February 28, 2018

CITY OF NEEDLES

Fluid Holdings Conditional Use Permit and General Plan Amendment

City of Needles

Planning Department

817 Third Street | Needles, California 92363

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INITIAL STUDY AND DRAFT MITIGATED NEGATIVE DECLARATION

Project Title: Fluid Holdings, Micro Lab Farms

Assessor's Parcel Number: 0660-101-32

Lead agency name and address: City of Needles Planning Department, 817 Third Street, Needles, California 92363

Contact person and phone number: Cindy Semione, Planner; phone: (760) 326-5740 x127; fax: (760) 326-6765; email: ndlscdda@citilink.net

Project Location: The proposed project site is located in the City of Needles in San Bernardino County, California in Township 08 North, Range 22 East, Section 23. The assessor's parcel number (APN) is 0660-101-32 and the parcel is 3.75 acres in size. The proposed project site fronts Needles Highway, and it is approximately 500 feet south of the intersection of Needles Highway and National Old Trails Road.

Project sponsor's name and address: Shannon Illingworth, phone: (714) 335-1799; email: shannon@growpodsolutions.com; address: 297 E. Harrison Street, Corona, California 92879

General plan description: Residential (medium density). A general plan amendment to change the land use designation to C-3 Highway Commercial is required for project approval.

Zoning: The proposed project site is currently zoned as C-3 (Highway Commercial). This zone is intended for uses that do not fit any of the other commercial developments in that businesses would include those not associated with the CBD or neighborhood center such as: shopping centers, automobile sales and services, commercial recreation, gasoline service stations, restaurants and motels and miscellaneous commercial uses. Naturally, many of the highway commercial uses would be located adjacent to the freeway interchanges. The proposed project would not require a zoning change.

Site history: The proposed project site is located along Needles Highway near the northern boundary of the city limits between Interstate 40 and the Colorado River. This stretch of Needles Highway is part of the Historic U.S. Route 66. A regional and site location map can be found in Appendix A: Figures 1-2.

Historical aerial imagery from 1969 through 1994 was reviewed and no developments are noted on the site. Although the site is located along Historic U.S. Route 66, the site is near the city limits where little or no development has occurred. Grazing may have occurred on the site in the past as an old broken-down corral appears on a nearby parcel. Due to the nature of the plant community on the site, size, age and type of plants, it appears no development has ever occurred.

Purpose: With the passage of The Compassionate Use Act of 1996 (Proposition 215) and most recently the Adult Use of Marijuana Act of 2016 (Proposition 64) that legalizes the use of marijuana in California for medicine and recreation, there has been a need for production in a safe and legal manner. This proposed project aims to satisfy the forecasted and increased need for such product.

Need: Since the passage of Proposition 64, there has been an increasing need by the public to obtain marijuana legally. Because the industry of supplying marijuana to the public in a legal manner is barely a year old, there is still a forecasted need in the industry to produce the product.

Project description: Micro Lab Farms proposes to construct a total of five structures: three buildings for production, one administrative building with restroom facilities, and one warehouse. The facility will use state of the art technology, some of which have patents pending and are proprietary secret. The Micro Lab Farms complex will be staffed by master growers and will become a farm known for research and development for the agriculture industry.

Micro Lab Farms is a high-tech agriculture, engineering company that wants to revolutionize the indoor agriculture space by using the latest technology such as LED lighting and other efficient energy saving systems.

By utilizing the most efficient equipment available Micro Lab Farms seeks to improve our environment, additionally minimalizing the amount of water used by controlling the evaporation process will help maintain water reserves. By using the best technology for horticulture, the Micro Lab Farms team has combined over 50 years of experience in the industry.

The proposed project includes development in two phases. Each phase is described in more detail below.

Phase 1

The first phase includes the construction of two 112-foot by 100-foot metal building façade (combined total of 22,400 square feet) to enclose a collection of metal containers known individually as pods. Ground will be leveled at appropriate elevations; an aggregate base will be installed as the foundation and 28 pods will be installed in each structure. See Appendix B: Project Site Plans for building locations and arrangement of pods. Each pod will be 8' x 40' with a maximum height of 10 feet. The metal building will have a maximum height of 15' to minimize visual profile. Within each pod, cultivation is proposed in a unique and proprietary manner that involves vertical grow techniques, led lighting to reduce power consumption by half when compared to traditional indoor growing, and enclosed re-circulating watering system that uses half of the water of other indoor growing facilities with no waste water generated. With the proprietary control systems that have been designed and installed in each pod, once plants are installed each pod can be sealed and human monitoring is unnecessary. Monitoring and control of all systems is conducted remotely. All construction will be completed to the standards of the International Building Code for commercial structures, including the installation of smoke and fire detection alarms. Each pod will be thoroughly insulated to reduce the load on the proposed air conditioning (A/C) units. Administrative and warehouse structures will have 4" concrete foundation. This phase is expected to take six months to construct.

State-of-the-art Phresh Filter carbon filtration units will be utilized by the proposed project to remove cannabis odor from any air vented to the exterior. These units have been utilized successfully by other cannabis projects for odor elimination. A parking lot will be installed adjacent to the buildings with access from Needles Highway (see site plan). At least four ADA parking spot will be designated based on the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design which requires one spot for every twenty-five. Because of the proprietary design of the pods that allow for remote monitoring and control, employee staff is reduced thereby reducing the parking areas and vehicle trips to and from the facility.

The perimeter of the parcel will be lined with fencing; either 6-foot chain-link fence or wrought iron and block fencing. The applicant proposes to install wrought iron and block fence along any area of the perimeter that is visible from Needles Highway. All other areas that are not visible from the highway are proposed to have 6-foot chain-link fence. The east side, that faces Needles Highway will have wrought iron entry/exit gates. Landscaping is proposed around all buildings and along Needles Highway and will be of desert tolerant plants and require minimal maintenance and water. The detention basin will be landscaped with native desert scrub plants and likely serve as mitigation for impacts to on-site jurisdictional resources. All rainwater runoff from rooftops and hardscape areas will flow into the detention basin for irrigation.

Phase 2

The second phase proposes the construction of one additional structure located at the north end of the parcel. This structure is expected to be constructed within two years of completion of Phase 1. The structure will be of similar in size (112-foot by 100-foot for a total of 11,200 square feet). The applicant seeks a variance of city municipal code which would allow "stacking" of the pods resulting in additional pods to be housed within the structure and resulting in a maximum height of 30 feet.

Construction and Operational Considerations

Construction hours will be limited to normal working hours during the week in an effort to minimize effects due to construction related activities such as vehicular traffic and noise. Construction activities will not occur during evenings, or Sundays, or on Holidays. The applicant is requesting work to be allowed during daylight hours on Saturdays. Equipment will be fitted with mufflers to further reduce noise levels. Additionally, a tribal monitor will be on-site for any dirt moving activity associated with the construction of the proposed project.

The following dust control measures will be implemented during both phases of construction activities. These measures are to ensure compliance with Air Quality Regulation IV, Rule 403–Fugitive Dust to reduce nuisance fugitive dust generation:

- All exposed surfaces (e.g. parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered daily for dust suppression when construction activities are occurring on-site.
- All trucks transporting soil, sand, or any other loose material off-site shall be covered.
- All stockpiled soil, sand, or any other loose material left on-site-shall be covered and secured.
- Adjacent public roads shall be kept clean of loose dirt tracked onto the roadways from the construction-site. A street

sweeper shall be used as needed.

- All vehicle speeds shall be limited to 5 miles per hour on the proposed project site.

Operations Plan

Each individual pod will be a self-contained growing area that will cultivate plants in a vertical structure with soil-like medium. No hydroponic cultivation systems will be used. Details of the growing and monitoring system is proprietary. Plants will be grown on an approximately 8-week cycle with staggered harvesting on a weekly basis. Harvesting activities will include cutting plants, drying and processing the final cannabis products.

Noise generated form ongoing operational activities is limited to air conditioning units located on the exterior for the metal façade structures. Noise levels generated due to air conditioning units are expected to be at or below 45 dB at the source and below 45 dB at the perimeter fence.

A minimal amount nutrients and other materials will be stored in appropriate containers inside the warehouse (building A). Deliveries will be during normal business hours. Used materials such as growing medium will be sent to a licensed disposal facility.

Cannabis harvested at the site will be transferred to a licensed distribution service who will deliver it to a licensed dispensary or manufacturing facility for refinement. No sales or further refinement will be performed on-site. The facility and its' operations will implement a track and trace system as required by the City of Needles and by the State of California

There will be a first aid kit and list of emergency contacts in each building, and employees will be trained in proper safety protocols. The facility entrance and restroom will be constructed to ADA standards.

Utilities

The proposed facility will be served by water supplied by the City of Needles and will require an extension of an existing water line. The operational water needs are 2 to 3 acre-feet per year after the build-out of Phase 2. The City of Needles will need to provide a "will serve" letter to Micro Lab Farms for the amount of water requested by the operation as part of the local permitting process. The groundwater well the City uses for the water source has sufficient capacity to meet the needs of the proposed project.

The proposed facility will use a septic system on-site. The septic system and leach field is contained entirely on-site. A 1,000-gallon septic tank will be installed 6" below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4" diameter buried 3 feet below grade in a bed of gravel. The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter the septic system. The proposed project will use electrical power supplied by the City of Needles Public Utility Authority. The need for power will be for A/C and cultivation low-watt led lighting. The estimated power draw per structure is 220 kilowatts (kW). At full buildout, the total power draw is estimated at 660 kW.

Hours and Days of Operation and Employees

After the completion of Phase 1, two employees will be needed on a daily basis approximately 8 hours per day. The operating hours will be during normal business hours 8am to 5pm Monday – Friday. After the build-out of Phase 2 structure, an additional employee will be needed for a total of 3 full-time employees.

Access and Security

Access to the proposed facility will be from Needles Highway. No public access to the facility will be allowed. Deliveries will be coordinated with on-site employees and only conducted when employees are present during normal business hours.

The property will be secured by a wrought iron and block fence and locked gate. Security cameras will be placed at various strategic points around the property. Cameras will be motion-activated and trigger additional lighting system. Additional interior security system will be used and is proprietary and confidential. All exterior lighting will comply with the City of Needles

lighting standards as outlined in Ordinance 594-AC and amended Chapter 12 of the Needles Municipal Code.

Surrounding Land Uses and Setting

The proposed project is located within a city planning zone known as C-3 (Highway Commercial). Highway 40 is located to the south and west of the proposed project. Parcels directly adjacent to the proposed project on the west, north and south are vacant, undeveloped land with natural vegetation. To the east of the subject parcel is Needles Highway with a hotel/resort, R/V park, and one residence further to the east. Even further to the east bordering these parcels is the Colorado River.

Other Public Agencies Whose Approval is Required

California Department of Food and Agriculture, Cultivation License

California Department of Fish and Wildlife

California Regional Water Quality Control Board

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ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

This proposed Mitigated Negative Declaration (MND) is included to give notice to interested agencies and the public that it is the City's intent to adopt an MND for this project. This does not mean that the decision regarding the project is final. This MND is subject to notification based on comments received by interested agencies and the public.

The City has prepared this Initial Study for this project, and pending public review, expects to determine from this study that the proposed project would not have a significant effect on the environment for the following reasons:

The proposed project would have no effect on Agriculture and Forestry Resources, Mineral Resources, Public Services, and Recreation.

In addition, the proposed project would have no significant effect on Aesthetics, Air Quality, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions, Hazardous and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Population and Housing, Traffic and Transportation, Tribal Cultural Resources, and Utilities and Service Systems.

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

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Tribal Cultural Resources	☐ Utilities/Service Systems	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ 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 project proponent. 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 (EIR) is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact 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 or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature	Date
Printed name	For

EVALUATION OF ENVIRONMENTAL IMPACTS:

- A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards.
- All answers must take into account the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
- "Negative Declaration: Less Than Significant with Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 21, "Earlier Analyses," may be cross-referenced).
- Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    - Earlier Analysis Used: Identify and state where they are available for review.
    - Impacts Adequately Addressed: Identify which effects from the above checklist were within the scope of and adequately analyze in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures of earlier analyses.
    - Mitigation Measures: For effects that are "Less Than Significant with Mitigation Measures Incorporated," describe the mitigation measures which address site-specific conditions for the project.
- Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plan, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- Supporting Information Sources: A source list should be attached, and other sources used, or individuals contacted should be cited in the discussion.
- This is only a suggested form, and lead agencies are free to use different formats, however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
- The explanation of each issue identify:
    - The significant criteria or threshold, if any, used to evaluate each question; and
    - The mitigation measure identified, if any, to reduce the impact to less than significant.

CHECKLIST, DISCUSSION OF CHECKLIST RESPONSES, PROPOSED MITIGATION

1. AESTHETICS

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Setting

The proposed project site is located along Needles Highway near the northern boundary of the city limits between Interstate 40 and the Colorado River. This stretch of Needles Highway is part of the Historic U.S. Route 66. A regional and site location map can be found in Appendix A: Project Site Maps.

Historical aerial imagery from 1969 through 1994 was reviewed and no developments are noted on the site. Although the site is located along Historic U.S. Route 66, the site is near the city limits where little or no development has occurred. Grazing may have occurred on the site in the past as an old broken-down corral appears on a nearby parcel. Due to the nature of the plant community on the site, size, age and type of plants, it appears no development has ever occurred.

Analysis:

a) Finding: The proposed project will not have a substantial adverse effect on a scenic vista. The proposed project will have No Impact on any scenic vista or scenic resources.

   Discussion: The proposed project will not have a substantial adverse effect on a scenic vista because there are no designated scenic vistas or scenic resources within the immediate area of the proposed project site.

b) Finding: The proposed project will not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. The proposed project will have No Impact on scenic resources such as rock outcroppings, trees, and historic buildings.

   Discussion: The proposed project will not include large vertical elements that might be visible from surrounding areas or that might block views of the mountains to the west or the Colorado River to the east. Additionally, there are no rock outcroppings or large trees located on the proposed project site. Additionally, there are no historic buildings on the proposed project site or immediately adjacent to the project site. El Garces is the closest known historic building and it is approximately 1.9 miles away from the proposed project site. Although the proposed project site is adjacent to a segment of Historic U.S. Route 66, this area does not contain any designated scenic highways. Although I-40 is eligible for inclusion in the State Scenic Highway System, it has not officially been designated as a scenic highway by the California Department of Transportation.

c) Finding: The proposed project will not substantially degrade the existing visual character or quality of the site and its surroundings. The proposed project will have a Less than Significant Impact regarding the degradation of the existing visual character or quality of the site and its surroundings.

Discussion: The existing visual character of the site is desert scrub that is surrounded by a mix of open space desert scrub and business and residential structures. The design of the proposed structure will not include any large visible elements that might block views of the mountains to the west. The tallest structure will be constructed in Phase 2 at a maximum height of 30 feet (Operating Restriction AES-2). Desert shrubs native to this area will be used as landscaping around the perimeter of the structure to maintain the look of its surroundings.

d) Finding: The proposed project will not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. The proposed project will not create a new source of substantial light or glare and will have No Impact on day or nighttime views of the area.

Discussion: The proposed project will not create a new source of light. All lighting installed will be consistent with the City of Needles Ordinance 59-4AC and amended Chapter 12A of the Needles Municipal Code. All proposed structures and within the proposed project area will have illuminated entrances and windows during evening hours. The site will also require exterior lighting for safety purposes and will be down cast lighting to avoid and minimize impacts to surrounding wildlife. As such, the project proponent will adhere to the City's lighting standards regarding the fixture type, illumination levels, wattage, and shielding, which will moderate any light generated from the proposed project to a level that will not contribute adverse impacts to nighttime views (AES-1). Additionally, the grow facilities indoor lighting system will be confine any light and glare to the interior of the structure.

Applicant Proposed Operating Restrictions:

AES-1: The proposed project will manage its lighting as prescribed in City of Needles Ordinance 594-AC and amended Chapter 12A of the Needles Municipal Code, in compliance with the City's lighting standards regarding fixture type, wattage, illumination levels, and shielding. The indoor grow lighting system will also be shielded to confine light and glare to the interior of the proposed structure. The landscaping and planting plan will include the planting of desert-appropriate and native vegetation such as palm trees and native desert cacti, consistent with the visual context of the area.

AES-2: The proposed buildings will not exceed 30 feet in height.

Mitigation: None required.

2. AGRICULTURE AND FORESTRYRESOURCES.

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board (CARB).

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
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?	☐	☐	☐	☒
Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
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))?	☐	☐	☐	☒
Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Setting:

The proposed project is located in an area within the City of Needles that is adjacent to open space desert scrub habitat and partially urbanized residential and commercial lots. The proposed project is not within or adjacent to any land used for agricultural use or zoned for agriculture (California Department of Conservation 2018), which is neither forest land nor zoned timberland (San Bernardino County 2007). Desert open space and residential and commercial structures surround the proposed project area.

Analysis:

a) Finding: The proposed project will not 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. The project will have No Impact to farmland and will not convert any Farmland to non-agricultural use.

   Discussion: The proposed project is not within the survey boundary for the California Resource Agency's Farmland Mapping and Monitoring Program, and no farmland is present within the proposed project area. .

b) Finding: The proposed project will have No Impact on existing zoning for agricultural use or a Williamson Act contract.

   Discussion: The proposed project site is currently zoned as C-3 (Highway Commercial). This zone is intended for uses that do not fit any of the other commercial developments in that businesses would include those not associated with the CBD or neighborhood center such as: shopping centers, automobile sales and services, commercial recreation, gasoline service stations, restaurants and motels and miscellaneous commercial uses. Naturally, many of the highway commercial uses would be located adjacent to the freeway interchanges. The proposed project would not require a zoning change. The land is not under a Williamson Act contract.

c) Finding: The proposed project will not conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)) or timberland (as defined in Public Resources Code section 4526). There will be No Impact to the zoning of forest lands or timberlands.

Discussion: There is no forest land as defined in Public Resources Code section 12220(g) or timberland as defined in Public Resources Code section 4526 in the proposed project area or associated with the proposed project in any way.

d) Finding: The proposed project will not result in the loss of forest land or conversion of forest land to non-forest use. There will be No Impact to forest land and no conversion of any forest land to non-forest use.

Discussion: The proposed project site consists of desert scrub in the City of Needles, with no associated forest land.

e) Finding: The proposed project will not involve other changes in the existing environment that, 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. The proposed project will have No Impact on existing Farmland or forest land.

Discussion: The proposed project site consists of desert scrub within the northern limits of the City of Needles, with no associated Farmland and no forest land. No direct effects, indirect effects, or cumulative effects of the proposed project with other projects will result in the conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.

Applicant Proposed Operating Restrictions: None.

Mitigation: None required.

3. AIR QUALITY.

Where available, the significant criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant**	**No Impact**
Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Setting:

The proposed project site is located with the Mojave Desert Air Basin in the eastern portions of San Bernardino County and Riverside County, and portions of Kern and Los Angeles Counties. The City of Needles is located within the Mojave Desert Air Quality Management District (MDAQMD). The proposed project site is located within the eastern portion of the MDAQMD. Sensitive receptors near the proposed project site are the employees and visitors to the hotel\resort, RV park, and one residence to the east.

The MDAQMD is listed as "non-attainment" for the following Federal Standards: O3 and PM10 (MDAQMD 2016). The MDAQMD is listed as "non-attainment" for the following California Standards: Ozone (O3) and Respirable Particulate Matter (PM10), as well as Fine Particulate Matter (PM2.5) only in the southwest corner of the desert portion of San Bernardino County (MDAQMD 2017).

Analysis:

a) Finding: The proposed project will not conflict with or obstruct implementation of the applicable air quality plan. With implementation of the proposed operating restrictions, potential impacts would be considered less than significant.

Discussion: It is the MDAQMD's responsibility is to achieve and maintain air quality standards established by state and federal governments. To meet these standards, each air quality management district creates and implements a plan.

The MDAQMD is in a "non-attainment" status for O3 and PM10 Federal health protective standards for air pollution (ambient air quality standards), and also "non-attainment" for O3, PM10, and PM2.5 state health protective standards (MDAQMD 2018). Because the "non-attainment" designation for PM2.5 applies occurs only in the southwest portion of San Bernardino County, it does not apply to the area of the proposed project.

A potential exists for significant impact to air quality if the project conflicts with or obstructs the implementation of the MDAQMD plan. Although the proposed project could have an incremental increase in emissions within the district, the issue is whether anticipated project-related impacts are anticipated and addressed properly in the MDAQMD plan and reduced where feasible. It is necessary to assess if the proposed project is consistent with the MDAQMD plan.

The California Clean Air Act requires the MDAQMD achieve certain standards for the PM10 and O3. The MDAQMD prepared the PM10 Attainment Plan Final Report in July 1995. The report notes the area around the

City of San Bernardino as the location of the PM10 source. The project is not located within this area. The report states that most of the northern and eastern portions of the county are not monitored, indicating this area is not the primary source or of primary concern. The MDAQMD Plan states measures for construction activities. These measures have been incorporated into this proposed project.

This proposed project is not expected to conflict with or obstruct the implementation of the MDAQMD Attainment Plan for PM2.5, PM10, or O3.

Additionally, operating restrictions AQ-1 and AQ-2 (listed below) will be implemented to minimize potential impacts to air quality.

b) Finding: The project will not violate any air quality standard or contribute substantially to any existing or projected air quality violation. Impacts would be considered less than significant.

Discussion: The MDAQMD regulates air quality in San Bernardino County. Air quality standards were established for emissions such as visible emissions, fugitive dust, and particulate matter. In accordance with the Air Quality Regulation IV–Prohibitions, Rule 402–Nuisance, "a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property" (MDAQMD 1977).

Potential for air quality contaminants can arise during either or both the construction phase or operational phase of the proposed project. Potential for each is discussed below.

Potential Impacts During Construction

There is potential for the project to create fugitive dust, which adds to the particulate airborne matter, during construction of any of the structures, parking areas, landscaping, and especially clearing and grubbing. This occurs with the exposure of bare soil during this phase. Precautions in accordance with Air Quality Regulation IV, Rule 403–Fugitive Dust are required. During all construction activities, dust control measures shall be implemented to reduce fugitive dust generation. Operating restriction AQ-1 is described at the end of this section. Impacts to air quality as a result of implementation of this proposed project, along with the implementation of air quality operating restrictions, are expected to be less than significant.

Potential Impacts During Operation

Access roads and driveways to the proposed project site will be required to be paved with asphalt. As such, disturbance to soil from vehicular traffic is not expected. Because on-site dust generation from vehicle and truck traffic during normal operation of the built facility is not expected, impacts from fugitive dust and other particulate matter are considered less than significant.

Carbon monoxide (CO) hot spots and impacts to the ozone are typically associated with heavy vehicular traffic and vehicles idling at busy intersections (intersections with 100,000 daily vehicle trips). There are no intersections within the region of the proposed project that meet these criteria. Because the daily vehicle trips are expected to be about ten after the proposed project is built, emissions from such intersections or vehicular traffic are not expected with the implementation of the project. In addition, the MDAQMD is currently in attainment/unclassified for CO on the federal and state levels.

Sources of emissions from the proposed project include cultivation and harvesting of the plants. All cultivation and harvesting will occur indoors. The project will be served by city water and will utilize grid power provided by the Needles Public Utility Authority. The primary use of power will be for air conditioning (A/C) and cultivation lighting. As such, no violation to any air quality standard would occur with the implementation of the proposed project. Also, the impact to air quality would be less than significant.

c) Finding: The project will not 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors).

Discussion: The MDAQMD is in a "non-attainment" status for O3 and PM10 Federal health protective standards for air pollution (ambient air quality standards), and also "non-attainment" for O3, PM10, and PM2.5 state health protective standards (MDAQMD 2018). With incorporation of operating restriction AQ-1, potential impacts would be considered less than significant.

Construction and operational activities are not expected to generate total emissions (direct or indirect) in excess of thresholds as defined by federal or state governments. As described previously, measures will be taken to control fugitive dust during the construction phase (operating restriction AQ-1). Operation of construction equipment could result in temporary incremental emissions within the air basin; however, because of the relatively small size of the proposed project, and the requirement for all equipment used on site will meet CARB standards, cumulative impacts resulting from the implementation of the proposed project are expected to be less than significant. Therefore, the project will not result in a cumulative significant increase of any criteria pollutant for which the proposed project region is "non- attainment" under an applicable Federal or State ambient air quality standards.

d) Finding: The project will not expose sensitive receptors to substantial pollutant concentrations. With incorporation of operating restriction AQ-2, potential impacts would be considered less than significant.

Discussion: Sensitive receptor land uses near the project site primarily include recreational areas along the Colorado River to the east including a hotel/resort, R/V park, and one possible residence. Other adjacent parcels are vacant land.

As stated previously, the proposed project would not produce significant quantities of criteria pollutants during the temporary construction phase or during the normal operation of the site. All cultivation activities would be conducted indoors, and a filtration system known as Phresh Filter filtration would be used to prevent odors from leaving the structures. Because of the isolation design of each pod, no pest controls would be necessary. The Phresh Filter filtration units are expected to be effective in cleansing the air of remaining particulate materials. Therefore, the implementation of the proposed project would not expose sensitive receptors to pollutants.

e) Finding: The project may create objectionable odors affecting a substantial number of people; however, with applicant proposed operating restriction AQ-2 incorporated, the impact will be less than significant.

Discussion: During normal operation of the facility after completion of construction, there is potential to impact air quality from odors generated by the growing and cultivation activities. Cannabis odors have potential to reach nearby receptors at the hotel/resort, R/V park and potential residence to the east. Air from the cultivation pods would be abated by an air ventilation/filter system containing Phresh Filter activated carbon filtration units to ensure odors are eliminated or minimized. The filtration technology uses activated carbon to remove contaminants and impurities through chemical absorption. Chemicals passing through the carbon surface of activated carbon traps contaminants and impurities. With the implementation of the proposed project and mitigation measure of installing air filtration units, impact to air quality from objectionable odors is expected to be less than significant.

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Applicant Proposed Operating Restrictions:

AQ-1: During short-term construction activities, the following dust control measures will be implemented to reduce nuisance dust generation:

- All exposed surfaces (e.g. parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered twice daily for dust suppression when construction activities are occurring on-site.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All standing soil, sand, or other loose material left on-site shall be covered and secured.
- Adjacent public roads shall be kept clean of loose dirt tracked onto the roadways from the construction-site.

- All vehicle speeds shall be limited to 5 miles per hour.

AQ-2: All cultivation and processing structures shall be designed and maintained per manufacturer recommendations with a ventilation and air filtration system containing activated carbon filters, such as Phresh Filters, to ensure odors generated by the proposed facility are not a nuisance.

4. BIOLOGICAL RESOURCES

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
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?	☐	☒	☐	☐
Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☒	☐	☐
Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Setting:

The following federal, state, and local regulatory requirements are applicable for the proposed project and are important to consider when analyzing potential impacts to biological resources. These regulatory requirements are discussed below.

Regulatory Requirements

Endangered Species Act

Under provisions of Section 7(a)(2) of the Endangered Species Act (ESA), a Federal agency that permits, licenses, funds or otherwise authorizes a project activity must consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that its actions would not jeopardize the continued existence of any listed species or destroy or adversely modify critical habitat. As such, focused surveys were conducted to determine absence/presence of any listed species with the potential to occur within the biological survey area (BSA) for impact evaluation.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC. 703-712), as amended, governs take, possession, import, export, transport, selling, purchasing or bartering of migratory birds, their eggs, parts and nests, except as authorized under a valid permit (50 CFR 21.11). The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes, and requiring harvests to be limited to levels that prevent over- utilization. Section 704 of the MBTA states that the Secretary of the Interior is authorized and directed to determine if, and by what means, the take of migratory birds should be allowed and to adopt suitable regulations permitting and governing take but ensuring that take is compatible with the protection of the species.

Clean Water Act, Section 401 Jurisdiction

Section 401 of the Clean Water Act (CWA) is administered by the State (SWRCB). Section 401 requires that any applicant for a federal permit for activities that involve a discharge to waters of the United States (WUS) shall provide the federal permitting agency a certification from the state in which the discharge is proposed that states that the discharge will comply with applicable provisions under the CWA. Section 401 Water Quality Certification is required for discharges to activities regulated by the U.S. Army Corps of Engineers (USACE) under Section 404. SWRCB jurisdiction typically matches the

USACE jurisdictional boundaries for WUS mapped at the ordinary high-water mark (OHWM).

Clean Water Act, Section 404 Jurisdiction

Section 404 of the CWA, which is administered by the USACE, regulates discharges of dredged or fill material into WUS. These waters include wetlands and non-wetland bodies of water that meet specific criteria, including a direct (through a tributary system linking a stream channel with traditional navigable waters used in interstate or foreign commerce) or indirect (through a nexus identified in the USACE regulations) connection to interstate commerce.

OHWM Non-Wetland Jurisdiction

Non-wetland WUS are non-tidal, perennial, and intermittent watercourses and tributaries to such watercourses (USACE 1986). The limit of USACE jurisdiction for non-tidal watercourses (without adjacent wetlands) is defined in 33 CFR 328.4(c)(1) as the OHWM. The OHWM is defined as the "line on the shore established by the fluctuations of water and indicated by physical characteristics including clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter, and debris, or other appropriate means that consider the characteristics of the surrounding areas" (USACE 1986). The bank-to-bank extent of the channel that contains the water-flow during a normal rainfall year generally serves as a good first approximation of the lateral limit of USACE jurisdiction. The upstream limits of other WUS are defined as the point of where the OHWM is no longer perceptible.

Three-Parameter Wetland Jurisdiction

Wetlands are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE 1986). To be determined a federal wetland, the following three criteria should be met:

- A majority (greater than 50 percent) of dominant vegetation species are wetland associated species;
- hydrologic conditions exist that result in periods of flooding, ponding, or saturation for at least 5 percent of the growing season; and,
- soils saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part and should exhibit hydric soil characteristics indicative of permanent or periodic inundation.

Wetland vegetation is normally characterized by vegetation in which more than 50 percent of the cover of dominant plant species is composed of obligate wetland, facultative wetland, or facultative species that occur in wetlands.

Solid Waste Agency of Northern Cook County versus U.S. Army Corps of Engineers

The aforementioned characteristics may not be apply to isolated, non-navigable waters (including vernal pools) pursuant to the January 9, 2001 Supreme Court decision in the case of Solid Waste Agency of Northern Cook County versus U.S. Army Corps of Engineers (SWANCC 2001). The SWANCC decision eliminated jurisdiction over isolated, intrastate, non-navigable WUS where the sole basis of jurisdiction is founded on the presence of migratory bird habitat.

Rapanos v. United States and Carabell v. United States

USACE (2008a) will assert jurisdiction categorically and on a case-by-case basis, based on the court cases of Rapanos v. United States and Carabell v. United States over:

1. Traditional navigable waters (TNWs) and their adjacent wetlands;
2. Non-navigable tributaries of TNWs that are relatively permanent waters (RPWs) (e.g., tributaries that typically flow year-round or have a continuous flow at least seasonally) and wetlands that directly about such tributaries (e.g., not separated by uplands, berm, dike, or similar feature); and,
3. Non-RPWs if determined (on a fact-specific analysis) to have a significant nexus with a TNW, including non-navigable tributaries that do not typically flow year-round or have continuous flow at least seasonally, wetlands adjacent to such tributaries, and wetlands adjacent to but that do not directly abut a relatively permanent, non-navigable tributary. Absent a significant nexus, jurisdiction is lacking.

Of particular note is that RPWs do not include ephemeral tributaries, which flow only in response to precipitation, and intermittent streams, which do not typically flow year-round or have continuous flow at least seasonally (e.g., typically three months). Determination of a significant nexus involves a functional analysis, and consideration of both hydrological and ecological factors for each tributary.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that the significant environmental impacts of proposed projects or actions undertaken, funded, or requiring an issuance of a permit by a state or local agency are identified, government decision maker and the public are informed about the effects of those actions, and that steps are taken in order to avoid or mitigate those environmental impacts, if feasible.

California Endangered Species Act and California Fish and Game Code § 2080 And 2081

The California Endangered Species Act (CESA) is administered by the California Department of Fish and Wildlife (CDFW) and prohibits the "take" of plant and animal species identified as either threatened or endangered in the State of California by the Fish and Game Commission. "Take" includes pursue, hunt, kill, or capture a listed species, or any other action that results in adverse impacts. Sections 2080 and 2081 of the California Fish and Game Code (FGC) allow the CDFW to authorize exceptions to the "take" of the State-listed threatened or endangered plant and animal species for purposes such as public and private development. State lead agencies are required to consult with CDFW to ensure that any actions undertaken by the lead agency are not likely to jeopardize the continued existence of any state-listed species or result in destruction or degradation of habitat.

California Fish and Game Code § 1600-1603

The State of California Code of Regulations empowers the CDFW to issue a Streambed Alteration Agreement under Section 1600-1603 of the FGC for any alteration of a river, stream, or lake where fish or wildlife resources may be substantially adversely affected. Streams (and rivers) are defined by the presence of a channel bed and banks, and at least an ephemeral flow of water. CDFW regulates wetland areas only to the extent that those wetlands are part of a river, stream or a lake as defined by CDFW.

CDFW has not defined wetlands for jurisdictional purposes. CDFW generally includes within the jurisdictional limits of streams and lakes any riparian habitat present. Riparian habitat includes willows, alders, and other vegetation typically associated with stream banks or lake shoreline. In most situations, wetlands associated with a stream or lake would fall within the limits of riparian habitat. Thus, defining the limits of CDFW jurisdiction based on riparian habitat will automatically include any wetland areas. Wetlands not associated with a lake, stream or other regulated areas generally are not subject to CDFW jurisdiction.

Porter-Cologne Water Quality Control Act

Pursuant to the Porter-Cologne Water Quality Control Act, California Water Code, Division 7 (Porter-Cologne), the SWRCB is granted ultimate authority over water quality policy for the State of California. The SWRCB/SWRCBs, oversee water quality at the local and regional levels, and regulate pollutant and nuisance discharges into Waters of the State of California (WSC). WSC are defined as any surface water or groundwater, including saline waters (Water Code 13050 (e)) within the boundaries of the state. Before allowing discharges that may affect the quality of WSC, a Report of Waste Discharge must be filed with SWRCB.

Biological Resources

Prior to visiting the project site, a review of the California Natural Diversity Data Base (CNDDB) and Biogeographic Information Observation System (BIOS) was conducted to identify if any special-status plant and animal species are known to occur within in the vicinity. These databases identify recorded locations of special-status plant and animal species in the project vicinity and, therefore, having the potential to occur on the project site. Also reviewed prior to a site visit were U.S. Fish and Wildlife Service Critical Habitat Portal online mapper to determine the presence of designated critical habitat, aerial photographs, and relevant USGS 7.5-minute topographical quadrangles.

Plant Communities

The project site contains one plant community type: Creosote bush scrub. A complete description of the community is based on Sawyer and Keeler-Wolf A Manual of California Vegetation, 2nd Edition (2014) and is provided below. However, it should be noted that the plant community present on the project site is nearly monotypic creosote bush (*Larrea tridentata*).

Creosote Bush Scrub (Disturbed)

Creosote bush/allscale scrub is a habitat classification that includes areas of relatively open cover dominated by creosote bush (*Larrea tridentata*) with allscale (*Atriplex polycarpa*) as a co-dominant and is common throughout the Mojave Desert. The herbaceous layer is intermittent to open with seasonal annuals or perennial grasses. Soils found within this habitat classification are well-drained. Disturbed creosote bush scrub is identical in species composition, habitat, and soil type to that of the undisturbed creosote bush scrub; however, it exhibits a relatively higher level of disturbance (25-50%) and the

herbaceous layer consists primarily of non-native grasses. This plant community is found throughout the proposed project site.

Plant Species

Three special-status plants, spiny-hair blazing star (*Mentzelia tricuspis*), threecorner milkvetch (*Astragalus geyeri* var. *triquetrus*), and sticky buckwheat (*Eriogonum viscidulum*), are noted as occurring within a 5-mile radius of the project site (CDFW 2018). Below is a description of habitat requirements of these special-status plants. Due to the disturbed nature of the project site from off-highway vehicles (OHV) (See photo in Appendix C), soil requirements, and plant community association, these special-status plants are not expected to occur within the project limits. No individual plants of these species were observed during the site visits. A focused plant survey will be conducted prior to construction during the appropriate growing season to identify any special-status desert dwelling plants that have the potential for occurring on the proposed project site (Mitigation Measure 4.1). Below is a table of all plant species that were evaluated.

Table 1: Special-Status Plant Species Potential Occurring within the Project Vicinity

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
PLANTS				
Astragalus geyeri var. *triquetrus* Threecorner milkvetch	BLM Sensitive; LCR MSHCP Listed.	Sandy soils with sparse gravel. Elev. 1200-2450m. Range restricted to Clark and Lincoln Counties, NV; and Mohave County, AZ	Outside of known range.	Not expected to occur, therefore no effect on species. Not observed during survey.
Eriogonum viscidulum Sticky buckwheat	BLM Sensitive; LCR MSHCP listed.	Sandy washes with deep loose sand. Range restricted to Clark and Lincoln Counties, NV; and Mohave County, AZ	Outside of known range.	Not expected to occur, therefore no effect on species. Not observed during survey.
Mentzelia tricuspis Spiny-hair blazing star	CNPS List 2B.1	Mojavean desert scrub; sandy or gravelly slopes and washes, 150-1280 m.	Marginal suitable habitat occurs on site. Low quality disturbed habitat.	Low potential to occur. Not observed during survey.

Animal Species

California Department of Fish and Wildlife CNDDB and US Fish and Wildlife databases were researched to determine special-status species known to occur within a 5-mile radius of the site, and therefore with potential to occur on the site. Also, wildlife species covered by the Lower Colorado Multi-species Habitat Conservation Program were considered. Below is a table of all species evaluated with discussion further below for species that have potential to occur on site. A total of 36 special-status wildlife species (1 invertebrate, 4 fishes, 3 amphibians, 3 reptiles, 15 birds, and 10 bats) are noted as occurring within a 5-mile radius of the project site (USFWS 2018) (CDFW 2018) (LCR MSHCP 2018).

Table 2: Special-Status Animal Species Potential Occurring within the Project Vicinity

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
INVERTEBRATES				

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Hesperopsis gracielae MaNeill's sootywing	CA: S1	Requires dense stands of quailbush.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
FISHES				
Catostomus latipinnis Flannelmouth sucker	CA S1 Sensitive	Colorado River. Spawns in riffles.	No habitat present.	Not expected to occur, therefore no effect on species.
Gila cypha Humpback chub	US: FE	Colorado River.	No habitat present.	Not expected to occur, therefore no effect on species.
Gila elegans Bonytail	US: FE CA: SE	Colorado River.	No habitat present.	Not expected to occur, therefore no effect on species.
Xyrauchen texanus Razorback sucker	US: FE CA: SE	Colorado River. Spawns in sand gravel rocks.	No habitat present.	Not expected to occur, therefore no effect on species.
AMPHIBIANS				
Bufo Incilus alvarius Colorado River toad	LCR MSHCP listed.	Requires ponds, slow-moving streams, temporary pools.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Rana Lithobates onca Relict leopard frog	LCR MSHCP listed.	Found in Back Canyon Virgin River.	Outside known range.	Not expected to occur, therefore no effect on species.
Rana Lithobates yavapaiensis Lowland leopard frog	BLM sensitive; LCR MSHCP listed.	Permanent and intermittent streams, sloughs, beaver ponds.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
REPTILES				
Gopherus agassizii Desert tortoise	US: FT CA: ST	Historically found throughout the Mojave and Sonoran Deserts into Arizona, Nevada, and Utah. Occurs throughout the Mojave Desert in scattered populations. Found in creosote bush scrub, saltbush scrub, thornscrub (in Mexico), and Joshua tree woodland. Found in the open desert as well as in oases, riverbanks, washes, dunes, and occasionally rocky slopes.	Marginal suitable habitat present.	No sign observed during focused surveys. This species is not expected to occur and therefore, no effect on species.

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Phrynosoma mcalli Flat-tailed horn lizard	CDFW: SSC	Sandy flats associated with creosote scrub. Range is Sonoran Desert from Coachella Valley south to Mexican border.	Marginal suitable habitat present but outside of known range.	Not expected to occur, therefore no effect on species.
Thamnophis eques megalops Northern Mexican garterscnake	US: FT	Found near permanent water sources and thick dense bank vegetation.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
BIRDS				
Athene cunicularia Burrowing owl	CDFW: SSC BLM: S	Usually occupies ground squirrel burrows in open, dry grasslands, agricultural and range lands, railroad rights-of-way, margins of highways, golf courses, and airports. Resident over most of southern California (sparsely distributed over desert areas).	Suitable foraging habitat present. Not observed during focused surveys. No suitable burrows observed.	Potential to occur. Not observed during site visits.
Coccyzus americanus occidentalis Western yellow-billed cuckoo	US: Threatened CA: SE BLM: S (Nesting sites are protected.)	Riparian obligate species primarily with willow-cottonwood riparian forests, but other species occur in alder and box elder dominated riparian habitats	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Colaptes chrysoides Gilded flicker	CA: SE	Mature saguaro cactus.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Icteria virens Yellow-breasted chat	CDFW: SSC	Riparian willow thickets.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Ixobrychus exilis Least bittern	CDFW: SSC	Freshwater and brackish marshes.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Laterallus jamaicensis cotumiculus California black rail	CA: ST	Tidal and freshwater marshes.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Melanerpes uropygialis Gila woodpecker	CA: SE BLM: Sensitive	Cottonwood and other desert riparian. Cavity nester in riparian trees or saguaro cactus.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Micranthene whitneyi Elf owl	CA: SE BLM: Sensitive	Cottonwood willow and mesquite riparian along Colorado River.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Myiarchus tyrannulus Brown-crested flycatcher	CDFW: Watch list	Riparian thickets along Colorado River.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Piranga rubra Summer tanager	CDFW: SSC	Occur along streams among willows, cottonwoods, mesquite, or saltcedar	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Pyrocephalus rubinus Vermillion flycatcher	CDFW: SSC	Cottonwood, willow, mesquite and other desert riparian.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Rallus obsoletus yumanensis Yuma Ridgway's rail	US: FE CA: ST, Fully protected	Fresh water marshes along Colorado River.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Toxostoma crissale Crissal thrasher	CDFW: SSC	Desert riparian, dense vegetation along streams.	Suitable habitat is not present	Not expected to occur, therefore no effect on species.
Virep bellii arizonae Arizona Bell's vireo	CA: SE BLM: S	Summer resident along Colorado River, willow thickets.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Setophaga petechial sonorana Sonoran yellow warbler	CA: SSC	Summer resident of Colorado River, riparian, cottonwoods, willows.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
MAMMALS				
Antrozous pallidus Pallid bat	CDFW: SSC BLM: S	Deserts, grasslands, shrublands, woodlands and forests, in open dry habitat with rocky areas for roosting.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Corynorhinus townsendii Townsend's big-eared bat	CA: CT CDFW: SSC BLM: S USFS: S	Coniferous forests and woodlands, semi-desert and montane shrublands	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Chaetodipus penicillatus sobrinus Desert pocket mouse	LCR MSHCP: Listed	Desert areas with coarse vermiculite soils and clumped brush habitat. Avoid open desert scrub areas due to lack of cover.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Lasiurus blossevillii Western red bat	CA: SSC, Candidate	Desert riparian. Roosts in trees.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Lasiurus xanthinus Western yellow bat	CA: SSC	Desert riparian. Roosts in trees.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Lontra Canadensis Sonora Southwestern river otter	CA: SSC	Aquatic habitat along the Colorado River.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Macrotis californicus California leaf-nosed bat	BLM: S CA: SSC	Foraging occurs in desert washes with mesquite, ironwood, Palo verde, catclaw, smoketree.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Ovis Canadensis nelson Desert bighorn sheep	CDFW: Fully protected BLM: S	Open, steep rocky terrain.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Sigmodon arizonae plenus Colorado River cotton rat	CDFW: SSC	Grass cattail habitat with developed herbaceous understory.	Suitable not habitat present.	Not expected to occur, therefore no effect on species.
Sigmodon hispidus eremicus Yuma Hispid cotton rat	CDFW: SSC	Backwater habitat along the Colorado River.	Suitable not habitat present.	Not expected to occur, therefore no effect on species.

Designations:

US: United States

CA: California

FE – Federally Endangered

FT – Federally Threatened

SE – State Endangered

ST – State Threatened

CT – Candidate Threatened

CDFW: SSC – Species of Special Concern

CDFW: FP – Fully Protected

CDFW: WL – Watch List

BLM: S – Sensitive

USFS: S – Sensitive

WBWG: M – Medium Priority

As stated above, several special-status wildlife species have the potential to occur within the limits of the project and therefore have a potential to be impacted with the implementation of the proposed project. All other species are not further discussed beyond the extent of the table above because no impact is expected to them.

Desert tortoise (*Gopherus agassizii*) – (Federal: threatened; California: threatened). The proposed project site lies within the known range of the desert tortoise (DT). Therefore, focused protocol surveys to determine presence\absence were conducted. Mr. Jeff Johnson of Pacific BioScience Inc. conducted all focused surveys. Mr. Johnson has extensive experience conducting DT surveys over the past twenty years for large and small projects including studies for military installations and linear projects such as the High Desert Corridor. No individuals or their sign were detected during surveys. Therefore, impacts to this species and its habitat are considered to be less than significant. Although no individuals or their sign were observed, individuals could occur on the site in the future prior to clearing and grubbing. Pre-construction surveys shall be conducted (Mitigation Measure 4.3). If individuals are noted in the future, U.S. Fish and Wildlife Service and California Department of Fish and Wildlife shall be contacted immediately for consultation prior to work commencing.

Burrowing owl (*Athene cunicularia*) – (Federal: None; California: Species of Special Concern). This species occurs in open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. It is a subterranean nester that is dependent upon burrowing mammals, most notably the California ground squirrel. Marginal suitable habitat occurs on site. As such a cursory habitat assessment was conducted on May 22, 2018 by Mr. Jeff Johnson with Pacific BioScience, Inc. No suitable burrows were found on site or on adjacent parcels. Also, no individuals or their sign were observed during any site visit. Therefore, impacts to this species and its habitat are considered to be less than significant.. Although no individuals or their sign were observed, individuals could occur on the site in the future prior to clearing and grubbing. Pre-construction surveys shall be conducted (Mitigation Measure 4.4). If individuals are noted in the future, California Department of Fish and Wildlife shall be contacted immediately for consultation prior to work commencing.

Nesting Raptors and Other Birds

Suitable habitat for raptors and other birds protected by the Migratory Bird Treaty Act (MBTA) occurs within and adjacent to the project site. Due to the disturbed nature of this habitat the potential for nesting should be considered low to moderate for common wildlife adapted to urbanized environs. Most native breeding birds are protected under California Fish and Game Code Section 3503, and raptors specifically are protected under Section 3503.5. Additionally, California Fish and Game Code Section 3800 prohibits the taking of non-game birds and fully protected species. The nesting period for raptors and other birds generally occurs between February 15 and August 31. Construction activities that occur during the nesting season could disturb nesting sites for protected birds if construction occurs within 500 feet of an active nest for raptors and potentially less for other birds. Impacts to potential avian nesting habitat should be avoided, if possible. If avoidance is not possible, minimization measures will be necessary, including pre-construction nesting surveys. If no nests are found or if construction occurs during the non-breeding season (generally September 1 through February 14), no further action is warranted (Mitigation Measure 4.2).

Jurisdictional Resources

The project site was evaluated for the presence of wetland features under state and federal jurisdiction. A search of the USFWS National Wetlands Inventory revealed one drainage feature within the project limits that is potentially jurisdictional. This ephemeral feature appears to flow generally west to east at the extreme north end of the site.

One additional feature occurs in the middle of the site and one additional feature at the southern boundary. These features were evaluated and determined to meet the definition of State jurisdictional. Mr. Jeff Johnson of Pacific BioScience, Inc. spoke with Mr. Richard Kim of California Department of Fish and Wildlife on September 18, 2018 to discuss potential of jurisdictional resources on the site and characteristics used to make determinations as the desert region poses challenging conditions. In the absence of riparian vegetation, sign of water flow could be the only characteristic available to delineate boundary of features. Although no riparian vegetation is present on site, sign of historic water flow was observed, and it was this characteristic that was used to delineate the boundary of features. See Appendix C and D for Jurisdictional Delineation and map of feature locations. A summary of each feature is below:

Feature #1 – Episodic ephemeral stream located at the northern end of the proposed project site, 376 feet long with an average width of 8 feet for a total area of 0.069 acres.

Feature #2 – Episodic ephemeral stream located at the middle of the proposed project site, 423 feet long with an average width of 14 feet for a total area of 0.136 acres.

Feature #3 – Episodic ephemeral stream located at the southern perimeter of the proposed project site, 456 feet long with an average width of 12 feet for a total area of 0.126 acres.

The proposed project design was modified to avoid Feature #3 at the southern edge of the site. Jurisdictional Features #1 and #2 would be permanently impacted with the implementation of the proposed project and result in permanent impacts to no more than 0.205 acres of CDFW jurisdictional features. As such, a California Department of Fish and Wildlife Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement would be required prior to impacts of these features. Impacts to these drainage features will be mitigated by the creation of a detention basin onsite that is equivalent in size to the impacted areas (Mitigation Measure 4.5). The detention basin will contain native vegetation found in the impacted drainages. As additional mitigation, land will be purchased offsite in nearby locations that contain drainages of equal value and will be

preserved in perpetuity. This is typically acceptable mitigation for these types of impacts to streambeds.

The site was also evaluated to determine Army Corps of Engineers jurisdiction, if any, under the Section 404 of the Clean Water Act. As with State jurisdiction, determining ACOE jurisdiction can be challenging in the desert region. Characteristics used are: 1) presence of water, 2) soils, and 3) vegetation. As stated previously, only historic sign of water flow was observed. Pacific BioScience, Inc. field biologists were present on site intentionally during a heavy monsoonal rain event to observe conditions. No water flow was noted. When considering the potential for jurisdiction, connectivity to a traditional navigable waterway must be present. Although the Colorado River occurs approximately 600 feet to the east, no connectivity was observed during the heavy event, although it could, and likely does, during an extreme event. It was determined that ordinarily no water flow occurs off the site and therefore, water flow markings should not be considered "ordinary" high water indications. Surface runoff from Needles Highway ordinarily percolates through the ground and does not reach the Colorado River. Pacific BioScience, Inc. understands that typically larger episodic drainages with ordinary water flow and obvious connectivity to the Colorado River should be jurisdictional as well as all areas directly adjacent to the river that experiences periodic flooding. Features on the project site do not meet these criteria.

Analysis:

a) Finding: The proposed project will have a potentially significant impact 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. However, Mitigation Measures 4.1, 4.2, 4.3, and 4.4 would ensure that impacts would remain less than significant.

   Discussion: The proposed project site has natural vegetation with open space on adjacent parcels. As such, potential exists for several special-status species known to occur within the vicinity to occur on the site. Although focused surveys were conducted, and no special-status species were detected, potential exists for wildlife to occur on site in the future. Pre-construction surveys are required to reduce the potential for impacting a special-status species should it occur on the site at the time of clearing and grubbing.

b) Finding: The proposed project will have a potentially significant impact on riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service unless mitigation is incorporated. With the implementation of Mitigation Measure 4.5 impacts to these resources will be reduced to a less than significant level.

   Discussion: At least three California Department of Fish and Wildlife jurisdictional features are present on the proposed project site. Two of these episodic ephemeral streams would be permanently impacted as a result of the implementation of the proposed project. A Lake and Streambed Alteration Agreement (LSAA) permit would be required prior to impacting these features. As such, a LSAA application has been submitted electronically via CDFW's Environmental Permit Information Management System (EPIMS). Mitigation measures to offset the resulting impacts to these drainage features will be mitigated by the creation of a detention basin onsite that is equivalent in size to the impacted areas (Mitigation Measure 4.5). The detention basin will contain native vegetation found in the impacted drainages. As additional mitigation, land will be purchased offsite in nearby locations that contain drainages of equal value and will be preserved in perpetuity. This is typically acceptable mitigation for these types of impacts to streambeds.

   Finding: The project will not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. Therefore, the project will have No Impact to wetlands.

   Discussion: There are no federally protected wetlands as defined by Section 404 of the Clean Water Act that exist on the project site (USFWS 2018), nor would any wetlands be affected indirectly by the project's activities.

c) Finding: The proposed project will have a potentially significant impact on the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites unless mitigation is incorporated. However, Mitigation Measures 4.2, 4.3, and 4.4 would ensure that impacts would remain less than significant.

Discussion: The proposed project site has natural vegetation with open space occurring on adjacent parcels. As such, potential exists for nesting birds to occur on the project site or adjacent parcels. If possible, construction should occur between September 1 and February 14 to avoid the nesting bird season. If clearing and grubbing must start during the nesting bird season (February 15–August 31), then a pre-construction survey must be completed by a qualified biologist to survey for active nests on the project site and within a 300-foot buffer (500-foot buffer for raptor species) surrounding the project (Mitigation Measure 4.2). This survey must be performed no more than three days prior to start of initial clearing and grubbing. If nests are discovered, a qualified biologist shall establish an appropriate buffer around the active nest that shall remain in place until the nest is determined to be inactive.

d) Finding: The project will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. There will be No Impact with regard to local ordinances or policies protecting biological resources.

Discussion: There is no applicable local policy or ordinance protecting biological resources that will be in conflict with any phase of the project.

e) Finding: The project will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. There will be no impact to any existing conservation plan.

Discussion: The proposed project does not present a conflict with an adopted Habitat Conservation Plan (Lower Colorado River Multi-Species Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Applicant Proposed Operating Restrictions: None.

Mitigation:

Mitigation Measure 4.1: A focused plant survey will be conducted prior to construction during the appropriate growing season to identify any special-status desert dwelling plants that have the potential for occurring on the proposed project site.

Mitigation Measure 4.2: If work must be completed during the nesting bird season (February 15–August 31), then a pre-construction survey must be completed by a qualified biologist to survey for active bird nests on the project site within the project footprint and in a 300-foot buffer (500-foot buffer for raptor species) surrounding the project. This survey must occur no more than seven days prior to when construction begins. If nests are discovered, a qualified biologist shall establish a species appropriate buffer around the nest that shall remain in place until the nest is determined by a qualified biologist to be inactive.

Mitigation Measure 4.3: A qualified biologist shall survey for desert tortoise prior to construction. In the event an individual is found, the qualified biologist shall capture and relocate to a designated area approved by USFWS and CDFW.

Mitigation Measure 4.4: A qualified biologist shall survey for burrowing owl prior to construction. In the event an occupied burrow is found and removal is unavoidable, passive relocation methods are to be used by the qualified biologist to move the owls out of the impact zone. This includes covering or excavating all burrows and installing one-way doors into occupied burrows. This will allow any animals inside to leave the burrow, but will exclude any animals from re-entering the burrow. A period of one week is required after the relocation effort to allow the birds to leave the impacted area before excavation of the burrow can begin. The burrows should then be excavated by hand and filled in to prevent their reuse. The removal of active burrows on site requires construction of new burrows or the enhancement of existing unsuitable burrows at least one week prior to passive relocation efforts.

Mitigation Measure 4.5: To offset the resulting impacts to drainages within the proposed project site, there will be the creation of a detention basin onsite that is equivalent in size to the impacted areas. The detention basin will contain native vegetation found in the impacted drainages. As additional mitigation, land will be purchased offsite in nearby locations that contain drainages of equal value and will be preserved in perpetuity.

5. CULTURAL RESOURCES.

Would the project:	Potentially Significant	Potentially Significant Unless Mitigation Incorp.	Less Than Significant Impact	No Impact
Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☒	☐
Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐
Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Setting:

According to the California Public Resources Code Section 21084, a project may have a significant effect on the environment if the project "may cause a substantial adverse change in the significance of an historical resource." Tribal cultural resources are discussed separately in the Tribal Cultural Resources section.

Pacific BioScience, Inc. conducted research on cultural resources within a two-mile area of the project site. The records search identified four previously recorded sites and ten studies within a two-mile buffer of the site. Three of these sites are historical, and one is Native American in origin with pottery shard scatter. No sites or studies are recorded within the project site. The four previously recorded sites are summarized in Table 3 below.

Table 3: Recorded Sites within a Two-Mile Buffer of the Project Area

Site No.	Description	Eligibility
Primary: P-36-000985	Pottery shard scatter.	
Primary: P-36-002910	This site is a segment of the Historic U.S. Route 66.	Eligible (2S2)
Primary: P-36-002904	This site is a historic glass scatter of artifacts appearing to date from 1880s through 1919.	
Primary: P-36-019765	This site is the National Register listed former Needles Atchison Topeka and Santa Fe Depot, currently El Garces.	Listed (1S)

A site visit occurred on August 18, 2018. No historical sites were identified within the 3.75-acre project area.

Analysis:

a) Finding: The project is highly unlikely to cause a substantial adverse change in the significance of a historical resource as defined in §15064.5. Impacts would be considered less than significant.

Discussion: The records search and field survey did not identify any historical resources on the project site. Three historic sites were identified within a two-mile radius of the project site. It is unlikely that the project will result in a substantial adverse change in the significance of a historical resource and the impact is determined to be Less than Significant.

b) Finding: The project is unlikely to cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064. Impacts would remain less than significant with incorporation of Mitigation Measure 5.1.

Discussion: The records search and field survey did not identify any archaeological resources on the project site. One Native American site was identified within a two-mile radius of the project site. Based on these findings, it is unlikely that the project will result in a substantial adverse change in the significance of an archaeological resource,

and the impact is considered to be Less than Significant with Mitigation. Mitigation Measure 5.1 should be

implemented that includes a tribal monitor to be on-site during all grading activities. This has been agreed upon by the local Native American Tribes within the area. A tribal monitor on-site will be able to make the appropriate decisions in the event any human remains are found during grading activities that may have Native American significance.

c) Finding: The project is highly unlikely to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Impacts would be considered less than significant.

Discussion: Based on the type of construction, ground disturbance is unlikely to be at a depth greater than 12 inches. There is a very low risk that paleontological resources will be encountered. Based on this, it is unlikely that the project will result in a substantial adverse change in the significance of a paleontological resource.

d) Finding: The project is unlikely to disturb any human remains, including those interred outside of formal cemeteries. Impacts would be less than significant with incorporation of Mitigation Measure 5.1.

Discussion: The records did not identify any historical or archaeological resources on the project site. Based on historic aerial imagery and historic topographic maps, the proposed project site does not appear to have been historically used as a cemetery. It is unlikely that the project will disturb any human remains, including those buried outside of formal cemeteries. Ground disturbance will not be to a large depth.

Applicant Proposed Operating Restrictions: None.

Mitigation:

Mitigation Measure 5.1: Section 7050.5 of the California Health and Safety Code states that it is a misdemeanor to knowingly disturb human remains. If human remains are encountered, work should halt in the vicinity and the County Coroner and local Native American Tribes should be notified. At the same time, an archaeologist should be contacted to evaluate the situation. If the remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of identification.

6. GEOLOGY AND SOILS.

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
• 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 or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?	☐	☐	☐	☒
• Strong seismic ground shaking?	☐	☐	☒	☐
• Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
• Landslides?	☐	☐	☐	☒
Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
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?	☐	☐	☐	☒
Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

Setting:

According to the most current maps prepared by the State Geologist and the California Geologic Survey (Divisions of Mines and Geology 2018), the proposed project is not located within an Alquist-Priolo Earthquake Fault Zone. Additionally, the proposed project location is not identified on the County of San Bernardino Geological Hazards Surface Mining and Reclamation Act (SMARA) Overlay Map as in the area of an earthquake fault, or in an area subject to liquefaction, landslide, or collapse (San Bernardino County 2018).

A custom soil report was produced for the proposed project area using the web tool provided by the United States Department of Agriculture Natural Resources Conservation Service. No data was available for the proposed project area or areas immediately surrounding (NRCS 2018).

The proposed facility will use a septic system and leach field that will be contained entirely on-site. A 1,000-gallon septic tank will be installed 6” below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4” diameter buried 3 feet below grade in a bed of gravel. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4” diameter buried 3 feet below grade in a bed of gravel. The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter the septic system.

Analysis:

a) Finding: The proposed project will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving 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 or based on other substantial evidence of a known fault. There will be No Impact regarding exposure of people or structures to adverse effects from a known earthquake fault.

Discussion: According to the most current maps prepared by the State Geologist and the California Geologic Survey, the proposed project is not located within an Alquist-Priolo Earthquake Fault Zone and is not identified as in proximity to an

earthquake fault on the County of San Bernardino Geologic Hazards SMARA Overlay Map.

b) Finding: The project will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. With adherence to regulatory requirements of the International Building Code standards, the proposed project will have a Less than Significant Impact regarding exposure of people or structures to adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking.

Discussion: As stated above, the proposed project is not located within an Alquist-Priolo Earthquake Fault Zone. However, earthquakes that occur along fault zones still contribute to seismic ground shaking in areas throughout Southern California. As such, all proposed facility structures will comply with International Building Code standards so as to minimize any potential impacts resulting from ground-shaking during an earthquake. The proposed project is not located within a mapped earthquake fault zone and the construction and design of the project will comply with all International Building Code standards.

c) Finding: The proposed project will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction. The proposed project would have No Impact to exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction.

Discussion: As discussed above, the proposed project area is as not in the vicinity of an earthquake fault, and not in an area subject to liquefaction. The climate of Needles is dry, which receives less than six inches of rainfall annually, and no saturated soils are found within or adjacent to the proposed project area.

d) Finding: The proposed project will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides. There will be No Impact from landslides.

Discussion: The proposed project area is not located in an area that is susceptible to landslides. The project site is level and at grade with surrounding parcels.

e) Finding: The project will not result in substantial soil erosion or the loss of topsoil. Impacts would be considered less than significant.

Discussion: The proposed project is considered flat, and although earthmoving will occur to construct the proposed facility, there is unlikely to be substantial soil erosion or loss of topsoil. Implementation of operating restriction GS-1 will prevent wind erosion. Additionally, long-term wind erosion will be reduced or eliminated by the use of native plantings installed on-site.

f) Finding: The project will not 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. There will be No Impact with regard to soil stability.

Discussion: As discussed above, the proposed project is not located on a geologic unit or soil that is unstable or subject to lateral spreading or subsidence liquefaction or collapse.

g) Finding: The proposed project will not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property. Therefore, no impacts regarding expansive soils and their risks to life or property are expected to occur.

Discussion: The proposed project is not located in an area with expansive soils. These types of soils require a high clay content, of which is not present within the proposed project area, nor do they exist within this desert region.

h) Finding: The project will not have soils incapable of adequately supporting the use of septic tanks or

alternative waste water disposal systems where sewers are not available for the disposal of waste water. Therefore, No Impact from septic tanks or alternative waste water systems are expected to occur.

Discussion: The proposed facility will use a septic system and leach field that will be contained entirely on-site. A 1,000-gallon septic tank will be installed 6" below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4" diameter buried 3 feet below grade in a bed of gravel The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter the septic system. Additionally, the soils present on site are generically fine to coarse sand which are suitable for septic systems.

Applicant Proposed Operating Restrictions:

GS-1: During short-term construction activities, all exposed surfaces (e.g. parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered twice daily for soil retention and dust suppression when construction activities are occurring on-site.

Mitigation: None required.

7. GREENHOUSE GAS EMISSIONS

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
Generate greenhouse gas emission, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

Setting:

In 2006 the State of California enacted the Global Warming Solutions Act of 2006 which required the state to establish a greenhouse gas (GHG) emissions cap for 2020 based on 1990 emissions. The act also required mandatory reporting rules for significant sources of GHG emissions. GHG emissions in the project area are regulated by the MQAQMD, which has developed daily and annual thresholds of significance for these emissions.

Analysis:

a) Finding: The proposed project will not generate GHG emissions, either directly or indirectly, that will have a significant effect on the environment. The project is determined to have a Less than Significant Impact in regard to either direct or indirect generation of GHG emissions.

Discussion: The proposed project can be broken into two phases: construction and operation. During the construction phase, there is the potential for GHG emissions from equipment and vehicles used during this phase. However, the emissions generated will be minor and incremental given the scale of the project and the limited period of construction.

During operations, there are little to no direct emissions due to project activities. Nearly all activities occur indoors, and equipment used includes lighting, pumps, and ventilation units that are all electrically powered. The project will result in an incremental amount of indirect GHG emissions due to the estimated 660 kW power usage for project operations. In any case, the total CO_2 emissions are still far below the threshold of significance for the MDAQMD.

b) Finding: The project will not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG. The proposed project would have No Impact.

Discussion: The project proposes a facility that will involve the cultivation and processing of cannabis products.

For the purposes of this analysis, the proposed project was evaluated against the following applicable plans, policies, and regulations:

i. MDAQMD—the CEQA and Federal Conformity Guidelines contain thresholds of significance for GHG emissions. As described above, project emissions will be far below the threshold of significance adopted in the plan.

As reporting of emissions is required for electricity suppliers pursuant to the Mandatory Greenhouse Gas Reporting Program as part of meeting the reduction goals set for California, it is reasonable to determine that emissions due to the electrical demand of the project will continue to be regulated in line with state goals.

The project will therefore not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

Applicant Proposed Operating Restrictions: None.

Mitigation: None required.

8. HAZARDS AND HAZARDOUSMATERIALS

Would the project:	Potentially Significant	Potentially Significant Unless Mitigation Incorp.	Less Than Significant Impact	No Impact
Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
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?	☐	☐	☐	☒
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 for people residing or working in the project area?	☐	☐	☐	☒
For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Setting:

The proposed project site contains desert scrub and plants that indicate this area has not been developed and there are no records of development. The proposed project site does not currently contain any hazardous materials or known hazards. An analysis of the proposed project site did not identify any mapped spill or cleanup sites within or immediately adjacent to the project area.

Analysis:

a) Finding: The proposed project will not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Exposure of the public or environment to hazardous materials due to the project is highly unlikely and the impact is considered Less than Significant.

Discussion: The proposed project will require various materials for cannabis cultivation. Materials necessary for each cultivation cycle will be delivered as needed and securely stored inside the cultivation facility. No materials necessary for the cultivation process are considered hazardous substances, and the project will not require the development of a hazardous materials business plan. The California Environmental Protection Agency (CalEPA), will approve all materials being used on site. Material Safety Data Sheets (MSDS) will be provided by the project proponent to the City of Needles for all supplies used for cultivation. Disposal of materials will comply with the City of Needles Ordinance 594-AC. No pesticides will be used on-site for cultivation purposes.

b) Finding: The proposed project will not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. No pesticides will be used on-site for cultivation purposes. The proposed project would have No Impact.

Discussion: The proposed project will require various materials for cannabis cultivation. Materials necessary for each cultivation cycle will be delivered as needed and securely stored inside the cultivation facility. No materials necessary

for the cultivation process are considered hazardous substances, and the project will not require the development of a hazardous materials business plan. The California Environmental Protection Agency (CalEPA), will approve all materials being used on site. No volatile chemicals, pesticides or other materials that would pose a hazard to human health or to the environment will be used on the proposed project facility.

Finding: The project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No Impact in regard to hazardous emissions and handling of hazardous materials near a school.

Discussion: The proposed project site is 1.5 miles from the nearest school and will not involve any hazardous emissions or materials. All waste produced during cultivation cycles is considered non-hazardous and will be managed and secured and in compliance with City of Needles Ordinance 594-AC. The proposed project will therefore have

c) Finding: The proposed project is not 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, does not create a significant hazard to the public or the environment. No Impact on any hazardous materials site which could be a potential hazard to the public or the environment.

Discussion: The proposed project does not contain any hazardous materials on site, and is not identified as being a hazardous material site.

Finding: The proposed project is not 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. No Impact will occur.

Discussion: The proposed project is not located within an airport land use plan or within two miles of an airport. The closest airport to the proposed project site is Eagle Airpark, which is located approximately 2.5 miles north of the project site in Arizona. The Needles Airport is located 7.2 miles from the proposed project site. The project will not result in safety hazards to people working or residing within an airport land use area

d) Finding: The proposed project is not within the vicinity of a private airstrip and will not result in a safety hazard for people residing or working in the project area. No Impact will occur.

Discussion: The proposed project is not located in the immediate vicinity of a private airstrip

e) Finding: The proposed project will not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. No Impact will occur.

Discussion: The proposed project has adequate emergency access from Needles Hwy. Additionally, the proposed project and construction of facilities will not impede emergency response routes to the surrounding area. A lock box with a gate key will be made available for emergency vehicles at times when the gate is locked.

f) Finding: The proposed project will not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. No Impact will occur.

Discussion: The proposed project is located in the northern limits of the City of Needles that is not adjacent to wildlands. After review of the CalFire hazard map for San Bernardino County, the proposed project is not within any mapped moderate, high or very-high fire hazard zones.

Applicant Proposed Operating Restrictions:

HHM-1. MSDS shall be provided to the City of Needles for all potentially hazardous materials used in the operation in the event that emergency responders may require them.

Mitigation: None required.

9. HYDROLOGY AND WATERQUALITY

Would the project:	Potentially Significant	Potentially Significant Unless Mitigation Incorp.	Less Than Significant Impact	No Impact
Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
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?	☐	☐	☒	☐
Otherwise substantially degrade water quality?	☐	☐	☒	☐
Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☒	☐	☐
Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☒	☐	☐
Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Setting:

The proposed facility will be served by water supplied by the City of Needles. The operational water needs are 2 to 3 acre-feet per year after the build-out of Phase 2. The City of Needles will need to provide a "will serve" letter to Micro Lab Farms for the amount of water requested by the operation as part of the local permitting process. The groundwater well the City uses for the water source has sufficient capacity to meet the needs of the proposed project.

The proposed facility will use a septic system and leach field that will be contained entirely on-site. A 1,000-gallon septic tank will be installed 6" below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4" diameter buried 3 feet below grade in a bed of gravel. The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter septic system.

This document, for the purposes of CEQA, will analyze the higher level of water use, with the recognition that impacts could be reduced based on the cultivation and irrigation techniques employed. The grow pods utilize a re-circulating watering system that uses half of the water of other indoor growing facilities with no waste water generated.

The proposed facility will also have bathrooms and sinks for employee use that drain to a septic system which is contained entirely on-site.

The City of Needles is located in San Bernardino County Flood Control District, Zone 6. As mapped by the Federal Emergency Management Agency (FEMA), the project site is within flood Zone A (no base flood elevations determined) and Zone X (area of minimal flood hazard) (FEMA 2016).

A hydrology study was conducted by Ludwig Engineering, and proper elevations for foundations were determined. The elevations of all proposed structures have been modified appropriately to address flooding concerns. The hydrology study

can be found in Appendix D.

Analysis:

a) Finding: The proposed project is highly unlikely to violate any water quality standards or waste discharge requirements. With incorporation of operating restriction HWQ-1,the proposed project will have a Less than Significant Impact on violating any water quality standards or waste discharge requirements.

Discussion: The proposed facility will use a septic system and leach field that will be contained entirely on-site. A 1,000-gallon septic tank will be installed 6" below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4" diameter buried 3 feet below grade in a bed of gravel. The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter the septic system.

b) Finding: The proposed project will not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted). The project will have a Less Than Significant Impact to groundwater supplies and will not substantially deplete groundwater supplies or lower the local groundwater table.

Discussion: The proposed facility will be served by water supplied by the City of Needles. The operational water needs are 2 to 3 acre-feet per year after the build-out of Phase 2. The City of Needles will need to provide a "will serve" letter to Micro Lab Farms for the amount of water requested by the operation as part of the local permitting process. The groundwater well the City uses for the water source has sufficient capacity to meet the needs of the proposed project.

c) Finding: The project will not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site. The proposed project will have a Less Than Significant Impact with implementation of Mitigation Measure 4.5 to existing drainage patterns that would result in substantial erosion or siltation on- or off-site.

Discussion: The proposed project is relatively flat. There are three jurisdictional features on site and their details are listed below:

Feature #1 – Episodic ephemeral stream located at the northern end of the proposed project site, 376 feet long with an average width of 8 feet for a total area of 0.069 acres.
Feature #2 – Episodic ephemeral stream located at the middle of the proposed project site, 423 feet long with an average width of 14 feet for a total area of 0.136 acres.
Feature #3 – Episodic ephemeral stream located at the southern perimeter of the proposed project site, 456 feet long with an average width of 12 feet for a total area of 0.126 acres.

Feature #1 and #2 will be impacted through the implementation of the proposed project. Although the two jurisdictional features that will be impacted by the proposed project facilitate flow during heavy storm events, the impacts will not substantially alter the drainage pattern in the area as a whole due to the construction of a detention basin onsite. The detention basin will have a rectangular weir in place as an outlet to allow on- and off-site flow through the site to be discharged at a very low velocity. The low velocities will ensure that no erosion of surrounding properties will occur. Therefore, the proposed project will not result in substantial erosion or siltation on- or off-site.

d) Finding: The project will not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. The proposed project will have a Less Than Significant Impact with implementation of Mitigation Measure 4.5 and operating restriction HWQ-2 to existing drainage patterns that

could result in increased surface runoff in a manner which would result in flooding on- or off-site.

Discussion: The proposed project is relatively flat. There are three jurisdictional features on site and their details are listed below:

Feature #1 – Episodic ephemeral stream located at the northern end of the proposed project site, 376 feet long with an average width of 8 feet for a total area of 0.069 acres.
Feature #2 – Episodic ephemeral stream located at the middle of the proposed project site, 423 feet long with an average width of 14 feet for a total area of 0.136 acres.
Feature #3 – Episodic ephemeral stream located at the southern perimeter of the proposed project site, 456 feet long with an average width of 12 feet for a total area of 0.126 acres

Feature #1 and #2 will be impacted through the implementation of the proposed project and will be mitigated through the implementation of Mitigation Measure 4.5. Although the two jurisdictional features that will be impacted by the proposed project facilitate flow during heavy storm events, the impacts will not substantially alter the drainage pattern in the area as a whole and will not result in a substantial increase in the rate of surface runoff which could result in flooding on- or off-site. Drainage swales will be installed on hard surfaces to facilitate flow into a detention basin. Surface water runoff will be diverted towards the detention basin which has sufficient capacity for ordinary rain events (See Appendix B – Project Plans). In the event capacity is reached, there will be an outflow across the highway via an Arizona crossing into an adjacent unnamed wash. There will be no substantial additional sources of polluted runoff.

e) Finding: The proposed project will not create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. There proposed project would have a Less than Significant impact with incorporation of operating restriction HWQ-2

Discussion: The proposed project has designed drainage features to facilitate any surface runoff that would not exceed the capacity of existing or planned storm water drainage systems. Drainage swales will be installed on hard surfaces to facilitate flow into a detention basin. Surface water runoff will be diverted towards the detention basin which has sufficient capacity for ordinary rain events (See Appendix B – Project Plans). In the event capacity is reached, there will be an outflow across the highway via an Arizona crossing into an adjacent unnamed wash. There will be no substantial additional sources of polluted runoff.

f) Finding: The proposed project will not otherwise substantially degrade water quality. With operating restrictions HWQ-1, HWQ-2 and HWQ-3 impacts would be considered less than significant.

Discussion: The proposed project will not substantially degrade water quality through the implementation of HWQ-1, HWQ-2, and HWQ-3; therefore, there will be No Impact to water quality with the implementation of the proposed project.

g) Finding: The proposed project will not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. There will be No Impact with regard to placing housing in a flood hazard area as a result of the proposed project.

Discussion: Although a portion of the proposed project site is within flood Zone A, the project scope does not including housing.

h) Finding: The proposed project will not place within a 100-year flood hazard area structures which would impede or redirect flood flows. The proposed project will have a Less than Significant Impact to impeding or redirecting flood flows.

Discussion: As mapped by the Federal Emergency Management Agency (FEMA), the project site is within flood Zone A (no base flood elevations determined) and Zone X (area of minimal flood hazard) (FEMA 2016).
A hydrology study was conducted by Ludwig Engineering (Appendix D), and proper elevations for foundations were

determined. The elevations of all proposed structures have been modified appropriately to address flooding concerns. The conclusion and recommendations of the hydrology study were to construct drainage structures to catch the inflow run-off; and to redirect flows to a detention basin for temporary storage. Additionally, the hydrology study recommended an overflow structure to be constructed on the basin to allow discharge into Needles Highway.

i) Finding: The proposed project will not expose people or structures to a significant risk or loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. There will be a Less Than Significant Impact on people or structures resulting from flooding.

Discussion: Although a portion of the proposed project site is located within flood Zone A, the proposed facilities were designed to be constructed at proper elevations so as to avoid impacts from a major flood event. A hydrology study was conducted by Ludwig Engineering (Appendix D), and proper elevations for foundations were determined. The elevations of all proposed structures have been modified appropriately to address flooding concerns. The conclusion and recommendations of the hydrology study were to construct drainage structures to catch the inflow run-off; and to redirect flows to a detention basin for temporary storage. Additionally, the hydrology study recommended an overflow structure to be constructed on the basin to allow discharge into Needles Highway.

j) Finding: The proposed project will not result in inundation by seiche, tsunami, or mudflow. There would be No Impact.

Discussion: The proposed project site is not located on or near a lake, and therefore poses no risk of seiche. Additionally, the proposed project site is located hundreds of miles from the coast that could present a risk of tsunami. Finally, the proposed project location and immediate area is flat and not subject to mudslides.

Applicant Proposed Operation Restrictions:

HWQ-1: Cleanouts will be installed which will allow cultivation effluent testing for both water and wastewater sent to the city sewer and water sent to landscaping, and cultivation effluent testing will occur on a regular schedule.

HWQ-2: Drainage swales will be installed on hard surfaces to facilitate flow into a detention basin. Surface water runoff will be diverted towards the detention basin which has sufficient capacity for ordinary rain events. In the event capacity is reached, there will be an outflow across the highway via an Arizona crossing into an adjacent unnamed wash. There will be no substantial additional sources of polluted runoff.

HWQ-3: The project is required to comply with all sections of Titles 22 and 17 of the California Code of Regulations as applicable ("Regulations that Apply to Recycled Water"), including but not limited to type of backflow prevention required, proper installation of backflow prevention, testing and maintenance of backflow prevention, source specifications for recycled water, use area requirements for recycled water including signage, and restrictions on dual plumbed systems. In addition, the sewage disposal and recycled water systems are subject to all local codes, including securing and conforming with the terms of any permits required by the City of Needles, the County of San Bernardino County, or the Colorado River Water Quality Control Board.

Mitigation:

Mitigation Measure 4.5: To offset the resulting impacts to drainages within the proposed project site, there will be the creation of a detention basin onsite that is equivalent in size to the impacted areas. The detention basin will contain native vegetation found in the impacted drainages. As additional mitigation, land will be purchased offsite in nearby locations that contain drainages of equal value and will be preserved in perpetuity

10. LAND USE ANDPLANNING.

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
Physically divide an established community?	☐	☐	☐	☒
Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Setting:

The proposed project site is currently zoned as C-3 (Highway Commercial). This zone is intended for uses that do not fit any of the other commercial developments in that businesses would include those not associated with the CBD or neighborhood center such as: shopping centers, automobile sales and services, commercial recreation, gasoline service stations, restaurants and motels and miscellaneous commercial uses. Naturally, many of the highway commercial uses would be located adjacent to the freeway interchanges. The General Plan identifies the project site as Residential and the applicant seeks to amend the General Plan to C-3 Highway Commercial.

Analysis:

a) Finding: The proposed project will not physically divide an established community. The proposed project will have No Impact regarding the potential to physically divide and established community.

Discussion: The proposed project is of a small size (3.75 acres), located near the northern limits of the City of Needles, and the development of the area will not introduce any sort of divide in the community. Additionally, no structure on the proposed facility will be greater than 30 feet, and thus will not cause a visual divide amongst the surrounding area.

b) Finding: The proposed project will not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. Impacts would be considered less than significant.

Discussion: Based on this analysis, the project is not determined to conflict with any applicable land use plan, as it is contingent upon a change in designated land use and zoning, and there is sufficient basis for the zoning change and the general plan amendment.

c) Finding: The proposed project will not conflict with any applicable habitat conservation plan or natural community conservation plan. The proposed project would have No Impact.

Discussion: The proposed project is located within the City of Needles which does not have any habitat conservation plan or natural community conservation plans in place that would apply to the project.

Applicant Proposed Operation Restrictions: None.

Mitigation: None required.

11. MINERAL RESOURCES.

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Setting:

The proposed project site is not located in an area zoned for mining or for mineral resource extraction (San Bernardino County 2007). The closest known mineral resource is located at 5163 National Trails Highway; an excavation business which specializes in aggregate base and rock. This establishment is approximately 0.3 miles away from the proposed project site.

Additionally, there is potential mineral resources located in the Eagle Pass area, more than two miles from the proposed project site, and an established mineral resource known as the Needles magnesite deposit is located west of Eagle Peak, which lies more than four miles away from the project site (Division of Mines and Geology 1985).

Analysis:

a) Finding: The proposed project will not 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. The proposed project will have No Impact on regarding the loss of availability of a known mineral resources.

Discussion: The proposed project location is not zoned for mineral resource extraction. Additionally, the nearest mapped mineral deposits are more than two miles away from the proposed project location. Therefore,

b) Finding: The proposed project will not 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. The proposed project will result in No Impact to the loss of availability of a locally-important mineral resource recovery site.

Discussion: The proposed project site is not located within a mineral resource recovery site as delineated on the City of Needles General Plan or the County of San Bernardino's General Plan.

Applicant Proposed Operation Restrictions: None.

Mitigation: None required.

12. NOISE.

Would the project result in:	Potentially Significant	Potentially Significant Unless Mitigation Incorp.	Less Than Significant	No Impact
Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
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 expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Setting:

The Needles City Code noise standards require developments shall be designed to achieve a community noise equivalent level not to exceed 65 dB. The proposed project is located in an area within the City of Needles that is adjacent to open space desert scrub habitat and partially urbanized residential and commercial lots. Noise generated form ongoing operational activities is limited to air conditioning units located on the exterior for the metal façade structures. Noise levels generated due to air conditioning units are expected to be at or below 45 dB at the source and below 45 dB at the perimeter fence based on manufacturer specifications. Noise generated from construction equipment is expected to be loud at times with the loudest equipment potentially reaching as high as dBA 83. Several operational restrictions will be implemented to reduce potential noise impacts during construction.

Analysis:

a) Finding: The project will not expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. With incorporation of Mitigation Measures 12.1 and 12.2, impacts would be less than significant.

Discussion: The Environmental Protection Agency (EPA) has general recommendations for noise standards that reasonably prevent nuisance and allow for speech intelligibility. The typical levels are expressed in day-night noise levels (L_{dn}), which is the average sound level in decibels during a 24-hour period with a 10-dBA weighting applied to noise generated during nighttime hours. The EPA recommends an indoor L_{dn} of 45 dBA and an outdoor L_{dn} of 55 dBA (EPA 1974). A baseline noise study was conducted to determine existing ambient noise levels for both short- and long-term conditions. Given the specifications for noise generated equipment it is not expected that resulting noise levels after construction would be a significant increase. Refer to the Noise Study in Appendix G for details.

b) Finding: The proposed project will not expose persons to or generate excessive groundborne vibration or groundborne noise levels. Impacts would be considered less than significant.

Discussion: The proposed project will not result in any generation of excessive amounts of groundbourne vibration or groundbourne noise levels during construction of the facilities. A baseline noise study was conducted to determine existing ambient noise levels for both short- and long-term conditions. Given the specifications for noise generated equipment it is not expected that resulting noise levels after construction would be a significant increase. Refer to the Noise Study in Attachment G for details.

c) Finding: The proposed project will not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. With incorporation of Mitigation Measure 12.1

and 12.2, the proposed project will result in a Less Than Significant Impact regarding a substantial permanent increase in ambient noise levels within the project vicinity.

Discussion: The proposed project will include the installation of A/C units which are expected to produce noise levels at or below 45 dB at the source and below 45 dB at the perimeter fence based on manufacturer specifications. A baseline noise study was conducted to determine existing ambient noise levels for both short- and long-term conditions. Given the specifications for noise generated equipment it is not expected that resulting noise levels after construction would be a significant increase. Refer to the Noise Study in Attachment G for details. As such, and with the implementation of Mitigation Measure 12.1 and 12.2 listed below, the proposed project will result in a Less Than Significant Impact regarding a substantial permanent increase in ambient noise levels within the project vicinity.

d) Finding: The proposed project will not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. With the implementation of itigation measures 12.1 and 12.2, impacts to construction-related noise are considered to be Less Than Significant.

Discussion: Temporary noise impacts of the proposed project are expected to occur during construction of Phase I and Phase II. During these construction phases, noise from construction activities would increase the noise environment in the immediate area. This noise increase would be temporary and occur during daytime hours only. The following table indicates the equipment used for construction of the proposed project and the maximum noise levels that the equipment would emit at a receptor distance of 50 feet.

Table 4: Construction Equipment Noise

Type of Equipment	Maximum Level, dBA at 50 feet
Backhoe	78
Bulldozer	82
Compactor (ground)	83
Compressor (air)	78
Generator	81
Paver	77
Pickup Truck	75
Type of Equipment	**Maximum Level, dBA at 50 feet**
Pneumatic Tools	85
Source: Federal Highway Administration, 2006	

Construction will be limited to occur between the hours of 8:00 a.m. and 6:00 p.m. during weekdays with the exception of Saturdays upon approval, in order to not degrade the quality of life of nearby residents during nighttime and evening hours.

Other noise impacts of a temporary or periodic nature include deliveries of materials at the site, shipment of cannabis product, and employees entering and exiting the site (it is projected a maximum of 20 vehicles trips per day). None of these activities are anticipated to generate noise levels in excess of the existing noise already experienced at the proposed project site.

With the implementation of Mitigation Measures 12.1 and 12.2, impacts to construction-related noise are considered to be Less Than Significant.

e) Finding: The proposed project is not located within an airport land use plan or within two miles of a public

airport or public use airport and will expose people residing or working in the proposed project area to excessive noise levels. There would be No Impact.

Discussion: The proposed project is not located within an airport land use plan or within two miles of a public airport or public-use airport. The closest airport is Eagle Airpark, located 2.5 miles north of the project site in Arizona. The Needles Airport is located approximately 7.2 miles from the proposed project site. The proposed project will not expose people working or residing within an airport land use area to excessive noise.

f) Finding: The proposed project is not within the vicinity of a private airstrip and will not expose people residing or working in the project area to excessive noise levels. There will be No Impact.

Discussion: The proposed project is not located in the immediate vicinity of a private airstrip.

Applicant Proposed Operating Restrictions: None.

Mitigation:

Mitigation Measure 12.1: The applicant shall acknowledge that the noise generated by operation of the proposed project must not exceed 65 dBA at the exterior side of any adjacent residences or result in an increase of more than 5 dBA in ambient noise if ambient noise is over 65 dBA L_{dn}.

Mitigation Measure 12.2: The following shall apply to construction noise from tools and equipment:

- The operation of tools or equipment used in construction, drilling, repair, alteration, or demolition shall be limited to between the hours of 8: 00 a.m. and 6:00 p.m. Monday through Friday. The applicant is requesting work to be allowed between 8:00 a.m. and 6:00 p.m. on Saturdays.
- No heavy equipment related construction activities shall be allowed on Sundays or holidays.
- All stationary and construction equipment shall be maintained in good working order and fitted with factory-approved muffler systems.

13. POPULATION AND HOUSING.

Would the project:	Potentially Significant	Potentially Significant Unless Mitigation Incorp.	Less Than Significant	No Impact
Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Setting:

The proposed project site is currently zoned as C-3 (Highway Commercial). zone is intended for uses that do not fit any of the other commercial developments in that businesses would include those not associated with the CBD or neighborhood center such as: shopping centers, automobile sales and services, commercial recreation, gasoline service stations, restaurants and motels and miscellaneous commercial uses. Naturally, many of the highway commercial uses would be located adjacent to the freeway interchanges. The applicant seeks to amend the General Plan and change the designation from Residential to C-3 (Highway Commercial).

The proposed site has not been developed and therefore will not result in the removal or displacement of any existing housing.

The population of Needles at the 2010 Census was 4,844 (U.S. Census Bureau 2010) and estimated at 4,988 in 2016 (U.S. Census Bureau 2016). Total housing units for the City of Needles were estimated at 2,992 in 2016, with an estimated 4.9% homeowner vacancy rate (U.S. Census Bureau 2016).

Analysis:

a) Finding: The proposed project will not induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure). The proposed project will have a Less Than Significant Impact to inducing substantial population growth.

   Discussion: At full operation, the associated cultivation and processing operation will employ three people which is considered minimal when discussion population growth.

b) Finding: The proposed project will not displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere. No Impact.

   Discussion: The proposed project is located on an undeveloped parcel and will not displace substantial numbers of existing housing.

c) Finding: The proposed project will not displace substantial numbers of people, necessitating the construction of replacement housing elsewhere. No Impact.

   Discussion: As stated above, the proposed project is located on an undeveloped parcel and will not displace substantial numbers of people.

Applicant Proposed Operation Restrictions: None.

Mitigation: None required.

14. 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**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
• Fire protection?	☐	☐	☒	☐
• Police protection?	☐	☐	☒	☐
• Schools?	☐	☐	☐	☒
• Parks?	☐	☐	☐	☒
• Other public facilities?	☐	☐	☒	☐

Setting:

The San Bernardino County Fire Department serves the City of Needles under contract for fire protection services. Fire Station 32 serves the City of Needles and is located approximately 3 miles from the proposed project site.

The San Bernardino County Sheriff's Department is contracted by the City of Needles for providing law enforcement Services and the nearest station is located approximately 1.9 miles south of the proposed project site.

Schools in the Needles area are part of the Needles Unified School District. The closest school to the proposed project site is Grace Elementary School and is approximately 1.3 miles away to the southeast.

The closest park in proximity to the proposed project is Route 66 Wayside Rest Stop, which is approximately 0.3 miles away.

The Colorado River Medical Center is the closest full-service hospital and is approximately 2 miles away from the proposed project location.

A first aid kit will be present on the proposed project site and a list of emergency contacts will be stored in each building.

Analysis:

a) Finding: The proposed project will not 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 for fire protection. Impacts to fire would be considered less than significant.

   Discussion: The proposed project facilities will have wiring installed by a certified electrical contractor to the standards of the California Code of Regulations for commercial structures, and smoke/fire detection alarms will be installed to meet the California Code of Regulations. Emergency responders will have access to the proposed project site via Needles Hwy.

b) Finding: The proposed project will not 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 for police protection. With incorporation of operating restriction PS-1, impacts would remain less than significant.

   Discussion: The proposed project will be secured by a chain-link fence and locked gate. Security cameras will be placed at various strategic points around the property. Cameras will be motion-activated and trigger additional lighting system. Additional interior security system will be used and is proprietary and confidential. The project

will also be subject to a robust security plan (Operation Restriction PS-1), which includes a provision that the facility will be secured by locked gates where only employees and the facility operator have access codes. There will be security cameras on each exterior corner of each building. Some cameras will be motion activated and will turn on exterior lights if movement is detected. There will be interior security cameras in each of the main spaces.

c) Finding: The proposed project will not 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 related to schools. The proposed project will have No Impact to schools and No Impact to any public services related to schools.

Discussion: The proposed project site is located more than 1.5 miles from any school, which is greater than the 600-foot minimum distance required by City of Needles Ordinance 594-AC. Additionally, as discussed in Population and Housing above, there would be no increase in population.

d) Finding: The proposed project will not 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 for parks. The proposed project will have No Impact to parks or to the acceptable service ratios, response times, or other performance objectives for any of the public services for parks.

Discussion: The proposed project is located more than 0.3 miles away from the nearest park and complies with the City of Needles Ordinance 594-AC as the project site is well beyond the 200-foot minimum distance from a park. Additionally, as discussed in Population and Housing above, there would be no increase in population.

e) Finding: The proposed project will not 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 for other public facilities. With incorporation of operating restriction PS-2, impacts would remain less than significant.

Discussion: The proposed project is located approximately 2 miles from the Colorado River Medical Center. The project does not propose hazardous activities and is not anticipated to place any extra demand on the community's medical services. There will be a first aid kit on the project site and a list of emergency contacts in each building as outlined in operating restriction PS-2.

Applicant Proposed Operation Restrictions:

PS-1: The project will be subject to a robust security plan, which includes a provision that the facility will be secured by locked gates where only employees and the facility operator have access codes. There will be security cameras on each exterior corner of each building. Some cameras will be motion activated and will turn on exterior lights if movement is detected. There will be interior security cameras in each of the main spaces.

PS-2: There will be a first aid kit on the project site and a list of emergency contacts in each building, and employees will be trained in proper safety protocols.

Mitigation: None required.

15. RECREATION

	Potentially Significant	Potentially Significant Unless Mitigation Incorp.	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Setting:

The City of Needles has approximately 40 acres of maintained grass and parkland, in addition to its 111-acre municipal golf course (City of Needles 2018). The closest park in proximity to the proposed project is the Route 66 Wayside Rest Stop, which is approximately 0.3 miles away.

The proposed project does not include construction of recreational facilities or any other connection to recreational facilities.

Analysis:

a) Finding: The proposed project will not 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. No Impact.

   Discussion: The proposed project does not include recreational facilities or any connection to recreational facilities. There will be no public access to the project site, no retail sales of cannabis from the project site, and the project will include its own parking for employees. Thus, there is no opportunity for interaction with the use of the existing neighborhood or the neighborhood's recreational facilities. Additionally, as mentioned in Population and Housing above, there would be no population increase through the implementation of the proposed project.

b) Finding: The proposed project will not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. No Impact.

   Discussion: The proposed project does not include recreational facilities.

Applicant Proposed Operation Restrictions: None.

Mitigation: None required.

16. TRANSPORTATION/TRAFFIC

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
Result in inadequate emergency access?	☐	☐	☐	☒
Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Setting:

I-40 is the major highway through Needles, connecting Barstow to the west and Arizona to the east. The project is approximately three blocks at its closest point north and east from I-40, although the nearest Interstate on-ramp or off-ramp is located approximately 0.8 mile away from the project. U.S. Route 95 also enters the city from the east on former Historic U.S. Route 66 concurrent with the I-40 freeway, then splits with Interstate 40 west of the city, as U.S. Route 95 heads north to Nevada (Caltrans 2016). Due to its parallel alignment with I- 40, U.S. Route 95 is located a similar distance from the project site.

Local transit service to and within the Needles area is provided by Needles Area Transit. Amtrak provides daily service to Needles station, on the Southwest Chief route operating between Chicago and Los Angeles. The Needles airport is located south of the City, approximately 7.2 miles from the project site (Google Maps 2018).

A 2013 traffic study conducted by the County of San Bernardino (Needles Highway Traffic Memorandum, 2013) determined that the segment of Needles Hwy where the proposed project is located is a current two-lane roadway that carries approximately 1,400 vehicles per day which has since decreased from a previous 2007 traffic count of approximately 2000 vehicle trips per day. Based on the 2012 RTP, the existing two-lane highway at the proposed project location has the carrying capacity of 6,000 vehicle trips per day. The proposed project will be contributing less than 20 vehicle trips per day which includes the projected amount of employee personnel and deliveries traveling to the site, which is considered a less than significant impact.

Analysis:

a) Finding: The project will not conflict with an applicable plan, ordinance, or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit. Impacts would be less than significant.

   Discussion: A traffic study conducted by the County of San Bernardino (Needles Highway Traffic Memorandum, 2013) determined that the segment of Needles Hwy where the proposed project is located is a current two-lane roadway that carries approximately 1,400 vehicles per day which has since decreased from a previous 2007 traffic count of approximately 2000 vehicle trips per day. Based on the 2012 RTP, the existing two-lane highway at the proposed project location has the carrying capacity of 6,000 vehicle trips per day. The proposed project will be

contributing less than 20 vehicle trips per day, which includes the projected amount of employee personnel and deliveries traveling to the site, which is considered a Less than Significant impact to the existing transportation system within the vicinity of the proposed project site.

b) Finding: The project will not conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways. Impacts would be considered less than significant.

Discussion: A traffic study conducted by the County of San Bernardino (Needles Highway Traffic Memorandum, 2013) determined that the segment of Needles Hwy where the proposed project is located is a current two-lane roadway that carries approximately 1,400 vehicles per day which has since decreased from a previous 2007 traffic count of approximately 2000 vehicles per day. Based on the 2012 RTP, the existing two-lane highway at the proposed project location has the carrying capacity of 6,000 vehicle trips per day. The proposed project will be contributing less than 20 vehicle trips per day along Needles Hwy where the proposed project is located. It is expected that the proposed project will not impact the congestion or traffic movement along Needles Hwy or neighboring roadways.

c) Finding: The project will not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. The project will have No Impact on air traffic patterns or air safety.

Discussion: The project will not result in any additional air traffic, either to the Needles Airport or to other regional airports. The distance of the project from the Needles Airport (approximately 7.2 miles), and the height of the buildings proposed (15 feet and 30 feet, respectively) will present no safety risk to flights departing from or landing at the Needles Airport.

d) Finding: The proposed project will not substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). Impacts would be considered less than significant.

Discussion: All structures built within the proposed project site will comply with International Building Codes.

e) Finding: The proposed project will not result in inadequate emergency access. No Impact.

Discussion: The proposed project is adjacent to Needles Hwy with adequate space and pathing for emergency access.

f) Finding: The proposed project will not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. No Impact.

Discussion: The proposed project is not in conflict with the adopted policies regarding public transit, bicycle, or pedestrian facilities—including but not limited to the Circulation and Transportation Plan adopted by the City of Needles in the 1986 General Plan. The proposed project is not anticipated to decrease the performance or safety of Needles Hwy or nearby transportation features or facilities.

Applicant Proposed Operation Restrictions: None.

Mitigation: None required.

17. TRIBAL CULTURAL RESOURCES

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant**	**No Impact**
Cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources Code §5020.1(k)?	☐	☐	☐	☒
Cause a substantial adverse change in the significance of a tribal cultural resource determined by the lead agency to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code §5024.1?	☐	☒	☐	☐

Setting:

According to the California Public Resources Code Section 21084, a project may have a significant effect on the environment if the project "may cause a substantial adverse change in the significance of an historical resource." Assembly Bill 52 (AB52) specifies that a project with the potential for adverse effects on tribal cultural resources may be considered a significant effect on the environment. The City of Needles, as the lead CEQA agency and as required by AB52, has consulted with the local Native American Tribes in the project area.

Tribes that are located regionally include the Fort Mojave Tribe, Colorado River Indian Tribe, Morongo Band of Mission Indians, Torres Martinez Desert Cahuilla Indians, and the Twenty-Nine Palms Band of Mission Indians.

The records search indicated that only one site of Native American origin is present within a two-mile buffer of the project site.

Analysis:

a) Finding: The project is unlikely to cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources Code §5020.1(k). No Impact is anticipated to tribal cultural resources.

   Discussion: Unless the City of Needles consultation with the appropriate Tribes indicates otherwise

b) Finding: The project is unlikely to cause a substantial adverse change in the significance of a tribal cultural resource determined by the lead agency to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code §5024.1. Impacts will be considered less than significant with incorporation of Mitigation Measure 17.1.

   Discussion: The City of Needles should require a tribal monitor at the project site during the construction phase. This has been added as a Mitigation Measure 17.1.

Applicant Proposed Operation Restrictions: None.

Mitigation:

Mitigation Measure 17.1: To minimize the potential for any adverse impacts to tribal cultural resources, the City of Needles requires a tribal cultural monitor to be on site during the ground-disturbance phases of the project. The applicant will coordinate the services of a tribal monitor with the Fort Mojave tribe.

18. UTILITIES AND SERVICE SYSTEMS

Would the project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
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?	☐	☐	☒	☐
Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

Setting:

The proposed facility will be served by water supplied by the City of Needles. The operational water needs are 2 to 3 acre-feet per year after the build-out of Phase 2. The City of Needles will need to provide a "will serve" letter to Micro Lab Farms for the amount of water requested by the operation as part of the local permitting process. The groundwater well the City uses for the water source has sufficient capacity to meet the needs of the proposed project as confirmed by email correspondence with a City representative.

The proposed facility will use a septic system and leach field that will be contained entirely on-site. A 1,000-gallon septic tank will be installed 6" below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4" diameter buried 3 feet below grade in a bed of gravel. The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter the septic system.

The proposed project will use electrical power supplied by the City of Needles Public Utility Authority. The need for power will be for A/C and cultivation low-watt LED lighting. The estimated power draw per structure is 220 kilowatts (kW). At full buildout, the total power draw is estimated at 660 kW.

Analysis:

a) Finding: The proposed project will not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board. With incorporation of operating restriction HWQ-1, impacts will be considered less than significant.

   Discussion: The proposed facility will use a septic system and leach field that will be contained entirely on-site. A 1,000-gallon septic tank will be installed 6" below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4" diameter buried 3 feet below grade in a bed of gravel. The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter the septic system.

b) Finding: The proposed project will not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. With incorporation of operating restriction HWQ-1, and impacts will be considered less than significant.

18. UTILITIES AND SERVICE SYSTEMS

Discussion: The City of Needles will need to provide a "will serve" letter regarding water and sewer systems and has confirmed that the facilities providing both services will not require any expansion in order to meet the needs of this project.

c) Finding: The proposed project will not require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. With incorporation of operating restriction HWQ-2 and implementation of Mitigation Measure 4.5, impacts will be considered less than significant.

Discussion: The proposed project, at 3.75 acres in size, is not anticipated to contribute toward any significant increase in capacity needs of stormwater drainage facilities. The proposed detention basin will accommodate flow onsite from rain events.

d) Finding: The project will have sufficient water supplies available to serve the project from existing entitlements and resources, and new or expanded entitlements are not needed. The proposed project will have a Less Than Significant Impact to water supplies available to serve the project from existing entitlements and resources.

