Draft
Environmental Impact Report

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Volume 4

Appendix D to J

Euismod Energy Storage Project
by Euismod Project LLC
& Euismod Project I, LLC
(*PP26401)*

ZCC No. 22, Map 233; CUP No. 18, Map 233;
CUP No. 19, Map 233; CUP No. 20, Map 233;
CUP No. 21, Map 233; ZV No. 10, Map 233;
Non-Summary Vacation, Map 233

Kern County
Planning and Natural Resources Department
Bakersfield, California

August 2026

Appendices—Volume 4

NOTE TO REVIEWER OF ELECTRONIC FILES:

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Appendix D: Cultural Resources Phase I Investigation Report

Appendix E: Energy Utilization Evaluation Report

Appendix F1: Geotechnical Investigation Report

Appendix F2: Paleontological Resources Assessment Report

Appendix G: Phase I Environmental Site Assessment

Appendix H: Preliminary Hydrology Study

Appendix I: Noise Impact Assessment Report

Appendix J: Preliminary Plume Study

Appendix D
Cultural Resources Phase I Investigation Report

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Cultural Resources Assessment for the Euismod Project Site

Kern County, California

December 19, 2024 (Updated 5/27/26)

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Keywords: Cultural resources survey; positive results; Survey Area coverage 122 acres; Kern County; Fairmont Butte, CA Quadrangle; Section 14, Township T9N, Range R15W, SBB&M; seven historic period archaeological sites (CA-KER-011928H, CA-KER-011929H, CA-KER-011930H, CA-KER-011931H, CA-KER-011932H, CA-KER-011933H, and CA-KER-011934H); Fifteen Isolates (P-15-022549, P-15-022550, P-15-022551, P-15-022552, P-15-022553, P-15-022554, P-15-022555, P-15-022556, P-15-022557, P-15-022558, P-15-022559, P-15-022560, P-15-022561, P-15-022562, P-15-022563); all resources recommended not eligible for CRHR.

Table of Contents

Executive Summary v

1.0 INTRODUCTION 1

1.1 Project Location and Description 1

2.0 SETTING 4

2.1 Environmental Setting 4

2.2 Prehistoric Setting 4

2.2.1 Late Pleistocene (ca. > 12000 BP) 5

2.2.2 Early Holocene (ca. 12000–7000 BP) 5

2.2.3 Middle Holocene (ca. 7000–4000 BP) 5

2.2.4 Late Holocene (ca. 4000 BP – contact) 6

2.3 Ethnography 8

2.3.1 Kitanemuk 8

2.3.2 Tataviam 8

2.3.3 Vanyume/Serrano 9

2.4 Historic Context 10

3.0 REGULATORY FRAMEWORK 12

3.1 State Regulations 12

3.1.1 Historical Resources 12

3.1.2 Substantial Adverse Change and Indirect Impacts to Historical Resources 13

3.1.3 Archaeological Resources 13

3.1.4 California State Assembly Bill 52 14

3.1.4.1 Consultation with Native Americans 14

3.1.4.2 Tribal Cultural Resources 14

3.1.5 California Register of Historical Resources 14

4.0 RESEARCH METHODS 16

4.1 Records Search 16

4.2 Native American Outreach 16

4.3 Field Survey 16

5.0 RESULTS 18

5.1 Records Search 18

5.2 Historic Maps and Aerial Photography Review 28

5.3 Field Survey 29

5.3.1 Newly Recorded Archaeological Sites 29

5.3.2 Newly Recorded Isolates 35

6.0 SUMMARY AND EVALUATION 37

7.0 CONCLUSION AND RECOMMENDATIONS 38

8.0 REFERENCES 40

Tables

Table 1. Prior Cultural Resources Studies in the Survey Area and 1-mile Radius 20
Table 2. Previously Recorded Cultural Resources within 1-mile Radius of the Survey Area 25
Table 3. Newly Recorded Isolated Resources 36

Figures

Figure 1. Project vicinity. 2
Figure 2. Project Location Map. 3
Figure 3. Overview of CA-KER-011932H. View to the south. Photo taken on 11/6/2024. 31
Figure 4. Sample of Historic-era Artifacts at CA-KER-011932H. Photo taken on 11/6/2024. 32
Figure 5. Overview of CA-KER-011933H. View to the north. Photo taken on 11/7/2024. 33
Figure 6. Overview of CA-KER-011934H. View to the north. Photo taken on 11/7/2024. 34
Figure 7. Sample of Historic-era Artifacts at CA-KER-011934H. Photo taken on 11/7/2024. 35

Appendices

Appendix A: Field Results Map
Appendix B. Resumes
Appendix C. Native American Coordination Documentation
Appendix D. State of California Department of Parks and Recreation 523 Series Forms
Appendix E: Letter Addendum Report: Cultural Resources Survey for the Euismod Tie-Line Survey Area, Kern County, California

Acronyms and Abbreviations

Notation	Description
AB 52	Assembly Bill 52 of 2024
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
DPR	California Department of Parks and Recreation
OHV	Off-Highway Vehicle
NAHC	California Native American Heritage Commission
NETR	Nationwide Environmental Title Research, LLC
NRHP	National Register of Historic Places
PRC	Public Resources Code
Project	Euismod Project
SCE	Southern California Edison
SSJVIC	Southern San Joaquin Valley Information Center
USGS	U.S. Geological Survey

Units of Measure

Notation	Description
AD	Anno Domino
BP	Before Present
ft	feet(foot)

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Executive Summary

TRC was retained by Euismod Project, LLC and Euismod Project I, LLC to conduct a cultural resources assessment for the proposed Euismod Project to be developed on vacant land located northwest of the intersection of 170th Street West and Rosamond Blvd. in unincorporated Kern County, California. The proposed Euismod Project (Project) would develop battery energy storage systems that would connect to the nearby Southern California Edison Whirlwind Substation via overhead 220 kV tie-lines. The study was conducted to determine the potential for impacts to cultural resources from development of the project and provide a basis for evaluation pursuant to the California Environmental Quality Act (CEQA). Kern County is expected to be the CEQA Lead Agency for the Project. The battery energy storage systems would be located on an approximately 120-acre site and the field survey for this assessment included an additional approximately two acre area that was being considered for an optional access corridor.

This study includes a review of the cultural context and history of the Project area, a cultural resources records search of the Survey Area plus a 1-mile buffer (Study Area), a review of the Sacred Lands File by the California Native American Heritage Commission, historic map and aerial imagery review, an intensive-level pedestrian survey of the Survey Area, and the preparation of this report presenting the methodology and results of the study.

On January 30, 2024, TRC archaeologists initiated a California Historical Resources Information System records search via a data request from the Southern San Joaquin Valley Information Center (SSJVIC), located at California State University at Bakersfield. The results of the records search indicated that minimal portions of the Survey Area had been included in four prior surveys for cultural resources between 2002-2012. These surveys resulted in the identification of three cultural resources within the Survey Area and include two historic period refuse scatters (CA-KER-7185H & CA-KER-8666H) and one historic-era utility access road (P-15-020596). All three resources have been previously evaluated and recommended ineligible for listing on the National Register of Historic Places (NRHP)/California Register of Historical Resources (CRHR). In addition, 57 cultural resources have been recorded within the Study Area.

The records search also revealed that the area of the offsite Project tie-lines and interconnections at the existing SCE Whirlwind Substation were part of previous cultural resource surveys conducted for the Whirlwind Substation and associated infrastructure (Panich et al. 2010; Pacific Legacy and Urbana 2010; ICF 2022a, b) and documented one relatively large historic trash scatter (CA-KER-7214H/P-15-012793) that was evaluated and subsequently recommended as not eligible for listing on the NRHP/CRHR. The tie-line corridors were surveyed for the Project in 2026 (Wetherbee 2026), and the results can be found in Appendix E.

Site CA-KER-7214H was revisited again in 2022 by ICF during a cultural resources survey in support of the Bullhead Solar Project and observed that the southern third of the site had been destroyed by the installation of the SCE Whirlwind Substation. The northern portion of the site appeared to remain in similar condition as in 2010. Later in 2022, ICF completed another test evaluation of site CA-KER-7214H and concluded that the site may be the result of multiple dumping episodes during the mid-twentieth century and the data obtained from this site's recordation was unable to address the questions because there is no contextual information associated with the refuse dump to link the artifacts to a particular individual or group. Consequently, ICF further concluded the site does not meet any of the four CRHR criteria and is

therefore not recommended for CRHR-listing as an individual resource or as a contributor to a potential archaeological district.

TRC archaeologists conducted a cultural resources survey of the Survey Area between November 5-7, 2024. During the field survey efforts, TRC archaeologists revisited the areas where the two previously recorded historic period refuse scatters (CA-KER-7185H and CA-KER-8666H) were originally recorded; but were unable to relocate the two resources. Moderate disturbances from recreational activities, as evidenced by the presence of modern trash, OHV tracks, and bullet holes in the cans were observed at these locations which most likely resulted in these sites not being relocated. In addition, the previously recorded Access Road (P-15-020596) was noted and remains intact as previously recorded in 2020 and no modifications or changes were observed. Based on current site conditions, TRC concurs with the recommendation that sites CA-KER-7185H, CA-KER-8666H, and P-15-020596 are ineligible for listing on the NRHP/CRHR.

In addition, TRC archaeologists identified 22 newly recorded cultural resources (7 archaeological sites and 15 isolates) within the Survey Area and noted that much of the area had been disturbed by prior use and random unregulated dumping. The seven newly recorded archaeological sites (CA-KER-011928H, CA-KER-011929H, CA-KER-011930H, CA-KER-011931H, CA-KER-011932H, CA-KER-011933H, and CA-KER-011934H) are comprised of sparse historic period refuse scatters dating to the late 19th to 20th centuries and contain little potential to provide any additional information regarding the history of the area. These historic refuse scatters are ubiquitous throughout the region. The newly recorded sites do not contain artifacts or temporal significance distinguishing them from any of the similar sites found across the Antelope Valley. In addition, recreational activities have heavily disturbed and compromised the integrity of these sites. The 15 isolates date to the precontact and historic periods and lack context and data potential and are by definition not eligible for inclusion in the CRHR. All 22 newly identified cultural resources have been fully recorded on CA DPR 523 forms and have no further potential information important to history or prehistory beyond their recording. All 22 resources are recommended not eligible for listing on the CRHR.

Throughout the course of this study, no "historical resources," as defined by CEQA, were encountered within or adjacent to the Survey Area, tie-line routes, or interconnection. No further cultural resources investigations are recommended for the project site unless site development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds. Therefore, TRC recommends that Kern County may reach a finding of ‘less than significant with mitigation incorporated’ regarding cultural resources for the Euismod Project. With the recommended mitigation measure (CUL-1) there would be no foreseeable adverse impact to cultural resources and, therefore, no potential for an adverse cumulative impact.

1.0 Introduction

Between January and November 2024, at the request of Euismod Project, LLC and Euismod Project I, LLC, TRC performed a cultural resources study of approximately 122 acres (Survey Area) for the proposed Euismod Project to be developed on vacant land located northwest of the intersection of 170th Street West and Rosamond Blvd. in unincorporated Kern County, California (Figures 1-2). The proposed Euismod Project (Project) would develop battery energy storage systems that would connect to the nearby Southern California Edison (SCE) Whirlwind Substation via overhead 220 kV tie-lines. TRC conducted this study to determine whether the proposed Project may have the potential to impact properties eligible for or listed on the California Register of Historical Resources (CRHR), per the California Environmental Quality Act (CEQA). Kern County is expected to be the CEQA Lead Agency for the Project.

This study included a review of the area cultural context and history of the Survey Area, a cultural resources records search of the Survey Area plus a 1-mile buffer (Study Area), a review of the Sacred Lands File by the California Native American Heritage Commission (NAHC), historic map and aerial photography review, an intensive-level pedestrian survey, and the preparation of this report that documents the results of these efforts and provides management recommendations.

TRC personnel involved in the preparation of this report include Principal Investigator and senior archaeologist Matthew Wetherbee, MSc., RPA, archaeologist Stephen Marts, MSc., and TRC GIS specialist, Randall Blake, BA. Resumes of key personnel are provided in Appendix B.

The tie-line corridors were surveyed for the Project in 2026 (Wetherbee 2026), and the results can be found in Appendix E.

1.1 Project Location and Description

The project will use lithium-ion battery technology and ancillary electrical equipment to receive and store electric energy from the grid and deliver energy to the grid when needed. Batteries and control equipment will be housed in purpose-built enclosures. Transformers on the Project site will convert between low voltage direct current conveyed in and out of batteries and the high voltage alternating current conveyed through the 220 kV tie-line that will connect to 220 kV infrastructure at the existing SCE Whirlwind Substation located approximately 200 feet south of the proposed Project development area at closest approach. The Survey Area described in this report encompasses the maximum potential Project site footprint under consideration at the time of this work. Specifically, the Survey Area lies within Section 14, Township 9 North, Range 15 West, SBB&M on the Fairmont Butte, CA 7.5' U.S. Geological Survey (USGS) Topographic Quadrangles (Figures 1 and 2). This Cultural Resource Assessment also includes the Projects proposed offsite electric tie-lines and interconnection facilities at the SCE Whirlwind Substation based on previous surveys. The tie-line routes are shown in Figure 2. Tie line construction will include, but not be limited to, clearing for access, foundation work for tie-line support structures, and installation of overhead conductors and shield wires and overhead or under communications. Interconnection infrastructure will also need to be installed inside the developed area of the existing SCE Whirlwind Substation.

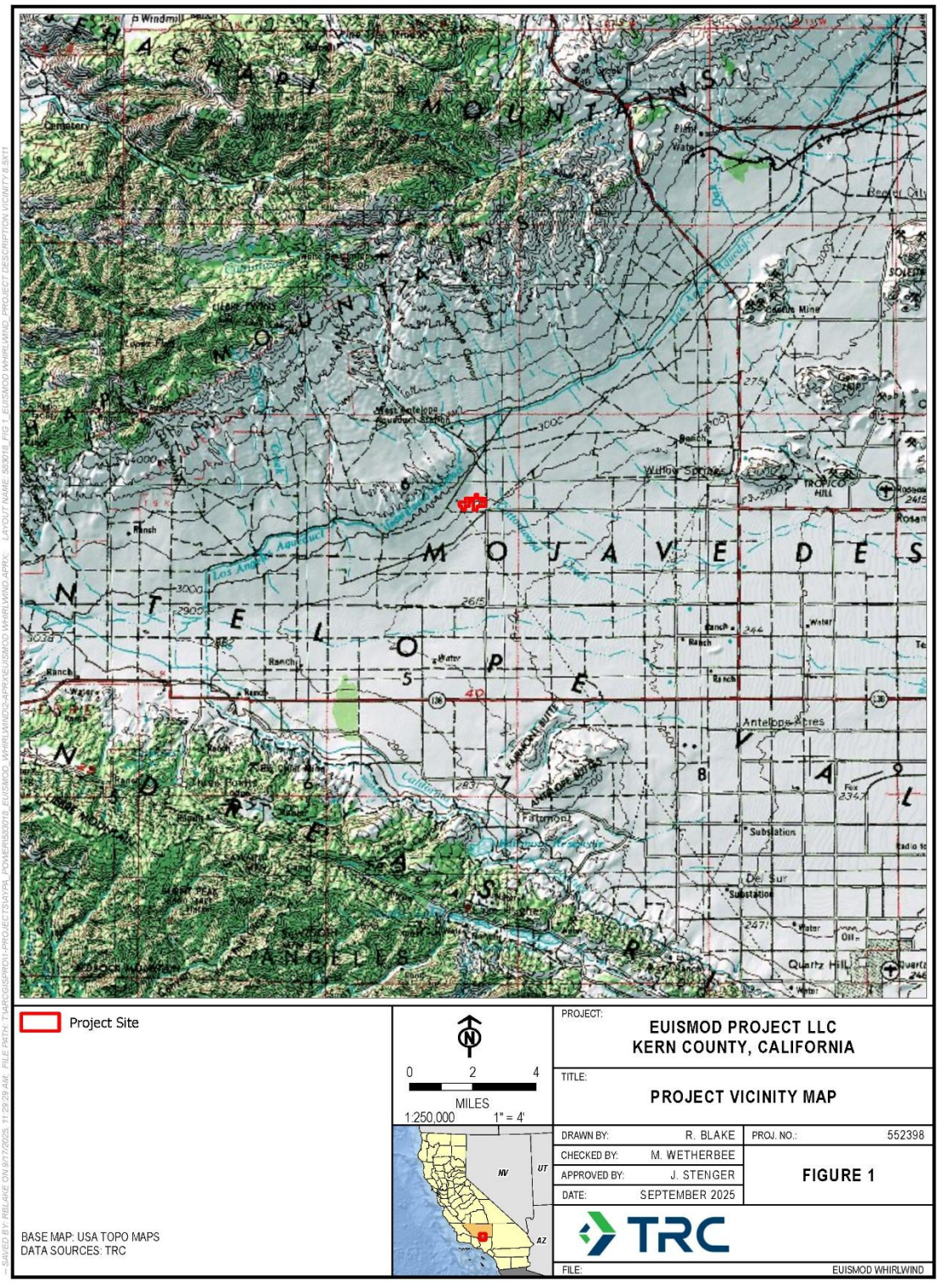


Figure 1. Project vicinity.

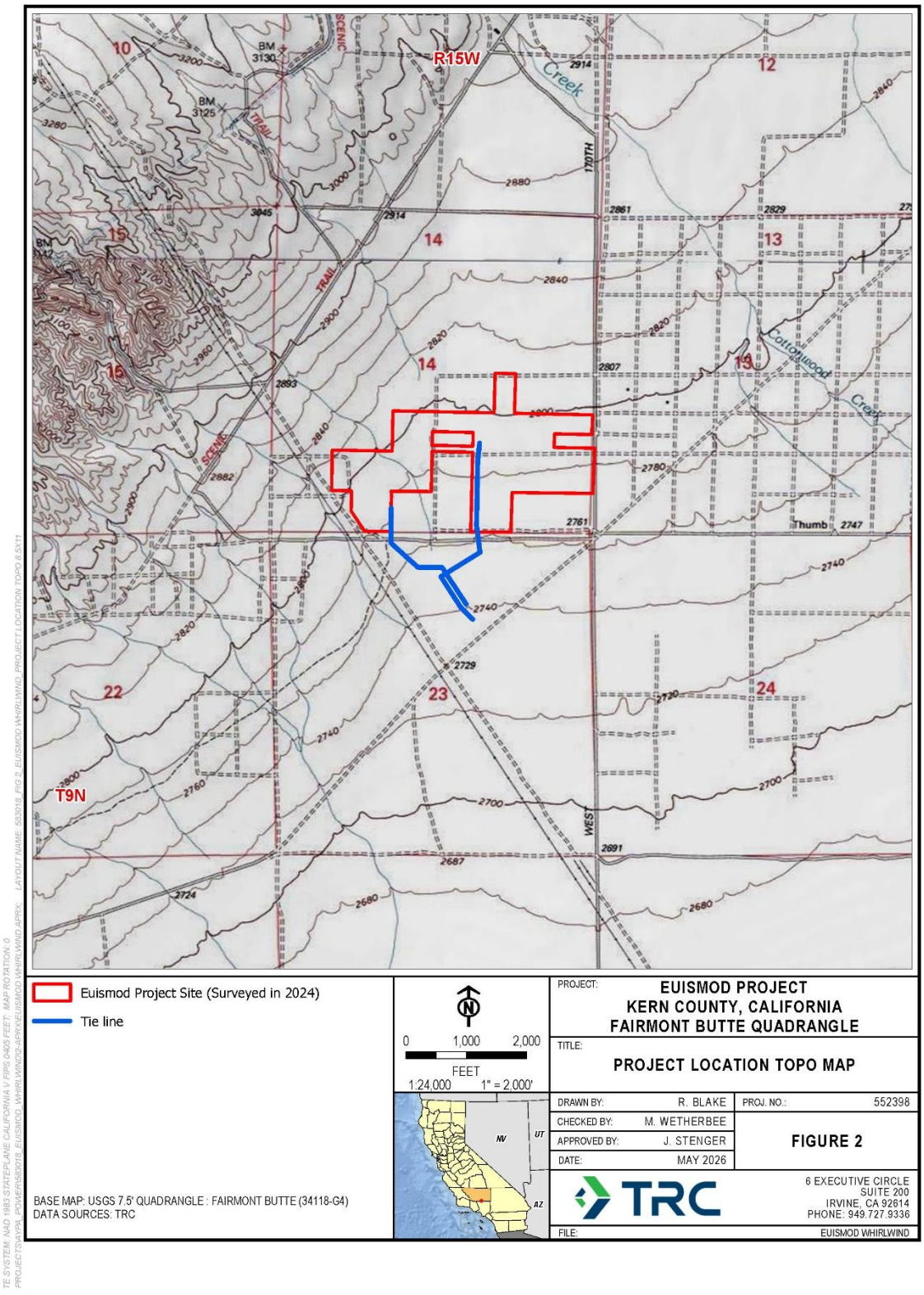


Figure 2. Project Location Map.

2.0 Setting

2.1 Environmental Setting

The Survey Area is located northwest of 170th Street W and Rosamond Blvd in Kern County on undeveloped vacant land in the northwest portion of the Antelope Valley. It is on a southeast facing slope near the base of the southeast side of the Tehachapi Mountain range. In the Survey Area, elevation ranges from approximately 2,760 feet (ft) above mean sea level toward the southeast to 2,800 ft above mean sea level toward the northwest. The ephemeral Cottonwood Creek is located approximately 0.5-mile northeast of the Survey Area, and two smaller unnamed ephemeral drainages traverse the western portion of the Survey Area draining generally toward the southeast.

The Antelope Valley is dominated by the Creosote Bush Scrub vegetation community. As the name implies, this community is dominated by creosote bush (*Larrea tridentata*) and accompanied by burro bush (*Ambrosia dumosa*). In areas subjected to modern and historic disturbance principal species include desert trumpet (*Eriogonum inflatum*), desert senna (*Cassia armata*), burro bush, and other exotic grasses.

A considerable variety of desert animals inhabit the Antelope Valley, including insects, birds, reptiles, amphibians, and mammals. Many of these would have been exploited by aboriginal societies during prehistoric times. Among these, notable species include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and ground squirrels (*Spermophilus beecheyi*). A wide variety of bird species are also present, including sparrows (*Emberizidae* sp.), Gambel's quail *(Callipepa gambelii)*, and mourning dove (*Zenaida macroura*). (Greenwood and McIntyre 1998).

The Mojave Desert is primarily north of the east-west trending Transverse Ranges, including the Santa Inez, Santa Monica, San Gabriel, San Bernardino, and Little San Bernardino mountains. The Tehachapi Mountains are a relatively short, approximately 40 miles (64 km) long, Transverse Range that connects the Coast Ranges on the west with the southern end of the Sierra Nevada on the east. The Tehachapi separate the San Joaquin Valley from the Antelope Valley portion of the Mojave Desert. Most of the Antelope Valley floor is composed of recent Quaternary alluvial deposits thought to be less than 10,000 years old. Deposits near the center of the valley floor are relatively lower in elevation and contain quantities of accumulated clay while the upper regions of the Antelope Valley are composed of older Quaternary alluvium devoid of the clay found at lower elevations (Dibblee 1980:73).

Soils are characterized using the U.S. Department of Agriculture's Natural Resource Conservation Service Web Soil Survey (2024). The surface geology of the Survey Area near the Whirlwind Substation includes mixtures of Rosamond fine sandy loam (0 to 2 percent slope), Cajon sandy loam (2 to 9 percent slope), Hesperia fine sandy loam (2 to 5 percent slope), and Hanford sandy loam (2 to 9 percent slope) (Soilweb 2024).

2.2 Prehistoric Setting

The Project area lies within a transitional area between the coastal and interior "Desert Culture" areas. In the southern California region, there is an almost continuous record of human occupation since ca. 12,000 years before present (BP). This has provided archaeologists with the opportunity to describe a great portion of the area's prehistory, but when currently accepted

cultural and chronological sequences for various sub-regions such as the Los Angeles Basin and Antelope Valley are compared, discrepancies become apparent.

2.2.1 Late Pleistocene (ca. > 12000 BP)

Over the last century, a relatively small number of archaeological finds in southern California have been attributed to the Late Pleistocene period. Cairn burials, cleared circles, crude tools, and rock alignments in the Colorado Desert were hypothesized to date from 12000 to 50000 years BP, and controversial cut marks were reported on mammoth bones (Miller et al. 1991). Three Mojave Desert sites, Calico Hills (Simpson 1980), China Lake (Davis 1982), and Manix Lake (Simpson 1958, 1960, 1964) were or are purported to have cultural materials more than 10,000 years old. The primary evidence for claims of great antiquity at these sites and others in southern California is similarity of crude “tools” to Paleolithic tools from the Old World, relative patination and/or embeddedness of the artifacts, questionable radiocarbon dates, and equally questionable associations of “tools” and Pleistocene fauna (Bamforth and Dorn 1988; Payen 1982).

2.2.2 Early Holocene (ca. 12000–7000 BP)

The Paleoindian period (ca. 12000–10000 BP) is represented in the general Project vicinity by relatively few isolated and widely distributed fluted (e.g., Clovis) points, primarily from the central Mojave Desert (Sutton 1996). Early desert populations were thought to have hunted primarily large fauna along the shores of pluvial lakes and also used lacustrine resources to some extent (Erlandson 1994; Warren and Crabtree 1986). In the latter part of the Early Holocene (ca. 10000–7000 BP), the adaptive strategy continued in a similar fashion, consisting of generalized hunting and gathering, with a focus on wetland resources. Sites from this period, known as the Lake Mojave Period, displayed a tool kit containing crescents, knives, scrapers, gravers, and perforators, as well as temporally-diagnostic Lake Mojave and Silver lake points. Early research efforts in the Mojave Desert described Lake Mojave Period sites on remnant Pleistocene geological surfaces adjacent to ancient lakes and streams, creating an obvious interpretative bias toward lacustrine focus and big game hunting (Basgall 1993). More recent work has illustrated that these sites occur in a wide variety of settings, with faunal materials dominated by small and medium-size animal remains (Basgall et al. 1994). Early descriptions of desert lakes, running streams, more productive terrestrial vegetation, and abundant fauna are largely exaggerated and, though there may have been more effective moisture than today, the current cyclic hydrologic pattern was already established by about 10000-8500 years BP (Basgall et al. 1994). Sites located at lakeshores also may be indicative of a diverse ecological adaptation, providing access to terrestrial, shoreline, and lake ecotones (Sutton 1996).

2.2.3 Middle Holocene (ca. 7000–4000 BP)

The Middle Holocene period, or Altithermal, known in the U.S. Southwest/West as the Pinto Period, is viewed as a time of extensive environmental and cultural change in southern California. Ground stone plant processing technologies appear in the archaeological record, hunting and fishing technologies diversified, and resource bases changed (Moratto 1984). This period of marked aridity was thought to have caused significant changes in settlement and subsistence practices and even abandonment of some desert areas (Wallace 1962), but more recent evidence points to considerable local, regional, and temporal variability in mid-Holocene thermal maxima throughout southern California (Carbone 1991; Hall 1992). In the Mojave Desert, environment as a cause of cultural change has been de-emphasized (McGuire and Hall

1988), because modern floral and faunal populations have persisted since the end of the Pleistocene. Occupation of the Mojave Desert was continuous but perhaps erratic (Sutton 1996) and the sites that do occur during this time have been identified along dry lake shores or stream beds (Warren 1984; Warren and Crabtree 1986), tending to be surface manifestations, with the exception of the Stahl Site (Schroth 1994).

Pinto projectile points and a flake industry similar to the Lake Mojave tool complex were considered diagnostic artifact types (Warren 1984). However, more recent excavation data from the Pinto Basin and Stahl sites indicate that Pinto points may not be useful as a chronometric index except as generalized dart points ca. 10,000–2,000 BP (Schroth 1994). Based on a surface collection at the Sweetser site (CA-KER-302), in the western Mojave Desert, Glennan proposed a Rhyolite Tradition, whose assemblage includes knives, choppers, scrapers, cores, and groundstone (Glennan 1971 in Moratto 1984). Also from this same time period, western Antelope Valley sites CA-KER-303 and CALAN-488 evidence trade with the coast with shell beads and steatite.

Early archaeological evidence from this period pointed to a primary focus on large mammals and little use of plant resources such as small, hard seeds (Warren and Crabtree 1986). Milling stones occur infrequently at Mojave Desert sites, which have material remains typical of temporary camps and are consistent with a subsistence strategy of diversified hunting and gathering (Sutton 1996; Wallace 1962; Warren 1984). Recent excavation data illustrate dietary diversity, probable use of hammerstones to process plant resources, and more complete processing of animals (McGuire and Hall 1988; Sutton 1993). Faunal remains from Pinto period sites include artiodactyls, reptiles, lagomorphs, and freshwater mussels (Sutton 1996). Warren (1984) proposed that a high degree of mobility would have ensured flexibility, allowing populations to respond to seasonal climatic changes. Subsequent studies at Fort Irwin have illustrated that exploitations of peripheral areas as well as fertile areas provided a subsistence base broad enough to ensure the availability of resources during both dry and wet periods (McGuire and Hall 1988).

2.2.4 Late Holocene (ca. 4000 BP – contact)

During this period, technology and subsistence practices continued to diversify, and economic and population expansion, along with resource intensification, occurred in most areas of southern California (McDonald 1992; Sutton 1996). The role of the environment with respect to cultural changes remains an issue.

During the Middle and Late Holocene (4000–1500 BP), a minor phase called the “little pluvial” is evidenced by multiple lacustrine episodes that may have formed more often and endured longer (Enzel et al. 1992). There may also have been an increase in groundwater and minor expansion of the riparian zones surrounding springs (McGuire and Hall 1988). Warren (1984) and Crabtree (Warren and Crabtree 1986) noted that these changes may have enabled the development of new patterns of subsistence and settlement that persisted through subsequent, drier times. Diversity in site types and artifact assemblages illustrate exploitation of a wide range of resources within a generalized, mobile subsistence strategy. Large mammals may have continued to comprise a major portion of the diet (McGuire and Hall 1988; Warren and Crabtree 1986) but plant food resources increased in importance, as evidenced by the appearance of the mortar and pestle, probably used for processing mesquite pods in the desert (Warren 1984) and acorns in the foothills (Moratto 1984). Site assemblages during this period are characterized by flake stone tools, bifaces, cores, and debitage, almost exclusively made of microcrystalline

materials such as jasper and chalcedony. Artifacts typical of this period include medium to large stemmed and notched projectile points that exhibit affinities with Great Basin point types (McGuire and Hall 1988; Warren and Crabtree 1986). Very few projectile points are usually recovered, and most are “spent” indicating long retention. Bifaces are generally made of local materials, although late-stage bifaces more often may be extralocal materials. The large bifacial core is a principal transportable artifact form for tool and flake manufacture. Grinding tools are frequent but not an abundant site component.

The smaller Rose Spring type point, which seems to be related to Southwestern point types, appears near the end of the Late Holocene in the Mojave Desert and is believed to indicate the advent of the bow and arrow (Rogers 1966; Yohe 1998). Split-twig figurines and petroglyphs found in the central Mojave Desert are associated with the appearance of the bow and arrow (Warren 1984) and, together with pit houses and Basketmaker III ceramics found in the eastern Mojave, are indicative of influences from northern Arizona (Warren 1984). Contact with the Pacific Coast is evidenced by the geographically widespread, yet rare, occurrence of shell beads and ornaments in the California deserts, Great Basin, and Southwest (Warren 1984). However, some desert sites contain large numbers of beads, especially in the Coachella Valley and Anza Borrego State Park.

During the Saratoga Springs Period (1500–800 BP), following the introduction of the bow and arrow (ca. 1500 BP), technological and economic developments in southern California persisted and expanded in the form of Anasazi influences from the east and Yuman (or Patayan) influences from the lower Colorado River Valley (Warren 1984; Yohe 1998). By the end of the Saratoga Springs period, Anasazi influences had disappeared from the Mojave Desert and were replaced by Shoshonean connections. This western expansion of Uto-Aztecan speakers, ancestral to the Luiseño and Gabrielino, from the desert areas to the coastal areas is thought to have occurred sometime between ca. 1400 and 600 BP (Moratto 1984). Flaked stone artifact assemblages closely resemble their predecessors, but Rose Spring, Cottonwood Triangular, and Desert Side-notched arrow points appear in the cultural record. Arrow points, milling stones, mortars, pestles, ceramics, obsidian and other important toolstone, and ornamental and ritual objects made of shell, bone, and stone are commonly found at sites dating to this period (Warren and Crabtree 1986; Sutton 1996).

The Late Prehistoric Period (800 BP–contact) began with the decline of Anasazi influences and the continued diversification and expansion of Numic speaking groups across the Great Basin, Takic speaking groups into southern California, and the Hopi across the Southwest (Sutton 1996). The groups which emerged are most easily discussed in terms of linguistic affinities with historical populations. Archaeological correlations are less definitive, as all of these groups shared a similar material culture and settlement pattern in the deserts and inland southern California (Warren and Crabtree 1986). Far more late period sites are obvious in southern California when compared to earlier periods. Although this may be due in part to sampling error or depositional processes, it appears that there was a large population influx or increase during this last period of prehistory. Resources were exploited more intensively, populations consolidated, and the range of foraging territory decreased. These changes appear to be widespread throughout California.

In the deserts, this is evidenced in part by the use of local lithic materials in the manufacture of tools that show increasing degrees of specialization. Additionally, site occupation during this period was lengthier and more regular than during previous periods (McGuire and Hall 1988). Desert subsistence continued to focus around hunting and gathering a diverse variety of animal

and plant resources, including small mammals (McGuire and Hall 1988). Large late prehistoric villages located in the general Project vicinity include sites in the Antelope Valley, Oro Grande (Rector et al. 1983), and Las Flores Ranch, along the Mojave River (de Barros 1990; Smith 1963). However, it appears that the Antelope Valley had become a marginal area by ca. AD 1650 (Sutton 1980 in Moratto 1984).

2.3 Ethnography

The Project area is situated at the intersection of ethnographic traditional use areas of several Native American groups, including the Kitanemuk, Tataviam, and Vanyume/Serrano (Blackburn and Bean 1978: 564; King and Blackburn 1978: 535; Bean and Smith 1978a: 579). Though the Kitanemuk is the only group documented as using the area where the Project is located (Blackburn and Bean 1978: 564), the ethnographically documented traditional use areas the Tataviam and Vanyume/Serrano are in close proximity, to the southwest and east of the Project area, respectively (King and Blackburn 1978: 535; Bean and Smith 1978a: 579). The following discussion provides information on the Kitanemuk, Tataviam, and Vanyume/Serrano, whose traditional use areas include or are immediately adjacent to the Project area. In all likelihood the Project area was a location used historically by indigenous groups as a corridor between the Tehachapi and San Gabriel Mountain Ranges.

2.3.1 Kitanemuk

The Kitanemuk were a small group located principally in the Tehachapi Mountains and spoke a Serrano language of the Takic family. The Kitanemuk were primarily mountain dwellers, though did range into the arid lowlands of the Antelope Valley during cooler seasons. Kitanemuk families were organized into patrilineal bands with bilocal residence patterns. Social rankings and prestige systems were well developed. Each village had administrative elite including a chief, a ceremonial manager, two messengers, as well as shamans, diviners and other ritualists. Ethnographic data show no evidence of significant settlements near the Survey Area, though the Kitanemuk use area is thought to have extended to the immediate east of the Project area. (Blackburn and Bean 1978). The Kitanemuk were assimilated into Missions San Fernando, San Gabriel, and possibly Ventura (San Buenaventura) and some were residents at Fort Tejon during 1850s and Tule River Reservation. (Blackburn and Bean 1978).

2.3.2 Tataviam

Very little information on the Tataviam is available. Though this group was Takic-speaking and had very similar cultural attributes to other Takic-speaking groups in the area (Kitanemuk, Serrano, Gabrielino, Cahuilla, and Cupan), the Tataviam language and other Takic languages were not mutually intelligible; this contrasts with the general similarity of these other languages. Kroeber (1925) termed this group *Alliklik*, apparently the Chumash name, but evidence exists that the Serrano and Vanyume called these people *Tatavi-yam*, thus *Tataviam* (King and Blackburn 1978).

The Tataviam territory was fairly small, centered on the upper Santa Clara River east of Piru Creek and extending east to Elizabeth Lake and Gleason Mountain, north to the foothills of the Tehachapi Mountains, and west to the upper Piru Creek and upper Santa Clara River. Though the Tataviam principally used areas on the south-facing slopes of the Liebre and Sawhill Mountains, these Mountains' northern foothills and the extreme western end of Antelope Valley were also included in their territory. (King and Blackburn 1978).

Tataviam culture was very similar to the neighboring Takic-speaking Kitanemuk and Gabrielino, but also shared some similarities with the bordering Chumashan-speaking Emigdiano and Castac Chumash. Common cultural elements of the region's Takic groups, based on information documented on the Gabrielino and Serrano/Vanyume, include small patrilineal bands with bilocal residence patterns, settling near water sources.

These groups were primarily hunters and gatherers. Principal game included deer, mountain sheep, antelope, rabbits, birds, and other small mammals. The primary staples depended on the location of each hamlet but each supplemented their diets with various other roots, bulbs, and shoots. Technologically, these Takic-speaking groups were known to utilize shell, wood, bone, stone, and plant fibers to make a variety of implements. Ground stone tools/features included bedrock milling features, mortars, metates, and manos, while flaked stone knives, projectile points, and drills were made from local cryptocrystalline silicates, volcanic, and metavolcanics. (Bean and Smith 1978a, 1978b).

Trade with neighboring groups was common and intermarriage with the Kitanemuk was not uncommon; some intermarriage with the Interior Chumash is also recorded. Conflict with adjacent groups was probably somewhat common, though usually instigated by theft, abductions, lack of ceremonial reciprocity, or trespassing. Religion focused on the creator Chingichngish. The toloache cult was central to the religion and probably male puberty rites and involved the ingestion of *Datura* accompanied by various highly formalized rituals. Sand paintings were common to the *Datura*-ingesting ceremonies, as well as female puberty rites. Historically, Takic-speaking groups cremated their dead along with formal funerary rites, and it is presumed that the Tataviam did the same (Bean and Smith 1978a, 1978b). Records show that almost all Tataviam had been baptized by 1810 and, unfortunately, by 1916 the last Tataviam speaker had died (King and Blackburn 1978).

2.3.3 Vanyume/Serrano

Spanish explorers to the mountainous areas east of Los Angeles provided the name "Serrano" (meaning 'mountaineer' or 'highlander') to the indigenous people they encountered in this region of the Transverse Ranges. However, a group related to the Serrano lived north of the mountainous region for which the Serrano name is derived. This related group, known as the Vanyume, occupied a significant portion of the western Mojave Desert from the San Bernardino Mountains east of the Cajon Pass northward and beyond the Mojave River. The eastern boundary extended to nearly the Providence Mountains (Bean and Smith 1978a).

The name Serrano is regularly used to describe a group of languages in the Takic family of the Uto-Aztecan Stock. While little linguistic information is available on the Vanyume, it is understood that the Vanyume spoke a dialect of the Serrano language (Shipley 1978; Bean and Smith 1978a). The Serrano were organized into autonomous localized lineages occupying specific territories. Because settlement was determined by the availability of water, most Vanyume lived in small villages situated near water sources, principally the Mojave River. Individual family dwellings consisted of circular, domed structures built of willow frames that were covered in thatched tule. (Bean and Smith 1978a).

The Serrano and Vanyume were primarily hunters and gatherers. Principal game included deer, mountain sheep, antelope, rabbits, birds, and other small mammals. The primary staples depended on the location of each hamlet but each supplemented their diets with various other roots, bulbs, and shoots. Early travelers like Jedediah Smith observed that the Vanyume

processed acorns and pine nuts to make an edible “mush”. The presence of acorns and pine nuts suggests that an active trade network or gathering area was present to have such staples along the Mojave River at the time of his crossing in 1826. Technologically, they were known to utilize shell, wood, bone, stone, and plant fibers to make a variety of implements. (Bean and Smith 1978a).

2.4 Historic Context

European settlement of Southern California began with the founding of Mission San Diego de Alcalá in 1769, and the first known European entry in the Mojave/Antelope Valley area took place in 1772. That encounter was a raid led by Captain Pedro Fages, in pursuit of Spanish army deserters, into the San Joaquin Valley. Fages passed Hughes Lake while crossing the mountains. Four years later, Friar Francisco Garcés reportedly followed a similar route into the Antelope Valley. In the 1840s and 1850s, other expeditions passed through the southern Mojave Desert and Antelope Valley, primarily to conduct topographic surveys. No governmental land grants were issued, and no established trails or roads are documented from this time period.

The first stimulus for development and exploitation of resources in the Antelope Valley occurred in 1876. At that time, only four roads crossed the Antelope Valley: Soledad Road, Mojave Road, the San Francisquito Canyon Road, and the Fort Tejon (now Barrel Springs) Road. In 1876, the Southern Pacific Railroad completed the San Joaquin Valley line from Oakland to Los Angeles. The line from the Los Angeles basin entered the Antelope Valley by way of Soledad Pass, located just south of present-day Palmdale, and met the tracks from the north at Lang Station, in the center of the Antelope Valley. After the completion of the railroad, Mojave became a terminus for miners and borax shippers to transport their goods out of the valley. In 1884, the Twenty Mule Team of borax haulers was established in Mojave. Stages departed every other day with passengers, mail, and mining supplies to Darwin, Cerro Gordo, Lone Pine, and Independence; these teams carried bullion on the return trips. In 1882 and 1883, the Southern Pacific extended the rail line from Mojave to Needles. The next year, in 1884, Mojave became a junction point for the Atlantic & Pacific Railroad Company, which purchased the Mojave/Needles trackage (Serpico 2000).

A devastating drought in the 1890s brought homesteading and agriculture in the Antelope Valley to a halt and small communities were virtually abandoned. Following the drought, innovations in the delivery of water revived the Antelope Valley’s agricultural industries. It came to be known as the “land of almonds and perpetual sunshine” and the greatest almond and alfalfa-growing section of Southern California.

In 1913, the completion of the Los Angeles Aqueduct from the Owens Valley in the Eastern Sierra to the City of Los Angeles provided the impetus for the development of the rich agricultural lands in the Antelope Valley. After the opening of the aqueduct, irrigated lands in the Valley increased from 5,000 acres in 1910 to 11,900 acres in 1919. This boosted agricultural productivity, primarily of pear, apple, nut, alfalfa, and poultry, and the human population increased. By 1920, large-scale cultivation of alfalfa made it the Antelope Valley’s major crop. Pears were another booming crop, second only to alfalfa. The Great Depression effectively brought a halt to this thriving industry. Blight struck some of the pear orchards in 1930s and when banks could no longer extend credit to ranchers, many lost their property and left the area.

2.4.1 Community of Rosamond

Rosamond was originally founded by the Southern Pacific Railroad Company and is said to be named for the daughter of a railroad official (Gudde 1998:321). The first post office opened in the area in 1885 under the proprietorship of David Bayles and was occasionally referred to as Baylesville or Bayles Station. Industries in the area during the late 19th century included railroad operations, and gold mining including the Tropico Mine and other previously mentioned mines in the area. Agricultural activities supported the area during the early 20th century utilizing the abundant natural groundwater available at the time. Rosamond's first schoolhouse was built in 1900 by the postmaster Charles Graves, an African-American settler to the area. World War II and the development of nearby Muroc Air Base (now Edwards Air Force Base) brought revenue to the area leading to the installation of streetlights and a water plant. Later industries included a carbon processing plant, recycling operations and continued farming. The Rosamond town council was incorporated in 1995. Today, the small community of Rosamond has a population of just over 14,000, many of whom are aerospace employees working at Edwards Air Force Base and nearby areas.

3.0 Regulatory Framework

This section identifies federal and state legislation; local statutes, ordinances, and guidelines that govern the identification and treatment of cultural resources; and the analysis of project-related effects to these resources. The lead agency must consider their relevant requirements when making decisions on projects that may affect cultural resources.

3.1 State Regulations

CEQA requires a State or Local lead agency to analyze whether historic and/or archaeological resources may be adversely impacted by a proposed project. Under CEQA, a "project that may cause a substantial adverse change in the significance of a historic resource is a project that may have a significant effect on the environment" (Public Resources Code [PRC] Section 21084.1). Answering this question is a two-part process: first, the determination must be made as to whether the proposed project involves cultural resources. Second, if cultural resources are present, the proposed project must be analyzed for a potential "substantial adverse change in the significance" of the resource.

3.1.1 Historical Resources

According to state CEQA guidelines Section 15064.5, for the purposes of CEQA, historical resources are as follows:

- A resource listed in, or formally determined eligible … for listing in the CRHR (PRC 5024.1, Title 14 California Code of Regulations [CCR], Section 4850 et seq.).
- A resource included in a local register of historical resources, as defined in Section PRC 5020.1(k), of the Public Resources Code or identified as significant in a historic resources survey meeting the requirements of Section PRC 5024.1(g).
- Any object, building, structure, site, area, place, record, or manuscript that the lead agency determines to be eligible for national, state, or local landmark listing; generally, a resource shall be considered by the lead agency to be historically significant (and therefore a historic resource under CEQA) if the resource meets the criteria for listing on the CRHR (as defined in PRC Section 5024.1, Title 14 CCR Section 4852).

