100e-003**	**0.0282**	**0.0120**	**1.8000e-004**		**2.2800e-003**	**2.2800e-003**		**2.2800e-003**	**2.2800e-003**		**36.0554**	**36.0554**	**6.9000e-004**	**6.6000e-004**	**36.2697**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9737	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4566	4.4566	4.2900e-003	0.0000	4.5637
Unmitigated	46.8856	0.9251	59.1488	0.1028		7.9598	7.9598		7.9598	7.9598	833.1519	353.8683	1,187.0203	0.7732	0.0655	1,225.8780

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6420					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	45.9119	0.8966	56.6732	0.1027		7.9461	7.9461		7.9461	7.9461	833.1519	349.4118	1,182.5637	0.7689	0.0655	1,221.3143
Landscaping	0.0746	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4566	4.4566	4.2900e-003		4.5637
Total	**46.8856**	**0.9252**	**59.1488**	**0.1028**		**7.9598**	**7.9598**		**7.9598**	**7.9598**	**833.1519**	**353.8683**	**1,187.0203**	**0.7732**	**0.0655**	**1,225.8780**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6420					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0746	0.0285	2.4756	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4566	4.4566	4.2900e-003		4.5637
Total	**0.9737**	**0.0285**	**2.4756**	**1.3000e-004**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**4.4566**	**4.4566**	**4.2900e-003**	**0.0000**	**4.5637**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Estates Meadows

Northern Sierra AQMD Air District, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	No Change	0	1	No Change	0.00
Cement and Mortar Mixers	Diesel	No Change	0	1	No Change	0.00
Cranes	Diesel	No Change	0	1	No Change	0.00
Forklifts	Diesel	No Change	0	2	No Change	0.00
Generator Sets	Diesel	No Change	0	1	No Change	0.00
Graders	Diesel	No Change	0	2	No Change	0.00
Pavers	Diesel	No Change	0	1	No Change	0.00
Paving Equipment	Diesel	No Change	0	1	No Change	0.00
Rollers	Diesel	No Change	0	2	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	1	No Change	0.00
Scrapers	Diesel	No Change	0	1	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	5	No Change	0.00
Welders	Diesel	No Change	0	3	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	2.48700E-002	1.71680E-001	2.17720E-001	3.60000E-004	1.00800E-002	1.00800E-002	0.00000E+000	3.06390E+001	3.06390E+001	2.02000E-003	0.00000E+000	3.06894E+001
Cement and Mortar Mixers	1.50000E-004	9.20000E-004	7.70000E-004	0.00000E+000	4.00000E-005	4.00000E-005	0.00000E+000	1.14570E-001	1.14570E-001	1.00000E-005	0.00000E+000	1.14870E-001
Cranes	4.58600E-002	5.20400E-001	2.29570E-001	6.90000E-004	2.14800E-002	1.97700E-002	0.00000E+000	6.08332E+001	6.08332E+001	1.96700E-002	0.00000E+000	6.13251E+001
Forklifts	2.46100E-002	2.27510E-001	2.42970E-001	3.20000E-004	1.53400E-002	1.41100E-002	0.00000E+000	2.82012E+001	2.82012E+001	9.12000E-003	0.00000E+000	2.84292E+001
Generator Sets	4.03500E-002	3.57930E-001	4.41350E-001	7.90000E-004	1.82000E-002	1.82000E-002	0.00000E+000	6.78249E+001	6.78249E+001	3.28000E-003	0.00000E+000	6.79068E+001
Graders	1.13200E-002	1.48110E-001	4.41800E-002	1.70000E-004	4.69000E-003	4.32000E-003	0.00000E+000	1.45532E+001	1.45532E+001	4.71000E-003	0.00000E+000	1.46708E+001
Pavers	6.20000E-004	6.49000E-003	7.26000E-003	1.00000E-005	3.10000E-004	2.90000E-004	0.00000E+000	1.03206E+000	1.03206E+000	3.30000E-004	0.00000E+000	1.04041E+000
Paving Equipment	4.80000E-004	4.85000E-003	6.35000E-003	1.00000E-005	2.40000E-004	2.20000E-004	0.00000E+000	8.94610E-001	8.94610E-001	2.90000E-004	0.00000E+000	9.01840E-001
Rollers	9.50000E-004	9.62000E-003	9.40000E-003	1.00000E-005	5.90000E-004	5.40000E-004	0.00000E+000	1.15253E+000	1.15253E+000	3.70000E-004	0.00000E+000	1.16185E+000
Rubber Tired Dozers	2.09300E-002	2.19430E-001	8.07600E-002	1.70000E-004	1.06500E-002	9.80000E-003	0.00000E+000	1.50112E+001	1.50112E+001	4.85000E-003	0.00000E+000	1.51326E+001
Scrapers	4.65000E-003	5.35100E-002	3.50200E-002	8.00000E-005	2.08000E-003	1.92000E-003	0.00000E+000	6.65833E+000	6.65833E+000	2.15000E-003	0.00000E+000	6.71217E+000
Tractors/Loaders/ Backhoes	2.31300E-002	2.34740E-001	2.96520E-001	4.10000E-004	1.32400E-002	1.21800E-002	0.00000E+000	3.60195E+001	3.60195E+001	1.16500E-002	0.00000E+000	3.63107E+001
Welders	1.01760E-001	5.30440E-001	6.12390E-001	9.20000E-004	2.38400E-002	2.38400E-002	0.00000E+000	6.77594E+001	6.77594E+001	8.27000E-003	0.00000E+000	6.79662E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	2.48700E-002	1.71680E-001	2.17720E-001	3.60000E-004	1.00800E-002	1.00800E-002	0.00000E+000	3.06390E+001	3.06390E+001	2.02000E-003	0.00000E+000	3.06894E+001
Cement and Mortar Mixers	1.50000E-004	9.20000E-004	7.70000E-004	0.00000E+000	4.00000E-005	4.00000E-005	0.00000E+000	1.14570E-001	1.14570E-001	1.00000E-005	0.00000E+000	1.14870E-001
Cranes	4.58600E-002	5.20400E-001	2.29570E-001	6.90000E-004	2.14800E-002	1.97700E-002	0.00000E+000	6.08331E+001	6.08331E+001	1.96700E-002	0.00000E+000	6.13250E+001
Forklifts	2.46100E-002	2.27510E-001	2.42970E-001	3.20000E-004	1.53400E-002	1.41100E-002	0.00000E+000	2.82011E+001	2.82011E+001	9.12000E-003	0.00000E+000	2.84292E+001
Generator Sets	4.03500E-002	3.57930E-001	4.41350E-001	7.90000E-004	1.82000E-002	1.82000E-002	0.00000E+000	6.78248E+001	6.78248E+001	3.28000E-003	0.00000E+000	6.79067E+001
Graders	1.13200E-002	1.48110E-001	4.41800E-002	1.70000E-004	4.69000E-003	4.32000E-003	0.00000E+000	1.45531E+001	1.45531E+001	4.71000E-003	0.00000E+000	1.46708E+001
Pavers	6.20000E-004	6.49000E-003	7.26000E-003	1.00000E-005	3.10000E-004	2.90000E-004	0.00000E+000	1.03206E+000	1.03206E+000	3.30000E-004	0.00000E+000	1.04040E+000
Paving Equipment	4.80000E-004	4.85000E-003	6.35000E-003	1.00000E-005	2.40000E-004	2.20000E-004	0.00000E+000	8.94610E-001	8.94610E-001	2.90000E-004	0.00000E+000	9.01840E-001
Rollers	9.50000E-004	9.62000E-003	9.40000E-003	1.00000E-005	5.90000E-004	5.40000E-004	0.00000E+000	1.15253E+000	1.15253E+000	3.70000E-004	0.00000E+000	1.16185E+000
Rubber Tired Dozers	2.09300E-002	2.19430E-001	8.07600E-002	1.70000E-004	1.06500E-002	9.80000E-003	0.00000E+000	1.50112E+001	1.50112E+001	4.85000E-003	0.00000E+000	1.51326E+001
Scrapers	4.65000E-003	5.35100E-002	3.50200E-002	8.00000E-005	2.08000E-003	1.92000E-003	0.00000E+000	6.65833E+000	6.65833E+000	2.15000E-003	0.00000E+000	6.71216E+000
Tractors/Loaders/Backhoes	2.31300E-002	2.34740E-001	2.96520E-001	4.10000E-004	1.32400E-002	1.21800E-002	0.00000E+000	3.60195E+001	3.60195E+001	1.16500E-002	0.00000E+000	3.63107E+001
Welders	1.01760E-001	5.30440E-001	6.12390E-001	9.20000E-004	2.38400E-002	2.38400E-002	0.00000E+000	6.77594E+001	6.77594E+001	8.27000E-003	0.00000E+000	6.79661E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	9.79143E-007	9.79143E-007	0.00000E+000	0.00000E+000	1.30338E-006
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cranes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15069E-006	1.15069E-006	0.00000E+000	0.00000E+000	1.30452E-006
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.41838E-006	1.41838E-006	0.00000E+000	0.00000E+000	1.40700E-006
Generator Sets	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17951E-006	1.17951E-006	0.00000E+000	0.00000E+000	1.17808E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.37427E-006	1.37427E-006	0.00000E+000	0.00000E+000	1.36325E-006
Pavers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	9.61160E-006
Paving Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Rollers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.33234E-006	1.33234E-006	0.00000E+000	0.00000E+000	1.32165E-006
Scrapers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.48983E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.11051E-006	1.11051E-006	0.00000E+000	0.00000E+000	1.10160E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.18065E-006	1.18065E-006	0.00000E+000	0.00000E+000	1.17706E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			
No	Replace Ground Cover of Area Disturbed	PM10 Reduction		PM2.5 Reduction			
No	Water Exposed Area	PM10 Reduction		PM2.5 Reduction		Frequency (per day)	

No	Unpaved Road Mitigation	Moisture Content %		Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Architectural Coating	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Roads	0.02	0.01	0.02	0.01	0.00	0.00
Grading	Fugitive Dust	0.13	0.07	0.13	0.07	0.00	0.00
Grading	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	Fugitive Dust	0.01	0.00	0.01	0.00	0.00	0.00
Site Preparation	Roads	0.00	0.00	0.00	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00
Hearth	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.38	0.54	0.72	0.70	0.78	0.84	0.00	0.88	0.88	0.63	0.00	0.88
Natural Gas	4.76	4.28	4.37	0.00	2.33	2.33	0.00	4.12	4.12	8.33	0.00	4.12
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	20.00	20.00	20.00	20.00	20.00	20.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting: Low Density Suburban

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00	0.00	0.00	
No	Land Use	Increase Diversity	-0.01	0.13		
No	Land Use	Improve Walkability Design	0.00	0.00		
No	Land Use	Improve Destination Accessibility	0.00	0.00		
No	Land Use	Increase Transit Accessibility	0.25	0.00		
No	Land Use	Integrate Below Market Rate Housing	0.00	0.00		
	Land Use	Land Use SubTotal	0.00			

Yes	Neighborhood Enhancements	Improve Pedestrian Network	1.00	Project Site		
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.01			
No	Parking Policy Pricing	Limit Parking Supply	0.00	0.00		
No	Parking Policy Pricing	Unbundle Parking Costs	0.00	0.00		
No	Parking Policy Pricing	On-street Market Pricing	0.00	0.00		
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00	0.00		
No	Transit Improvements	Expand Transit Network	0.00	0.00		
No	Transit Improvements	Increase Transit Frequency	0.00		0.00	
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.01			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"	3.00			
No	Commute	Workplace Parking Charge		0.00		
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program	5.00			
	Commute	Commute Subtotal	0.00			

No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.01			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
Yes	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	250.00
No	Use Low VOC Paint (Residential Exterior)	250.00
No	Use Low VOC Paint (Non-residential Interior)	250.00
No	Use Low VOC Paint (Non-residential Exterior)	250.00
No	Use Low VOC Paint (Parking)	250.00
No	% Electric Lawnmower	0.00
No	% Electric Leafblower	0.00
No	% Electric Chainsaw	0.00

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
Yes	Exceed Title 24	7.00	
No	Install High Efficiency Lighting		
Yes	On-site Renewable		100.00

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
Yes	Apply Water Conservation on Strategy	20.00	20.00
No	Use Reclaimed Water	0.00	0.00
No	Use Grey Water	0.00	
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction	0.00	
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape	0.00	0.00

Solid Waste Mitigation

Mitigation Measures	Input Value

Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

APPENDIX B

BIOLOGICAL SURVEY REPORT

Eco Synthesis
SCIENTIFIC & REGULATORY SERVICES, INC.

Estates Drive Site

Biological Survey Report

Prepared by:

Adrian Juncosa, PhD

Prepared for:

JK Architecture + Engineering
165 River Road, Suite 1
Tahoe City, CA 96145

Report Date:

September 18, 2020

Table of Contents

1 Introduction ... 1
1.1 Site and Survey Details ... 1
1.2 Site Location and Setting ... 1
2 Methods ... 3
2.1 Field Survey ... 3
2.2 Mapping ... 3
2.3 Investigator Qualifications ... 3
3 Results ... 4
3.1 Upland Habitats ... 4
3.2 Wetlands ... 4
3.3 Special Status Species ... 6
4 Impact Assessment and Mitigation ... 13
4.1 Project Description ... 13
4.2 Potential Impacts ... 13
4.3 Other Regulatory Consistency ... 14
5 References ... 15

Figures

Figure 1. Project location ... 2
Figure 2. Habitat map ... 5

Table

Table 1. Special-status species recorded in the CNDDB from project region ... 7

Appendices

Appendix A. Plant species observed on the project site.

1 INTRODUCTION

1.1 Site and Survey Details

Site name: Estates Drive

APN: 019-450-047-000 (portion)

Area: 2.06 acres

Location: Study area is within Section 14, T. 17 N, R. 16 E

Latitude/longitude: center of site is at approximately 39.3236 N, -120.16920 W.

Address: 10020 Estates Drive, Truckee, CA 96161

Study dates: October 9, 2019, July 17, 2020, August 26, 2020

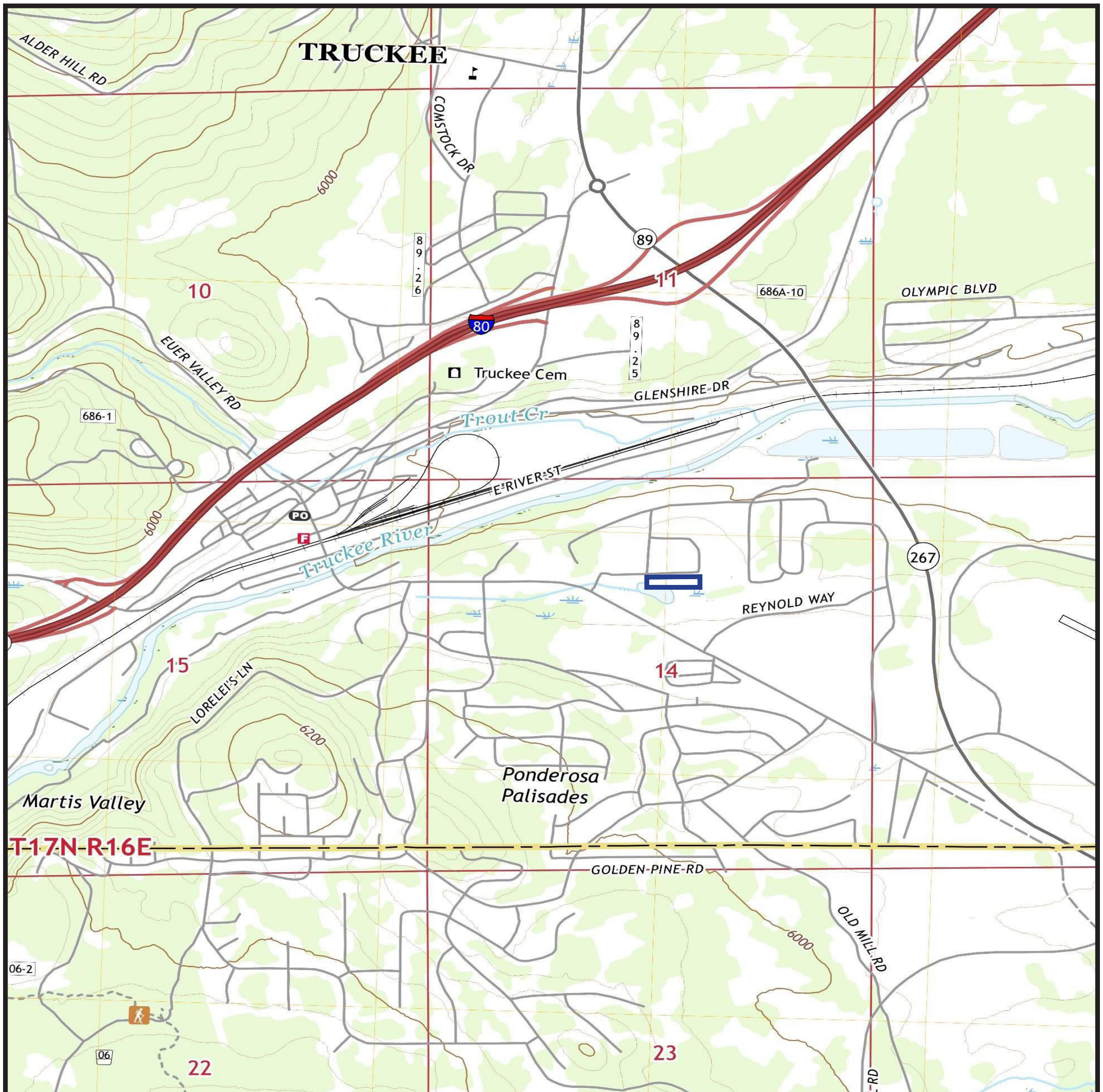
Report date: September 18, 2020

Biologist: Adrian Juncosa, Ph.D.

1.2 Site Location and Setting

The study site is adjacent to multi-family residential areas across Estates Drive to the north, and is abutted on the east, south, and west by undeveloped land. Some of this is ruderal and unvegetated (disturbed), and other areas, particularly on the south, support fairly extensive wet meadows. More widely, the site is located in a generally urban and urban park/recreational (golf course) area.

The study area lies in the Sierra Nevada ecoregion (Level III), Northern Sierra Upper Montane Forests (Level IV). However, even the Level IV regions are very broad biological cagetories encompassing an amount of species and ecological process diversity that is not useful for environmental review of individual small project sites. Further discussion of habitat mapping is provided under Methods, below.



EcoSynthesis
SCIENTIFIC & REGULATORY SERVICES INC

Scale: Approximately 1:24,000 (1″=2,000′)

North

Estates Drive Site

Wetland Delineation

Figure 1. Location Map

Project site (approximate)

USGS 7.5-minute Truckee quadrangle

2 METHODS

2.1 Field Survey

The site was traversed by both meandering and more-or-less linear transects spaced no more than 25-30 feet apart to identify any notable habitat types or elements that had not drawn attention at the time of the wetland delineation (2019), and to develop a floristic plant list.

Plant species observed were identified by sight or by reference to Baldwin et al. (2012), and were noted on a proprietary checklist of the local flora. Birds were identified by sight, calls or song, or fallen feathers. Identifications and nomenclature follows that used in Sibley (2000). Mammals were identified by direct observation or by sign (scat, tracks, or characteristic burrows). Wildlife observations were opportunistic only and were not intended to be a comprehensive wildlife survey of the study area.

The site was studied on October 9, 2019, July 17, 2020, and August 26, 2020.

2.2 Mapping

Wetland polygons were derived from a formal three-parameter wetland delineation that had been completed earlier. Remaining site features were mapped from satellite imagery informed by the field work.

2.3 Investigator Qualifications

The site was studied and this report written by Adrian Juncosa, Ph.D. (Botany; Duke University). Since 1988, he has completed over 200 botanical, wildlife, and general biological site studies, impact analyses, mitigation, and monitoring projects in central and northern California, with particular expertise in the foothills and montane Sierra Nevada, where he has been based since 1995.

3 RESULTS

Vegetation types that are found within the study area are depicted in Figure 2. Appendix A includes a list of plants that were observed on the site.

3.1 Upland Habitats

The site has been substantially altered by human actions, probably since early in the history of the Town of Truckee. Anthropogenic alterations have included grading, ditching for drainage, and probably grazing and cultivation of pasture species.

Vegetation is named according to the Manual of California Vegetation, 2nd edition.

3.1.1 CRESTED WHEATGRASS RANGELANDS

Agropyron cristatum semi-natural herbaceous stands

Almost the entirety of the upland area on site supports this vegetation type, which is overwhelmingly dominated by crested wheat grass, a non-native pasture species widely seeded in Great Basin rangelands. Other common species include Sierra tarweed (*Madia glomerata*), slender cinquefoil (*Potentilla gracilis*), yarrow (*Achillea millefolium*), one-sided bluegrass (*Poa secunda*), and additional grasses in portions of the wheatgrass stands close to the Freshwater Emergent Wetlands (beardless wildrye [*Elymus triticoides*], meadow barley [*Hordeum brachyantherum*]). Other notable species include California poppy (*Eschscholtzia californica*), which is not native to Truckee but grows well and persists after being seeded. The dominance of species not native to the Truckee area is indicative of a site that has been substantially altered from its original native condition.

3.1.2 BERMS

These are not a vegetation type per se, but represent a distinctive land cover within the study site. These berms are comprised of boulders and soil, with variable vegetation (or in some areas, lack of very much vegetation at all). Probably the single most dominant species is poison hemlock (*Conium maculatum*). A few (very few) shrubs are present, of choke cherry and gooseberry.

3.2 Wetlands

3.2.1 FRESHWATER EMERGENT WETLAND

Most of the wetlands present on the site form a single contiguous polygon, enclosing patches of somewhat differing emergent wetland vegetation. One patch toward the western end of the study site (at DP-2 in Figure 2) supports some species that are typical of vernal pools, and dries out in the springtime. Another patch toward the eastern end of the site (at DP-5) is vegetated by a near monoculture of spikerush, and dries out sometime early in the summer. The elongate, ditch-like wetland area along the southern parcel boundary supports mostly sedge vegetation, and has surface water throughout most or all of the summer (probably varying from year to year), but also ultimately goes dry in the autumn, at least in 2020. The very small (approximately 0.004 acre, each) isolated wetland patches support relatively low diversity vegetation (unsurprisingly given their small area).

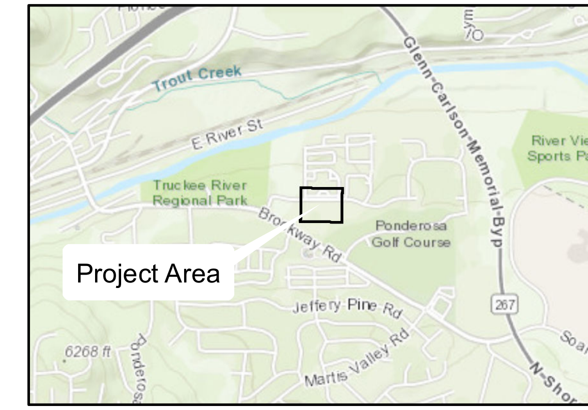
EcoSynthesis
SCIENTIFIC & REGULATORY SERVICES INC

DIGITAL MAPPING SOLUTIONS
INTEGRATING DATA TO CREATE SPATIAL KNOWLEDGE

Estates Drive Site Biological Study

Date: 9/12/2020

Figure 2. Wetland and Habitat Map



Upland Habitats

Crested Wheatgrass Rangeland:

Dominated by *Agropyron cristatum*, mixed with variable components of native and other non-native species. The few pines are <6" dbh.

Berm

Composed of boulders, cobble, and soil with sparse to moderate vegetation cover, largely non-native. Portions of the berms extend within delineated wetlands.

0 25 50 75 100 Feet

Scale 1:700 (1 inch = 58 feet)

N

Wetland Delineation Legend

- Data Point
- Reference Corner Point
- Study Area (2.0569 ac)
- FEW: Freshwater Emergent Wetlands (0.4406 ac)
- Out of Study Area
- Parcels (Town of Truckee)

Notes

Imagery Source: Googe Pro, image date 2018-06-07; 2-foot contours provided by Town of Truckee from 2016 LiDAR, parcels and roads from the Town of Truckee online Open Data; all other data provided by EcoSynthesis. Projection: State Plane Calif. Zone II, NAD83, feet. Grid showing latitude and longitude. Service Layer Credits: Source: Esri

Map created by www.digitalmappingsolutions.com on 2/12/2020.

A substantial berm separates most of the site from the long narrow wetland along the southern boundary, although surface drainage could flow from the center of the site to either the western or eastern patches of wetland noted above, and thence to the southern boundary wetland area. There is another even more substantial berm separating the ditch-like wetland from the off-site wetland restoration area. In other words, there is no direct connection between the two except in the area east of the present study area, which is downslope from the restoration area. Water from both the present study site and from the restoration area flows northeast away from both sites.

To the best of my ability to determine from field observation and lidar topography, there is no surface flow connection at any time of year between the wetlands of the Estates Drive site and the restoration site and the Truckee River. This connection appears to be interrupted by higher topography within the fenced TTSA area containing what appears to be an overflow basin intended only to impound water under exceptional surface water circumstances. However, I have no direct information about this basin, nor was I able to directly examine the area within the fence. If the understanding expressed here is correct (subject to verification or revision), it would mean that all of the extensive wetlands present on both sides of Brockway Road from Ponderosa Drive through the low topography north of Estates Drive between Martis Drive and Crestview Drive would be isolated wetlands.

3.3 General Wildlife

Unsurprisingly for a small study area in urban surroundings, and given that species-specific surveys were not carried out, very few wildlife species were observed or detected by sign within the site itself. These included three birds (common raven, dark-eyed junco, mountain chickadee), and distinctive burrows suggestive of the presence of one or more ground squirrels (probably Belding's ground squirrel). No trees suitable for raptor or owl nesting are present, nor suitable day roosting sites for special status or other bat species. No deer sign was observed, and the site's habitats, location, and mostly urbanized surroundings make it unsuitable for use as a deer migratory corridor or fawning area.

3.4 Special Status Species

For this report, we consulted the CNDDB BIOS system for relevant occurrences, mostly those within about five miles of the site. These results are presented in Table 1. The greater project region includes many habitat resources such as conifer woodlands and rivers that are not represented within the site. Also, many of the special-status species, both plants and wildlife, which resulted from the CNDDB query are found in wetland and aquatic habitats, which the proposed development proposes to avoid. Table 1 includes these species, but indicates that their habitat is not found within the development footprint, though it may occur within the study site. Additional text on several species is provided below.

Site surveys sufficient to provide a floristic botanical survey were conducted, and no special status species of plants were observed. Opportunistic wildlife observations were made in the course of wetland and botanical field work on site, but no species-specific surveys targeted at any special status wildlife species were conducted. Notwithstanding the context of these limitations, no special status species of wildlife were observed during the present study. (See below for discussion of willow flycatcher reported on an adjacent parcel.)

Table 1. Special-status species recorded by the CNDDB within five miles of the Estates Drive study site. Animals are listed roughly according to phylogenetic relationships; plants are listed alphabetically by scientific name. See text for notes on species not included in this table and additional information on species for which suitable habitat is present. Many species tracked by CNDDB have no regulatory status, or have status applicable only within federal lands (e.g., U.S. Forest Service sensitive species), and do not necessarily meet the threatened/endangered criteria applicable under CEQA guideline 15380, but these are included for completeness. For this table, "Project Area" means the development footprint, not the entire study area. Accordingly, "No" is entered for any species for which suitable habitat may occur in wetlands, which will remain undeveloped.

Status definitions (Federal status/State status/Rare Plant Ranking):

E or T, listed as endangered or threatened under federal or state Endangered Species Act;

C, candidate for listing as endangered or threatened;

SC, species of special concern; FP, fully protected (California DFW);

List 1B, considered rare, threatened or endangered by CDFW and normally regarded as meriting consideration under CEQA Guideline 15380; List 2, rare, threatened, or endangered in California but more common elsewhere; effects on List 3 (insufficient information) and List 4 (watch list) species are not normally considered to be significant except on a case-by-case basis.

Species	**Status (US/Ca/ RPR)**	**Microhabitat/Occurrence**	**Suitable Habitat in Development Footprint?**	**Other Information**
MAMMALS				
Sierra Nevada red fox *Vulpes vulpes necator*	-/T	Meadows with adequate small mammal prey and friable soils for burrowing.	No	No mesic, high-biomass meadows within site; soils are very rocky.
Sierra Nevada mountain beaver *Aplodontia rufa californica*	-/SC	Wet areas with forb-rich wetland vegetation; streamsides and wetland seeps.	No	Perennially saturated forb-dominated seeps not found within study area.
Sierra Nevada showshoe hare *Lepus americanus tahoensis*	-/SC	Coniferous forest with shrub cover.	No	Would be expected occasionally to forage within the site, possible nesting areas within riparian thickets.
Porcupine *Erethizon dorsatus*	none	Forest, woodland, shrubland. Many regional records, often roadkill.	No	No current status but numbers believed to be declining.

BIRDS				
Northern goshawk *Accipiter gentilis*	-/SC	High-canopy-cover coniferous forest without nearby human disturbance (within ¼ mile).	No	
Bald eagle *Haliaeetus leucocephala*	Delisted/ E, FP	Nests and winters in large trees or snags at large bodies of water; forages for fish and waterfowl.	No	
Osprey *Pandion haliaetus*	(watch list)	Snags or large trees adjacent to lakes.	No	
Willow flycatcher *Empidonax traillii*	-/E	Willow thickets near perennial or near-perennial surface water.	No	Suitable habitat is present off site, but not within study area. See text .
Yellow warbler *Setophagia petechia (brewsteri)*	-/SC	Riparian forest and shrubland, nesting records in region are close to water.	No	
AMPHIBIANS				
Sierra Nevada yellow-legged frog *Rana sierrae*	E/T	Lakes, ponds, meadow streams, isolated pools, and sunny riverbanks.	No	No perennial water bodies within study area.
Southern long-toed salamander *Ambystoma macrodactylum sigillatum*	-/SC	Lakes, ponds for breeding, adults utilize underground or covered areas in mesic areas.	Marginal	Nearby pond is surrounded by urban development; terrestrial use likeliest under rocks of berms, immediately adjacent to wetlands.
FISHES				
Mountain sucker *Catostomus platyrhynchus*	-/SC	Perennial streams	No	
Lahontan cutthroat trout *Oncorhynchus clarkii henshawi*	T/-	Perennial streams without non-native trout species.	No	
Mountain whitefish *Prosopium williamsoni*	-/SC	Perennial streams	No	

INVERTEBRATES				
Morrison's bumblebee *Bombus morrisoni*	none	Open dry scrub. Requires flower diversity for season-long foraging.	No	Record is from 1915 in general vicinity of Truckee.
Western bumblebee *Bombus occidentalis*	-/CE	Open grassy areas with season-long foraging.	Marginal	Most of known food plants absent from site. 1958 record at Boca.
Western pearlshell *Margaritifera falcata*	none	Low velocity flowing water.	No	Truckee River about six miles east.
Sheldon's amphipod *Stygobromus sheldoni*	none	Springs.	No	5-mile (im)precision record centered at UC Sagehen station.
PLANTS				
Three-tip sagebrush *Artemisia tripartita*	-/-/2B	Rocky slopes and exposed ridges; one regional occurrence at meadow edge.	Yes	Potentially suitable habitat was surveyed; species was not found.
Common moonwort *Botrychium lunaria*	-/-/2B	Wet meadows and seeps.	No	5-mile (im)precision record centered at UC Sagehen station.
Donner Pass buckwheat *Eriogonum umbellatum* var. *torreyanum*	-/-/1B	Open areas on specific type of volcanic soils substrate.	Yes (marginal)	Potentially suitable habitat was surveyed; species was not found.
Plumas ivesia *Ivesia sericoleuca*	-/-/1B	Vernally moist flats and areas just outside meadow wetlands.	Yes	Potentially suitable habitat was surveyed; species was not found.
Santa Lucia dwarf rush *Juncus luciensis*	-/-/1B	Vernal pools, wet meadow, streamsides.	No	.
Robbins' pondweed *Potamogeton robbinsii*	-/-/1B	Perennial lakes, ponds.	No	
Alder buckthorn *Rhamnus alnifolia*	-/-/2	Wet meadow edges, seeps, stream sides; obligate wetland species in California.	No	No woody riparian habitat within site; no *Rhamnus* species present.
Tahoe yellow cress *Rorippa subumbellata*	C/E/1B	Known only from sandy lakeshore habitat (Lake Tahoe).	No	Truckee record is very old (19th c.) and probably not here.
Marsh skullcap *Scutellaria galericulata*	-/-/2	Wetland (wet meadow) species.	No	No wet meadows.

3.4.1 WILDLIFE

Willow Flycatcher

Willow flycatcher is a candidate for state listing as endangered, which nests in willow or similar riparian shrublands with surface water (ponds or very wet marshes; not merely mesic grass or sedge meadows) present throughout the breeding season. Most records in the greater Truckee region are in relatively extensive riparian habitat. Birds of this species in migration use generally similar habitats as they do for nesting (Sedgwick, 2020).

A comment to Town staff from Truckee River Watershed Council references an observation of willow flycatcher (*Empidonax traillii*) on the adjoining wetland restoration site south of the study site. We have no other information about this observation, which would be necessary in order to fully assess its accuracy and significance for environmental review of the Estates Drive parcel project.

Willow flycatcher is in a genus of birds (*Empidonax*) that is notoriously difficult to identify, not only to species but even to genus. The authoritative Birds of the World website maintained by Cornell Laboratory of Ornithology states "As are most members of the genus Empidonax, Willow Flycatcher is difficult to identify in the field, and without vocal cues is nearly impossible to distinguish from Alder Flycatcher, whose habitats often overlap those of the Willow." The vocal cues referred to in this quote are ordinarily only made by birds during the breeding season, on a breeding territory, so a visual-only observation of the species outside that season would usually be expected require additional auditory confirmation. However, some birds do sometimes vocalize outside the nesting season, so auditory confirmation in other seasons can be absolutely ruled out.

For the purposes of this report, it is reasonable to assume that the reported identification was made with the benefit of auditory evidence, and during the nesting season, otherwise it would have been noted as a possible observation based on visual observation only.

Suitable nesting habitat for willow flycatcher may occur in contiguous willow clumps on the south side of the off-site pond. The best thickets on the site appear to be located a minimum of approximately 140 and 230 feet away from the boundary of the Estate Drive site, with more marginal willows (much smaller shrubs, not continuous) coming as close as about 100 feet off site. Given that a seasonal avoidance distances that are commonly used to ensure non-disturbance of nesting birds are 50 or 100 feet for small passerine birds, these sites would not be expected to be adversely affected by disturbance from the Estates Drive site, even during construction and less so during post-construction operation.

One isolated willow shrub about 16 feet in diameter is present between the off-site berm and the pond, with the closest point of the shrub canopy only about 15 feet from the parcel boundary. However, this would be marginal nesting habitat anywhere, and given the presence of far superior nesting habitat on the other sides of the pond, is extremely unlikely to be used as a nesting site by willow flycatcher.

The environmental review significance of birds in migration cannot be assessed without more regional evaluation than was included in the scope of the present study. However, birds not defending a territory or maintaining a nest with eggs or young are overall less likely to the sensitive to disturbance.

Sierra Nevada Yellow-legged Frog (SNYLF)

This species breeds in perennial ponds or generally slow moving flowing water, and is highly aquatic, rarely straying more than a few feet from water except in special cases such as very wet marshes around or intervening between breeding ponds. There is a suitable breeding pond immediately off site, though this is on the same restoration property about which TRWC commented that there was use of the site by willow flycatcher. Without the opportunity to confer with TRWC staff, we tentatively presume that, if SNYLF were present there, this would have been mentioned. However, even absent confirmation that the species is not known to use the adjacent site, if it were present, the only habitat within the study that has a sufficiently lengthy period of inundation is the ditch-like wetland along the southern parcel boundary. This feature is outside the project development footprint.

Southern Long-toed Salamander

This is species whose range includes a wide variety of habitats from forest to semi-arid shrubland or grassland. It breeds in perennial or, at least, very long-seasonal water bodies, and the larvae are aquatic. Unlike SNYLF, it does not remain in or immediately adjacent to the pond as an adult, instead, it exits and lives in moist underground sites such as under logs or boulders with moist soil. Although many salamanders utilize rodent burrows during non-breeding adulthood, to quote Stebbins (2010) about the long-toed salamander: "Found in piles of rotten wood, under bark, rotting logs, rock, and other objects near quiet water of ponds, lakes, or streams." This would indicate that the suitable terrestrial habitat within the Estates Drive site - even under the assumption that the off-site pond is breeding habitat, which is of limited likelihood itself due to the urban setting - would be under the boulders that form the berm adjacent to the wetland along the southern property boundary. A very few old ground squirrel burrows do exist in a rather dry portion of the site which given the notably mesic requirements of non-breeding adults as described in Stebbins and other sources, seem marginally suitable or entirely unsuitable for the species.

Morrison's and Western Bumble Bees

These species nest underground, or in or under organic material on the ground; thus, theoretically suitable nesting habitat exists almost everywhere that is not paved. However, the essential habitat characteristic for these bees is the presence of abundant flower resources of reasonably high species diversity, so that there are foraging opportunities throughout the entire season of activity (Goulson, 2010). The study site has a very limited number of such forb or shrub species, and almost none of the highly preferred genera used by these species (Williams, 2014).

Bumble bees are known to be declining steeply in numbers, and the western bumble bee is a candidate for state endangered status. Reasons for their decline include loss of diverse herbaceous and shrub habitat, use of certain pesticides, and, perhaps above all, a non-native parasite.

3.4.2 PLANTS

Potentially (albeit probably only marginally) suitable habitat occurs within the study site for three special status plant species. This habitat was surveyed at a time of year when the plants would be evident and definitively identifiable, and none of these species were found.

Three-tip Sagebrush

This species is identifed by its leaves, not flower or fruits, so the plant is definitively identifiable at any time from approximately April through October or even November. Nearly all of the regional records are on high, exposed rocky ridges and slopes, however, there is one record in the Lake Van Norden area just outside the edge of a meadow (not found in CNDDB but there is a herbarium specimen, and I have seen the plant in the reported location). No three-tip sagebrush was found at Estates Drive.

Donner Pass Buckwheat

This plant grows on a rather specific type of volcanic-derived soil, though its exact characteristics are not yet precisely known. Most of the occurrences are on steep slopes or open ridges, but there are records in western Truckee in a site that may be sufficiently similar to the Estate Drive to consider that it is potentially suitable habitat. Donner Pass buckwheat is formally keyed out using inflorescences, which are relatively persistent after the July to September flowering dates (later ones at higher elevations). However, it is also just as definitively identifiable from leaves alone, among all regional *Eriogonum* species. No Donner Pass buckwheat was found at the study site.