Discussion: The City of Needles will need to provide a "will serve" letter to Fluid Holdings for the amount of water requested for the project. The groundwater well that the City utilizes as their municipal water source has sufficient capacity to meet the project's needs as confirmed via email correspondence with a City representative.

e) Finding: There is adequate capacity to serve the project's projected wastewater demand in addition to the provider's existing commitments. Impacts would be considered less than significant.

Discussion: The proposed facility will use a septic system and leach field that will be contained entirely on-site. A 1,000-gallon septic tank will be installed 6" below grade. The leach field will be approximately 450 square feet and have perforated effluent distribution pipes with 4" diameter buried 3 feet below grade in a bed of gravel. The leach field will be no longer than 100-feet long. Because the cultivation system used by the facility will be self-contained, no wastewater from this process will enter the septic system.

f) Finding: The proposed project will not be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs. Impacts would be considered less than significant.

Discussion: The proposed project is not anticipated to generate significant non-compostable or non-recyclable solid waste. Assuming regional growth in waste generation of 3 percent per year, the nearest landfill identified as a disposal area for solid waste for the project has adequate capacity until 2051.

g) Finding: The proposed project will not violate any federal, state, and local statutes and regulations related to solid waste. Impacts would be considered less than significant.

Discussion: The project is not anticipated to generate any hazardous waste or a significant amount of compostable or non-compostable waste. All wastes generated will be disposed of at appropriate facilities with adequate capacity to handle the waste.

Applicant Proposed Operation Restrictions:

Same as proposed restriction HWQ-1 and HWQ-2.

Mitigation:

Same as proposed Mitigation Measure 4.4

19. MANDATORY FINDINGS OF SIGNIFICANCE

Would:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
The project will not have the potential to 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.	☐	☒	☐	☐
The project will not have impacts that are individually limited, but cumulatively considerable when viewed in connection with the effects of past projects, the effects of other current project, and the effects of probable future projects?	☐	☒	☐	☐
The project is not of a type or located in an area that will cause substantial adverse effects on human beings?	☐	☒	☐	☐

Setting:

The proposed project is located in an urban setting in the City of Needles and consists of the development of three small commercial structures in two phases for indoor cannabis cultivation. The estimated annual water requirement for operations is between 2 and 3 acre-feet, although this is highly dependent on the facility operator and is an upper-end estimate.

After performing record searches from CNDDB/USFWS/LCR MSHCP, it was determined that 3 plant species and 36 animal species have the potential for occurrence within a 5-mile radius of the propose project site. After further research and focused surveys, no special status plants or animals are expected to be impacted by the implementation of the proposed project.

As previously described, a records search and a field survey was conducted to analyze cultural resources within the vicinity of the proposed project. No cultural resources were identified on the parcel, but the research still recommended measures as appropriate precautions against adversely impacting tribal or historic resources.

Analysis:

a) Finding: The project does not have the potential to 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.

   Discussion: As previously described in the Biological Resources section of this document, the project is highly unlikely to impact a plant or wildlife population and will not have an adverse effect on habitat for fish or wildlife. However, mitigation measures have been added to ensure impacts to wildlife remain less than significant.

   The records search did not reveal any existing recorded sites within the project site, nor did the field survey discover any cultural resources. Research indicated appropriate mitigation measures in case human remains are unearthed during construction activities. With these mitigation measures in place, the project will have a Less than Significant Impact in regard to its potential to degrade biological or cultural resources.

b) Finding: The project will not have impacts that are individually limited, but cumulatively considerable when viewed in connection with the effects of past projects, the effects of other current project, and the effects of probable future projects.

   Discussion: Previous sections describe project impacts to Biological Resources, Hydrology and Water Quality, Noise, and Tribal Cultural Resources and provide mitigation measures that reduce these impacts to Less than Significant levels. However, the proposed project must be considered along with other past projects and reasonably

foreseeable future projects that may cumulatively result in a significant impact to the environment.

The effects of this project in relation to other cannabis cultivation projects within the City of Needles includes an increased demand on the local electrical transmission infrastructure. Upwards of fifty cannabis cultivation operations have been permitted or are proposed within the City of Needles. As of early 2018, the City increased their electrical allocation from 35 megawatts (MW) to 60 MW to provide over 40 MW of additional power for new development. The City electrical utility obtains their electricity from the Western Area Power Administration (WAPA). The effect of this increase in allocation on WAPA's generation is unknown, but the WAPA has also indicated that they would be able to supply upwards of 100 MW to the City of Needles if a formerly used Nevada Power line is rehabilitated (Needles Desert Star 2017), which points to transmission as the major limiting factor and not generation of electricity. It is assumed that no additional generation will need to be installed to meet the demands of this project or other past and reasonably foreseeable projects that can be cumulatively analyzed. Therefore, the cumulative impact on electrical utilities is considered Less than Significant.

Likewise, a cumulative effect of the project along with other cannabis cultivation operations within the City of Needles is an increased water demand on the municipal supply. The City has indicated via email correspondence that they are able to meet the demand of this project and other projects without taxing the current water system. The City has not yet determined whether the total projected water demand for other cannabis cultivation projects can be met by the current water source. The cumulative impact to Hydrology and Water Quality and Utilities and Service Systems are considered Less than Significant.

The project along with other cultivation operations in the City of Needles all have the potential to impact air quality in the area. The construction impacts from the proposed project are temporary, and with the proposed operating restrictions, the impacts are considered less than significant. These impacts are no different than any other light commercial construction. Operational air quality impacts must be considered as well. All projects within the City must comply with Ordinance 594-AC in terms of potential for odor nuisance. Each project will therefore be required to utilize the same general form of ventilation filtration employed by this project. Thus, odor impacts from all projects will be properly mitigated, and the impact as a whole will be considered Less than Significant.

The project does not present a significant risk to cultural resources, and it is unnecessary to consider the project along with other projects in the area, as any effects of this project will be isolated to the limited ground disturbance at the urban project site.

The noise impacts of the proposed project will be mitigated to a level of less than 65 dBA at the property line, which is consistent with residential standards. There are no other projects proposed in the immediate project vicinity. Cumulative noise impacts are considered Less than Significant with incorporation of the mitigation measures listed in the Noise section above.

There will be No Impact to Agricultural and Forestry, Geology and Soils, Greenhouse Gases, Land Use, Mineral Resources, Recreation, Population and Housing, and Transportation and Traffic. Therefore, it will not add to any impacts that may be cumulatively considerable.

Therefore, based on this analysis, the project will not result in any impacts that are individually limited but cumulatively considerable.

c) Finding: The proposed project is not of a type or located in an area that will cause substantial adverse effects on human beings.

Discussion: Based on all of the previous analysis and findings, it can be found that the proposed project is not located in an area and will not cause a substantial adverse effect on human beings with mitigation incorporated. The impact will be Less than Significant.

Mitigation:

All of the following mitigation measures shall apply.

Mitigation Measure 4.1: A focused plant survey will be conducted prior to construction during the appropriate growing season to identify any special-status desert dwelling plants that have the potential for occurring on the proposed project site.

Mitigation Measure 4.2: If work must be completed during the nesting bird season (February 15–August 31), then a pre-construction survey must be completed by a qualified biologist to survey for active bird nests on the project site within the project footprint and in a 300-foot buffer (500-foot buffer for raptor species) surrounding the project. This survey must occur no more than seven days prior to when construction begins. If nests are discovered, a qualified biologist shall establish a species appropriate buffer around the nest that shall remain in place until the nest is determined by a qualified biologist to be inactive.

Mitigation Measure 4.3: A qualified biologist shall survey for desert tortoise prior to construction. In the event an individual is found, the qualified biologist shall capture and relocate to a designated area approved by USFWS and CDFW.

Mitigation Measure 4.4: A qualified biologist shall survey for burrowing owl prior to construction. In the event an occupied burrow is found and removal is unavoidable, passive relocation methods are to be used by the qualified biologist to move the owls out of the impact zone. This includes covering or excavating all burrows and installing one-way doors into occupied burrows. This will allow any animals inside to leave the burrow, but will exclude any animals from re-entering the burrow. A period of one week is required after the relocation effort to allow the birds to leave the impacted area before excavation of the burrow can begin. The burrows should then be excavated by hand and filled in to prevent their reuse. The removal of active burrows on site requires construction of new burrows or the enhancement of existing unsuitable burrows at least one week prior to passive relocation efforts.

Mitigation Measure 4.5: To offset the resulting impacts to drainages within the proposed project site, there will be the creation of a detention basin onsite that is equivalent in size to the impacted areas. The detention basin will contain native vegetation found in the impacted drainages. As additional mitigation, land will be purchased offsite in nearby locations that contain drainages of equal value and will be preserved in perpetuity.

Mitigation Measure 5.1: Section 7050.5 of the California Health and Safety Code states that it is a misdemeanor to knowingly disturb human remains. If human remains are encountered, work should halt in the vicinity and the County Coroner and local Native American Tribes should be notified. At the same time, an archaeologist should be contacted to evaluate the situation. If the remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of identification.

Mitigation Measure 12.1: The applicant shall acknowledge that the noise generated by operation of the proposed project must not exceed 65 dBA at the exterior side of any adjacent residences or result in an increase of more than 5 dBA in ambient noise if ambient noise is over 65 dBA Ldn.

Mitigation Measure 12.2: The following shall apply to construction noise from tools and equipment:

- The operation of tools or equipment used in construction, drilling, repair, alteration, or demolition shall be limited to between the hours of 8: 00 a.m. and 6:00 p.m. Monday through Friday. The applicant is requesting work to be allowed between 8:00 a.m. and 6:00 p.m. on Saturdays.
- No heavy equipment related construction activities shall be allowed on Sundays or holidays.
- All stationary and construction equipment shall be maintained in good working order and fitted with factory-approved muffler systems.

Mitigation Measure 17.1: To minimize the potential for any adverse impacts to tribal cultural resources, the City of Needles requires a tribal cultural monitor to be on site during the ground-disturbance phases of the project. The applicant will coordinate the services of a tribal monitor with the Fort Mojave tribe.

20. DISCUSSION OF MITIGATION MEASURES and Applicant Proposed Restrictions

The City of Needles found that the project could result in potentially significant adverse impacts unless mitigation measures are required. A list of Mitigation that addresses and mitigates potentially significant adverse impacts to a level of non-significance follows.

Mitigation:

Mitigation Measure 4.1 (Biological Resources): A focused plant survey will be conducted prior to construction during the appropriate growing season to identify any special-status desert dwelling plants that have the potential for occurring on the proposed project site.

Mitigation Measure 4.2: If work must be completed during the nesting bird season (February 15–August 31), then a pre-construction survey must be completed by a qualified biologist to survey for active bird nests on the project site within the project footprint and in a 300-foot buffer (500-foot buffer for raptor species) surrounding the project. This survey must occur no more than seven days prior to when construction begins. If nests are discovered, a qualified biologist shall establish a species appropriate buffer around the nest that shall remain in place until the nest is determined by a qualified biologist to be inactive.

Mitigation Measure 4.3: A qualified biologist shall survey for desert tortoise prior to construction. In the event an individual is found, the qualified biologist shall capture and relocate to a designated area approved by USFWS and CDFW.

Mitigation Measure 4.4: A qualified biologist shall survey for burrowing owl prior to construction. In the event an occupied burrow is found and removal is unavoidable, passive relocation methods are to be used by the qualified biologist to move the owls out of the impact zone. This includes covering or excavating all burrows and installing one-way doors into occupied burrows. This will allow any animals inside to leave the burrow, but will exclude any animals from re-entering the burrow. A period of one week is required after the relocation effort to allow the birds to leave the impacted area before excavation of the burrow can begin. The burrows should then be excavated by hand and filled in to prevent their reuse. The removal of active burrows on site requires construction of new burrows or the enhancement of existing unsuitable burrows at least one week prior to passive relocation efforts.

Mitigation Measure 4.5: To offset the resulting impacts to drainages within the proposed project site, there will be the creation of a detention basin onsite that is equivalent in size to the impacted areas. The detention basin will contain native vegetation found in the impacted drainages. As additional mitigation, land will be purchased offsite in nearby locations that contain drainages of equal value and will be preserved in perpetuity.

Mitigation Measure 5.1 (Cultural Resources): Section 7050.5 of the California Health and Safety Code states that it is a misdemeanor to knowingly disturb human remains. If human remains are encountered, work should halt in the vicinity and the County Coroner and local Native American Tribes should be notified. At the same time, an archaeologist should be contacted to evaluate the situation. If the remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of identification.

Mitigation Measure 12.1: The applicant shall acknowledge that the noise generated by operation of the proposed project must not exceed 65 dBA at the exterior side of any adjacent residences or result in an increase of more than 5 dBA in ambient noise if ambient noise is over 65 dBA Ldn.

Mitigation Measure 12.2: The following shall apply to construction noise from tools and equipment:

- The operation of tools or equipment used in construction, drilling, repair, alteration, or demolition shall be limited to between the hours of 8: 00 a.m. and 6:00 p.m. Monday through Friday. The applicant is requesting work to be allowed between 8:00 a.m. and 6:00 p.m. on Saturdays.
- No heavy equipment related construction activities shall be allowed on Sundays or holidays.
- All stationary and construction equipment shall be maintained in good working order and fitted with factory-approved muffler systems.

Mitigation Measure 17.1 (Tribal Cultural Resources): To minimize the potential for any adverse impacts to tribal

cultural resources, the City of Needles requires a tribal cultural monitor to be on site during the ground-disturbance phases of the project. The applicant will coordinate the services of a tribal monitor with the Fort Mojave tribe.

Applicant proposed operating restrictions:

AES-1: The project will manage its lighting as prescribed in City of Needles Ordinance 594-AC and amended Chapter 12A of the Needles Municipal Code, in compliance with the City's lighting standards regarding fixture type, wattage, illumination levels, and shielding. The indoor grow lighting system will also be shielded to confine light and glare to the interior of the proposed structure. The landscaping and planting plan will include the planting of desert-appropriate and native vegetation such as palm trees and native desert cacti, consistent with the visual context of the area.

AES-2: The proposed buildings will not exceed 30 feet in height.

AQ-1: During short-term construction activities, the following dust control measures will be implemented to reduce nuisance dust generation:

- All exposed surfaces (e.g. parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered twice daily for dust suppression when construction activities are occurring on-site.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All standing soil, sand, or other loose material left on-site shall be covered and secured.
- Adjacent public roads shall be kept clean of loose dirt tracked onto the roadways from the construction-site.
- All vehicle speeds shall be limited to 5 miles per hour.

AQ-2: All cultivation and processing structures shall be designed and maintained per manufacturer recommendations with a ventilation and air filtration system containing activated carbon filters, such as Phresh Filters, to ensure odors generated by the proposed facility are not a nuisance.

GS-1: During short-term construction activities, all exposed surfaces (e.g. parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered twice daily for soil retention and dust suppression when construction activities are occurring on-site.

HHM-1: MSDS shall be provided to the City of Needles for all potentially hazardous materials used in the operation in the event that emergency responders may require them.

HWQ-1: Cleanouts will be installed which will allow cultivation effluent testing for both water sent to the city sewer and water sent to landscaping, and cultivation effluent testing will occur on a regular schedule.

HWQ-2: Drainage swales will be installed on hard surfaces to facilitate flow into a detention basin. Surface water runoff will be diverted towards the detention basin which has sufficient capacity for ordinary rain events. In the event capacity is reached, there will be an outflow across the highway via an Arizona crossing into an adjacent unnamed wash. There will be no substantial additional sources of polluted runoff.

HWQ-3: The project is required to comply with all sections of Titles 22 and 17 of the California Code of Regulations as applicable ("Regulations that Apply to Recycled Water"), including, but not limited to, type of backflow prevention required; proper installation of backflow prevention; testing and maintenance of backflow prevention; source specifications for recycled water; use area requirements for recycled water, including signage; and restrictions on dual plumbed systems. In addition, the sewage disposal and recycled water systems are subject to all local codes, including securing and conforming with the terms of any permits required by the City of Needles, San Bernardino County, or the Colorado River Water Quality Control Board.

PS-1: The project will be subject to a robust security plan, which includes a provision that the facility will be secured by locked gates where only employees and the facility operator have access codes. There will be security cameras on

each exterior corner of each building. Some cameras will be motion activated and will turn on exterior lights if movement is detected. There will be interior security cameras in each of the main spaces.

PS-2: There will be a first aid kit on the project site and a list of emergency contacts in each building, and employees will be trained in proper safety protocols.

21. EARLIER ANALYSES.

Earlier analysis may be used where, pursuant to the tiering, program Environmental Impact Report (EIR), or other CEQA process, one or more effects have been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case a discussion should identify the following on attached sheets:

No earlier analyses were used.

SOURCE/REFERENCE LIST

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MITIGATION MONITORING AND REPORTING PLAN:

Mitigation Measure 4.1 (Biological Resources): A focused plant survey will be conducted prior to construction during the appropriate growing season to identify any special-status desert dwelling plants that have the potential for occurring on the proposed project site.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
Prior to construction activities	Each time prior to construction activities for each phase during appropriate growing season		City of Needles		

Mitigation Measure 4.2 If work must be completed during the nesting bird season (February 15– August 31), then a pre-construction survey should be completed by a qualified biologist to survey for active bird nests on the project site within the project footprint and in a 300-foot buffer (500-foot buffer for raptor species) surrounding the project. This survey must occur no more than seven days prior to when construction begins. If nests are discovered, a qualified biologist shall establish a species appropriate buffer around the nest that shall remain in place until the nest is determined by a qualified biologist to be inactive.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
Prior to construction activities	Each time prior to construction activities for each phase, if construction starts during nesting bird season		City of Needles		

Mitigation Measure 4.3: A qualified biologist shall survey for desert tortoise prior to construction. In the event an individual is found, the qualified biologist shall capture and relocate to a designated area approved by USFWS and CDFW.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
Prior to construction activities	Each time prior to construction activities for each phase, if construction starts during nesting bird season		City of Needles		

Mitigation Measure 4.4: A qualified biologist shall survey for burrowing owl prior to construction. In the event an occupied burrow is found and removal is unavoidable, passive relocation methods are to be used by the qualified biologist to move the owls out of the impact zone. This includes covering or excavating all burrows and installing one-way doors into occupied burrows. This will allow any animals inside to leave the burrow, but will exclude any animals from re-entering the burrow. A period of one week is required after the relocation effort to allow the birds to leave the impacted area before excavation of the burrow can begin. The burrows should then be excavated by hand and filled in to prevent their reuse. The removal of active burrows on site requires construction of new burrows or the enhancement of existing unsuitable burrows at least one week prior to passive relocation efforts.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
Prior to construction	Each time prior to		City of Needles		

activities	construction activities for each phase, if construction starts during nesting bird season				

Mitigation Measure 4.5: To offset the resulting impacts to drainages within the proposed project site, there will be the creation of a detention basin onsite that is equivalent in size to the impacted areas. The detention basin will contain native vegetation found in the impacted drainages. As additional mitigation, land will be purchased offsite in nearby locations that contain drainages of equal value and will be preserved in perpetuity.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
During construction activity.	Continuous during construction		City of Needles		

Mitigation Measure 5.1 (Cultural Resources): Section 7050.5 of the California Health and Safety Code states that it is a misdemeanor to knowingly disturb human remains. If human remains are encountered, work should halt in the vicinity, and the County Coroner and local Native American Tribes should be notified. At the same time, an archaeologist should be contacted to evaluate the situation. If the remains are of Native American origin the Coroner must notify the Native American Heritage Commission within 24 hours of identification.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
During construction activity.	Continuous during construction		City of Needles		

Mitigation Measure 12.1: The applicant shall acknowledge that the noise generated by operation of the proposed project must not exceed 65 dBA at the exterior side of any adjacent residences or result in an increase of more than 5 dBA in ambient noise if ambient noise is over 65 dBA Ldn.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
During construction activity.	Continuous during construction		City of Needles		

Mitigation Measure 12.2: The following shall apply to construction noise from tools and equipment:

- The operation of tools or equipment used in construction, drilling, repair, alteration, or demolition shall be limited to between the hours of 8: 00 a.m. and 6:00 p.m. Monday through Friday. The applicant is requesting work to be allowed between 8:00 a.m. and 6:00 p.m. on Saturdays.
- No heavy equipment related construction activities shall be allowed on Sundays or holidays.
- All stationary and construction equipment shall be maintained in good working order and fitted with factory- approved muffler systems.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
During construction activity.	Continuous during construction		City of Needles		

Mitigation Measure 17.1 (Tribal Cultural Resources): To minimize the potential for any adverse impacts to tribal cultural resources, the City of Needles requires a tribal cultural monitor to be on site during the ground-

disturbance phases of the project. The applicant will coordinate the services of a tribal monitor with the Fort Mojave tribe.

Implementation Time Frame	Monitoring Frequency	Date Verified	To Be Verified By	Compliance Yes | No	Comments / Action Taken
During construction activity.	Continuously during construction		City of Needles		

APPENDIX A

Project Area Maps

0 1 2 3 4 Miles

LEGEND

Project Site

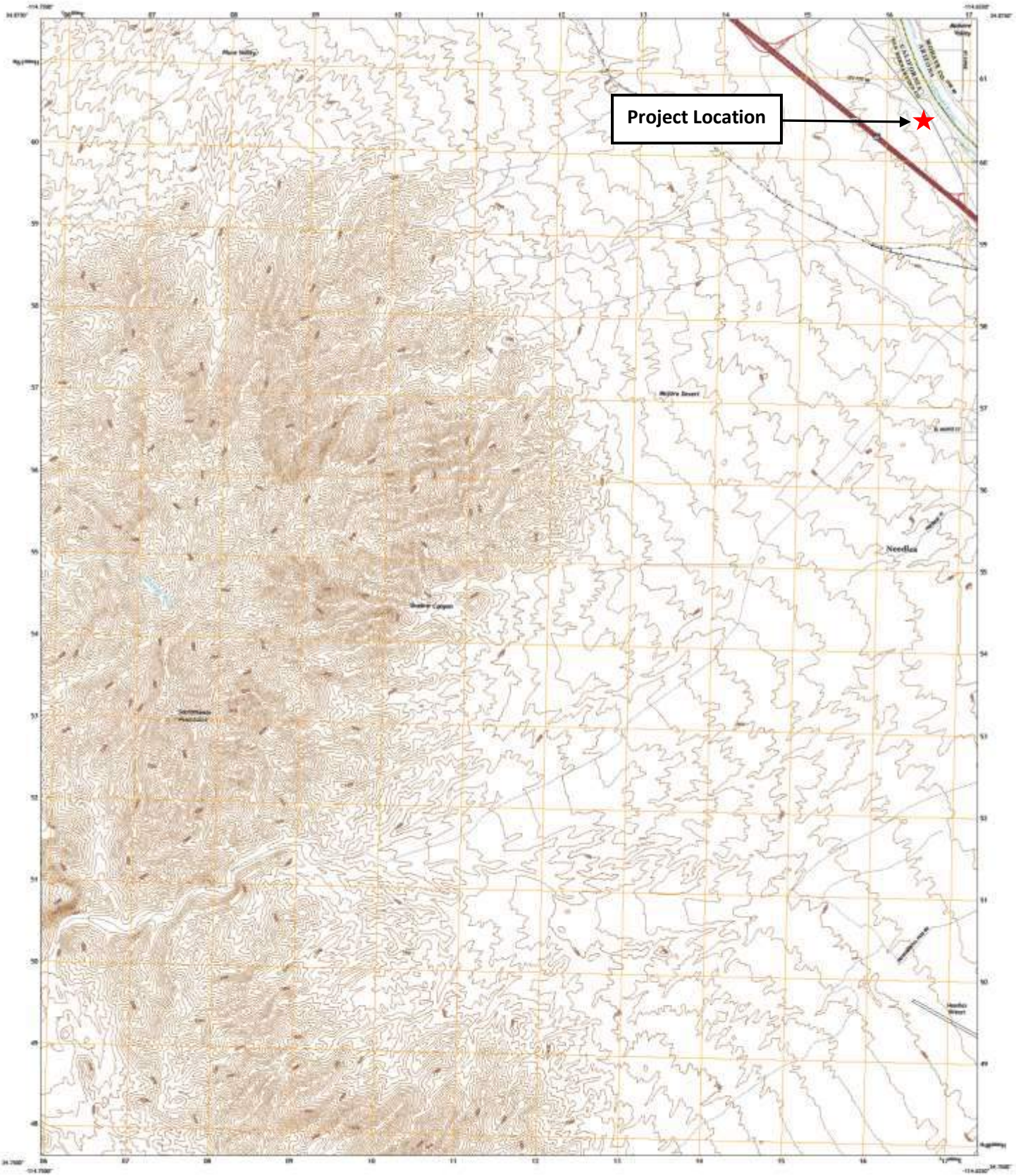
FIGURE 1
Project Location

Pacific BioScience, Inc.

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

US Topo

NEEDLES SW QUADRANGLE
CALIFORNIA - ARIZONA
7.5-MINUTE SERIES



Produced by the United States Geological Survey

SCALE 1:24 000

ROAD CLASSIFICATION

NEEDLES SW, CA, AZ
2018

0 50 100 200 Feet

Pacific BioScience, Inc.

LEGEND

Project Limits

Project Site

FIGURE 2
Project Limits

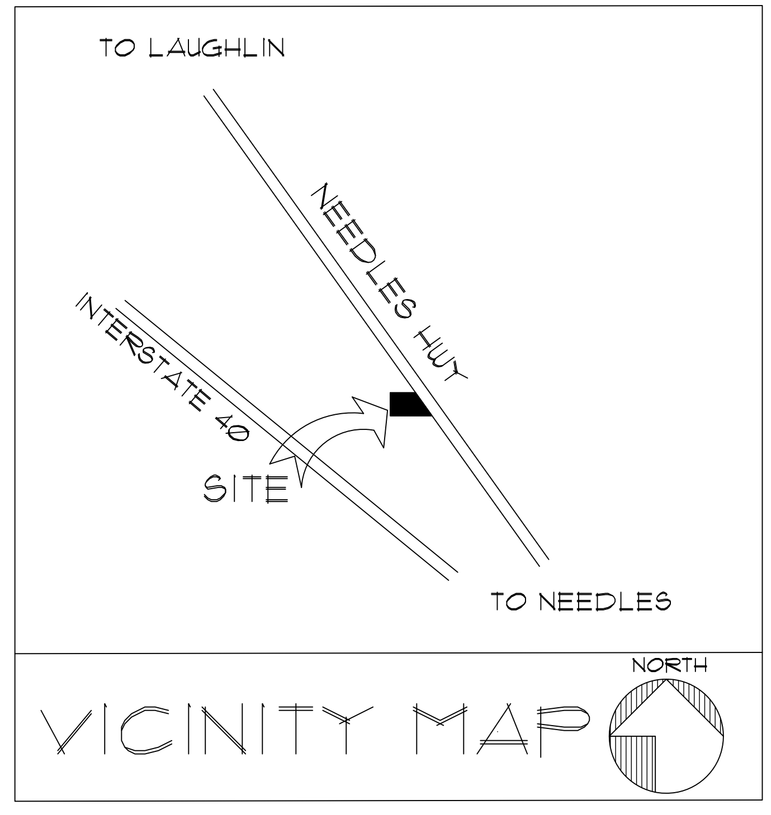
APPENDIX B

Project Site Plans

OFFICE , WAREHOUSE AND METAL BARN STRUCTURE FOR:

FLUID, LLC

SHEET INDEX



VICINITY MAP

OWNER:	LAURA POLING 9910VANDERBILT AVE CLAREMONT, CA
PROPERTY ADDRESS:	3353 NEEDLES HWY NEEDLES, CA
PLAN PREPARER:	TINA FOBEL 1097 DESERT MARIGOLD CIRCLE BULLHEAD CITY, AZ 928-404-2013
LEGAL	PARCEL MAP 6626 PARCEL 1

PARCEL NO:	0660-101-32-0000
PARCEL SIZE:	3.44 ACRE
ZONING:	-
OCCUPANCY:	B-BUSINESS OFFICE F1- FACTORY
OCC. LOAD:	BUSINESSE PER TABLE 1004.1.2 = 100 GROSS WAREHOUSE PER TABLE 1004.1.2 = 500 GROSS
LAND USE:	-
EMPLOYEES:	SEE SHEET 1 OF CIVIL PLANS FOR
PARKING:	PARKING REQUIREMENTS TOTAL SPACES = 18 + 4 HDCP = 22
SOURCE OF ELEVATIONS:	SEE ENGINEER'S PLANS
CONSTRUCTION TYPE:	TYPE V-B WITH FIRE SPRINKLERS
BLDG HT.:	±22' (45' MAX)

PLANS TO CONFORM TO 2012 IRC, IMC
UPC, 2011 NEC AND 2006 IECC, CALIF PROVISIONS TITLE 24

UTILITY LEGEND

ELECTRICAL:	NPUCA
WATER:	NPUCA
TRASH:	REPUBLIC
GAS:	SOUTHWEST GAS
FIRE DISTRICT:	SB COUNTY FIRE
TELEPHONE:	FRONTIER
SEWER:	NPUCA

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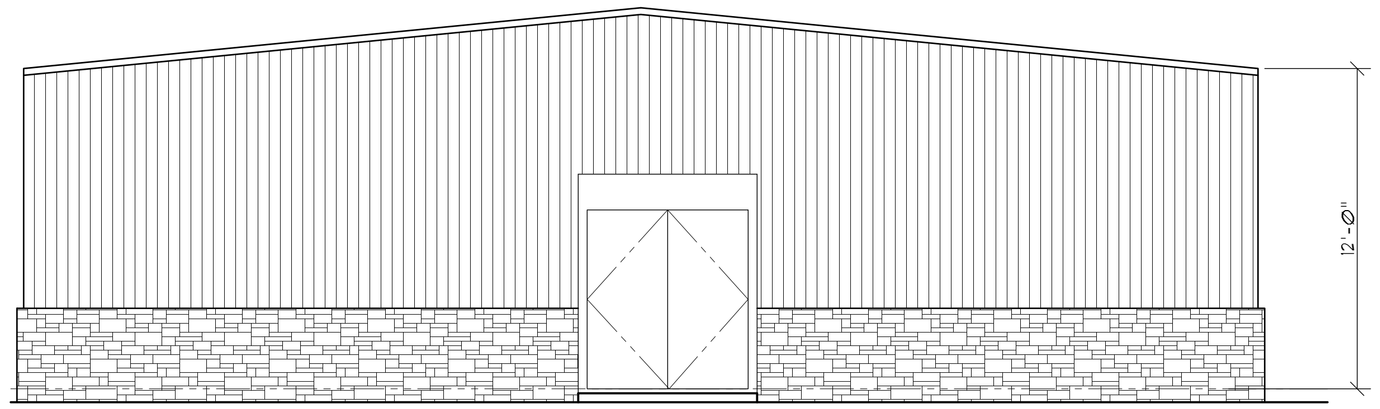
Fax: (928) 855-4030
5960 Highway 95 Ste. B
Fort Mohave, AZ 86426
(928) 768-7088
Fax: (928) 768-7088

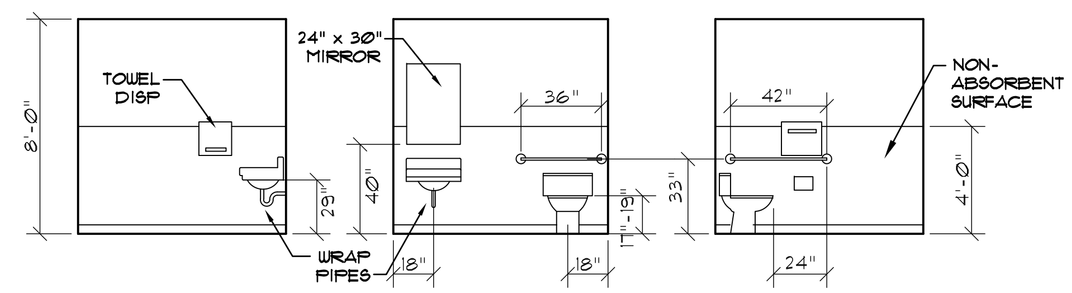
A OFFICE BUILDING FOR:
3353 NEEDLES HIGHWAY
FLUID, LLC
NEEDLES, CA
TITLE SHEET

Date 6-12-18
Scale NO SCALE
Drawn T. FOBEL
Job -
Sheet T1
Of - Sheets

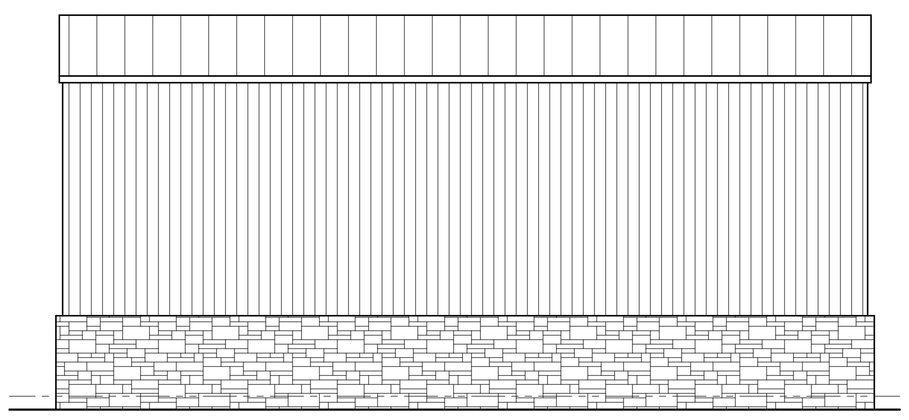
INSULATION INSTALLATION		
	R-VALUE MINIMUM	R-VALUE
WALLS	R-13	R-19
FLOORS	R-19	-
CEILINGS	R-30	R-50
SLABS	N/A	-
CRAWL SPACE WALLS	R-5/R-13	-
SUPPLY AND RETURN DUCTS	R-8	R-8
DUCTS IN FLOOR TRUSSES	R-6	R-6
FENESTRATION WINDOWS, DOORS & SKYLIGHTS	.65	.65 MAX.
GLAZED FENESTRATION WINDOWS, GLAZED DOORS & SKYLTS	.40	.40 MAX.



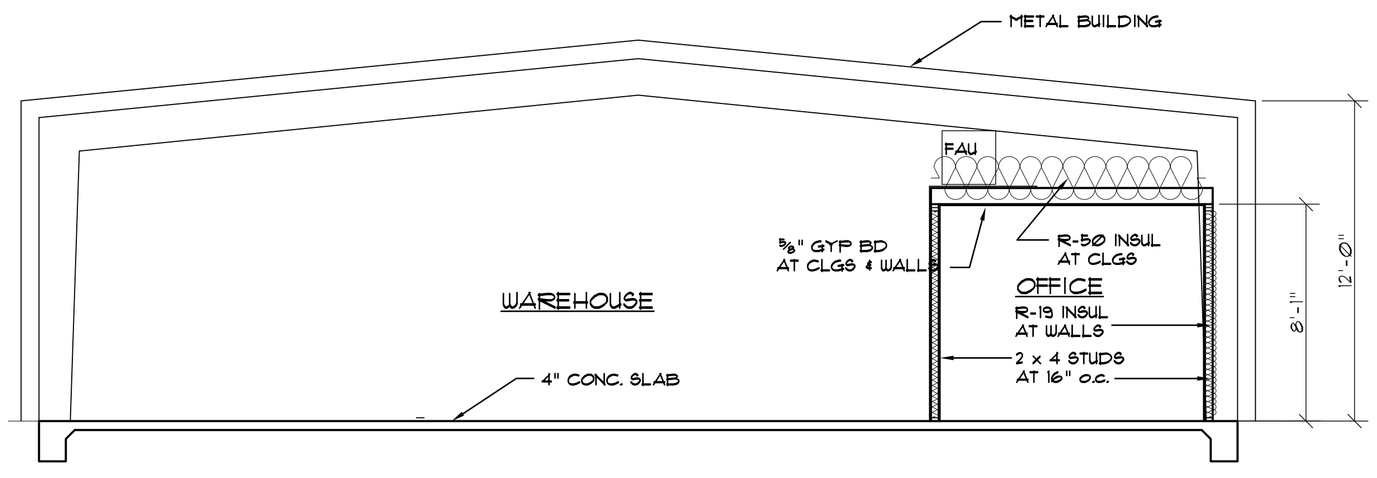
EAST - WEST ELEVATION



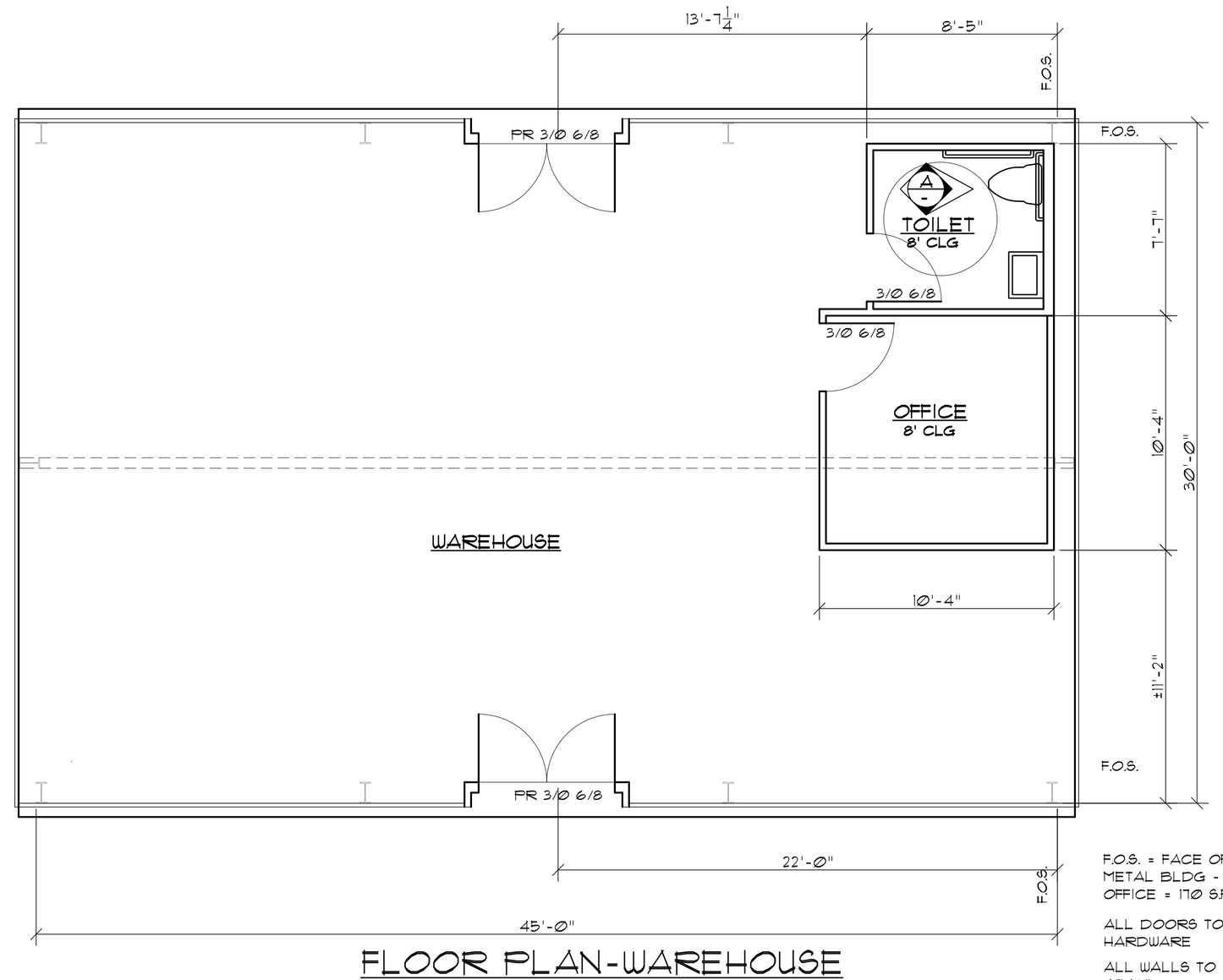
A TYPICAL TOILET ROOM LAYOUT
ALL FIXTURES TO MEET ADA REQUIREMENTS



NORTH - SOUTH ELEVATION



TYPICAL SECTION



FLOOR PLAN-WAREHOUSE

F.O.S. = FACE OF STEEL
METAL BLDG - 1,350 S.F.
OFFICE = 110 S.F.

ALL DOORS TO HAVE ADA HARDWARE

ALL WALLS TO BE 2 x 4 STUDS AT 16" o.c.

REVISIONS

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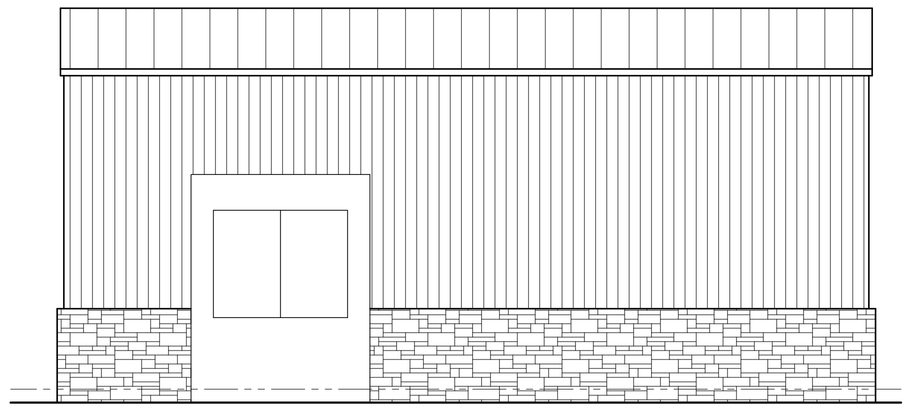
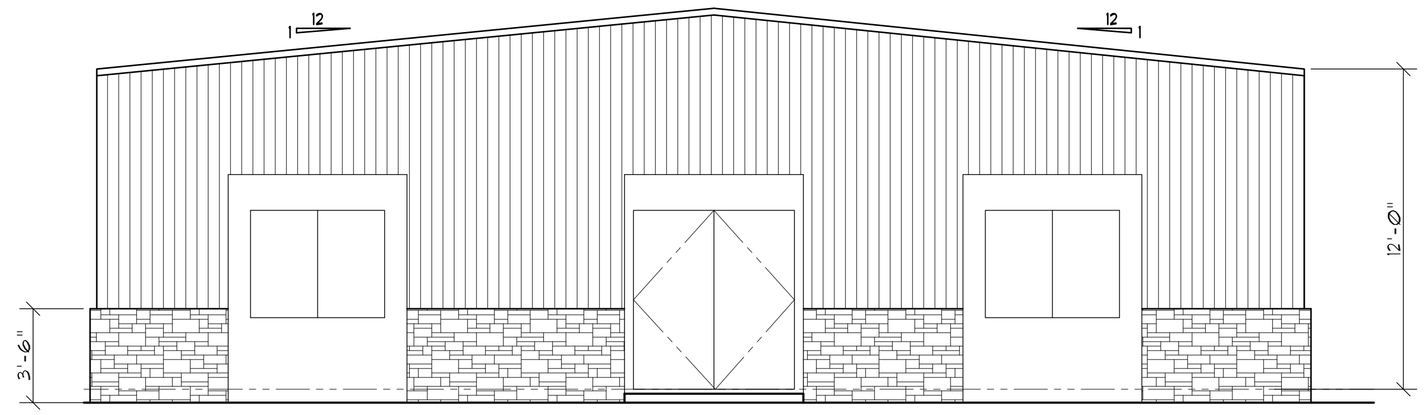
A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA

FLOOR PLAN & FRAMING PLAN - BLDG A

Date	6-12-18
Scale	1/4" = 1'-0"
Drawn	T. FOBEL
Job	-
Sheet	A2
Of	- Sheets



NORTH ELEVATION



EAST ELEVATION

INSULATION INSTALLATION		
	R-VALUE MINIMUM	R-VALUE
WALLS	R-13	R-19
FLOORS	R-19	-
CEILINGS	R-30	R-50
SLABS	N/A	-
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SUPPLY AND RETURN DUCTS	R-8	R-8
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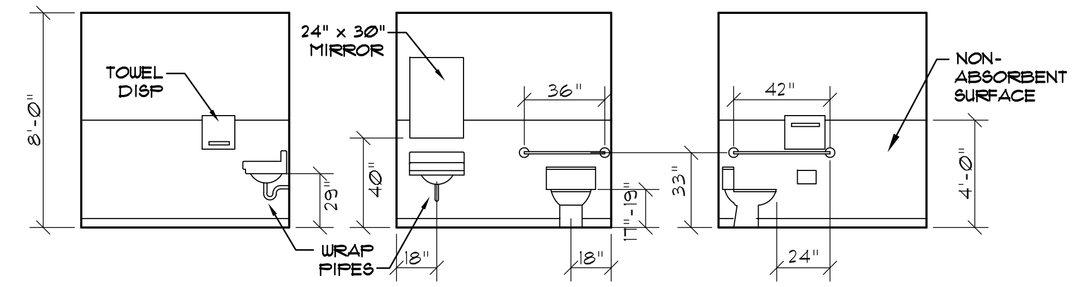

A TYPICAL TOILET ROOM LAYOUT
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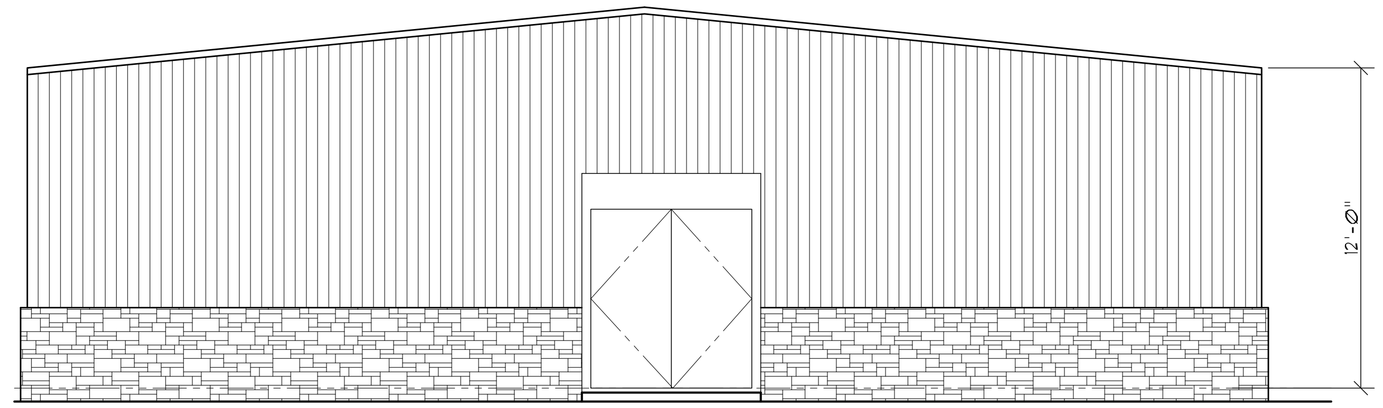
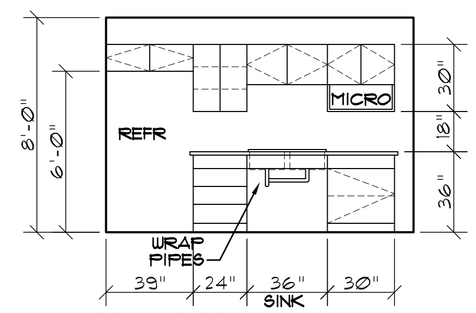
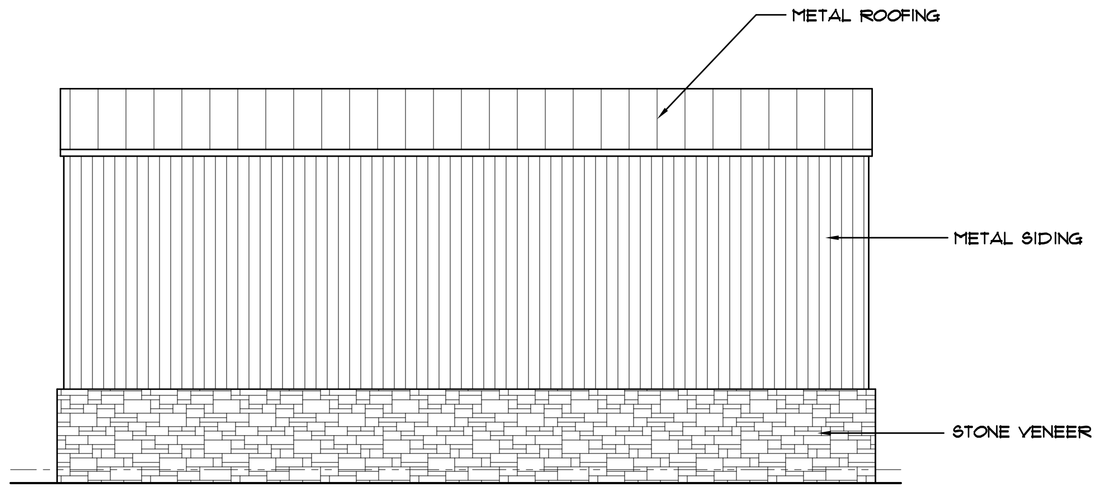


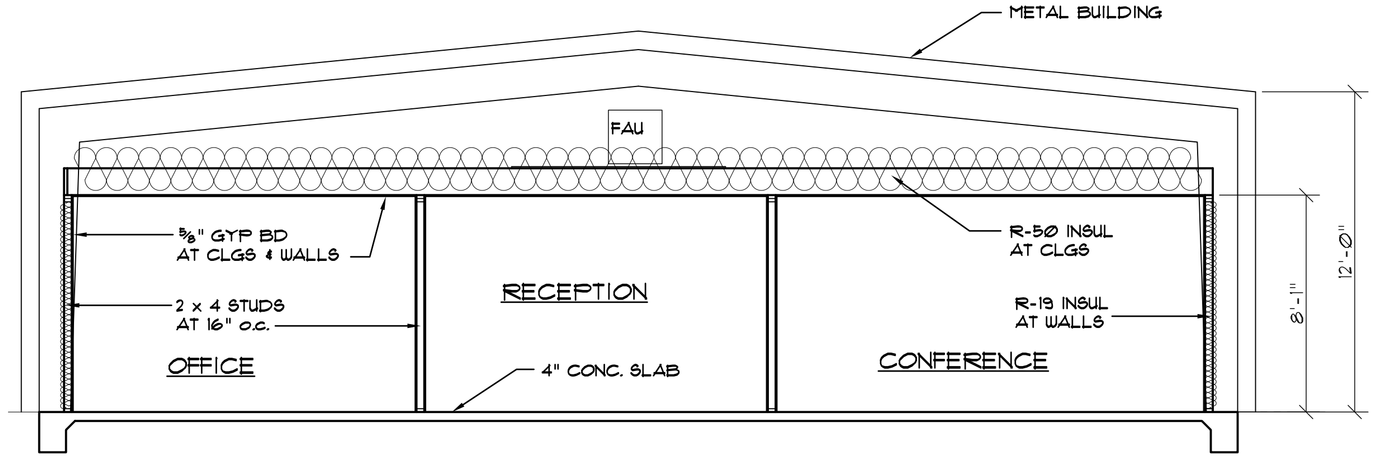
WEST ELEVATION



B BREAK ROOM



SOUTH ELEVATION



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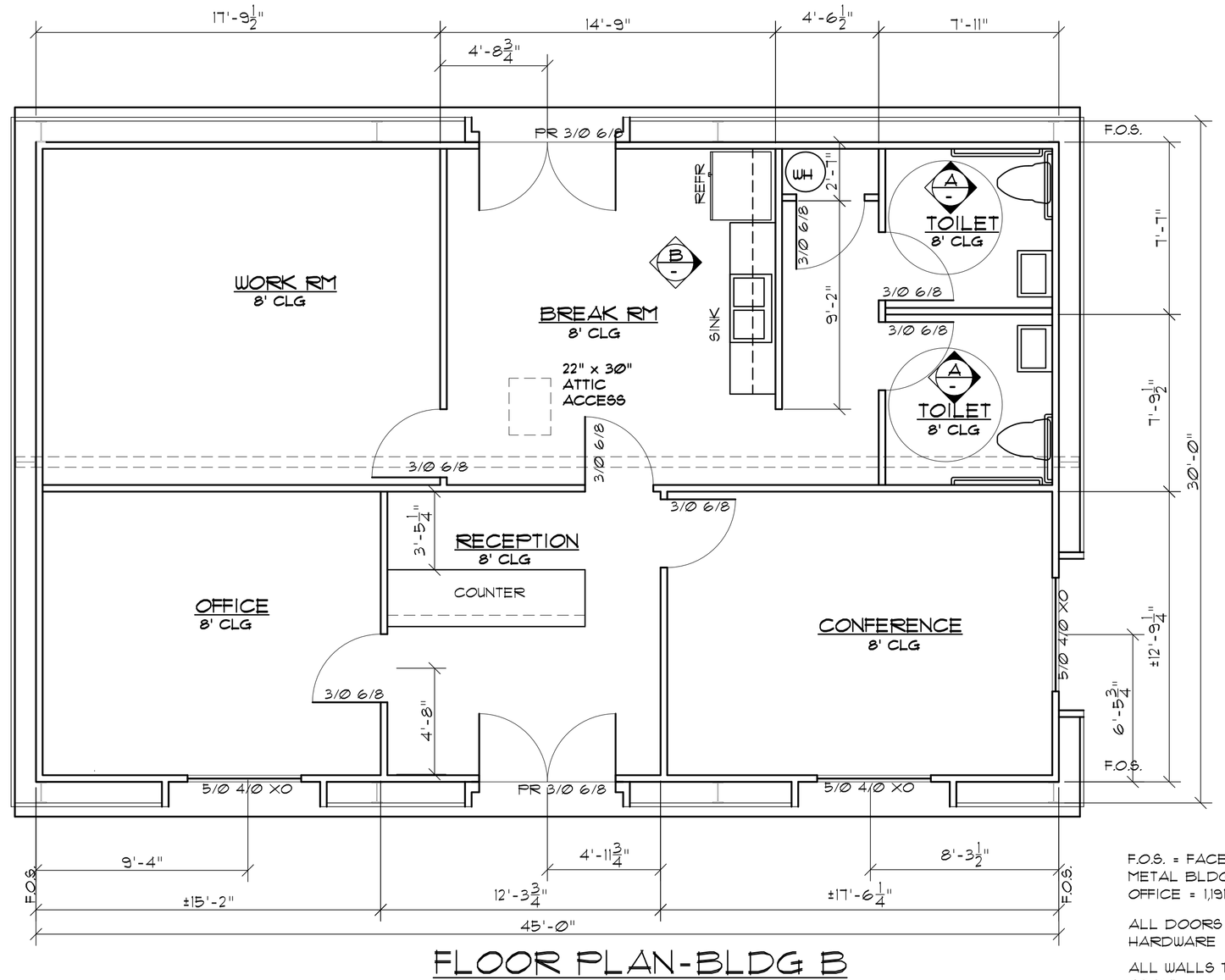

FLOOR PLAN-BLDG B

F.O.S. = FACE OF STEEL
METAL BLDG - 1,350 S.F.
OFFICE = 1,191 S.F.

ALL DOORS TO HAVE ADA HARDWARE

ALL WALLS TO BE 2 x 6 STUDS AT 16" o.c.

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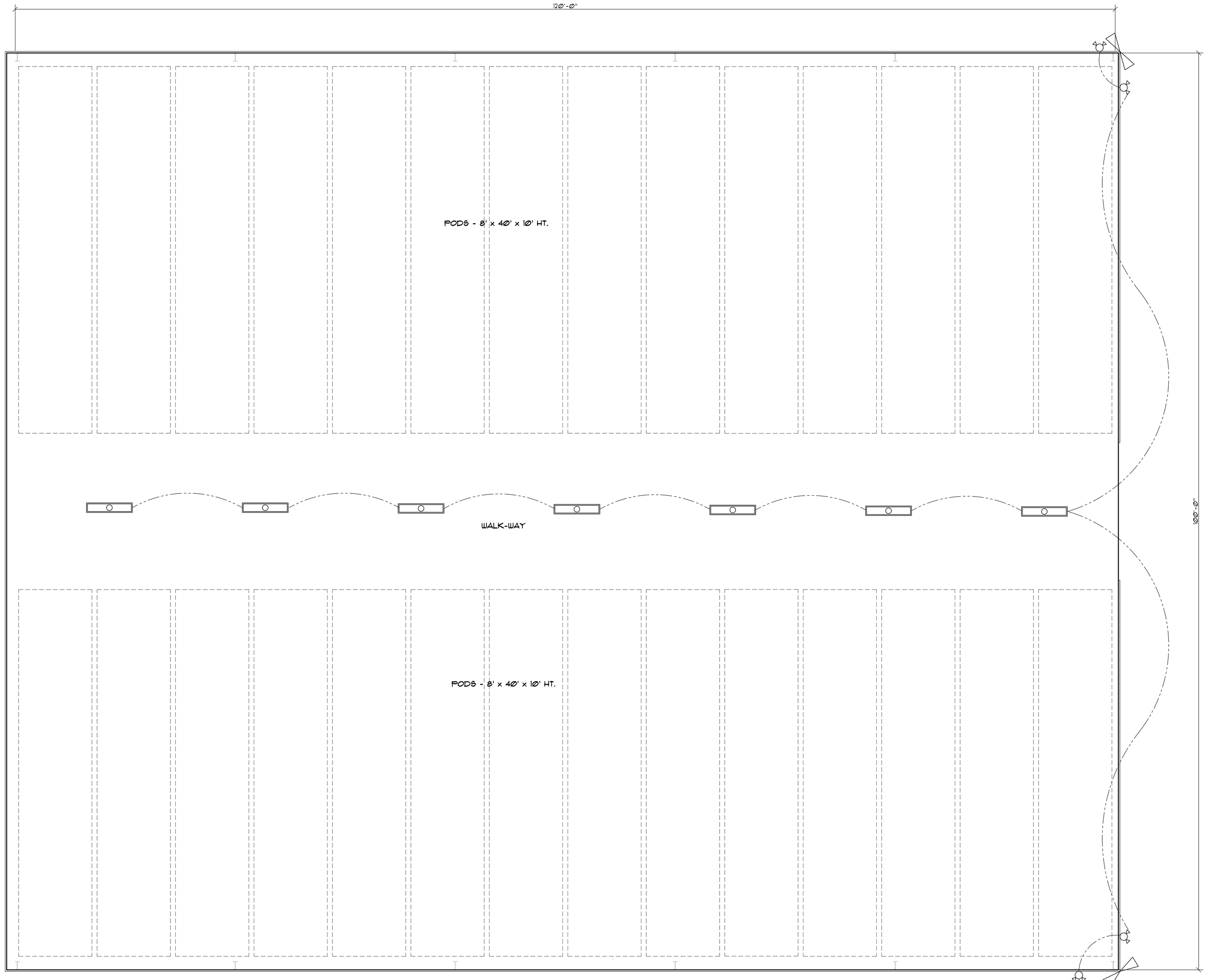
A OFFICE BUILDING FOR:
3353 NEEDLES HIGHWAY
NEEDLES, CA

FLUID, LLC

FLOOR PLAN & EXTERIORS - BLDG B

Date 6-12-18
Scale 1/4" = 1'-0"
Drawn T. FOBEL
Job -
Sheet A2a
Of - Sheets



FLOOR PLAN AND SECURITY LIGHTING PLAN

2' x 4' CLG MOUNTED HPS LIGHT FIXTURE

SECURITY CAMERA RECESSED LIGHT FIXTURE

FLOOD LIGHT

REVISIONS

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(928) 758-4433
Fax (928) 758-1086

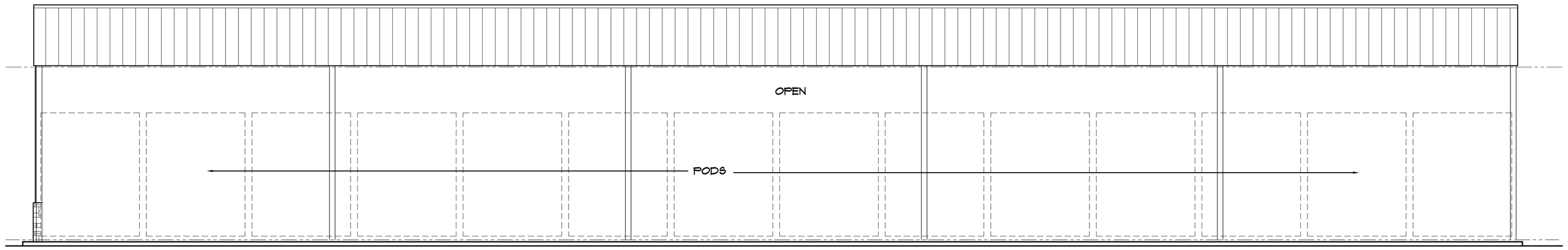
A OFFICE BUILDING FOR:

FLUID, LLC

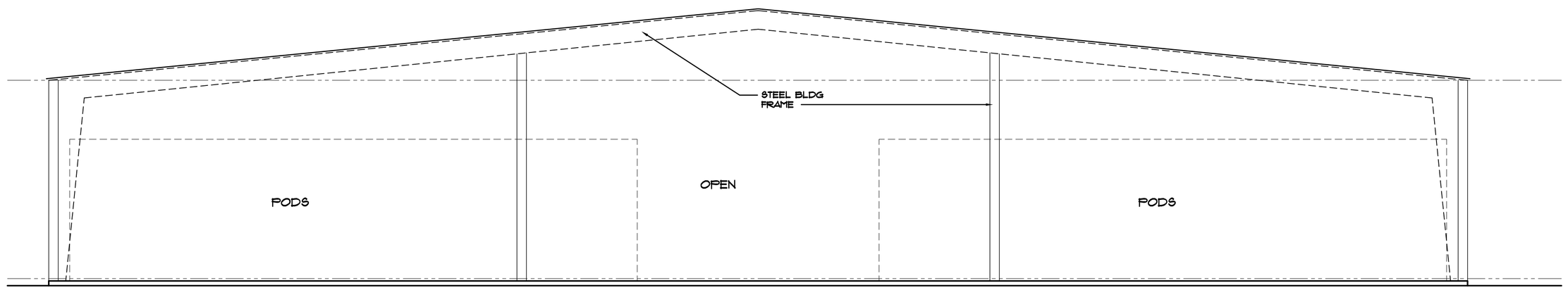
3353 NEEDLES HIGHWAY NEEDLES, CA

FLOOR PLAN AND LIGHTING BLDGS 1 & 2

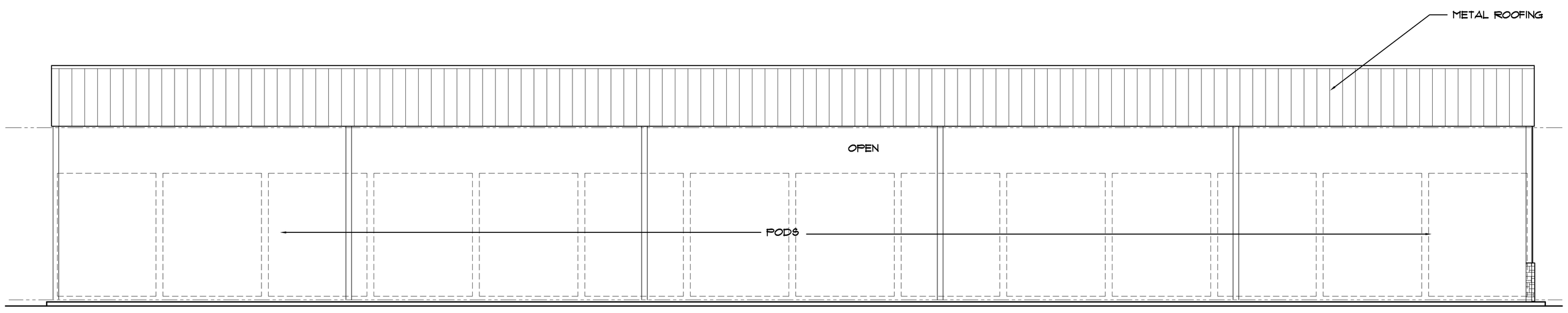
Date	6-12-18
Scale	3/16" = 1'-0"
Drawn	T. FOBEL
Job	-
Sheet	A2b
Of	- Sheets



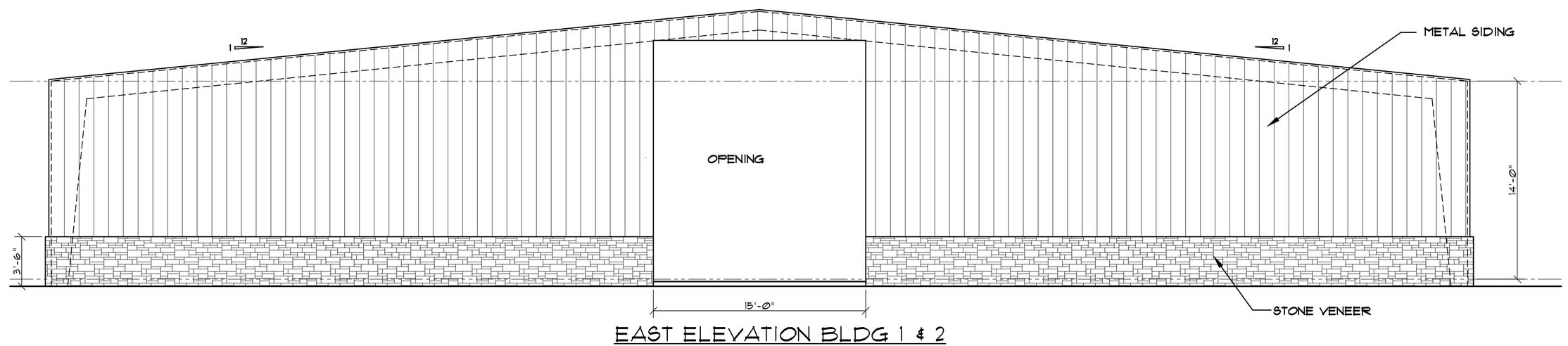
SIDE ELEVATION BLDG 1 & 2



WEST ELEVATION BLDG 1 & 2



SIDE ELEVATION BLDG 1 & 2



EAST ELEVATION BLDG 1 & 2

REVISIONS

Leavy Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
2130 McCulloch Blvd., Ste. B
Lake Havasu City, AZ 86403
(928) 855-4000
Fax (928) 855-4330
5690 Highway 95, Ste. B
Bullhead City, AZ 86429
(928) 758-4433
Fax (928) 758-1086

A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA
EXTERIOR ELEVATIONS BLDGS 1 & 2

Date 6-12-18
Scale 3/16" = 1'-0"
Drawn T. FOBEL
Job -
Sheet A3
Of - Sheets

SCHEDULE PANEL A

TYPE: 240A/120V, 1ϕ, 3W
MAINS: 225 AMPBUSS WITH 200 AMP MLO
WALL: X

QTY. NO.	CKT NO.	SERVING	CIRCUIT KVA ØA	CIRCUIT KVA ØB	BREAKER TRIP	BREAKER FR	BREAKER FR	BREAKER TRIP	CIRCUIT KVA ØA	CIRCUIT KVA ØB	SERVING	CKT NO.	QTY. NO.
X	1	AC-A	3.1		50			40	2.5		WATER HEATER	2	X
X	3			3.1						2.5		4	X
X	5	SPARE	X		20			50A	3.0		FAU-A	6	X
X	7	SPARE		X	20			15		1.2	INTERIOR LIGHTING	8	X
X	9	RECEPTACLES - GFI	.8		15			15	1.4		INTERIOR LIGHTING	10	X
X	11	RECEPTACLES		.8	15			15		.8	EXTERIOR LIGHTING	12	X
X	13	SPARE	X		20							14	X
X	15	SPARE		X	20			X		X	SPARE	16	X
X	17	-	X		-			-	X		-	18	X
X	19	-		X	-			X		X	-	20	X
X	21	-	X		-			-	-		-	22	X
X	23	-		X				X		-		24	X
X	25	-	X		-			-	-		-	26	X
X	27			-				X		-		28	X
X	29	-	-		-			-	-		-	30	X
X	31			-				X		-		32	X
X	33	-	-		-			-	-		-	34	X
X	35			-				X		-		36	X
X	37	-	-		-			-	-		-	38	X
X	39			-				X		-		40	X
X	41	-						X	X		-	42	X

	ØA	ØB
ESTIMATED FUTURE LOAD (SPARE)		
CONNECTED LOAD	3.9 3.9	10.8 8.4 6.9 4.5
TOTAL FUTURE & CONNECTED LOAD	10.8 +	8.4 = 19.2 KVA

REMARKS: X

TOTAL LOAD: 19.2KVA+25% LIGHTING:5.0 KVA +25%LARGEST MOTOR10.0KVA 38.2 KVA 38200VA ** 240 = 159AMPS

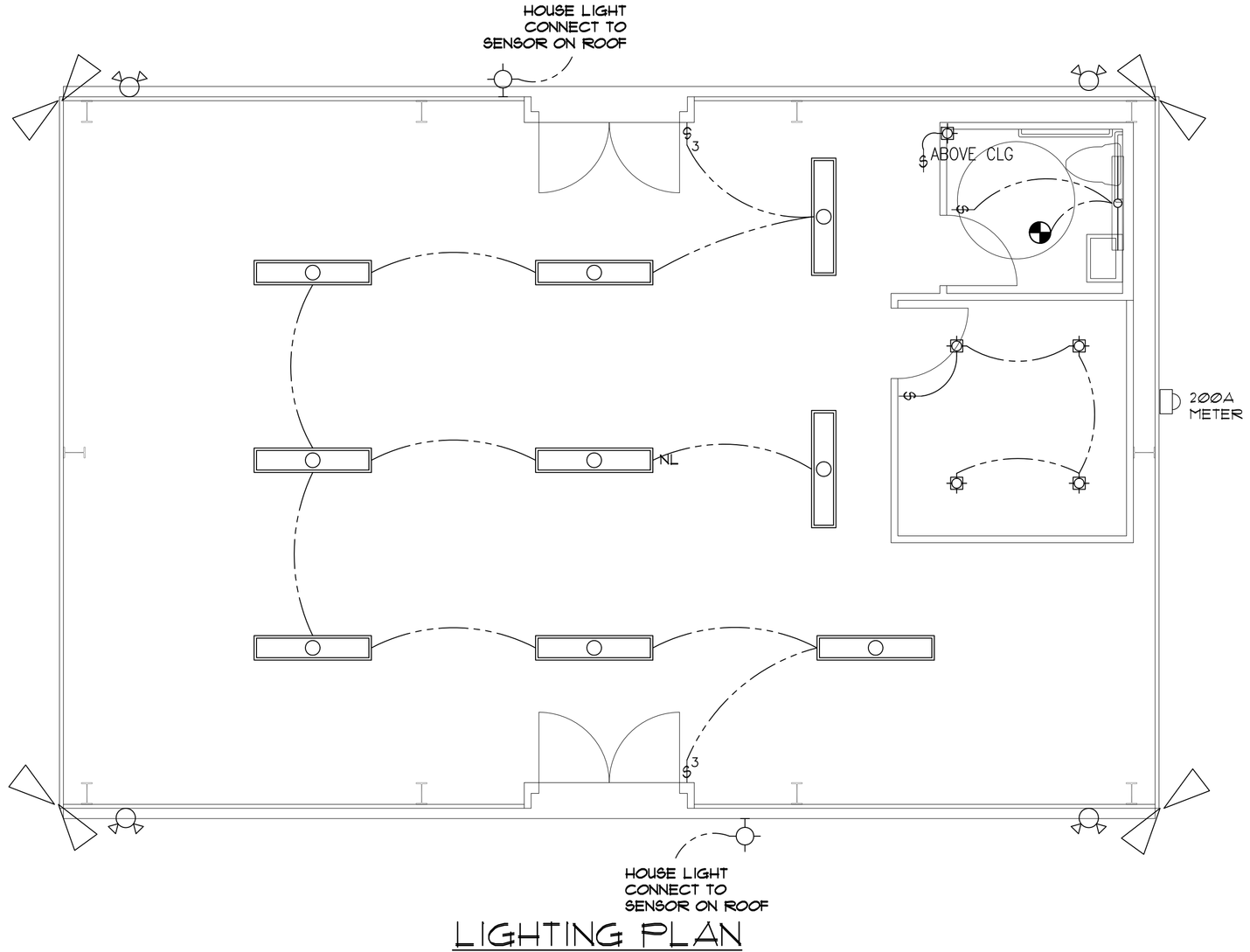
LIGHT FIXTURE SCHEDULE

SYMBOL	MANUFACTURER AND CATALOG NUMBER		LAMPS
		WALL MTD VANITY UP/DN VANITY LIGHT	2 - F32T8
		LED RECESSED LIGHT	850 LUMENS
		EXTERIOR GRADE FLOOD LIGHT WALL MOUNTED DUSK TO DAWN	
		2' x 4' CLG MOUNTED HPS LIGHT FIXTURE	
		2' x 4' TBAR MOUNTED RECESSED LIGHT FIXTURE	
		WALL MOUNTED EMERGENCY EXIT SIGN w/BATTERY & LIGHTS	
		WALL MOUNTED EMERGENCY EXIT SIGN w/BATTERY	PROVIDE EXIT LT EVERY 100' MAX. IN CORRIDORS
		SECURITY CAMERA RECESSED LIGHT FIXTURE	
		FLOOD LIGHT	

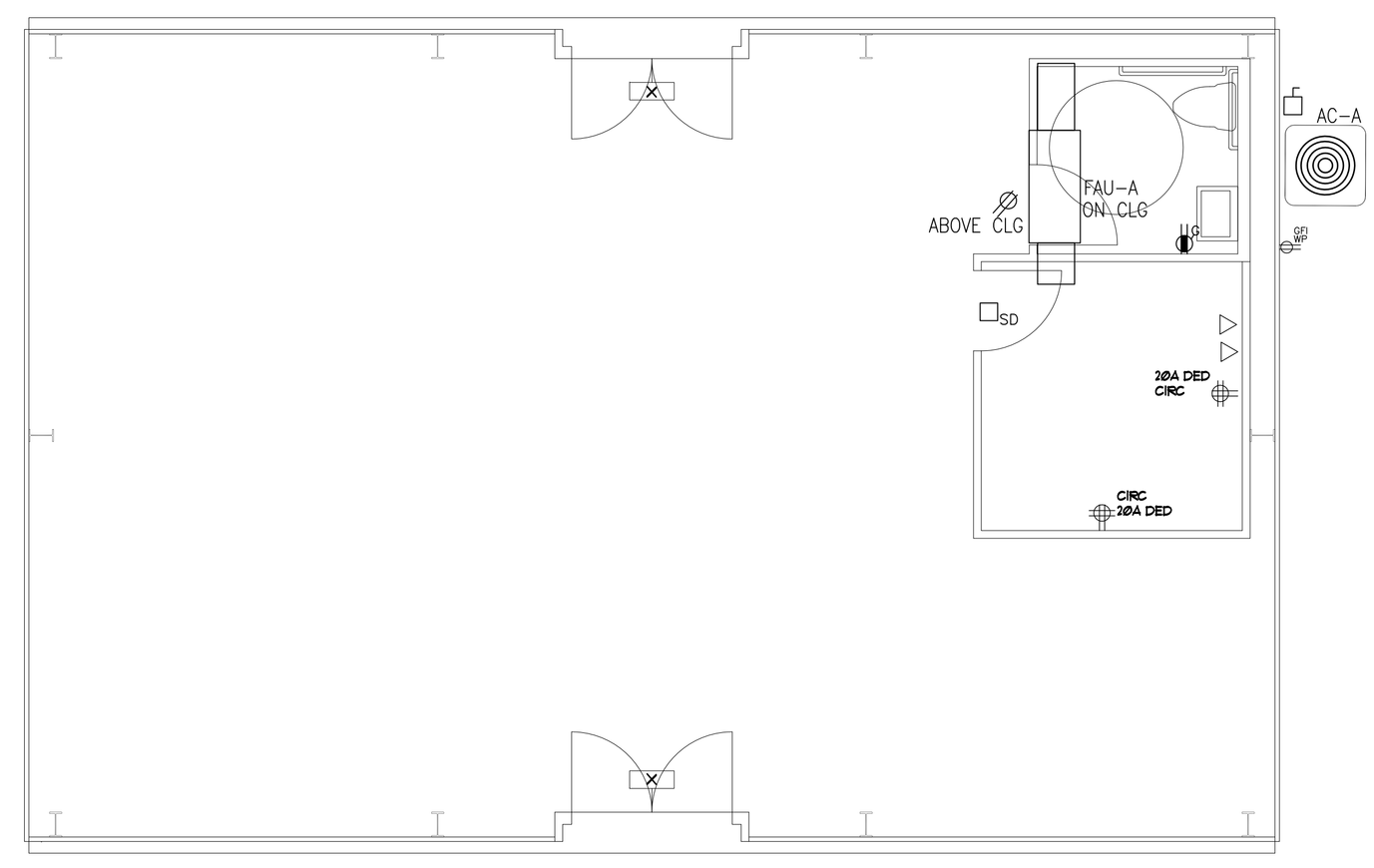
NL = NIGHT LIGHT

ELECTRICAL SYMBOL LIST

- $3 — TRIPLE POLE SWITCH, WALL MOUNTED UP +42" U.O.N., SUBLETTER INDICATES OUTLETS OR FIXTURES CONTROLLED.
- SD — SMOKE DETECTOR
- DUPLEX RECEPTACLE, 20A, 2 POLE, 3 WIRE, GROUNDED, 125V, WALL MOUNTED UP +15" U.O.N.
- G — DUPLEX RECEPTACLE, GROUND FAULT INTERRUPTER TYPE, 20A, 2 POLE, 3 WIRE, GROUNDED, 125V, WALL MOUNTED ABOVE TOP OF COUNTER.
- QUADRUPLE RECEPTACLE, 20A, 2 POLE 3 WIRE, GROUNDED, 125V, WALL MOUNTED UP +15" U.O.N.
- DUPLEX RECEPTACLE, 20A, 2 POLE, 3 WIRE, GROUNDED, 208V, WALL MOUNTED UP +15" U.O.N.
- DISCONNECT SWITCH, NON-FUSED, W/AMPERAGE RATING & QUANTITY OF POLES AS SHOWN. FUSED IF NOTED.
- PHONE, CABLE INTERNET AND USB ACCESS



LIGHTING PLAN



POWER PLAN

REVISIONS

Civil Engineering • Surveying • Planning
ASSOCIATES, INC.
3134 McCloire Blvd, Ste. B
Lake Havasu City, AZ 86403
(928) 505-0505
Fax: (928) 854-6530
5690 Highway 95, Ste. B
Fort Mohave, AZ 86426
(928) 768-1000
Fax: (928) 768-7066

A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA

ELECTRICAL PLANS - BLDG A

Date 6-12-18
Scale ¼" = 1'-0"
Drawn T. FOBEL
Job -
Sheet E1
Of - Sheets

SCHEDULE PANEL A

TYPE: 240A/120V, 1ϕ, 3W
MAINS: 225 AMPBUSS WITH 200 AMP MLO
WALL: X

QTY. NO.	CKT NO.	SERVING	CIRCUIT KVA ØA	CIRCUIT KVA ØB	BREAKER TRIP	BREAKER FR	BREAKER FR	BREAKER TRIP	CIRCUIT KVA ØA	CIRCUIT KVA ØB	SERVING	CKT NO.	QTY. NO.
X	1	AC-A	3.1		50			40	2.5		WATER HEATER	2	X
X	3			3.1						2.5		4	X
X	5	MICROWAVE	1.0		20			50A	3.0		FAU-A	6	X
X	7	PURIFIER		1.0	20			15		1.2	INTERIOR LIGHTING	8	X
X	9	RECEPTACLES - GFI	1.5		15			15	1.4		INTERIOR LIGHTING	10	X
X	11	RECEPTACLES		1.3	15			15		.8	EXTERIOR LIGHTING	12	X
X	13	BREAK ROOM	.8		20							14	X
X	15	SPARE		X	20			X		X	SPARE	16	X
X	17	-	X		-			-	X		-	18	X
X	19	-		X	-			X		X	-	20	X
X	21	-	X		-			-	-		-	22	X
X	23	-		X				X		-		24	X
X	25	-	X		-			-	-		-	26	X
X	27			-				X		-		28	X
X	29	-	-		-			-	-		-	30	X
X	31			-				X		-		32	X
X	33	-	-		-			-	-		-	34	X
X	35			-				X		-		36	X
X	37	-	-		-			-	-		-	38	X
X	39			-				X		-		40	X
X	41	-						X	X		-	42	X

	ØA	ØB
ESTIMATED FUTURE LOAD (SPARE)		
CONNECTED LOAD	6.4 5.4	13.3 9.9 6.9 4.5
TOTAL FUTURE & CONNECTED LOAD	13.3	+ 9.9 = 23.2 KVA

REMARKS: X

TOTAL LOAD: 23.2KVA+25% LIGHTING: 5.0 KVA +25%LARGEST MOTOR 10.0KVA 38.2 KVA 38200VA ** 240 = 159AMPS

LIGHT FIXTURE SCHEDULE

SYMBOL	MANUFACTURER AND CATALOG NUMBER		LAMPS
		WALL MTD VANITY UP/DN VANITY LIGHT	2 - F32T8
		LED RECESSED LIGHT	850 LUMENS
		EXTERIOR GRADE FLOOD LIGHT WALL MOUNTED DUSK TO DAWN	
		2' x 4' CLG MOUNTED HPS LIGHT FIXTURE	
		2' x 4' TBAR MOUNTED RECESSED LIGHT FIXTURE	
		WALL MOUNTED EMERGENCY EXIT SIGN w/BATTERY & LIGHTS	
		WALL MOUNTED EMERGENCY EXIT SIGN w/BATTERY	PROVIDE EXIT LT EVERY 100' MAX. IN CORRIDORS
		SECURITY CAMERA RECESSED LIGHT FIXTURE	
		FLOOD LIGHT	

NL = NIGHT LIGHT

ELECTRICAL SYMBOL LIST

- $3 — TRIPLE POLE SWITCH, WALL MOUNTED UP +42" U.O.N., SUBLETTER INDICATES OUTLETS OR FIXTURES CONTROLLED.
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- G — DUPLEX RECEPTACLE, GROUND FAULT INTERRUPTER TYPE, 20A, 2 POLE, 3 WIRE, GROUNDED, 125V, WALL MOUNTED ABOVE TOP OF COUNTER.
- QUADRUPLE RECEPTACLE, 20A, 2 POLE 3 WIRE, GROUNDED, 125V, WALL MOUNTED UP +15" U.O.N.
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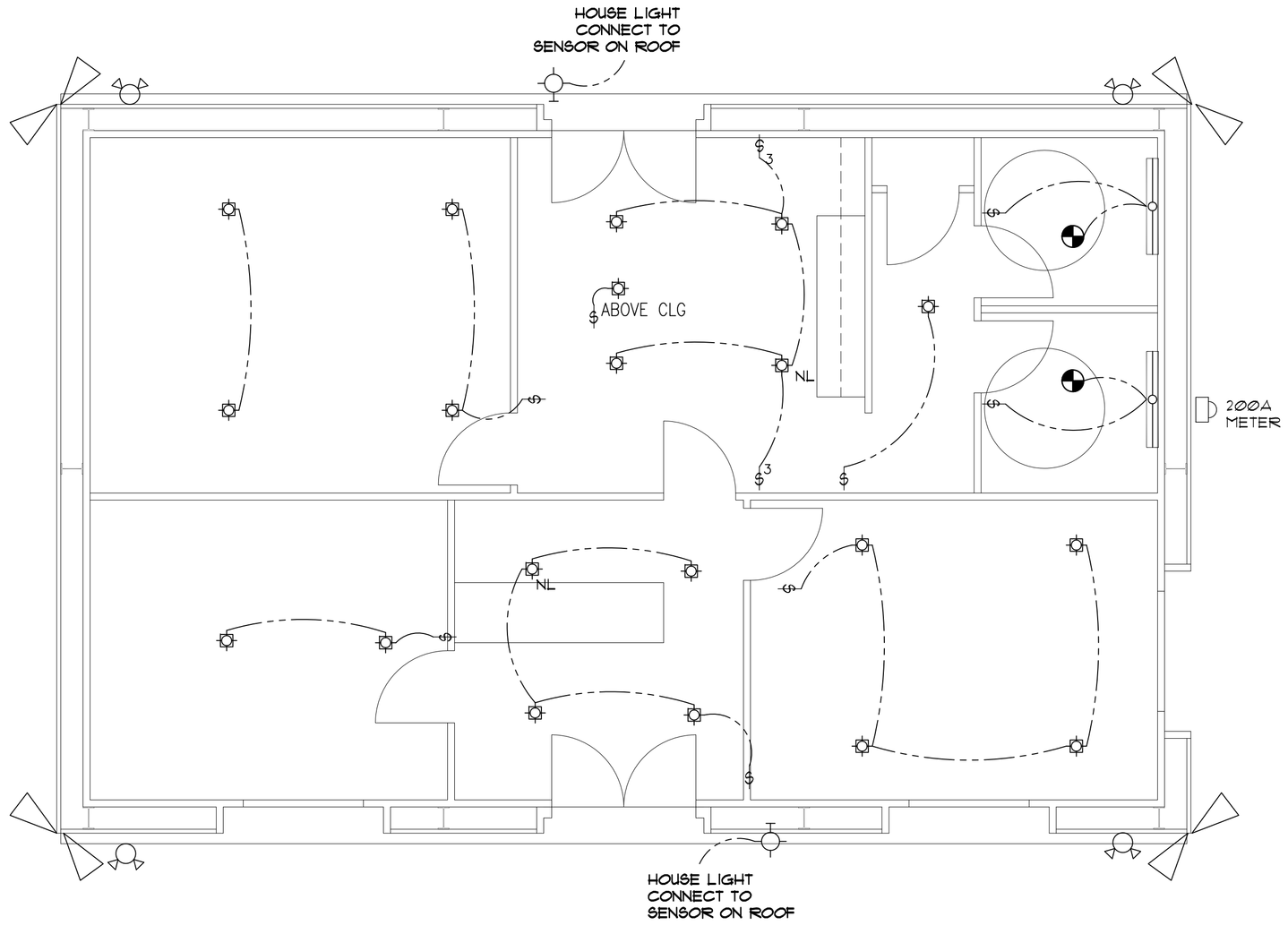
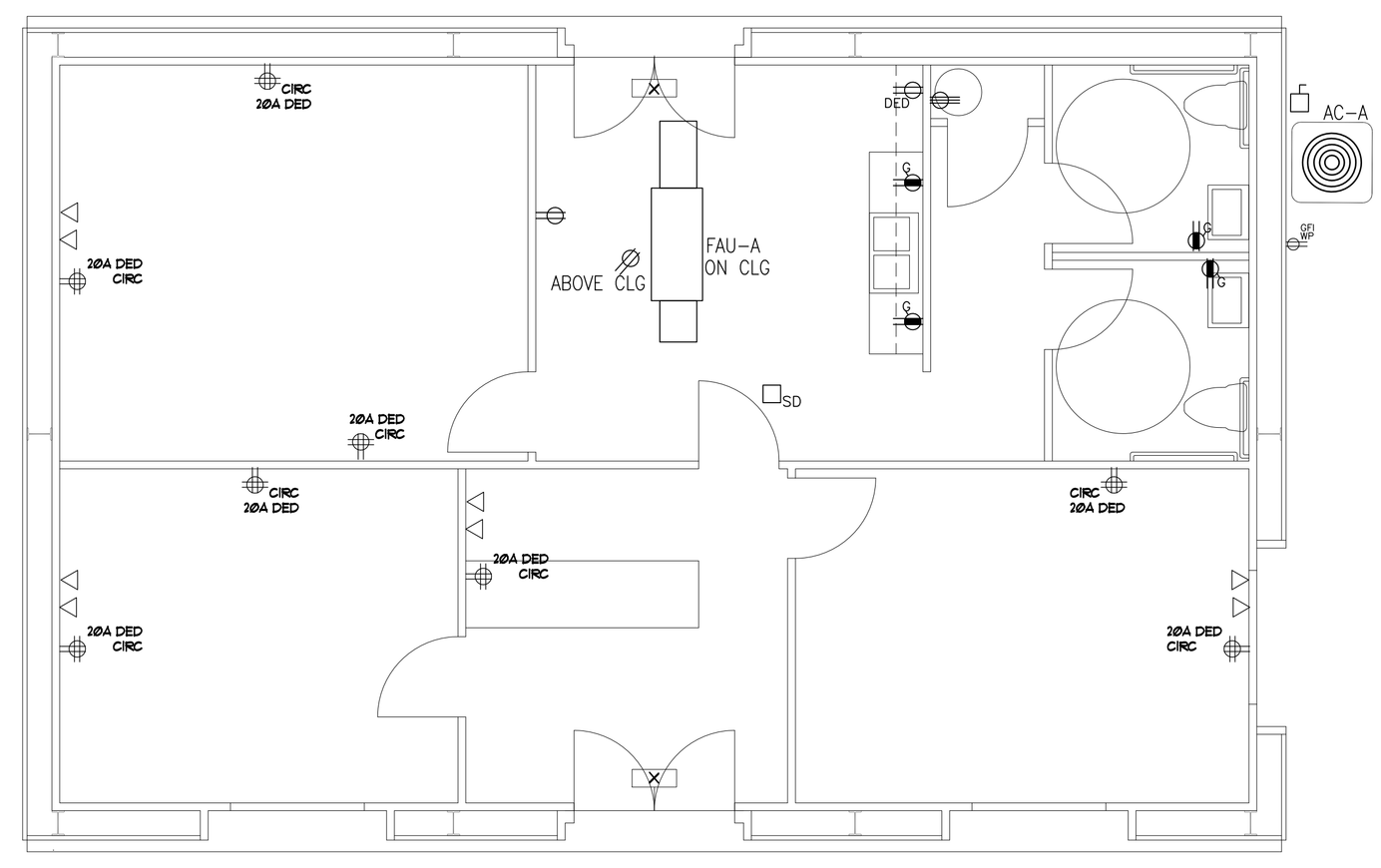
- DISCONNECT SWITCH, NON-FUSED, W/AMPERAGE RATING & QUANTITY OF POLES AS SHOWN. FUSED IF NOTED.
- PHONE, CABLE INTERNET AND USB ACCESS



LIGHTING PLAN



POWER PLAN

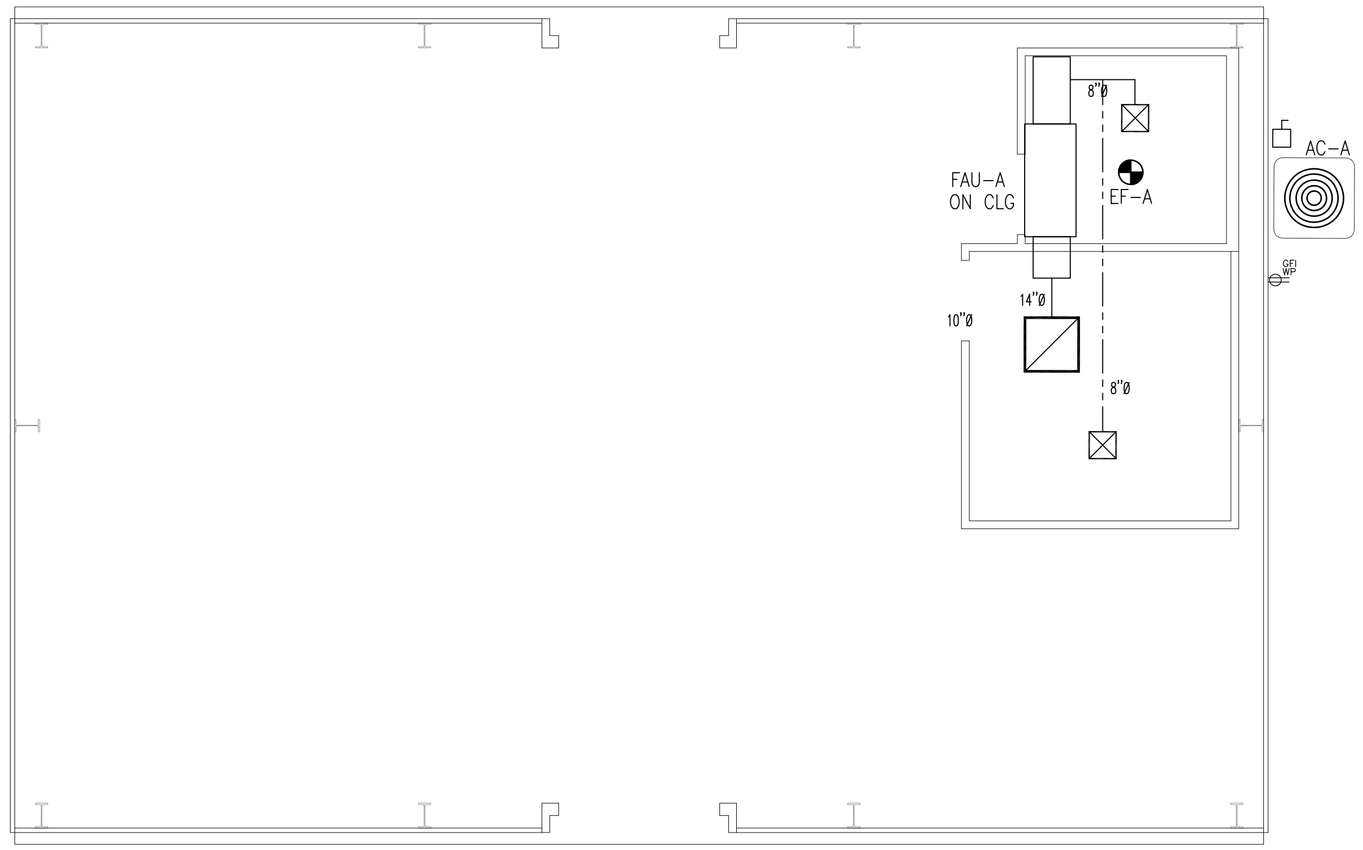
REVISIONS

Leading Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
2128 McCinnis Rd, Ste. B
Fort Worth, TX 76177
(817) 785-1100
Fax: (817) 785-1105
5890 Highway 95, Ste. B
Fort Mohave, AZ 86426
(928) 768-7000
Fax: (928) 768-7005
2108 Kiowa Blvd.
Lake Havasu City, AZ 86403
(928) 854-4030
Fax: (928) 854-4033

A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA

ELECTRICAL PLANS - BLDG B

Date 6-12-18
Scale ¼" = 1'-0"
Drawn T. FOBEL
Job -
Sheet E1.0
Of - Sheets



MECHANICAL PLAN

MECHANICAL EQUIPMENT SCHEDULE

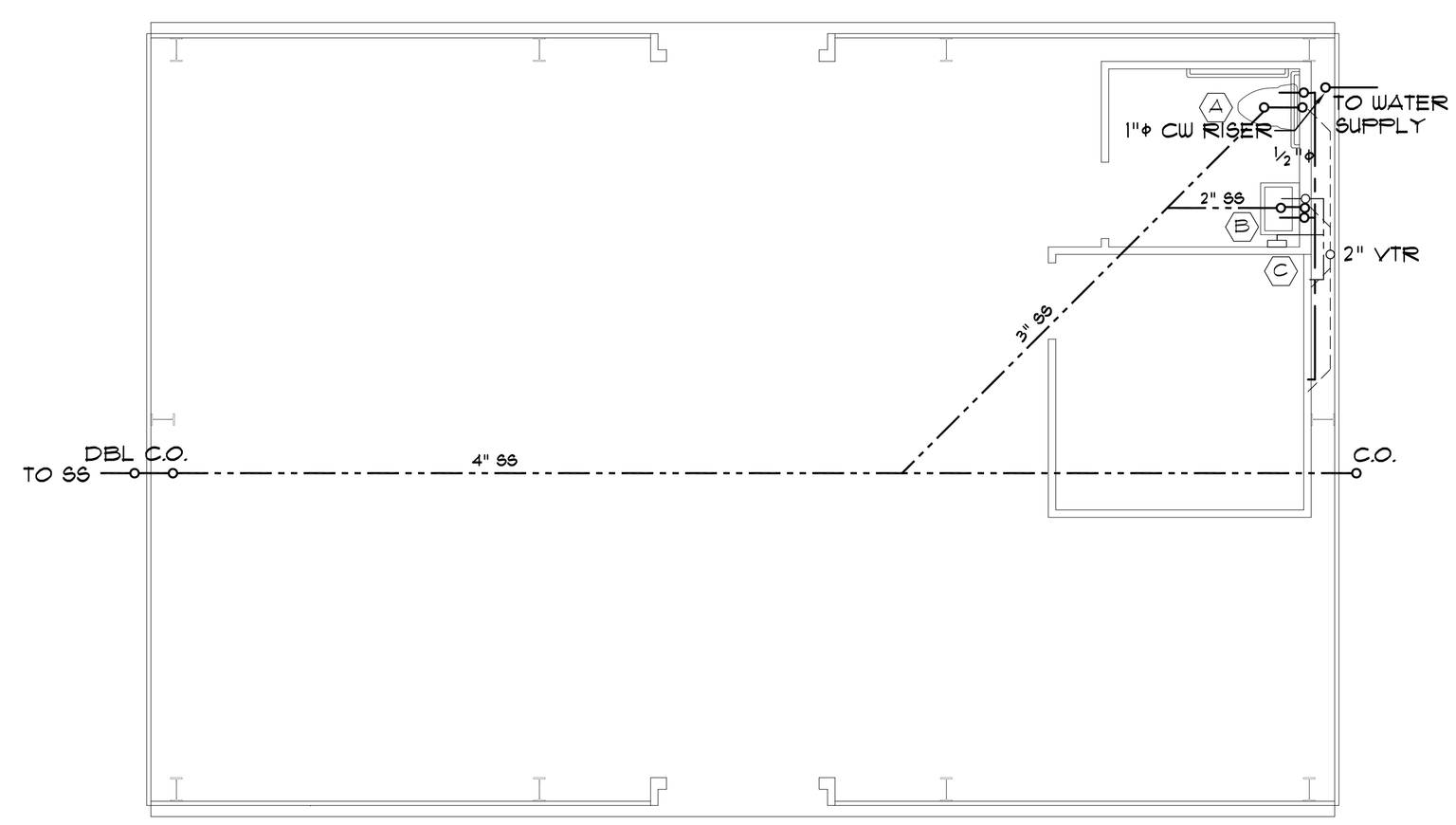
SYMBOL	TYPE	SIZE	WEIGHT	LOAD		VOLTS/PHASE	BREAKER/FUSE	WIRE	REMARKS
FAU-A	AIR HANDLER		450 LBS	22.5	FLA	120/240	50A	2-#10, #10 GRD, 3/4"C	–
AC-A	HEAT PUMP	4 TON	182 LBS	22.5	FLA	120/240	50A	2-#10, #10 GRD, 3/4"C	–
EF-A	EXHAUST FAN	100 CFM					.9A	2-#10, #10 GRD, 3/4"C	1/10 HP

PLUMBING FIXTURE SCHEDULE

(A) WATER CLOSET, TITLE 24 COMPLIANT
1.6 GAL PER FLUSH, FLUSH TANK, 18" RIM HEIGHT, WITH ELONGATED CLOSED SEAT.