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources whose historic integrity (as defined above) does not meet the National Register of Historic Places (NRHP) criteria may still be eligible for listing in the CRHR. In addition, *unique archaeological resources,* discussed below may also qualify as historical resources based on the above criteria.

According to CEQA, the fact that a resource is not listed in or determined eligible for listing in the CRHR or is not included in a local register or survey shall not preclude the lead agency from determining that the resource may be an historical resource (PRC Section 5024.1). Pursuant to CEQA, a project with an effect that may cause a substantial adverse change in the significance of a historical resource may have a significant effect on the environment (state CEQA guidelines Section 15064.5[b]).

3.1.2 Substantial Adverse Change and Indirect Impacts to Historical Resources

State CEQA guidelines specify that a "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (state CEQA guidelines Section 15064.5). Material impairment occurs when a project alters in an adverse manner or demolishes "those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion" or eligibility for inclusion in the NRHP, CRHR, or local register. In addition, pursuant to state CEQA guidelines section 15126.2, the "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."The following guides and requirements are of particular relevance to this study's analysis of indirect impacts to historic resources. Pursuant to state CEQA guidelines (Section 15378), study of a project under CEQA requires consideration of "the whole of an action, which has the potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." State CEQA guidelines (Section 15064(d)) further defines direct and indirect impacts as follows:

1. A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project.
2. An indirect physical change in the environment is a physical change in the environment, which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment.
3. An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project.

3.1.3 Archaeological Resources

In terms of archaeological resources, PRC Section 21083.2(g) defines a *unique archaeological resource* as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a proposed project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (PRC Sections 21083.2[a], [b], and [c]). CEQA notes that, if an archaeological resource is neither a unique archaeological resource nor an historical resource, the effects of the project on those resources shall not be considered to be a significant effect on the environment (state CEQA guidelines Section 15064.5[c][4]).

3.1.4 California State Assembly Bill 52

Assembly Bill 52 of 2014 (AB 52) amended PRC Section 5097.94 and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3.

3.1.4.1 Consultation with Native Americans

AB 52 formalizes the lead agency – tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the project, including tribes that may not be federally recognized. Lead agencies are required to begin consultation prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report.

3.1.4.2 Tribal Cultural Resources

Section 4 of AB 52 adds Sections 21074(a) and 21074(b) to the PRC, which address tribal cultural resources and cultural landscapes. Section 21074(a) defines *tribal cultural resources* as one of the following:

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
    a. Included or determined to be eligible for inclusion in the CRHR.
    b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.
2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Section 1 (a)(9) of AB 52 establishes that “a substantial adverse change to a tribal cultural resource has a significant effect on the environment.” Effects on tribal cultural resources should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures “capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource.” Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to tribal cultural resources, the consultation shall include those topics (PRC Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3[a]).

3.1.5 California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is “an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state’s historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change” (PRC Sections 21083.2 and 21084.1). Certain properties, including those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the

CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historical resources surveys, or designated by local landmarks programs, may be nominated for inclusion in the CRHR. According to PRC Section 5024.1(c), a resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

- **Criterion 1:** It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- **Criterion 2:** It is associated with the lives of persons important in our past.
- **Criterion 3:** It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- **Criterion 4:** It has yielded, or may be likely to yield, information important in history or prehistory.

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources whose historic integrity does not meet NRHP criteria may still be eligible for listing in the CRHR.

4.0 Research Methods

4.1 Records Search

The California Historical Resources Information System (CHRIS) information centers house cultural resources records and reports for California's 58 counties. On January 30, 2024, TRC initiated a CHRIS records search via a data request at the Southern San Joaquin Valley Information Center (SSJVIC) for the Survey Area plus an approximate 1-mile buffer (Study Area). The purpose of the records search was to identify previously recorded prehistoric or historic cultural resources, including isolated artifacts, archaeological sites, historical buildings, and structures that are within the Study Area. The records search was intended to provide information about specific resources that may be in the Project area, as well as to provide a preliminary assessment of the cultural resources' sensitivity of the general vicinity. The records search included a review of the appropriate USGS quadrangles on which archaeological sites are plotted, archaeological site records, and data from previous surveys and research reports. In addition, the CHRIS database, the NRHP, the CRHR, the listings of California Historical Landmarks, and the California Points of Historical Interest were examined to ascertain the presence of designated, evaluated, or historic-era resources in the Survey Area.

4.2 Native American Outreach

On February 12, 2024, TRC requested a search of the Sacred Lands File and requested a list of groups or individuals listed as contacts from the NAHC. On February 21, 2024, TRC received the results of the search and the contacts list from the NAHC by email and included them in this report (Appendix C). The Sacred Lands File search and tribal contact list was obtained as a courtesy to facilitate notification by the County of Kern, as the CEQA lead agency. The results of the Sacred Lands File search were negative for cultural resources.

4.3 Field Survey

Between November 5-7, 2024, TRC archaeologists Stephen Marts, MSc., and Joseph Rutkin, BA, conducted an intensive level pedestrian survey of the Survey Area under the direction of TRC Principal Investigator, Matthew Wetherbee, MSc., RPA. During the intensive-level survey, the archaeologists walked parallel east-west, 15-meter (approximately 50 ft) transects across the entire Survey Area. In this way, the ground surface was examined for the presence of prehistoric artifacts (e.g., flaked stone tools, tool-making debris, or stone milling tools), historical artifacts (e.g., metal, glass, or ceramics), sediment discoloration that might indicate the presence of a cultural midden, depressions, and other features that might indicate the former presence of structures or buildings (e.g., post holes or foundations).

Where cultural materials were encountered, TRC collected all data necessary to complete the appropriate State of California Department of Parks and Recreation (DPR) 523 Series forms. Sites were mapped with a handheld mapping-grade Samsung Tablet GPS Unit. All GPS data were exported and plotted onto the associated geo-referenced USGS 7.5-minute quadrangle to ensure accuracy and to produce location maps of all resources. In addition to the site mapping, TRC documented all sites with overview photographs. Associated features and diagnostic artifacts were inventoried, numbered sequentially, measured, recorded using a GPS unit, and photographed and sketched as appropriate. The environmental setting, depositional context, structure, topography, and geographical location were noted for each site. Artifacts were recorded by material type (e.g., glass, ceramic, or metal) and object class (e.g., bottle, clothing,

or can). Measurements and diagnostic attributes, especially maker's marks, were documented as thoroughly as possible. No artifacts were collected during the surveys.

Following fieldwork, TRC prepared DPR 523 Series forms for all newly recorded and updated resources, including primary record, archaeological site record, location map, and sketch map forms, as well as additional forms as needed. All completed DPR 523 Series forms can be found in Appendix D. DPR forms for all newly recorded and updated archaeological resources will be submitted to the SSJVIC, which will issue primary numbers for all newly recorded resources and trinomials for all newly recorded archaeological sites.

5.0 Results

5.1 Records Search

The results of the records search were received from the SSJVIC on February 12, 2024. The results of the records search indicate that there are 42 cultural resources studies within the Study Area, and 19 studies included the Survey Area between 1961 and 2019 (Table 1). However, 14 of these studies were regional overview studies that incorporated ethnographic, historical, and geological investigations and did not consist of pedestrian field surveys of the Survey Area. The first field survey to include a portion of the Survey Area was conducted in 2006 and consisted of an archaeological investigation of the first and second Los Angeles Aqueducts and selected access roads along the western edge of the Survey Area for the Los Angeles Department of Water and Power (Nilsson et al. 2006). The next three cultural resources surveys to include portions of the Survey Area were completed between 2010 and 2012 and consisted of small portions along the eastern and southern boundaries in support of projects for the Southern California Edison (SCE) Company. These prior field surveys effectively covered approximately 10 percent of the Survey Area, leaving the remaining approximate 90 percent of the area unsurveyed for cultural resources.

As a result of these prior studies, three cultural resources have been previously recorded within or adjacent to the Survey Area (Table 2; Map 3). The first cultural resource to be recorded within the Survey Area was in 2002 by URS Corporation and consisted of a historic period surface refuse scatter (CA-KER-7185H/P-15-012727) measuring approximately 300 ft. by 360 ft. located in the southwestern portion of the Survey Area. Cultural material identified included 2 church key opened beer cans (post 1935), 1 key wound external friction coffee can, 12 brown bottle glass fragments, 1 can with “Punch Here” embossed on the end (1935-1945), 7 pieces of cement, 1 windshield fragment, 1 car spring, 1 tin insecticide atomizer with rolled seams, and several redeposited milled wood fragments. Based on the diagnostic artifacts, the site dated to a post-1935 period of use and disturbances to the site included mechanized equipment that has redistributed some of the artifacts (Nilsson et al. 2006:172). The site was evaluated for NRHP eligibility and subsequently recommended ineligible for the NRHP under any criterion (Nilsson et al. 2006:280).

The second resource to be recorded within the Survey Area was in 2012 by LSA (Miller 2012) and consisted of a historic period surface refuse scatter (CA-KER-8666H/P-15-015698) dating to the latter half of the 20th century. Materials observed included a number of pull-tab metal cans, spam cans, glass shards, clay pigeon fragments, shotgun shells, and tiles mixed in with modern debris. The site measures approximately 322 ft. by 295 ft. and is located in the southeast portion of the Survey Area. Due to the cultural material being of recent age (dating to the latter half of the 20th century), site CA-KER-8666H was recommended not eligible for listing on the CRHR under any criterion (Miller 2012).

The third resource that transects the Survey Area consists of the Access Road (P-15-020596) to service the SCE Big Creek Hydroelectric System Vincent 220kV Transmission Line initially constructed in 1925-1928 and was first delineated on the 1955 Arvin USGS Topographic Quadrangle Map. The Access Road spans approximately 224 miles from Big Creek Powerhouse #3 in North Fork, California, SCE Springville Substation near Strathmore, SCE Magunden Substation in Bakersfield, and SCE Antelope Substation in Lancaster, California. The Access Road is an unpaved 15-ft wide dirt road that winds through the Sierra Nevada Mountains and Tehachapi Mountains. Today, the Access Road supports the Vincent 220kV

Transmission Line, Magunden-Mesa Transmission Line, and portions of the Correction-Cummings-Kern River #1 Transmission Line. Resource P-15-020596 was evaluated for NRHP/CRHR eligibility in 2020 and determined ineligible for the NRHP/CRHR through the Section 106 process (Urbana Preservation and Planning 2020).

The area of the proposed electric tie-in routes was previously surveyed for cultural resources in 2010 for Southern California Edison's Tehachapi Renewable Transmission Project and Whirlwind Substation (Panich et al. 2010). As a result of that survey, one large historic-era refuse scatter (CA-KER-7214H/P-15-012793) was identified and recorded. Site CA-KER-7214H contained approximately 150 cans and several discrete concentrations of colorless (post-1920s) glass fragments dispersed throughout an open alluvial plain within a creosote scrub woodland plant community. At least three 4" x 6" posts were observed; a square well-like feature and a shallow pit feature with raised berm were also present.

Pacific Legacy updated the site record in March 2010 at which the time the site boundaries were substantially expanded. Pacific Legacy completed an evaluation assessment of the site that included a series of shovel test units excavated that revealed no subsurface deposits, and historic research failed to associate the site with known individuals or events (Pacific Legacy and Urbana 2010). Based on the site assessment, Pacific Legacy recommended site CA-KER-7214H ineligible for listing on the NRHP or CRHR (Pacific Legacy and Urbana 2010).

In addition, ICF revisited site CA-KER-7214H during a survey in support of the Bullhead Solar Project and observed that the southern third of the site had been destroyed by the installation of the SCE Whirlwind Substation (ICF 2022a). The northern portion of the site appeared to remain in similar condition as in 2010. Later in 2022, ICF completed another test evaluation of site CA-KER-7214H consisting of two STPs in the northern and central portion of the site. (ICF 2022b). The STPs were excavated to a depth of 50 centimeters and negative for cultural resources, consistent with Pacific Legacy's 2010 testing results. The soil matrix was a light-brown silty loam with light gravel throughout the levels. ICF concluded that the site may be the result of multiple dumping episodes during the mid-twentieth century and that data obtained from this site's recordation can address very little (if anything) regarding the questions because there is no contextual information associated with the refuse dump to link the artifacts to a particular individual or group. Consequently, the site does not meet any of the four CRHR criteria and is therefore not recommended for CRHR-listing as an individual resource or as a contributor to a potential archaeological district (ICF 2022b).

A total of 57 cultural resources have been recorded outside the Survey Area and within a 1-mile radius and include 11 precontact lithic scatters and isolates, 44 historic period refuse scatters and isolates, two segments of historic SCE transmission lines and associated access roads, and two multi-component sites containing historic period refuse scatters and precontact cultural materials (Table 2). It is anticipated that none of these cultural resources outside of the current Survey Area will be impacted by the proposed project.

Table 1. Prior Cultural Resources Studies in the Survey Area and 1-mile Radius

Report Number	Author	Year	Study Title	Relationship to Survey Area
*KE-02232	Cawley	1961	Cawley Manuscript	Within Survey Area
*KE-01867	Hall, Matthew C., Barker, James P., Snyder, Toni B., Weaver, Richard A., and Lawton, Harry W.	1975	Background to Prehistory of the El Paso/Red Mountain Desert Region	Within Survey Area
*KE-01630	Sutton, Mark Q., Forbes, Charles, and Robinson, Sylva	1978	A Possible Paleo-Indian Site Complex in the Western Mojave Desert	Within Survey Area
*KE-01182	Schiffman, Robert A. and Garfinkel, Alan P.	1980	Draft - Archaeological Overview of Kern County	Within Survey Area
*KE-01183	Schiffman, Robert A. and Garfinkel, Alan P.	1981	Prehistory of Kern County - An Overview	Within Survey Area
KE-01918	Sutton, Mark Q.	1984	Archaeological Investigations at KER-733, Western Mojave Desert, California	Outside Survey Area (within 1-mile radius)
KE-00644	McIntyre, Michael J.	1985	Archaeological reconnaissance report - Pacific Crest Trail, Antelope Valley A.R.R.	Outside Survey Area (within 1-mile radius)
*KE-01960	Cleland, James H., Woods, Clyde M., Skinner, Elizabeth J., Kelly, Michael S., and Apple, Rebecca M.	1986	Kern River Pipeline Cultural Resource Overview	Within Survey Area
*KE-01628	Sutton, Mark Q.	1987	On the Late Prehistory of the Western Mojave Desert	Within Survey Area
*KE-01196	Robinson, R.W.	1991	A Regional Overview of the Cultural Resources of the Willow Springs Specific Plan Update, Southern Kern County, California	Outside Survey Area (within 1-mile radius)
*KE-02002	Meyers, Thomas B. and Trimble, Michael K.	1993	Archaeological Curation - Needs Assessments for Fort Sill, Oklahoma, Fort Gordon, Georgia, Vandenberg Air Force Base, California, Camp Pendleton Marine Corps Base, California, and Naval Air Weapons Station, China Lake, California	Within Survey Area

Report Number	Author	Year	Study Title	Relationship to Survey Area
KE-00355	Clift, Gregory R. and Sutton, Mark Q.	1994	An Archaeological Assessment of Tentative Tract No. 5612, Rosamond, Kern County, California	Outside Survey Area (within 1-mile radius)
*KE-02244	Everson, G. Dicken and Schneider, Joan S.	1994	Kelso Conference Papers: A Collection of Papers and Abstracts from the First Five Kelso Conferences on the Prehistory of the Mojave Desert	Within Survey Area
*KE-05164	Harvey, Victoria and Brixius, Sandra	1999	Preliminary Report on the Analysis of Shell Beads from KER-303, Western Mojave Desert, Rosamond, California	Outside Survey Area (within 1-mile radius)
*KE-05164	Harvey, Victoria	2000	Burial Beads: A Statistical Reassessment of Prehistoric Data From CA-KER-303, Rosamond, Western Mojave Desert, California	Outside Survey Area (within 1-mile radius)
*KE-05164	Harvey, Victoria	2000	Cemetery Tales: Six Prehistoric Human Burials form CA-KER-303, Western Mojave Desert, California	Outside Survey Area (within 1-mile radius)
*KE-02825	Hansen, Linda	2003	Western Mojave Desert Off Road Vehicle Designation Project	Within Survey Area
*KE-02826	Pool, Mike and Hansen, Linda	2003	Decision Record CDCA Plan Amendment: Western Mojave Desert Off Road Vehicle Designation Project	Within Survey Area
*KE-02827	Hansen, Linda, Hays, Michael E., Priester, Scott, and Pool, Mike	2003	Draft Environmental Impact Report and Statement for the West Mojave Plan: A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment Vol 1	Within Survey Area
KE-03534	Nilsson, Elena, Bevill, Russel, Kelly, Michael S., and Dwyer, Erin	2006	Archaeological Inventory of the First and Second Los Angeles Aqueducts and Selected Access Roads, Kern, Inyo, and Los Angeles Counties, CA	Within Survey Area
KE-03941	Price, Barry A., Baloian, Mary Clark, Lichtenstein, Robert, and Linder, Marc	2009	Confidential Specialist Report: Cultural Resources Inventory for the Tehachapi Renewable Transmission Project Kern, Los Angeles, and San Bernardino Counties, California	Outside Survey Area (within 1-mile radius)

Report Number	Author	Year	Study Title	Relationship to Survey Area
KE-05192	Harper, Veronica and Glover, Amy	2009	Archaeological Assessment, Tehachapi Renewable Transmission Project, Segments 4 and 10 Rosamond to Whirlwind and Rosamond to Windhub Proposed Telecommunications Line, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04224	Pacific Legacy, Inc. and Urbana Preservation and Planning, LLC.	2010	Supplemental Archaeological Investigation and National Register of Historic Places and California Register of Historical Resources Eligibility Evaluation of Archaeological Site CA-KER-7214H Southern California Edison Tehachapi Renewable Transmission Project, Segment 9, Kern County, California	Within Tie-in route
KE-04225	Jackson, Thomas, Armstrong, Matthew, and Sikes, Nancy	2010	Cultural Resources Inventory of the Southern California Edison Company Whirlwind to Rosamond and Rosamond to Windhub Telecommunication Line, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04226	Schneider, Tsim D. and Holson, John	2010	Supplemental Archaeological Survey Report #2, Tehachapi Renewable Transmission project Segment 4, Kern and Los Angeles Counties, California	Within Survey Area
KE-04227	Schneider, Tsim D. and Holson, John	2010	Supplemental Archaeological Survey Report #2, Tehachapi Renewable Transmission Project Segment 10, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04229	Panich, Lee, Cimino, Stephanie, and Holson, John	2010	Supplemental Archaeological Survey Report #1, Tehachapi Renewable Transmission Project Segment 10, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04233	Panich, Lee, Cimino, Stephanie, and Holson, John	2010	Supplemental Archaeological Survey report #1, Tehachapi Renewable Transmission Project, Segment 4, Kern and Los Angeles Counties, California	Within Survey Area
*KE-04435	Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey	2010	Volume I: A Geoarchaeological Overview and Assessment of Caltrans Districts 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA 06-0A7408 TEA Grant	Outside Survey Area (within 1-mile radius)

Report Number	Author	Year	Study Title	Relationship to Survey Area
*KE-04435	Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey S.	2010	Volume II: Appendices A Geoarchaeological Overview and Assessment of Caltrans District 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA 06-0A7408 TEA Grant	Outside Survey Area (within 1-mile radius)
KE-04057	Hudlow, Scott M.	2011	Phase I Cultural Resources Survey for PV3, Willow Springs, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04058	Hudlow, Scott M.	2011	Phase I Cultural Resources Survey for PV-11, (Rosamond Solar Array) Rosamond, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04230	Bischoff, Wayne	2011	Third Supplemental Survey Report for Additional Roads on Segment 10, Tehachapi Renewable Transmission Project, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04234	Bischoff, Wayne	2011	Cultural Resources Survey Letter Report for the Variance Request for Disturbance Area Modifications for Towers M73-T3A and M73-T3B, Segment 4, Tehachapi Renewable Transmission Project, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04099	Miller, Jason Andrew	2012	Results of the AV Solar Ranch Survey (LSA Project No. SCE1105S)	Within Survey Area
KE-05194	Valasik, Molly and Gust, Sherri	2014	Pacific Wind and Catalina Solar DIMP Cultural Resources Assessment, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-04833	Foglia, Shannon and Cooley, Theodore	2016	Cultural Resources Survey Report for the Proposed Southern California Edison Company's Antelope-Magunden No. 1 Transmission Line Rating Remediation Project, Kern County, California	Outside Survey Area (within 1-mile radius)
KE-05013	Gilbert, Rebecca	2017	Archaeological Survey Report for Southern California Edison's (SCE) North Rosamond Project near Whirlwind Substation, Kern County, California	Outside Survey Area (within 1-mile radius)

Report Number	Author	Year	Study Title	Relationship to Survey Area
*KE-05199	Allen, Mark W.	2018	Analysis of Four Lithic Assemblages from Archaeological Sites in the SR-138 Northwest Corridor Improvement Project Antelope Valley, Los Angeles County	Within Survey Area
KE-05163	Hudlow, Scott M.	2019	A Phase I Cultural Resource Survey for Property at the Northeast Corner of 170th Street West and Rosamond Boulevard, Rosamond, Kern County, California	Outside Survey Area (within 1-mile radius)
*KE-05199	Mason, Roger D., Earle, David D., Reddy, Seetha N., Allen, Mark W., Gust, Sherri, Blumel, Wendy, Bornyasz, Mitchel, and Dahdul, Mariam	2019	Historical Context and Archaeological Research Design for the Antelope Valley Study Area Los Angeles and Kern Counties, California	Within Survey Area
KE-05500	ICF	2022	Cultural Resources Technical Report; Bullhead Solar Project. Prepared for EDF Renewables, Oakland, CA.	Outside Survey Area (within 1-mile radius)
KE-05500	ICF	2022	Phase II Cultural Resources Technical Report; Bullhead Solar Project. Prepared for EDF Renewables, Oakland, CA.	Outside Survey Area (within 1-mile radius)

*Overview report and not onsite pedestrian survey.

Table 2. Previously Recorded Cultural Resources within 1-mile Radius of the Survey Area

Primary Number	Trinomial	Year	Site Type	Relationship to Survey Area
P-15-000303	CA-KER-000303/H	1970	Precontact/Protohistoric – lithic and ceramic scatter, hearths, habitation debris/historic refuse scatter	Outside (within 1-mile radius)
P-15-012722	CA-KER-007180H	2002	Historic – Refuse scatter, foundations	Outside (within 1-mile radius)
P-15-012725	CA-KER-007183H	2002	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-012726	CA-KER-007184H	2002	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-012727	CA-KER-007185H	2002	Historic – Refuse scatter	Within Survey Area
P-15-012728	CA-KER-007186H	2002	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-012729	CA-KER-007187H	2002	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-012779		2007	Precontact isolate	Outside (within 1-mile radius)
P-15-012781		2007	Precontact lithic scatter	Outside (within 1-mile radius)
P-15-012792		2007	Precontact isolate cairn	Outside (within 1-mile radius)
P-15-012793	CA-KER-007214H	2010	Historic – Refuse scatter	Within Tie-in route
P-15-012803	CA-KER-007224H	2007	Historic - foundations	Outside (within 1-mile radius)
P-15-013655	CA-KER-007672	2007	Precontact lithic scatter and cairn	Outside (within 1-mile radius)
P-15-013656	CA-KER-007673H	2007	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-013657	CA-KER-007674H	2007	Historic – Refuse scatter	Outside (within 1-mile radius)

Primary Number	Trinomial	Year	Site Type	Relationship to Survey Area
P-15-013829	CA-KER-007743	2010	Precontact lithic scatter	Outside (within 1-mile radius)
P-15-013830	CA-KER-007744H	2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-013831	CA-KER-007745H	2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-013832	CA-KER-007746H	2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-014589	CA-KER-008173H	2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-014592	CA-KER-008175H	2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-014597	CA-KER-008180H	2010	Historic – Refuse scatter, roads	Outside (within 1-mile radius)
P-15-014598	CA-KER-008181H	2010	Historic - roads	Outside (within 1-mile radius)
P-15-014691	CA-KER-008258H	2011	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-015698	CA-KER-008666H	2012	Historic – Refuse scatter	Within Survey Area
P-15-015744		2012	Historic - isolate	Outside (within 1-mile radius)
P-15-015745		2012	Historic - isolate	Outside (within 1-mile radius)
P-15-015746	CA-KER-008682H	2012	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-015747		2012	Historic - isolate	Outside (within 1-mile radius)
P-15-016245		2011	Precontact - isolate	Outside (within 1-mile radius)
P-15-016246		2011	Precontact - isolate	Outside (within 1-mile radius)

Primary Number	Trinomial	Year	Site Type	Relationship to Survey Area
P-15-016593	CA-KER-009169/H	2009	Precontact – lithic scatter; Historic refuse scatter	Outside (within 1-mile radius)
P-15-016594	CA-KER-009170H	2009	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016603	CA-KER-009179H	2009	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016615	CA-KER-009191H	2010	Historic – Refuse scatter, foundations	Outside (within 1-mile radius)
P-15-016628		2008	Precontact - isolate	Outside (within 1-mile radius)
P-15-016634		2008	Precontact - isolate	Outside (within 1-mile radius)
P-15-016660		2009	Historic - isolate	Outside (within 1-mile radius)
P-15-016661		2009	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016662		2009	Precontact - isolate	Outside (within 1-mile radius)
P-15-016667		2009	Precontact - isolate	Outside (within 1-mile radius)
P-15-016672		2009	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016674		2009	Precontact - isolate	Outside (within 1-mile radius)
P-15-016680		2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016681		2010	Precontact - isolate	Outside (within 1-mile radius)
P-15-016682		2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016683		2010	Historic – isolate	Outside (within 1-mile radius)

Primary Number	Trinomial	Year	Site Type	Relationship to Survey Area
P-15-016688		2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016689		2010	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-016690		2010	Historic – isolate	Outside (within 1-mile radius)
P-15-016692		2010	Historic – isolate	Outside (within 1-mile radius)
P-15-017243		2011	Historic SCE Big Creek Hydroelectric System Company Vincent 220kV Transmission Line	Outside (within 1-mile radius)
P-15-017582		2011	Historic SCE Antelope-Magunden #1 220kV Transmission Line	Outside (within 1-mile radius)
P-15-017588		2012	Historic – isolate	Outside (within 1-mile radius)
P-15-017589		2012	Historic – isolate	Outside (within 1-mile radius)
P-15-019153		2016	Historic – isolate	Outside (within 1-mile radius)
P-15-019154	CA-KER-010447H	2016	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-019725		2017	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-020415		2019	Historic – Refuse scatter	Outside (within 1-mile radius)
P-15-020596		2019	Historic - Access Road to SCE Big Creek Hydroelectric System Vincent 220kV Transmission Line	Within Survey Area

5.2 Historic Maps and Aerial Photography Review

In addition to consulting records maintained by CHRIS, TRC reviewed Bureau of Land Management General Land Office map dated 1856, and 1915, 1943, 1949, and 1965 USGS quadrangle maps, Google Earth and NETRonline historic aerial imagery, and the NRHP for historic properties or features that may have once been located within the Project area.

Historical sources consulted during this study show that in the 1850s no man-made features of any kind were observed within or adjacent to the Project area. Historic topographic maps from 1915 show the forerunners of 170 Street W along the eastern boundary and a road traversing the Survey Area. Between 1943-1949, an Edison Co. Transmission line is indicated west of the Survey Area and the vicinity continued to develop with additional roadways and no structures are present within the Survey Area or offsite electric tie-line areas. Historic aerial imagery from 1948 and 2022 show the land within the Survey Area and the area of the electric tie-lines as open and undeveloped to the present day except for the SCE Whirlwind Substation and a high voltage transmission line constructed in 2010 and later (NETR 2024).

5.3 Field Survey

TRC conducted an intensive-level pedestrian survey of the entire 122-acre Survey Area. Ground surface visibility was generally good to excellent, averaging approximately 80 percent throughout the Survey Area. Although some vegetation was present, archaeologists generally had very good visual access to the Survey Area. Vegetation throughout the Survey Area consisted of Joshua trees and creosote bushes. Soils observed within the property consisted of loose sand, silt, gravel, and decomposed granite. Metamorphic rocks like schist, gneiss, and quartzite were present as gravel while larger boulders were mostly granitic. An abundance of quartz rich gravel was also present. Gravel piles were observed in the western half of the Survey Area and often in clusters most likely resulting from on-going unregulated dumping. The western half of the Survey Area also had a series of dry creek beds that trend in a southeast direction. Because of the nature of historic-era resources identified in and near the Survey Area all being exclusively surface sites, it is unlikely that intentionally buried deposits associated with identified historic archaeological sites are present. Modern refuse was observed throughout the Survey Area resulting from many decades of unregulated dumping.

During the field surveys, TRC identified and recorded 22 cultural resources within the Survey Area. These resources consist of seven newly identified archaeological sites and 15 newly identified isolates (see Table 3; Appendix A). All of the archaeological sites are comprised exclusively of historic period refuse scatters dating to the late 19th to mid to late 20th centuries. The isolates consist of 13 historic period artifacts and two precontact artifacts identified throughout the Survey Area without any associated features. California DPR 523 Series forms for all recorded resources are included as Appendix C. The two previously recorded historic period refuse scatters (CA-KER-7185H and CA-KER-8666H) were not relocated during the current field efforts and there were moderate disturbances from recreation activities from modern use of the area that may have displaced these two resources. However, the previously recorded Access Road (P-15-020596) was relocated during the current field survey. Because the resource was recorded and evaluated in 2020, and no notable changes or modifications were observed, a site record update was not completed. Below is a description of each newly recorded cultural resource.

5.3.1 Newly Recorded Archaeological Sites

CA-KER-011928H (P-15-022564/SITE-H-001)

CA-KER-011928H is a sparse historic-era refuse scatter measuring approximately 175 ft × 95 ft within and near a dry wash with loose decomposed granite and sandy topsoil. Artifacts identified include brick fragments, sanitary cans, and a crushed hole-in-cap can. Soils are mostly composed of alluvial decomposed granite. Bricks included a 2"× 2"× 8" red brick, 3+

miscellaneous red brick fragments, a cement brick fragment, and two sanitary cans with bullet holes, one crushed hole-in-cap can (mid 1800s-1949), and one large crushed 4 gallon can. The date range for all cans is post-1900, with most dating to the middle twentieth century (Maxwell 1993). The topography surrounding the site consists of the flat desert terrain with shallow seasonal drainages. Local vegetation is primarily creosote bushes with scattered Joshua trees and long dry grasses. Ground surface visibility was 80 percent. There were moderate disturbances from water and wind erosion, recreation activities, and modern use of the area as evidenced by the presence of recent trash, OHV tracks, and bullet holes in the cans.

CA-KER-011929H (P-15-022565/SITE-H-003)

CA-KER-011929H is a sparse historic-era refuse scatter measuring approximately 432 ft × 240 ft located on an alluvial plain with loose decomposed granite and sandy topsoil. Artifacts identified include a "…RT 4/5 QU"art glass bottle top, clear glass bases and body shards, 1 gallon rectangular liquid can with twist cap and a soldered wire handle (used as a target), 5+ hole-in-cap cans (pre 1918), one plain tobacco can, one 1-gallon internally rolled side seam can with knife or lever opening, milled wood, pane glass, and one hole-in-cap can ~3"×4 3/8" with 7/8" cap, and one internally rolled side seam can. A potential fire pit is also present. The date range for all cans is post-1900, with most dating to the middle twentieth century (Maxwell 1993). The topography surrounding the site consists of flat desert terrain with shallow seasonal drainages. Vegetation observed primarily consists of creosote bushes with scattered Joshua trees and dry grasses. Ground surface visibility was 70 percent. Disturbances were noted and include use of the area for recreation, as evidenced by the presence of modern trash, OHV tracks, and bullet holes in the cans.

CA-KER-011930H (P-15-022566/SITE-H-006)

CA-KER-011930H is a small sparse historic-era refuse scatter measuring approximately 40 ft × 27 ft situated on an alluvial plain with loose decomposed granite and sandy topsoil. Artifacts identified include three double church key opened beverage cans with crimped side seam, brown bottle glass shards, nine bimetal pop-top cans, green glass, one clear glass bottle top, one “Ball” hobble skirt bottle bottom (1961+), dark aqua glass skirted and ribbed beverage bottle by Maywood glass Co. (1930-1959), one "lift ring, one “pull open" bimetal crenelated side seam pop-top beverage can (1965-1983), and one aluminum pop-top can (1962-1979). The date range for all cans is post-1900, with most dating to the middle twentieth century (Maxwell 1993; Briggs 2018; Lockhart et al. 2017). The topography surrounding the site consists of flat desert terrain with shallow seasonal drainages. Vegetation observed primarily consists of creosote bushes with scattered Joshua trees and dry grasses. Ground surface visibility was 90 percent. Disturbances were noted and include use of the area for recreation, as evidenced by the presence of modern trash, OHV tracks, and bullet holes in the cans.

CA-KER-011931H (P-15-022567/SITE-H-007)

CA-KER-011931H is a small sparse historic-era refuse scatter measuring approximately 70 ft × 37 ft situated on an alluvial plain with loose decomposed granite and sandy topsoil. Artifacts identified include one Crosman Arms Super Pell "260 22 CA" tin (1950s), one Glass Container Corp. (1934-1964), brown glass bottle bottom, and one Nesbitts 16 fl. oz. bottle with lithography dating from 1950-1970. The date range for all artifacts is post-1900, with most dating to the middle twentieth century (Maxwell 1993; Briggs 2018; Lockhart et al. 2017). The topography surrounding the site consists of flat desert terrain with shallow seasonal drainages. Vegetation observed primarily consists of creosote bushes with scattered Joshua trees and dry grasses.

Ground surface visibility was 90 percent. Disturbances were noted and include use of the area for recreation, as evidenced by the presence of modern trash, OHV tracks, and bullet holes in the cans.

CA-KER-011932H (P-15-022568/SITE-H-011)

CA-KER-011932H is a sparse historic-era refuse scatter measuring approximately 188 ft × 110 ft situated on an alluvial plain with loose decomposed granite and sandy topsoil (Figure 3). Artifacts identified at the site include one ~4" x $4^{11/16}$" hole-in-cap can with a $2^{1/4}$" cap and 1/4" solder dot (1860-1941), six aqua glass fragments, one amethyst glass fragment (ca. 1885-1920), one fragmented brown glazed crock pot, one steel spoon, one small spoked metal wheel, one crushed sanitary can, 2+ opaque white milk glass fragments, and a purple glass base embossed with "M" "Patented September 20 1898" (Figure 4; Marion Flint Glass Co., 1894-ca. 1912). No distinct features are present. The topography surrounding the site consists of flat desert terrain with shallow seasonal drainages. Vegetation observed primarily consists of creosote bushes with scattered Joshua trees and dry grasses. Ground surface visibility was 90 percent. The date range for the artifacts is 1885 through to the middle twentieth century indicating multiple dumping episodes (Maxwell 1993; Briggs 2018; Lockhart et al. 2017). Disturbances were noted and include use of the area for recreation, as evidenced by the presence of modern trash, OHV tracks, and bullet holes in the cans.



Figure 3. Overview of CA-KER-011932H. View to the south. Photo taken on 11/6/2024.



Figure 4. Sample of Historic-era Artifacts at CA-KER-011932H. Photo taken on 11/6/2024.

CA-KER-011933H (P-15-022569/SITE-H-013)

CA-KER-011933H is a small sparse historic-era refuse scatter measuring approximately 74 ft × 52 ft situated on an alluvial plain with loose decomposed granite and sandy topsoil (Figure 5). Artifacts identified include one brown glass bottom and fragments (Owen's Illinois plant 6 [1929-1964]), clear Anchor Hocking bottle broken into fragments, one shot hole-in-cap can, and one 5-gallon steel bucket with bullet holes. No distinct features are present. The topography surrounding the site consists of flat desert terrain with shallow seasonal drainages. Vegetation observed primarily consists of creosote bushes with scattered Joshua trees and dry grasses. Ground surface visibility was 90 percent. The date range for all cultural material is post-1900, with most dating to the middle twentieth century (Maxwell 1993; Briggs 2018; Lockhart et al. 2017). Disturbances were noted and include use of the area for recreation, as evidenced by the presence of modern trash, OHV tracks, and bullet holes in the cans.



Figure 5. Overview of CA-KER-011933H. View to the north. Photo taken on 11/7/2024.

CA-KER-011934H (P-15-022570/SITE-H-014)

CA-KER-011934H is a historic-era refuse scatter measuring approximately 120 ft × 68 ft situated on an alluvial plain with loose decomposed granite and sandy topsoil (Figure 6). Artifacts identified include one rubber tire, amethyst glass fragments (ca. 1885-1920), Embossed "FOR DRIP OR GLASS COFFEE MAKERS" key-wind can lid, embossed clear glass bottle fragments, one shot bimetal pop-top beverage can, ceramic saucer sherds, Owen's Illinois "DES PaT 114.028" clear glass bottle bottom and two body fragments, and one shot thick aluminum baking tray (Figure 7). No distinct features are present. The topography surrounding the site consists of flat desert terrain with shallow seasonal drainages. Vegetation observed primarily consists of creosote bushes with scattered Joshua trees and dry grasses. Ground surface visibility was 90 percent. The date range for the artifacts is 1885 through to late twentieth century indicating multiple dumping episodes (Maxwell 1993; Briggs 2018; Lockhart et al. 2017). There was moderate disturbances from water and wind erosion, recreation activities, and modern use of the area, as evidenced by the presence of modern trash, OHV tracks, and bullet holes in the cans.



Figure 6. Overview of CA-KER-011934H. View to the north. Photo taken on 11/7/2024.



Figure 7. Sample of Historic-era Artifacts at CA-KER-011934H. Photo taken on 11/7/2024.

In sum, all of the sites identified during the current field survey efforts are similar in nature and date to the historic period. All the sites appear to represent the accumulation of debris through casual unregulated dumping and disposal, as well as from prior construction projects in the area, and most likely reflect a secondary deposit from nearby access roads or transported to be used for recreational target practice, which is common in the area. The refuse scatters appear to be surface deposits, without any distinct features, and there is no indication that refuse was intentionally buried at any of these locations. The artifact assemblages are consistent with other historic refuse scatters and random dumping sites throughout the region. The contents of each of these sites are generic, commonly found in the area, and lack any association with discrete historic populations. Disturbances were noted at each site and include water and wind erosion, as well as modern use of the area for recreation, as evidenced by several OHV tracks and the presence of modern trash. Few meaningful conclusions can be drawn from further study at any of these refuse scatters.

5.3.2 Newly Recorded Isolates

TRC identified and recorded 15 isolated resources, consisting of 13 historic resources and two precontact resources within the Survey Area (Table 3; Appendix A). The historic resources consist mostly of cans and glassware, all dating from early to mid-twentieth century. These are consistent with other historic-era refuse found in the area and likely the result of casual dumping or people using the area for recreation. Precontact isolates consist solely of flaked stone debitage, which is consistent with precontact sites recorded in the area and throughout the region and are likely associated with prehistoric people's use of the area.

Table 3. Newly Recorded Isolated Resources

Temporary Isolate Number	Time Period	Description	Date Range of Historic-era Artifacts	References	Proximity to Survey Area
P-15-022549/ ISO-H-004	Historic	Bimetal pull tab can	1968–1979	Maxwell 1993	Within
P-15-022550/ ISO-H-005	Historic	Crushed double church key can and Dr Pepper glass bottle fragments	1935-1970	Maxwell 1993	Within
P-15-022551/ ISO-H-006	Historic	Aluminum beer can teardrop pop-top	1962-1970	Maxwell 1993	Within
P-15-022552/ ISO-H-007	Historic	Aluminum pull tab beverage can	1962–1970	Maxwell 1993	Within
P-15-022553/ ISO-H-014	Historic	Piels Real Draft Beer" "New Aluminum" can “Lift Ring Pull Open"	1967-1969	Maxwell 1993	Within
P-15-022554/ ISO-H-015	Historic	Bimetal pop-top beverage can. crimped side seam	1962-1975	Maxwell 1993	Within
P-15-022555/ ISO-H-018	Historic	O. Ames Crucible Steel 1896 style riveted shovel	Post-1886	Gordon 2020	Within
P-15-022556/ ISO-H-020	Historic	Crushed matchstick milk can	1933-1970s	Schroeder 2021	Within
P-15-022557/ ISO-H-021	Historic	Double church key opened beverage can	1935-1970	Maxwell 1993	Within
P-15-022558/ ISO-H-022	Historic	Amethyst glass neck and opening, molded side seams, cork or wax closure and Green 7 up bottle neck and rim with lithography	Pre-1920 1939-1969	Lindsey et al. 2016 Lockhart 2007	Within
P-15-022559/ ISO-H-025	Historic	Cragmont COLA glass bottle fragments	1968	—	Within
P-15-022560/ ISO-H-026	Historic	Crushed small matchstick solder dot milk can	1933-1970s	Schroeder 2021	Within
P-15-022561/ ISO-H-027	Historic	White milk class rim and body fragment of tall container	1930-1980s	—	Within
P-15-022562/ ISO-L-001	Precontact	Reddish (rhyolite) Tertiary flake	—	—	Within
P-15-022563/ ISO-L-002	Precontact	Quartz secondary flake	—	—	Within

6.0 Summary and Evaluation

TRC conducted this cultural resources assessment for the project for the Lead Agency's needs pursuant to CEQA. Background research and archaeological surveys were conducted to identify cultural resources that could be impacted by ground-disturbing activities associated with the proposed Project. TRC conducted intensive-level pedestrian surveys of the entire 122-acre Survey Area encompassing the 120 acre Project site and an additional approximately two acres previously being considered for an optional access corridor. The current field survey efforts identified a total of 22 cultural resources within the Survey Area and include seven newly identified archaeological sites, and 15 newly identified isolates. These resources generally reflect the use of the area by prehistoric peoples, as well as the historical use of the project vicinity for recreation activities and unregulated dumping.

Resources CA-KER-011928H, CA-KER-011929H, CA-KER-011930H, CA-KER-011931H, CA-KER-011932H, CA-KER-011933H, and CA-KER-011934H all consist of sparse historic period refuse scatters containing a variety of artifacts including cans, glass, brick, and ceramic fragments that produce a date range of late nineteenth and twentieth centuries. Modern debris dating from the 1970s to 1980s was also identified within the sites. Although some of the materials are partially buried through natural depositional processes, all of the refuse scatters appear to be strictly surface deposits created by unregulated dumping. Nothing distinguishes these historic sites from any other of the vast majority of similar sites found across the Antelope Valley. None of these resources are associated with events that have made a significant contribution to the broad pattern of local or regional history or the cultural heritage of California (Criterion 1). No individuals important to local, California or national history were found to be specifically associated with any of these resources (Criterion 2). The lack of distinct features or other associated artifacts and the presence of modern refuse suggests that is has been used over time, most likely in multiple, unrelated depositional events, and presents a mixed context and therefore does not represent any unusual or unique features that would make the site distinctive (Criterion 3). These historic surface refuse scatters do not contain sufficient information to contribute to significant questions in historical archaeology and there is low likelihood of buried archaeological deposits at these sites (Criterion 4), and they do not represent a unique archaeological resource. The research potential at CA-KER-011928H, CA-KER-011929H, CA-KER-011930H, CA-KER-011931H, CA-KER-011932H, CA-KER-011933H, and CA-KER-011934H has been exhausted, and few meaningful conclusions can be drawn from further study. Consequently, it is recommended that resources CA-KER-011928H, CA-KER-011929H, CA-KER-011930H, CA-KER-011931H, CA-KER-011932H, CA-KER-011933H, and CA-KER-011934H are not eligible for listing on the CRHR. Recordation of these sites has been completed and DPR forms will be filed with the SSJVIC. No further work is recommended for these resources.

Isolates, by definition are generally not considered significant under CRHR, nor are they considered unique archaeological resources. Therefore, TRC finds the project will result in no impacts to isolated resources listed in Table 3, and no further cultural resource work is recommended for these resources.

7.0 Conclusion and Recommendations

TRC conducted a cultural resources survey of an approximately 122-acre Survey Area that encompasses the maximum Project site footprint under consideration at the time of this work. The records search indicated that four prior cultural resources studies included portions of the Survey Area, and four cultural resources were previously identified within or adjacent to the Survey Area and tie-in route. These previously recorded resources include three historic period refuse scatters (CA-KER-7185H, CA-KER-7214H, and CA-KER-8666H) and one historic built environment resource comprised of an access road (P-15-020596) initially constructed to service the SCE Big Creek Hydroelectric System Vincent 220kV Transmission Line. Resources CA-KER-7185H, CA-KER-7214H, and CA-KER-8666H have been previously evaluated for NRHP/CRHR eligibility and subsequently recommended ineligible for the NRHP/CRHR, while resource P-15-020596 was found ineligible for the NRHP/CRHR through Section 106 process.