Plumas Ivesia

This species is found in several locations around Truckee, in modest to major occurrences (>10,000 plants) in Martis Valley and on the Waddle Ranch open space area, and in an even more extensive and populous occurrence at Sardine Meadow, north of Stampede Reservoir (many thousands of plants over hundreds of acres). Scattered occurrences of Plumas ivesia are found throughout parts of Truckee, even in partially disturbed sites within otherwise urbanized areas. It occurs most often on volcanic soils in meadows that are not quite wetlands, similar to portions of the study site. However, no plants of Plumas ivesia were found.

4 IMPACT ASSESSMENT AND MITIGATION

4.1 Project Description

The proposed project is residential development with roads and other infrastructure. The characteristic of the project footprint that is the most important for evaluation of potential biological impacts is that the layout avoids direct fills of any of the wetlands on site.

4.2 Potential Impacts

4.2.1 SPECIAL STATUS SPECIES

As discussed in Section 3.4, no suitable habitat for most of the regional special status wildlife species is found within the study site, or is found within it only in areas that are proposed to be avoided by proposed development. An observation of willow flycatcher is reported from the restoration parcel to the south, though, as discussed, the most plausible nesting area is sufficiently far from the present study site that disturbance from construction and occupation of the project would be unlikely to have a significant adverse effect.

Suitable habitat for three special status plant species is present within the development footprint, but none of those species were found during floristic botanical survey of the site.

4.2.2 WETLANDS

Although the project proposes to avoid direct fills of any wetland areas, with any ground disturbance and construction of residences or commercial or industrial areas, there is potential for adverse indirect impacts on wetlands. These fall into two categories: disturbance from human activity (noise, movement, lighting) and alterations of water quality or quantity.

The entire site already lies within 150 feet of an existing moderately busy local road, so additional disturbance resulting from the proposed project would not be reasonably expected to be significant, beyond the existing conditions.

All construction projects in the area are subject to during-construction stormwater requirements with respect to control of sediment within the construction area, so that it cannot enter local waters, whether tributary to the Truckee River or not.

Engineering plans for permanent protection of water quality and quantity in the wetlands outside the project footprint would not normally be available at this stage of project application, so we are unable to judge whether mitigation is inherent in the project design or needs to be identified as a specific project condition of approval. Accordingly, this report recommends that the project design incorporate features to contain urban runoff (e.g., from roads and parking areas), treat it to remove urban pollutants, and infiltrate into edge-of-footprint areas, which may be surface or underground facilities.

4.3 Other Regulatory Consistency

California Fish and Game Code (FGC)

Various sections of the FGC prohibit take of protected species. Fully protected species are included in the CNDDB and are properly treated as special-status species in CEQA analysis. Such species do not occur on the study site, therefore these sections are not applicable to the project.

Section 3503.5 prohibits take or possession of raptors, owls, or the destruction of eggs or occupied nests during the nesting season. No

Migratory Bird Treaty Act

Loss of limited numbers of common species of plants or animals is not a significant impact under current CEQA guidelines pertaining to biological resources. However, the MBTA and FGC §3513 prohibit take of migratory birds, which is defined to include destruction of active nests (presumed to contain eggs or nestlings). The implementation of the MBTA's provisions has changed in recent years and may change yet again prior to construction of the project, so it is prudent to assume that compliance with the nesting bird protections of both the federal and state acts requires that no grading, brush clearing (mechanized or otherwise), or tree removal occur during the nesting season without a nesting bird survey that confirms that no occupied nests are present, or contingent mitigation actions if nests are present.

or ground surface disturbance (any form of grading) are to occur between May 1 and August 15, this report recommends that nesting bird surveys should occur between 7 and 14 days prior to initiation of construction. Nesting surveys for small birds are only fully effective if carried out between dawn and 11 AM; many species become inactive during mid-day.

Survey work should cover all habitat within 100 feet of vegetation removal or ground disturbance, or a greater distance in the case of raptor/owl survey, a distance of 500 feet from the limit of disturbance. In the event that nests are identified, temporary non-disturbance zones should be the same width as the survey buffer (100-500 feet, depending on the species found to be nesting), and a revisit by the biologist, with confirmed observations of fledglings in the nest vicinity, would be required prior to vegetation removal or soil disturbance, unless this were to be delayed past August 15.

5 REFERENCES

Baldwin, et al. 2012. *The Jepson Manual: Vascular Plants of California (Second Edition)*. University of California Press, Berkeley, California.

California Department of Fish and Wildlife (CDFW). 2018. Southern long-toed salamander. California Wildlife Habitat Relationships System, CDFW. Update of life history account.

CDFW. 2020. *California Natural Diversity Data Base*. Biogeographic Data Branch, Sacramento, California. Digital data base accessed by BIOS online application (CDFG).

California Native Plant Society (CNPS). 2001. *Inventory of Rare and Endangered Plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, editor. California Native Plant Society, Sacramento, California. Updated online edition also consulted.

Goulson, D. 2010. *Bumblebees: Behavior, Ecology, and Conservation, 2nd edition.* Oxford University Press, Oxford, UK.

Sedgwick, J. A. (2020). Willow Flycatcher (*Empidonax traillii*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, New York. Accessed online at https://doi.org/10.2173/bow/wilfly.01.

Sibley, D. A. 2000. *National Audubon Society - The Sibley Guide to Birds.* Alfred Knopf, New York.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians, 3rd edition.* Houghton Mifflin Co., Boston, Massachusetts.

Williams, P., R. Thorp, L. Richardson, and S. Colla. 2014. *Bumble Bees of North America.* Princeton University Press, Princeton, NJ.

Appendix A:

Estates Drive Botanical Survey List

Appendix A. List of plant species observed at the Estates Drive study site in midsummer and autumn site visits. A few additional spring ephemeral species would be added to the list in the event of springtime survey work. Survey focus emphasized potential development areas but include most species present in wetlands as well, though these will be avoided by the proposed development. Plants are listed alphabetically by genus name, not separated by families. Nomenclature follows the Jepson Manual (TJM; Baldwin et al., 2012) with some synonyms from the Flora of North America.

Achillea millefolium	yarrow	
Acmispon americanum	American lotus	
Agoseris glauca var. *monticola*	false dandelion	
Agropyron cristatum	crested wheat grass	Dominant dry meadow species, non-native.
Agrostis exarata	spike bent grass	
Agrostis gigantea	bent grass	
Carex nebrascensis	Nebraska sedge	
Carex praegracilis	clustered field sedge	
Chenopodium sp.	lamb's quarters	
Cirsium andersonii	Sierra thistle	
Cirsium vulgare	common (bull) thistle	
Conium maculatum	poison hemlock	
Deschampsia danthonioides	annual hair grass	
Eleocharis palustris	creeping spikerush	
Elymus elymoides	squirrel tail grass	
Elymus hispidus (Thinopyrum intermedium)	pubescent or intermediate wheat grass	
Elymus trachycaulus	slender wheat grass	
Elymus (Leymus) triticoides	beardless wild-rye	
Epilobium brachycarpum	tall annual willowherb	
Epilobium ciliatum	fringed willowherb	
Eschscholtzia californica	California poppy	
Festuca sp.	fescue	Probably *F. californica* but does not perfectly match all of its characteristics; possibly a non-native seed species not represented in TJM.
Gayophytum diffusum	spreading groundsmoke	
Geum macrophyllum	big-leaved avens	
Hordeum brachyantherum	meadow barley	
Juncus (arcticus var.*) balticus*	Baltic rush	

Lactuca serriola	prickly lettuce	
Lepidium densiflorum	peppergrass	
Madia glomerata	Sierra tarweed	
Navarretia intertexta var. *propinqua*	near navarretia	
Navarretia (leucocephala)	whitehead navarretia	
Penstemon rydbergii	Rydberg's beardtongue	
Pinus contorta ssp. *murrayana*	lodgepole pine	Small trees only (<6" dbh)
Pinus jeffreyi	Jeffrey pine	Small trees only (<6" dbh)
Plagiobothrys sp.	popcorn flower	
Poa pratensis	Kentucky bluegrass	
Poa palustris	swamp (fowl) bluegrass	
Poa secunda	one-sided bluegrass	
Polygonum aviculare	prostrate knotweed	
Polygonum douglasii	Douglas' knotweed	
Polygonum polygaloides	milkwort knotweed	
Potentilla gracilis	slender cinquefoil	
Poteridium annuum	western burnet	
Poterium sanguisorba	garden burnet	
Prunus virginiana var. *demissa*	choke cherry	
Psilocarphus sp.	woolly marbles	
Purshia tridentata	antelope bitterbrush	
Ribes (inerme)	gooseberry	
Rumex salicifolius	willow dock	
Sisymbrium altissimum	tumble mustard	
Symphyotrichum spathulatum	western aster	
Taraxacum officinale	dandelion	
Urtica dioica ssp. *holosericea*	stinging nettle	
Verbascum thapsus	woolly mullein	

APPENDIX C

WETLAND DELINEATION, WETLAND ANALYSIS, AND SUPPLEMENTAL IMPACT ANALYSIS

EcoSynthesis
SCIENTIFIC & REGULATORY SERVICES, INC.

Estates Drive Site

Wetland Delineation

Prepared by:

Adrian Juncosa, PhD

Prepared for:

JK Architecture + Engineering
165 River Road, Suite 1
Tahoe City, CA 96145

Report Date:

February 5, 2020

Contents

Summary iii

1 INTRODUCTION 1

1.1 Contact Information 1

1.2 Site Information 1

2 METHODS 4

2.1 Background Information 4

2.2 Field Methods 4

3 RESULTS 6

3.1 Wetland Criteria 6

3.2 Discussion of Wetland Determination Data Points 111

3.3 Types of Waters Observed 111

3.4 Commerce and Recreation 111

4 REFERENCES 133

Figures

1. Site location 2
2. National Wetlands Inventory 7
3. Soils 9
4. Preliminary aquatic resources delineation map 12

Tables

1. Plant species encountered at data points 6
2. Types and acreages of waters 14

Appendices

A. Photographs

B. Wetland Determination Data Sheets

Summary

This report is a preliminary delineation and description of aquatic resources within the Estates Drive Site, a study area of approximately two acres in Placer County, California. It includes the information needed for verification by the U.S. Army Corps of Engineers by means of either a preliminary or an approved jurisdictional determination, and for other environmental review and permitting purposes.

Determinations at possible wetland areas were carried out according to the 1987 Corps of Engineers (Corps) Wetlands Delineation Manual and 2010 Regional Supplement for the Western Mountains, Valleys, and Coast Region, Version 2.0.

The following areas of aquatic features were found within the study area:

Freshwater Emergent Wetland 0.4406 acre

As best as could be determined from available information, water draining from the site (if and when it does so) ultimately infiltrates before flowing to the Truckee River or any feature that is tributary thereto. All wetland features within the site are therefore isolated waters not falling under the jurisdiction of the (federal) Clean Water Act.

1 INTRODUCTION

1.1 Contact Information

Owner:

Delineation: EcoSynthesis Scientific & Regulatory Services, Inc.
16173 Lancaster Place
Truckee, CA 96161

Contact:	Adrian Juncosa
Telephone:	(530) 412-1601
E-mail:	ajuncosa@ecosynthesis.com

1.2 Site Information

Project name: Estates Drive Site

Corps Number: no number assigned yet

APN: 019-450-047-000 (portion)

Study Area: Approximately 2.06 acres

Location: Study area is within an unsectioned portion of T. 10 N, R. 1 E

Latitude/longitude: center of site is at approximately 39.3236 N, -120.16920 W.

Address: 10020 Estates Drive, Truckee, CA 96161

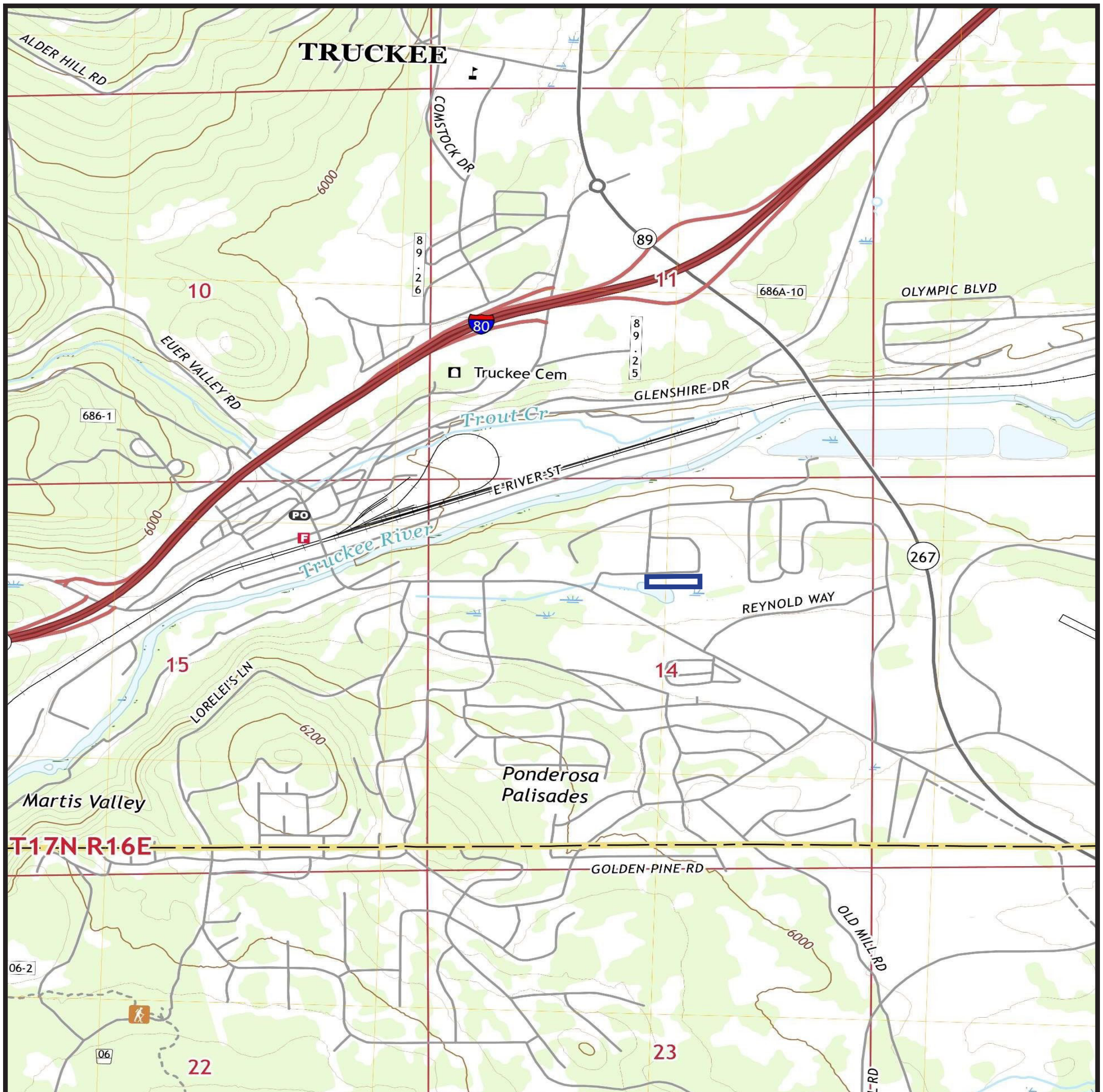
Study dates: Several dates in summer of 2019; data points studied on October 9, 2019

Report date: February 5, 2020

Driving Directions from Sacramento:

Travel I-80 east, exit at Central Truckee, turn right at the end of the off ramp, and exit from the roundabout at the first opportunity. Turn left on West River Street, go approximately 0.5 mile and turn right onto Brockway Road.

Follow this approximately 0.6 mile, past one traffic signal, and turn left onto Estates Drive. Follow this around, curving to the right, to the site, opposite the existing Truckee Senior Apartments.



Eco Synthesis
SCIENTIFIC & REGULATORY SERVICES INC

Scale: Approximately 1:24,000 (1″=2,000′)

North

Estates Drive Site

Wetland Delineation

Figure 1. Location Map

Project site (approximate)

USGS 7.5-minute Truckee quadrangle

Site Description

The Estates Drive study area is approximately two acres, quite level, at an elevation of approximately 5,850 feet above mean sea level.

The study area is located in a small valley floor on a terrace about 90 feet above the level of the Truckee River. Soils are mostly derived from residuum (rock weathered in place) of volcanic lithology. There is obvious evidence that the site was graded and/or otherwise modified at some point in the distant past. In addition to earthen berms just off site, there is a berm constructed of boulders around two sides of the site, just within the parcel boundary. and about half of the vegetation is dominated by clumps of crested wheat grass, which is a non-native species that was (and still is) often used to seed grazing land in cold, arid sites. The boulder berm and surrounding anthropogenic changes are visible, and apparently already of long standing, in a NAPP aerial photograph from June 1987.

Most of the site is herbaceous upland vegetation, with a few small pine saplings. Generally, the eastern portion of the uplands is overwhelmingly dominated by crested wheat grass, whereas the western portion is vegetated by a mixture of mostly native upland, facultative-upland, and facultative species of grasses and forbs, some of which (mountain tarweed) are indicative of soils whose A horizons have been disturbed in the past. Sedge and rush dominated wetland vegetation and perennial or long-seasonal surface water are present in areas near the site periphery.

2 METHODS

2.1 Background Information

Preliminary wetland mapping was obtained from the US Fish and Wildlife Service National Wetlands Inventory (NWI) via the on-line Wetlands Mapper application (USFWS, 2019). Information on soils was obtained from the Web Soil Survey on-line application (NRCS, 2019). Climatic information was obtained from the Western Regional Climate Center (WRCC, 2019) and from the National Oceanic and Atmospheric Administration (NOAA, 2020).

2.2 Field Methods

Field work was carried out according to the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987) and Regional Supplement for the Western Mountains, Valleys, and Coast (WMVC) Region, Version 2.0 (ERDC, 2010).

The present study was informed by several brief visits to the site during the summer of 2019. Wetland determination data points were studied on October 9, 2019.

Specific field methods that were applied to the determination of each of the criteria within the study area are described below.

2.2.1 VEGETATION

Plant species were identified on sight based on extensive (25 years') experience with plant identification within the Town of Truckee and the surrounding region.

The generic names of some plants that are on the national wetland plant list are different from the ones that are found in The Jepson Manual, 2nd Edition (Baldwin et al., 2012), and the Flora of North America North of Mexico (which references do not always agree with one another either). Scientific names provided in this report include synonymy in such cases.

Determinations of plant cover were visual estimates, aided where necessary by cover percentage diagrams originally provided in Forest Service (2001) and also distributed by other entities.

Wetland indicator status assignments were made according to current National Wetland Plant List (Lichvar et al., 2016). This delineation report uses the standard abbreviations as defined below:

OBL	obligate (almost always found within wetlands)
FACW	facultative-wetland (generally, but not always, found within wetlands)
FAC	facultative (found equally within and outside wetlands)
FACU	facultative-upland (generally not, but may be, found within wetlands)
UPL	upland (rarely found within wetlands)

2.2.2 SOILS

Wetland determination soil test pits were excavated by hand tools to depths of 10-14 inches. The shallowest pit (DP-5) encountered large angular rocks and could not be extended deeper.

Determination of the presence or absence of hydric soils field indicators was made on the basis of Field Indicators of Hydric Soils in the United States (NRCS, 2017; Version 8.1) and the WMVC Regional Supplement (ERDC, 2010). Due to updates in the names and numbers of hydric soils indicators, there are minor discrepancies between the indicators in NRCS (2017) and those listed on the WMVC data form, but in no case did this impair the hydric soils determination.

2.2.3 HYDROLOGY

Determinations of wetland hydrology or absence thereof were made by means of field indicators described in the Regional Supplement (ERDC, 2010).

2.2.4 BOUNDARIES

The limits of delineated wetlands were determined at the point where one or more mandatory criteria were no longer met.

2.2.5 SURVEY AND MAPPING TECHNOLOGY

Boundaries and data point locations were surveyed with a Trimble GeoXH 6000 GNSS ("GPS") unit. The resulting data were then differentially post-processed using publicly available base station data. Given the open terrain, with no woody overstory or nearby buildings to create multipath signal reception, satellite reception was excellent and the post-processed points were overwhelmingly (99.6 percent) determined by the Trimble Pathfinder Office software to be within the 5-15 cm accuracy range. Field work was exported in California State Plan zone 2, US survey feet, and reprojected to WGS 1984 for the contents of this report and digital submittals.

3 RESULTS

This section includes information on the site's environmental setting and specific information on each of the mandatory wetland criteria (vegetation, soils, and hydrology) and observations at the data points, followed by a description of the wetlands that were delineated.

The NWI mapping from Wetlands Mapper is provided in Figure 2 (page 7). NRCS soil survey mapping is shown in Figure 3 (page 9). The aquatic resources mapping is provided in Figure 4 (page 12). A list of plant species relevant to the determination of wetlands and other waters is provided in Table 1, and acreages of delineated features are summarized in Table 2. Wetland determination data forms are found in Appendix A.

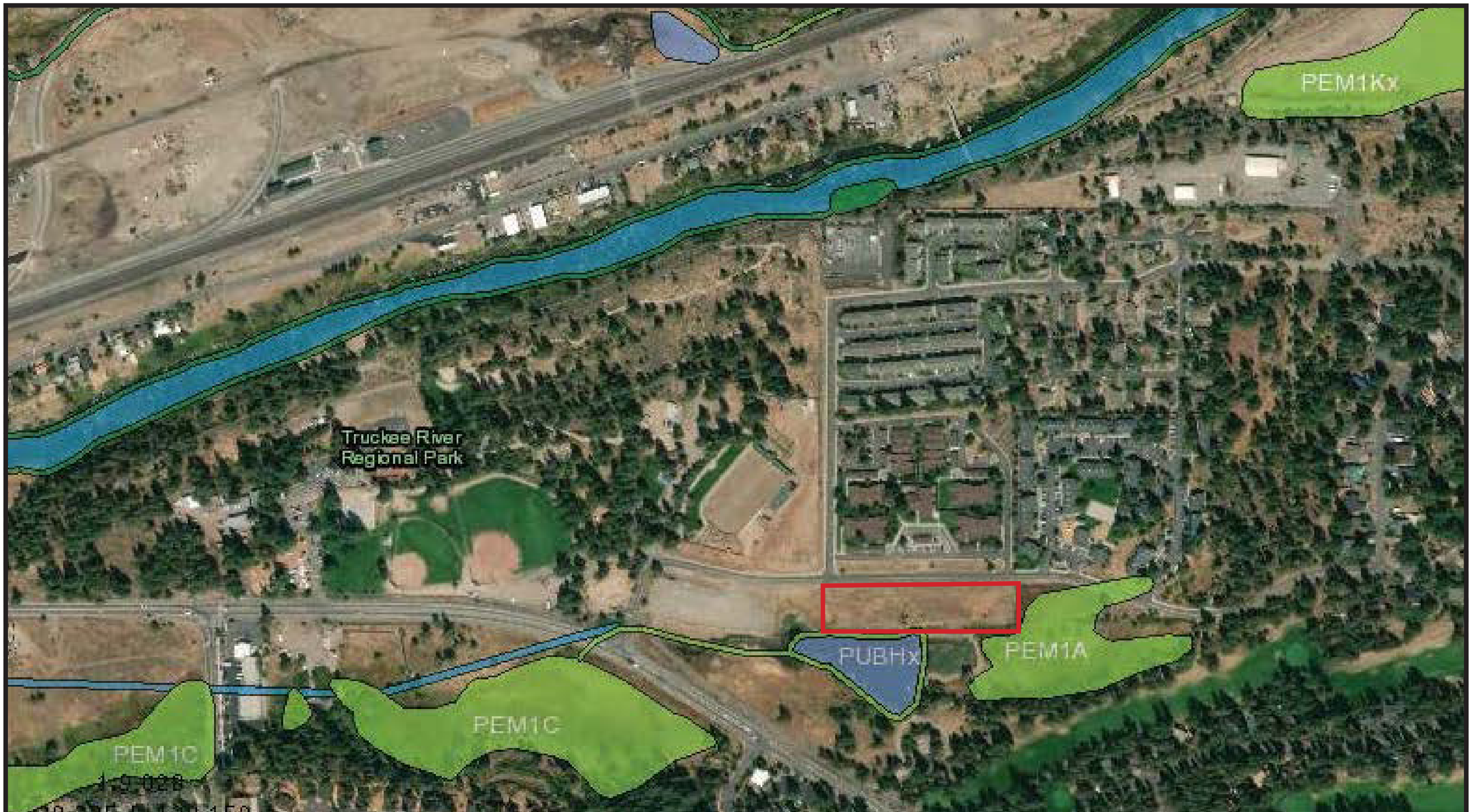
3.1 Wetland Criteria

3.1.1 VEGETATION

Vegetation at areas studied by means of three-parameter wetland determination data points is described on the data sheets (Appendix A) and in Section 3.2, which discusses the reasons for non-wetland determinations. Plant species observed at data points are listed in Table 1. Three species could not be definitively identified in October, though the overwhelmingly most likely species identifications are known, or would not affect the vegetation determination.

Table 1. Plant species that were observed at and near wetland determination data points. Nomenclature follows Baldwin et al. (2012). Wetland indicator status is from Lichvar et al. (2016).

Scientific Name	Common Name	Wetland Status
Achillea millefolium	yarrow	FACU
Agropyron cristatum	crested wheatgrass	UPL
Carex nebrascensis	Nebraska sedge	OBL
Deschampsia danthonioides	annual hairgrass	FACW
Eleocharis palustris	creeping spikerush	OBL
Epilobium brachycarpum	tall annual willow-herb	UPL
Gayophytum diffusum	spreading groundsmoke	UPL
Hordeum brachyantherum	meadow barley	FAC
Juncus (arcticus var.*) balticus*	Baltic rush	FACW
Madia glomerata	mountain tarweed	FACU
Navarretia (leucocephala)	whitehead navarretia	OBL
Penstemon rydbergii	Rydberg's beardtongue	FACU
Plagiobothrys sp.	popcorn flower	FACW/OBL
Poa secunda	one-sided bluegrass	FACU
Polygonum douglasii	Douglas' knotweed	FACU
Polygonum polygaloides	milkwort knotweed	FACW
Potentilla gracilis	slender cinquefoil	FAC
Psilocarphus (brevissimus/tenellus)	woolly marbles	FACW/OBL
Symphyotrichum spathulatum	western mountain aster	FAC



Eco Synthesis
SCIENTIFIC & REGULATORY SERVICES, INC.

Estates Drive Site Wetland Delineation

Figure 1. National Wetlands Inventory Map

Project site (approximate)

Feature labeled PEM1Kx in upper right corner is second constructed basin referred to in text in Section 3.1.3.

North

Scale approximately 1:9,000

3.1.2 SOILS

Results from Soil Survey

The following soil types occupy the wetland study area (with map symbol in Figure 3 and acreage):

Kyburz-Trojan complex, 9 to 30 percent slopes (acres)

Aquolls and Borolls, 0 to 5 percent slopes (acres)

Given that the site is nearly level, the mapping of a soil complex with slopes of 9 to 30 percent slopes is clearly incorrect, however, some observed soils corresponded reasonably well to Kyburz series.

Kyburz-Trojan soils are mapped over nearly all of the study area. Both of the major series are moderately or very deep to volcanic rock (weathered or fractured), with an argillic B horizon and moderately slow permeability. The data explorer on WebSoilSurvey indicates that restrictive horizons would generally be found at great depth (up to 2 meters) though fractured or weathered rock are expected at shallower depths.

Rock was encountered at a shallow depth in the eastern portion of the site (DP-5), which may correspond better to one or another of the inclusions (such as Aldi soil) that are noted in the soil survey. Also, a layer of diatomaceous clay (confirmed by observation of a sample dispersed in water, at 400x magnification) was encountered at DP-4. Such clays are encountered at variable depths in other Kyburz soils within Town limits; they are derived from igneous-silicaceous-enriched paleolacustrine sediments and may or may not function as a horizon that is restrictive to infiltration of water.

Aquolls and Borolls are not soil series, but rather suborders of Mollisols, which have a relatively thick, dark colored humus-rich surface horizon. Aquolls are poorly drained valley floor or drainageway soils with an aquic moisture regime (thus are almost always wetlands, unless artificially drained). Borolls are described in the 1994 soil survey as poorly drained soils on the periphery of wet meadows. This suborder is now replaced by Cryolls, and those referred to in the local soil survey would be Aquic Argicryolls. Aquolls and Borolls may include strata of variable permeability but, even with slow or even moderate permeability in some layers, may remain inundated or saturated during all or part of the year on the basis of surface or subsurface inflows.

Hydric Soils List

Aquolls and Borolls are listed as hydric soils.

Field Observations

Hydric soils determinations were made in the field in accordance with NRCS (2017).

All of the hydric soils observed at the site exhibited low chroma matrix and distinct or prominent redox concentrations within 12 inches of the surface (indicator F6, redox dark surface). As is typical in relatively flat terrain, hydric soils often extended beyond the boundary of hydrophytic vegetation.

Soil Map—Tahoe National Forest Area, California
(Approximate Boundary)

120° 10' 13" W

120° 10' 3" W

39° 19' 37" N

39° 19' 37" N

39° 19' 32" N

39° 19' 32" N

120° 10' 13" W

120° 10' 3" W

Map Scale: 1:1,080 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84

Estates Drive Site Wetland Delineation

Figure 3. Soil Map

See text for discussion of mapped soils.

3.1.3 HYDROLOGY

The study site is in hydrologic unit 16050102 (Truckee).

Average annual precipitation at a nearby station (Truckee Ranger Station, 049043) was 30.15 inches of water for the period 1904 to 2016 (WRCC). Precipitation at the Truckee-Tahoe Airport (about 1.2 mile from the site) for the period of October 1, 2018, through September 30, 2019, totaled 34.68 inches (NOAA, 2020), thus, slightly higher than the long-term average but within a "normal" range. Accordingly, observations in October 2019 are representative of normal circumstances.

Except for some lower elevation microsites within wetland depressions, the entire two-acre site lies between some elevation higher than 5,948.0 feet and the high points at slightly higher than 5,950 feet (total relief of less than two feet). There is no run-on into the site from offsite surface waters that lie at a slightly higher elevation than the wetlands within the site, because the site is separated from an offsite pond and wetland complex by an earthen berm surrounding the western and southern sides. Nor can water from the site flow uphill to offsite aquatic features. At the southeastern corner of the site, both on- and offsite surface water flows to the northeast, the ground surface off site (to the east) is lower than that of the site, thus no run-on can occur there.

The western wetland lobe within the site is supported by incident precipitation and possibly some internal runoff from uplands that lie a few tenths of a foot higher in elevation. Water in that lobe of wetlands then remains stationary or possibly (at times) flows eastward, separated from most of the site by a second berm, composed of large boulders. The long narrow wetland area along the southern site boundary lies at essentially the same elevation as the breach in this boulder berm, so it is unclear whether water flows from the channelized wetland into the eastern, *Eleocharis*-dominated wetland lobe, or from that area into the channel, or if the direction of flow changes depending upon precipitation and snowmelt. There is a break in the boulder berm within the site (but not in the offsite earthen berm) at this point. Regardless, except for three very small isolated wetland patches, the whole of the wetland area on the Estates Drive site is contiguous and lies at essentially the same elevation (net flow in any direction is minimal). Very slow surface flow (not visually perceptible) may exit the site on the eastern side or at the southeastern corner.

In a June 30, 1987, NAPP color infrared photograph (frame 473-65), the reddish color signature that would be expected if the *Eleocharis*-dominated area were wetland is not present. However, the boulder berm and other features were all present, seemingly in their present condition.

Nearby and Downstream Waters

The nearest blue line water body on the USGS map is the Truckee River, about 0.26 mile to the northwest of the center of the site. Flow exits the vicinity of the site northward through a culvert under Estates Drive, then ultimately passes through culverts into a detention basin, the minimal outflow of which all infiltrates into the soil before arriving at the exterior berm of another, much larger, constructed basin (labeled PEM1Kx in Figure 2). Available topographic information indicates that, in order for any outflow from the first detention/infiltration basin to flow around the berm creating this second basin, it would need to flow uphill. Therefore there is no surface connection between the wetlands on site and the Truckee River. The entire wetland complex from the south side of Brockway Road all the way past River View Drive is apparently isolated from any navigable or interstate surface waters.

3.2 Discussion of Wetland Determination Data Points

Three-parameter wetland determination data points were studied at six locations (see Figure 4, Aquatic Resources Delineation Map). Data forms for the wetland determination data points that were studied are included in Appendix A.

Points DP-1 and DP-6 did not meet all three mandatory wetland criteria and were determined to be non-wetland. DP-6 typifies the crested wheat grass vegetation that is prevalent over the eastern half of the site, and is of value primarily to provide a baseline of the upland soil conditions on the site. DP-1 is located just outside the wetland area at the western end of the parcel. As is common for data points located very close to wetlands on level or very gently sloping topography, soils were hydric and vegetation was a mixture of indicator statuses with two dominants, FAC and FACU. The wetland boundary near this point was readily determined at the boundary between this FAC/FACU vegetation and the FACW/OBL vegetation that dominates within the nearby wetland.

All other data points were determined to be wetlands, and similarly exhibited a pronounced boundary at the limit of FACW/OBL dominated vegetation. Indicators of ponding were observed, suggesting that the most correct terminology would be Freshwater Emergent Wetlands rather than Wet Meadow (largely saturation supported).

3.3 Observed Wetlands

Wetlands observed on the Estates Drive site are listed in Table 2, with the applicable FGDC (2013) categories of wetlands and deepwater habitats of the U.S.

Table 2. Summary of waters (irrigation canals) delineated at the Estates Drive site.

DESCRIPTION	MAP IDENTIFIER	AREA (acres)	FGDC (COWARDIN) CATEGORY AND DOMINANT SUBSTRATE
Palustrine			
Semipermanently flooded	FEW-1	0.4277	Palustrine emergent wetland persistent
Intermittently exposed	FEW-2	0.0046	Palustrine emergent wetland persistent
Intermittently exposed	FEW-3	0.0041	Palustrine emergent wetland persistent
Intermittently exposed	FEW-4	0.0039	Palustrine emergent wetland persistent
Total:	**Freshwater Emergent Wetland**	**0.4403 acres**	**Palustrine emergent wetland persistent**

3.4 Commerce and Recreation

The site described in this report is private land with no known current commercial or recreational use.

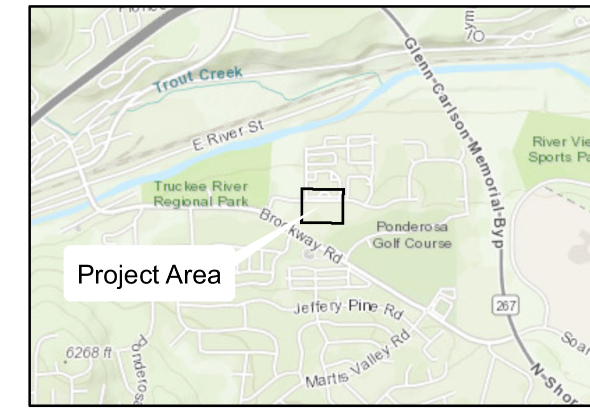
EcoSynthesis
SCIENTIFIC & REGULATORY SERVICES INC

DIGITAL MAPPING SOLUTIONS
INTEGRATING DATA TO CREATE SPATIAL KNOWLEDGE

Estates Drive Site Wetland Delineation

Date: 2/12/2020

Figure 4. Aquatic Resources Delineation Map



Acreage Table

Isolated Wetlands	
FEW-1	0.4279
FEW-2	0.0046
FEW-3	0.0041
FEW-4	0.0039
Subtotal	*0.4406*
Total	**0.4406 acre (all features)**

0 25 50 75 100 Feet

Scale 1:700 (1 inch = 58 feet)

N

Legend

- Data Point
- Reference Corner Point
- Study Area (2.0569 ac)
- FEW: Freshwater Emergent Wetlands (0.4406 ac)
- Out of Study Area
- Parcels (Town of Truckee)

Notes

Map prepared in accordance with recommendations by U.S. Army Corps of Engineers. All features shown on the present map are understood to be jurisdictional for the purspoes of Clean Water Act permitting. Imagery Source: Googe Pro, image date 2018-06-07; 2-foot contours provided by Town of Truckee from 2016 LiDAR, parcels and roads from the Town of Truckee online Open Data; all other data provided by EcoSynthesis. Projection: State Plane Calif. Zone II, NAD83, feet. Grid showing latitude and longitude. Service Layer Credits: Source: Esri,

Map created by www.digitalmappingsolutions.com on 2/12/2020.

4 REFERENCES

Baldwin, et al. 2012. *The Jepson Manual: Vascular Plants of California (Second Edition).* University of California Press, Berkeley, California.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Wetlands Research Program Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

ERDC, 2010: see under U.S. Army Corps of Engineers, Engineer Research and Development Center.

Federal Geographic Data Committee (FGDC). 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

Forest Service, 2001: see under U.S. Department of Agriculture Forest Service.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *Western Mountains, Valleys, and Coast 2016 Regional Wetland Plant List.* Phytoneuron 2016-30: 1-17.

National Oceanic and Atmospheric Administration (NOAA). 2020. Data downloaded from Climate Data Online, which provides access to data from the National Climate Data Center via the web address https://www.ncdc.noaa.gov/cdo-web/.

NRCS, 2017 and 2020: see USDA, Natural Resources Conservation Service.

US Army Corps of Engineers, Engineer Research and Development Center (ERDC). 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0).* Final report ERDC/EL TR-10-3.

USDA Forest Service. 2001. Forest Inventory and Analysis Phase 3 Field Guide, Section 13: Vegetation Diversity and Structure. Phase 3 Guide version dated April 10, 2001.

USDA Natural Resources Conservation Service (NRCS). 2017. *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.1, 2017.* L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz, editors. Report prepared by NRCS in cooperation with National Technical Committee for Hydric Soils and U.S. Army Corps of Engineers, Engineer Research and Development Center.

USDA Natural Resources Conservation Service (NRCS). 2020. Custom Soil Resource Report for Nevada County, California. Report produced by WebSoilSurvey, the NRCS online application accessed at http://websoilsurvey.nrcs.usda.gov.

US Fish and Wildlife Service (USFWS). 2020. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Downloaded from the Wetlands Mapper at http://www.fws.gov/wetlands/.

Western Regional Climate Center (WRCC). 2020. Period of Record Monthly Climate Summary for COOP station 049043. Downloaded from https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9043.

Appendix A:

Wetland Determination

Data Forms

Data forms are in a separate electronic folder to prevent Acrobat from automatically changing entries in fields of the same name in different data forms.

Eco Synthesis
SCIENTIFIC & REGULATORY SERVICES, INC.

MEMORANDUM

To: Nick Pappani

From: Adrian Juncosa

Date: April 24, 2021

Subject: Estates Meadows Project Wetland and Biological Resource Impact Analysis

This memorandum provides my analysis of potential impacts on wetland and biological resources that I believe could result (or not result) from the project referenced above, with identification of one impact that could rise to the level of significance under CEQA, and a recommended mitigation measure that would reduce that single impact to a less-than-significant level.