(B) HANDICAPPED LAVATORY, ELKAY WCLW0192305DSACC
FAUCET – SENSOR INCLUDED

(C) INSTA HOT WATER HEATER



PLUMBING PLAN

COLD WATER
HOT WATER
SEWER LINE
VENT

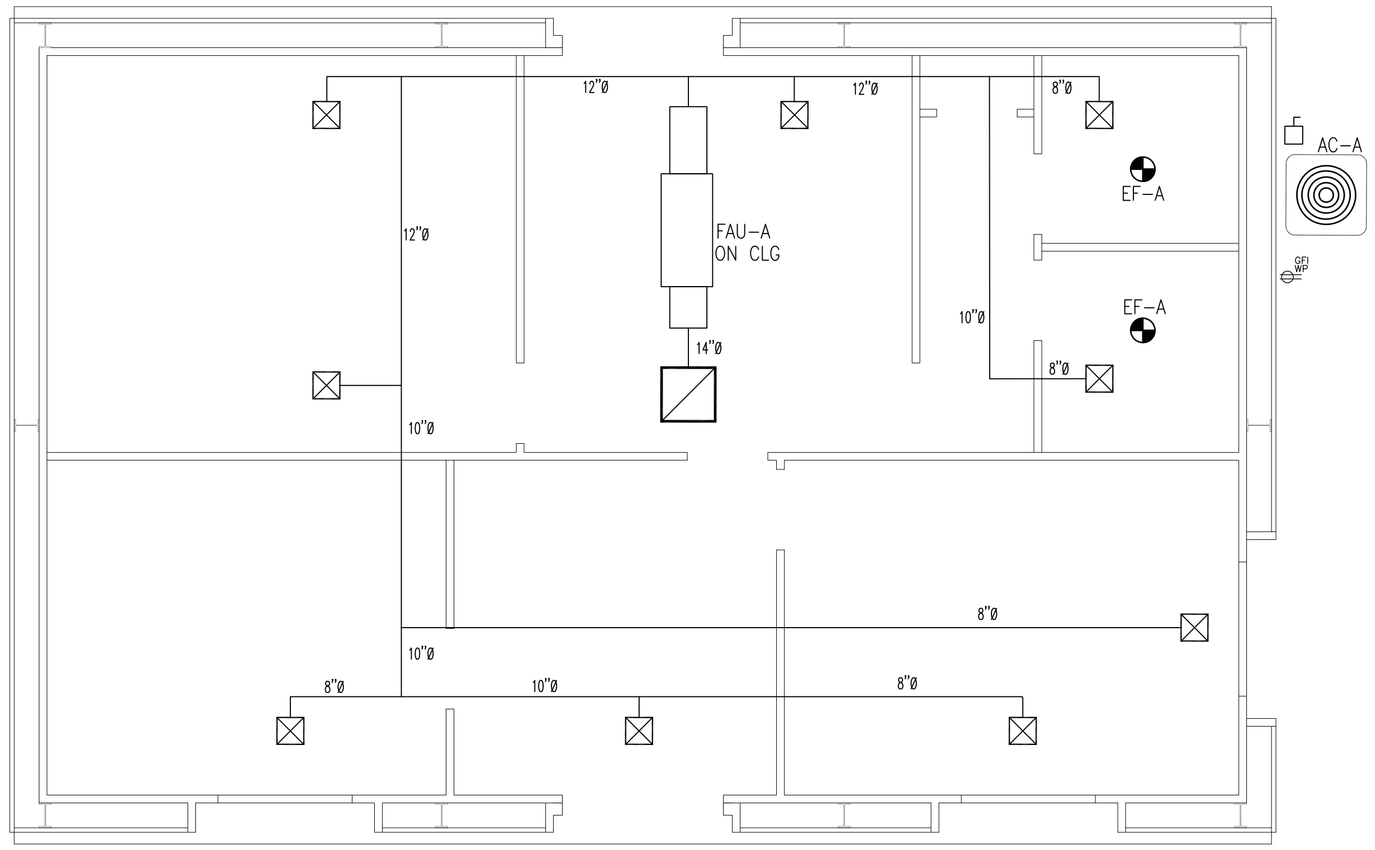
REVISIONS

Civil Engineering • Surveying • Planning
ASSOCIATES, INC.
3134 McCoins Blvd, Ste. B
Lake Havasu City, AZ 86403
(928) 855-0300
Fax: (928) 854-6530
5960 Highway 95, Ste. B
Fort Mohave, AZ 86426
(928) 768-7000
Fax: (928) 768-7066

A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA

MECHANICAL & PLUMBING PLANS - BLDG A

Date 6-12-18
Scale 1/4" = 1'-0"
Drawn T. FOBEL
Job -
Sheet MP1
Of - Sheets



MECHANICAL PLAN

MECHANICAL EQUIPMENT SCHEDULE

SYMBOL	TYPE	SIZE	WEIGHT	LOAD		VOLTS/PHASE	BREAKER/FUSE	WIRE	REMARKS
FAU-A	AIR HANDLER		450 LBS	22.5	FLA	120/240	50A	2-#10, #10 GRD, 3/4"C	-
AC-A	HEAT PUMP	4 TON	182 LBS	22.5	FLA	120/240	50A	2-#10, #10 GRD, 3/4"C	-
EF-A	EXHAUST FAN	100 CFM					.9A	2-#10, #10 GRD, 3/4"C	1/10 HP

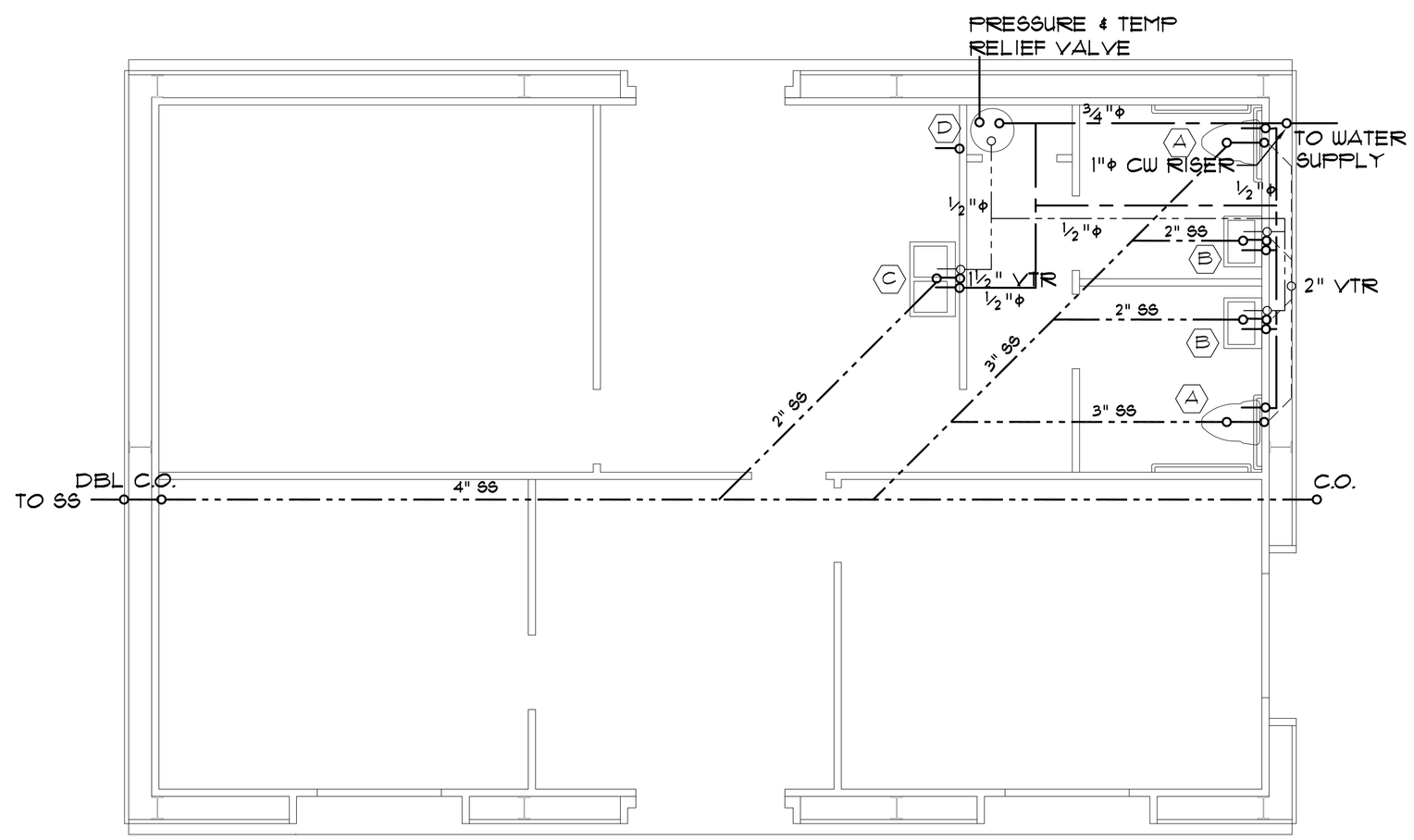
PLUMBING FIXTURE SCHEDULE

(A) WATER CLOSET, TITLE 24 COMPLIANT
1.6 GAL PER FLUSH, FLUSH TANK, 18" RIM HEIGHT, WITH ELONGATED CLOSED SEAT.

(B) HANDICAPPED LAVATORY, ELKAY WCLW0192305D5ACC
FAUCET - SENSOR INCLUDED

(C) 2 COMPARTMENT SINK, ELKAY ECTSRAD33226B6
FAUCET - MOEN MODEL 8957

(D) 40 GAL. WATER HEATER, - ELECTRIC



PLUMBING PLAN

COLD WATER
HOT WATER
SEWER LINE
VENT

REVISIONS

Leading Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
2128 McCulloch Blvd. Ste. B
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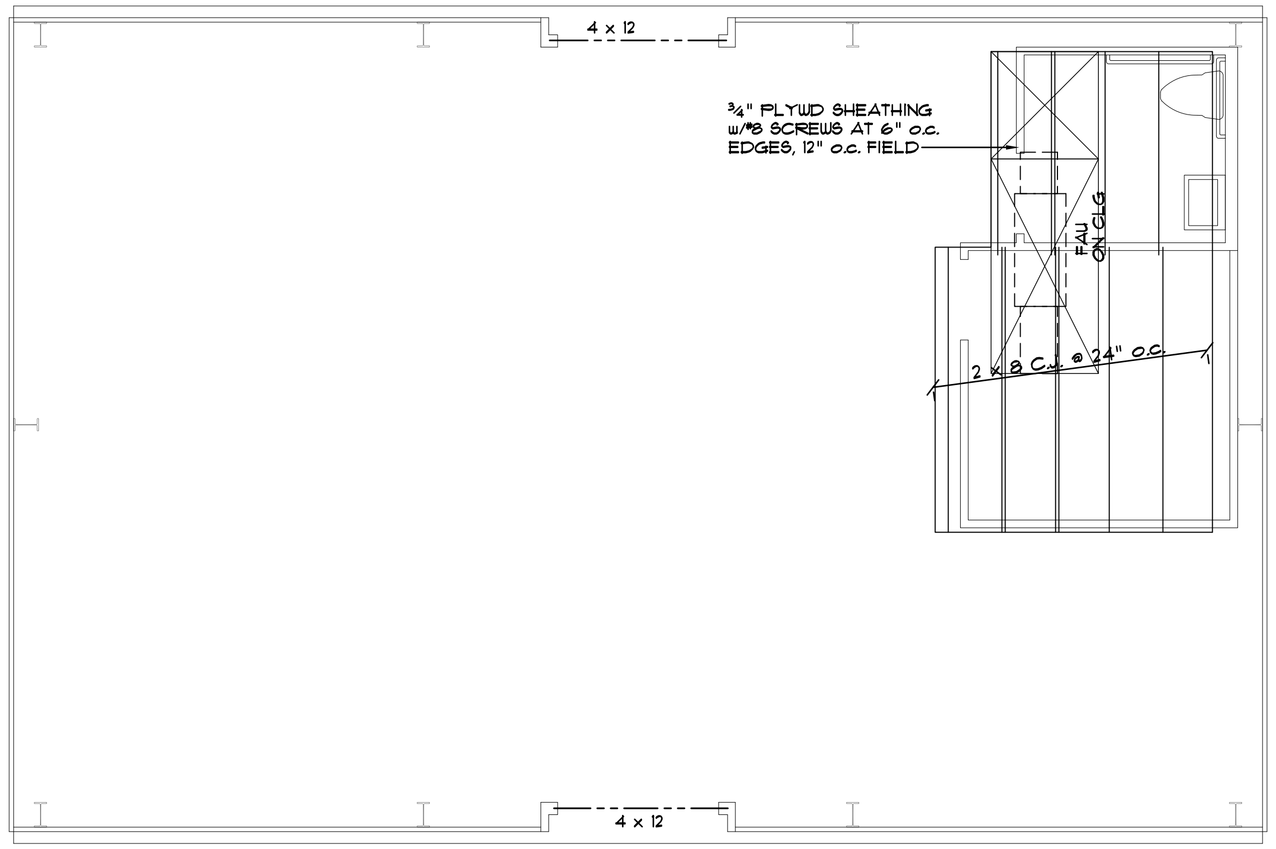
(928) 855-2200
Fax: (928) 854-4530
5890 Highway 95, Ste. B
Fort Mohave, AZ 86426
(928) 768-2200
Fax: (928) 768-7095

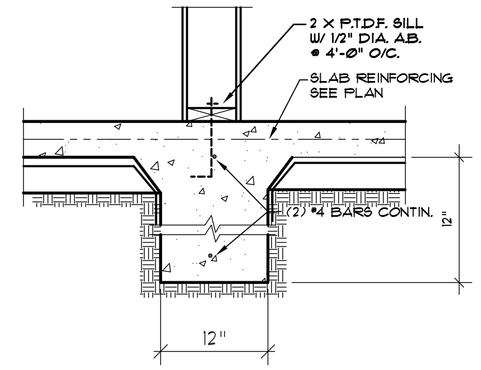
A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA

MECHANICAL & PLUMBING PLANS - BLDG B

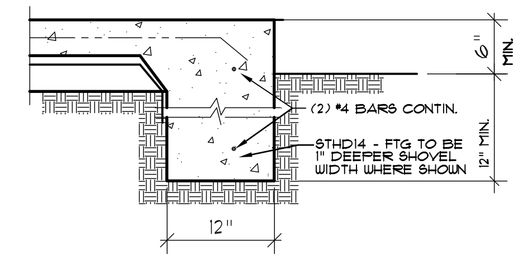
Date 6-12-18
Scale 1/4" = 1'-0"
Drawn T. FOBEL
Job -
Sheet MP2
Of - Sheets



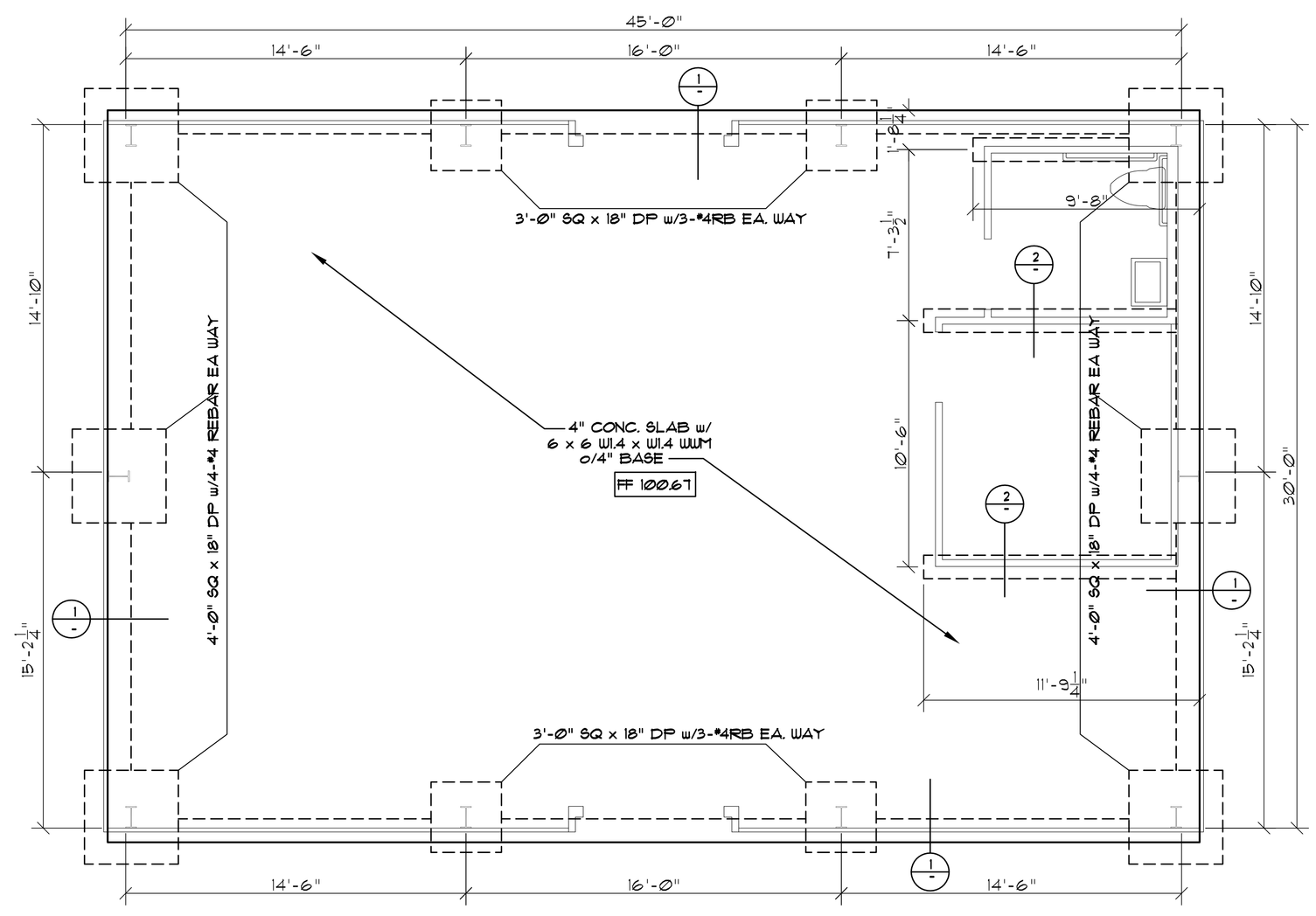
CEILING FRAMING PLAN



2 FOOTING DETAIL



1 EXTERIOR FOOTING



FOUNDATION PLAN

NOTES:

ANCHOR BOLTS ½"ϕ x 10"L @ 6'-0" o.c.
12" FROM CORNERS & OPENINGS

12" PERIMETER FOOTING 12" INTO
UNDISTURBED SOIL - PROVIDE #4 REBAR
CONTINUOUS TOP & BOTTOM

MIN. CONCRETE STRENGTH = 2,500 PSI

PROVIDE CONTROL JOINTS AT 30' MAX.
INTERVALS AND AT ALL OFFSETS
EXCEEDING 10'-0"

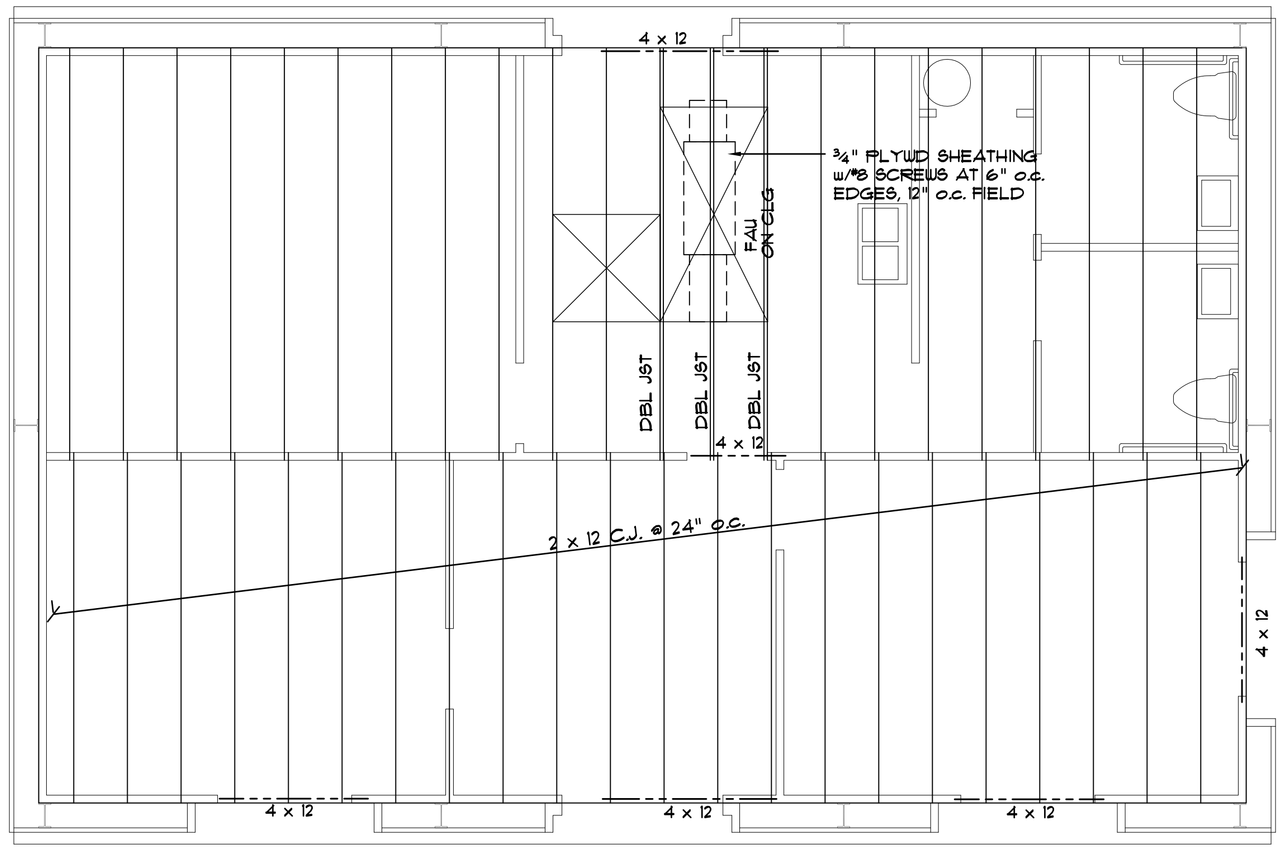
REVISIONS

Civil Engineering • Surveying • Planning
ASBURY ENTES, INC.
2134 McCune Blvd. Ste. B
Lake Havasu City, AZ 86403
(928) 855-4344
Fax: (928) 854-6030
5690 Highway 95 Ste. B
Fort Mohave, AZ 86426
(928) 768-4344
Fax: (928) 768-7066

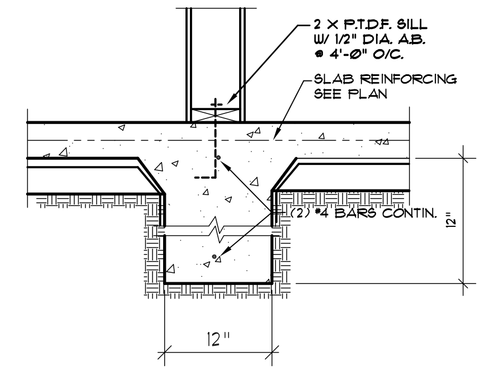
A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA

FOUNDATION PLAN & FRAMING - BLDG A

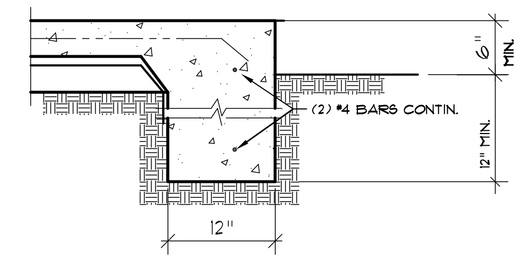
Date	6-12-18
Scale	¼" = 1'-0"
Drawn	T. FOBEL
Job	-
Sheet	S1
Of	- Sheets



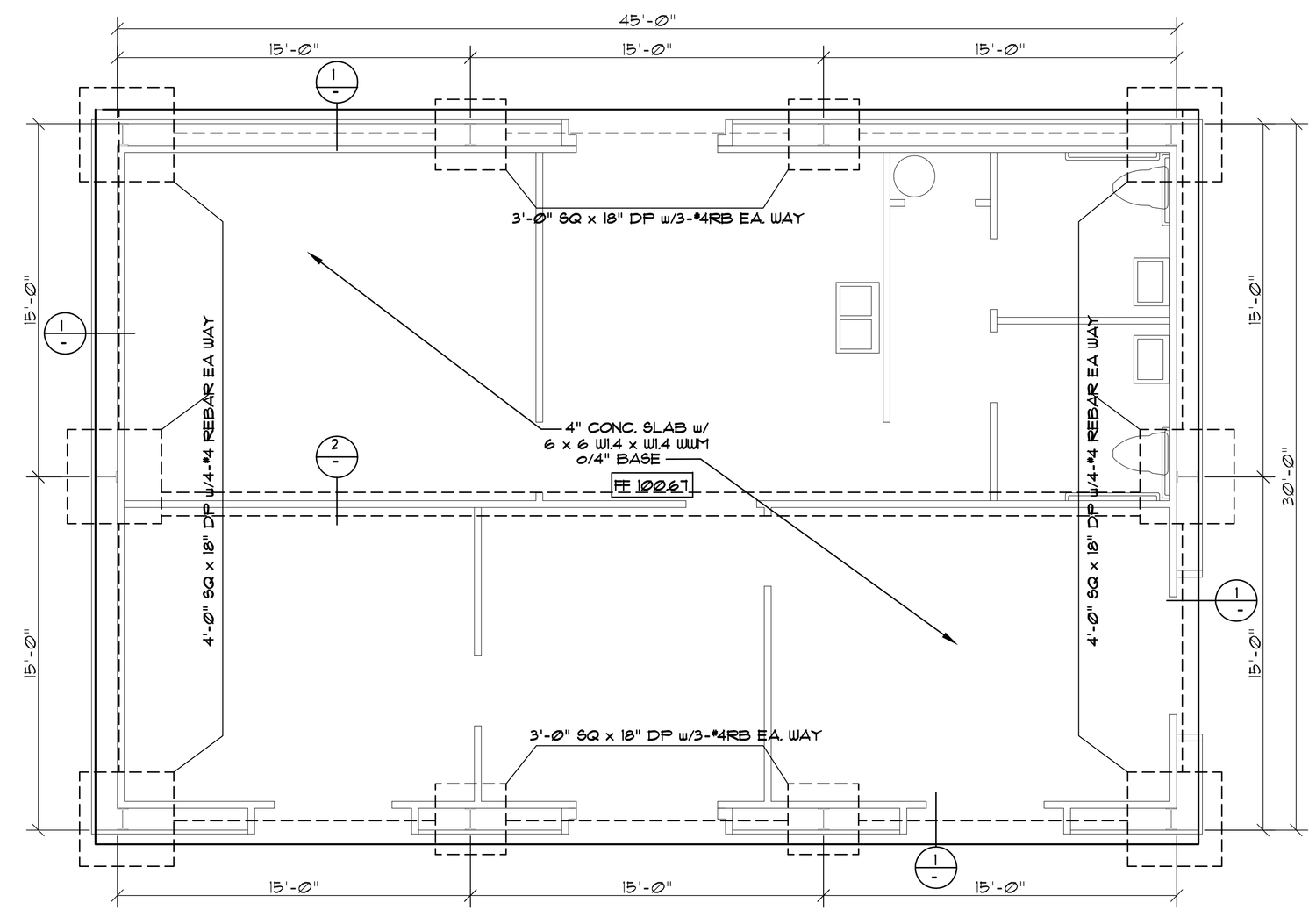
CEILING FRAMING PLAN



2 FOOTING DETAIL



1 EXTERIOR FOOTING



FOUNDATION PLAN - BLDG B

NOTES:

ANCHOR BOLTS ½"ϕ x 10"L @ 6'-0" o.c.
12" FROM CORNERS & OPENINGS

12" PERIMETER FOOTING 12" INTO
UNDISTURBED SOIL - PROVIDE #4 REBAR
CONTINUOUS TOP & BOTTOM

MIN. CONCRETE STRENGTH = 2,500 PSI

PROVIDE CONTROL JOINTS AT 30' MAX.
INTERVALS AND AT ALL OFFSETS
EXCEEDING 10'-0"

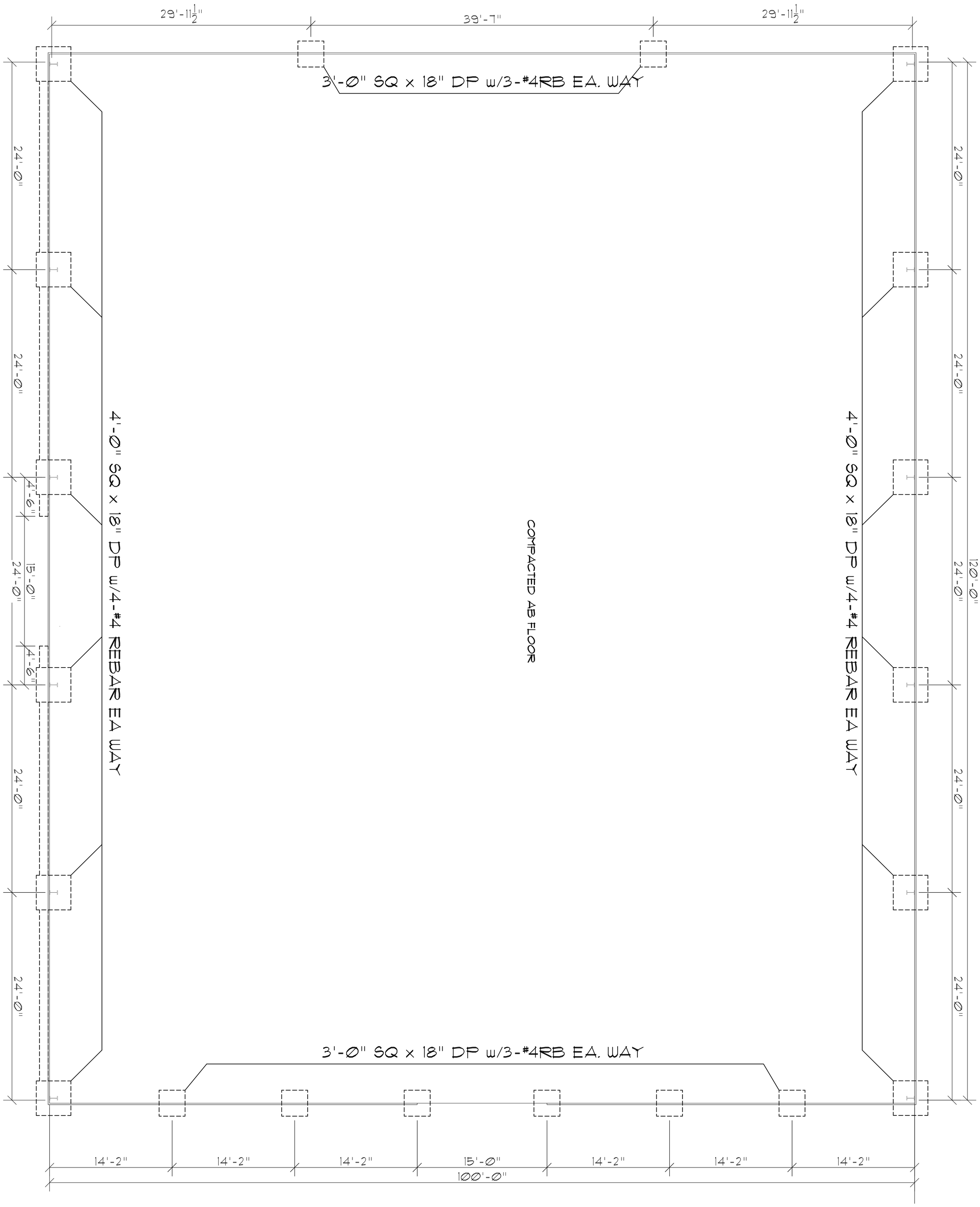
REVISIONS

Leading Engineering
ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
3134 McCoins Blvd., Ste. B
Lake Havasu City, AZ 86403
(928) 855-6030
Fax: (928) 854-6030
5690 Highway 95, Ste. B
Fort Mohave, AZ 86426
(928) 768-7088
Fax: (928) 768-7088

A OFFICE BUILDING FOR:
FLUID, LLC
3353 NEEDLES HIGHWAY
NEEDLES, CA

FOUNDATION PLAN & FRAMING - BLDG B

Date	6-12-18
Scale	¼" = 1'-0"
Drawn	T. FOBEL
Job	-
Sheet	S1a
Of	- Sheets



FOUNDATION PLAN

A OFFICE BUILDING FOR:

FLUID, LLC

3353 NEEDLES HIGHWAY NEEDLES, CA

FOUNDATION BLDGS 1 & 2

Date 6-12-18

Scale 3/16" = 1'-Ø"

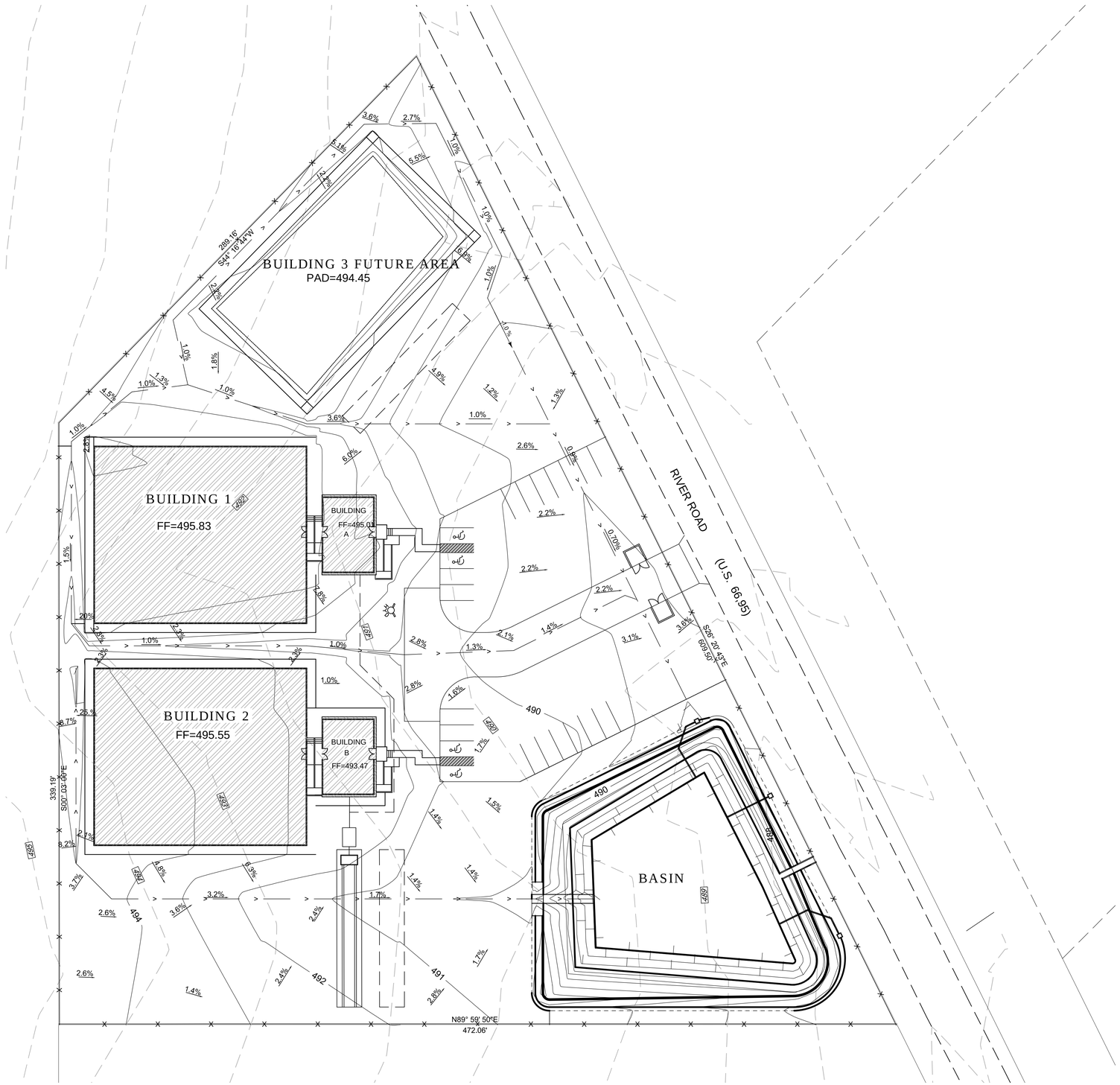
Drawn T. FOBEL

Job -

Sheet S16 Of - Sheets

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
2126 McCulloch Blvd., Ste. 8
Lake Havasu City, AZ 86403
(928) 680-6060
Fax: (928) 854-6530
5890 Highway 95 Ste B
Fort Mohave, AZ 86426
(928) 768-4443
Fax: (928) 768-7086

REVISIONS



N

0 30' 60'

LEYEND:

- PROPOSED FIRE HYDRANT
- T — TRASH ENCLOSURE
- PROPOSED BUILDING
- LEACH FIELD
- FLOW DIRECTION
- (488.59) — EXISTING ELEVATION
- (—489—) — EXISTING CONTOUR ELEVATION
- —490— PROPOSED CONTOUR ELEVATION
- PROPOSED 6' CHAIN LINK FENCE

UNDERGROUND SERVICE ALERT

DIAL TOLL FREE

811

TWO WORKING DAYS BEFORE YOU DIG

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-889-0153
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 88426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6539

3353 NEEDLES HIGHWAY

NEEDLES CA

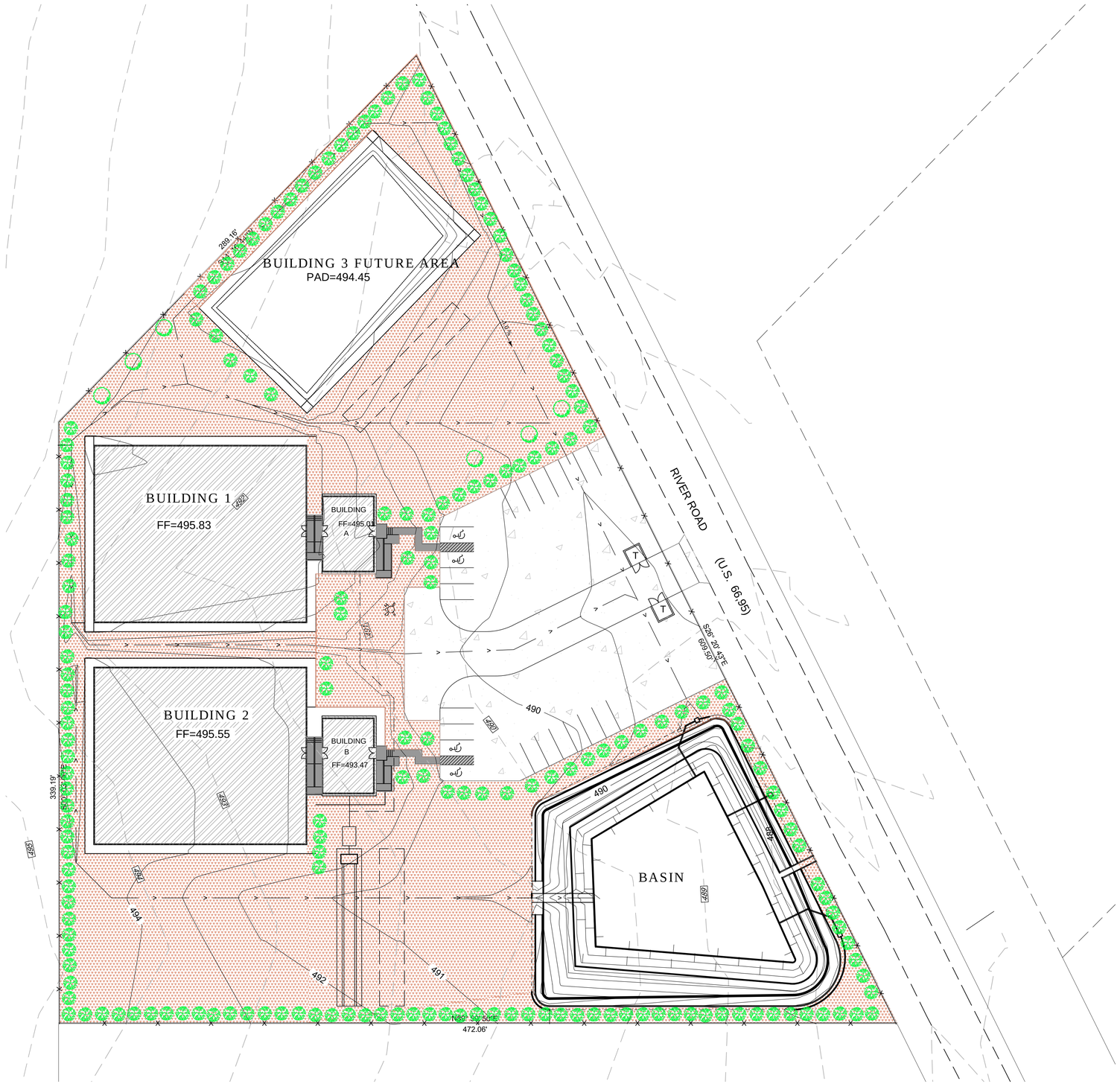
DRAINAGE PATTERN

CLIENT:
POLING LAURA
991 VANDERBILT AVE | CLAREMONT, CA 91711

DESIGNED BY:	DRAWN BY:	CHECKED BY:
HA	HA	CD

SCALE 1" = 30'

SHEET 1 OF 1



N

0 30' 60'

LEYEND:

- PROPOSED FIRE HYDRANT
- T — TRASH ENCLOSURE
- PROPOSED BUILDING
- LEACH FIELD
- FLOW DIRECTION
- (488.59) — EXISTING ELEVATION
- (—489—) — EXISTING CONTOUR ELEVATION
- —490— — PROPOSED CONTOUR ELEVATION
- PROPOSED 6' CHAIN LINK FENCE
- COARSE AGGREGATE COVER
- CONCRETE
- PAVING
- MEDIUM, LOW WATER 7 GALLON PINK OLEANDER (PLANT TYPE SHRUB) HIGHT & SPREAD 4-5'X4-5'
- LARGE SISSOO TREE 15 GALLON 60' TALL SPREAD OF 40 FEET

LANDASCAPE AREA:

LOT AREA= 163,193 SQ. FT. 3.75 ACRES

TOTAL LANDSCAPE AREA= 57,211 SQ. FT. 1.31 ACRE

COARSE AGGREGATE COVER TO BE AS LISTED ±(120SQ' @ 2" THICK = 1 TON. -ALWAYS ADD 1 EXTRA TON PER LOAD, 57,211 SQ' - 120 SQ' = 476.7 TONS +1 = 477.7 TONS-REQUIRED

PLANT QUANTITIES

PINK OLEANDER SHRUB 187 E.A.
LARGE SISSOO TREE 6 E.A.

UNDERGROUND SERVICE ALERT
DIAL TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

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3353 NEEDLES HIGHWAY

NEEDLES CA

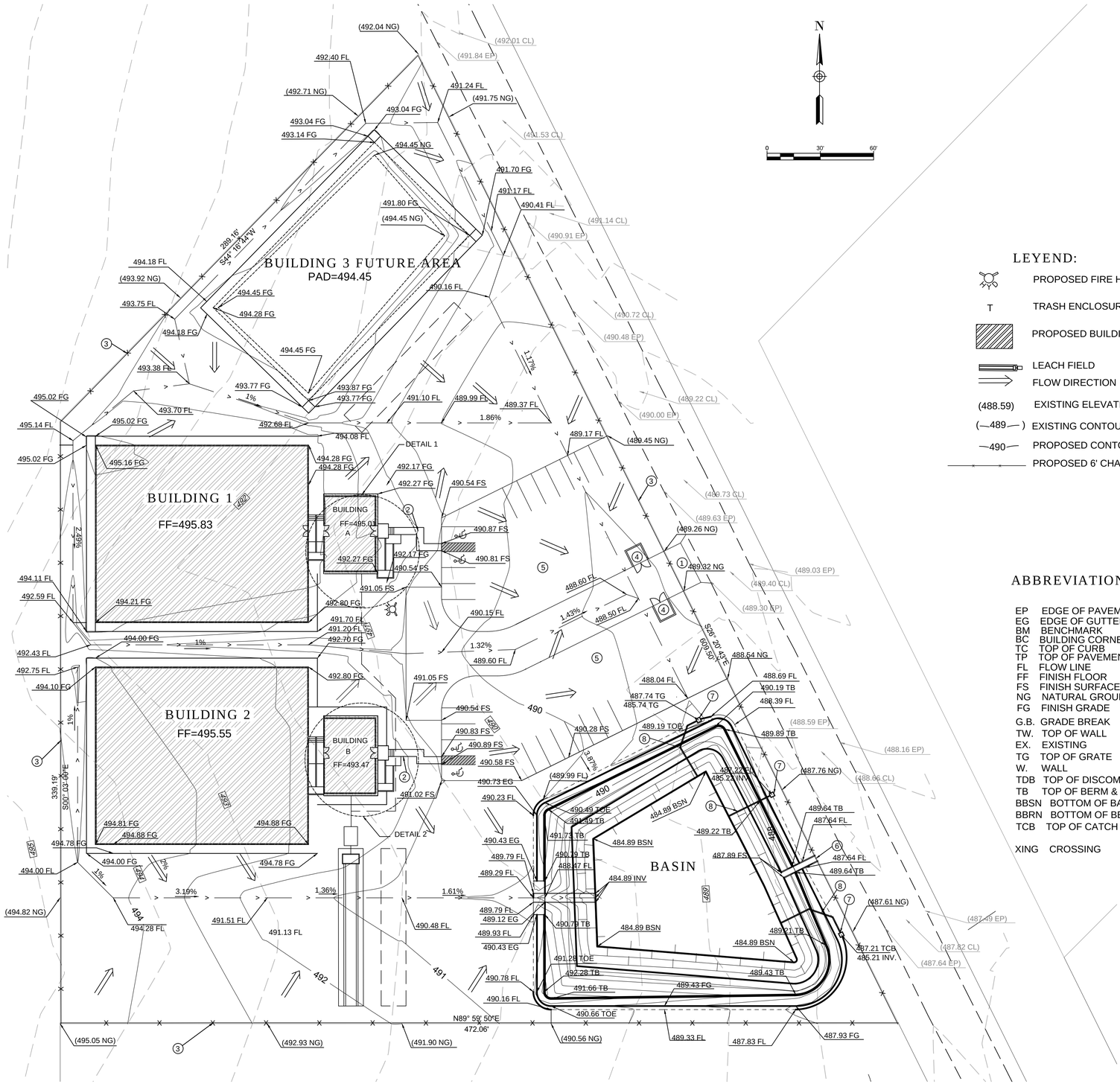
LANDSCAPE PLAN

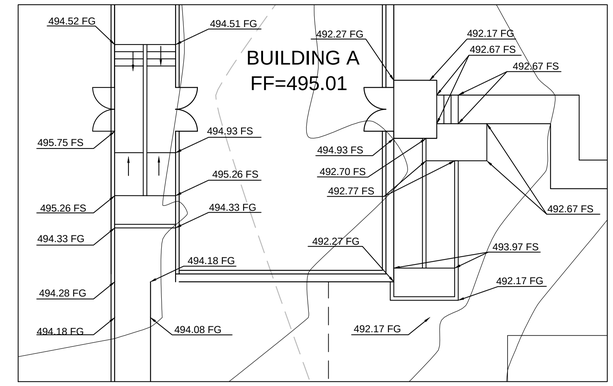
CLIENT:
POLING LAURA
991 VANDERBILT AVE | CLAREMONT, CA 91711

DESIGNED BY:	DRAWN BY:	CHECKED BY:
HA	HA	CD

SCALE 1" = 30'

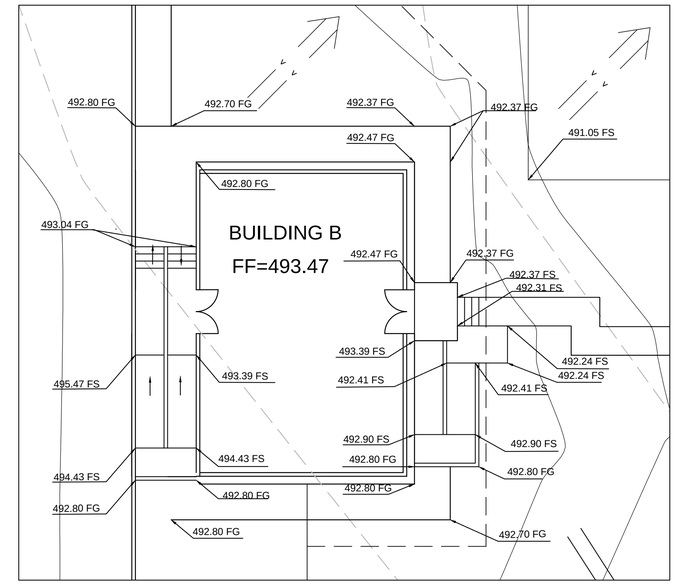
SHEET 1 OF 1





DETAIL 1

SCALE: 1"=10'



DETAIL 2

SCALE: 1"=10'

LEYEND:

- PROPOSED FIRE HYDRANT
- T — TRASH ENCLOSURE
- PROPOSED BUILDING
- LEACH FIELD
- FLOW DIRECTION
- (488.59) — EXISTING ELEVATION
- (489) — EXISTING CONTOUR ELEVATION
- 490 — PROPOSED CONTOUR ELEVATION
- PROPOSED 6' CHAIN LINK FENCE

ABBREVIATIONS

EP	EDGE OF PAVEMENT
EG	EDGE OF GUTTER
BM	BENCHMARK
BC	BUILDING CORNER
TC	TOP OF CURB
TP	TOP OF PAVEMENT
FL	FLOW LINE
FF	FINISH FLOOR
FS	FINISH SURFACE
NG	NATURAL GROUND
FG	FINISH GRADE
G.B.	GRADE BREAK
TW.	TOP OF WALL
EX.	EXISTING
TG	TOP OF GRATE
W.	WALL
TDB	TOP OF DISCOMPSOSE BASE
TB	TOP OF BERM & BASIN
BBSN	BOTTOM OF BASIN
BBRN	BOTTOM OF BERM
TCB	TOP OF CATCH BASIN
XING	CROSSING

CONSTRUCTIONS NOTES:

1. CONSTRUCT DRIVEWAY APPROACH PER STD. 110-2
2. CONSTRUCT 4" PCC OVER COMPACTED EARTH 389.27 SQ. FT.
3. CONSTRUCT 6' CHAIN LINK FENCE 1,7010 L.F.
4. CONSTRUCT TRASH ENCLOSURE AS SHOWN ON PLAN 2 E.A.
5. CONSTRUCT 2-1/2" PAVEMENT MILLING OVER COMPACTED EARTH 22,661 SQ. FT.
6. CONSTRUCT EMERGENCY SPILL AS SHOWN ON PLAN
7. INSTALL 24"X24"X24' CATCH BASIN AS SHOW NON PLAN 3 E.A.
8. INSTALL 8" CORRUGATED DRAIN PIPE AS SHOW NON PLAN 106 L.F.

UNDERGROUND SERVICE ALERT
DIAL TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
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5890 Hwy. 95, Ste. B, Fort Mohave, AZ 88426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd, Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

3353 NEEDLES HIGHWAY

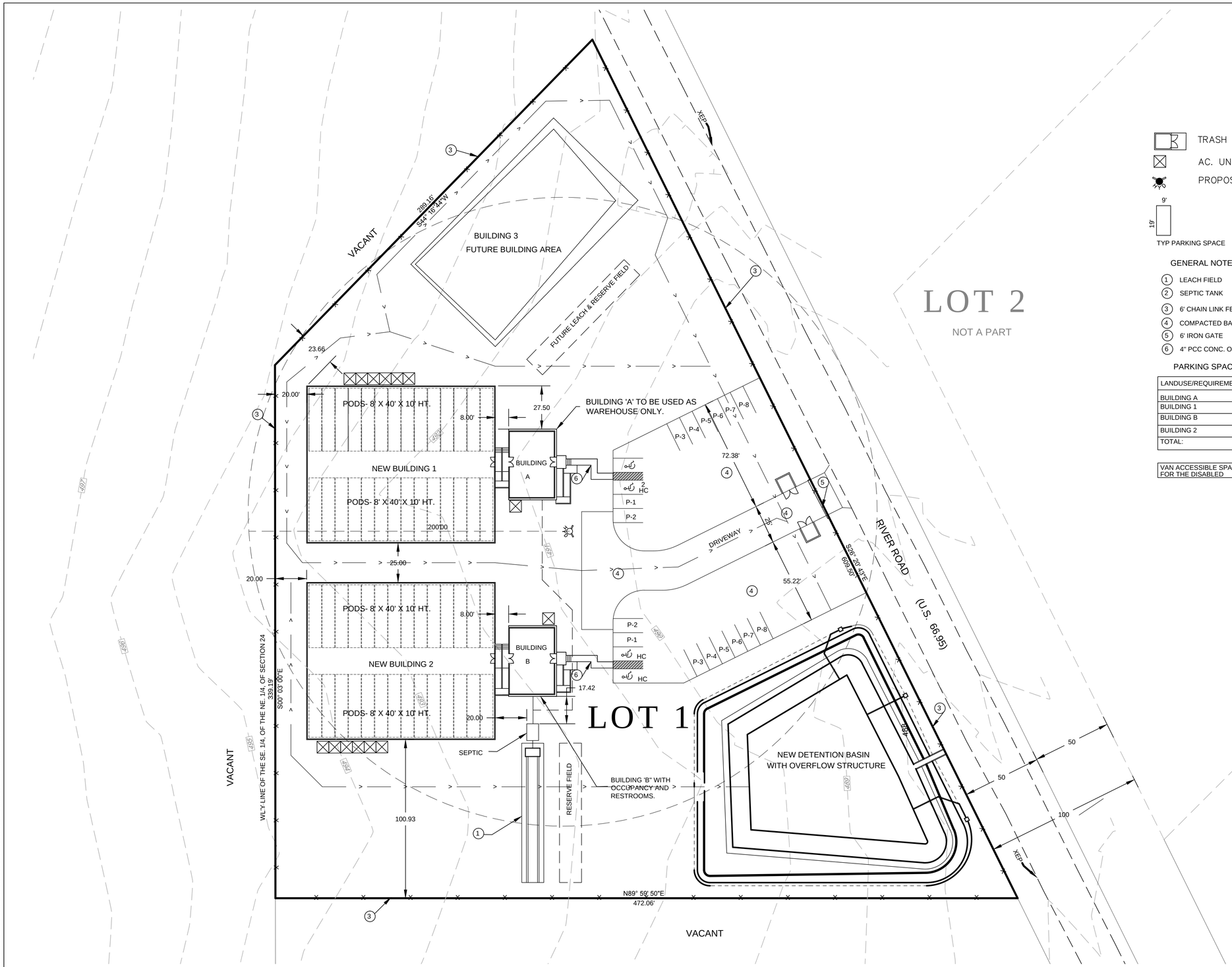
NEEDLES CA
PRECISE GRADING

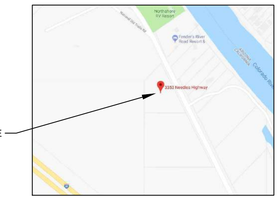
CLIENT:
POLING LAURA
991 VANDERBILT AVE | CLAREMONT, CA 91711

SCALE 1" = 30'

SHEET 2 OF 2

DESIGNED BY:	DRAWN BY:	CHECKED BY:
HA	HA	CD





VICINITY MAP
N.T.S

TRASH ENCLOSURE

AC. UNIT

PROPOSED FIRE HYDRANT

TYP PARKING SPACE

TYP HANDICAP PARKING SPACE

GENERAL NOTES

1. LEACH FIELD
2. SEPTIC TANK
3. 6' CHAIN LINK FENCE
4. COMPACTED BASE
5. 6' IRON GATE
6. 4" PCC CONC. OVER COMPACTED EARTH

PARKING SPACE ANALYSIS

LANDUSE/REQUIREMENT	PARKING RATE	BUILDING SIZE REQUIREMENTS	PARKING REQUIRED	PARKING PROVIDED
BUILDING A	1 / 5000 S.F.	1,350 SF/5000	1	1
BUILDING 1	1 / 5000 S.F.	1,2000 S.F./5000	2	8
BUILDING B	1 / 5000 S.F.	1,350 SF/5000	1	1
BUILDING 2	1 / 5000 S.F.	1,2000 S.F./5000	2	8
TOTAL:			6	18

VAN ACCESSIBLE SPACES FOR THE DISABLED			2	4

BUILDING AREAS (PHASES)

BUILDING 1 - METAL BUILDING (PHASE 1) 12,000 S.F.
BUILDING A - METAL BUILDING WITH 1 RESTROOM & BUILDING SHELL (PHASE 1) 1,350 S.F.

BUILDING 2 - METAL BUILDING (PHASE 1) 12,000 S.F.
BUILDING B - METAL BUILDING OFFICE (PHASE 1) 1,350 S.F.

BUILDING 3 - METAL BUILDING (PHASE 2) 11,250 S.F.

LEGAL DESCRIPTION:
LOT 1 OF PARCEL MAP NO. 6626, IN THE CITY OF NEEDLES, STATE OF CALIFORNIA MB. 63, PG. 99, BEING A PORTION OF THE THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4 OF SECTION 24, TOWNSHIP 9 NORTH RANGE 22 EAST SAN BERNARDINO BASE AND MERIDIAN

APN NO: 0660-101-32-0000
LOT AREA: 163,189 S.F. 3.75 ACRES

UTILITIES

WATER SERVICE TO BE PROVIDED BY CITY, LINE EXTENSION WILL BE NECESSARY
SEWER BY SEPTIC TANK

BUILDINGS COLOR

LIGHTSTONE PANELS ,KOKO BROWN TRIM

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-889-0153
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 86426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-953-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

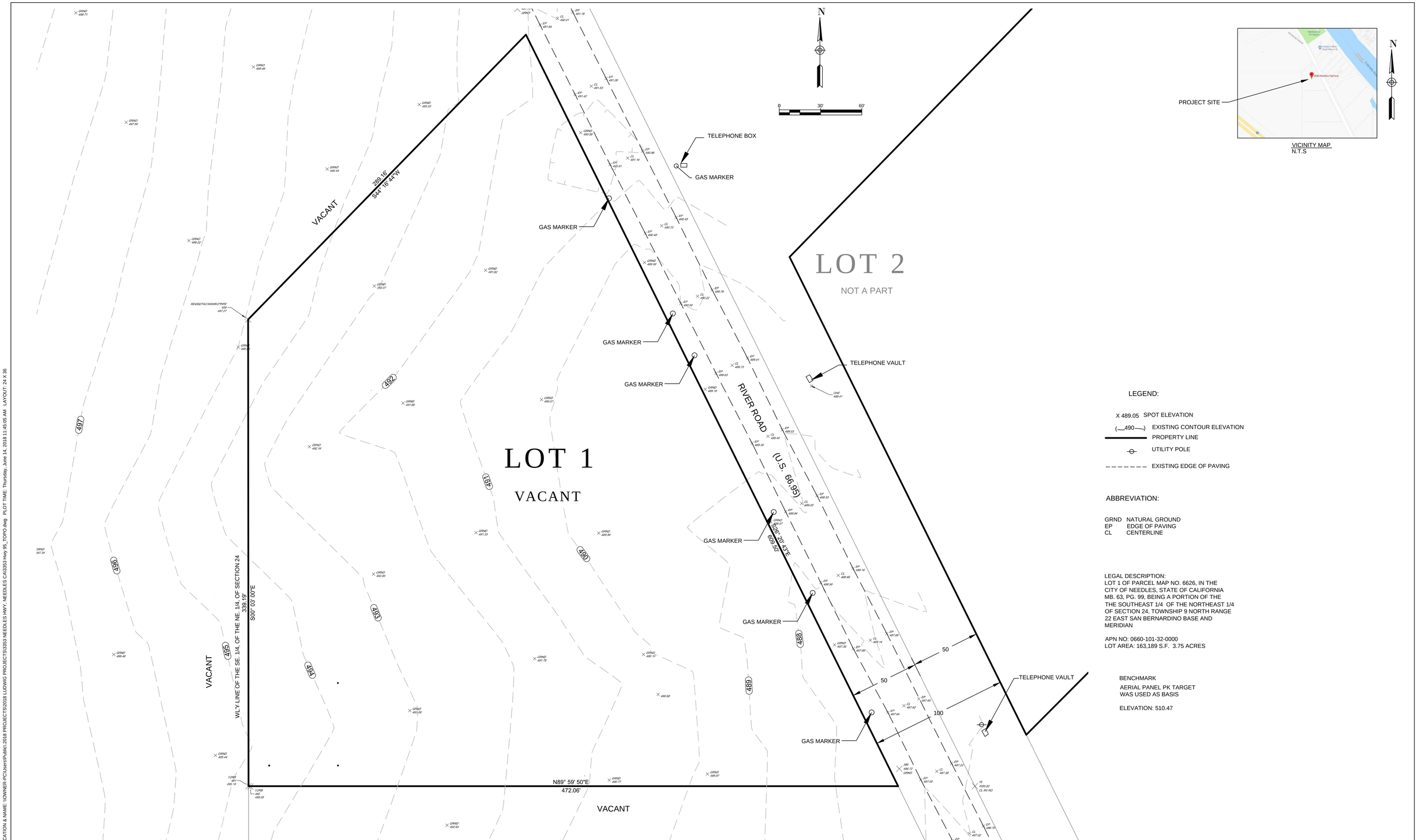
3353 NEEDLES HIGHWAY
NEEDLES CA
PRELIMINARY SITE PLAN

CLIENT:
POLING LAURA
991 VANDERBILT AVE | CLAREMONT, CA 91711

SCALE 1" = 30'

SHEET 1 OF 1

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
HA	HA	CD	01-01



LEGEND:

X 489.05	SPOT ELEVATION
(—490—)	EXISTING CONTOUR ELEVATION
———	PROPERTY LINE
—⊖—	UTILITY POLE
– – – – – – –	EXISTING EDGE OF PAVING

ABBREVIATION:

GRND NATURAL GROUND
EP EDGE OF PAVING
CL CENTERLINE

LEGAL DESCRIPTION:
LOT 1 OF PARCEL MAP NO. 6626, IN THE CITY OF NEEDLES, STATE OF CALIFORNIA MB. 63, PG. 99, BEING A PORTION OF THE THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4 OF SECTION 24, TOWNSHIP 9 NORTH RANGE 22 EAST SAN BERNARDINO BASE AND MERIDIAN

APN NO: 0660-101-32-0000
LOT AREA: 163,189 S.F. 3.75 ACRES

BENCHMARK
AERIAL PANEL PK TARGET
WAS USED AS BASIS

ELEVATION: 510.47

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-889-0153
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 88426, Phone: 928-768-1857, Fax: 928-768-7086
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2126 McCulloch Blvd., Ste. 8 Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

3353 NEEDLES HIGHWAY
NEEDLES CA
EXISTING SITE PLAN

CLIENT:
POLING LAURA
991 VANDERBILT AVE | CLAREMONT, CA 91711

DESIGNED BY:	DRAWN BY:	CHECKED BY:
HA	HA	CD

SCALE 1" = 30'
SHEET 1 OF 1
01-01

PLOT STYLE: HighPR.ctb PROJECT LOCATION & NAME: \\OWNER-PC\Users\Public\2018 PROJECTS\2018 LUDWIG PROJECTS\3353 NEEDLES HWY, NEEDLES CA\3353 Hwy 95_TOPO.dwg PLOT TIME: Thursday, June 14, 2018 11:45:05 AM LAYOUT: 24 X 36


future building site
basin

APPENDIX C

Biological Resources Assessment & Jurisdictional Delineation

FLUID HOLDINGS

BIOLOGICAL RESOURCES ASSESSMENT & JURISDICTIONAL DELINEATION

October 2018

Prepared for:

Micro Lab Farms
297 E. Harrison Street
Corona, California 92879
*

Prepared by:

Jeff Johnson
Pacific BioScience, Inc.
156 Woodburne
Newport Beach, California 92660

Pacific BioScience, Inc.

Biological Resources Assessment

for

Micro Lab Farms

October 2018

Prepared By: _____ Date: 10/10/18

Jeff Johnson
Principal Biologist
(805) 750-3474
Pacific BioScience, Inc.

156 Woodburne
Newport Beach, CA 92660
www.pacificbioscience.com

Table of Contents

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1.0 Introduction

This report summarizes the findings of a biological resources assessment and jurisdictional determination and delineation conducted by Pacific BioScience, Inc. on a parcel of land located along Needles Highway in the City of Needles, California.

This assessment consists of a general biological resources evaluation to identify commonly occurring flora, fauna, and plant communities as well as the potential for the proposed project site to support any special-status biological resources. The presence of features having potential to be under the jurisdiction of the Army Corps of Engineers (ACOE) or the California Department of Fish and Wildlife (CDFW), i.e. wetlands or waterways, was also determined and delineated.

2.0 Project Location

The project site is 3.75 acres in total size and located in the City of Needles, San Bernardino County, California (Exhibits 1 and 2). The site is known as parcel 32 of San Bernardino County Assessor's Parcel Map Book 0660 on page 101. The property is mapped on U.S.G.S. 7.5 minute series topographical quadrangle map Needles in section Township 8 North, Range 22 East, Section 23. It is bounded by Needles Highway on the east with a hotel, resort and Colorado River further to the east. Vacant land with natural vegetation occurs to the north, south and west of the proposed project site.

0 1 2 3 4 Miles

LEGEND

Project Site

FIGURE 1
Project Location

Pacific BioScience, Inc.

LEGEND

Project Limits

Project Site

FIGURE 2
Project Limits

Pacific BioScience, Inc.

3.0 Background

The project site was an open sand and gravel mine for decades prior to operations stopping in the 1960's. Since that time the site has been graded and cleared of vegetation periodically with the most recent clearing occurring in approximately 2008 when the entire bottom of the mining pit was cleared of vegetation and graded. The open pit still exists today and access roads throughout the site continue to be cleared on a regular and frequent basis. The site is currently zoned for sand and gravel mining (S-G) according to the City of Orange Zoning Map.

4.0 Methods

Literature Review

Prior to visiting the project site, a review of the California Natural Diversity Data Base (CNDDB) and Biogeographic Information Observation System (BIOS) was conducted to identify if any special-status plant and animal species are known to occur within in the vicinity. These databases identify recorded locations of special-status plant and animal species in the project vicinity and, therefore, having the potential to occur on the project site. Also reviewed prior to a site visit were U.S. Fish and Wildlife Service Critical Habitat Portal online mapper to determine the presence of designated critical habitat, aerial photographs, and relevant USGS 7.5-minute topographical quadrangles. The CNNDB and USFWS species lists are attached in Appendix A.

Field Survey Methodology

Pacific BioScience Inc. biologist, Jeff Johnson, conducted site visits on May 22, 29, July 23, August 18 and September 22, 2018 between the hours of 0730 and 1700 each day. During site visits in May the skies were clear with temperatures in the 90's, during June the daytime temperature reached 100, and in August temperature were well above 100. The survey conducted in September was during clear sky with temperature in the 90's to 100. These temperatures are typical for the time of year and day. It should be noted that a heavy rainfall occurred during the site visit in July, and again the night before the site visit in August, which is the monsoon season. The entire project site was traversed on foot on each of the visits for assessment of the habitat and identification of common and special-status plant and wildlife species.

A presence absence protocol desert tortoise survey was conducted during the site visits on May 29 and again on September 22. The action area was defined as the entire project site and each adjacent parcel to the north, west, and south. Development occurs beyond these parcels so they were not considered suitable, as well as parcels to the east across Needles Highway. For the purpose of desert

tortoise surveys, the action area was defined because of the potential for indirect impacts to adjacent lands from noise and lighting. No impacts, either direct or indirect, are expected beyond the adjacent parcels. Parallel north\south transects spaced no more than 10 meters apart were traversed on foot to ensure full coverage of the site. Parallel transects outside the action area were also conducted, where possible, at 200, 400, and 600-meter intervals per protocol guidelines.

Plant communities were noted on aerial photographs and all plant species observed were noted in a field notebook.

The site visit also included identification of any potential wetlands or waterways under jurisdiction of the Army Corp of Engineers, California Department of Fish and Wildlife, or California Regional Water Quality Control Board.

5.0 Results and Recommendations

Literature Review

A search of the USFWS Critical Habitat Portal revealed that the project does not contain critical habitat for any federal-listed species (USFWS 2018). The project site does not occur within any refuges; however, it is located near the Colorado River. Because of it's proximity to the Colorado River, The Lower Colorado River Multi-Species Habitat Conservation Program and the species covered by that program were reviewed and evaluated.

Based on the most recent version of the CNDDB (CDFW 2018), no special-status habitats are known to occur within the project limits. There are recorded occurrences of 3 special-status plant species and 36 special-status wildlife species within the vicinity of the proposed project.

Existing Conditions

The project site is highly disturbed from OHV use, transients, several existing dirt access roads within the project limits, and minor amounts of illegal residential and commercial dumping. See Appendix C for photo log.

Soils

The project site is mapped as containing one soil series. A soil series is a group of soils with similar profiles. These profiles include major horizons with similar thickness, arrangement, and other important characteristics, which may promote favorable conditions for certain biological resources. The soil type found on the project site is:

71- Lagunita sand, 0 to 1 percent slopes: consists of very deep, excessively drained soils that form in stratified stream alluvium from mixed sources. These soils are found at elevations between 75 to 1,400 feet.

Field Survey

Plant Communities

The project site contains one plant community type: Creosote bush/allscale scrub. A complete description of this community is based on Sawyer and Keeler-Wolf A Manual of California Vegetation, 2nd Edition (2014) and is provided below. However, it should be noted that the plant community present on the project site is disturbed.

Creosote Bush/Allscale Scrub (Disturbed)
Creosote bush/allscale scrub is a habitat classification that includes areas of relatively open cover dominated by creosote bush (*Larrea tridentata*) with allscale (*Atriplex polycarpa*) as a co-dominant and is common throughout the Mojave Desert. The herbaceous layer is intermittent to open with seasonal annuals or perennial grasses. Soils found within this habitat classification are well-drained. Disturbed creosote bush scrub is identical in species composition, habitat, and soil type to that of the undisturbed creosote bush scrub; however, it exhibits a relatively higher level of disturbance (25-50%) and the herbaceous layer consists primarily of non-native grasses. This plant community is found throughout the proposed project site.

Plant Species

The following plants were observed within the project site: creosote bush (Larrea tridentate), allscale (Atriplex polycarpa), honey mesquite (Prospis glandulosa), *Opuntia* sp., Russian thistle (Salsola tragus), and *Tamarisk* sp. Three special-status plants, spiny-hair blazing star (*Mentzelia tricuspis*), threecorner milkvetch (*Astragalus geyeri* var. *triquetrus*), and sticky buckwheat (*Eriogonum viscidulum*), are noted as occurring within the region of the project site (CDFW 2018). Below is a description of habitat requirements of these special-status plants. Due to the highly disturbed nature of the project site, soil requirements, and plant community association, these special-status plants are not expected to occur within the project limits. No individual plants of these species were observed during the site visits. Below is a table of all plant species that were evaluated.

Table 1: Special Status Plant Species Potentially Occurring within the Project Region

Scientific Name Common Name	Status	Habitat Requirements	Rationale	Potential for Occurrence/ Conclusion
PLANTS				

Scientific Name Common Name	Status	Habitat Requirements	Rationale	Potential for Occurrence/ Conclusion
Astragalus geyeri var. *triquetrus* Threecorner milkvetch	BLM Sensitive; LCR MSHCP Listed.	Sandy soils with sparce gravel. Elev. 1200-2450m. Range restricted to Clark and Lincoln Couties, NV; and Mohave County, AZ	Outside of known range.	Not expected to occur, therefore no effect on species. Not observed during survey.
Eriogonum viscidulum Sticky buckwheat	BLM Sensitive; LCR MSHCP listed.	Sandy washes with deep loose sand. Range restricted to Clark and Lincoln Couties, NV; and Mohave County, AZ	Outside of known range.	Not expected to occur, therefore no effect on species. Not observed during survey.
Mentzelia tricuspis Spiny-hair blazing star	CNPS List 2B.1	Mojavean desert scrub; sandy or gravelly slopes and washes, 150-1280 m.	Marginal suitable habitat occurs on site. Low quality disturbed habitat.	Low potential to occur. Not observed during survey.

Special-status Wildlife

California Department of Fish and Wildlife CNDDB and US Fish and Wildlife databases were researched to determine special-status species known to occur within the vicinity of the site, and therefore with potential to occur on the site. Also, wildlife species covered by the Lower Colorado Multi-species Habitat Conservation Program were considered. Below is a table of all species evaluated with discussion further below for species that have potential to occur on site. A total of 36 special-status wildlife species (1 invertebrate, 4 fishes, 3 amphibians, 3 reptiles, 15 birds, and 10 bats) are noted as occurring within the region of the project site (US F&WS 2018) (CDFW 2018) (LCR MSHCP 2018).

Table 2: Special Status Animal Species Potentially Occurring within the Project Region

Scientific Name Common Name	Status	Habitat Requirements	Rationale	Potential for Occurrence/ Conclusion
INVERTEBRATES				
Hesperopsis gracielae MaNeill's sootywing	CA: S1	Requires dense stands of quailbush.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
FISHES				

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Catostomus latipinnis Flannelmouth sucker	CA S1 Sensitive	Colorado River. Spawns in riffles.	No habitat present.	Not expected to occur, therefore no effect on species.
Gila cypha Humpback chub	US: FE	Colorado River.	No habitat present.	Not expected to occur, therefore no effect on species.
Gila elegans Bonytail	US: FE CA: SE	Colorado River.	No habitat present.	Not expected to occur, therefore no effect on species.
Xyrauchen texanus Razorback sucker	US: FE CA: SE	Colorado River. Spawns in sand gravel rocks.	No habitat present.	Not expected to occur, therefore no effect on species.
AMPHIBIANS				
Bufo Incilus alvarius Colorado River toad	LCR MSHCP listed.	Requires ponds, slow-moving streams, temporary pools.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Rana Lithobates onca Relict leopard frog	LCR MSHCP listed.	Found in Back Canyon Virgin River.	Outside known range.	Not expected to occur, therefore no effect on species.
Rana Lithobates yavapaiensis Lowland leopard frog	BLM sensitive; LCR MSHCP listed.	Permanent and intermittent streams, sloughs, beaver ponds.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
REPTILES				
Gopherus agassizii Desert tortoise	US: FT CA: ST	Historically found throughout the Mojave and Sonoran Deserts into Arizona, Nevada, and Utah. Occurs throughout the Mojave Desert in scattered populations. Found in creosote bush scrub, saltbush scrub, thornscrub (in Mexico), and Joshua tree woodland. Found in the open desert as well as in oases, riverbanks, washes, dunes, and occasionally rocky slopes.	Marginal suitable habitat present.	No sign observed during focused surveys. This species is not expected to occur and therefore, no effect on species.
Phrynosoma mcalli Flat-tailed horn lizard	CDFW: SSC	Sandy flats associated with creosote scrub. Range is Sonoran desert from Coachella Valley south to Mexican border.	Marginal suitable habitat present but outside of known range.	Not expected to occur, therefore no effect on species.

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Thamnophis eques megalops Northern Mexican garterscnake	US: FT	Found near permanent water sources and thick dense bank vegetation.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
BIRDS				
Athene cunicularia Burrowing owl	CDFW: SSC BLM: S	Usually occupies ground squirrel burrows in open, dry grasslands, agricultural and range lands, railroad rights-of-way, margins of highways, golf courses, and airports. Resident over most of southern California (sparsely distributed over desert areas).	Suitable foraging habitat present. Not observed during focused surveys. No suitable burrows observed.	Potential to occur. Not observed during site visits.
Coccyzus americanus occidentalis Western yellow-billed cuckoo	US: Threatened CA: SE BLM: S (Nesting sites are protected.)	Riparian obligate species primarily with willow-cottonwood riparian forests, but other species occur in alder and box elder dominated riparian habitats	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Colaptes chrysoides Gilded flicker	CA: SE	Mature saguaro cactus.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Icteria virens Yellow-breasted chat	CDFW: SSC	Riparian willow thickets.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Ixobrychus exilis Least bittern	CDFW: SSC	Freshwater and brackish marshes.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Laterallus jamaicensis cotumiculus California black rail	CA: ST	Tidal and freshwater marshes.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Melanerpes uropygialis Gila woodpecker	CA: SE BLM: Sensitive	Cottonwood and other desert riparian. Cavity nester in riparian trees or saguaro cactus.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Micranthene whitneyi Elf owl	CA: SE BLM: Sensitive	Cottonwood willow and mesquite riparian along Colorado River.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Myiarchus tyrannulus Brown-crested flycatcher	CDFW: Watch list	Riparian thickets along Colorado River.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Piranga rubra Summer tanager	CDFW: SSC	Occur along streams among willows, cottonwoods, mesquite, or saltcedar	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Pyrocephalus rubinus Vermillion flycatcher	CDFW: SSC	Cottonwood, willow, mesquite and other desert riparian.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Rallus obsoletus yumanensis Yuma Ridgway's rail	US: FE CA: ST, Fully protected	Fresh water marshes along Colorado River.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Toxostoma crissale Crissal thrasher	CDFW: SSC	Desert riparian, dense vegetation along streams.	Suitable habitat is not present	Not expected to occur, therefore no effect on species.
Virep bellii arizonae Arizona Bell's vireo	CA: SE BLM: S	Summer resident along Colorado River, willow thickets.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Setophaga petechial sonorana Sonoran yellow warbler	CA: SSC	Summer resident of Colorado River, riparian, cottonwoods, willows.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
MAMMALS				
Antrozous pallidus Pallid bat	CDFW: SSC BLM: S	Deserts, grasslands, shrublands, woodlands and forests, in open dry habitat with rocky areas for roosting.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Corynorhinus townsendii Townsend's big-eared bat	CA: CT CDFW: SSC BLM: S USFS: S	Coniferous forests and woodlands, semi-desert and montane shrublands	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Chaetodipus penicillatus sobrinus Desert pocket mouse	LCR MSHCP: Listed	Desert areas with coarse vermiculite soils and clumped brush habitat. Avoid open desert scrub areas due to lack of cover.	Suitable habitat is not present.	Not expected to occur, therefore no effect on species.
Lasiurus blossevillii Western red bat	CA: SSC, Candidate	Desert riparian. Roosts in trees.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.

Scientific Name **Common Name**	**Status**	**Habitat Requirements**	**Rationale**	**Potential for Occurrence/ Conclusion**
Lasiurus xanthinus Western yellow bat	CA: SSC	Desert riparian. Roosts in trees.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Lontra Canadensis Sonora Southwestern river otter	CA: SSC	Aquatic habitat along the Colorado River.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Macrotis californicus California leaf-nosed bat	BLM: S CA: SSC	Foraging occurs in desert washes with mesquite, ironwood, Palo verde, catclaw, smoketree.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Ovis Canadensis nelson Desert bighorn sheep	CDFW: Fully protected BLM: S	Open, steep rocky terrain.	Suitable habitat not present.	Not expected to occur, therefore no effect on species.
Sigmodon arizonae plenus Colorado River cotton rat	CDFW: SSC	Grass cattail habitat with developed herbaceous understory.	Suitable not habitat present.	Not expected to occur, therefore no effect on species.
Sigmodon hispidus eremicus Yuma Hispid cotton rat	CDFW: SSC	Backwater habitat along the Colorado River.	Suitable not habitat present.	Not expected to occur, therefore no effect on species.

Designations:
US: United States
CA: California
FE – Federally Endangered
FT – Federally Threatened
SE – State Endangered
ST – State Threatened
CT – Candidate Threatened
CDFW: SSC – Species of Special Concern
CDFW: FP – Fully Protected
CDFW: WL – Watch List
BLM: S – Sensitive
USFS: S – Sensitive
WBWG: M – Medium Priority

As stated above, several special-status wildlife species have the potential to occur within the limits of the project and therefore have a potential to be impacted with the implementation of the proposed project. All other species are not further discussed beyond the extent of the table above because no impact is expected to them.

Desert tortoise (*Gopherus agassizii*) – (Federal: threatened; California: threatened). The proposed project site lies within the known range of the desert tortoise (DT). Therefore, focused protocol surveys to determine presence\absence were conducted. Mr. Jeff Johnson of Pacific BioScience Inc. conducted all focused surveys.

Mr. Johnson has extensive experience conducting DT surveys over the past twenty years for large and small projects including studies for military installations and linear projects such the High Desert Corridor. No individuals or their sign were detected during surveys. Therefore, no impact to this species is expected. Although no individuals or their sign were observed, individuals could occur on the site in the future prior to clearing and grubbing. Pre-construction surveys shall be conducted. If individuals are noted in the future, U.S. Fish and Wildlife Service and California Department of Fish and Game shall be contacted immediately for consultation prior to work commencing.

Burrowing owl (*Athene cunicularia*) – (Federal: None; California: Species of Special Concern). This species occurs in open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. It is a subterranean nester that is dependent upon burrowing mammals, most notably the California ground squirrel. Marginal suitable habitat occurs on site. As such a cursory habitat assessment was conducted on May 22, 2018 by Mr. Jeff Johnson with Pacific BioScience, Inc. No suitable burrows were found on site or on adjacent parcels. Also, no individuals or their sign were observed during any site visit. Therefore, no impact to this species is expected. Although no individuals or their sign were observed, individuals could occur on the site in the future prior to clearing and grubbing. Pre-construction surveys shall be conducted. If individuals are noted in the future, California Department of Fish and Game shall be contacted immediately for consultation prior to work commencing.

Nesting Birds

Suitable habitat for raptors and other migratory birds was noted within and adjacent to the project site. All but two nesting birds are protected under Section 3503 of the Fish and Game Code (FGC), and raptors specifically are protected under Section 3503.5 of the FGC. Additionally, both the Migratory Bird Treaty Act and Section 3513 of the FGC prohibit the take or trading of migratory birds. The nesting period for raptors and other migratory birds is generally recognized by resource agencies as February 15 to August 31. Construction activities that occur during the nesting season could disturb active nests if construction occurs within 500 feet of an active raptor nest and approximately 150 feet for other migratory birds. Impacts to potential avian nesting habitat should be avoided during nesting season, if feasible. If avoidance is not feasible, a minimum of four pre-construction nesting surveys site visits, within 30 days of start of site clearing with the last visit no more than three days prior. No action is necessary if no active nests are found or if construction will occur during the non-breeding season (generally September 1 through February 14).

Jurisdictional Features

The project site was evaluated for the presence of wetland features under state and federal jurisdiction. A search of the USFWS National Wetlands Inventory revealed one drainage feature within the project limits that is potentially jurisdictional. This ephemeral feature appears to flow generally west to east at the extreme north end of the site.

Two additional features occur near the northern boundary of the site and one additional feature at the southern boundary. These features were evaluated and determined to meet the definition of State jurisdictional. Mr. Jeff Johnson of Pacific BioScience, Inc. spoke with Mr. Richard Kim of California Department of Fish and Wildlife on September 18, 2018 to discuss potential of jurisdictional resources on the site and characteristics used to make determinations as the desert region poses challenging conditions. In the absence of riparian vegetation, sign of water flow could be the only characteristic available to delineate boundary of features. Although no riparian vegetation is present on site, sign of historic water flow was observed and it was this characteristic that was used to delineate the boundary of features. See Appendix B for a map of feature locations. A description of each feature is below:

Feature #1 – Episodic ephemeral stream located at the northern end of the proposed project site, 376 feet long with an average width of 8 feet for a total area of 0.069 acres.

Feature #2 – Episodic ephemeral stream located at the center of the proposed project site, 423 feet long with an average width of 14 feet for a total area of 0.136 acres.

Feature #3 – Episodic ephemeral stream located at the southern perimeter of the proposed project site, 456 feet long with an average width of 12 feet for a total area of 0.126 acres.

The proposed project design was modified to avoid Feature #3 at the southern edge of the site. Jurisdictional Features #1 and #2 would be permanently impacted with the implementation of the proposed project and result in permanent impacts to no more than 0.205 acres of CDFW jurisdictional features. As such, a California Department of Fish and Wildlife Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement would be required prior to impacts of these features. Mitigation measure to offset this impact is typically enhancement or creation of similar features on site. The proposed detention basin with native vegetation could satisfy this mitigation if approved by the Department of Fish and Wildlife. As an alternative, off site mitigation could include the restoration, enhancement and preservation of similar features. Details of these mitigation measures will be established in the Section 1600 Lake and Streambed Alteration Agreement permit.

The site was also evaluated to determine Army Corps of Engineers jurisdiction, if

any, under the Section 404 of the Clean Water Act. As with State jurisdiction, determining ACOE jurisdiction can be challenging in the desert region. Characteristics used are: 1) presence of water, 2) soils, and 3) vegetation. As stated previously, only historic sign of water flow was observed. Pacific BioScience, Inc. field biologists were present on-site intentionally during a heavy monsoonal rain event to observe conditions. No water flow was noted. When considering the potential for jurisdiction, connectivity to a traditional navigable waterway must be present. Although the Colorado River occurs approximately 600 feet to the east, no connectivity was observed during the heavy event, although it could, and likely does, during an extreme event. It was determined that ordinarily no water flow occurs off the site and therefore, water flow markings should not be considered "ordinary" high water indications. Surface runoff from Needles Highway ordinarily percolates through the ground and does not reach the Colorado River. Pacific BioScience, Inc. understands that typically larger episodic drainages with ordinary water flow and obvious connectivity to the Colorado River should be jurisdictional as well as all areas directly adjacent to the river that experiences periodic flooding. Features on the project site do not meet these criteria.

6.0 References

California Department of Fish and Game (CDFG). 2005. Biogeographic Information and Observation System (BIOS 5). Website: https://map.dfg.ca.gov/bios/. Accessed March 20, 2018.

California Department of Fish and Wildlife (CDFW). 2015. CNDDB RareFind 5 California Natural Diversity Database Query for Special-Status Species. Website: https://map.dfg.ca.gov/rarefind/view /RareFind.aspx. Accessed March 20, 2018.

California Native Plant Society (CNPS). 2015. Rare Plant Program. Website: http://www.rareplants.cnps.org. Accessed March 20, 2018.

Holland, R. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California, Sacramento: California Department of Fish and Wildlife.

Soil Survey Staff. 2015. Natural Resources Conservation Service: Official Soil Series Descriptions. Website: http://www.nrcs.usda.gov/. Accessed March 24, 2018.

United States Fish and Wildlife Service (USFWS). 2011. Environmental Conservation Online System: U.S. FWS Threatened and Endangered Species Active Critical Habitat Report (online mapper). Website: http://ecos.fws.gov/ecp/report/table/critical-habitat.html. Accessed March 20, 2016.

United States Geological Survey (USGS). 2012. Needles, California 7.5-Minute Topographic Quadrangle Map. Washington, D.C.: U.S. Government Printing Office.

Appendix A: CNDDB and USFWS Species Lists

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06633	**EO Index:**	14746
Key Quad:	Needles (3411475)	**Element Code:**	ABNME0501A
Occurrence Number:	2	**Occurrence Last Updated:**	2011-09-13

Scientific Name: *Rallus obsoletus yumanensis*

Common Name: Yuma Ridgway's rail

Listing Status: **Federal:** Endangered
State: Threatened

CNDDB Element Ranks: **Global:** G5T3
State: S1S2

Rare Plant Rank:

Other Lists: CDFW_FP-Fully Protected
NABCI_RWL-Red Watch List

General Habitat:

NESTS IN FRESHWATER MARSHES ALONG THE COLORADO RIVER AND ALONG THE SOUTH AND EAST ENDS OF THE SALTON SEA.

Micro Habitat:

PREFERS STANDS OF CATTAILS AND TULES DISSECTED BY NARROW CHANNELS OF FLOWING WATER; PRINCIPLE FOOD IS CRAYFISH.

Last Date Observed:	2009-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2009-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	USFWS-HAVASU NWR, UNKNOWN	**Trend:**	Stable
Presence:	Presumed Extant		

Location:

TOPOCK MARSH, THREEMILE LAKE, AND CHANNELS, ON ARIZONA SIDE OF COLORADO RIVER, LAKE HAVASU NWR.

Detailed Location:

TOPOCK MARSH INCL TOPOCK BAY, SACRAMENTO WASH DELTA, LOST LAKE, LOST LAKE CHANNELS, BEAL LAKE, BEAL LAKE CHANNEL, WILLOW LAKE, LOWER GOOSE LAKE, THE GLORY HOLE, HERON LAKE, 1ST, 2ND, 3RD FINGER, NARROW FINGER, ROADSIDE FINGERS & NORTH ARM.

Ecological:

RAILS FIRST OBSERVED BY WELCH ON THIS SITE IN 1966. ONE OF THE MAJOR COLORADO RIVER BREEDING AREAS. RAILS FROM THIS AREA FORAGE, WINTER AND/OR BREED. 1,620 HECTARE LAKE OF DROWNED MESQUITE WITH EXTENSIVE STANDS OF CATTAIL AND BULRUSH.

Threats:

DAM CONSTRUCTION, WATER DIVERSION, AND CHANNELIZATION.

General:

MARSH AREAS HAVE BEEN KNOWN TO SUPPORT YCR HABITAT & WERE CONSISTENTLY STUDIED BY VARIOUS AGENCIES BTWN 1966-2009 AS TOPOCK MARSH & HAVASU NWR. DETECTIONS VARIED FROM 1-120 DEPENDING ON YEAR & SURVEY LOCATION. 2 AT THE GLORY HOLE IN 2009.

PLSS:	T99X, R99X, Sec. UN (X)	**Accuracy:**	nonspecific area	**Area (acres):**	10,156
UTM:	Zone-11 N3851922 E725617	**Latitude/Longitude:**	34.78456 / -114.53424	**Elevation (feet):**	455

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Topock (3411464), Whale Mtn. (3411465), Needles (3411475)

Sources:

CHM05R0001	CH2M HILL - BIOLOGICAL RESOURCES SURVEY REPORT FOR THE AREA OF POTENTIAL EFFECT TOPOCK COMPRESSOR STATION EXPANDED GROUNDWATER EXTRACTION AND TREATMENT SYSTEM NEEDLES, CALIFORNIA. 2005-10-XX
CON02R0002	CONWAY, C. ET AL. (U.S. BUREAU OF RECLAMATION) - POPULATION TRENDS, DISTRIBUTION, AND MONITORING PROTOCOLS FOR THE CALIFORNIA BLACK RAIL (FINAL REPORT) 2002-01-10
FWS06R0002	U.S. FISH & WILDLIFE SERVICE - YUMA CLAPPER RAIL 5-YEAR REVIEW 2006 (PERIOD COVERED BY REVIEW: 2000-2005). 2006-05-30
FWS83R0007	U.S. FISH & WILDLIFE SERVICE - YUMA CLAPPER RAIL RECOVERY PLAN, FINAL. 1983-02-04
GOU75R0001	GOULD, G. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE) - YUMA CLAPPER RAIL STUDY - CENSUSES AND HABITAT DISTRIBUTION, 1973-74 (REPORT NO. 75-2). 1975-04-XX
MCN10R0001	MCNEIL, S. ET AL. (SOUTHERN SIERRA RESEARCH STATION) - YELLOW-BILLED CUCKOO DISTRIBUTION, ABUNDANCE AND HABITAT USE ON THE LOWER COLORADO RIVER AND TRIBUTARIES, 2009 ANNUAL REPORT 2010-06-XX
OHM73R0001	OHMART, R.D. & R.W. SMITH - "NORTH AMERICAN CLAPPER RAIL (RALLUS LONGIROSTRIS) LITERATURE SURVEY WITH SPECIAL CONSIDERATION BEING GIVEN TO THE PAST AND CURRENT STATUS OF YUMANENSIS" (BUREAU OF RECLAMATION) 1973-XX-XX
POW84R0001	POWELL, R.E. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE-BLYTHE) - COLORADO RIVER / YUMA RIVER CLAPPER RAIL SURVEY - 1984 RESULTS AND DISCUSSION. 1984-XX-XX
POW85U0001	POWELL, R. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE-BLYTHE) - TELEPHONE CONVERSATION WITH CARRIE SHAW, CNDDB, REGARDING ARIZONA POPULATION OF YUMA CLAPPER RAIL AT TOPOCK MARSH, OCCURRENCE #2 1985-05-03
POW85U0002	POWELL, R. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE-BLYTHE) - MAPS AND LETTERS DESCRIBING THE CURRENT STATUS OF THE YUMA CLAPPER RAIL (3 SETS OF MAPS). 1985-12-04
POW90U0001	POWELL, R. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE) - YUMA CLAPPER RAIL CENSUS SUMMARY (1990). 1990-XX-XX
SMI73R0001	SMITH, P.M. - YUMA CLAPPER RAIL STUDY, MOHAVE COUNTY, AZ. (TOPOCK MARSH). CDFG ADMINISTRATIVE REPORT; JUNE 1984. 1973-XX-XX
TOM73A0001	TOMLINSON, R. & R. TODD - DISTRIBUTION OF TWO WESTERN CLAPPER RAIL RACES AS DETERMINED BY RESPONSES TO TAPED CALLS. THE CONDOR 75:177-183. 1973-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06615	**EO Index:**	14710
Key Quad:	Needles (3411475)	**Element Code:**	ABNRB02022
Occurrence Number:	114	**Occurrence Last Updated:**	2015-05-15

Scientific Name: *Coccyzus americanus occidentalis*

Common Name: western yellow-billed cuckoo

Listing Status: **Federal:** Threatened
State: Endangered

CNDDB Element Ranks: **Global:** G5T2T3
State: S1

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
NABCI_RWL-Red Watch List
USFS_S-Sensitive
USFWS_BCC-Birds of Conservation Concern

General Habitat:

RIPARIAN FOREST NESTER, ALONG THE BROAD, LOWER FLOOD-BOTTOMS OF LARGER RIVER SYSTEMS.

Micro Habitat:

NESTS IN RIPARIAN JUNGLES OF WILLOW, OFTEN MIXED WITH COTTONWOODS, WITH LOWER STORY OF BLACKBERRY, NETTLES, OR WILD GRAPE.

Last Date Observed:	1986-06-28	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2009-07-02	**Occurrence Rank:**	Unknown
Owner/Manager:	USBOR, USFWS-HAVASU NWR	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

HAVASU NATIONAL WILDLIFE REFUGE, MOJAVE VALLEY, SE OF NEEDLES ALONG COLORADO RIVER BETWEEN TOPOCK MARSH AND I-40.

Detailed Location:

GAINES SITE CR2, 1977. 1996-2001 LOCATION GIVEN ONLY AS "LAKE HAVASU." SURVEYS FROM 2007 ("TOPOCK MARSH RESTORATION") & 2009 ("TOPOCK PLATFORM HAVTPR") AT 21 ACRE RESTORATION SITE ON AZ SIDE VICINITY OF SECTION 15.

Ecological:

HABITAT CONSISTED OF FREMONT COTTONWOOD AND GOODDINGS WILLOW SURROUNDED BY SALT CEDAR WITH A MESQUITE RESTORATION PLOT ADJACENT TO THE SITE. TAMARISK, ARROWWEED, AND AGRICULTURAL FIELD SURROUNDED THE SITE. NO STANDING WATER IN 2007.

Threats:

General:

7 OBSERVED (POSSIBLY NESTING), 1977. 1 OBSERVED 10 JUN 1983. 1 UNMATED MALE & 2 PAIRS (1 WITH CONFIRMED NEST) OBSERVED 28 JUN 1986. 0 FOUND IN 1996 & 1997. DETECTED IN 1998, 2000, & 2001. 1+ OBSERVED 12 JUN-27 JUL 2007. 1 OBS 2 JUL 2009.

PLSS:	T16N, R22W, Sec. 01 (G)	**Accuracy:**	specific area	**Area (acres):**	2,857
UTM:	Zone-11 N3852933 E723245	**Latitude/Longitude:**	34.79419 / -114.55987	**Elevation (feet):**	470

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

GAI77R0001	GAINES, D. - CURRENT STATUS AND HABITAT REQUIREMENTS OF THE YELLOW-BILLED CUCKOO IN CALIFORNIA. ENDANGERED WILDLIFE PROJECT. E-1-1. CALIFORNIA DEPARTMENT OF FISH AND GAME. 1977-XX-XX
GAI77R0002	GAINES, D. - THE STATUS OF SELECTED RIPARIAN FOREST BIRDS IN CALIFORNIA - A PRELIMINARY SURVEY AND REVIEW. UNPUBLISHED REPORT TO NONGAME WILDLIFE INVESTIGATIONS, CALIFORNIA DEPT OF FISH & GAME. 1977-XX-XX
HUN83F0029	HUNTER, W. - FIELD SURVEY FORM FOR COCCYZUS AMERICANUS OCCIDENTALIS 1983-XX-XX
HUN83U0001	HUNTER, W. - VEGETATION MAPS PREPARED FOR BUREAU OF RECLAMATION AS PART OF A BIRD SURVEY FOR CALIFORNIA DEPARTMENT OF FISH AND GAME 1983-XX-XX
JOH08R0001	JOHNSON, M. ET AL. (U.S. GEOLOGICAL SURVEY) - YELLOW-BILLED CUCKOO DISTRIBUTION, ABUNDANCE, AND HABITAT USE ALONG THE LOWER COLORADO RIVER AND ITS TRIBUTARIES, 2007 ANNUAL REPORT. 2008-XX-XX
LAY86F0001	LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX
MCK02U0001	MCKERNAN, R. & G. BRADEN (SAN BERNARDINO COUNTY MUSEUM) - STATUS, DISTRIBUTION AND HABITAT AFFINITIES OF THE SOUTHWESTERN WILLOW FLYCATCHER ALONG THE LOWER COLORADO RIVER, YEAR 6 - 2001 2002-05-XX
MCN10R0001	MCNEIL, S. ET AL. (SOUTHERN SIERRA RESEARCH STATION) - YELLOW-BILLED CUCKOO DISTRIBUTION, ABUNDANCE AND HABITAT USE ON THE LOWER COLORADO RIVER AND TRIBUTARIES, 2009 ANNUAL REPORT 2010-06-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	86676	**EO Index:**	87668
Key Quad:	Needles NW (3411486)	**Element Code:**	ABNSB09010
Occurrence Number:	5	**Occurrence Last Updated:**	2012-09-10

Scientific Name: *Micrathene whitneyi*

Common Name: elf owl

Listing Status: **Federal:** None
State: Endangered

CNDDB Element Ranks: **Global:** G5
State: S1

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_LC-Least Concern
USFWS_BCC-Birds of Conservation Concern

General Habitat:

IN CALIFORNIA, NESTING AREA LIMITED TO COTTONWOOD-WILLOW & MESQUITE RIPARIAN ZONE ALONG THE COLORADO RIVER.

Micro Habitat:

NESTS IN DESERTED WOODPECKER HOLES, OFTEN IN LARGER TREES WHICH OFFER INSULATION FROM HIGH DAYTIME TEMPERATURES.

Last Date Observed:	1977-04-29	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-05-04	**Occurrence Rank:**	None
Owner/Manager:	PVT	**Trend:**	Decreasing
Presence:	Possibly Extirpated		

Location:

MOUTH OF PIUTE WASH, BETWEEN THE COLORADO RIVER AND NEEDLES HWY, ABOUT 6.25 MILES NNW OF NEEDLES.

Detailed Location:

MAPPED GENERALLY TO REMSEN'S (1976) AND ROBERSON'S (1977) EBIRD LOCATIONS AND TO THE GENERAL UNCLEARED HABITAT AT PIUTE WASH SURVEYED BY LAYMON & HALTERMAN (1987) AND GOULD (1998-1999). AREA NOT CLEARED FOR AGRICULTURE IN 2010 AERIAL.

Ecological:

HABITAT DESCRIBED AS MESQUITE, SALT CEDAR, & PALO VERDE IV (1987), & AS DESERT RIPARIAN WITH SALT CEDAR & A FEW WILLOWS (1998). VISITED, BUT NOT SURVEYED IN 1999; HABITAT BURNED WITH CHARRED SALT CEDAR & NEW 3-FT TALL SALT CEDAR SPROUTS.

Threats:

BURNING OF HABITAT AND INVASION OF SALT CEDAR. POTENTIAL FOR AREA TO BE CLEARED FOR AGRICULTURE.

General:

4 OBSERVED AT AN ACTIVE NEST CAVITY ON 10 APR 1976. 2 OBSERVED AT A NEST CAVITY ON 29 APR 1977. NONE DETECTED IN 1987. NONE DETECTED DURING DFG SURVEYS IN 1998. SITE VISITED, BUT NOT SURVEYED IN 1999 DUE TO DEGRADED HABITAT (BURNED).

PLSS:	T10N, R22E, Sec. 25 (S)	**Accuracy:**	3/5 mile	**Area (acres):**	0
UTM:	Zone-11 N3867797 E715623	**Latitude/Longitude:**	34.92975 / -114.63929	**Elevation (feet):**	485

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles NW (3411486)

Sources:

GOU98F0010	GOULD, G. ET AL. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE) - FIELD SURVEY FORM FOR MICRATHENE WHITNEYI 1998-04-16
GOU99F0002	GOULD, G. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE) - FIELD SURVEY FORM FOR MICRATHENE WHITNEYI 1999-05-04
HAL89A0001	HALTERMAN, M. ET AL. - STATUS & DISTRIBUTION OF THE ELF OWL IN CALIFORNIA. WESTERN BIRDS 20:71-80. 1989-XX-XX
LAY87R0001	HALTERMAN, M. ET AL. - POPULATION ASSESSMENT OF THE ELF OWL IN CALIFORNIA. REPORT AND FIELD SURVEY FORMS (INCLUDES FIELD SURVEY FOR OTHER SPECIAL ANIMALS AT SITES AND NEGATIVE DATA). 1987-08-XX
REM76U0001	REMSEN, V. - CHECKLIST S4059117 FROM EBIRD: AN ONLINE DATABASE OF BIRD DISTRIBUTION AND ABUNDANCE. AVAILABLE: HTTP://WWW.EBIRD.ORG. 1976-04-10
ROB77U0001	ROBERSON, D. - CHECKLIST S5652099 FROM EBIRD: AN ONLINE DATABASE OF BIRD DISTRIBUTION AND ABUNDANCE. AVAILABLE: HTTP://WWW.EBIRD.ORG. 1977-04-29
RYA98F0010	RYAN ET AL. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE) - FIELD SURVEY FORM FOR MICRATHENE WHITNEYI 1998-05-04
RYA98F0012	RYAN ET AL. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE) - FIELD SURVEY FORM FOR MICRATHENE WHITNEYI & ICTERIA VIRENS 1998-05-19

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	64822	**EO Index:**	64901
Key Quad:	Needles (3411475)	**Element Code:**	ABNSB10010
Occurrence Number:	810	**Occurrence Last Updated:**	2006-06-06

Scientific Name: *Athene cunicularia*

Common Name: burrowing owl

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G4
State: S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFWS_BCC-Birds of Conservation Concern

General Habitat:

OPEN, DRY ANNUAL OR PERENNIAL GRASSLANDS, DESERTS, AND SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro Habitat:

SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Last Date Observed:	2005-04-11	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2005-04-11	**Occurrence Rank:**	Excellent
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

1.1 MILE SE OF THE INTERSECTION OF I-40 AND HIGHWAY 95 (EAST BROADWAY STREET), SOUTH EDGE OF NEEDLES.

Detailed Location:

Ecological:

HABITAT CONSISTS OF CREOSOTE BUSH SCRUB ON SANDY/ROCKY SOILS; BURROW SITS ON THE EAST-FACING SLOPE OF A HILL.