During the field survey efforts, TRC archaeologists revisited the areas where the two previously recorded historic period refuse scatters (CA-KER-7185H and CA-KER-8666H) were originally recorded; but were unable to relocate the two resources. Natural and mechanical disturbances were observed at these locations which most likely resulted in these sites not being relocated due to ground disturbing processes. In addition, the previously recorded Access Road (P-15-020596) was noted and remains intact as previously recorded in 2020 and no modifications or changes were observed. Consequently, it is therefore recommended that sites CA-KER-7185H, CA-KER-8666H, and P-15-020596 retain their prior eligibility status.

In addition, TRC archaeologists identified 22 newly recorded cultural resources (7 archaeological sites and 15 isolates) within the Survey Area and noted that that much of the area had been disturbed by prior recreational use and random unregulated dumping. The seven newly recorded archaeological sites (CA-KER-011928H, CA-KER-011929H, CA-KER-011930H, CA-KER-011931H, CA-KER-011932H, CA-KER-011933H, and CA-KER-011934H) are comprised of sparse historic period refuse scatters dating to the late 19th to 20th centuries and contain little potential to provide any additional information regarding the history of the area. These historic refuse scatters are very common throughout the region, and nothing distinguishes these historic sites from any other of the vast majority of similar sites found across the Antelope Valley. In addition, recreational activities have heavily disturbed and compromised the integrity of these sites. The 15 isolates date to the precontact and historic periods and lack context and data potential and are, by definition, not eligible for inclusion in the CRHR. All 22 newly identified cultural resources have been fully recorded and contain no further information important to history or prehistory beyond their recording, and all are recommended not eligible for listing in the CRHR.

The results of the current study identified no "historical resources," as defined by CEQA, within or adjacent to the Survey Area, tie-line routes, or interconnection. No further cultural resources investigations are recommended for the project site unless site development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds. Therefore, TRC recommends that Kern County may reach a finding of ‘less than significant with mitigation incorporated’ regarding cultural resources for the Euismod Project.

In addition, TRC recommends the following mitigation measure to ensure that significant impacts to cultural resources are avoided and any unanticipated discoveries are treated appropriately during project implementation:

- **CUL-1: Develop Cultural Resource Unanticipated Discovery Plan (UDP)**. The project applicant shall prepare and submit for approval a Cultural Resource Unanticipated Discovery Plan (UDP) to guide all cultural resource management activities during project construction. The Plan shall be submitted to Kern County for review and approval at least 30 days before the start of construction.

  In the event of an unanticipated discovery, all work must be suspended within 50 feet of the find until a qualified archaeologist evaluates it. Construction activities may continue in other areas. If, in consultation with the County, the discovery is determined not to be important pursuant to State law described above, work will be permitted to continue in the area.

  If the qualified archaeologist determines a resource to constitute a “historical resource” pursuant to CEQA Guidelines Section 15064.5(a) or a “unique archaeological resource” pursuant to Public Resources Code Section 21083.2(g), the qualified archaeologist shall coordinate with the project applicant and the County to develop a formal treatment plan. The plan should serve to reduce impacts to the resources and allow construction to proceed. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Section 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis.

With the above recommended mitigation measure there would be no foreseeable adverse impact to cultural resources and, therefore, no potential for an adverse cumulative impact. Furthermore, if human remains are unearthed during excavation, State Health and Safety Code Section 7050.5 state that, “there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered [has made the appropriate assessment and] the recommendations concerning the treatment and disposition of the human remains has been made to the person responsible for the excavation or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.”

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Appendix A. Field Results Map

(CONFIDENTIAL)

Appendix B. Resumes

TRC Cultural Resource Senior Staff conducted the survey effort. These individuals meet the professional qualification standards in Archaeology, Historic Preservation, and Architectural History, as set forth by the Secretary of the Interior (Standards and Guidelines*, Federal Register* Vol. 48, No. 190, September 28, 1983).

Matthew Wetherbee, MSc. Paleoecology of Human Societies, University College London, England, Register of Professional Archaeologists (RPA)

Position and Project Role: Senior Archaeologist, Report Co-author

Mr. Wetherbee is an archaeologist with over 20 years of Cultural Resources Management experience focused on prehistory throughout California and the Pacific Northwest. He has managed multiple small and large-scale residential and commercial projects for environmental firms, and high-profile capital projects and operations and maintenance environmental compliance programs. This work includes pre-field research, cultural resources surveys, significant assessments for California Register of Historical Resources (CRHR) and National Register of Historical Places (NRHP), developing and reviewing mitigation recommendations, preparing technical reports and agreement documents, and reviewing consultants work according to state and federal heritage laws and regulations such as California Environmental Quality Act (CEQA), Washington State Environmental Policy Act (SEPA), and Section 106 and 110 of the National Historic Preservation Act (NHPA) for protecting cultural resources.

Stephen Marts, MSc. Anthropology, University of California, Riverside

Position and Project Role: Archaeologist, Field Director, Report Co-author

Mr. Marts has over 10 years of experience in California with field directing archaeological surveys, outdoor operations, and Section 106 compliance, including work with FCC 620 and 621 wireless applications. As an avid learner, he has honed his higher education, selecting classes that would aide him in a career as an archaeologist; taking classes specifically in archaeological theory, cultural studies, forensic anthropology, geological studies, and classes in making ceramics to aid him in understanding materials he would be working with in archaeological contexts. Those studies, coupled with his own independent research on representation of animals in ancient art and the biodiversity of the past have combined to make Mr. Marts an archaeologist with diverse experience and critical thinking skills.

Appendix C. Native American Coordination Documentation

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Reginald Pagaling
Chumash

VICE-CHAIRPERSON
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

SECRETARY
Sara Dutschke
Miwok

PARLIAMENTARIAN
Wayne Nelson
Luiseño

COMMISSIONER
Isaac Bojorquez
Ohlone-Costanoan

COMMISSIONER
Stanley Rodriguez
Kumeyaay

COMMISSIONER
Laurena Bolden
Serrano

COMMISSIONER
Reid Milanovich
Cahuilla

COMMISSIONER
Vacant

EXECUTIVE SECRETARY
Raymond C. Hitchcock
Miwok, Nisenan

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

February 21, 2024

Matthew Wetherbee
TRC

Via Email to: MWetherbee@trccompanies.com

Re: Euismod Project, Kern County

Dear Mr. Wetherbee:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Cameron.vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Kern County
2/21/2024

County	Tribe Name	Fed (F) Non-Fed (N)	Contact Person	Contact Address	Phone #	Fax #	Email Address	Cultural Affiliation	Counties	Last Updated
Kern	Chumash Council of Bakersfield	N	Julio Quair, Chairperson	729 Texas Street Bakersfield, CA, 93307	(661) 322-0121		chumashtribe@sbcglobal.net	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	
	Coastal Band of the Chumash Nation	N	Gabe Frausto, Chairman	P.O. Box 40653 Santa Barbara, CA, 93140	(805) 568-8063		fraustogabriel28@gmail.com	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	8/28/2023
	Fernandeno Tataviam Band of Mission Indians	N	Sarah Brunzell, CRM Manager	1019 Second Street San Fernando, CA, 91340	(818) 837-0794		CRM@tataviam-nsn.us	Tataviam	Kern,Los Angeles,Ventura	5/25/2023
	Kern Valley Indian Community	N	Brandy Kendricks, Tribal Member Monitor	30741 Foxridge Court Tehachapi, CA, 93561	(661) 821-1733		krazykendricks@hotmail.com	Kawaiisu Tubatulabal	Inyo,Kern,Los Angeles,San Bernardino,Tulare	1/29/2024
	Kern Valley Indian Community	N	Robert Robinson, Chairperson	P.O. Box 1010 Lake Isabella, CA, 93240	(760) 378-2915		bbutterbredt@gmail.com	Kawaiisu Tubatulabal	Inyo,Kern,Los Angeles,San Bernardino,Tulare	1/29/2024
	Kitanemuk & Yowlumne Tejon Indians	N	Delia Dominguez, Chairperson	115 Radio Street Bakersfield, CA, 93305	(626) 339-6785		2deedominguez@gmail.com	Kitanemuk Southern Valley Yokut	Kern,Los Angeles	
	Quechan Tribe of the Fort Yuma Reservation	F	Jill McCormick, Historic Preservation Officer	P.O. Box 1899 Yuma, AZ, 85366	(928) 261-0254		historicpreservation@quechantribe.com	Quechan	Imperial,Kern,Los Angeles,Riverside,San Bernardino,San Diego	5/16/2023
	Quechan Tribe of the Fort Yuma Reservation	F	Manfred Scott, Acting Chairman - Kw'ts'an Cultural Committee	P.O. Box 1899 Yuma, AZ, 85366	(928) 210-8739		culturalcommittee@quechantribe.com	Quechan	Imperial,Kern,Los Angeles,Riverside,San Bernardino,San Diego	5/16/2023
	Quechan Tribe of the Fort Yuma Reservation	F	Jordan Joaquin, President, Quechan Tribal Council	P.O.Box 1899 Yuma, AZ, 85366	(760) 919-3600		executivesecretary@quechantribe.com	Quechan	Imperial,Kern,Los Angeles,Riverside,San Bernardino,San Diego	5/16/2023
	San Fernando Band of Mission Indians	N	Donna Yocum, Chairperson	P.O. Box 221838 Newhall, CA, 91322	(503) 539-0933	(503) 574-3308	dyocum@sfbmi.org	Kitanemuk Vanyume Tataviam	Kern,Los Angeles,San Bernardino,Ventura	5/8/2023
	San Manuel Band of Mission Indians	F	Alexandra McCleary, Senior Manager of Cultural Resources Management	26569 Community Center Drive Highland, CA, 92346	(909) 633-0054		alexandra.mccleary@sanmanuel-nsn.gov	Serrano	Kern,Los Angeles,Riverside,San Bernardino	1/16/2024
	Tejon Indian Tribe	F	Candice Garza, CRM Scheduler	4941 David Road Bakersfield, CA, 93307	(661) 345-0632		cgarza@tejonindiantribe-nsn.gov	Kitanemuk	Kern	4/11/2023
	Tule River Indian Tribe	F	Kerri Vera, Environmental Department	P. O. Box 589 Porterville, CA, 93258	(559) 783-8892	(559) 783-8932	kerri.vera@tulerivertribe-nsn.gov	Yokut	Alameda,Amador,Calaveras,Contra Costa,Fresno,Inyo,Kern,Kings,Madera,Mariposa,Merced,Monterey,Sacramento,San	7/22/2016
	Tule River Indian Tribe	F	Neil Peyron, Chairperson	P.O. Box 589 Porterville, CA, 93258	(559) 781-4271	(559) 781-4610	neil.peyron@tulerivertribe-nsn.gov	Yokut	Alameda,Amador,Calaveras,Contra Costa,Fresno,Inyo,Kern,Kings,Madera,Mariposa,Merced,Monterey,Sacramento,San	
	Tule River Indian Tribe	F	Joey Garfield, Tribal Archaeologist	P. O. Box 589 Porterville, CA, 93258	(559) 783-8892	(559) 783-8932	joey.garfield@tulerivertribe-nsn.gov	Yokut	Alameda,Amador,Calaveras,Contra Costa,Fresno,Inyo,Kern,Kings,Madera,Mariposa,Merced,Monterey,Sacramento,San	7/22/2016

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Euismod Project, Kern County.

Record: PROJ-2024-000953
Report Type: List of Tribes
Counties: Kern
NAHC Group: All

Appendix D. State of California Department of Parks and Recreation 523 Series Forms

(CONFIDENTIAL)

Appendix E. Letter Addendum Report: Cultural Resources Survey for the Euismod Tie-Line Survey Area

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17911 Von Karman Ave.
Suite 400
Irvine, CA 92614

T 949.727.9336
TRCcompanies.com

May 27, 2026

Mr. Sam Holing
Senior Manager of Project Development
Aypa Power Development, LLC

Via Email: sholing@aypa.com

Re: Letter Addendum Report: Cultural Resources Survey for the Euismod Tie-Line Survey Area, Kern County, California

Dear Mr. Holing,

The following letter report serves as an addendum to the Cultural Resources Assessment for the Euismod Project site (Wetherbee 2024) and details the results of a cultural resources field survey undertaken by TRC for the Euismod Project Tie-Lines (Survey Area) located on vacant private property in unincorporated Kern County, California (Attachment A; Figures 1). The purpose of this study is to provide Aypa and Kern County with the necessary information and analysis to determine whether the construction of the proposed tie-lines would have any potential impacts to significant cultural resources eligible for or listed in the California Register of Historical Resources (CRHR) as mandated by the California Environmental Quality Act (CEQA). The following report details the methods and findings of the study.

Project Description: The project consists of the development of a 220 kV tie-line that will connect to 220 kV infrastructure at the existing Southern California Edison's (SCE) Whirlwind Substation located approximately 200 feet south of the proposed Euismod Project site. Tie-line construction will include, but not be limited to, clearing for access, foundation work for tie-line support structures, and installation of overhead conductors and shield wires and overhead or under communications. Interconnection infrastructure will also need to be installed inside the developed area of the existing SCE Whirlwind Substation. The tie-lines measure approximately 2,831 feet in length with a 100-foot buffer corridor (50ft. on either side of the centerline). Total acreage of the Survey Area is approximately 6.4 acres.

Project Locations: The proposed tie-line Survey Area is located near the southwest intersection of 170th Street and Rosamond Blvd. in unincorporated Kern County, California. The Survey Area can be found within the northern half of Section 23, Township 9 North, Range 15 West, on the Fairmont Butte, California 7.5' USGS Topographic Quadrangle in Attachment A (Figure 1).

Methods

SSJVIC Records Search: On January 30, 2024, TRC Senior Archaeologist Matthew Wetherbee, MSc., RPA., initiated a California Historical Resources Information System (CHRIS) records search via a data request from the Southern San Joaquin Valley Information Center, located at California State University at Bakersfield, California. As part of this study, the following resource listings were reviewed: the California Register of Historical Resources (CRHR), the California State Historic Resources Inventory, the National Register of Historic Places (NRHP), the Office of Historic Preservation (OHP), the California Historical Landmarks, the California Points of Historical Resources, Archaeological Determinations of Eligibility, and the OHP Historic Property Directory.

A cultural background of the Euismod project site, including the current study, is provided in TRC's 2024 cultural resources investigations for the Euismod project site and is not repeated in this report (Wetherbee 2024).

NAHC: On February 12, 2024, TRC requested a search of the Sacred Lands File and requested a list of groups or individuals listed as contacts from the NAHC. On February 21, 2024, TRC received the results of the search and the contacts list from the NAHC by email and are included in Wetherbee (2024; Appendix C). The Sacred Lands

File search and tribal contact list was obtained as a courtesy to facilitate notification by the County of Kern, as the CEQA lead agency. The results of the Sacred Lands File search were negative for cultural resources.

Field Survey: On April 29, 2026, TRC archaeologist Brian Sandford, BA, conducted an intensive level pedestrian survey of the Survey Area under the direction of TRC Principal Investigator, Matthew Wetherbee, MSc., RPA. Portions of the tie-lines that are within the initial Euismod Project site were recently surveyed in 2024 (Wetherbee 2024) and were not resurveyed during the current field investigation. Additionally, portions of the tie-lines within the SCE Whirlwind substation were not surveyed; TRC did not enter the substation. The survey included walking the tie-line corridor up to the SCE Whirlwind Substation fenceline.

During the intensive-level survey, the archaeologist walked parallel north-south, 15-meter (approximately 50 ft) transects across the entire tie-line Survey Area including 50ft. on each side of the center line. In this way, the ground surface was examined for the presence of precontact artifacts (e.g., flaked stone tools, tool-making debris, or stone milling tools), historical artifacts (e.g., metal, glass, or ceramics), sediment discoloration that might indicate the presence of a cultural midden, depressions, and other features that might indicate the former presence of structures or buildings (e.g., post holes or foundations).

Findings

SSJVIC Records Search: The findings discussed below will focus exclusively on the tie-line corridor in support of the Euismod project. The full records search for the Euismod project site, including the tie-line Survey Area, were received from SSJVIC on February 12, 2024, and are discussed in Wetherbee (2024). The results of the records search indicate that the area of the proposed electric tie-in routes was previously surveyed (Table 1) for cultural resources between 2006 to 2022 in support of various projects including SCE's Tehachapi Renewable Transmission Project (TRTP), Solar Ranch Project, and the Bullhead Solar Project (Table 1). As a result of these prior studies, one cultural resource was identified and recorded comprised of historic period refuse scatters (Table 2; Figure 2).

In 2007, during cultural resources field surveys in support of SCE's TRTP and Whirlwind Substation, one large historic-era refuse scatter (CA-KER-7214H/P-15-012793) was identified and recorded (Ramirez et al. 2007). Initially, CA-KER-7214H measured approximately 500 feet north-south by 220 feet east-west and described as a diffuse historic debris scatter. The site boundary circumscribed 20-25 vent hole cans, 25-30 sanitary cans, non-diagnostic colorless, blue, and solarized glass fragments, a green bottle base, a snuff tin, a spice tin, a syrup tin, and a modern trash pile containing fencing, barbed wire, oil cans, and pipes (Ramirez et al. 2007). No building remains were observed.

Site CA-KER-7214H was revisited in 2010 by Pacific Legacy and the site was substantially expanded to approximately 1,500 feet north-south by 984 feet east-west based on surface artifact distribution. The site contained over 150 cans and several discrete concentrations of colorless (post-1920s) glass fragments dispersed throughout an open alluvial plain within a creosote scrub woodland plant community. At least three 4" x 6" posts were observed; a square well-like feature and a shallow pit feature with raised berm were also present. Many of the artifacts dating from the 1960s to the present are likely related to roadside debris and do not indicate a discrete dumping episode. It was noted that the site was in fair condition, with impacts including a two-track road and shooting (Panich et al. 2010).

Pacific Legacy updated the site record in March 2010 at which the time the site boundaries were substantially expanded. Pacific Legacy completed an evaluation assessment of the site that included a series of shovel test units excavated that revealed no subsurface deposits, and historic research failed to associate the site with known individuals or events (Pacific Legacy and Urbana 2010). Based on the site assessment, Pacific Legacy recommended site CA-KER-7214H ineligible for listing on the NRHP or CRHR (Pacific Legacy and Urbana 2010).

In addition, ICF revisited site CA-KER-7214H during a survey in support of the Bullhead Solar Project and observed that the southern third of the site had been destroyed by the installation of the SCE Whirlwind Substation (ICF 2022a). The northern portion of the site appeared to remain in similar condition as in 2010. Later in 2022, ICF completed another test evaluation of site CA-KER-7214H consisting of two STPs in the northern and central portion of the site (ICF 2022b). The STPs were excavated to a depth of 50 centimeters and were negative for cultural materials, consistent with Pacific Legacy's 2010 testing results. The soil matrix was a light-brown silty loam with light gravel throughout the levels. ICF concluded that the site may be the result of multiple dumping episodes during the mid-twentieth century and that data obtained from this site's recordation can address very little (if anything) regarding the questions because there is no contextual information associated with the refuse dump to link the artifacts to a particular individual or group. Consequently, the site does not meet any of the four CRHR criteria and is therefore not recommended for CRHR-listing as an individual resource or as a contributor to a potential archaeological district (ICF 2022b).

Table 1. Prior Cultural Resources Studies in the Tie-Line Survey Area.

Report Number	Author	Year	Study Title	Relationship to Tie-Line Survey Area
KE-03534	Nilsson, Elena, Bevill, Russel, Kelly, Michael S., and Dwyer, Erin	2006	Archaeological Inventory of the First and Second Los Angeles Aqueducts and Selected Access Roads, Kern, Inyo, and Los Angeles Counties, CA	Within Tie-Line Survey Area
KE-03941	Price, Barry A., Baloian, Mary Clark, Lichtenstein, Robert, and Linder, Marc	2009	Confidential Specialist Report: Cultural Resources Inventory for the Tehachapi Renewable Transmission Project Kern, Los Angeles, and San Bernardino Counties, California	Within Tie-Line Survey Area
KE-04224	Pacific Legacy, Inc. and Urbana Preservation and Planning, LLC.	2010	Supplemental Archaeological Investigation and National Register of Historic Places and California Register of Historical Resources Eligibility Evaluation of Archaeological Site CA-KER-7214H Southern California Edison Tehachapi Renewable Transmission Project, Segment 9, Kern County, California	Within Tie-Line Survey Area
KE-04099	Miller, Jason Andrew	2012	Results of the AV Solar Ranch Survey (LSA Project No. SCE1105S)	Within Tie-Line Survey Area
KE-05500	ICF	2022a	Cultural Resources Technical Report; Bullhead Solar Project. Prepared for EDF Renewables, Oakland, CA.	Within Tie-Line Survey Area
KE-05500	ICF	2022b	Phase II Cultural Resources Technical Report; Bullhead Solar Project. Prepared for EDF Renewables, Oakland, CA.	Within Tie-Line Survey Area

Table 2. Previously Recorded Cultural Resources within the Tie-Line Survey Area.

Primary Number	Trinomial	Year	Site Type	Relationship to Project Area
P-15-012793	CA-KER-007214H	2007	Historic – Refuse scatter	Within Tie-Line Survey Area

Field Survey: On April 29, 2026, TRC conducted an intensive-level pedestrian field survey of the previously unsurveyed areas for the tie-line Survey Area (Attachment A; Figure 2). Ground surface visibility was generally good to excellent, averaging approximately 80 percent throughout the Survey Area (Attachment B; Figures 3-7). The Survey Area has a 3-degree slope to the south. Vegetation throughout the Survey Area consisted of creosote bushes and fiddleneck grasses. Soils observed within the Survey Area consisted of loose sand, silt, gravel, metamorphic rocks including schist, gneiss, and quartzite and decomposed granite. Modern refuse was observed throughout the Survey Area resulting from many decades of unregulated dumping. No new cultural resources were identified during the current field survey efforts.

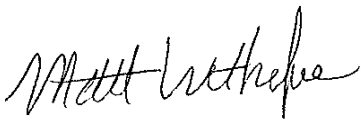
The location of site CA-KER-7214H was revisited and it was confirmed that the southern half of the site had been destroyed by the construction of the SCE Whirlwind Substation, as mentioned during the prior survey completed by ICF in 2022. Recent disturbances noted within site include water and wind erosion areas as observed by alluvial elements in the drainages, as well as modern use of the area for recreation, as evidenced by several OHV and motorcycle tracks and the presence of modern trash (Attachment B; Figures 6-7). In addition, continuing maintenance, including the placement of gravel for the existing SCE transmission line that traverses the site, and a berm for the substation near the southern portion of the site have heavily impacted the site. Due to these disturbances, one historic sanitary can with a maker's mark and two other crushed historic cans (Attachment B; Figures 8-9) were observed on the surface. These natural and mechanical disturbances observed within the site most likely resulted in altering the surface appearance of the site resulting in most of the surficial artifacts not being relocated.

Conclusion and Recommendations: Information provided by previous cultural resources studies identified one previously recorded historic refuse scatter within the tie-line Survey Area. Resource CA-KER-7214H had been previously evaluated and determined by SHPO as not eligible for the NRHP/CRHR in 2010 and 2022, and thus was not re-evaluated in this study. TRC revisited the site as part of the current study and observed that much of the area to be impacted by mechanical and natural disturbances. Disturbances from water erosion continue to impact the site and the site appears to have washed downslope as only a few artifacts were observed at the reported location. In addition, on-going operations and maintenance activities for the existing transmission line that traverses the site also continue to impact the site. A DPR update site form was completed detailing the current condition of the resource (Attachment C). Due to the prior archaeological investigations and the continuing disturbances to the area, it is recommended that site CA-KER-7214H retains its status as ineligible for listing in the NRHP/CRHR. No further NRHP/CRHR assessments and mitigation are recommended for resources CA-KER-7214H, unless additional features or cultural materials are identified during construction activities. No new cultural resources were identified during the current study.

The results of the current study identified no "historical resources," as defined by CEQA, within or adjacent to the tie-line Survey Area. Therefore, it is anticipated that proposed construction of the tie-lines in support of the Euismod Project site will have no impacts to significant historical resources. No further cultural resources investigations are recommended for the tie-line area, unless development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

If you have any questions, please call me at (206) 945-6644 or email at mwetherbee@trccompanies.com.

Sincerely,



Matthew Wetherbee, MSc., RPA
Cultural Resources Lead – West Coast/Principal Investigator
TRC

Attachment A: Project Report Figures.
Attachment B: Field Survey Photos.
Attachment C: DPR Update Site Form.

References

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2010 Supplemental Archaeological Survey Report #1, Tehachapi Renewable Transmission Project, Segment 4, Kern and Los Angeles Counties, California. Submitted to Southern California Edison Company, Rosemead, CA.

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Wetherbee, Matthew
2024 Cultural Resources Assessment for the Euismod Project Site, Kern County, California. Prepared for Euismod Project LLC and Euismod Project I LLC, Austin, TX.
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ATTACHMENT A:

Project
Report Figures

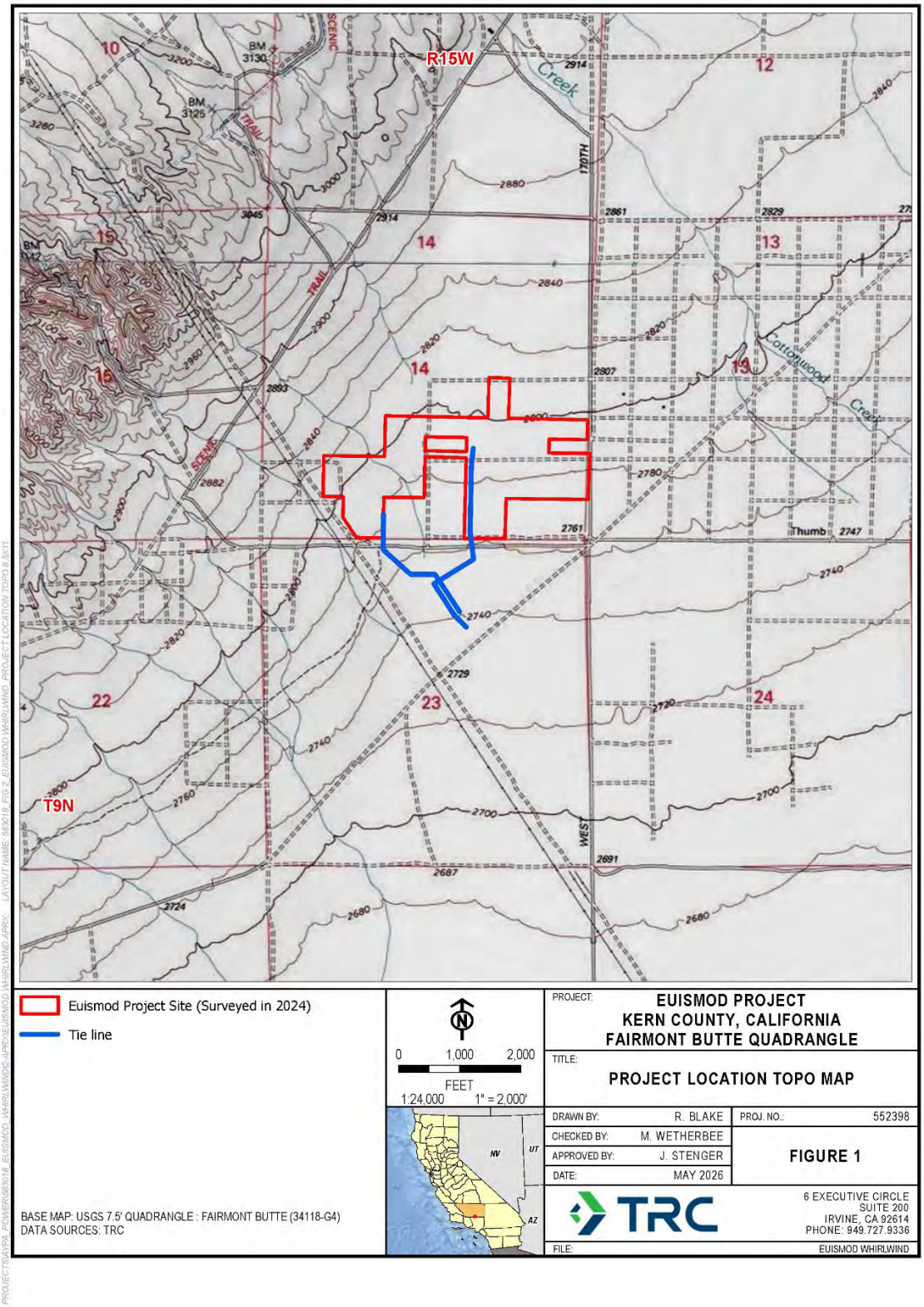


Figure 1. Project Location Map.

ATTACHMENT B:

Field Survey Photos



Figure 3. Overview of Survey Area. View to the south. Photo taken on April 29, 2026.



Figure 4. Overview of Survey Area. View to the southeast. Photo taken on April 29, 2026.



Figure 5. Overview of Survey Area. View to the southeast. Photo taken on April 29, 2026.



Figure 6. Overview of Survey Area and location of Site CA-KER-7214H. View to the south. Photo taken on April 29, 2026.



Figure 7. Overview of Survey Area and location of Site CA-KER-7214H. View to the south. Photo taken on April 29, 2026.



Figure 8. Crushed can from Site CA-KER-7214H. Plane view. Photo taken on April 29, 2026.



Figure 9. Sanitary can from Site CA-KER-7214H. Plane view. Photo taken on April 29, 2026.

ATTACHMENT C:

DPR Update Site Forms

(Confidential)

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Appendix E
Energy Utilization Evaluation Report

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To:	Victoria Edwards, Project Development Associate, CAISO Euismod Project LLC and Euismod Project I LLC
From:	Joe Stenger and Richard Burke
Subject:	Energy Evaluation, Euismod Project, Kern County, CA
Date:	June 24, 2026
Project No.:	552398

Executive Summary

The Euismod Project (Project) is a proposed electric energy storage project in unincorporated Kern County, California that will utilize lithium-ion batteries and ancillary equipment to store energy received from the regional electric grid to be returned to the grid when needed (Attachment 1). Battery energy storage is a key component of State and local planning to reduce reliance on non-renewable energy resources and to strengthen electric grid reliability. The Project will help to accomplish these goals by providing capacity to store energy when there is excess generation capacity, such as from renewable sources like wind and sunlight, and then allowing that energy to be used when needed thereby reducing dependence on fossil fuel generation sources.

The energy analysis and energy use values presented in this memorandum are based on the information and calculations presented in the Project's *Air Quality and Greenhouse Gas Emissions Report* (TRC, 2026). As shown below, Project construction will require an estimated 375,000 gallons of non-renewable diesel fuel and gasoline for onsite equipment operation and worker and materials transportation. This estimate includes onsite electric power generation as needed since there is no electric power nearby at a voltage that is practical to use for construction. Construction over the two-year period is expected to require up to 640,000 kilowatt hours of onsite electric power generation. During construction, fuel efficiency will be economically driven since fuel is a substantial contributor to construction cost. Possible additional measures are identified that, if adopted, could further ensure consumption of non-renewable diesel fuel and gasoline during construction is not inefficient, wasteful, or unnecessary.

During operations, onsite fossil fuel use will be limited to periodic testing of up to four diesel-fired back-up generators, with testing estimated to consume less than 10 gallons per month in total. Routine power supply for site operations would be delivered from the grid. The Project will be designed to meet applicable CALGreen building code requirements for energy efficiency. Energy uses will be minimized through efficient design and will be economically driven to be as low as practical, since onsite energy use, especially climate control for electronic equipment, is a

substantial contributor to operating cost. Additional measures are identified below that could further support energy efficiency during operations.

In addition to onsite uses of energy, there will be unavoidable energy conversion and transmission efficiency losses from charging, storage, discharging, and transferring energy, which is the purpose of this Project. These losses depend on the future operating profile, ambient conditions, and other factors that are not quantifiable at this time. Project energy transmission losses will be minimized by interconnecting with the grid at the adjacent Whirlwind Substation.

Considering that lithium-ion battery technology is widely accepted as currently the most efficient utility-scale electric power storage technology commercially available and the Project will make an important contribution to helping achieve State and local goals, policies, and requirements for additional utility scale energy storage capacity, the Project will have a net beneficial effect on energy conservation. Given the Project's adherence to CALGreen building code efficiency requirements and other economically driven efficiency measures, the Project would not represent a wasteful or inefficient use of energy.

Project Description

The Project is a proposed electric energy storage project in unincorporated Kern County, California that will utilize lithium-ion batteries and ancillary equipment to store energy received from the regional electric grid to be returned to the grid when needed (Attachment 1). Battery energy storage is a key component of State and local planning to reduce the emission of greenhouse gases and to strengthen electric grid reliability. The Project will help to accomplish these goals by providing capacity to store energy when there is excess generation capacity, such as from renewable sources like wind and sunlight, and then allowing that energy to be used when needed thereby reducing dependence on fossil fuel generation sources. Grid reliability is additionally supported by the rapid response batteries can provide when needed to stabilize rapid changes in electric power demand.

The batteries will be housed in purpose-built outdoor enclosures. Ancillary facilities will include inverters and transformers to convert between low-voltage direct current (DC) conveyed in and out of the batteries and high-voltage alternating current (AC) conveyed to and from the regional electric grid. The Project will connect to the regional electric grid at the adjacent Southern California Edison (SCE) Whirlwind Substation via 220 kilovolt overhead electric lines. The Project will be designed for remote operation and monitoring and will require minimal onsite staffing. The Project site comprises all or parts of 10 existing parcels totaling approximately 120 acres. The Project site and tie-line routes are currently undeveloped except for electric transmission and communications infrastructure and various unpaved roads and trails. Construction of the Project on the site, at the Whirlwind Substation, and for the tie-lines will primarily entail installation of modular components using standard construction equipment without unusual energy demands or inefficiencies.

Construction will use diesel fuel for onsite electric power generation since there is no electric power on or near the site or tie-lines at a voltage low enough to be practical to use for construction. Construction of proposed interconnection facilities at the existing Whirlwind Substation may use an existing substation power source. During operations, electric power to the site will be provided by station service transformers located at the onsite collector substations. The Project will not require frequent deliveries during operations. Routine onsite staff needs are estimated to be approximately two positions initially and approximately six positions at full build-out. Therefore,

the Project will generate few trips during operations and offsite energy consumption will not be a substantial contributor to overall operations energy demand.

Regulatory Setting and Applicable Plans

Federal

Corporate Average Fuel Standards

Established by the U.S. Congress in 1975, the Corporate Average Fuel Economy (CAFE) standards reduce energy consumption by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) and United States Environmental Protection Agency (USEPA) jointly administer the CAFE standards. The U.S. Congress has specified that CAFE standards must be set at the "maximum feasible level" with consideration given for: (1) technological feasibility; (2) economic practicality; (3) effect of other standards on fuel economy; and (4) need for the nation to conserve energy. Fuel efficiency standards for medium- and heavy-duty trucks have been jointly developed by USEPA and NHTSA. The Phase 1 heavy-duty truck standards apply to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles for model years 2014 through 2018, and result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type. USEPA and NHTSA have also adopted the Phase 2 heavy-duty truck standards, which cover model years 2021 through 2027 and require the phase-in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type.

National Energy Policy and Conservation Act

The National Energy Conservation Policy Act serves as the underlying authority for Federal energy management goals and requirements. Signed into law in 1975, it has been regularly updated and amended by subsequent laws and regulations. Pursuant to the Act, the National Highway Traffic Safety Administration is responsible for establishing additional vehicle standards. In 2012, new fuel economy standards for passenger cars and light trucks were approved for model years 2017 through 2021 (77 FR 62624–63200). Fuel economy is determined based on each manufacturer's average fuel economy for the fleet of vehicles available for sale in the United States.

Energy Policy Act of 2005

The Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the Act, consumers and businesses can attain Federal tax credits for purchasing fuel efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary micro-turbine power plants, and solar power equipment.

Energy Independence and Security Act of 2007

The Energy and Independence Security Act of 2007 sets Federal energy management requirements in several areas, including energy reduction goals for Federal buildings, facility management and benchmarking, performance and standards for new buildings and major renovations, high-performance buildings, energy savings performance contracts, metering, energy-efficient product procurement, and reduction in petroleum use and increase in alternative

fuel use. This Act also amends portions of the National Energy Policy and Conservation Act. In addition to setting increased Corporate Average Fuel Economy standards for motor vehicles, the EISA includes the following provisions: Renewable Fuel Standard; Appliance and Lighting Efficiency Standards; and Building Energy Efficiency Standards.

State

Numerous California laws, Executive Orders and policies focus on planning and implementation of measures to reduce greenhouse gas emissions and climate change, including through energy efficiency and use of carbon-free renewable energy generation to reduce emissions of greenhouse gases. Some key laws and regulations are identified below.

California Assembly Bill 1493 (AB 1493, Pavley)

In response to the transportation sector accounting for more than half of California's CO2 emissions, Assembly Bill (AB) 1493 (commonly referred to as CARB's Pavley regulations), enacted in 2002, requires CARB to set GHG emission standards for new passenger vehicles, light-duty trucks, and other vehicles manufactured in and after 2009 whose primary use is non-commercial personal transportation. Phase I of the legislation established standards for model years 2009–2016 and Phase II established standards for model years 2017–2025. Refer to Section 4.8, Greenhouse Gas Emissions, of this EIR for additional details regarding this regulation.

California Air Resources Board

Global Warming Solutions Act of 2006

In 2006, the California State Legislature adopted AB 32 (codified in the California HSC, Division 25.5 – California Global Warming Solutions Act of 2006), which focuses on reducing GHG emissions in California to 1990 levels by 2020. Under HSC Division 25.5, CARB has the primary responsibility for reducing the state's GHG emissions; however, AB 32 also tasked the CEC and the CPUC with providing information, analysis, and recommendations to CARB regarding strategies to reduce GHG emissions in the energy sector. In 2016, SB 32 and its companion bill AB 197 amended HSC Division 25.5 and established a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and included provisions to ensure that the benefits of state climate policies reach into disadvantaged communities. Refer to Section 4.8, Greenhouse Gas Emissions, of this EIR for additional details regarding these regulations.

Low Carbon Fuel Standard

The Low Carbon Fuel Standard (LCFS), established in 2007 through Executive Order S-1-07 and administered by CARB, requires producers of petroleum-based fuels to reduce the carbon intensity of their products, starting with 0.25 percent in 2011 and culminating in a 10-percent total reduction in 2020. Petroleum importers, refiners and wholesalers can either develop their own low carbon fuel products or buy LCFS credits from other companies that develop and sell low carbon alternative fuels, such as biofuels, electricity, natural gas and hydrogen.

Advanced Clean Car Program

The Advanced Clean Cars emissions-control program was approved by CARB in 2012 and is closely associated with the Pavley regulations. The program requires a greater number of zero-emission vehicle models for years 2015 through 2025 to control smog, soot and GHG emissions. This program includes the Low-Emissions Vehicle (LEV) regulations to reduce criteria pollutants

and GHG emissions from light- and medium-duty vehicles; and the Zero-Emissions Vehicle regulations (ZEV) to require manufactures to produce an increasing number of pure ZEV's (meaning battery and fuel cell electric vehicles) with the provision to produce plug-in hybrid electric vehicles (PHEV) between 2018 and 2025.

Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling

In 2004, CARB adopted an Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling in order to reduce public exposure to diesel particulate matter emissions (Title 13 California Code of Regulations [CCR] Section 2485). The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than five minutes at any given location. While the goal of this measure is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from unnecessary idling.

Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles

In addition to limiting exhaust from idling trucks, in 2008, CARB approved the Truck and Bus regulation to reduce NOX, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 CCR, Section 2025). The phased regulation aims to reduce emissions by requiring installation of diesel soot filters and encouraging the retirement, replacement, or retrofit of older engines with newer emission-controlled models. The phasing of this regulation has full implementation by 2023.

CARB also promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower, such as bulldozers, loaders, backhoes, and forklifts, as well as many other self-propelled off- road diesel vehicles. The In-Use Off-Road Diesel-Fueled Fleets regulation adopted by CARB on July 26, 2007, aims to reduce emissions by installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models (13 CCR Section 2449). The compliance schedule requires full implementation by 2023 in all equipment for large and medium fleets and by 2028 for small fleets. While the goals of these measures are primarily to reduce public health impacts from diesel emissions, compliance with the regulation has shown an increase in energy savings in the form of reduced fuel consumption from more fuel-efficient engines.

California Energy Action Plan Update

The 2008 Energy Action Plan Update provides a status update to the 2005 Energy Action Plan II, which is the State's principal energy planning and policy document (CPUC and CEC, 2008). The plan continues the goals of the original Energy Action Plan, describes a coordinated implementation plan for State energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. First-priority actions to address California's increasing energy demands are energy efficiency, demand response (i.e., reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure), and the use of renewable sources of power. If these actions are unable to satisfy the increasing energy and capacity needs, the plan supports clean and efficient fossil-fired generation.

California Building Standards Senate Bill 1078 and 107; Executive Order S-14-08, S-21-09, and SB 2X

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) accelerated the due date of the 20 percent mandate to 2010 instead of 2017. These mandates apply directly to investor-owned utilities. In November 2008, then-Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Portfolio Standard to 33 percent renewable power by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the Renewable Portfolio Standard by signing Executive Order S-21-09, which directs the CARB under its AB 32 authority to enact regulations to help the state meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020. CARB approved the Renewable Electricity Standard on September 23, 2010, by Resolution 10-23. SBX1-2 (2011) codified the 33 percent by 2020 goal.

Executive Order B-30-15; Senate Bill 100 and 350

In April 2015, the Governor issued Executive Order B-30-15, which established a GHG reduction target of 40 percent below 1990 levels by 2030. SB 350 (Chapter 547, Statutes of 2015) advanced these goals through two measures. First, the law increases the renewable power goal from 33 percent renewables by 2020 to 50 percent by 2030. Second, the law requires the CEC to establish annual targets to double energy efficiency in buildings by 2030. The law also requires the California Public Utilities Commission (CPUC) to direct electric utilities to establish annual efficiency targets and implement demand-reduction measures to achieve this goal. In 2018, SB 100 revised the goal of the program to achieve the 50 percent renewable resources target by December 31, 2026, and to achieve a 60 percent target by December 31, 2030. SB 100 also established a further goal to have an electric grid that is entirely powered by clean energy by 2045.

Assembly Bill 32 (2006) and Senate Bill (2016)

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006." AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels; the same requirement as under S-3-05) and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Reductions in overall energy consumption have been implemented to reduce emissions.

In September 2016, the Governor signed into legislation SB 32, which builds on AB 32 and requires the state to cut GHG emissions to 40 percent. With SB 32, the Legislature also passed AB 197, which provides additional direction for updating the Scoping Plan to meet the 2030 GHG reduction target codified in SB 32.

During June 2021, CARB in collaboration with other State agencies, held a three-day public workshop series to initiate the development of the update to the AB 32 Climate Change Scoping Plan, which is due in 2022 and will reflect California's goal to achieve carbon neutrality by 2045. Part of the effort in meeting California's long-term reduction goals include reducing petroleum use in cars and trucks by 50 percent, increasing from one-third to more than one-half of California's electricity derived from renewable sources, doubling the efficiency savings achieved at existing

buildings and making heating fuels cleaner; reducing the release of methane, black carbon, and other short-lived climate pollutants, and managing farm and rangelands, forests, and wetlands so they can store carbon.

Senate Bill 1368

On September 29, 2006, Governor Arnold Schwarzenegger signed into law SB 1368 (Perata, Chapter 598, Statutes of 2006). The law limits long-term investments in baseload generation by the state's utilities to those power plants that meet an emissions performance standard jointly established by the CEC and the CPUC. The CEC regulations do the following:

- Establish a standard for baseload generation owned by, or under long-term contract, to publicly owned utilities of 1,100 pounds of carbon dioxide (CO2) per megawatt-hour. This encourages the development of power plants that meet California's growing energy needs while minimizing their emissions of GHGs.
- Require posting of notices of public deliberations by publicly owned utilities on long-term investments on the CEC website. This facilitates public awareness of utility efforts to meet customer needs for energy over the long-term while meeting the state's standards for environmental impact.
- Establish a public process for determining the compliance of proposed investments with the emissions performance standard.

Cap-and-Trade Program

To achieve the goals of AB 32, the Climate Change Scoping Plan: A Framework for Change included an early action plan to develop a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system. The cap-and-trade regulation, which is a key element of California's climate plan, took effect in January 2012, and compliance obligation began in January 2013. The cap-and-trade program sets a statewide limit on sources responsible for 85% of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The program is designed to provide covered entities the flexibility to seek out and implement the lowest-cost options to reduce emissions. The first phase of the cap-and trade regulation included generated in and imported into California, large combustion sources (i.e., generally those emitting more than 25,000 metric tons [MT] of CO2e per year), and certain industrial sectors. The second phase added providers of transportation fuels and other combustion fuels (e.g., natural gas, propane) to the cap-and-trade program. The regulation requires that emissions generated by these facilities and combustion of fuels be reduced over time under a declining "cap."