Prior to final project design, the project contracted for a formal three parameter delineation of aquatic resources (Juncosa, A., 2020, *Estates Drive Site Wetland Delineation*, report prepared for JK Architecture + Engineering, Tahoe City, CA) following U.S. Army Corps of Engineers 1987 Manual of Wetlands Delineation and the 2010 Regional Supplement for Western Mountain, Valleys, and Coast, Version 2.0. The project has been designed to avoid any direct impact (excavation or fills) on any delineated wetland feature (there are no other types of aquatic resources present within the site).

However, development will occur in close proximity to wetlands that were mapped on the project site, so the potential for significant indirect impacts to result must be evaluated. For the circumstances that exist on the project site, there are three main categories of such potential impacts:

- possibility of increase or decrease in water quantity (whether surface flow or groundwater);
- possibility of alterations of water quality; and
- possibility of disturbance of human-activity-averse wildlife, if any, that might depend upon the wetlands found within the site or immediately outside it.

Commonly, planning documents such as Town or County General Plans, Specific Plans, or the like specify buffer zones to be allowed from the edges of wetland or other aquatic features, sometimes of width that varies according to the type of feature. However, although there is some generalized science about buffer distances, in general they are rather arbitrarily determined (e.g., 25 feet, 50 feet, or 100 feet). Arbitrary but fixed buffer distances are helpfully predictable, but do not necessarily address the different types of potentially adverse effects, which may extend different distances from the limits of development; or they may be excessive distances when the specific impact processes are analyzed. And indeed those distances may not be constant throughout the year, as is discussed below.

For the purposes of the present analysis, I consider each of these main categories of impact individually, to determine the potential for impacts and the nature of recommended mitigation measures, if warranted.

16173 Lancaster Place, Truckee, CA 96161 • Telephone: 530.412.1601 • E-mail: ajuncosa@ecosynthesis.com

Predevelopment Setting

The potential (or lack thereof) for significant indirect wetland impacts is best understood in the context of the physical setting prior to project development. The site is nearly horizontal over nearly all of its area, with a topographic channel extending along the entire southern boundary and extending slightly past it. There are three very small isolated wetlands, none of which exceeds 0.005 acre in area. Under conditions of surplus hydrology, the remaining wetland areas (two large lobes of one large contiguous wetland) flow very slowly toward the south, and the channel in turn drains eastward and then ultimately northward, though not ever actually reaching the Truckee River, to the best of our opportunity to determine.

The channel is separated from the pond and other wetlands located southward, toward Brockway Road, by a high enough berm that there is never, under any known or plausible surface water ponding or flow circumstances, an immediate surface water connection between the project site and the wetland restoration area to the south. (Flow from both wetland areas does merge some distance downstream, to the east of the site.) Except for the areas of direct wetland connection, the channel is also separated from the development areas by another berm that incorporates a number of large boulders.

Water Quantity

The most obvious way in which alteration of water quantity could adversely affect a wetland feature would be the reduction of water supply such that wetland hydrology (inundation or near-surface saturation for a prolonged period of time) no longer occurs under normal precipitation circumstances. Even with a lesser alteration that does not entirely eliminate the occurrence of wetland hydrology, reduction in the period during which wetland hydrology is present can alter the composition of the wetland plant community. Finally, in some circumstances, increased water, or a change in the season that it arrives, can also result in an adverse impact by changing the hydrology in a way that is more favorable for a common wetland plant community that differs from the pre-existing one which may be less common or may support some uncommon species.

Wetland hydrology may be derived from incident precipitation, point or sheet flow run-on from adjacent areas, or from groundwater. The Estates Meadows site is so flat that for nearly the entire wetland area, run-on from adjacent watershed is likely to be only a limited, albeit non-zero, proportion of its hydrological support. The extreme western end of the wetland extends off site, where it may receive a small amount of inflow from adjacent uplands, but this is still likely a small proportion because the parcel to the west is also very flat and is underlain by the same soils.

No surface indicators (tributaries or even minor rills) suggest that concentrated surface flow occurs on the site. There may be some limited surface sheet flow over short distances, but given the very flat topography, this is likely to be only a modest contributor to wetland hydrology of any of the delineated features.

In principle, ground water balance in a wetland may vary from a surplus at the wettest times, with lateral subsurface flow out of a wetland into surrounding soil, to a deficit at other times (lateral flow from surrounding soil back into the wetland). However, subsurface flow rates are determined by gradient, permeability of soil, and, where there is an impervious soil layer, cross-sectional area above it. At the Estates Meadows site, there is practically no gradient at all, soils are largely clay or clay loam with weak to moderate structure except, in some areas, a thin superficial layer of sandy loam. Thus the soils are not highly transmissive when moist. There is a restrictive horizon only in the southwest corner, under the wetland area but not at the nearest upland study point. Given these factors, ground water movement is probably not a major component of the wetland hydrology at the site.

Supplementing this physical understanding of site hydrology, it is possible to infer, with a sufficient level of accuracy for impact analysis, the main sources of hydrology for wetlands that support different types of wetlands, based in part on knowledge of a site's soils and topography and in part on the character of the wetland vegetation. For example, as a rule, small depressional wetlands that support predominantly annual native forb species (vernal pools) are supported primarily by incident precipitation that pools in the topographic depression and evaporates as temperatures warm. Such an area occurs on the project site surrounding the data point numbered DP-2, shown on the aquatic resources delineation map.

Though the great majority of the wetlands on the Estates Meadows site are contiguous, vegetation varies somewhat in different areas, which indicates that the hydrology differs somewhat as well. The two large lobes of the contiguous wetland support vegetation that is suggestive of being supported hydrologically primarily by incident precipitation, with minor contribution from sheet flow from closely adjacent areas. This vegetation includes an area of predominantly vernal pool vegetation in the western lobe and the near-monoculture of creeping spike-rush in the eastern lobe.

As explained above, the hydrology of those two portions of the large mapped wetland is probably primarily derived from incident precipitation, but this is not the exclusive source and even the minor proportion that may be water from the adjacent watershed might be important in maintaining the existing plant community composition. However, in both cases as well as the two nearby non-contiguous wetlands FEW-2 and FEW-3, there are areas of undeveloped watershed that are avoided by the design of the project, so that adverse impacts on water quantity to support the present character of vegetation in nearly all of the wetland area within the site would not be anticipated to result from the project.

Of all wetland areas on site, the only one whose potential watershed is significantly reduced is FEW-4, which will be surrounded by concrete walkways and, beyond those, buildings. This 0.0039 acre wetland is dominated by Nebraska sedge with a lesser component (about 30 percent relative cover) of vernal pool annuals. Nebraska sedge is generally indicative of at least a moderately prolonged period of wetland hydrology, whereas the vernal pool species suggest early springtime inundation followed by drying out of the soil early in the summer. Overall, the plants indicate an intermediate hydrologic regime.

That being the case, it is possible that the moderate loss of hydrology from reduction of the watershed size could result in enough change to alter the vegetation composition, though not enough to be likely to eliminate wetland conditions altogether. (Incident precipitation alone would be sufficient to continue to support wetland hydrology.) In light of the generally very conservative approach of CEQA to wetland impacts, this is identified as a potentially significant impact.

Impact: Although wetland FEW-4 will continue to receive the same amount of incident rain- and snowfall as before, a portion of its hydrologic support from surrounding areas (albeit a lesser proportion of its overall hydrology than the incident precipitation) will be reduced. Since the hydrology is equivocal at present, this change could result in a notable change in vegetation composition and is therefore identified as a potentially significant impact.

Mitigation Measure: The immediately surrounding concrete walkways should be graded to drain into the avoided wetland/upland area, and to the extent feasible, snow from these same proximal walkways should be cleared into the avoided area, supplementing the area's hydrology in a manner analogous to preserving a larger surrounding watershed and thereby reducing the impact to a less-than-significant level.

Water Quality

The project design routes runoff from most impervious surfaces, in particular from the driveways and parking areas, into bioretention facilities that serve to store, disperse, and treat the urban runoff. As discussed above, the wetland areas, all of which are avoided, derive their hydrologic support from incident precipitation (including melting snowpack) and from adjacent watersheds that will not have vehicle traffic.

The section on water quantity discusses possible contribution of drainage from concrete walkways and/or rooftops to the isolated wetland area FEW-4. Since the walkways will not be used by motor vehicles, there would be not significant water quality concern from allowing this drainage from impervious areas to enter the preserved wetland (see below).

Finally, the project site slopes very gently to the south, so that any surface or subsurface water that is not conducted to bioretention facilities either remains in the soil profile or ends up in the channel along the southern site boundary, which flows eastward and then generally to the north in the direction of the Truckee River. This is a long flow pathway and the appearance of the channels and detention basins through which it passes suggests that nearly all of the flow infiltrates prior to arriving at the TTSA fenceline around a large basin. Examination in the field and of lidar topography suggests that the runoff from the entire extensive wetland system including and south of the Estates Meadows project site does not reach the river.

Accordingly, degradation of wetland water quality of any water body from urban runoff would not be expected to result from the project; there is no anticipated significant impact on water quality.

Wildlife Disturbance

Biology study revealed no notable wildlife resources in the wetlands or for that matter anywhere on the site itself. However, substantial wetland restoration work has been carried out on the land between the Estates Meadows project site and Brockway Road, resulting in enhanced wildlife habitat values in this area. In this habitat "island" within an otherwise urbanized landscape, there might be a variety of wildlife use, but of that use, the category that is potentially the most sensitive to during-construction and operational human disturbance would probably be nesting birds that utilize wetland and riparian habitats, specifically those that nest in woody vegetation such as willow thickets or cottonwood trees.

Close examination of satellite imagery and of field conditions shows that this preferred type of habitat occurs within the restoration site, but only on the southern side close to Brockway Road, over 100 feet from the limits of the Estates Meadows project. Construction-related nesting bird survey in the restoration site identified the presence of a single juvenile flycatcher in this habitat during the non-nesting season (that is, almost certainly a migrating individual in transit). This bird is stated to have been a willow flycatcher, which is a state-listed endangered species. However, that species is a member of a group that is widely regarded as the most difficult (and in the case of some species, impossible) to identify visually, of all North American birds. Moreover, migrating birds do not make the species' diagnostic vocalizations and may be ones not normally found in a given area, so the range of possible species is greater. In short, it would be more correct to regard this observation as merely an *Empidonax* or *Contopus* flycatcher pending additional and more detailed observation.

Notwithstanding these considerations pertaining to this one observation, the willow-cottonwood area within the restoration site is undeniably possible nesting habitat for several species of common to rare riparian birds (including willow flycatcher and others). However, given the distance from the project site, and the moderately high tolerance of vehicles on Brockway Road and of pedestrians, dogs, and bicyclists on the Brockway Trail that would be a precondition for any bird to select the aforementioned habitat as a nesting site, there would be no significant wildlife disturbance impact expected to result from the project.

Eco Synthesis
SCIENTIFIC & REGULATORY SERVICES, INC.

MEMORANDUM

To: Nick Pappani

From: Adrian Juncosa

Date: July 20, 2021

Subject: Estates Meadows Project Supplemental Impact Analysis

This memorandum provides an updated analysis of potential impacts on wetland and biological resources that could result (or not result) from the project referenced above, based upon supplemental information provided by the applicant and discussion with the applicant team and Town staff.

A previous memorandum dated April 24, 2021, discussed three potential impact areas (change in water quantity in wetlands adjacent to developed areas, change in water quality, and wildlife disturbance). That analysis remains unchanged although some new issues have become apparent.

Water Quantity and Quality

The project team has provided additional quantitative details and graphics pertaining to stormwater management, which have been reviewed by the Town Engineering Division and are stated via email communications from Town staff to have been found acceptable: Snow Storage Exhibit, Town of Truckee Post-Construction Storm Water Quality Plan, and SWQP Exhibit.

This being the case, we can rely upon the Town's review of required stormwater management analysis and exhibits to conclude that no significant impacts on water quantity or quality in the on-site wetlands (or those off site, for that matter) would be expected to result during project operations. As was noted in the April memorandum and re-emphasized by comments from the project team, pervious vegetated areas that will remain within the project site provide substantial capacity for infiltration of water from impervious areas such as roofs (which is moreover quite "clean" water since no airborne pollutants settle on roofs that do not also settle on every other horizontal surface).

As shown in the SWQP Exhibit, flow from the parking lot, which could potentially contain urban pollutants related to motor vehicles (e.g., hydrocarbons) is directed to two vegetated swales and/or bioretention. There will be occasions when flows in excess of the design precipitation event, or potentially high flows during a season of high groundwater level, result in "overflow" that is not accommodated by the capacity of the treatment swales being routed to pervious undeveloped areas to the east and west of the buildings. Thence it could move by either slow lateral subsurface flow or (under high flow conditions) as dispersed surface sheet flow toward the preserved wetlands.

However, as noted by the project team (and I agree entirely), this is exactly what already occurs under those same conditions without any development present. The water depth in the existing wetlands is controlled by the outflow topography, so the slight increase in water arriving at the landscaped/undeveloped areas that could be ascribed to the runoff from impervious surfaces will not alter the ecological conditions in the wetlands. In other words, excess water, if any, will simply flow out.

To the extent that runoff from paved areas contains vehicular pollutants, these are most concentrated in initial or low flows, and less concentrated or not present at all in subsequent flows. Therefore the vegetated/bioretention facilities, if they are protected from diminishment of function resulting from accumulation of sediment, can be expected to function as intended to remove urban pollutants prior to their arrival in the wetlands that are preserved on site.

In conclusion, further documentation provided by the project team and reviewed and approved by Town staff, provides firm basis to find that no significant operational impacts on water quantity or quality in the preserved wetlands will result from the project.

Potential Impacts During Construction

Geotechnical study of the site reinforced the NRCS soil survey mapping and my direct observation during the wetland delineation that soils within the project site are high in clay and underlain by soil horizons and/or bedrock that restricts percolation of free soil water (that is, not bound to soil particles by osmotic or physical water potential).

Disruption of soil profiles by heavy construction equipment can result in generation of sediment that can then be carried to on- or off-site wetlands by precipitation runoff. This disruption may include mere disturbance of the soil surface (fragmentation of soil aggregates) as well as compaction throughout the profile of a high-clay-content soil, which reduces infiltration and increases runoff and erosion. This latter effect is greatly exacerbated when clayey soils have high water content.

As discussed above, and in accordance with project team comments, pervious areas within the project site will function operationally as areas to infiltrate runoff that originally emanated from impervious structural improvements. For this to be the case, any portions of the site outside the final impervious footprint that are subject to heavy equipment traffic or laydown of heavy materials must either be protected from compaction throughout the construction period, or that compaction must be remediated by deep ripping to the depth that compaction has resulted, typically one to two feet but may be a greater depth.

Finally, Building C (easternmost building) is located very close to a wetland that will be preserved. During site clearing and construction of its foundation, there is potential for equipment to stray into the wetland, or even for grading for expansive soil remediation or construction of forms to extend into the wetland. Even after the foundation is constructed and the trench backfilled, it will be necessary for equipment used to erect the remainder of the structure or place siding or roofing to travel outside the building's exterior, which given the close proximity, means traveling through the wetland itself.

This analysis results in identification of the following impacts and mitigation measures:

Impact: Sediment derived from soil disturbance during construction could degrade water quality in on-site or off-site wetlands.

Mitigation: Implement erosion and sediment control measures, including but not limited to installation of filter fencing between the main wetland (FEW-1, which extends along the entire southern site boundary and has large lobes in both the eastern and western portions of the site) and areas of equipment or vehicle travel, or soil disturbance. Ideally the filter fencing installation should be common with an extent of orange exclusion fencing, at least in the eastern portion of the site.

In addition to the filter fencing, sediment controls shall be installed around temporary stockpiles of any soil materials or unwashed sand or drain rock. Standard drainage inlet protections and other measures shall be included in the project's stormwater pollution prevention plan. All sediment controls and other SWPPP provisions shall be monitored for functional deficiencies daily, with supplemental monitoring anytime a precipitation event of more than 1/4" is forecast, both prior to and after the precipitation event.

Fencing shall be installed prior to arrival of excavating equipment (other than that needed for the installation itself) and maintained in good functional condition throughout the entire period of construction through completion of landscaping of pervious areas.

No excavation shall occur at any time under any circumstances within any delineated wetland area.

Impact: Soil disturbance and compaction from equipment operation could result in lasting impairment of infiltration capacity or other adverse ecological effects.

Mitigation: No equipment or vehicles shall be operated within any wetland area unless the entirety of the possible travel surface is protected with "meadow mats" (e.g., DURA-BASE, or other functional equivalent). Ideally, non-wetland soil areas intended for future landscaping and pervious function should also be protected by meadow mats if equipment travel is to occur while the soil is moist, wet, or saturated. If not, then soil areas subject to equipment travel shall be deep ripped prior to landscaping.

Since construction will be occurring in closer proximity to wetlands than is usual and the measures needed for protection of those wetlands are somewhat more stringent than normal, a pre-construction meeting including on-site construction supervision staff, Town representation, and a knowledgeable wetland scientist shall be held to ensure that measures are rigorously implemented but are refined for compatibility with construction practicalities if needed.

In the event of a multi-year construction schedule, meadow mats must be removed from wetlands prior to (each) winter.

Wildlife Disturbance

As was discussed in my April 24 memorandum, there is no habitat suitable for special status wildlife within or close enough to the project site to suggest that significant disturbance of any such species would be expected to result either during construction or operation of the project. Therefore, no seasonal surveys to prevent impacts on special status species are warranted.

Loss of limited numbers of common species of plants or wildlife does not constitute a significant impact under current CEQA guidelines. However, the Migratory Bird Treaty Act and California Fish and Game Code Section 3513 both prohibit take of migratory birds, including destruction of active nests, which are presumed to contain eggs or nestlings. Since violation of regulatory requirements other than CEQA Guidelines could be deemed a significant natural resource impact, or for resource protection reasons irrespective of CEQA compliance, it is common for lead agencies to require surveys for nesting birds and contingent mitigation actions. Wording for such a project approval condition is provided below.

Impact: Initiation of construction between May 1 and August 15 could result in destruction or abandonment of active bird nests.

Mitigation Measure or Approval Condition: In the event that site clearing or construction activity is to be initiated between May 1 and August 15, a survey for nesting birds shall be conducted by a qualified biologist throughout the project site and, to the extent that access is allowed, within a radius of 100 feet outside the project boundary. If any active nests are found, a non-disturbance buffer zone of 100 feet will be marked with a continuous run of brightly colored tape or exclusion fencing and no construction activity will occur within that buffer zone until the biologist has confirmed that the nest is no longer occupied.

In the event that construction extends beyond one calendar year with start-up on or after May 1 of the second year, the nesting bird survey and no-disturbance buffer zone (if warranted) shall be repeated.

APPENDIX D

GEOTECHNICAL ENGINEERING REPORT

GEOTECHNICAL ENGINEERING REPORT
CASCADE HOUSING PROJECT

10040 ESTATES DRIVE
A PORTION OF APN 019-450-047-000
TRUCKEE, CALIFORNIA

OCTOBER 5, 2020

PREPARED FOR:

CASCADE HOUSING ASSOCIATION
KRISTIN ISHAM
PO BOX 182
SPRINGFIELD, OREGON 97477

NV5
10775 PIONEER TRAIL, SUITE 213
TRUCKEE, CALIFORNIA 96161

PROJECT NO. 42769.00

Project No. 42769.00
October 5, 2020

Cascade Housing Association
Kristin Isham
PO Box 182
Springfield, Oregon 97477

Reference: **Cascade Housing Project**
10040 Estates Drive
A Portion of APN 019-450-047-000
Truckee, California

Subject: **Geotechnical Engineering Report**

This report presents the results of our geotechnical engineering investigation for the proposed Cascade Housing Project to be constructed at 10400 Estates Drive in Truckee, California. The project will involve constructing four three-story workforce housing units at the site. Appurtenant construction will include two asphalt concrete paved access driveways, an asphalt concrete paved parking lot, hard surface patios, recreation space, and underground utilities.

Moderately expansive fat clay soil was encountered in three of our test pits at depths ranging from approximately 2 to 3 feet below existing site grades. The fat clay soil extended to depths of about 6.5 to 7.5 feet below the ground surface. The moderately expansive soil could have detrimental effects on the proposed structures. We have provided options in the following report for reducing the adverse effects of expansive soil on the proposed project. We recommend the most feasible option is to remove approximately 2 feet of potentially expansive soil below bottom of footing subgrade and replace with structural fill. A representative of NV5 should observe subsurface conditions during grading to assist in identifying area of potentially expansive soil.

Approximately 1 to 2 feet of existing fill was encountered in our test pits across the site. The existing fill consisted of medium dense silty Sand with gravel (SM). Due to the potential for excessive settlement, existing fill will not be suitable for support of structures and pavements. We have provided recommendations in the following report for removing and replacing existing fill with compacted structural fill in structural areas.

During our subsurface investigation we encountered hard clay soil at depths of approximately 2 to 3 feet below the ground surface and very dense granular soil at depths of approximately 1 to 1.5 feet below the ground surface. Depending on final site grades, rainfall, and/or irrigation practices, perched groundwater will likely seasonally develop above onsite near-surface fine-grained and/or dense granular soil and could cause adverse effects to the proposed structures. We have provided recommendations to reduce the potential adverse effects of perched groundwater in the following report.

With the exception of the aforementioned issues, our professional opinion is that the site is suitable for the proposed development using conventional earthwork grading and foundation construction techniques. Specific recommendations regarding the geotechnical aspects of project design and construction are presented in the following report.

The findings presented in this report are based on our subsurface exploration, laboratory test results, and experience in the project area. We recommend retaining our firm to provide construction monitoring services during earthwork and foundation excavation to observe subsurface conditions encountered with respect to our recommendations provided in this report. As plans develop, we should be consulted concerning the need for additional services.

Please contact us if you have any questions regarding this report or if we can be of additional service.

Sincerely,
NV5

Prepared by:

PROFESSIONAL GEOLOGIST
PAMELA J. RAYNAK
No. 7180
10/05/2020
STATE OF CALIFORNIA

Pamela J. Raynak, P.G.
Senior Geologist

Reviewed by:

LICENSED PROFESSIONAL ENGINEER
ALLISON K. HATHON
C 83162
10/05/2020
CIVIL
STATE OF CALIFORNIA

Allison K. Hathon, P.E.
Project Engineer

copies: Carla Sammis, JK Architecture Engineering

TABLE OF CONTENTS

1 INTRODUCTION 1
- 1.1 PURPOSE 1
- 1.2 SCOPE OF SERVICES 1
- 1.3 SITE DESCRIPTION 1
- 1.4 PROPOSED IMPROVEMENTS 2

2 LITERATURE REVIEW 3
- 2.1 SITE GEOLOGY 3
- 2.2 REGIONAL FAULTING 3
- 2.3 POTENTIAL SEISMIC HAZARDS 4
  - 2.3.1 Soil Liquefaction 4
  - 2.3.2 Lateral Spreading 4
  - 2.3.3 Slope Instability 4

3 SUBSURFACE EXPLORATION 5
- 3.1 FIELD EXPLORATION 5
- 3.2 SUBSURFACE SOIL CONDITIONS 5
- 3.3 GROUNDWATER CONDITIONS 5

4 LABORATORY TESTING 7

5 CONCLUSIONS 8

6 RECOMMENDATIONS 10
- 6.1 EARTHWORK 10
  - 6.1.1 Clearing and Grubbing 10
  - 6.1.2 Preparation for Fill Placement 10
  - 6.1.3 Expansive Soil 11
  - 6.1.4 Fill Placement 12
  - 6.1.5 Cut/Fill Slope Grading 13
  - 6.1.6 Temporary Unconfined Excavations 14
  - 6.1.7 Underground Utility Trenches 14
  - 6.1.8 Construction Dewatering 15
- 6.2 SURFACE WATER AND FOUNDATION DRAINAGE 15
- 6.3 STRUCTURAL IMPROVEMENT DESIGN CRITERIA 16
  - 6.3.1 Foundations 16
  - 6.3.2 Seismic Design Criteria 17
  - 6.3.3 Slab-on-Grade Construction 18
  - 6.3.4 Retaining Wall Design Criteria 20
  - 6.3.5 Pavement Sections 22
- 6.4 PLAN REVIEW AND CONSTRUCTION MONITORING 23

7 LIMITATIONS 24

8 REFERENCES 25

FIGURES

Figure 1 Site Vicinity Map
Figure 2 Test Pit Location Plan

APPENDICES

Appendix A Proposal
Appendix B Important Information About This Geotechnical-Engineering Report
Appendix C Test Pit Logs
Appendix D Laboratory Test Data

1 INTRODUCTION

This report presents the results of our geotechnical engineering investigation for the proposed Cascade Housing Project to be constructed at 10040 Estates Drive in Truckee, California. We performed our investigation in general accordance with our May 15, 2020 proposal for the project. A copy of the proposal is included as Appendix A of this report. For your review, Appendix B contains a document prepared by the Geoprofessional Business Association entitled *Important Information about This Geotechnical-Engineering Report.* This document summarizes the general limitations, responsibilities, and use of geotechnical engineering reports.

1.1 PURPOSE

The purpose of our work was to explore and evaluate the subsurface conditions at the project site and to provide our geotechnical engineering conclusions and recommendations for project design and construction.

Our findings are based on our subsurface exploration, laboratory test results, and our experience in the project area. We recommend retaining our firm to provide construction monitoring services during earthwork and foundation excavation to observe subsurface conditions encountered with respect to our recommendations.

1.2 SCOPE OF SERVICES

To prepare this report we performed the following scope of services:

- We performed a site reconnaissance, literature review, and subsurface exploration involving test pits excavated with a mini-excavator.
- We logged the subsurface conditions encountered and collected bulk soil samples for classification and laboratory testing.
- We performed laboratory tests on selected soil samples obtained during our subsurface investigation to evaluate material properties.
- Based on our subsurface exploration and the results of our laboratory testing, we performed engineering analyses to develop geotechnical engineering recommendations for project design and construction.

1.3 SITE DESCRIPTION

The approximately 2.4-acre project site comprises the southernmost area of a larger parcel located near the Truckee Regional Park and Rodeo Grounds in Truckee, California. The approximate location of the site is shown on Figure 1, Site Vicinity Map. The proposed project will involve construction of four workforce housing units at the site. A plan view of the project site is shown on Figure 2, Test Pit Location Plan.

The site has been modified from previous grading activities; however, is currently undeveloped. Based on our review of a conceptual design site plan prepared by JK

Architecture Engineering (JKAE) dated July 10, 2020, wetland delineations have been established along the south and east property lines and within a low lying area near the eastern edge of the site. An earthen levee is located adjacent to most of the southern property line. A row of stacked boulders (riprap) was observed near most of the south edge of the site and along the east property line and southeast corner of the site. Several granitic boulders up to about 5 feet in diameter were observed near the northwest corner of the site. Scattered granitic cobbles were observed at the ground surface across the site. An existing water level gauge (stovepipe PVC pipe) is located near the south central edge of the site. The project site is bounded by Estates Drive to the north, undeveloped land to the east and west, and a recently restored wetland area to the south. Vegetation at the site consists of very scattered conifer trees, low lying brush and grasses.

The general center of the site is located at 39.3264^{o}N latitude and 120.1691^{o}W longitude (WGS84 datum). As previously mentioned, site grades have been previously modified by grading. The site lies at an elevation of approximately 5,850 feet above mean sea level (MSL). A low lying depressional area is located near the east edge of the site in an established wetland area with an elevation of approximately 5,847 feet MSL. Surface water drainage consists of overland flow. The site is relatively level. Regional topography in the immediate site vicinity slopes very gently down in a general north to south direction. NV5 anticipates that surface water flow at the site travels in a general north to south and west to east direction towards the nearby wetland areas.

1.4 PROPOSED IMPROVEMENTS

Information about the proposed project was obtained from our site visits, conversations with Carla Sammis of JK Architecture Engineering (JKAE), and review of a site plan and conceptual drawings prepared by JKAE dated July 10, 2020. The project will involve construction of four three-story workforce housing structures. Appurtenant construction will include two asphalt concrete paved access driveways, an asphalt concrete paved parking lot, hard surface patios, recreation space, and underground utilities.

We anticipate the proposed structures will be wood-frame structures with concrete slab-on-grade floors. Preliminary maximum structural loads for walls and columns will be about 2.6 to 3.6 kips per linear foot and about 14 kips, respectively. We anticipate average cut and fill depths will be about 1 to 3 feet and will not exceed about 6 feet. No detailed grading plans were available for our review.

2 LITERATURE REVIEW

We reviewed available geologic and soil literature in our files to evaluate geologic and anticipated subsurface conditions at the project site.

2.1 SITE GEOLOGY

We reviewed the *Geologic Map of the Lake Tahoe Basin, California and Nevada,* by George J. Saucedo, California Geological Survey, 2005. We also reviewed a geologic map and report titled *Geologic Map of the North Lake Tahoe-Donner Pass Region, Northern Sierra Nevada, California*, by Arthur Gibbs Sylvester et al., California Geological Survey, 2012. The geologic maps indicate that the site is generally underlain by Quaternary aged glacial outwash deposits that are comprised of silt, sand, gravel, and cobbles. The glacial outwash locally contain jökulhlaup (flood) deposits. Based on our subsurface investigation, described below, near-surface soil conditions are consistent with the mapped geology.

2.2 REGIONAL FAULTING

The project is located in a potentially active seismic area. To evaluate the location of mapped faults relative to the project site, we reviewed the following maps:

- *Fault Activity Map of California <http://maps.conservation.ca.gov/ cgs/fam/>;* by Charles W. Jennings and William A. Bryant, California Geological Survey, Geologic Data Map No. 6, 2010.

The potential risk of fault rupture is based on the concept of recency and recurrence. The more recently a particular fault has ruptured, the more likely it will rupture again. The California State Mining and Geology Board define an "active fault" as one that has had surface displacement within the past 11,000 years (Holocene). Potentially active faults are defined as those that have ruptured between 11,000 and 1.6 million years before the present (Quaternary). Faults are generally considered inactive if there is no evidence of displacement during the Quaternary period.

The referenced geologic maps show several active and potentially active faults located near the project site, including the Dog Valley Fault (active, approximately 5.3 miles northwest), a group of unnamed faults southeast of Truckee (active and potentially active, approximately 1.4 to 2.4 miles southwest), the Polaris Fault (active, approximately 1.6 miles northeast), the West Tahoe – Dollar Point Fault Zone (potentially active, approximately 3.3 miles southeast), the Agate Bay Fault (potentially active, approximately 6.4 miles southeast), the Tahoe Sierra Frontal Fault Zone (potentially active, approximately 6.6 miles southwest), the West Tahoe Fault (active, approximately 17 miles south-southeast), and the North Tahoe Fault (active, approximately 12.7 miles southeast). Earthquakes associated with these faults may cause strong ground shaking at the project site.

2.3 POTENTIAL SEISMIC HAZARDS

Primary hazards associated with earthquake faults include strong ground motion and surface rupture. No faults are mapped as crossing or trending towards the site; therefore, the potential for surface rupture at the site is considered low. Earthquakes centered on regional faults in the area, such as the West Tahoe Fault, would likely result in higher ground motion at the site than earthquakes centered on smaller faults that are mapped closer to the site.

Secondary seismic hazards include liquefaction, lateral spreading, and seismically induced slope instability. These potential hazards are discussed below.

2.3.1 Soil Liquefaction

Liquefaction is a phenomenon where loose, saturated, granular soil deposits lose a significant portion of their shear strength due to excess pore water pressure buildup. Cyclic loading, such as that caused by an earthquake, typically causes an increase in pore water pressure and subsequent liquefaction. Based on the results of our subsurface investigation, near-surface soil at the site consists of dense to very dense granular soil and hard fine-grained soil with varying amounts of gravel, cobbles, and boulders. This soil profile will have a low potential for liquefaction.

2.3.2 Lateral Spreading

Lateral spreading is the lateral movement of soil resulting from liquefaction of subadjacent materials. Since we anticipate that there is a low potential for liquefaction of soil at the site, the potential for lateral spreading to occur is also considered low.

2.3.3 Slope Instability

Slope instability includes landslides, debris flows, and rockfall. No landslides, debris flows or rockfall hazards were observed in the project area. Due to the relatively level topography of the site and general surrounding area the potential for slope instability is considered low.

3 SUBSURFACE EXPLORATION

We performed our subsurface exploration to characterize typical subsurface conditions at the site.

3.1 FIELD EXPLORATION

We explored subsurface conditions at the site on September 3, 2020 by excavating four exploratory test pits to depths ranging from approximately 3.5 to 10 feet below the ground surface (bgs). Test pits were excavated with a Takeuchi TB240 mini-excavator equipped with a 24-inch bucket. Test pit locations were selected based on locations of proposed improvements and site access.

An engineer from our firm logged the soil conditions exposed in the test pits, visually classified soil, and collected bulk soil samples for laboratory testing. Soil samples were packaged and sealed in the field to reduce moisture loss and were returned to our laboratory for testing. Upon completion, test pits were backfilled with the excavated soil. The approximate locations of our test pits are shown on Figure 2, Test Pit Location Plan.

3.2 SUBSURFACE SOIL CONDITIONS

Near-surface soil encountered in our test pits consisted of approximately 1 to 2 feet of existing fill. The existing fill was comprised of loose to dense silty Sand with gravel (SM) and poorly graded Gravel with clay and sand (GP-GC) and varying amounts of cobbles. The upper 4 to 6 inches of existing fill contained organic material. Underlying the existing fill, Test Pits TP-1, TP-2 and TP-3 encountered dense to very dense clayey Gravel with sand (GC). Test Pit TP-3 encountered refusal on cobbles and very dense soil in the clayey Gravel with sand (GC) layer at a depth of approximately 3.5 feet bgs. Hard gravelly fat Clay with sand (CH) containing some boulders was encountered below the clay Gravel with sand (GC) in Test Pits TP-1 and TP-2 at depths of 3 feet bgs and below the existing fill in Test Pit TP-4 at a depth of 2 feet bgs. The clay layer was approximately 4 to 4.5 feet deep in Test Pits TP-1 and TP-4 and was underlain by very dense clayey Gravel with sand (GC). Test Pit TP-1 and TP-4 were excavated to depths of approximately 10 and 9 feet bgs, respectively. Test Pit TP-2 encountered essential refusal in hard clay soil at 7.5 feet bgs. More detailed descriptions of the subsurface conditions observed are presented in our Test Pit Logs in Appendix C.

3.3 GROUNDWATER CONDITIONS

During our subsurface investigation, we observed an onsite piezometer located near the south central edge of the site. Based on our previous experience in the project area, we understand that the piezometer (designated as 12-2) was installed by the Truckee River Watershed Council (TRWC) in 2012 as part of the wetland restoration project located immediately adjacent to and south of the site. NV5 contacted TRWC to obtain groundwater elevation measurements collected in the onsite piezometer. Based on our review of groundwater elevation data, it appears that depths to groundwater measured in piezometer 12-2 ranged from 1.18 to 5.74 feet bgs between October 31, 2017 and October 5, 2018.

We did not observe groundwater during our subsurface exploration to the depths explored. However, fluctuations in soil moisture content and groundwater levels should be anticipated depending on precipitation, irrigation, runoff conditions, and other factors. Based on our experience in the project area, seasonal saturation of near-surface soil should be anticipated, especially during and immediately after seasonal snowmelt.

Dense to very dense soil was encountered in Test Pits TP-1 through TP-3 at depths ranging from approximately 1 to 1.5 feet bgs. Hard fine-grained soil was encountered in Test Pits TP-1, TP-2 and TP-4 at depths ranging from approximately 2 to 3 feet bgs. Groundwater elevations measured in the onsite piezometer 12-2 indicate seasonally high groundwater at depths a little over 1 foot bgs at the site. Depending on final site grades, rainfall, irrigation practices, and other factors, perched groundwater will likely seasonally develop above onsite dense and/or fine-grained soil. Perched groundwater may cause moisture intrusion into foundation crawlspaces or through concrete slab-on-grade floors, degradation of asphalt concrete pavements, and other adverse conditions. Mitigation measures such as gravel underdrains, elevated building pads, trench drains, water barriers, or other methods may be required to intercept shallow groundwater or reduce potential adverse effects on project features.

We recommend the project civil engineer in conjunction with NV5 review the subsurface information available within this report and revealed during site preparation in order to develop appropriate surface and subsurface drainage plans. The contractor should prepare detailed as-built drawings of the subsurface drainage system.

4 LABORATORY TESTING

We performed laboratory tests on bulk soil samples collected from our exploratory test pits to evaluate their engineering properties. We performed the following laboratory tests:

- Atterberg Limits / Plasticity (ASTM D4318)
- Sieve Analysis (ASTM D422)
- Expansion Index (ASTM D4829)

Sieve analysis and Atterberg limits data resulted in Unified Soil Classification System (USCS) classifications of gravelly fat Clay with sand (CH) and clayey Gravel with sand (GC). Expansion index testing of a soil sample collected from Test Pit TP-3 at a depth of 1 foot bgs indicated that the clay fines in the clayey Gravel with sand (GC) has a very low potential for expansion. Expansion index testing of a composite sample of clay fines from Test Pit TP-1 and TP-4 indicated that the clay soil has a moderate potential for expansion. More specific soil classification and laboratory test data is included in Appendix D. USCS classifications and Atterberg indices are summarized below.

Table 4.1 – Summary of Laboratory Test Results

Test Pit Number	Depth (feet)	USCS Classification	Percent Passing #200 Sieve	Liquid Limit	Plasticity Index
TP-1	3.5 – 4	Gravelly Fat Clay with Sand	49.9	58	31
TP-1	9.5 - 10	Clayey Gravel with Sand (GC)	21.6	--	--
TP-2	2 – 2.5	Clayey Gravel with Sand (GC)	46.6	--	--
TP-4	3.5 - 4	Gravelly Fat Clay with Sand (CH)	50.2	51	28

5 CONCLUSIONS

The following conclusions are based on our field observations, laboratory test results, and our experience in the area.