Threats:

THREATENED BY PRIVATE DEVELOPMENT.

General:

2 ADULTS OBSERVED AT AN ACTIVE BURROW SITE ON 11 APR 2005.

PLSS:	T08N, R23E, Sec. 04, SW (S)	**Accuracy:**	80 meters	**Area (acres):**	0
UTM:	Zone-11 N3854732 E720841	**Latitude/Longitude:**	34.81091 / -114.58565	**Elevation (feet):**	550

County Summary:	**Quad Summary:**
San Bernardino	Needles (3411475)

Sources:

DAV05F0001 DAVENPORT, A. - FIELD SURVEY FORM FOR ATHENE CUNICULARIA (BURROW SITE) 2005-04-11

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	64823	**EO Index:**	64902
Key Quad:	Needles (3411475)	**Element Code:**	ABNSB10010
Occurrence Number:	811	**Occurrence Last Updated:**	2006-06-06

Scientific Name: *Athene cunicularia*

Common Name: burrowing owl

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G4
State: S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFWS_BCC-Birds of Conservation Concern

General Habitat:

OPEN, DRY ANNUAL OR PERENNIAL GRASSLANDS, DESERTS, AND SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro Habitat:

SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Last Date Observed:	2005-07-01	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2005-07-01	**Occurrence Rank:**	Good
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

0.25 MILE ENE OF THE INTERSECTION OF I-40 AND HIGHWAY 95 (EAST BROADWAY STREET), SOUTH EDGE OF NEEDLES.

Detailed Location:

Ecological:

HABITAT CONSISTS OF CREOSOTE BUSH SCRUB ON SANDY/ROCKY SOILS; BURROW SITS ON THE NORTH-FACING SLOPE OF A BANK.

Threats:

THREATENED BY PRIVATE DEVELOPMENT.

General:

2 ADULTS OBSERVED AT AN ACTIVE BURROW SITE ON 11 APR 2005; 3 FLEDGLINGS WERE OBSERVED ON 1 JUL 2005.

PLSS:	T09N, R23E, Sec. 32, SE (S)	**Accuracy:**	80 meters	**Area (acres):**	0
UTM:	Zone-11 N3856311 E720168	**Latitude/Longitude:**	34.82529 / -114.59259	**Elevation (feet):**	523

County Summary:	**Quad Summary:**
San Bernardino	Needles (3411475)

Sources:

DAV05F0002 DAVENPORT, A. - FIELD SURVEY FORM FOR ATHENE CUNICULARIA (BURROW SITE) 2005-04-11

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	A5598	**EO Index:**	107339
Key Quad:	Needles (3411475)	**Element Code:**	ABNSB10010
Occurrence Number:	2008	**Occurrence Last Updated:**	2017-07-31

Scientific Name: *Athene cunicularia*

Common Name: burrowing owl

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G4
State: S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFWS_BCC-Birds of Conservation Concern

General Habitat:

OPEN, DRY ANNUAL OR PERENNIAL GRASSLANDS, DESERTS, AND SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro Habitat:

SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Last Date Observed:	2016-11-18	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2016-11-18	**Occurrence Rank:**	Good
Owner/Manager:	SBD COUNTY	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ABOUT 0.2 MILES SW OF SAN CLEMENTE ST AT CLARY DR AND 1.0 MILES SW OF I-40 AT D ST IN NEEDLES.

Detailed Location:

MAPPED TO PROVIDED COORDINATES.

Ecological:

BURROW IN DESERT CREOSOTE SCRUB NEAR LEVEE USED FOR STORM WATER CONTROL, AND NEAR URBAN DEVELOPMENT.

Threats:

DEVELOPMENT.

General:

1 ADULT PERCHED AT ENTRANCE TO BURROW OBSERVED ON 18 NOV 2016. FURTHER FIELDWORK NEEDED TO DETERMINE EXTENT OF OVERWINTERING USE AT SITE.

PLSS:	T09N, R23E, Sec. 31, SE (S)	**Accuracy:**	80 meters	**Area (acres):**	5
UTM:	Zone-11 N3855942 E717977	**Latitude/Longitude:**	34.82244 / -114.61663	**Elevation (feet):**	679

County Summary:	**Quad Summary:**
San Bernardino	Needles (3411475)

Sources:

STR16F0005 STRATTON, G. - FIELD SURVEY FORM FOR ATHENE CUNICULARIA [SC-013417]. 2016-11-18

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06605	**EO Index:**	25408
Key Quad:	Needles (3411475)	**Element Code:**	ABNYF04150
Occurrence Number:	15	**Occurrence Last Updated:**	2012-04-11

Scientific Name: *Melanerpes uropygialis*

Common Name: Gila woodpecker

Listing Status: **Federal:** None
State: Endangered

CNDDB Element Ranks: **Global:** G5
State: S1

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_LC-Least Concern
USFWS_BCC-Birds of Conservation Concern

General Habitat:

IN CALIFORNIA, INHABITS COTTONWOODS AND OTHER DESERT RIPARIAN TREES, SHADE TREES, AND DATE PALMS.

Micro Habitat:

CAVITY NESTER IN RIPARIAN TREES OR SAGUARO CACTUS.

Last Date Observed:	1983-04-21	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1983-04-21	**Occurrence Rank:**	Unknown
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

E END OF NEEDLES MUNICIPAL GOLF COURSE, ABOUT 1 MI N OF I-40 AT E BROADWAY ST, NEEDLES.

Detailed Location:

MAPPED TO 1983 MAP AND TRS. 1910: MVZ RECORD LOCATION GIVEN AS "COLORADO RIVER, NEEDLES, SAN BERNARDINO CA." GEOREFERENCED LOCATION BY MVZ ARE IN DOWNTOWN NEEDLES. LOCALITY OF USNM, CAS SPECIMENS IS "NEEDLES."

Ecological:

GOLF COURSE WITH WILLOW-SALT CEDAR ASSOCIATION.

Threats:

SITE BOUNDED ON ALL SIDES BY DEVELOPMENT.

General:

2 MALES COLLECTED BY HOLLISTER MAY 1905 (USNM #196115-6). 2 DETECTED BY GRINNELL 17 FEB 1910. 1 MALE COLLECTED BY DIXON 18 FEB 1910 (MVZ #12733). 1 FEMALE COLLECTED BY KUSCHE 1 JAN 1922 (CAS #25320). 1 ACTIVE PAIR DETECTED 21 APR 1983.

PLSS:	T09N, R23E, Sec. 29, SE (S)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-11 N3857661 E719995	**Latitude/Longitude:**	34.83749 / -114.59413	**Elevation (feet):**	475

County Summary:	**Quad Summary:**
San Bernardino	Needles (3411475)

Sources:

GRI10U0018	GRINNELL, J. (MUSEUM OF VERTEBRATE ZOOLOGY) - FIELD NOTES FROM EXPEDITION 15 FEB-15 MAY 1910: "COLORADO RIVER, IN CALIFORNIA AND ARIZONA." 1910-05-15
HOL05S0002	HOLLISTER, N. (U.S. NATIONAL MUSEUM OF NATURAL HISTORY) - USNM SPECIMENS #196115 & 196116 COLLECTED AT "NEEDLES," SAN BERNARDINO COUNTY. 1905-05-11
HUN83F0019	HUNTER, W.C. - FIELD SURVEY FORM FOR MELANERPES UROPYGIALIS 1983-XX-XX
HUN83U0001	HUNTER, W. - VEGETATION MAPS PREPARED FOR BUREAU OF RECLAMATION AS PART OF A BIRD SURVEY FOR CALIFORNIA DEPARTMENT OF FISH AND GAME 1983-XX-XX
KUS22S0001	KUSCHE, J. (CALIFORNIA ACADEMY OF SCIENCES) - CAS SPECIMEN #25320 COLLECTED AT "NEEDLES," SAN BERNARDINO COUNTY. 1922-01-01
MVZ10S0003	MUSEUM OF VERTEBRATE ZOOLOGY (UNIVERSITY OF CALIFORNIA, BERKELEY) - MVZ 12733 COLLECTED BY JOSEPH DIXON (#514) AT "COLORADO RIVER, NEEDLES." 1910-02-18

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06611	**EO Index:**	25400
Key Quad:	Needles (3411475)	**Element Code:**	ABNYF04150
Occurrence Number:	27	**Occurrence Last Updated:**	2012-04-11

Scientific Name: *Melanerpes uropygialis*

Common Name: Gila woodpecker

Listing Status: **Federal:** None
State: Endangered

CNDDB Element Ranks: **Global:** G5
State: S1

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_LC-Least Concern
USFWS_BCC-Birds of Conservation Concern

General Habitat:

IN CALIFORNIA, INHABITS COTTONWOODS AND OTHER DESERT RIPARIAN TREES, SHADE TREES, AND DATE PALMS.

Micro Habitat:

CAVITY NESTER IN RIPARIAN TREES OR SAGUARO CACTUS.

Last Date Observed:	1987-04-13	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1987-04-13	**Occurrence Rank:**	Fair
Owner/Manager:	CITY OF NEEDLES	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

NEEDLES SEWAGE DISPOSAL SITE, ALONG COLORADO RIVER SE OF NEEDLES.

Detailed Location:

1910: MVZ RECORD LOCATION GIVEN AS "COLORADO RIVER, NEEDLES, SAN BERNARDINO CA." LOCALITY OF USNM, CAS SPECIMENS IS "NEEDLES."

Ecological:

AREA POSSIBLY USED FOR BREEDING; 40 ACRES OF SCATTERED PATCHES OF WILLOW AND SALT CEDAR, WITH SOME MESQUITE (1987).

Threats:

POSSIBLY THREATENED BY ENLARGEMENT OR MANIPULATION OF DISPOSAL SITE.

General:

2 MALES COLLECTED BY HOLLISTER MAY 1905 (USNM #196115-6). 2 DETECTED BY GRINNELL 17 FEB 1910. 1 MALE COLLECTED BY DIXON 18 FEB 1910 (MVZ #12733). 1 FEMALE COLLECTED BY KUSCHE 1 JAN 1922 (CAS #25320). 2 DETECTED 13 APR 1987.

PLSS:	T09N, R23E, Sec. 33, NW (S)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-11 N3856869 E720420	**Latitude/Longitude:**	34.83027 / -114.58969	**Elevation (feet):**	470

County Summary:	**Quad Summary:**
San Bernardino	Needles (3411475)

Sources:

GRI10U0018	GRINNELL, J. (MUSEUM OF VERTEBRATE ZOOLOGY) - FIELD NOTES FROM EXPEDITION 15 FEB-15 MAY 1910: "COLORADO RIVER, IN CALIFORNIA AND ARIZONA." 1910-05-15
HOL05S0002	HOLLISTER, N. (U.S. NATIONAL MUSEUM OF NATURAL HISTORY) - USNM SPECIMENS #196115 & 196116 COLLECTED AT "NEEDLES," SAN BERNARDINO COUNTY. 1905-05-11
KUS22S0001	KUSCHE, J. (CALIFORNIA ACADEMY OF SCIENCES) - CAS SPECIMEN #25320 COLLECTED AT "NEEDLES," SAN BERNARDINO COUNTY. 1922-01-01
LAY87F0021	LAYMON, S. & M. HALTERMAN - FIELD SURVEY FORM FOR MELANERPES UROPYGIALIS AT NEEDLES SEWAGE DISPOSAL SITE, OBSERVED DURING ELF OWL ASSESSMENT PROJECT 1987-04-13
MVZ10S0003	MUSEUM OF VERTEBRATE ZOOLOGY (UNIVERSITY OF CALIFORNIA, BERKELEY) - MVZ 12733 COLLECTED BY JOSEPH DIXON (#514) AT "COLORADO RIVER, NEEDLES." 1910-02-18

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06580	**EO Index:**	25270
Key Quad:	Needles SW (3411476)	**Element Code:**	ABPAE36010
Occurrence Number:	27	**Occurrence Last Updated:**	1989-08-10

Scientific Name: *Pyrocephalus rubinus*

Common Name: vermilion flycatcher

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5

State: S2S3

Rare Plant Rank:

Other Lists: CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern

General Habitat:

DURING NESTING, INHABITS DESERT RIPARIAN ADJACENT TO IRRIGATED FIELDS, IRRIGATION DITCHES, PASTURES, AND OTHER OPEN, MESIC AREAS.

Micro Habitat:

NEST IN COTTONWOOD, WILLOW, MESQUITE, AND OTHER LARGE DESERT RIPARIAN TREES.

Last Date Observed:	1938-03-15	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1938-03-15	**Occurrence Rank:**	Unknown
Owner/Manager:	PVT, BLM	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ABOUT 2 MILES W OF NEEDLES, E OF SACRAMENTO MOUNTAINS.

Detailed Location:

Ecological:

Threats:

General:

LACM SPECIMEN #18939 COLLECTED IN 1938.

PLSS:	T09N, R22E, Sec. 25, SW (S)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-11 N3858232 E715457	**Latitude/Longitude:**	34.84361 / -114.64357	**Elevation (feet):**	680

County Summary:	**Quad Summary:**
San Bernardino	Needles SW (3411476)

Sources:

BLM80S0011 BLM - DESERT PLAN STAFF - COMPILATION OF HISTORIC MUSEUM SPECIMEN INFORMATION FOR PYROCEPHALUS RUBINUS, COLLECTED DURING THE PREPARATION OF "THE CALIFORNIA DESERT PLAN". 1980-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06615	**EO Index:**	12434
Key Quad:	Needles (3411475)	**Element Code:**	ABPAE43080
Occurrence Number:	9	**Occurrence Last Updated:**	1995-12-12

Scientific Name: *Myiarchus tyrannulus*

Common Name: brown-crested flycatcher

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5

State: S3

Rare Plant Rank:

Other Lists: CDFW_WL-Watch List
IUCN_LC-Least Concern

General Habitat:

INHABITS DESERT RIPARIAN AREAS ALONG THE COLORADO RIVER, AS WELL AS OTHER DESERT OASES AND RIPARIAN AREAS NW TO VICTORVILLE.

Micro Habitat:

REQUIRES RIPARIAN THICKETS, TREES, SNAGS, AND SHRUBS FOR FORAGING PERCHES, NESTING CAVITIES, AND COVER.

Last Date Observed:	1986-06-08	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-06-08	**Occurrence Rank:**	Unknown
Owner/Manager:	USBOR, USFWS-HAVASU NWR	**Trend:**	Decreasing
Presence:	Presumed Extant		

Location:

HAVASU NWR, MOJAVE VALLEY, AZ. JUST SE OF NEEDLES PRIMARILY ALONG E SIDE COLORADO RIVER.

Detailed Location:

Ecological:

Threats:

AREA DEGRADED FROM FLOODING, SALINITY PROBLEMS, AND HEAVY SALT CEDAR INFESTATION.

General:

RECORDED BY GAINES DURING RIPARIAN SURVEY IN 1977; ONE MALE OBSERVED DURING SUMMER OF 1986.

PLSS:	T16N, R22W, Sec. 01 (G)	**Accuracy:**	specific area	**Area (acres):**	2,857
UTM:	Zone-11 N3852933 E723245	**Latitude/Longitude:**	34.79419 / -114.55987	**Elevation (feet):**	465

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

GAI77R0002 GAINES, D. - THE STATUS OF SELECTED RIPARIAN FOREST BIRDS IN CALIFORNIA - A PRELIMINARY SURVEY AND REVIEW. UNPUBLISHED REPORT TO NONGAME WILDLIFE INVESTIGATIONS, CALIFORNIA DEPT OF FISH & GAME. 1977-XX-XX

LAY86F0001 LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06605	**EO Index:**	25266
Key Quad:	Needles (3411475)	**Element Code:**	ABPAE43080
Occurrence Number:	11	**Occurrence Last Updated:**	1995-12-12

Scientific Name: *Myiarchus tyrannulus*

Common Name: brown-crested flycatcher

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5

State: S3

Rare Plant Rank:

Other Lists: CDFW_WL-Watch List
IUCN_LC-Least Concern

General Habitat:

INHABITS DESERT RIPARIAN AREAS ALONG THE COLORADO RIVER, AS WELL AS OTHER DESERT OASES AND RIPARIAN AREAS NW TO VICTORVILLE.

Micro Habitat:

REQUIRES RIPARIAN THICKETS, TREES, SNAGS, AND SHRUBS FOR FORAGING PERCHES, NESTING CAVITIES, AND COVER.

Last Date Observed:	1983-06-10	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1983-06-10	**Occurrence Rank:**	Unknown
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

NEEDLES GOLF COURSE.

Detailed Location:

Ecological:

HABITAT CONSISTS OF GOODDING'S WILLOW AND SALT CEDAR; SURROUNDED BY DEVELOPMENT.

Threats:

General:

ONE INDIVIDUAL OBSERVED; PRESUMED NESTING.

PLSS:	T09N, R23E, Sec. 29, SE (S)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-11 N3857661 E719995	**Latitude/Longitude:**	34.83749 / -114.59413	**Elevation (feet):**	475

County Summary:	**Quad Summary:**
San Bernardino	Needles (3411475)

Sources:

HUN83F0027	HUNTER, W.C. - FIELD SURVEY FORM FOR MYIARCHUS TYRANNULUS 1983-XX-XX
HUN83U0001	HUNTER, W. - VEGETATION MAPS PREPARED FOR BUREAU OF RECLAMATION AS PART OF A BIRD SURVEY FOR CALIFORNIA DEPARTMENT OF FISH AND GAME 1983-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06615	**EO Index:**	14639
Key Quad:	Needles (3411475)	**Element Code:**	ABPBK06090
Occurrence Number:	33	**Occurrence Last Updated:**	1995-12-12

Scientific Name: *Toxostoma crissale*

Common Name: Crissal thrasher

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5

State: S3

Rare Plant Rank:

Other Lists: CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern

General Habitat:

RESIDENT OF SOUTHEASTERN DESERTS IN DESERT RIPARIAN AND DESERT WASH HABITATS.

Micro Habitat:

NESTS IN DENSE VEGETATION ALONG STREAMS/WASHES; MESQUITE, SCREWBEAN MESQUITE, IRONWOOD, CATCLAW, ACACIA, ARROWWEED, WILLOW.

Last Date Observed:	1986-06-08	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-06-08	**Occurrence Rank:**	Unknown
Owner/Manager:	USBOR, USFWS-HAVASU NWR	**Trend:**	Decreasing
Presence:	Presumed Extant		

Location:

HAVASU NWR, MOJAVE VALLEY, AZ. JUST SE OF NEEDLES PRIMARILY ALONG E SIDE COLORADO RIVER.

Detailed Location:

Ecological:

AREA DEGRADED FROM FLOODING/SALINITY PROBLEMS AND HEAVY SALT CEDAR INFESTATION.

Threats:

General:

ONE OBS DURING SUMMER OF 1986. ALSO RECORDED BY GAINES DURING RIPARIAN SURVEY IN 1977.

PLSS:	T16N, R22W, Sec. 01 (G)	**Accuracy:**	specific area	**Area (acres):**	2,857
UTM:	Zone-11 N3852933 E723245	**Latitude/Longitude:**	34.79419 / -114.55987	**Elevation (feet):**	465

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

GAI77R0002 GAINES, D. - THE STATUS OF SELECTED RIPARIAN FOREST BIRDS IN CALIFORNIA - A PRELIMINARY SURVEY AND REVIEW. UNPUBLISHED REPORT TO NONGAME WILDLIFE INVESTIGATIONS, CALIFORNIA DEPT OF FISH & GAME. 1977-XX-XX

LAY86F0001 LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	84626	**EO Index:**	12427
Key Quad:	Needles (3411475)	**Element Code:**	ABPBW01111
Occurrence Number:	2	**Occurrence Last Updated:**	2012-01-03

Scientific Name: *Vireo bellii arizonae*

Common Name: Arizona bell's vireo

Listing Status: **Federal:** None
State: Endangered

CNDDB Element Ranks: **Global:** G5T4
State: S1S2

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_NT-Near Threatened
USFWS_BCC-Birds of Conservation Concern

General Habitat:

SUMMER RESIDENT ALONG COLORADO RIVER. CHIEFLY INHABITS WILLOW THICKETS WITH UNDERGROWTH OF BACCHARIS GLUTINOSA.

Micro Habitat:

NESTS IN WILLOW, MESQUITE, OR OTHER SMALL TREE/SHRUB, WITHIN 8 FT (USUALLY 2-3 FT) OF GROUND.

Last Date Observed:	1986-06-28	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-06-28	**Occurrence Rank:**	Unknown
Owner/Manager:	USBOR, USFWS-HAVASU NWR	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ALONG THE COLORADO RIVER AT THE NORTHERN BOUNDARY OF LAKE HAVASU NWR, ABOUT 1.6 MI SE OF HWY 40 AT E BROADWAY ST.

Detailed Location:

1981 DATA MAPPED TO LOCATIONS GIVEN BY DISTANCE FROM "HAVASU N.W.R. NORTHERN BOUNDARY."

Ecological:

HABITAT CONSISTED OF "SCATTERED PATCHES OF WILLOW SURROUNDED BY SALT-CEDAR" & "WILLOW-MESQUITE" MIX. IN 1986, HABITAT REPORTED TO BE GOOD, BUT FLOODING, SALINITY, AND HEAVY SALT CEDAR INFESTATION WERE PROBLEMS.

Threats:

General:

2 SINGING MALES DETECTED BTWN 10 APRIL & 18 JUN 1981. 7 SINGING MALES DETECTED 10 JUN 1983 BTWN T8 R23 SEC 4 & T8 R23 SEC 26 ALONG THE COLORADO RIVER. 11 SINGING MALES DETECTED BTWN 8 & 28 JUN 1986 BETWEEN JACK SMITH PARK & BEAL SLOUGH.

PLSS:	T08N, R23E, Sec. 09 (S)	**Accuracy:**	nonspecific area	**Area (acres):**	326
UTM:	Zone-11 N3854323 E721572	**Latitude/Longitude:**	34.80707 / -114.57777	**Elevation (feet):**	480

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

HUN83F0049	HUNTER, W.C. - FIELD SURVEY FORM FOR VIREO BELLII ARIZONAE 1983-XX-XX
HUN83U0001	HUNTER, W. - VEGETATION MAPS PREPARED FOR BUREAU OF RECLAMATION AS PART OF A BIRD SURVEY FOR CALIFORNIA DEPARTMENT OF FISH AND GAME 1983-XX-XX
LAY86F0001	LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX
SER86R0001	SERENA, M. - DISTRIBUTION HABITAT PREFERENCES, AND REPRODUCTIVE SUCCESS OF ARIZONA BELL'S VIREO (VIREO BELLII ARIZONAE) ALONG THE LOWER COLORADO RIVER IN 1981. 1986-11-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	84625	**EO Index:**	24920
Key Quad:	Needles (3411475)	**Element Code:**	ABPBW01111
Occurrence Number:	15	**Occurrence Last Updated:**	2012-01-03

Scientific Name: *Vireo bellii arizonae*

Common Name: Arizona bell's vireo

Listing Status: **Federal:** None
State: Endangered

CNDDB Element Ranks: **Global:** G5T4
State: S1S2

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_NT-Near Threatened
USFWS_BCC-Birds of Conservation Concern

General Habitat:

SUMMER RESIDENT ALONG COLORADO RIVER. CHIEFLY INHABITS WILLOW THICKETS WITH UNDERGROWTH OF BACCHARIS GLUTINOSA.

Micro Habitat:

NESTS IN WILLOW, MESQUITE, OR OTHER SMALL TREE/SHRUB, WITHIN 8 FT (USUALLY 2-3 FT) OF GROUND.

Last Date Observed:	1987-05-01	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1987-05-01	**Occurrence Rank:**	Good
Owner/Manager:	CITY OF NEEDLES	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

IN VICINITY OF JACK SMITH PARK IN NEEDLES, ABOUT 1 MI NE OF HWY 40 AT E BROADWAY ST., FORT MOHAVE INDIAN RESERVATION.

Detailed Location:

1981 DATA MAPPED TO LOCATIONS GIVEN BY DISTANCE FROM A "U.S.G.S. WATER FLOW MONITORING STATION," BELIEVED TO BE REFERRING TO USSGS STATION 09423550. 1987 DATA MAPPED TO "T-9N, R-23E, W 1/2 SEC 33."

Ecological:

IN THE VICINITY OF SEWAGE DISPOSAL PONDS.

Threats:

POSSIBLE THREATS INCLUDE ENLARGEMENT OR MANIPULATION OF DISPOSAL SITE.

General:

5 SINGING MALES DETECTED BETWEEN 10 APRIL & 18 JUN 1981. 11 SINGING MALES DETECTED BETWEEN 8 & 28 JUN 1986 BETWEEN JACK SMITH PARK & BEAL SLOUGH (ALSO EOS #23 & 24). 3 SINGING MALES DETECTED ON 1 MAY 1987.

PLSS:	T09N, R23E, Sec. 33 (S)	**Accuracy:**	nonspecific area	**Area (acres):**	543
UTM:	Zone-11 N3856885 E720510	**Latitude/Longitude:**	34.83038 / -114.58870	**Elevation (feet):**	470

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

LAY86F0001 LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX

LAY87F0022 LAYMON, S. & M. HALTERMAN - FIELD SURVEY FORM FOR VIREO BELLII ARIZONAE AT NEEDLES SEWAGE DISPOSAL AREA, OBSERVATION DURING ELF OWL ASSESSMENT PROJECT, OCC. #015. 1987-05-01

SER86R0001 SERENA, M. - DISTRIBUTION HABITAT PREFERENCES, AND REPRODUCTIVE SUCCESS OF ARIZONA BELL'S VIREO (VIREO BELLII ARIZONAE) ALONG THE LOWER COLORADO RIVER IN 1981. 1986-11-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	84606	**EO Index:**	85588
Key Quad:	Needles NW (3411486)	**Element Code:**	ABPBW01111
Occurrence Number:	21	**Occurrence Last Updated:**	2012-01-03

Scientific Name: *Vireo bellii arizonae*

Common Name: Arizona bell's vireo

Listing Status: **Federal:** None
State: Endangered

CNDDB Element Ranks: **Global:** G5T4
State: S1S2

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_NT-Near Threatened
USFWS_BCC-Birds of Conservation Concern

General Habitat:

SUMMER RESIDENT ALONG COLORADO RIVER. CHIEFLY INHABITS WILLOW THICKETS WITH UNDERGROWTH OF BACCHARIS GLUTINOSA.

Micro Habitat:

NESTS IN WILLOW, MESQUITE, OR OTHER SMALL TREE/SHRUB, WITHIN 8 FT (USUALLY 2-3 FT) OF GROUND.

Last Date Observed:	1981-06-18	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1981-06-18	**Occurrence Rank:**	Unknown
Owner/Manager:	BIA-FORT MOJAVE RES	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ALONG THE COLORADO RIVER BETWEEN GORDON DRIVE & LAGUNA RD (BOTH AT MOHAVE VALLEY DR), ABOUT 5.5 MI NNW OF NEEDLES.

Detailed Location:

EXACT LOCATION UNKNOWN. MAPPED TO DESCRIBED LOCATIONS INCLUDING "2.6 KM S OF RUSSELL BROS MAIN IRRIGATION PUMP," "0.8 KM N OF THE FIRST ROAD SOUTH OF THE NORTH NEEDLES COMPRESSOR STATION," & "1.9 KM N OF WETMORE TRAILER PARK BOAT RAMP."

Ecological:

Threats:

General:

5 SINGING MALES DETECTED BETWEEN 10 APRIL TO 18 JUN 1981.

PLSS:	T10N, R22E, Sec. 36 (S)	**Accuracy:**	nonspecific area	**Area (acres):**	1,146
UTM:	Zone-11 N3866301 E716086	**Latitude/Longitude:**	34.91617 / -114.63461	**Elevation (feet):**	540

County Summary:	**Quad Summary:**
San Bernardino	Needles NW (3411486)

Sources:

SER86R0001	SERENA, M. - DISTRIBUTION HABITAT PREFERENCES, AND REPRODUCTIVE SUCCESS OF ARIZONA BELL'S VIREO (VIREO BELLII ARIZONAE) ALONG THE LOWER COLORADO RIVER IN 1981. 1986-11-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	84608	**EO Index:**	85589
Key Quad:	Needles NW (3411486)	**Element Code:**	ABPBW01111
Occurrence Number:	22	**Occurrence Last Updated:**	2012-01-03

Scientific Name: *Vireo bellii arizonae*

Common Name: Arizona bell's vireo

Listing Status: **Federal:** None
State: Endangered

CNDDB Element Ranks: **Global:** G5T4
State: S1S2

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_NT-Near Threatened
USFWS_BCC-Birds of Conservation Concern

General Habitat:

SUMMER RESIDENT ALONG COLORADO RIVER. CHIEFLY INHABITS WILLOW THICKETS WITH UNDERGROWTH OF BACCHARIS GLUTINOSA.

Micro Habitat:

NESTS IN WILLOW, MESQUITE, OR OTHER SMALL TREE/SHRUB, WITHIN 8 FT (USUALLY 2-3 FT) OF GROUND.

Last Date Observed:	1981-06-18	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1981-06-18	**Occurrence Rank:**	Unknown
Owner/Manager:	BIA-FORT MOJAVE RES	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

JUST S OF WILSON DR ALONG PEBBLE BEACH CIRCLE, ABOUT 3.7 MI NW OF NEEDLES, FORT MOHAVE INDIAN RESERVATION.

Detailed Location:

MAPPED TO LOCATION STATED AS "0.1 KM S OF WETMORE TRAILER PARK BOAT RAMP" & "0.05 KM S" OF THAT LOCATION.

Ecological:

Threats:

General:

2 SINGING MALES DETECTED BETWEEN 10 APRIL TO 18 JUN 1981.

PLSS:	T09N, R22E, Sec. 12 (S)	**Accuracy:**	2/5 mile	**Area (acres):**	0
UTM:	Zone-11 N3862358 E715877	**Latitude/Longitude:**	34.88069 / -114.63792	**Elevation (feet):**	480

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles NW (3411486)

Sources:

SER86R0001 SERENA, M. - DISTRIBUTION HABITAT PREFERENCES, AND REPRODUCTIVE SUCCESS OF ARIZONA BELL'S VIREO (VIREO BELLII ARIZONAE) ALONG THE LOWER COLORADO RIVER IN 1981. 1986-11-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06615	**EO Index:**	14663
Key Quad:	Needles (3411475)	**Element Code:**	ABPBX03017
Occurrence Number:	5	**Occurrence Last Updated:**	1995-12-12

Scientific Name: *Setophaga petechia sonorana*

Common Name: Sonoran yellow warbler

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5T2T3

State: S2

Rare Plant Rank:

Other Lists: CDFW_SSC-Species of Special Concern
USFWS_BCC-Birds of Conservation Concern

General Habitat:

SUMMER RESIDENT OF COLORADO RIVER VALLEY, IN RIPARIAN DECIDUOUS HABITAT. BELOW 600 FT ELEVATION.

Micro Habitat:

INHABITS COTTONWOODS AND WILLOWS, PARTICULARLY THE CROWN FOLIAGE; NESTS IN UNDERSTORY, USUALLY 2-16 FT ABOVE GROUND.

Last Date Observed:	1986-06-28	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-06-28	**Occurrence Rank:**	Unknown
Owner/Manager:	USBOR, USFWS-HAVASU NWR	**Trend:**	Decreasing
Presence:	Presumed Extant		

Location:

HAVASU NWR; MOJAVE VALLEY, AZ. JUST SE OF NEEDLES PRIMARILY ALONG E SIDE COLORADO RIVER.

Detailed Location:

4 MALES OBS IN JUNE, 1986. ONE PAIR ALSO OBS ON CALIFORNIA SIDE OF RIVER NEAR NEEDLES SEWAGE PONDS.

Ecological:

AREA IS VERY DEGRADED FROM FLOODING, SALINITY & HEAVY SALT CEDAR INFESTATION.

Threats:

General:

PLSS:	T16N, R22W, Sec. 01 (G)	**Accuracy:**	specific area	**Area (acres):**	2,857
UTM:	Zone-11 N3852933 E723245	**Latitude/Longitude:**	34.79419 / -114.55987	**Elevation (feet):**	470

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

HUN83F0056	HUNTER, W.C. - FIELD SURVEY FORM FOR DENDROICA PETECHIA SONORANA 1983-XX-XX
HUN83U0001	HUNTER, W. - VEGETATION MAPS PREPARED FOR BUREAU OF RECLAMATION AS PART OF A BIRD SURVEY FOR CALIFORNIA DEPARTMENT OF FISH AND GAME 1983-XX-XX
LAY86F0001	LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06615	**EO Index:**	14671
Key Quad:	Needles (3411475)	**Element Code:**	ABPBX24010
Occurrence Number:	27	**Occurrence Last Updated:**	1996-01-08

Scientific Name: *Icteria virens*

Common Name: yellow-breasted chat

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5

State: S3

Rare Plant Rank:

Other Lists: CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern

General Habitat:

SUMMER RESIDENT; INHABITS RIPARIAN THICKETS OF WILLOW AND OTHER BRUSHY TANGLES NEAR WATERCOURSES.

Micro Habitat:

NESTS IN LOW, DENSE RIPARIAN, CONSISTING OF WILLOW, BLACKBERRY, WILD GRAPE; FORAGES AND NESTS WITHIN 10 FT OF GROUND.

Last Date Observed:	1986-06-28	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-06-28	**Occurrence Rank:**	Unknown
Owner/Manager:	USBOR, USFWS-HAVASU NWR	**Trend:**	Increasing
Presence:	Presumed Extant		

Location:

HAVASU NWR, MOJAVE VALLEY, AZ. JUST SE OF NEEDLES ALONG BOTH SIDES COLORADO RIVER.

Detailed Location:

42 MALES OBS ON AZ SIDE DURING 1986 SURVEY. 16 MALES OBS ON CA SIDE IN 1983.

Ecological:

THERE IS EVIDENCE THIS TAXON HAS MOVED INTO SALT CEDAR HABITAT OVER THE PAST 10 OR SO YEARS, THUS THE AMOUNT OF HABITAT AVAILABLE TO IT ALONG THE COLO RIV HAS INCREASED DESPITE THE LOSS OF SO MUCH NATIVE RIPARIAN VEG.

Threats:

General:

42 MALES OBS ON AZ SIDE DURING 1986 SURVEY. 16 MALES OBS ON CA SIDE IN 1983.

PLSS:	T16N, R22W, Sec. 01 (G)	**Accuracy:**	specific area	**Area (acres):**	2,857
UTM:	Zone-11 N3852933 E723245	**Latitude/Longitude:**	34.79419 / -114.55987	**Elevation (feet):**	465

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

GAI77R0002	GAINES, D. - THE STATUS OF SELECTED RIPARIAN FOREST BIRDS IN CALIFORNIA - A PRELIMINARY SURVEY AND REVIEW. UNPUBLISHED REPORT TO NONGAME WILDLIFE INVESTIGATIONS, CALIFORNIA DEPT OF FISH & GAME. 1977-XX-XX
HUN83F0028	HUNTER, W.C. - FIELD SURVEY FORM FOR ICTERIA VIRENS 1983-XX-XX
HUN83U0001	HUNTER, W. - VEGETATION MAPS PREPARED FOR BUREAU OF RECLAMATION AS PART OF A BIRD SURVEY FOR CALIFORNIA DEPARTMENT OF FISH AND GAME 1983-XX-XX
LAY86F0001	LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06611	**EO Index:**	24860
Key Quad:	Needles (3411475)	**Element Code:**	ABPBX24010
Occurrence Number:	67	**Occurrence Last Updated:**	1989-08-10

Scientific Name: *Icteria virens*

Common Name: yellow-breasted chat

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5

State: S3

Rare Plant Rank:

Other Lists: CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern

General Habitat:

SUMMER RESIDENT; INHABITS RIPARIAN THICKETS OF WILLOW AND OTHER BRUSHY TANGLES NEAR WATERCOURSES.

Micro Habitat:

NESTS IN LOW, DENSE RIPARIAN, CONSISTING OF WILLOW, BLACKBERRY, WILD GRAPE; FORAGES AND NESTS WITHIN 10 FT OF GROUND.

Last Date Observed:	1987-05-11	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1987-05-11	**Occurrence Rank:**	Fair
Owner/Manager:	CITY OF NEEDLES	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

NEEDLES SEWAGE DISPOSAL SITE, ALONG COLORADO RIVER, SE OF NEEDLES.

Detailed Location:

5 INDIVIDUALS LOCATED DURING A 1987 SURVEY.

Ecological:

EXCELLENT HABITAT PROBABLY USED FOR BREEDING. 40 ACRES OF SCATTERED PATCHES OF WILLOW, SALT CEDAR WITH SOME MESQUITE.

Threats:

POSSIBLY THREATENED BY ENLARGEMENT OR MANIPULATION OF DISPOSAL SITE.

General:

PLSS:	T09N, R23E, Sec. 33, W (S)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-11 N3856869 E720420	**Latitude/Longitude:**	34.83027 / -114.58969	**Elevation (feet):**	470

County Summary:	**Quad Summary:**
San Bernardino	Needles (3411475)

Sources:

LAY87F0020 LAYMON, S. & M. HALTERMAN - FIELD SURVEY FORM FOR ICTERIA VIRENS AT NEEDLES SEWAGE DISPOSAL SITE, OBS DURING ELF OWL ASSESSMENT PROJECT, OCC. #027. 1987-05-01

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06615	**EO Index:**	13338
Key Quad:	Needles (3411475)	**Element Code:**	ABPBX45030
Occurrence Number:	12	**Occurrence Last Updated:**	1996-01-08

Scientific Name: *Piranga rubra*

Common Name: summer tanager

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G5

State: S1

Rare Plant Rank:

Other Lists: CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern

General Habitat:

SUMMER RESIDENT OF DESERT RIPARIAN ALONG LOWER COLORADO RIVER, AND LOCALLY ELSEWHERE IN CALIFORNIA DESERTS.

Micro Habitat:

REQUIRES COTTONWOOD-WILLOW RIPARIAN FOR NESTING AND FORAGING; PREFERS OLDER, DENSE STANDS ALONG STREAMS.

Last Date Observed:	1986-06-28	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-06-28	**Occurrence Rank:**	Unknown
Owner/Manager:	USBOR, USFWS-HAVASU NWR	**Trend:**	Decreasing
Presence:	Presumed Extant		

Location:

HAVASU NWR, MOJAVE VALLEY, AZ. JUST SE OF NEEDLES PRIMARILY ALONG E SIDE COLORADO RIVER.

Detailed Location:

5 MALES OBS DURING SUMMER 1986. ALSO OBS DURING 1977 SURVEY.

Ecological:

AREA CURRENTLY DEGRADED FROM PROBLEMS WITH FLOODING, SALINITY, AND SALT CEDAR INFESTATION. ONLY SCATTERED WILLOW AND COTTONWOOD TREES.

Threats:

General:

5 MALES OBS DURING SUMMER 1986. ALSO OBS DURING 1977 SURVEY.

PLSS:	T16N, R22W, Sec. 01 (G)	**Accuracy:**	specific area	**Area (acres):**	2,857
UTM:	Zone-11 N3852933 E723245	**Latitude/Longitude:**	34.79419 / -114.55987	**Elevation (feet):**	465

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475)

Sources:

GAI77R0002	GAINES, D. - THE STATUS OF SELECTED RIPARIAN FOREST BIRDS IN CALIFORNIA - A PRELIMINARY SURVEY AND REVIEW. UNPUBLISHED REPORT TO NONGAME WILDLIFE INVESTIGATIONS, CALIFORNIA DEPT OF FISH & GAME. 1977-XX-XX
LAY86F0001	LAYMON, S. & M. HALTERMAN - COLLECTION OF FIELD SURVEY FORMS AND MAPS FROM A TRIP TO THE COLORADO RIVER AND DESERTS 1986-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	39107	**EO Index:**	42469
Key Quad:	Needles (3411475)	**Element Code:**	AFCJC02110
Occurrence Number:	1	**Occurrence Last Updated:**	2000-02-29

Scientific Name: *Catostomus latipinnis*

Common Name: flannelmouth sucker

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G3G4

State: S1

Rare Plant Rank:

Other Lists:

General Habitat:

COLORADO RIVER BORDERING CALIFORNIA.

Micro Habitat:

SPAWNS IN RIFFLES, USUALLY OVER A SUBSTRATE OF COARSE GRAVEL.

Last Date Observed:	2000-01-25	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2000-01-25	**Occurrence Rank:**	Fair
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

COLORADO RIVER, NEAR NEEDLES PARK MARINA, NEEDLES.

Detailed Location:

COORDINATES GIVEN AS LATITUDE 34, 50', 78" N; LONGITUDE 114, 35', 98" W.

Ecological:

RIVERINE. USGS REPORT ON FISH FOUND BETWEEN LAKE HAVASU AND UPSTREAM TO DAVIS DAM, NEEDLES AREA SAMPLED AND DATA FOR THE REACH IN REPORT.

Threats:

General:

FISH WAS ORIGINALLY CAPTURED 10/26/1999 AT BIG BEND PARK (NEAR LAUGHLIN NV); WEIGHT 1978 GRAMS; LENGTH 535 MM; PIT TAG #2027431D59; INPLANTED WITH RADIO TELEMETRY TAG AND RELEASED. LOCATED AT ABOVE COORD. 1/25/2000.

PLSS:	T09N, R23E, Sec. 29, SE (S)	**Accuracy:**	nonspecific area	**Area (acres):**	259
UTM:	Zone-11 N3859260 E718572	**Latitude/Longitude:**	34.85221 / -114.60926	**Elevation (feet):**	470

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475), Needles SW (3411476), Needles NW (3411486)

Sources:

CRU00F0001	CRUM, L. (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE) - FIELD SURVEY FORM FOR CATOSTOMUS LATIPINNIS (FLANNELMOUTH SUCKER) 2000-01-25
USG00R0001	U.S. GEOLOGICAL SURVEY - SEASON REPORT: COLORADO RIVER "ROUND UP" - FISH SURVEY FORM DAVIS DAM TO LAKE HAVASU, NOVEMBER, 1999 TO APRIL, 2000. 2000-04-10

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	39107	**EO Index:**	34114
Key Quad:	Needles (3411475)	**Element Code:**	AFCJC11010
Occurrence Number:	25	**Occurrence Last Updated:**	2000-09-12

Scientific Name: *Xyrauchen texanus*

Common Name: razorback sucker

Listing Status: **Federal:** Endangered
State: Endangered

CNDDB Element Ranks: **Global:** G1
State: S1S2

Rare Plant Rank:

Other Lists: AFS_EN-Endangered
CDFW_FP-Fully Protected
IUCN_EN-Endangered

General Habitat:

FOUND IN THE COLORADO RIVER BORDERING CALIFORNIA.

Micro Habitat:

ADAPTED FOR SWIMMING IN SWIFT CURRENTS BUT ALSO NEED QUIET WATERS. SPAWN IN AREAS OF SAND/GRAVEL/ROCKS IN SHALLOW WATER.

Last Date Observed:	2000-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2000-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

COLORADO RIVER, RAINBOW BEACH TO SEWAGE DISPOSAL PONDS AREA, NEEDLES.

Detailed Location:

1 CAUGHT IN NEEDLES IN JUNE 1976, AND 1 CAUGHT AT RAINBOW BEACH 15 FEB 1976, MAPPED TO COVER BOTH THESE LOCATIONS. OBSERVED SPAWNING IN NEEDLES AREA IN 1952.

Ecological:

RIVERINE. USGS REPORT ON FISH FOUND BETWEEN LAKE HAVASU AND UPSTREAM TO DAVIS DAM, NEEDLES AREA SAMPLED AND DATA FOR THE REACH IN REPORT.

Threats:

General:

RAINBOW BEACH FISH, MALE, CAUGHT ANGLING, GUTTED WEIGHT 3600 GRAMS, AGE ~22 YEARS, FORK LENGTH 600 MM; NEEDLES FISH FL 673 MM, 22 YEARS OLD.

PLSS:	T09N, R23E, Sec. 29 (S)	**Accuracy:**	nonspecific area	**Area (acres):**	259
UTM:	Zone-11 N3859260 E718572	**Latitude/Longitude:**	34.85221 / -114.60926	**Elevation (feet):**	467

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475), Needles SW (3411476), Needles NW (3411486)

Sources:

ULM85U0001 ULMER, L. - RECENT RECORDS OF RAZORBACK SUCKERS (XYRAUCHEN TEXANUS) FROM THE COLORADO RIVER, CALIFORNIA. 1985-XX-XX

USG00R0001 U.S. GEOLOGICAL SURVEY - SEASON REPORT: COLORADO RIVER "ROUND UP" - FISH SURVEY FORM DAVIS DAM TO LAKE HAVASU, NOVEMBER, 1999 TO APRIL, 2000. 2000-04-10

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	66572	**EO Index:**	66708
Key Quad:	Needles (3411475)	**Element Code:**	AMACC10010
Occurrence Number:	242	**Occurrence Last Updated:**	2006-10-03

Scientific Name: *Antrozous pallidus*

Common Name: pallid bat

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G5
State: S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
CDFW_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFS_S-Sensitive
WBWG_H-High Priority

General Habitat:

DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS AND FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.

Micro Habitat:

ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.

Last Date Observed:	1939-07-22	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1939-07-22	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

NEEDLES.

Detailed Location:

EXACT LOCATION UNKNOWN. MAPPED IN THE VICINITY OF NEEDLES.

Ecological:

Threats:

General:

1 UNKNOWN SPECIMEN COLLECTED BY CHARLES R. SHAW ON 22 JUL 1939, LSU #1426.

PLSS:	T09N, R23E, Sec. 30 (S)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-11 N3858254 E718466	**Latitude/Longitude:**	34.84316 / -114.61067	**Elevation (feet):**	500

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475), Needles SW (3411476)

Sources:

MAN04S0028	MAMMAL NETWORKED INFORMATION SYSTEM (MANIS) - PRINTOUT OF ANTROZOUS PALLIDUS SPECIMEN RECORDS FROM MANIS. INCLUDES RECORDS FROM MVZ, CAS, KU, UWBM, UMNH, LACM, MSB, FMNH, TTU, MSU. 2004-12-09

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	58710	**EO Index:**	58746
Key Quad:	Needles NW (3411486)	**Element Code:**	AMAJF10011
Occurrence Number:	2	**Occurrence Last Updated:**	2004-12-17

Scientific Name: *Lontra canadensis sonora*

Common Name: southwestern river otter

Listing Status: **Federal:** None

State: None

Rare Plant Rank:

Other Lists: CDFW_SSC-Species of Special Concern

CNDDB Element Ranks: **Global:** G5T1

State: S1

General Habitat:

AQUATIC HABITATS ALONG THE COLORADO RIVER.

Micro Habitat:

NEEDS ABUNDANT FOOD SOURCES AND SUFFICIENT WATER FOR SHELTER AND FORAGING.

Last Date Observed:	1926-12-31	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1926-12-31	**Occurrence Rank:**	Unknown
Owner/Manager:	BIA-FORT MOJAVE RES	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

FORT MOJAVE RESERVATION. COLORADO RIVER, ABOUT 5 MILES NORTH OF NEEDLES.

Detailed Location:

Ecological:

Threats:

General:

1 FEMALE SPECIMEN COLLECTED 31 DEC 1926 BY R. ELLIS JR. AT "NEEDLES, 5 MI N OF; COLORADO RIVER." DEPOSITED AT KU #48059.

PLSS:	T10N, R22E, Sec. 36 (S)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-11 N3865710 E716368	**Latitude/Longitude:**	34.91079 / -114.63168	**Elevation (feet):**	500

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles NE (3411485), Needles NW (3411486)

Sources:

MAN04S0009	MAMMAL NETWORKED INFORMATION SYSTEM (MANIS) - PRINTOUT OF LONTRA CANADENSIS SONORA SPECIMEN RECORDS FROM MANIS. THIS INCLUDES RECORDS FROM KU & MVZ. 2004-12-15

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	06553	**EO Index:**	14490
Key Quad:	Needles SW (3411476)	**Element Code:**	AMALE04013
Occurrence Number:	42	**Occurrence Last Updated:**	1989-08-10

Scientific Name: *Ovis canadensis nelsoni*

Common Name: desert bighorn sheep

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G4T4
State: S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
CDFW_FP-Fully Protected
USFS_S-Sensitive

General Habitat:

WIDELY DISTRIBUTED FROM THE WHITE MTNS IN MONO CO. TO THE CHOCOLATE MTS IN IMPERIAL CO.

Micro Habitat:

OPEN, ROCKY, STEEP AREAS WITH AVAILABLE WATER AND HERBACEOUS FORAGE.

Last Date Observed:	1986-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	BLM, PVT	**Trend:**	Decreasing
Presence:	Presumed Extant		

Location:

SACRAMENTO MOUNTAINS.

Detailed Location:

Ecological:

Threats:

DISEASE IS A PROBLEM. WATER IS A LIMITING FACTOR, BOTH IN DISTRIBUTION AND AMOUNT.

General:

POPULATION ESTIMATE OF 60 INDIVIDUALS; POPULATION DECLINING DUE TO DISEASE.

PLSS:	T08N, R21E, Sec. 11 (S)	**Accuracy:**	specific area	**Area (acres):**	27,834
UTM:	Zone-11 N3853030 E705057	**Latitude/Longitude:**	34.79888 / -114.75851	**Elevation (feet):**	

County Summary:

San Bernardino

Quad Summary:

Monumental Pass (3411466), Needles SW (3411476), Flattop Mtn. (3411477)

Sources:

WEA71R0004 WEAVER, R.A. & J. HALL - DESERT BIGHORN SHEEP IN SOUTHWESTERN SAN BERNARDINO COUNTY - WILDLIFE MANAGEMENT ADMINISTRATION REPORT NO. 71-8. 1971-10-XX

WEA86U0001 WEAVER, R. - ESTIMATED BIGHORN POPULATIONS BY MOUNTAIN RANGES - LIST OF RANGES BY COUNTY, AND THEIR CALIFORNIA TAXA. PERSONALLY UPDATED BY WEAVER IN 1986. (6/1985 REVISION) 1986-XX-XX

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	A5665	**EO Index:**	107404
Key Quad:	Needles SW (3411476)	**Element Code:**	ARAAF01012
Occurrence Number:	982	**Occurrence Last Updated:**	2017-08-02

Scientific Name: *Gopherus agassizii*

Common Name: desert tortoise

Listing Status:	**Federal:**	Threatened	**Rare Plant Rank:**	
	State:	Threatened	**Other Lists:**	IUCN_VU-Vulnerable
CNDDB Element Ranks:	**Global:**	G3		
	State:	S2S3		

General Habitat:

MOST COMMON IN DESERT SCRUB, DESERT WASH, AND JOSHUA TREE HABITATS; OCCURS IN ALMOST EVERY DESERT HABITAT.

Micro Habitat:

REQUIRE FRIABLE SOIL FOR BURROW AND NEST CONSTRUCTION. CREOSOTE BUSH HABITAT WITH LARGE ANNUAL WILDFLOWER BLOOMS PREFERRED.

Last Date Observed:	2016-11-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2016-11-17	**Occurrence Rank:**	Good
Owner/Manager:	SBD COUNTY	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ABOUT 0.5 MILES W OF I-40 AT RIVER RD AND 1.25 MILES NW OF ERIN DR AT CORONADO ST, NEEDLES.

Detailed Location:

MAPPED TO PROVIDED COORDINATES.

Ecological:

BURROW IN SIDE OF SLOPE IN DESERT CREOSOTE SCRUB. LEVEES AND BASIN USED FOR STORMWATER CONTROL.

Threats:

CLOSE TO URBAN AREAS.

General:

1 ADULT OBSERVED HIBERNATING AT BACK OF BURROW ON 17 NOV 2016.

PLSS:	T09N, R22E, Sec. 24, SW (S)	**Accuracy:**	80 meters	**Area (acres):**	5
UTM:	Zone-11 N3859383 E716186	**Latitude/Longitude:**	34.85382 / -114.63531	**Elevation (feet):**	562

County Summary:	**Quad Summary:**
San Bernardino	Needles SW (3411476)

Sources:

STR16F0004 STRATTON, G. - FIELD SURVEY FORM FOR GOPHERUS AGASSIZII [SC-013417]. 2016-11-17

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number:	66572	**EO Index:**	82812
Key Quad:	Needles (3411475)	**Element Code:**	PDLOA031T0
Occurrence Number:	5	**Occurrence Last Updated:**	2011-02-23

Scientific Name: *Mentzelia tricuspis*

Common Name: spiny-hair blazing star

Listing Status: **Federal:** None

State: None

CNDDB Element Ranks: **Global:** G4

State: S2

Rare Plant Rank: 2B.1

Other Lists:

General Habitat:

MOJAVEAN DESERT SCRUB.

Micro Habitat:

SANDY OR GRAVELLY SLOPES AND WASHES.150-1280 M.

Last Date Observed:	1949-04-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1949-04-17	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

NEEDLES.

Detailed Location:

EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS CENTERED ON THE TOWN OF NEEDLES.

Ecological:

DRY DESERT WASH AND ROCKY HILLSIDE.

Threats:

General:

ONLY SOURCES ARE VAGUE HISTORICAL COLLECTIONS. NEEDS FIELDWORK. JONES 1884 COLLECTION "THE NEEDLES" AND 1942 HOLT COLLECTION "NEAR NEEDLES" ATTRIBUTED TO THIS OCCURRENCE.

PLSS:	T09N, R23E, Sec. 30 (S)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-11 N3858254 E718466	**Latitude/Longitude:**	34.84316 / -114.61067	**Elevation (feet):**	500

County Summary:	**Quad Summary:**
San Bernardino, Arizona State	Needles (3411475), Needles SW (3411476)

Sources:

COO49S0011	COOPER, N. - COOPER #3496 RSA #446910 1949-04-17
HOL42S0006	HOLT, V. - HOLT SN CHSC #1023 1942-03-26
JON84S0003	JONES, M. - JONES #3824 POM #83995, UC #380551 1884-05-05
MUN20S0028	MUNZ, P. & R. HARWOOD - MUNZ #3639 RSA #7615 1920-04-01

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
Phone: (760) 431-9440 Fax: (760) 431-5901
http://www.fws.gov/carlsbad/

In Reply Refer To: October 08, 2018
Consultation Code: 08ECAR00-2019-SLI-0054
Event Code: 08ECAR00-2019-E-00142
Project Name: Needles Grow Facility

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
(760) 431-9440

Project Summary

Consultation Code: 08ECAR00-2019-SLI-0054

Event Code: 08ECAR00-2019-E-00142

Project Name: Needles Grow Facility

Project Type: DEVELOPMENT

Project Description: Construction of a grow facility in Needles, CA

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/34.86269358712137N114.63103807280973W

Counties: San Bernardino, CA

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Reptiles

NAME	STATUS
Desert Tortoise *Gopherus agassizii* Population: Wherever found, except AZ south and east of Colorado R., and Mexico There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4481	Threatened

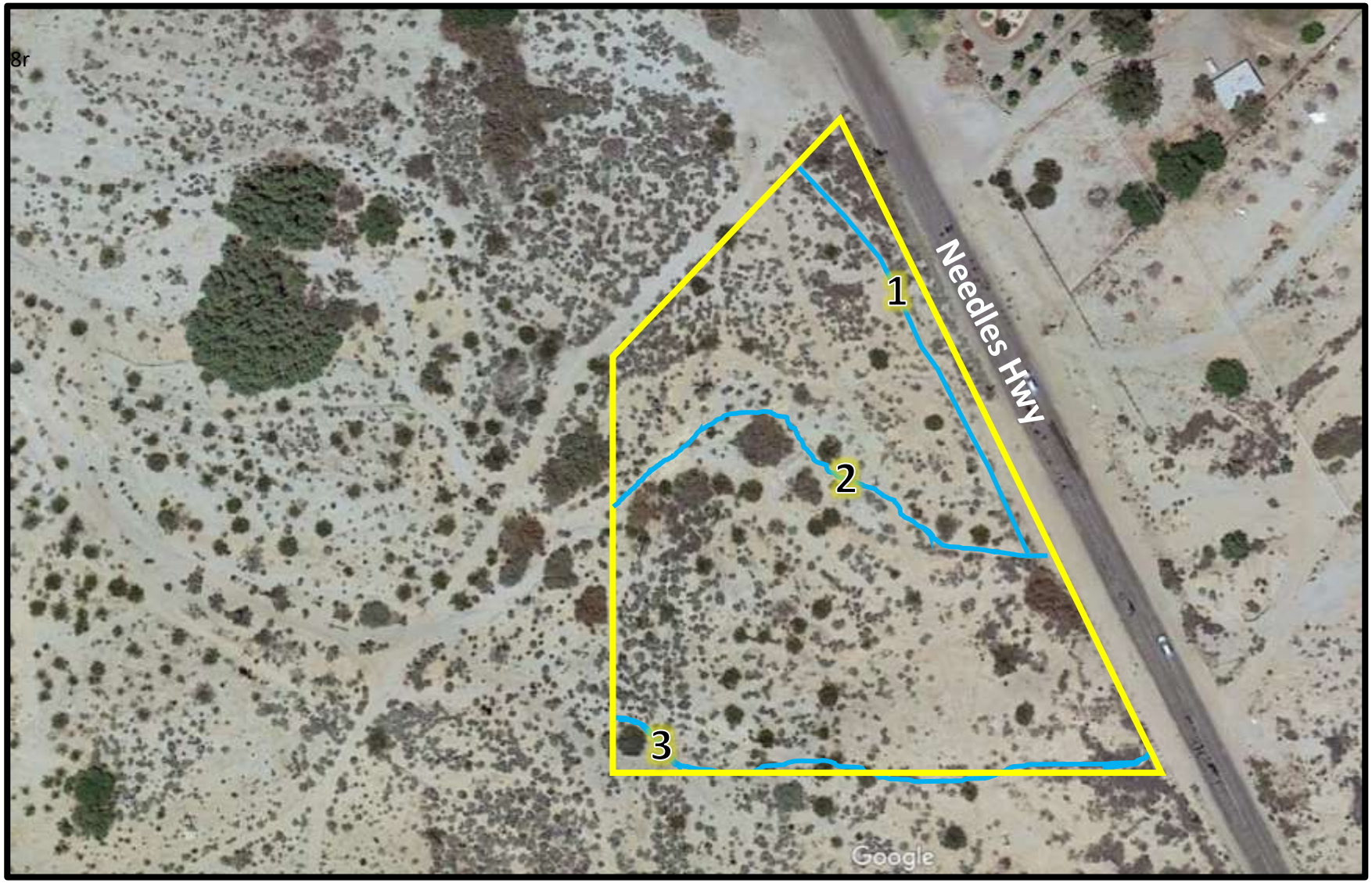
Fishes

NAME	STATUS
Razorback Sucker *Xyrauchen texanus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/530	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Appendix B: Jurisdictional Features Map



0 100 200 Feet

N

Pacific BioScience, Inc.

LEGEND

Project Limits

Jurisdictional Drainage (Numbered 1-3)

Appendix B
Jurisdictional Drainages

Appendix C: Representative Site Photos

0 100 200 Feet

LEGEND

Project Limits

Photograph Locations (Numbers 1-11)

DF Drainage Feature Photograph Location (Numbers 1-3)

Photograph Locations

Pacific BioScience, Inc.

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Drainage Feature #1

Drainage Feature #2

Drainage Feature #3

Dirt Road Disturbance On-Site

APPENDIX D

Hydrology Report

April 18, 2019

Mr. Don Olsen, PE
Epic Engineering, PC
City Engineer
City of Needles, Ca

RE: Fluid Holdings project at 3353 Needles Highway, Needles, Ca
Response letter to City Engineer's comment letter dated April 8, 2019

Dear Mr. Olsen:

This letter is intended to respond to your comment letter identified above in answer to each of your comments identified therein. I will utilize the same comment number sequence without listing each comment for purposes of brevity. The revised hydrology report will be submitted together with this letter.

1. Hydrology calculations: The detailed calculations are included in the final report.

2. Infiltration: The infiltration calculations are included in the final report.

3. Detention Basin routing: The revised final hydrology report included the routing hydrographs. The detention basin retains the entire design storm runoff and it does not overflow. An overflow weir will be incorporated in the retention/detention basin design to protect the integrity of the basin should there occur a higher than design storm runoff.

4. Storm Water Leaving the Site: As we discussed during the conference call on April 17, the flooding issue of Needles Highway in the vicinity of the project that the City had concerns about is not created by the proposed project. The main reason that the highway suffers damages from high intensity storms is due to the offsite runoff from the I-40 bridge that flows downstream to Needles Highway at a location approximately 150-200' South of the subject property. At that location, the flow spreads, some crosses over the highway but a majority flows northerly on both sides of the highway due to the lack of drainage structures or a "dip" section at the highway to allow all of the flows to continue to the Colorado River in its natural drainage course. Thus, the highway flooding issue is independent of the development of this project.

(continued)

5. Floodplain (FEMA) issue: We believe that the FEMA floodplain issue has been addressed. As we indicated previously, the FEMA flood zone A does not have established and identified a BFE (building floor elevation), the standard method of addressing the floodplain issue is to raise the finished floors of the structures one foot above the existing highest adjacent grade of the buildings. The site has been designed to comply with that standard.

Also, your concern regarding flooding of the site from overflow of the Colorado River as you mentioned during the conference call of April 17; please be advised that the site is more than 800 feet from the river and substantially higher than the west bank of the river. Therefore, there is no impact of river flooding on the subject project.

We respectfully request that the City Engineer accept our responses to items 4 & 5 as they are the same arguments that we presented during our April 17 conference call.

Please advise if there are any questions or comments in response to this letter, we would be happy to address them immediately.

Please review and approve at your earliest convenience as time is of the essence.

Thank you

Ludwig Engineering

Hugo Acu

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning

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15252 Seneca Rd.
Victorville, CA 92392
Ph. 760-951-7676
Fax 760-241-0573

PRELIMINARY HYDROLOGY REPORT FOR PARCEL 1 OF PARCEL MAP 6626, PMB 63, PGS. 69, RECORDS OF SAN BERNARDINO COUNTY, CALIFORNIA.

IN THE CITY OF NEEDLES, CALIFORNIA.
APN: 0660-101-32-0000

PREPARED BY:

LUDWIG ENGINEERING
2126 McCulloch Blvd., Suite 8
Lake Havasu City, AZ 86403
Ph. 928-680-6060

PREPARED FOR:

FLUIDS HOLDING
991 Vanderbuilt Avenue
Claremont, California 91711

SUBMITTED: 4/18/2019

TABLE OF CONTENTS

Hydrology

Appendix I

General Vicinity Map of project and Narrative

VICINITY MAP

Background:

The project site is located in the City Of Needles, San Bernardino County, California. The project site is located about 580 feet from the intersection of River Road and National Trails Highway. The site is less than 600 feet from the Colorado River. Scatter homes are located northeasterly and southeasterly. Open desert land surrounds the site to the north, west and south. By visual inspection of the area, it was determined that a portion of the west open desert flows directly into the project site. Area delineated as Area 2 is approximately 14.29 acres, and impacts the project site. See Off-Site Exhibit on Appendix 'V' of this report.

Purpose:

The purpose for this report is to determine hydrologic areas affecting the project site. Post – development impervious and pervious is also a part of this report. The existing pre-condition run-off and post- conditions peak flows were determined and are shown on Appendix III. With the aid of drainage structures such as ditches and detention basin, flows will be controlled. For the Post-Development 3 metal buildings and 2 office buildings are proposed. All of the structures will be within reach of new fire hydrants as shown on the drainage plan, see attached copy on Appendix V. The development will have fire department access driveways and two access points are proposed for ease circulation of fire department apparatus.

Hydrology:

The hydrology analysis for off-site and on-site areas were determined by aerial photos and maps with contours generated by this consultant. Visual inspection of the drainage area was conducted. Pictures of well defined natural channels and washes were taken, see appendix IV. Upon delineation of drainage areas a hydrology program produced by the Natural Resources Conservation Service (SCS/NRCS) known as WIN TR-20 (HydroCad) Small Watershed Hydrology Computer Program Version 10.00

and the San Bernardino Hydrology Manual, was used to analyze off-site and on-site areas. Combined with other hydrology and hydraulics calculations for a given rainfall event. These techniques are used to generate hydrographs throughout water shed. The detention basin was analyzed with WIN TR-20 (HydroCad). The basin will have a Weir overflow emergency discharge only structure to protect for more intensities rain events as shown on the drainage plan, see Appendix V. The off-site and on-site preconditions will be routed through the site along the westerly and northerly property lines. The off-site flows will be controlled with the aid of 'v' ditch sections. Outlets will be place at the terminus of the flow lines. See exhibit 'B' for location of these drainage structures.

FEMA ZONE 'A' (PROJECT SITE)

The area is delineated as "Zone A" on the FEMA FLOOD MAPS, the area is shown as without no Base Flood Elevation (BFE). By inspecting the other zones surrounding Zone 'A', Zone 'AO', located approximately 1,053 feet southwesterly from the project site; is shown with a BFE of (Depth 3 Feet) as shown on the FIRM MAP. The Colorado River is under Zone 'AE' and Flood Way is shown with a (Depth 4.75 feet) as shown on the FIRM MAP. The Colorado River Floodway is approximately 737 feet Northeasterly from the project site. Due to concerns of flooding of the new structures, being constructed on the project site; an analysis of the off-site tributaries was conducted. The analysis was based on the 24hr 100 year frequency for the area. Three Cross Sections were analyzed See Exhibit 'A' for location of these sections. Sections are label as Section 'A', Section 'B' and Section 'C'. Sections 'A' and 'B' were place along the proposed Westerly and Easterly wall limit of the future buildings. Flow depths of the sections are shown on the calculation for each section. Depths were determined using the off-site tributary, located southwesterly of the project site. The area is delineated as (AREA OF MINIMAL FLOOD HAZARD ZONE 'X'). Zone 'X' is shown as Area with Reduced Risk due to Levee structure; in our case Highway 40 is the structure blocking the run-off. The calculated depth is very minimal, average depth is approximately as shown:

Section ‘A’ average depth = 0.49’
Bank Full Depth = 1.85’

Section ‘B’ average depth = 0.44’
Bank Full Depth = 1.52’

Section ‘C’ average depth = 0.39’
Bank Full Depth = 1.65’

Sections average depth:

= 0.49 Section ‘A’
= 0.44 Section ‘B’
= 0.39 Section ‘C’

0.44 averages

Bank Full Depth:

= 1.85’ Section ‘A’
= 1.52’ Section ‘B’
= 1.65’ Section ‘C’

= 1.67’ averages

For this project the Bank Full Depth will be used as the basis for the vertical datum of the finished floor of the buildings. 1.67 feet will be added to the highest existing adjacent elevation of the proposed buildings. If the elevation shown on the grading and drainage plan are higher than 1.67 feet the elevation will remain as shown on the plan. All fished floors will be higher than the existing highest elevation of the proposed foot print of the building.

Needles Highway Concerns:

Reference City Engineer Comment #4 on a letter dated April 8, 2019;

A conference was held at the City of Needles on April 17, 2019 with City Officials including the City Engineer and Planning Staff. As discussed on such conference regarding flooding issue of Needles Highway in the vicinity

of the project that the City had concerns about, is not created by the proposed project. As field observation by our engineer, the main reason Needles Highway suffers damages from high intensity storms is due to the offsite runoff from the I-40 Bridge crossing the Highway and flowing downstream to Needles Highway; at a location approximately 150' southerly from the project site. At that location the flow spreads, some flows crosses over the Highway. As observed the majority of the flows northerly on both sides of the Highway. Due to the absence of either drainage structures under the Highway or a dip-crossing at that location. Thus the existing flooding issue of the road is completely independent of the development of the proposed project.

We respectfully request the City Engineer accept this response as he indicated during the conference call.

In regards to comment #5 of the same letter, we believe that FEMA floodplain issue is address since there is no BFE elevation established, the standard method of addressing the floodplain issue is to raise the finished floors of the new buildings one foot above the highest adjacent grade. The site was designed complying with that standard.

We respectfully request that the City Engineer also accepts this response as he indicated during the conference call.

We appreciate approval of the revised Hydrology Report Submitted herewith.

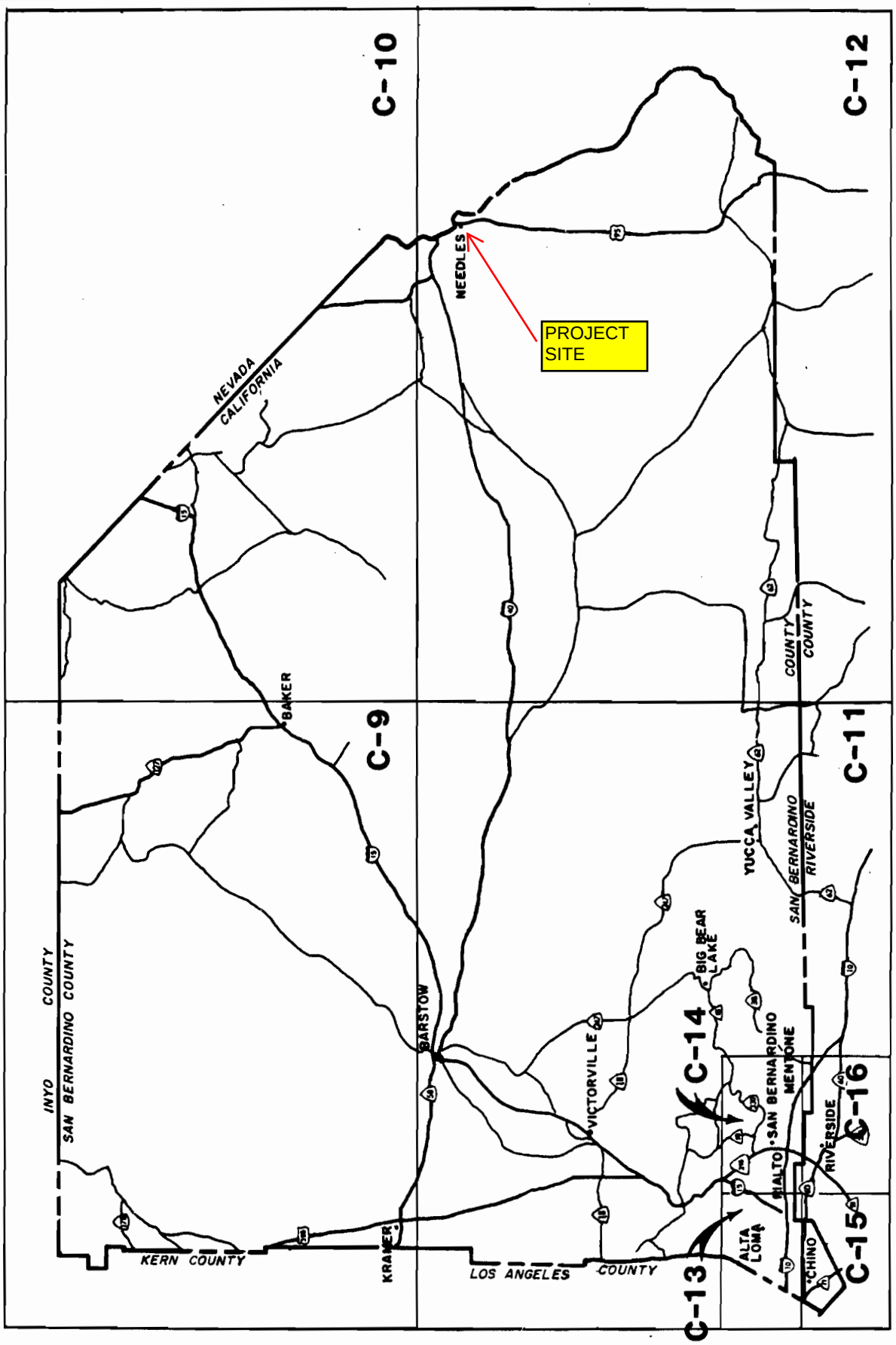
Conclusion:

Drainage and grading plan was developed for the pos-development condition of the site. Off-site runoff will be controlled with drainage structures. Off-site flows contributory drainage will be permitted to enter the new development; and will be directed through the site and directly discharging into Needles Highway. On-site flows will be directed toward a detention pond with an emergency overflow structure for higher rain events. The site is within FEMA Zone 'A' as shown on Panel 5010 Map N0. 06075C5010H map revised August 28 2008. Zone 'A' base flood is not determined by the FEMA map. Our conclusion and recommendations

regarding offsite drainage flows’ entering this development is to construct drainage structures to catch the inflow run-off, and to redirect flows through the site and discharge directly into Needles Highway.

Appendix II

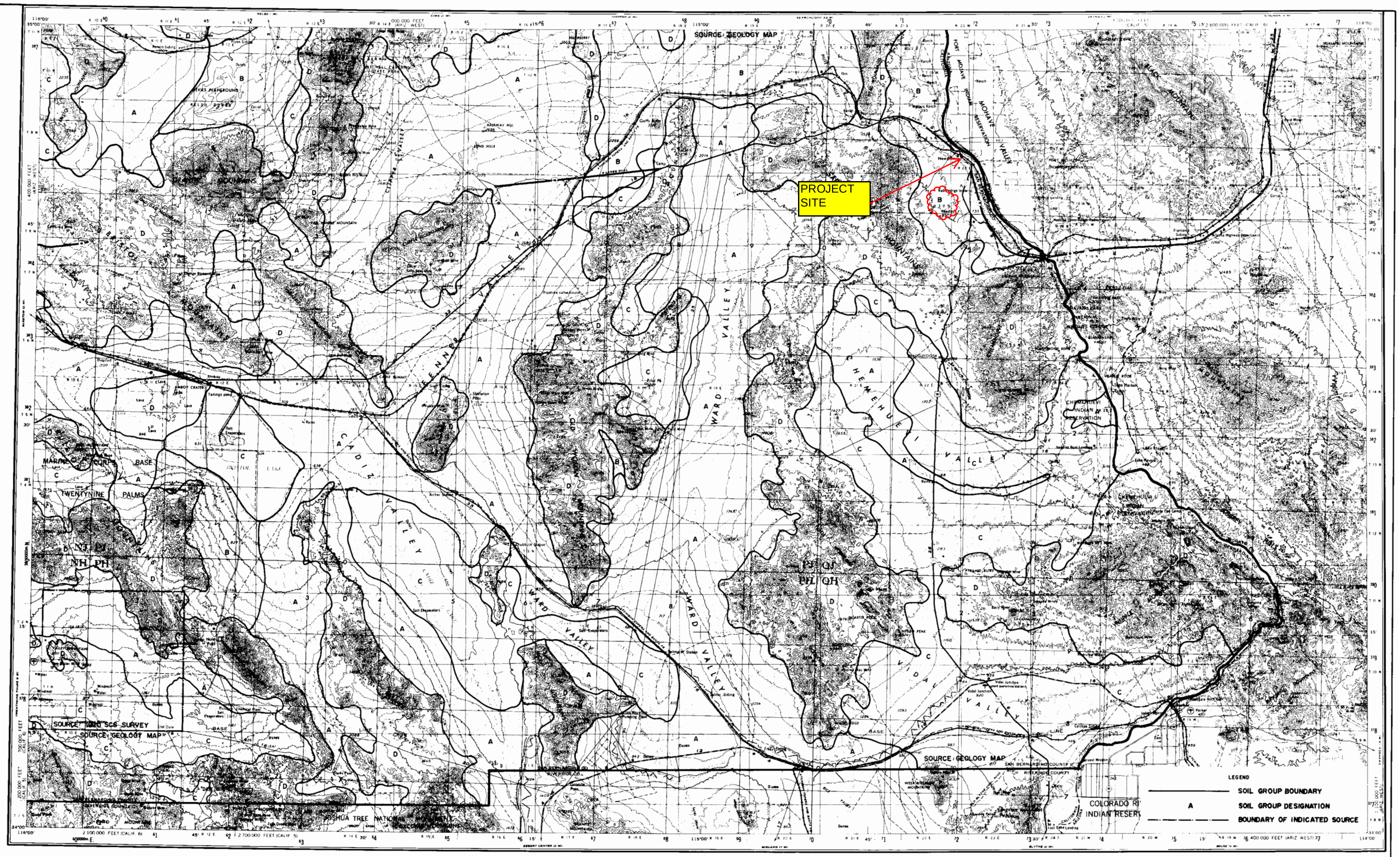
San Bernardino County Hydrologic Soils Group Map

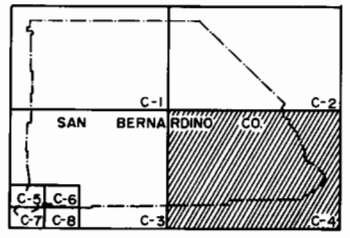


SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

SAN BERNARDINO COUNTY
SOIL MAP INDEX

Figure C-1





INDEX MAP

Scale 1:250,000

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS
TRANSVERSE MERCATOR PROJECTION
BLACK NUMBERED LINES INDICATE THE 10,000 METRE UNIVERSAL TRANSVERSE MERCATOR GRID, ZONE 11
1986 MAGNETIC DECLINATION FROM TRUE NORTH FOR THIS SHEET VARIES FROM 18° (270 MILS) EASTERLY FOR THE CENTER OF THE WEST EDGE TO 14°30' (260 MILS) EASTERLY FOR THE CENTER OF THE EAST EDGE.

BASE MAP REPRODUCED FROM U.S.G.S. "NEEDLES" TOPOGRAPHIC MAP

SCALE REDUCED BY 1/2

LOCATION DIAGRAM

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP FOR SOUTHEAST AREA

FIGURE C-12

Curve (1) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent.)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	25	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		77	86	91	94

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

CURVE NUMBERS FOR PERVIOUS AREAS

Figure C-3 (1 of 2)

Curve (1) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (Continued)					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87

Notes:

1. All curve numbers are for Antecedent Moisture Condition (AMC) II.
2. Quality of cover definitions:

   Poor-Heavily grazed, regularly burned areas, or areas of high burn potential. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.

   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.

   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.
3. See Figure C-2 for definition of cover types.

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

CURVE NUMBERS FOR PERVIOUS AREAS

Figure C-3 (2 of 2)

GROUP B: Soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well drained sandy-loam soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

GROUP C: Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

GROUP D: High runoff potential. Soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.

C.2.1. Soil Maps

Maps have been prepared which designate the locations of the various soil groups within San Bernardino County (see Figure C-1 for index map) and are contained at the back of this section (Figures C-9 through C-16). Section C.8 contains details regarding soil map data and sources of information.

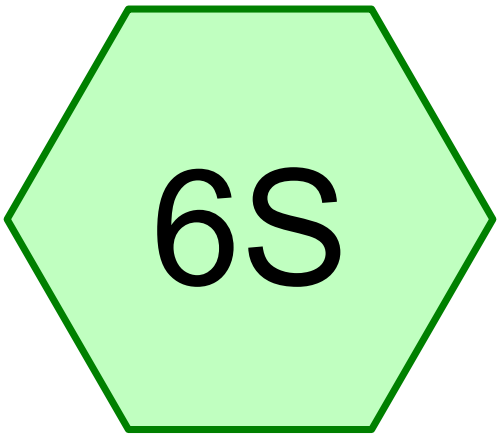
C.3. SOIL COVER AND HYDROLOGIC CONDITIONS

The type of vegetation or ground cover on a watershed, and the quality or density of that cover, have a major impact on the infiltration capacity of a given soil. Definitions of specific cover types are provided in Figure C-2. Further refinement in the cover type descriptions is provided by the definition of cover quality as follows:

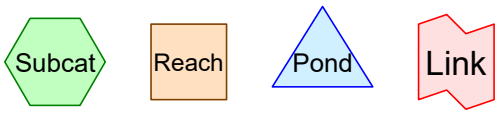
Appendix III

Peak Flow Hydrologic Analysis

post – development and pre-development.



ONSITE PRE



Routing Diagram for FLUID HOLDINGS 3353 NEEDLES HWY
Prepared by LUDWIG ENGINEERING, Printed 4/18/2019
HydroCAD® 10.00-22 s/n 05220 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.750	86	Newly graded area, HSG B (6S)
3.750	**86**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.750	HSG B	6S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.750		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	3.750	0.000	0.000	0.000	3.750	Newly graded area	6S
0.000	**3.750**	**0.000**	**0.000**	**0.000**	**3.750**	**TOTAL AREA**	

Summary for Subcatchment 6S: ONSITE PRE

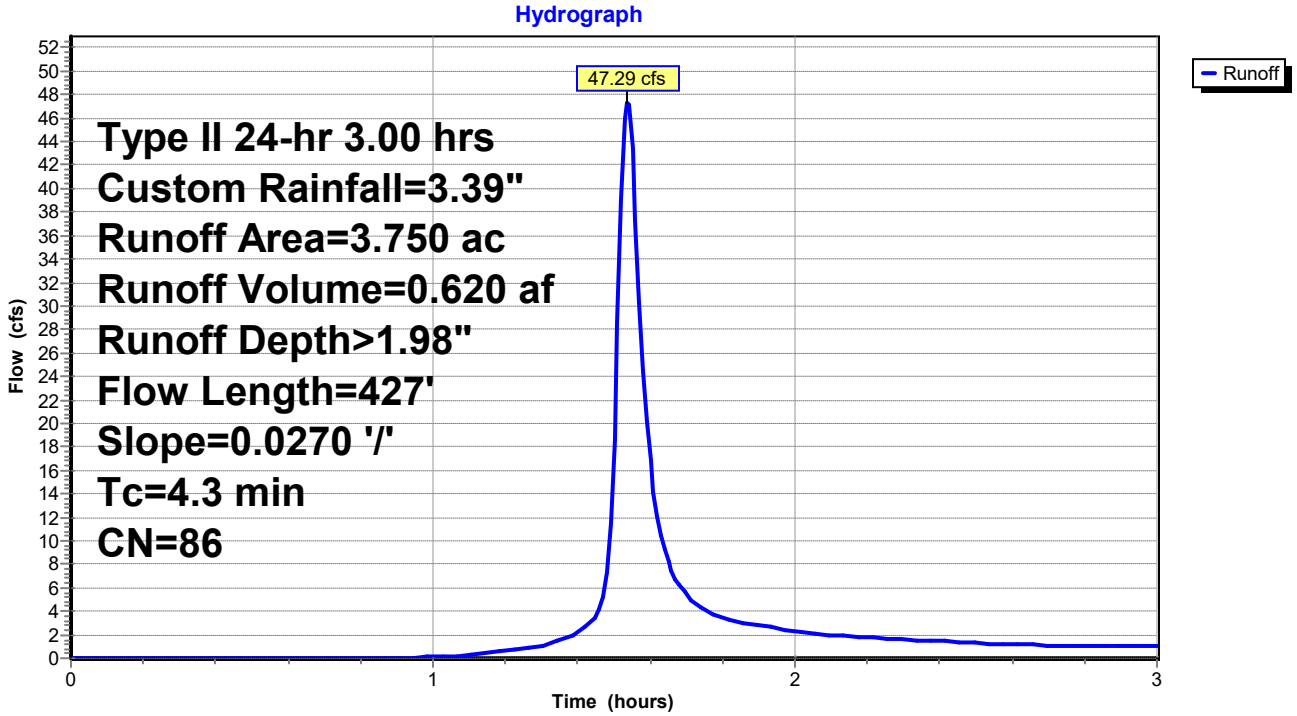
Runoff = 47.29 cfs @ 1.54 hrs, Volume= 0.620 af, Depth> 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
3.750	86	Newly graded area, HSG B
3.750		100.00% Pervious Area

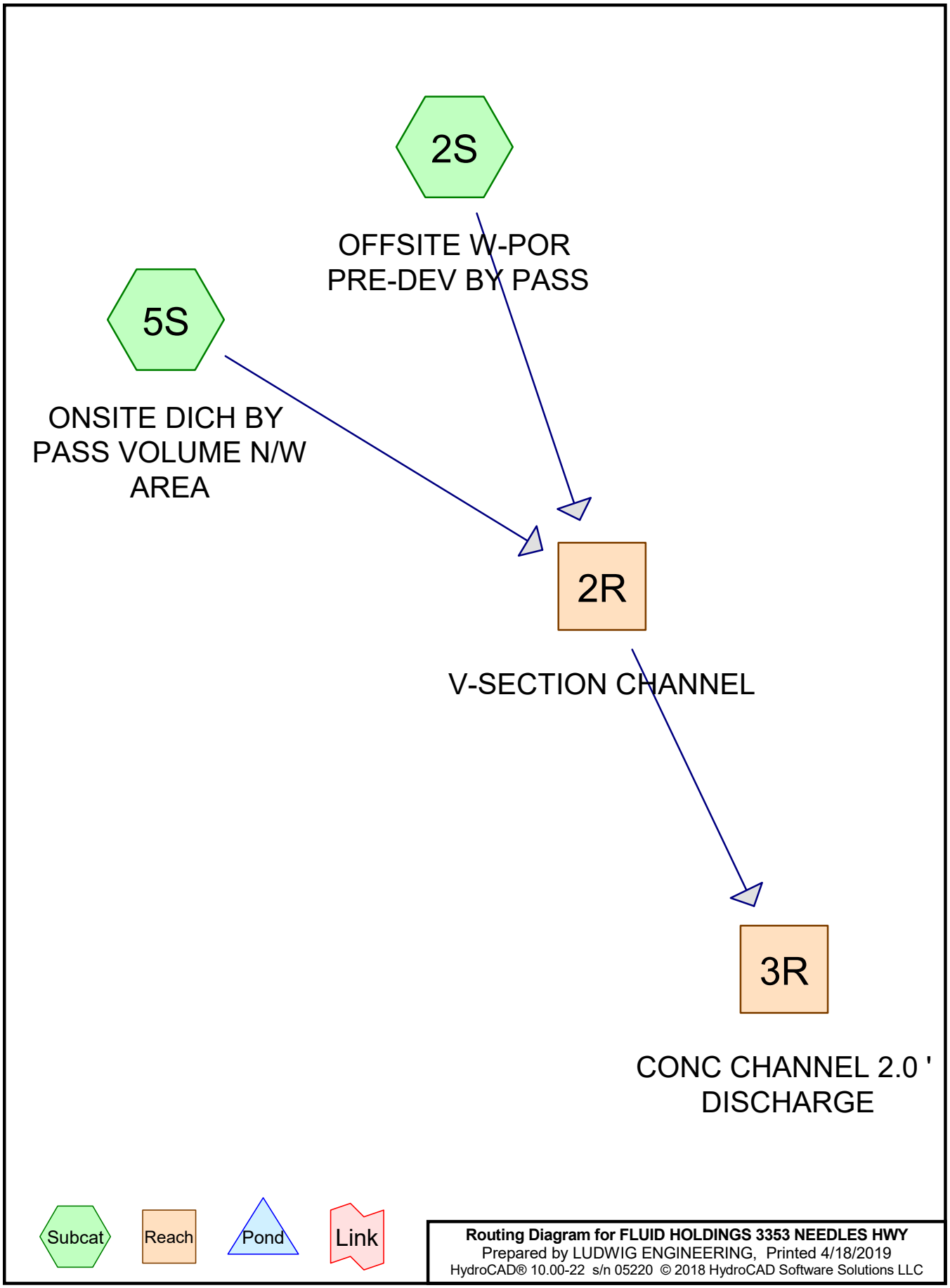
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	427	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 6S: ONSITE PRE



Hydrograph for Subcatchment 6S: ONSITE PRE

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.04
1.00	0.41	0.00	0.11
1.05	0.44	0.01	0.19
1.10	0.48	0.01	0.30
1.15	0.52	0.02	0.45
1.20	0.56	0.03	0.61
1.25	0.61	0.04	0.77
1.30	0.67	0.06	1.06
1.35	0.75	0.09	1.50
1.40	0.85	0.13	2.20
1.45	1.04	0.22	3.56
1.50	2.25	1.04	**18.58**
1.55	2.46	1.21	**43.49**
1.60	2.57	1.30	16.82
1.65	2.66	1.37	8.20
1.70	2.72	1.43	5.45
1.75	2.78	1.48	4.19
1.80	2.83	1.52	3.47
1.85	2.87	1.55	3.07
1.90	2.91	1.59	2.81
1.95	2.95	1.62	2.57
2.00	2.98	1.65	2.34
2.05	3.01	1.67	2.11
2.10	3.04	1.70	1.97
2.15	3.07	1.72	1.88
2.20	3.10	1.75	1.79
2.25	3.12	1.77	1.71
2.30	3.15	1.79	1.62
2.35	3.17	1.81	1.54
2.40	3.19	1.83	1.45
2.45	3.21	1.84	1.36
2.50	3.23	1.86	1.28
2.55	3.24	1.87	1.20
2.60	3.26	1.89	1.16
2.65	3.28	1.90	1.13
2.70	3.30	1.92	1.12
2.75	3.31	1.93	1.10
2.80	3.33	1.95	1.08
2.85	3.34	1.96	1.07
2.90	3.36	1.97	1.05
2.95	3.37	1.99	1.03
3.00	**3.39**	**2.00**	1.02



Routing Diagram for FLUID HOLDINGS 3353 NEEDLES HWY
Prepared by LUDWIG ENGINEERING, Printed 4/18/2019
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.954	77	Natural western desert, HSG B (2S, 5S)
0.954	**77**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.954	HSG B	2S, 5S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.954		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.954	0.000	0.000	0.000	0.954	Natural western desert	2S, 5S
0.000	**0.954**	**0.000**	**0.000**	**0.000**	**0.954**	**TOTAL AREA**	

Summary for Subcatchment 2S: OFFSITE W-POR PRE-DEV BY PASS

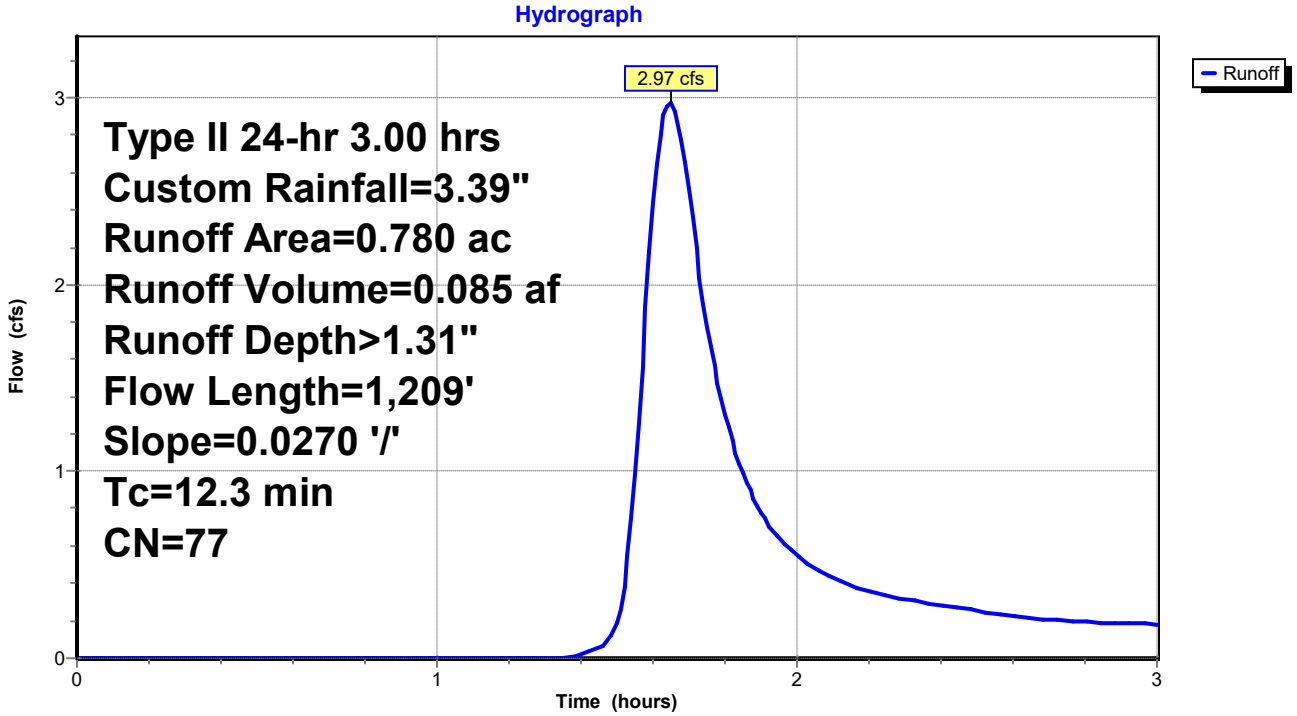
Runoff = 2.97 cfs @ 1.65 hrs, Volume= 0.085 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
0.780	77	Natural western desert, HSG B
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	1,209	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 2S: OFFSITE W-POR PRE-DEV BY PASS



Hydrograph for Subcatchment 2S: OFFSITE W-POR PRE-DEV BY PASS

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.00
1.35	0.75	0.01	0.00
1.40	0.85	0.02	0.02
1.45	1.04	0.06	0.05
1.50	2.25	0.59	0.18
1.55	2.46	0.71	0.98
1.60	2.57	0.79	2.44
1.65	2.66	0.84	**2.97**
1.70	2.72	0.88	2.52
1.75	2.78	0.92	1.77
1.80	2.83	0.95	1.31
1.85	2.87	0.98	0.99
1.90	2.91	1.01	0.78
1.95	2.95	1.04	0.64
2.00	2.98	1.06	0.55
2.05	3.01	1.08	0.48
2.10	3.04	1.10	0.43
2.15	3.07	1.12	0.39
2.20	3.10	1.14	0.35
2.25	3.12	1.16	0.33
2.30	3.15	1.17	0.31
2.35	3.17	1.19	0.30
2.40	3.19	1.20	0.28
2.45	3.21	1.22	0.27
2.50	3.23	1.23	0.25
2.55	3.24	1.24	0.24
2.60	3.26	1.26	0.23
2.65	3.28	1.27	0.21
2.70	3.30	1.28	0.21
2.75	3.31	1.29	0.20
2.80	3.33	1.30	0.20
2.85	3.34	1.32	0.19
2.90	3.36	1.33	0.19
2.95	3.37	1.34	0.19
3.00	**3.39**	**1.35**	0.18

Summary for Subcatchment 5S: ONSITE DICH BY PASS VOLUME N/W AREA

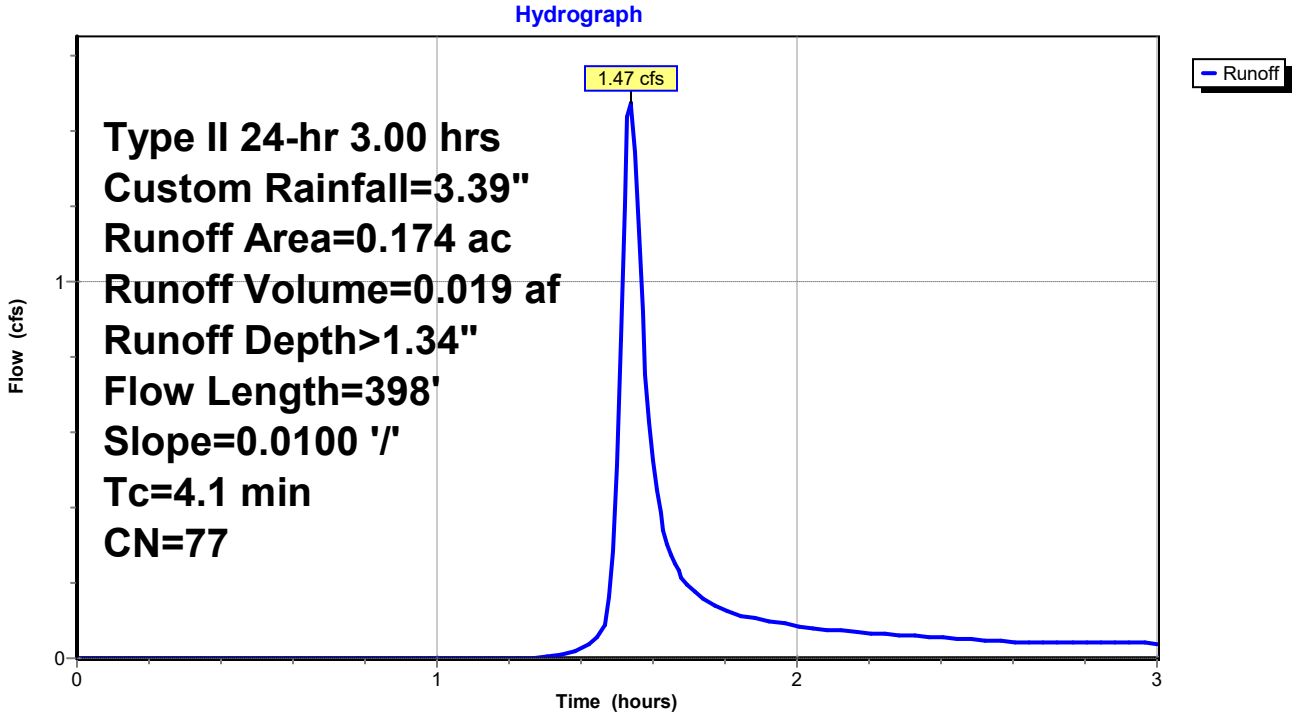
Runoff = 1.47 cfs @ 1.54 hrs, Volume= 0.019 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
0.174	77	Natural western desert, HSG B
0.174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	398	0.0100	1.61		**Shallow Concentrated Flow, shallow** Unpaved Kv= 16.1 fps

Subcatchment 5S: ONSITE DICH BY PASS VOLUME N/W AREA



Hydrograph for Subcatchment 5S: ONSITE DICH BY PASS VOLUME N/W AREA

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.00
1.35	0.75	0.01	0.01
1.40	0.85	0.02	0.03
1.45	1.04	0.06	0.06
1.50	2.25	0.59	**0.51**
1.55	2.46	0.71	**1.34**
1.60	2.57	0.79	0.53
1.65	2.66	0.84	0.27
1.70	2.72	0.88	0.19
1.75	2.78	0.92	0.15
1.80	2.83	0.95	0.13
1.85	2.87	0.98	0.11
1.90	2.91	1.01	0.10
1.95	2.95	1.04	0.10
2.00	2.98	1.06	0.09
2.05	3.01	1.08	0.08
2.10	3.04	1.10	0.07
2.15	3.07	1.12	0.07
2.20	3.10	1.14	0.07
2.25	3.12	1.16	0.06
2.30	3.15	1.17	0.06
2.35	3.17	1.19	0.06
2.40	3.19	1.20	0.05
2.45	3.21	1.22	0.05
2.50	3.23	1.23	0.05
2.55	3.24	1.24	0.05
2.60	3.26	1.26	0.04
2.65	3.28	1.27	0.04
2.70	3.30	1.28	0.04
2.75	3.31	1.29	0.04
2.80	3.33	1.30	0.04
2.85	3.34	1.32	0.04
2.90	3.36	1.33	0.04
2.95	3.37	1.34	0.04
3.00	**3.39**	**1.35**	0.04

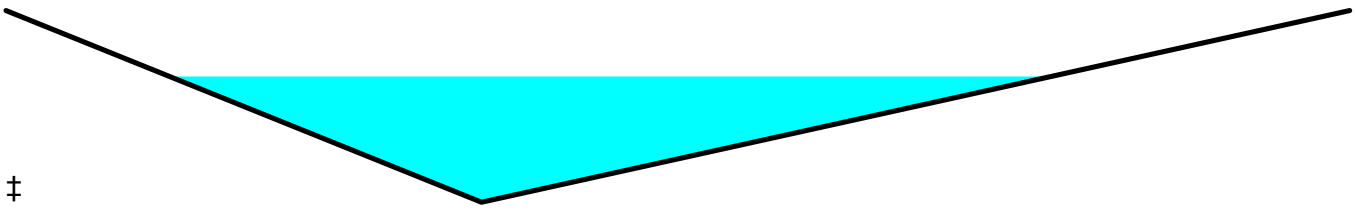
Summary for Reach 2R: V-SECTION CHANNEL

Inflow Area = 0.954 ac, 0.00% Impervious, Inflow Depth > 1.31" for Custom event
Inflow = 3.25 cfs @ 1.64 hrs, Volume= 0.104 af
Outflow = 2.83 cfs @ 1.69 hrs, Volume= 0.102 af, Atten= 13%, Lag= 3.1 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.50 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 7.1 min

Peak Storage= 749 cf @ 1.69 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 0.67' Flow Area= 4.4 sf, Capacity= 8.68 cfs

0.00' x 0.67' deep channel, n= 0.036
Side Slope Z-value= 6.9 12.6 '/' Top Width= 13.07'
Length= 397.0' Slope= 0.0100 '/'
Inlet Invert= 495.76', Outlet Invert= 491.79'