CEQA

The Project will require discretionary approvals from the County and other entities that will require environmental impacts of the Project to be considered pursuant to the California Environmental Quality Act (CEQA). CEQA Guidelines (California Code of Regulations Title 14, Division 6, Chapter 3) require that an environmental impact report (EIR) include discussion of the potential energy impacts of proposed projects with emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. CEQA Guidelines Appendix F, *Energy Conservation*, identifies the State goal of energy conservation and the means of achieving the energy conservation goal to include:

- Decreasing overall per capita energy consumption
- Decreasing reliance on fossil fuels such as coal, natural gas, and oil

- Increasing reliance on renewable energy sources

Senate Bill (SB) 1389

This bill, approved in 2002, requires the California Energy Commission (CEC) to conduct assessments and forecasts to develop and evaluate energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety (Public Resources Code Section 25301(a)). This work provides the inputs for the Integrated Energy Policy Report (IEPR). CEC adopts an IEPR every two years and an update every other year. The 2023 IEPR (January 2024) is the most recent and identifies priority energy issues currently facing the state, including strategies and recommendations to further the state's goal of ensuring reliable, affordable, and environmentally responsible energy sources. The 2023 IEPR identified a need for California to accelerate the pace of clean energy resource deployment including grid-scale renewables and storage connected at the transmission level. The 2025 IEPR, in progress, continues to focus on advancing clean energy deployment with AB 1279, SB 100, and SB 1020 being referenced as key initiatives.

SB 100

This bill, approved in 2018, requires public utilities and other retail electricity sellers to procure minimum quantities of electricity from renewable sources as follows:

- 50 percent of electricity sold to end users by December 31, 2026.
- 52 percent of electricity sold to end users by December 31, 2027.
- 60 percent of electricity sold to end users by December 31, 2030.

AB 1279

This bill, the California Climate Crisis Act of 2022, set a goal of achieving net-zero GHG emissions no later than 2045 and reducing GHG emissions to 85% below 1990 levels by 2045. The Act also required the California Air Resources Board to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions.

SB 1020

This bill, the Clean Energy, Jobs, and Affordability Act of 2022, sets targets for renewable energy resources and zero-carbon resources to supply 90% of all retail sales of electricity to California end-use customers by 2035, 95% by 2040, and 100% by 2045.

Executive Orders

Executive Order (EO) B-30-15 was signed by Governor Jerry Brown in 2015 establishing an interim goal of reducing greenhouse gas emissions to 40 percent below 1990 levels by 2030 in order to ensure California will meet its 2050 target.

EO B-55-18 was signed by Governor Jerry Brown in 2018 and established a statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative CO2 emissions thereafter.

EO N-79-20, signed by Governor Newsom in 2020, mandated that all new car and delivery and short-haul truck sales will be zero-emission by 2035, and all big-rig truck sales 100 percent zero-emission by 2045.

Emergency Proclamation

On July 30th, 2021, Governor Newsom declared a State of Emergency in California regarding statewide electricity shortages caused by climate change, drought, heat, and wildfires. The Governor called upon agencies across the State to take actions to expedite approval of battery energy storage systems to bring capacity online in 2022 and beyond. The Emergency Proclamation, in part, orders that "[a]ll energy agencies shall act immediately to achieve energy stability during this emergency…," and orders State agencies "to work with the State's load serving entities on accelerated plans for the construction, procurement, and rapid deployment of new clean energy and storage projects to mitigate the risk of capacity shortages and increase the availability of carbon-free energy at all times of day."

California Building Standards Code

The California Building Standards Code, Title 24 of the California Code of Regulations, contains the regulations that govern the construction of buildings in California. Title 24, Part 6 (California Energy Code) contains energy conservation standards applicable to most residential and nonresidential buildings throughout California. Title 24, Part 11 is the California Green Building Standards (also known as CALGreen) and includes regulations for energy efficiency and conservation, material conservation, resource efficiency, and environmental quality. CALGreen also mandates locally permitted new residential and non-residential building construction, demolition, and certain additions and alteration projects to recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous Construction and Demolition debris generated during the project (CALGreen sections 4.408, 5.408, 301.1.1 and 301.3).

Kern County

Kern County's Energy Element of its General Plan (Kern County 2009) does not mention energy storage. Overall, the element promotes development of both fossil fuel-based and renewable energy sources. The goals, policies, and implementation measures in the Energy Element of the Kern County General Plan applicable to energy, as related to the main project, are provided below. The Kern County General Plan contains additional policies, goals, and implementation measures that are more general in nature and not specific to development such as the main project. Therefore, they are not listed below. Section 5.4.5. Solar Energy Development of the Energy Element contains the following goal and policies relevant to the Project:

- Goal 1: Encourage safe and orderly commercial solar development.
- Policy 1: The County shall encourage domestic and commercial solar energy uses to conserve fossil fuels and improve air quality.

Environmental Setting

Electricity

Electricity, a consumptive utility, is a manufactured resource. The production of electricity requires the consumption or conversion of energy resources, including water, wind, oil, gas, coal, solar, geothermal, and nuclear resources, into energy. The delivery of electricity involves a number of system components for distribution and use. The electricity generated is distributed through a network of transmission and distribution lines, commonly called a power grid. Energy capacity, or electrical power, is generally measured in watts (W), while energy use is measured in watt-hours (Wh). For example, if a light bulb has a capacity rating of 100 W, the energy required to

keep the bulb on for 1 hour would be 100 Wh. If ten 100-W bulbs were on for 1 hour, the energy required would be 1,000 Wh or 1 kilowatt-hour (kWh). On a utility scale, a generator's capacity is typically rated in megawatts (MW), which is 1 million watts, while energy usage is measured in megawatt-hours (MWh) or gigawatt-hours (GWh), which is 1 billion watt-hours.

According to the U.S. Energy Information Administration (EIA), California used approximately 239,480 GWh of electricity in 2023 (EIA, 2025a). The sector-specific breakdown for energy consumption in 2023 indicates that commercial uses utilized 47 percent of the state's total energy consumption, followed by 35 percent for residential uses, 18 percent for industrial uses, and 0.3 percent for transportation uses (EIA, 2024). Electricity usage in California for differing land uses varies substantially by the type of uses in a building, type of construction materials used in a building, and the efficiency of all electricity consuming devices within a building. Due to the state's energy efficiency building standards and efficiency and conservation programs, California's energy use per capita in the residential sector is lower than any other state except Hawaii (EIA, 2025b).

Southern California Edison (SCE) provides electricity to the Project site. SCE, a subsidiary of Edison International, serves approximately 180 cities in 11 counties across central and southern California. SCE receives electric power from a variety of sources. SCE updates all load forecasts for gas and electricity services every year. Load growth forecasts for the project area are currently determined using load growth projection tools that use a number of sources of data, including past peak loading, population, development characteristics, and temperature history information. Table 1 shows the electric power mix delivered to retail customers by SCE compared to the statewide mix in 2023, the most recent year for which data are available.

Table 1: Electric Power Mix Delivered to SCE and CA Customers in 2023

Energy Resource	SCE	CA
Eligible Renewables	**37.6%**	**36.9%**
Biomass & bio-waste[a]	**0.1%**	**2.1%**
Geothermal	**5.2%**	**4.8%**
Small hydroelectric	**0.7%**	**1.8%**
Solar	**19.8%**	**17.0%**
Wind	**11.7%**	**11.2%**
Other Resources	0%	1.8%
Coal		
Large Hydroelectric	4.5%	11.7%
Natural Gas	20.0%	36.6%
Nuclear	9.1%	9.3%
Other	0.1%	0.1%
Unspecified sources of power[b]	28.8%	3.7%
Total	**100%**	**100%**

Notes:
[a] The Eligible Renewables category is further delineated into the specific sources: biomass & waste, geothermal, small hydroelectric, solar, and wind
[b] "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources. Source: SCE, 2025.

Methane (Natural Gas)

Methane, called by service providers "natural gas," is a combustible mixture of simple hydrocarbon compounds (primarily methane) that is used as a fuel source. Natural gas consumed in California is obtained from naturally occurring reservoirs and delivered through high-pressure transmission pipelines. According to the EIA, California used approximately 2,087,461 million cubic feet of natural gas in 2023 (EIA, 2025c). Most of California's natural gas customers are residential and small commercial customers (core customers). These customers accounted for approximately 35 percent of the natural gas delivered by California utilities in 2023. Large consumers, such as electric generators and industrial customers (noncore customers), accounted for approximately 58 percent and vehicle fuel accounted for approximately 1.5 percent of the natural gas delivered by California utilities in 2023 (EIA, 2025c). While the supply of natural gas in the United States and production in the lower 49 states has increased greatly since 2008, California produces little and imports 95 percent of its supply of natural gas (EIA, 2025c).

Natural gas is measured in terms of cubic feet (cf). Southern California Gas Company (SoCalGas) is the natural gas provider in Kern County; however, there is not a known natural gas service for the project site. SoCalGas' service territory encompasses approximately 20,000 square miles and more than 500 communities. In the California Energy Demand mid-energy demand scenario, natural gas demand in SoCalGas' service territory is projected to remain flat and increase by only 0.01 percent in 2030 above the last recorded demand in 2018 (CEC, 2020). In 2024, approximately 2,269 million cubic feet per day (MMcfd) were used in SoCalGas' service area. For the winter of 2023 to 2024, the highest daily SoCalGas pipeline capacity was estimated to be 3,851 MMcfd (California Gas and Electric Utilities, 2025). With the current natural gas assets and withdrawal protocols in place and sufficient interstate gas supplies, the California Public Utilities Commission (CPUC) predicted no curtailments or emergency flow orders in the winter of 2023 to 2024 (CPUC, 2023a).

Transportation

California used approximately 27.2 billion gallons of petroleum in 2023 (EIA, 2025d). Most California's petroleum customers are residential and small commercial customers (core customers). This equates to a daily use of approximately 74.5 million gallons of petroleum. By sector, transportation uses utilize approximately 86 percent of the state's petroleum, followed by 10 percent from industrial, 3 percent from commercial, 1 percent from residential, and less than 1 percent from electric power uses (EIA, 2025d). In California, petroleum fuels refined from crude oil are the dominant source of energy for transportation sources. Petroleum usage in California includes petroleum products, such as motor gasoline, diesel fuel, liquefied petroleum gases, and jet fuel. California has implemented policies to improve vehicle efficiency and to support the use of alternative transportation. Over the last decade, California has implemented several policies, rules, and regulations to improve vehicle efficiency, increase the development and use of alternative fuels, reduce air pollutants and greenhouse gas (GHG) from the transportation sector, and reduce vehicle miles traveled (CEC, 2020). The California Energy Commission (CEC) predicts that the demand for gasoline will continue to decline over the next 10 years and that there will be an increase in the use of alternative fuels (CEC, 2020).

Existing Conditions

The Project site and tie-line routes are currently undeveloped except for electric transmission and communications infrastructure and various unpaved roads and trails. Therefore, the Project site does not currently consume energy. The existing Whirlwind Substation, located on adjacent parcels to the south and the proposed interconnection point for the Project, is a component of SCE's Tehachapi Renewable Transmission Project that is designed and was constructed to increase the renewable energy supply to southern California. Numerous renewable energy generation projects including wind and solar generation occur in the vicinity.

Methodology

Construction fuel consumption has been estimated from the Project's greenhouse gas emissions, which were determined by modeling using the California Emissions Estimator Model as reported in the Project's Air Quality and Greenhouse Gas Emissions Report (TRC, 20265). The conversion factor used to estimate gasoline use is 8.78 kilograms of CO2 per gallon, and the conversion factor for diesel is 10.21 kilograms of CO2 per gallon (USEPA, 2025). As a worst-case, all heavy-duty construction equipment associated with onsite construction activities and trucks involved in importing or exporting material to and from the site are assumed to use diesel fuel. Operational power demand was calculated using the following approach. The peak use of onsite auxiliary power is expected to occur soon after Phase 3 of the Project is operational, which is assumed to be in 2033. At that time, the peak auxiliary load is expected to be 19,805 MWh/year for the full project scope of storing 9200 MWhr. This load calculation is based on the following assumptions:

- Run kW/Unit and Standby kW/Unit for a CATL 8-hour BESS System
- Historical hourly time-of-use data in the grid from 2020.
- No system output between hours of 5 am to 12 pm (charging) and 3 pm to 10 pm (discharging).
- Expected demand in kWhr per month from battery and inverter loads.
- 1,997 battery containers and 411 inverters

Project Energy Impacts

Construction

During construction, the Project will create energy demands, including fuel for worker transportation, delivery vehicles, and onsite construction equipment (Attachment 2). Under a worst-case scenario, if all construction workers travel to the Project area in gasoline-powered vehicles and all equipment uses diesel fuel, construction worker transportation will consume approximately 74,000 gallons of gasoline, material transport will consume approximately 89,000 gallons of diesel fuel, and onsite construction equipment will consume approximately 248,000 gallons of diesel fuel. These estimates are based on the CO2 conversion factors above and equipment use and trip generation tables provided in the Project's *Air Quality and Greenhouse Gas Emissions Report* (TRC, 2026).

Based on the expectation that equipment and vehicles used for decommissioning would be similar to those used for construction of the project, decommissioning fuel consumption is conservatively assumed to be the same as construction fuel consumption.

Fuel consumption is a substantial cost for large construction projects, and commercially driven efficiency will effectively incentivize efficient use of fuel consumed for construction. The following are possible additional measures that, if adopted, could further ensure consumption of non-renewable diesel fuel and gasoline during construction is not inefficient, wasteful, or unnecessary:

- Require contractors to facilitate construction worker ridesharing communications by methods such as posting ridesharing and public transit information at an onsite construction worker notice board.
- Further incentivize construction phase energy efficiency, with particular focus on non-renewable energy efficiency, by including it as a favorably rated selection criteria disclosed in the request for proposal, thereby inviting contractor consideration of conventional and creative practicable energy saving solutions such as:
    - Vanpooling or other energy saving transportation for construction workers.
    - Use of battery-powered construction equipment
    - Construction equipment fleet efficiency.
    - Energy efficiency incentives flow down to subcontractors, suppliers, and transporters.

Operation

During operations, onsite fossil fuel use will be limited to periodic testing of up to four approximately 150 kW diesel-fired back-up generators, with testing estimated to consume less than 10 gallons per month in total. Testing will be limited to periods recommended by the equipment manufacturer to avoid wasteful use of diesel fuel.

Energy will also be used during occasional visits by staff, deliveries, and augmentation installations.

Electric energy from the grid will be used to provide routine power during operations. The primary energy demand during operations will be electric power for climate control for site electrical equipment, climate-controlled storage containers, and up to three approximately 1,200 square foot buildings. Other operational energy demands will include lighting, O&M building office electronics, pumping water, microwave communications, and electrical components in SCADA and site security monitoring systems. The total peak use of onsite auxiliary power is expected to occur soon after Phase 3 of the Project is operational, which is assumed to be in 2033. At that time, the peak auxiliary load is expected to be 19,805 MWh/year for the full project scope of storing 9200 MWhr.

In addition to onsite uses, there will be unavoidable energy losses from charging, storage, discharging, and transferring energy. These energy losses during operations depend on the future operating profile, ambient conditions, and other factors that cannot be accurately quantified at this time. The Project's interconnection points at the Whirlwind Substation, designed and constructed as part of SCE's Tehachapi Renewable Energy Project, will minimize these losses.

The State's goals and policies identified above will not be achievable without substantial additional energy storage capacity such as that which the Project will provide. As evidenced by the Emergency Proclamation, the need for battery energy storage is immediate. Project operations will have a substantial beneficial impact on energy resources consistent with State goals and policies for energy efficiency based on the following factors:

- The Project will use lithium-ion battery energy storage technology to store energy from the grid when excess capacity is available and then release it to the grid for later use when it is needed. The Project will help to provide grid stability and capacity for storage of renewable energy, thereby decreasing reliance on fossil fuels and increasing reliance on renewable energy sources consistent with State goals and policies for energy efficiency. Lithium-ion battery energy storage is among the highest in efficiency range of any commercially viable utility-scale energy storage technology with an efficiency of 80 to 90 percent (U.S. Energy Information Administration, 2021; U.S. Department of Energy Pacific Northwest National Laboratory, undated; California Energy Commission, 2024). Therefore, use of this technology consistent with State goals and policies for storage will not constitute inefficient, wasteful, or unnecessary consumption of energy.
- The Project's energy storage capacity will contribute to demand response and grid resiliency during peak energy demands.
- The proposed Project will be interconnected to the regional grid by SCE and will be operated to benefit the regional energy supply and infrastructure.
- The proximity of the site to the point of interconnection at the substation and the proposed Project's location in an area with abundant solar and wind generation capacity make the site an efficient location for energy storage with minimal transmission loss.

The facility will be designed for remote operation and monitoring. Nonetheless, energy will be consumed by vehicles and by equipment during periodic maintenance, augmentation installations, and routine operations, including emergency generator testing. Energy use by vehicles and equipment are shown below in Tables 2 and 3.

Table 2 – Energy Consumption by Operational Vehicles

Operations Activity	VMT per Trip	Annual Trips	Annual VMT	Mi per gal*	Gal per mi	Gal per yr
Periodic Maintenance	34.7	288	9,994	33.5	0.030	298
Augmentation Install	34.7	800	27,760	33.5	0.030	829
Routine Ops	34.7	5,110	177,317	33.5	0.030	5,293
Totals		**6,198**	**215,071**			**6,420**

*From iSeeCars, Understanding MPG Trends Across States, available at https://www.iseecars.com/articles/understanding-mpg-trends-across-states

Table 3 – Energy Consumption by Operational Equipment

Operations Activity	Frequency (days/yr)	Equipment	Hp	No.	Hours/ Day	Hp-hrs/ day	Gal/ hp-hr	Gal//yr
Periodic Maintenance	16	Crane	150	1	2	300	0.0520	250
		Forklift	60	1	2	120	0.0580	111
		Tractor/Loader/ Backhoe	100	1	4	400	0.0570	365
Augmentation Install	10	Crane	150	1	6	900	0.0520	468
		Crane (small)	50	1	6	300	0.0520	156
		Forklift	60	1	2	120	0.0580	70
Routine Ops (Generator Testing)	12	Generator	250	4	0.5	500	0.0510	306
Total								**1725**

The Project will be designed to meet applicable CalGreen building code requirements. The following possible additional measures could further support energy efficiency during operations:

- Provide incentives for the contractor to exceed California Code of Regulations Title 24 requirements and meet or exceed voluntary efficiency standards where it makes sense to do so. The Project site is in an area with a large temperature range and summers with extreme heat. Minimizing the Project's energy use on climate control, lighting, and other energy demands during operations would be cost-saving and consistent with State policies on energy conservation.
- Incentivize energy efficiency, with a focus on non-renewable energy efficiency, by including it as a favorably rated selection criteria for operations phase contracting for supply and transportation services.

The Project will not conflict with or obstruct any State or local plan for renewable energy or energy efficiency and as previously described, will be consistent with State energy policies. Furthermore, the Project will not result in any reasonably foreseeable wasteful, inefficient, or unnecessary consumption of energy resources during either construction or operations.

CEQA

VI. ENERGY. Would the project:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

During construction, fuel use will be minimized, since fuel is a substantial contributor to construction costs. Possible additional measures are identified that, if adopted, could further ensure consumption of non-renewable diesel fuel and gasoline during construction is not inefficient, wasteful, or unnecessary.

During operations, energy uses will be minimized through efficient design and will be economically driven to be as low as practical, since onsite energy use, especially climate control for electronic

equipment, is a substantial contributor to operating cost. Additional measures are identified that could further support energy efficiency during operations.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The Project will not conflict with or obstruct any State or local plan for renewable energy or energy efficiency and will be consistent with State energy policies. Rather, the Project will make an important contribution to helping achieve State and local goals, policies, and requirements for additional utility scale energy storage capacity. For example:

- California Energy Commission policies – the Project will contribute to the CEC's energy policies described in its Integrated Energy Policy Report, including the need for California to accelerate the pace of clean energy resource deployment including grid-scale renewables and storage connected at the transmission level.
- State of Emergency in California regarding statewide electricity shortages caused by climate change, drought, heat, and wildfires – the Project will help implement this action by the Governor that calls upon agencies across the State to take actions to expedite approval of battery energy storage systems to bring capacity online in 2022 and beyond.
- Kern County General Plan Energy Element – by providing storage for energy generated by solar facilities, the Project will help implement the County's goal of encouraging safe and orderly commercial solar development and its policy of encouraging domestic and commercial solar energy uses to conserve fossil fuels and improve air quality.

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ATTACHMENT 1

PROJECT DESCRIPTION

EUISMOD PROJECT DESCRIPTION

This Attachment provides a comprehensive description of the Euismod Project in support of the Euismod Project I LLC application to California Department of Fish and Wildlife for an incidental take permit for the construction, operation and decommissioning of the Euismod Project's North BESS Area described in Section 2.0, below.

1.0 OVERVIEW

1.1 Introduction

The Euismod Project (Project) is a proposed battery energy storage system (BESS) project with associated infrastructure, which will use lithium-ion batteries and ancillary equipment to store approximately 1,150 megawatts (MW) or 9,200 megawatt-hours (MWh) of electricity from the regional grid, to be supplied back as needed. The BESS facilities will be located on an approximate 120-acre Site (Site) in the unincorporated area of southeastern Kern County, California, as shown in Figure 1, *Project Vicinity Map*. A topographic map of the Site area is shown in Figure 2, *Project Location Map – Topographic.* The associated infrastructure will include battery energy storage arrays, collector substations, Supervisory Control and Data Acquisition (SCADA) Systems, microwave communications towers, operations & maintenance support buildings, climate-controlled permanent storage containers, onsite power infrastructure, roads and improved surfaces, two 230-kV overhead transmission lines to the Southern California Edison (SCE) Whirlwind Substation located on the adjacent parcels to the south of the Site, and a temporary laydown yard. These project components are described in further detail below in Section 2.0, *Proposed Project Facilities*. Project construction, operations, and decommissioning, respectively, are described in following Sections 3.0, *Construction Activities*, 4.0, *Operational Activities*, and 5.0, *Decommissioning*. The Site and the Project's two overhead electric lines are shown in Figure 3, *Project Location – Aerial*.

1.2 Project Objectives

The Applicant's Project objectives are:

- Establish a reliable, economically feasible, and commercially financeable energy storage facility of sufficient size to substantially contribute to State goals for storage capacity.
- Provide Kern County, the State of California, and Southern California Edison, with storage capacity that will assist in meeting obligations under California's Renewable Portfolio Standard Program. To achieve California's 2045 clean energy targets, the Public Utilities Commission has identified a need for 52 gigawatts of energy storage capacity.
- Use proven and established energy storage technology that is efficient with low maintenance requirements.
- Minimize the need for new infrastructure to connect the storage capacity to the grid.
- Site and design the project in an environmentally responsible manner.
- Locate the storage capacity close to an abundant source of renewable energy to optimize transmission efficiency.
- Utilize land that is commercially viable to secure.

- Develop an energy storage facility in Kern County that will support the economy by investing in the local community, providing green jobs to the County and California, and increase tax and fee revenue to the County.

2.0 PROPOSED PROJECT FACILITIES

The Project site is divided into three areas: the North BESS Area, which is the subject of this incidental take permit (ITP) application, and the South and West BESS Areas, for which separate ITP applications are being submitted. The three BESS areas are show in Figure 4, *Proposed Overall Site Plan*, and include the following features described in additional detail in following subsections:

- The **South BESS Area** will include battery energy storage arrays, SCADA systems, a microwave communication tower, an O&M building; storage containers, site power infrastructure, water infrastructure, site control and security infrastructure, roads and improved surfaces, and a temporary laydown yard on an approximate 40.19 acre parcel. The South BESS Area will provide storage for 400 MW for 8 hours (3.2 gigawatt-hours).
- The **North BESS Area** will include battery energy storage arrays, a collector substation, SCADA systems, an O&M building; storage containers, site power infrastructure, water infrastructure, site control and security infrastructure, roads and improved surfaces spanning across four parcels totaling approximately 30.3 acres. The North BESS area will provide storage capacity for 300 MW for 8 hours (2.4 gigawatt-hours).
- The **West BESS Area** will include battery energy storage arrays, a collector substation, SCADA systems, a microwave communication tower, an O&M building; storage containers, site power infrastructure, water infrastructure, site control and security infrastructure, roads and improved surfaces spanning across five parcels totaling approximately 49.96 acres. The West BESS Area will provide storage capacity for 450 MW for 8 hours (3.6 gigawatt-hours).

All equipment, facilities, and infrastructure be designed in accordance with all applicable codes and regulatory standards in effect at the time of application. Facilities are further described in the following sections.

2.1 Battery Energy Storage Arrays

As shown in Figure 4, *Proposed Overall Site Plan*, the Project will be occupied mostly by arrays of outdoor enclosures housing batteries and other electrical equipment, with paved driveways/fire lanes throughout the arrays. Enclosures will be purpose-built and free-standing approximately twelve feet or less in height. In addition to battery enclosures, bi-directional medium voltage (MV) transformers, also in purpose-built enclosures, and voltage converters will be arranged throughout the battery arrays, and underground cables will connect the MV transformers to the collector substations. Battery enclosures spacing within the array areas will follow National Fire Protection Association (NFPA) Standard 855 requirements, Kern County Fire Department requirements, and manufacturer specifications. Battery enclosures will be set back a minimum of 50 feet from property lines.

Equipment manufacturing, construction, and operations will include comprehensive measures to ensure safe equipment installation and operation. Each battery module and battery enclosure are inspected and tested at the manufacturer's facility. Each enclosure will be inspected for damage at the Site prior to installation and testing. Once installed, tested, and in operational mode, each battery module will be

continuously monitored for electrical current, voltage, and temperature to optimize performance and mitigate potential failures. Batteries performing out of specification will be immediately taken offline by the automated monitoring system. The system will be designed and constructed to comply with all applicable codes in effect in the County including NFPA Standards, National Electrical Code, and California Fire Code. The proposed project will be constructed to meet all Kern County Fire Department requirements including gate access, onsite road design, fire hydrants, safety equipment, and other fire safety requirements. An 8-foot-high chain link fence with security wire will be provided around the proposed project's perimeter and will be continuously monitored for security. The design includes an incident command post for staging, assessing, and monitoring in the event of a battery fire onsite. The final location will be subject to approval by the Kern County Fire Department.

NFPA 855 standards are designed specifically to mitigate risks for electric energy storage facilities including BESS. Enclosures will be equipped with fire prevention, detection, and isolation methods and materials. At a minimum, this will include smoke/fire detection sensors; ground fault detection, alarms, and systems for automatic shutdown of cooling fans and opening of electrical contacts in the battery system. Battery enclosures will be located a minimum of 50 feet from the Site boundaries and will be spaced in accordance with NFPA 855 requirements designed to minimize risk of a fire spreading to adjacent enclosures. NFPA 855 also requires comprehensive safety planning submittals to the local fire authority including results of bench-scale fire and explosion testing by the manufacturer and hazard mitigation analysis for the specific type of battery used, and an Emergency Response Plan designed to ensure well-planned, prompt, safe, and appropriate response in the event of an emergency. The Emergency Response Plan will also comply with California Senate Bill (SB) 38. These submittals will be made to the Fire Department after the specific equipment is selected and prior to issuance of building permits. NFPA 855 additionally mandates initial and annual refresher training for onsite employees, and the Project owners will coordinate with the Fire Department to facilitate site-specific Fire Department training.

2.2 Collector Substations

The North BESS Area and the West BESS Area each will have an onsite collector substation with three bi-directional transformers to convert between MV and high voltage for connection to the electric grid. Each collector substation will include 220 and 34.5 kV bus work, circuit breakers, disconnect switches, instrument transformers, metering transformers, three 220/34.5 kV bi-directional transformers, two auxiliary transformers for station service, a control house with relay protection, a supervisory control and data acquisition (SCADA) system, and a telemetry system. Most of the onsite substation structures and equipment will be less than 40 feet high. The collector substation in the North BESS area would include an H-Frame dead-end structure up to 80 feet high and shield wires spanning from the top over other substation equipment. The tie-line would take off from the H-frame structure within the substation and then extend south supported by three tubular steel structures up to 140 feet high to span through the South BESS area, with the southmost structure inside the South BESS area being the point of change in ownership (POCO). The collector substation in the West BESS area would include a tubular steel pole dead-end structure up to 140 feet high with shield wires spanning from the pole top downward over other substation equipment. The dead-end pole structure would be the POCO for the tie-line from the West BESS area. From both the POCO structures, the tie-lines described in further detail in Section 2.11, *SCE Tie-Line and Substation Improvements*, would pass overhead across the proposed project site boundary directly onto SCE-owned property between the proposed project site and the Whirlwind Substation. The collector

substation frameworks and transmission line support structures will be galvanized or otherwise finished with a low-reflective surface. The POCO pole structure for both interconnections would be within the proposed project site and would belong to the respective project proponent and SCE would construct, own, and operate the tie-line extending from the POCO across the proposed project site boundary to the interconnection point at the Whirlwind Substation 220 kV bus.

2.3 Supervisory Control and Data Acquisition System (SCADA)

Each of the collector substations will have a SCADA system. The SCADA systems will aggregate all information from the BESS, inverters, transformers, breakers, Fire Alarm Control Panel (FACP), and tie-lines. The SCADA systems will also communicate with the transmission service provider, grid operator and the proposed project's remote Operations Center. The SCADA systems can also control critical site functions, including charge/discharge, breaker status, and total project output.

2.4 Microwave Communication Towers

The proposed project will require two microwave communications towers, which will be located adjacent to each of the collector substations. The microwave communications towers are necessary for remote communications with the CAISO, and other outside parties. They will provide the antennae an unobstructed line-of-sight to microwave sites at other strategic geographic locations, allowing signals to be repeated from the sites for the reliable transmission of high-capacity data signals. The towers will be equipped with a cable ladder for routing and antenna transmission lines. There will also be a safety-climbing ladder with fall-arrest devices and cables in conformance with State and County requirements, as well as chain-link security fencing around the base of the microwave communication towers to prevent unauthorized access. The tower areas will be finished with gravel surfacing and a compacted gravel access route needed for potential maintenance needs.

2.5 O&M Buildings

The proposed project will include a total of three Operations and Maintenance (O&M) buildings, all being approximately 1,200 square feet in size, located at each of the designated BESS areas (South, North, and West). The preliminary plan is for each building to include several offices, a conference room for employees, contractors, and vendors, a breakroom, and sanitary facilities. Parking spaces will be provided adjacent to each of the buildings.

2.6 Storage Containers

Up to eight climate-controlled, permanent storage containers will be provided in each BESS Area for spare parts. These facilities are intended to support ongoing operations and maintenance by ensuring secure and accessible storage of critical components.

2.7 Site Power Infrastructure

Onsite power for operations will be provided via station service transformers located at the collector substations. The proposed project infrastructure will also include diesel-fired generators to provide backup power for critical functions. Preliminary planning is for two 150 kW diesel fired generators at each of the two collector substations, each equipped with a 500-gallon fuel tank.

2.8 Water Infrastructure

Onsite water infrastructure will include water tanks distributed through the Site, including an aboveground 10,000 to 30,000-gallon tank located adjacent to the incident command post near 170th Street West. Dedicated firewater storage will be provided to meet Kern County Fire Department requirements. A water tank with a co-located groundwater well will be located in each of the three BESS areas to supply fire protection water and water supply for the O&M building.

2.9 Site Control and Security Infrastructure

The Site will be closed to public access with secure gates. Paved driveways will provide access from 170th Street West and signs identifying the BESS facility will be provided at entrance gates. Onsite roads, access gates, and fire hydrants will be designed in accordance with the Kern County Fire Department requirements. The North and South BESS areas will be surrounded by a common perimeter fence, and the West BESS area will have its own perimeter fence. A Knox rapid access system will be provided at gates for fire department access. Roads will be designed for two-way circulation of onsite traffic, which will be minimal, consisting of visits by the proposed project's employees, contractors, and vendors providing periodic maintenance and monitoring. Shielded, downward-directed night-lighting will be provided for safety and security. All lighting will be required to conform to applicable County Dark Skies Ordinance requirements. A detailed lighting plan will be required prior to issuance of building permits. Motion-sensitive cameras and other monitoring equipment may also be installed. Cameras may be mounted on poles up to 20 feet in height.

2.10 Roads and Improved Surfaces

The final finished grade throughout the developed portion of the Site will consist of stable improved surfaces including asphalt paved roads meeting fire department requirements, concrete footings and slabs, stabilized stormwater control systems, and gravel surfacing encompassing other areas.

Drainage onsite will be managed in shallow rip-rap ditches with culverts at road crossings and surface impoundments to control peak flows in accordance with County requirements. Approximately 16.3 acres of the Site are not planned for development. Areas not planned for development will be left undisturbed.

2.11 SCE Tie-Line and Substation Improvements

SCE will design, construct, own, and operate the tie-line extending from the respective POCO pole across the Site boundary to the interconnection point at the Whirlwind Substation 220 kV bus. The following description of anticipated SCE facilities is preliminary and subject to change.

The electric tie-lines will extend overhead from the POCO across the proposed project boundary directly into SCE-owned property between the Site and the Whirlwind Substation. SCE may construct the tie-lines as either single-circuit (three conductors) or double-circuit (six conductors) using poles or lattice towers to support the overhead lines. The preliminary design for the east tie-line includes three steel tower or pole structures approximately 140 feet high on SCE property between the Site and the Whirlwind Substation interconnection. The preliminary design of the west tie-line includes up to five steel tower or pole structures on SCE property between the Site and the point of interconnection with three approximately 140 feet high and two higher structures or poles that will be less than 200 feet high. The higher structures will be needed to achieve required vertical clearances over existing transmission

lines. Fiberoptic cables between the collector substations and the Whirlwind Substation will also be needed, and will either be overhead, underground, or both. Within the existing Whirlwind Substation, each of the tie-lines will require installation of facilities for new 220 kV switchrack and line positions to terminate the tie-lines and telecommunications infrastructure. A preliminary scope description for the tie-lines extending from the South and West BESS Areas is provided in the Table below.

Preliminary SCE Interconnection Work Scope Summary

Transmission Work
• Install a new 220kV generation tie-line from the POCO in the South BESS area to a new 220kV substation rack inside SCE's Whirlwind Substation. o Install conductors and shield wire from the POCO to the new 220kV substation rack inside SCE's Whirlwind Substation. o Install three tubular steel poles or towers from SCE's Whirlwind Substation rack to the POCO. Height will be compatible with the height of the POCO structure. • Install a new 220kV generation tie-line from the POCO in the West BESS area to a new 220kV substation rack inside SCE's Whirlwind Substation. o Install conductors and shield wire from the POCO to the new 220kV substation rack inside SCE's Whirlwind Substation. o Install five tubular steel poles or towers from SCE's Whirlwind Substation rack to the POCO. Height will be compatible with the height of the POCO structure and required crossings.
Whirlwind Substation Work
For each Tie-Line: • Install a new 220kV switchrack position to terminate the new generation tie line. • Install one approximately 65-foot-high steel dead-end structure at 220kV position 5N. o Install three 220kV coupling capacitor voltage transformers (CCTV) on new steel pedestal structures. Connect CCVTs using one 650 kilo circular mils (kCMIL) aluminum conductor steel reinforced)ACSR) conductor per phase. o Install new pull boxes with terminal blocks and make-before-break (MBB) switches at the CCVT structures. o Install three 220kV surge arresters on new steel pedestal structures. Connect surge arresters using one 605kCMIL ACSR conductor per phase. o Install three 220kV line drops with tie down support structure. Connect the line drop to the disconnect switches using three 1590kCMIL ACSR conductors per phase. o Install new homerun cables to the new CCVTs. o Land ground wire and optical and ground wire (OPGW) at the top of approximately the 65-foot-high dead-end structure. • Install one 220kV line position. o Install two 220kV, 4000A, 50kA circuit breakers 4052 & 5052 with the circuit breaker mechanism facing away from the cable trench. o Install four 220kV, 4000A, horizontal group-operated disconnect switches on new steel structures. Equip the north line switch with a ground switch. o Equip the position with three 1590kCMIL ACSR conductors per phase. Install all required bus support structures and all conductor spacers. o Install two operator interface cabinets for the new circuit breakers. The operator interface cabinets will be fabricated by the contractor.

- Install new homerun cables for the new circuit breakers.
- Install fourteen 220kV bus support post insulators.
- Install foundation, conduit, grounding, homerun, and power cables.
- Install four conductor supports with pedestals.

Telecommunications Work

For Each Tie-Line:

- Install two new underground diverse fiber optic line routes from Whirlwind Substation to new meet-me manholes outside of Whirlwind Substation fence line.
  - Route 1:
    - Install new 2-5-inch underground conduit and fiber.
    - Install one approximately 4-foot by 4-foot by 6-foot manhole "meet-me" structure outside the southwest fence line of Whirlwind Substation.
  - Route 2:
    - Install new 2-5-inch underground conduit and fiber.
    - Install one approximately 4-foot by 4-foot by 6-foot manhole "meet-me" structure outside the north fence line of Whirlwind Substation.

2.12 Temporary Laydown Yard

An approximately three acre temporary laydown area will be needed for project construction. The temporary laydown area will be located adjacent to the driveway near 170th Street West. The laydown area will be temporarily fenced and secured during construction and will be used for temporary storage of materials and equipment.

3.0 CONSTRUCTION ACTIVITIES

Construction of the proposed project is expected to last for approximately 2 years and will initiate once the Project owners receive all of the necessary permits and agency approvals. The preliminary construction plan is for construction to begin in the North and South areas and commercial operations to begin first in the South Area while construction continues in other areas. At peak construction, the proposed project is expected to require approximately 150 onsite construction workers. The proposed project will utilize union labor, with wages at or above Internal Revenue Service (IRS) standards for prevailing wages, and will comply with the Occupational Safety and Health Administration (OSHA) Standards during and after the construction phase. Additionally, the National Fire Protection Association (NFPA) 70E Standards for hot electrical work will be strictly adhered to and enforced.

Construction will proceed with clearing, grubbing, and grading managed to minimize the area of active disturbance at any given time. Surfaces will be stabilized promptly once grading in the area is complete. Extensive grading will not be required due to the existing grading levels at the Site close to the planned finish grades needed for construction and control of stormwater drainage. Final grading will be designed to achieve a cut and fill balance. Grading will be completed using common construction equipment such as water trucks, bulldozers, loaders, haul trucks and graders. Rough grading will include conditioning foundation areas as needed to achieve proper and consistent compaction in the subgrade and over the rough graded surface and achieving a cut/fill balance. Finish grading will consist of bringing the ground surface elevation contours to final grade with a gentle slope for positive drainage. Grading in the

flood zone will be minimized and designed for no net fill and to avoid impact to flood flows. The BESS equipment will not be located in the flood zone. Staging for construction will occur within the areas to be developed and within an approximately three acre temporary staging area near 170th Street West.

Following grading, the foundations (concrete or pile) for the BESS and associated infrastructure will be installed. In the BESS arrays, smaller equipment such as DC converters and SCADA systems will be supported on concrete foundations. Batteries and MV transformers will be supported by piles or concrete foundations. Piles will be vibrated or screwed into place. Concrete foundation installation will consist of excavation as needed, installing forms, installing reinforcing steel, structural inspection, and then concrete pouring and finishing. Forms will be removed in following days after the concrete has hardened. Concrete will be purchased from an offsite supplier and trucked to the Site. No onsite batch plant is anticipated. Equipment placement and MV underground duct bank installation will begin after the equipment foundations have been placed and concrete adequately cured. Cranes will be used to lift equipment enclosures from delivery trucks onto foundations and then the enclosures will be secured in place. Trenchers or backhoes will be used to excavate and backfill ditches for installation of conduit and underground cabling to connect the equipment. Once underground conductors are installed, connections will completed and then inspected. The onsite collector substation and SCE interconnection improvements will overlap with the BESS installation and will be scheduled to accommodate testing and commissioning prior to the scheduled commercial operations date. Installation of foundations, equipment, underground duct banks, construction of the collector substation, and interconnection improvements will use conventional earthmoving and building equipment such as cement trucks, water trucks, truck-mounted drills, dump trucks, loader/backhoes, bobcats, man-lifts, and cranes. SCE will be responsible for all construction within the Whirlwind Substation and the gen-tie lines between the Whirlwind Substation and the POCOs.

During project construction, water will be required for common construction-related purposes, including but not limited: dust suppression, soil compaction, and grading. The overall construction water usage is anticipated to be approximately 55 acre-feet during the 2 year construction period. Construction water will be from onsite wells supplemented by water purchased from local water purveyors. Water trucks will be kept onsite and used to control fugitive dust in accordance with the Eastern Kern County Air Pollution Control District (APCD) requirements. The project owners will require construction contractors to comply with all applicable APCD requirements during construction including, but not limited to, Rule 402 for control of fugitive dust. A Fugitive Dust Emission Control Plan will be submitted to APCD for approval prior to groundbreaking.

The designated temporary staging and parking area for construction will occur onsite near active work areas as development progresses. Temporary bulk fuel storage will be provided onsite for construction with secondary containment. Sanitary facilities for construction will be provided via portable self-contained units maintained by a licensed contractor. Staging and parking for SCE's construction is expected to occur within currently developed SCE property at the Whirlwind Substation.

Electric power for construction onsite will be provided by portable generators since there is no electric distribution line nearby and the voltage of nearby transmission is too high to be of practical use. Portable generators will conform with APCD requirements.

All constructed electrical equipment will be inspected and tested as appropriate prior to energizing. Construction will be required to follow all applicable local, state, and federal safety regulations and a full-time safety professional will be present onsite to monitor and implement a comprehensive project-specific safety program. Construction will be subject to requirements of the State General Permit for stormwater discharges from construction sites including implementation of a Storm Water Pollution Prevention Plan (SWPPP) with Best Management Practices (BMPs) developed by a California Qualified SWPPP Developer and implemented by a Qualified SWPPP Practitioner. The Project will be required to comply with the General Permit until it is demonstrated to the Regional Water Quality Control Board (RWQCB) that surface stabilization is complete, and a Notice of Termination is accepted.

4.0 OPERATIONAL ACTIVITIES

The anticipated operational life is 35 years. The proposed project is designed for remote operation and will be available to charge or discharge electric energy year-round, 24 hours per day, seven days per week. A comprehensive monitoring and security system will be included. Installed infrastructure at the Whirlwind Substation, the gen-tie lines between the Whirlwind Substation and the POCO, and SCE control and metering equipment within the collector substations will be operated and maintained by SCE. The Project owners will be responsible for operation and maintenance of all onsite facilities, except for SCE control and metering equipment within the collector substations.

An estimated two to six full-time employees will be routinely onsite for operations. In addition, the Project may require approximately four to six part-time employees for periodic maintenance. The O&M building will provide offices, a conference room, a break room, and sanitary facilities for onsite employees, vendors, and contractors.

During operation, it is anticipated that water will be required for flushing and filling the firewater tanks as well as O&M building use. Water consumption during operations is expected to be less than 2 acre-feet per year. During operations, the water used is anticipated to be from onsite wells or purchased from a local water purveyor.

Replacement, repair, or augmentation of systems will occur as needed within the Site. Maintenance will occasionally generate spent batteries that will be returned to the battery manufacturer for recycling. Other equipment may also require replacement from time-to-time and will be removed from the Site and recycled or disposed of in accordance with applicable State regulations for waste management.