1. Based on the results of our laboratory testing, the fat clay soil encountered in Test Pits TP-1, TP-2, and TP-4 at depths ranging from approximately 2 to 3 feet bgs is moderately expansive. Due to the potential for adverse effects caused by expansive soil, the moderately expansive clay soil is not suitable for direct support of proposed structures on conventional shallow spread foundations, slabs-on-grades or pavements. We have provided recommendations for mitigating the effects of expansive soil in the following section of this report. However, we recommend the most feasible option is to remove approximately 2 feet of potentially expansive soil below bottom of footing subgrade and replace with structural fill. A representative of NV5 should be onsite during grading to observe subsurface conditions and assist in identifying areas of potentially expansive soil.
2. Approximately 1 to 2 feet of loose to medium dense existing fill was encountered across the site during our subsurface exploration. Due to the potential for excessive settlement, the fill will not be suitable for support of structures or pavement. Structures and pavement should be founded on underlying native non-expansive coarse-grained soil, or the existing fill can be removed and replaced with compacted structural fill. As we recommend removing approximately 2 feet of potentially expansive soil below bottom of footing subgrade and replace with structural fill, we anticipate existing fill can be removed during this process and replaced with structural fill.
3. Although groundwater was not encountered in our test pits to the maximum depth explored, near-surface soil layers will likely become seasonally saturated. Groundwater elevations measured by others in the onsite piezometer (12-2) indicates that depths to groundwater fluctuate seasonally and have been near the ground surface at a depth of about 1.18 feet bgs. We anticipate that the clay soil underlying the site will have low permeability and generate a significant volume of storm water runoff. In addition, we encountered hard fine-grained soil and dense to very dense coarse grained soil at depths of about 1 to 2 feet below existing site grades. Seasonal runoff and perched groundwater may cause moisture intrusion through concrete slab-on-grade floors, degradation of asphalt concrete pavements, and other adverse conditions. Due to the relatively level topography of the site, water may pond on the ground surface in some areas. Consequently, positive surface and subsurface drainage will be important across the site. We have provided recommendations to reduce the potential for these adverse effects in the *Recommendations* section of this report.
4. The Takeuchi TB240 mini-excavator used for our field exploration encountered refusal on very dense/hard soil and cobbles in the central portions of the site. Confined excavations for footings and underground utilities that extend into dense or hard soil

may be difficult. A significant amount of cobbles and over-sized material should be anticipated in onsite excavations.

5. The fat clay soil is generally not suitable for reuse as structural fill due to the high percentage of fine-grained soil and moderate expansion potential. In addition, a high fines content was present in the coarse grained soil [clayey Gravel with sand (GC)] encountered at the site. Some of the coarse grained soil may be suitable for reuse as structural fill, however, selective grading may be required to separate the fine-grained soil from coarse-grained soil. Structural fill meeting the requirements outlined in the *Recommendations* section of this report should be used where structural fill is required. Moisture content, dry density, and relative compaction of structural fill should be evaluated by our firm at regular intervals during structural fill placement.
6. Based on site grading, we anticipate existing fill will be encountered at subgrade for pavement. We recommend removing the existing fill and replacing with structural fill as noted above. Structural fill or coarse grained site soil should provide adequate pavement support. However, seasonal saturation of near-surface soil should be considered in the design of pavement areas. Subdrains under pavement areas and/or v-ditches along the side of roads should be considered to reduce saturation.

6 RECOMMENDATIONS

The following geotechnical engineering recommendations are based on our understanding of the project as currently proposed, our field observations, results of our laboratory tests, engineering analyses, and our experience in the area.

6.1 EARTHWORK

The following sections present our recommendations for site clearing and grubbing, preparation for and placement of fill material, cut/fill slope grading, temporary excavations, utility trench construction, and construction dewatering.

6.1.1 Clearing and Grubbing

Areas proposed for fill placement, road and driveway construction, and building areas should be cleared and grubbed of vegetation and other deleterious materials. Existing vegetation, organic topsoil, and any debris should be stripped and hauled offsite or stockpiled outside the construction limits.

Man-made debris and backfill soil in our exploratory test pits or any other onsite excavations should be over-excavated to underlying, competent material and replaced with compacted structural fill. Grubbing may be required where concentrations of organic soil or tree roots are encountered during site grading.

Existing fill should be removed in areas that will support foundation elements, earth retention structures, concrete slabs-on-grade, and pavement sections. Based on our field observations, the depth of existing fill ranges from about one to two feet across the site. Based on our subsurface exploration, we expect that the upper 6 inches of the existing fill contains organics and may be stockpiled for future use in landscape areas, but is not suitable for use as structural fill.

Existing fill should either be replaced with compacted structural fill or improvements may be founded directly on properly prepared underlying native coarse grained soil but not fat clay soil. Existing fill material will be suitable for re-use as structural fill material provided any debris exceeding eight inches in maximum dimension and all organic or deleterious material are removed prior to placement. Preparation of the subgrade exposed by over-excavation and requirements for structural fill should be in accordance with recommendations provided below.

All rocks greater than 8 inches in greatest dimension (oversized rock) should be removed from the top 12 inches of soil, if encountered. Oversized rock may be used in landscape areas, rock faced slopes, or removed from the site. Oversized rock should not be placed in fill without prior approval by the project geotechnical engineer.

6.1.2 Preparation for Fill Placement

Prior to fill placement, all areas of existing fill material, man-made debris, or backfill soil should be removed to expose non-expansive native soil as discussed in the previous section. Where potentially expansive soil is encountered at subgrade level, please see the following section to address potentially expansive soil.

Where fill placement is planned, the near-surface soil should be scarified to a depth of about 12 inches or to competent material and then uniformly moisture conditioned to within 2 percent of the optimum moisture content. Scarified and moisture conditioned soil should be recompacted with appropriate compaction equipment and proof rolled with a loaded, tandem-axle truck under the observation of an NV5 representative. Any areas that exhibit pumping or rutting should be over-excavated and replaced with compacted structural fill placed according to the recommendations below.

6.1.3 Expansive Soil

Based on the results of our field investigation and laboratory testing, moderately expansive clay soil is present across the site at depths ranging from approximately 2 to 3 feet bgs and extends to depths of about 6.5 to 7.5 feet bgs. Expansive soil is characterized by its ability to undergo significant volume change (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from rainfall, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may cause settlement or heave of structures, concrete slabs supported-on-grade, or pavements supported over this material. Depending on the extent and location below finished subgrade, this soil could have a detrimental effect on the proposed construction.

We recommend a representative of NV5 be present during site preparation and grading to evaluate proposed building and pavement areas for the presence of near-surface, expansive soil. In the event expansive soil is encountered or suspected within 36 inches of the bottom of foundations, slabs, or pavements, one or more of the mitigation options discussed below should be implemented.

Several options are available to mitigate or reduce potential adverse effects to structures, concrete slabs-on-grade, and pavements due to expansive subgrade soil. We recommend removing and replacing potentially expansive soil with non-expansive fill. Based on our subsurface exploration, the moderately expansive soil extends to depths of approximately 7.5 feet bgs. Based on the depth of the potentially expansive soil and the potential for groundwater seepage, it will likely not be feasible to remove the entire extent of the potentially expansive soil. As a result, we recommend removing approximately 2 feet of potentially expansive soil below bottom of footing subgrade and replacing with structural fill.

Another option includes using a deepened foundation system such as helical piers to extend through potentially expansive soil and bear in the very dense coarse-grained soil below the clay layer. The helical pier foundation system should be used in conjunction with post tensioned slabs-on-grade as the slabs-on-grade should not be placed directly on the potentially expansive soil at the site. Post-tensioned slabs-on-grade in conjunction with removing approximately 2 feet of potentially expansive soil below bottom of footing subgrade and replacing with structural fill will further help reduce the adverse effects of moderately expansive soil at the site.

Based on our experience in the site area, cracks parallel to pavement edges adjacent to landscaped and other areas subject to uncontrolled surface drainage and/or evaporation may occur due to seasonal wetting and drying of the subgrade soil. The pavement sections provided in Section 6.3.3 will not reduce this effect. If potential pavement cracking described above is not acceptable, we recommend removing a minimum of 2 feet of expansive clay from beneath the pavement and replacing it with compacted non-expansive fill.

With the exception of removing all expansive soil beneath structures, the options listed above are intended to reduce the potential for distress to structures and pavements caused by expansive soil. It should be noted these recommendations are consistent with those applied at other projects in the area with similar soil conditions. However, even with proper implementation of these recommendations, minor slab (interior and exterior) and/or pavement movement and/or distress may occur due to swelling and shrinking of the subgrade soil.

6.1.4 Fill Placement

All fill placed beneath structural improvements (e.g., foundation elements, pavements, and utility lines) and as part of a fill slope or retaining structure should be considered structural fill. Material used for structural fill should consist of uncontaminated, predominantly granular, non-expansive native soil or approved import soil. Structural fill should consist of granular material, nearly free of organic debris, with a liquid limit of less than 40, a plasticity index less than 15, 100 percent passing the 8-inch sieve, and less than 30 percent passing the No. 200 sieve. In general, near-surface site soil has greater than 30 percent passing the No. 200 sieve and does not meet the above recommendations. Some of the near-surface coarse grained contains less than 30 percent fines and may be suitable for reuse as structural fill. However, selective grading may be needed to separate the suitable coarse grained soil for reuse as structural fill. Based on our previous experience in the area, site soil may be above optimum moisture content even in late summer and may require air drying or additional compaction effort to reach the specified compaction. Moisture content, dry density, and relative compaction of fill should be evaluated by our firm at regular intervals during fill placement. Rock used in fill should be broken into fragments no larger than eight inches in diameter. Rocks larger than eight inches are considered oversized material and should be stockpiled for offhaul, later use in rock-faced slopes, or placement in landscape areas.

Imported fill material should be predominantly granular, non-expansive, and free of deleterious or organic material. Import material that is proposed for use on site should be submitted to NV5 for approval and laboratory analysis at least 72 hours prior to import.

If site grading is performed during periods of wet weather, near-surface site soil may be significantly above its optimum moisture content. These conditions could hamper equipment maneuverability and efforts to compact fill materials to the recommended compaction criteria. Fill material may require drying to facilitate placement and compaction, particularly during or following the wet season or spring snowmelt. Suitable compaction results may be difficult to obtain without processing the soil (e.g., discing during favorable weather, covering stockpiles during periods of precipitation, etc.).

Compaction requirements (maximum dry density and moisture content) specified in this report reference ASTM D1557 – *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort*. Structural fill should be uniformly moisture conditioned to within 2 percent of the optimum moisture content and placed in maximum 8-inch thick, loose lifts (layers) prior to compacting. Structural fill should be compacted to at least 90 percent of the maximum dry density. The upper 8 inches of structural fill in paved areas should be compacted to at least 95 percent of the maximum dry density. Moisture content, dry density, and relative compaction of fill should be evaluated by our firm at regular intervals during fill placement. The earthwork contractor should assist our representative by preparing test pads with the onsite earth moving equipment.

Structural fill material with more than 30 percent rock larger than ¾-inch cannot be reliably tested using conventional compaction testing equipment. We recommend that a procedural approach, or method specification, be used for quality assurance during rock fill placement rather than a specified relative compaction. The procedural requirements will depend on the equipment used, as well as the nature of the fill material, and will need to be determined by the geotechnical engineer on site. Based on our experience in the area, we anticipate that the procedural specification will require a minimum of six passes with a Cat 563 or similar, self-propelled vibratory compactor to compact a maximum 8-inch thick loose lift. Processing or screening of the fill may be required to remove rocks larger than 8-inches in maximum dimension. Continuous observation by an NV5 representative will be required during fill placement to confirm that procedural specifications have been met.

6.1.5 Cut/Fill Slope Grading

Permanent cut and fill slopes at the subject site should be stable at inclinations up to 2H:1V (horizontal to vertical); however, we recommend re-vegetating or armoring all cut/fill slopes to reduce the potential for erosion. Steeper slopes may be possible at the site provided slopes are protected from excessive erosion using rock slope protection or similar slope reinforcement. Slopes steeper than 2H:1V (horizontal to vertical) should be evaluated on a case-by-case basis.

Fill should be placed in horizontal lifts to the lines and grades shown on the project plans. Slopes should be constructed by overbuilding the slope face and then cutting it back to design slope grades. Fill slopes should not be constructed or extended horizontally by placing soil on an existing slope face and/or compacted by track walking.

Equipment width keyways and benches should be provided where fill is placed on side-slopes with gradients steeper than 5H:1V. The keyway should be excavated at the toe of the slope and extend into competent material. Benching must extend through loose surface soil into suitable material, and be performed at intervals such that no loose soil is left beneath the fill. NV5 should observe keyways and benches prior to fill placement.

The upper two to five feet of cut slopes should be rounded into the existing terrain above the slope to remove loose material and produce a contoured transition from cut face to natural ground. Scaling to remove unstable cobbles and boulders may be necessary. Fill slopes should be compacted as recommended for the placement of structural fill. The upper four to eight inches may be scarified to help promote revegetation.

6.1.6 Temporary Unconfined Excavations

Based on our understanding of the proposed project, temporary unconfined excavations deeper than four feet will not be needed. However, the following criteria may be used for construction of temporary cut slopes at the site.

Table 6.1.5.1 – Unconfined Excavation Slopes

Temporary Slope Inclination (Horizontal to Vertical)	Depth Below Ground Surface (feet)
0.5H:1V	0-6

These temporary slope inclinations may require modification in the field during construction or where loose soil, groundwater seepage, or existing fill is encountered. The slope should be scaled of loose cobbles and boulders. Higher slopes should be covered with strong wire or fabric, firmly secured to prevent roll down of cobbles or other deleterious materials. The contractor is responsible for the safety of workers and should strictly observe federal and local Occupational Safety and Health Administration (OSHA) requirements for excavation shoring and safety. Some raveling of temporary cut slopes should be anticipated. During wet weather, surface water runoff should be prevented from entering excavations. To reduce the likelihood of sloughing or failure, temporary cut slopes must not remain over the winter.

6.1.7 Underground Utility Trenches

We anticipate that the contractor will be able to excavate underground utility trenches using conventional earthmoving equipment across the majority of the site. However, confined excavations that extend into dense coarse grained and hard fine-grained soil may be difficult. Due to the very hard nature of fine-grained soil encountered in our test pits, we anticipate that a track-mounted excavator equipped with a ripper or hydraulic hammer will be required below about 2 feet across the site. An excavator with a “thumb” attachment may increase ease of boulder removal at the site.

We expect that some caving and sloughing of utility trench sidewalls will occur. OSHA requires all utility trenches deeper than five feet bgs be shored with bracing equipment or sloped back prior to entry.

Shallow subsurface seepage may be encountered in trench excavations, particularly if utility trenches are excavated during the spring or early summer. The earthwork contractor may need to employ dewatering methods as discussed in the *Construction Dewatering* section below to excavate, place, and compact trench backfill materials.

Soil used as trench backfill should be non-expansive and should not contain rocks greater than 3 inches in maximum dimension. Trench backfill should consist of uniformly moisture conditioned soil and be placed in maximum 8-inch thick loose lifts prior to compacting. Unless otherwise specified by the applicable local utility district, pipe bedding and trench backfill should be compacted to at least 90 percent of the maximum dry density. Trench backfill placed within 8 inches of building subgrade and driveway areas should be compacted to at least 95 percent of the maximum dry density. The moisture content, density, and relative compaction of fill should be tested by NV5 at regular intervals during fill placement.

6.1.8 Construction Dewatering

During our subsurface exploration, we did not encounter groundwater seepage in our exploratory test pits. However, groundwater elevations measured by others in the onsite piezometer (12-2) indicates that depths to groundwater fluctuate seasonally and have been near the ground surface at a depth of about 1.18 feet bgs. We anticipate that the clay soil underlying the site will have low permeability and generate a significant volume of storm water runoff. If grading is performed during or immediately following the wet season or spring snowmelt, seepage will likely be encountered during grading. We should observe those conditions, if they are encountered, and provide site specific subsurface drainage recommendations. The following recommendations are preliminary and are not based on a groundwater flow analysis.

We anticipate that dewatering of excavations can be performed by gravity or by constructing sumps to depths below the excavation and removing water with pumps. To maintain stability of the excavation when placing and compacting trench backfill, groundwater levels should be drawn down at least two feet below the lowest point of the excavation.

If seepage is encountered during trench excavation, it may be necessary to remove underlying saturated soil and replace it with free draining, open-graded, crushed rock (drain rock). Soil backfill may be placed after backfilling with drain rock to an elevation higher than encountered groundwater.

6.2 SURFACE WATER AND FOUNDATION DRAINAGE

This section of the report presents our recommendations to reduce the possibility of surface water and near-surface groundwater entering below grade areas. Care should be taken to reduce water and moisture introduced into the building interior, including crawlspaces, during construction.

Based on our observations and past experience with geotechnical investigations in the project vicinity, there is a relatively high potential for seasonal saturation of near-surface soil and groundwater seepage into foundation areas. Previous measurements of groundwater elevations collected by others at the site indicate seasonal fluctuations in groundwater elevations underlying the site and a near-surface depth of 1.18 feet bgs. We anticipate that the clay soil underlying the site will have low permeability and generate a significant volume of storm water runoff. In addition, near-surface dense coarse grained and hard fine-grained soil was encountered in our test pits at depths of about 1 to 2 feet bgs. Depending on final site grades, rainfall, irrigation practices, and other factors beyond the scope of this study, perched groundwater will likely seasonally develop above onsite dense and/or fine-grained soil. Near-surface groundwater may migrate through concrete floor slabs, degrade asphalt concrete pavements, increase frost heave, and contribute to other adverse conditions.

Final site grading should be planned so that surface water is directed away from all foundations and pavements. Ponding of surface water should not be allowed near pavements or structures. Paved areas should be sloped away from structures a minimum of 2 percent and drainage gradients should be maintained to carry all surface water to a properly designed infiltration facility. The surface drainage system should generally be kept separate from the foundation (subsurface) drainage system. Surface water should not be infiltrated at elevations above the lowest foundation elements.

Drains should be constructed on the upslope side of exterior foundations and should be placed along continuous interior wall foundations. Drains should extend to properly designed infiltration facilities. Recommended subsurface drain locations can be provided at the time of construction and when foundation elevations and configuration are known. Due to the gentle topography of the site, elevations of foundations should be carefully planned so that it is possible to install gravity-fed drains that daylight a minimum of 10 feet from structures. Subsurface and foundation drain locations should be included on the project plans.

All foundation and slab-on-grade concrete should have a water to cement ratio of 0.45 or less. Underslab or blanket drains should be considered in slab-on-grade floor areas to reduce moisture transmission through the floor and help maintain subgrade support, particularly if the floor surface is lower than the adjacent exterior grade.

Where utility trenches slope toward structures, potential flow paths through utility trench backfill should be plugged with a less permeable material at the exterior of the foundation. All utility pipes should have sealed joints.

Roof drip-lines should be protected from erosion with a gravel layer and riprap. Roof downspouts should be directed to a closed collector pipe that discharges flow to positive drainage. Backfill soil placed adjacent to building foundations should be placed and compacted such that water is not allowed to pond or infiltrate. Backfill should be free of deleterious material and placed and compacted in accordance with the above earthwork recommendations.

6.3 STRUCTURAL IMPROVEMENT DESIGN CRITERIA

The following sections provide design criteria for foundations, seismic design, slabs-on-grade, retaining walls, and pavement sections.

6.3.1 Foundations

Our opinion is that shallow spread foundations are suitable for support of the proposed structures. The foundations should bear in structural fill (as recommended in Section 6.1.3) or coarse-grained nonexpansive undisturbed soil.

Exterior foundations should be embedded a minimum of 18 inches below the lowest adjacent exterior finish grade for frost protection and confinement. The bottom of interior footings should be at least 12 inches below lowest adjacent finish grade for confinement. Reinforcing steel requirements for foundations should be determined by the project structural engineer.

Foundations founded in compacted fill or coarse-grained nonexpansive undisturbed soil may be designed using an allowable bearing capacity of 2,500 psf for dead plus live loads. Allowable bearing pressures may be increased by 33 percent for transient loading such as wind or seismic loads.

Resistance to lateral loads (including transient loads) may be provided by frictional resistance between the bottom of concrete foundations and the underlying soil, and by passive soil pressure against the sides of foundations. Lateral resistance derived from passive earth pressure can be modeled as a triangular pressure distribution ranging from 0 psf at the ground surface to a maximum of 350d psf, where d equals the depth of the foundation in feet. A coefficient of friction of 0.4 may be used between poured-in-place concrete foundations and the underlying structural fill. Lateral load resistance provided by passive soil pressure and friction may be used in combination without reduction.

Total settlement of individual foundations will vary depending on the plan dimensions of the foundation and actual structural loading. Based on anticipated foundation dimensions and loads, we estimate that total post-construction settlement of footings designed and constructed in accordance with our recommendations will be on the order of ½ inch. Differential settlement between similarly loaded, adjacent footings is expected to be less than ¼ inch, provided footings are founded on similar materials (e.g., all on structural fill or native soil). Differential settlement between adjacent footings founded on dissimilar materials (e.g., one footing on structural fill and an adjacent footing on undisturbed coarse-grained soil) may approach the maximum anticipated total settlement. Settlement of foundations is expected to occur rapidly and should be essentially complete shortly after initial application of loads.

Loose material remaining in footing excavations should be removed to expose firm, unyielding material or compacted to at least 90 percent relative compaction. Footing excavations should be moistened prior to placing concrete to reduce risk of problems caused by wicking of moisture from curing concrete. NV5 should observe footing excavations prior to reinforcing steel and concrete placement.

6.3.2 Seismic Design Criteria

In accordance with the 2019 California Building Code (CBC), the seismic design criteria shown in the table below should be used for the project site. The values were obtained for the site using the online Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps tool found at https://seismicmaps.org. Input values included the site's approximate latitude and longitude obtained from Google Earth and the Site Class. Site Class selection was based on our literature review, our subsurface investigation, our experience in the area, and the Site Class definitions provided in Chapter 20 of ASCE 7-16.

Table 6.3.2.1 – 2019 CBC Seismic Design Parameters

Description	Value	Reference
Approximate Latitude/Longitude	39.3264ºN/120.1691 ºW	Google Earth
Site Class	C	Table 20.3-1, ASCE 7-16
Mapped Short-Period Spectral Response Acceleration Parameter	S_S = 1.345 g	Figure 1613.2.1(1), 2019 CBC
Mapped 1-Second Period Spectral Response Acceleration Parameter	S_1 = 0.444 g	Figure 1613.2.1(2), 2019 CBC
Short Period Site Coefficient	F_A = 1.2	Table1613.2.3(1), 2010 CBC
1-Second Period Site Coefficient	F_V = 1.5	Table 1613.2.3(2), 2019 CBC
Site Adjusted Short-Period Spectral Response Acceleration Parameter	S_{MS} = 1.614 g	Equation 16-36, 2019 CBC
Site Adjusted 1-Second Period Spectral Response Acceleration Parameter	S_{M1} = 0.666 g	Equation 16-37, 2019 CBC
Design Short-Period Spectral Response Acceleration Parameter	S_{DS} = 1.076 g	Equation 16-38, 2019 CBC
Design 1-Second Period Spectral Response Acceleration Parameter	S_{D1} = 0.444 g	Equation 16-39, 2019 CBC
Peak Ground Acceleration	PGA = 0.579 g	Figure 22-9, ASCE 7-16
Risk Category	II	Table 1604.5, 2019 CBC
Seismic Design Category	D	Tables1613.2.5 (1) & (2) 2019 CBC

6.3.3 Slab-on-Grade Construction

Conventional concrete slabs-on-grade may be used in conjunction with perimeter concrete footings; assuming our recommendation for removal of existing fill and approximately 2 feet of potentially expansive soil below bottom of footing subgrade and replacing with structural fill is utilized at the site. Slabs-on-grade should be a minimum of four inches thick. If floor loads higher than 250 psf, intermittent live loads, or vehicle loads are anticipated, the project structural engineer should provide slab thickness and steel reinforcing requirements.

Prior to constructing concrete slabs, the upper eight inches of slab subgrade should be scarified, uniformly moisture conditioned to within two percent of optimum moisture content and compacted to at least 90 percent of the maximum dry density. Scarification and compaction may not be required if floor slabs are placed directly on undisturbed compacted structural fill.

Slabs should be underlain by at least four inches of Class 2 aggregate base placed over the prepared subgrade. The aggregate base should be compacted to a minimum of 95 percent of the maximum dry density. If a subdrain is installed as described below, slabs may be constructed over the crushed gravel layer provided a moisture barrier will be placed over the gravel.

To reduce the potential for groundwater intrusion, the project architect and/or owner should consider constructing a drain beneath concrete slabs-on-grade in areas where groundwater and/or saturated soil may be present during wet periods. Subdrains should consist of a minimum of four inches of clean crushed gravel placed over native subgrade leveled or sloped at two percent towards a 4-inch diameter perforated drain pipe. The drain pipe should be placed with perforations faced down in a minimum 12-inch wide gravel-filled trench. The depth of the trench may vary depending on cover requirements for the drain pipe and the slope required to drain water from beneath the slab to a properly constructed infiltration facility. A minimum of one pipe should be installed in each area of the slab surrounded by continuous perimeter foundation elements.

In slab-on-grade areas where moisture sensitive floor coverings are proposed, a vapor barrier (e.g., 15 mil Stego® Wrap) should be placed over the base course or gravel subdrain to reduce the migration of moisture vapor through the concrete slab. The vapor barrier should be installed in accordance with the manufacturer's instructions. Concrete should be placed directly on the vapor barrier. All slab concrete should have a water-cement ratio of 0.45 or less. Alternatively, two inches of spray insulation may be placed between the gravel layer and slab-on-grade.

Regardless of the type of vapor barrier used, moisture can wick up through a concrete slab. Excessive moisture transmission through a slab can cause adhesion loss, warping, and peeling of resilient floor coverings, deterioration of adhesive, seam separation, formation of air pockets, mineral deposition beneath flooring, odor, and fungi growth. Slabs can be tested for water transmissivity in areas that are moisture sensitive. Commercial sealants, moisture retarding admixtures, fly ash, and a reduced water-to-cement ratio can be incorporated into the concrete to reduce slab permeability. To further reduce the chance of moisture transmission, a waterproofing consultant should be contacted.

Exterior slabs-on-grade such as sidewalks should be placed on a minimum 6-inch thick compacted aggregate base section to help reduce the potential for frost heave. Deleterious material should be removed from floor slab subgrades prior to concrete placement. For exterior slabs, the upper eight inches of native soil should be scarified, moisture conditioned, and compacted to at least 90 percent of the maximum dry density. We recommend a minimum concrete thickness of four inches. Where traffic loads are possible, we recommend a minimum concrete thickness of six inches. Concrete used for sidewalk construction should meet the durability requirements of Section 1904 of the 2019 CBC. The Exposure Class should be F2 unless the surface will be exposed to deicing chemicals, in which case the Exposure Class should be F3.

Concrete slabs impart a relatively small load on the subgrade (approximately 50 psf). Therefore, some vertical movement should be anticipated from possible expansion, freeze-thaw cycles, or differential loading.

6.3.4 Retaining Wall Design Criteria

Retaining walls should be designed to resist lateral earth pressures exerted by retained soil plus additional lateral forces (i.e., surcharge loads) that will be applied to walls. Pressures exerted against retaining walls may be calculated by modeling soil as an equivalent fluid with unit weights presented in the following table. The equivalent fluid weights are for well-drained walls.

Table 6.3.4.1 – Equivalent Fluid Unit Weights*

Loading Condition	Retained Cut or Compacted Fill (Level Backfill)	Retained Cut or Compacted Fill (Backfill Slopes up to 2H:1V)
At-Rest Pressure (pcf)	50	70
Active Pressure (pcf)	35	50
Passive Pressure (pcf)	350	350
Coefficient of Friction	0.40	0.40

*Equivalent fluid unit weights presented are ultimate values and do not include a factor of safety. Passive pressures provided assume footings are founded in competent native soil or compacted and tested fill.

The values presented in Table 6.3.4.1 assume that the retained soil will not exceed approximately six feet in height and that no surcharge loads (e.g., footings, vehicles) are anticipated within a horizontal distance of approximately three feet from the face of the wall. These values are also based on the assumption that retaining wall foundations will bear in structural fill. Fifty percent of any uniform areal surcharge placed at the top of a restrained wall (at-rest condition) may be assumed to act as a uniform horizontal pressure over the entire height of the wall. This may be reduced to 30 percent for unrestrained walls (active condition). In addition, we can provide retaining wall and rockery wall design criteria for specific loading and backfill configurations, if requested.

The use of the tabulated active pressure unit weight requires that the wall design accommodate sufficient deflection for mobilization of the retained soil to occur. Typically, a wall yield of at least 0.1 percent of the wall height is sufficient to mobilize active conditions in granular soil (*Caltrans Bridge Design Specifications*, August 2004). If the walls are rigid or restrained to prevent rotation, at-rest conditions should be used for design.

We recommend including additional lateral loading (ΔP_{ae}) on retaining structures due to seismic accelerations when designing walls greater than six feet in height. The USGS Seismic Design Maps tool was used to establish seismic design parameters and provides an estimated peak ground acceleration (PGA) corresponding to the maximum considered earthquake (MCE_R) ground motion.

For an earthquake producing a design PGA of 0.579g and a horizontal seismic coefficient (k_h) equal to one-third the PGA, and following the Mononobe-Okabe procedure to evaluate seismic loading on retaining walls, we recommend that the resulting additional lateral force applied to retaining structures with drained level backfill be estimated as $\Delta P_{ae}=6.4H^2$ (pounds per foot), where H is the height of the wall in feet. The additional seismic force may be assumed to be applied at a height of H/3 above the base of the wall. This seismic loading is for standard retaining walls with drained, level backfill conditions only. NV5 should be consulted to provide seismic loading values for more critical walls or walls with non-level or non-drained backfill conditions. The use of reduced factors of safety is often appropriate when reviewing overturning and sliding resistance during seismic events.

Heavy compaction equipment or other loads should not be used in close proximity to retaining walls unless the wall is designed or braced to resist the additional lateral forces. If planned surface loads are closer to the top of the retaining wall than one-half of its height, NV5 should review the loads and loading configuration.

Retaining wall backfill should consist of granular material, nearly free of organic debris, with a liquid limit less than 40, a plasticity index less than 15, 100 percent passing the 8-inch sieve, and less than 30 percent passing the No. 200 sieve. Backfill should be uniformly moisture conditioned to within two percent of the optimum moisture content and compacted with appropriate compaction equipment to at least 90 percent of the maximum dry density. If the retaining wall backfill will support foundations or rigid pavements, the backfill should be compacted to at least 95 percent of the maximum dry density. An NV5 representative should review and provide specific backfill criteria for all retaining walls over 10 feet in height. Utilities that run through retaining wall backfill should allow for vertical movement where they pass through the wall.

Retaining wall design criteria presented in Table 6.3.4.1 assume that retaining walls are well-drained to reduce hydrostatic pressures. Back-of-wall drainage consisting of graded gravel drains and geosynthetic blankets should be installed to reduce hydrostatic pressures. Gravel drains should consist of at least 18 inches of open-graded, crushed rock placed directly behind the wall, wrapped in non-woven geotextile filter fabric such as Mirafi 140N or approved equivalent. Drains should have a minimum 4-inch diameter, perforated drain pipe placed at the base of the wall, inside the drain rock, with perforations placed down. The pipe should be sloped so that water is directed away from the wall by gravity. A geosynthetic drainage blanket such as Enkadrain™ or equivalent should also be placed against the back of the wall. Backfill must be compacted carefully so that equipment or soil does not tear or crush the drainage blanket.

We recommend that subsurface walls and slabs be treated to resist moisture migration. Moisture retarding material should consist of sheet membrane rubberized asphalt, polymer-modified asphalt, butyl rubber, or other approved material capable of bridging nonstructural cracks, applied in accordance with the manufacturers recommendations. A manufactured water-stop and/or key should be placed at all cold joints. The project architect or contractor may wish to consult with a waterproofing expert regarding additional options for reducing moisture migration into living areas.

6.3.5 Pavement Sections

Based on our experience in the Tahoe-Truckee area, environmental factors, such as freeze-thaw cycles and thermal cracking will usually govern the life of asphalt concrete (AC) pavements. Thermal cracking of asphalt pavement allows more water to enter the pavement section, which promotes deterioration and increases maintenance costs. In addition, snow removal activities on site may result in heavy traffic loads. For these reasons, we recommend a minimum driveway/parking area pavement section of three inches of AC on six inches of aggregate base (AB).

As mentioned previously in this report, depending of final site grading, subgrade soil may consist of expansive clay. Based on our experience in the site area, cracks parallel to pavement edges adjacent to landscaped and other areas subject to uncontrolled surface drainage and/or evaporation may occur due to seasonal wetting and drying of the expansive subgrade soil. The pavement section provided above will not reduce this effect. If potential pavement cracking described above is not acceptable, we recommend removing a minimum of 2 feet of expansive clay from beneath the pavement and replacing it with compacted non-expansive fill prior to pavement construction.

We recommend that paving stones in non-traffic areas be supported by a minimum of four inches of Caltrans Class 2 AB. For light traffic areas, the AB section should be increased to at least six inches. An underlying concrete slab is not necessary for light traffic and non-traffic areas. Prior to placing aggregate base, the subgrade should be prepared in accordance with the recommendations provided below.

Due to seasonal saturation of the underlying AB, potentially expansive soil and freeze-thaw cycles, some vertical movement of paving stones over time should be anticipated. This movement can likely be reduced by constructing a drainage layer beneath paving stone pavements. The drainage layer should consist of at least 4 inches of compacted clean angular gravel under the AB layer. The drainage layer should contain a minimum 4-inch diameter perforated pipe, sloped to drain water from beneath the pavement towards an infiltration facility. All open-graded gravel should be consolidated using vibratory compaction equipment. A minimum 4-ounce non-woven filter fabric such as Mirafi 140N or approved equivalent should be placed between the compacted gravel subdrain and aggregate base course.

The upper six inches of native soil should be compacted to at least of 95 percent of the maximum dry density prior to placing AB. AB should also be compacted to a minimum of 95 percent of the maximum dry density. Subgrade and AB dry densities should be evaluated by NV5. In addition to field density tests, the subgrade should be proof rolled under NV5's observation prior to AB placement. If temporary pavement is used during construction, we recommend preparation of the subgrade and AB as outlined above prior to construction of the temporary pavement.

To improve pavement performance and lifespan, we recommend promoting drainage of the pavement subgrade. Drainage can be accomplished through roadway layout and design, subdrains, and/or roadside ditches. An NV5 representative should evaluate pavement subgrade at the time of construction and provide location-specific recommendations for subdrains. Typical subdrains consist of a shallow trench with a minimum 4-inch diameter perforated pipe encased in open-graded gravel wrapped in filter fabric. Pavement subgrade should be graded and prepared such that water drains from beneath the pavement section to a properly designed infiltration facility. Subdrains may be used in conjunction with roadside ditches located on one or both sides of the roadway. Roadside ditches should be constructed to a depth greater than the proposed pavement and subdrain section. Ditches should be rock-lined or vegetated to help reduce erosion and convey water to a properly designed infiltration facility.

We recommend installing cut-off curbs where paved areas abut landscaped areas to reduce migration of irrigation water into subgrade soil or baserock, promoting asphalt failure. Cut-off curbs should be a minimum of 4-inches wide, and extend through the aggregate base a minimum of four inches into subgrade soil.

6.4 PLAN REVIEW AND CONSTRUCTION MONITORING

Construction monitoring includes review of plans and specifications and observation of onsite activities during construction as described below. We should review final grading and foundation plans prior to construction to evaluate whether our recommendations have been implemented and to provide additional and/or modified recommendations, if necessary. We also recommend that our firm be retained to provide construction monitoring and testing services during site grading, foundation, retaining wall, underground utility, and road construction to observe subsurface conditions with respect to our engineering recommendations.

7 LIMITATIONS

Our professional services were performed consistent with generally accepted geotechnical engineering principles and practices employed in the site area at the time the report was prepared. No warranty, express or implied, is intended.

Our services were performed consistent with our agreement with our client. We are not responsible for the impacts of changes in environmental standards, practices, or regulations subsequent to performance of our services. We do not warrant the accuracy of information supplied by others or the use of segregated portions of this report. This report is solely for the use of our client. Reliance on this report by a third party is at the risk of that party.

If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in the report should be reviewed by NV5 to assess the relevancy of our conclusions and recommendations. Additional field work and laboratory tests may be required to revise our recommendations. Costs to review project changes and perform additional field work and laboratory testing necessary to modify our recommendations are beyond the scope of services provided for this report. Additional work will be performed only after receipt of an approved scope of services, budget, and written authorization to proceed.

Analyses, conclusions, and recommendations presented in this report are based on site conditions as they existed at the time we performed our subsurface exploration. We assumed that subsurface soil conditions encountered at the locations of our subsurface explorations are generally representative of subsurface conditions across the project site. Actual subsurface conditions at locations between and beyond our explorations may differ. If subsurface conditions encountered during construction are different than those described in this report, we should be notified so that we can review and modify our recommendations as needed. Our scope of services did not include evaluating the project site for the presence of hazardous materials or petroleum products.

The elevation or depth to groundwater and soil moisture conditions underlying the project site may differ with time and location. The project site map shows approximate exploration locations as determined by pacing distances from identifiable site features. Therefore, exploration locations should not be relied upon as being exact.

The findings of this report are valid as of the present date. Changes in the conditions of the property can occur with the passage of time. These changes may be due to natural processes or human activity, at the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or a broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

8 REFERENCES

American Society of Civil Engineers. (2017). *ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures.* Print.

California Building Standards Commission. (2019). *2019 California Building Code.* Print.

California Department of Transportation. (2012). *Highway Design Manual.* Print.

California Department of Transportation. (2008). *Bridge Design Specifications.*

California Geological Survey. (2012). *Geologic Map of North Lake Tahoe-Donner Pass Region, Northern Sierra Nevada, California.* By Arthur Gibbs Sylvester et al. Print.

California Geological Survey. (2005). *Geologic Map of the Lake Tahoe Basin, California and Nevada.* By George J. Saucedo. Print.

California Geological Survey. (2010). *Fault Activity Map of California.* Geologic Data Map No. 6, By Charles W. Jennings and William A. Bryant. *<http://maps.conservation.ca.gov/cgs/fam/>*

Das, Braja M. *Principles of Foundation Engineering, 6th Edition.* 2007. Thomson. Print.

Geoprofessional Business Association (GBA). (2019). *Important Information about This Geotechnical-Engineering Report*. Print.

Kramer, Steven L. *Geotechnical Earthquake Engineering*. 2008. Pearson Education. Print.