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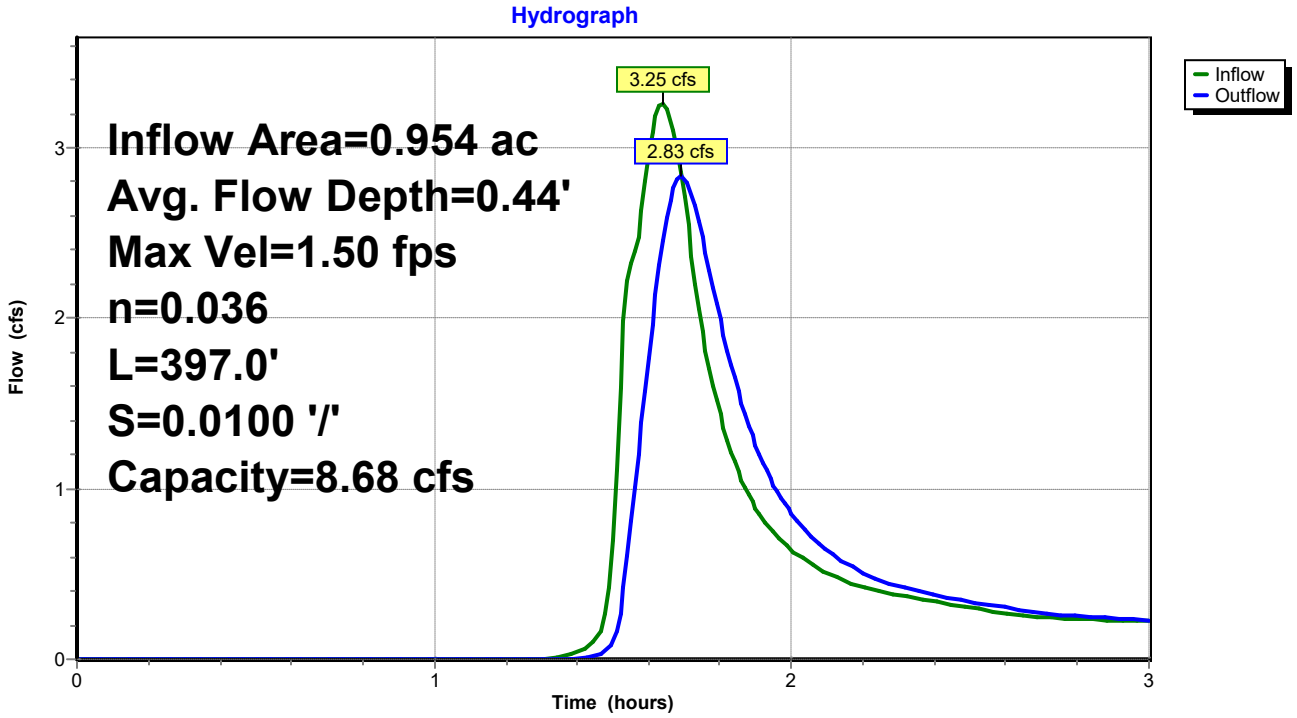
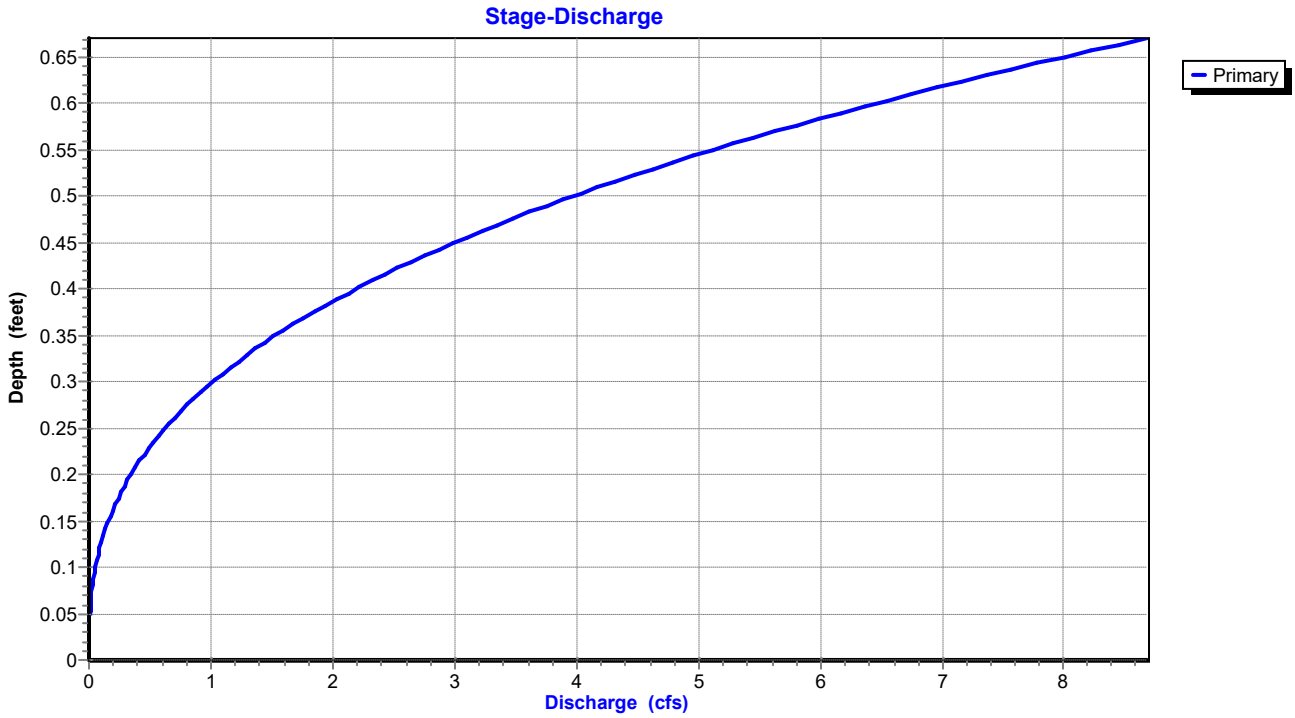
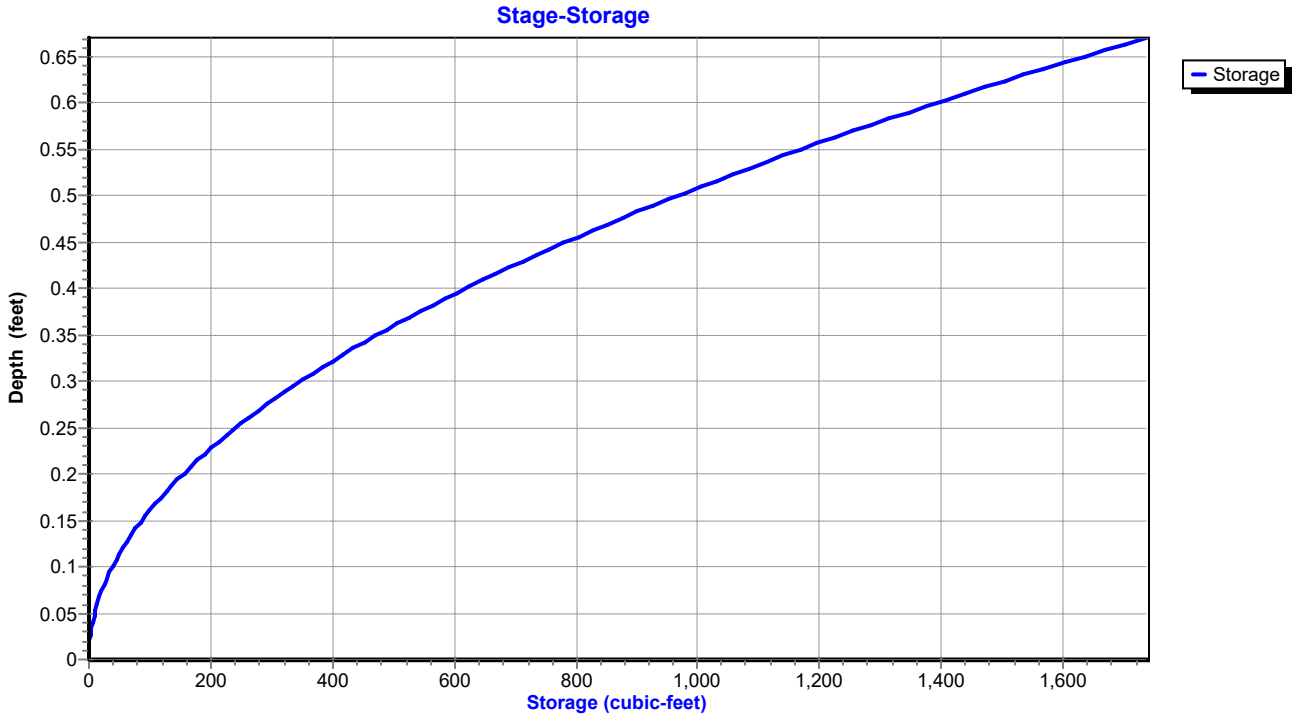
Reach 2R: V-SECTION CHANNEL



Reach 2R: V-SECTION CHANNEL



Reach 2R: V-SECTION CHANNEL



Hydrograph for Reach 2R: V-SECTION CHANNEL

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	495.76	0.00
0.10	0.00	0	495.76	0.00
0.20	0.00	0	495.76	0.00
0.30	0.00	0	495.76	0.00
0.40	0.00	0	495.76	0.00
0.50	0.00	0	495.76	0.00
0.60	0.00	0	495.76	0.00
0.70	0.00	0	495.76	0.00
0.80	0.00	0	495.76	0.00
0.90	0.00	0	495.76	0.00
1.00	0.00	0	495.76	0.00
1.10	0.00	0	495.76	0.00
1.20	0.00	0	495.76	0.00
1.30	0.00	0	495.76	0.00
1.40	0.04	6	495.80	0.00
1.50	0.69	60	495.88	0.10
1.60	**2.96**	**527**	**496.13**	**1.77**
1.70	**2.71**	**748**	**496.20**	**2.82**
1.80	1.43	576	496.15	1.99
1.90	0.89	407	496.08	1.25
2.00	0.64	305	496.04	0.85
2.10	0.51	244	496.01	0.64
2.20	0.42	206	495.99	0.51
2.30	0.38	182	495.98	0.43
2.40	0.34	166	495.97	0.38
2.50	0.30	152	495.96	0.34
2.60	0.27	140	495.95	0.30
2.70	0.25	130	495.94	0.27
2.80	0.24	122	495.94	0.25
2.90	0.23	118	495.93	0.24
3.00	0.22	114	495.93	0.23

Stage-Discharge for Reach 2R: V-SECTION CHANNEL

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
495.76	0.00	0.00
495.77	0.12	0.00
495.78	0.19	0.00
495.79	0.25	0.00
495.80	0.30	0.00
495.81	0.35	0.01
495.82	0.40	0.01
495.83	0.44	0.02
495.84	0.48	0.03
495.85	0.52	0.04
495.86	0.56	0.05
495.87	0.59	0.07
495.88	0.63	0.09
495.89	0.66	0.11
495.90	0.70	0.13
495.91	0.73	0.16
495.92	0.76	0.19
495.93	0.79	0.22
495.94	0.83	0.26
495.95	0.86	0.30
495.96	0.89	0.35
495.97	0.92	0.39
495.98	0.94	0.45
495.99	0.97	0.50
496.00	1.00	0.56
496.01	1.03	0.63
496.02	1.06	0.70
496.03	1.08	0.77
496.04	1.11	0.85
496.05	1.13	0.93
496.06	1.16	1.02
496.07	1.19	1.11
496.08	1.21	1.21
496.09	1.24	1.31
496.10	1.26	1.42
496.11	1.29	1.54
496.12	1.31	1.66
496.13	1.34	1.78
496.14	1.36	1.91
496.15	1.38	2.05
496.16	1.41	2.19
496.17	1.43	2.34
496.18	1.45	2.50
496.19	1.48	2.66
496.20	1.50	2.83
496.21	1.52	3.00
496.22	1.54	3.19
496.23	1.57	3.37
496.24	1.59	3.57
496.25	1.61	3.77
496.26	1.63	3.98
496.27	1.65	4.19
496.28	1.68	4.42
496.29	1.70	4.65
496.30	1.72	4.88
496.31	1.74	5.13
496.32	1.76	5.38
496.33	1.78	5.64
496.34	1.80	5.91
496.35	1.82	6.18
496.36	1.84	6.47
496.37	1.86	6.76
496.38	1.88	7.06
496.39	1.90	7.37
496.40	1.92	7.68
496.41	1.94	8.01
496.42	1.96	8.34
496.43	**1.98**	**8.68**

Stage-Area-Storage for Reach 2R: V-SECTION CHANNEL

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
495.76	0.0	0
495.77	0.0	0
495.78	0.0	2
495.79	0.0	4
495.80	0.0	6
495.81	0.0	10
495.82	0.0	14
495.83	0.0	19
495.84	0.1	25
495.85	0.1	31
495.86	0.1	39
495.87	0.1	47
495.88	0.1	56
495.89	0.2	65
495.90	0.2	76
495.91	0.2	87
495.92	0.2	99
495.93	0.3	112
495.94	0.3	125
495.95	0.4	140
495.96	0.4	155
495.97	0.4	171
495.98	0.5	187
495.99	0.5	205
496.00	0.6	223
496.01	0.6	242
496.02	0.7	262
496.03	0.7	282
496.04	0.8	303
496.05	0.8	326
496.06	0.9	348
496.07	0.9	372
496.08	1.0	396
496.09	1.1	422
496.10	1.1	447
496.11	1.2	474
496.12	1.3	502
496.13	1.3	530
496.14	1.4	559
496.15	1.5	589
496.16	1.6	619
496.17	1.6	651
496.18	1.7	683
496.19	1.8	716
496.20	1.9	749
496.21	2.0	784
496.22	2.1	819
496.23	2.2	855
496.24	2.2	892
496.25	2.3	929
496.26	2.4	968
496.27	2.5	1,007
496.28	2.6	1,047
496.29	2.7	1,087
496.30	2.8	1,129
496.31	2.9	1,171
496.32	3.1	1,214
496.33	3.2	1,258
496.34	3.3	1,302
496.35	3.4	1,347
496.36	3.5	1,394
496.37	3.6	1,440
496.38	3.7	1,488
496.39	3.9	1,536
496.40	4.0	1,586
496.41	4.1	1,635
496.42	4.2	1,686
496.43	**4.4**	**1,738**

Summary for Reach 3R: CONC CHANNEL 2.0 ' DISCHARGE

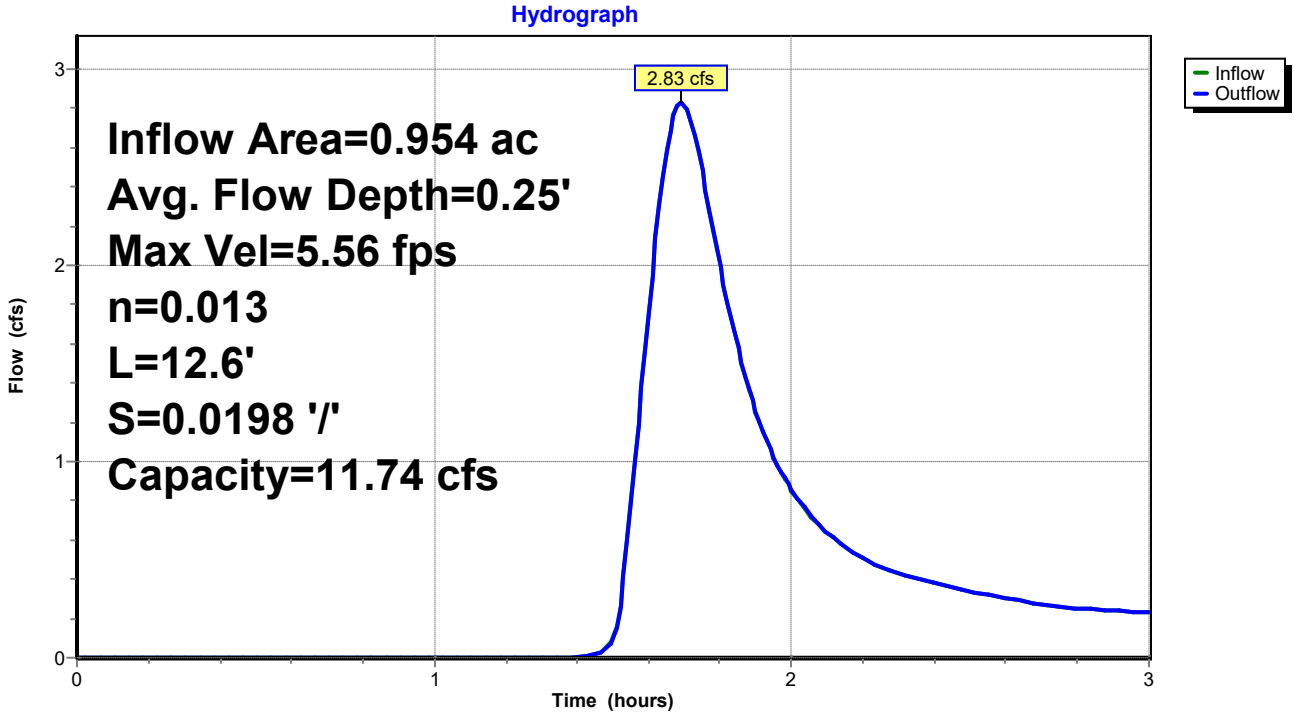
Inflow Area = 0.954 ac, 0.00% Impervious, Inflow Depth > 1.28" for Custom event
Inflow = 2.83 cfs @ 1.69 hrs, Volume= 0.102 af
Outflow = 2.83 cfs @ 1.69 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.56 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.96 fps, Avg. Travel Time= 0.1 min

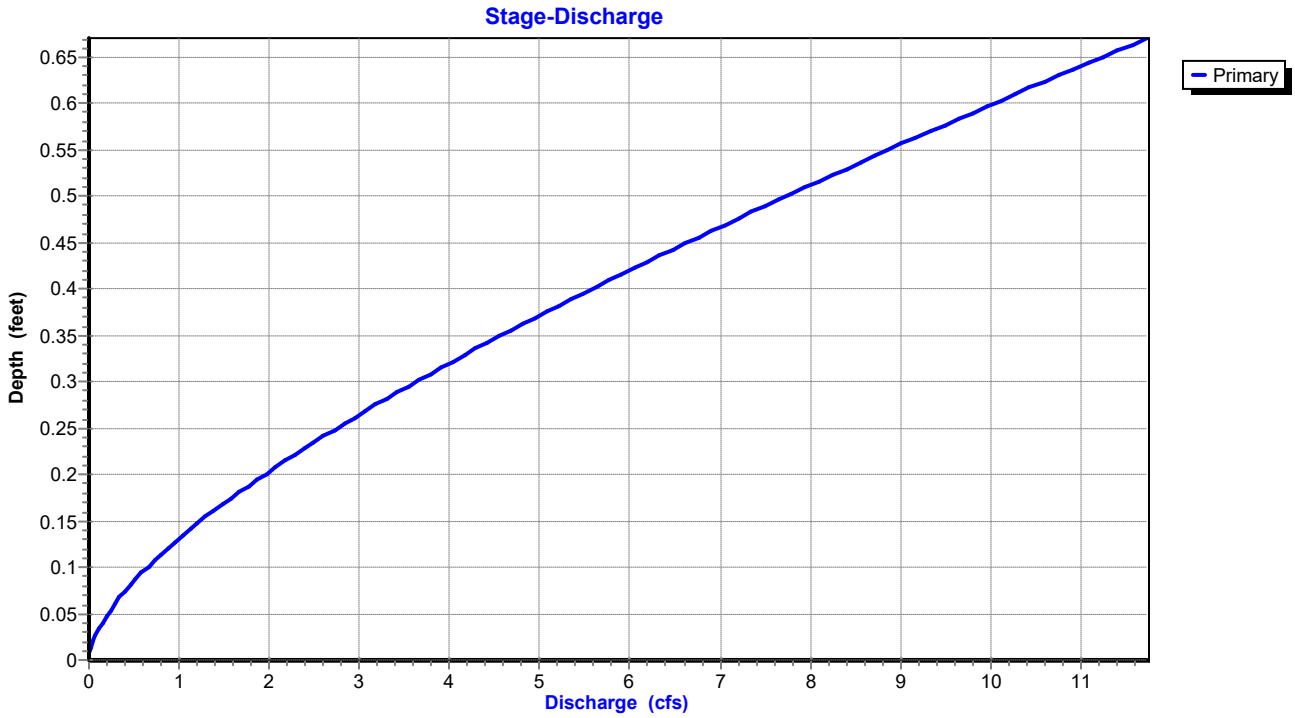
Peak Storage= 6 cf @ 1.69 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 0.67' Flow Area= 1.3 sf, Capacity= 11.74 cfs

2.00' x 0.67' deep channel, n= 0.013 Concrete, trowel finish
Length= 12.6' Slope= 0.0198 '/'
Inlet Invert= 491.79', Outlet Invert= 491.54'

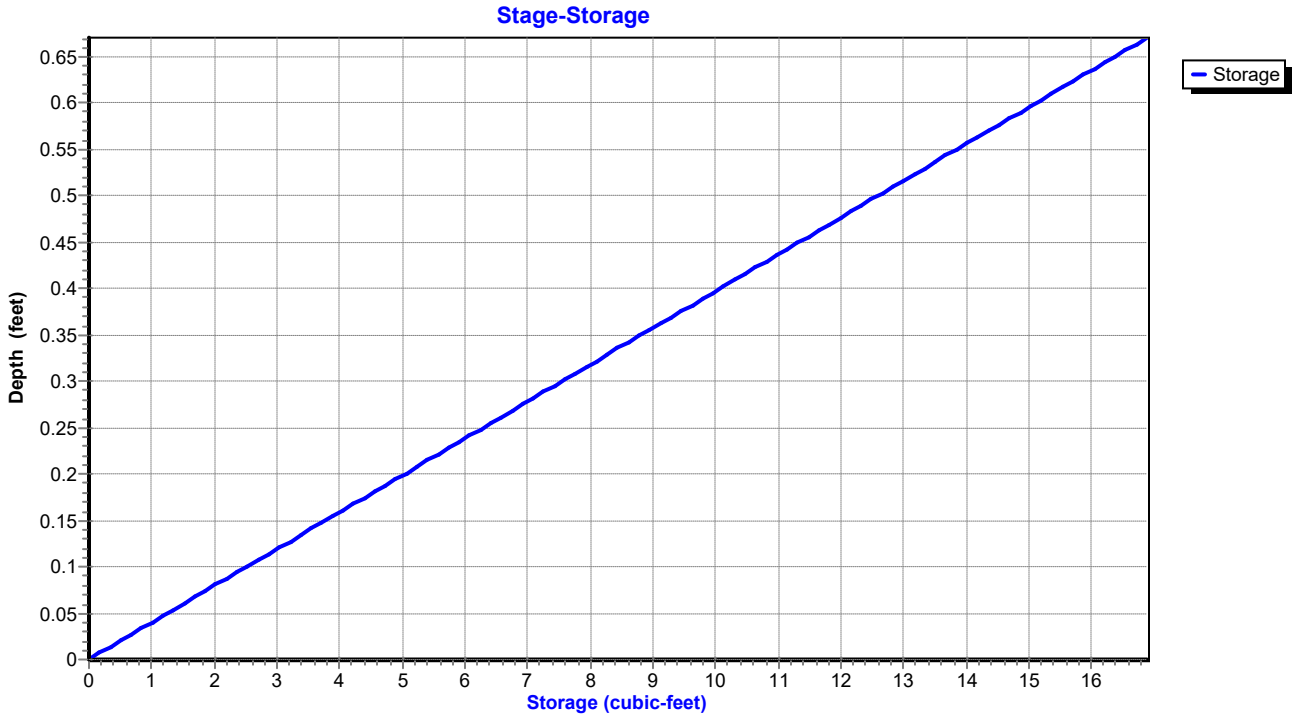
Reach 3R: CONC CHANNEL 2.0 ' DISCHARGE



Reach 3R: CONC CHANNEL 2.0 ' DISCHARGE



Reach 3R: CONC CHANNEL 2.0 ' DISCHARGE



Hydrograph for Reach 3R: CONC CHANNEL 2.0 ' DISCHARGE

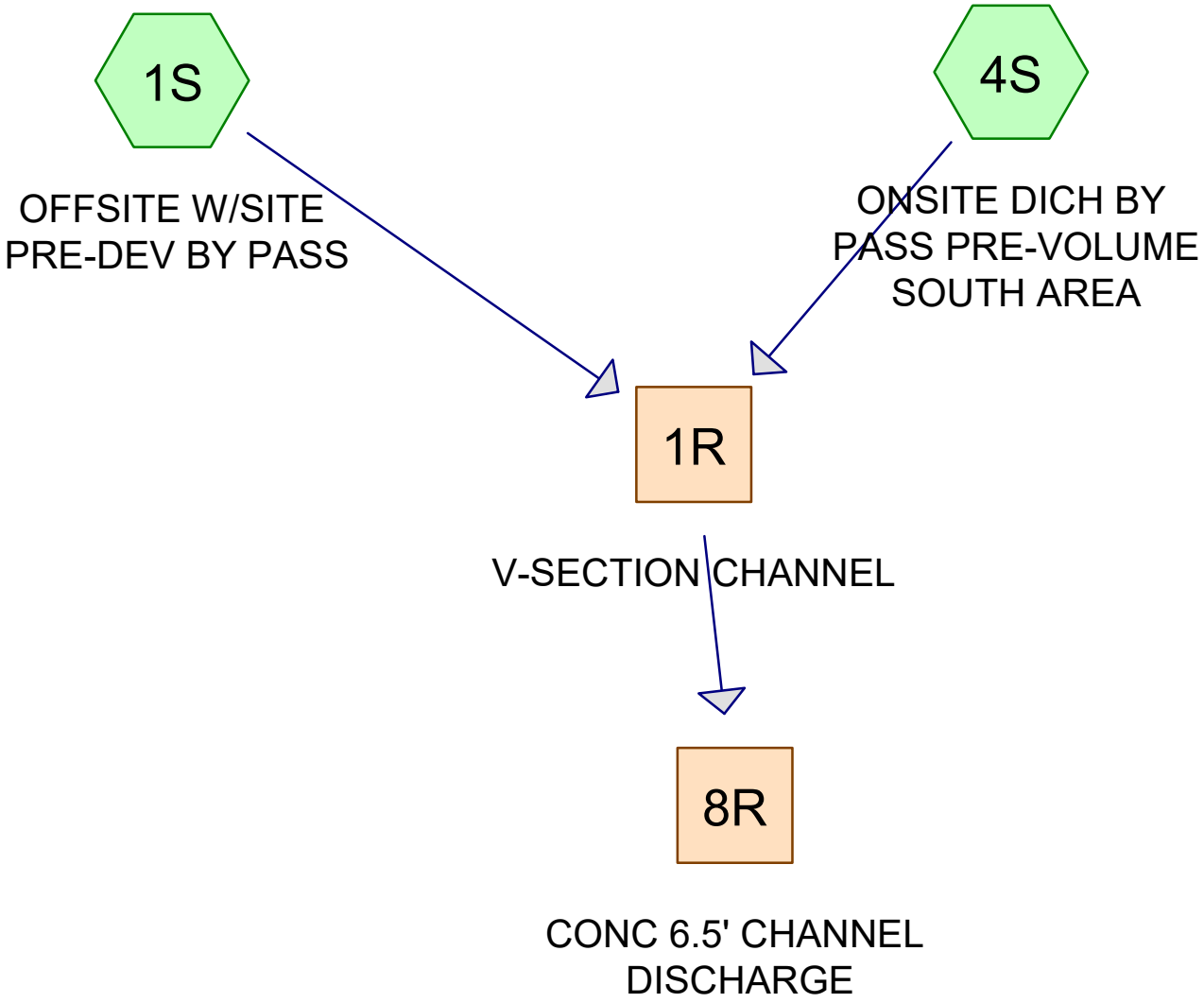
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	491.79	0.00
0.10	0.00	0	491.79	0.00
0.20	0.00	0	491.79	0.00
0.30	0.00	0	491.79	0.00
0.40	0.00	0	491.79	0.00
0.50	0.00	0	491.79	0.00
0.60	0.00	0	491.79	0.00
0.70	0.00	0	491.79	0.00
0.80	0.00	0	491.79	0.00
0.90	0.00	0	491.79	0.00
1.00	0.00	0	491.79	0.00
1.10	0.00	0	491.79	0.00
1.20	0.00	0	491.79	0.00
1.30	0.00	0	491.79	0.00
1.40	0.00	0	491.79	0.00
1.50	0.10	1	491.82	0.09
1.60	**1.77**	**5**	**491.98**	**1.76**
1.70	**2.82**	**6**	**492.04**	**2.82**
1.80	1.99	5	491.99	1.99
1.90	1.25	4	491.94	1.26
2.00	0.85	3	491.91	0.85
2.10	0.64	2	491.89	0.64
2.20	0.51	2	491.88	0.51
2.30	0.43	2	491.87	0.43
2.40	0.38	2	491.86	0.38
2.50	0.34	2	491.86	0.34
2.60	0.30	2	491.85	0.30
2.70	0.27	1	491.85	0.27
2.80	0.25	1	491.85	0.25
2.90	0.24	1	491.84	0.24
3.00	0.23	1	491.84	0.23

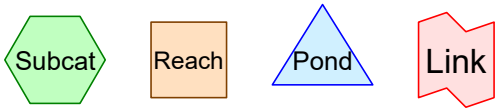
Stage-Discharge for Reach 3R: CONC CHANNEL 2.0 ' DISCHARGE

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
491.79	0.00	0.00
491.80	0.73	0.02
491.81	1.17	0.05
491.82	1.52	0.09
491.83	1.83	0.15
491.84	2.11	0.21
491.85	2.37	0.28
491.86	2.61	0.37
491.87	2.84	0.45
491.88	3.05	0.55
491.89	3.26	0.65
491.90	3.45	0.76
491.91	3.63	0.87
491.92	3.81	0.99
491.93	3.98	1.11
491.94	4.14	1.24
491.95	4.30	1.38
491.96	4.45	1.51
491.97	4.60	1.65
491.98	4.74	1.80
491.99	4.88	1.95
492.00	5.01	2.10
492.01	5.14	2.26
492.02	5.26	2.42
492.03	5.39	2.59
492.04	5.51	2.75
492.05	5.62	2.92
492.06	5.74	3.10
492.07	5.85	3.27
492.08	5.95	3.45
492.09	6.06	3.63
492.10	6.16	3.82
492.11	6.26	4.01
492.12	6.36	4.20
492.13	6.45	4.39
492.14	6.55	4.58
492.15	6.64	4.78
492.16	6.73	4.98
492.17	6.81	5.18
492.18	6.90	5.38
492.19	6.98	5.59
492.20	7.07	5.80
492.21	7.15	6.00
492.22	7.23	6.22
492.23	7.30	6.43
492.24	7.38	6.64
492.25	7.46	6.86
492.26	7.53	7.08
492.27	7.60	7.30
492.28	7.67	7.52
492.29	7.74	7.74
492.30	7.81	7.97
492.31	7.88	8.19
492.32	7.94	8.42
492.33	8.01	8.65
492.34	8.07	8.88
492.35	8.13	9.11
492.36	8.19	9.34
492.37	8.25	9.58
492.38	8.31	9.81
492.39	8.37	10.05
492.40	8.43	10.29
492.41	8.49	10.52
492.42	8.54	10.76
492.43	8.60	11.01
492.44	8.65	11.25
492.45	8.71	11.49
492.46	**8.76**	**11.74**

Stage-Area-Storage for Reach 3R: CONC CHANNEL 2.0 ' DISCHARGE

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
491.79	0.0	0
491.80	0.0	0
491.81	0.0	1
491.82	0.1	1
491.83	0.1	1
491.84	0.1	1
491.85	0.1	2
491.86	0.1	2
491.87	0.2	2
491.88	0.2	2
491.89	0.2	3
491.90	0.2	3
491.91	0.2	3
491.92	0.3	3
491.93	0.3	4
491.94	0.3	4
491.95	0.3	4
491.96	0.3	4
491.97	0.4	5
491.98	0.4	5
491.99	0.4	5
492.00	0.4	5
492.01	0.4	6
492.02	0.5	6
492.03	0.5	6
492.04	0.5	6
492.05	0.5	7
492.06	0.5	7
492.07	0.6	7
492.08	0.6	7
492.09	0.6	8
492.10	0.6	8
492.11	0.6	8
492.12	0.7	8
492.13	0.7	9
492.14	0.7	9
492.15	0.7	9
492.16	0.7	9
492.17	0.8	10
492.18	0.8	10
492.19	0.8	10
492.20	0.8	10
492.21	0.8	11
492.22	0.9	11
492.23	0.9	11
492.24	0.9	11
492.25	0.9	12
492.26	0.9	12
492.27	1.0	12
492.28	1.0	12
492.29	1.0	13
492.30	1.0	13
492.31	1.0	13
492.32	1.1	13
492.33	1.1	14
492.34	1.1	14
492.35	1.1	14
492.36	1.1	14
492.37	1.2	15
492.38	1.2	15
492.39	1.2	15
492.40	1.2	15
492.41	1.2	16
492.42	1.3	16
492.43	1.3	16
492.44	1.3	16
492.45	1.3	17
492.46	**1.3**	**17**





Routing Diagram for FLUID HOLDINGS 3353 NEEDLES HWY
Prepared by LUDWIG ENGINEERING, Printed 4/18/2019
HydroCAD® 10.00-22 s/n 05220 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
14.131	77	Natural western desert, HSG B (1S, 4S)
14.131	**77**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
14.131	HSG B	1S, 4S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
14.131		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	14.131	0.000	0.000	0.000	14.131	Natural western desert	1S, 4S
0.000	**14.131**	**0.000**	**0.000**	**0.000**	**14.131**	**TOTAL AREA**	

Summary for Subcatchment 1S: OFFSITE W/SITE PRE-DEV BY PASS

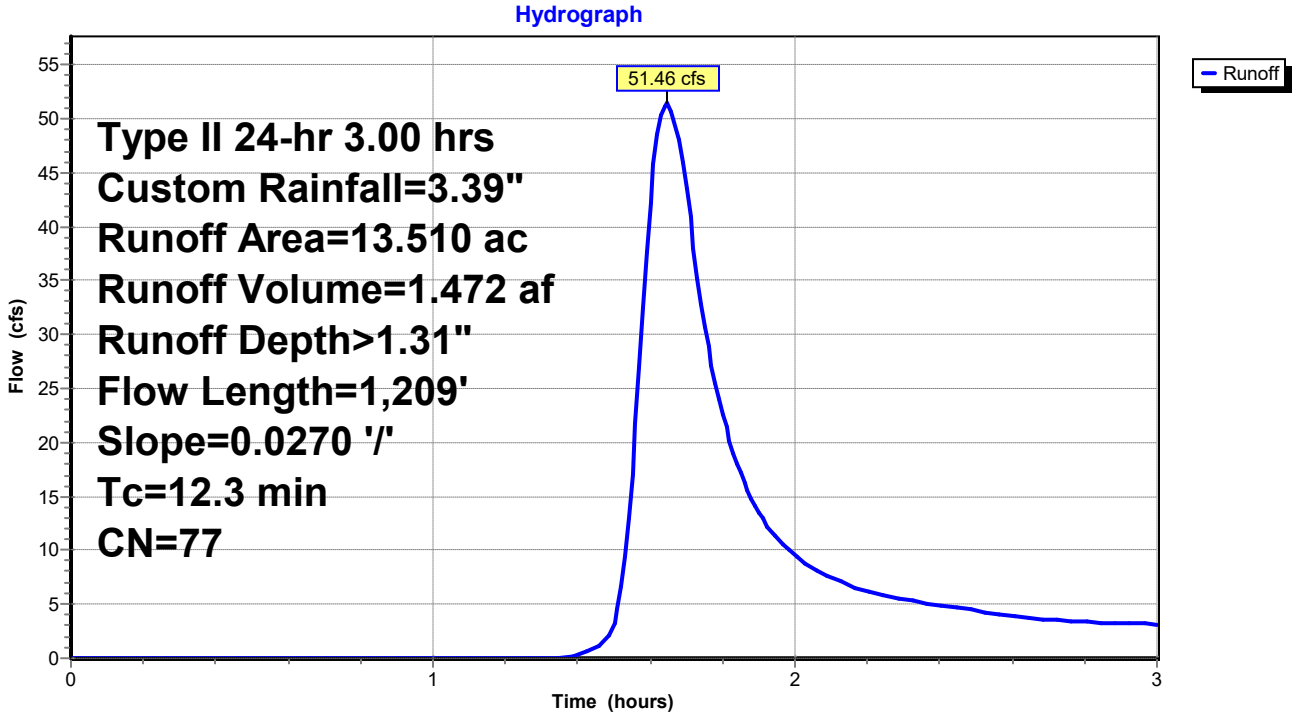
Runoff = 51.46 cfs @ 1.65 hrs, Volume= 1.472 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
13.510	77	Natural western desert, HSG B
13.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	1,209	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 1S: OFFSITE W/SITE PRE-DEV BY PASS



Hydrograph for Subcatchment 1S: OFFSITE W/SITE PRE-DEV BY PASS

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.01
1.35	0.75	0.01	0.07
1.40	0.85	0.02	0.32
1.45	1.04	0.06	0.93
1.50	2.25	0.59	3.20
1.55	2.46	0.71	17.04
1.60	2.57	0.79	42.19
1.65	2.66	0.84	**51.45**
1.70	2.72	0.88	43.57
1.75	2.78	0.92	30.73
1.80	2.83	0.95	22.63
1.85	2.87	0.98	17.16
1.90	2.91	1.01	13.55
1.95	2.95	1.04	11.17
2.00	2.98	1.06	9.56
2.05	3.01	1.08	8.39
2.10	3.04	1.10	7.47
2.15	3.07	1.12	6.71
2.20	3.10	1.14	6.14
2.25	3.12	1.16	5.76
2.30	3.15	1.17	5.44
2.35	3.17	1.19	5.17
2.40	3.19	1.20	4.91
2.45	3.21	1.22	4.66
2.50	3.23	1.23	4.41
2.55	3.24	1.24	4.15
2.60	3.26	1.26	3.91
2.65	3.28	1.27	3.71
2.70	3.30	1.28	3.56
2.75	3.31	1.29	3.46
2.80	3.33	1.30	3.38
2.85	3.34	1.32	3.32
2.90	3.36	1.33	3.26
2.95	3.37	1.34	3.21
3.00	**3.39**	**1.35**	3.16

Summary for Subcatchment 4S: ONSITE DICH BY PASS PRE-VOLUME SOUTH AREA

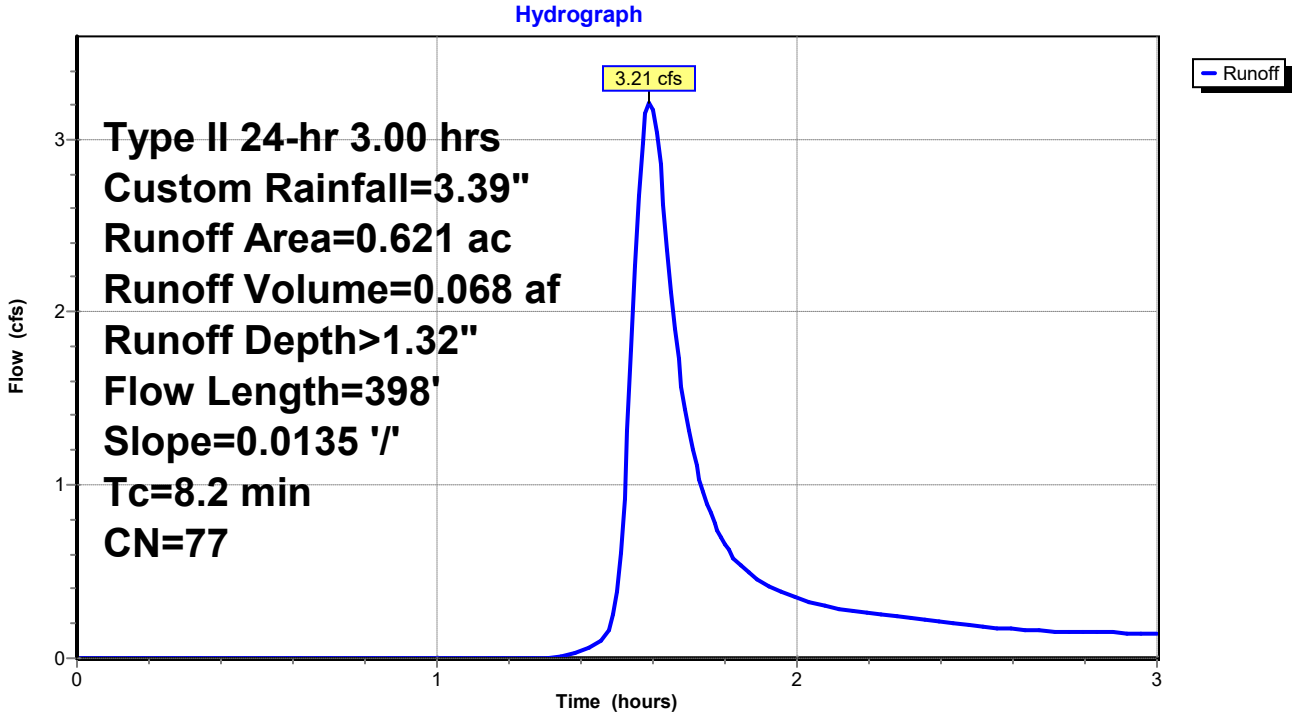
Runoff = 3.21 cfs @ 1.59 hrs, Volume= 0.068 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
0.621	77	Natural western desert, HSG B
0.621		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	398	0.0135	0.81		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps

Subcatchment 4S: ONSITE DICH BY PASS PRE-VOLUME SOUTH AREA



Hydrograph for Subcatchment 4S: ONSITE DICH BY PASS PRE-VOLUME SOUTH AREA

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.00
1.35	0.75	0.01	0.01
1.40	0.85	0.02	0.04
1.45	1.04	0.06	0.09
1.50	2.25	0.59	0.38
1.55	2.46	0.71	**2.26**
1.60	2.57	0.79	**3.16**
1.65	2.66	0.84	2.11
1.70	2.72	0.88	1.31
1.75	2.78	0.92	0.89
1.80	2.83	0.95	0.66
1.85	2.87	0.98	0.52
1.90	2.91	1.01	0.44
1.95	2.95	1.04	0.39
2.00	2.98	1.06	0.35
2.05	3.01	1.08	0.32
2.10	3.04	1.10	0.29
2.15	3.07	1.12	0.27
2.20	3.10	1.14	0.26
2.25	3.12	1.16	0.24
2.30	3.15	1.17	0.23
2.35	3.17	1.19	0.22
2.40	3.19	1.20	0.21
2.45	3.21	1.22	0.20
2.50	3.23	1.23	0.19
2.55	3.24	1.24	0.18
2.60	3.26	1.26	0.17
2.65	3.28	1.27	0.16
2.70	3.30	1.28	0.16
2.75	3.31	1.29	0.15
2.80	3.33	1.30	0.15
2.85	3.34	1.32	0.15
2.90	3.36	1.33	0.15
2.95	3.37	1.34	0.14
3.00	**3.39**	**1.35**	0.14

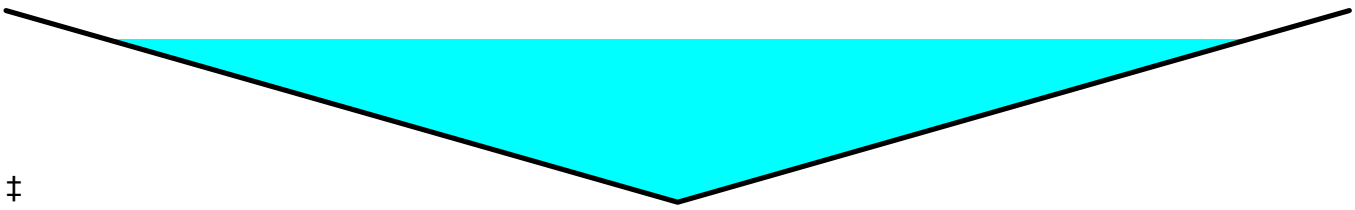
Summary for Reach 1R: V-SECTION CHANNEL

Inflow Area = 14.131 ac, 0.00% Impervious, Inflow Depth > 1.31" for Custom event
Inflow = 53.63 cfs @ 1.65 hrs, Volume= 1.540 af
Outflow = 52.37 cfs @ 1.66 hrs, Volume= 1.528 af, Atten= 2%, Lag= 1.1 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.86 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.83 fps, Avg. Travel Time= 2.4 min

Peak Storage= 4,382 cf @ 1.66 hrs
Average Depth at Peak Storage= 0.85'
Bank-Full Depth= 1.00' Flow Area= 14.9 sf, Capacity= 80.61 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 14.9 '/' Top Width= 29.80'
Length= 406.4' Slope= 0.0162 '/'
Inlet Invert= 494.00', Outlet Invert= 487.41'



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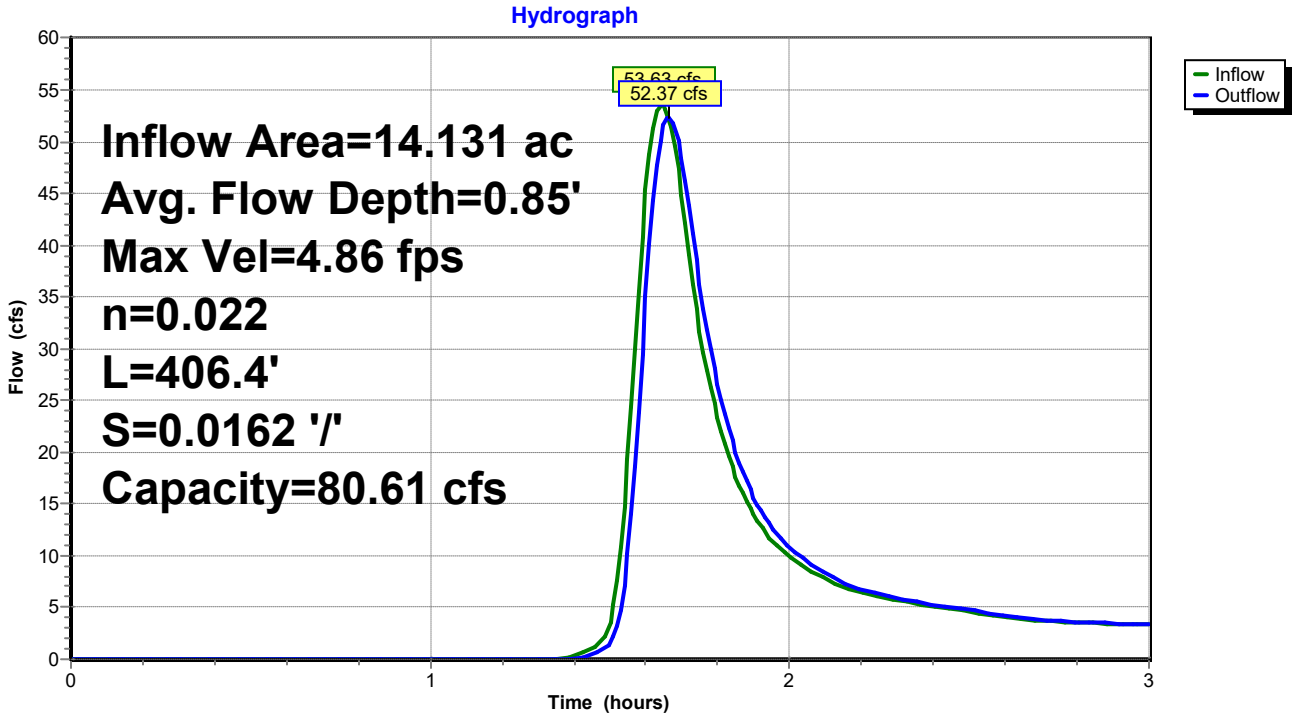
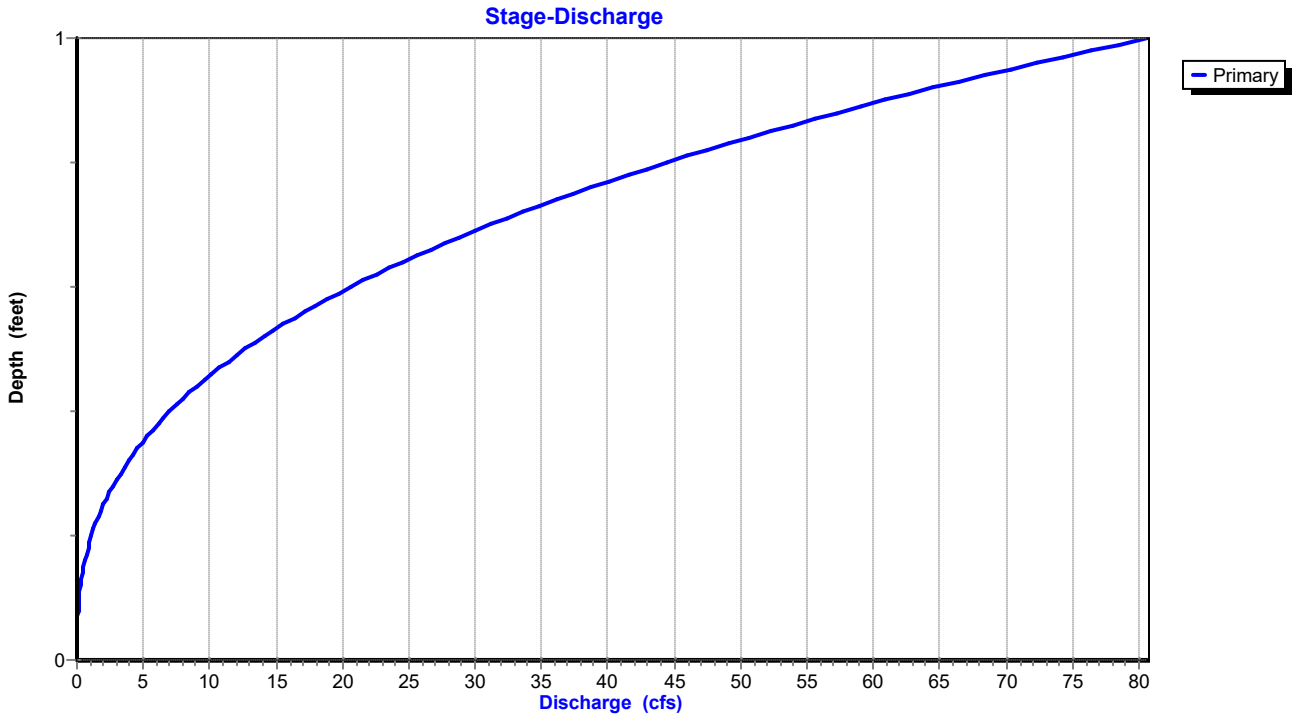
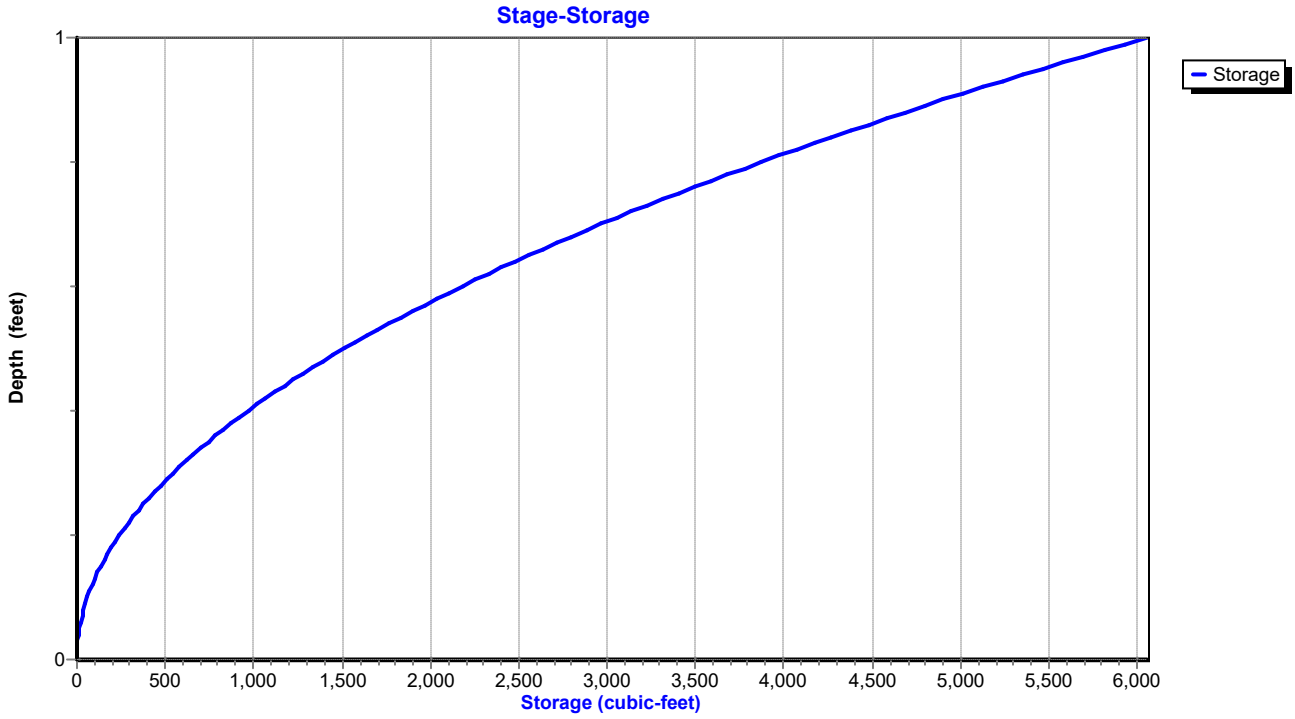
Reach 1R: V-SECTION CHANNEL



Reach 1R: V-SECTION CHANNEL



Reach 1R: V-SECTION CHANNEL



Hydrograph for Reach 1R: V-SECTION CHANNEL

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	494.00	0.00
0.10	0.00	0	494.00	0.00
0.20	0.00	0	494.00	0.00
0.30	0.00	0	494.00	0.00
0.40	0.00	0	494.00	0.00
0.50	0.00	0	494.00	0.00
0.60	0.00	0	494.00	0.00
0.70	0.00	0	494.00	0.00
0.80	0.00	0	494.00	0.00
0.90	0.00	0	494.00	0.00
1.00	0.00	0	494.00	0.00
1.10	0.00	0	494.00	0.00
1.20	0.00	0	494.00	0.00
1.30	0.01	0	494.00	0.00
1.40	0.35	34	494.07	0.08
1.50	3.59	310	494.23	1.53
1.60	**45.35**	**3,238**	**494.73**	**34.99**
1.70	**44.89**	**4,129**	**494.83**	**48.38**
1.80	23.29	2,628	494.66	26.49
1.90	13.99	1,771	494.54	15.65
2.00	9.91	1,337	494.47	10.76
2.10	7.76	1,099	494.43	8.29
2.20	6.40	941	494.39	6.73
2.30	5.68	850	494.37	5.88
2.40	5.12	785	494.36	5.29
2.50	4.59	725	494.35	4.76
2.60	4.08	665	494.33	4.24
2.70	3.72	616	494.32	3.83
2.80	3.54	587	494.31	3.59
2.90	3.41	570	494.31	3.45
3.00	3.30	556	494.30	3.34

Stage-Discharge for Reach 1R: V-SECTION CHANNEL

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
494.00	0.00	0.00
494.01	0.25	0.00
494.02	0.40	0.00
494.03	0.52	0.01
494.04	0.63	0.02
494.05	0.73	0.03
494.06	0.83	0.04
494.07	0.92	0.07
494.08	1.00	0.10
494.09	1.09	0.13
494.10	1.17	0.17
494.11	1.24	0.22
494.12	1.32	0.28
494.13	1.39	0.35
494.14	1.46	0.43
494.15	1.53	0.51
494.16	1.59	0.61
494.17	1.66	0.71
494.18	1.72	0.83
494.19	1.79	0.96
494.20	1.85	1.10
494.21	1.91	1.26
494.22	1.97	1.42
494.23	2.03	1.60
494.24	2.09	1.79
494.25	2.15	2.00
494.26	2.20	2.22
494.27	2.26	2.45
494.28	2.32	2.70
494.29	2.37	2.97
494.30	2.42	3.25
494.31	2.48	3.55
494.32	2.53	3.86
494.33	2.58	4.19
494.34	2.64	4.54
494.35	2.69	4.90
494.36	2.74	5.29
494.37	2.79	5.69
494.38	2.84	6.11
494.39	2.89	6.55
494.40	2.94	7.00
494.41	2.99	7.48
494.42	3.03	7.98
494.43	3.08	8.49
494.44	3.13	9.03
494.45	3.18	9.59
494.46	3.22	10.16
494.47	3.27	10.76
494.48	3.32	11.39
494.49	3.36	12.03
494.50	3.41	12.70
494.51	3.45	13.38
494.52	3.50	14.10
494.53	3.54	14.83
494.54	3.59	15.59
494.55	3.63	16.37
494.56	3.68	17.18
494.57	3.72	18.01
494.58	3.76	18.86
494.59	3.81	19.74
494.60	3.85	20.64
494.61	3.89	21.58
494.62	3.93	22.53
494.63	3.98	23.51
494.64	4.02	24.52
494.65	4.06	25.56
494.66	4.10	26.62
494.67	4.14	27.71
494.68	4.18	28.82
494.69	4.22	29.97
494.70	4.27	31.14
494.71	4.31	32.34
494.72	4.35	33.57
494.73	4.39	34.83
494.74	4.43	36.12
494.75	4.47	37.43
494.76	4.51	38.78
494.77	4.55	40.15
494.78	4.58	41.56
494.79	4.62	42.99
494.80	4.66	44.46
494.81	4.70	45.96
494.82	4.74	47.49
494.83	4.78	49.05
494.84	4.82	50.64
494.85	4.85	52.26
494.86	4.89	53.92
494.87	4.93	55.61
494.88	4.97	57.33
494.89	5.01	59.08
494.90	5.04	60.87
494.91	5.08	62.69
494.92	5.12	64.54
494.93	5.15	66.43
494.94	5.19	68.35
494.95	5.23	70.31
494.96	5.27	72.30
494.97	5.30	74.33
494.98	5.34	76.39
494.99	5.37	78.48
495.00	**5.41**	**80.61**

Stage-Area-Storage for Reach 1R: V-SECTION CHANNEL

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
494.00	0.0	0	494.51	3.9	1,575
494.01	0.0	1	494.52	4.0	1,637
494.02	0.0	2	494.53	4.2	1,701
494.03	0.0	5	494.54	4.3	1,766
494.04	0.0	10	494.55	4.5	1,832
494.05	0.0	15	494.56	4.7	1,899
494.06	0.1	22	494.57	4.8	1,967
494.07	0.1	30	494.58	5.0	2,037
494.08	0.1	39	494.59	5.2	2,108
494.09	0.1	49	494.60	5.4	2,180
494.10	0.1	61	494.61	5.5	2,253
494.11	0.2	73	494.62	5.7	2,328
494.12	0.2	87	494.63	5.9	2,403
494.13	0.3	102	494.64	6.1	2,480
494.14	0.3	119	494.65	6.3	2,558
494.15	0.3	136	494.66	6.5	2,638
494.16	0.4	155	494.67	6.7	2,718
494.17	0.4	175	494.68	6.9	2,800
494.18	0.5	196	494.69	7.1	2,883
494.19	0.5	219	494.70	7.3	2,967
494.20	0.6	242	494.71	7.5	3,053
494.21	0.7	267	494.72	7.7	3,139
494.22	0.7	293	494.73	7.9	3,227
494.23	0.8	320	494.74	8.2	3,316
494.24	0.9	349	494.75	8.4	3,406
494.25	0.9	378	494.76	8.6	3,498
494.26	1.0	409	494.77	8.8	3,590
494.27	1.1	441	494.78	9.1	3,684
494.28	1.2	475	494.79	9.3	3,779
494.29	1.3	509	494.80	9.5	3,875
494.30	1.3	545	494.81	9.8	3,973
494.31	1.4	582	494.82	10.0	4,072
494.32	1.5	620	494.83	10.3	4,172
494.33	1.6	659	494.84	10.5	4,273
494.34	1.7	700	494.85	10.8	4,375
494.35	1.8	742	494.86	11.0	4,479
494.36	1.9	785	494.87	11.3	4,583
494.37	2.0	829	494.88	11.5	4,689
494.38	2.2	874	494.89	11.8	4,796
494.39	2.3	921	494.90	12.1	4,905
494.40	2.4	969	494.91	12.3	5,014
494.41	2.5	1,018	494.92	12.6	5,125
494.42	2.6	1,068	494.93	12.9	5,237
494.43	2.8	1,120	494.94	13.2	5,351
494.44	2.9	1,172	494.95	13.4	5,465
494.45	3.0	1,226	494.96	13.7	5,581
494.46	3.2	1,281	494.97	14.0	5,697
494.47	3.3	1,338	494.98	14.3	5,816
494.48	3.4	1,395	494.99	14.6	5,935
494.49	3.6	1,454	495.00	**14.9**	**6,055**
494.50	3.7	1,514			

Summary for Reach 8R: CONC 6.5' CHANNEL DISCHARGE

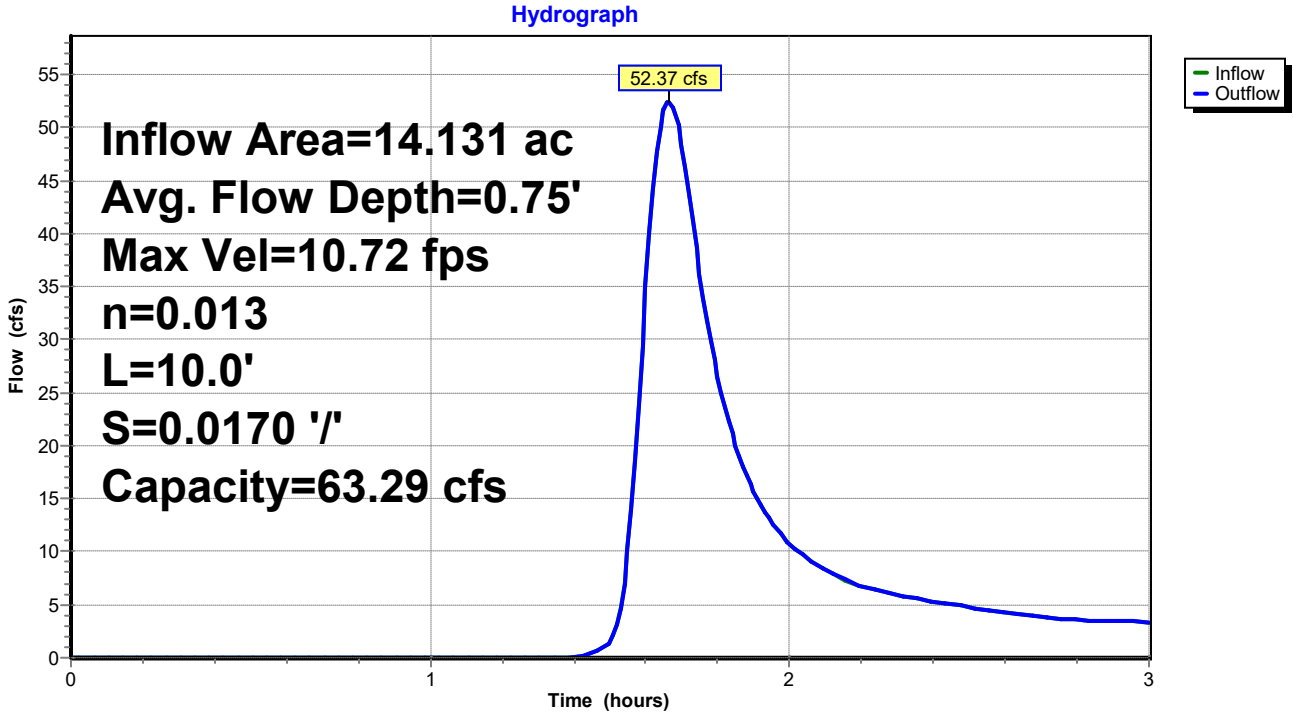
Inflow Area = 14.131 ac, 0.00% Impervious, Inflow Depth > 1.30" for Custom event
Inflow = 52.37 cfs @ 1.66 hrs, Volume= 1.528 af
Outflow = 52.37 cfs @ 1.66 hrs, Volume= 1.527 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.72 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.10 fps, Avg. Travel Time= 0.0 min

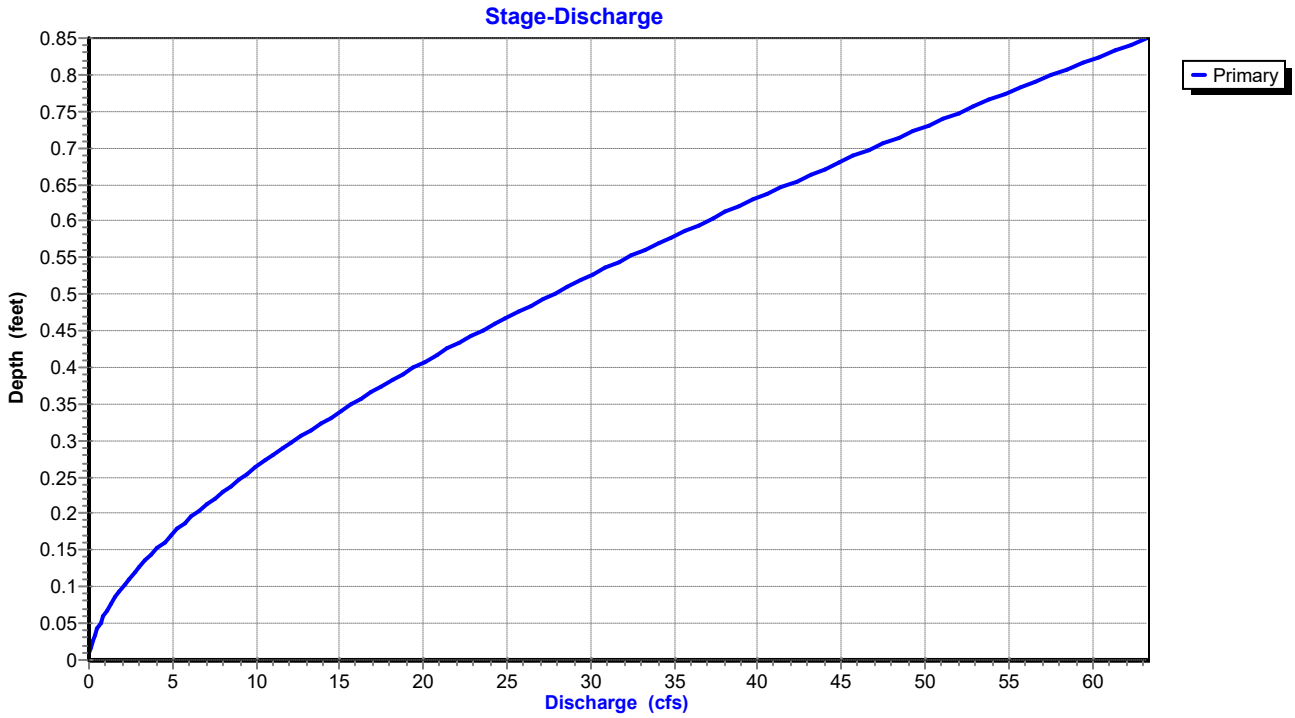
Peak Storage= 49 cf @ 1.66 hrs
Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 0.85' Flow Area= 5.5 sf, Capacity= 63.29 cfs

6.50' x 0.85' deep channel, n= 0.013 Concrete, trowel finish
Length= 10.0' Slope= 0.0170 '/'
Inlet Invert= 487.41', Outlet Invert= 487.24'

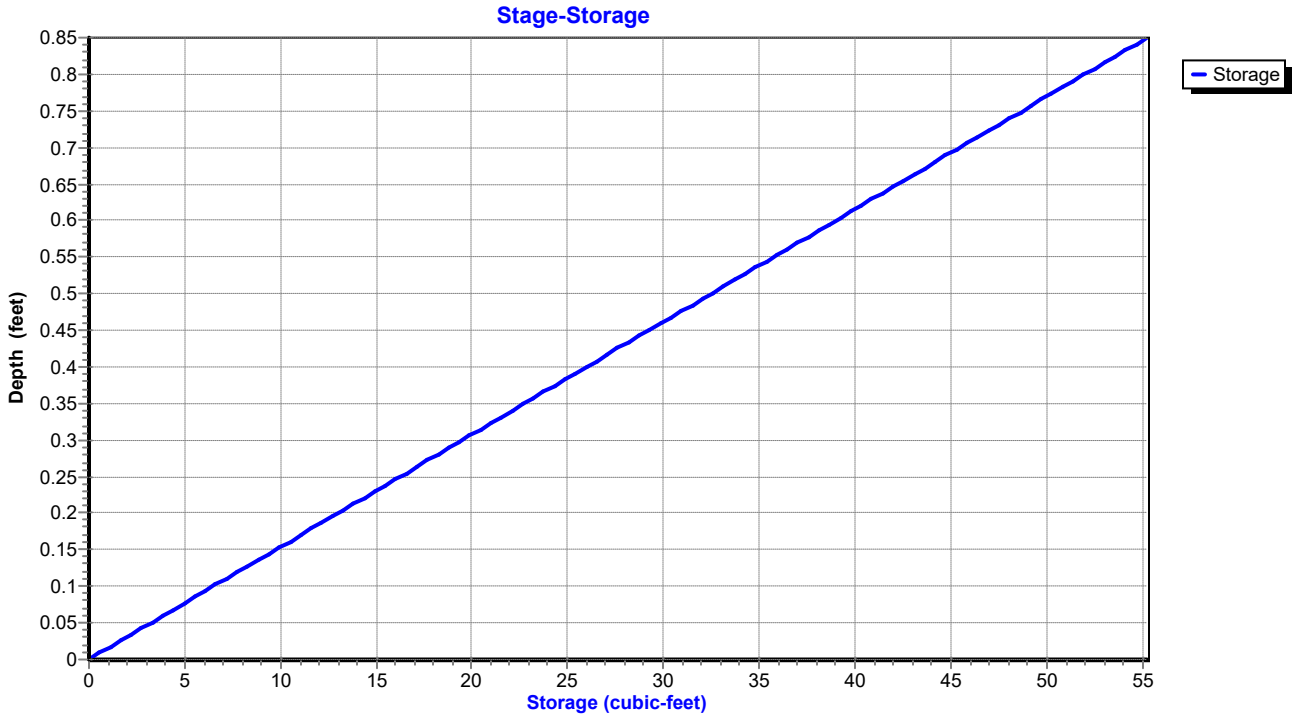
Reach 8R: CONC 6.5' CHANNEL DISCHARGE



Reach 8R: CONC 6.5' CHANNEL DISCHARGE



Reach 8R: CONC 6.5' CHANNEL DISCHARGE



Hydrograph for Reach 8R: CONC 6.5' CHANNEL DISCHARGE

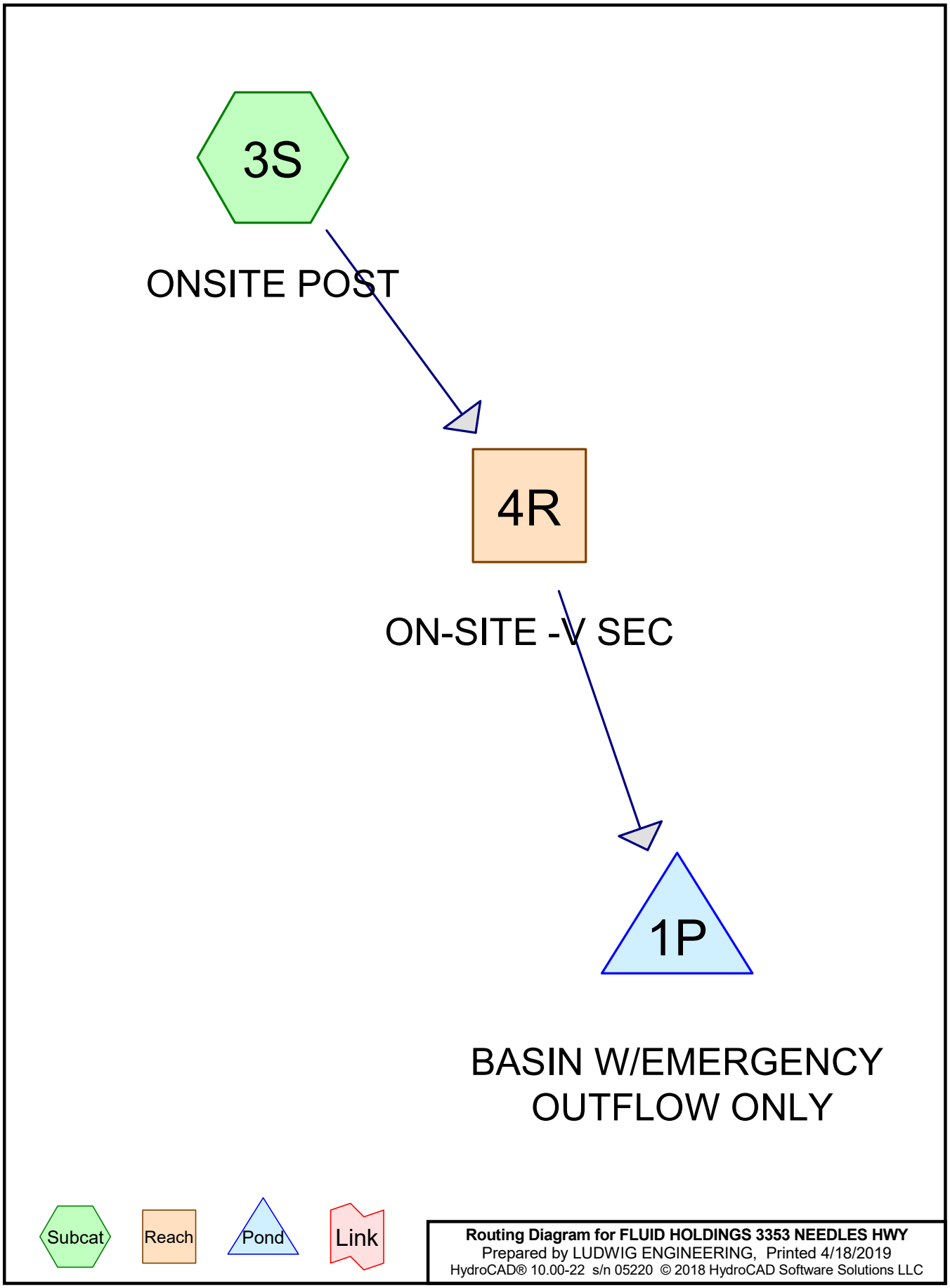
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	487.41	0.00
0.10	0.00	0	487.41	0.00
0.20	0.00	0	487.41	0.00
0.30	0.00	0	487.41	0.00
0.40	0.00	0	487.41	0.00
0.50	0.00	0	487.41	0.00
0.60	0.00	0	487.41	0.00
0.70	0.00	0	487.41	0.00
0.80	0.00	0	487.41	0.00
0.90	0.00	0	487.41	0.00
1.00	0.00	0	487.41	0.00
1.10	0.00	0	487.41	0.00
1.20	0.00	0	487.41	0.00
1.30	0.00	0	487.41	0.00
1.40	0.08	1	487.42	0.08
1.50	1.53	5	487.49	1.50
1.60	**34.99**	**38**	**487.99**	**34.89**
1.70	**48.38**	**46**	**488.12**	**48.42**
1.80	26.49	32	487.90	26.52
1.90	15.65	23	487.76	15.67
2.00	10.76	18	487.69	10.77
2.10	8.29	15	487.65	8.29
2.20	6.73	13	487.62	6.74
2.30	5.88	12	487.60	5.88
2.40	5.29	12	487.59	5.29
2.50	4.76	11	487.58	4.76
2.60	4.24	10	487.57	4.24
2.70	3.83	10	487.56	3.83
2.80	3.59	9	487.55	3.59
2.90	3.45	9	487.55	3.45
3.00	3.34	9	487.54	3.34

Stage-Discharge for Reach 8R: CONC 6.5' CHANNEL DISCHARGE

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
487.41	0.00	0.00
487.42	0.68	0.05
487.43	1.09	0.15
487.44	1.43	0.28
487.45	1.73	0.45
487.46	2.00	0.65
487.47	2.26	0.88
487.48	2.49	1.14
487.49	2.72	1.42
487.50	2.94	1.72
487.51	3.15	2.05
487.52	3.35	2.39
487.53	3.54	2.76
487.54	3.73	3.15
487.55	3.91	3.56
487.56	4.08	3.98
487.57	4.25	4.43
487.58	4.42	4.89
487.59	4.58	5.36
487.60	4.74	5.86
487.61	4.90	6.37
487.62	5.05	6.89
487.63	5.20	7.44
487.64	5.35	7.99
487.65	5.49	8.56
487.66	5.63	9.15
487.67	5.77	9.75
487.68	5.90	10.36
487.69	6.04	10.99
487.70	6.17	11.63
487.71	6.30	12.28
487.72	6.42	12.95
487.73	6.55	13.62
487.74	6.67	14.31
487.75	6.79	15.02
487.76	6.91	15.73
487.77	7.03	16.46
487.78	7.15	17.19
487.79	7.26	17.94
487.80	7.38	18.70
487.81	7.49	19.47
487.82	7.60	20.25
487.83	7.71	21.04
487.84	7.82	21.85
487.85	7.92	22.66
487.86	8.03	23.48
487.87	8.13	24.31
487.88	8.23	25.15
487.89	8.33	26.01
487.90	8.44	26.87
487.91	8.53	27.74
487.92	8.63	28.62
487.93	8.73	29.51
487.94	8.83	30.40
487.95	8.92	31.31
487.96	9.01	32.23
487.97	9.11	33.15
487.98	9.20	34.08
487.99	9.29	35.03
488.00	9.38	35.98
488.01	9.47	36.93
488.02	9.56	37.90
488.03	9.65	38.87
488.04	9.73	39.86
488.05	9.82	40.85
488.06	9.90	41.84
488.07	9.99	42.85
488.08	10.07	43.86
488.09	10.15	44.88
488.10	10.24	45.91
488.11	10.32	46.94
488.12	10.40	47.99
488.13	10.48	49.03
488.14	10.56	50.09
488.15	10.63	51.15
488.16	10.71	52.22
488.17	10.79	53.30
488.18	10.87	54.38
488.19	10.94	55.47
488.20	11.02	56.57
488.21	11.09	57.67
488.22	11.17	58.78
488.23	11.24	59.90
488.24	11.31	61.02
488.25	11.38	62.15
488.26	**11.45**	**63.29**

Stage-Area-Storage for Reach 8R: CONC 6.5' CHANNEL DISCHARGE

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
487.41	0.0	0
487.42	0.1	1
487.43	0.1	1
487.44	0.2	2
487.45	0.3	3
487.46	0.3	3
487.47	0.4	4
487.48	0.5	5
487.49	0.5	5
487.50	0.6	6
487.51	0.7	7
487.52	0.7	7
487.53	0.8	8
487.54	0.8	8
487.55	0.9	9
487.56	1.0	10
487.57	1.0	10
487.58	1.1	11
487.59	1.2	12
487.60	1.2	12
487.61	1.3	13
487.62	1.4	14
487.63	1.4	14
487.64	1.5	15
487.65	1.6	16
487.66	1.6	16
487.67	1.7	17
487.68	1.8	18
487.69	1.8	18
487.70	1.9	19
487.71	1.9	20
487.72	2.0	20
487.73	2.1	21
487.74	2.1	21
487.75	2.2	22
487.76	2.3	23
487.77	2.3	23
487.78	2.4	24
487.79	2.5	25
487.80	2.5	25
487.81	2.6	26
487.82	2.7	27
487.83	2.7	27
487.84	2.8	28
487.85	2.9	29
487.86	2.9	29
487.87	3.0	30
487.88	3.1	31
487.89	3.1	31
487.90	3.2	32
487.91	3.3	33
487.92	3.3	33
487.93	3.4	34
487.94	3.4	34
487.95	3.5	35
487.96	3.6	36
487.97	3.6	36
487.98	3.7	37
487.99	3.8	38
488.00	3.8	38
488.01	3.9	39
488.02	4.0	40
488.03	4.0	40
488.04	4.1	41
488.05	4.2	42
488.06	4.2	42
488.07	4.3	43
488.08	4.4	44
488.09	4.4	44
488.10	4.5	45
488.11	4.5	46
488.12	4.6	46
488.13	4.7	47
488.14	4.7	47
488.15	4.8	48
488.16	4.9	49
488.17	4.9	49
488.18	5.0	50
488.19	5.1	51
488.20	5.1	51
488.21	5.2	52
488.22	5.3	53
488.23	5.3	53
488.24	5.4	54
488.25	5.5	55
488.26	**5.5**	**55**



Routing Diagram for FLUID HOLDINGS 3353 NEEDLES HWY
Prepared by LUDWIG ENGINEERING, Printed 4/18/2019
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.954	88	Urban industrial, 72% imp, HSG B (3S)
2.954	**88**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.954	HSG B	3S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.954		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.954	0.000	0.000	0.000	2.954	Urban industrial, 72% imp	3S
0.000	**2.954**	**0.000**	**0.000**	**0.000**	**2.954**	**TOTAL AREA**	

Summary for Subcatchment 3S: ONSITE POST

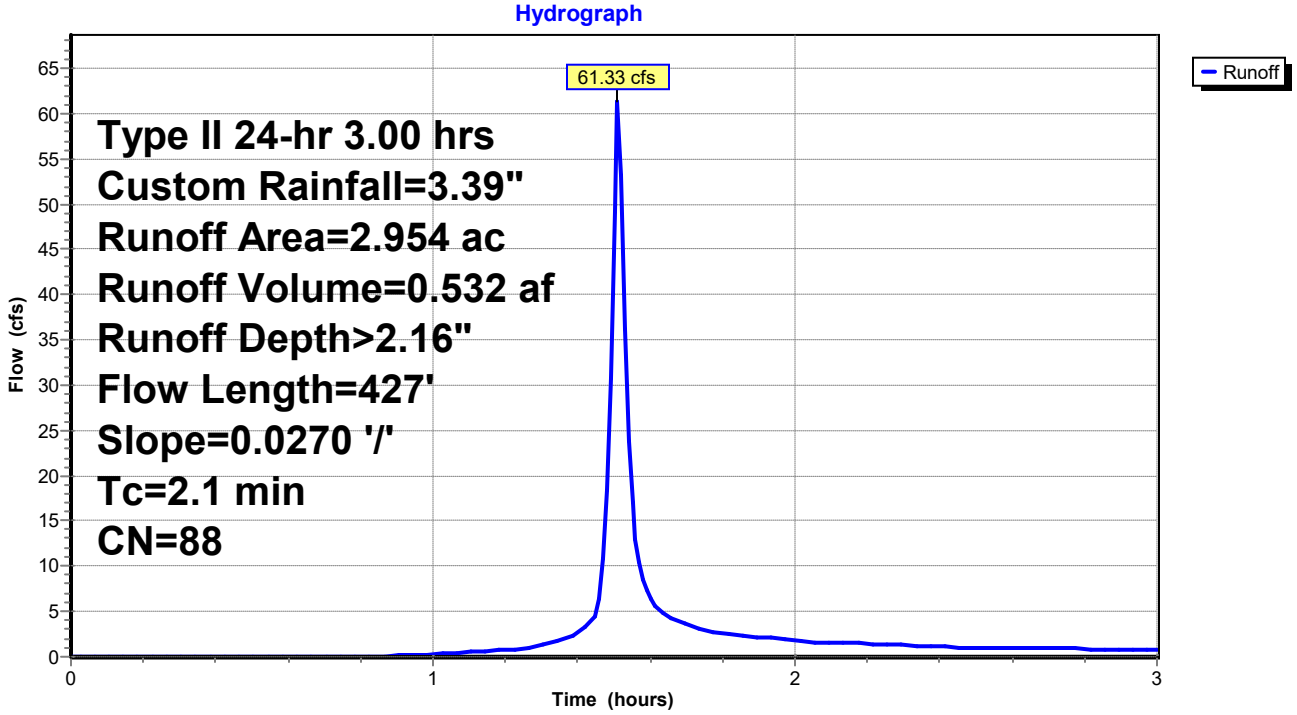
Runoff = 61.33 cfs @ 1.51 hrs, Volume= 0.532 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
2.954	88	Urban industrial, 72% imp, HSG B
0.827		28.00% Pervious Area
2.127		72.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	427	0.0270	3.34		**Shallow Concentrated Flow, IMPERVIOUS** Paved Kv= 20.3 fps

Subcatchment 3S: ONSITE POST



Hydrograph for Subcatchment 3S: ONSITE POST

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.02
0.85	0.32	0.00	0.07
0.90	0.35	0.00	0.13
0.95	0.38	0.01	0.19
1.00	0.41	0.01	0.26
1.05	0.44	0.02	0.35
1.10	0.48	0.03	0.49
1.15	0.52	0.04	0.65
1.20	0.56	0.05	0.77
1.25	0.61	0.07	0.97
1.30	0.67	0.09	1.32
1.35	0.75	0.12	1.84
1.40	0.85	0.17	2.70
1.45	1.04	0.28	4.67
1.50	2.25	1.17	**49.14**
1.55	2.46	1.35	**17.03**
1.60	2.57	1.44	6.39
1.65	2.66	1.52	4.51
1.70	2.72	1.58	3.62
1.75	2.78	1.62	2.98
1.80	2.83	1.67	2.56
1.85	2.87	1.71	2.36
1.90	2.91	1.74	2.17
1.95	2.95	1.77	1.97
2.00	2.98	1.80	1.78
2.05	3.01	1.83	1.63
2.10	3.04	1.86	1.56
2.15	3.07	1.88	1.49
2.20	3.10	1.90	1.42
2.25	3.12	1.93	1.35
2.30	3.15	1.95	1.28
2.35	3.17	1.97	1.21
2.40	3.19	1.99	1.14
2.45	3.21	2.01	1.06
2.50	3.23	2.02	0.99
2.55	3.24	2.04	0.94
2.60	3.26	2.05	0.93
2.65	3.28	2.07	0.91
2.70	3.30	2.08	0.90
2.75	3.31	2.10	0.89
2.80	3.33	2.11	0.87
2.85	3.34	2.13	0.86
2.90	3.36	2.14	0.84
2.95	3.37	2.15	0.83
3.00	**3.39**	**2.17**	0.82

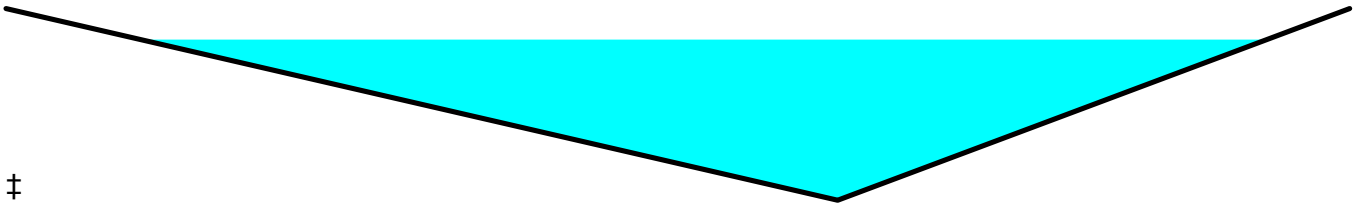
Summary for Reach 4R: ON-SITE -V SEC

Inflow Area = 2.954 ac, 72.00% Impervious, Inflow Depth > 2.16" for Custom event
Inflow = 61.33 cfs @ 1.51 hrs, Volume= 0.532 af
Outflow = 40.55 cfs @ 1.53 hrs, Volume= 0.526 af, Atten= 34%, Lag= 1.1 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.49 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 4.7 min

Peak Storage= 4,889 cf @ 1.53 hrs
Average Depth at Peak Storage= 1.26'
Bank-Full Depth= 1.50' Flow Area= 16.5 sf, Capacity= 64.85 cfs

0.00' x 1.50' deep channel, n= 0.036
Side Slope Z-value= 9.1 5.6 '/' Top Width= 22.05'
Length= 420.4' Slope= 0.0134 '/'
Inlet Invert= 493.38', Outlet Invert= 487.74'



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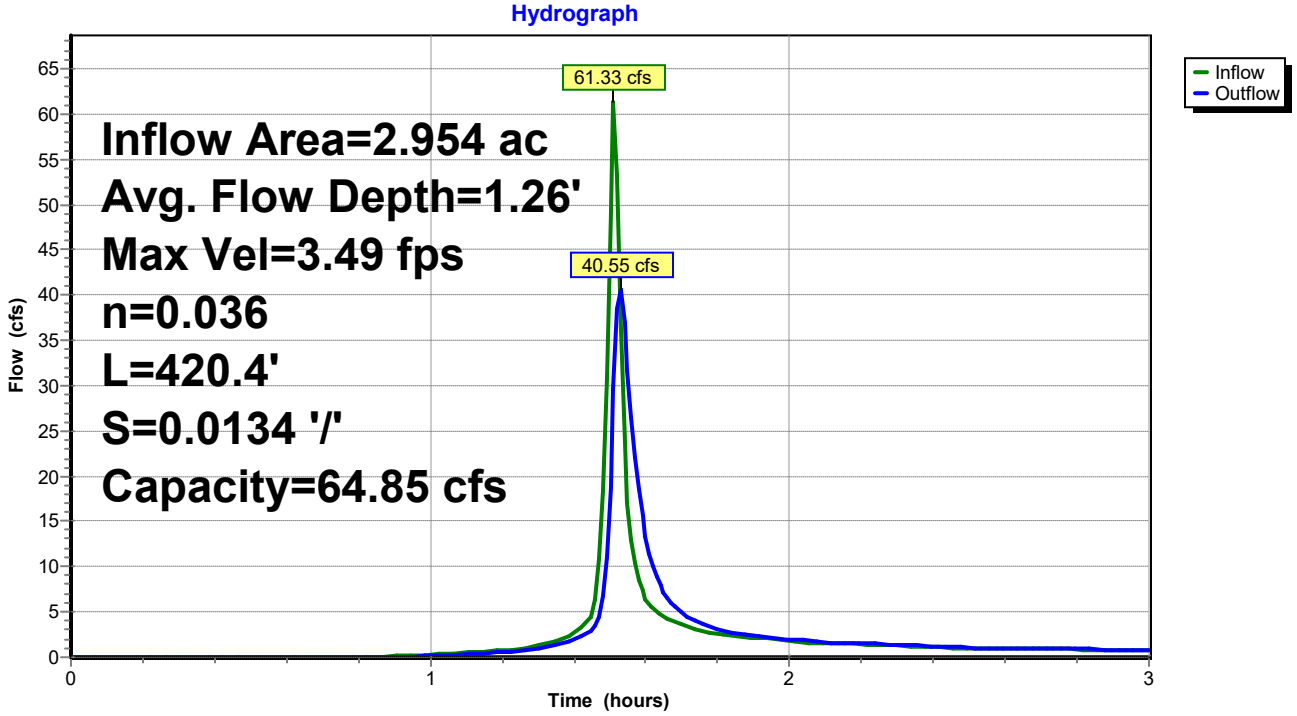
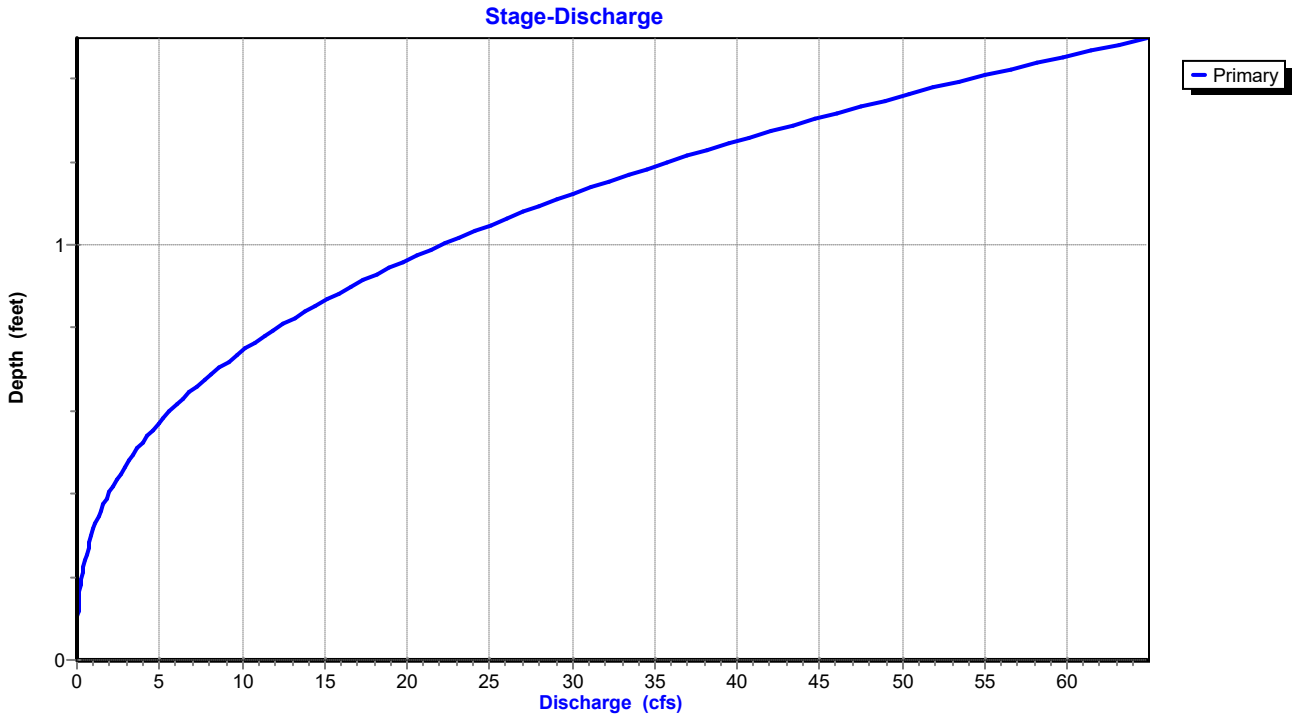
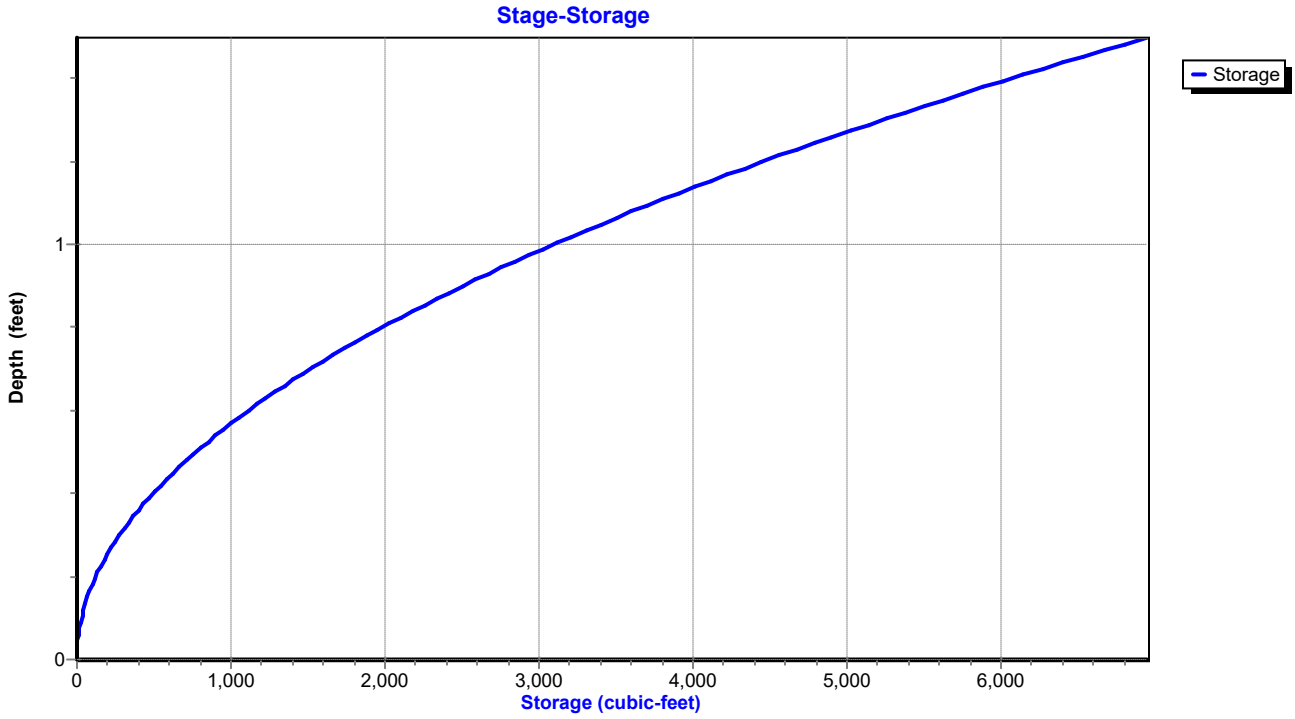
Reach 4R: ON-SITE -V SEC



Reach 4R: ON-SITE -V SEC



Reach 4R: ON-SITE -V SEC



Hydrograph for Reach 4R: ON-SITE -V SEC

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	493.38	0.00
0.10	0.00	0	493.38	0.00
0.20	0.00	0	493.38	0.00
0.30	0.00	0	493.38	0.00
0.40	0.00	0	493.38	0.00
0.50	0.00	0	493.38	0.00
0.60	0.00	0	493.38	0.00
0.70	0.00	0	493.38	0.00
0.80	0.02	1	493.40	0.00
0.90	0.13	23	493.47	0.03
1.00	0.26	65	493.53	0.13
1.10	0.49	121	493.58	0.29
1.20	0.77	199	493.63	0.57
1.30	1.32	293	493.69	0.95
1.40	2.70	491	493.78	1.89
1.50	**49.14**	**2,740**	**494.32**	**18.74**
1.60	**6.39**	**2,114**	**494.21**	**13.26**
1.70	3.62	1,000	493.95	4.89
1.80	2.56	705	493.86	3.07
1.90	2.17	587	493.82	2.40
2.00	1.78	509	493.79	1.99
2.10	1.56	448	493.76	1.67
2.20	1.42	413	493.75	1.50
2.30	1.28	383	493.73	1.36
2.40	1.14	353	493.72	1.22
2.50	0.99	322	493.70	1.08
2.60	0.93	297	493.69	0.97
2.70	0.90	286	493.68	0.92
2.80	0.87	279	493.68	0.89
2.90	0.84	272	493.68	0.86
3.00	0.82	265	493.67	0.83

Stage-Discharge for Reach 4R: ON-SITE -V SEC

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
493.38	0.00	0.00	493.89	1.91	3.65	494.40	3.03	23.19
493.39	0.12	0.00	493.90	1.94	3.85	494.41	3.05	23.80
493.40	0.22	0.00	493.91	1.96	4.05	494.42	3.07	24.42
493.41	0.29	0.00	493.92	1.98	4.25	494.43	3.09	25.05
493.42	0.35	0.00	493.93	2.01	4.47	494.44	3.11	25.69
493.43	0.41	0.01	493.94	2.03	4.69	494.45	3.13	26.35
493.44	0.46	0.01	493.95	2.06	4.91	494.46	3.15	27.01
493.45	0.51	0.02	493.96	2.08	5.15	494.47	3.17	27.68
493.46	0.56	0.03	493.97	2.11	5.39	494.48	3.19	28.36
493.47	0.60	0.04	493.98	2.13	5.63	494.49	3.21	29.05
493.48	0.64	0.05	493.99	2.15	5.89	494.50	3.23	29.76
493.49	0.69	0.06	494.00	2.18	6.15	494.51	3.25	30.47
493.50	0.73	0.08	494.01	2.20	6.42	494.52	3.27	31.19
493.51	0.77	0.10	494.02	2.22	6.69	494.53	3.28	31.93
493.52	0.81	0.12	494.03	2.25	6.97	494.54	3.30	32.68
493.53	0.84	0.14	494.04	2.27	7.26	494.55	3.32	33.43
493.54	0.88	0.17	494.05	2.29	7.56	494.56	3.34	34.20
493.55	0.92	0.20	494.06	2.31	7.87	494.57	3.36	34.98
493.56	0.95	0.23	494.07	2.34	8.18	494.58	3.38	35.77
493.57	0.99	0.26	494.08	2.36	8.50	494.59	3.40	36.57
493.58	1.02	0.30	494.09	2.38	8.83	494.60	3.42	37.38
493.59	1.06	0.34	494.10	2.40	9.16	494.61	3.44	38.20
493.60	1.09	0.39	494.11	2.43	9.50	494.62	3.45	39.04
493.61	1.12	0.44	494.12	2.45	9.86	494.63	3.47	39.88
493.62	1.16	0.49	494.13	2.47	10.21	494.64	3.49	40.74
493.63	1.19	0.55	494.14	2.49	10.58	494.65	3.51	41.61
493.64	1.22	0.61	494.15	2.51	10.96	494.66	3.53	42.49
493.65	1.25	0.67	494.16	2.54	11.34	494.67	3.55	43.37
493.66	1.28	0.74	494.17	2.56	11.73	494.68	3.56	44.28
493.67	1.31	0.81	494.18	2.58	12.13	494.69	3.58	45.19
493.68	1.34	0.89	494.19	2.60	12.54	494.70	3.60	46.12
493.69	1.37	0.97	494.20	2.62	12.96	494.71	3.62	47.06
493.70	1.40	1.05	494.21	2.64	13.38	494.72	3.64	48.01
493.71	1.43	1.14	494.22	2.66	13.82	494.73	3.66	48.96
493.72	1.46	1.24	494.23	2.69	14.26	494.74	3.67	49.94
493.73	1.49	1.34	494.24	2.71	14.71	494.75	3.69	50.92
493.74	1.51	1.44	494.25	2.73	15.17	494.76	3.71	51.92
493.75	1.54	1.55	494.26	2.75	15.64	494.77	3.73	52.93
493.76	1.57	1.67	494.27	2.77	16.12	494.78	3.74	53.95
493.77	1.60	1.79	494.28	2.79	16.61	494.79	3.76	54.98
493.78	1.62	1.91	494.29	2.81	17.11	494.80	3.78	56.03
493.79	1.65	2.04	494.30	2.83	17.61	494.81	3.80	57.09
493.80	1.68	2.18	494.31	2.85	18.12	494.82	3.82	58.16
493.81	1.70	2.32	494.32	2.87	18.65	494.83	3.83	59.25
493.82	1.73	2.46	494.33	2.89	19.19	494.84	3.85	60.34
493.83	1.76	2.62	494.34	2.91	19.73	494.85	3.87	61.45
493.84	1.78	2.77	494.35	2.93	20.28	494.86	3.89	62.57
493.85	1.81	2.94	494.36	2.95	20.84	494.87	3.90	63.70
493.86	1.83	3.11	494.37	2.97	21.41	494.88	**3.92**	**64.85**
493.87	1.86	3.28	494.38	2.99	22.00			
493.88	1.89	3.47	494.39	3.01	22.59			