5.0 DECOMMISSIONING

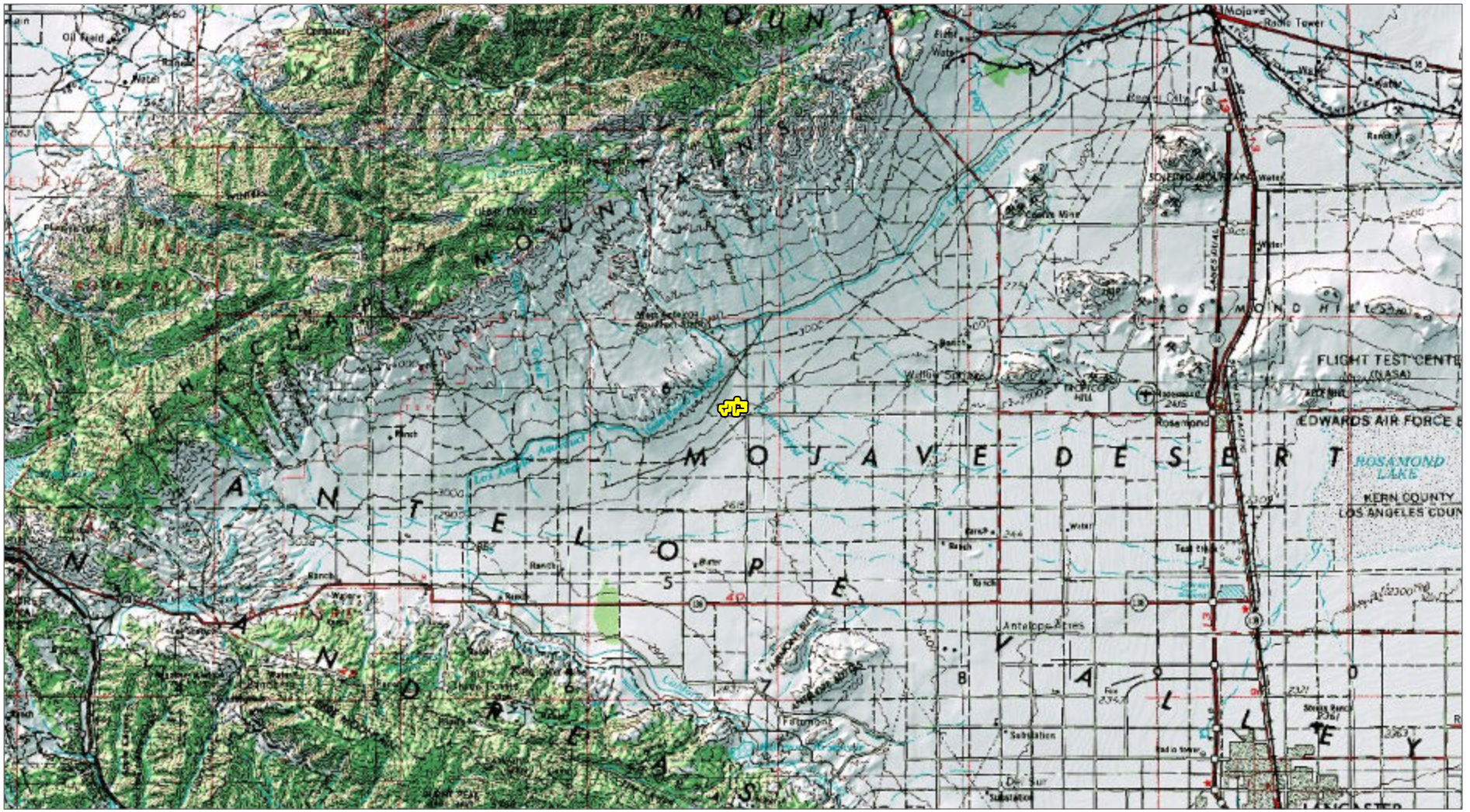
If not repowered at the end of the operating life, then the proposed project would be decommissioned, and the project components, including the BESS facility would be removed from the Site. Disturbed areas from the removal of the Project components would be stabilized. The Site could then be converted to other uses in accordance with applicable land use regulations in effect at that time. A decommissioning plan would be developed and would adhere to the requirements of the appropriate governing authorities as well as all applicable local, state, and federal requirements and BMPs.

The decommissioning would include removal of above-grade facilities, buried electrical conduit, and concrete and pile foundations. Equipment would be repurposed off-site, recycled, or disposed of in a landfill as appropriate under State regulations. Most material generated would be recyclable metals, concrete, and electrical equipment. Some or most battery components would be recycled, and other components may be disposed of as hazardous waste, depending on available technology. Li-ion and lithium-iron phosphate batteries and their constituent parts would likely be recycled. Some batteries may have the capacity to be reused at the end of the operating life of the proposed project.

Decommissioning activities would be primarily within the proposed project's security fence, which will be among the last components to be removed. Decommissioning would take up to approximately 12 months to complete and would occur in the following phases:

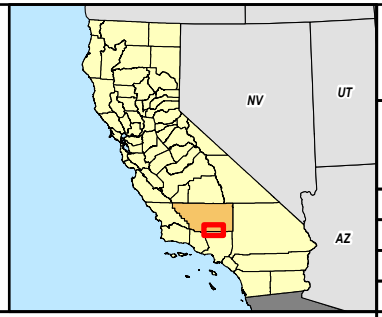
- Phase 1 – Shutting down the systems and removing hazardous materials and wiring;
- Phase 2 – Removing the battery storage enclosures, inverters, and substations; and
- Phase 3 – Removing foundations, fencing and driveways, and surface stabilization. Disturbed areas would be stabilized as soon as practical as decommissioning progresses across the Site.

Decommissioning would involve the use of heavy equipment similar to that used for construction, although likely with a generally smaller equipment fleet. Appropriate hazardous materials control and erosion control measures would be used throughout the decommissioning process. It is anticipated that such controls would be substantially similar to those implemented during construction.



LEGEND

PROJECT SITE



BASE MAP: USGS TOPOGRAPHIC SERVICE LAYER
DATA SOURCES: TRC, RINCON, USGS

N

0 12,500 25,000 FEET

1:300,000 1" = 25,000'

PROJECT:
EUISMOD PROJECT
KERN COUNTY, CALIFORNIA

TITLE:
PROJECT VICINITY MAP

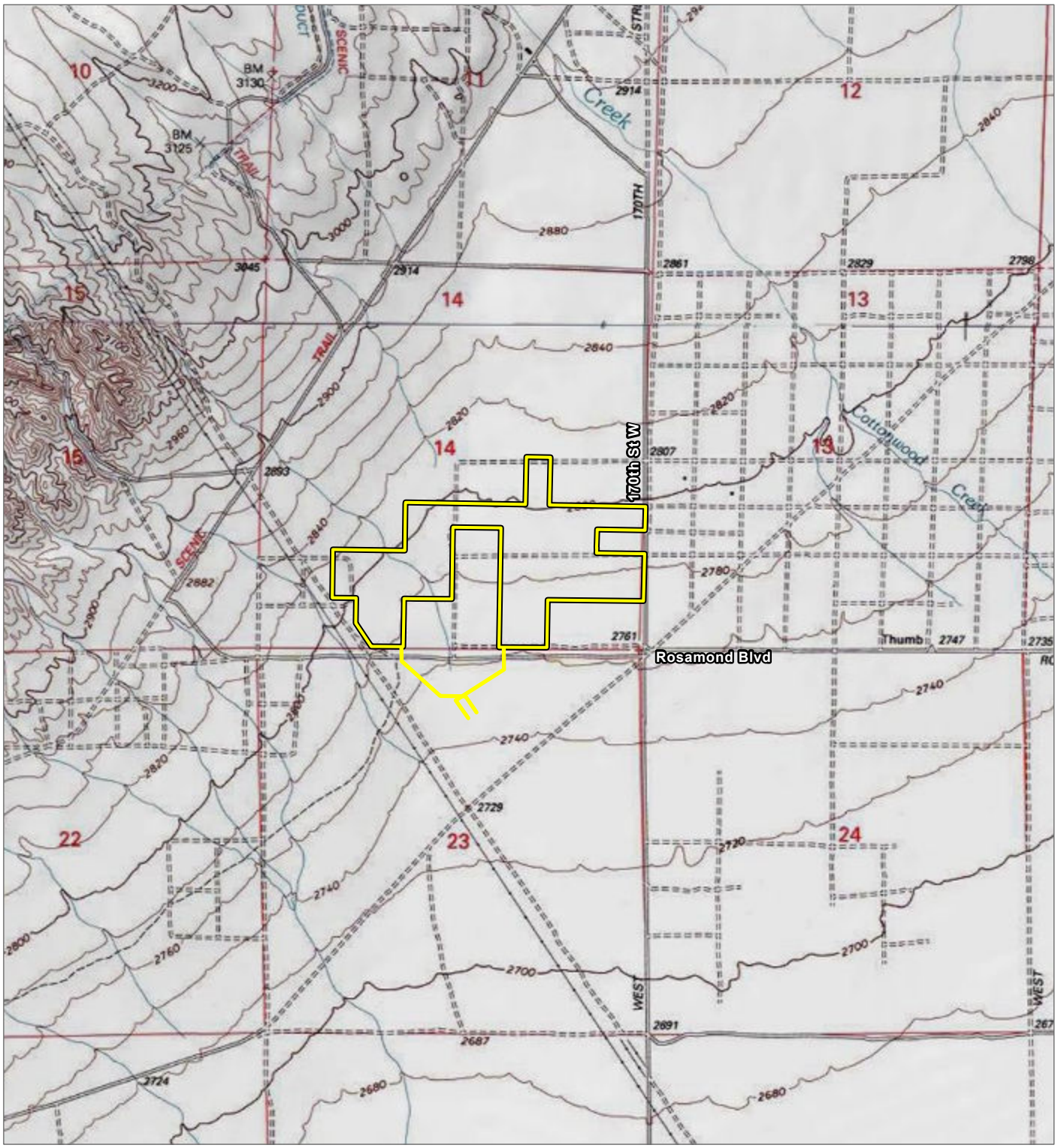
DRAWN BY:	A. CLINE	PROJ. NO.:	552398
CHECKED BY:	H. GEDDIE		
APPROVED BY:	J. STENGER		**FIGURE 1**
DATE:	NOVEMBER 2025		

TRC

6 EXECUTIVE CIRCLE
SUITE 200
IRVINE, CA 92614
PHONE: 949.727.9336

FILE: 552398_EUISMOD_BIOSURVEY

COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET. MAP ROTATION: 0
SAVED BY: ACLINE ON 11/13/2025, 12:26:43 PM. FILE PATH: T:\1_PROJECTS\AYPA_POWER\552398_EUISMOD_MWRLMIND\2_APRX\552398_EUISMOD_BIOSURVEY.APRX. LAYOUT NAME: FIGURE 1 PROJECT VICINITY MAP



LEGEND

- PROJECT SITE
- ELECTRIC TIE-LINE

0 1,000 2,000

FEET

1:24,000 1" = 2,000'



BASE MAP: USGS TOPOGRAPHIC SERVICE LAYER
7.5' QUADRANGLE : FAIRMONT BUTTE (34118-G4)
DATA SOURCES: TRC

PROJECT:

EUISMOD PROJECT
KERN COUNTY, CALIFORNIA

TITLE:

PROJECT LOCATION MAP
TOPOGRAPHIC

DRAWN BY:	A. CLINE	PROJ. NO.:	552398
CHECKED BY:	H. GEDDIE		
APPROVED BY:	J. STENGER		**FIGURE 2**
DATE:	FEBRUARY 2026		

TRC
6 EXECUTIVE CIRCLE
SUITE 200
IRVINE, CA 92614
PHONE: 949.727.9336

FILE: 552398_EUISMOD_BIOSURVEY

COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET: MAP ROTATION: 0
-- SAVED BY: ACLINE ON 2/26/2026, 15:22:35 PM; FILE PATH: T:\1-PROJECTS\AYPA_POWER\552398_EUISMOD_WHIRLWIND\2-APRX\552398_EUISMOD_BIOSURVEYAPRX; LAYOUT NAME: FIGURE 2 PROJECT LOCATION_TOPOGRAPHIC



LEGEND

PROJECT SITE

ELECTRIC TIE-LINE

BASE MAP: GOOGLE EARTH AERIAL IMAGERY SERVICE LAYER
AERIAL DATE: 10/2024
DATA SOURCES: TRC, GOOGLE

N

0 1,000 2,000

FEET

1:24,000 1" = 2,000'



PROJECT:

EUISMOD PROJECT
KERN COUNTY, CALIFORNIA

TITLE:

PROJECT LOCATION MAP
AERIAL

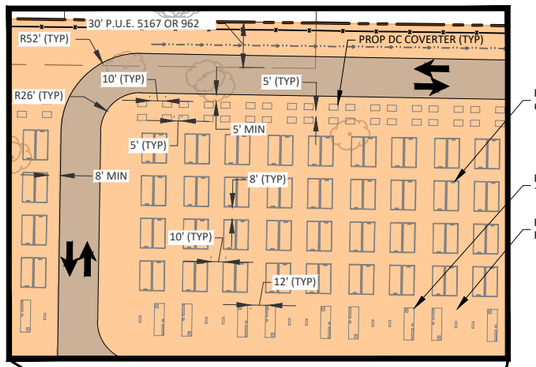
DRAWN BY:	A. CLINE	PROJ. NO.:	552398
CHECKED BY:	H. GEDDIE		
APPROVED BY:	J. STENGER		**FIGURE 3**
DATE:	FEBRUARY 2026		

TRC

6 EXECUTIVE CIRCLE
SUITE 200
IRVINE, CA 92614
PHONE: 949.727.9336

FILE: 552398_EUISMOD_BIOSURVEY

COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET: MAP ROTATION: 0
22:35 PM: FILE PATH: T:\1-PROJECTS\AYPA_POWER\552398_EUISMOD_WHIRLWIND2-APRX\552398_EUISMOD_BIOSURVEY.APRX: - LAYOUT NAME: FIGURE 3 PROJECT LOCATION_AERIAL



TYPICAL ARRAY DETAIL
SCALE: 1" = 100'

90' ROAD RESERVATION
PROP 4' WIDE PEDESTRIAN GATE
PROP 4' WIDE PEDESTRIAN GATE
EX 40' WIDE PAVED ROAD
APN: 261-103-22
APN: 261-104-14
APN: 261-104-05
APN: 261-104-06
APN: 261-104-07
90' ROAD RESERVATION
EX TELECOMMUNICATION LINE (TYP)
APN: 261-104-15
PROP FENCE MOUNTED SIGN
PROP WATER TANK (TYP)
OPTION A: INCIDENT COMMAND POST INCLUDING WATER TANK, PUMP HOUSE AND WELL (SEE GRADING AND DRAINAGE PLAN FOR ELEVATION)
PROP 26' WIDE PAVED DRIVE/FIRE LANE (TYP)
66'
112'
78'
30'
PROP PUMP HOUSE (TYP)
APN: 261-104-08
PROP WELL (TYP)
PROP 4' WIDE PEDESTRIAN GATE
PROP ENTRANCE WITH SECURITY GATE AND KNOX BOX (TYP)
30'
EX BRIDGE
PROP 4' WIDE PEDESTRIAN GATE
PROPOSED SUBSTATION
484'
O&M CONEX
PROP 4' WIDE PEDESTRIAN GATE
APN: 261-104-17
OPTION B: INCIDENT COMMAND POST INCLUDING WATER TANK, PUMP HOUSE AND WELL (SEE GRADING AND DRAINAGE PLAN FOR ELEVATION)
APN: 261-103-16
85'
DETENTION POND D3
54'
APN: 261-104-12
RETENTION POND B1
PROP FENCE MOUNTED SIGN
PROP O&M BUILDING #1 20' X 60'
RETENTION POND C1
PROP 4' WIDE PEDESTRIAN GATE
53'
APN: 261-103-13
APN: 261-103-12
EX BOLLARD (4)
PROP MICROWAVE COMMUNICATIONS TOWER
338'
EX WATER VALVE (TYP)
EX DIRT ROAD (TYP)
EX FIRE DEPARTMENT CONNECTION
APN: 261-103-11
PROP WELL (TYP)
PROP 26' WIDE PAVED DRIVE/FIRE LANE (TYP)
PROP 26' WIDE PAVED DRIVE/FIRE LANE (TYP)
RETENTION POND A1
PROP PUMP HOUSE (TYP)
APN: 261-104-03
CONSTRUCTION LAYDOWN AREA
RETENTION POND B1.1
PROP WATER TANK (TYP)
DETENTION POND D2
PROP 4' WIDE PEDESTRIAN GATE
177'
DETENTION POND B2
PROP 4' WIDE PEDESTRIAN GATE
71'
PROP MICROWAVE COMMUNICATIONS TOWER
96'
PROP ENTRANCE WITH SECURITY GATE AND KNOX BOX (TYP)
EX SIGN (TYP)
PROP O&M BUILDING WEST 20' X 60'
PROP BACKUP GENERATORS
ANTICIPATED POCO
ANTICIPATED POCO
FEMA DESIGNATION LINE
PROP FENCE MOUNTED SIGN
APN: 261-103-09
PROPOSED SUBSTATION
PROP PARKING 1 - 10'X20' 3 - 9'X20'
APN: 261-103-19
EX OVERHEAD ELECTRIC (TYP)
APN: 261-104-11
EX POWER POLE (TYP)
PROP 220 kV OVERHEAD ELECTRIC
PROP 220 kV OVERHEAD ELECTRIC
EX WATER LINE (TYP)
FLOOD ZONE "X (UNSHADED)"
FLOOD ZONE "A"
PROP 4' WIDE PEDESTRIAN GATE
O&M CONEX
PROP O&M BUILDING #2 20' X 60'
RETENTION POND C2
DETENTION POND D4
34'
56'
C.L. ROSAMOND BLVD (ROS 3159)
PROP SECONDARY ACCESS GATE
PROP 4' WIDE PEDESTRIAN GATE
110' ROAD RESERVATION
EX COMM STRUCTURE
APN: 261-131-06
APN: 261-131-05
APN: 261-132-06
APN: 261-132-01
APN: 261-132-02
APN: 261-132-03
APN: 261-132-04
LANDS OF SOUTHERN CALIFORNIA EDISON COMPANY
170TH STREET WEST (R/W VARIES) (A PUBLIC STREET)
E 1/2, NW 1/4, NE 1/4, NW 1/4, SEC. 23, T9N, R15W, SBM (PR-23000372214) (APN: 261-131-04)
EX ELECTRIC STRUCTURE (TYP)
REVISED 220 kV OVERHEAD ELECTRIC
APN: 261-131-12
EX EDGE OF PAVEMENT (TYP)
EX CONCRETE PAVEMENT (TYP)
EX UTILITY MANHOLE (TYP)
EX STREET LIGHT (TYP)
SCE WHIRLWIND SUBSTATION

MINIMUM SETBACKS	
DISTANCE	DESCRIPTION
300'	BATTERIES TO WHIRLWIND SUBSTATION
300'	BATTERIES TO RESPONDERS STATION
50'	BATTERIES TO PROPERTY LINES
600'	BATTERIES TO 170TH STREET WEST
55'	FRONT YARD
5'	SIDE YARD
5'	REAR YARD
55'	SECTION LINE ROAD RESERVATION
45'	MID-SECTION LINE ROAD RESERVATION

LEGEND

EXISTING FEATURES

- ADJACENT PARCEL BOUNDARY
- FEMA FLOOD ZONE LINE
- SECTION LINE
- SECTION RESERVATION LINE
- EXISTING EASEMENT LINE
- RIPRAP
- DIRT ROAD
- CONCRETE
- PAVEMENT
- WALL
- SIGN
- BOLLARD
- UTILITY POLE
- MANHOLE
- FIRE HYDRANT
- WATER VALVE
- STREET LIGHT
- UTILITY MANHOLE
- OVERHEAD ELECTRIC (OE)
- ELECTRIC STRUCTURE
- WATER (W)
- TELECOMMUNICATION (TEL)
- GUARDRAIL

PROPOSED FEATURES

- PROJECT BOUNDARY
- FLOW LINE
- CULVERT
- CHAIN LINK FENCE
- ASPHALT PAVEMENT
- ACCESS GATE
- BATTERY CONTAINER
- TRANSFORMER
- DC CONVERTER
- AUX & SCADA PANELS
- STORAGE CONTAINERS
- VEHICLE DIRECTION (SEE NOTE)
- AUXILIARY PAD
- EUISMOD PROJECT LLC CUP (SOUTH AREA)
- EUISMOD PROJECT I LLC CUP (WEST AREA)
- EUISMOD PROJECT I LLC CUP (NORTH AREA)
- SOUTH MICROWAVE CUP (EUISMOD PROJECT LLC)
- WEST MICROWAVE CUP (EUISMOD PROJECT I LLC)

NOTE: ALL ONSITE ROADS ARE TWO-WAY CIRCULATION.

GRAPHIC SCALE

0' 200' 400'
1" = 400'

NORTH

N

SEAL:

PERMIT PLAN SET NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER:

DATE:

NO.	BY	DATE	REVISION	APP'D.
1		06/25/25	1st REVIEW COMMENTS ADDRESSED	

PROJECT:
EUISMOD PROJECT
0 170th STREET WEST
WILLOW SPRINGS, CA 93560
KERN COUNTY

CASE NO: PLN25-00046, MAP 233

TITLE:
PROPOSED OVERALL SITE PLAN

DRAWN BY:	TSS	PROJ. NO.:	552398
CHECKED BY:	DG		
APPROVED BY:	SH		FIGURE 4
DATE:	2/17/26		

TRC
6 Executive Circle
Suite 200
Irvine, CA 92614
Phone: 949.727.9336

H:\WORK IN PROGRESS\SOLAR SITES\VAPA POWER\EUISMOD\CAD\LAYOUT SHEETS\SITE PLANS_11X17\11X17_SITE PLANS.DWG

ATTACHMENT 2

ENERGY USE DURING CONSTRUCTION

Euismod Project - Energy Use During Construction

2027				
Phase	**Activity**	**Fuel Type**	**MTCO2**	**Fuel (gals)[1]**
SCE Whirlwind SS IT/Telecom	Off-Road Equipment	Diesel	7.73	757
	Onsite Truck	Diesel	0.23	23
	Worker Trips	Gasoline	2.04	232
	Vendor Trips	Diesel	0	0
	Hauling Trips	Diesel	2.62	257
Onsite Clearing/Grading	Off-Road Equipment	Diesel	266	26,053
	Onsite Truck	Diesel	5.09	499
	Worker Trips	Gasoline	19.5	2,221
	Vendor Trips	Diesel	7.68	752
	Hauling Trips	Diesel	72.3	7,081
SCE Clear Veg. & Install T-line Supports & UG	Off-Road Equipment	Diesel	47.5	4,652
	Onsite Truck	Diesel	0.6	59
	Worker Trips	Gasoline	8.16	929
	Vendor Trips	Diesel	0	0
	Hauling Trips	Diesel	7.85	769
Onsite Trench/Backfill	Off-Road Equipment	Diesel	49.5	4,848
	Onsite Truck	Diesel	0.63	62
	Worker Trips	Gasoline	15.2	1,731
	Vendor Trips	Diesel	5.24	513
	Hauling Trips	Diesel	0	0
Onsite Equipment Foundations & T-Poles	Off-Road Equipment	Diesel	310	30,362
	Onsite Truck	Diesel	7.18	703
	Worker Trips	Gasoline	116	13,212
	Vendor Trips	Diesel	9.17	898
	Hauling Trips	Diesel	106	10,382
SCE T-line OH	Off-Road Equipment	Diesel	9.12	893
	Onsite Truck	Diesel	0.24	24
	Worker Trips	Gasoline	2.85	325
	Vendor Trips	Diesel	0	0
	Hauling Trips	Diesel	2.74	268
SCE Whirlwind SS Civil & Elect.	Off-Road Equipment	Diesel	16.9	1,655
	Onsite Truck	Diesel	0.57	56
	Worker Trips	Gasoline	7.77	885
	Vendor Trips	Diesel	0	0
	Hauling Trips	Diesel	7.48	733
Onsite SS Construction	Off-Road Equipment	Diesel	67	6,562
	Onsite Truck	Diesel	1.79	175
	Worker Trips	Gasoline	24.3	2,768
	Vendor Trips	Diesel	11.2	1,097
	Hauling Trips	Diesel	7.79	763
Onsite Equipment Installation	Off-Road Equipment	Diesel	273	26,738
	Onsite Truck	Diesel	4.85	475
	Worker Trips	Gasoline	91.22	10,390
	Vendor Trips	Diesel	40.2	3,937
	Hauling Trips	Diesel	0	0
Onsite Pave/Gravel/Landscape	Off-Road Equipment	Diesel	219	21,450
	Onsite Truck	Diesel	10.6	1,038
	Worker Trips	Gasoline	37.6	4,282
	Vendor Trips	Diesel	10.4	1,019
	Hauling Trips	Diesel	163	15,965
		2027 Totals (gals)	**Diesel**	**171,518**
			Gasoline	**36,975**

[1]Fuel usage determined using EPA emission factor for each fuel type
https://www.epa.gov/sites/default/files/2015-07/documents/emission-factors_2014.pdf

Product	kg CO2/gal
Diesel	10.21
Gasoline	8.78

Appendix F
Geologic Studies

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Appendix F1
Preliminary Geotechnical Investigation Report

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2045 Martin Ave., Ste. 202
Santa Clara, CA 95050
T 650.967.2365
TRCcompanies.com

Revised April 20, 2026
July 1, 2025
552398

EUISMOD PROJECT LLC AND EUISMOD PROJECT I LLC
Att. Mr. Sam Holing
1 Belvedere Place
Mill Valley, CA 94941

RE: GEOTECHNICAL INVESTIGATION
EUISMOD PROJECT
170TH STREET WEST AND ROSAMOND BOULEVARD
WILLOW SPRINGS, KERN COUNTY, CALIFORNIA

Dear Mr. Holing:

TRC is pleased to present the results of TRC's geotechnical study for the above referenced project. TRC's report includes a description of the geotechnical and seismic aspects of the site along with TRC's conclusions and geotechnical recommendations for design of the Euismod Project. This revised report includes revisions and responses to the peer review comments made by WSP dated April 10,2026.

TRC refers you to the text of this report for detailed recommendations. If you have any questions concerning TRC's findings, please call me at the number above, or Joe Stenger at (949) 697-7169.

Very truly yours,

TRC

Mustafa B. Dogan
Senior Geotechnical Engineer

AC:MBD

Copies: Addressee (2 and email)

Geotechnical Investigation

Euismod Project

170th Street and Rosamond Boulevard, Willow Springs, Kern County, California

Report No. 552398 has been prepared for:

EUISMOD PROJECT LLC AND EUISMOD PROJECT I LLC

11801 Domain Blvd. Suite 450, Austin TX, 78758

July 1, 2025

Revised April 20, 2026



Alberto Cortez
Senior Staff Engineer

Mustafa B. Dogan
Senior Geotechnical Engineer

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Project Description 1
1.2 Scope of Services 1
2.0 SITE CONDITIONS 2
2.1 Site Reconnaissance 2
2.2 Exploratory Program 2
2.3 Subsurface Conditions 2
2.4 Groundwater 2
2.5 Frost Depth Conditions 3
2.6 Shrink and Swell Potential 3
2.6 Soil Infiltration 3
3.0 GEOLOGIC HAZARDS 3
3.1 Regional Geologic Setting 3
3.2 Faults Rupture 3
Table 1. Active Faults 4
3.3 Maximum Estimated Ground Shaking 4
3.4 Liquefaction 4
3.5 Dry Seismic Settlement 4
3.6 Landsliding 4
3.7 Lateral Spreading 5
3.8 Flooding 5
4.0 CORROSION EVALUATION 5
Table 2. Results of Corrosivity Testing 5
Table 3. Relationship Between Soil Resistivity and Soil Corrosivity 6
Table 4. Relationship Between Sulfate Concentration and Sulfate Exposure 6
5.0 FIELD SOIL ELECTRICAL AND THERMAL RESISTIVITY TESTING 7
5.1 Soil Electrical Resistivity Testing 7
Table 5A. Results of Field Electrical Resistivity Testing 7
Table 5B. Results of Field Electrical Resistivity Testing 8
Table 5C. Results of Field Electrical Resistivity Testing 9
5.2 Soil Thermal Resistivity Testing 9
6.0 CONCLUSIONS AND RECOMMENDATIONS 10
6.1 Primary Geotechnical Concerns 10
6.1.1 Strong Seismic Shaking 10
6.1.2 Dry Seismic Shaking 10
6.1.3 Loose Near-Surface Soils 10
6.1.4 Corrosion Potential of Near-Surface Soils 10
6.2 Plans, Specifications, and Construction Review 10
7.0 EARTHWORK 11
7.1 Clearing and Site Preparation 11
7.2 Removal of Existing Fill 11
7.3 Abandoned Utilities 11
7.4 Subgrade Preparation 12
7.5 Material for Fill 12
7.6 Compaction 12
7.7 Wet Soils and Wet Weather Conditions 12
7.8 Trench Backfill 13

7.9 Temporary Slopes and Trench Excavations 13
7.10 Permanent Slopes and Fill Drainage 14
7.11 Surface Drainage 14
7.12 Landscaping Considerations 14
7.13 Construction Observation 15
8.0 FOUNDATIONS 15
8.1 ASCE 7-16 Site Class and Site Seismic Coefficients 15
Table 6. ASCE 7-16/CBC 2022 Site Class and Site Seismic Coefficients 16
8.2 Shallow Foundations 16
8.2.1 Footings 16
8.2.2 Footing Settlement 17
8.2.3 Lateral Loads 17
8.3 Friction Piers 17
8.4 Friction Piles 17
8.5 Lateral Loads on Friction Piles or Piers 18
8.6 Lateral Response 18
Table 7. LPILE Geotechnical Parameters 18
8.7 Drilled Pier Considerations 18
9.0 CONCRETE SLABS-ON-GRADE 19
9.1 Equipment Pads 19
10.0 RETAINING WALLS 19
10.1 Lateral Earth Pressures 19
10.2 Seismic Lateral Earth Pressures 20
10.3 Drainage 20
10.4 Backfill 20
10.5 Foundation 21
11.0 PAVEMENTS 21
11.1 Asphalt Concrete 21
Table 8. Recommended Asphalt Concrete Pavement Design Alternatives Pavement Components Design R–Value = 25 21
11.2 Asphalt Concrete, Aggregate Base and Subgrade 21
11.3 Gravel Road Design 22
12.0 LIMITATIONS 22
13.0 REFERENCES 22

FIGURE 1 — VICINITY MAP
FIGURE 2 — SITE PLAN
FIGURE 3 — SITE GEOLOGY MAP

APPENDIX A — FIELD INVESTIGATION
APPENDIX B — LABORATORY PROGRAM

GEOTECHNICAL INVESTIGATION
EUISMOD PROJECT LLC AND EUISMOD PROJECT I LLC
170TH STREET WEST AND ROSAMOND BOULEVARD, WILLOW SPRINGS, KERN COUNTY, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of TRC's geotechnical study for the proposed Euismod Project battery energy storage facility to be located northwest of the intersection of 170th Street West and Rosamond Boulevard in Willow Springs, Kern County, California. This revised report includes revisions and responses to the peer review comments made by WSP dated April 10,2026. The site location is shown on the Vicinity Map, Figure 1. The purpose of TRC's investigation was to evaluate the geologic and subsurface conditions and to provide geotechnical recommendations for design of the proposed project.

A site plan titled "Preliminary Site Plan, Euismod Project, Willow Springs, CA 93560, Kern County," prepared by TRC and dated March 3, 2025, was reviewed in preparation for the geotechnical investigation described herein.

1.1 Project Description

TRC understands that Euismod Project is pursuing development of a Battery Energy Storage System (BESS) and ancillary equipment including two substations, three O&M buildings 20 by 60 feet, stormwater detention ponds, backup generators, auxiliary equipment pads, an emergency response station, water tanks, groundwater wells and pump houses, microwave communications, and access roads/fire lanes and parking. The layout of the proposed development is shown on Site Plan, Figure 2. TRC anticipates that equipment and facilities be supported by concrete piers, driven piles, or shallow foundations. Roads, parking, and other flatwork will be constructed on engineered subgrades.

1.2 Scope of Services

The geotechnical investigation described herein included the following services:

- Exploration of subsurface conditions by drilling 23 borings in the area of the proposed improvements and retrieving soil samples for observation and laboratory testing.
- Evaluation of the physical and engineering properties of the subsurface soils by visually classifying the samples and performing various laboratory tests on selected samples.
- Performing three soil resistivity tests using the Wenner 4-pin method.
- Engineering analysis to evaluate parameters for structure foundations, site earthwork, retaining walls, pavements, and slabs-on-grade.
- Preparation of this report to summarize TRC's findings and to present TRC's conclusions and recommendations.

The assessment of environmental characteristics in the soil, particularly those involving hazardous substances at the site, was not performed as part of this investigation.

2.0 SITE CONDITIONS

2.1 Site Reconnaissance

TRC's Project Engineer performed a reconnaissance of the site on April 22, 2025. The approximately 120-acre project site consists of a undeveloped open desert scrub terrain generally with 1 to 3 percent slope and bordered by open terrain except for the east boundary that abuts 170th Street West. High voltage electric transmission infrastructure occurs on and adjacent to portions of the site and the Southern California Edison Whirlwind Substation is located approximately 200 feet south of the site at closest approach.

Reconnaissance included marking of the planned field exploration locations. Notification was provided to Underground Service Alert (USA) and TRC also contracted a private utility locator to confirm absence of underground utilities at exploration locations prior to beginning fieldwork.

2.2 Exploratory Program

Subsurface exploration was performed on April 22 through 25, 2025 using conventional, truck-mounted hollow-stem auger drilling equipment to investigate, sample, and log subsurface soils. 23 hollow-stem auger exploratory borings were drilled to depths ranging from 16.5 to 41.5 feet.

TRC borings were backfilled in accordance with Kern County Department of Environmental Health guidelines. The approximate locations of the borings are shown on the Site Plan, Figure 2. The logs of the borings and details regarding TRC's field investigation are included in Appendix A; laboratory tests are discussed in Appendix B.

2.3 Subsurface Conditions

TRC borings generally encountered interbedded layers of loose to medium dense poorly graded sand with silt, loose to medium dense poorly graded sand, and loose to medium dense silty sand to depths ranging from approximately 4.5 to 9.5 feet. Below the depths of 4.5 to 9 feet, TRC borings generally encountered medium dense poorly graded sand, medium dense poorly graded sand with silt, medium dense silty sand, and medium dense poorly graded sand with gravel to depths ranging from approximately 16.5 to 28.5 feet. Below the depths of 16.5 to 28.5 feet, TRC borings encountered medium dense to dense poorly graded sand, medium dense to dense poorly graded sand with gravel, medium dense poorly graded sand with silt, and medium dense to dense silty sand to a depth of 41.5 feet, the maximum depth explored.

2.4 Groundwater

Free ground water was not encountered in any of TRC's borings to a maximum depth of approximately 41.5 feet below the existing ground surface (bgs). The California Geologic Survey (CGS) has not mapped the area to have historically high ground water levels. The Little Buttes Quadrangle report (CGS, 2005) indicates the depths to regional ground water levels are greater than 40 feet. Additionally, ground water data from Geotracker indicates that ground water was measured between the depths of approximately 114.5 to 128.5 feet below the ground surface for monitoring wells located about 15.2 miles east of the project site. Based on TRC's subsurface exploration, TRC judged a ground water depth of at least 41.5 feet to be appropriate for design purposes. Fluctuations in the level of the ground water may occur due to variations in rainfall, underground drainage patterns, regional influences, and other factors not evident at the time the borings were drilled. Variations in depth to ground water can be expected based on annual precipitation amounts, ground water withdrawal and other factors.

2.5 Frost Depth Conditions

Based on the Kern County Code of Building Regulations, Exhibit A, Statement of Local Findings, the typical frost depth for the project site location is at the ground surface. Therefore, TRC considers frost to be negligible.

2.6 Shrink and Swell Potential

Based on the near-surface soils encountered, which generally consisted of loose sands, TRC recommends a shrinkage factor of 10 and 15 percent be used when the soils are compacted to 90 and 95 percent relative compaction, respectively. Swelling of the soils is not anticipated due to the low expansion potential of the sandy soils.

2.6 Soil Infiltration

Based on the near-surface soils encountered, which generally consisted of loose sands, TRC recommends an infiltration rate of 1-inch per hour may be used for the site. Infiltration rates can vary depending on site-specific conditions, therefore, further field investigation consisting of infiltration tests may be required to determine site-specific infiltration rates.

3.0 GEOLOGIC HAZARDS

A qualitative evaluation of geologic hazards was made during this investigation. TRC's comments concerning these hazards are presented below.

3.1 Regional Geologic Setting

The site area is mapped as being underlain by Wash Deposits (late Holocene), Modern Alluvial Fan Deposits (Holocene), and Younger Alluvial Fan Deposits (Hernandez, J.L, and Lancaster, J.T.). Wash deposits are characterized as unconsolidated fine to medium-grained sand, with some coarse sand, fine gravel, and silt; modern alluvial fan deposits are characterized as unconsolidated to weakly consolidated, poorly sorted, gravel, sand, and silt deposits forming active, essentially undissected, alluvial fans; younger alluvial fan deposits are characterized as unconsolidated to weakly consolidated, fine to medium arkosic sand and fine gravel. Figure 3 shows the regional geologic conditions based on the National Geologic Map Database (2011) by Hernandez, J.L, and Lancaster, J.T.

3.2 Faults Rupture

Based on the US Geological Survey Quaternary Fault Database, the nearest active fault is the Garlock Fault and the San Andreas Fault Zone located approximately 9.1 miles northwest and 11.3 miles southwest of the project site, which are classified as Latest Quaternary and Historic exhibiting movement within the last 15,000 years and 150 years, respectively. A potentially active unnamed fault is located approximately 1.5 miles northeast of the project site. Fault rupture through the site, therefore, is not anticipated. The nearest active faults to the project site are presented in Table 1 below.

Table 1. Active Faults

Fault Name	Distance (mi)	Quaternary Fault Classification
Garlock Fault	9.1	Latest Quaternary – movement within the last 15,000 years
San Andreas Fault	11.3	Historic – movement within the last 150 years
Unnamed Fault	1.5	Undifferentiated Quaternary – movement within the last 1.6 million years

Source: US Geological Survey Quaternary Fault Database

3.3 Maximum Estimated Ground Shaking

Based on Equation 11.8-1 of ASCE 7-16, TRC judges a maximum considered earthquake geometric mean peak ground acceleration of 0.55g to be appropriate for geotechnical analyses for the project site.

3.4 Liquefaction

The site is not located within an area mapped by the CGS for seismically induced liquefaction hazard. During cyclic ground shaking, such as earthquakes, cyclically-induced stresses may cause increased pore water pressures within the soil matrix, which results in liquefaction. Additionally, the Little Buttes Quadrangle report (CGS, 2005) indicates low potential for liquefaction. Liquefied soil may lose shear strength that may lead to large shear deformations and/or flow failure (Youd et al., 2001). Liquefied soil can also settle as pore pressures dissipate following an earthquake. Limited field data is available on this subject; however, settlement on the order of 2 to 3 percent of the thickness of the liquefied zone has been measured in some cases.

Soils most susceptible to liquefaction are loose to moderately dense, saturated, non-cohesive soils with poor drainage, such as sands and silts with interbedded or capping layers of relatively low permeability soil. Based on subsurface soils encountered and ground water expected to be deeper than 41.5 feet below the ground surface, TRC concludes that potential for liquefaction can be considered low.

3.5 Dry Seismic Settlement

If near-surface soils vary in composition both vertically and laterally, strong earthquake shaking can cause non-uniform densification of loose to medium dense cohesionless soil strata. This results in movement of the near-surface soils.

TRC performed dry sand settlement calculations following Tokimatsu and Seed method (1987) for the loose to medium dense granular layers. TRC's calculations indicated that the loose to medium dense granular layers encountered in the borings may densify and settle on the order of approximately 1.7 inches with post-construction differential movement of approximately 0.9-inch over a horizontal distance of 50 feet.

3.6 Landsliding

The site is in a relatively flat area. The site has not been mapped by the State of California for seismically-induced landslide hazards. For these reasons, it is TRC's opinion that the probability of landsliding occurring at the site is low.

3.7 Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "free" face such as an open body of water, channel, or excavation. In soils this movement is generally due to failure along a weak plane and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. There are no creeks or open bodies of water within an appropriate distance from the site for lateral spreading to occur. Additionally, because of the low probability for liquefaction, the probability of lateral spreading occurring at the site during a seismic event is low.

3.8 Flooding

Based on TRC's review of the Federal Emergency Management Agency Flood Maps (FEMA) for the project area, the majority of the site is located in a FEMA Zone X (2008), which is defined as "area of minimal flood hazard." The easternmost edge of the site is located in a FEMA Special Flood Hazard Areas (SFHAs) Zone A, which is defined as "no base flood elevations determined."

4.0 CORROSION EVALUATION

To evaluate the corrosion potential of the subsurface soils at the site, TRC submitted four samples collected during TRC's subsurface investigation to an analytical laboratory for pH, resistivity, soluble sulfate, chloride content, and oxidation reduction potential testing. The results of these tests are summarized in Table 2 below.

Table 2. Results of Corrosivity Testing

Sample	Depth (feet)	Chloride (mg/kg)	Sulfate (mg/kg)	pH	Resistivity (ohm-cm)	Oxidation Reduction Potential, mV	Estimated Corrosivity Based on Resistivity	Estimated Corrosivity Based on Sulfates
EB-1	5.0	11	220	8.2	3,412	455	Moderately	Negligible
EB-7	2.5	12	204	8.4	4,142	473	Moderately	Negligible
EB-13	2.5	14	221	8.4	3,996	493	Moderately	Negligible
EB-19	5.0	42	211	8.3	3,668	498	Moderately	Negligible

Notes: 1. mg/kg = milligrams per kilogram.

Many factors can affect the corrosion potential of soil including soil moisture content, resistivity, permeability and pH, as well as chloride and sulfate concentration. In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor. Based on classification developed by William J. Ellis (1978), the approximate relationship between soil corrosiveness was developed as shown in Table 3 below.

Table 3. Relationship Between Soil Resistivity and Soil Corrosivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very Severely Corrosive
900 to 2,300	Severely Corrosive
2,300 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
10,000 to >100,000	Very Mildly Corrosive

Chloride and sulfate ion concentrations and pH appear to play secondary roles in affecting corrosion potential. High chloride levels tend to reduce soil resistivity and break down otherwise protective surface deposits, which can result in corrosion of buried metallic improvements or reinforced concrete structures. Sulfate ions in the soil can lower the soil resistivity and can be highly aggressive to Portland cement concrete (PCC) by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. Soils containing high sulfate content could also cause corrosion of the reinforcing steel in concrete. Table 4.2.1 of the American Concrete Institute (ACI, 2008) provides requirements for concrete exposed to sulfate-containing solutions as summarized in Table 4.

Table 4. Relationship Between Sulfate Concentration and Sulfate Exposure

Water-Soluble Sulfate (SO_4) in soil, ppm	Sulfate Exposure
0 to 1,000	Negligible
1,000 to 2,000	Moderate[1]
2,000 to 20,000	Severe
over 20,000	Very Severe

[1]= seawater

Acidity is an important factor of soil corrosivity. The lower the pH (the more acidic the environment), the higher the corrosivity will be with respect to buried metallic structures. As soil pH increases above 7 (the neutral value), the soil is increasingly more alkaline and less corrosive to buried steel structures due to protective surface films which form on steel in high pH environments. A pH between 5 and 8.5 is generally considered relatively passive from a corrosion standpoint.

As shown in Table 2, the soil resistivity results ranged from 3,412 to 4,142 ohm-centimeters. Based on these results and the resistivity correlations presented in Table 3, the corrosion potential to buried metallic improvements may be characterized moderately corrosive. A corrosion protection engineer should be consulted about appropriate corrosion protection methods for buried metallic materials.

Based on Table 19.3.1.1 – Exposure Categories and Classes of the ACI (2019) and sulfate results from 204 to 221 mg/km as shown on Table 2, the exposure class is S0 and S1 for soils with water-soluble sulfate of less than 150 and between 150 to 1,500 ppm, respectively. Based on Table 19.3.2.1 – Requirements for Concrete by Exposure Class of the ACI (2019), for an exposure class of S0 and S1, the maximum water cement ratio and minimum compressive strength to be used is not applicable and 2,500 psi, and 0.50 and 4,000 psi, respectively. A water-soluble chloride content of less than 500 ppm is generally considered non-corrosive to reinforced concrete. Based on Table 19.3.1.1 of the ACI, the class for corrosion protection of reinforcement are C0 (concrete dry or protected from moisture condition) and C1 (concrete exposed to moisture but not to external sources of chloride condition). Based on Table 19.3.2.1 of the ACI, for both

classes Co and C1, a concrete minimum compressive strength ratio of 2,500 psi and no restriction on the maximum water cement ratio should be used.

5.0 FIELD SOIL ELECTRICAL AND THERMAL RESISTIVITY TESTING

5.1 Soil Electrical Resistivity Testing

TRC performed in-situ electrical resistivity testing at the project site using the Wenner four-point method at the site. The soil electrical resistivity was measured along the Profile #'s 1 through 3 lines as shown on the Site Plan, Figure 2. Measurements were taken at ten nominal pin (metal electrode) spacing's of approximately 1, 3, 5, 7, 10, 20, 30, 50, 70, and 100 feet, with pins in ground to depths between 3 and 12 inches. The results of these tests are summarized in Table 5 below.