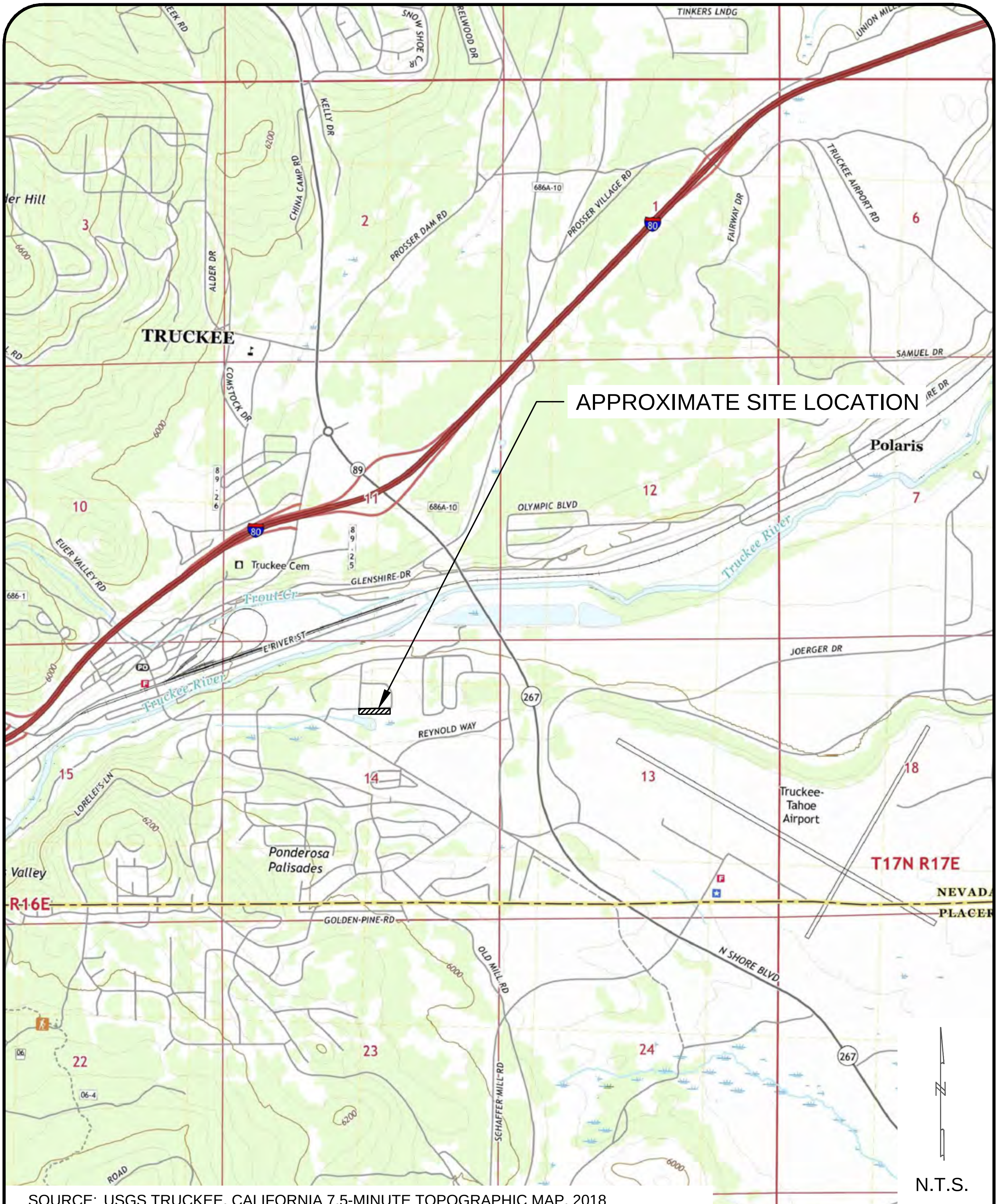
Office of Statewide Health Planning and Development. (2019). Seismic Design Maps *<https://seismicmaps.org>.*

United States Geological Survey. (2018). *Truckee, California Quadrangle*. Print.

FIGURES

Figure 1 Site Vicinity Map

Figure 2 Test Pit Location Plan



SOURCE: USGS TRUCKEE, CALIFORNIA 7.5-MINUTE TOPOGRAPHIC MAP, 2018

NV5

SITE VICINITY MAP
CASCADE HOUSING PROJECT
TRUCKEE, CALIFORNIA

PROJECT NO.: 42769.00

DATE: OCTOBER 2020

FIGURE NO.: 1

LEGEND

TP-4 APPROXIMATE TEST PIT LOCATION AND DESIGNATION

50 0 25 50

SCALE IN FEET

1" = 50'

MODIFIED FROM CONCEPTUAL DESIGN SITE PLAN PREPARED BY JK ARCHTECTURE ENGINEERING DATED JULY 10, 2020.

NV5

TEST PIT LOCATION PLAN

CASCADE HOUSING PROJECT

TRUCKEE, CALIFORNIA

DRAWN BY: PJR	CHECKED BY: AKH
PROJECT NO.: 42769.00	
DATE: OCTOBER 2020	
FIGURE NO.: 2	

APPENDIX A

Proposal

Proposal No. PT20109
May 15, 2020

Cascade Housing Association
PO Box 182
Springfield, Oregon 97477

Attention: Jerry Burke and Michelle Martin

Reference: **Cascade Housing Project**
10040 Estates Drive
Truckee, California

Subject: **Proposal for Geotechnical Engineering Services**

This letter presents our proposal to prepare a geotechnical engineering report for the proposed Cascade Housing Project to be constructed at 10040 Estates Drive, in Truckee, California. The purpose of our services will be to explore and evaluate subsurface conditions at the project site and to develop geotechnical engineering recommendations for project design and construction. Site subsurface conditions and specific recommendations regarding the geotechnical aspects of project design and construction can significantly affect project costs. NV5 will provide site-specific design recommendations to help reduce construction costs for your project. We have a reputation for responsive, innovative, yet practical approaches to geotechnical problems. Included in this proposal is a brief summary of our understanding of the project, the scope of services we intend to provide, and an estimate of our fees.

PROJECT DESCRIPTION

The site is located on the south side of Estates Drive, south of the existing Truckee Donner Senior Apartments complex and north of an existing golf course irrigation pond and wetland area. This proposal is based on conversations with Carla Sammis of JK Architecture Engineering (JKAE), review of a conceptual site plan prepared by JKAE dated March 17, 2020, and a site visit. The project will involve construction of three workforce housing units. We anticipate that the new structures will be three-story, wood-frame, either conventional or modular buildings with slab-on-grade and/or raised wood floors. For the purposes of this proposal, we have assumed that conventional shallow spread foundations will be used. Structural loads were assumed for the purposes of this proposal. Estimated vertical structural loads are not expected to exceed approximately 80 kips at isolated columns and 4 kips per linear foot along continuous wall foundations, for long-term loading conditions. The site is currently undeveloped. We anticipate that cuts and fills for the proposed structures will be about 2 to 3 feet and are not expected to exceed about 5 feet. Appurtenant construction will an include asphalt concrete paved access driveway and parking lots, hard-surface patios, and underground utilities.

ANTICIPATED CONDITIONS

In preparation of this proposal, we reviewed geologic maps and reports in our files regarding subsurface conditions in the vicinity of the site. Based on this information and our experience in the area, we anticipate that subsurface soil conditions will consist of coarse-grained soil types associated with glacial outwash deposits. T

Due to the close proximity of the site to an existing wetland, we anticipate that groundwater will be seasonally present at relatively shallow depths and may affect the proposed construction. We anticipate that the site can be accessed by track-mounted equipment.

SCOPE OF SERVICES

Review of Available Literature

Prior to our subsurface exploration, we will review regional geologic maps and reports in our files from other nearby sites. Our field exploration locations will be selected based on site access and the anticipated project layout.

Field Exploration

Prior to conducting our subsurface investigation, we will mark the site for Underground Service Alert (USA) and contact this agency to locate underground public utilities on and adjacent to the site. We propose to explore the subsurface conditions at the project site by excavating 3 to 4 test pits to depths up to approximately 10 feet below the existing ground surface or refusal. The test pits will be excavated using a mini-excavator or backhoe outside of the limits of the wetland area. The test pits will be visually logged by a field representative who will obtain bulk soil samples for classification and laboratory testing. Upon completion, the test pits will be backfilled with excavated soil.

Laboratory Testing

The purpose of laboratory testing is to evaluate the physical and engineering properties of the soil samples collected in the field. We anticipate the laboratory testing program will consist of tests for soil classification (gradations and plasticity) and expansion potential.

Analysis and Report

Based on the results of our field exploration and laboratory testing, we will provide our opinions and recommendations regarding the following:

- General soil and groundwater conditions at the project site, with emphasis on how the conditions are expected to affect the proposed construction;
- Discussion of special geotechnical engineering constraints such as existing fill, highly expansive or compressible soil, near-surface groundwater, liquefaction potential, and potential secondary seismic hazards;

- Recommendations for earthwork construction, including site preparation recommendations, a discussion of reuse of existing near-surface soil as structural fill, and a discussion of remedial earthwork recommendations, if warranted;
- Recommendations for temporary excavations, construction dewatering, and trench backfill;
- Recommendations for permanent cut and fill slopes;
- Surface and subsurface drainage recommendations;
- Recommendations for conventional shallow spread foundation design including soil bearing values, minimum footing depth, resistance to lateral loads and estimated settlements, and California Building Code Site Class and seismic coefficients for use in structural design;
- Lateral earth pressures and drainage recommendations for short retaining structures;
- Subgrade preparation for slab-on-grade concrete; and
- Asphalt concrete and paving stone pavement recommendations.

We will present our opinions and recommendations in a written report complete with logs of our test pits and laboratory test results.

SCHEDULE AND FEES

At the present time, we can begin our subsurface exploration within one week of your authorization to proceed, depending on availability of excavating equipment and an operator. If weather, access, or site conditions restrict our field operations, we may need to revise our scope of services and fee estimate. We anticipate submitting our final written report within two to three weeks after completion of our subsurface exploration. If requested, we can provide preliminary verbal information with respect to our anticipated conclusions and recommendations prior to completion of our final report.

We will provide the scope of services described above for an estimated fee of on a time-and-expense basis in accordance with our attached 2020 Fee Schedule. This cost includes the excavation equipment and operator we plan to use for our subsurface exploration. Billing will be on a monthly basis. Additional services beyond the scope of this proposal performed at the client's request will be billed on a time and expense basis using the fee schedule applicable at the time the services are provided.

In order to defray the initial mobilization costs of the excavation equipment, we are requesting a retainer in the amount of at the time of contract signing. All remittances should be sent to our Truckee office at the following address:

Accounts Receivable
NV5
10775 Pioneer Trail, Suite 213
Truckee, CA 96161

Remittances should reference this proposal number, PT20109

Prior to initiating our subsurface exploration, all site utilities and utility easements must be accurately located in the field, on a scaled map, or both. This information must be made available to NV5 by the client before beginning our subsurface exploration. Our fee is not adequate to compensate for both the performance of the services and the assumption of risk of damage to such structures. NV5 will not accept responsibility for damage to existing utilities not accurately located in the manner described above. Services rendered by NV5 to repair them will be billed at cost.

CLOSING

NV5 will perform its services in a manner consistent with the standard of care and skill ordinarily exercised by members of the profession practicing under similar conditions in the geographic vicinity at the time the services are performed. No warranty or guarantee, express or implied, is part of the services offered by this proposal.

Enclosed with this proposal is our firm's Agreement for Geotechnical Engineering Services. Please sign and return one copy of the attached Agreement for Geotechnical Engineering Services to our attention if this proposal meets with your approval. This proposal is deemed to be incorporated into and made part of the Agreement for Geotechnical Engineering Services.

We appreciate the opportunity to submit this proposal and look forward to working with you on this project. If you have any questions or need additional information, please contact the undersigned.

Sincerely,
NV5

P. Raynak
Pamela J. Raynak, P.G.
Senior Geologist

John K. Hudson
John K. Hudson, P.E., C.E.G.
Associate Engineer

Attachment: 2020 Fee Schedule
Agreement for Geotechnical Engineering Services

APPENDIX B

Important Information about This Geotechnical-Engineering Report

(Included with Permission of the GBA, Copyright 2019)

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will <u>not</u> likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will <u>not</u> be adequate to develop geotechnical design recommendations for the project.

Do <u>not</u> rely on this report if your geotechnical engineer prepared it:
- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do <u>not</u> rely on an executive summary. Do <u>not</u> read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:
- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are <u>Not</u> Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are <u>not</u> building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX C

Test Pit Logs

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

COARSE GRAINED SOIL More than 50% of the soil is retained on the No. 200 sieve	GRAVEL More than 50% coarse fraction is larger than the No. 4 sieve size	Clean Gravel with less than 5% fines*	GW	WELL GRADED GRAVEL, GRAVEL SAND MIXTURES
			GP	POORLY GRADED GRAVEL, GRAVEL SAND MIXTURES
		Gravel with more than 12% fines*	GM	SILTY GRAVEL, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVEL, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
	SAND More than 50% coarse fraction is smaller than the No. 4 sieve size	Clean Sand with less than 5% fines*	SW	WELL GRADED SAND, GRAVELY SAND
			SP	POORLY GRADED SAND, GRAVELY SAND
		Sand with more than 12% fines*	SM	SILTY SAND, POORLY GRADED SAND-SILT MIXTURE
			SC	CLAYEY SAND, POORLY GRADED SAND-SILT MIXTURE
FINE GRAINED SOIL More than 50% of the soil passes the No. 200 sieve	SILT AND CLAY Liquid limit less than 50		ML	INORGANIC SILT & VERY FINE SAND, ROCK FLOUR, SILTY OR CLAYEY FINE SAND, OR CLAYEY SILT WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAY OF LOW TO MEDIUM PLASTICITY, GRAVELY CLAY, SANDY CLAY, SILTY CLAY, LEAN CLAY
			OL	ORGANIC CLAY AND ORGANIC SILTY CLAY OF LOW PLASTICITY
	SILT AND CLAY Liquid limit greater than 50		MH	INORGANIC SILT, MIMCACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOIL, ELASTIC SILT
			CH	INORGANIC CLAY OF HIGH PLASTICITY, FAT CLAY
			OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILT
HIGHLY ORGANIC SOIL			Pt	PEAT AND OTHER HIGHLY ORGANIC SOIL
ROCK			RX	ROCK

* Hybrid classifications are used when the fines content is between 5% and 12% (e.g, SP-SM, GP-GM, SW-SC, GW-GC, etc.)

PARTICLE SIZE LIMITS

BOULDERS		
		12"
COBBLES		
		3"
GRAVEL	COARSE	
		¾"
	FINE	
		#4
SAND	COARSE	
		#10
	MEDIUM	
		#40
	FINE	
		#200
SILT		
		0.002 mm
CLAY		

SAMPLE DESIGNATION

- MODIFIED CALIFORNIA SAMPLER (3" OUTSIDE DIAMETER)
- MODIFIED CALIFORNIA SAMPLER (2-1/2" OUTSIDE DIAMETER)
- STANDARD PENETRATION SPLIT SPOON SAMPLER (2" OUTSIDE DIAMETER)
- BULK OR CLASSIFICATION SAMPLE
- SHELBY TUBE (3" OUTSIDE DIAMETER)

KEY TO SYMBOLS

▽	OBSERVED GROUNDWATER
▼	STABILIZED GROUNDWATER LEVEL
LL	LIQUID LIMIT
PL	PLASTIC LIMIT
PI	PLASTICITY INDEX
Gs	SPECIFIC GRAVITY
PERM	PERMEABILITY
CONSOL	CONSOLIDATION
SA	SIEVE ANALYSIS
-200	PERCENT PASSING NO. 200 SIEVE

NON-COHESIVE (GRANULAR) SOIL

RELATIVE DENSITY	SPT BLOWS PER FOOT (N)
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	51 +

COHESIVE (CLAYEY) SOIL

COMPARATIVE CONSISTENCY	SPT BLOWS PER FOOT (N)	UNCONFINED COMPRESSIVE STRENGTH (TSF)
VERY SOFT	0 - 2	0 - 0.25
SOFT	3 - 4	0.25 - 0.50
MEDIUM STIFF	5 - 8	0.50 - 1.00
STIFF	9 - 15	1.00 - 2.00
VERY STIFF	16 - 30	2.00 - 4.00
HARD	31 +	4.00 +

BLOW COUNTS

BLOW COUNTS REPRESENT THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER EVERY 6 INCHES OF AN 18-INCH DRIVE OR FRACTION INDICATED. BLOW COUNTS PRESENTED ON LOGS HAVE NOT BEEN ADJUSTED.

SOIL CONTACTS

________	SOLID - WELL-DEFINED CHANGE
----------	DASHED - GRADATIONAL OR APPROXIMATE CHANGE

MOISTURE CONTENT

CLASSIFICATION	DESCRIPTION
DRY	FREE OF MOISTURE, DUSTY, DRY TO THE TOUCH
SLIGHTLY MOIST	BELOW THE SOIL'S OPTIMUM MOISTURE CONTENT, BUT NOT DRY
MOIST	NEAR THE SOIL'S OPTIMUM MOISTURE CONTENT
VERY MOIST	ABOVE THE SOIL'S OPTIMUM MOISTURE CONTENT, BUT NOT WET
WET	VISIBLE FREE WATER, USUALLY SOIL IS BELOW WATER TABLE

CEMENTATION

CLASSIFICATION	DESCRIPTION
WEAK	CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE
MODERATE	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE
STRONG	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE

MINOR CONSTITUENT QUANTITIES

QUALIFIER	DESCRIPTION
TRACE	PARTICLES ARE PRESENT, BUT ESTIMATED TO BE LESS THAN 5%
SOME	5 to 12%
WITH	12 to 30%

N|V|5

SOIL CLASSIFICATION KEY
CASCADE HOUSING PROJECT
TRUCKEE, CALIFORNIA

PROJECT NO.: 42769.00
DATE: SEPTEMBER 2020
FIGURE NO.: C-1

TEST PIT NO. TP-1

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE
42769.00	CASCADE HOUSING PROJECT	~5,850 FT MSL	09/03/2020	1 OF 1

EXCAVATING CONTRACTOR	OPERATOR	EXCAVATING METHOD AND BUCKET SIZE
CLAUSS EXCAVATION, INC.	MIKE CLAUSS	TAKEUCHI TB240 MINI-EXCAVATOR W/24" BKT

LOGGED BY	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
NCM	BULK	NO	NO

SAMPLE NO.	POCKET PEN. (TSF)	PERCENT PASSING #200 SIEVE	DEPTH (FEET)	GRAPHIC LOG	USCS	DESCRIPTIONS/REMARKS
			0–0.5		FILL	FILL: 4 TO 6 INCHES DARK BROWN SILTY SAND WITH GRAVEL (SM); DRY, LOOSE, WITH ORGANICS (FILL/TOPSOIL)
			0.5–1.5		FILL	FILL: BROWN SILTY SAND WITH GRAVEL (SM); DRY, MEDIUM DENSE, FREQUENT COBBLES AND BOULDERS TO 18 INCHES DIAMETER, EST. 30% FINES
1-1	--	--	1.5–3		GC	GRAY CLAYEY GRAVEL WITH SAND (GC); DRY, DENSE TO VERY DENSE, FINE TO COARSE GRAVEL
1-2	+4.5	49.9	3–7		CH	STRONG BROWN (MOTTLED REDDISH BROWN AND GRAY) GRAVELLY FAT CLAY WITH SAND (CH); SLIGHTLY MOIST, HARD, COARSE GRAVEL
1-3	--	21.6	7–10		GC	STRONG BROWN CLAYEY GRAVEL WITH SAND (GC); MOIST TO VERY MOIST, VERY DENSE, FINE TO COARSE GRAVEL, ABUNDANT COBBLES TO 6 INCHES DIAMETER
			10			TEST PIT TERMINATED AT 10 FEET BGS

TEST PIT NO. TP-2

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE
42769.00	CASCADE HOUSING PROJECT	~5,850 FT MSL	09/03/2020	1 OF 1

EXCAVATING CONTRACTOR	OPERATOR	EXCAVATING METHOD AND BUCKET SIZE
CLAUSS EXCAVATION, INC.	MIKE CLAUSS	TAKEUCHI TB240 MINI-EXCAVATOR W/24" BKT

LOGGED BY	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
NCM	BULK	NO	NO

SAMPLE NO.	POCKET PEN. (TSF)	PERCENT PASSING #200 SIEVE	DEPTH (FEET)	GRAPHIC LOG	USCS	DESCRIPTIONS/REMARKS
					FILL	FILL: 4 TO 6 INCHES DARK BROWN SILTY SAND WITH GRAVEL (SM); DRY, LOOSE, WITH ORGANICS (FILL/TOPSOIL)
			1		FILL	FILL: BROWN SILTY SAND WITH GRAVEL (SM); DRY, MEDIUM DENSE, FREQUENT COBBLES AND BOULDERS TO 18 INCHES DIAMETER, EST. 30% FINES
2-1	--	46.6	2		GC	GRAY CLAYEY GRAVEL WITH SAND (GC); DRY, DENSE TO VERY DENSE, FINE TO COARSE GRAVEL
			3–7		CH	STRONG BROWN (MOTTLED REDDISH BROWN AND GRAY) GRAVELLY FAT CLAY WITH SAND (CH); SLIGHTLY MOIST TO VERY MOIST, HARD, COARSE GRAVEL, SOME BOULDERS TO 16 TO 18 INCHES
			8			TEST PIT TERMINATED AT 7.5 FEET BGS; REFUSAL ON VERY DENSE SOIL
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

TEST PIT NO. TP-3

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE
42769.00	CASCADE HOUSING PROJECT	~5,850 FT MSL	09/03/2020	1 OF 1

EXCAVATING CONTRACTOR	OPERATOR	EXCAVATING METHOD AND BUCKET SIZE
CLAUSS EXCAVATION, INC.	MIKE CLAUSS	TAKEUCHI TB240 MINI-EXCAVATOR W/24" BKT

LOGGED BY	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
NCM	BULK	NO	NO

SAMPLE NO.	POCKET PEN. (TSF)	PERCENT PASSING #200 SIEVE	DEPTH (FEET)	GRAPHIC LOG	USCS	DESCRIPTIONS/REMARKS
					FILL	FILL: 4 TO 6 INCHES DARK BROWN SILTY SAND WITH GRAVEL (SM); DRY, LOOSE, WITH ORGANICS (FILL/TOPSOIL)
3-1	--	--	1		FILL	FILL: BROWN SILTY SAND WITH GRAVEL (SM); DRY, MEDIUM DENSE, FREQUENT COBBLES AND BOULDERS TO 18 INCHES DIAMETER, EST. 30% FINES
			2		GC	GRAY CLAYEY GRAVEL WITH SAND (GC); DRY, DENSE TO VERY DENSE, FINE TO COARSE GRAVEL
			3			
			4			TEST PIT TERMINATED AT 3.5 FEET BGS; REFUSAL ON COBBLES AND VERY DENSE SOIL
			5			
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

TEST PIT NO. TP-4

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE
42769.00	CASCADE HOUSING PROJECT	~5,850 FT MSL	09/03/2020	1 OF 1

EXCAVATING CONTRACTOR	OPERATOR	EXCAVATING METHOD AND BUCKET SIZE
CLAUSS EXCAVATION, INC.	MIKE CLAUSS	TAKEUCHI TB240 MINI-EXCAVATOR W/24" BKT

LOGGED BY	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
NCM	BULK	NO	NO

SAMPLE NO.	POCKET PEN. (TSF)	PERCENT PASSING #200 SIEVE	DEPTH (FEET)	GRAPHIC LOG	USCS	DESCRIPTIONS/REMARKS
					FILL	FILL: 4 TO 6 INCHES DARK BROWN SILTY SAND WITH GRAVEL (SM); DRY, LOOSE, WITH ORGANICS (FILL/TOPSOIL)
			1		FILL	FILL: GRAYISH BROWN POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC); ~~DRY, DENSE~~, FINE TO COARSE SAND, TRACE COBBLES TO 6 INCHES DIAMETER, EST. 10% TO 20% FINES
			2		CH	STRONG BROWN (MOTTLED BROWN AND GRAY) GRAVELLY FAT CLAY WITH SAND (CH), SLIGHTLY MOIST, VERY HARD, FINE TO COARSE GRAVEL
			3			
4-1	+4.5	50.2	4			
			5			
			6			
			7		GC	GRAYISH BROWN CLAYEY GRAVEL WITH SAND (GC); MOIST, VERY DENSE, FINE TO COARSE GRAVEL, SOME COBBLES TO 6 INCHES DIAMETER
			8			
			9			TEST PIT TERMINATED AT 9 FEET BGS
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

APPENDIX D

Laboratory Test Data

PARTICLE SIZE DISTRIBUTION

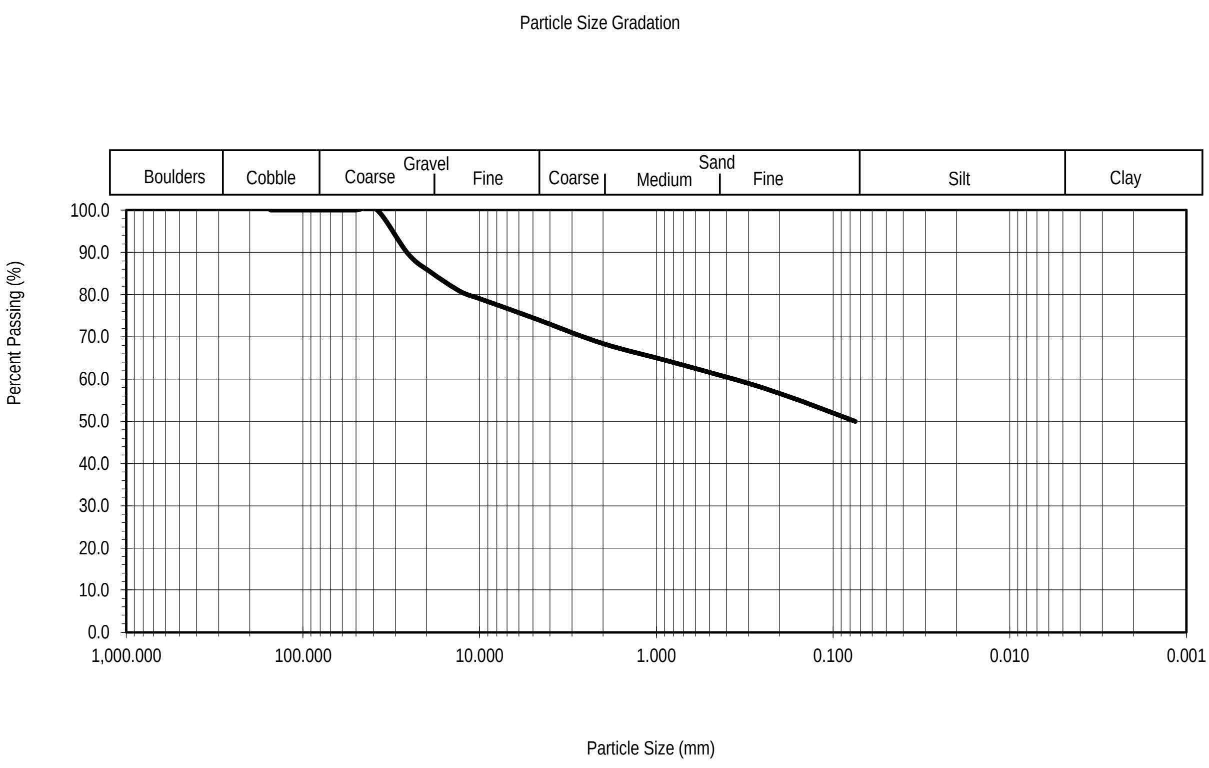
ASTM D422

DSA File #:

DSA Appl #:

Project No.:	**42769.00**	Project Name:	**Cascade Housing**	Date:	**9/10/2020**
Sample No.:	**1-2**	Boring/Trench:	**1** Depth, (ft.): **3.5-4**	Tested By:	**0**
Description:	**Strong Brown (7.5YR 4/6) Gravelly Fat Clay with Sand (CH)**			Checked By:	**draft**
Sample Location:				Lab. No.:	**15-20-441**

Sieve Size	Particle Diameter		Dry Weight on Sieve			Percent
	Inches	Millimeter	Retained On Sieve	Accumulated On Sieve	Passing Sieve	Passing
(U.S. Standard)	(in.)	(mm)	(gm)	(gm)	(gm)	(%)
6 Inch	6.0000	152.4	0.00	0.0	1,732.0	100.0
3 Inch	3.0000	76.2	0.00	0.0	1,732.0	100.0
2 Inch	2.0000	50.8	0.00	0.0	1,732.0	100.0
1.5 Inch	1.5000	38.1	0.00	0.0	1,732.0	100.0
1.0 Inch	1.0000	25.4	179.50	179.5	1,552.5	89.6
3/4 Inch	0.7500	19.1	73.80	253.3	1,478.7	85.4
1/2 Inch	0.5000	12.7	82.10	335.4	1,396.6	80.6
3/8 Inch	0.3750	9.5	32.90	368.3	1,363.7	78.7
#4	0.1870	4.7500	79.00	447.3	1,284.7	74.2
#10	0.0787	2.0000	100.65	548.0	1,184.0	68.4
#20	0.0335	0.8500	71.47	619.4	1,112.6	64.2
#40	0.0167	0.4250	60.10	679.5	1,052.5	60.8
#60	0.0098	0.2500	49.46	729.0	1,003.0	57.9
#100	0.0059	0.1500	55.40	784.4	947.6	54.7
#200	0.0030	0.0750	82.60	867.0	865.0	49.9



ATTERBERG INDICES

ASTM D4318

DSA File #:

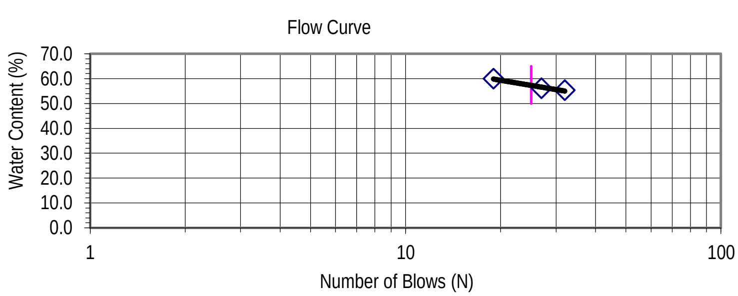
DSA Appl #:

Project No.:	**42769.00**	Project Name:	**Cascade Housing**	Date:	**9/10/2020**
Sample No.:	**1-2**	Boring/Trench: **1**	Depth, (ft.): **3.5-4**	Tested By:	**SLN**
Description:	**Strong Brown (7.5YR 4/6) Gravelly Fat Clay with Sand (CH)**			Checked By:	**MLH**
Sample Location:				Lab. No.:	**15-20-441**

Estimated % of Sample Retained on No. 40 Sieve: 50 Sample Air Dried: yes

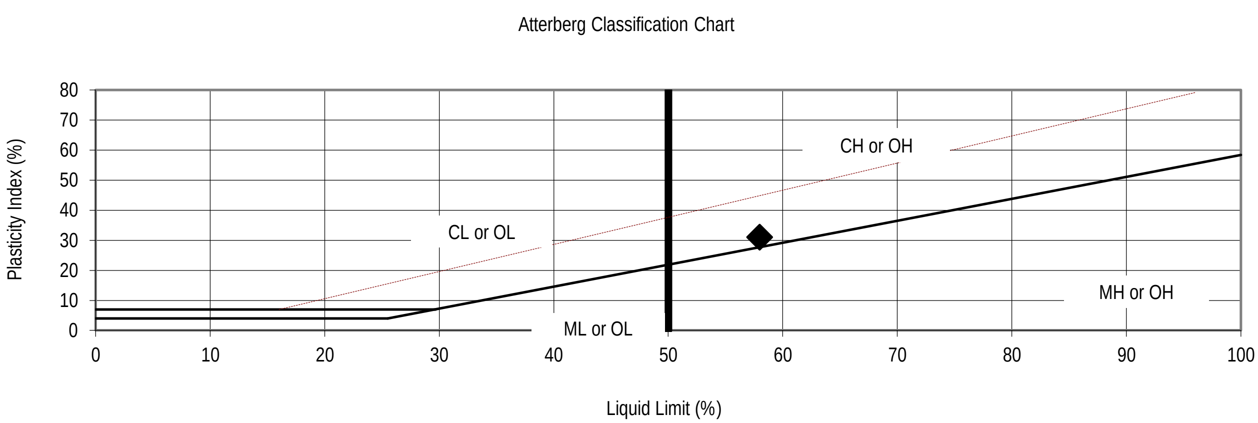
Test Method A or B: A

	LIQUID LIMIT:					PLASTIC LIMIT:		
Sample No.:	1	2	3	4	5	1	2	3
Pan ID:	T	B	2			E	2-2	
Wt. Pan (gr)	15.12	15.35	15.27			13.90	15.18	
Wt. Wet Soil + Pan (gr)	25.70	25.26	25.75			19.95	21.52	
Wt. Dry Soil + Pan (gr)	21.93	21.70	21.82			18.68	20.18	
Wt. Water (gr)	3.77	3.56	3.93			1.27	1.34	
Wt. Dry Soil (gr)	6.81	6.35	6.55			4.78	5.00	
Water Content (%)	55.4	56.1	60.0			26.6	26.8	
Number of Blows, N	32	27	19					
				LIQUID LIMIT =	58	PLASTIC LIMIT =		27



Plasticity Index = 31

Group Symbol = CH



792 Searls Avenue | Nevada City, CA 95959 | www.NV5.com | Office 530.478.1305 | Fax 530.478.1019

CQA – INFRASTRUCTURE – ENERGY – PROGRAM MANAGEMENT – ENVIRONMENTAL

PARTICLE SIZE DISTRIBUTION

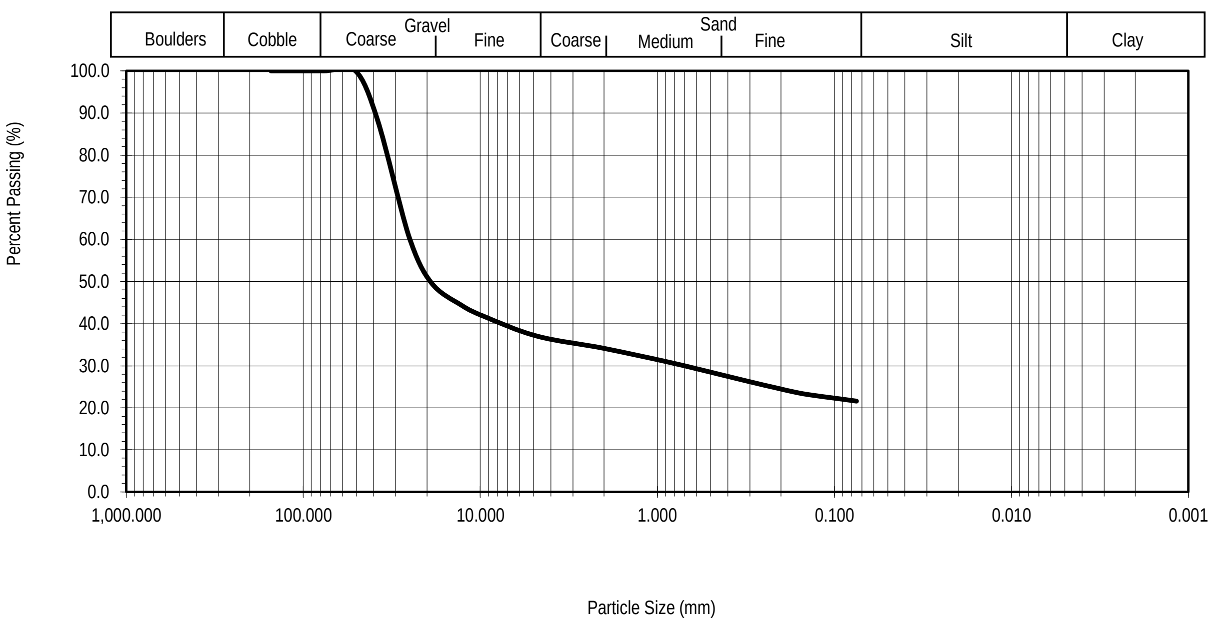
ASTM D422

DSA File #:
DSA Appl #:

Project No.:	**42769.00**	Project Name:	**Cascade Housing**	Date:	**9/10/2020**
Sample No.:	**1-3**	Boring/Trench: **1**	Depth, (ft.): **9.5-10**	Tested By:	**SLN**
Description:	**Strong Brown (7.5YR 4/6) Clayey Gravel with Sand (GC)**			Checked By:	**MLH**
Sample Location:				Lab. No.:	**15-20-441**

Sieve Size (U.S. Standard)	Particle Diameter Inches (in.)	Particle Diameter Millimeter (mm)	Dry Weight on Sieve Retained On Sieve (gm)	Dry Weight on Sieve Accumulated On Sieve (gm)	Dry Weight on Sieve Passing Sieve (gm)	Percent Passing (%)
6 Inch	6.0000	152.4	0.00	0.0	2,002.0	100.0
3 Inch	3.0000	76.2	0.00	0.0	2,002.0	100.0
2 Inch	2.0000	50.8	0.00	0.0	2,002.0	100.0
1.5 Inch	1.5000	38.1	232.70	232.7	1,769.3	88.4
1.0 Inch	1.0000	25.4	548.90	781.6	1,220.4	61.0
3/4 Inch	0.7500	19.1	223.70	1,005.3	996.7	49.8
1/2 Inch	0.5000	12.7	110.30	1,115.6	886.4	44.3
3/8 Inch	0.3750	9.5	51.60	1,167.2	834.8	41.7
#4	0.1870	4.7500	94.80	1,262.0	740.0	37.0
#10	0.0787	2.0000	57.24	1,319.2	682.8	34.1
#20	0.0335	0.8500	66.53	1,385.8	616.2	30.8
#40	0.0167	0.4250	61.35	1,447.1	554.9	27.7
#60	0.0098	0.2500	46.28	1,493.4	508.6	25.4
#100	0.0059	0.1500	40.95	1,534.4	467.6	23.4
#200	0.0030	0.0750	35.63	1,570.0	432.0	21.6

Particle Size Gradation



N|V|5

PARTICLE SIZE DISTRIBUTION

ASTM D422

DSA File #:

DSA Appl #:

Project No.:	**42769.00**	Project Name:	**Cascade Housing**	Date:	**9/10/2020**
Sample No.:	**2-1**	Boring/Trench:	**2** Depth, (ft.): **2-2.5**	Tested By:	**GWO**
Description:	**Strong Brown (7.5YR 4/6) Clayey Gravel with Sand (GC)**			Checked By:	**MLH**
Sample Location:				Lab. No.:	**15-20-441**

Sieve Size	Particle Diameter		Dry Weight on Sieve			Percent
	Inches	Millimeter	Retained On Sieve	Accumulated On Sieve	Passing Sieve	Passing
(U.S. Standard)	(in.)	(mm)	(gm)	(gm)	(gm)	(%)
6 Inch	6.0000	152.4	0.00	0.0	1,580.0	100.0
3 Inch	3.0000	76.2	0.00	0.0	1,580.0	100.0
2 Inch	2.0000	50.8	0.00	0.0	1,580.0	100.0
1.5 Inch	1.5000	38.1	0.00	0.0	1,580.0	100.0
1.0 Inch	1.0000	25.4	87.10	87.1	1,492.9	94.5
3/4 Inch	0.7500	19.1	19.40	106.5	1,473.5	93.3
1/2 Inch	0.5000	12.7	74.50	181.0	1,399.0	88.5
3/8 Inch	0.3750	9.5	109.20	290.2	1,289.8	81.6
#4	0.1870	4.7500	302.40	592.6	987.4	62.5
#10	0.0787	2.0000	40.11	632.7	947.3	60.0
#20	0.0335	0.8500	33.46	666.2	913.8	57.8
#40	0.0167	0.4250	46.36	712.5	867.5	54.9
#60	0.0098	0.2500	39.10	751.6	828.4	52.4
#100	0.0059	0.1500	38.50	790.1	789.9	50.0
#200	0.0030	0.0750	53.42	843.6	736.4	46.6

792 Searls Avenue | Nevada City, CA 95959 | www.NV5.com | Office 530.478.1305 | Fax 530.478.1019

CQA – INFRASTRUCTURE – ENERGY – PROGRAM MANAGEMENT – ENVIRONMENTAL

EXPANSION INDEX/SWELL

ASTM D4829

DSA File #:

DSA Appl #:

Project No.:	42769.00	Project Name:	Cascade Housing	Date:	9/24/2020
Sample No.:	3-1	Boring/Trench No.: 3	Depth (ft.) 1-1.5	Tested By:	MLH
Soil Description:	Strong Brown (7.5YR 4/6) **Clayey Gravel with Sand (GC)**			Checked By:	MLH
Estimated % of sample retained on #4:	20	Notes:		Lab. No.:	15-20-441

Specimen Type:	Undisturbed:	Disturbed:	Remolded to: ASTM Guidelines
Tube Dia. (Inch) =		Ring Dia. (Inch) = 4	Ring Height (Inch) = 1.00

FIELD DATA Tube Sample Moisture & Density			LAB DATA	Test wt. 144 Initial	Final	Test wt. Initial	Final	Test wt. Initial	Final
Tare Tube Number		LC	Tare Number	5.00					
Tare Weight	(gr)	231.47	Tare Ring Weight (gr)	368.53	368.53				
Wet Soil + Tare	(gr)	534.17	Tare Pan Weight (gr)	0.00	0.00				
Dry Soil + Tare	(gr)	495.12	Wet Soil + Tare (gr)	726.20	772.17				
Weight of Water	(gr)	39.05	Dry Soil + Tare (gr)	680.06	680.06	0.00		0.00	
Dry Soil Weight	(gr)	263.65	Weight of Water (gr)	46.14	92.11	0.00	0.00	0.00	0.00
Moisture Content	(%)	14.81	Dry Soil Weight (gr)	311.53	311.53	0.00	0.00	0.00	0.00
Soil Height	(In.)		Moisture Content (%)	14.81	29.57	0.00	0.00	0.00	0.00
Wet Unit Weight	(pcf)		Wet Unit Weight (pcf)	108.44	121.24				
Dry Unit Weight	(pcf)		Dry Unit Weight (pcf)	94.45	93.57				
			Sample Height (Inches)	1.00	1.009				
Specific Gravity		2.7	Percent Saturation	51.02	99.72				

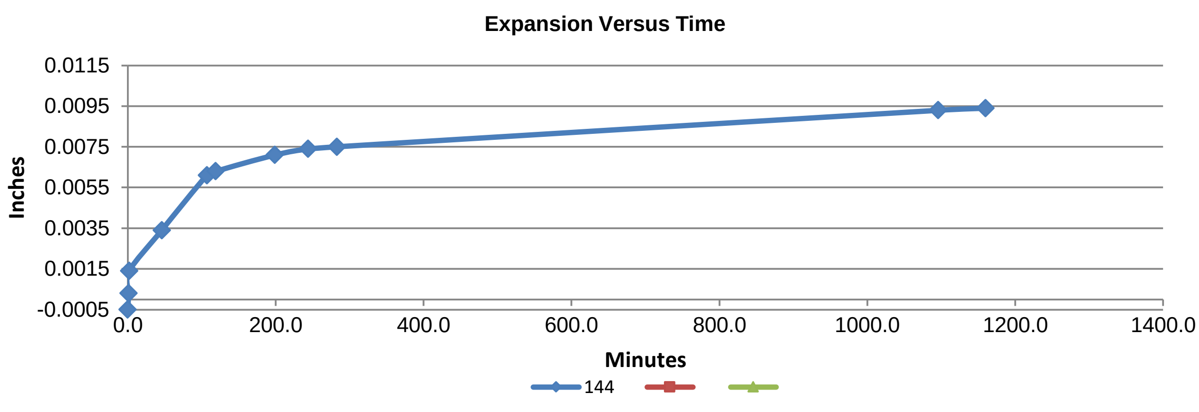
Expansion Index Number

Surcharge (psf)		Uncorrected	Corrected to 50% Saturation
Test wt.	144	9	9
Test wt.			
Test wt.			

Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)
0.0	-0.0005				
1.0	0.0003				
2.0	0.0014				
46.0	0.0034				
107.0	0.0061				
119.0	0.0063				
199.0	0.0071				
244.0	0.0074				
283.0	0.0075				
1096.0	0.0093				
1160.0	0.0094				

Expansion Index Values and Descriptions

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High



N|V|5

PARTICLE SIZE DISTRIBUTION

ASTM D422

DSA File #:
DSA Appl #:

Project No.:	**42769.00**	Project Name:	**Cascade Housing**	Date:	**9/10/2020**
Sample No.:	**4-1**	Boring/Trench:	**4** Depth, (ft.): **3.5-4**	Tested By:	**GWO**
Description:	**Strong Brown (7.5YR 4/6) Gravelly Fat Clay with Sand (CH)**			Checked By:	**MLH**
Sample Location:				Lab. No.:	**15-20-441**

Sieve Size (U.S. Standard)	Particle Diameter Inches (in.)	Particle Diameter Millimeter (mm)	Dry Weight on Sieve Retained On Sieve (gm)	Dry Weight on Sieve Accumulated On Sieve (gm)	Dry Weight on Sieve Passing Sieve (gm)	Percent Passing (%)
6 Inch	6.0000	152.4	0.00	0.0	1,169.0	100.0
3 Inch	3.0000	76.2	0.00	0.0	1,169.0	100.0
2 Inch	2.0000	50.8	0.00	0.0	1,169.0	100.0
1.5 Inch	1.5000	38.1	0.00	0.0	1,169.0	100.0
1.0 Inch	1.0000	25.4	21.50	21.5	1,147.5	98.2
3/4 Inch	0.7500	19.1	51.80	73.3	1,095.7	93.7
1/2 Inch	0.5000	12.7	37.30	110.6	1,058.4	90.5
3/8 Inch	0.3750	9.5	51.80	162.4	1,006.6	86.1
#4	0.1870	4.7500	155.80	318.2	850.8	72.8
#10	0.0787	2.0000	55.00	373.2	795.8	68.1
#20	0.0335	0.8500	51.51	424.7	744.3	63.7
#40	0.0167	0.4250	42.87	467.6	701.4	60.0
#60	0.0098	0.2500	30.58	498.2	670.8	57.4
#100	0.0059	0.1500	32.90	531.1	637.9	54.6
#200	0.0030	0.0750	51.51	582.6	586.4	50.2

Particle Size Gradation

Particle Size (mm)

792 Searls Avenue | Nevada City, CA 95959 | www.NV5.com | Office 530.478.1305 | Fax 530.478.1019

CQA – INFRASTRUCTURE – ENERGY – PROGRAM MANAGEMENT – ENVIRONMENTAL

ATTERBERG INDICES

ASTM D4318

DSA File #:

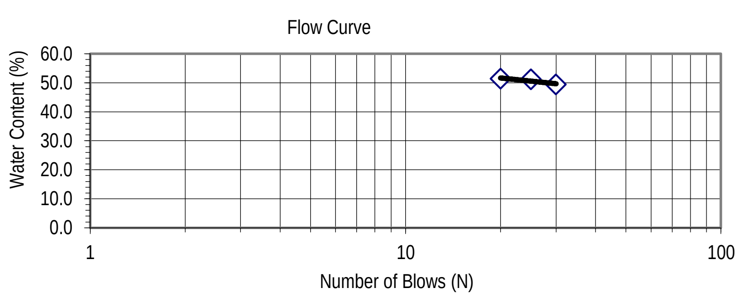
DSA Appl #:

Project No.:	**42769.00**	Project Name:	**Cascade Housing**	Date:	**9/10/2020**
Sample No.:	**4-1**	Boring/Trench: **4**	Depth, (ft.): **3.5-4**	Tested By:	**SLN**
Description:	**Strong Brown (7.5YR 4/6) Gravelly Fat Clay with Sand (CH)**			Checked By:	**MLH**
Sample Location:				Lab. No.:	**15-20-441**

Estimated % of Sample Retained on No. 40 Sieve: ______ Sample Air Dried: yes

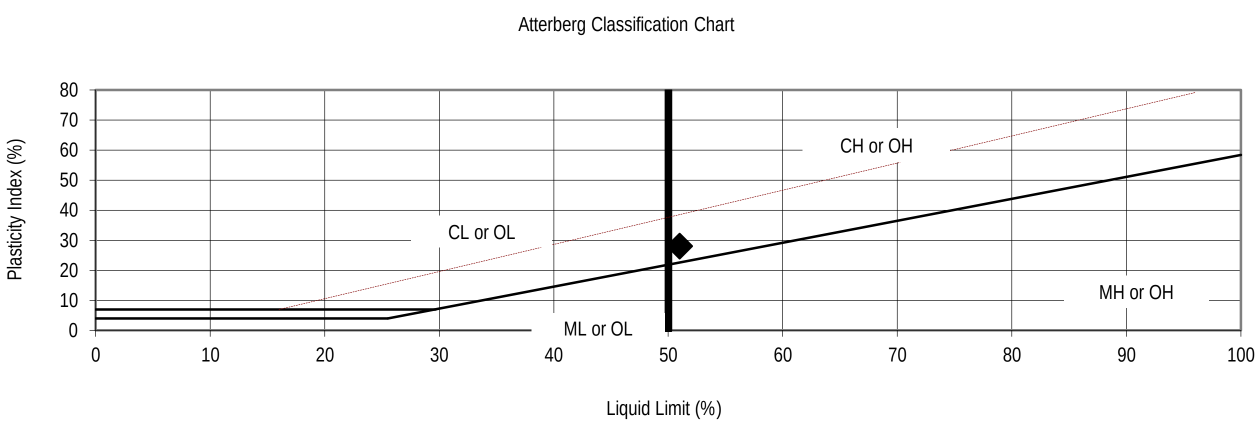
Test Method A or B: A

	LIQUID LIMIT:					PLASTIC LIMIT:		
Sample No.:	1	2	3	4	5	1	2	3
Pan ID:	LO	SN	BS			13	EE	
Wt. Pan (gr)	15.08	14.02	15.28			15.20	15.58	
Wt. Wet Soil + Pan (gr)	27.58	22.94	25.12			21.40	21.88	
Wt. Dry Soil + Pan (gr)	23.45	19.92	21.78			20.23	20.71	
Wt. Water (gr)	4.13	3.02	3.34			1.17	1.17	
Wt. Dry Soil (gr)	8.37	5.90	6.50			5.03	5.13	
Water Content (%)	49.3	51.2	51.4			23.3	22.8	
Number of Blows, N	30	25	20					
				LIQUID LIMIT =	51		PLASTIC LIMIT =	23



Plasticity Index = 28

Group Symbol = CH



EXPANSION INDEX/SWELL

ASTM D4829

DSA File #:

DSA Appl #:

Project No.:	42769.00	Project Name:	Cascade Housing	Date:	9/24/2020
Sample No.:	Composite	Boring/Trench No.:	1 Depth (ft.) -	Tested By:	MLH
Soil Description:	Strong Brown (7.5YR 4/6) Gravelly Fat Clay with Sand (CH)			Checked By:	draft
Estimated % of sample retained on #4:	20	Notes:	comp. of 1-1, 1-2 & 4-1	Lab. No.:	15-20-441

Specimen Type:	Undisturbed:	Disturbed:	Remolded to:	ASTM Guidelines
Tube Dia. (Inch) =		Ring Dia. (Inch) = 4	Ring Height (Inch) = 1.00	

FIELD DATA Tube Sample Moisture & Density			LAB DATA	Test wt. 144 Initial	Final	Test wt. Initial	Final	Test wt. Initial	Final
Tare Tube Number		CTP	Tare Number	0.00					
Tare Weight	(gr)	408.63	Tare Ring Weight (gr)	368.51	368.51				
Wet Soil + Tare	(gr)	797.92	Tare Pan Weight (gr)	0.00					
Dry Soil + Tare	(gr)	744.26	Wet Soil + Tare (gr)	701.69					
Weight of Water	(gr)	53.66	Dry Soil + Tare (gr)	655.76	655.76	0.00		0.00	
Dry Soil Weight	(gr)	335.63	Weight of Water (gr)	45.93	-655.76	0.00	0.00	0.00	0.00
Moisture Content	(%)	15.99	Dry Soil Weight (gr)	287.25	287.25	0.00	0.00	0.00	0.00
Soil Height	(In.)		Moisture Content (%)	15.99	-228.29	0.00	0.00	0.00	0.00
Wet Unit Weight	(pcf)		Wet Unit Weight (pcf)	101.02					
Dry Unit Weight	(pcf)		Dry Unit Weight (pcf)	87.09					
			Sample Height (Inches)	1.00	1.060				
Specific Gravity		2.7	Percent Saturation	46.20	#VALUE!				

Expansion Index Number

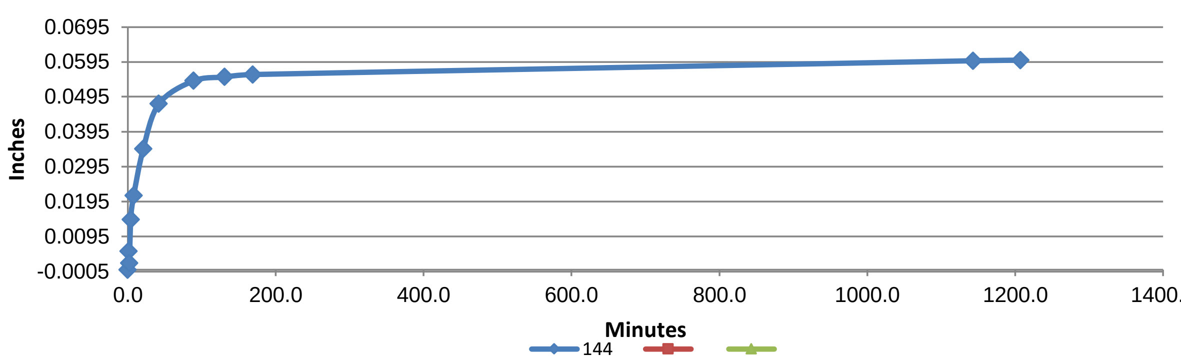
Surcharge (psf)		Uncorrected	Corrected to 50% Saturation
Test wt.	144	60	57
Test wt.			
Test wt.			

Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)
0.0	0.0000				
1.0	0.0053				
2.0	0.0019				
4.0	0.0144				
8.0	0.0212				
21.0	0.0346				
42.0	0.0475				
89.0	0.0541				
131.0	0.0552				
169.0	0.0559				
1143.0	0.0598				
1207.0	0.0600				

Expansion Index Values and Descriptions

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

Expansion Versus Time



APPENDIX E

PRELIMINARY DRAINAGE REPORT

#19-170

PRELIMINARY DRAINAGE REPORT
FOR
ESTATES MEADOW HOUSING PROJECT

PREPARED FOR:
OREGON INVESTORS X LIMITED PARTNERSHIP:
CASCADE HOUSING ASSOCIATION
CONTACT: KRISTI ISHAM
PO BOX 182
SPRINGFIELD, OR 97477

PREPARED BY:
JK ARCHITECTURE ENGINERING
PO BOX 7409
TAHOE CITY, CA 96145

March 2021

TABLE OF CONTENTS

1.0 Introduction 3

2.0 Design Criteria 3

3.0 Site Conditions 3

4.0 Hydrologic Calculations 4

5.0 Overland Release 5

6.0 Downstream Analysis 6

7.0 Proposed BMP's 6

8.0 Conclusion 6

APPENDIX

A – Vicinity Map
B – Watershed Maps
C – Peak Flow Worksheets & References
D – Flood Maps

1.0 Introduction

The following preliminary drainage report evaluates the drainage conditions associated with the proposed Estates Meadow Housing project. This document supplements the preliminary site plans for the subject parcel submitted with the CEQA application.

The property is located at 10020 Estates Drive in Truckee, just south of Sierra Senior Services. Truckee River runs approximately 0.25 miles north of the project site at the closest point. The site is currently mostly undeveloped, with the exception of existing underground utilities and utility boxes.

The proposed project consists of developing the site to include: 3 three-story buildings and 1 one-story building consisting of 30 affordable housing units and 1 community building with approximately 27,811 gross square footage. Other site improvements will include associated access drives running along the northern property line, parking areas, recreation space, utilities, and stormwater facilities. A portion of the site will remain as open space and all existing wetlands will be preserved. The project will be completed in one phase.

2.0 Design Criteria

The Town of Truckee Public Improvement Engineering Standards (TOT Standards) has requirements relative to drainage design for projects. These, in addition to project specific design criteria, and those of the Town of Truckee Storm Water Quality Plan (TOT SWQP), as approved by the Regional Water Quality Control Board, largely comprise the overall design requirements to which the project shall adhere. The various conditions and requirements can be summarized in the following basic criteria:

- Drainage pipes shall be sized for the 10-year storm event (no head) and assessed for the 100-year event.
- Collected runoff from impervious surfaces shall be treated on-site as determined by the TOT SWQP during final design.
- Storm drainage facilities will be designed to provide groundwater recharge, attenuate peak flows, and minimize risk of erosion.
- Maintain pre-project watershed boundaries and drainage patterns.
- Flow concentrations shall not cause property damage.
- Energy dissipaters shall be included in outfall designs.
- All construction activities and permanent improvements shall include BMP’s for the protection of water resources.

Drainage improvements shall be designed to comply with all the above listed constraints. In addition, this project will comply with all the requirements from the California Water Quality Control Board and Town of Truckee for Permanent and Temporary BMP’s. The Lahontan Region office in South Lake Tahoe provides enforcement of the Terms and Conditions of the permit. If it is determined that the total project disturbance is more than 1 acre, a Storm Water Pollution Prevention Plan (SWPPP), that addresses the proposed project improvements, will be prepared, and implemented as part of this permit. At this time, a SWPPP is anticipated with this project.

3.0 Site Conditions

The project is located to the south of Truckee River, at an elevation of approximately 5,850 feet above sea level.

Most of the precipitation occurs between November and May in the form of snow. The area is typically dry during mid-summer through fall until the first rains or snow fall events.

Per FEMA Map 06057C0533E, the project is outside of the 100-year floodplain. The FEMA map with the project site location is included with Appendix D.

Per the Wetland Delineation report prepared for the site, "there is no run-on into the site from offsite surface waters that lie at a slightly higher elevation than the wetlands within the site, because the site is separated from an offsite pond and wetland complex by an earthen berm surrounding the western and southern sides. Nor can water from the site flow uphill to offsite aquatic features. At the southeastern corner of the site, both on- and offsite surface water flows to the northeast, the ground surface off site (to the east) is lower than that of the site, thus no run-on can occur there… The long narrow wetland area along the southern site boundary lies at essentially the same elevation as the breach in this boulder berm, so it is unclear whether water flows from the channelized wetland into the eastern, Eleocharis-dominated wetland lobe, or from that area into the channel, or if the direction of flow changes depending upon precipitation and snowmelt". For additional information regarding the wetlands refer to the Wetland Delineation report prepared by EcoSynthesis, dated February 5, 2020.

At the northwest corner of the site there is an existing 18" HDPE culvert that collects surface water from the northwest corner of the site and Estates Drive. The culvert crosses under Estates Drive to the north into a drainage channel that ultimately reaches a detention basin at the end of River View Drive. The proposed improvements will not increase the flows to this culvert.

The project site slopes on an average 0% - 6% almost evenly across the entire site. Runoff generally runs southeast as sheet flow. Much of the natural ground surface is undeveloped, covered with grasses and a few trees. There is also a boulder berm around south and east sides of the site.

4.0 Hydrologic Calculations

The watershed maps shown in Appendix B shows the tributary areas to the onsite flows, which under pre-development conditions includes runoff from the southern half of Estates Drive. Under post-development conditions the roadway runoff is proposed to be kept offsite. Therefore, for the purposes of this report, the area within the roadway easement is considered a separate offsite watershed for both the pre- and post-development conditions.

The onsite tributary area is approximately 1.98 acres and the offsite tributary area, which includes the southern half of Estates Drive, is approximately 0.44 acres.

The overall pre-development watershed patterns will not be adversely affected by the proposed development, and the proposed improvements will restore the open space terrain to pre-project or better conditions in terms of vegetative cover and infiltration capacity, and the project will not adversely alter overall drainage patterns.

The estimated peak flows at the points of concentration are calculated in the worksheets provided in Appendix "C". These have been calculated using the TOT Standards method for small watersheds (<320 acres).

Variables used in these calculations include the watershed area, design storm intensity, summer and winter site conditions, and an infiltration rate. Design storm intensities are based on an approximate mean annual precipitation for the site as determined from Standard Drawing 63, then using Standard Drawings 59 & 60 the design storm intensity is determined. Rational Method "C" values representing site conditions were estimated using Standard Drawing 58. For the pre- and post- winter condition an assumed impervious area of 90% was used to account for the ground being frozen and/or saturated. Per TOT Standards, the design storm intensities for the winter condition were adjusted for snow melt by increasing the intensities by 0.10 in/hr.

Per USGS Soil Survey information for the site, the predominant soil in the area is Soil Group C, consisting of layers of gravelly sandy loam, gravelly clay loam, and weathered bedrock with a "capacity of the most limiting layer to transmit water (Ksat) ranging from 0.20 to 0.57 in/hr". the predominant soil type in the area is Soil Group C. Correlating that information with the TOT

Standards, Section 5.03 Hydrology and Runoff, an infiltration rate of 0.17 in/hr shall be used unless otherwise supported by the Geotechnical Report.

Onsite rooftop and impervious area disconnection along with bioretention, are proposed as part of the improvements. The site design measures will be sized during final design using the Town of Truckee Post-Construction Storm Water Quality Plan.

4.1 Watershed Time of Concentration and Peak Unit Flows

The Watershed Response Time has been determined using the applicable methodology from the TOT Standards which combines the overland flow and collector flow times from the top of the watershed to the point of concentration. The velocity of flow is determined starting with Mannings "n" given the type of terrain. Other values used in determining the response times are based on topography. A maximum distance of 600' of overland flow was considered in the calculations, per the Town which states that overland flow "usually" becomes concentrated within 600'.

Manning's "n" values were selected using EPA's Storm Water Management Model (SWMM) User's Manual. Refer to Appendix C for Manning's "n" tables.

The Watershed Response Time, peak flow estimates, did not consider the detention time through the proposed bio-retention areas of the proposed landscape for a more conservative approach.

Design storm intensities have been determined using Standard Drawings 59 & 60 and the associated peak flows (Q_{10} and Q_{100}) for the 10-year and 100-year storm event have been determined for a point of concentration immediately downstream of the proposed project area. As the watershed is located in an area that is snow covered much of the year, the calculations provided evaluate the "winter" (assumed impervious) conditions, which is the worst-case scenario.

The Peak Flow Worksheets for the watershed are provided in Appendix "C" with the results summarized below:

Pre-Development – Winter:	Q_{10} = 0.6 CFS; Q_{100} = 0.9 CFS
Post-Development – Winter:	Q_{10} = 1.8 CFS; Q_{100} = 2.5 CFS
Pre-Development Off-Site – Winter:	Q_{10} = 0.6 CFS; Q_{100} = 1.2 CFS
Post-Development – Off-Site – Winter:	Q_{10} = 0.6 CFS; Q_{100} = 1.2 CFS
Pre-Development – Summer:	Q_{10} = 0.2 CFS; Q_{100} = 0.5 CFS
Post-Development – Summer:	Q_{10} = 1.5 CFS; Q_{100} = 2.2 CFS
Pre-Development – Off-Site – Summer:	Q_{10} = 0.6 CFS; Q_{100} = 1.1 CFS
Post-Development – Off-Site – Summer:	Q_{10} = 0.6 CFS; Q_{100} = 1.2 CFS

The minimum required retention facilities volume to reduce post-development peak flows to pre-development conditions was determined by the Hydrograph Method included in Appendix "C". Onsite stormwater quality treatment facilities will be utilized for peak flow attenuation and will be sized per the TOT SWQP water quality treatment sizing criteria with the final Construction Documents.

It should be recognized, as with any methodology in hydrology, that these results are approximate though adequate for the level of analysis desired at this time.

There will be no adverse alteration to the overall drainage patterns and watershed characteristics. Therefore, no adverse effect to the existing downstream storm drain facilities is anticipated under post developed conditions.

5.0 Overland Release

The only subsurface conveyance in the project area is the existing offsite HDPE culvert at the northwest corner of the property. Flows originated from the existing culvert will remain unchanged or reduced with this project.

The existing 18” culvert has a gravity flow capacity of approximately 10.7 cfs, which is the worst-case scenario. If considering pressure flow conditions, considering the available head, the pipe flow capacity further exceeds its estimated tributary runoff. The exiting wetlands will remain undisturbed.

6.0 Downstream Analysis

Post-development runoff will be routed through a system of proposed bioretention swales with adequate capacity to attenuate post-development peak flows to equal or less than the pre-development flows, and to treat stormwater runoff from impervious surfaces, per Town of Truckee requirements. Therefore, no downstream analysis has been performed beyond the consideration of the existing outflow described above.

As shown in the watershed maps and peak flow calculations, no overall drainage pattern, watershed tributary area or watershed characteristic is proposed to be altered. Therefore, no adverse impact to the existing drainage pattern is expected due to the proposed improvements.

For analysis purposes the bioretention swales were assumed to be at capacity (full) for a more conservative approach.

7.0 Proposed BMP’s

All BMP’s, both temporary and permanent, will be in accordance with Town of Truckee Erosion Prevention Standards. They are as follows:

7.1 Temporary Construction Phase BMP’s

Construction phase BMP’s include silt fencing, straw wattles, staging areas, tree protection fencing, dust control, and other miscellaneous provisions as required by the regulatory agencies. Equipment and construction materials will be transported on existing roads to minimize environmental impacts. Furthermore, construction activities will be limited as much as possible to keep the disturbance minimized to reduce the impacts to the existing vegetation and terrain.

7.2 Permanent BMP’s

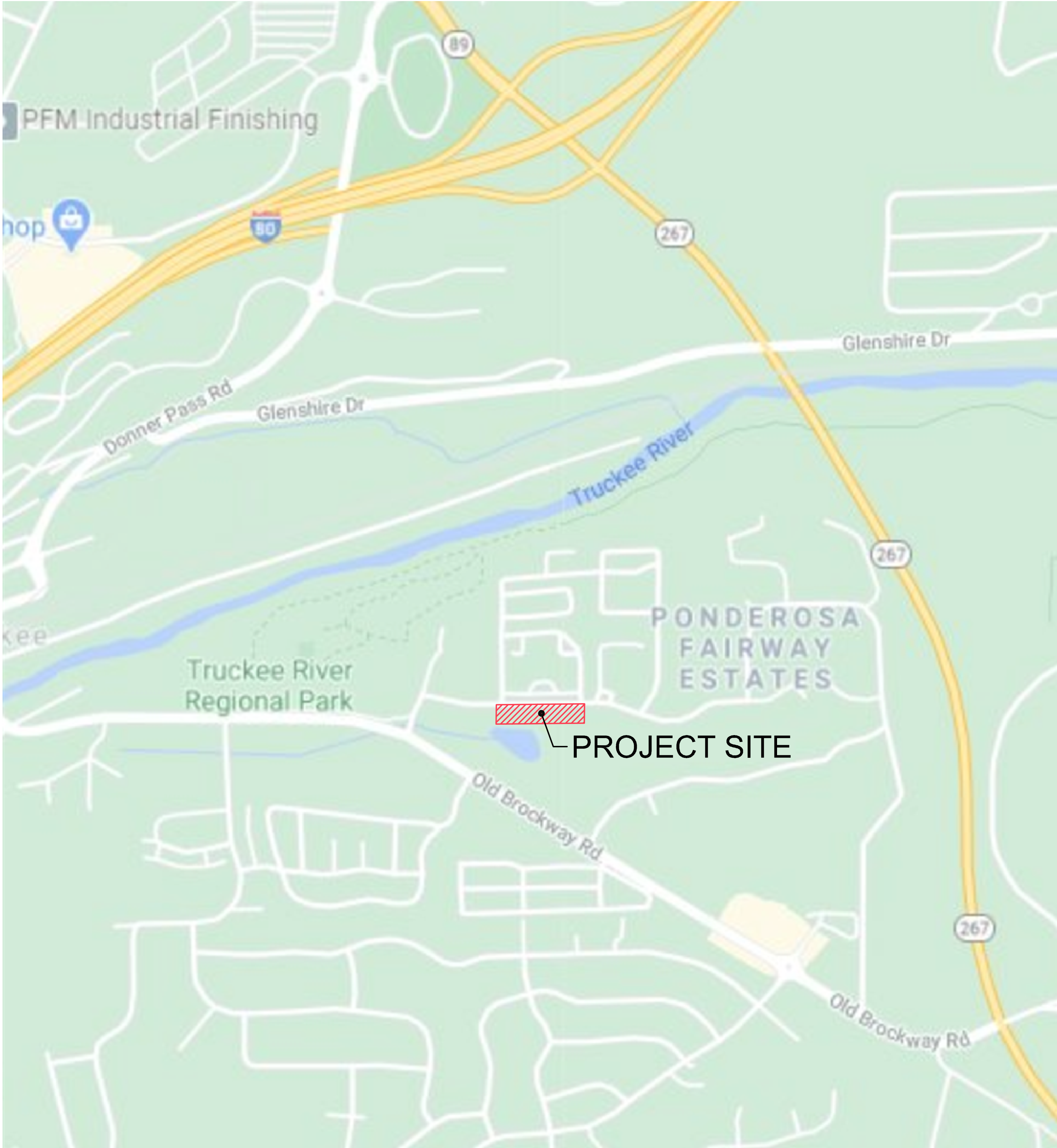
Soil stabilization, revegetation and landscaping: All non-hardscaped disturbed areas of the site will be revegetated and landscaped, per Town requirements to mitigate potential impacts due to vegetation removal for the construction of the proposed site improvements.

8.0 Conclusion

As shown, the project does not propose to alter overall drainages patterns. As previously mentioned, onsite stormwater runoff will be routed through an adequate system of Low Impact Development permanent BMPs to attenuate post-development peak flows to equal or less than pre-development levels. Therefore, no adverse effects on the stormwater management for this site or the downstream facilities is anticipated as a result of the proposed project.

Appendix A

Vicinity Map



N

SCALE: 1" = 1,000'

VICINITY MAP

ESTATES MEADOW HOUSING

JK ARCHITECTURE ENGINEERING

AUBURN | TAHOE CITY | RENO | SAN JOSE

www.jkaedesign.com

CLIENT: CASCADE HOUSING ASSOCIATION

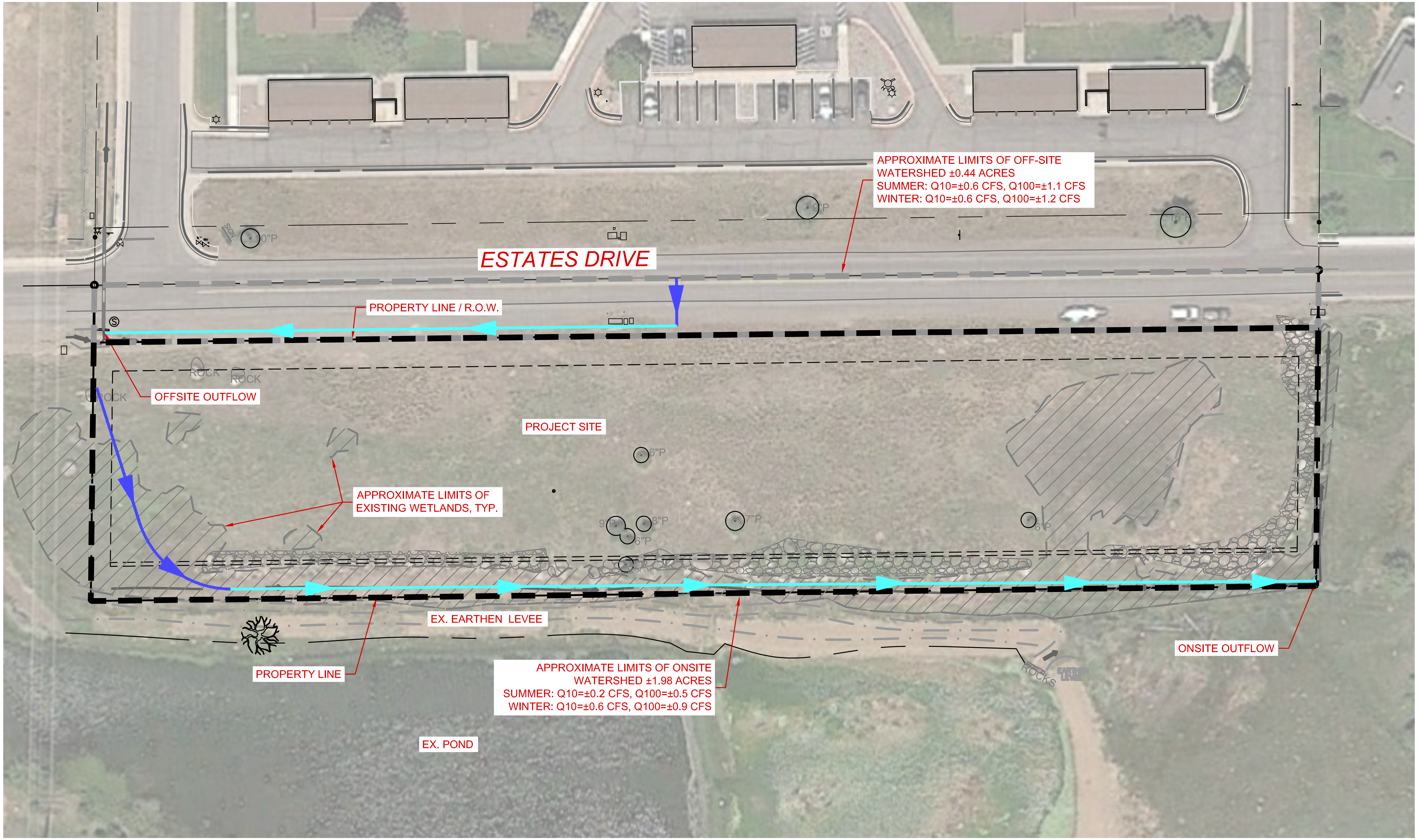
DATE: MARCH 2021

JOB NO: 19-170

DRAWING: V1

Appendix B

Watershed Map



LEGEND:

- OVERLAND FLOW PATH
- COLLECTOR FLOW PATH
- ON-SITE WATERSHED BOUNDARY
- OFF-SITE WATERSHED BOUNDARY

SCALE: 1" = 50'

0' 25' 50' 100'

N

JK ARCHITECTURE ENGINEERING

AUBURN | TAHOE CITY | RENO | SAN JOSE

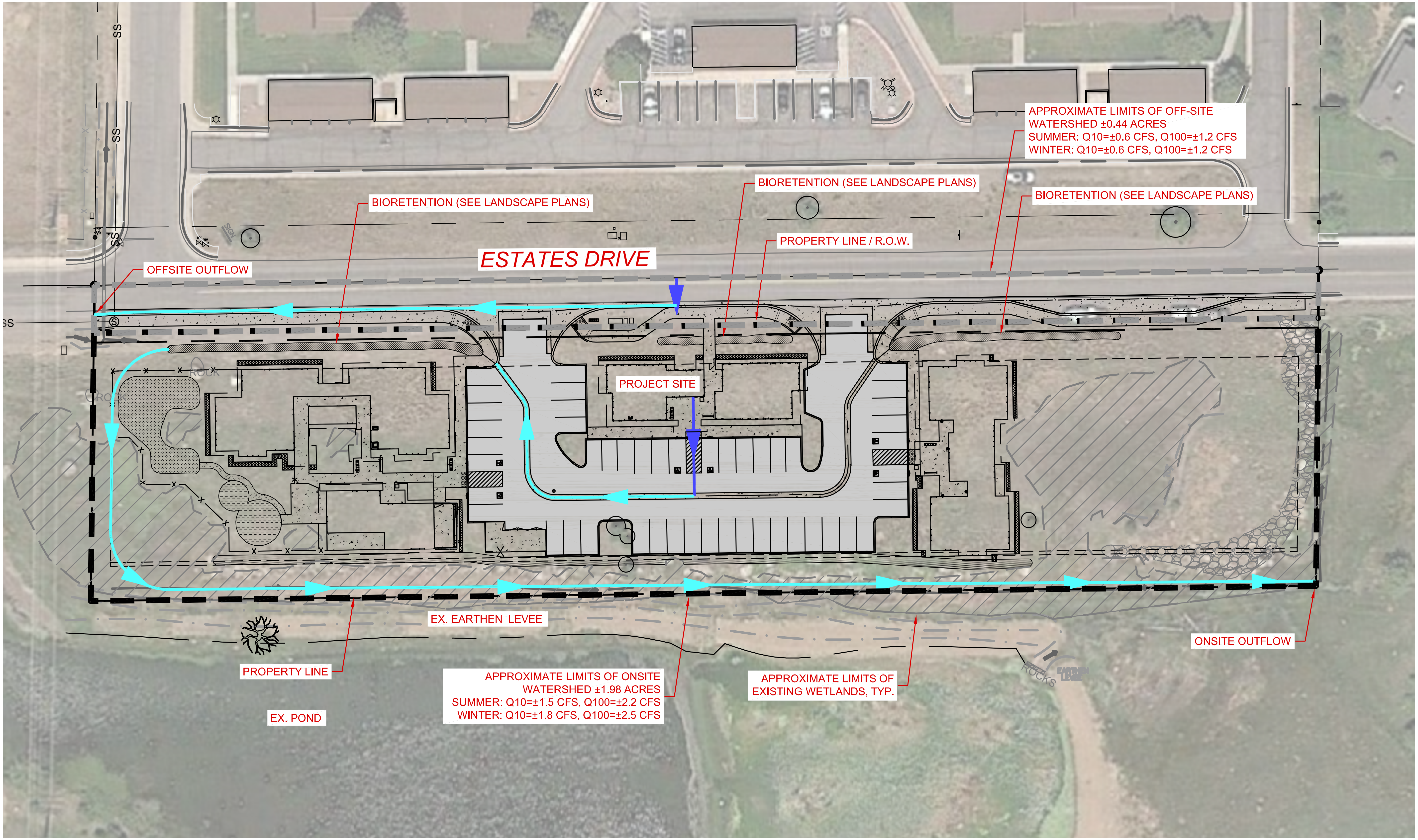
www.jkaedesign.com

CLIENT NAME:
OREGON INVESTORS X LIMITED PARTNERSHIP:
CASCADE HOUSING ASSOCIATION

PROJECT NAME:
ESTATES MEADOW HOUSING

PRE-DEVELOPMENT WATERSHED MAP

DATE: MARCH 2021
JOB NO: 19-170



LEGEND:

- OVERLAND FLOW PATH
- COLLECTOR FLOW PATH
- ON-SITE WATERSHED BOUNDARY
- OFF-SITE WATERSHED BOUNDARY

SCALE: 1" = 50'

0' 25' 50' 100'

N

JK ARCHITECTURE ENGINEERING

AUBURN | TAHOE CITY | RENO | SAN JOSE

www.jkaedesign.com

CLIENT NAME:
OREGON INVESTORS X LIMITED PARTNERSHIP:
CASCADE HOUSING ASSOCIATION

PROJECT NAME:
ESTATES MEADOW HOUSING

PRE-DEVELOPMENT WATERSHED MAP

DATE: MARCH 2021
JOB NO: 19-170

Appendix C

Peak Flow Worksheets

&

References

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Off-Site - Pre Poject - Winter*					
Area (acres)	*0.44*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*25*	*1.3%*	*0.011*	*-*	*-*	*0.60*
Collector 1	*300*	*0.5%*	*0.025*	*0.25*	*17.00*	*2.91*
Collector 2						
Time of Concentration (minutes)						2.37
(Standard Drawing SD #60) 10-Year Intensity (inches/hour)						*1.73*
10-Year Intensity Adjusted for Snow Melt (inches/hour)						*1.83*
Infiltration Rate (inches/hour)					*0.17*	
Infiltration Factor (cfs/acre)					*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)					*0.04*	
Runoff Coefficient "C"					*0.77*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)						*0.6*

(Standard Drawing SD #59) 100-Year Intensity (in/hour)		*3.36*
100-Year Intensity Adjusted for Snow Melt (inches/hour)		*3.46*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)	*0.04*	
Runoff Coefficient "C"	*0.77*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*1.2*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Off-Site - Pre Project - Summer*					
Area (acres)	*0.44*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*25*	*1.3%*	*0.011*	-	-	*0.60*
Collector 1	*300*	*0.5%*	*0.025*	*0.25*	*17.00*	*2.91*
Collector 2						
Time of Concentration (minutes)						2.37
(Standard Drawing SD #60) 10-Year Intensity (inches/hour)						*1.73*
10-Year Intensity Adjusted for Snow Melt (inches/hour)						*1.83*
Infiltration Rate (inches/hour)					*0.17*	
Infiltration Factor (cfs/acre)					*0.21*	
Pervious Area (acres)					*0.26*	
Runoff Coefficient "C" (Standard Drawing SD #58)					*0.77*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)						*0.6*

(Standard Drawing SD #59) 100-Year Intensity (in/hour)		*3.36*
100-Year Intensity Adjusted for Snow Melt (inches/hour)		*3.46*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area (acres)	*0.26*	
Runoff Coefficient "C" (Standard Drawing SD #58)	*0.77*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*1.1*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Off-Site - Post Project - Winter*					
Area (acres)	*0.44*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*15*	*1.3%*	*0.011*	*-*	*-*	*0.44*
Collector 1	*305*	*0.5%*	*0.025*	*0.25*	*17.00*	*2.95*
Collector 2						
Time of Concentration (minutes)						2.37

(Standard Drawing SD #60) 10-Year Intensity (inches/hour)		*1.73*
10-Year Intensity Adjusted for Snow Melt (inches/hour)		*1.83*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)	*0.04*	
Runoff Coefficient "C"	*0.77*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*0.6*

(Standard Drawing SD #59) 100-Year Intensity (in/hour)		*3.36*
100-Year Intensity Adjusted for Snow Melt (inches/hour)		*3.46*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)	*0.04*	
Runoff Coefficient "C"	*0.77*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*1.2*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Off-Site - Post Project - Summer*					
Area (acres)	*0.44*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*15*	*1.3%*	*0.011*	-	-	*0.44*
Collector 1	*305*	*0.5%*	*0.025*	*0.25*	*17.00*	2.95
Collector 2						
Time of Concentration (minutes)						2.37

(Standard Drawing SD #60) 10-Year Intensity (inches/hour)		*1.73*
10-Year Intensity Adjusted for Snow Melt (inches/hour)		*1.83*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area (acres)	*0.09*	
Runoff Coefficient "C" (Standard Drawing SD #58)	*0.77*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*0.6*

(Standard Drawing SD #59) 100-Year Intensity (in/hour)		*3.36*
100-Year Intensity Adjusted for Snow Melt (inches/hour)		*3.46*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area (acres)	*0.09*	
Runoff Coefficient "C" (Standard Drawing SD #58)	*0.77*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*1.2*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Pre Project - Winter*					
Area (acres)	*1.98*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*See Standard Drawing SD #64 in Appendix E*					*11.00*
Overland Flow 2						
Collector 1	*568*	*0.4%*	*0.1*	*2.40*	*4.00*	*6.79*
Collector 2						
Time of Concentration (minutes)						17.79

(Standard Drawing SD #60) 10-Year Intensity (inches/hour)		*1.44*
10-Year Intensity Adjusted for Snow Melt (inches/hour)		*1.54*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)	*0.20*	
Runoff Coefficient "C"	*0.22*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*0.6*

(Standard Drawing SD #59) 100-Year Unit Peak Flow (cfs/acre)		*2.05*
100-Year Intensity Adjusted for Snow Melt (inches/hour)		*2.15*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)	*0.20*	
Runoff Coefficient "C"	*0.22*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*0.9*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Pre Project - Summer*					
Area (acres)	*1.98*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*See Standard Drawing SD #64 in Appendix E*					*11.00*
Overland Flow 2						
Collector 1	*568*	*0.4%*	*0.1*	*2.40*	*4.00*	*6.79*
Collector 2						
Time of Concentration (minutes)						17.79

(Standard Drawing SD #60) 10-Year Intensity (inches/hour)		*1.44*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area (acres)	*1.98*	
Runoff Coefficient "C" (Standard Drawing SD #58)	*0.22*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*0.2*

(Standard Drawing SD #59) 100-Year Intensity (in/hour)		*2.05*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Area Impervious (acres)	*1.98*	
Runoff Coefficient "C" (Standard Drawing SD #58)	*0.22*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*0.5*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Post Project - Winter*					
Area (acres)	*1.98*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*52*	*1.5%*	*0.011*	-	-	*0.90*
Collector 1	*156*	*0.6%*	*0.015*	*0.25*	*17.00*	*0.96*
Collector 2	*760*	*0.4%*	*0.100*	*1.18*	*4.00*	*10.85*
Collector 4						
Time of Concentration (minutes)						12.71

(Standard Drawing SD #60) 10-Year Intensity (inches/hour)		*1.73*
10-Year Intensity Adjusted for Snow Melt (inches/hour)		*1.83*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)	*0.20*	
Runoff Coefficient "C"	*0.51*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*1.8*

(Standard Drawing SD #59) 100-Year Intensity (in/hour)		*2.46*
100-Year Intensity Adjusted for Snow Melt (inches/hour)		*2.56*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area - 90% Impervious Winter-Snow Cover (acres)	*0.20*	
Runoff Coefficient "C"	*0.51*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*2.5*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

Town of Truckee Public Improvement Engineering Standards Small Watershed Peak Flow Worksheet						
Date	*March 2021*					
Engineer	*JK Architecture Engineering*					
Project	*Estates Meadow Housing*					
Watershed	*Post Project - Summer*					
Area (acres)	*1.98*	Elevation (ft)	*5850*	Return Period (years)		*10 & 100*
	Length (feet)	Slope (V/H)	Mannings "n"	Contributing Area (Acres)	Side Slope (ft H / 1 ft V)	Response Time (minutes)
Overland Flow 1	*52*	*1.5%*	*0.011*	-	-	*0.90*
Collector 1	*156*	*0.6%*	*0.015*	*0.25*	*17.00*	*0.96*
Collector 2	*760*	*0.4%*	*0.100*	*1.18*	*4.00*	*10.85*
Collector 4						
Time of Concentration (minutes)						12.71

(Standard Drawing SD #60) 10-Year Intensity (inches/hour)		*1.73*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Pervious Area (acres)	*1.20*	
Runoff Coefficient "C" (90% Impervious Winter-Snow Cover)	*0.51*	
10-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*1.5*

(Standard Drawing SD #59) 100-Year Intensity (in/hour)		*2.46*
Infiltration Rate (inches/hour)	*0.17*	
Infiltration Factor (cfs/acre)	*0.21*	
Area Impervious (acres)	*1.20*	
Runoff Coefficient "C" (90% Impervious Winter-Snow Cover)	*0.51*	
100-Year Watershed Peak Flow (cfs) ("C" x Intensity x Area) - (Infiltration Factor x Pervious Area)		*2.2*

Notes: Manning's "n" from EPA's Storm Water Management Model User's Manual Version 5.1, September 2015

Collector equation (Equation 5.2) from Town of Truckee General Requirements Section 1.

ESTATES MEADOW HOUSING PROJECT
TRIANGULAR HYDROGRAPH DETENTION CALCULATION:

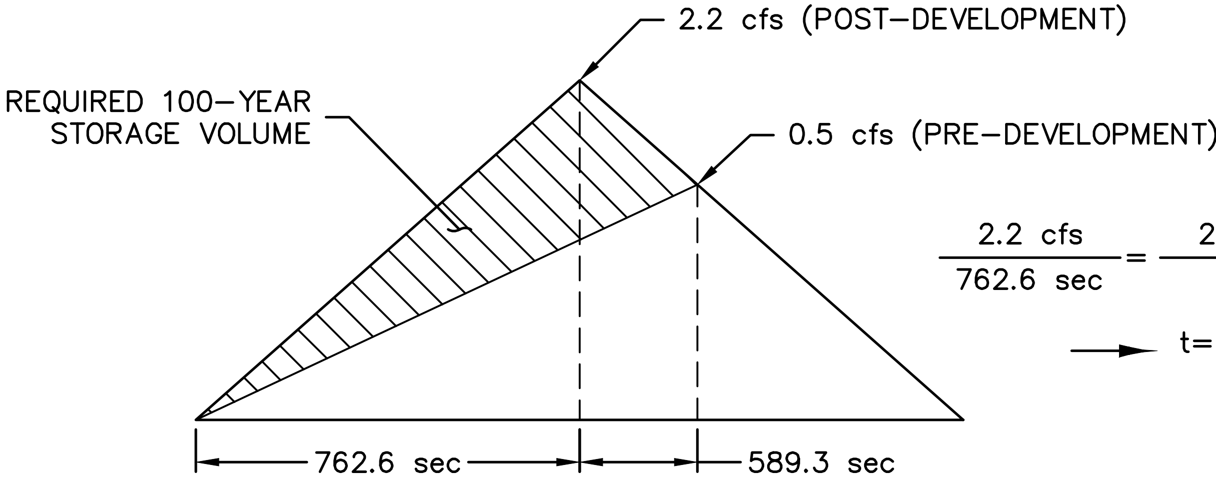
SUMMER CONDITIONS

PRE-DEVELOPMENT CONDITIONS:

Tc=17.79 MIN =1,067.4 sec
Q10*=0.2 cfs
Q100*=0.5 cfs

POST-DEVELOPMENT CONDITIONS:

Tc=12.71 MIN=762.6 sec
Q10*=1.5 cfs
Q100*=2.2 cfs



$$\frac{2.2\text{ cfs}}{762.6\text{ sec}} = \frac{2.2\text{ cfs} - 0.5\text{ cfs}}{t}$$

$\longrightarrow$ t=589.3 sec

A) REQUIRED 100-YEAR STORAGE VOLUME = AREA OF HYDROGRAPH =
(1/2*2.2*762.6) + ((2.2+0.5)*589.3*1/2) – ((762.6+589.3)*0.5*1/2)= 1,296.4 CF

B) COLLECTED RUNOFF FROM IMPERVIOUS SURFACES SHALL BE TREATED ON-SITE AS DETERMINED BY THE TOWN OF TRUCKEE STORM WATER QUALITY PLAN (SWQP)

C) STORM DRAINAGE FACILITIES WILL BE DESIGNED, AT FINAL DESIGN, TO PROVIDE GROUNDWATER RECHARGE, ATTENUATE PEAK FLOWS, AND MINIMIZE RISK OF EROSION.

ESTATES MEADOW HOUSING PROJECT
TRIANGULAR HYDROGRAPH DETENTION CALCULATION:

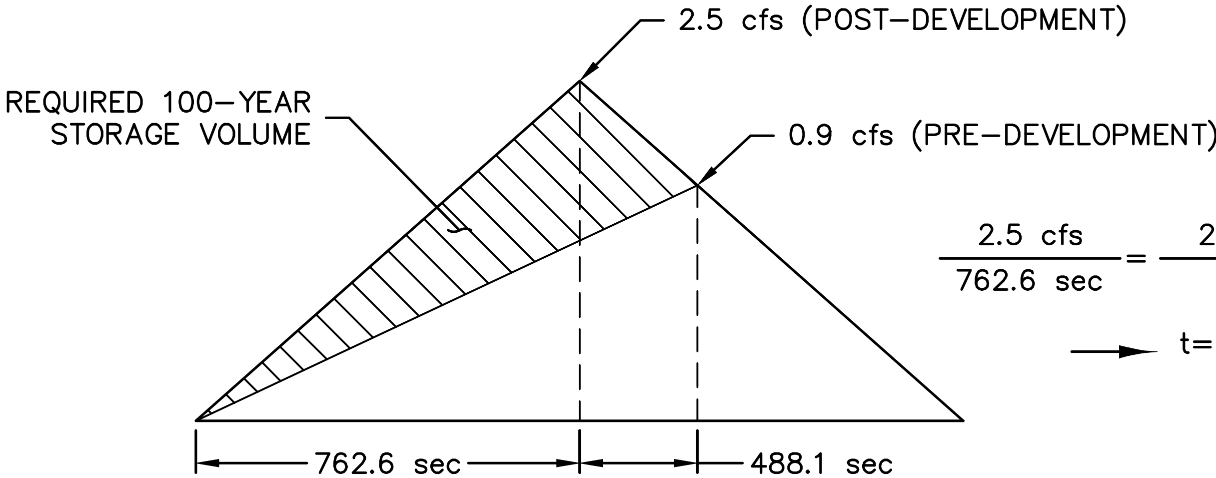
WINTER CONDITIONS

PRE–DEVELOPMENT CONDITIONS:

Tc=17.79 MIN =1,067.4 sec
Q10*=0.6 cfs
Q100*=0.9 cfs

POST–DEVELOPMENT CONDITIONS:

Tc=12.71 MIN=762.6 sec
Q10*=1.8 cfs
Q100*=2.5 cfs



$$\frac{2.5\ \text{cfs}}{762.6\ \text{sec}} = \frac{2.5\ \text{cfs} - 0.9\ \text{cfs}}{t}$$

$\longrightarrow$ t=488.1 sec

A) REQUIRED 100–YEAR STORAGE VOLUME = AREA OF HYDROGRAPH =
(1/2*2.5*762.6) + ((2.5+0.9)*488.1*1/2) – ((762.6+488.1)*0.9*1/2)= 1,220.2 CF

B) COLLECTED RUNOFF FROM IMPERVIOUS SURFACES SHALL BE TREATED ON–SITE AS DETERMINED BY THE TOWN OF TRUCKEE STORM WATER QUALITY PLAN (SWQP)

C) STORM DRAINAGE FACILITIES WILL BE DESIGNED, AT FINAL DESIGN, TO PROVIDE GROUNDWATER RECHARGE, ATTENUATE PEAK FLOWS, AND MINIMIZE RISK OF EROSION.

TABLE FOR ESTIMATING "C" IN RATIONAL FORMULA

UNIMPROVED AREAS

CONDITION	EXTREME	HIGH	MODERATE	LOW
Slope	.36 – .28 Above 30%	.28 – .15 30% – 10%	.15 – .10 10% – 5%	.10 – .05 5% – 0
Surface permeability	.20 – .15 Bare rock or very thin soil	.15 – .07 Impervious clays shallow soils	.07 – .04 Deep pervious loam, sandy loam	.03 Deep sand, volcanic ash
Vegetation	.20 – .15 None or very sparse	.15 – .07 Less than 20% covered with substantial growth	.07 – .04 About 50% covered with heavy growth	.03 90% covered with heavy growth, deep hummus layer
Surface	.20 – .15 Smooth soil, slick rock drainage flow continuos	.15 – .07 Roughened soil or rocks	.07 – .04 Drainage flow interrupted many ponds, lakes & marshes	.03 Drainage flow arrested many ponds, lakes & marshes

IMPROVED AREAS

Surface	C
Roof surfaces	.95
A.C. or P.C.C. pavement, patios, driveways, streets, sidewalks	.90
Landscaped areas	.25
Gravel walks, roadways	.30

EXAMPLE: Unimproved		EXAMPLE: Improved	
20% slope	.22	100 acre tract	
Well drained soil	.05	15 ac.	@.95
Fair cover	.07	50 ac. A.C.pave	@.90
No ponds	.08	35 ac. landscaped	@.25
	C= .42		

$$C = \frac{(15 \times .95)+(50 \times .90)+(35 \times .25)}{100 \text{ acres}} = 0.68 \qquad C = 0.68$$

REGISTERED PROFESSIONAL ENGINEER
DANIEL P. WILKINS
No. C050267
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

TOWN OF TRUCKEE

TOWN OF TRUCKEE
ENGINEERING DEPARTMENT

VALUES FOR ESTIMATING COEFFICIENT OF RUNOFF "C"

LOCAL ROAD SYSTEM STANDARDS

NOT TO SCALE MAY, 2003	APPROVED BY: Daniel P. Wilkins TOWN ENGINEER	STANDARD DRAWING SD#58

NEVADA COUNTY DESIGN STORM (INTENSITY)

100 YEAR STORM DURATION IN MINUTES FOR NEVADA COUNTY

Pre- Project
Post-Project
Off-Site

Mean Annual Precipitation Inches	5	10	15	30	60 1hr	120 2hr	180 3hr	360 6hr	720 12hr	1440 24hr
	Intensity in inches per hour									
20	2.22	1.63	1.36	.99	.73	.53	.44	.32	.24	.17
22	2.39	1.75	1.46	1.07	.78	.57	.48	.35	.25	.19
24	2.55	1.86	1.55	1.14	.83	.61	.51	.37	.27	.20
26	2.71	1.98	1.65	1.21	.89	.65	.54	.40	.29	.21
28	2.87	2.10	1.75	1.28	.94	.69	.57	.42	.31	.22
30	3.03	2.22	1.85	1.35	.99	.73	.60	.44	.32	.24
32	3.19	2.34	1.95	1.43	1.04	.76	.64	.47	.34	.25
34	3.36	2.46	2.05	1.50	1.10	.80	.67	.49	.36	.26
36	3.52	2.58	2.15	1.57	1.15	.84	.70	.51	.38	.28
38	3.68	2.69	2.24	1.64	1.20	.88	.73	.54	.39	.29
40	3.84	2.81	2.34	1.72	1.26	.92	.77	.56	.41	.30
42	4.00	2.93	2.44	1.79	1.31	.96	.80	.58	.43	.31
44	4.17	3.05	2.54	1.86	1.36	1.00	.83	.61	.45	.33
46	4.33	3.17	2.64	1.93	1.41	1.04	.86	.63	.46	.34
48	4.49	3.29	2.74	2.00	1.47	1.07	.89	.66	.48	.35
50	4.65	3.40	2.84	2.08	1.52	1.11	.93	.68	.50	.36
52	4.81	3.52	2.94	2.15	1.57	1.15	.96	.70	.51	.38
54	4.97	3.64	3.03	2.22	1.63	1.19	.99	.73	.53	.39
56	5.14	3.76	3.13	2.29	1.68	1.23	1.02	.75	.55	.40
58	5.30	3.88	3.23	2.37	1.73	1.27	1.06	.77	.57	.41
60	5.46	4.00	3.33	2.44	1.78	1.31	1.09	.80	.58	.43
62	5.62	4.12	3.43	2.51	1.84	1.35	1.12	.82	.60	.44
64	5.78	4.23	3.53	2.58	1.89	1.38	1.15	.84	.62	.45
66	5.94	4.35	3.63	2.65	1.94	1.42	1.19	.87	.64	.46
68	6.11	4.47	3.72	2.73	2.00	1.46	1.22	.89	.65	.48
70	6.27	4.59	3.82	2.80	2.05	1.50	1.25	.91	.67	.49
72	6.43	4.71	3.92	2.87	2.10	1.54	1.28	.94	.69	.50
74	6.59	4.83	4.02	2.94	2.15	1.58	1.31	.96	.70	.52
76	6.75	4.94	4.12	3.02	2.21	1.62	1.35	.99	.72	.53
78	6.92	5.06	4.22	3.09	2.26	1.65	1.38	1.01	.74	.54
80	7.08	5.18	4.32	3.16	2.31	1.69	1.41	1.03	.76	.55

TOWN OF TRUCKEE
ENGINEERING DEPARTMENT
100 YEAR STORM DURATION IN MINUTES FOR NEVADA COUNTY

LOCAL ROAD SYSTEM STANDARDS

NOT TO SCALE
MAY, 2003
APPROVED BY:
TOWN ENGINEER
STANDARD DRAWING SD#59

NEVADA COUNTY DESIGN STORM (INTENSITY)

10 YEAR STORM DURATION IN MINUTES FOR NEVADA COUNTY

Pre-Project
Post-Project
Off-Site

Mean Annual Precipitation Inches	5	10	15	30	60 1hr	120 2Hr	180 3Hr	360 6Hr	720 12Hr	1440 24Hr
	Intensity in inches per hour									
20	1.57	1.15	.96	.70	.51	.38	.31	.23	.17	.12
22	1.68	1.23	1.03	.75	.55	.40	.34	.25	.18	.13
24	1.80	1.31	1.10	.80	.59	.43	.36	.26	.19	.14
26	1.91	1.40	1.17	.85	.62	.46	.38	.28	.20	.15
28	2.02	1.48	1.23	.90	.66	.48	.40	.30	.22	.16
30	2.14	1.57	1.30	.95	.70	.51	.43	.31	.23	.17
32	2.25	1.65	1.37	1.01	.74	.54	.45	.33	.24	.18
34	2.37	1.73	1.44	1.06	.77	.57	.47	.35	.25	.19
36	2.48	1.82	1.51	1.11	.81	.59	.49	.36	.27	.19
38	2.59	1.90	1.58	1.16	.85	.62	.52	.38	.28	.20
40	2.71	1.98	1.65	1.21	.89	.65	.54	.40	.29	.21
42	2.82	2.07	1.72	1.26	.92	.68	.56	.41	.30	.22
44	2.94	2.15	1.79	1.31	.96	.70	.59	.43	.31	.23
46	3.05	2.23	1.86	1.36	1.00	.73	.61	.45	.33	.24
48	3.17	2.32	1.93	1.41	1.03	.76	.63	.46	.34	.25
50	3.28	2.40	2.00	1.46	1.07	.78	.65	.48	.35	.26
52	3.39	2.48	2.07	1.52	1.11	.81	.68	.50	.36	.27
54	3.51	2.57	2.14	1.57	1.15	.84	.70	.51	.37	.27
56	3.62	2.65	2.21	1.62	1.18	.87	.72	.53	.39	.28
58	3.74	2.73	2.28	1.67	1.22	.89	.74	.55	.40	.29
60	3.85	2.82	2.35	1.72	1.26	.92	.77	.56	.41	.30
62	3.96	2.90	2.42	1.77	1.30	.95	.79	.58	.42	.31
64	4.08	2.98	2.49	1.82	1.33	.98	.81	.60	.44	.32
66	4.19	3.07	2.56	1.87	1.37	1.00	.84	.61	.45	.33
68	4.31	3.15	2.63	1.92	1.41	1.03	.86	.63	.46	.34
70	4.42	3.24	2.70	1.97	1.44	1.06	.88	.65	.47	.35
72	4.53	3.32	2.77	2.02	1.48	1.08	.90	.66	.48	.35
74	4.65	3.40	2.84	2.08	1.52	1.11	.93	.68	.50	.36
76	4.76	3.49	2.90	2.13	1.56	1.14	.95	.70	.51	.37
78	4.88	3.57	2.97	2.18	1.59	1.17	.97	.71	.52	.38
80	4.99	3.65	3.04	2.23	1.63	1.19	.99	.73	.53	.39

REGISTERED PROFESSIONAL ENGINEER
DANIEL P. WILKINS
No. C056237
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

TOWN OF TRUCKEE

TOWN OF TRUCKEE
ENGINEERING DEPARTMENT
10 YEAR STORM DURATION
IN MINUTES FOR NEVADA COUNTY

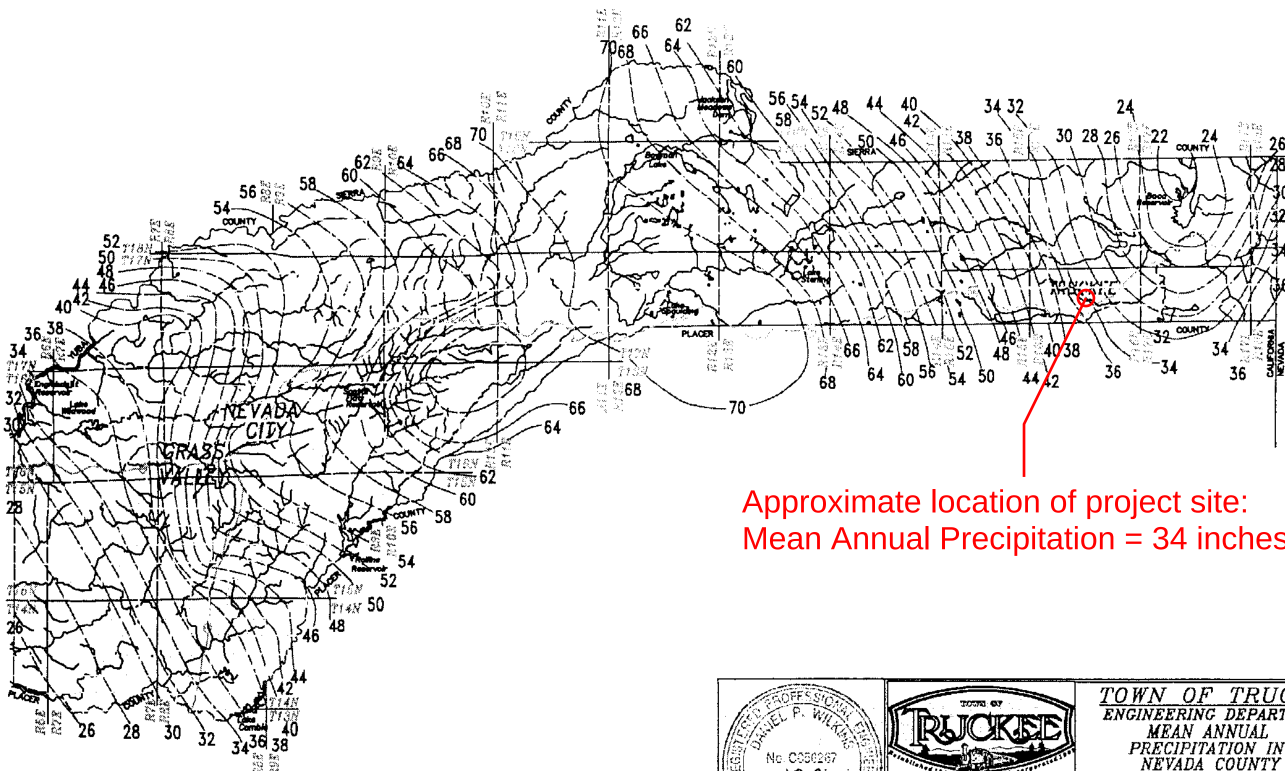
LOCAL ROAD SYSTEM STANDARDS

NOT TO SCALE
MAY, 2003

APPROVED BY:
Daniel P. Wilkins
TOWN ENGINEER

STANDARD DRAWING
SD#60

NEVADA COUNTY



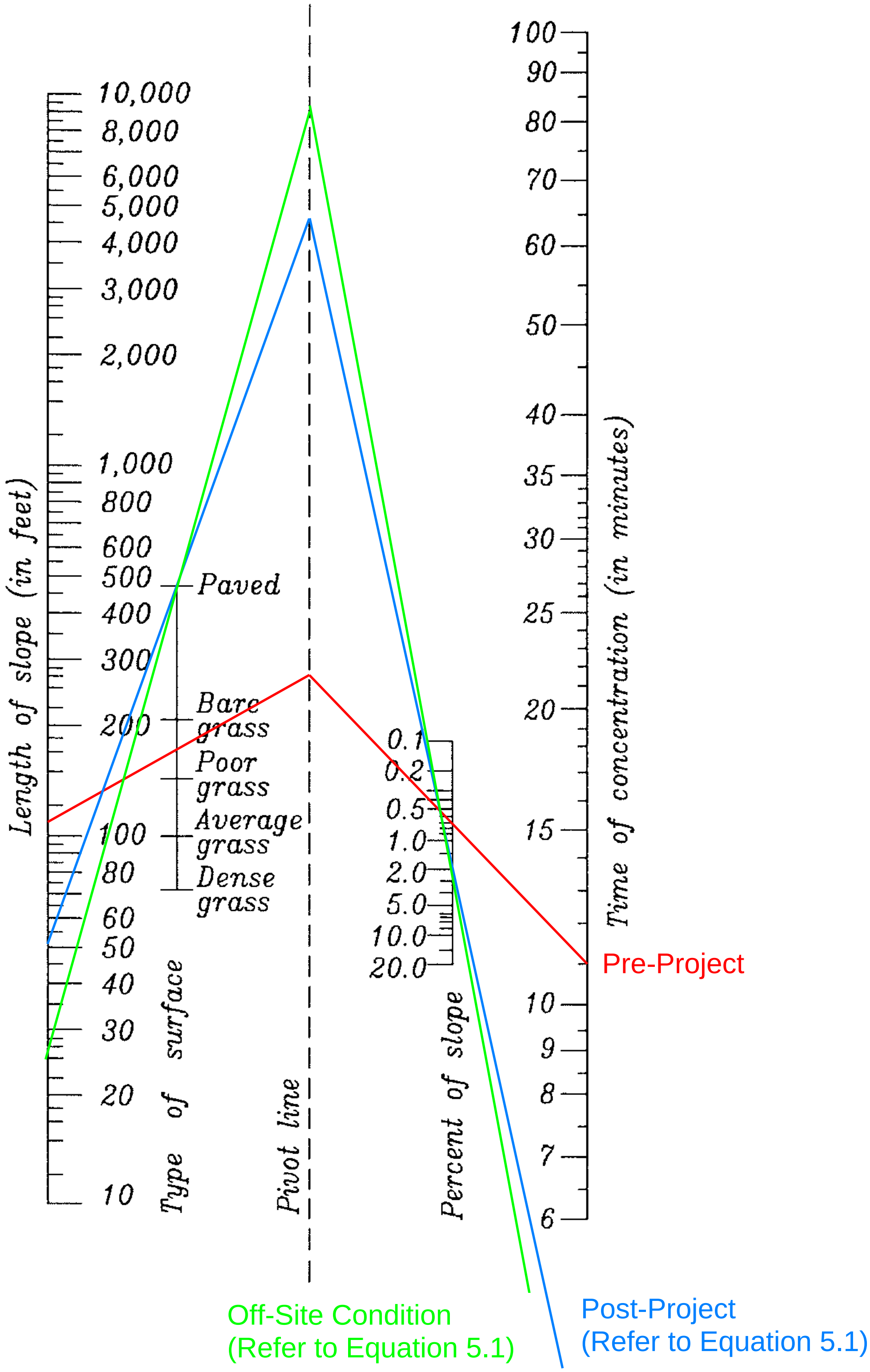
REGISTERED PROFESSIONAL ENGINEER
DANIEL P. WILKINS
No. C050267
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

TOWN OF TRUCKEE

TOWN OF TRUCKEE
ENGINEERING DEPARTMENT
MEAN ANNUAL PRECIPITATION IN NEVADA COUNTY

LOCAL ROAD SYSTEM STANDARDS

NOT TO SCALE	APPROVED BY:	STANDARD DRAWING
MAY, 2003	TOWN ENGINEER	SD#63



REGISTERED PROFESSIONAL ENGINEER DANIEL P. WILKINS No. C050267 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

TOWN OF TRUCKEE

TOWN OF TRUCKEE
ENGINEERING DEPARTMENT
TIME OF CONCENTRATION
SHEET FLOW

LOCAL ROAD SYSTEM STANDARDS

NOT TO SCALE DATE:	APPROVED BY: Daniel P. Wilkins TOWN ENGINEER	STANDARD DRAWING SD#64

A.6 Manning's n – Overland Flow

Surface	n
Smooth asphalt	0.011
Smooth concrete	0.012
Ordinary concrete lining	0.013
Good wood	0.014
Brick with cement mortar	0.014
Vitrified clay	0.015
Cast iron	0.015
Corrugated metal pipes	0.024
Cement rubble surface	0.024
Fallow soils (no residue)	0.05
Cultivated soils	
Residue cover < 20%	0.06
Residue cover > 20%	0.17
Range (natural)	0.13
Grass	
Short, prairie	0.15
Dense	0.24
Bermuda grass	0.41
Woods	
Light underbrush	0.40
Dense underbrush	0.80

Source: McCuen, R. et al. (1996), *Hydrology*, FHWA-SA-96-067, Federal Highway Administration, Washington, DC

A.7 Manning's n – Closed Conduits

Conduit Material	**Manning n**
Asbestos-cement pipe	0.011 - 0.015
Brick	0.013 - 0.017
Cast iron pipe - Cement-lined & seal coated	 0.011 - 0.015
Concrete (monolithic) - Smooth forms - Rough forms	 0.012 - 0.014 0.015 - 0.017
Concrete pipe	0.011 - 0.015
Corrugated-metal pipe (1/2-in. x 2-2/3-in. corrugations) - Plain - Paved invert - Spun asphalt lined	 0.022 - 0.026 0.018 - 0.022 0.011 - 0.015
Plastic pipe (smooth)	0.011 - 0.015
Vitrified clay - Pipes - Liner plates	 0.011 - 0.015 0.013 - 0.017

Source: ASCE (1982). *Gravity Sanitary Sewer Design and Construction*, ASCE Manual of Practice No. 60, New York, NY.

A.8 Manning's n – Open Channels

Channel Type	**Manning n**
Lined Channels	
- Asphalt	0.013 - 0.017
- Brick	0.012 - 0.018
- Concrete	0.011 - 0.020
- Rubble or riprap	0.020 - 0.035
- Vegetal	0.030 - 0.40
Excavated or dredged	
- Earth, straight and uniform	0.020 - 0.030
- Earth, winding, fairly uniform	0.025 - 0.040
- Rock	0.030 - 0.045
- Unmaintained	0.050 - 0.140
Natural channels (minor streams, top width at flood stage < 100 ft)	
- Fairly regular section	0.030 - 0.070
- Irregular section with pools	0.040 - 0.100

Source: ASCE (1982). *Gravity Sanitary Sewer Design and Construction,* ASCE Manual of Practice No. 60, New York, NY.