Stage-Area-Storage for Reach 4R: ON-SITE -V SEC

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
493.38	0.0	0
493.40	0.0	1
493.42	0.0	5
493.44	0.0	11
493.46	0.0	20
493.48	0.1	31
493.50	0.1	44
493.52	0.1	61
493.54	0.2	79
493.56	0.2	100
493.58	0.3	124
493.60	0.4	150
493.62	0.4	178
493.64	0.5	209
493.66	0.6	242
493.68	0.7	278
493.70	0.8	317
493.72	0.9	357
493.74	1.0	400
493.76	1.1	446
493.78	1.2	495
493.80	1.3	545
493.82	1.4	598
493.84	1.6	654
493.86	1.7	712
493.88	1.8	773
493.90	2.0	836
493.92	2.1	901
493.94	2.3	969
493.96	2.5	1,040
493.98	2.6	1,112
494.00	2.8	1,188
494.02	3.0	1,266
494.04	3.2	1,346
494.06	3.4	1,429
494.08	3.6	1,514
494.10	3.8	1,602
494.12	4.0	1,692
494.14	4.2	1,785
494.16	4.5	1,880
494.18	4.7	1,978
494.20	4.9	2,078
494.22	5.2	2,180
494.24	5.4	2,285
494.26	5.7	2,393
494.28	6.0	2,503
494.30	6.2	2,615
494.32	6.5	2,730
494.34	6.8	2,848
494.36	7.1	2,968
494.38	7.4	3,090
494.40	7.6	3,215
494.42	8.0	3,342
494.44	8.3	3,472
494.46	8.6	3,604
494.48	8.9	3,739
494.50	9.2	3,876
494.52	9.6	4,016
494.54	9.9	4,158
494.56	10.2	4,303
494.58	10.6	4,450
494.60	10.9	4,599
494.62	11.3	4,751
494.64	11.7	4,906
494.66	12.0	5,063
494.68	12.4	5,222
494.70	12.8	5,384
494.72	13.2	5,548
494.74	13.6	5,715
494.76	14.0	5,884
494.78	14.4	6,056
494.80	14.8	6,231
494.82	15.2	6,407
494.84	15.7	6,587
494.86	16.1	6,768
494.88	**16.5**	**6,952**

Summary for Pond 1P: BASIN W/EMERGENCY OUTFLOW ONLY

Inflow Area = 2.954 ac, 72.00% Impervious, Inflow Depth > 2.14" for Custom event
Inflow = 40.55 cfs @ 1.53 hrs, Volume= 0.526 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 487.50' @ 3.00 hrs Surf.Area= 0.177 ac Storage= 0.526 af
Flood Elev= 488.00' Surf.Area= 0.185 ac Storage= 0.614 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

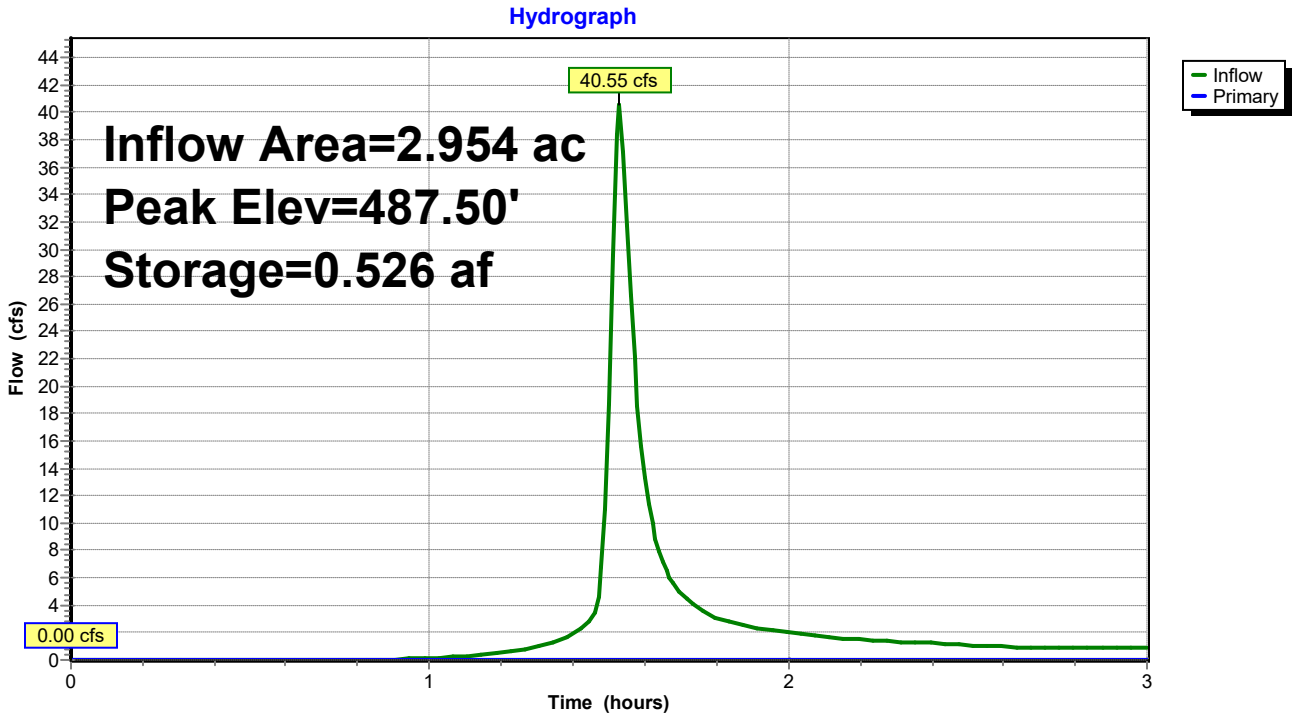
Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	0.614 af	**BASIN (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
484.00	0.123	0.000	0.000
485.00	0.138	0.130	0.130
486.00	0.153	0.145	0.276
487.00	0.169	0.161	0.437
488.00	0.185	0.177	0.614

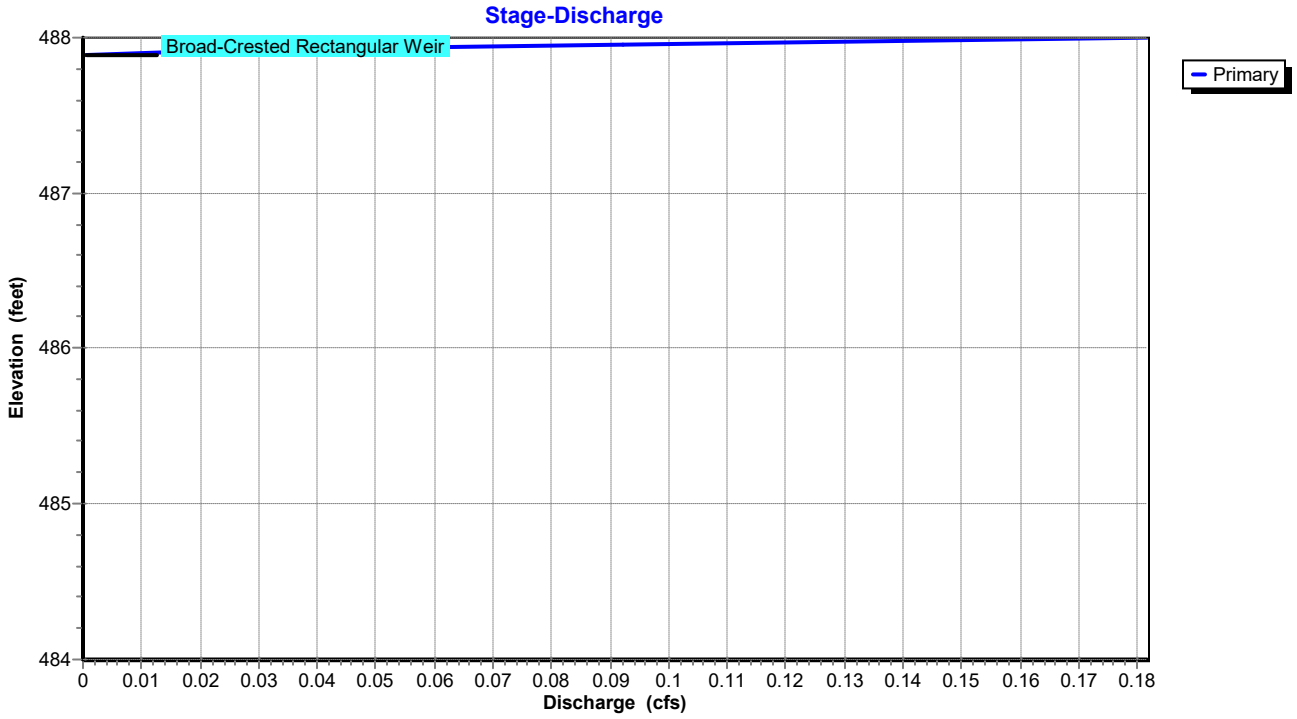
Device	Routing	Invert	Outlet Devices
#1	Primary	487.89'	**2.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=484.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

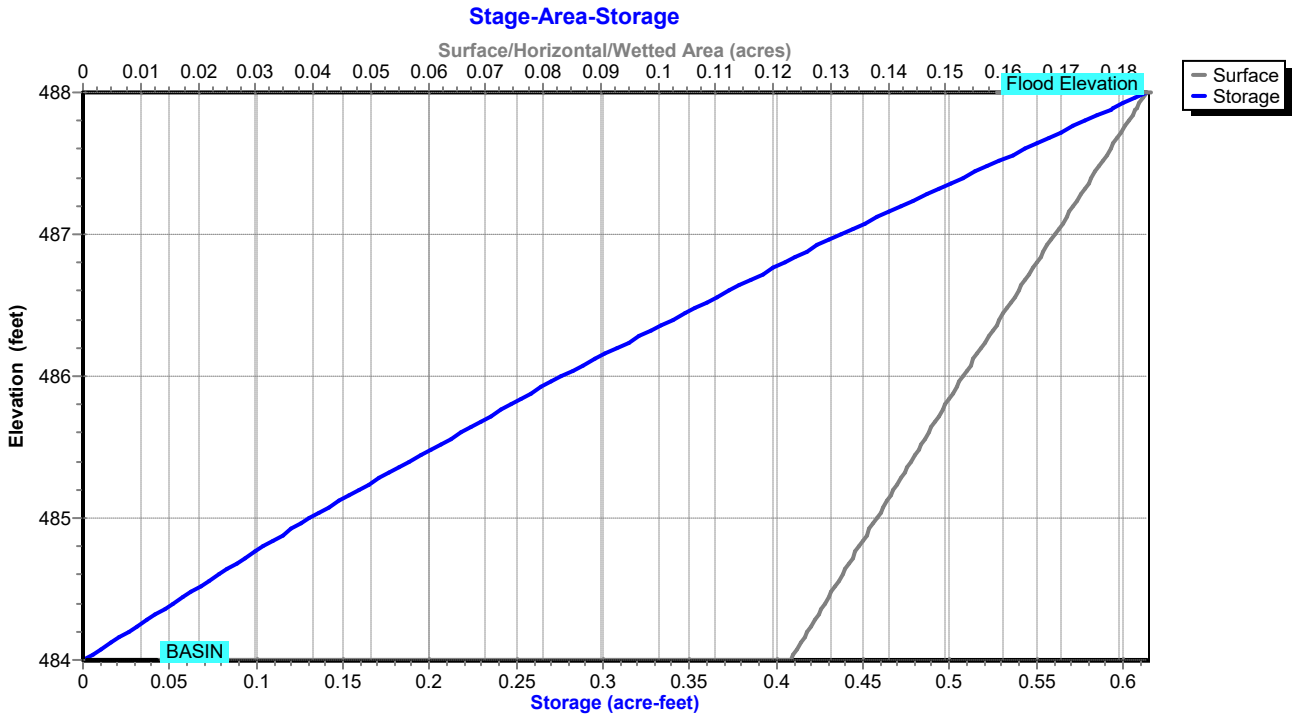
Pond 1P: BASIN W/EMERGENCY OUTFLOW ONLY



Pond 1P: BASIN W/EMERGENCY OUTFLOW ONLY



Pond 1P: BASIN W/EMERGENCY OUTFLOW ONLY



Hydrograph for Pond 1P: BASIN W/EMERGENCY OUTFLOW ONLY

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	484.00	**0.00**
0.10	0.00	0.000	484.00	0.00
0.20	0.00	0.000	484.00	0.00
0.30	0.00	0.000	484.00	0.00
0.40	0.00	0.000	484.00	0.00
0.50	0.00	0.000	484.00	0.00
0.60	0.00	0.000	484.00	0.00
0.70	0.00	0.000	484.00	0.00
0.80	0.00	0.000	484.00	0.00
0.90	0.03	0.000	484.00	0.00
1.00	0.13	0.001	484.01	0.00
1.10	0.29	0.002	484.02	0.00
1.20	0.57	0.006	484.05	0.00
1.30	0.95	0.012	484.09	0.00
1.40	1.89	0.023	484.18	0.00
1.50	**18.74**	0.063	484.48	0.00
1.60	**13.26**	0.291	486.10	0.00
1.70	4.89	0.356	486.49	0.00
1.80	3.07	0.387	486.69	0.00
1.90	2.40	0.409	486.83	0.00
2.00	1.99	0.428	486.94	0.00
2.10	1.67	0.443	487.03	0.00
2.20	1.50	0.456	487.11	0.00
2.30	1.36	0.467	487.17	0.00
2.40	1.22	0.478	487.23	0.00
2.50	1.08	0.488	487.29	0.00
2.60	0.97	0.496	487.33	0.00
2.70	0.92	0.504	487.38	0.00
2.80	0.89	0.511	487.42	0.00
2.90	0.86	0.519	487.46	0.00
3.00	0.83	**0.526**	**487.50**	0.00

Stage-Discharge for Pond 1P: BASIN W/EMERGENCY OUTFLOW ONLY

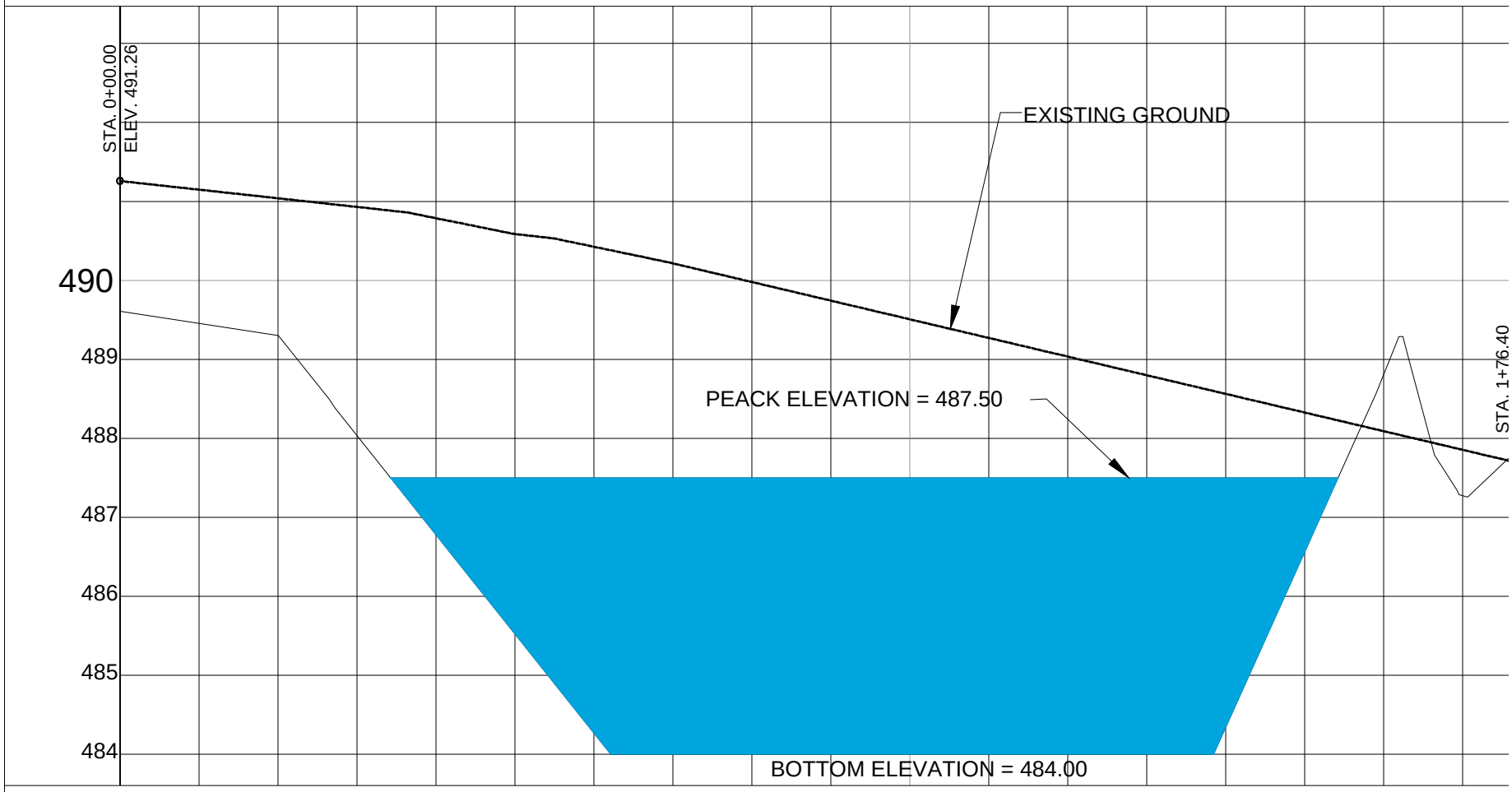
Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
484.00	0.00	485.02	0.00	486.04	0.00	487.06	0.00
484.02	0.00	485.04	0.00	486.06	0.00	487.08	0.00
484.04	0.00	485.06	0.00	486.08	0.00	487.10	0.00
484.06	0.00	485.08	0.00	486.10	0.00	487.12	0.00
484.08	0.00	485.10	0.00	486.12	0.00	487.14	0.00
484.10	0.00	485.12	0.00	486.14	0.00	487.16	0.00
484.12	0.00	485.14	0.00	486.16	0.00	487.18	0.00
484.14	0.00	485.16	0.00	486.18	0.00	487.20	0.00
484.16	0.00	485.18	0.00	486.20	0.00	487.22	0.00
484.18	0.00	485.20	0.00	486.22	0.00	487.24	0.00
484.20	0.00	485.22	0.00	486.24	0.00	487.26	0.00
484.22	0.00	485.24	0.00	486.26	0.00	487.28	0.00
484.24	0.00	485.26	0.00	486.28	0.00	487.30	0.00
484.26	0.00	485.28	0.00	486.30	0.00	487.32	0.00
484.28	0.00	485.30	0.00	486.32	0.00	487.34	0.00
484.30	0.00	485.32	0.00	486.34	0.00	487.36	0.00
484.32	0.00	485.34	0.00	486.36	0.00	487.38	0.00
484.34	0.00	485.36	0.00	486.38	0.00	487.40	0.00
484.36	0.00	485.38	0.00	486.40	0.00	487.42	0.00
484.38	0.00	485.40	0.00	486.42	0.00	487.44	0.00
484.40	0.00	485.42	0.00	486.44	0.00	487.46	0.00
484.42	0.00	485.44	0.00	486.46	0.00	487.48	0.00
484.44	0.00	485.46	0.00	486.48	0.00	487.50	0.00
484.46	0.00	485.48	0.00	486.50	0.00	487.52	0.00
484.48	0.00	485.50	0.00	486.52	0.00	487.54	0.00
484.50	0.00	485.52	0.00	486.54	0.00	487.56	0.00
484.52	0.00	485.54	0.00	486.56	0.00	487.58	0.00
484.54	0.00	485.56	0.00	486.58	0.00	487.60	0.00
484.56	0.00	485.58	0.00	486.60	0.00	487.62	0.00
484.58	0.00	485.60	0.00	486.62	0.00	487.64	0.00
484.60	0.00	485.62	0.00	486.64	0.00	487.66	0.00
484.62	0.00	485.64	0.00	486.66	0.00	487.68	0.00
484.64	0.00	485.66	0.00	486.68	0.00	487.70	0.00
484.66	0.00	485.68	0.00	486.70	0.00	487.72	0.00
484.68	0.00	485.70	0.00	486.72	0.00	487.74	0.00
484.70	0.00	485.72	0.00	486.74	0.00	487.76	0.00
484.72	0.00	485.74	0.00	486.76	0.00	487.78	0.00
484.74	0.00	485.76	0.00	486.78	0.00	487.80	0.00
484.76	0.00	485.78	0.00	486.80	0.00	487.82	0.00
484.78	0.00	485.80	0.00	486.82	0.00	487.84	0.00
484.80	0.00	485.82	0.00	486.84	0.00	487.86	0.00
484.82	0.00	485.84	0.00	486.86	0.00	487.88	0.00
484.84	0.00	485.86	0.00	486.88	0.00	487.90	0.00
484.86	0.00	485.88	0.00	486.90	0.00	487.92	0.03
484.88	0.00	485.90	0.00	486.92	0.00	487.94	0.06
484.90	0.00	485.92	0.00	486.94	0.00	487.96	0.09
484.92	0.00	485.94	0.00	486.96	0.00	487.98	0.13
484.94	0.00	485.96	0.00	486.98	0.00	488.00	**0.18**
484.96	0.00	485.98	0.00	487.00	0.00		
484.98	0.00	486.00	0.00	487.02	0.00		
485.00	0.00	486.02	0.00	487.04	0.00		

Stage-Area-Storage for Pond 1P: BASIN W/EMERGENCY OUTFLOW ONLY

Elevation (feet)	Surface (acres)	Storage (acre-feet)
484.00	0.123	0.000
484.05	0.124	0.007
484.10	0.125	0.013
484.15	0.125	0.020
484.20	0.126	0.026
484.25	0.127	0.033
484.30	0.128	0.039
484.35	0.128	0.046
484.40	0.129	0.052
484.45	0.130	0.059
484.50	0.130	0.065
484.55	0.131	0.072
484.60	0.132	0.078
484.65	0.133	0.085
484.70	0.133	0.091
484.75	0.134	0.098
484.80	0.135	0.104
484.85	0.136	0.111
484.90	0.136	0.117
484.95	0.137	0.124
485.00	0.138	0.130
485.05	0.139	0.138
485.10	0.140	0.145
485.15	0.140	0.152
485.20	0.141	0.160
485.25	0.142	0.167
485.30	0.143	0.174
485.35	0.143	0.181
485.40	0.144	0.189
485.45	0.145	0.196
485.50	0.145	0.203
485.55	0.146	0.211
485.60	0.147	0.218
485.65	0.148	0.225
485.70	0.148	0.232
485.75	0.149	0.240
485.80	0.150	0.247
485.85	0.151	0.254
485.90	0.151	0.261
485.95	0.152	0.269
486.00	0.153	0.276
486.05	0.154	0.284
486.10	0.155	0.292
486.15	0.155	0.300
486.20	0.156	0.308
486.25	0.157	0.316
486.30	0.158	0.324
486.35	0.159	0.332
486.40	0.159	0.340
486.45	0.160	0.348
486.50	0.161	0.356
486.55	0.162	0.365
486.60	0.163	0.373
486.65	0.163	0.381
486.70	0.164	0.389
486.75	0.165	0.397
486.80	0.166	0.405
486.85	0.167	0.413
486.90	0.167	0.421
486.95	0.168	0.429
487.00	0.169	0.437
487.05	0.170	0.446
487.10	0.171	0.455
487.15	0.171	0.464
487.20	0.172	0.472
487.25	0.173	0.481
487.30	0.174	0.490
487.35	0.175	0.499
487.40	0.175	0.508
487.45	0.176	0.517
487.50	0.177	0.526
487.55	0.178	0.534
487.60	0.179	0.543
487.65	0.179	0.552
487.70	0.180	0.561
487.75	0.181	0.570
487.80	0.182	0.579
487.85	0.183	0.587
487.90	0.183	0.596
487.95	0.184	0.605
488.00	**0.185**	**0.614**

BASIN CROSS SECTION WITHOU OUTFLOW

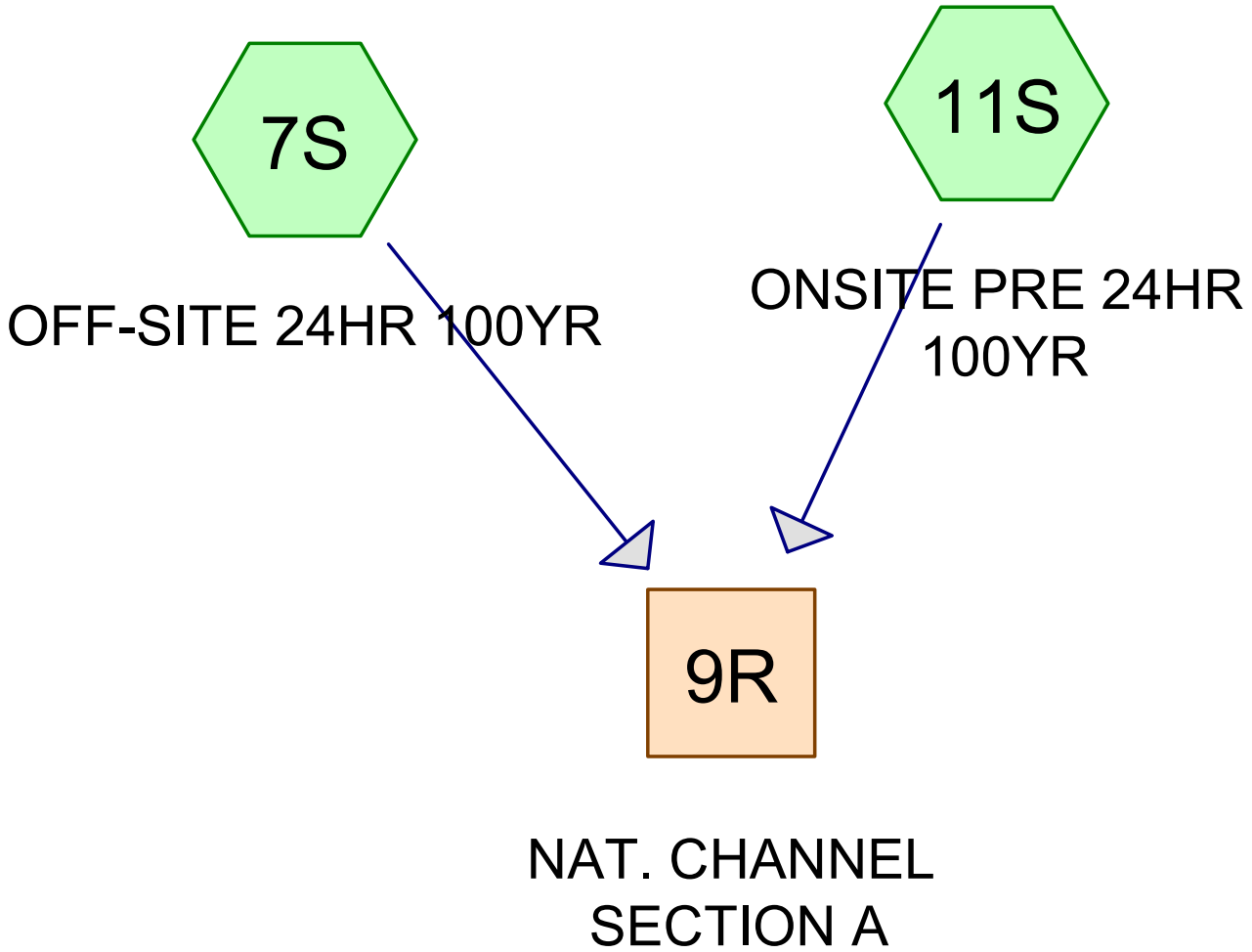
1P

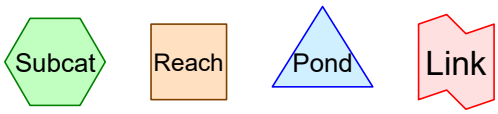


INFLOW AREA = 2.954 ACRES
PEAK ELEVATION = 487.50
STORAGE 0.526 af

TR20- INFLOW = 61.33 CFS POST DEVELOPMENT
PRE -DEV. = 47.29 CFS

14.04 CFS ALLOWED TO BE RETAINED TR-20
14.31 CFS PER SAN BERNARDON COUNTY HYDROLOGY MANUAL
SAFETY FACTOR FOR BASIN INFLOW = 40.55 CFS FOR OTHER RAIN EVENTS





Routing Diagram for FLUID HOLDINGS 3353 NEEDLES HWY
Prepared by LUDWIG ENGINEERING, Printed 4/18/2019
HydroCAD® 10.00-22 s/n 05220 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.040	77	Natural western desert, HSG B (7S, 11S)
18.040	**77**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
18.040	HSG B	7S, 11S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
18.040		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	18.040	0.000	0.000	0.000	18.040	Natural western desert	7S, 11S
0.000	**18.040**	**0.000**	**0.000**	**0.000**	**18.040**	**TOTAL AREA**	

Summary for Subcatchment 7S: OFF-SITE 24HR 100YR

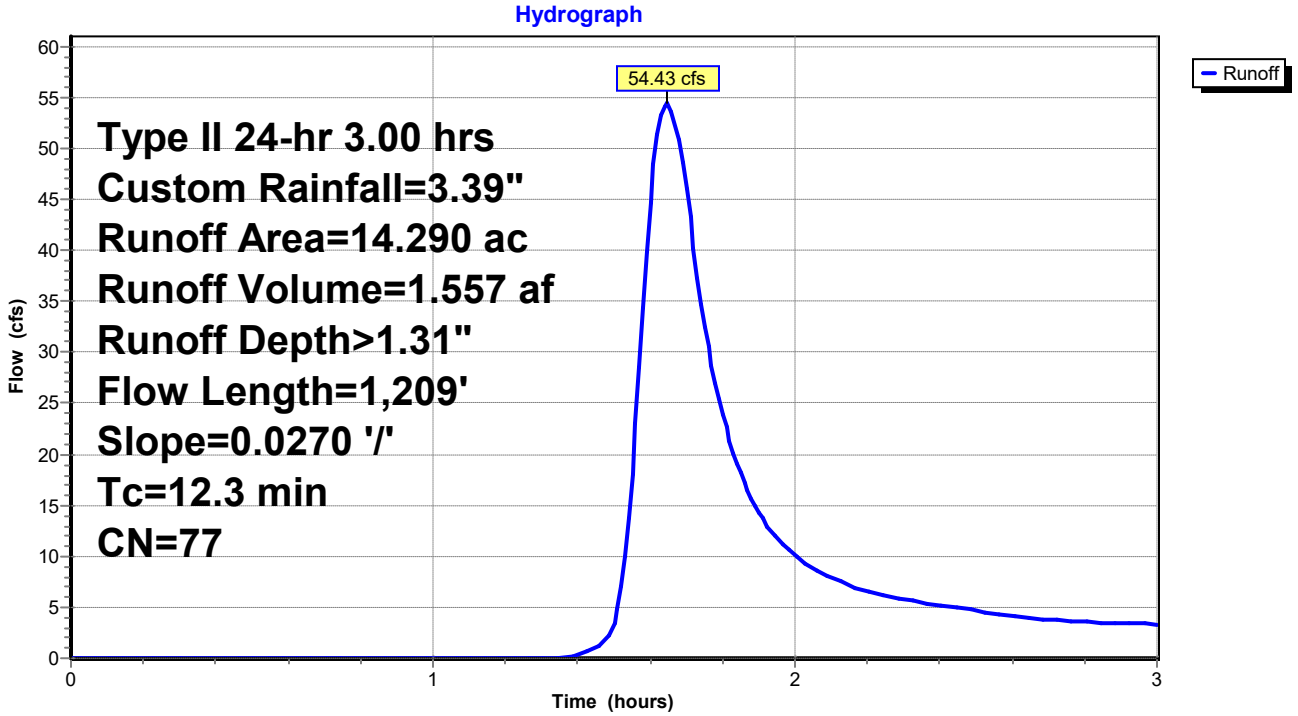
Runoff = 54.43 cfs @ 1.65 hrs, Volume= 1.557 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
14.290	77	Natural western desert, HSG B
14.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	1,209	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 7S: OFF-SITE 24HR 100YR



Hydrograph for Subcatchment 7S: OFF-SITE 24HR 100YR

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.01
1.35	0.75	0.01	0.07
1.40	0.85	0.02	0.33
1.45	1.04	0.06	0.99
1.50	2.25	0.59	3.39
1.55	2.46	0.71	18.03
1.60	2.57	0.79	44.62
1.65	2.66	0.84	**54.42**
1.70	2.72	0.88	46.09
1.75	2.78	0.92	32.51
1.80	2.83	0.95	23.94
1.85	2.87	0.98	18.15
1.90	2.91	1.01	14.33
1.95	2.95	1.04	11.81
2.00	2.98	1.06	10.12
2.05	3.01	1.08	8.87
2.10	3.04	1.10	7.90
2.15	3.07	1.12	7.10
2.20	3.10	1.14	6.49
2.25	3.12	1.16	6.09
2.30	3.15	1.17	5.76
2.35	3.17	1.19	5.46
2.40	3.19	1.20	5.19
2.45	3.21	1.22	4.92
2.50	3.23	1.23	4.66
2.55	3.24	1.24	4.39
2.60	3.26	1.26	4.14
2.65	3.28	1.27	3.92
2.70	3.30	1.28	3.77
2.75	3.31	1.29	3.66
2.80	3.33	1.30	3.58
2.85	3.34	1.32	3.51
2.90	3.36	1.33	3.45
2.95	3.37	1.34	3.40
3.00	**3.39**	**1.35**	3.34

Summary for Subcatchment 11S: ONSITE PRE 24HR 100YR

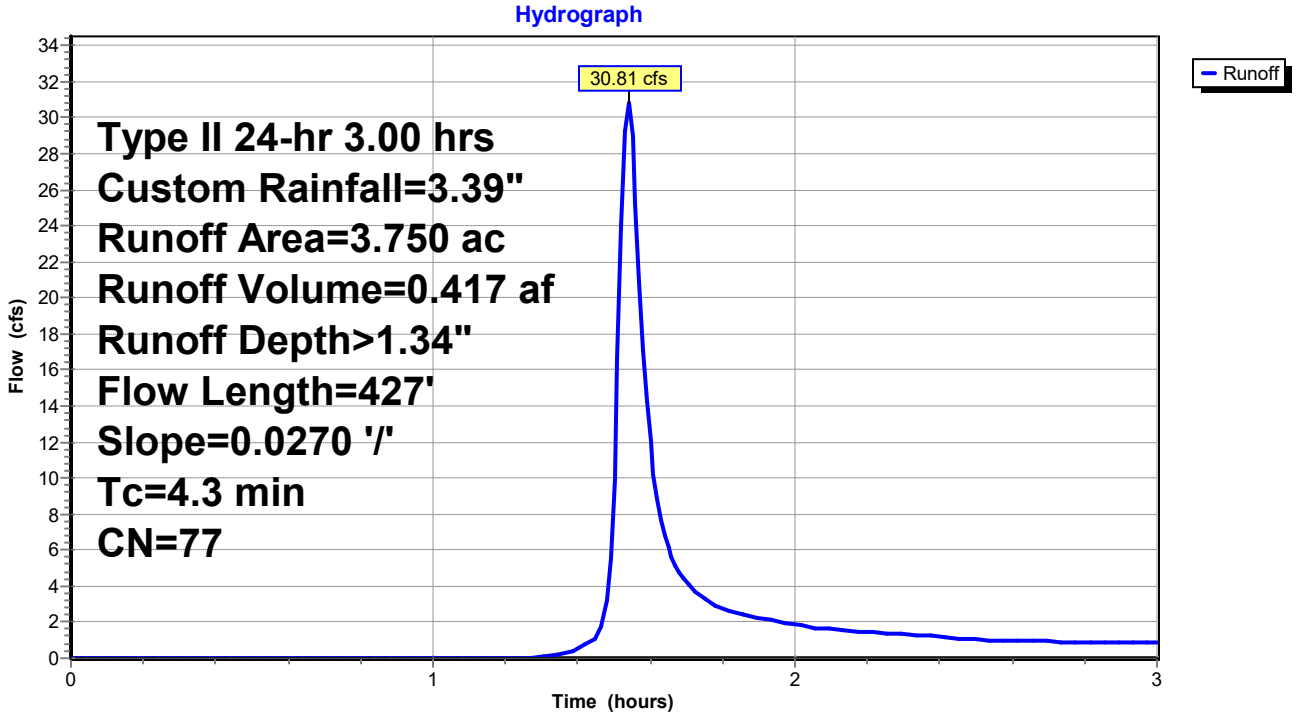
Runoff = 30.81 cfs @ 1.54 hrs, Volume= 0.417 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
3.750	77	Natural western desert, HSG B
3.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	427	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 11S: ONSITE PRE 24HR 100YR



Hydrograph for Subcatchment 11S: ONSITE PRE 24HR 100YR

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.04
1.35	0.75	0.01	0.20
1.40	0.85	0.02	0.52
1.45	1.04	0.06	1.20
1.50	2.25	0.59	**9.94**
1.55	2.46	0.71	**29.01**
1.60	2.57	0.79	12.02
1.65	2.66	0.84	6.16
1.70	2.72	0.88	4.22
1.75	2.78	0.92	3.28
1.80	2.83	0.95	2.74
1.85	2.87	0.98	2.44
1.90	2.91	1.01	2.24
1.95	2.95	1.04	2.06
2.00	2.98	1.06	1.88
2.05	3.01	1.08	1.70
2.10	3.04	1.10	1.60
2.15	3.07	1.12	1.52
2.20	3.10	1.14	1.46
2.25	3.12	1.16	1.39
2.30	3.15	1.17	1.33
2.35	3.17	1.19	1.26
2.40	3.19	1.20	1.19
2.45	3.21	1.22	1.12
2.50	3.23	1.23	1.05
2.55	3.24	1.24	0.98
2.60	3.26	1.26	0.95
2.65	3.28	1.27	0.94
2.70	3.30	1.28	0.92
2.75	3.31	1.29	0.91
2.80	3.33	1.30	0.90
2.85	3.34	1.32	0.88
2.90	3.36	1.33	0.87
2.95	3.37	1.34	0.86
3.00	**3.39**	**1.35**	0.84

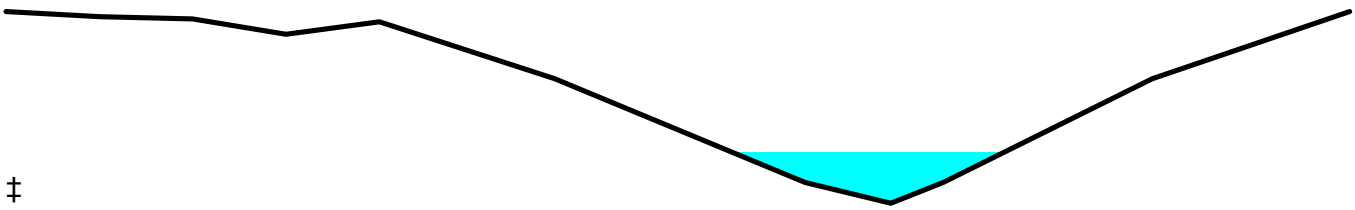
Summary for Reach 9R: NAT. CHANNEL SECTION A

Inflow Area = 18.040 ac, 0.00% Impervious, Inflow Depth > 1.31" for Custom event
Inflow = 60.96 cfs @ 1.64 hrs, Volume= 1.974 af
Outflow = 59.62 cfs @ 1.66 hrs, Volume= 1.952 af, Atten= 2%, Lag= 1.4 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.00 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 3.1 min

Peak Storage= 6,369 cf @ 1.66 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.85' Flow Area= 250.8 sf, Capacity= 1,406.03 cfs

Custom cross-section, Length= 320.0' Slope= 0.0112 '/' (102 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 492.79', Outlet Invert= 489.22'

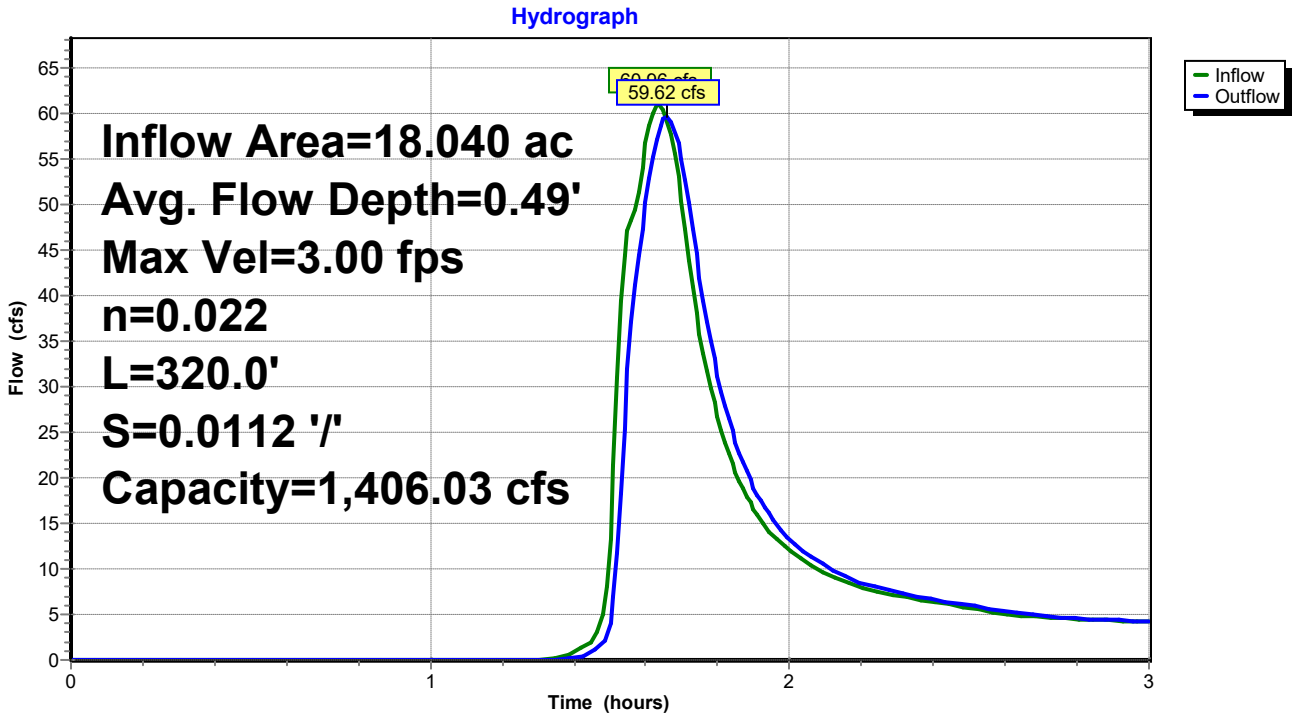


‡

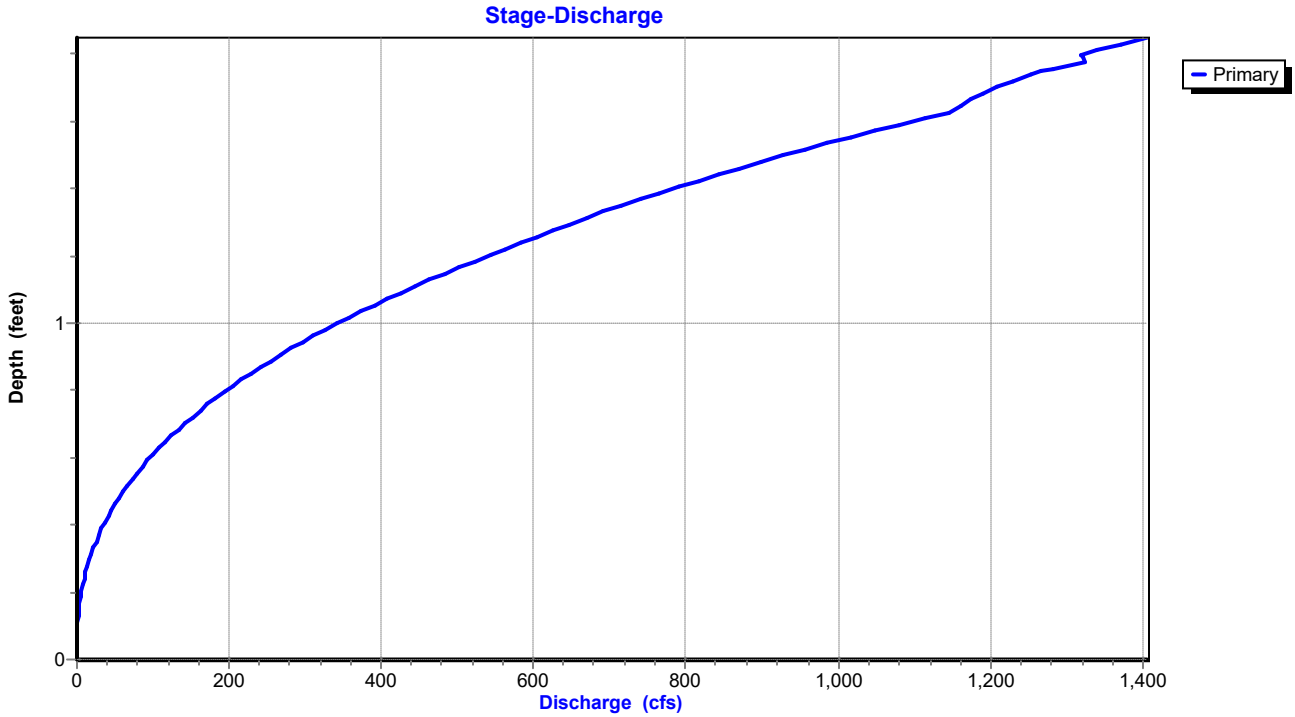
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	494.65	0.00
25.00	494.60	0.05
50.00	494.58	0.07
75.00	494.43	0.22
100.00	494.55	0.10
147.00	494.00	0.65
214.00	493.00	1.65
237.00	492.80	1.85
251.00	493.00	1.65
307.00	494.00	0.65
359.88	494.65	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.20	3.7	37.0	1,185	5.72
1.20	102.2	160.0	32,705	540.56
1.63	186.4	231.8	59,658	1,148.25
1.75	218.1	296.8	69,802	1,267.46
1.78	227.1	304.2	72,696	1,324.42
1.80	233.5	330.8	74,718	1,320.49
1.85	250.8	359.9	80,244	1,406.03

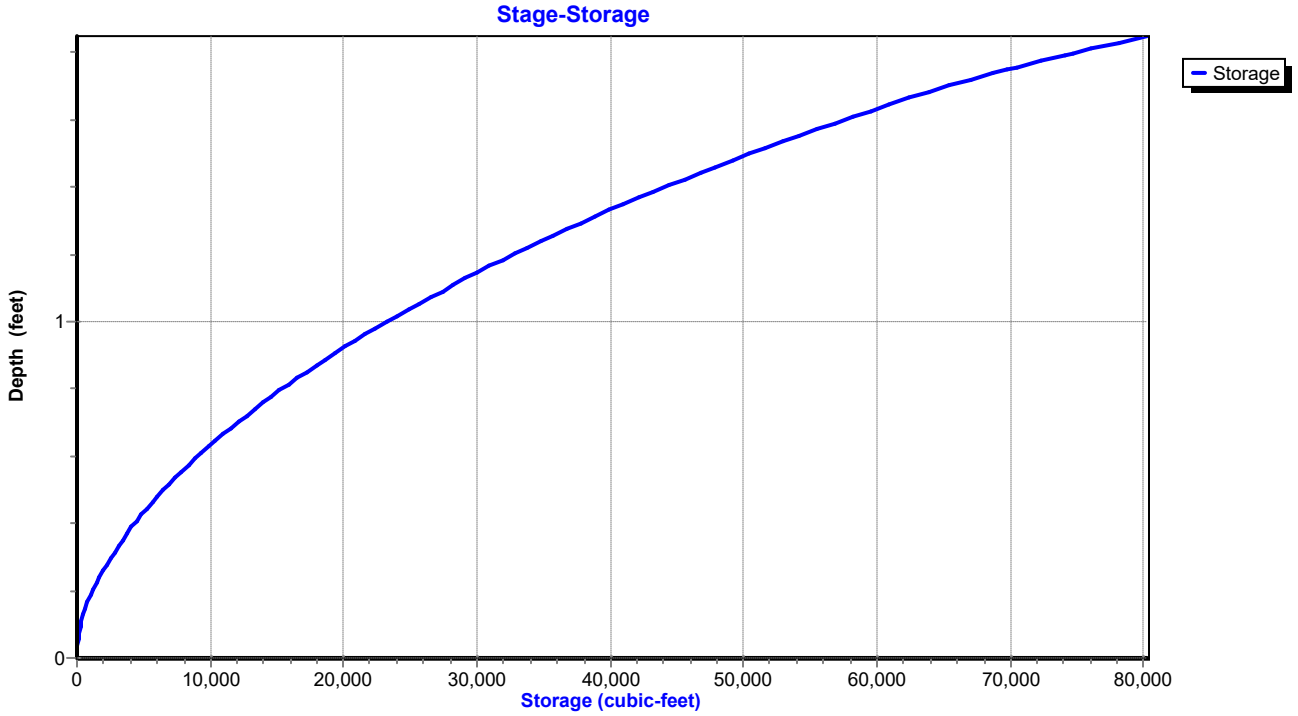
Reach 9R: NAT. CHANNEL SECTION A



Reach 9R: NAT. CHANNEL SECTION A



Reach 9R: NAT. CHANNEL SECTION A



Hydrograph for Reach 9R: NAT. CHANNEL SECTION A

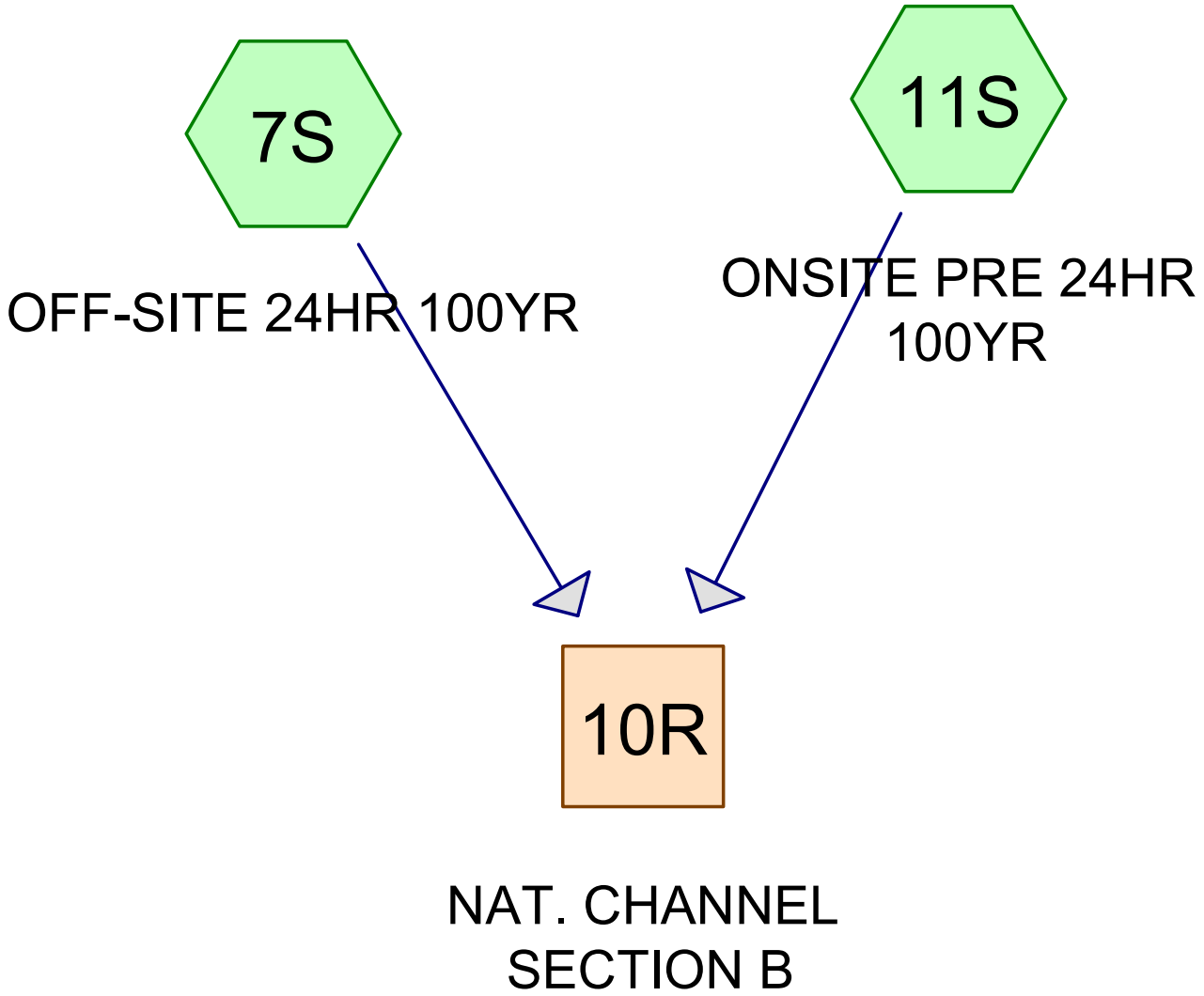
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	492.79	0.00
0.10	0.00	0	492.79	0.00
0.20	0.00	0	492.79	0.00
0.30	0.00	0	492.79	0.00
0.40	0.00	0	492.79	0.00
0.50	0.00	0	492.79	0.00
0.60	0.00	0	492.79	0.00
0.70	0.00	0	492.79	0.00
0.80	0.00	0	492.79	0.00
0.90	0.00	0	492.79	0.00
1.00	0.00	0	492.79	0.00
1.10	0.00	0	492.79	0.00
1.20	0.00	0	492.79	0.00
1.30	0.04	2	492.79	0.00
1.40	0.85	100	492.85	0.21
1.50	13.33	917	492.97	4.06
1.60	**56.64**	**5,613**	**493.25**	**50.18**
1.70	**50.30**	**5,997**	**493.27**	**54.93**
1.80	26.68	3,966	493.17	31.18
1.90	16.57	2,765	493.10	18.92
2.00	11.99	2,142	493.06	13.25
2.10	9.50	1,788	493.04	10.27
2.20	7.95	1,559	493.02	8.45
2.30	7.08	1,421	493.01	7.40
2.40	6.38	1,318	493.00	6.65
2.50	5.71	1,224	492.99	5.97
2.60	5.09	1,127	492.98	5.35
2.70	4.69	1,050	492.98	4.86
2.80	4.48	1,005	492.97	4.57
2.90	4.32	975	492.97	4.40
3.00	4.19	951	492.97	4.25

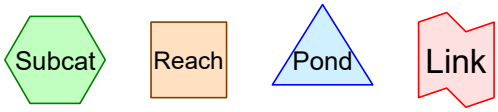
Stage-Discharge for Reach 9R: NAT. CHANNEL SECTION A

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
492.79	0.00	0.00
492.81	0.33	0.01
492.83	0.52	0.08
492.85	0.69	0.24
492.87	0.83	0.51
492.89	0.97	0.91
492.91	1.09	1.48
492.93	1.21	2.22
492.95	1.32	3.16
492.97	1.43	4.31
492.99	1.54	5.72
493.01	1.67	7.46
493.03	1.79	9.46
493.05	1.91	11.73
493.07	2.02	14.26
493.09	2.12	17.05
493.11	2.23	20.12
493.13	2.32	23.47
493.15	2.42	27.12
493.17	2.51	31.05
493.19	2.60	35.30
493.21	2.69	39.86
493.23	2.77	44.73
493.25	2.86	49.94
493.27	2.94	55.48
493.29	3.02	61.38
493.31	3.10	67.64
493.33	3.17	74.26
493.35	3.25	81.24
493.37	3.32	88.61
493.39	3.40	96.35
493.41	3.47	104.48
493.43	3.54	113.00
493.45	3.61	121.93
493.47	3.68	131.27
493.49	3.75	141.02
493.51	3.82	151.19
493.53	3.89	161.80
493.55	3.95	172.87
493.57	4.02	184.39
493.59	4.09	196.36
493.61	4.15	208.78
493.63	4.22	221.67
493.65	4.28	235.04
493.67	4.34	248.87
493.69	4.41	263.20
493.71	4.47	278.01
493.73	4.53	293.32
493.75	4.59	309.13
493.77	4.65	325.45
493.79	4.71	342.31
493.81	4.77	359.70
493.83	4.83	377.63
493.85	4.89	396.08
493.87	4.95	415.08
493.89	5.01	434.63
493.91	5.06	454.73
493.93	5.12	475.39
493.95	5.18	496.61
493.97	5.23	518.40
493.99	5.29	540.56
494.01	5.33	561.79
494.03	5.37	583.48
494.05	5.40	605.86
494.07	5.44	628.92
494.09	5.48	652.66
494.11	5.52	677.09
494.13	5.56	702.22
494.15	5.60	728.06
494.17	5.64	754.61
494.19	5.68	781.89
494.21	5.73	809.89
494.23	5.77	838.63
494.25	5.81	868.12
494.27	5.85	898.36
494.29	5.89	929.42
494.31	5.94	961.25
494.33	5.98	993.86
494.35	6.02	1,027.26
494.37	6.06	1,061.44
494.39	6.11	1,096.44
494.41	**6.15**	1,132.24
494.43	**6.12**	1,156.01
494.45	6.05	1,171.39
494.47	5.98	1,188.50
494.49	5.92	1,208.10
494.51	5.87	1,230.08
494.53	5.83	1,254.45
494.55	5.83	1,289.33
494.57	5.83	1,324.42
494.59	5.66	1,320.49
494.61	5.63	1,353.27
494.63	5.61	**1,388.05**

Stage-Area-Storage for Reach 9R: NAT. CHANNEL SECTION A

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
492.79	0.0	0
492.81	0.0	13
492.83	0.2	49
492.85	0.3	108
492.87	0.6	192
492.89	0.9	298
492.91	1.3	429
492.93	1.8	583
492.95	2.4	760
492.97	3.0	961
492.99	3.7	1,185
493.01	4.5	1,429
493.03	5.3	1,689
493.05	6.1	1,966
493.07	7.1	2,258
493.09	8.0	2,566
493.11	9.0	2,890
493.13	10.1	3,229
493.15	11.2	3,584
493.17	12.4	3,955
493.19	13.6	4,341
493.21	14.8	4,743
493.23	16.1	5,160
493.25	17.5	5,594
493.27	18.9	6,042
493.29	20.3	6,507
493.31	21.8	6,989
493.33	23.4	7,486
493.35	25.0	7,998
493.37	26.6	8,527
493.39	28.3	9,070
493.41	30.1	9,630
493.43	31.9	10,205
493.45	33.7	10,796
493.47	35.6	11,403
493.49	37.6	12,025
493.51	39.6	12,663
493.53	41.6	13,316
493.55	43.7	13,987
493.57	45.9	14,672
493.59	48.0	15,374
493.61	50.3	16,091
493.63	52.6	16,824
493.65	54.9	17,573
493.67	57.3	18,337
493.69	59.7	19,117
493.71	62.2	19,912
493.73	64.8	20,723
493.75	67.3	21,550
493.77	70.0	22,393
493.79	72.7	23,252
493.81	75.4	24,126
493.83	78.2	25,017
493.85	81.0	25,923
493.87	83.9	26,845
493.89	86.8	27,782
493.91	89.8	28,736
493.93	92.8	29,704
493.95	95.9	30,689
493.97	99.0	31,689
493.99	102.2	32,705
494.01	105.4	33,739
494.03	108.7	34,795
494.05	112.1	35,873
494.07	115.5	36,972
494.09	119.0	38,093
494.11	122.6	39,234
494.13	126.2	40,397
494.15	129.9	41,582
494.17	133.7	42,787
494.19	137.5	44,014
494.21	141.4	45,261
494.23	145.4	46,531
494.25	149.4	47,821
494.27	153.5	49,132
494.29	157.7	50,467
494.31	161.9	51,822
494.33	166.2	53,199
494.35	170.6	54,597
494.37	175.1	56,016
494.39	179.6	57,457
494.41	184.1	58,918
494.43	188.8	60,412
494.45	193.6	61,963
494.47	198.7	63,584
494.49	204.0	65,273
494.51	209.5	67,032
494.53	215.2	68,861
494.55	221.1	70,757
494.57	227.2	72,696
494.59	233.5	74,718
494.61	240.2	76,880
494.63	**247.2**	**79,109**





Routing Diagram for FLUID HOLDINGS 3353 NEEDLES HWY
Prepared by LUDWIG ENGINEERING, Printed 4/18/2019
HydroCAD® 10.00-22 s/n 05220 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.040	77	Natural western desert, HSG B (7S, 11S)
18.040	**77**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
18.040	HSG B	7S, 11S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
18.040		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	18.040	0.000	0.000	0.000	18.040	Natural western desert	7S, 11S
0.000	**18.040**	**0.000**	**0.000**	**0.000**	**18.040**	**TOTAL AREA**	

Summary for Subcatchment 7S: OFF-SITE 24HR 100YR

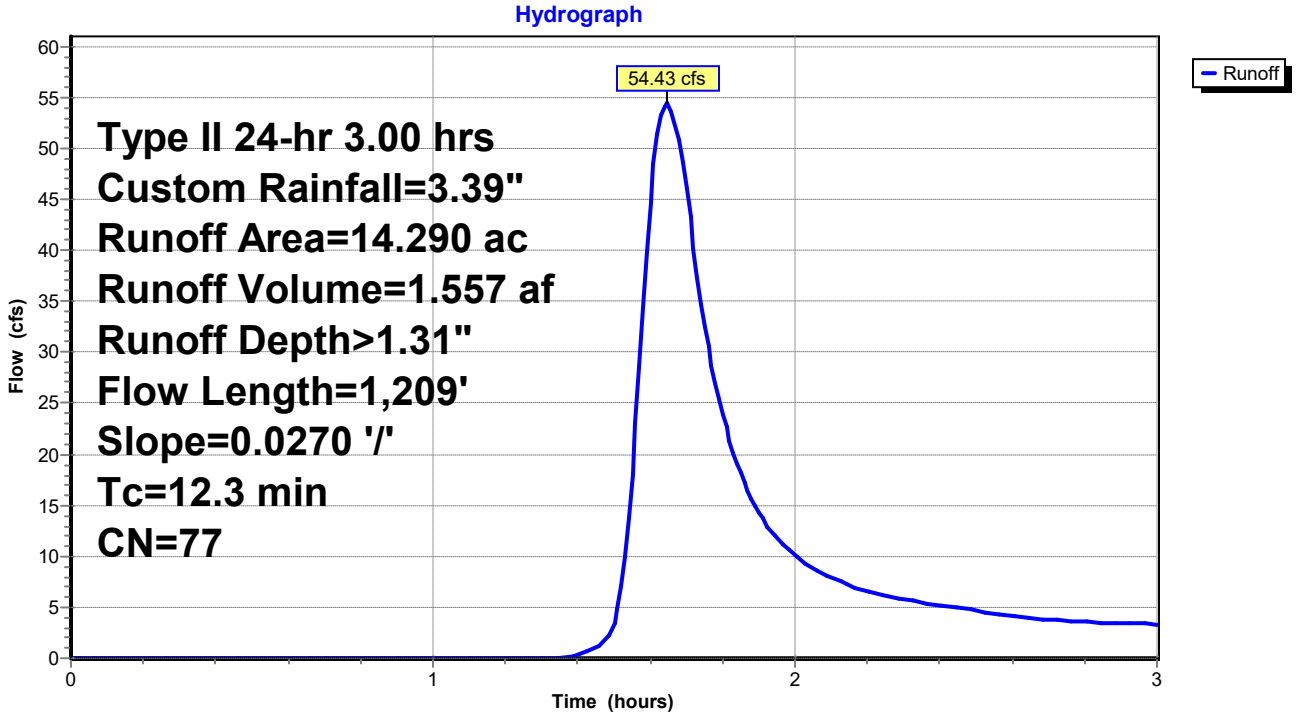
Runoff = 54.43 cfs @ 1.65 hrs, Volume= 1.557 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
14.290	77	Natural western desert, HSG B
14.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	1,209	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 7S: OFF-SITE 24HR 100YR



Hydrograph for Subcatchment 7S: OFF-SITE 24HR 100YR

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.01
1.35	0.75	0.01	0.07
1.40	0.85	0.02	0.33
1.45	1.04	0.06	0.99
1.50	2.25	0.59	3.39
1.55	2.46	0.71	18.03
1.60	2.57	0.79	44.62
1.65	2.66	0.84	**54.42**
1.70	2.72	0.88	46.09
1.75	2.78	0.92	32.51
1.80	2.83	0.95	23.94
1.85	2.87	0.98	18.15
1.90	2.91	1.01	14.33
1.95	2.95	1.04	11.81
2.00	2.98	1.06	10.12
2.05	3.01	1.08	8.87
2.10	3.04	1.10	7.90
2.15	3.07	1.12	7.10
2.20	3.10	1.14	6.49
2.25	3.12	1.16	6.09
2.30	3.15	1.17	5.76
2.35	3.17	1.19	5.46
2.40	3.19	1.20	5.19
2.45	3.21	1.22	4.92
2.50	3.23	1.23	4.66
2.55	3.24	1.24	4.39
2.60	3.26	1.26	4.14
2.65	3.28	1.27	3.92
2.70	3.30	1.28	3.77
2.75	3.31	1.29	3.66
2.80	3.33	1.30	3.58
2.85	3.34	1.32	3.51
2.90	3.36	1.33	3.45
2.95	3.37	1.34	3.40
3.00	**3.39**	**1.35**	3.34

Summary for Subcatchment 11S: ONSITE PRE 24HR 100YR

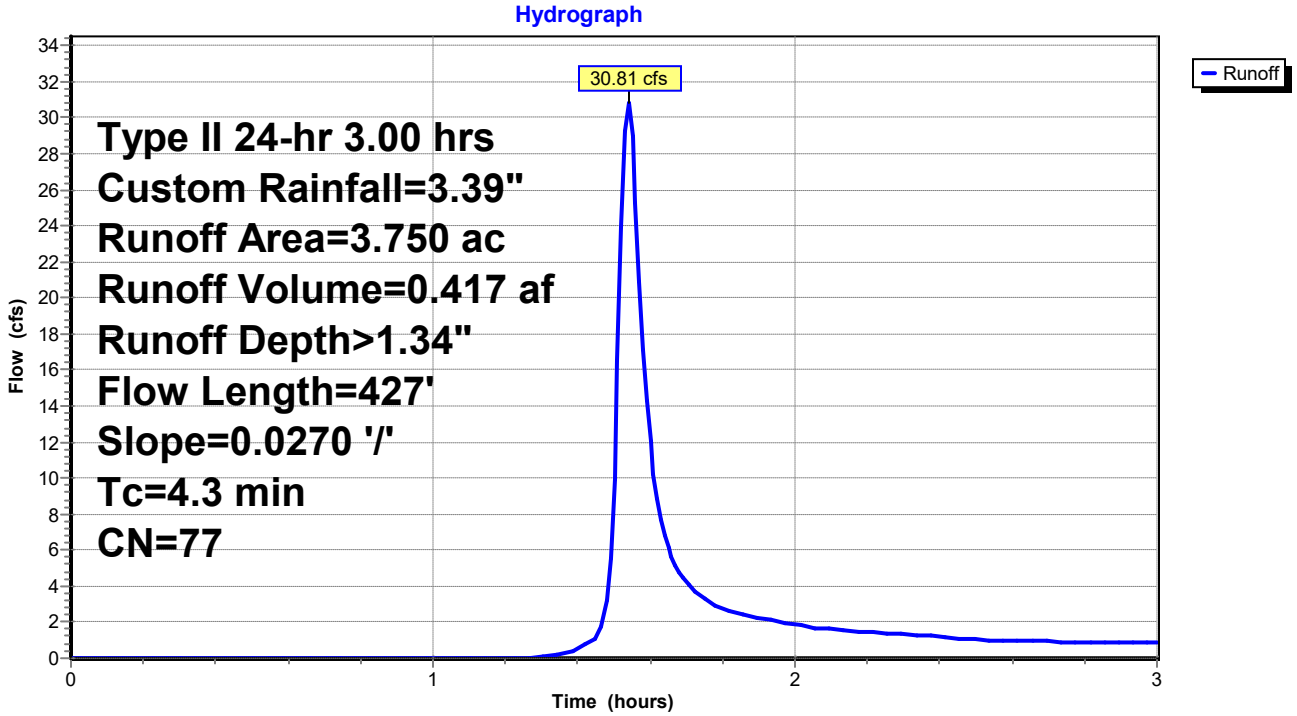
Runoff = 30.81 cfs @ 1.54 hrs, Volume= 0.417 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
3.750	77	Natural western desert, HSG B
3.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	427	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 11S: ONSITE PRE 24HR 100YR



Hydrograph for Subcatchment 11S: ONSITE PRE 24HR 100YR

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.04
1.35	0.75	0.01	0.20
1.40	0.85	0.02	0.52
1.45	1.04	0.06	1.20
1.50	2.25	0.59	**9.94**
1.55	2.46	0.71	**29.01**
1.60	2.57	0.79	12.02
1.65	2.66	0.84	6.16
1.70	2.72	0.88	4.22
1.75	2.78	0.92	3.28
1.80	2.83	0.95	2.74
1.85	2.87	0.98	2.44
1.90	2.91	1.01	2.24
1.95	2.95	1.04	2.06
2.00	2.98	1.06	1.88
2.05	3.01	1.08	1.70
2.10	3.04	1.10	1.60
2.15	3.07	1.12	1.52
2.20	3.10	1.14	1.46
2.25	3.12	1.16	1.39
2.30	3.15	1.17	1.33
2.35	3.17	1.19	1.26
2.40	3.19	1.20	1.19
2.45	3.21	1.22	1.12
2.50	3.23	1.23	1.05
2.55	3.24	1.24	0.98
2.60	3.26	1.26	0.95
2.65	3.28	1.27	0.94
2.70	3.30	1.28	0.92
2.75	3.31	1.29	0.91
2.80	3.33	1.30	0.90
2.85	3.34	1.32	0.88
2.90	3.36	1.33	0.87
2.95	3.37	1.34	0.86
3.00	**3.39**	**1.35**	0.84

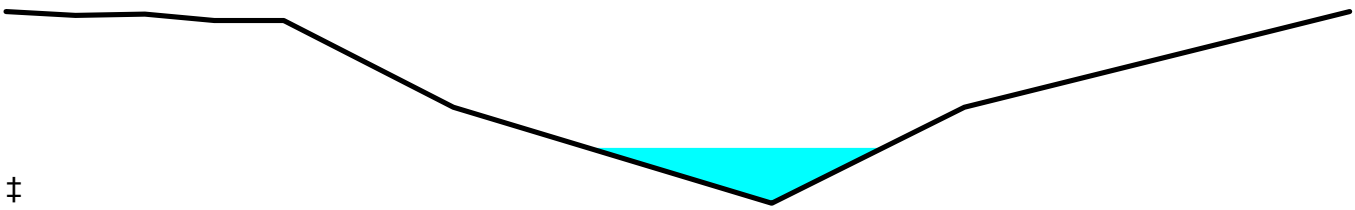
Summary for Reach 10R: NAT. CHANNEL SECTION B

Inflow Area = 18.040 ac, 0.00% Impervious, Inflow Depth > 1.31" for Custom event
Inflow = 60.96 cfs @ 1.64 hrs, Volume= 1.974 af
Outflow = 60.38 cfs @ 1.65 hrs, Volume= 1.961 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.60 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 1.9 min

Peak Storage= 4,167 cf @ 1.65 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.52' Flow Area= 291.5 sf, Capacity= 1,490.34 cfs

Custom cross-section, Length= 179.6' Slope= 0.0112 '/' (101 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 491.24', Outlet Invert= 489.22'

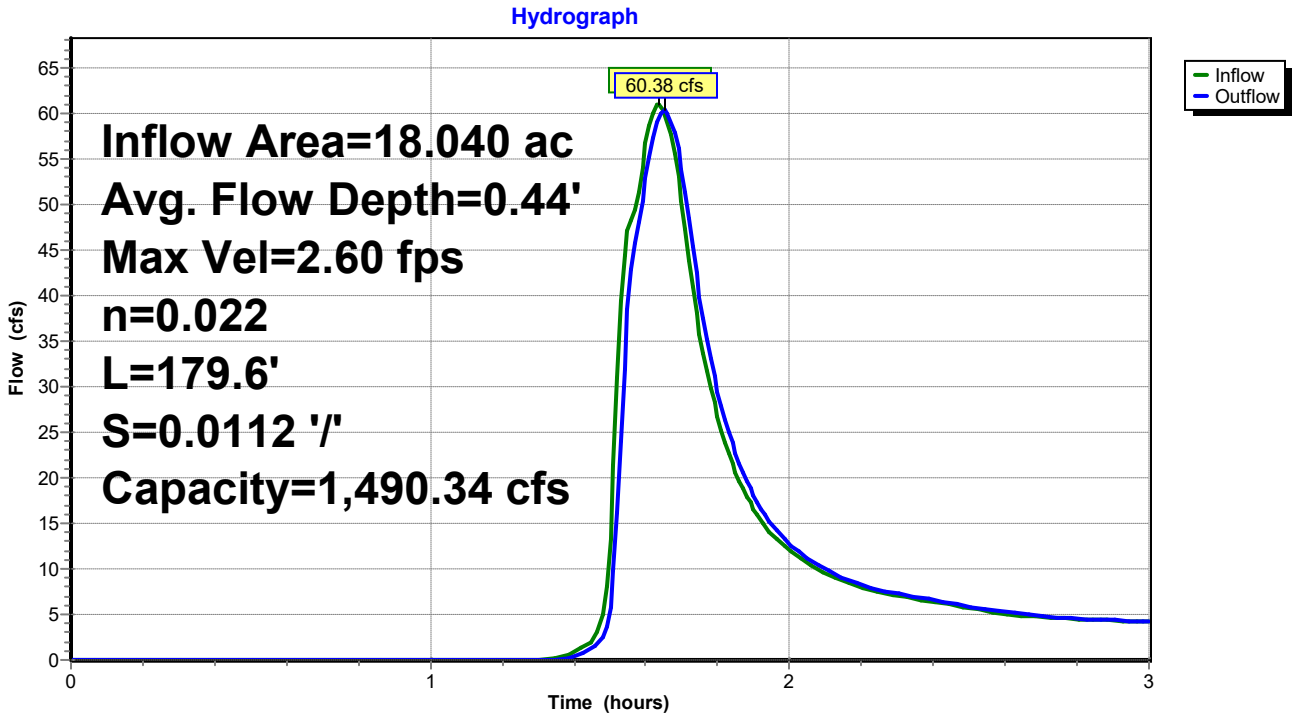


‡

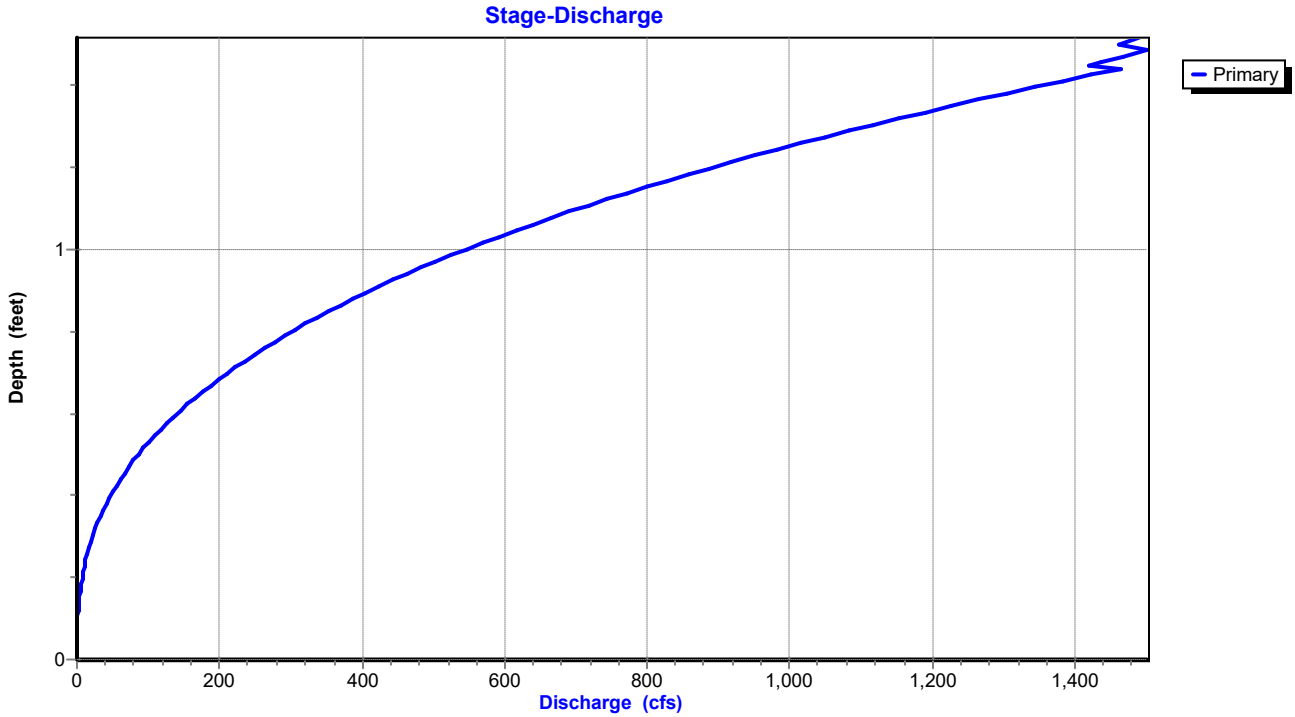
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	492.76	0.00
25.00	492.73	0.03
50.00	492.74	0.02
75.00	492.69	0.07
100.00	492.69	0.07
161.00	492.00	0.76
275.55	491.24	1.52
344.90	492.00	0.76
483.59	492.76	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.76	69.9	183.9	12,551	262.62
1.45	261.3	395.8	46,922	1,418.73
1.49	277.6	423.1	49,866	1,499.82
1.50	282.1	463.3	50,673	1,473.24
1.52	291.5	483.6	52,360	1,490.34

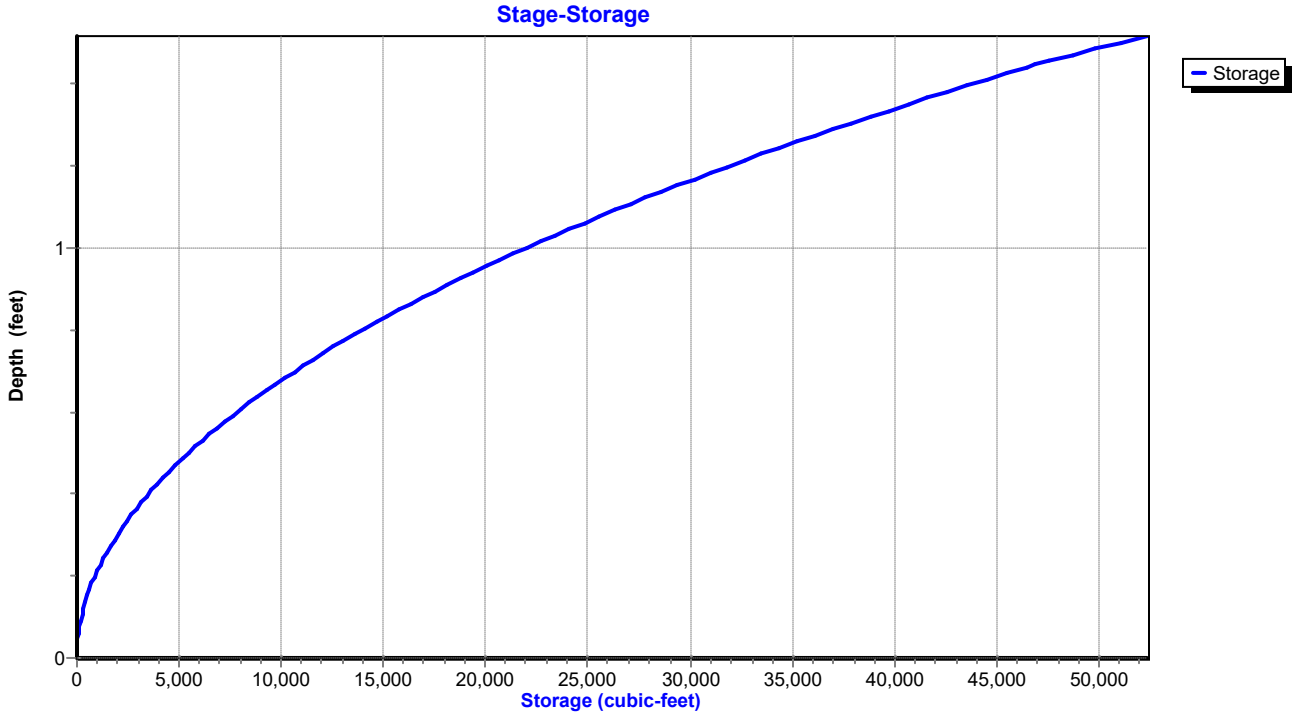
Reach 10R: NAT. CHANNEL SECTION B



Reach 10R: NAT. CHANNEL SECTION B



Reach 10R: NAT. CHANNEL SECTION B



Hydrograph for Reach 10R: NAT. CHANNEL SECTION B

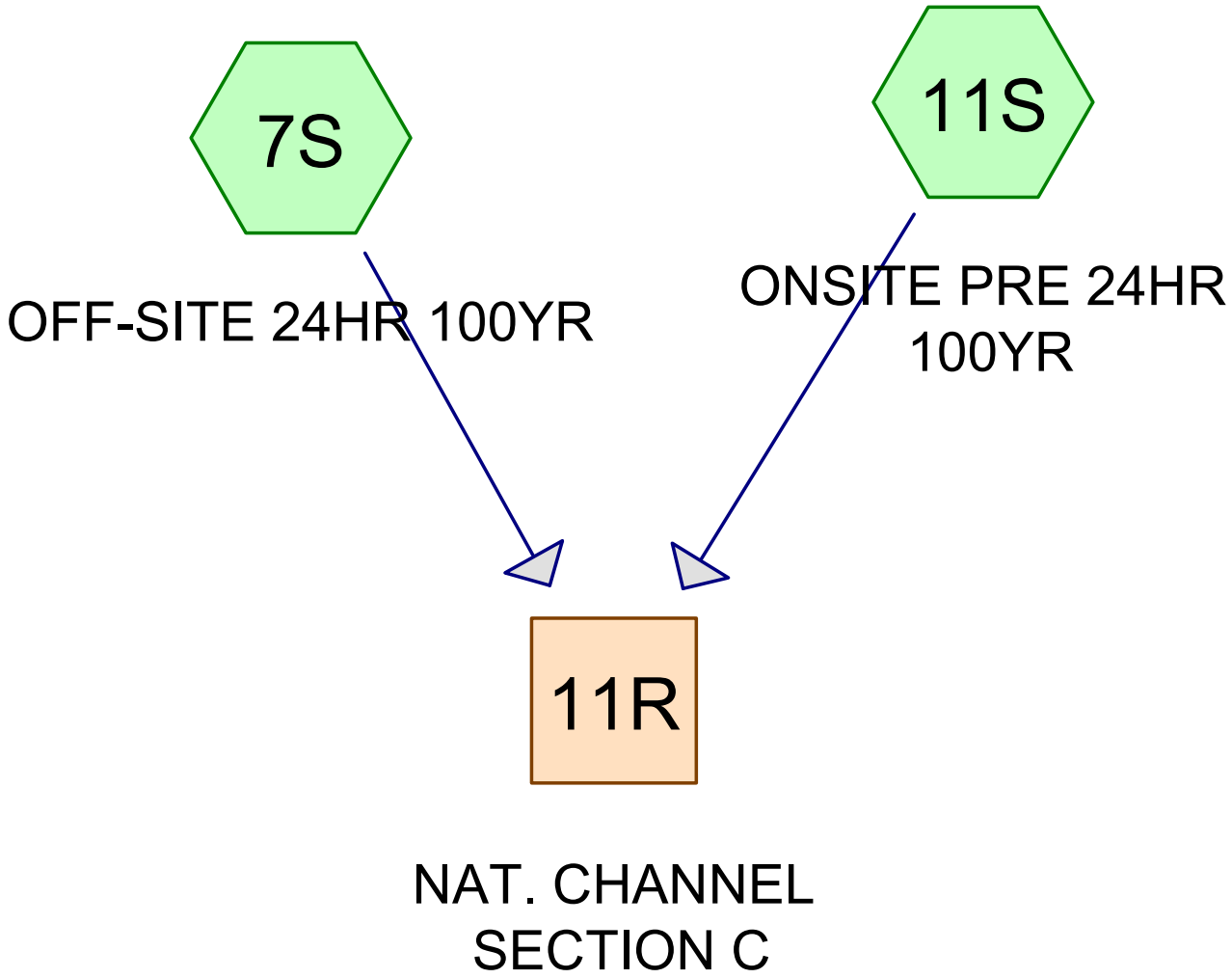
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	491.24	0.00
0.10	0.00	0	491.24	0.00
0.20	0.00	0	491.24	0.00
0.30	0.00	0	491.24	0.00
0.40	0.00	0	491.24	0.00
0.50	0.00	0	491.24	0.00
0.60	0.00	0	491.24	0.00
0.70	0.00	0	491.24	0.00
0.80	0.00	0	491.24	0.00
0.90	0.00	0	491.24	0.00
1.00	0.00	0	491.24	0.00
1.10	0.00	0	491.24	0.00
1.20	0.00	0	491.24	0.00
1.30	0.04	2	491.25	0.00
1.40	0.85	86	491.30	0.34
1.50	13.33	721	491.42	5.82
1.60	**56.64**	**3,771**	**491.66**	**52.86**
1.70	**50.30**	**3,825**	**491.66**	**53.88**
1.80	26.68	2,436	491.57	29.51
1.90	16.57	1,682	491.52	18.02
2.00	11.99	1,299	491.48	12.76
2.10	9.50	1,079	491.46	9.98
2.20	7.95	936	491.45	8.26
2.30	7.08	852	491.44	7.27
2.40	6.38	787	491.43	6.55
2.50	5.71	726	491.42	5.88
2.60	5.09	666	491.41	5.24
2.70	4.69	622	491.41	4.78
2.80	4.48	597	491.41	4.53
2.90	4.32	580	491.40	4.36
3.00	4.19	566	491.40	4.23

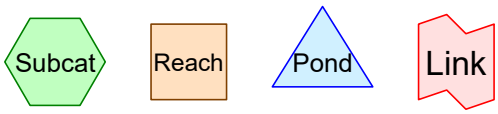
Stage-Discharge for Reach 10R: NAT. CHANNEL SECTION B

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
491.24	0.00	0.00	491.75	2.88	90.69	492.26	4.51	571.51
491.25	0.18	0.01	491.76	2.92	95.49	492.27	4.53	586.71
491.26	0.33	0.02	491.77	2.96	100.46	492.28	4.56	602.16
491.27	0.44	0.05	491.78	2.99	105.62	492.29	4.59	617.80
491.28	0.53	0.11	491.79	3.03	110.89	492.30	4.62	633.79
491.29	0.61	0.19	491.80	3.07	116.35	492.31	4.65	650.03
491.30	0.69	0.30	491.81	3.10	121.99	492.32	4.67	666.47
491.31	0.77	0.47	491.82	3.14	127.76	492.33	4.70	683.28
491.32	0.84	0.66	491.83	3.17	133.72	492.34	4.73	700.33
491.33	0.91	0.89	491.84	3.21	139.87	492.35	4.76	717.57
491.34	0.97	1.19	491.85	3.25	146.14	492.36	4.78	735.22
491.35	1.04	1.53	491.86	3.28	152.63	492.37	4.81	753.09
491.36	1.10	1.92	491.87	3.32	159.30	492.38	4.84	771.16
491.37	1.16	2.39	491.88	3.35	166.10	492.39	4.87	789.66
491.38	1.22	2.90	491.89	3.39	173.12	492.40	4.90	808.37
491.39	1.27	3.48	491.90	3.42	180.33	492.41	4.92	827.30
491.40	1.33	4.14	491.91	3.46	187.67	492.42	4.95	846.64
491.41	1.38	4.86	491.92	3.49	195.26	492.43	4.98	866.20
491.42	1.44	5.65	491.93	3.52	203.02	492.44	5.01	886.01
491.43	1.49	6.54	491.94	3.56	210.92	492.45	5.03	906.22
491.44	1.54	7.48	491.95	3.59	219.08	492.46	5.06	926.65
491.45	1.59	8.52	491.96	3.62	227.41	492.47	5.09	947.35
491.46	1.64	9.66	491.97	3.66	235.88	492.48	5.11	968.45
491.47	1.69	10.85	491.98	3.69	244.64	492.49	5.14	989.76
491.48	1.74	12.16	491.99	3.72	253.56	492.50	5.17	1,011.37
491.49	1.79	13.57	492.00	3.76	262.62	492.51	5.19	1,033.36
491.50	1.84	15.05	492.01	3.79	271.72	492.52	5.22	1,055.57
491.51	1.88	16.65	492.02	3.82	280.97	492.53	5.25	1,078.10
491.52	1.93	18.35	492.03	3.85	290.39	492.54	5.28	1,101.01
491.53	1.98	20.13	492.04	3.87	300.13	492.55	5.30	1,124.14
491.54	2.02	22.04	492.05	3.90	310.02	492.56	5.33	1,147.61
491.55	2.07	24.06	492.06	3.93	320.10	492.57	5.36	1,171.44
491.56	2.11	26.16	492.07	3.96	330.49	492.58	5.38	1,195.50
491.57	2.15	28.42	492.08	3.99	341.04	492.59	5.41	1,219.92
491.58	2.20	30.78	492.09	4.02	351.80	492.60	5.44	1,244.70
491.59	2.24	33.22	492.10	4.05	362.86	492.61	5.46	1,269.70
491.60	2.28	35.84	492.11	4.08	374.09	492.62	5.49	1,295.10
491.61	2.33	38.55	492.12	4.11	385.54	492.63	5.51	1,320.83
491.62	2.37	41.36	492.13	4.13	397.29	492.64	5.54	1,346.79
491.63	2.41	44.36	492.14	4.16	409.21	492.65	5.57	1,373.18
491.64	2.45	47.46	492.15	4.19	421.37	492.66	5.59	1,399.88
491.65	2.49	50.65	492.16	4.22	433.83	492.67	5.62	1,426.82
491.66	2.53	54.05	492.17	4.25	446.46	492.68	**5.65**	1,454.20
491.67	2.57	57.54	492.18	4.28	459.36	492.69	5.43	1,418.73
491.68	2.61	61.15	492.19	4.31	472.54	492.70	5.42	1,438.59
491.69	2.65	64.96	492.20	4.33	485.89	492.71	5.42	1,459.15
491.70	2.69	68.87	492.21	4.36	499.54	492.72	5.41	1,480.24
491.71	2.73	72.92	492.22	4.39	513.46	492.73	5.40	**1,499.82**
491.72	2.77	77.16	492.23	4.42	527.56	492.74	5.22	1,473.24
491.73	2.80	81.50	492.24	4.45	541.97	492.75	5.13	1,470.69
491.74	2.84	86.00	492.25	4.48	556.65	492.76	5.11	1,490.34

Stage-Area-Storage for Reach 10R: NAT. CHANNEL SECTION B

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
491.24	0.0	0
491.26	0.1	10
491.28	0.2	36
491.30	0.4	78
491.32	0.8	140
491.34	1.2	219
491.36	1.7	313
491.38	2.4	427
491.40	3.1	558
491.42	3.9	705
491.44	4.8	870
491.46	5.9	1,053
491.48	7.0	1,252
491.50	8.2	1,469
491.52	9.5	1,705
491.54	10.9	1,957
491.56	12.4	2,225
491.58	14.0	2,513
491.60	15.7	2,817
491.62	17.5	3,138
491.64	19.4	3,478
491.66	21.3	3,834
491.68	23.4	4,207
491.70	25.6	4,599
491.72	27.9	5,008
491.74	30.2	5,433
491.76	32.7	5,876
491.78	35.3	6,337
491.80	37.9	6,815
491.82	40.7	7,310
491.84	43.6	7,824
491.86	46.5	8,354
491.88	49.6	8,901
491.90	52.7	9,466
491.92	55.9	10,049
491.94	59.3	10,648
491.96	62.7	11,266
491.98	66.3	11,900
492.00	69.9	12,551
492.02	73.6	13,222
492.04	77.5	13,912
492.06	81.4	14,620
492.08	85.5	15,350
492.10	89.6	16,098
492.12	93.9	16,865
492.14	98.3	17,653
492.16	102.8	18,460
492.18	107.4	19,285
492.20	112.1	20,130
492.22	116.9	20,996
492.24	121.8	21,880
492.26	126.9	22,783
492.28	132.0	23,707
492.30	137.2	24,650
492.32	142.6	25,611
492.34	148.1	26,594
492.36	153.6	27,595
492.38	159.3	28,614
492.40	165.1	29,656
492.42	171.0	30,715
492.44	177.0	31,793
492.46	183.1	32,892
492.48	189.4	34,011
492.50	195.7	35,147
492.52	202.1	36,304
492.54	208.7	37,481
492.56	215.3	38,676
492.58	222.1	39,891
492.60	229.0	41,127
492.62	236.0	42,380
492.64	243.1	43,654
492.66	250.3	44,947
492.68	257.6	46,260
492.70	265.3	47,640
492.72	273.5	49,113
492.74	282.1	50,673
492.76	**291.5**	**52,360**





Routing Diagram for FLUID HOLDINGS 3353 NEEDLES HWY
Prepared by LUDWIG ENGINEERING, Printed 4/18/2019
HydroCAD® 10.00-22 s/n 05220 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.040	77	Natural western desert, HSG B (7S, 11S)
18.040	**77**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
18.040	HSG B	7S, 11S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
18.040		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	18.040	0.000	0.000	0.000	18.040	Natural western desert	7S, 11S
0.000	**18.040**	**0.000**	**0.000**	**0.000**	**18.040**	**TOTAL AREA**	

Summary for Subcatchment 7S: OFF-SITE 24HR 100YR

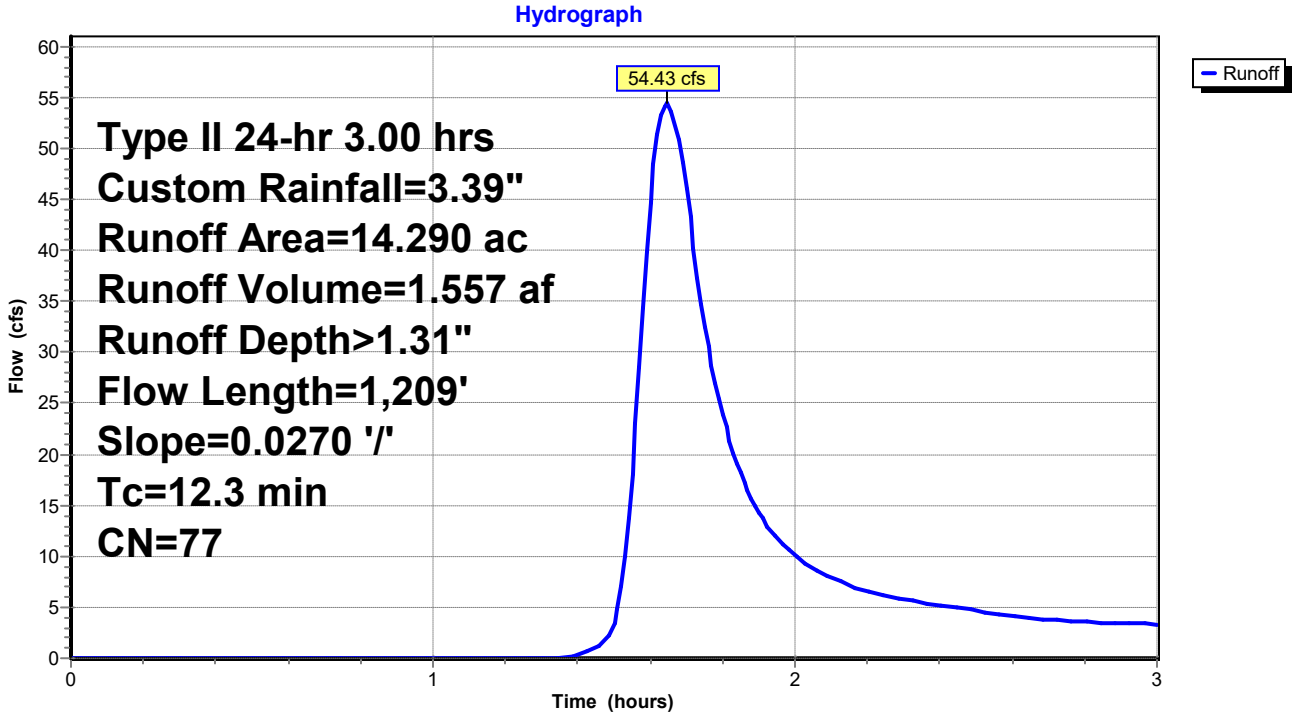
Runoff = 54.43 cfs @ 1.65 hrs, Volume= 1.557 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
14.290	77	Natural western desert, HSG B
14.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	1,209	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 7S: OFF-SITE 24HR 100YR



Hydrograph for Subcatchment 7S: OFF-SITE 24HR 100YR

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.01
1.35	0.75	0.01	0.07
1.40	0.85	0.02	0.33
1.45	1.04	0.06	0.99
1.50	2.25	0.59	3.39
1.55	2.46	0.71	18.03
1.60	2.57	0.79	44.62
1.65	2.66	0.84	**54.42**
1.70	2.72	0.88	46.09
1.75	2.78	0.92	32.51
1.80	2.83	0.95	23.94
1.85	2.87	0.98	18.15
1.90	2.91	1.01	14.33
1.95	2.95	1.04	11.81
2.00	2.98	1.06	10.12
2.05	3.01	1.08	8.87
2.10	3.04	1.10	7.90
2.15	3.07	1.12	7.10
2.20	3.10	1.14	6.49
2.25	3.12	1.16	6.09
2.30	3.15	1.17	5.76
2.35	3.17	1.19	5.46
2.40	3.19	1.20	5.19
2.45	3.21	1.22	4.92
2.50	3.23	1.23	4.66
2.55	3.24	1.24	4.39
2.60	3.26	1.26	4.14
2.65	3.28	1.27	3.92
2.70	3.30	1.28	3.77
2.75	3.31	1.29	3.66
2.80	3.33	1.30	3.58
2.85	3.34	1.32	3.51
2.90	3.36	1.33	3.45
2.95	3.37	1.34	3.40
3.00	**3.39**	**1.35**	3.34

Summary for Subcatchment 11S: ONSITE PRE 24HR 100YR

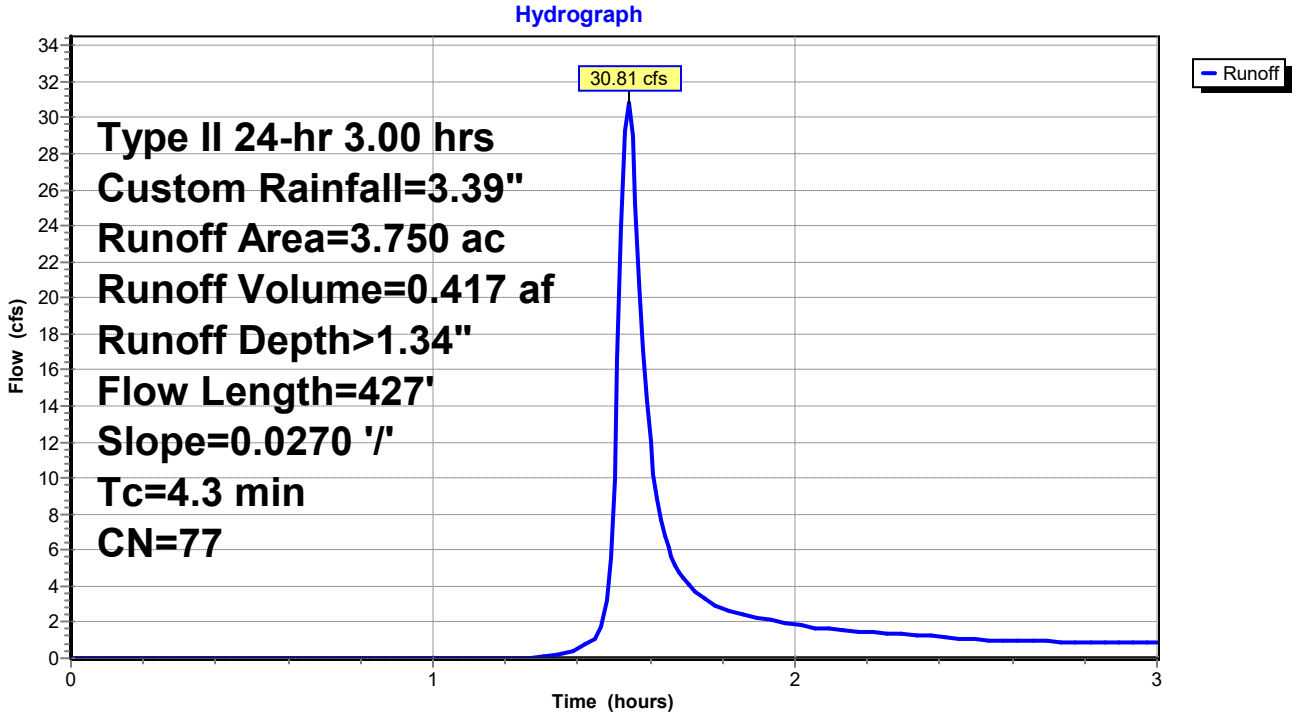
Runoff = 30.81 cfs @ 1.54 hrs, Volume= 0.417 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Type II 24-hr 3.00 hrs Custom Rainfall=3.39"