Table 5A. Results of Field Electrical Resistivity Testing

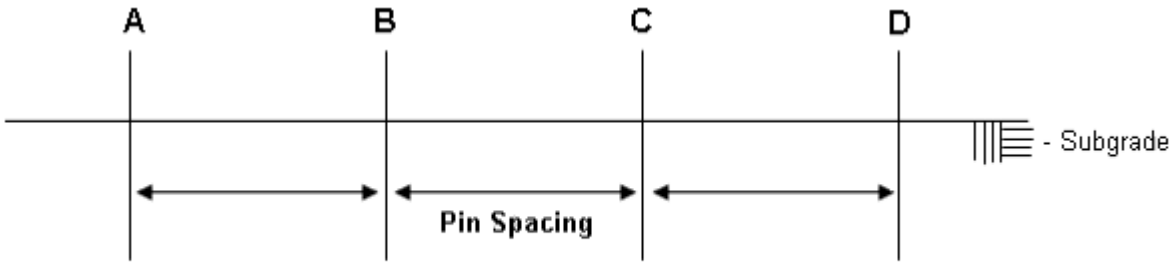
Line Number	Spacing (a) (feet)	Resistivity (P) Average (ohm-cm)
SRL-1 (N-S)	1	10054.4
	3	9221.3
	5	7672.9
	7	8895.4
	10	9679.9
	20	9315.1
	30	6371.6
	50	6913.6
	70	6870.5
	100	6061.3
SRL-1 (E-W)	1	14507.0
	3	13472.8
	5	12256.7
	7	13804.0
	10	16109.0
	20	16018.0
	30	11358.5
	50	11988.6
	70	11415.0
	100	11174.7

Table 5B. Results of Field Electrical Resistivity Testing

Line Number	Spacing (a) (feet)	Resistivity (P) Average (ohm-cm)
SRL-2 (N-S)	1	31302.6
	3	22722.8
	5	23795.3
	7	24733.7
	10	25566.8
	20	24161.1
	30	26089.6
	50	30392.9
	70	33876.5
	100	34261.4
SRL-2 (E-W)	1	27874.5
	3	22033.4
	5	22071.7
	7	22991.0
	10	23450.6
	20	23180.6
	30	25578.3
	50	30613.1
	70	34694.2
	100	34883.8

Table 5C. Results of Field Electrical Resistivity Testing

Line Number	Spacing (a) (feet)	Resistivity (P) Average (ohm-cm)
SRL-3 (N-S)	1	52378.4
	3	44785.0
	5	45244.6
	7	29291.7
	10	32748.5
	20	31961.4
	30	28106.2
	50	29990.7
	70	32421.9
	100	31494.1
SRL-3 (E-W)	1	32662.3
	3	26916.9
	5	27912.8
	7	18701.1
	10	19843.5
	20	18275.9
	30	13435.5
	50	13659.6
	70	12943.3
	100	11825.8



- Soil Resistivity Testing Set-up

5.2 Soil Thermal Resistivity Testing

TRC performed thermal resistivity testing on soil samples from borings EB-7, EB-13, and EB-19 from the upper 5 feet. The samples were compacted to approximately 90 percent relative compaction based on ASTM D1557, and tested for thermal resistivity at varying moisture contents; these results are presented in Appendix B.

6.0 CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical engineering viewpoint, the proposed improvements may be constructed as planned, in TRC's opinion, provided the design and construction are performed in accordance with the recommendations presented in this report.

6.1 Primary Geotechnical Concerns

The primary geotechnical and geologic concerns at the site are as follows:

- Strong seismic shaking
- Dry seismic shaking
- Loose near-surface soils
- Corrosion potential of the near-surface soils

TRC has prepared a brief description of the issues and presented typical approaches to manage potential concerns associated with the long-term performance of the development.

6.1.1 Strong Seismic Shaking

TRC recommends that, at a minimum, the proposed improvements be designed in accordance with the seismic design criteria presented in Table 6.

6.1.2 Dry Seismic Shaking

TRC's analysis indicates that there is potential for up to 1.7 inches of dry seismic induced settlement with differential settlement on the order of 0.9-inch in a horizontal distance of 50 feet. The proposed improvements should be designed to accommodate the potential seismic and as well as static settlements. Detailed recommendations are presented in the Earthwork and Foundation sections of this report.

6.1.3 Loose Near-Surface Soils

Based on the loose near-surface granular soils encountered during TRC's explorations, TRC recommends over-excavating the top 3 feet, scarifying and recompacting the bottom 12 inches in-place (4 feet reworked), and replacing the excavation with compacted fill materials for areas that will support improvements on shallow foundations. Additionally, the over-excavation should extend at least 5 feet laterally beyond the building footprints.

6.1.4 Corrosion Potential of Near-Surface Soils

As discussed above, the corrosion potential to buried metallic improvements constructed within the native soils may be characterized as moderately corrosive. A qualified corrosion engineer should be contacted to provide specific recommendations regarding corrosion protection for buried metal pipe or buried metal pipe fittings.

6.2 Plans, Specifications, and Construction Review

TRC recommends that TRC perform a plan review of the geotechnical aspects of the project design for general conformance with TRC's recommendations. In addition, subsurface materials encountered in the

relatively small diameter, widely spaced borings may vary significantly from other subsurface materials on the site. Therefore, TRC also recommends that a representative of TRC observe and confirm the geotechnical specifications of the project construction. This will allow TRC to form an opinion about the general conformance of the project plans and construction with TRC's recommendations. In addition, TRC's observations during construction will enable TRC to note subsurface conditions that may vary from the conditions encountered during TRC's investigation and, if needed, provide supplemental recommendations. For the above reasons, TRC's geotechnical recommendations are contingent upon TRC providing geotechnical observation and testing services during construction.

7.0 EARTHWORK

7.1 Clearing and Site Preparation

The proposed project area should be cleared of all surface and subsurface improvements to be removed and deleterious materials including existing building foundations, slabs, irrigation lines, utilities, fills, pavements, debris, designated trees, shrubs, and associated roots. Abandonment of existing buried utilities is discussed below. Excavations extending below the planned finished site grades should be cleaned and backfilled with suitable material compacted as recommended in the "Compaction" section of this report. TRC recommends that backfilling of holes or pits resulting from demolition and removal of existing building foundations, buried structures or other improvements be carried out under TRC's observation and that the backfill be observed and tested during placement.

Vegetated areas within the proposed improvements should be stripped to sufficient depth to remove all surface vegetation and topsoil containing greater than 3 percent organic matter by weight. The actual stripping depth required depends on site usage prior to construction and should be established in the field by TRC at the time of construction. The stripped materials should be removed from the site or may be stockpiled for use in landscaped areas, if desired.

7.2 Removal of Existing Fill

If undocumented fill is encountered, it should be removed down to the native soil. If the fill material meets the requirements in the "Material for Fill" section below, it may be reused as engineered fill. Side slopes of fill removal excavations in building and improvement areas should be sloped at inclinations no steeper than 3:1 (horizontal:vertical) to minimize abrupt variations in fill thickness. All fill material should be compacted in accordance with the recommendations for fill presented in the "Compaction" section of this report.

7.3 Abandoned Utilities

If abandoned utilities are discovered within the proposed project areas they should be removed in their entirety. As an alternative, it may be feasible to abandon underground utilities in-place within the proposed project areas provided the utility does not conflict with new improvements, is completely grouted, and previous fills associated with the utility do not pose a risk to the structures. Existing underground utilities outside the proposed project areas may be removed or abandoned in-place by grouting or plugging the ends with concrete. The decision to abandon in-place versus removal should be based on the level of risk associated with the utility line.

Fills associated with underground utilities abandoned in-place may have an increased potential for settlement, and partially grouted or plugged pipelines will have a potential risk of collapse that may result in ground settlement, soil piping and leakage of pipeline constituents. The potential risks are relatively low for small diameter pipes (4 inches or less) above the ground water table and increasingly higher with increasing diameter.

7.4 Subgrade Preparation

After the site has been properly cleared, stripped, and necessary excavations have been made, exposed surface soils in those areas to receive fill, or slabs on grade should be scarified to a depth of 12 inches, moisture conditioned, and compacted in accordance with the recommendations for fill presented in the "Compaction" section. The finished compacted subgrade should be firm and relatively non-yielding under the weight of compaction equipment.

7.5 Material for Fill

All on-site soils below the stripped layer having an organic content of less than 3 percent by weight are suitable for use as fill at the site. In general, fill material should not contain rocks or lumps larger than 6 inches in greatest dimension, with 15 percent or less larger than 2.5 inches in the greatest dimension.

Import fill material should be inorganic, have a PI of 20 or less and should have sufficient binder to reduce the potential for sidewall caving of foundation and utility trenches. Non-expansive fill (NEF) should have a PI of 15 or less. Samples of the proposed import fill should be submitted to TRC at least 10 working days prior to delivery to the site to allow for visual review and laboratory testing. This will allow TRC to evaluate the general conformance of the import fill with TRC's recommendations.

Consideration should also be given to the environmental characteristics and corrosion potential of imported fill. Suitable documentation should be provided for import material. In addition, it may be appropriate to perform laboratory testing of the environmental characteristics and corrosion potential of imported materials. Import soils should not be more corrosive than the on-site native materials, including pH, soluble sulfates, chlorides, and resistivity.

7.6 Compaction

All fill, as well as scarified surface soils in those areas to receive fill, should be uniformly compacted to at least 90 percent relative compaction as determined by ASTM Test Designation D1557, latest edition. In areas that will support improvements on shallow foundations, subsurface soils should also be scarified and uniformly compacted to at least 90 percent relative compaction (ASTM D1557, latest edition).
All fill should be placed in lifts no greater than 8 inches in uncompacted thickness. Each successive lift should be firm and relatively non-yielding under the weight of construction equipment.

In pavement areas, the upper 6 inches of subgrade and full depth of aggregate base should be compacted to at least 95 percent relative compaction (ASTM D1557, latest edition). Aggregate base should be compacted at a moisture content near the laboratory optimum moisture content. Import soils with a PI between 15 to 20 should be compacted at a moisture content at least 3 percent over optimum.

7.7 Wet Soils and Wet Weather Conditions

Earthwork such as subgrade preparation, fill placement and trench backfill may be difficult for soil containing high moisture content or during wet weather. If the soil is significantly above its optimum moisture content, it will become soft, yielding, and difficult to compact. Based on the results of TRC's laboratory tests, the in-situ moisture contents of the near surface soils are generally below the optimum moisture contents. If saturated soils are encountered, aerating or blending with drier soils to achieve a workable moisture content may be required. TRC recommends that earthwork be performed during periods of suitable weather conditions, such as the "summer" construction season.

There are several alternatives to facilitate subgrade preparation, fill placement and trench backfill if the soil is wet or earthwork is performed during the wet winter season.

- Scarify and air dry until the fill materials have a suitable moisture content for compaction,
- Over-excavate the fill and replace with suitable on-site or import materials with an appropriate moisture content,
- Install a layer of geo-synthetic (geotextile or geogrid) to reduce surface yielding and bridge over soft fill,
- Chemically treat the higher moisture content soils with quicklime (CaO), kiln-dust, or cement to reduce the moisture content and increase the strength of the fill.

The implementation of these methods should be reviewed on a case-by-case basis so that a cost-effective approach may be used for the specific conditions at the time of construction.

7.8 Trench Backfill

Bedding and pipe embedment materials to be used around underground utility pipes should be well graded sand or gravel conforming to the pipe manufacturer's recommendations and should be placed and compacted in accordance with project specifications, local requirements of the governing jurisdiction. General fill to be used above pipe embedment materials should be placed and compacted in accordance with local requirements or the recommendations contained in this section, whichever is more stringent. On-site soils may be used as general fill above pipe embedment materials provided, they meet the requirements of the "Material for Fill" section of this report. General fill should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction (ASTM D1557, latest edition) by mechanical means only. Water jetting of trench backfill should not be allowed. The upper 6 inches of general fill in all pavement areas subject to wheel loads should be compacted to at least 95 percent relative compaction.

Utility trenches located adjacent to footings should not extend below an imaginary 1:1 (horizontal: vertical) plane projected downward from the footing bearing surface to the bottom edge of the trench. Where utility trenches will cross beneath footing bearing planes, the footing concrete should be deepened to encase the pipe, or the utility trench should be backfilled with sand/cement slurry or lean concrete within the foundation-bearing plane.

Where relatively higher permeability sand or gravel backfill is used in trenches through lower permeability soils, TRC recommends that a cut-off plug of compacted clayey soil or a 2-sack cement/sand slurry be placed where such trenches enter the building and pavement areas. This would reduce the likelihood of water entering the trenches from the landscaped areas and seeping through the trench backfill into the building and pavement areas and coming into contact with subgrade soils.

7.9 Temporary Slopes and Trench Excavations

The contractor should be responsible for all temporary slopes and trenches excavated at the site and design of any required temporary shoring. Shoring, bracing, and benching should be performed by the contractor in accordance with the strictest governing safety standards. On a preliminary basis, site soils can be classified as Type C based on soil classification by OSHA. Therefore, a maximum slope 1.5:1 (horizontal: vertical) should be anticipated. A TRC representative should be retained to verify soil conditions in the field at the time of the excavation.

7.10 Permanent Slopes and Fill Drainage

TRC recommends that fill slopes have a maximum inclination of 3H:1V (horizontal:vertical). Cut slopes may have a maximum inclination of 3H:1V.

Where fill will be placed on slopes greater than 6H:1V, TRC recommends that horizontal benches angled slightly into the slope be cut into the native residual soils on the slopes prior to placing fill. Benches should be parallel to slope contours. These benches should be at least 6 feet in width at vertical distances of approximately 2 to 4 feet. In addition, a keyway should be cut into the slope at the base of the fill. The keyway should be at least 6 feet wide and extend at least 4 feet deep into competent material. Bench and keyway recommendations may need revision during construction to account for field conditions.

Surface water should not be allowed to flow over the top of engineered slopes. Ponding of surface water should not be allowed at the top or bottom of slopes. Level areas above slopes should be graded to a 2 percent gradient or greater to direct surface water away from the top of slopes toward a suitable point of discharge such as concrete lined ditches or surface drain inlets.

In sloping areas, drainage terraces and concrete-lined V-ditches should be constructed at the top of new cut or fill slopes. Appropriately lined ditches should also be used to collect surface water wherever open space areas direct storm water toward the planned development. All ditches should be appropriately sized for maximum storm water flows based on the upslope tributary area and should discharge to appropriately sized drainage inlets. Concrete lined ditches should be adequately reinforced and have adequate construction and control joints. Concrete ditches should be constructed with the uphill edge of the gutter cut at least 2 inches below adjacent surface grade. Forming and backfilling around concrete lined ditches should not be allowed.

Subsurface drainage improvements should be installed as a part of earthwork for fill construction. These improvements should include positive surface gradients for keyways and benches and the installation of a subdrain system consisting of perforated pipe and permeable gravel or drain rock. If drain rock is used, the rock and pipe should be entirely enclosed with a permeable geotextile fabric (Mirafi 140N or equivalent). Subdrains should also be installed where seepage is observed. Subdrains may also need to be installed at the toe of any proposed cut slopes depending on the actual conditions observed during construction. The actual location of subdrains should be determined in the field at the time of construction.

7.11 Surface Drainage

Positive surface water drainage gradients, at least 5 percent in landscaping and 2 percent in pavement areas, should be provided to direct surface water away from foundations and slabs towards suitable discharge facilities. Ponding of surface water should not be allowed on or adjacent to structures, slabs-on-grade, or pavements. Roof runoff should be directed away from foundation and slabs-on-grade. Downspouts may discharge onto splash-blocks provided the area is covered with concrete slabs or asphalt concrete pavements.

7.12 Landscaping Considerations

TRC recommends restricting the amount of surface water infiltrating these soils near structures and slabs-on-grade. This may be accomplished by:

- Selecting landscaping that requires little or no watering, especially within 3 feet of structures, slabs-on-grade, or pavements,
- Using low flow rate sprinkler heads, or drip irrigation systems,

- Regulating the amount of water distributed to lawn or planter areas by installing timers on the sprinkler system,
- Providing surface grades to drain rainfall or landscape watering to appropriate collection systems and away from structures, slabs-on-grade, or pavements,
- Preventing water from draining toward or ponding near building foundations, slabs-on-grade, or pavements, and
- Avoiding open planting areas within 3 feet of the building perimeters.

TRC recommends that the landscape architect consider these items when developing the landscaping plans.

7.13 Construction Observation

A representative from TRC should observe the geotechnical aspects of the grading and earthwork for general conformance with TRC's recommendations including site preparation, selection of fill materials, and the placement and compaction of fill. To facilitate the construction schedule TRC requests sufficient notification (48 hours) for site visits. The project plans and specifications should incorporate recommendations contained in the text of this report.

8.0 FOUNDATIONS

Based on TRC's investigation, the proposed improvements that include BESS, buildings, substation, backup generators, auxiliary equipment pads, and water tank structures may be supported on shallow foundations. Alternatively, the proposed improvements may be supported on drilled pier or driven pile foundations. These foundations will be able to support the structures with only minor settlements. Foundation recommendations are discussed in the sections below.

8.1 ASCE 7-16 Site Class and Site Seismic Coefficients

The 2022 California Building Code (CBC) outlines the procedure for seismic design of a structure. Based on subsurface exploration, the site is generally underlain by loose to dense sand, which corresponds to a site soil class D. The 2022 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 provides an exception from a site-specific ground motions study for certain structures on Site Class D, which states a ground motion hazard analysis is not required where the value of the parameter S_{M1} determined by Equation (11.4-2) is increased by 50% for all applications of S_{M1} and the resulting value of the parameter S_{D1} determined by Equation (11.4-4) shall be used for all applications of S_{D1}. It is TRC's understanding that the requirements in Exception Note No. 1 in Section 11.4.8 of ASCE 7-16 per Supplement 3 may apply to this project. If the exception does not apply, a site-specific ground motion hazard analysis is required. Based on the above information and local seismic sources, the site may be characterized for design using the information in Table 6 below.

Table 6. ASCE 7-16/CBC 2022 Site Class and Site Seismic Coefficients

Latitude: 34.865873° N Longitude: -118.437949° W	**CBC Reference**	**Factor/ Coefficient**	**Value**
Soil Profile Type	Section 1613.2.2	Site Class	D
Mapped Spectral Response Acceleration for MCE at 0.2 second Period	Figure 1613.2.1(1)	S_s	1.375
Mapped Spectral Response Acceleration for MCE at 1 Second Period	Figure 1613.2.1(3)	S_1	0.551
Site Coefficient	Table 1613.2.3(1)	F_a	1.0
Site Coefficient	Table 1613.2.3(2)	F_v	1.75*
Adjusted MCE Spectral Response Parameter	Equation 16-20	S_{MS}	1.375
Adjusted MCE Spectral Response Parameter	Equation 16-21	S_{M1}	Null – See Section 11.4.8
Design Spectral Response Acceleration Parameter	Equation 16-22	S_{DS}	0.917
Design Spectral Response Acceleration Parameter	Equation 16-23	S_{D1}	Null – See Section 11.4.8

* The value of F_v shall be used only for calculation of T_s, determination of seismic category, linear interpolation for intermediate values of S_1, and when taking the exceptions under Items 1 and 2 of Section 11.4.8 for the calculation of S_{D1}.

8.2 Shallow Foundations

The proposed BESS, buildings, substation, backup generators, auxiliary equipment pads, and water tank structures may be supported on conventional, shallow, continuous and/or isolated spread footings bearing in native soil. Recommendations for foundation design are presented below.

8.2.1 Footings

All footings should have a minimum width of 12 inches, and the bottom of footings should extend at least 12 inches below lowest adjacent finished grade. Lowest adjacent finished grade may be taken as the bottom of interior slab-on-grade or the finished exterior grade, excluding landscape topsoil, whichever is lower.

Footings constructed in accordance with the above recommendations would be capable of supporting a maximum allowable bearing pressure of 1,500 pounds per square foot (psf) for dead loads, 2,250 psf for combined dead and live loads, and 3,000 psf for all loads including wind or seismic. These allowable bearing pressures are based upon factors of safety of 3.0, 2.0 and 1.5 for dead, dead plus live, and seismic loads, respectively.

This maximum allowable bearing pressure is a net value, therefore, the weight of the footing may be neglected for design purposes. All footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

All continuous footings should be reinforced with top and bottom steel to provide structural continuity and to help span local irregularities. It is essential that either TRC or a competent geotechnical engineer observe all footing excavations before reinforcing steel is placed.

8.2.2 Footing Settlement

Structural loads were not available for TRC's review. Total settlement of an individual foundation will vary depending on the plan dimensions of the foundation and the actual load supported. Based on the bearing pressures provided above, TRC estimates that total footing settlement should be approximately 1-inch with post-construction differential movement of approximately 0.5-inch over a horizontal distance of 50 feet. Additionally, there is potential for 1.7 inches of seismic induced dry shaking settlement at the site. The footings should be designed to accommodate differential settlements on the order of 0.9-inch over a horizontal distance of 50 feet from seismic induced dry shaking.

8.2.3 Lateral Loads

Lateral loads may be resisted by friction between the bottom of footings and the supporting subgrade. The supporting subgrade should consist of scarified and uniformly compacted soil to at least 90 percent relative compaction (ASTM D1557, latest edition). A maximum allowable frictional resistance of 0.30 may be used for design. In addition, lateral resistance may be provided by passive pressures acting against footings poured neat against competent soil. TRC recommends that an allowable passive pressure based on an equivalent fluid pressure of 250 pounds per cubic foot (pcf) be used in design, with a maximum value of 1,250 psf at depth. The values provided above based on a safety factor of 1.5. The upper 12 inches of soil should be neglected when calculating lateral passive resistance unless covered by concrete slabs or pavements.

8.3 Friction Piers

Alternatively, the proposed improvement structures may be supported on drilled cast-in-place, straight-shaft friction piers. The piers should have a minimum diameter of at least 18 inches. Piers may be designed for an allowable skin friction of 150 pounds per square foot (psf) for combined dead plus live loads with a one-third increase allowed for either transient wind or seismic loading. Piers should have a minimum center-to-center spacing of at least three pier diameters.

Resistance to uplift loads will be developed in friction along the piers. TRC recommend that an allowable uplift frictional resistance of 105 psf be used.

The bottoms of pier excavations should be dry, reasonably clean, and free of loose soil before reinforcing steel is installed and concrete is placed. TRC recommends that the excavation of all piers be performed under TRC's direct observation to establish that the piers are founded in suitable materials and constructed in accordance with the recommendations presented in this report.

Total settlement for the recommended pile foundations should not exceed ½-inch and post construction differential settlement across the structures founded on piers should be less than ¼-inch due to static loads.

8.4 Friction Piles

Alternatively, the proposed improvement structures alternatively may be supported on driven steel friction piles. Piles may be designed for an allowable skin friction of 150 pounds per square foot (psf) for combined dead plus live loads with a one-third increase allowed for either transient wind or seismic loading. Piles should have a minimum center-to-center spacing of at least three pile diameters. Pile loading should be assumed to act over the gross pile perimeter, which is the sum of twice the flange width and twice the web dimension.

Resistance to uplift loads will be developed in friction along the piles. TRC recommends that an allowable uplift frictional resistance of 105 psf be used.

Total settlement for the recommended pile foundations should not exceed ½-inch and post construction differential settlement across the structures founded on piles should be less than ¼-inch due to static loads.

TRC recommends that the contractor drive several test piles to confirm that they can be driven and perform at least two load tests to confirm their capacity.

8.5 Lateral Loads on Friction Piles or Piers

Lateral loads exerted on structures supported on piles or piers may be resisted by a passive resistance based on an equivalent fluid pressure of 250 pounds per cubic foot (pcf) acting against two times the projected diameters of the individual pile or pier shaft below finished grade, with a maximum of 1,250 psf at depth. The upper 12 inches of soil should be neglected when calculating the lateral capacity of the piers or piles.

8.6 Lateral Response

Lateral load resistance for pier-supported structures may be developed through pier bending/soil interaction. The magnitude of the lateral load resistance is dependent upon many factors, including pier stiffness and embedment length, conditions of fixity at the pile cap, the physical properties of the surrounding soils, the tolerable top deflection and the yield moment capacity of the pier. The foundation engineer should account for any construction installation tolerances that could impact recommended embedment lengths.

Table 7 contains recommended input soil parameters for lateral response analysis of pier foundations for using the LPILE computer program (by Ensoft, Inc., Version 2012). Program default values may be used for strain factor (E_{50}) and horizontal subgrade reaction (K).

Table 7. LPILE Geotechnical Parameters

Depth (ft)	Modal P-Y Curve	Effective Unit Weight (pcf)	Cohesion, c (psf)	Internal Angle of Friction (degrees)
0 to 9.5	Sand (Reese, et al.)	120	-	30
9.5 to 23.5	Sand (Reese, et al.)	120	-	32
23.5 to 41.5	Sand (Reese, et al.)	120	-	35

8.7 Drilled Pier Considerations

Based on the subsurface soils, loose sandy soils may pose caving problems during drilled pier construction. The pier drilling contractor may need to use temporary straight-sided casing to maintain hole stability.

Procedures provided in the FHWA manual on drilled shaft construction (Brown et al., 2010) are recommended to be followed by the contractor. TRC recommends that each pier excavations should be inspected and approved by a geotechnical engineer prior to installation of reinforcement. TRC

recommends a representative of TRC be present during drilled pier construction to observe and verify soil and excavation conditions prior to placing steel reinforcement or concrete.

Drilled pier excavations should be constructed in a continuous way to reduce the time from excavation of hole to placement of reinforcing steel and concrete placement to a minimum. Steel reinforcement and concrete should be placed on the same day of completion of each pier excavation. Drilling of adjacent holes that are closer than 4 diameters center to center should not be allowed until the concrete in the previous hole is set.

Concrete used for drilled pier construction should be discharged vertically into the drilled holes to reduce aggregate segregation. Under no circumstances during pier construction should concrete be allowed to free-fall against either the steel reinforcement or the sides of the excavation. Sufficient space should be provided in the pier reinforcement cage during fabrication to allow the insertion of a pump hose or tremie tube for concrete placement. The pier reinforcement cage should be installed and the concrete pumped immediately after drilling is completed.

In order to develop the design skin friction values provided above, concrete used for drilled pier construction should have a slump ranging from 4 to 6 inches if placed in a dry shaft without temporary casing, and from 6 to 8 inches if temporary casing or slurry drilling methods are used. The concrete mix should be designed with appropriate admixtures and/or water/cement ratios to achieve these recommended slumps. Adding water to a conventional mix to achieve the recommended slump should not be allowed. For concrete mixes with slumps over 6 inches, vibration of the concrete during placement is generally not recommended as aggregate settlement may result in the lack of aggregate within the upper portion of the pile. Careful vibration of the concrete around anchor bolt assemblies is recommended.

If slurry drilling methods are used for drilled pier construction, concrete should be placed into the hole using tremie methods. Tremie concrete placement should be performed in accordance with American Concrete Institute (ACI) 304R. The tremie pipe should be rigid and remain several feet below the surface of the in-place concrete at all times to maintain a seal between the water or slurry and the fresh concrete. The upper concrete seal layer will likely become contaminated with excess water and/or soil as the concrete is placed and should be removed to expose uncontaminated concrete during or immediately following completion of concrete placement. It has been TRC's experience that the concrete seal layer may be on the order of 3 to 5 feet thick but will depend on the pile diameter, amount of water seepage, and construction workmanship.

9.0 CONCRETE SLABS-ON-GRADE

9.1 Equipment Pads

Equipment pads should be at least 4 inches thick and should be underlain by at least 4 inches of aggregate base compacted to a minimum of 90 percent relative compaction at a moisture content near the laboratory optimum in accordance with ASTM Test Method D1557, latest edition. Reinforcing steel would be beneficial in reducing shrinkage cracking and vertical faulting at control and construction joints. TRC recommends that exterior slabs be isolated from adjacent foundations and that adequate construction and control joints be used in design of the concrete slabs to control cracking inherent in concrete construction.

10.0 RETAINING WALLS

10.1 Lateral Earth Pressures

Any proposed retaining walls should be designed to resist lateral earth pressures from adjoining natural materials, backfill, and surcharge loads. Provided that adequate drainage is provided as recommended

below, TRC recommends that walls restrained from movement at the top be designed to resist an equivalent fluid pressure of 45 pounds per cubic foot (pcf) plus a uniform pressure of 8H pounds per square foot, where H is the distance in feet between the bottom of the footing and the top of the wall. Restrained walls should also be designed to resist an additional uniform pressure equivalent to one-half of any surcharge loads applied at the surface. Any unrestrained retaining walls with adequate drainage should be designed to resist an equivalent fluid pressure of 45 pcf plus one-third of any surcharge loads.

The above lateral earth pressures assume level backfill conditions and sufficient drainage behind the walls to prevent build-up of hydrostatic pressure from surface water infiltration and/or a rise in the ground water level. If adequate drainage is not provided, TRC recommends an equivalent fluid pressure of 40 pcf be added to the values recommended above for both restrained and unrestrained walls. Damp-proofing of the walls should be included in areas where wall moisture and efflorescence would be undesirable.

10.2 Seismic Lateral Earth Pressures

Wall greater than 6 feet in height need to be designed for seismic lateral loading. For TRC's analysis, TRC has assumed that the walls will have flat, non-sloping backfill. TRC used the Mononobe-Okabe approach to approximate the increased earth pressures induced by earthquakes. As discussed in Section 3.3 of TRC's report, a peak ground acceleration of 0.55g is expected at the site. TRC performed calculations using this ground acceleration and estimated an additional seismic increment of 14.5 pcf to be applied to in addition to the static lateral earth pressures given in Section 10.1 for flexible walls. For restrained walls, under seismic conditions the total pressure to be used in analysis (seismic plus static) should be the greater of at-rest pressure or the sum of the active pressure and the seismic increment acting in a triangular distribution. For unrestrained walls under seismic loading, the total pressure should be sum of the active pressure and the seismic increment acting in a triangular distribution.

10.3 Drainage

All walls over 2 feet in exposed height should be designed with adequate drainage. Adequate drainage may be provided by a subdrain system behind the walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½- to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or equivalent. The upper 2 feet of wall backfill should consist of relatively low permeable compacted on-site clayey soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or Enkadrain drainage matting may be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. The drainage panel should be connected to the perforated pipe at the base of the wall, or to some other closed or through-wall system. Miradrain panels should terminate 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

10.4 Backfill

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

10.5 Foundation

Reinforced concrete retaining walls not located on or adjacent to slopes may be supported on a continuous spread footing designed in accordance with the recommendations presented in the "Footings" section of this report. Lateral load resistance for the walls may be developed in accordance with the recommendations presented in the "Lateral Loads" section.

11.0 PAVEMENTS

11.1 Asphalt Concrete

Based on the near-surface soils encountered during TRC's exploration, which generally consisted of poorly graded sand with silt and silty sand, TRC judges an R-value of 25 to be applicable for design based on a subgrade consisting of untreated native sandy soils. Using estimated traffic indices for various pavement-loading requirements and untreated on-site soils, TRC developed the following recommended pavement sections based on Procedure 608 of the Caltrans Highway Design Manual, presented in Table 8.

Table 8. Recommended Asphalt Concrete Pavement Design Alternatives Pavement Components Design R–Value = 25

General Traffic Condition	Design Traffic Index	Asphalt Concrete (Inches)	Aggregate Baserock* (Inches)	Total Thickness (Inches)
Automobile	5.0	3.0	7.0	10.0
Parking Channel	5.5	3.0	8.0	11.0
Truck Access &	6.0	3.5	9.0	12.5
Parking Areas	6.5	4.0	9.0	13.0

*Caltrans Class 2 aggregate base; minimum R-value equal to 78.

The traffic indices used in TRC's pavement design are considered reasonable values for the proposed development and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. The traffic parameters used for design were selected based on engineering judgment and not on information furnished to TRC such as an equivalent wheel load analysis or a traffic study.

Because the full thickness of asphalt concrete is frequently not placed prior to construction traffic being allowed to use the streets (or parking lots), rutting and pavement failures can occur prior to project completion. To reduce this occurrence, TRC recommends that either the full design pavement section be placed prior to use by construction traffic, or a higher Traffic Index (TI) be specified where construction traffic will use the pavement.

11.2 Asphalt Concrete, Aggregate Base and Subgrade

Asphalt concrete and aggregate base should conform to and be placed in accordance with the requirements of Caltrans Standard Specifications, latest edition, except that ASTM Test Designation D1557 should be used to determine the relative compaction of the aggregate base.

11.3 Gravel Road Design

The proposed project may need a gravel road for access. Based on the expected subsurface soils, which include loose to medium sandy soils, TRC judges an R-Value of 25 to be applicable for design based on a subgrade consisting of untreated on-site soils. TRC recommends that the gravel road have a minimum thickness of at least 13 inches.

12.0 LIMITATIONS

This report has been prepared for the sole use of Euismod Project LLC and Euismod Project I LLC specifically for design of the proposed Euismod Project located in Willow Springs, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in the project area at the time this report was written. No other warranty, expressed or implied, is made or should be inferred.

The opinions, conclusions and recommendations contained in this report are based upon the information obtained from TRC's investigation, which includes data from widely separated discrete locations, visual observations from TRC's site reconnaissance, along with local experience and engineering judgment. The recommendations presented in this report are based on the assumption that soil and geologic conditions at or between borings do not deviate substantially from those encountered or extrapolated from the information collected during TRC's investigation. TRC is not responsible for the data presented by others.

TRC should be retained to review the geotechnical aspects of the final plans and specifications for conformance with TRC's recommendations. The recommendations provided in this report are based on the assumption that TRC will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If TRC is not retained for these services, TRC cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of TRC's report by others. Furthermore, TRC will cease to be the Geotechnical-Engineer-of-Record if TRC is not retained for these services and/or at the time another consultant is retained for follow up service to this report.

The opinions presented in this report are valid as of the present date for the property evaluated. Changes in the condition of the property will likely occur with the passage of time due to natural processes and/or the works of man. In addition, changes in applicable standards of practice can occur as a result of legislation and/or the broadening of knowledge. Furthermore, geotechnical issues may arise that were not apparent at the time of TRC's investigation. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of TRC's control. Therefore, this report is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any other properties.

13.0 REFERENCES

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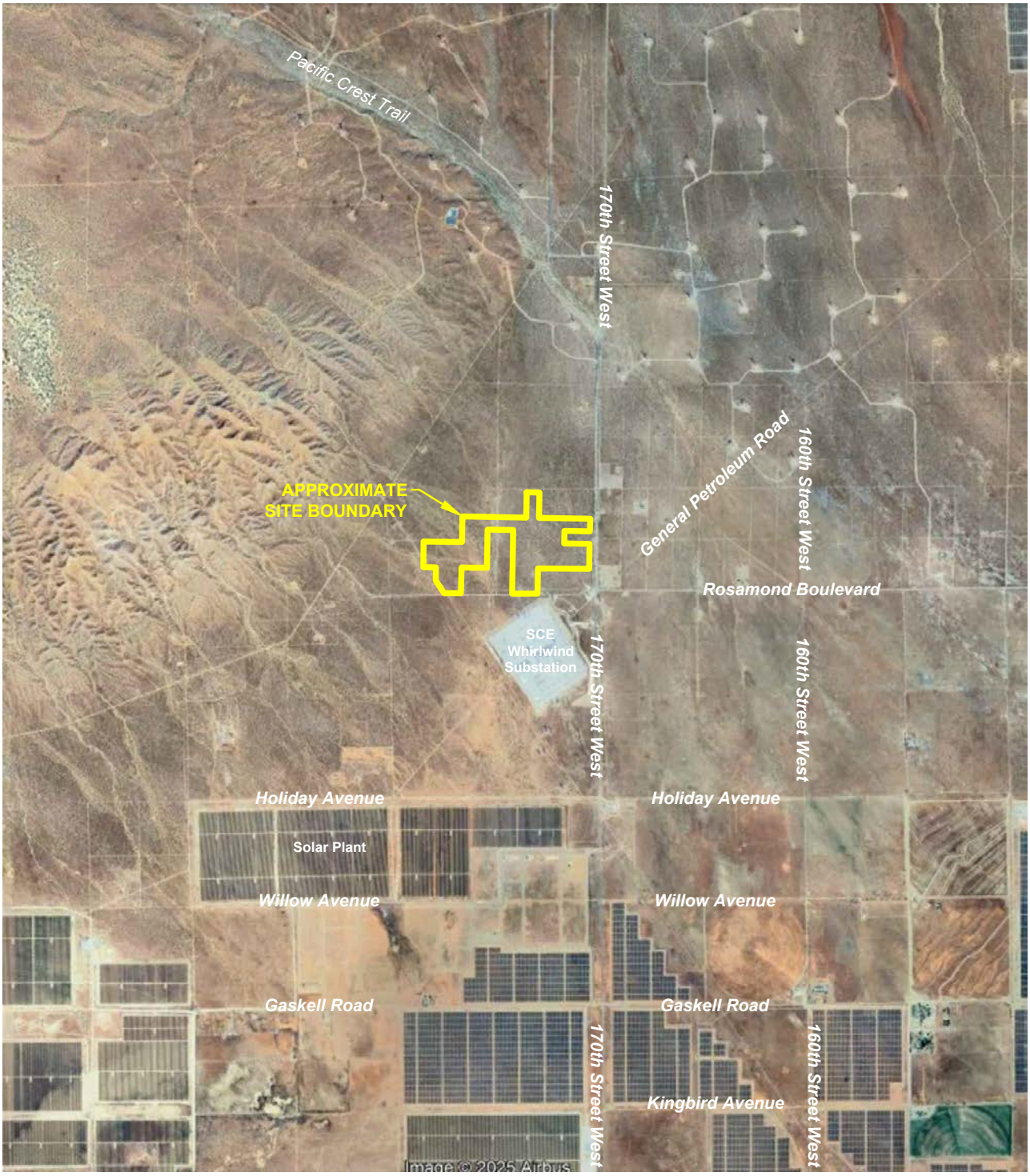
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* * * * * * * * * * * * *



SOURCE AERIAL PHOTO: Google Earth, October 2024.

N

APPROXIMATE SCALE (FEET)

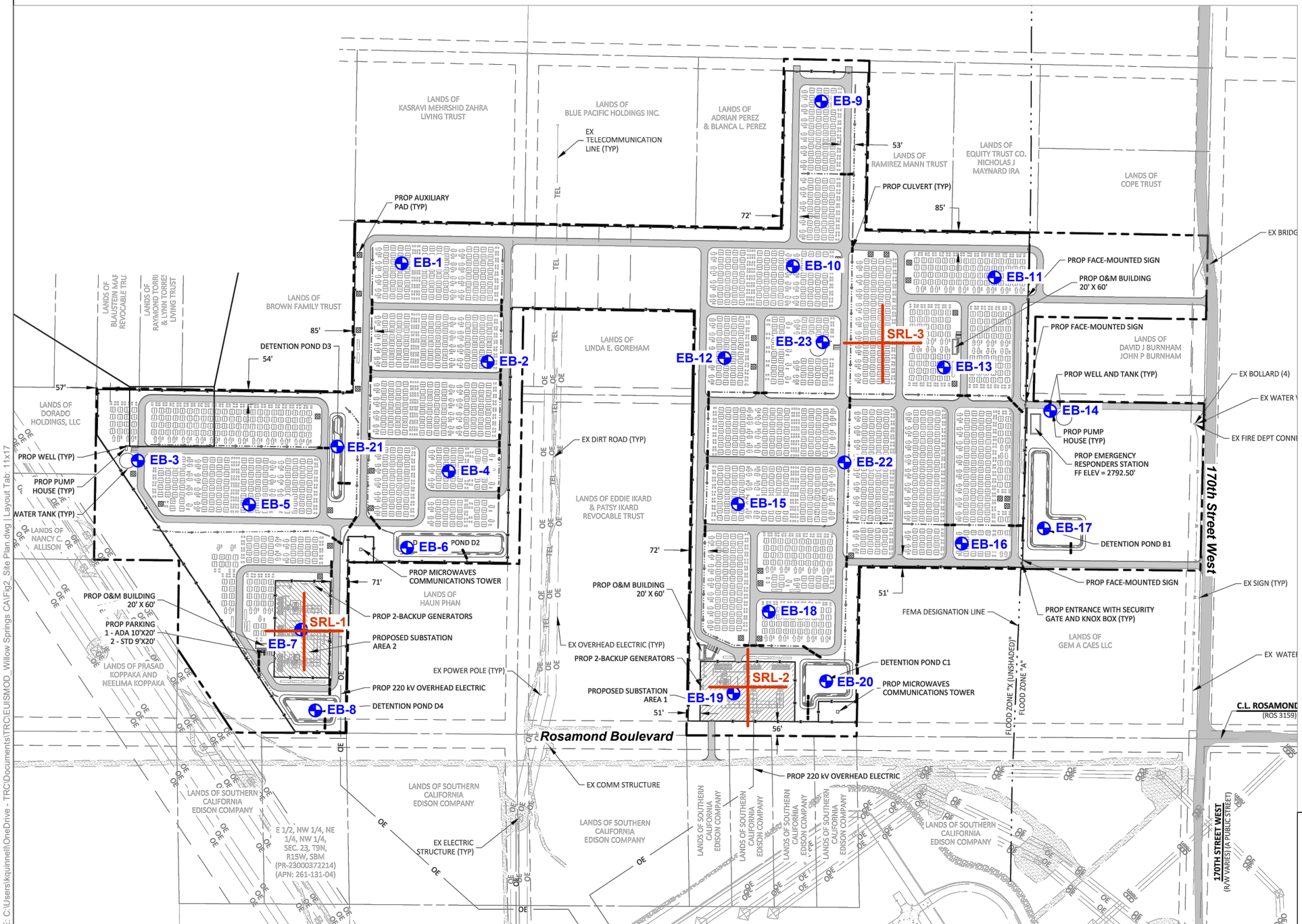
0 4,000 8,000

VICINITY MAP

Euismod Project
170th Street West and Rosamond Boulevard
Willow Springs, California

TRC | 552398 | **FIGURE 1**

FILE NAME: C:\Users\kquinnell\OneDrive - TRC\Documents\TRC\EUISMOD_Willow Springs CA\Fig1_Vicinity Map.dwg | Layout Tab: 8x11



LEGEND

Approximate locations of:

EB-23 — Exploratory boring

SRL-3 — Soil resistivity profile (each line = 300 ft.)

N

SCALE (FEET)

0 400 800

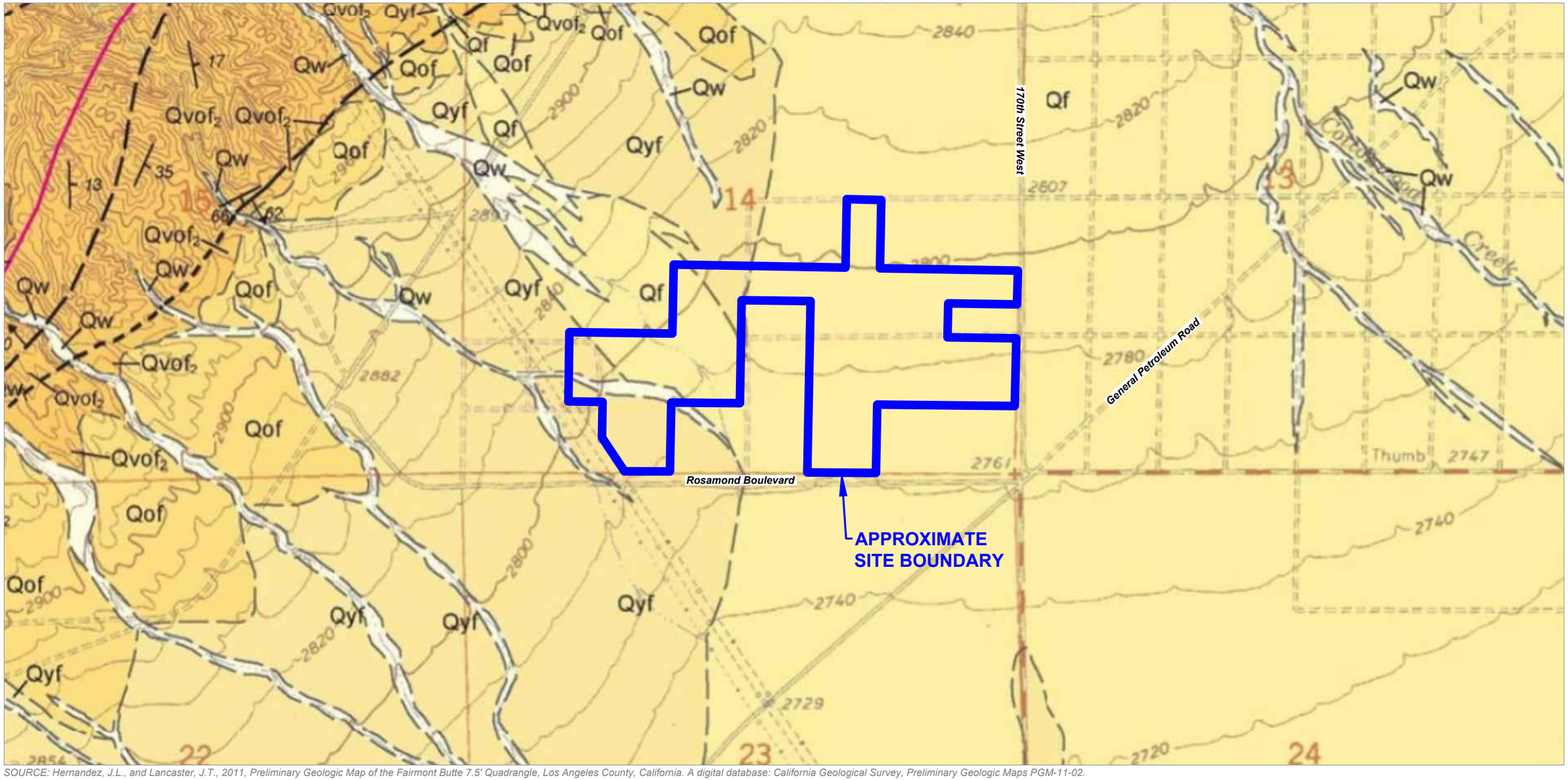
SOURCE: Site plan by TRC, March 2025.