JK Architecture Engineering
165 River Road, Suite 1
Tahoe City, CA 96145

Coefficient of Runoff "C"

Estates Meadow Housing

Refernce: Values for Estimating Coefficient of Runoff "C"
Standard Drawing SD #58 of the Town of Truckee Public Improvement Engineering Standards

Unimproved Condition

CONDITION	SITE	C
Slope	2.50%	0.03
Surface Permeability	Gravelly Loam	0.05
Vegetation	<20% Coverage	0.11
Surface	Ponding	0.03
	TOTAL	**0.22**

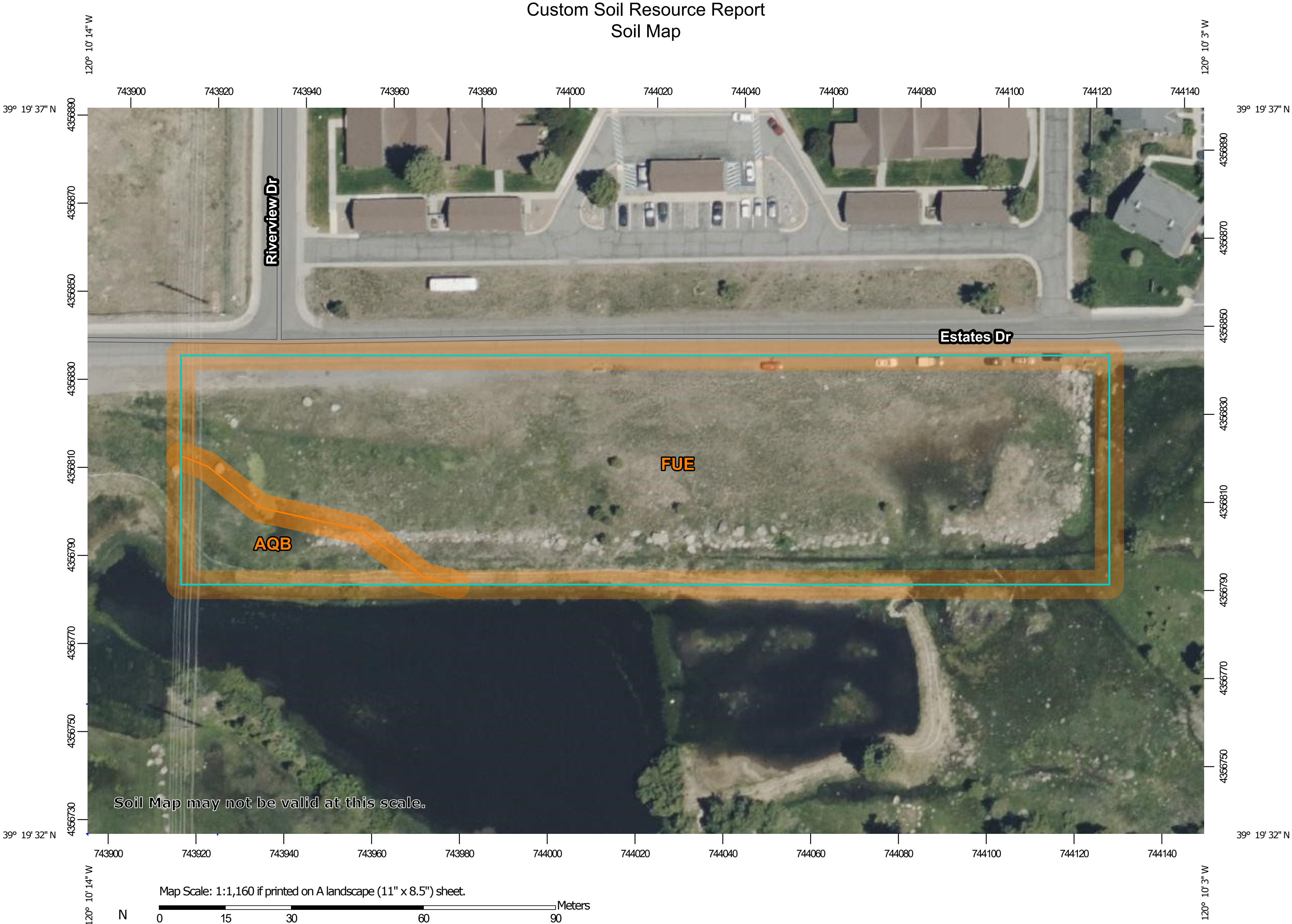
Improved Condition

AREA (acres)	SURFACE TYPE	C
0.37	AC Pavement	0.90
0.17	Concrete Walks	0.90
0.24	Buildings	0.95
1.20	Landscape	0.25
1.98	**Weighted Average**	**0.51**

Offiste Condition

AREA (acres)	SURFACE TYPE	C
0.35	AC Pavement	0.90
0.09	Landscape	0.25
0.44	**Weighted Average**	**0.77**

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,160 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 15, 30, 60, 90

Feet: 0, 50, 100, 200, 300

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Tahoe National Forest Area, California
Survey Area Data: Version 14, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 8, 2019—Jun 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AQB	Aquolls and Borolls, 0 to 5 percent slopes	0.2	8.0%
FUE	Kyburz-Trojan complex, 9 to 30 percent slopes	2.5	92.0%
Totals for Area of Interest		**2.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Tahoe National Forest Area, California

AQB—Aquolls and Borolls, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hlg2
Elevation: 5,000 to 8,500 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 25 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Aquolls and similar soils: 55 percent
Borolls and similar soils: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aquolls

Setting

Landform: Marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Flat
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Description of Borolls

Setting

Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Flat
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

FUE—Kyburz-Trojan complex, 9 to 30 percent slopes

Map Unit Setting

National map unit symbol: hlj5
Elevation: 5,500 to 6,400 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 39 to 50 degrees F
Frost-free period: 20 to 30 days
Farmland classification: Not prime farmland

Map Unit Composition

Kyburz and similar soils: 60 percent
Trojan and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kyburz

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 6 inches: gravelly sandy loam
H2 - 6 to 34 inches: gravelly clay loam
H3 - 34 to 60 inches: weathered bedrock

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: 34 to 38 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Trojan

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from conglomerate; residuum weathered from basic volcanic breccia

Typical profile

H1 - 0 to 21 inches: gravelly sandy loam
H2 - 21 to 67 inches: gravelly clay loam
H3 - 67 to 71 inches: unweathered bedrock

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: 67 to 71 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

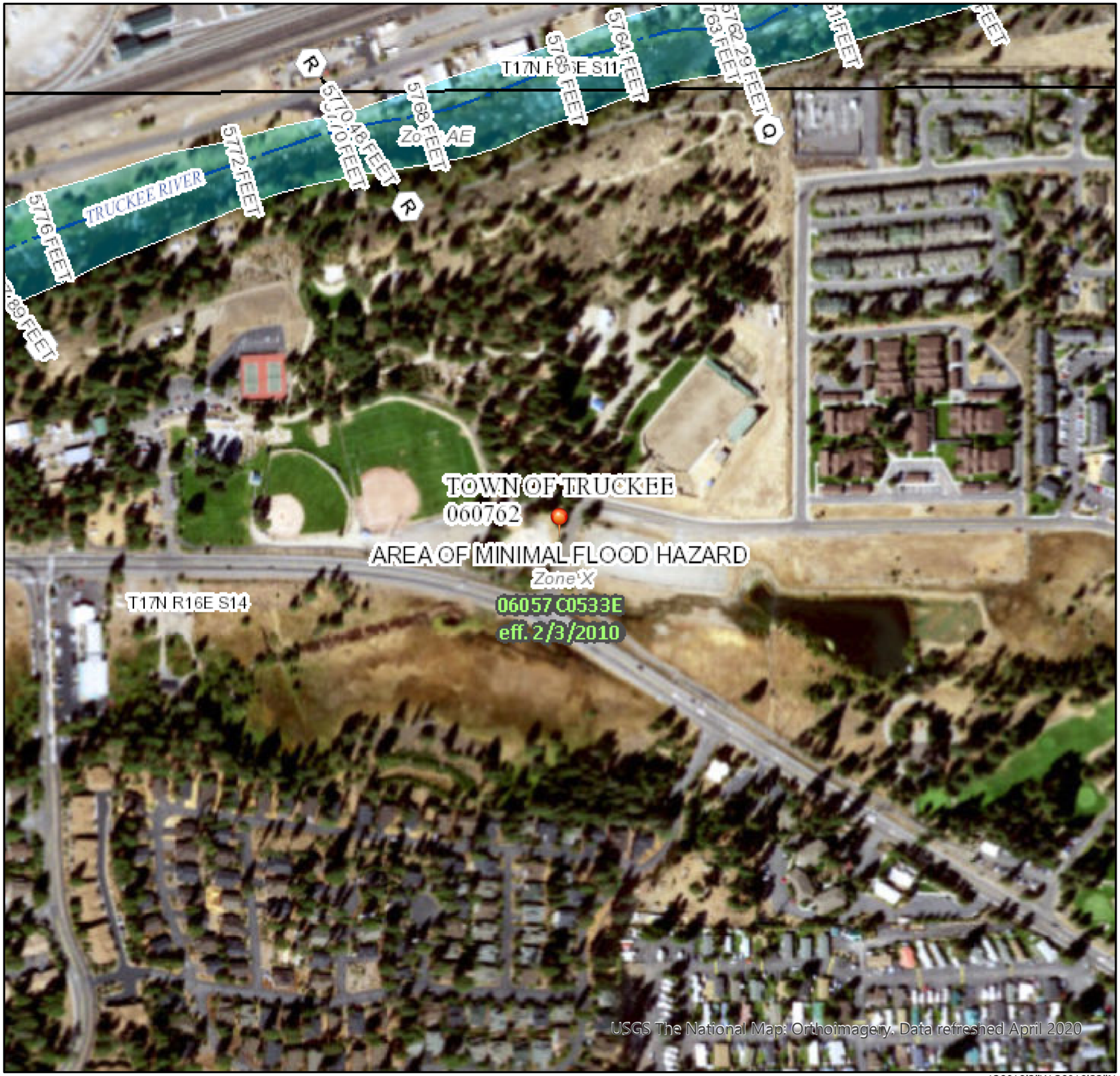
Appendix D

Flood Maps

National Flood Hazard Layer FIRMette

FEMA

120°10'39"W 39°19'49"N



120°10'2"W 39°19'22"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

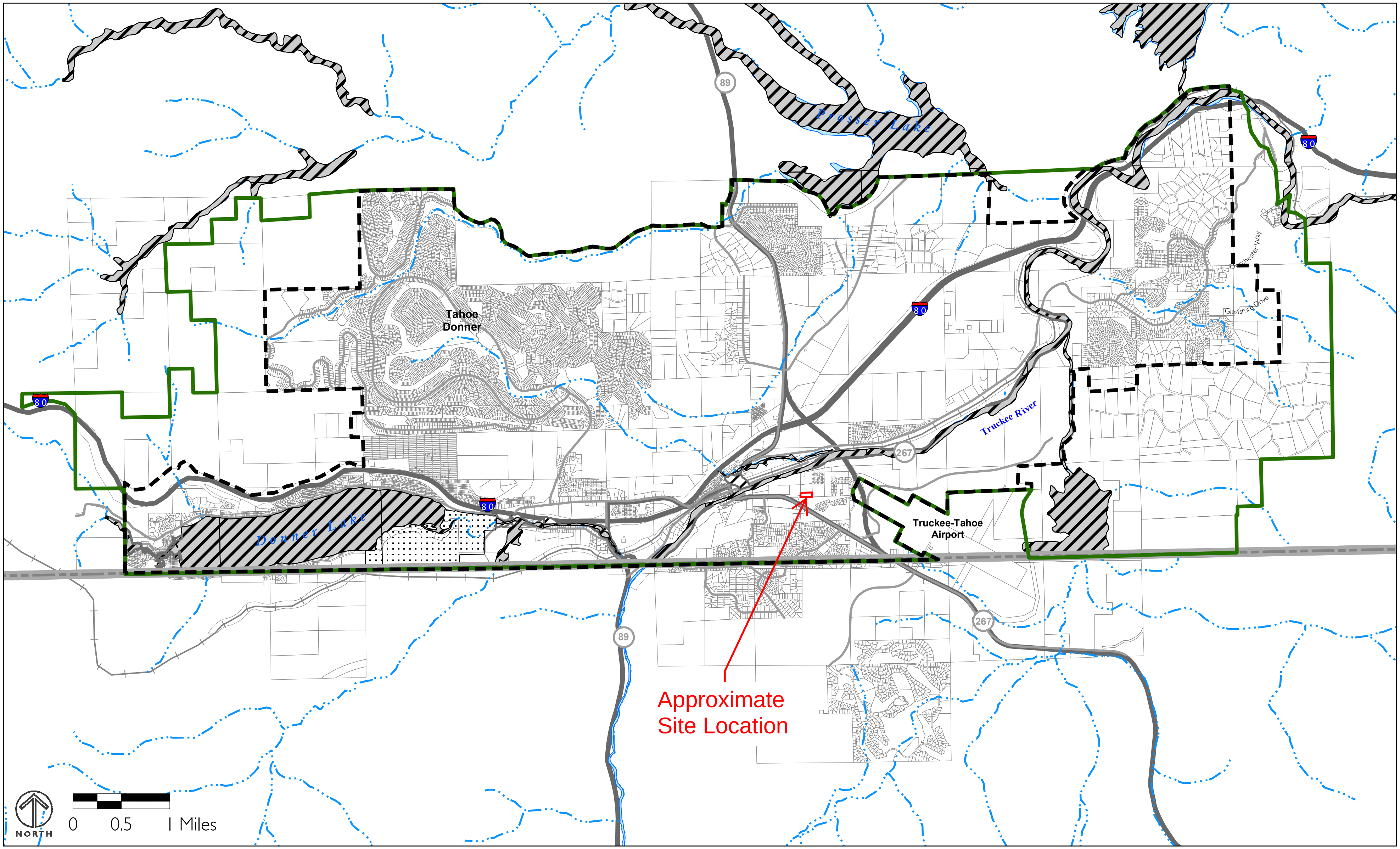
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/8/2020 at 5:41 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Source: Federal Emergency Management Agency, 1998 Note: This figure includes flood hazard mapping for Nevada County only

FIGURE 4.7-1

Truckee Town Limits

Proposed Sphere of Influence

Creek or other Drainage

FEMA FLOOD HAZARD ZONES

Zone A: Subject to 100-Year Flood. Base Elevation Undetermined. Annual probability of flooding of 1% or greater.

Zone X500: Area between the limit of the 100-year and 500-year flood; or certain areas subject to 100-year flood with average depths of less than one foot. Annual Probablility of Flooding 0.2% to 1%

Zone D: Unstudied Area: Flood Hazards Undetermined

Zone X: Areas Outside of 500-year floodplain

AREAS SUBJECT TO FLOODING

TOWN OF TRUCKEE
2025 GENERAL PLAN EIR

APPENDIX F

ENVIRONMENTAL NOISE ASSESSMENT

Truckee Workforce Housing
Environmental Noise Assessment

Town of Truckee, California

September 20, 2020

jcb Project # 2020-119

Prepared for:

Cascade Housing Association
P.O. Box 182
Springfield, Oregon 97477

Attn:
Jerry Burke & Michelle Martin
cc: Carla Sammis JKA Architecture / Engineering

Prepared by:

j.c. brennan & associates, Inc.

Jim Brennan, INCE
President
Member, Institute of Noise Control Engineering (INCE)

INTRODUCTION

This section discusses the existing noise environment in the project vicinity, and identifies potential noise impacts and mitigation measures related to development of the Truckee Workforce Housing residential development. Specifically, this section analyzes potential noise impacts due to and upon development of the project relative to applicable noise criteria and to the existing ambient noise environment.

PROJECT DESCRIPTION

The Truckee Workforce Housing project is located on the south side of Estates Drive, and north of Brockway Road. The project includes three buildings with a total of 30 residential units, community room, laundry facility, and managers office.

Figure 1 shows the project location, and Figure 2 shows the project site plan.

Acoustical Terminology[1]

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective. Often, someone’s music is described as noise by another.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels.

[1] For an explanation of these terms, see Appendix A: "Acoustical Terminology"

There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the

composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise. The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common noise sources. Appendix A provides a summary of acoustical terms used in this report.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.).

Table 1
Typical Maximum Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source:Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. September 2013.

Figure 1
Project Location

j.c. brennan & associates
consultants in acoustics

Rev. 1/11/17

BUILDING DATA

BUILDING A		BUILDING B/C		BUILDING B/C	
COMMUNITY ROOM	1,000 SF	1BEDROOM UNITS	2	1BEDROOM UNITS	2
LAUNDRY	150 SF	2BEDROOM UNITS	6	2BEDROOM UNITS	6
MANAGER OFFICE	70 SF	3BEDROOM UNITS	4	3BEDROOM UNITS	4
RESTROOM	70 SF				
1 BEDROOM UNITS	6				
TOTAL	6	TOTAL	12	TOTAL	12

PARKING

REQUIRED:	
1 BEDROOM UNITS 10 X 1	10
2 BEDROOM UNITS (6/UNIT) 12 X 2	24
3 BEDROOM UNITS (4/UNIT 8 X 2	16
TOTAL REQUIRED:	50
TOTAL PROVIDED:	50
ACCESSIBLE SPACES 2% MIN	2
ACCESSIBLE SPACES PROVIDED	3

Cascade Housing
Truckee Donner 2 Acre

conceptual site plan
Conceptual Design 3/17/2020

JK ARCHITECTURE ENGINEERING
Imagine. Design. Create.

Continuous 24-hour Noise Measurement Location

Figure 2
Truckee Workforce Housing Site Plan

j.c. brennan & associates
consultants in acoustics

Rev. 1/11/17

CRITERIA

Town of Truckee General Plan Noise Element Goals and Policies

The following Town of Truckee General Plan Noise Element goals and policies relative to this project.

> **Goal 1:**
> **Minimize community noise exposure to excessive noise by ensuring compatible land uses relative to noise sources.**
>
> **Policy 1.1:**
> Allow new development only if consistent with the ground transportation noise compatibility guidelines and policies of this Element. Noise measurements used in establishing compatibility shall be measured in dBA CNEL and based on worst case noise levels, either existing or future, with future noise levels to be predicted based on projected 2025 levels.
>
> **Policy 1.2:**
> Require new development to mitigate exterior noise to “normally acceptable” levels in outdoor areas where quiet is a benefit such as in the backyards of single-family homes.
>
> **Policy 1.3:**
> Enforce the California Noise Insulation Standards for interior noise levels attributable to exterior sources for all proposed new single- and multi-family residences. (*Note: This is an interior noise level of 45 dB Ldn/CNEL*)
>
> **Goal 2:**
> **Address noise issues through the planning and permitting process.**
>
> **Policy 2.1:**
> Require mitigation of all significant noise impacts as a condition of project approval.
>
> **Policy 2.2:**
> Require preparation of a noise analysis which is to include recommendations for mitigation for all proposed projects which may result in potentially significant noise impacts to nearby noise sensitive land uses.
>
> **Policy 2.3:**
> Require preparation of a noise analysis which is to include recommendations for mitigation for all proposed development within noise impacted areas that may be exposed to levels greater than “normally acceptable.”

Policy 2.4:
Discourage the construction of sound walls and require development projects to evaluate site design techniques, building setbacks, earthen berms, alternative architectural layouts and other means to meet noise reduction requirements.

Goal 3:
Reduce noise levels from sources such as domestic uses, construction and car stereos, and from mobile sources, including motor vehicle traffic and aircraft operations.

Policy 3.13:
Require the following standard construction noise control measures to be included as requirements at construction sites in order to minimize construction noise impacts.

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.
- Utilize "quiet" air compressors and other stationary noise-generating equipment where appropriate technology exists.
- The project sponsor shall designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint and will require that reasonable measures warranted to correct the problem be implemented. The project sponsor shall also post telephone number for excessive noise complaints in conspicuous locations in the vicinity of the project site. Additionally, the project sponsor shall send a notice to neighbors in the project vicinity with the information on the construction schedule and the telephone number for noise complaints.

The Town of Truckee Noise Element guidelines are provided in Table 2.

Table 2
Noise Compatibility Guidelines

Exterior Noise Exposure (CNEL, dB)*

Land Use Category	50	55	60	65	70	75	80
Residential, Mobile Homes	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Normally Unacceptable	Unacceptable	Unacceptable
Residential in Mixed Use Development	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Unacceptable	Unacceptable
Hospitals, Schools, Congregate Care	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Unacceptable	Unacceptable
Office; Medical; Light Industrial	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Unacceptable
Hotel; Commercial	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Unacceptable
Neighborhood Parks; RV Parks	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable	Unacceptable
Other Recreation; Community and Regional Parks	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Unacceptable

* Based on worst-case levels, both existing and 2025.

NORMALLY ACCEPTABLE
Specified land use is compatible, assuming standard construction practices are used.

NORMALLY UNACCEPTABLE
New land uses should be discouraged, but development may be allowed after a detailed noise analysis is performed, noise reduction and insulation features necessary to reduce exterior noise to "normally acceptable" levels and interior noise levels as appropriate are included in project design, and the land uses are shown to serve the greater public interests of the citizens of Truckee.

CONDITIONALLY ACCEPTABLE
New land uses may be allowed if a detailed noise analusis is performed and noise reduction and insulation features necessary to reduce exterior noise levels to "normally acceptable" levels and interior noise levels as appropriate are included in the project design.

UNACCEPTABLE
New construction or development of these land uses should generally not be permitted because mitigation is usually not feasible.

Note: The Truckee-Tahoe Airport has separate guidelines addressing airport noise.

Town of Truckee Development Code
The Town of Truckee Development Code essentially contains the Noise Ordinance referred to in the Town of Truckee Noise Element policies.

Section 18.44.020 of the development code states that noise complaints associated with the types of commercial uses (loading docks, stationary noise sources, etc.) would be directed to the Community Development Department.

Section 18.44.040 states that exterior noise levels, when measured at a noise-sensitive receiving land use, shall not exceed the noise level standards set forth in Table 3 (Table 3-8 in the Code). In the event that the ambient noise environment exceeds the Table 3 standards, the applicable standards shall be adjusted to equal the ambient noise level. In addition, the Table 3 standards shall be reduced by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

Table 3
Noise Standards by Receiving Land Use
Town of Truckee Development Code

Cumulative Duration of Intrusive Sound	Noise Metric	Daytime (7 am to 10 pm)	Nighttime (10 pm - 7 am)
Hospital, Library, Religious Institution, Residential or School Uses:			
Cumulative period of 30 minutes per hour	L_{50}	55	50
Cumulative period of 15 minutes per hour	L_{25}	60	55
Cumulative period of 5 minutes per hour	L_{08}	65	60
Cumulative period of 1 minute per hour	L_{02}	70	65
Level not to be exceeded for any time during hour	L_{max}	75	70
Commercial Uses:			
Cumulative period of 30 minutes per hour	L_{50}	65	60
Cumulative period of 15 minutes per hour	L_{25}	70	65
Cumulative period of 5 minutes per hour	L_{08}	75	70
Cumulative period of 1 minute per hour	L_{02}	80	75
Level not to be exceeded for any time during hour	L_{max}	85	80
Note: Each of the noise limits specified above shall be reduced by 5 dBA for impulsive or simple tone noises or for noises consisting of speech or music. If the existing ambient noise levels exceed that permitted in the first four noise-limit categories, the allowable limit shall be increased to encompass the ambient.			

Section 18.44.070 – Exceptions states that the provisions of the chapter do not apply to noise sources associated with non-single family residential construction provided that the activities do

not take place before 7 a.m. or after 9 p.m. on any day except Sunday, or before 9 a.m. or after 6 p.m. on Sunday. The provisions of the chapter do not apply to noise sources associated with single family residential construction on a single family lot.

Truckee Tahoe Airport Land Use Compatibility Plan (ALUC)

The Truckee Tahoe Airport Land Use Compatibility Plan (ALUC) establishes noise level criteria and policies for varying land use compatibility zones. The project site is located within Zone D, which is considered a "Primary Traffic Pattern", and the noise impact is considered to be moderate. This zone requires an overflight easement, as shown in Table 2A of the ALUC.

The project site is located adjacent to the 55 dB CNEL contour, as shown on Figure 3. Based upon the ALUC, an overflight easement is required. That table goes on to state the following: "*Noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities*."

Vibration Standards

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

The Town of Truckee does not have specific policies pertaining to vibration levels. However, vibration levels associated with construction activities and project operations are addressed as potential noise impacts associated with project implementation.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Based upon Caltrans criteria, the threshold for damage to structures ranges from 0.2 to 0.6 peak particle velocity in inches per second (in/sec p.p.v). The general threshold at which human annoyance could occur is noted as 0.1 in/sec p.p.v.

Significant Increase In Noise Levels

Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to measurably severe noise levels. In practice, a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following[2]:

- A 3-dB change is barely perceptible,
- A 5-dB change is clearly perceptible, and
- A 10-dB change is perceived as being twice or half as loud.

For this project an increase in noise levels of 5 dB or greater due to the project is considered to be significant change.

[2] California Department of Transportation. *Technical Noise Supplement to the Traffic Analysis Protocol.* September 2013.

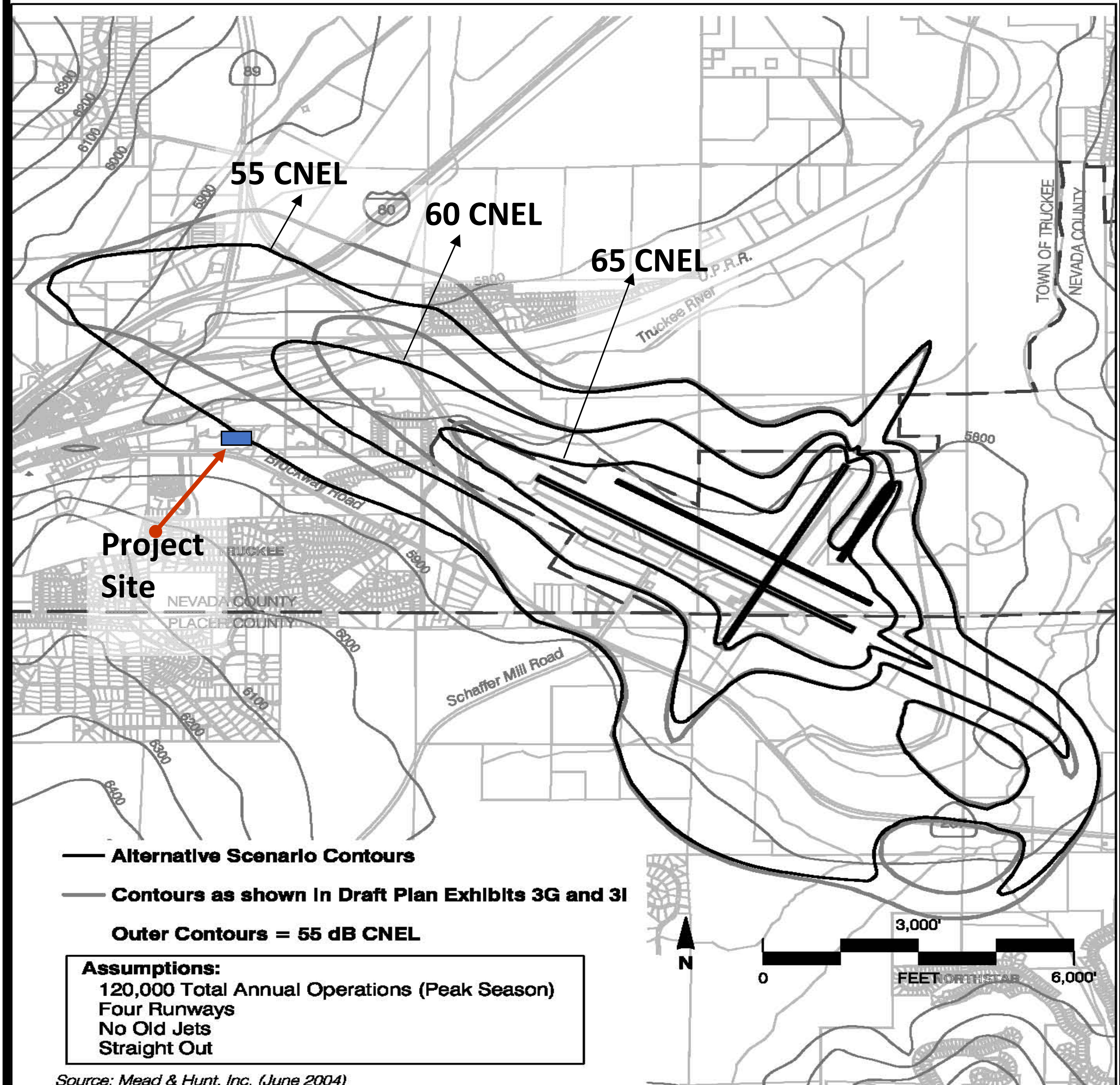


Exhibit H-1

Straight-Out Scenario

Truckee Tahoe Airport

Figure 3: Airport Contours

EXISTING NOISE ENVIRONMENT

Existing Background Noise Levels

The primary noise sources in the project vicinity includes roadway traffic along Brockway Road, aircraft overflights from the Truckee Tahoe Airport, and distant train horn noise. Based upon the distance to the Union Pacific Railroad (UPRR) track (1,700-feet), and personal observations, the UPRR operations are not a contributor to the overall noise environment. j.c. brennan & associates, Inc. conducted continuous 24-hour noise level measurements on the project site. The long-term (24-hour) noise measurement site was selected to determine the existing background noise levels all noise sources, and the temporal distribution of roadway traffic along Brockway Road over a 24-hour period. Noise measurements were conducted on June 24th-25th, 2020. Sound level meters were programmed to collect hourly noise level data, including the hourly averages (Leq), hourly maximum (Lmax) levels, and hourly statistical noise levels. Figure 2 shows the noise measurement location. The results of the noise level measurements are shown in Table 4. Appendix B contains the results of the continuous 24-hour noise level measurements, and graphically shows the results of the 24-hour noise measurement survey.

Equipment used for all noise level measurements included Larson-Davis-Laboratories (LDL) Model 820 precision integrating sound level meters. The sound level meter was calibrated in the field using an LDL Model CAL200 acoustical calibrator to ensure accuracy.

Table 4
Existing Ambient Noise Monitoring Results
June 24-25, 2020

Site	Location	Duration	Average Measured Hourly Noise Levels, (dBA)						
			24-hr Ldn/CNEL	Daytime (7:00 am - 10:00 pm)			Nighttime (10:00 pm - 7 am)		
				Leq	L50	Lmax	Leq	L50	Lmax
Continuous 24-hour Noise Measurement Results									
A	Central portion of the project site	24-hours	59.1	55.3	53.3	68.6	51.6	47.9	68.6
Source - j.c. brennan & associates, Inc. 2020									

IMPACT ASSESSMENT

Traffic Noise Impact Assessment

<u>Exterior Traffic Noise Levels</u>

To predict noise levels due to traffic, the Federal Highway Administration Traffic Noise Prediction Model (FHWA RD-77-108) was used. The Model is used in conjunction with the Calveno reference noise emission curves, and accounts for vehicle volume and speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the project site. The FHWA Model was developed to predict hourly Leq values for free-flowing traffic conditions. To calculate Ldn/CNEL, average daily traffic (ADT) volume data is manipulated based on the assumed day/night distribution of traffic on the project roadways.

Traffic volumes for Brockway Road were obtained from the Town of Truckee General Plan. Table 5 shows the results of the traffic noise calculations. Table 5 compares the existing and the existing plus project scenarios. Appendix C contains the inputs and results of the FHWA traffic noise prediction model. For this analysis, a trip generation rate of 10 trips per unit was used. Therefore, the project would result in an additional 300 vehicle trips per day. All 300 of the vehicle trips were assigned to Brockway Road for the existing plus project scenario.

The calculated traffic noise levels are at a reference distance of 75-feet from the roadway centerlines. The distances to the 60 dB and 65 dB Ldn/CNEL contours are also shown. Based upon Table 5, the project site is located well outside of the 60 dB Ldn/CNEL contour. In addition, the project will not result in a significant increase in roadway traffic along Brockway Road.

Table 5
Predicted Traffic Noise Levels and Project-Related Traffic Noise Level Increases (Existing Scenarios)

Roadway	Distance to Existing + Project Traffic Noise Contours		Predicted Ldn/CNEL @ 75-feet from the Roadway Centerlines (dB)				
	65 dB CNEL	60 dB CNEL	Existing	Existing + Project	Change	Criteria	Significant?
Brockway Road	80-feet	172-feet	65	65	0	> +5	No

Source: j.c. brennan & associates, Inc., Inc., FHWA RD-77-108 Traffic Noise Prediction Model, and Town of Truckee General Plan

Truckee-Tahoe Airport Exterior Noise Levels

As described earlier, the project site is located adjacent to the Truckee Tahoe Airport 55 dB CNEL noise contour (See Figure 3). The project is not subjected to aircraft noise levels exceeding the Town of Truckee or Airport Land Use Compatibility Plan noise level criteria. A discussion of overall interior noise levels is discussed later in this report.

Overall Interior Noise Levels

Based upon the measured noise levels on the project site, exterior noise levels are approximately 60 dB Ldn/CNEL. Typical construction methods will result in an exterior to interior noise level reduction of 25 dB. A noise level reduction of 15 dB will occur with windows and doors in the partially open position. Therefore, interior noise levels at the project site will comply with the interior noise level standard of 45 dB Ldn/CNEL.

Construction Noise Impact Assessment

During the construction of the project, noise from construction activities would add to the noise environment in the project vicinity. Activities involved in construction would generate maximum noise levels, as indicated in Table 6, ranging from 76 to 90 dB at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A substantial project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration, and would likely occur primarily during daytime hours. Based upon the predicted noise levels shown in Table 6, the maximum noise levels would range between 78 dB and 90 dB at the nearest residences.

Policy 3.13 provides requirements for construction activities. These requirements will be followed to reduce construction noise level impacts.

Table 6:
Construction Equipment Noise

Type of Equipment	Maximum Level, dB at 50 feet
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Pneumatic Tools	85
Source: *Roadway Construction Noise Model User's Guide*. Federal Highway Administration. FHWA-HEP-05-054. January 2006.	

Construction Vibration Impact Assessment

The primary vibration-generating activities associated with the proposed project would occur during construction when activities such as grading and utility placement occur.

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural. Table 7 shows the typical vibration levels produced by construction equipment.

All buildings near the construction could be impacted by construction related vibrations, especially vibratory compactors/rollers. The nearest receptors are generally located a minimum of 50-feet from the construction sites. At these distances construction vibrations are not predicted to exceed acceptable levels. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours.

Table 7:
Construction Vibration

Type of Equipment	Peak Particle Velocity @ 25 feet (inches/second)	Peak Particle Velocity @ 50 feet (inches/second)	Peak Particle Velocity @ 100 feet (inches/second)
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210	0.074	0.026

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006

The Table 7 data indicate that construction vibration levels anticipated for the project are less than the 0.1 in/sec criteria at distances of 50-feet. Therefore, construction vibrations are not predicted to cause damage to existing buildings or cause annoyance to sensitive receptors.

CONCLUSIONS

The project will comply with the Town of Truckee exterior and interior noise level criteria. The following mitigation measures will be required:

1. Overflight easements shall be required for the Truckee Tahoe Airport operations;
2. Implement Policy 3.13 with respect to construction noise levels.

Appendix A
Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).

L_{dn} Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

L_{eq} Equivalent or energy-averaged sound level.

L_{max} The highest root-mean-square (RMS) sound level measured over a given period of time.

$L_{(n)}$ The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50% of the time during the one hour period.

Loudness A subjective term for the sensation of the magnitude of sound.

Noise Unwanted sound.

NRC Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the AMaximum@ level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.

SEL Sound Exposure Level. SEL is s rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.

STC Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

Impulsive Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.

Simple Tone Any sound which can be judged as audible as a single pitch or set of single pitches.

j.c. brennan & associates
consultants in acoustics

Appendix B

Truckee Workforce Housing Project

Continous 24 Hr Monitoring

June 24-25, 2020

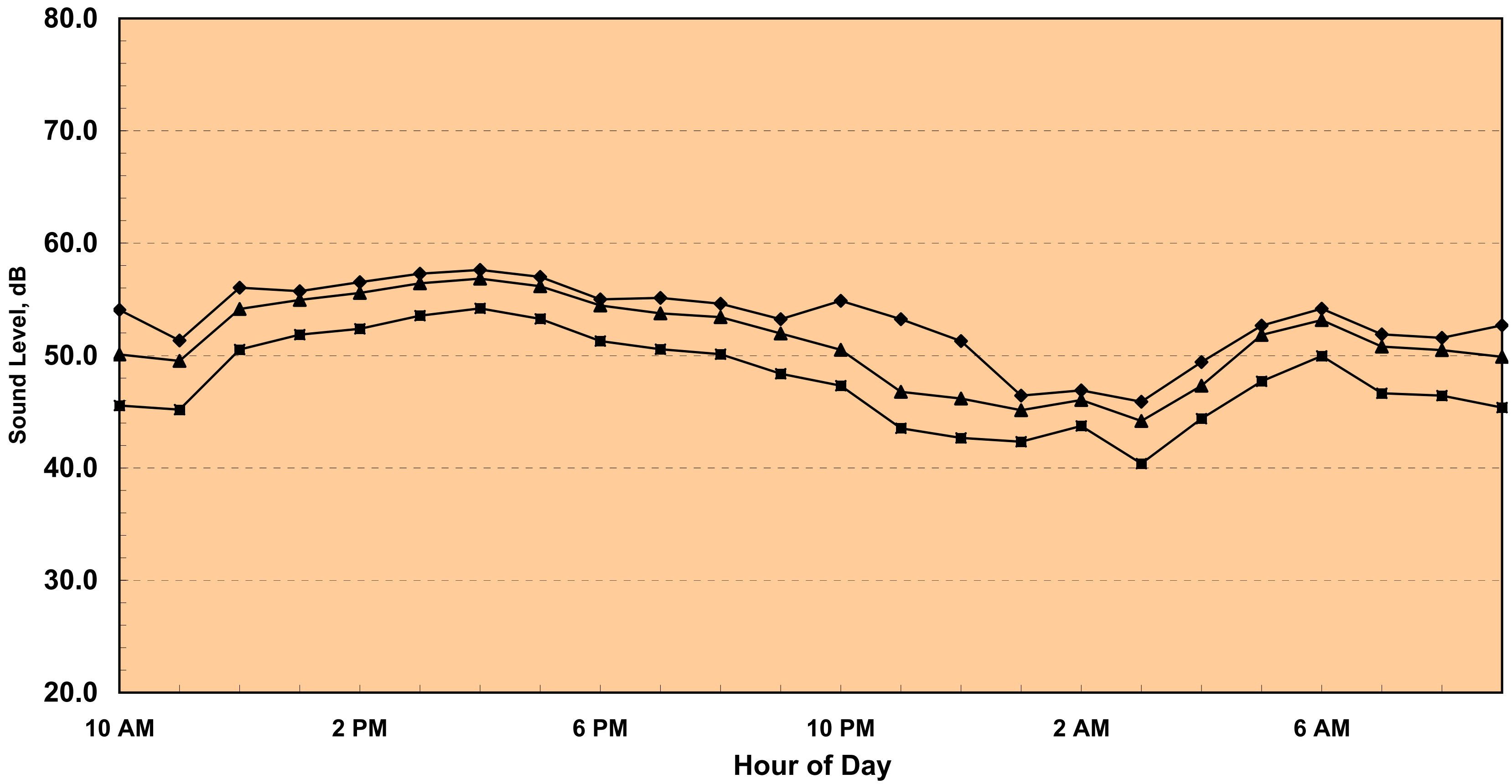
Hour	Leq	Lmax	L50	L90
10:00	54.1	77.0	50.1	45.6
11:00	51.3	67.8	49.5	45.2
12:00	56.0	72.2	54.1	50.5
13:00	55.7	68.5	55.0	51.9
14:00	56.5	69.4	55.6	52.4
15:00	57.3	71.6	56.4	53.5
16:00	57.6	68.1	56.8	54.2
17:00	57.0	70.9	56.2	53.3
18:00	55.0	62.0	54.5	51.3
19:00	55.1	74.5	53.7	50.6
20:00	54.6	71.2	53.4	50.1
21:00	53.2	69.0	52.0	48.4
22:00	54.9	77.8	50.5	47.3
23:00	53.2	79.7	46.8	43.5
0:00	51.3	76.0	46.2	42.7
1:00	46.4	64.0	45.1	42.3
2:00	46.9	58.6	46.0	43.7
3:00	45.9	56.1	44.2	40.4
4:00	49.4	74.4	47.3	44.4
5:00	52.7	61.4	51.8	47.7
6:00	54.2	69.2	53.2	50.0
7:00	51.9	61.9	50.8	46.6
8:00	51.6	64.6	50.5	46.4
9:00	52.7	69.4	49.9	45.4

	Statistical Summary								
	Daytime (7 a.m. - 7 p.m.)			Evening (7 p.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average	High	Low	Average
Leq (Average)	57.6	51.3	55.3	55.1	53.2	54.4	54.9	45.9	51.6
Lmax (Maximum)	77.0	61.9	68.6	74.5	69.0	71.6	79.7	56.1	68.6
L50 (Median)	56.8	49.5	53.3	53.7	52.0	53.0	53.2	44.2	47.9
L90 (Background)	54.2	45.2	49.7	50.6	48.4	49.7	50.0	40.4	44.7

Computed CNEL, dB	59.1
% Daytime Energy	65%
% Evening Energy	13%
% Nighttime Energy	21%

j.c. brennan & associates
consultants in acoustics

Appendix B
Continous Measured Hourly Noise Levels
Heavenly Snowmaking Monitoring



CNEL = 59.1 dB

j.c. brennan & associates
consultants in acoustics

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2020-119
Description: Truckee Workforce Housing
Ldn/CNEL: CNEL
Hard/Soft: Soft

Segment	Roadway Name	Scenario	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Brockway Road	Existing	9,000	65	13	22	2	1	45	75	
2	Brockway Road	Existing + Project	9,300	65	13	22	2	1	45	75	
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

j.c. brennan & associates
consultants in acoustics

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2020-119
Description: Truckee Workforce Housing
Ldn/CNEL: CNEL
Hard/Soft: Soft

Segment	Roadway Name	Scenario	Autos	Medium Trucks	Heavy Trucks	Total
1	Brockway Road	Existing	63.9	55.7	57.2	65
2	Brockway Road	Existing + Project	64.1	55.8	57.3	65

j.c. brennan & associates
consultants in acoustics

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2020-119
Description: Truckee Workforce Housing
Ldn/CNEL: CNEL
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Scenario	75	70	65	60	55
1	Brockway Road	Existing	17	36	78	168	362
2	Brockway Road	Existing + Project	17	37	80	172	370

j.c. brennan & associates
consultants in acoustics