Area (ac)	CN	Description
3.750	77	Natural western desert, HSG B
3.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	427	0.0270	1.64		**Shallow Concentrated Flow, area flow** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 11S: ONSITE PRE 24HR 100YR



Hydrograph for Subcatchment 11S: ONSITE PRE 24HR 100YR

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00
0.10	0.03	0.00	0.00
0.15	0.04	0.00	0.00
0.20	0.06	0.00	0.00
0.25	0.07	0.00	0.00
0.30	0.09	0.00	0.00
0.35	0.11	0.00	0.00
0.40	0.13	0.00	0.00
0.45	0.14	0.00	0.00
0.50	0.16	0.00	0.00
0.55	0.18	0.00	0.00
0.60	0.20	0.00	0.00
0.65	0.22	0.00	0.00
0.70	0.25	0.00	0.00
0.75	0.27	0.00	0.00
0.80	0.30	0.00	0.00
0.85	0.32	0.00	0.00
0.90	0.35	0.00	0.00
0.95	0.38	0.00	0.00
1.00	0.41	0.00	0.00
1.05	0.44	0.00	0.00
1.10	0.48	0.00	0.00
1.15	0.52	0.00	0.00
1.20	0.56	0.00	0.00
1.25	0.61	0.00	0.00
1.30	0.67	0.00	0.04
1.35	0.75	0.01	0.20
1.40	0.85	0.02	0.52
1.45	1.04	0.06	1.20
1.50	2.25	0.59	**9.94**
1.55	2.46	0.71	**29.01**
1.60	2.57	0.79	12.02
1.65	2.66	0.84	6.16
1.70	2.72	0.88	4.22
1.75	2.78	0.92	3.28
1.80	2.83	0.95	2.74
1.85	2.87	0.98	2.44
1.90	2.91	1.01	2.24
1.95	2.95	1.04	2.06
2.00	2.98	1.06	1.88
2.05	3.01	1.08	1.70
2.10	3.04	1.10	1.60
2.15	3.07	1.12	1.52
2.20	3.10	1.14	1.46
2.25	3.12	1.16	1.39
2.30	3.15	1.17	1.33
2.35	3.17	1.19	1.26
2.40	3.19	1.20	1.19
2.45	3.21	1.22	1.12
2.50	3.23	1.23	1.05
2.55	3.24	1.24	0.98
2.60	3.26	1.26	0.95
2.65	3.28	1.27	0.94
2.70	3.30	1.28	0.92
2.75	3.31	1.29	0.91
2.80	3.33	1.30	0.90
2.85	3.34	1.32	0.88
2.90	3.36	1.33	0.87
2.95	3.37	1.34	0.86
3.00	**3.39**	**1.35**	0.84

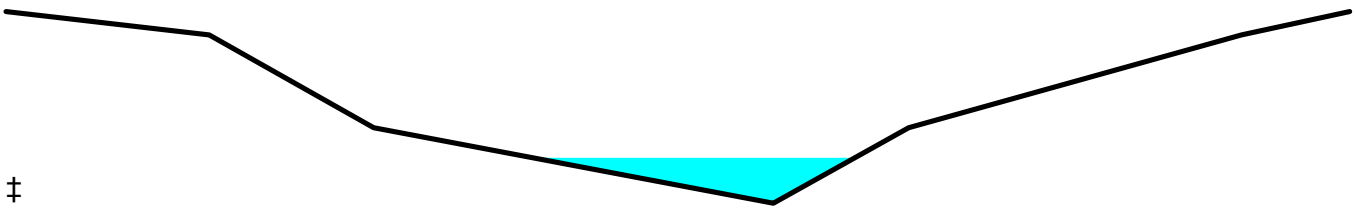
Summary for Reach 11R: NAT. CHANNEL SECTION C

Inflow Area = 18.040 ac, 0.00% Impervious, Inflow Depth > 1.31" for Custom event
Inflow = 60.96 cfs @ 1.64 hrs, Volume= 1.974 af
Outflow = 60.41 cfs @ 1.65 hrs, Volume= 1.962 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.07 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 1.9 min

Peak Storage= 4,047 cf @ 1.65 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.65' Flow Area= 480.3 sf, Capacity= 2,478.95 cfs

Custom cross-section, Length= 138.5' Slope= 0.0082 '/' (101 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 490.36', Outlet Invert= 489.22'

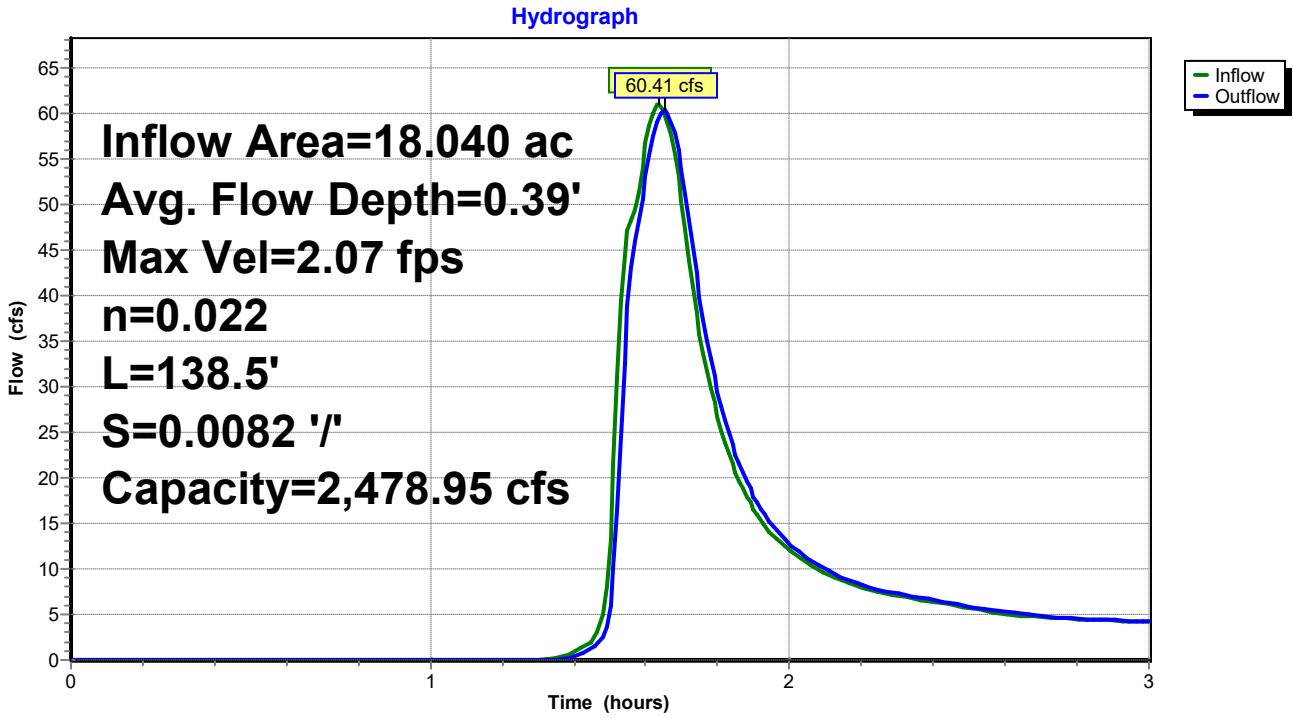


‡

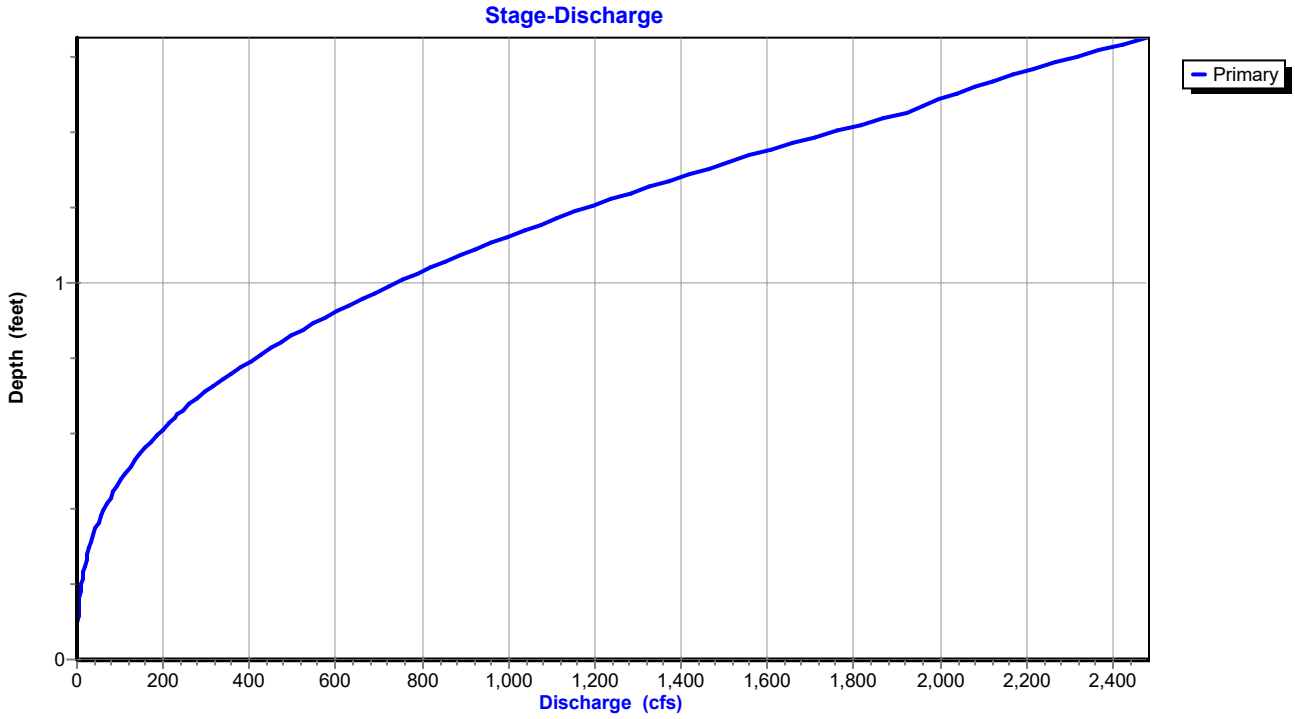
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	492.00	0.00
94.00	491.80	0.20
170.00	491.00	1.00
355.00	490.35	1.65
417.50	491.00	1.00
571.50	491.80	0.20
621.50	492.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.65	80.4	247.5	11,141	233.01
1.45	370.4	477.5	51,306	1,914.60
1.65	480.3	621.5	66,527	2,478.95

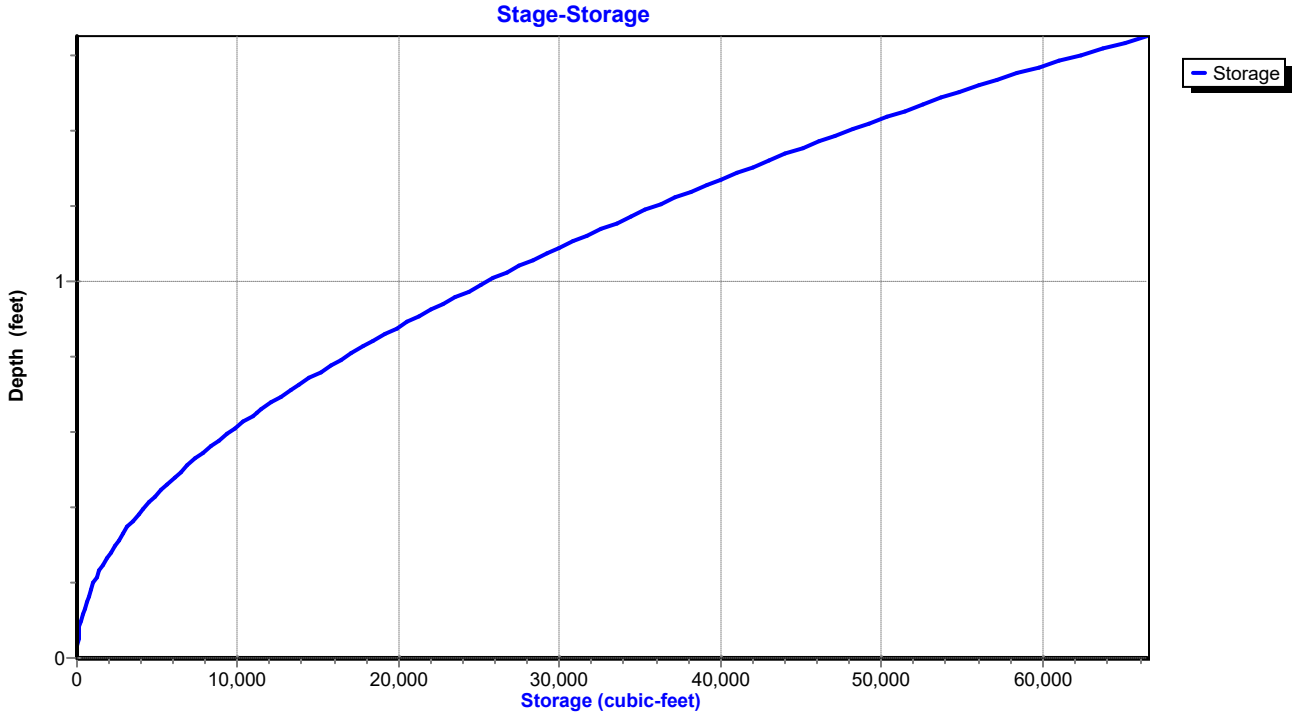
Reach 11R: NAT. CHANNEL SECTION C



Reach 11R: NAT. CHANNEL SECTION C



Reach 11R: NAT. CHANNEL SECTION C



Hydrograph for Reach 11R: NAT. CHANNEL SECTION C

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	490.36	0.00
0.10	0.00	0	490.36	0.00
0.20	0.00	0	490.36	0.00
0.30	0.00	0	490.36	0.00
0.40	0.00	0	490.36	0.00
0.50	0.00	0	490.36	0.00
0.60	0.00	0	490.36	0.00
0.70	0.00	0	490.36	0.00
0.80	0.00	0	490.36	0.00
0.90	0.00	0	490.36	0.00
1.00	0.00	0	490.36	0.00
1.10	0.00	0	490.36	0.00
1.20	0.00	0	490.36	0.00
1.30	0.04	2	490.36	0.00
1.40	0.85	85	490.42	0.35
1.50	13.33	709	490.52	5.93
1.60	**56.64**	**3,667**	**490.73**	**52.99**
1.70	**50.30**	**3,710**	**490.74**	**53.80**
1.80	26.68	2,359	490.66	29.42
1.90	16.57	1,630	490.61	17.97
2.00	11.99	1,259	490.58	12.74
2.10	9.50	1,047	490.56	9.95
2.20	7.95	908	490.55	8.24
2.30	7.08	827	490.54	7.27
2.40	6.38	763	490.53	6.55
2.50	5.71	705	490.52	5.88
2.60	5.09	645	490.52	5.24
2.70	4.69	603	490.51	4.78
2.80	4.48	579	490.51	4.53
2.90	4.32	563	490.51	4.36
3.00	4.19	550	490.50	4.23

Stage-Discharge for Reach 11R: NAT. CHANNEL SECTION C

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
490.36	0.00	0.00
490.38	0.28	0.03
490.40	0.45	0.15
490.42	0.59	0.42
490.44	0.72	0.88
490.46	0.83	1.59
490.48	0.94	2.60
490.50	1.04	3.91
490.52	1.14	5.57
490.54	1.23	7.60
490.56	1.32	10.07
490.58	1.41	13.00
490.60	1.49	16.39
490.62	1.57	20.27
490.64	1.65	24.67
490.66	1.73	29.67
490.68	1.81	35.26
490.70	1.88	41.44
490.72	1.95	48.24
490.74	2.03	55.69
490.76	2.10	63.88
490.78	2.16	72.77
490.80	2.23	82.37
490.82	2.30	92.70
490.84	2.37	103.83
490.86	2.43	115.81
490.88	2.50	128.58
490.90	2.56	142.18
490.92	2.62	156.61
490.94	2.68	171.99
490.96	2.75	188.29
490.98	2.81	205.50
491.00	2.87	223.62
491.02	2.93	243.27
491.04	3.01	264.55
491.06	3.08	286.76
491.08	3.15	309.90
491.10	3.21	333.99
491.12	3.28	359.07
491.14	3.35	385.23
491.16	3.41	412.36
491.18	3.48	440.49
491.20	3.54	469.62
491.22	3.60	499.84
491.24	3.66	531.16
491.26	3.72	563.51
491.28	3.78	596.91
491.30	3.84	631.37
491.32	3.90	667.04
491.34	3.96	703.81
491.36	4.02	741.68
491.38	4.07	780.65
491.40	4.13	820.76
491.42	4.18	862.14
491.44	4.24	904.66
491.46	4.29	948.33
491.48	4.35	993.16
491.50	4.40	1,039.23
491.52	4.45	1,086.59
491.54	4.50	1,135.15
491.56	4.56	1,184.91
491.58	4.61	1,235.88
491.60	4.66	1,288.22
491.62	4.71	1,341.84
491.64	4.76	1,396.71
491.66	4.81	1,452.85
491.68	4.86	1,510.25
491.70	4.91	1,569.13
491.72	4.96	1,629.30
491.74	5.01	1,690.77
491.76	5.05	1,753.55
491.78	5.10	1,817.72
491.80	**5.15**	1,882.73
491.82	**5.17**	1,939.02
491.84	5.16	1,985.31
491.86	5.15	2,034.03
491.88	5.14	2,085.35
491.90	5.14	2,139.22
491.92	5.14	2,195.49
491.94	5.14	2,254.14
491.96	5.14	2,315.19
491.98	5.15	2,378.94
492.00	5.16	**2,445.16**

Stage-Area-Storage for Reach 11R: NAT. CHANNEL SECTION C

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
490.36	0.0	0
490.38	0.1	12
490.40	0.3	44
490.42	0.7	97
490.44	1.2	170
490.46	1.9	264
490.48	2.8	381
490.50	3.7	519
490.52	4.9	677
490.54	6.2	855
490.56	7.6	1,055
490.58	9.2	1,278
490.60	11.0	1,521
490.62	12.9	1,784
490.64	14.9	2,067
490.66	17.1	2,374
490.68	19.5	2,702
490.70	22.0	3,050
490.72	24.7	3,418
490.74	27.5	3,808
490.76	30.5	4,220
490.78	33.6	4,653
490.80	36.9	5,106
490.82	40.3	5,580
490.84	43.9	6,076
490.86	47.6	6,594
490.88	51.5	7,132
490.90	55.5	7,690
490.92	59.7	8,269
490.94	64.1	8,871
490.96	68.6	9,494
490.98	73.2	10,138
491.00	78.0	10,802
491.02	82.9	11,485
491.04	88.0	12,188
491.06	93.2	12,906
491.08	98.5	13,639
491.10	103.9	14,388
491.12	109.4	15,152
491.14	115.0	15,934
491.16	120.8	16,732
491.18	126.7	17,545
491.20	132.7	18,373
491.22	138.8	19,218
491.24	145.0	20,079
491.26	151.3	20,956
491.28	157.7	21,848
491.30	164.3	22,756
491.32	171.0	23,681
491.34	177.8	24,622
491.36	184.7	25,578
491.38	191.7	26,550
491.40	198.8	27,538
491.42	206.1	28,543
491.44	213.5	29,563
491.46	220.9	30,599
491.48	228.5	31,650
491.50	236.2	32,718
491.52	244.1	33,802
491.54	252.0	34,902
491.56	260.1	36,018
491.58	268.2	37,148
491.60	276.5	38,296
491.62	284.9	39,460
491.64	293.4	40,640
491.66	302.1	41,834
491.68	310.8	43,045
491.70	319.7	44,273
491.72	328.6	45,516
491.74	337.7	46,775
491.76	346.9	48,049
491.78	356.2	49,340
491.80	365.7	50,647
491.82	375.3	51,975
491.84	385.1	53,337
491.86	395.2	54,738
491.88	405.6	56,181
491.90	416.4	57,665
491.92	427.3	59,187
491.94	438.6	60,748
491.96	450.2	62,348
491.98	462.0	63,991
492.00	**474.2**	**65,674**

Appendix IIIa

San Bernardino County Hydrologic Analysis

PROJECT: 3353 NEEDLES HWY, NEEDLES CA **DATE:**

ENGINEER: LUDWIG ENGINEERING

1.	Enter the design storm return frequency **(years)**	100
2.	Enter catchment lag **(hours)**	0.52
3.	Enter the catchment area **(acres)**	14.29 AC OFF-SITE
4.	Enter baseflow **(cfs/square mile)**	0
5.	Enter S-Graph proportions **(decimal)**	
	Valley: Developed	
	Foothill	
	Mountain	
	Valley: Undeveloped	
	Desert	1
6.	Enter maximum loss rate, F_m **(inch/hour)**	0.436
7.	Enter low loss fraction, $\bar{Y}$ **(decimal)**	0.46
8.	Enter watershed area-averaged 5-minute point rainfall **(inches)***	0.594
	Enter watershed area-averaged 30-minute point rainfall **(inches)***	1.41
	Enter watershed area-averaged 1-hour point rainfall **(inches)***	1.98
	Enter watershed area-averaged 3-hour point rainfall **(inches)***	2.37
	Enter watershed area-averaged 6-hour point rainfall **(inches)***	2.60
	Enter watershed area-averaged 24-hour point rainfall **(inches)***	3.42
9.	Enter 24-hour storm unit interval **(minutes)**	5.0

*Note: enter values unadjusted by depth-area factors

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

WATERSHED INFORMATION FORM

Figure E-7

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PROJECT: 3353 NEEDLES HWY, NEEDLES CA **DATE:**

ENGINEER: LUDWIG ENGINEERING

1.	Enter the design storm return frequency **(years)**	100
2.	Enter catchment lag **(hours)**	0.52
3.	Enter the catchment area **(acres)**	3.75 ON SITE
4.	Enter baseflow **(cfs/square mile)**	0
5.	Enter S-Graph proportions **(decimal)**	
	Valley: Developed	
	Foothill	
	Mountain	
	Valley: Undeveloped	
	Desert	1
6.	Enter maximum loss rate, F_m **(inch/hour)**	0.436
7.	Enter low loss fraction, $\bar{Y}$ **(decimal)**	
8.	Enter watershed area-averaged 5-minute point rainfall **(inches)***	0.594
	Enter watershed area-averaged 30-minute point rainfall **(inches)***	1.41
	Enter watershed area-averaged 1-hour point rainfall **(inches)***	1.98
	Enter watershed area-averaged 3-hour point rainfall **(inches)***	2.37
	Enter watershed area-averaged 6-hour point rainfall **(inches)***	2.60
	Enter watershed area-averaged 24-hour point rainfall **(inches)***	3.42
9.	Enter 24-hour storm unit interval **(minutes)**	5.0

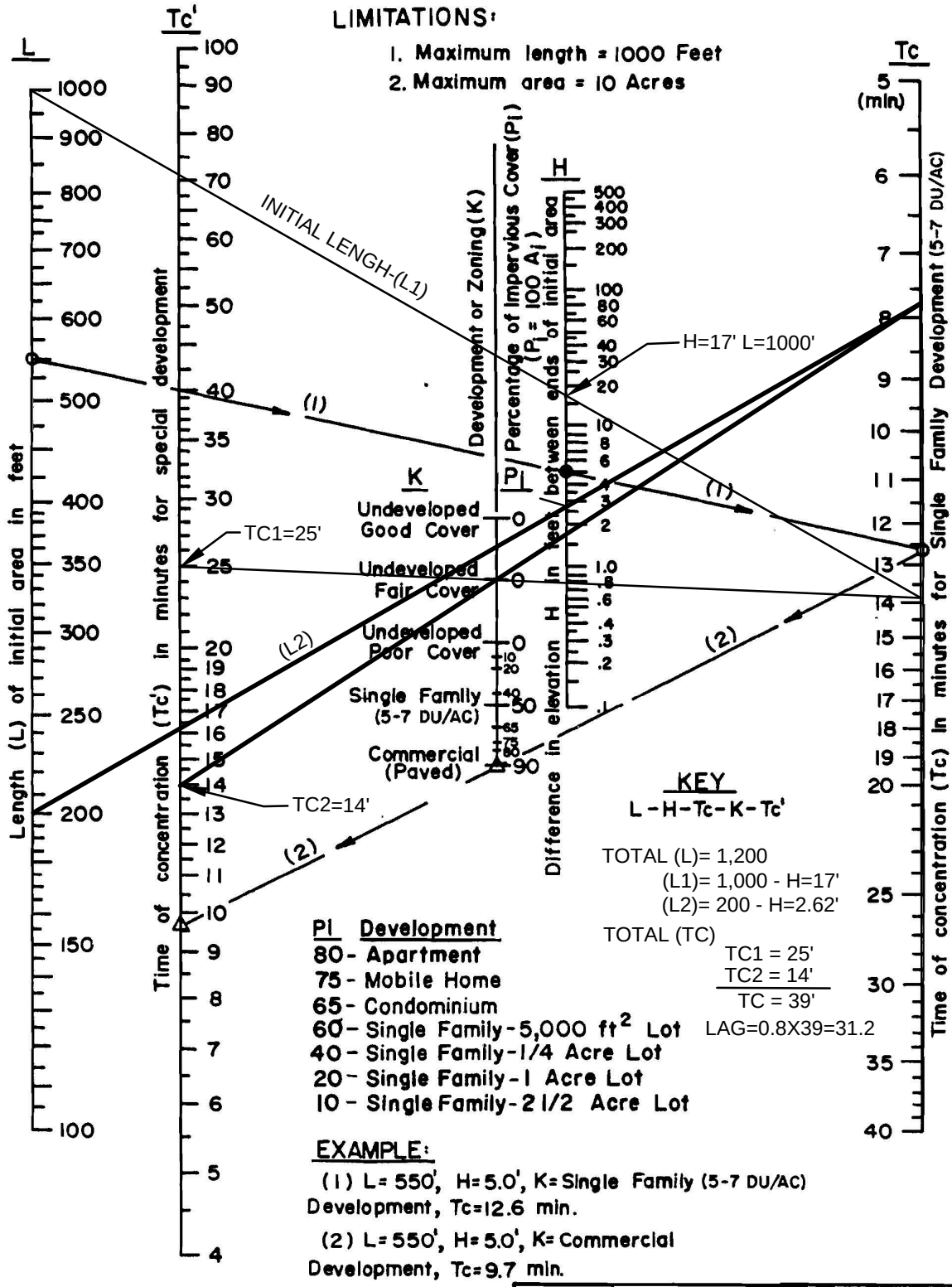
*Note: enter values unadjusted by depth-area factors

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

WATERSHED INFORMATION FORM

Figure E-7

114

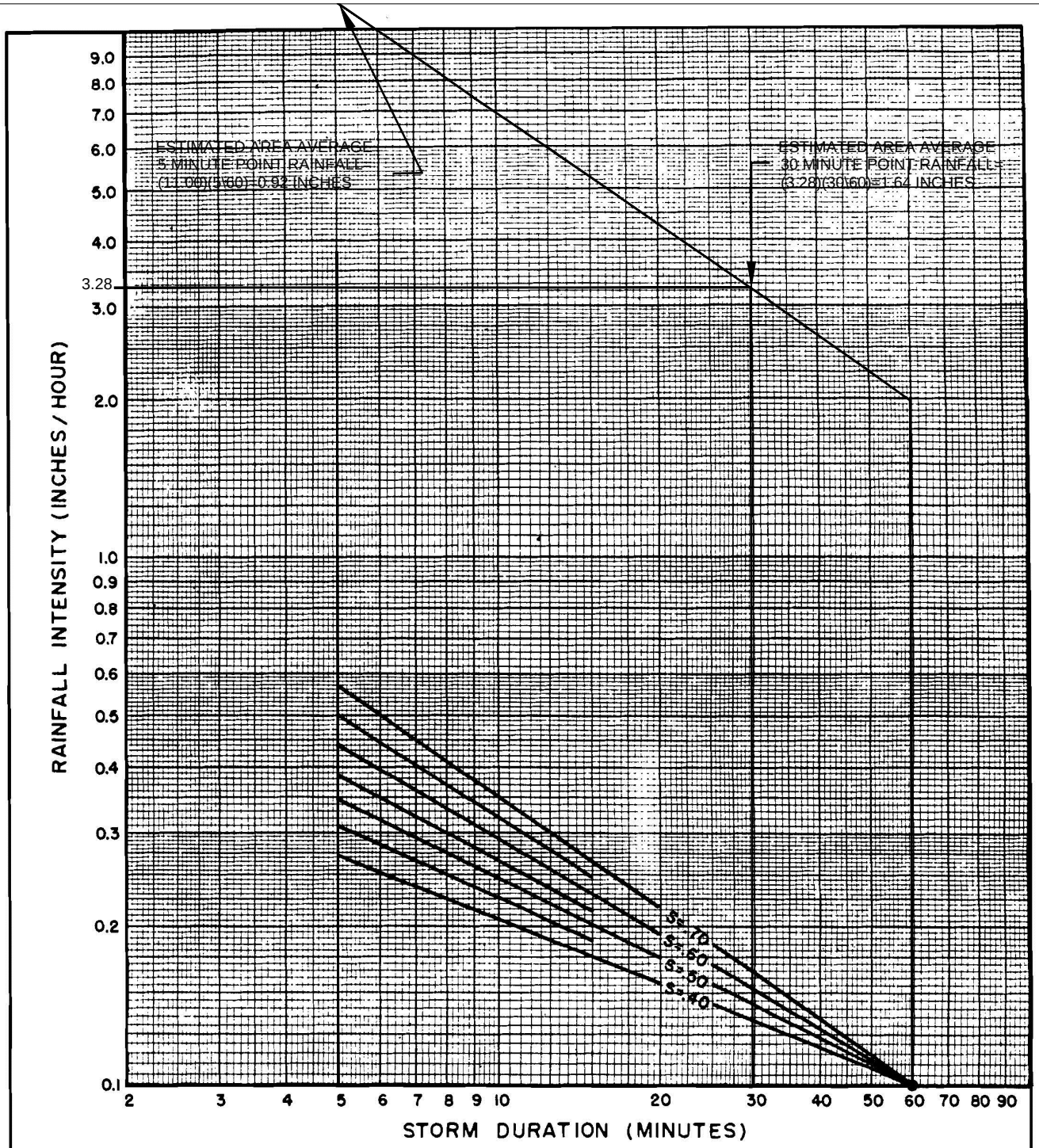


SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

Figure D-1



DESIGN STORM FREQUENCY = 100 YEARS

ONE HOUR POINT RAINFALL = 1.98 INCHES

LOG-LOG SLOPE = 0.70

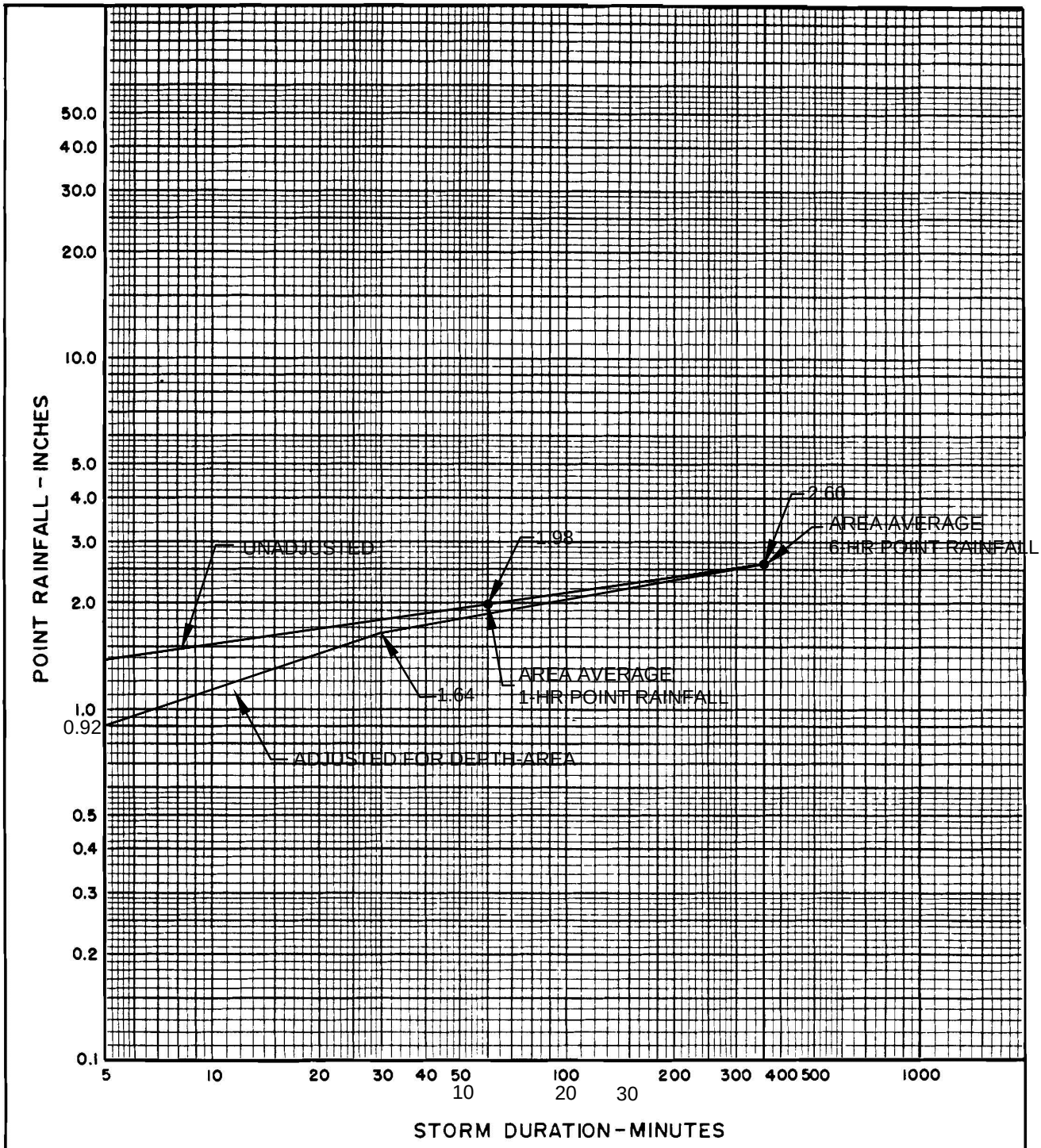
PROJECT LOCATION = NEEDLES CA

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

INTENSITY - DURATION CURVES CALCULATION SHEET

FIGURE D-3



PROJECT LOCATION 3353 NEEDLES HWY. NEEDLES CALIFORNIA

NOTES 100 YR: 1 HR = 1.98 INCH 6 HR = 2.60 INCH

PER NOAA ATLAS 14, VOLUME 6, VERSION 2 LONG=-114.6307° LAT: 34.8619°

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

AREA - AVERAGED
MASS RAINFALL
PLOTTING SHEET

FIGURE E-8

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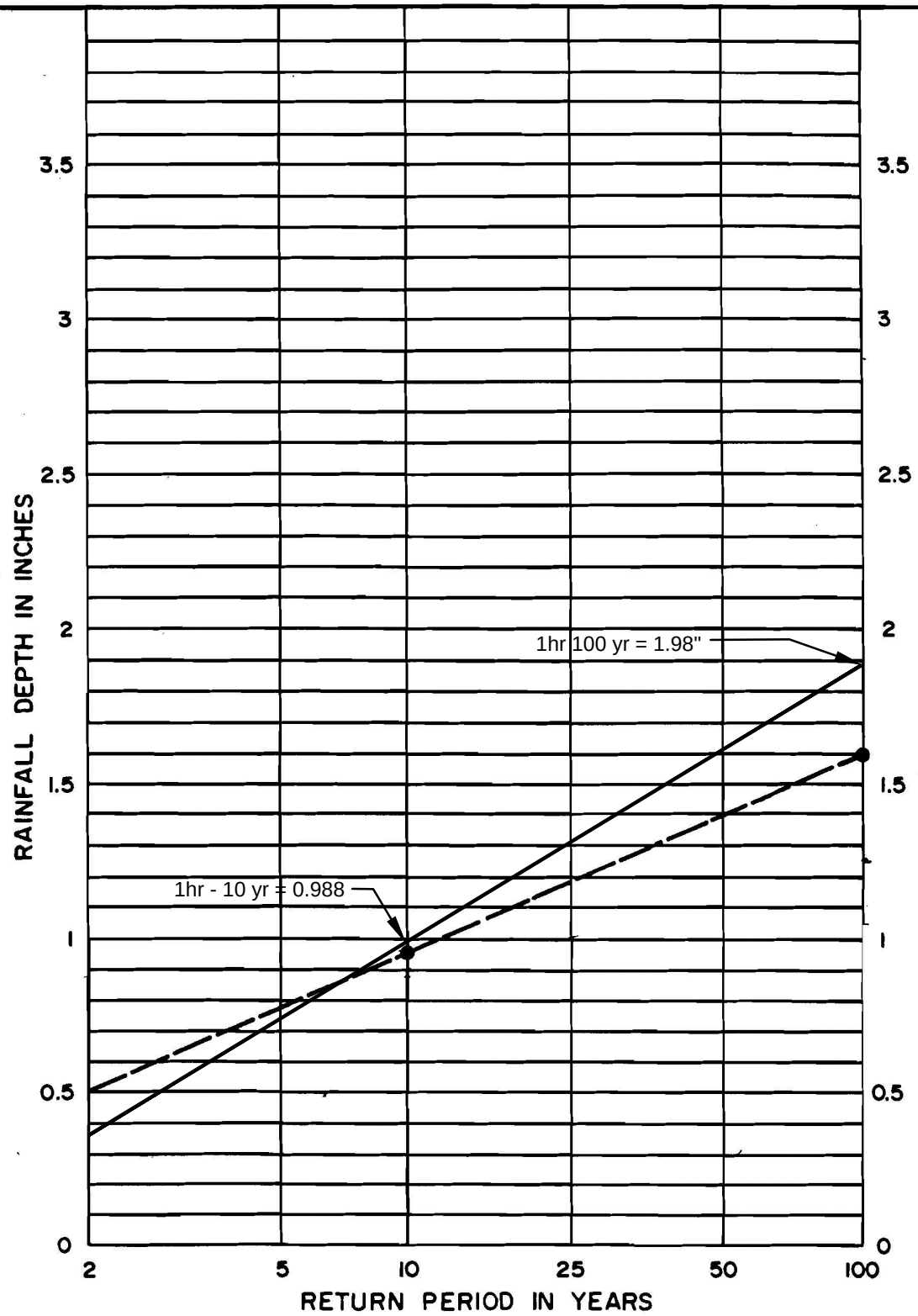

NOTE:

1. FOR INTERMEDIATE RETURN PERIODS PLOT 10-YEAR AND 100-YEAR ONE HOUR VALUES FROM MAPS, THEN CONNECT POINTS AND READ VALUE FOR DESIRED RETURN PERIOD. FOR EXAMPLE GIVEN 10-YEAR ONE HOUR = 0.95" AND 100-YEAR ONE HOUR = 1.60", 25-YEAR ONE HOUR = 1.18".

REFERENCE: NOAA ATLAS 2, VOLUME XI - CAL., 1973

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

FIGURE D-2

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S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 645 A/T = 4.80 – 3 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0223 OFF-SITE = 14.29 AC
T = UNIT TIME PERIOD (HOURS) =3

UNADJUSTED HYDROGRAPH

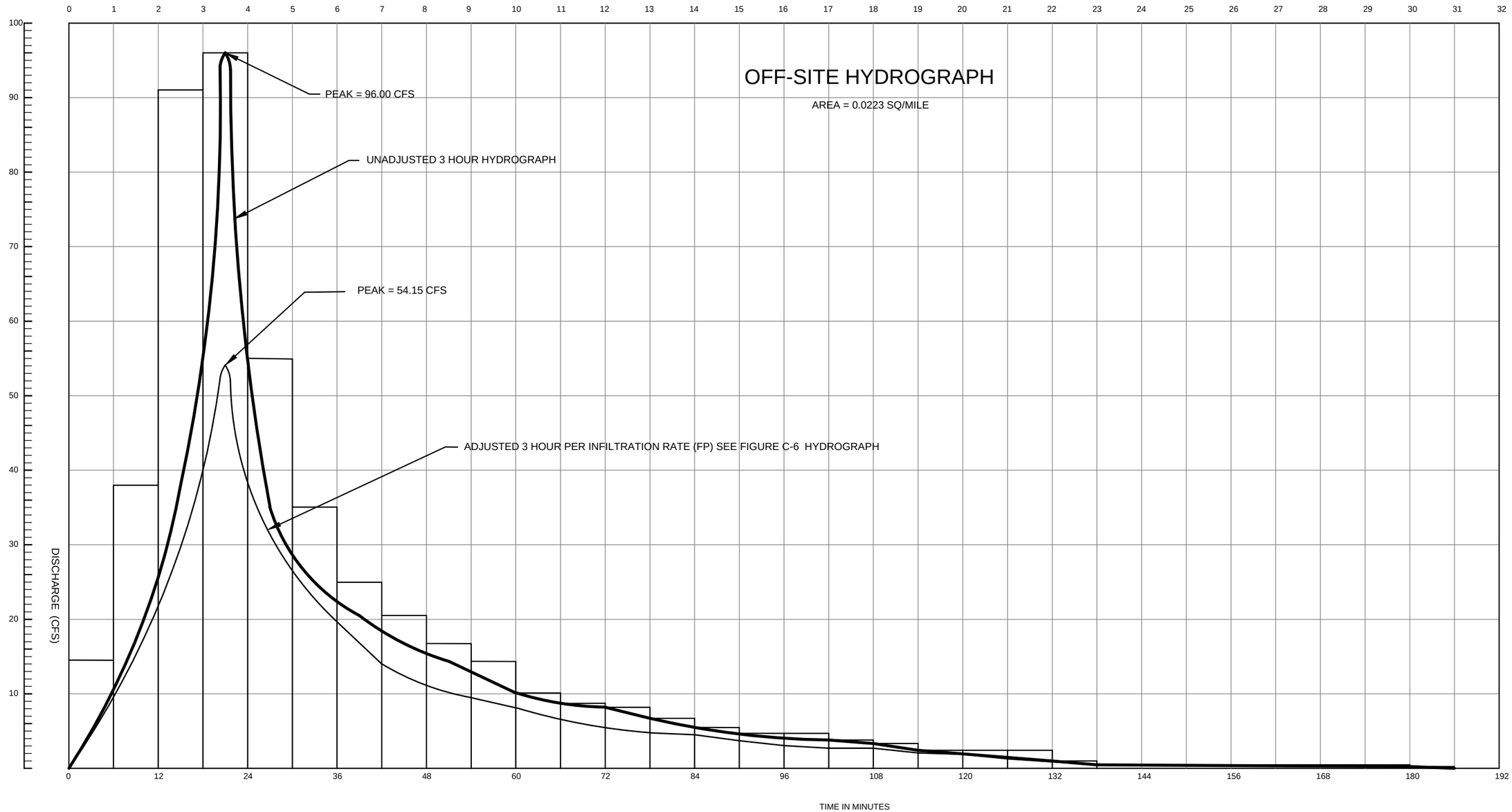
INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	14.40
2-(12)	11.0-3=8	38.40
3-(18)	30.0-11=19	91.20
4-(24)	50.0-30=20	96.00
5-(30)	61.5-50.0=11.50	55.20
6-(36)	68.8-61.5=7.30	35.04
7-42)	74.0-68.8=5.20	24.96
8-(48)	78.3-74.0=4.30	20.64
9-(54)	81.8-78.3=3.50	16.80
10-(60)	84.8-81.8=3.00	14.40
11-(66)	86.9-84.8=2.10	10.08
12-(72)	88.7-86.9=1.80	8.64
13-(78)	90.4-88.7=1.70	8.16
14-(84)	91.8-90.4=1.40	6.72
15-(90)	93.0-91.8=1.20	5.76
16-(96)	94.0-93=1.00	4.80
17-(102)	95.0-94=1.00	4.80
18-(108)	95.8-95=0.80	3.84
19-(114)	96.5-95.8=0.70	3.36
20-(120)	97.0-96.5=0.50	2.40
21-(126)	97.5-97=0.50	2.40
22-(132)	98.0-97.5=0.50	2.40
23-(138)	98.2-98=0.20	0.96
24-(144)	98.3-98.20=0.10	0.48
25-(150)	98.4-98.3=0.10	0.48
26-(156)	98.5-98.40=0.10	0.48
27-(162)	98.6-98.50=0.10	0.48
28-(168)	98.7-98.60=0.10	0.48
29-(174)	98.80-98.70=0.10	0.48
30-(180	99.90-98.80=0.10	0.48
31-(186)	100-99.90=0.10	0.48
32-(192)	100-100=0	0.00

S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 363.78 A/T = 2.70 – 3 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0223 OFF-SITE 14.29 AC
T = UNIT TIME PERIOD (HOURS) =3

ADJUSTED HYDROGRAPH

INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	8.12
2-(12)	11.0-3=8	21.66
3-(18)	30.0-11=19	51.44
4-(24)	50.0-30=20	**54.15**
5-(30)	61.5-50.0=11.50	31.13
6-(36)	68.8-61.5=7.30	19.76
7-42)	74.0-68.8=5.20	14.08
8-(48)	78.3-74.0=4.30	11.64
9-(54)	81.8-78.3=3.50	9.48
10-(60)	84.8-81.8=3.00	8.12
11-(66)	86.9-84.8=2.10	5.69
12-(72)	88.7-86.9=1.80	4.87
13-(78)	90.4-88.7=1.70	4.60
14-(84)	91.8-90.4=1.40	3.79
15-(90)	93.0-91.8=1.20	3.25
16-(96)	94.0-93=1.00	2.70
17-(102)	95.0-94=1.00	2.70
18-(108)	95.8-95=0.80	2.17
19-(114)	96.5-95.8=0.70	1.90
20-(120)	97.0-96.5=0.50	1.35
21-(126)	97.5-97=0.50	1.35
22-(132)	98.0-97.5=0.50	1.35
23-(138)	98.2-98=0.20	0.54
24-(144)	98.3-98.20=0.10	0.27
25-(150)	98.4-98.3=0.10	0.27
26-(156)	98.5-98.40=0.10	0.27
27-(162)	98.6-98.50=0.10	0.27
28-(168)	98.7-98.60=0.10	0.27
29-(174)	98.80-98.70=0.10	0.27
30-(180	99.90-98.80=0.10	0.27
31-(186)	100-99.90=0.10	0.27
32-(192)	100-100=0	0.00



SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

3 HOUR 100 YEAR UNIT HYDROGRAPH

S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 645 A/T = 2.40 – 6 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0223 OFF-SITE = 14.29 AC
T = UNIT TIME PERIOD (HOURS) =6

UNADJUSTED HYDROGRAPH

INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	7.20
2-(12)	11.0-3=8	19.20
3-(18)	30.0-11=19	45.60
4-(24)	50.0-30=20	**48.00**
5-(30)	61.5-50.0=11.50	27.60
6-(36)	68.8-61.5=7.30	17.52
7-42)	74.0-68.8=5.20	12.48
8-(48)	78.3-74.0=4.30	10.32
9-(54)	81.8-78.3=3.50	8.40
10-(60)	84.8-81.8=3.00	7.20
11-(66)	86.9-84.8=2.10	5.04
12-(72)	88.7-86.9=1.80	4.32
13-(78)	90.4-88.7=1.70	4.08
14-(84)	91.8-90.4=1.40	3.36
15-(90)	93.0-91.8=1.20	2.88
16-(96)	94.0-93=1.00	2.40
17-(102)	95.0-94=1.00	2.40
18-(108)	95.8-95=0.80	1.92
19-(114)	96.5-95.8=0.70	1.68
20-(120)	97.0-96.5=0.50	1.20
21-(126)	97.5-97=0.50	1.20
22-(132)	98.0-97.5=0.50	1.20
23-(138)	98.2-98=0.20	0.48
24-(144)	98.3-98.20=0.10	0.24
25-(150)	98.4-98.3=0.10	0.24
26-(156)	98.5-98.40=0.10	0.24
27-(162)	98.6-98.50=0.10	0.24
28-(168)	98.7-98.60=0.10	0.24
29-(174)	98.80-98.70=0.10	0.24
30-(180	99.90-98.80=0.10	0.24
31-(186)	100-99.90=0.10	0.24
32-(192)	100-100=0	0.00

S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 363.78 A/T = 1.3520 - 6 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0223 OFF-SITE 14.29 AC
T = UNIT TIME PERIOD (HOURS) =6

ADJUSTED HYDROGRAPH

INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	4.06
2-(12)	11.0-3=8	10.82
3-(18)	30.0-11=19	25.69
4-(24)	50.0-30=20	**27.04**
5-(30)	61.5-50.0=11.50	15.55
6-(36)	68.8-61.5=7.30	9.87
7-42)	74.0-68.8=5.20	7.03
8-(48)	78.3-74.0=4.30	5.81
9-(54)	81.8-78.3=3.50	4.73
10-(60)	84.8-81.8=3.00	4.05
11-(66)	86.9-84.8=2.10	2.84
12-(72)	88.7-86.9=1.80	2.43
13-(78)	90.4-88.7=1.70	2.30
14-(84)	91.8-90.4=1.40	1.89
15-(90)	93.0-91.8=1.20	1.62
16-(96)	94.0-93=1.00	1.35
17-(102)	95.0-94=1.00	1.35
18-(108)	95.8-95=0.80	1.08
19-(114)	96.5-95.8=0.70	0.95
20-(120)	97.0-96.5=0.50	0.68
21-(126)	97.5-97=0.50	0.68
22-(132)	98.0-97.5=0.50	0.68
23-(138)	98.2-98=0.20	0.27
24-(144)	98.3-98.20=0.10	0.14
25-(150)	98.4-98.3=0.10	0.14
26-(156)	98.5-98.40=0.10	0.14
27-(162)	98.6-98.50=0.10	0.14
28-(168)	98.7-98.60=0.10	0.14
29-(174)	98.80-98.70=0.10	0.14
30-(180	99.90-98.80=0.10	0.14
31-(186)	100-99.90=0.10	0.14
32-(192)	100-100=0	0.00

S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 645 A/T = 1.2685 – 3 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0059 ON-SITE = 3.75 AC
T = UNIT TIME PERIOD (HOURS) =3

UNADJUSTED HYDROGRAPH

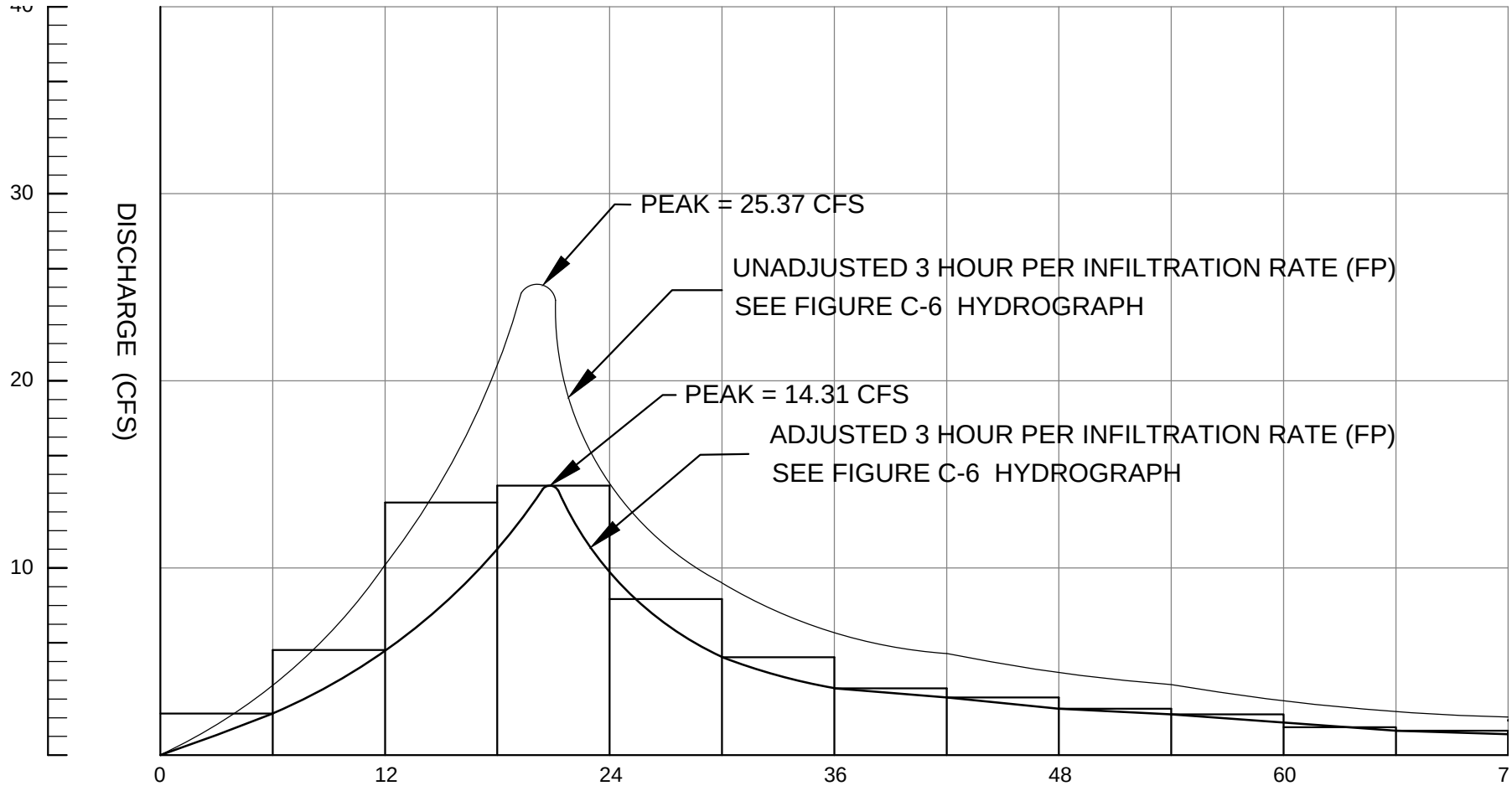
INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	3.80
2-(12)	11.0-3=8	10.15
3-(18)	30.0-11=19	24.10
4-(24)	50.0-30=20	**25.37**
5-(30)	61.5-50.0=11.50	14.59
6-(36)	68.8-61.5=7.30	9.26
7-42)	74.0-68.8=5.20	6.60
8-(48)	78.3-74.0=4.30	5.45
9-(54)	81.8-78.3=3.50	4.44
10-(60)	84.8-81.8=3.00	3.81
11-(66)	86.9-84.8=2.10	2.66
12-(72)	88.7-86.9=1.80	2.28
13-(78)	90.4-88.7=1.70	2.16
14-(84)	91.8-90.4=1.40	1.78
15-(90)	93.0-91.8=1.20	1.52
16-(96)	94.0-93=1.00	1.27
17-(102)	95.0-94=1.00	1.27
18-(108)	95.8-95=0.80	1.01
19-(114)	96.5-95.8=0.70	0.89
20-(120)	97.0-96.5=0.50	0.63
21-(126)	97.5-97=0.50	0.63
22-(132)	98.0-97.5=0.50	0.63
23-(138)	98.2-98=0.20	0.25
24-(144)	98.3-98.20=0.10	0.13
25-(150)	98.4-98.3=0.10	0.13
26-(156)	98.5-98.40=0.10	0.13
27-(162)	98.6-98.50=0.10	0.13
28-(168)	98.7-98.60=0.10	0.13
29-(174)	98.80-98.70=0.10	0.13
30-(180	99.90-98.80=0.10	0.13
31-(186)	100-99.90=0.10	0.13
32-(192)	100-100=0	0.00

S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 363.78 A/T = 0.72 – 3 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0059 ON-SITE 3.75 AC
T = UNIT TIME PERIOD (HOURS) =3

ADJUSTED HYDROGRAPH

INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	2.15
2-(12)	11.0-3=8	5.72
3-(18)	30.0-11=19	13.59
4-(24)	50.0-30=20	**14.31**
5-(30)	61.5-50.0=11.50	8.23
6-(36)	68.8-61.5=7.30	5.22
7-42)	74.0-68.8=5.20	3.72
8-(48)	78.3-74.0=4.30	3.08
9-(54)	81.8-78.3=3.50	2.50
10-(60)	84.8-81.8=3.00	2.15
11-(66)	86.9-84.8=2.10	1.50
12-(72)	88.7-86.9=1.80	1.29
13-(78)	90.4-88.7=1.70	1.22
14-(84)	91.8-90.4=1.40	1.00
15-(90)	93.0-91.8=1.20	0.85
16-(96)	94.0-93=1.00	0.71
17-(102)	95.0-94=1.00	0.71
18-(108)	95.8-95=0.80	0.57
19-(114)	96.5-95.8=0.70	0.50
20-(120)	97.0-96.5=0.50	0.36
21-(126)	97.5-97=0.50	0.36
22-(132)	98.0-97.5=0.50	0.36
23-(138)	98.2-98=0.20	0.14
24-(144)	98.3-98.20=0.10	0.07
25-(150)	98.4-98.3=0.10	0.07
26-(156)	98.5-98.40=0.10	0.07
27-(162)	98.6-98.50=0.10	0.07
28-(168)	98.7-98.60=0.10	0.07
29-(174)	98.80-98.70=0.10	0.07
30-(180	99.90-98.80=0.10	0.07
31-(186)	100-99.90=0.10	0.07
32-(192)	100-100=0	0.00



ON-SITE HYDROGRAPH

AREA = 0.0059 SQ/MILE

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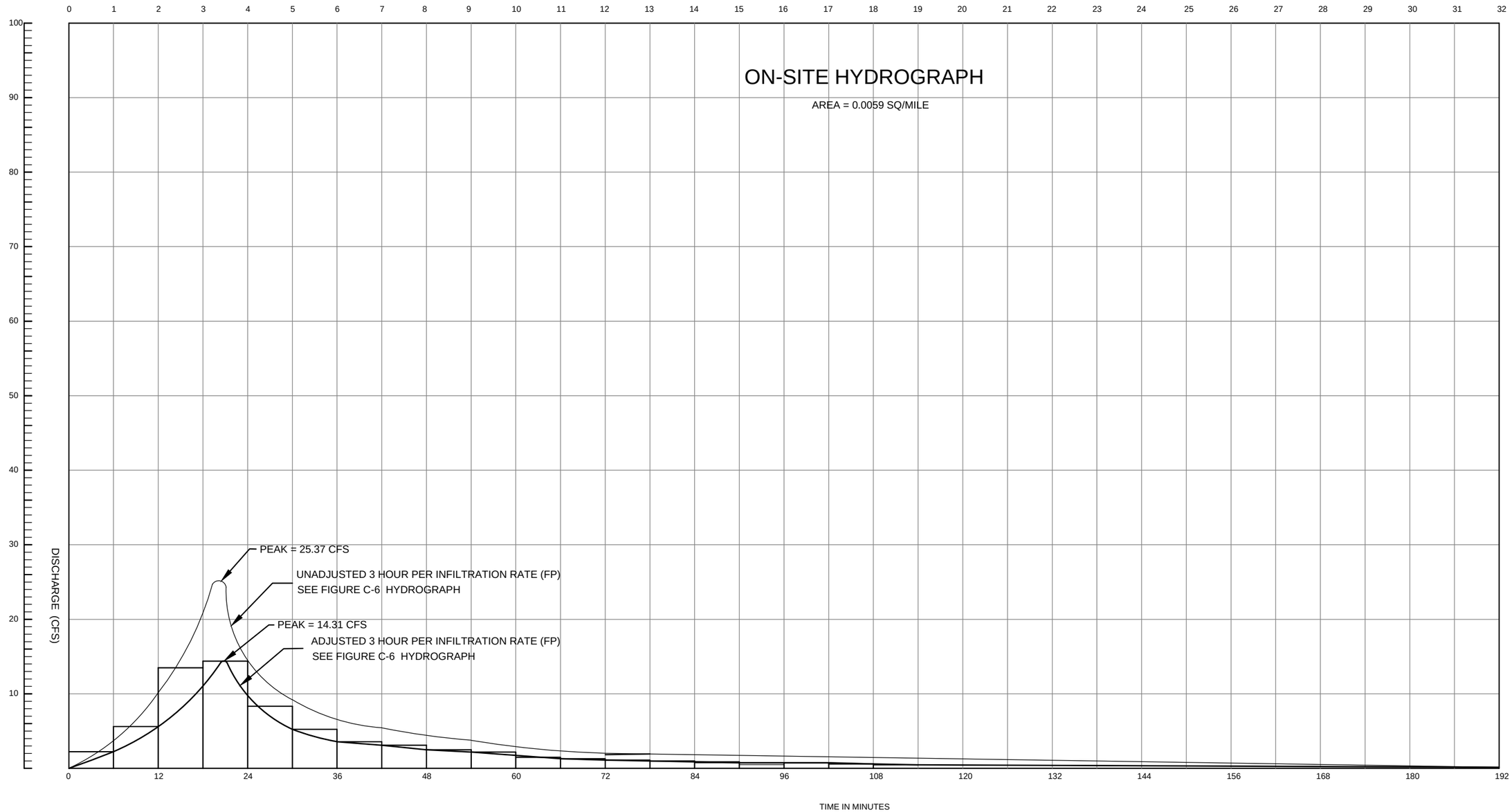
HYDROLOGY MANUAL



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HYDROLOGY MANUAL

3 HOUR 100 YEAR UNIT HYDROGRAPH

S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 645 A/T = 0.6343 – 6 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0059 ON-SITE = 3.75 AC
T = UNIT TIME PERIOD (HOURS) =6

UNADJUSTED HYDROGRAPH

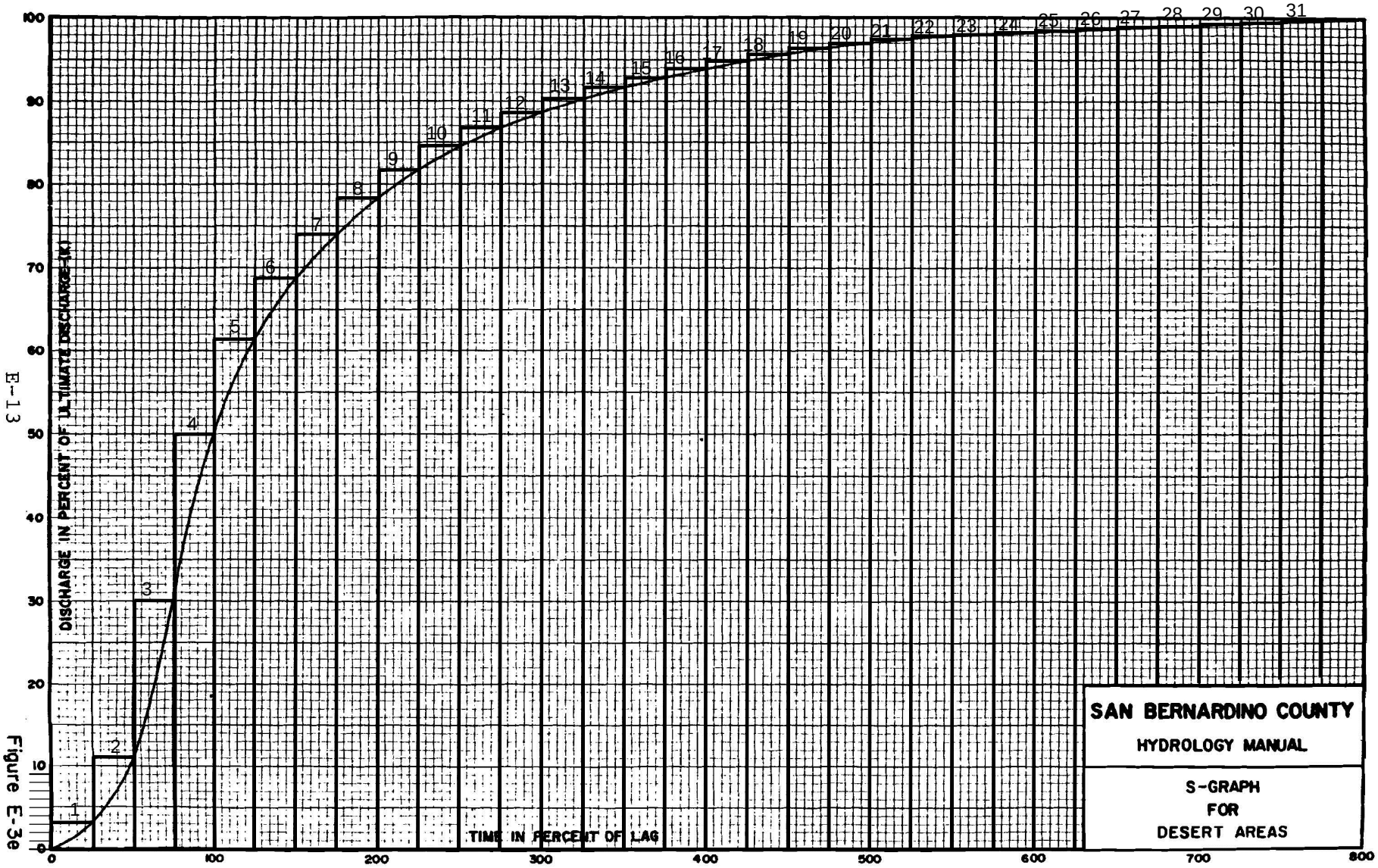
INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	1.90
2-(12)	11.0-3=8	5.07
3-(18)	30.0-11=19	12.05
4-(24)	50.0-30=20	**12.68**
5-(30)	61.5-50.0=11.50	7.29
6-(36)	68.8-61.5=7.30	4.63
7-42)	74.0-68.8=5.20	3.30
8-(48)	78.3-74.0=4.30	2.73
9-(54)	81.8-78.3=3.50	2.22
10-(60)	84.8-81.8=3.00	1.90
11-(66)	86.9-84.8=2.10	1.33
12-(72)	88.7-86.9=1.80	1.14
13-(78)	90.4-88.7=1.70	1.07
14-(84)	91.8-90.4=1.40	0.89
15-(90)	93.0-91.8=1.20	0.76
16-(96)	94.0-93=1.00	0.63
17-(102)	95.0-94=1.00	0.63
18-(108)	95.8-95=0.80	0.51
19-(114)	96.5-95.8=0.70	0.44
20-(120)	97.0-96.5=0.50	0.32
21-(126)	97.5-97=0.50	0.32
22-(132)	98.0-97.5=0.50	0.32
23-(138)	98.2-98=0.20	0.13
24-(144)	98.3-98.20=0.10	0.06
25-(150)	98.4-98.3=0.10	0.06
26-(156)	98.5-98.40=0.10	0.06
27-(162)	98.6-98.50=0.10	0.06
28-(168)	98.7-98.60=0.10	0.06
29-(174)	98.80-98.70=0.10	0.06
30-(180	99.90-98.80=0.10	0.06
31-(186)	100-99.90=0.10	0.06
32-(192)	100-100=0	0.00

S-GRAPH FOR DESERT: UNDEVELOPED, NEEDLES CALIFORNIA

ULTIMAGE DISCHARGE: K(cfs) = 363.78 A/T = 0.3577 – 6 HR
A = DRAINAGE AREA (SQUARE MILES) =0.0059 ON-SITE = 3.75 AC
T = UNIT TIME PERIOD (HOURS) =6

ADJUSTED HYDROGRAPH

INTERVAL	S-GRAPH MEAN VALUE	UNIT –HYDROGRAPH ORDINATES (CFS)
1-(6)	3.0	1.07
2-(12)	11.0-3=8	2.86
3-(18)	30.0-11=19	6.80
4-(24)	50.0-30=20	**7.15**
5-(30)	61.5-50.0=11.50	4.11
6-(36)	68.8-61.5=7.30	2.61
7-42)	74.0-68.8=5.20	1.86
8-(48)	78.3-74.0=4.30	1.54
9-(54)	81.8-78.3=3.50	1.25
10-(60)	84.8-81.8=3.00	1.07
11-(66)	86.9-84.8=2.10	0.75
12-(72)	88.7-86.9=1.80	0.64
13-(78)	90.4-88.7=1.70	0.61
14-(84)	91.8-90.4=1.40	0.50
15-(90)	93.0-91.8=1.20	0.43
16-(96)	94.0-93=1.00	0.36
17-(102)	95.0-94=1.00	0.36
18-(108)	95.8-95=0.80	0.29
19-(114)	96.5-95.8=0.70	0.25
20-(120)	97.0-96.5=0.50	0.18
21-(126)	97.5-97=0.50	0.18
22-(132)	98.0-97.5=0.50	0.18
23-(138)	98.2-98=0.20	0.07
24-(144)	98.3-98.20=0.10	0.04
25-(150)	98.4-98.3=0.10	0.04
26-(156)	98.5-98.40=0.10	0.04
27-(162)	98.6-98.50=0.10	0.04
28-(168)	98.7-98.60=0.10	0.04
29-(174)	98.80-98.70=0.10	0.04
30-(180	99.90-98.80=0.10	0.04
31-(186)	100-99.90=0.10	0.04
32-(192)	100-100=0	0.00


DISCHARGE IN PERCENT OF ULTIMATE DISCHARGE (%)
TIME IN PERCENT OF LAG
0
10
20
30
40
50
60
70
80
90
100
0
100
200
300
400
500
600
700
800
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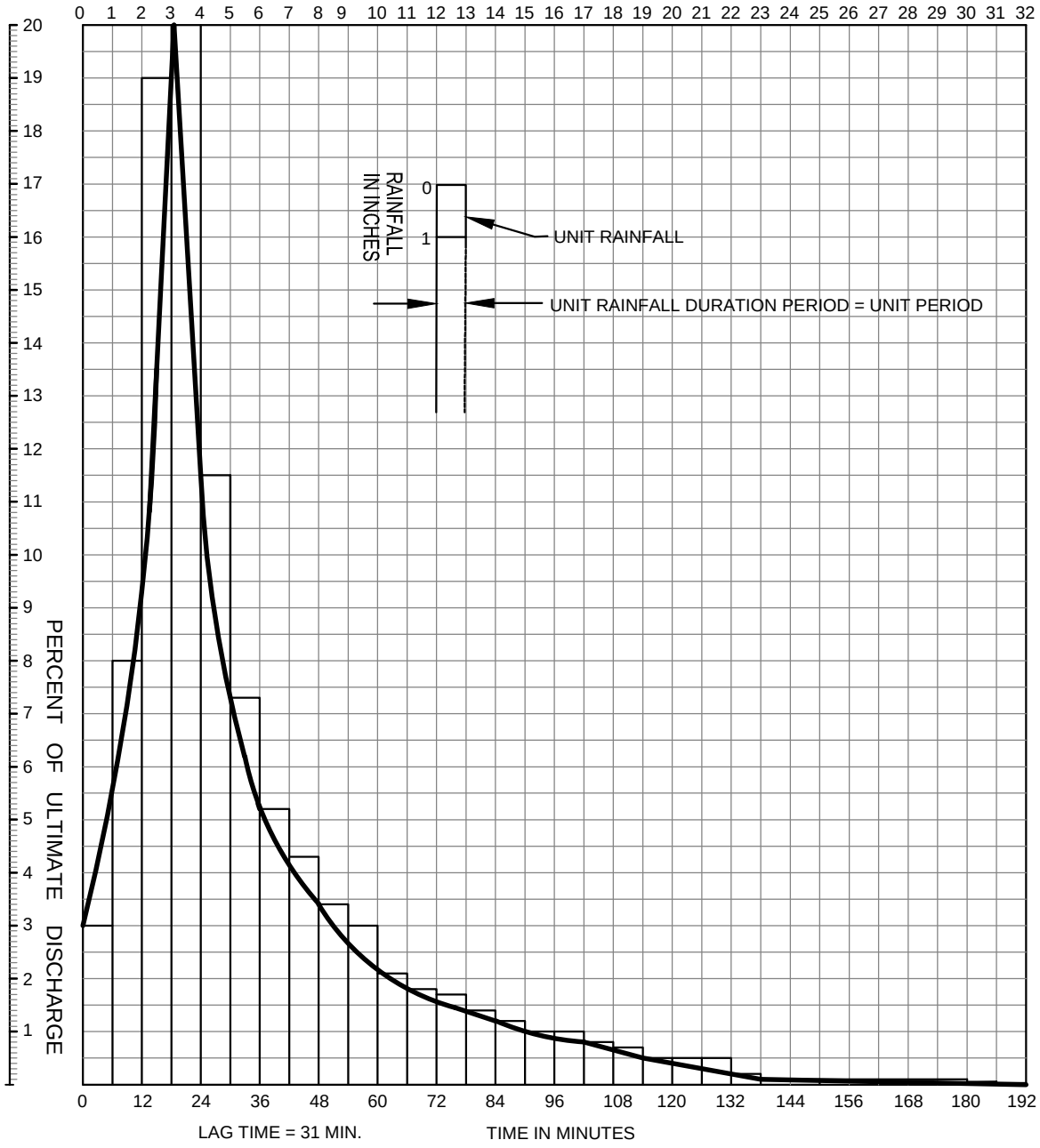
HYDROLOGY MANUAL
S-GRAPH
FOR
DESERT AREAS

Figure E-3e

PERIOD = 6 MINUTES



SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

UNIT DISTRUBUTION GRAPH

UNIT HYDROGRAPH STUDY
UNIT RAINFALL DETERMINATION
(UNIT PERIOD = 6 MINUTES)

PEAK RAINFALL UNIT NUMBER	ADJUSTED MASS RAINFALL (INCHES)	UNIT –RAINFALL (INCHES)
1	0.92	0.92
2	1.14	0.22
3	1.30	0.16
4	1.43	0.13
5	1.55	0.12
6	1.64	0.09
7	1.69	0.05
8	1.73	0.04
9	1.78	0.05
10	1.80	0.02
11	1.82	0.02
12	1.87	0.05
13	1.89	0.02
14	1.91	0.02
15	1.95	0.04
16	1.98	0.03
17	1.99	0.01
18	2.00	0.01
19	2.02	0.02
20	2.05	0.03
21	2.08	0.03
22	2.10	0.02
23	2.12	0.02
24	2.14	0.02
25	2.15	0.01
26	2.16	0.01
27	2.18	0.02
28	2.19	0.01
29	2.20	0.01
30	2.22	0.02
31	2.24	0.02
32	2.23	0.01
33	2.25	0.02
34	2.26	0.01
35	2.27	0.01
36	2.28	0.01
TIME 3 HOURS		TOTAL = 2.30 INCHES

UNIT HYDROGRAPH STUDY:
WATERSHED LOSS DETERMINATIONS

Area-Average Low Loss Fraction, $\bar{Y}$

Land use And condition	Area Fraction	Soil Group	Curve N0. (CN) (Fig-C-3	S(2)	Pervious Area Yield Fraction Y(3)
Chaparral, Broadleaf	85	B	77	2.99	0.60
Urban Commercial	75	b	90	1.11	0.31

Area Fraction: 85

(2): $S = (1000/CN) – 10$

(3): $Y = (P24-0.2S)^2/((P24+0.8S)P24$

(4): $\bar{Y} = 1-Y$

(2): $S = (1000/77) – 10 = 2.99$

(3): $Y = (3.42 – 0.2 \times 2.99)^2/(3.42 + 0.8 \times 2.99) \times 3.42 = 0.40$

(4): $\bar{Y} = 1- 0.40 = 0.60$

Area Fraction: 75

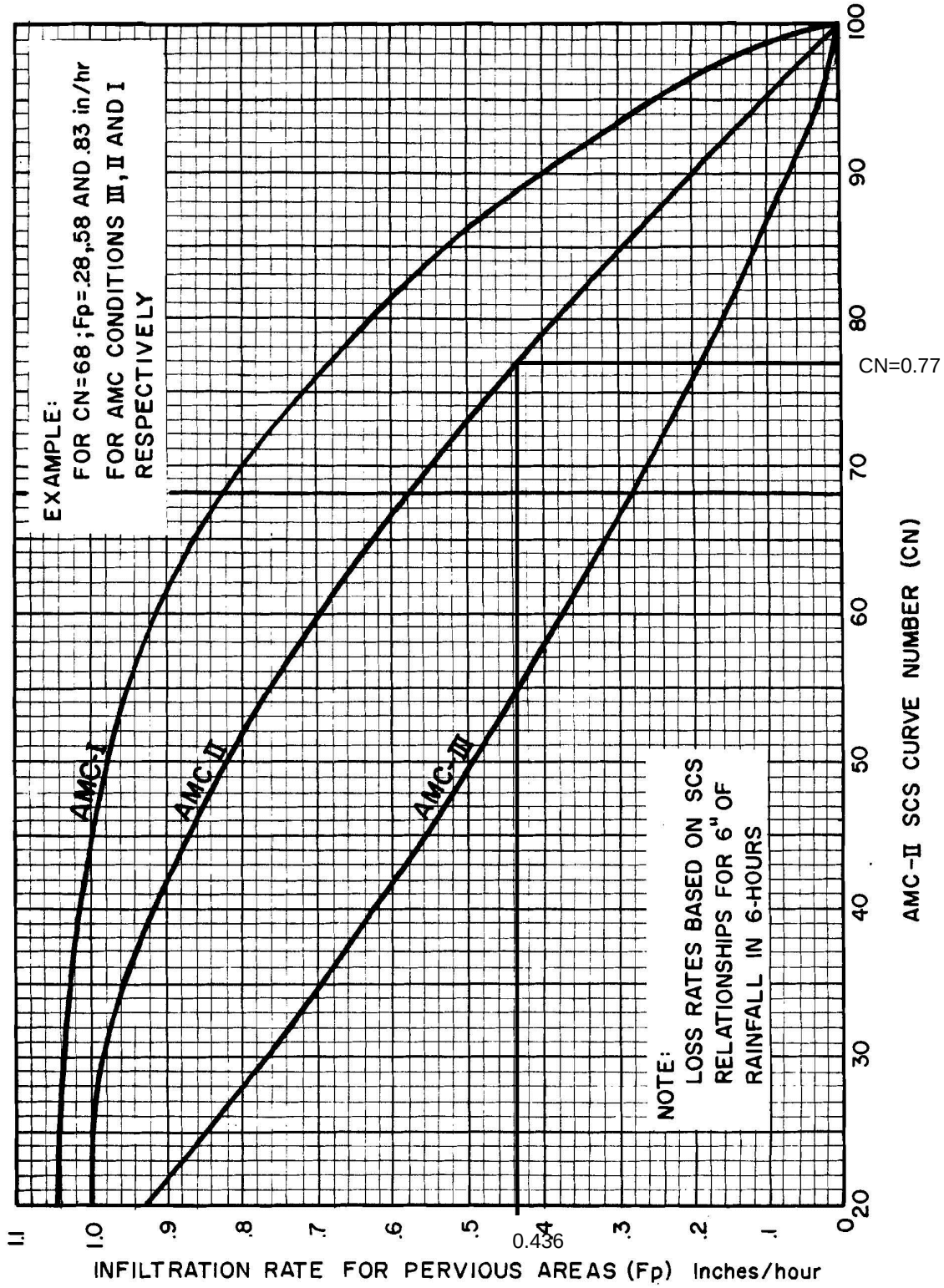
(2): $S = (1000/90) – 10 = 1.11$

(3): $Y = (3.42 – 0.2 \times 1.11)^2/(3.42 + 0.8 \times 1.11) \times 3.42 = 0.69$

(4): $\bar{Y} = 1- 0.69 = 0.31$

Area – Average Catchment Yield Fraction (Y) = 0.55

Area – Average Low Loss Fraction ($\bar{Y}$) = 0.46



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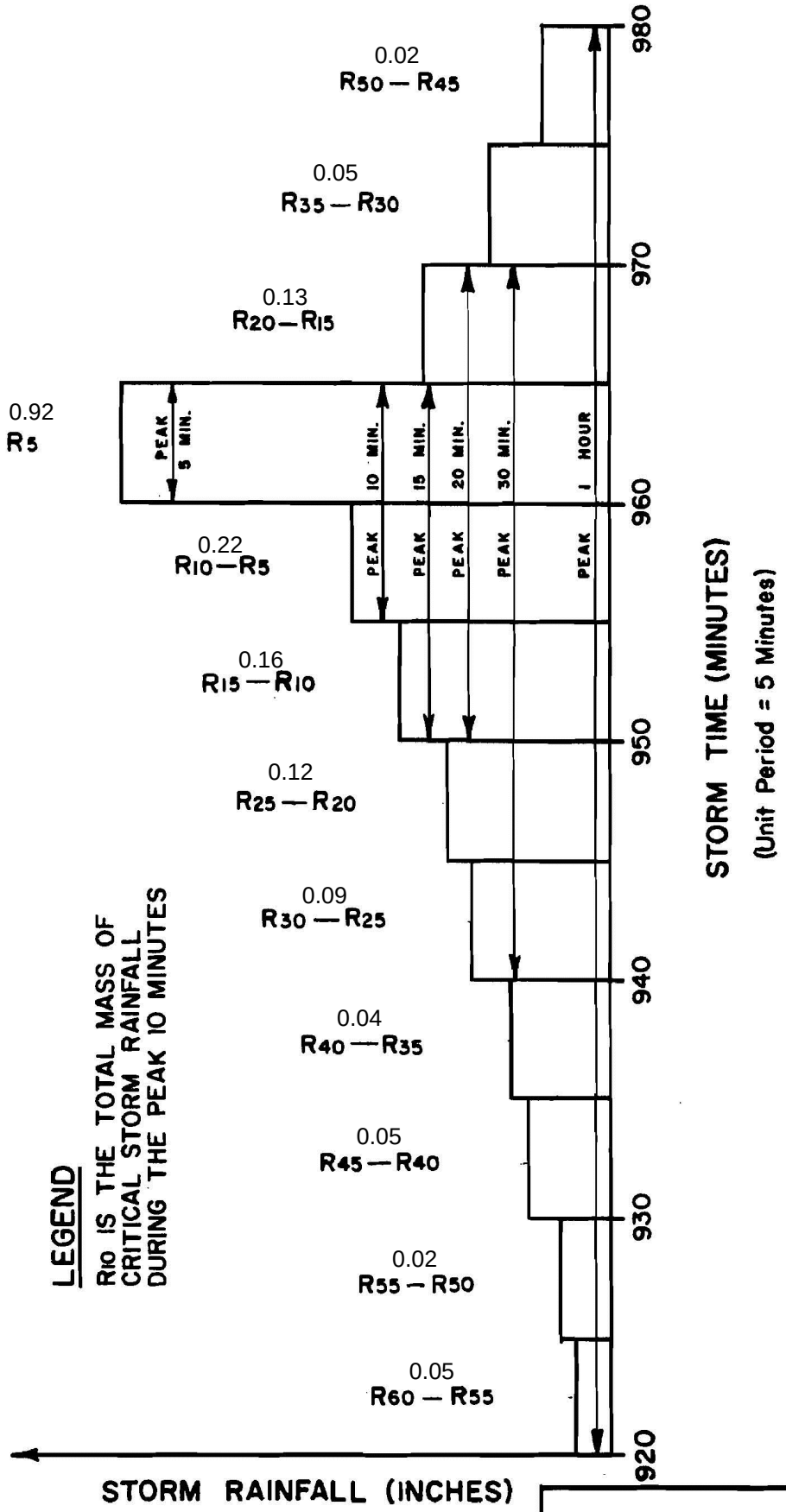
HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS SCS CURVE NUMBERS

Figure C-6

35



LEGEND

R_{10} IS THE TOTAL MASS OF CRITICAL STORM RAINFALL DURING THE PEAK 10 MINUTES

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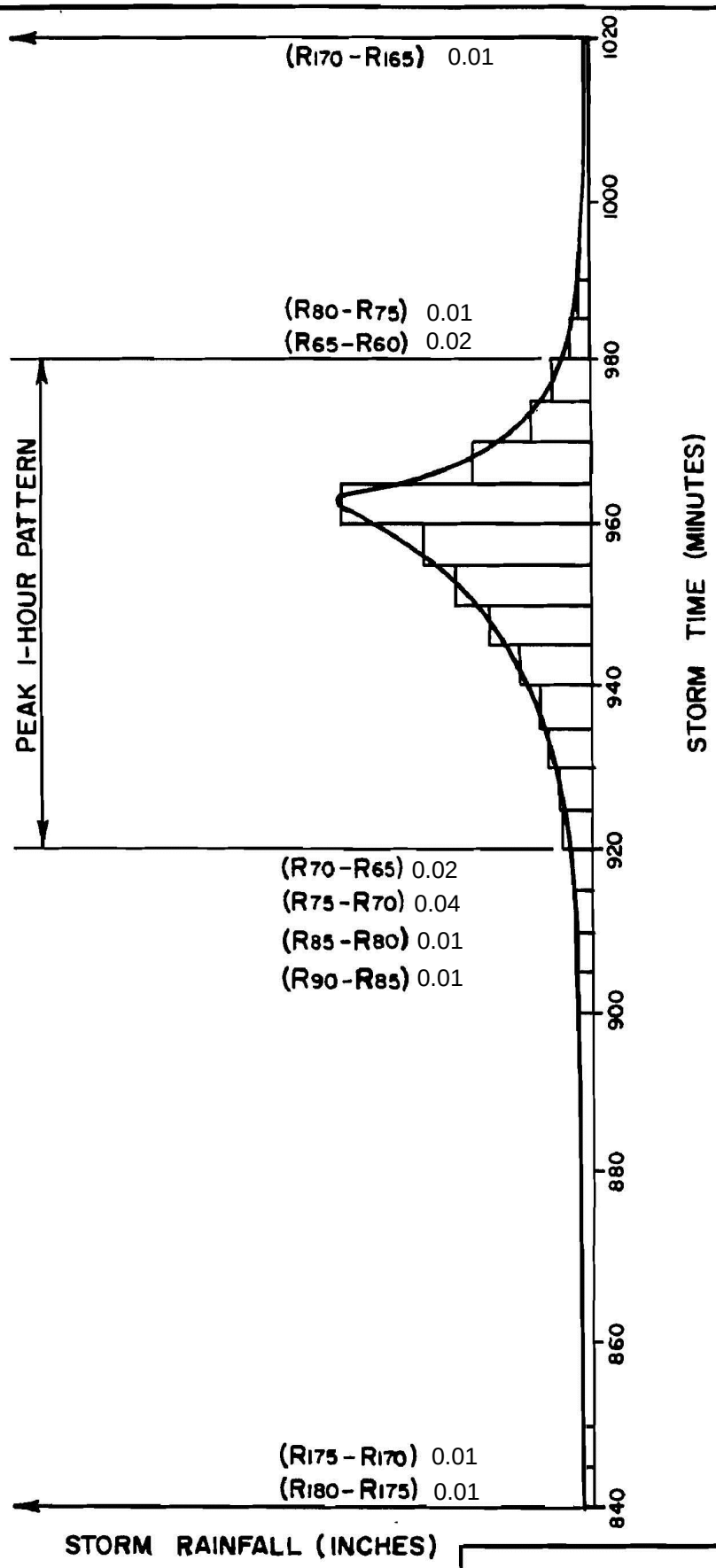
DESIGN CRITICAL STORM PEAK 1-HOUR PATTERN



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HYDROLOGY MANUAL

DESIGN CRITICAL STORM PEAK 3-HOUR PATTERN

Appendix IV

Pre – condition photos of total impervious and pervious areas


3353 Needles Hwy
River Rd


RV
PARK
© 2018 Google


RV
PARK

Appendix V

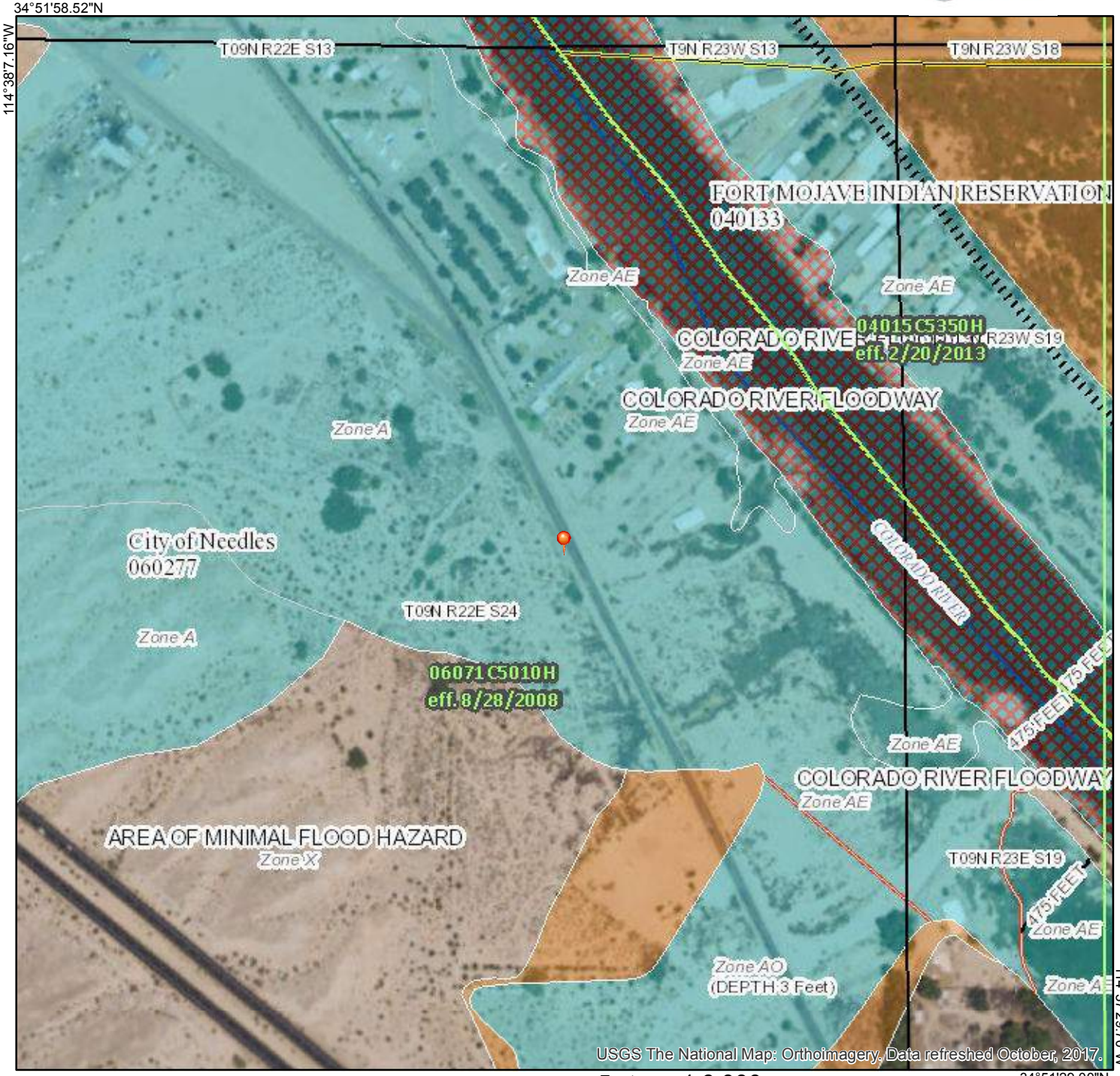
Exhibits

National Flood Hazard Layer FIRMette

FEMA

34°51'58.52"N

114°38'7.16"W



114°37'29.70"W

34°51'29.00"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

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 2/15/2019 at 10:46:38 AM 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.

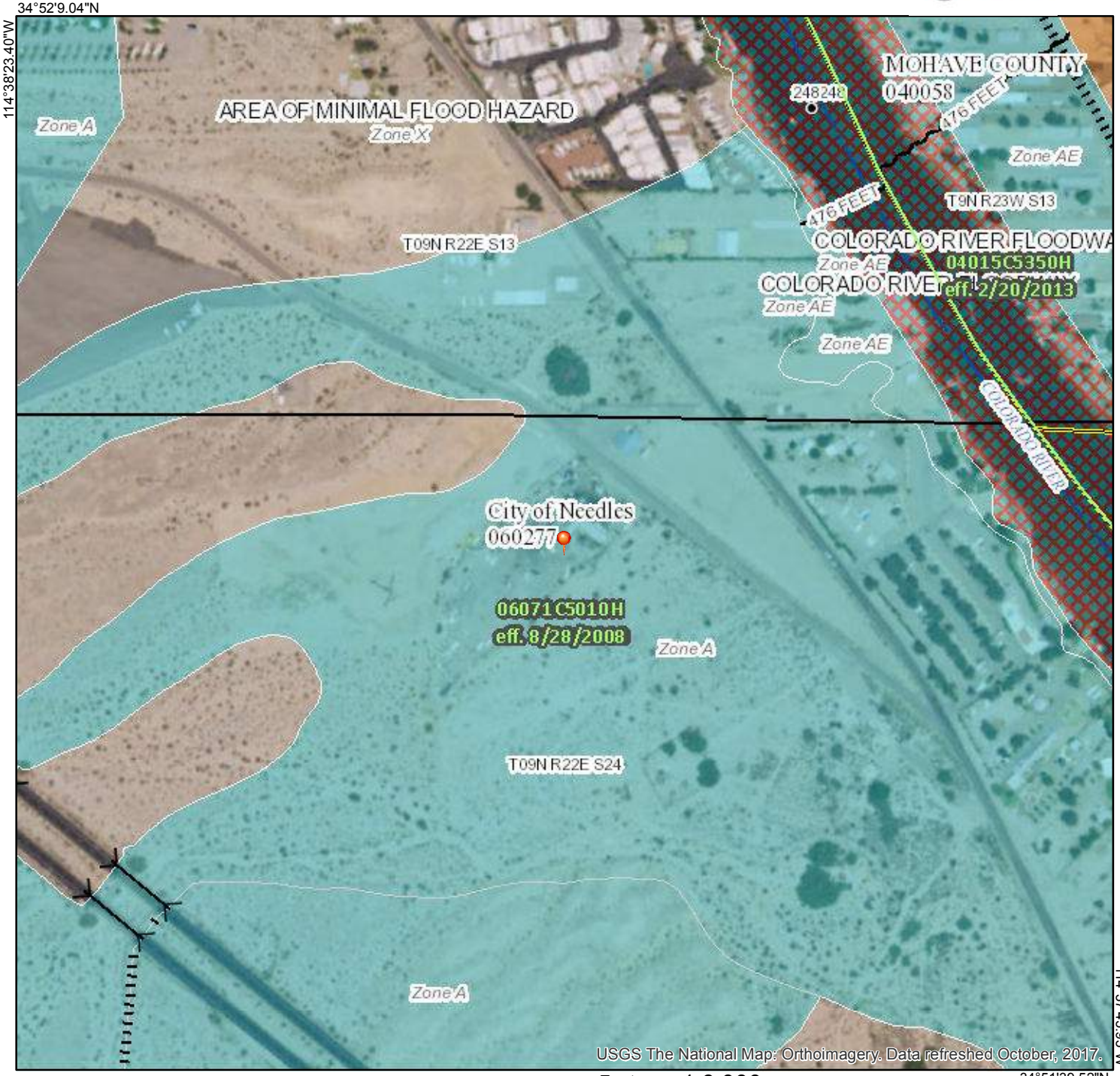
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

34°52'9.04"N

114°38'23.40"W



114°37'45.95"W

34°51'39.52"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

- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 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

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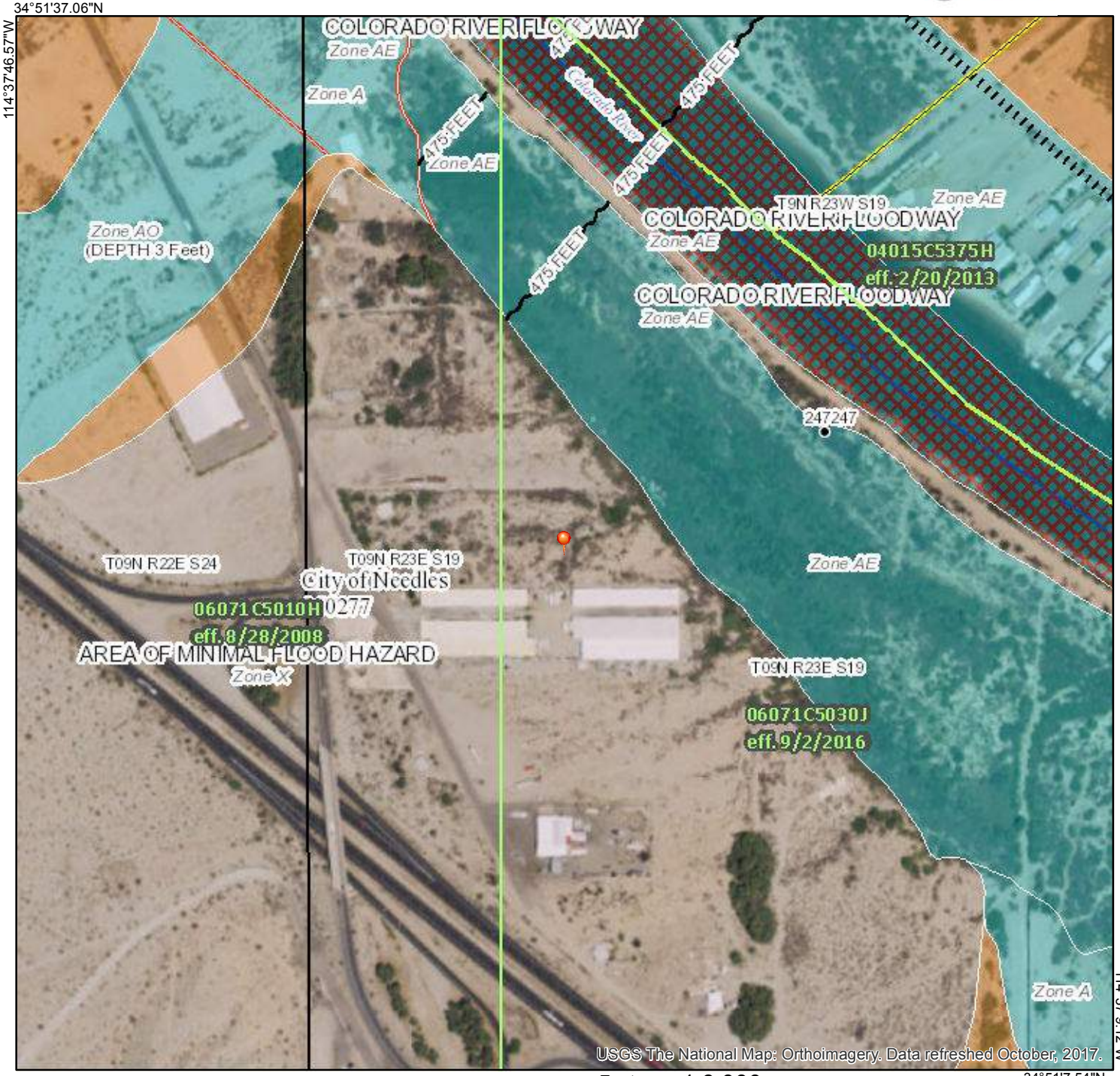
National Flood Hazard Layer FIRMette

FEMA

34°51'37.06"N

114°37'46.57"W



114°37'9.12"W

34°51'7.54"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

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
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 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 3/12/2019 at 8:49:06 AM 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.