SITE PLAN

Euismod Project
170th Street West and Rosamond Boulevard
Willow Springs, California

TRC | 552398 | **FIGURE 2**

FILE NAME: C:\Users\kquinnell\OneDrive - TRC\Documents\TRC\EUISMOD_Willow Springs CA\Fig2_Site Plan.dwg | Layout Tab: 11x17



SOURCE: Hernandez, J.L., and Lancaster, J.T., 2011, Preliminary Geologic Map of the Fairmont Butte 7.5' Quadrangle, Los Angeles County, California. A digital database: California Geological Survey, Preliminary Geologic Maps PGM-11-02.

GEOLOGIC LEGEND

Qw	Wash deposits (late Holocene)
Qf	Modern alluvial fan deposits (Holocene)
Qyf	Younger alluvial fan deposits (Holocene to late Pleistocene)
Qof	Older alluvial fan deposits (late Pleistocene)
$Qvof_2$	Very old alluvial fan deposits (middle to late Pleistocene)

Fault - Solid where accurately located, dashed where approximately located; short dash where inferred

17 — Strike and dip of sedimentary beds

N

APPROXIMATE SCALE (FEET)

0 1,000 2,000

GEOLOGY MAP

Euismod Project
170th Street West and Rosamond Boulevard
Willow Springs, California

TRC | 552398 | **FIGURE 3**

FILE NAME: C:\Users\kquinnell\OneDrive - TRC\Documents\TRC\EUISMOD_Willow Springs CA\Fig3_Geology Map.dwg | Layout Tab: 11x17

APPENDIX A

FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using conventional, truck-mounted, hollow-stem auger drilling equipment. Twenty-Three 8-inch-diameter exploratory borings were drilled between the dates of April 22 through 25, 2025 to a maximum depth of 41.5 feet. The approximate locations of the exploratory borings are shown on Figure 2. The soils encountered were continuously logged in the field by TRC's representative and described in accordance with the Unified Soil Classification System (ASTM D2488). The logs of the borings, as well as a key to the classification of the soil, are included as part of this appendix.

The locations of TRC's borings were approximately determined by pacing from existing site boundaries. Elevations of the borings were not determined. The locations of the borings should be considered accurate only to the degree implied by the method used.

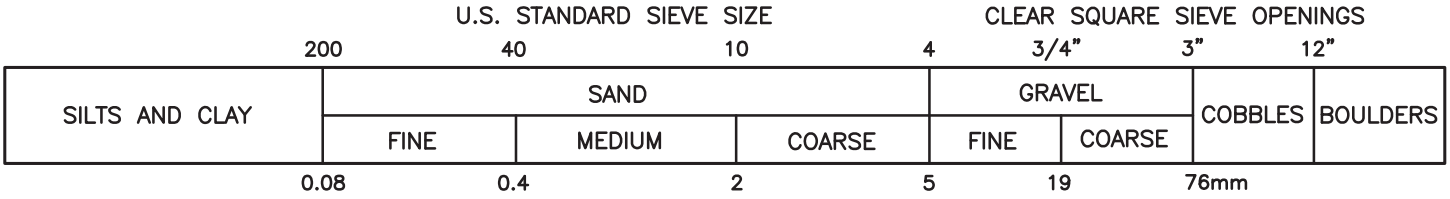
Representative soil samples were obtained from the borings at selected depths. All samples were returned to TRC's laboratory for evaluation and appropriate testing. Penetration resistance blow counts were obtained by dropping a 140-pound hammer 30 inches. Standard Penetration Test (SPT) 2-inch O.D. samples were obtained by driving the samplers 18 inches and recording the number of hammer blows for each 6 inches of penetration. Unless otherwise indicated, the blows per foot recorded on the boring logs represent the accumulated number of blows required to drive the samplers the last two 6-inch increments. When using the SPT sampler, the last two 6-inch increments is the uncorrected SPT measured blow count. The various samplers are denoted at the appropriate depth on the boring logs and symbolized as shown on Figure A-1.

The attached boring and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

* * * * * * * * * * *

PRIMARY DIVISIONS			SOIL TYPE		SECONDARY DIVISIONS
COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVELS (MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE)	CLEAN GRAVELS (Less than 5% Fines)	GW		Well graded gravels, gravel–sand mixtures, little or no fines
			GP		Poorly graded gravels or gravel–sand mixtures, little or no fines
		GRAVEL WITH FINES	GM		Silty gravels, gravel–sand–silt mixtures, plastic fines
			GC		Clayey gravels, gravel–sand–clay mixtures, plastic fines
	SANDS (MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE)	CLEAN SANDS (Less than 5% Fines)	SW		Well graded sands, gravelly sands, little or no fines
			SP		Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	SM		Silty sands, sand–silt–mixtures, non–plastic fines
			SC		Clayey sands, sand–clay mixtures, plastic fines
FINE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT IS LESS THAN 50 %)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL		Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS (LIQUID LIMIT IS GREATER THAN 50 %)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT		Peat and other highly organic soils

DEFINITION OF TERMS



GRAIN SIZES



SAMPLERS

SAND AND GRAVEL	BLOWS/FOOT*
VERY LOOSE	0–4
LOOSE	4–10
MEDIUM DENSE	10–30
DENSE	30–50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH+	BLOWS/FOOT*
VERY SOFT	0–1/4	0–2
SOFT	1/4–1/2	2–4
MEDIUM STIFF	1/2–1	4–8
STIFF	1–2	8–16
VERY STIFF	2–4	16–32
HARD	OVER 4	OVER 32

CONSISTENCY

*Number of blows of 140 pound hammer falling 30 inches to drive a 2–inch O.D. (1–3/8 inch I.D.) split spoon (ASTM D–1586).
+Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D–1586), pocket penetrometer, torvane, or visual observation.

KEY TO EXPLORATORY BORING LOGS

Unified Soil Classification System (ASTM D–2487)

TRC

FIGURE A–1

EXPLORATORY BORING: EB-01

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-24-25 FINISH DATE: 4-4-25	COMPLETION DEPTH: 16.5 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
		POORLY GRADED SAND WITH SILT (SP-SM) loose, dry, brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	6				
	5			8		2		
		SILTY SAND (SM) medium dense, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand	SM	11				
	10			11				
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	15				
	15	Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)

○ Pocket Penetrometer

△ Torvane

● Unconfined Compression

▲ U-U Triaxial Compression

1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-02

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-24-25 FINISH DATE: 4-24-25	COMPLETION DEPTH: 16.5 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
		SURFACE ELEVATION:						
	0	**POORLY GRADED SAND WITH SILT (SP-SM)** loose, moist, light brown, low plasticity, fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)	SP-SM	6				
	5	**SILTY SAND WITH GRAVEL (SM)** medium dense, moist, light brown, low plasticity, fine sand and fine gravel (sub-angular/rounded), trace medium to coarse sand	SM	11				
				10				
	10			13				
	15	**SILTY SAND (SM)** medium dense, moist, brown, low plasticity, fine sand, trace medium to coarse sand	SM	17				
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-03

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-25-25 FINISH DATE: 4-25-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 16.5 FT.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0		**SILTY SAND (SM)** medium dense, moist, light olive brown, low plasticity, fine to medium sand, trace coarse sand		10				
	5		loose	SM	9				
					9				
	10		medium dense		13				
	15				15				
			Bottom of boring at 16.5 feet						
	20								
	25								
	30								

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

SURFACE ELEVATION:

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

TRC

EXPLORATORY BORING: EB-04

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-24-25 FINISH DATE: 4-24-25	COMPLETION DEPTH: 16.5 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER
	SURFACE ELEVATION:				
	0	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, light olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	10	
	5	**SILTY SAND (SM)** medium dense, moist, light olive brown, fine sand, trace medium to coarse sand	SM	10	
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, light brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	10	
	10	**SILTY SAND (SM)** medium dense, moist, light brown, low plasticity, fine sand, trace coarse sand and fine gravel (sub-angular/rounded)	SM	14	
	15			14	
		Bottom of boring at 16.5 feet			
	20				
	25				
	30				

MOISTURE CONTENT (%) | DRY DENSITY (PCF) | PERCENT PASSING NO. 200 SIEVE

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-05

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-25-25 FINISH DATE: 4-25-25	COMPLETION DEPTH: 16.5 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER
	0	SURFACE ELEVATION:			
		SILTY SAND (SM) loose, moist, light brown, low plasticity, fine to medium sand, trace coarse sand	SM	7	
	5	medium dense		10	
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, light brown, low plasticity, fine to coarse sand, trace fine gravel (sub-angular/rounded)	SP-SM	11	
	10	**SILTY SAND (SM)** medium dense, moist, light brown, low plasticity, fine to medium sand, trace coarse sand	SM	14	
	15			14	
		Bottom of boring at 16.5 feet			
	20				
	25				
	30				

MOISTURE CONTENT (%) | DRY DENSITY (PCF) | PERCENT PASSING NO. 200 SIEVE

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-06

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-25-25 FINISH DATE: 4-25-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)
	SURFACE ELEVATION:			
	0	**POORLY GRADED SAND WITH SILT (SP-SM)** loose, moist, olive brown, low plasticity, fine sand, trace medium sand	SP-SM	9
	5	medium dense, fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)		12
		SILTY SAND (SM) medium dense, moist, light olive brown, low plasticity, fine sand, trace medium sand		10
	10			16
			SM	
	15	trace medium to coarse sand		17
		POORLY GRADED SAND (SP) medium dense, moist, brown, fine to medium sand, trace coarse sand		
	20			24
			SP	
	25			27
			SM	
	30	*Continued Next Page*		

SAMPLER | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | PERCENT PASSING NO. 200 SIEVE

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-06 Cont'd

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-25-25 FINISH DATE: 4-25-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

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ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	30		**SILTY SAND (SM)** dense, moist, light brown, low plasticity, fine sand, trace medium sand	SM	30				
	35		medium dense		28				
	40		**POORLY GRADED SAND (SP)** medium dense, moist, brown, fine to medium sand	SP	26				
			Bottom of boring at 41.5 feet						
	45								
	50								
	55								
	60								

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-07

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-25-25 FINISH DATE: 4-25-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	SURFACE ELEVATION:							
	0	**SILTY SAND (SM)** loose, dry, brown, low plasticity, fine sand, trace medium sand	SM	8		2		
	5			8				
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, light brown, low plasticity, fine sand, trace medium sand		10				
	10		SP-SM	12				
	15	olive brown, fine to medium sand, trace coarse sand		13				
		POORLY GRADED SAND (SP) medium dense, moist, brown, fine to medium sand, trace coarse sand						
	20			21				
	25		SP	24				
	30	*Continued Next Page*						

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-07 Cont'd

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-25-25 FINISH DATE: 4-25-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	30		**POORLY GRADED SAND (SP)** dense, moist, brown, fine to medium sand, trace coarse sand		30				
	35		medium dense	SP	27				
	40		fine to medium sand		28				
			Bottom of boring at 41.5 feet						
	45								
	50								
	55								
	60								

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Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-08

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-24-25 FINISH DATE: 4-24-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
		SILTY SAND (SM) loose, moist, light brown, low plasticity, fine sand, trace medium sand		7				
	5	medium dense, trace fine gravel (sub-angular/rounded)	SM	11				
		loose, fine sand, trace medium sand		9				
	10	medium dense, fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)		13				
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, brown, low plasticity, fine sand, trace medium sand	SP-SM	15				
	15	Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-09

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-24-25 FINISH DATE: 4-24-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
		SURFACE ELEVATION:						
	0	**SILTY SAND (SM)** loose, moist, olive brown, low plasticity, fine sand, trace medium sand		9				
	5	medium dense, fine to medium sand	SM	11				
				12				
	10			10				
	15	fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)		12				
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-10

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-24-25 FINISH DATE: 4-24-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
		SILTY SAND (SM) medium dense, moist, light olive brown, low plasticity, fine to medium sand, trace coarse sand	SM	10				
	5			11				
		POORLY GRADED SAND WITH SILT (SP-SM) loose, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	8				
	10	**SILTY SAND (SM)** medium dense, moist, light brown, low plasticity, fine to medium sand, trace coarse sand	SM	11				
	15			13				
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-11

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-24-25 FINISH DATE: 4-24-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
		SILTY SAND (SM) medium dense, moist, olive brown, low plasticity, fine to coarse sand, trace fine gravel (sub-angular/rounded)	SM	10				
	5	loose, fine to medium sand, trace coarse sand		7				
		POORLY GRADED SAND WITH SILT (SP-SM) loose, moist, light brown, low plasticity, fine to medium sand, trace coarse sand		9				
	10	medium dense	SP-SM	10				
	15			14				
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)

○ Pocket Penetrometer

△ Torvane

● Unconfined Compression

▲ U-U Triaxial Compression

1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-12

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-23-25 FINISH DATE: 4-23-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
SURFACE ELEVATION:	0	**SILTY SAND (SM)** loose, moist, light brown, low plasticity, fine sand, trace medium sand	SM	6				
	5	fine to medium sand, trace coarse sand		8 9				
	10	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, light brown, low plasticity, fine to medium sand	SP-SM	12				
	15	trace coarse sand		14				
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-13

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-23-25 FINISH DATE: 4-23-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
SURFACE ELEVATION:	0	**POORLY GRADED SAND WITH SILT (SP-SM)** loose, moist, light olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	6	X	2		
	5	medium dense, trace coarse sand		11	X			
		loose, fine to medium sand		9	X			
	10	**SILTY SAND (SM)** medium dense, moist, light brown, low plasticity, fine to medium sand, trace coarse sand	SM	11	X			
	15			15	X			
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-14

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-23-25 FINISH DATE: 4-23-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER
		SURFACE ELEVATION:			
	0	**POORLY GRADED SAND WITH SILT (SP-SM)** loose, moist, light brown, low plasticity, fine to coarse sand, trace fine gravel (sub-angular/rounded)	SP-SM	8	
	5	**SILTY SAND (SM)** loose, moist, light brown, low plasticity, fine to medium sand, trace coarse sand		9	
		medium dense	SM	10	
	10			12	
	15	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, light brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	14	
		Bottom of boring at 16.5 feet			
	20				
	25				
	30				

MOISTURE CONTENT (%) | DRY DENSITY (PCF) | PERCENT PASSING NO. 200 SIEVE

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-15

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-22-25 FINISH DATE: 4-22-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER
SURFACE ELEVATION:	0	**SILTY SAND (SM)** loose, moist, olive brown, low plasticity, fine sand, trace medium sand	SM	8	
	5	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, light olive brown, low plasticity, fine sand, trace medium sand	SP-SM	10	
		SILTY SAND (SM) medium dense, moist, light olive brown, low plasticity, fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)	SM	11	
	10	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	13	
	15			15	
		Bottom of boring at 16.5 feet			
	20				
	25				
	30				

MOISTURE CONTENT (%) | DRY DENSITY (PCF) | PERCENT PASSING NO. 200 SIEVE

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-16

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-23-25 FINISH DATE: 4-23-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0		SURFACE ELEVATION:						
			SILTY SAND (SM) loose, moist, olive brown, low plasticity, fine sand, trace medium sand		7				
	5				9				
			medium dense, trace coarse sand and fine gravel (sub-angular/rounded)	SM	11				
	10				12				
	15				11				
			Bottom of boring at 16.5 feet						
	20								
	25								
	30								

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-17

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-23-25 FINISH DATE: 4-23-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
SURFACE ELEVATION:	0	**SILTY SAND (SM)** medium dense, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand						
				10				
	5	loose	SM	9				
				8				
	10	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, dark olive brown, low plasticity, fine to medium sand, trace coarse sand		11				
			SP-SM					
	15			14				
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-18

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-22-25 FINISH DATE: 4-22-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
		SURFACE ELEVATION:						
	0	**SILTY SAND (SM)** medium dense, moist, light olive brown, low plasticity, fine to medium sand, trace coarse sand	SM	11				
	5	loose		9				
		POORLY GRADED SAND WITH SILT (SP-SM) loose, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand and fine gravel (sub-angular)		7				
	10	medium dense	SP-SM	11				
	15			12				
		Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)

○ Pocket Penetrometer

△ Torvane

● Unconfined Compression

▲ U-U Triaxial Compression

1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-19

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-22-25 FINISH DATE: 4-22-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	SURFACE ELEVATION:							
	0	**SILTY SAND (SM)** medium dense, dry, dark olive brown, low plasticity, fine to medium sand	SM	10				
	5			10		2		
				13				
	10	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, light brown, low plasticity, fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)	SP-SM	12				
	15			12				
	20	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)** medium dense, moist, brown, low plasticity, fine to medium sand, fine gravel (sub-angular/rounded), trace coarse sand	SP-SM	16				
	25			27				
	30		SP					

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

Continued Next Page

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-19 Cont'd

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-22-25 FINISH DATE: 4-22-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

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ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	30		**POORLY GRADED SAND WITH GRAVEL (SP)** medium dense, moist, brown, fine to coarse sand, fine gravel (sub-angular/rounded)	SP	25				
	35		**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, light brown, low plasticity, fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)	SP-SM	29				
	40		**POORLY GRADED SAND WITH GRAVEL (SP)** dense, moist, brown, fine to coarse sand, fine gravel (sub-angular/rounded)	SP	38				
			Bottom of boring at 41.5 feet						
	45								
	50								
	55								
	60								

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-20

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-22-25 FINISH DATE: 4-22-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
		POORLY GRADED SAND (SP) loose, moist, brown, fine to medium sand, trace coarse sand and fine gravel (sub-angular/rounded)		8				
	5			7				
				7				
			SP					
	10	medium dense		11				
	15			13				
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	14				
	20							
		POORLY GRADED SAND WITH GRAVEL (SP) medium dense, moist, light brown, fine to coarse sand, fine gravel (sub-angular/rounded)	SP	22				
	25							
			SP-SM					
	30	*Continued Next Page*						

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-20 Cont'd

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-22-25 FINISH DATE: 4-22-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 41.5 FT.

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ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	30		**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, brown, low plasticity, fine to coarse sand, trace fine gravel (sub-angular/rounded)	SP-SM	25				
	35		**POORLY GRADED SAND WITH GRAVEL (SP)** medium dense, moist, light brown, fine to coarse sand, fine gravel (sub-angular/rounded)	SP	26				
	40		dense		31				
			Bottom of boring at 41.5 feet						
	45								
	50								
	55								
	60								

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-21

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-24-25 FINISH DATE: 4-24-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION:	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER
	0	**SILTY SAND (SM)** loose, moist, olive brown, low plasticity, fine sand, trace medium to coarse sand		6	
	5	medium dense	SM	12	
		loose		8	
	10	medium dense		13	
	15	**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, brown, low plasticity, fine sand, trace medium sand	SP-SM	15	
		Bottom of boring at 16.5 feet			
	20				
	25				
	30				

MOISTURE CONTENT (%) | DRY DENSITY (PCF) | PERCENT PASSING NO. 200 SIEVE

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-22

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW-STEM AUGER
LOGGED BY: AC
START DATE: 4-22-25 FINISH DATE: 4-22-25

PROJECT NO: 552398
PROJECT: EUISMOD PROJECT
LOCATION: WILLOW SPRINGS, CA
COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
		SILTY SAND (SM) loose, moist, light brown, low plasticity, fine to medium sand, trace coarse sand		7				
	5	medium dense	SM	12				
		loose		9				
	10	medium dense		13				
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, light olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	11				
	15	Bottom of boring at 16.5 feet						
	20							
	25							
	30							

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

EXPLORATORY BORING: EB-23

Sheet 1 of 1

DRILL RIG: CME-75	PROJECT NO: 552398
BORING TYPE: 8-INCH HOLLOW-STEM AUGER	PROJECT: EUISMOD PROJECT
LOGGED BY: AC	LOCATION: WILLOW SPRINGS, CA
START DATE: 4-23-25 FINISH DATE: 4-23-25	COMPLETION DEPTH: 16.5 FT.

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ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER
	SURFACE ELEVATION:				
	0	**POORLY GRADED SAND WITH SILT (SP-SM)** loose, moist, brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	9	
	5	medium dense		11	
		SILTY SAND (SM) medium dense, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand	SM	12	
	10			13	
		POORLY GRADED SAND WITH SILT (SP-SM) medium dense, moist, olive brown, low plasticity, fine to medium sand, trace coarse sand	SP-SM	16	
	15	Bottom of boring at 16.5 feet			
	20				
	25				
	30				

MOISTURE CONTENT (%) | DRY DENSITY (PCF) | PERCENT PASSING NO. 200 SIEVE

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 5/25/25 SC, CA*

APPENDIX B

LABORATORY PROGRAM

The laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the soils underlying the site and to aid in verifying soil classification.

Compaction: Laboratory compaction tests (ASTM D1557) were performed on representative samples of the subsurface soils to determine the maximum dry density and optimum moisture content. Results of the tests are included in this appendix.

Moisture Content: The natural water content was measured (ASTM D2216) on samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Sieve Analyses: Gradation and washed sieve analyses (ASTM D422) were performed on samples of the subsurface soils to aid in soil classification. Results of these tests are included in this appendix.

Soil Corrosion: Laboratory tests were performed for saturated electrical resistivity (ASTM G57), chloride and sulfate (ASTM D4327), pH (ASTM D51), and ORP (redox) (ASTM G200). Results are presented in the report and summarized below.

Soil Thermal Resistivity: Soil thermal resistivity dryout tests (ASTM D5334-14) were performed on a sample of the site soils compacted to 90 percent relative compaction. The results are presented in the report and included below.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was performed on samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

* * * * * * * * * * *

Corrosivity Tests Summary

CTL # 028-3097 **Date:** 5/16/2025 **Tested By:** PJ **Checked:** PJ
Client: TRC **Project:** Euismond **Proj. No:** 552398
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP (Redox)		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%				Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	%	
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
EB-1	-	5.0	-	-	3,412	11	220	0.0220	8.2	455	26	Negative	1.7	Light Olive Brown SAND w/ Silt
EB-7	-	2.5	-	-	4,142	12	204	0.0204	8.4	473	25	Negative	2.1	Light Olive Brown SAND w/ Silt
EB-13	-	2.5	-	-	3,996	14	221	0.0221	8.4	493	24	Negative	2.1	Light Olive Brown SAND w/ Silt
EB-19	-	5.0	-	-	3,668	42	211	0.0211	8.3	498	24	Negative	2.4	Light Olive Brown SAND w/ Silt

SUMMARY OF LABORATORY TEST DATA

Project Name: Euismod Project

TRC Project #: 552398.0ECC

SAMPLE IDENTIFICATION			Soil Group (USCS System)	Moisture Content (%)	USCS GRAIN-SIZE DISTRIBUTION				COMPACTION CHARACTERISTICS			Thermal Resistivity (°C-cm/W)			
Source Name	Sample Name	Sample Depth (ft)			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Test Method	Optimum Moisture Content (%)	Maximum Dry Density (pcf)	Wet	Dry	Dry Density (pcf)[2]	Moisture Content[2]
EB-7	BULK	0.0-5.0	SM[1]	1.4	1.6	76.5	21.9		ASTM D1557	7.7	132.3	70.1	131.0	119.1	7.7
EB-13	BULK	0.0-5.0	SW-SM[1]	0.7	0.7	91.0	8.3		ASTM D1557	6.6	123.4	89.0	268.0	111.1	6.6
EB-19	BULK	0.0-5.0	SM[1]	0.6	3.7	63.9	32.4		ASTM D1557	7.1	137.8	63.2	162.0	124.0	7.1

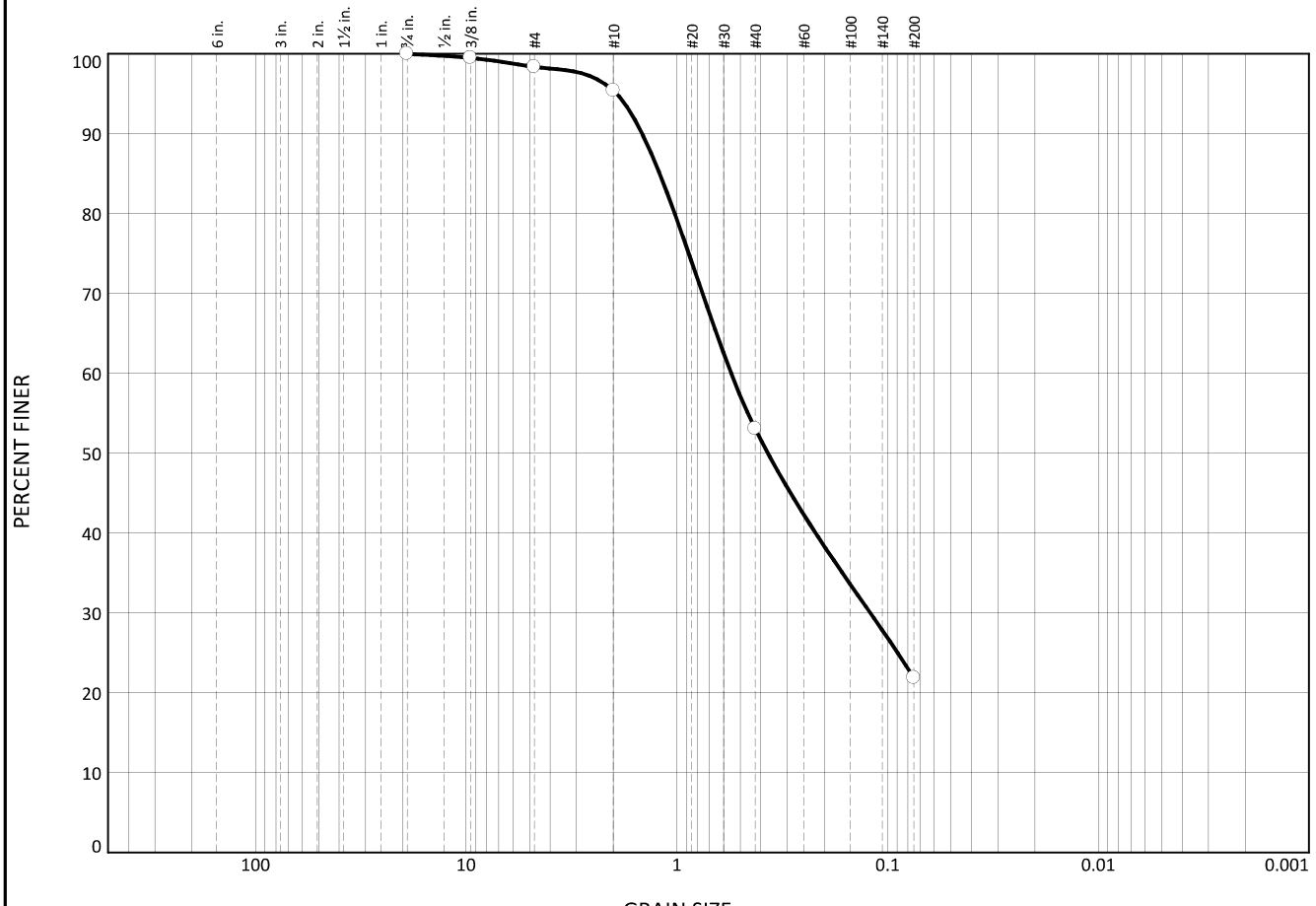
Notes:

1. USCS based on grain-size distribution and visual classification. An Atterberg limits test was not requested.
2. As requested, specimen was prepared at optimum moisture content at 90% of maximum dry density determined by a modified proctor (ASTM D1557).

DRAWN BY: TBT 07/01/25

CHECKED BY: JPB 07/01/25

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	3.0	42.3	31.2	21.9	

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
		1.2063	0.5522	0.3698	0.1208				

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
BROWN/GREEN SILTY SAND	05/22/25	SM	1.4

Project No. 552398.0ECC

Project: Euismod Project

Source of Sample: EB-7 **Depth:** 0.0-5.0 FT **Sample Number:** BULK

Remarks:
SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

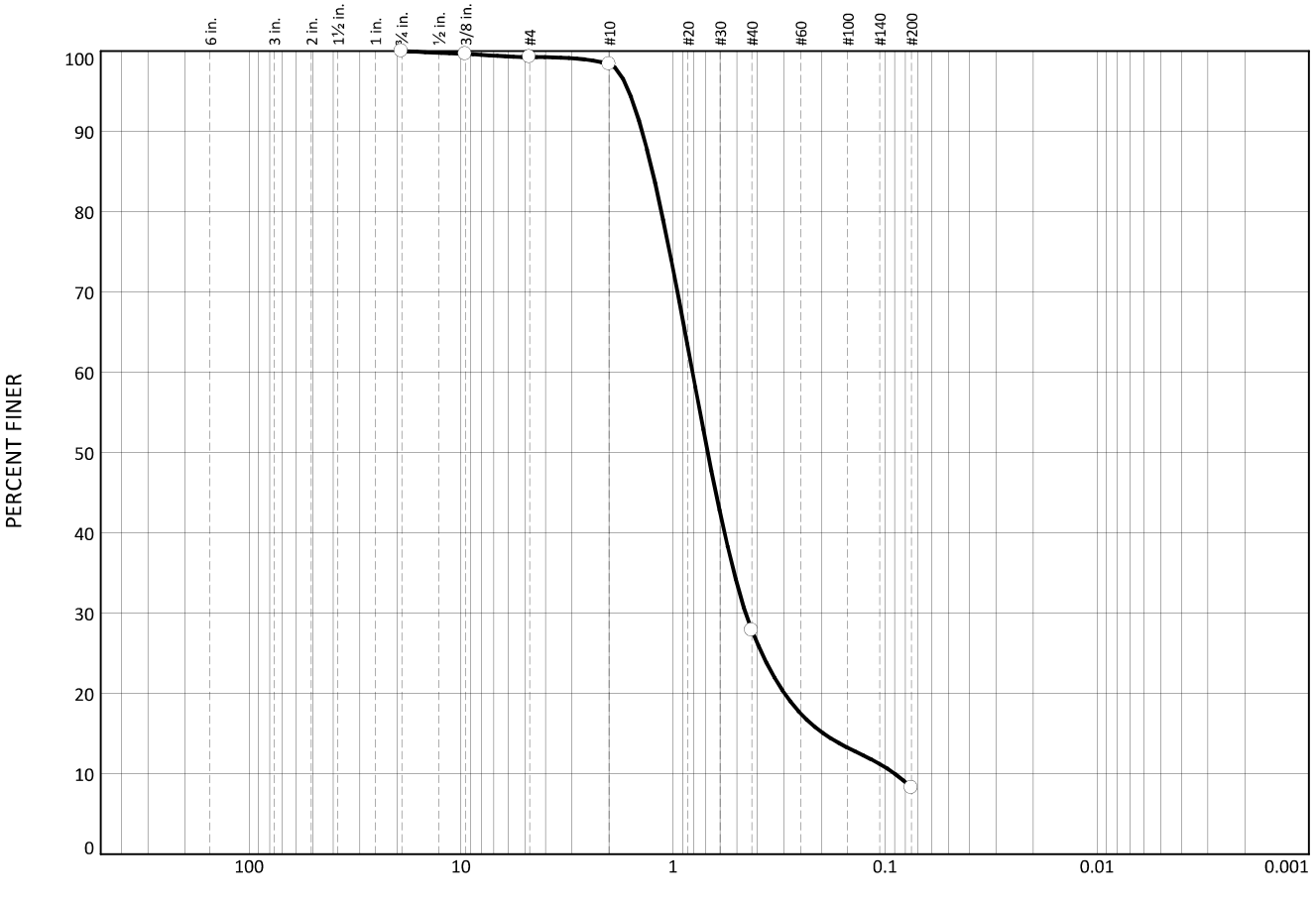
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 1

Tested By: JC 05/22/25 **Checked By:** JPB 07/01/25

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.9	70.5	19.6	8.3	

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
		1.2500	0.8079	0.6845	0.4543	0.1943	0.0897	2.85	9.00

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
BROWN/GREEN WELL-GRADED SAND WITH SILT	05/22/25	SW-SM	0.7

Project No. 552398.0ECC
Project: Euismod Project

Source of Sample: EB-13 **Depth:** 0.0-5.0 FT **Sample Number:** BULK

Remarks:
SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

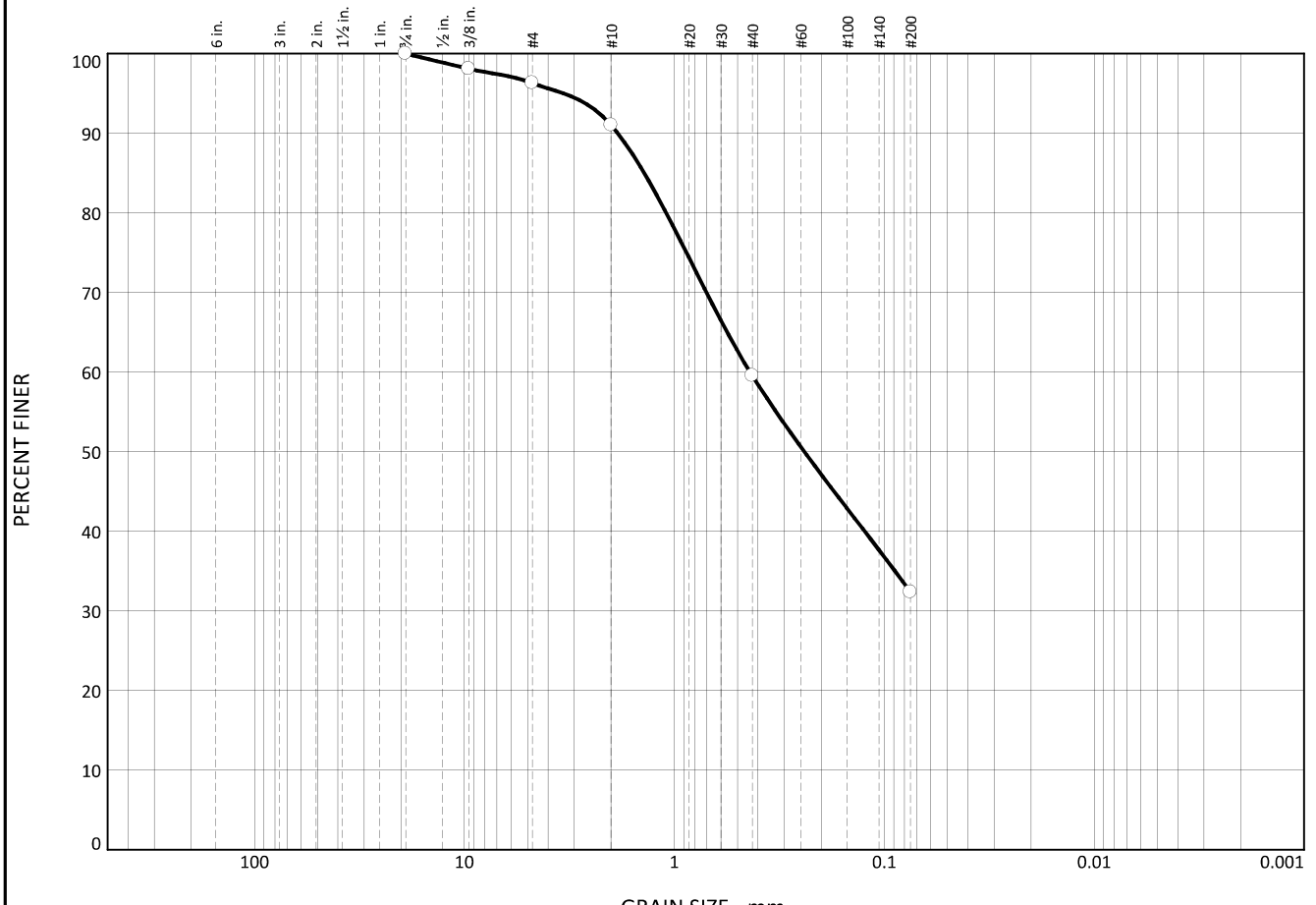
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 2

Tested By: JC 05/22/25 **Checked By:** JPB 07/01/25

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.7	5.3	31.5	27.1	32.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.3915	0.4360	0.2402					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN SILTY SAND	05/28/25	SM	0.6

Project No. 552398.0ECC

Project: Euismod Project

○ **Source of Sample:** EB-19 **Depth:** 0.0-5.0 FT **Sample Number:** BULK

Remarks:

○ SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

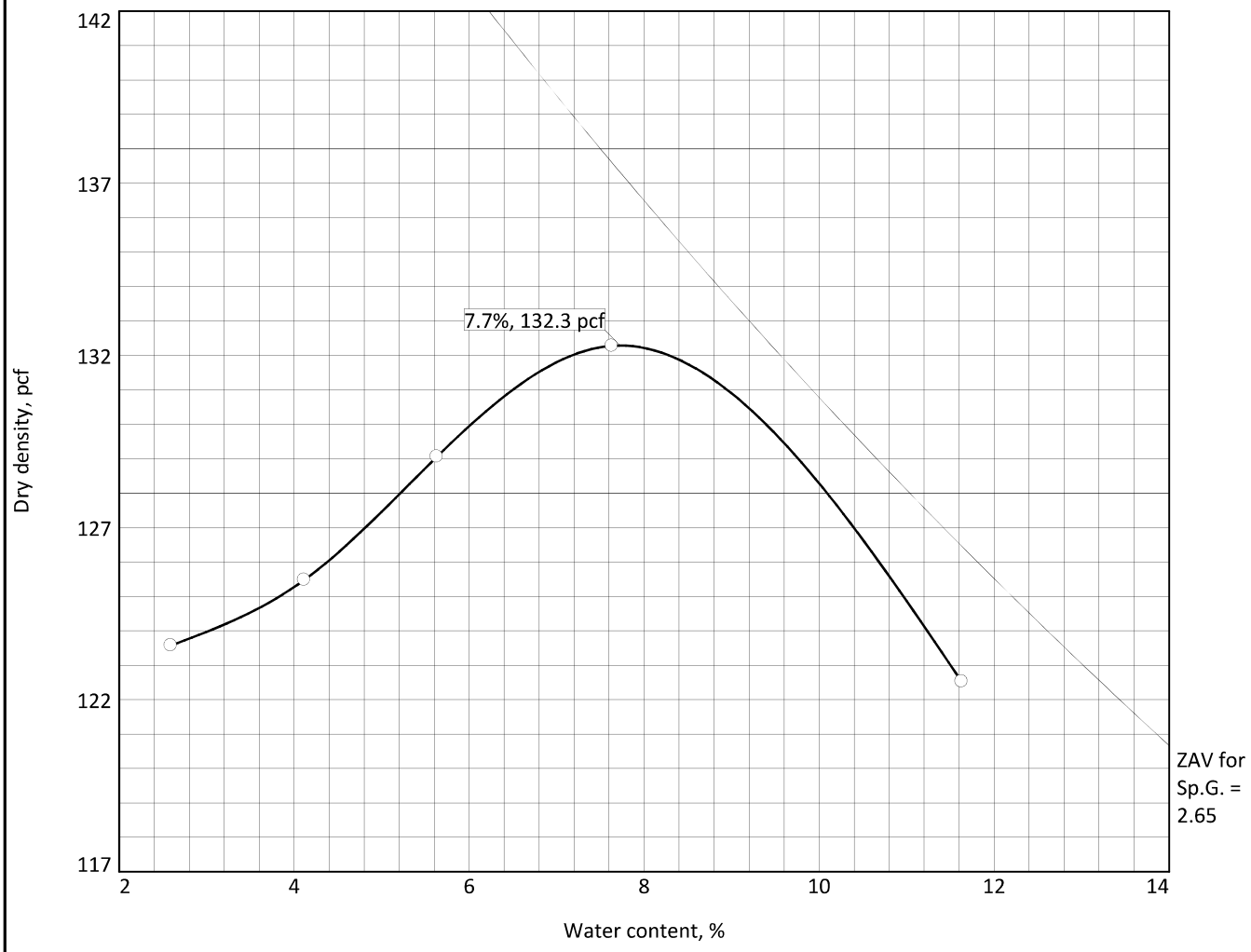
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Mt. Laurel, NJ

Figure 3

Tested By: JP 05/28/25 **Checked By:** JPB 07/01/25

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
0.0-5.0 FT	SM		1.4				0.0	21.9

TEST RESULTS

Maximum dry density = 132.3 pcf

Optimum moisture = 7.7 %

MATERIAL DESCRIPTION

BROWN/GREEN SILTY SAND

Project No. 552398.0ECC

Project: Euismod Project

Date:

Source of Sample: EB-7 **Sample Number:** BULK

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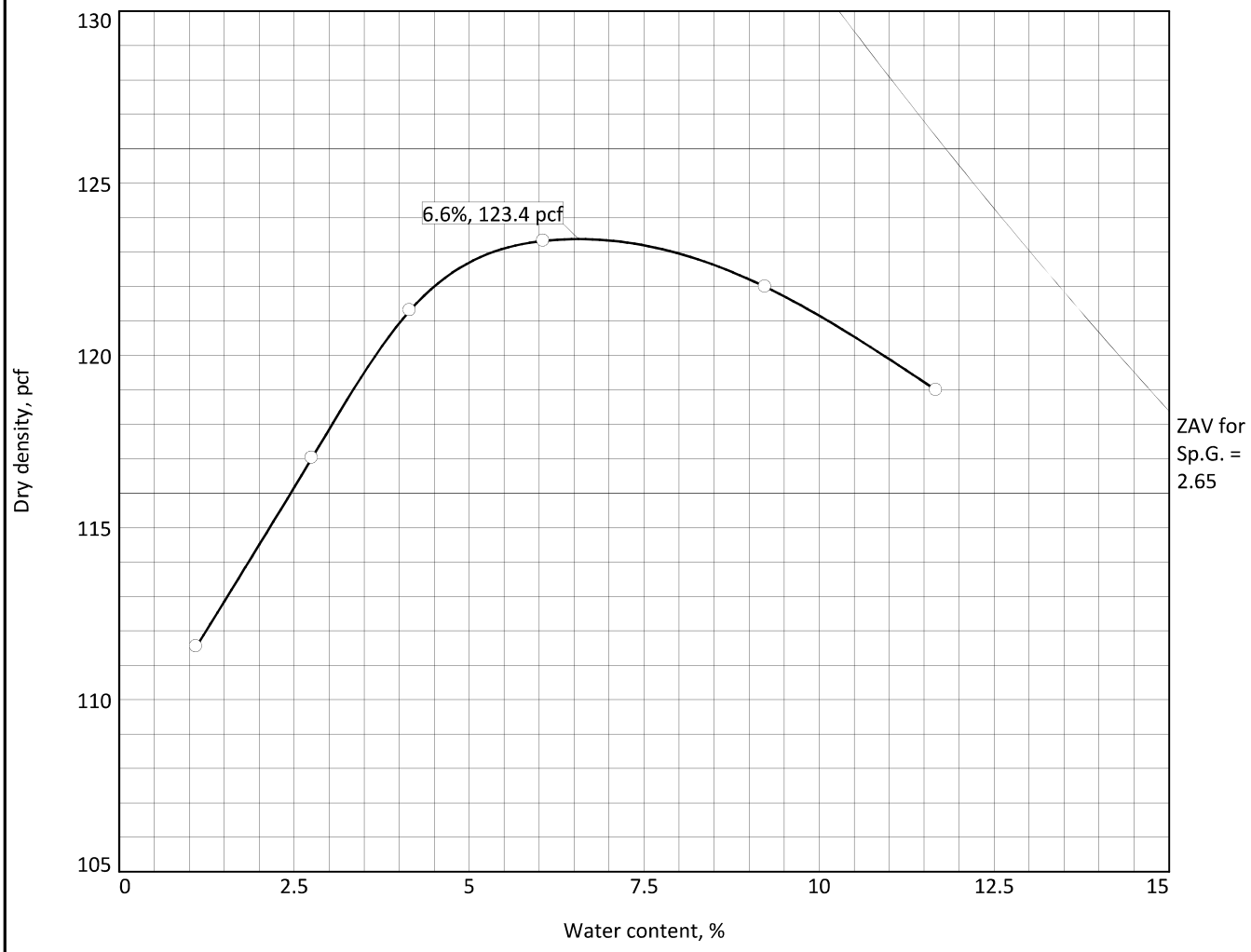
Remarks:

SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

Figure 4

Tested By: RJ 05/21/25 **Checked By:** JPB 07/01/25

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
0.0-5.0 FT	SW-SM		0.7				0.0	8.3

TEST RESULTS

Maximum dry density = 123.4 pcf

Optimum moisture = 6.6 %

MATERIAL DESCRIPTION

BROWN/GREEN WELL-GRADED SAND WITH SILT

Project No. 552398.0ECC

Project: Euismod Project

Date:

Source of Sample: EB-13 **Sample Number:** BULK

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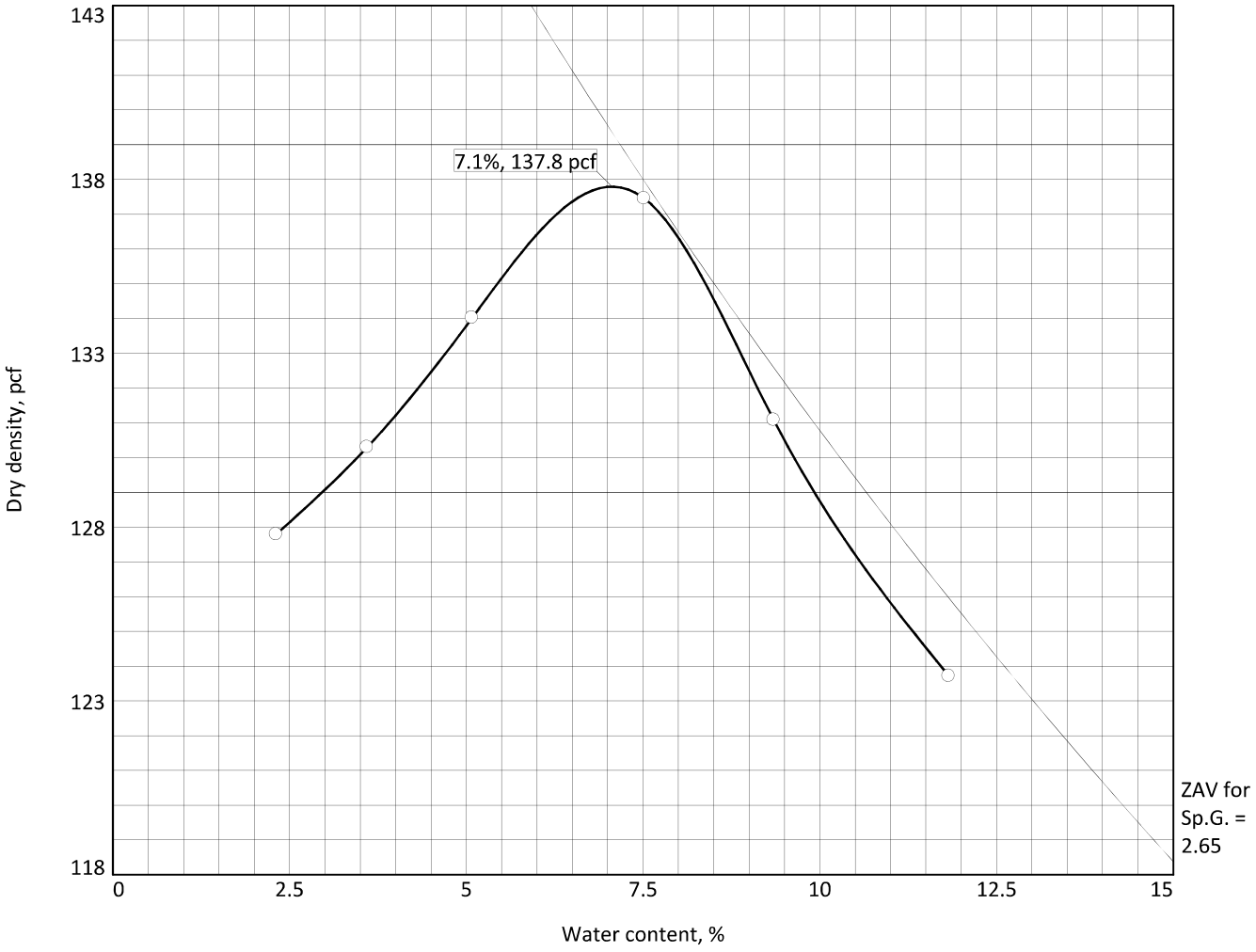
Remarks:

SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

Figure 5

Tested By: RJ 05/20/25 **Checked By:** JPB 07/01/25

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
0.0-5.0 FT	SM		0.6				0.0	32.4

TEST RESULTS

Maximum dry density = 137.8 pcf

Optimum moisture = 7.1 %

MATERIAL DESCRIPTION

BROWN SILTY SAND

Project No. 552398.0ECC

Project: Euismod Project

Date:

○ **Source of Sample:** EB-19 **Sample Number:** BULK

TRC Engineers, Inc.