NOAA Atlas 14, Volume 6, Version 2
Location name: Needles, California, USA*
Latitude: 34.8619°, Longitude: -114.6307°
Elevation: 496.41 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.084 (0.072-0.100)	0.142 (0.120-0.169)	0.224 (0.190-0.268)	0.297 (0.249-0.358)	0.405 (0.327-0.506)	0.495 (0.390-0.634)	0.594 (0.456-0.781)	0.703 (0.523-0.955)	0.865 (0.615-1.23)	1.09 (0.748-1.62)
10-min	0.121 (0.103-0.144)	0.203 (0.173-0.242)	0.321 (0.272-0.384)	0.426 (0.357-0.513)	0.580 (0.468-0.725)	0.709 (0.560-0.908)	0.851 (0.653-1.12)	1.01 (0.750-1.37)	1.24 (0.881-1.76)	1.57 (1.07-2.32)
15-min	0.146 (0.124-0.174)	0.246 (0.209-0.293)	0.389 (0.329-0.464)	0.515 (0.431-0.620)	0.701 (0.566-0.877)	0.858 (0.677-1.10)	1.03 (0.790-1.35)	1.22 (0.907-1.66)	1.50 (1.07-2.13)	1.90 (1.30-2.80)
30-min	0.200 (0.170-0.238)	0.337 (0.286-0.401)	0.532 (0.450-0.635)	0.705 (0.591-0.849)	0.960 (0.776-1.20)	1.18 (0.927-1.50)	1.41 (1.08-1.85)	1.67 (1.24-2.27)	2.05 (1.46-2.92)	2.60 (1.78-3.84)
60-min	0.281 (0.239-0.334)	0.473 (0.401-0.562)	0.747 (0.632-0.891)	0.988 (0.829-1.19)	1.35 (1.09-1.68)	1.65 (1.30-2.11)	1.98 (1.52-2.60)	2.34 (1.74-3.18)	2.88 (2.05-4.09)	3.64 (2.49-5.38)
2-hr	0.393 (0.334-0.467)	0.617 (0.524-0.734)	0.929 (0.786-1.11)	1.20 (1.00-1.44)	1.58 (1.28-1.98)	1.90 (1.50-2.43)	2.24 (1.72-2.94)	2.60 (1.94-3.53)	3.13 (2.22-4.45)	3.68 (2.52-5.43)
3-hr	0.457 (0.388-0.543)	0.695 (0.590-0.828)	1.02 (0.867-1.22)	1.31 (1.09-1.57)	1.71 (1.38-2.13)	2.03 (1.60-2.60)	2.37 (1.82-3.12)	2.74 (2.04-3.72)	3.27 (2.32-4.64)	3.70 (2.53-5.46)
6-hr	0.564 (0.479-0.670)	0.822 (0.698-0.979)	1.18 (0.995-1.40)	1.48 (1.24-1.78)	1.90 (1.53-2.38)	2.24 (1.77-2.87)	2.60 (2.00-3.42)	2.98 (2.22-4.05)	3.52 (2.50-5.01)	3.96 (2.71-5.85)
12-hr	0.648 (0.551-0.771)	0.915 (0.777-1.09)	1.28 (1.09-1.53)	1.60 (1.34-1.93)	2.05 (1.66-2.56)	2.42 (1.91-3.09)	2.80 (2.15-3.69)	3.22 (2.40-4.37)	3.82 (2.71-5.43)	4.30 (2.94-6.36)
24-hr	0.827 (0.729-0.957)	1.13 (0.997-1.31)	1.56 (1.37-1.82)	1.94 (1.69-2.27)	2.49 (2.10-3.00)	2.94 (2.44-3.61)	3.42 (2.78-4.31)	3.96 (3.13-5.11)	4.73 (3.60-6.35)	5.38 (3.97-7.45)
2-day	0.910 (0.802-1.05)	1.21 (1.07-1.40)	1.64 (1.44-1.91)	2.02 (1.76-2.36)	2.58 (2.18-3.11)	3.05 (2.53-3.74)	3.56 (2.89-4.47)	4.12 (3.26-5.32)	4.96 (3.77-6.64)	5.66 (4.17-7.83)
3-day	0.971 (0.856-1.12)	1.27 (1.12-1.47)	1.71 (1.50-1.98)	2.09 (1.82-2.45)	2.66 (2.25-3.21)	3.15 (2.61-3.87)	3.68 (2.98-4.62)	4.27 (3.38-5.51)	5.15 (3.92-6.90)	5.90 (4.35-8.16)
4-day	1.03 (0.912-1.20)	1.34 (1.18-1.56)	1.79 (1.57-2.08)	2.18 (1.90-2.56)	2.78 (2.35-3.35)	3.28 (2.73-4.04)	3.84 (3.12-4.83)	4.46 (3.53-5.76)	5.40 (4.11-7.23)	6.19 (4.57-8.57)
7-day	1.07 (0.946-1.24)	1.37 (1.21-1.59)	1.81 (1.59-2.10)	2.20 (1.92-2.57)	2.80 (2.36-3.37)	3.31 (2.74-4.07)	3.88 (3.15-4.88)	4.52 (3.58-5.84)	5.50 (4.19-7.38)	6.35 (4.68-8.79)
10-day	1.15 (1.01-1.33)	1.46 (1.28-1.69)	1.91 (1.68-2.22)	2.32 (2.02-2.71)	2.94 (2.49-3.55)	3.48 (2.89-4.28)	4.08 (3.31-5.13)	4.76 (3.76-6.14)	5.79 (4.41-7.76)	6.69 (4.93-9.25)
20-day	1.24 (1.09-1.44)	1.59 (1.40-1.85)	2.09 (1.84-2.43)	2.53 (2.21-2.96)	3.18 (2.69-3.83)	3.72 (3.09-4.57)	4.31 (3.50-5.42)	4.97 (3.93-6.41)	5.94 (4.52-7.96)	6.75 (4.98-9.35)
30-day	1.40 (1.23-1.62)	1.84 (1.62-2.13)	2.44 (2.14-2.83)	2.95 (2.57-3.45)	3.68 (3.11-4.44)	4.26 (3.54-5.25)	4.89 (3.97-6.15)	5.56 (4.40-7.17)	6.52 (4.96-8.74)	7.30 (5.38-10.1)
45-day	1.58 (1.39-1.83)	2.16 (1.90-2.50)	2.91 (2.56-3.38)	3.52 (3.07-4.12)	4.36 (3.69-5.26)	5.01 (4.16-6.16)	5.67 (4.60-7.13)	6.36 (5.03-8.20)	7.30 (5.56-9.78)	8.04 (5.93-11.1)
60-day	1.73 (1.53-2.00)	2.43 (2.14-2.82)	3.33 (2.92-3.87)	4.04 (3.52-4.72)	4.97 (4.21-6.00)	5.67 (4.71-6.97)	6.36 (5.16-8.00)	7.07 (5.59-9.12)	8.00 (6.09-10.7)	8.71 (6.42-12.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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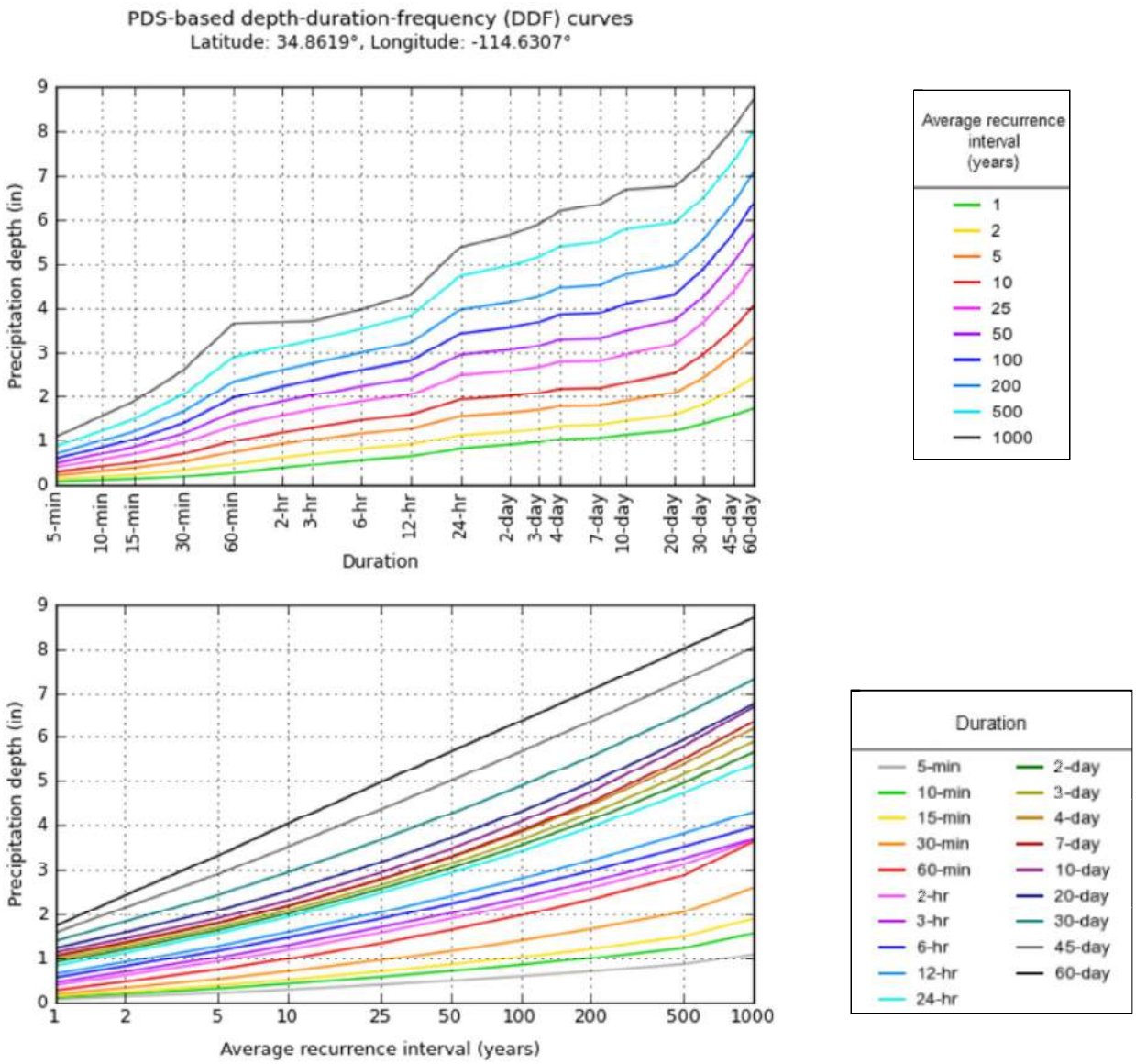
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Sun May 27 18:57:03 2018

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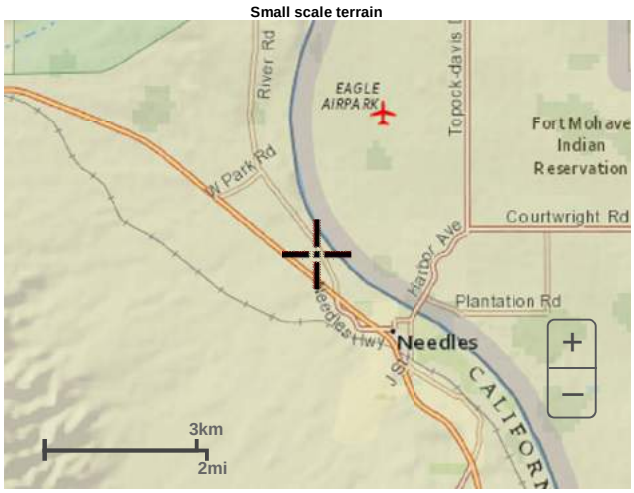
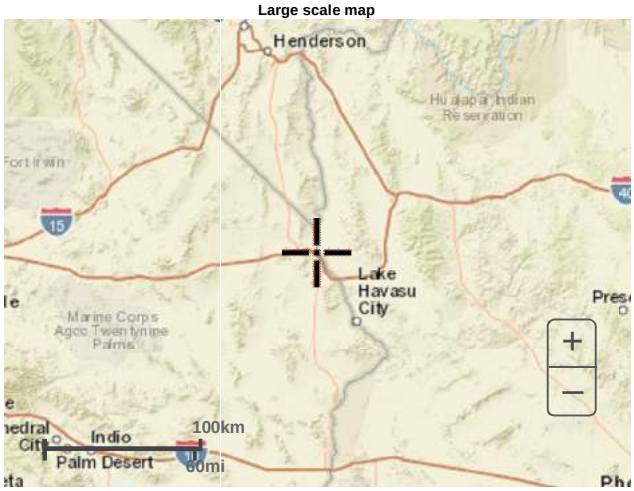
Maps & aerials

Small scale terrain

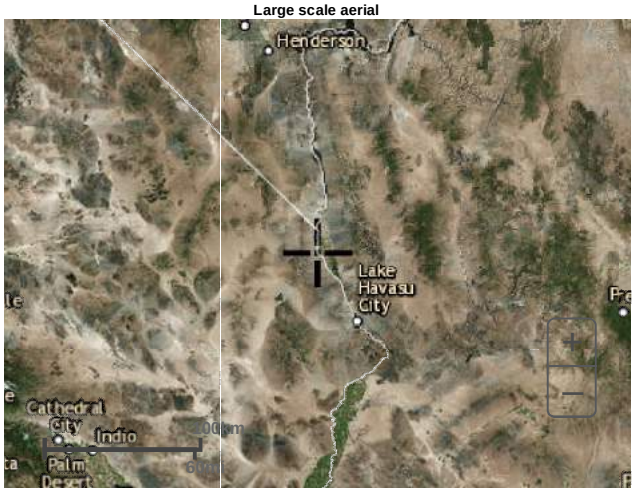


Large scale terrain

Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

PLOT STYLE: HalgPRI.ctb PROJECT LOCATION & NAME: C:\Users\Public\1.2018 PROJECTS\2018 LUDWIG PROJECTS\3353 NEEDLES HWY, NEEDLES CA\OFFSITE\TEEXHIBIT.dwg PLOT TIME: Monday, June 04, 2018 4:55:27 PM LAYOUT: Layout1

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street
San Bernardino, CA 92410
Phone: 909-884-8217
Fax: 909-889-0153

5890 Hwy. 95, Ste. B
Fort Mohave, AZ 88426
Phone: 928-768-1857
Fax: 928-768-7086

15252 Seneca Rd.
Victorville, CA 92392
Phone: 760-951-7676
Fax: 760-241-0573

2126 McCulloch Blvd., Ste. 8
Lake Havasu City, AZ 86403
Phone: 928-680-6060
Fax: 928-854-6530

3353 NEEDLES HIGHWAY

NEEDLES CA

OFFSITE EXHIBIT

CLIENT:
POLING LAURA
991 VANDERBILT AVE | CLAREMONT, CA 91711

SCALE
1" = 200'

SHEET
1
OF
1

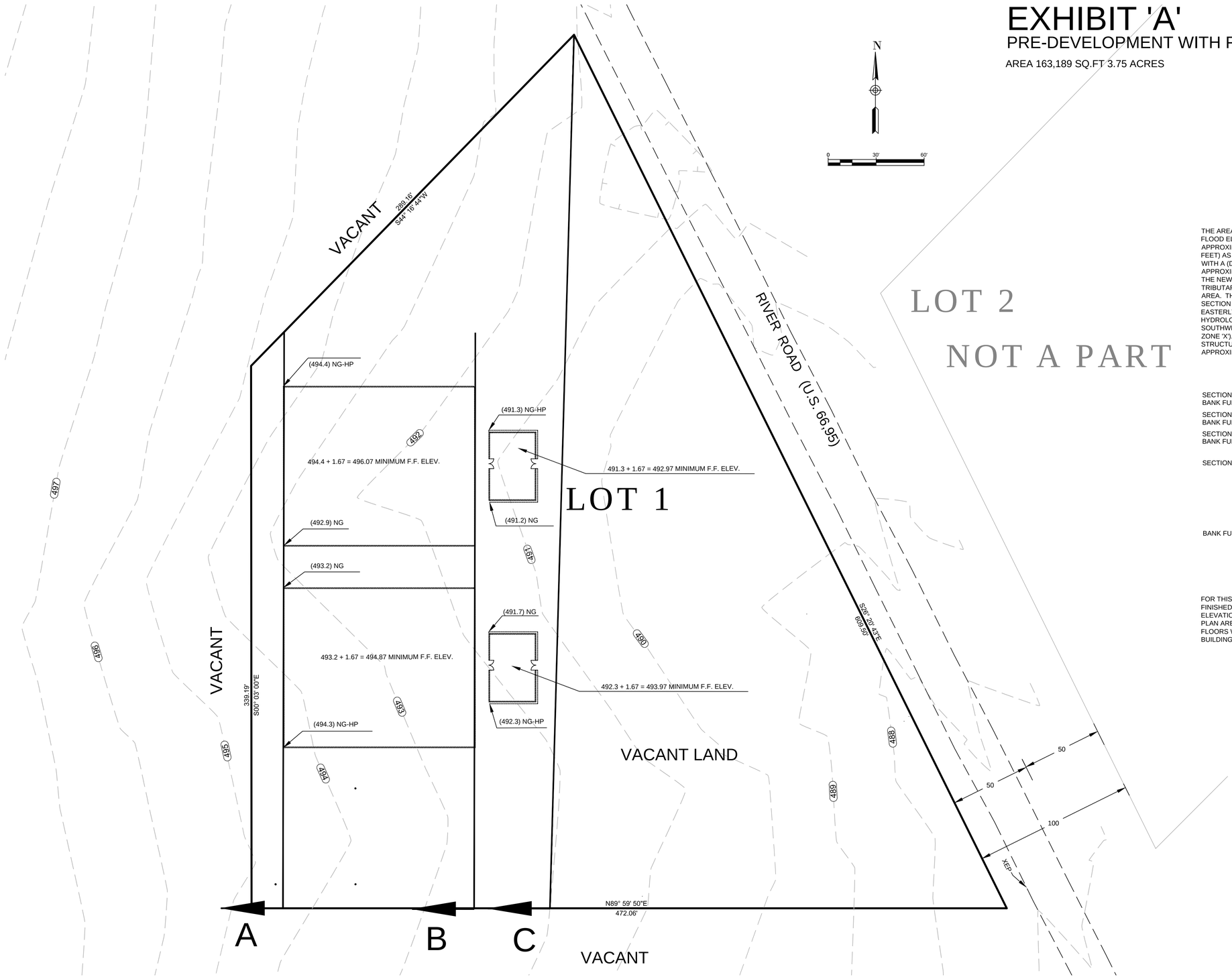
DESIGNED BY:	DRAWN BY:	CHECKED BY:
HA	HA	CD

01-01

EXHIBIT 'A'

PRE-DEVELOPMENT WITH FEMA ZONE 'A'

AREA 163,189 SQ.FT 3.75 ACRES



VICINITY MAP
N.T.S

THE AREA IS DELINEATED AS ZONE 'A' ON THE FEMA FLOOD MAPS, THE AREA IS SHOWN WITHOUT NO BASE FLOOD ELEVATION (BFE). BY INSPECTING THE OTHER ZONES SURROUNDING ZONE 'A', ZONE 'AO' LOCATED APPROXIMATELY 1,053 FEET SOUTHWESTERLY FROM THE PROJECT SITE; IS SHOWN WITH A BFE OF (DEPTH 3 FEET) AS SHOWN ON THE FIRM MAP. THE COLORADO RIVER IS UNDER ZONE 'AE' AND FLOOD WAY IS SHOWN WITH A (DEPTH 4.75 FEET) AS SHOWN ON THE FIRM MAP. THE COLORADO RIVER FLOODWAY IS APPROXIMATELY 737 FEET NORTHEASTERLY FROM THE PROJECT SITE. DUE TO CONCERNS TO FLOODING OF THE NEW STRUCTURES, BEING CONSTRUCTED ON THE PROJECT SITE; AN ANALYSIS OF THE OFF-SITE TRIBUTARIES WAS CONDUCTED. THE ANALYSIS WAS BASED ON THE 24 HOUR 100 YEAR RAIN EVENT FOR THE AREA. THREE CROSSECTIONS WERE ANALYZED SHOWN HEREON. SECTIONS ARE LABEL AS SECTION 'A', SECTION 'B' AND SECTION 'C'. SECTIONS 'A' AND 'B' WERE PLACED ALONG THE PROPOSED WESTERLY AND EASTERLY WALL LIMIT OF THE FUTURE BUILDINGS. FLOW DEPTHS OF THE SECTIONS ARE SHOWN ON THE HYDROLOGY REPORT. DEPTHS WERE DETERMINED USING THE OFF-SITE TRIBUTARY, LOCATED SOUTHWESTERLY OF THE PROJECT SITE. THE AREA IS DELINEATED AS (AREA OF MINIMAL FLOOD HAZARD ZONE 'X'). ZONE 'X' IS SHOWN AS AREA WITH REDUCED RISK DUE TO LEVEE STRUCTURE. HIGHWAY 40 IS THE STRUCTURE BLOCKING THE RUN-OFF. THE CALCULATED DEPTH IS VERY MINIMAL, AVERAGE DEPTH IS APPROXIMATELY AS SHOWN:

SECTION 'A' AVERAGE DEPTH	= 0.49'
BANK FULL DEPTH	= 1.85'
SECTION 'B' AVERAGE DEPTH	= 0.44'
BANK FULL DEPTH	= 1.52'
SECTION 'C' AVERAGE DEPTH	= 0.39'
BANK FULL DEPTH	= 1.65'

SECTIONS AVERAGE DEPTH:

= 0.49 SECTION 'A'
= 0.44 SECTION 'B'
= 0.39 SECTION 'C'

= 0.44 AVERAGES

BANK FULL DEPTH:

= 1.85 SECTION 'A'
= 1.52 SECTION 'B'
= 1.65 SECTION 'C'

= 1.67 AVERAGES

FOR THIS PROJECT THE BANK FULL DEPTH WILL BE USED AS THE BASIS FOR THE VERTICAL DATUM OF THE FINISHED FLOOR OF THE BUILDINGS. 1.67 FEET WILL BE ADDED TO THE HIGHEST EXISTING ADJACENT ELEVATION OF THE PROPOSED BUILDINGS. IF THE THE ELEVATION SHOWN ON THE GRADING AND DRAINAGE PLAN ARE HIGHER THAN 1.67 FEET THE ELEVATION WILL REMAIN AS SHOWN ON THE PLAN. ALL FINISHED FLOORS WILL BE HIGHER THAN THE EXISTING HIGHEST ELEVATION OF THE PROPOSED FOOT PRINT OF THE BUILDINGS.

LEGAL DESCRIPTION:
LOT 1 OF PARCEL MAP NO. 6626, IN THE CITY OF NEEDLES, STATE OF CALIFORNIA MB. 63, PG. 99, BEING A PORTION OF THE THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4 OF SECTION 24, TOWNSHIP 9 NORTH RANGE 22 EAST SAN BERNARDINO BASE AND MERIDIAN

APN NO: 0660-101-32-0000
LOT AREA: 163,189 S.F. 3.75 ACRES

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-889-0153
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 88426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd. Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

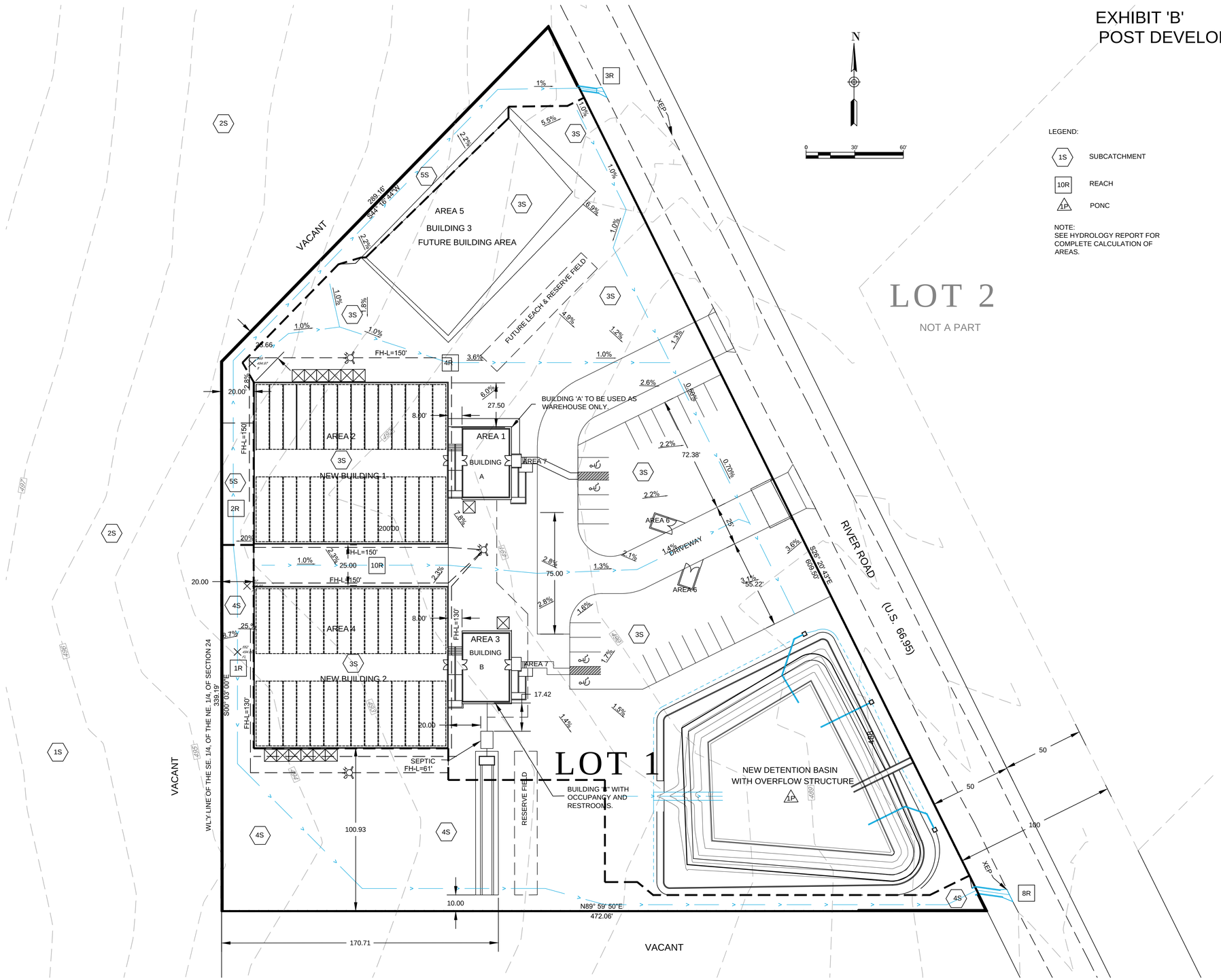
3353 NEEDLES HIGHWAY
NEEDLES CA
EXHIBIT 'A'

CLIENT:
FLUIDS HOLDINGS
991 VANDERBILT AVE | CLAREMONT, CA 91711

SCALE	SHEET	DESIGNED BY:	DRAWN BY:	CHECKED BY:
1" = 30'	1 OF 1	HA	HA	CD

01-01

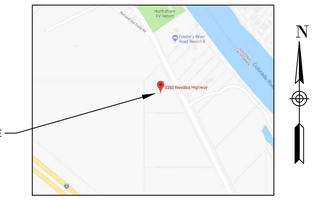
EXHIBIT 'B'
POST DEVELOPMENT



LEGEND:

- 1S — SUBCATCHMENT
- 10R — REACH
- 1P — PONC

NOTE:
SEE HYDROLOGY REPORT FOR COMPLETE CALCULATION OF AREAS.



VICINITY MAP
N.T.S

TOTAL LOT AREA=163,189 SQ. FT. =3.75 ACRES

IMPERVIOUS AREAS	DESCRIPTION	SQ. FT.	ACRES
AREA 1	BUILDING A	1,372.5 S.F.	0.03
AREA 2	BUILDING 1	12,000 S.F.	0.27
AREA 3	BUILDING B	1,372.5 S.F.	0.03
AREA 4	BUILDING 2	12,000 S.F.	0.27
AREA 5	BUILDING 3(FUTURE)	9,750 S.F.	0.22
AREA 6	PARKING AREA	27,457 S.F.	0.63
AREA 7	CONCRETE	389.27 S.F.	0.001
	TOTAL	59,545.27 S.F.	1.37

HYDROLOGY:
TOTAL OFFSITE = 14.29 AC = 54.43 CFS TR-20 SBCO HYDROGRAPH = 54.15 CFS
ONSITE PRE-DEVELOPMENT = 3.75 AC = 5.19 CFS

TOTAL PRE-DEVELOPEMENT EXITING THE SITE = 30.81 CFS TR-20 SBCO = 25.37

ON-SITE FLOWS TO DETENTION BASIN = 2.95 AC OR 11.65 CFS TR-20 SBCO = 14.31 CFS.
OVER FLOW WEIR WILL BE PLACE FOR HIGHER EVENTS. NO OUTFLOW HYDROGRAPH IS PRODUCED FOR THIS BASIN.

HYDROLOGY AREAS TO BY-PASS PRE-DEVELOPMENT

- 1S — OFF-SITE WEST OF PROJECT SITE PRE-DEVELOPMENT = 51.46 CFS TR-20 SBCO = 51.02 CFS
- 2S — OFF-SITE WEST OF PROJECT SITE PRE-DEVELOPMENT = 2.97 CFS TR-20 SBCO = 3.13 CFS
- 4S — ON-SITE AREA CONVENYING OFF-SITE INCLUDED AREA AS PR-DEVELOPMENT = 3.21 CFS
- 5S — ON-SITE AREA CONVENYING OFF-SITE INCLUDED AREA AS PR-DEVELOPMENT = 1.47 CFS

HYDROLOGY AREAS TO POST-DEVELOPMENT FLOWING TO DETENTION BASIN

- 3S — ON-SITE AREA = 14.04 CFS TR-20 SBCO CALCULATION YIELDS = 14.31 CFS BASIN CAN HANDLE UP TO 40.55 CFS STORAGE = 0.526 af

LEGAL DESCRIPTION:
LOT 1 OF PARCEL MAP NO. 6626, IN THE CITY OF NEEDLES, STATE OF CALIFORNIA MB. 63, PG. 99, BEING A PORTION OF THE THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4 OF SECTION 24, TOWNSHIP 9 NORTH RANGE 22 EAST SAN BERNARDINO BASE AND MERIDIAN

APN NO: 0660-101-32-0000
LOT AREA: 163,189 S.F. 3.75 ACRES

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-889-0153
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 86426, Phone: 928-768-1857, Fax: 928-768-7086
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2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6539

3353 NEEDLES HIGHWAY
NEEDLES CA
EXHIBIT 'B'

CLIENT:
FLUID HOLDINGS

SCALE: 1" = 30'
SHEET 1 OF 1

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
HA	HA	CD	01-01

PRECISE GRADING FOR LOT 1 OF PARCEL MAP 6626 IN THE CITY OF NEEDLES, CALIFORNIA

GRADING NOTES:

1. THE CONTRACTOR SHALL VERIFY LOCATION AND ELEVATIONS OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION, CALL BLUE STAKE (792-2211) TWO FULL WORKING DAYS PRIOR TO EXCAVATION.
2. THE CONTRACTOR SHALL GIVE FORTY-EIGHT (48) HOURS NOTICE WHEN HE SHALL REQUIRE THE SERVICES OF ENGINEER OR ANY OTHER PERSON PROPERLY AUTHORIZED FIR SUCH PURPOSE FOR LAYING OUT ANY PORTION OF THE WORK, HE SHALL ALSO DIG ALL STAKES HOLES NECESSARY TO GIVE LINE AND LEVELS AND SHALL PROVIDE ASSISTANCE CALLED FOR THE ENGINEER OR THIS ASSISTANTS UPON ANY PART OF WORK WHENEVER SO REQUESTED.
3. THE CONTRACTOR SHALL PRESERVE ALL STAKES SET FOR THE LINES, LEVELS OR MEASUREMENTS OF THE WORK IN THEIR PROPER PLACES UNTIL AUTHORIZED TO REMOVE THEM BY THE ENGINEER. ANY EXPENSE INCURRED IN REPLACING ANY STAKES WHICH THE CONTRACTOR OR HIS SUBORDINATES AMY HAVE FAILED TO RESERVE SHALL BE CHARGED TO THE CONTRACTOR,
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FURNISH, HAUL AND APPLY ALL WATER REQUIRED FOR COMPACTION AND FOR THE CONTROL OF DUST FROM CONSTRUCTION ACTIVITY. THE COST THEREOF IS THE TO BE INCLUDED IN THE GRADING CONSTRUCTION PRICE,
5. ALL ORGANIC AND OTHER DELETERIOUS MATERIAL SHALL BE REMOVED WITHIN THE CLEARING LIMITS FOR NECESSARY GRADING TO A DEPTH OF SIX (6) INCHES AND HAULED FROM THE SITE PRIOR TO GRADING.
6. BUILDING SITES SHALL BE CONSTRUCTED TO WITHIN 0.10 FOOT OF FINISH BUILDING PAD ELEVATION AS STAKED BY ENGINEER.
7. COMPATION IN PAD AREAS SHALL BE TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO DESIGNATION T-99, METHOD A. THOSE AREAS TO RECEIVED FILL ARE TO BE SCARIFIED TO A DEPTH OF SIX (6) INCHES, BROUGHT TO PROPER MOISTURE CONTENT AND COMPACTED TO ABOVE DENSITY, THE AREA SOURCE OF FILL MATERIAL SHALL BE APPROVED BY THE OWNER PRIOR TO COMMENCEMENT OF WORK. TEST OF FILL MATERIAL WILL BE DONE AT THE OWNER'S EXPENSE.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR THE CARE, MAINTENANCE, REPAIR OR REPLACEMENT OF EXISTING IMPROVEMENTS IN THE WORK AREA WHICH HAVE BEEN REMOVED OR DAMAGED DURING THE COURSE OF CONSTRUCTION ALL REPAIR, REPLACEMENT OR CLEANUP SHALL BE DONE TO HE SATISFACTION OF THE OWNER.
9. ELEVATIONS SHOWN ON THIS PLAN ARE ELEVATIONS OF FINAL GRADING AND IMPROVEMENTS. EXCAVATION TO SUBGRADE FOR BUILDING PATIOS. DRIVES, ETC. WILL NEED TO BE PERFORMED.
10. CLEARING AND GRUBBING SHALL INCLUDE REMOVAL AND LEGAL DISPOSAL OFF-SITE OF ALL VEGETATION, RUBBLE AND DEBRIS ON-SITE AND IN THE DRIVEWAY EASEMENT. THE COST FOR REMOVAL LEGAL DISPOSAL OFF-SITE SHALL BE INCLUDED IN THE UNIT BID PRICE PER ACRE OF CLEARING AND GRUBBING.
11. INTENTIONALLY LEFT BLANK.
12. THE CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIED BY GOVERNMENTAL AGENCIES/ ALL WORK TO CONFORM TO CODES, RULES OF POLICIES OF THE CITY OF NEEDLES, CA.
13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND/OR SURVEYOR PROVIDING THE CONSTRUCTION LAYOUT TO COMPARE THE SITE CONDITIONS WITH THE PLANS AND TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES OBSERVED. SHOULD ANY GRADE OR DESIGN INDICATED ON THE PLANS BE SUSPECT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF SAID AREA TA LEAST TWENTY-FOUR (24) HOURS BEFORE CONSTRUCTION IS SCHEDULED TO BEGIN IN AFFECTED AREA IF THE ENGINEER IS NOT NOTIFIED PRIOR TO START OF CONSTRUCTION I THE AFFECTED AREA DISCREPANCIES SHALL BE DEEMED THE RESPONSIBILITY OF THE CONTRACTOR AND/ OR THE SURVEYOR.
14. THE SOILS ENGINEER SHALL OBSERVE, INSPECT AND TEST ALL EARTHWORK OPERATIONS, INCLUDING BUT NOT LIMITED TO: TRENCH EXCAVATION AND BACKFILL. ONE TEST FOR EACH TWO (2) FEET OR FILL OR EACH 1,000 CUBIC YARDS, WHICHEVER IS GREATER IF FILL IS INTENDED TO SUPPORT STRUCTURES.
15. THE CONTRACTOR SHALL NOTIFY THE CITY BUILDING DIVISION AT LEAST 48 HOURS IN ADVANCE OF ANY CONSTRUCTION OR INSPECTION.
16. THE CONTRACTOR IS ADVISED THAT AN EXCAVATION AND DIRT MOVING PERMIT IS REQUIRED BY THE CITY OF NEEDLE, CA. HE IS RESPONSIBLE FOR OBTAINING SAID PERMIT AND COMPLYING WITH ITS REQUIREMENTS.
17. ALL UTILITIES SHOWN HEREON ARE BASED ON VISUAL OBSERVATION ON THE GROUND.
18. PLACEMENT OF FILL AND COMPACTION METHODS SHALL BE UNDER THE DIRECTION OF SOILS ENGINEER.
19. SEPARATE PLANS FOR TEMPORARY EROSION CONTROL MEASURES TO BE USED DURING THE RAINY SEASON SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT. THE CONTROL DEVICES SHOWN ON SAID PLANS WILL BE INSTALLED AND MAINTAINED IN OPERABLE CONDITION DURING THE RAINS.
20. THE CONTRACTOR SHALL CONTACT BLUE STAKE AT 1-800-227-2600 BEFORE LOCATING THEIR RESPECTIVE FACILITIES PRIOR TO ANY EXCAVATION.
21. A SOILS OR GEOTECHNICAL REPORT HAS BEEN PREPARED FOR THIS PROJECT. THE CONTRACTOR IS REQUIRED TO CONFORM TO THE PROVISIONS OF SAID REPORT DURING THE GRADING OPERATION.

DISTURBED AREA

133,222.24 SQ. FT 3.06 ACRES

EARTHWORK

CUT 2,831.93 C.Y. FILL 3,429.02 C.Y. NET 597.09 C.Y.

LEGAL DESCRIPTION:

LOT 1 OF PARCEL MAP NO. 6626, IN THE
CITY OF NEEDLES, STATE OF CALIFORNIA
MB. 63, PG. 99, BEING A PORTION OF THE
THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4
OF SECTION 24, TOWNSHIP 9 NORTH RANGE
22 EAST SAN BERNARDINO BASE AND
MERIDIAN

APN NO: 0660-101-32-0000
LOT AREA: 163,189 S.F. 3.75 ACRES

UTILITIES

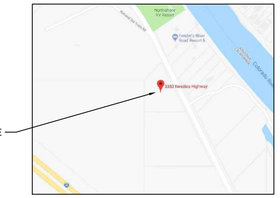
WATER SERVICE TO BE PROVIDED BY CITY, LINE EXTENSION WILL BE NECESSARY
SEWER BY SEPTIC TANK

ENGINEER'S NOTICE TO CONTRACTOR:

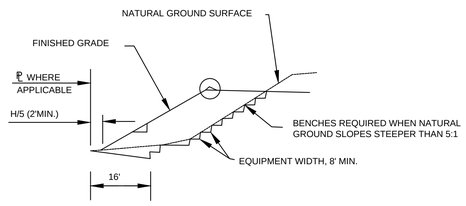
THE EXISTENCE AND/OR LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE DRAWINGS ARE OBTAINED BY SEARCH OF THE AVAILABLE RECORDS, TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITLITES EXCEPT AS SHOWN ON THESE DRAWINGS AND WE ASSUME NO RESPONSIBILITY AS TO THE ACCURACY OR HEIR DEPICTED LOCATION ON THESE DRAWINGS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ALL OTHER LINES NOT RECORD OR NOT SHOWN ON THESE DRAWINGS BY VERIFICATION OF THEIR LOCATION IN THE FIELD PRIOR TO THE INSTIGATION OF THE ACTUAL PORTION OF THE WORK ATTRIBUTED TO THEIR LOCATION.

OWNER:

POLING LAURA
991 VANDERBILT AVE
CLAREMONT CA 91711-3611



VICINITY MAP
N.T.S



FILL-SLOPE DETAIL
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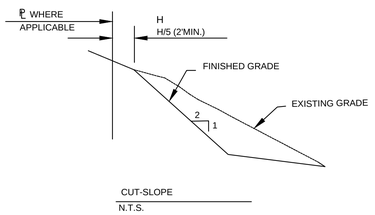

CUT-SLOPE
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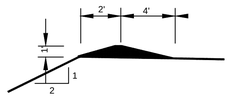


TOP OF FILL SLOPE
BERM DETAIL
N.T.S.

SHEET INDEX

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
EWREVISED	1.000	1.000	162432.74 Sq. Ft.	3046.12 Cu. Yd.	3944.21 Cu. Yd.	898.09 Cu. Yd.<Fill>
Totals			162432.74 Sq. Ft.	3046.12 Cu. Yd.	3944.21 Cu. Yd.	898.09 Cu. Yd.<Fill>

UNDERGROUND SERVICE ALERT
DIAL TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

GENERAL NOTES:

UNAUTHORIZED CHANGES & USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS, ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARED OF THESE PLANS.

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-889-0153
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 88426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

3353 NEEDLES HIGHWAY
NEEDLES CA
TITLE SHEET

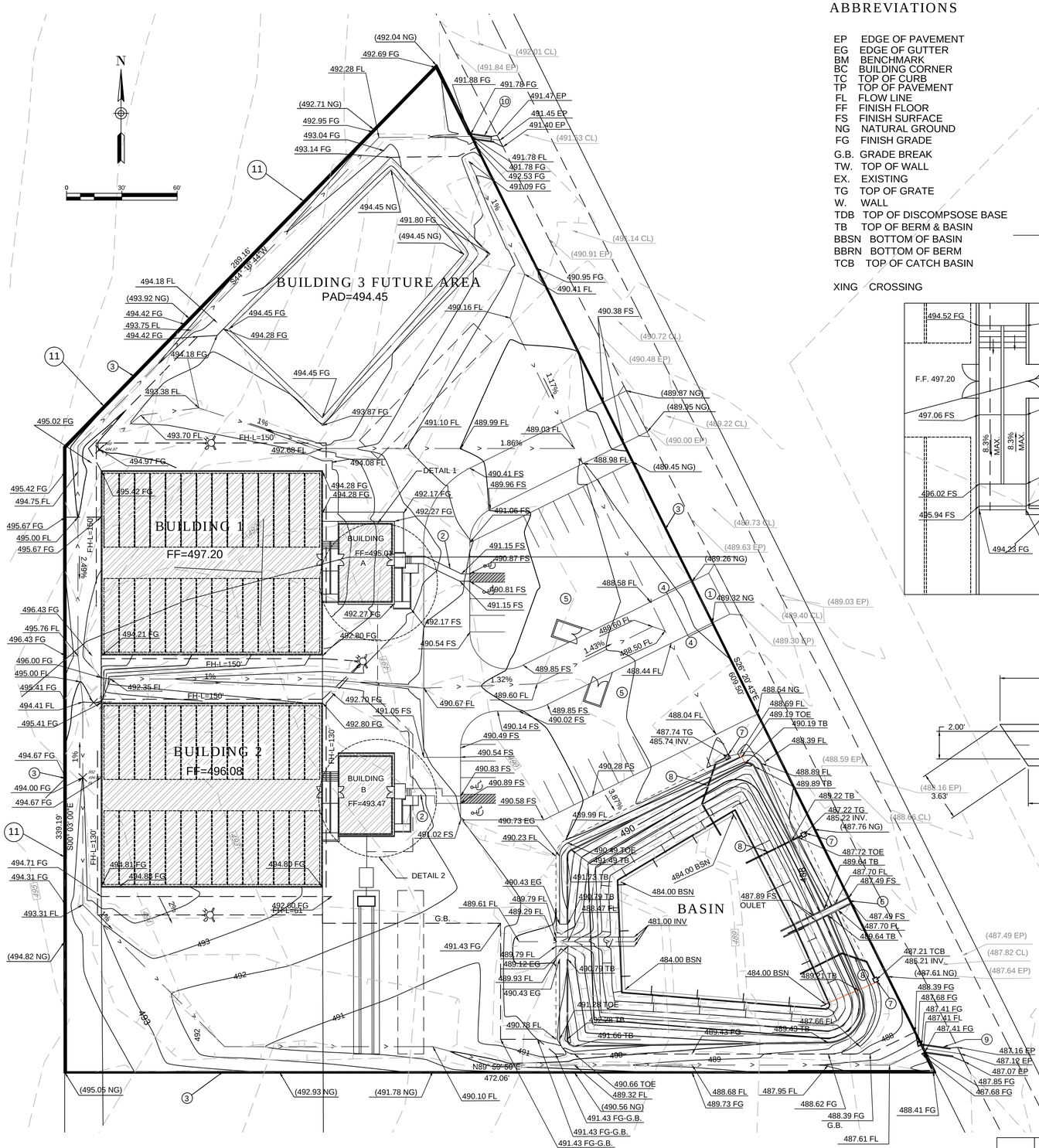
CLIENT:
POLING LAURA
991 VANDERBILT AVE | CLAREMONT, CA 91711

SCALE: AS NOTED

SHEET 1 OF 2

DESIGNED BY:	DRAWN BY:	CHECKED BY:
HA	HA	CD

01-01

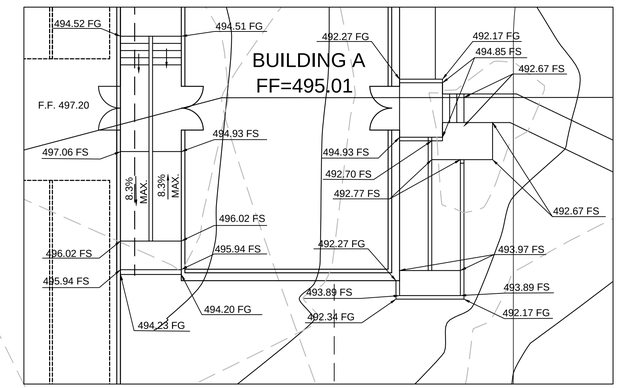


ABBREVIATIONS

EP	EDGE OF PAVEMENT
EG	EDGE OF GUTTER
BM	BENCHMARK
BC	BUILDING CORNER
TC	TOP OF CURB
TP	TOP OF PAVEMENT
FL	FLOW LINE
FF	FINISH FLOOR
FS	FINISH SURFACE
NG	NATURAL GROUND
FG	FINISH GRADE
G.B.	GRADE BREAK
TW.	TOP OF WALL
EX.	EXISTING
TG	TOP OF GRATE
W.	WALL
TDB	TOP OF DISCOMPSOSE BASE
TB	TOP OF BERM & BASIN
BBSN	BOTTOM OF BASIN
BBRN	BOTTOM OF BERM
TCB	TOP OF CATCH BASIN
XING	CROSSING

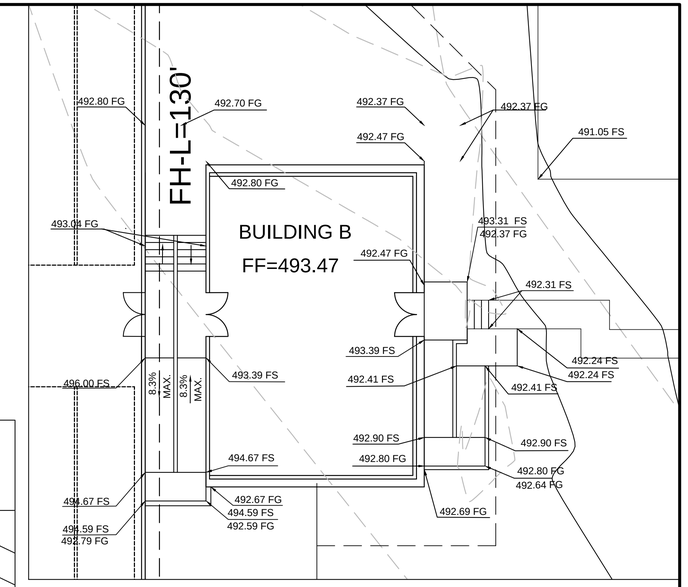
LEGEND:

- PROPOSED FIRE HYDRANT
- T — TRASH ENCLOSURE
- PROPOSED BUILDING
- LEACH FIELD
- FLOW DIRECTION
- (488.59) — EXISTING ELEVATION
- (489) — EXISTING CONTOUR ELEVATION
- 490 — PROPOSED CONTOUR ELEVATION
- PROPOSED 6' CHAIN LINK FENCE



DETAIL 1

SCALE: 1"=10'

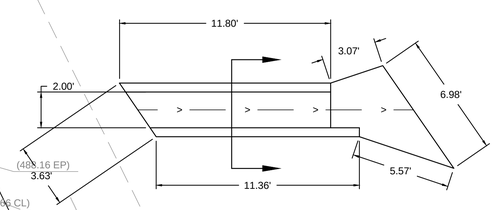


DETAIL 2

SCALE: 1"=10'

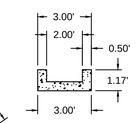
CONSTRUCTIONS NOTES:

1. CONSTRUCT DRIVEWAY APPROACH PER STD. 110-2
2. CONSTRUCT 4" PCC OVER COMPACTED EARTH 389.27 SQ. FT.
3. CONSTRUCT 6' CHAIN LINK FENCE 1,7010 L.F.
4. CONSTRUCT TRASH ENCLOSURE AS SHOWN ON PLAN 2 E.A.
5. CONSTRUCT 2-1/2" PAVEMENT MILLING OVER COMPACTED EARTH 22,661 SQ. FT.
6. CONSTRUCT EMERGENCY SPILL AS SHOWN ON PLAN
7. INSTALL 24"X24"X24' CATCH BASIN AS SHOW NON PLAN 3 E.A.
8. INSTALL 8" CORRUGATED DRAIN PIPE AS SHOW NON PLAN 106 L.F.
9. CONSTRUCT 3.5' WIDE CONCRETE SPILL SEE DETAIL HEREON
10. CONSTRUCT 2.0' WIDE CONCRETE SPILL SEE DETAIL HEREON
11. CONSTRUCT 3-ROWS OF BLOCK WALL WITH FIRST ROW ABOVE FINISHED GRADE TO BE A FLOW THROUGH BLOCK.



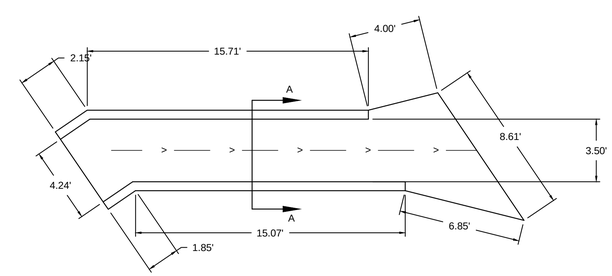
CONCRETE SPILL (10)

N.T.S.



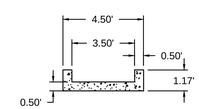
SECTION 'A-A'

N.T.S.



CONCRETE SPILL (9)

N.T.S.



SECTION 'A-A'

N.T.S.

UNDERGROUND SERVICE ALERT

DIAL TOLL FREE

811

TWO WORKING DAYS BEFORE YOU DIG

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-889-0153
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 86426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-953-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-0530

3353 NEEDLES HIGHWAY

NEEDLES CA

PRECISE GRADING

CLIENT:

POLING LAURA

991 VANDERBILT AVE | CLAREMONT, CA 91711

DESIGNED BY:	DRAWN BY:	CHECKED BY:
HA	HA	CD

SCALE 1" = 30'

SHEET 2 OF 2

PROJECT LOCATION & NAME: C:\Users\Public\2018 PROJECTS\2018 LUDWIG PROJECTS\3353 NEEDLES HWY, NEEDLES CA\PRECISE GRADING\3353 Hwy 95_PRECISE GRADING.dwg PLOT TIME: Tuesday, March 12, 2019 10:21:09 AM LAYOUT: Layout1

PLOT STYLE: HatchPlt.ctb

Appendix VI

References

References:

San Bernardino County Hydrology Manual

WIN-TR-20 Small Water Shed Hydrology Computer Program Version 10.00

Topographic survey of project site

GOOGLE aerial photos

GOOGLE base with 2’ contours

NOAA 14 for Site Area

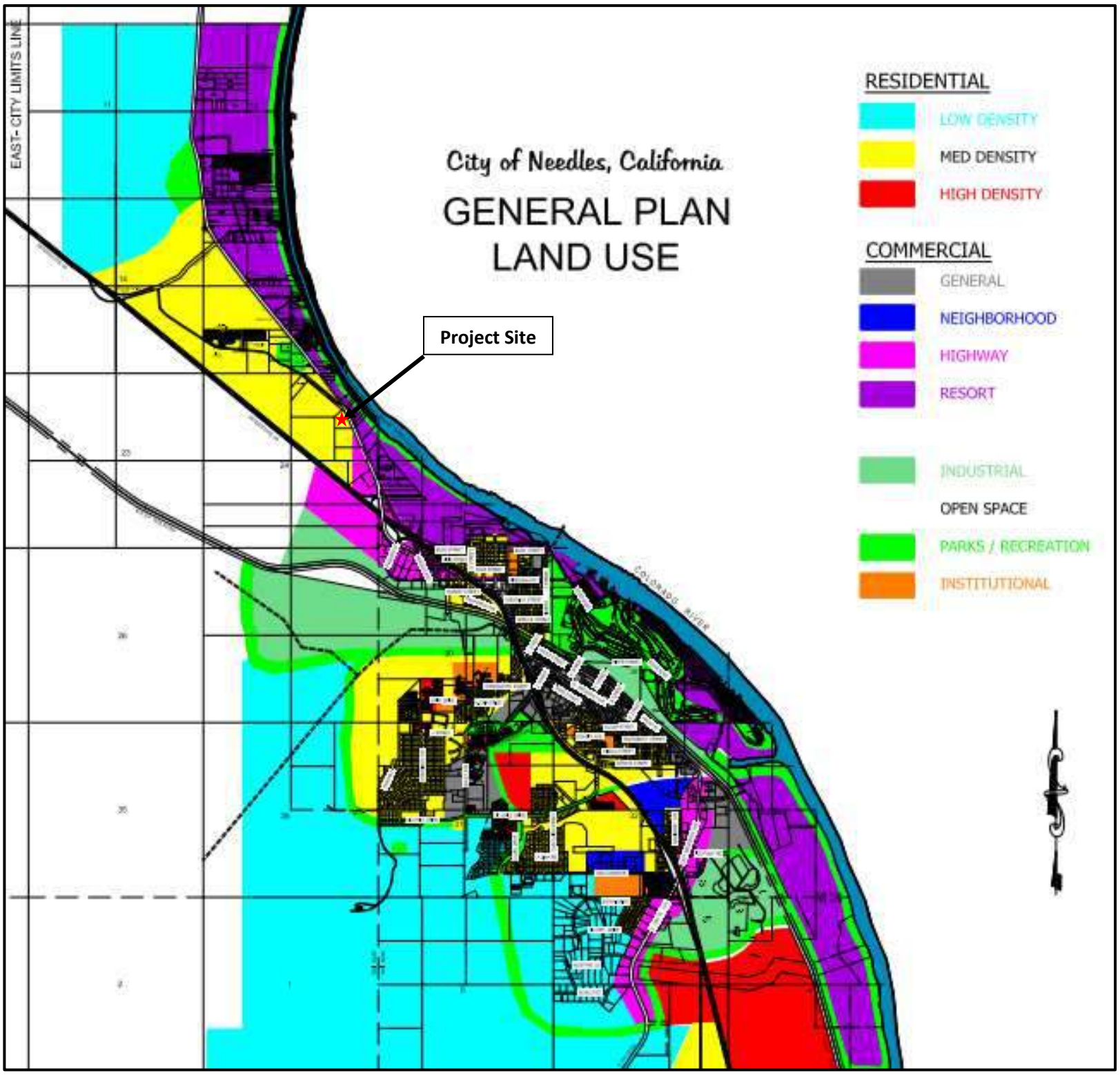
California Transportation maps

Site pictures.

FEMA Map of area

APPENDIX E

General Plan Land Use Map


City of Needles, California
GENERAL PLAN
LAND USE
Project Site
EAST- CITY LIMITS LINE
COLORADO RIVER
RESIDENTIAL
LOW DENSITY
MED DENSITY
HIGH DENSITY
COMMERCIAL
GENERAL
NEIGHBORHOOD
HIGHWAY
RESORT
INDUSTRIAL
OPEN SPACE
PARKS / RECREATION
INSTITUTIONAL

APPENDIX F

Site Photographs

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Drainage Feature #1

Drainage Feature #2

Drainage Feature #3

Dirt Road Disturbance On-Site

APPENDIX G

Noise Study Report

FLUID HOLDINGS

NOISE STUDY REPORT

February 2019

Prepared for:

Micro Lab Farms
297 E. Harrison Street
Corona, California 92879

*

Prepared by:

Jeff Johnson
Pacific BioScience, Inc.
156 Woodburne
Newport Beach, California 92660

Pacific BioScience, Inc.

Noise Study Report

for

Micro Lab Farms

February 2018

Prepared By: _____ Date: 2/12/18

Jeff Johnson
Principal Biologist
(805) 750-3474
Pacific BioScience, Inc.

156 Woodburne
Newport Beach, CA 92660
www.pacificbioscience.com

Table of Contents

Appendix

1 EXECUTIVE SUMMARY

Construction-related and operational noise impacts were modeled and analyzed for the proposed grow facility projected located approximately 500 feet south of the intersection of Needles Highway and National Old Trails Road, within the City of Needles, California. This noise impact analysis contains documentation of existing noise levels as well as analysis of the impacts generated by project operation and traffic and analysis of vibration impacts. This report analyzes the project's consistency with applicable federal, State, and local regulations. The results of this report find construction-related and operational noise levels are consistent with applicable regulations.

1.1 Project Description

Micro Lab Farms proposes to construct a total of five structures: three buildings for production, one administrative building with restroom facilities, and one warehouse. The facility will use state of the art technology, some of which have patents pending and are proprietary secret. The Micro Lab Farms complex will be staffed by master growers and will become a farm known for research and development for the agriculture industry.

Micro Lab Farms is a high-tech agriculture, engineering company that wants to revolutionize the indoor agriculture space by using the latest technology such as LED lighting and other efficient energy saving systems.

By utilizing the most efficient equipment available Micro Lab Farms seeks to improve our environment, additionally minimalizing the amount of water used by controlling the evaporation process will help maintain water reserves. By using the best technology for horticulture, the Micro Lab Farms team has combined over 50 years of experience in the industry.

The proposed project includes development in two phases.

1.2 Construction-Related Noise

Construction activity could result in noise levels in excess of the allowable noise levels at the residential uses to the north of the project site. With implementation of Mitigation Measure N-1, described herein, no substantial impacts will occur.

1.3 Operational Noise

Opening Year Without Project and Opening Year Plus Project traffic noise levels will not exceed allowable noise levels for commercial uses along Needles Highway. The proposed project will not result in increases in traffic noise that will cause noise standards to be exceeded. Therefore, no substantial impacts will result. In addition, increases in traffic due to the proposed project will not result in a perceptible noise increase at any of the studied roadway segments. No substantial impacts will occur

1.4 Vibration

Based on the threshold criteria established by the Federal Transit Administration (FTA) and the California Department of Transportation (Caltrans), vibration from use of heavy construction equipment to construct the proposed project would be below the thresholds to cause damage to nearby structures and result in less than *barely perceptible* vibration at studied receptors. No excessive, strongly perceptible vibration will occur.

1.5 Mitigation Measures

The following mitigation measures are required to ensure that project-related noise levels will not exceed established thresholds and are consistent with applicable federal, State, and local regulations.

Mitigation Measure N-1: The applicant shall acknowledge that the noise generated by operation of the proposed project must not exceed 65 dBA at the exterior side of any adjacent residences or result in an increase of more than 5 dBA in ambient noise if ambient noise is over 65 dBA Ldn.

Mitigation Measure N-2: The following shall apply to construction noise from tools and equipment:

- The operation of tools or equipment used in construction, drilling, repair, alteration, or demolition shall be limited to between the hours of 8: 00 a.m. and 6:00 p.m. Monday through Friday. The applicant is requesting work to be allowed between 8:00 a.m. and 6:00 p.m. on Saturdays.
- No heavy equipment related construction activities shall be allowed on Sundays or holidays.
- All stationary and construction equipment shall be maintained in good working order and fitted with factory- approved muffler systems.

With the implementation of Mitigation Measure N-1 and N-2, construction noise will feasibly be reduced to unsubstantial levels.

0 1 2 3 4 Miles

LEGEND

Project Site

FIGURE 1
Project Location

Pacific BioScience, Inc.

0 50 100 200 Feet

LEGEND

Project Limits

Project Site

Pacific BioScience, Inc.

FIGURE 2
Project Limits

2 INTRODUCTION

This report includes modeling and analysis of construction- and operation-related noise generated from the proposed project on surrounding land uses. Vibration effects and airport noise are also discussed herein. This project involves two phases and they are discussed below.

The first phase includes the construction of two 112-foot by 100-foot metal building facade to enclose a collection of metal containers known individually as pods. Ground will be leveled at appropriate elevations, an aggregate base will be installed as the foundation and 28 pods will be installed in each structure. See Appendix B: Project Site Plans for building locations and arrangement of pods. Each pod will be 8' x 40' with a maximum height of 10 feet. The metal building will have a maximum height of 15' to minimize visual profile. Within each pod, cultivation is proposed in a unique and proprietary manner that involves vertical grow techniques, led lighting to reduce power consumption by half when compared to traditional indoor growing, and enclosed re-circulating watering system that uses half of the water of other indoor growing facilities with no waste water generated. With the proprietary control systems that have been designed and installed in each pod, once plants are installed each pod can be sealed and human monitoring is unnecessary. Monitoring and control of all systems is conducted remotely. All construction will be completed to the standards of the International Building Code for commercial structures, including the installation of smoke and fire detection alarms. Each pod will be thoroughly insulated to reduce the load on the proposed air conditioning (A/C) units. Administrative and warehouse structures will have 4" concrete foundation. This phase is expected to take six months to construct.

State-of-the-art Phresh Filter carbon filtration units will be utilized by the proposed project to remove cannabis odor from any air vented to the exterior. These units have been utilized successfully by other cannabis projects for odor elimination. A parking lot will be installed adjacent to the buildings with access from Needles Highway (see site plan). At least one ADA parking spot will be designated based on the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design which requires one spot for every twenty-five. Because of the proprietary design of the pods that allow for remote monitoring and control, employee staff is reduced thereby reducing the parking areas and vehicle trips to and from the facility.

The perimeter of the parcel will be lined with fencing; either 6-foot chain-link fence or wrought iron and block fencing. The applicant proposes to install wrought iron and block fence along any area of the perimeter that is visible from Needles Highway. All other areas that are not visible from the highway are proposed to have 6-foot chain-link fence. The east side that faces Needles Highway will have wrought iron entry/exit gates. Landscaping is proposed around all buildings and along Needles Highway and will be of desert tolerant plants and require minimal maintenance and water. The detention basin will be landscaped with native desert scrub plants and likely serve as mitigation for impacts to on-site jurisdictional resources. All rainwater runoff from rooftops and hardscape areas will flow into the detention basin for irrigation.

The second phase proposes the construction of one additional structure located at the north end of the parcel. This structure is expected to be constructed within two years of completion of Phase 1. The structure will be of similar in size (112-foot by 100-foot). The applicant seeks a variance of city municipal code which would allow "stacking" of the pods resulting in additional pods to be housed within the structure.

This report has been prepared utilizing project-specific characteristics where available. In those instances where project-specific data is not available, the analysis has been supplemented by model defaults or other standardized sources of comparable data. In any case where non-project defaults or other data have been used, a "worst-case" scenario was developed to ensure a conservative estimate of noise impacts.

This report has been prepared for use by the Lead Agency to assess potential project-related noise impacts to the environment in compliance with federal, State, or local guidelines, particularly with respect to the noise issues identified in Appendix G of the State CEQA Guidelines. This report does not make determinations of significance pursuant to CEQA because such determinations are required to be made solely in the purview of the Lead Agency.

3.1 Defining Noise

"Sound" is a vibratory disturbance created by a moving or vibrating source and is capable of being detected. "Noise" is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance and, in the extreme, hearing impairment.

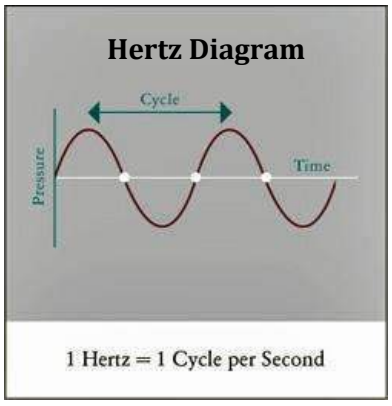
THE PRODUCTION OF SOUND

Sound has three properties: amplitude and amplitude variation of the acoustical wave (loudness), frequency (pitch), and duration of the noise. Despite the ability to measure sound, human perceptibility is subjective, and the physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness."

MEASURING SOUND

Sound pressure levels are described in logarithmic units of ratios of sound pressures to a reference pressure, squared. These units are called bels. To provide a finer description of sound, a bel is subdivided into 10 decibels, abbreviated dB. Since decibels are logarithmic units, sound pressure levels cannot be added or subtracted by ordinary arithmetic means. For example, if one automobile produces a sound pressure level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB. In fact, they would combine to produce 73 dB. This same principle can be applied to other traffic quantities as well. In other words, doubling the traffic volume on a street or the speed of the traffic will increase the traffic noise level by three dB. Conversely, halving the traffic volume or speed will reduce the traffic noise level by three dB. A three dB change in sound is the beginning at which humans generally notice a *barely perceptible* change in sound and a five dB change is generally *readily perceptible.*[1]

Sound pressure level alone is not a reliable indicator of loudness. The frequency or pitch of a sound also has a substantial effect on how humans will respond. While the intensity of the sound is a purely physical quantity, the loudness or human response depends on the characteristics of the human ear. Human hearing is limited not only to the range of audible frequencies but also in the way it perceives the sound pressure level in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 Hertz (Hz) and 5,000 Hz, and perceives both higher and lower frequency sounds of the same magnitude with less intensity. Hertz is a unit of frequency that defines any periodic event. In the case of sound pressure, a Hertz defines one cycle of a sound wave per second (see Figure 1, Hertz Diagram). To approximate the frequency response of the human ear, a series of sound pressure level adjustments is usually applied to the sound measured by a sound level meter.



STANDARDS FOR NOISE EQUIVALENT

Noise consists of pitch, loudness, and duration; therefore, a variety of methods for measuring noise have been developed. According to the California General Plan Guidelines for Noise Elements, the following are common metrics for measuring noise:

L_{eq} (Equivalent Energy Noise Level): The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over given sample periods. L_{eq} is typically computed over 1-, 8-, and 24-hour sample periods.

CNEL (Community Noise Equivalent Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7:00 PM to 10:00 PM and after addition of ten decibels to sound levels in the night from 10:00 PM to 7:00 AM.

L_{dn} (Day-Night Average Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of ten decibels to sound levels in the night after 10:00 PM and before 7:00 AM.

CNEL and L_{dn} are utilized for describing ambient noise levels because they account for all noise sources over an extended period of time and account for the heightened sensitivity of people to noise during the night. L_{eq} is better utilized for describing specific and consistent sources because of the shorter reference period.

Federal and State agencies have established noise and land use compatibility guidelines that use averaging approaches to noise measurement. The State Department of Aeronautics and the California Commission on Housing and Community Development have adopted the community noise equivalent level (CNEL).

3.2 Vibration and Groundborne Noise

Vibration is the movement of mass over time. It is described in terms of frequency and amplitude and unlike sound; there is no standard way of measuring and reporting amplitude. Vibration can be described in units of velocity (inches per second) or discussed in decibel (dB) units in order to compress the range of numbers required to describe vibration. Vibration impacts to buildings are generally discussed in terms of peak particle velocity (PPV) that describes particle movement over time (in terms of physical displacement of mass). For purposes of this analysis, PPV will be used to describe all vibration for ease of reading and comparison. Vibration can impact people, structures, and sensitive equipment. The primary concern related to vibration and people is the potential to annoy those working and residing in the area. Vibration with high enough amplitudes can damage structures (such as crack plaster or destroy windows). Groundborne vibration can also disrupt the use of sensitive medical and scientific instruments such as electron microscopes. Common sources of vibration within communities include construction activities and railroads.

Groundborne vibration generated by construction projects is usually highest during pile driving, rock blasting, soil compacting, jack hammering, and demolition-related activities. Next to pile driving, grading activity has the greatest potential for vibration impacts if large bulldozers, large trucks, or other heavy equipment are used.

4 EXISTING NOISE ENVIRONMENT

4.1 Sensitive Receptors

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, and residential uses make up the majority of these areas. Specific sensitive receptors within one-quarter mile of the project site include residential uses to the west and north. There are no schools located within one-quarter mile of the project site.

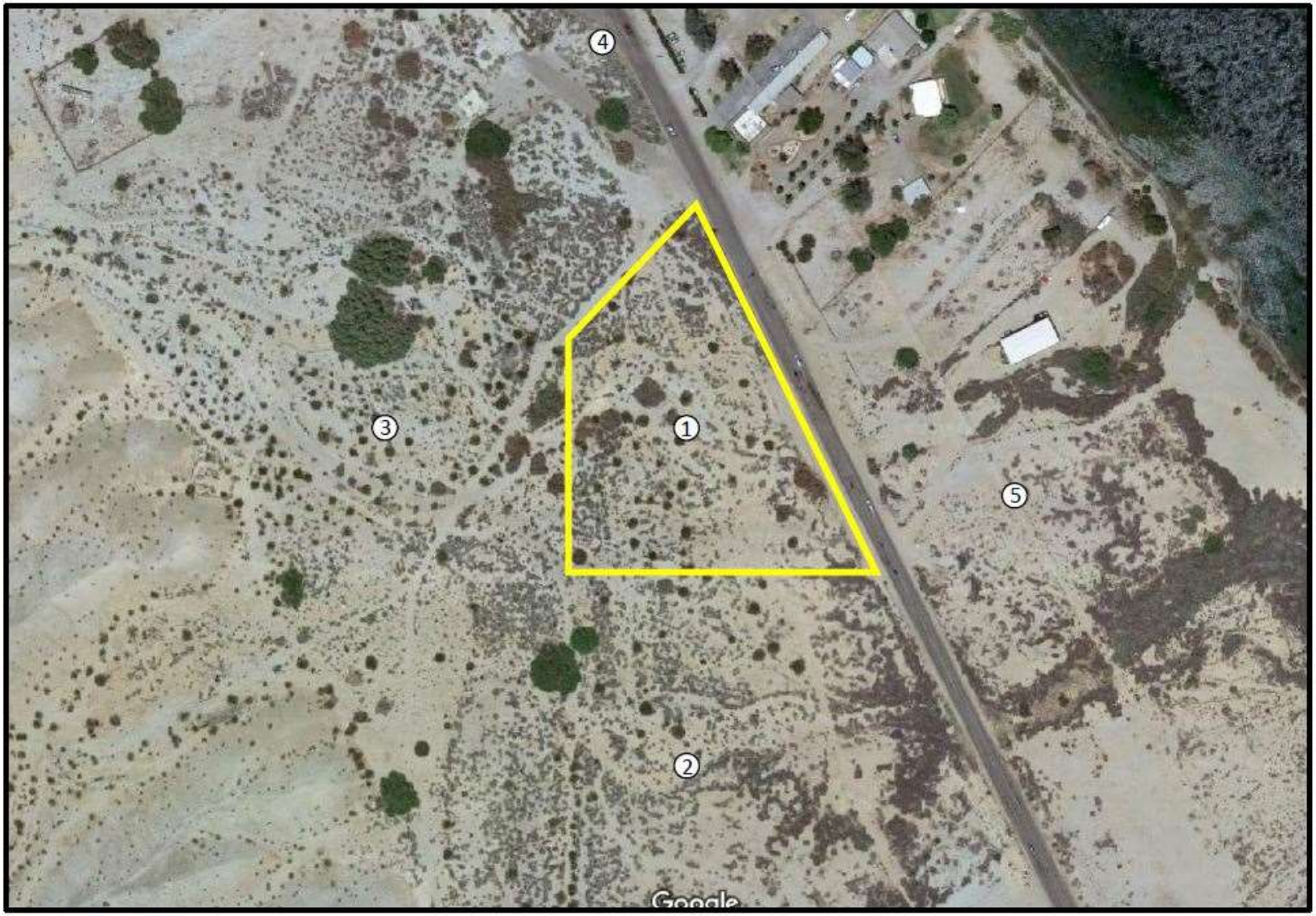
4.2 Existing Noise Levels

Short-term noise measurements at the project site were conducted to identify the ambient noise in the project vicinity. An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model SoundTrack LxT sound level meter was used to monitor existing ambient noise levels in the project area. The noise meter was programmed in "slow" mode to record noise levels in A-weighted form. The microphone height was set at five feet. Five 20-minute daytime noise measurements were taken between 8:20 AM and 10:25 AM on Saturday, February 9th, 2019.

Ambient noise levels are a composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location. The measurement location is shown in Exhibit 2 (Noise Measurement Location). The ambient noise level is presented in Table 1 (Ambient Noise Levels) and measurement output data is included as Appendix A.

Table 1: Ambient Noise Levels

Time Period	Measurement Period	Description	Existing Ambient Noise Levels		
			Leq	Lmax	Lmin
8:20 AM - 8:40 AM	20 Minutes	Center of property	51.2	62.4	35.2
8:48 AM - 9:08 AM	20 Minutes	100 yds S of property boundary	51.1	63.4	39.2
9:15 AM - 9:35 AM	20 Minutes	100 yds W of property boundary	49	62.1	37.1
9:40 AM - 10:00 AM	20 Minutes	100 yds N of property boundary	52.4	64.3	40.1
10:05 AM - 10:25 AM	20 Minutes	100 yds E of property boundary	53.9	64.1	43.2



0 100 200 Feet

LEGEND

Project Limits

(#) Sound Meter Locations (Numbered 1-5)

Figure 3
Noise Measurement Locations

Pacific BioScience, Inc.

5 REGULATORY FRAMEWORK

5.1 Federal Regulations

FEDERAL NOISE CONTROL ACT OF 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the L_{dn} should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In addition, the Levels of Environmental Noise identified five dBA as an "adequate margin of safety" for a noise level increase relative to a baseline noise exposure level of 55 dBA L_{dn} (i.e., there would not be a noticeable increase in adverse community reaction with an increase of five dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more localized levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated federal agencies, allowing more individualized control for specific issues by designated federal, State, and local government agencies.

FEDERAL TRANSIT ADMINISTRATION

The Federal Transit Administration (FTA) has developed methodology and significance criteria to evaluate incremental noise impacts from surface transportation modes (i.e., on road motor vehicles and trains) as presented in Transit Noise Impact and Vibration Assessment (FTA Guidelines). These incremental noise impact criteria are based on EPA findings and subsequent studies of annoyance in communities affected by transportation noise. The FTA extended the EPA's five dBA incremental impact criterion to higher ambient levels. As baseline ambient levels increase, smaller and smaller increments are allowed to limit expected increases in community annoyance. For example, in residential areas with a baseline ambient noise level of 50 dBA CNEL, a less-than-five dBA increase in noise levels would produce a minimal increase in community annoyance levels, while at 70 dBA CNEL, only one dBA increase could be accommodated before a significant annoyance increase would occur.

VIBRATION STANDARDS

The FTA provides guidelines for maximum-acceptable vibration criteria for different types of land uses. Groundborne vibration and noise levels associated with various types of construction equipment and activities are summarized in Table 2 (Reference Vibration Source Amplitudes for Construction Equipment). Table 3 (Groundborne Vibration and Noise Impact Criteria) shows the Federal Transit Administration's maximum acceptable vibration standard for human annoyance in residences where people normally sleep is 80 VdB (less than 70 vibration events per day).

Table 2
Reference Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV at 25 ft (in/sec) at 25 Feet	Approximate Vibration Level (VL) at 25 Feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 (upper range)	105
	0.170 (typical)	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
Slurry wall	0.017 in rock	75
Vibratory roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Notes: PPV is the peak particle velocity. Pile driver amplitude varies greatly based on equipment type and size.
Source: Federal Transit Administration. Transit Noise and Vibration Impact Assessment. 2006.

Table 3
Groundborne Vibration and Noise Impact Criteria

Land Use Category	Groundborne Vibration Impact Levels (VdB)		Groundborne Noise Impact Levels (dBA)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior vibrations	65 VdB[3]	65 VdB[3]	N/A	N/A
Category 2: Residences and buildings where people normally sleep	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	83 VdB	40 dBA	48 dBA

1 *Frequent Events – more than 70 vibration events per day*
2 *Infrequent Events – fewer than 70 vibration events per day*
3 *This criterion limit is based on levels that are acceptable for more moderately sensitive equipment such as optical microscopes.*

Source: United States Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Assessment, 1995

The FTA and Caltrans have compiled the data from numerous studies related to vibration and have developed standards for human perception and building damage. The FTA's maximum acceptable vibration standard for human annoyance is 78 VdB at nearby vibration-sensitive land uses.[4] The

Caltrans maximum vibration level standard is 0.2 in/sec PPV for the prevention of structural damage to typical residential buildings.

5.2 State Regulations

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

CEQA requires lead agencies to consider noise impacts. Under CEQA, lead agencies are directed to assess conformance to locally established noise standards or other agencies' noise standards; measure and identify the potentially significant exposure of people to or generation of excessive noise levels; measure and identify potentially significant permanent or temporary increase in ambient noise levels; and measure and identify potentially significant impacts associated with air traffic.

CALIFORNIA NOISE CONTROL ACT OF 1973

Sections 46000-46080 of the California Health and Safety Code, known as the California Noise Control Act of 1973, find that excessive noise is a serious hazard to public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

CALIFORNIA NOISE INSULATION STANDARDS (CCR TITLE 24)

In 1974, the California Commission on Housing and Community Development adopted noise insulation standards for multi-family residential buildings (Title 24, Part 2, California Code of Regulations). Title 24 establishes standards for interior room noise (attributable to outside noise sources). The regulations also specify that acoustical studies must be prepared whenever a residential building or structure is proposed to be located near an existing or adopted freeway route, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source, and where such noise source or sources create an exterior CNEL (or L_{dn}) of 60 dBA or greater. Such acoustical analysis must demonstrate that the residence has been designed to limit intruding noise to an interior CNEL (or L_{dn}) of 45 dBA or below [California's Title 24 Noise Standards, Chap. 2-35].

STATE OF CALIFORNIA GENERAL PLAN GUIDELINES 2003

Though not adopted by law, the State of California General Plan Guidelines 2003, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of development relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., L_{dn} or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate any special acoustical treatment or noise mitigation. The "conditionally acceptable" or "normally acceptable" ranges include conditions calling for detailed acoustical study or construction mitigation to reduce interior exposure levels prior to the construction or operation of the building under the listed exposure levels.

CALIFORNIA DEPARTMENT OF TRANSPORTATION

According to the Caltrans vibration manual, large bulldozers, vibratory rollers (used to compact earth), and loaded trucks utilized during grading activities can produce vibration, and depending on the level of vibration, could cause annoyance at uses within the project vicinity or damage structures. Caltrans has developed a screening tool to determine of vibration from construction equipment is substantial enough to impact surrounding uses.

The Caltrans vibration manual establishes thresholds for vibration impacts on buildings and humans. These thresholds are summarized in Tables 4 (Vibration Damage Potential Threshold Criteria) and 5 (Vibration Annoyance Potential Threshold Criteria).

Table 4
Vibration Damage Potential Threshold Criteria

Structural Integrity	Maximum PPV (in/sec)	
	Transient	Continuous
Historic and some older buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial and commercial structures	2.00	0.50
Source: Caltrans 2013		

Table 5
Vibration Annoyance Potential Threshold Criteria

Human Response	PPV Threshold (in/sec)	
	Transient	Continuous
Barely perceptible	0.035	0.012
Distinctly perceptible	0.24	0.035
Strongly perceptible	0.9	0.1
Severely perceptible	2	0.4

5.3 Local Regulations

City of Needles Municipal Code

Noise Control
The following noise standards shall be met where applicable:

In outdoor areas, a community noise equivalent level (CNEL) not exceeding 65 decibels, except that where it is not reasonably possible to achieve this objective, the development shall be designed to provide the lowest noise level reasonably possible within private open areas and/or common usable open areas of at least one hundred (100) square feet per unit, with access to such area available to the residents of each unit.

6 IMPACT ANALYSIS

The thresholds identified in Appendix G of the State CEQA Guidelines, as implemented by the City of Needles, have been utilized to assess the significance of the potential environmental effects of the project.

6.1 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed project could result in potentially significant impacts related to noise if it results in:

A. Exposure of persons or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
B. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
C. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
D. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
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, exposure of people residing or working in the project area to excessive noise levels.
F. For a project within a vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

To assess construction impacts, a worst-case construction scenario was modeled using the Federal Highway Administration's Roadway Construction Noise Model (RCNM). Modeling parameters and output are provided in Appendix B. RCNM utilizes standard noise emission levels for different types of equipment and includes utilization percentage, impact, and shielding parameters.

To assess Opening Year Plus Project traffic noise levels, vehicle trips associated with surrounding roadways were modeled utilizing the Federal Highway Administration (FHWA) Traffic noise Model (TNM) Version 2.5. Traffic noise levels identified represent conservative potential noise exposure. In reality, noise levels may vary from those represented as the calculations do not assume natural or artificial shielding nor do they assume reflection from existing or proposed structures or topography. Intervening structures or other noise-attenuating obstacles between a roadway and a receptor may reduce roadway noise levels at the receptor.

6.2 Consistency with Applicable Standards

CONSTRUCTION NOISE LEVELS

Construction noise levels were estimated for nearby receptors using the FHWA Roadway Construction Noise Model (RCNM). See Figure 4 below for receptor locations. The model indicates that the use of construction equipment such as excavators and graders could expose the highway commercial uses located approximately 400 feet to the north and east of the center of the project site to worst case noise levels of 64.3 dBA L_{max}. Table 6 (Construction Noise Impacts) below summarizes the maximum noise levels at each of the studied receivers. Pursuant to the Needles Municipal Code, a noise level of 65 dBA is allowable. As shown in Table 6, neighboring highway commercial uses will be exposed to maximum noise levels within allowable level. Mitigation Measure N-1 has been incorporated to minimize general construction noise impacts to residential and highway commercial uses to the north and east.

Table 6
Construction Noise Impacts

Receptor	Grading	Building Construction	Paving
1 – Highway Commercial	64.2	64.2	64.2
2 – Highway Commercial	64.4	64.4	64.4

OPERATIONAL NOISE LEVELS

A substantial increase in ambient noise is an increase that is *barely perceptible* (3 dBA). Operationally, the proposed project will result in occasional noise generating activities such as conversation and vehicle noise. These activities are common in commercial areas and do not represent a substantial increase in periodic noise in consideration that the proposed project location is surrounded to the north and east by residential and highway commercial use.

The proposed project will not result in increases in traffic noise that will cause noise standards to be exceeded. Therefore, no substantial impacts will result. In addition, increases in traffic due to the proposed project will not result in a perceptible noise increase at any of the studied roadway segments. No substantial impacts will occur.

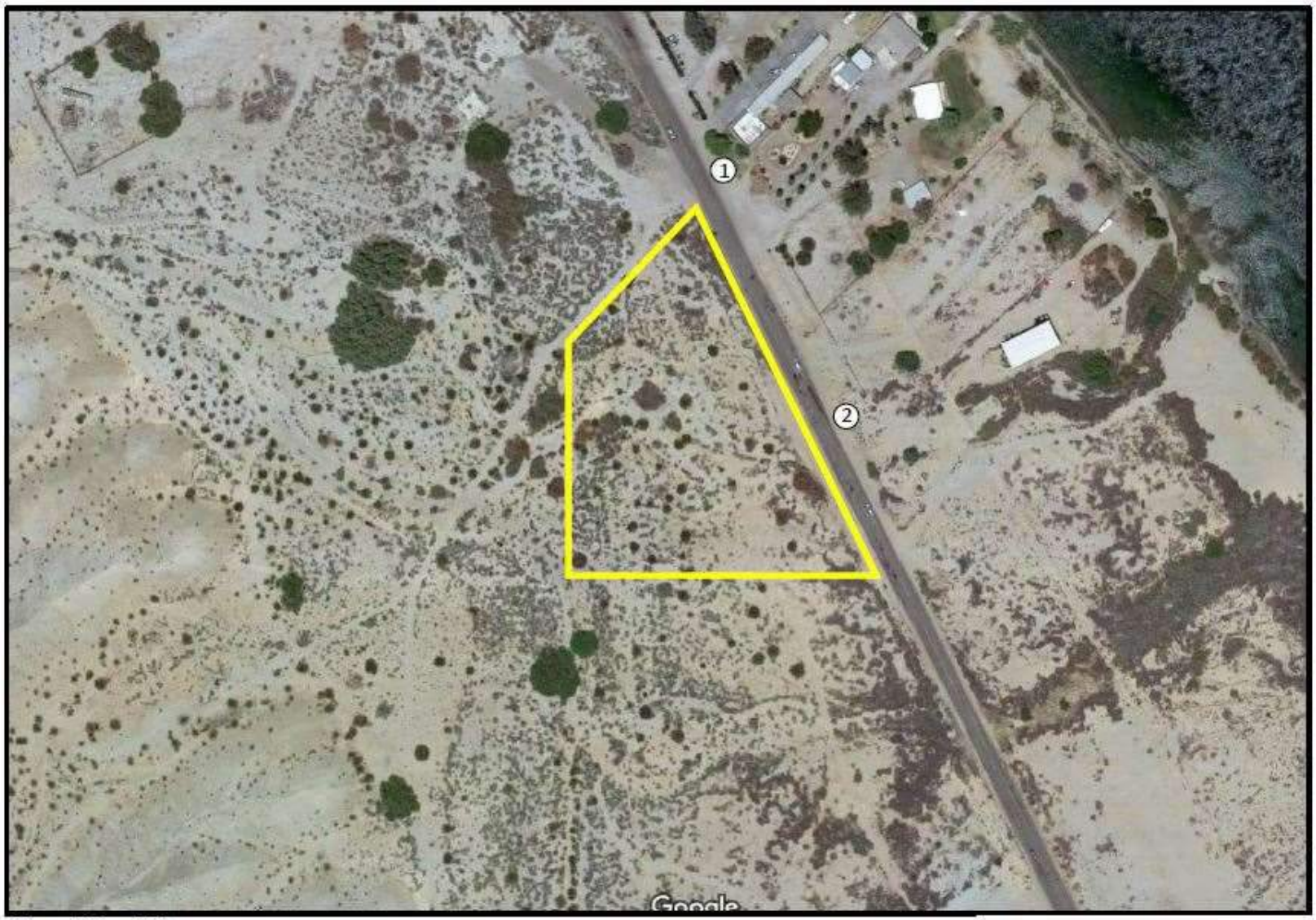
6.3 Vibration Impacts

CONSTRUCTION VIBRATION

Construction activities that use heavy equipment are repetitive sources of vibration; therefore, the *continuous* threshold is used. Residential and commercial uses are located to the north and east of the project site. As a worst case scenario, the *historic and older buildings* threshold is used. Based on the threshold criteria summarized in Tables 4 and 5, vibration from use of heavy construction equipment for the proposed project would be below the thresholds to cause damage to nearby structures at the receptors shown in Table 6 (Construction Noise Impacts).

Construction of the project does not require rock blasting, pile driving, or the use of a jack hammer, but will use heavy equipment such as a grader and excavator. All of the receptors will experience less than *barely perceptible* vibration from the use of construction equipment. Therefore, the project will not result in excessive, strongly perceptible vibration.

With regard to long-term operational impacts, activities associated with the project will not result in any excessive vibration-related impacts to adjacent or on-site properties.



0 100 200 Feet

LEGEND

Project Limits

(#) Receptor (Numbered 1-2)

Pacific BioScience, Inc.

Figure 4
Receptor Locations

7 MITIGATION MEASURES

The following mitigation measures are required to ensure that project-related noise levels will not exceed established thresholds.

Mitigation Measure N-1: The applicant shall acknowledge that the noise generated by operation of the proposed project must not exceed 65 dBA at the exterior side of any adjacent residences or result in an increase of more than 5 dBA in ambient noise if ambient noise is over 65 dBA Ldn.

Mitigation Measure N-2: The following shall apply to construction noise from tools and equipment:

- The operation of tools or equipment used in construction, drilling, repair, alteration, or demolition shall be limited to between the hours of 8: 00 a.m. and 6:00 p.m. Monday through Friday. The applicant is requesting work to be allowed between 8:00 a.m. and 6:00 p.m. on Saturdays.
- No heavy equipment related construction activities shall be allowed on Sundays or holidays.
- All stationary and construction equipment shall be maintained in good working order and fitted with factory- approved muffler systems.

With the implementation of Mitigation Measure N-1 and N-2, construction noise will feasibly be reduced to unsubstantial levels.

8 REFERENCES

[1] California Department of Transportation. Basics of Highway Noise: Technical Noise Supplement.
[2] November 2009. California Governor's Office of Planning and Research. General Plan Guidelines.
[3] 2003
California Department of Transportation. Transportation- and Construction-Induced Vibration
[4] Guidance Manual. June 2004
[5] Federal Transit Administration. *Transit Noise and Vibration Impact Assessment.* 2006
California Department of Transportation. *Transportation and Construction Vibration Guidance*
[6] *Manual. Division of Environmental Analysis. September 2013*
[7] United States Bureau of Mines. Mining Machinery Noise Control Guidelines. 1983
[8] United States Bureau of Mines. Noise Abatement Techniques for Construction Equipment. August 1979

Appendix A Noise Measurement Data

Summary

File Name on Meter	LxT_Data.001
File Name on PC	SLM_0005812_LxT_Data_001.00.ldbin
Serial Number	0005812
Model	SoundTrack LxT®
Firmware Version	2.302
User	Jeff Johnson, Andrew Johnstone
Location	City of Needles
Job Description	Needles Grow Facility
Note	Center of Property

Measurement

Description	
Start	2019-02-08 17:54:45
Stop	2019-02-08 18:15:00
Duration	00:20:15.4
Run Time	00:20:15.4
Pause	00:00:00.0
Pre Calibration	2019-02-06 11:05:13
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1	
Microphone Correction	Off	
Integration Method	Exponential	
Overload	143.7	dB

	A	**C**	**Z**	
Under Range Peak	99.9	96.9	**101.9**	dB
Under Range Limit	**48.9**	46.9	54.9	dB
Noise Floor	35.7	36.3	44.0	dB

Results

LASeq	51.2	dB
LASE	82.0	dB
EAS	17.633	µPa²h
EAS8	417.839	µPa²h

EAS40	2.089	mPa²h		
LZpeak (max)	2019-02-08 17:59:13		89.2	dB
LASmax	2019-02-08 18:03:13		62.4	dB
LASmin	2019-02-08 18:00:31		35.3	dB
SEA	-99.9	dB		
LAS > 85.0 dB (Exceedance Counts / Duration)	0		0.0	s
LAS > 115.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0		0.0	s
LCSeq	64.7	dB		
LASeq	51.2	dB		
LCSeq - LASeq	13.6	dB		
LAIeq	52.4	dB		
LAeq	51.2	dB		
LAIeq - LAeq	1.3	dB		

	A			
	dB	**Time Stamp**		
Leq	51.2			
LS(max)	62.4	2019/02/08 18:03:13		
LS(min)	35.3	2019/02/08 18:00:31		
LPeak(max)				

# Overloads	0			
Overload Duration	0.0	s		

Dose Settings

Dose Name	OSHA-1		OSHA-2	
Exchange Rate	5		5	dB
Threshold	90		80	dB
Criterion Level	90		90	dB
Criterion Duration	8		8	h

Results

Dose	-99.94		-99.94	%
Projected Dose	-99.94		-99.94	%
TWA (Projected)	-99.9		-99.9	dB
TWA (t)	-99.9		-99.9	dB
Lep (t)	37.4		37.4	dB

Statistics		
LAS5.00	56.9	dB
LAS10.00	55.2	dB
LAS33.30	50.2	dB
LAS50.00	47.7	dB
LAS66.60	45.7	dB
LAS90.00	42.2	dB

Calibration History			
Preamp	**Date**	**dB re. 1V/Pa**	**6.3**
PRMLxT1	2019-02-06 11:05:13	-49.9	66.8
PRMLxT1	2019-02-06 08:42:27	-49.8	31.1
PRMLxT1	2019-02-06 08:01:01	-49.0	18.5

Summary

File Name on Meter	LxT_Data.002
File Name on PC	SLM_0005812_LxT_Data_002.00.ldbin
Serial Number	0005812
Model	SoundTrack LxT®
Firmware Version	2.302
User	Jeff Johnson, Andrew Johnstone
Location	City of Needles
Job Description	Needles Grow Facility
Note	100 yds s of property boundary

Measurement

Description	
Start	2019-02-08 18:22:57
Stop	2019-02-08 18:43:04
Duration	00:20:06.7
Run Time	00:20:06.7
Pause	00:00:00.0
Pre Calibration	2019-02-06 11:05:13
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1	
Microphone Correction	Off	
Integration Method	Exponential	
Overload	143.7	dB

	A	C	Z
Under Range Peak	99.9	96.9	**101.9**
Under Range Limit	**48.9**	46.9	54.9
Noise Floor	35.7	36.3	44.0

Results

LASeq	51.1	dB		
LASE	82.0	dB		
EAS	17.453	µPa²h		
EAS8	416.557	µPa²h		
EAS40	2.083	mPa²h		
LZpeak (max)	2019-02-08 18:29:54		92.6	dB

LASmax	2019-02-08 18:23:15		63.4	dB
LASmin	2019-02-08 18:39:20		39.2	dB
SEA	-99.9	dB		
LAS > 85.0 dB (Exceedance Counts / Duration)	0		0.0	s
LAS > 115.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0		0.0	s
LCSeq	65.2	dB		
LASeq	51.1	dB		
LCSeq - LASeq	14.0	dB		
LAIeq	52.2	dB		
LAeq	51.1	dB		
LAIeq - LAeq	1.1	dB		

	A		
	dB	**Time Stamp**	
Leq	51.1		
LS(max)	63.4	2019/02/08 18:23:15	
LS(min)	39.2	2019/02/08 18:39:20	
LPeak(max)			

# Overloads	0			
Overload Duration	0.0	s		

Dose Settings

Dose Name	OSHA-1		OSHA-2	
Exchange Rate	5		5	dB
Threshold	90		80	dB
Criterion Level	90		90	dB
Criterion Duration	8		8	h

Results

Dose	-99.94		-99.94	%
Projected Dose	-99.94		-99.94	%
TWA (Projected)	-99.9		-99.9	dB
TWA (t)	-99.9		-99.9	dB
Lep (t)	37.4		37.4	dB

Statistics

LAS5.00	55.2	dB
LAS10.00	53.6	dB
LAS33.30	50.8	dB

LAS50.00	49.4	dB
LAS66.60	47.8	dB
LAS90.00	45.0	dB

Calibration History

Preamp	Date	dB re. 1V/Pa
PRMLxT1	2019-02-06 11:05:13	-49.9
PRMLxT1	2019-02-06 08:42:27	-49.8
PRMLxT1	2019-02-06 08:01:01	-49.0

Summary

File Name on Meter	LxT_Data.003
File Name on PC	SLM_0005812_LxT_Data_003.00.ldbin
Serial Number	0005812
Model	SoundTrack LxT®
Firmware Version	2.302
User	Jeff Johnson, Andrew Johnstone
Location	City of Needles
Job Description	Needles Grow Facility
Note	100 yds W of property boundary

Measurement

Description	
Start	2019-02-08 18:49:08
Stop	2019-02-08 19:09:24
Duration	00:20:16.5
Run Time	00:20:16.5
Pause	00:00:00.0
Pre Calibration	2019-02-06 11:05:13
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1	
Microphone Correction	Off	
Integration Method	Exponential	
Overload	143.7	dB

	A	C	Z
Under Range Peak	99.9	96.9	**101.9**
Under Range Limit	**48.9**	46.9	54.9
Noise Floor	35.7	36.3	44.0

Results

LASeq	49.0	dB		
LASE	79.9	dB		
EAS	10.820	µPa²h		
EAS8	256.151	µPa²h		
EAS40	1.281	mPa²h		
LZpeak (max)	2019-02-08 18:50:46		100.9	dB
LASmax	2019-02-08 18:50:46		62.1	dB

LASmin	2019-02-08 18:51:21		37.3	dB
SEA	-99.9	dB		
LAS > 85.0 dB (Exceedance Counts / Duration)	0		0.0	s
LAS > 115.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0		0.0	s
LCSeq	62.0	dB		
LASeq	49.0	dB		
LCSeq - LASeq	13.0	dB		
LAIeq	52.3	dB		
LAeq	49.0	dB		
LAIeq - LAeq	3.2	dB		

	A		
	dB	**Time Stamp**	
Leq	49.0		
LS(max)	62.1	2019/02/08 18:50:46	
LS(min)	37.3	2019/02/08 18:51:21	
LPeak(max)			

# Overloads	0	
Overload Duration	0.0	s

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results

Dose	-99.94	-99.94	%
Projected Dose	-99.94	-99.94	%
TWA (Projected)	-99.9	-99.9	dB
TWA (t)	-99.9	-99.9	dB
Lep (t)	35.3	35.3	dB

Statistics

LAS5.00	53.1	dB
LAS10.00	51.2	dB
LAS33.30	48.8	dB
LAS50.00	47.7	dB

LAS66.60	46.3	dB
LAS90.00	43.3	dB

Summary

File Name on Meter	LxT_Data.004
File Name on PC	SLM_0005812_LxT_Data_004.00.ldbin
Serial Number	0005812
Model	SoundTrack LxT®
Firmware Version	2.302
User	Jeff Johnson, Andrew Johnstone
Location	City of Needles
Job Description	Needles Grow Facility
Note	100 yrds N of property boundary

Measurement

Description	
Start	2019-02-08 19:13:55
Stop	2019-02-08 19:34:00
Duration	00:20:04.5
Run Time	00:20:04.5
Pause	00:00:00.0
Pre Calibration	2019-02-06 11:05:13
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	143.7	dB		
	A		**C**	**Z**
Under Range Peak	99.9		96.9	**101.9**
Under Range Limit	**48.9**		46.9	54.9
Noise Floor	35.7		36.3	44.0

Results

LASeq	52.4	dB		
LASE	83.2	dB		
EAS	23.120	µPa²h		
EAS8	552.798	µPa²h		
EAS40	2.764	mPa²h		
LZpeak (max)	2019-02-08 19:33:53		99.8	dB
LASmax	2019-02-08 19:19:06		64.3	dB
LASmin	2019-02-08 19:18:28		40.1	dB
SEA	-99.9	dB		
LAS > 85.0 dB (Exceedance Counts / Duration)	0		0.0	s
LAS > 115.0 dB (Exceedance Counts / Duration)	0		0.0	s

LZpeak > 135.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0		0.0	s

LCSeq	65.4	dB
LASeq	52.4	dB
LCSeq - LASeq	13.1	dB
LAIeq	54.3	dB
LAeq	52.4	dB
LAIeq - LAeq	1.9	dB

	A	
	dB	**Time Stamp**
Leq	52.4	
LS(max)	64.3	2019/02/08 19:19:06
LS(min)	40.1	2019/02/08 19:18:28
LPeak(max)		

# Overloads	0	
Overload Duration	0.0	s

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results

Dose	-99.94	-99.94	%
Projected Dose	-99.94	-99.94	%
TWA (Projected)	-99.9	-99.9	dB
TWA (t)	-99.9	-99.9	dB
Lep (t)	38.6	38.6	dB

Statistics

LAS5.00	56.9	dB
LAS10.00	55.5	dB
LAS33.30	52.0	dB
LAS50.00	50.4	dB
LAS66.60	49.2	dB
LAS90.00	46.3	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1	2019-02-06 11:05:13	-49.9
PRMLxT1	2019-02-06 08:42:27	-49.8
PRMLxT1	2019-02-06 08:01:01	-49.0

Summary				
File Name on Meter	LxT_Data.005			
File Name on PC	SLM_0005812_LxT_Data_005.00.ldbin			
Serial Number	0005812			
Model	SoundTrack LxT®			
Firmware Version	2.302			
User	Jeff Johnson, Andrew Johnstone			
Location	Needles			
Job Description	Needles Grow Facility			
Note	100 yds E of property boundary			

Measurement				
Description				
Start	2019-02-08 19:40:13			
Stop	2019-02-08 20:00:16			
Duration	00:20:03.3			
Run Time	00:20:03.3			
Pause	00:00:00.0			
Pre Calibration	2019-02-06 11:05:13			
Post Calibration	None			
Calibration Deviation	---			

Overall Settings				
RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	143.7	dB		
	A		**C**	**Z**
Under Range Peak	99.9		96.9	**101.9**
Under Range Limit	**48.9**		46.9	54.9
Noise Floor	35.7		36.3	44.0

Results				
LASeq	53.9	dB		
LASE	84.7	dB		
EAS	33.066	µPa²h		
EAS8	791.417	µPa²h		
EAS40	3.957	mPa²h		
LZpeak (max)	2019-02-08 19:43:17		100.6	dB
LASmax	2019-02-08 19:56:18		64.1	dB
LASmin	2019-02-08 19:42:38		43.2	dB
SEA	-99.9	dB		
LAS > 85.0 dB (Exceedance Counts / Duration)	0		0.0	s
LAS > 115.0 dB (Exceedance Counts / Duration)	0		0.0	s

LZpeak > 135.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0		0.0	s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0		0.0	s

LCSeq	66.0	dB
LASeq	53.9	dB
LCSeq - LASeq	12.1	dB
LAIeq	57.2	dB
LAeq	53.9	dB
LAIeq - LAeq	3.2	dB

	A		
	dB	**Time Stamp**	
Leq	53.9		
LS(max)	64.1	2019/02/08 19:56:18	
LS(min)	43.2	2019/02/08 19:42:38	
LPeak(max)			

# Overloads	0	
Overload Duration	0.0	s

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results

Dose	-99.94	-99.94	%
Projected Dose	-99.94	-99.94	%
TWA (Projected)	-99.9	-99.9	dB
TWA (t)	-99.9	-99.9	dB
Lep (t)	40.1	40.1	dB

Statistics

LAS5.00	58.4	dB
LAS10.00	56.9	dB
LAS33.30	53.9	dB
LAS50.00	52.3	dB
LAS66.60	50.9	dB
LAS90.00	47.9	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1	2019-02-06 11:05:13	-49.9
PRMLxT1	2019-02-06 08:42:27	-49.8
PRMLxT1	2019-02-06 08:01:01	-49.0