Mt. Laurel, NJ

Remarks:

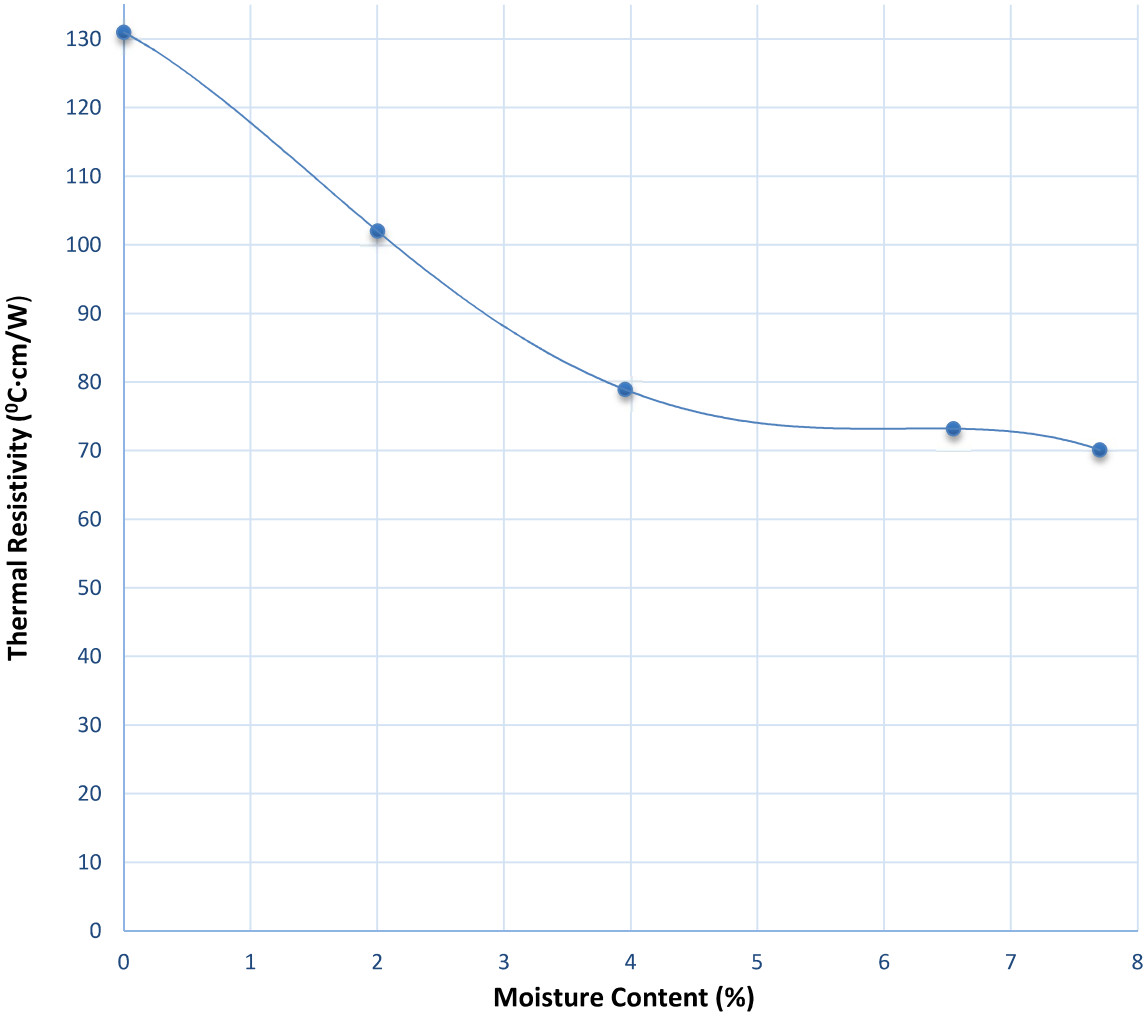
SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

Figure 6

Tested By: DA 06/03/25 **Checked By:** JPB 07/01/25

EB-7, BULK, 0.0-5.0 FT

THERMAL RESISTIVITY DRY-OUT CURVES
552398.0ECC: EUISMOD PROJECT

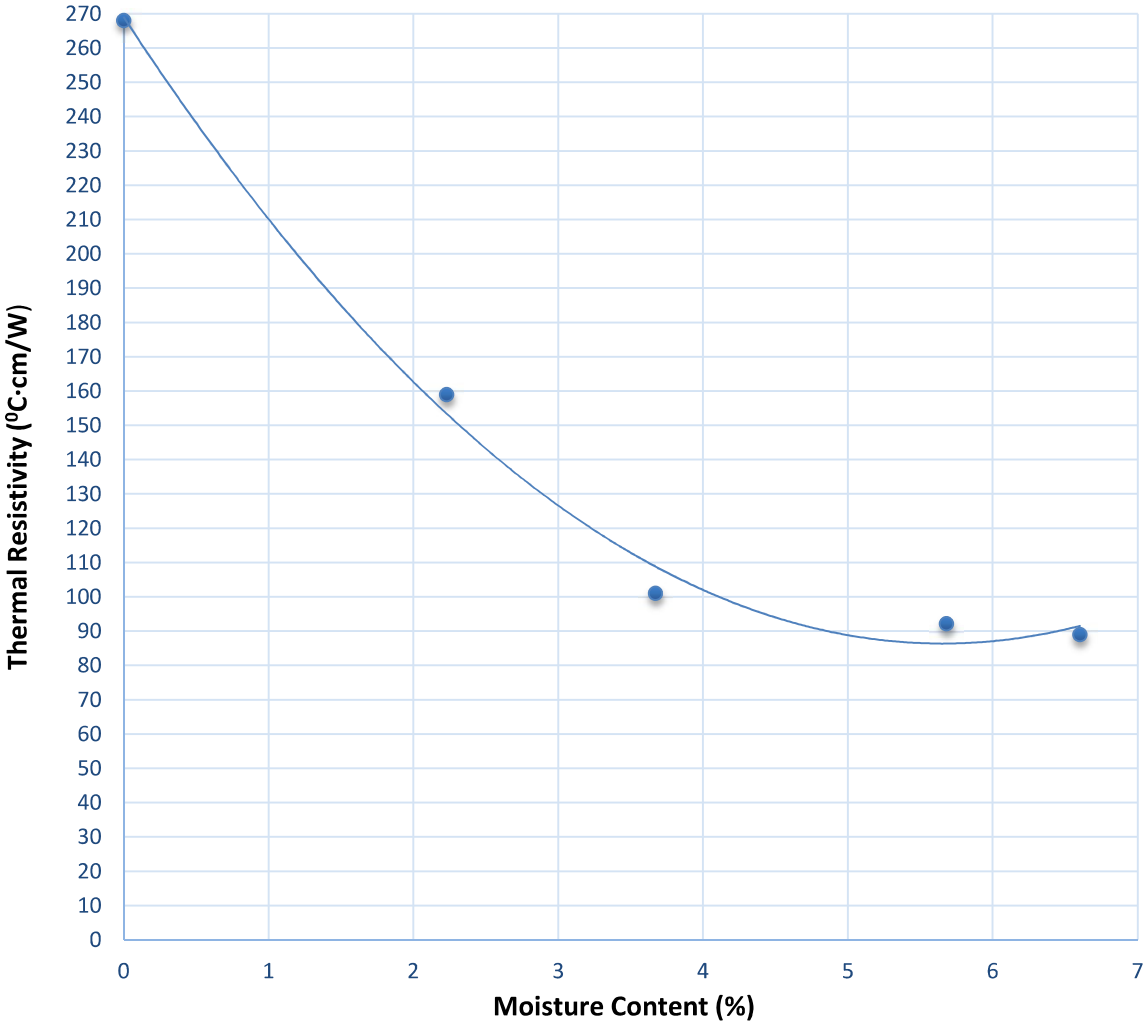


Specimen ID:	EB-7, BULK, 0.0-5.0 FT
Natural Moisture Content:	1.4%
LL:	N/A
PI:	N/A
<#200:	21.9%
Maximum Dry Dens.:	132.3 PCF
Optimum Moisture Content:	7.7%

Notes:
As requested, specimen was prepared at optimum moisture content at 90% of maximum dry density determined by a modified proctor (ASTM D1557) .

EB-13, BULK, 0.0-5.0 FT

THERMAL RESISTIVITY DRY-OUT CURVES
552398.0ECC: EUISMOD PROJECT

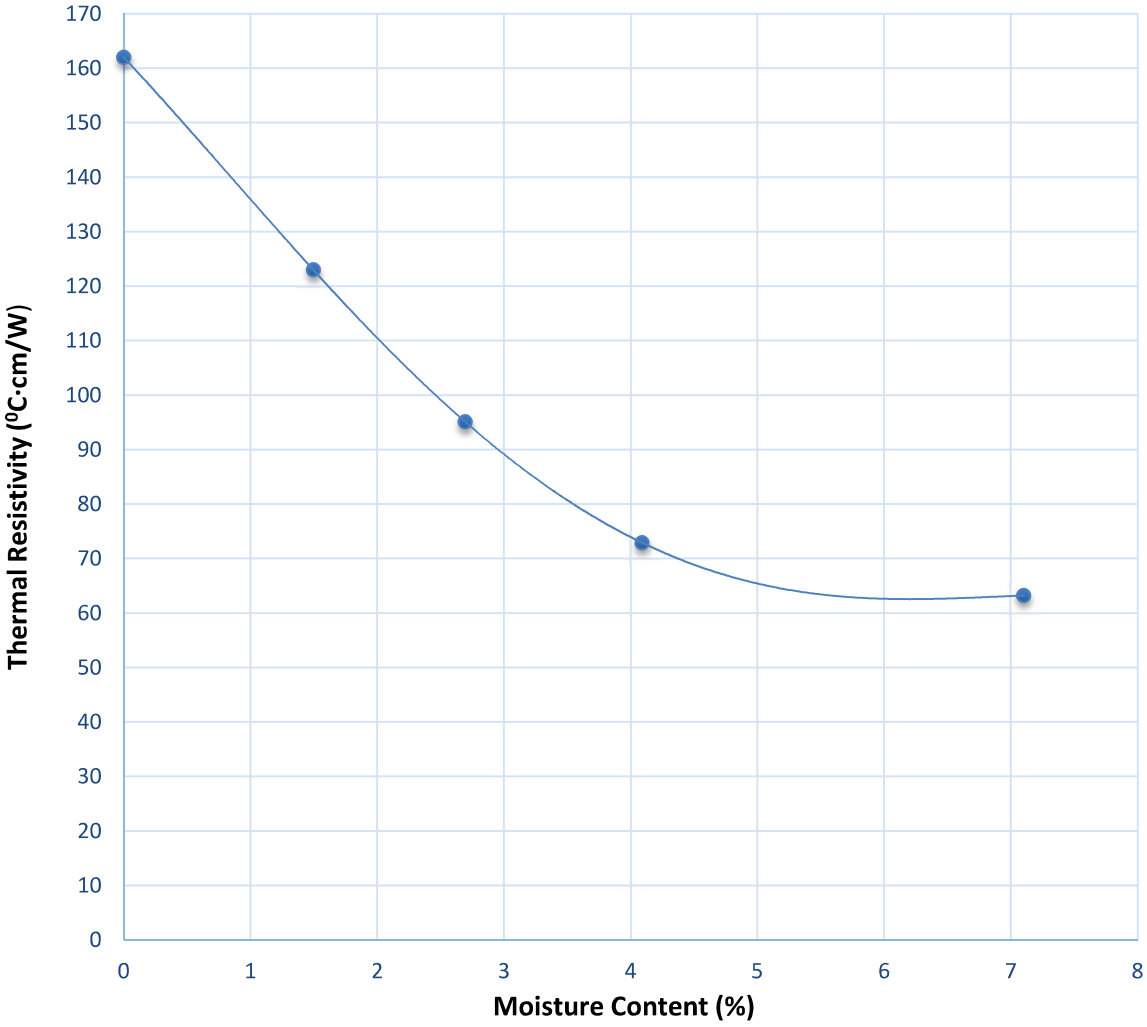


Specimen ID:	EB-13, BULK, 0.0-5.0 FT
Natural Moisture Content:	0.7%
LL:	N/A
PI:	N/A
<#200:	8.3%
Maximum Dry Dens.:	123.4 PCF
Optimum Moisture Content:	6.6%

Notes:
As requested, specimen was prepared at optimum moisture content at 90% of maximum dry density determined by a modified proctor (ASTM D1557) .

EB-19, BULK, 0.0-5.0 FT

THERMAL RESISTIVITY DRY-OUT CURVES
552398.0ECC: EUISMOD PROJECT



Specimen ID:	EB-19, BULK, 0.0-5.0 FT
Natural Moisture Content:	0.6%
LL:	N/A
PI:	N/A
<#200:	32.4%
Maximum Dry Dens.:	137.8 PCF
Optimum Moisture Content:	7.1%

Notes:
As requested, specimen was prepared at optimum moisture content at 90% of maximum dry density determined by a modified proctor (ASTM D1557) .

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Appendix F2
Paleontological Resources Assessment Report

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TRC
6 Executive Circle
Suite 200
Irvine, CA 92614

Main 949.727.9336

To:	Victoria Edwards, Project Development Associate, CAISO Euismod Project LLC and Euismod Project I LLC
From:	Joe Stenger, P.G., Technical Director Matthew Wetherbee, RPA, Cultural Resources Lead
Subject:	Paleontological Resources Mitigation, Euismod Project
Date:	April 15, 2026
Project No.:	552398

Introduction and Executive Summary

The Euismod Project (Project) is a proposed electric energy storage facility that will utilize lithium-ion batteries and ancillary equipment to store energy received from the regional electric grid to then be returned to the grid when needed. The energy storage facility will be developed on an approximately 120-acre site (Site) located approximately 13 miles west of Rosamond in unincorporated Kern County, California (Figure 1). The Project will include installation of electric tie-lines between the site and the Whirlwind Substation located on adjacent parcels to the south, and installation of interconnection infrastructure within the existing developed footprint of the Whirlwind Substation. The Site and interconnection routes are currently undeveloped other than electric and communications infrastructure. A record search was conducted for the Project by the Natural History Museum of Los Angeles County. The record search results indicate that there are no known paleontological localities onsite or in the vicinity of the Site. However, localities have been identified in the larger region in sedimentary deposits similar to those that occur beneath the ground surface at the Site. Based on methodologies in the Society of Vertebrate Paleontology's (SVP's) *Best Practice Guidelines for Mitigation of Adverse Impacts on Paleontological Resources* (SVP, 2025), Shallow sediments in the Project area have a Low Potential for significant fossils and sediments that will be encountered in deeper excavations have a Moderate Potential for significant fossils. A protection measure is proposed to prevent adverse impact to paleontological resources should any be discovered in construction excavations.

Project Description

The Project is a proposed electric energy storage facility that will utilize lithium-ion batteries and ancillary equipment to store energy received from the regional electric grid to then be returned to the grid when needed. The energy storage facility will be developed on an approximately 120-acre Site located approximately 13 miles west of Rosamond in unincorporated Kern County, California (Figure 1). The Project will include installation of electric tie-lines between the site and

the Whirlwind Substation located on adjacent parcels to the south, and installation of interconnection infrastructure within the existing developed footprint of the Whirlwind Substation. The Site and tie-line routes are currently undeveloped other than electric and communications infrastructure. The Project will be connected to the regional electric grid at the existing Southern California Edison Whirlwind Substation located just south of the Project via two 220 kilovolt (kV) overhead electric tie-lines. The tie-lines will include a shield wire above the conductors and fiber optic communications either overhead or underground. The Site has a gentle slope generally ranging from 1 to 3 percent so grading for the project will not require deep excavations. Most Project equipment will be installed on shallow piles or shallow foundations so also will not require deep excavations. These and most other excavations required for Project construction, including trenching for electric and communication lines between equipment, are expected to be less than 5 feet deep. Some excavations needed for Project construction may be deeper including excavations for the main power transformer foundations, the electric tie-line pole foundations, and the microwave tower foundations.

Setting

The Project is located near the northwest edge of the Antelope Valley in the western Mojave Desert near the foot of the Tehachapi Range. The Project occurs near the toe of coalescing alluvial fans emanating from the Tehachapi Range to the west via Cottonwood Creek and smaller unnamed drainages. When surface water and sediment flows occur, sediments are deposited and aggregate in the Site area as the steeper slopes to the west flatten into the gentle to nearly flat slopes in the Site area. The existing Whirlwind Substation development included drainage control structures that now convey water and sediment flows around the substation. Published mapping (Figure 2) shows surficial geology in the project vicinity to consist of recent Wash Deposits in ephemeral stream channels, and alluvial fan deposits that increasing in age from southeast to northwest (Hernandez and Lancaster, 2011). Mapped units include:

- Wash Deposits (late Holocene)
- Modern Alluvial Fan Deposits (Holocene)
- Younger Alluvial Fan Deposits (Holocene to late Pleistocene)
- Older Alluvial Fan Deposits (late Pleistocene)
- Very Old Alluvial Fan Deposits (middle to late Pleistocene)

Within the Site and along the two electric tie-line areas, surficial deposits are mostly Modern (Holocene) Alluvial Fan Deposits. These Holocene deposits and the Wash Deposits in active drainages are too geologically young to be recognized for containing important fossil resources. Areas near the west and northwest edge of the Site and at the western tie-line have near-surface geology mapped as being undifferentiated Holocene to late Pleistocene alluvial fan deposits. Pleistocene sediments are old enough to have the potential for the occurrence of significant paleontological resources. For considering potential impacts on paleontological resources, it is conservative to treat this unit as potentially Pleistocene where it occurs in the Project area. Alluvial deposits beneath the Site are thick and older sedimentary horizons are present below the surface units mapped in Figure 2. The potential for occurrence of significant paleontological resources increases with depth below the Holocene deposits.

Based on 23 geotechnical borings (TRC, 2025) located throughout the Site, near-surface sediments are primarily loose sand and silt with minor fine gravel to a depth of approximately 5 feet or more, underlain by primarily medium dense sand and silt with minor fine gravel extending

to the maximum depth explored (41.5'). The geotechnical boring logs do not show notable differences in sediments below the Site vertically or laterally other than the majority of the 23 geotechnical borings show loose near-surface sediments become medium-dense at a depth of approximately 5 feet below the ground surface.

A paleontological resource record search review was conducted for the Project. A records search request was submitted on December 2, 2024, to Dr. Alyssa Bell, PhD., at the Natural History Museum of Los Angeles County in Los Angeles. This institution maintains regional paleontological site records in their files, as well as supporting maps and documents. The records search results are used to identify previously performed paleontological resource assessments as well as known paleontological localities in the Project vicinity. The museum's response to the record search request is attached. Results of the record search indicate that there are no known paleontological localities on or near the Project Site. The record search identified four known fossil resource locations in the region as summarized below.

LACM LOCALITY NUMBER	TAXA	LOCATION	FORMATION	DEPTH (FEET BELOW SURFACE)
VP 7891	Camel	10 miles east-northeast[(1)]	Unknown, Pleistocene	21
VP 7853	Various small mammals, reptiles & fish	20 miles east-southeast	Unknown, Pleistocene siltstone	3-11
VP 7884	Camel	21 miles southeast	Unknown, Pleistocene	4
VP 3722	Horse	20 miles north[(1)]	Unknown, Pleistocene	Unknown

[(1)] Estimated from general location reported in record search results.

LACM VP 7853 is temporally related to sediments beneath the Project location but has little other relevance. LACM VP 7853 is near the middle of the valley with playa and lacustrine deposits with finer grain sizing and depositional conditions substantially more favorable for preservation of fossils than would be expected in the Site vicinity.

The geotechnical borings show that the Site is covered by a thick layer of loose sand and silt with minor fine gravel. There are no rock or sediment outcrops on or proximal to the Site. There are no incised drainage channels exposing older previously buried sediments. The closest Older Alluvial Fan Deposits are more than a quarter-mile north of the Site. No fossils have been reported to be observed on the Site during the past three years of site field studies. Given that there are no exposed previously buried sediments to observe on or adjacent to the Site, a pedestrian paleontological resource survey is not warranted.

Paleontological Sensitivity

Based on sediment characteristics, age, location, and results of the records search, the map unit shown as Qyf in Figure 2 and older sediments should initially be considered to have a Moderate Potential (SVP Designation 3) for the occurrence of significant fossil resources based on Society of Vertebrate Paleontology criteria. While significant fossil resources are rarely found in alluvial units and unlikely to be encountered during Project construction, the possibility cannot be ruled

out in this map unit or underlying older units. In these sediments, paleontological sensitivity increases with depth. Sediments in the upper portion of the Qyf unit are likely Holocene, transitioning to late Pleistocene with increasing depth within the unit.

The modern (Holocene) alluvial deposits and Wash Deposits shown as Qf in Figure 2 have Low Potential (SVP Designation 2) for the occurrence of significant fossil resources based on Society of Vertebrate Paleontology criteria. Due to the recency of the time record in these geologically young sediments, it is not reasonably foreseeable that these modern sediments could contain significant fossils.

The thickness of the modern (Holocene) alluvial deposits is not exposed on the site and is not clear from the lithologies observed in the geotechnical borings. However, the majority of 23 geotechnical borings show near-surface material to transition from loose to medium dense at a depth of approximately 5 feet with no other notable change in lithology, potentially from consolidation and/or overburden effects that can occur with time. For excavations in the Qf and Qyf map units TRC suggests sediments deeper than 5 feet be considered to potentially be Pleistocene or older, and initially considered to have Moderate Potential for the occurrence of significant fossil resources and increasing sensitivity with depth.

Wash Deposits (Qw) occur in channels where scouring and sediment transport is most active in modern time. Due to the potential for scouring to expose and then re-bury older sediments, all material deeper than five feet below the surface of modern Wash Deposits should be considered to potentially be Pleistocene with Moderate Potential for the occurrence of significant fossil resources and sensitivity increasing with depth.

For this work, the assessment of Moderate Potential for the occurrence of significant fossil resources in Qyf and older sediments is based in part on the absence of Site-specific excavation data. The potential for occurrence of significant fossil resources within the depth of planned excavations below the Site should be periodically reassessed by a qualified Paleontologist as site-specific experience is gained.

Suggested Mitigation Plan

Mitigation can be implemented to avoid the potential for an adverse impact where Project excavations will be in sediments with a Moderate Potential for the occurrence of significant fossil resources. This includes:

- Excavations in areas mapped as Qyf or Qf in Figure 2 to the extent that such excavations are more than five feet below the ground surface.

- Excavations in areas mapped as Qw in Figure 2 to the extent that such excavations are below the bottom of modern channel scour deposits.

The following mitigation measure, if adopted, could be used by the County to support a finding that the project would not have an adverse impact on paleontological resources:

The Project should retain a qualified paleontologist (QP), defined as a paleontologist meeting the Society for Vertebrate Paleontology's or United States Department of the Interior (43 CFR 49.110) qualifications. Prior to issuance of a grading permit, the County could require the applicant to submit written evidence that a QP has been retained, including a resume for the QP demonstrating

conformance with Society of Vertebrate Paleontology or Department of the Interior professional qualifications. Mitigation should include:

a. *The QP shall prepare a Paleontological Resources Awareness Training (PRAT) program for all construction personnel working on the Project. A PRAT program guidance document approved by the QP shall be provided to Project construction personnel working onsite. A copy of the PRAT program guidance document shall be submitted to the Kern County Planning and Natural Resources Department prior to groundbreaking. The training guide may be presented in video format.*

b. *Paleontological awareness training shall be provided to Project construction personnel and may be conducted in conjunction with other required awareness training.*

c. *The training shall include an overview of potential paleontological resources that could be encountered during ground disturbing activities to facilitate worker recognition, and instructions for avoidance and immediate notification to the QP in the event of a discovery, and penalties for unauthorized artifact collecting or intentional disturbance of paleontological resources.*

d. *The owner shall ensure new onsite construction workers receive PRAT training meeting these provisions before being allowed to work unsupervised. A record of training shall be kept onsite and available for review by County staff upon request.*

e. *The PRAT training guide shall be kept onsite and available for all personnel to review and be familiar with as necessary.*

f. *During construction, the QP or designated monitor shall initially monitor excavation work:*

    i. *within any area mapped as Qyf or Qf to the extent excavation is deeper than five feet below existing grade; and*

    ii. *within any area mapped as Qw to the extent excavation is deeper than five feet below the surface and below modern channel sediments.*

    Full-time monitoring can be adjusted to part time inspections in the absence of any discovery at the discretion of the QP. Part time monitoring can be terminated in the absence of any discovery and determination by the QP that adequate monitoring has occurred to determine the discovery of a significant fossil in remaining Project excavations is not reasonably foreseeable.

g. *Within 14 days following completion of monitoring, the QP shall prepare a report documenting the absence or discovery of fossil resources onsite.*

h. *If a paleontological resource is found, the construction contractor shall stop ground-disturbing activities within 50 feet of the discovery until the QP evaluates the significance of the resource and recommends appropriate treatment measures. For any discovery determined potentially significant by the QP, field data forms shall be used to record pertinent geologic data, stratigraphic sections shall be measured, and appropriate sediment samples shall be collected and submitted for analysis. Any potentially significant fossils encountered and recovered shall be catalogued and donated to a public, non-profit institution with a research interest in the material, if such an entity with interest can be reasonably identified. Accompanying notes, maps and photographs shall also be filed at the repository.*

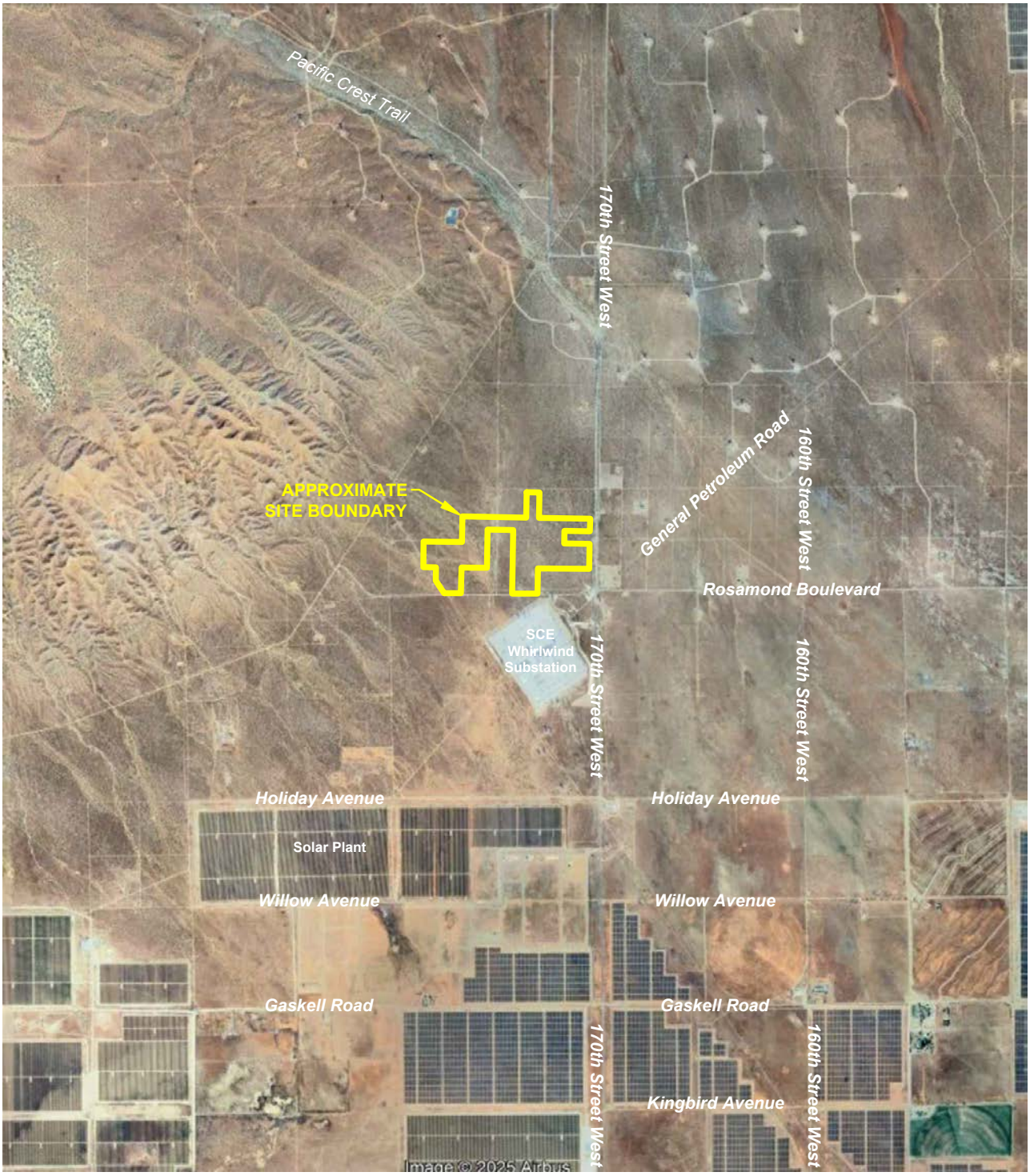
With the above mitigation measure, there would be no foreseeable adverse impact to paleontological resources and, therefore, no potential for a cumulative adverse impact.

References

Hernandez. J.L. and Lancaster, J.T. Preliminary Geologic Map of the Fairmont Butte 7.5' Quadrangle, Los Angeles County, California. A digital database: California Geological Survey, Preliminary Geologic Maps PGM-11-02. 2011.

TRC. Geotechnical Investigation, Euismod Project, LLC. 170th Street and Rosamond Boulevard, Willow Springs, Kern County, California. July 1, 2025.

SVP. Best Practice Guidelines for Mitigation of Adverse Impacts on Paleontological Resources. First Edition: Released October, 2025.



SOURCE AERIAL PHOTO: Google Earth, October 2024.

N

APPROXIMATE SCALE (FEET)

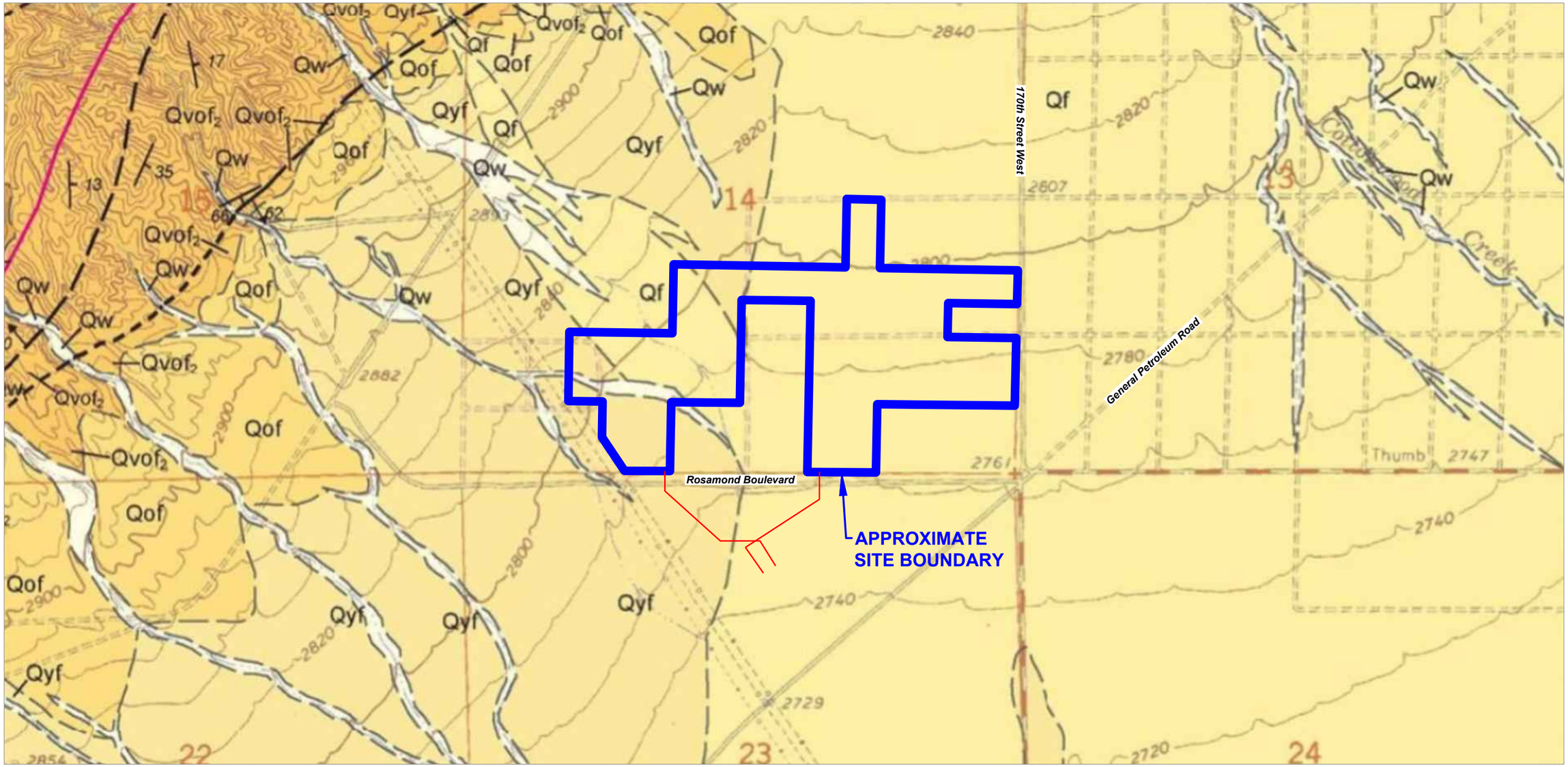
0 4,000 8,000

VICINITY MAP

Euismod Project
170th Street West and Rosamond Boulevard
Willow Springs, California

TRC | 552398 | **FIGURE 1**

FILE NAME: C:\Users\kquinnell\OneDrive - TRC\Documents\TRC\EUISMOD_Willow Springs CA\Fig1_Vicinity Map.dwg | Layout Tab: 8x11



SOURCE: Hernandez, J.L., and Lancaster, J.T., 2011, Preliminary Geologic Map of the Fairmont Butte 7.5' Quadrangle, Los Angeles County, California. A digital database: California Geological Survey, Preliminary Geologic Maps PGM-11-02.

GEOLOGIC LEGEND

Qw	Wash deposits (late Holocene)
Qf	Modern alluvial fan deposits (Holocene)
Qyf	Younger alluvial fan deposits (Holocene to late Pleistocene)
Qof	Older alluvial fan deposits (late Pleistocene)
$Qvof_2$	Very old alluvial fan deposits (middle to late Pleistocene)

Fault - Solid where accurately located, dashed where approximately located; short dash where inferred

17 — Strike and dip of sedimentary beds

Proposed Electric Tie-Line

N

APPROXIMATE SCALE (FEET)

0 1,000 2,000

GEOLOGY MAP

Euismod Project LLC
170th Street West and Rosamond Boulevard
Willow Springs, California

TRC | 552398 | **FIGURE 2**

FILE NAME: C:\Users\kquinnell\OneDrive - TRC\Documents\TRC\EUISMOD_Willow Springs CA\Fig3_Geology Map.dwg | Layout Tab: 11x17

Appendix G
Phase I Environmental Site Assessment

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PHASE I ENVIRONMENTAL SITE ASSESSMENT

120 Acres of Undeveloped Land Near the Intersection of Rosamond Boulevard and 170th Street West, Unincorporated Kern County, California

December 2024

Project Number: 552398.0ESG.0000

Prepared For:
Aypa Power Development, LLC
11801 Domain Blvd, Suite 450
Austin, Texas 78758

Prepared By:
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Report Prepared By:
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Table of Contents

EXECUTIVE SUMMARY 1
1.0 INTRODUCTION 2
1.1 Purpose and Scope of Services 2
1.2 Additional Services 2
1.3 Deviations to ASTM E 1527-21 Standard 2
1.4 Critical Viability Dates 3
2.0 SUBJECT PROPERTY DESCRIPTION 4
2.1 Subject Property Location 4
2.2 Subject Property Improvements 4
2.3 Current and Historic Property Use 4
2.3.1 Current Use(s) 4
2.3.2 Previous Owner and Operator Information 4
2.4 Physical Setting 5
2.5 Flooding 5
3.0 USER PROVIDED INFORMATION 6
3.1 Title and Judicial Records for Environmental Liens or AULs 6
3.2 Specialized Knowledge 6
3.3 Property Value Reduction Issues 6
3.4 Commonly Known or Reasonably Ascertainable Information 6
3.5 Reason for Conducting Phase I ESA 6
4.0 RECORDS REVIEW 7
4.1 Historical Review 7
4.1.1 Subject Property History 7
4.1.2 Area and Adjoining History 7
4.2 Database Report and Environmental Record Review 7
4.2.1 Subject Property 7
4.2.2 Adjoining and Surrounding Property Record Review 7
4.2.2.1 Adjoining Properties 8
4.2.2.2 Surrounding Properties 8
4.3 Previous Reports 8
4.4 Other Environmental Record Sources 9
5.0 RECONNAISSANCE 10
5.1 Methodology and Limiting Conditions 10
5.2 Interior and Exterior Site Observations 10
5.2.1 ASTs 11
5.2.2 Hazardous Substances 11
5.2.3 Hazardous Waste 11
5.2.4 Solid Waste 11

5.2.5 USTs 11
5.2.6 PFAS 11
5.3 Adjoining and Surrounding Properties Reconnaissance 11
5.3.1 Adjoining Properties 11
5.3.2 Surrounding Properties 12
6.0 FINDINGS, OPINIONS, AND CONCLUSIONS 13
6.1 Findings 13
6.1.1 RECs 13
6.1.2 CRECs 13
6.1.3 HRECs 13
6.1.4 De Minimis Conditions 13
6.2 Data Gaps 13
7.0 LIMITING CONDITIONS AND DEVIATIONS 15
7.1.1 Accuracy and Completeness 15
7.1.2 Warranties and Representations 15
7.1.3 Significant Assumptions 16
7.1.4 Site-Related Limiting Conditions 16
8.0 REFERENCES 17

List of Tables

Table 2.1 - Subject Property Improvements 4
Table 2.2 - Subject Property Owners 5
Table 4.1 - Other Environmental Record Sources 9
Table 5.1 - Interior and Exterior Property Observations 10
Table 5.2 - Adjoining Properties 11

List of Figures

Figure 1: Site Location Map
Figure 2: Site Plan

List of Appendices

Appendix A: Database Radius Report
Appendix B: Historical Research Documentation
Appendix C: Photograph Log
Appendix D: TRC Staff and Environmental Professional Qualifications/Resumes
Appendix E: Environmental Professional Statement

EXECUTIVE SUMMARY

TRC Environmental Corporation, Inc. (TRC) was retained by Aypa Power Development, LLC (also known as "Client" or "User") to perform a Phase I Environmental Site Assessment (ESA) of property located near the intersection of Rosamond Boulevard and 170th Street West in unincorporated Kern County, California (herein referred to as the "subject property). TRC conducted the ESA in connection with the Client's planned business transaction involving the subject property in accordance with TRC's proposal dated June 22, 2023. The Phase I ESA described in this report was performed in accordance with the scope and limitations of the ASTM Practice E 1527-21 *Standard Practice for ESAs: Phase I ESA Process* (ASTM E 1527-21). Limiting conditions and/or deviations from the ASTM standard are described in Sections 1.3 and 7.1 of this report.

Overview

The subject property consists of approximately of approximately 120 acres of undeveloped land. The irregularly shaped subject property consisted of vacant desert. The subject property is bisected by several unimproved roadways, an electrical easement, a fiber optic cable easement, and dry washes. Most of the subject property consists of bushes and grass. Several debris piles consisting of construction debris and trash were scattered throughout the subject property. The Southern California Edison Whirlwind substation is located south of the subject property.

History

The subject property has consisted of undeveloped desert since at least the early 1900s. The unimproved utility access roads that bisect portions of the subject property appear to have been graded in approximately 2010. No historical onsite or offsite sources of concern were identified.

Findings

This assessment has revealed no evidence of recognized environmental conditions (RECs), controlled RECs (CRECs), or historical RECs (HRECs).

This Executive Summary is part of this complete report; any findings, opinions, or conclusions in this Executive Summary are made in context with the complete report. TRC recommends that the User read the entire report for supporting information related to findings, opinions, and conclusions.

Legal Notice

This report has been prepared for Aypa Power Development, LLC. This document was prepared by TRC solely for the benefit of the Client and the User. With regard to third-party recipients of this document, neither TRC, nor the Client, nor the User, nor any of their respective parents, affiliates, or subsidiaries, nor any person acting on their behalf: (a) makes any warranty, expressed or implied, with respect to the use of any information or methods disclosed in this document; or (b) assumes any liability with respect to the use of any information or methods disclosed in this document. Any third-party recipient of this document, by its acceptance or use of this document, releases TRC, the Client, the User, and their parents, affiliates, and subsidiaries from any liability for direct, indirect, economic, incidental, consequential, or special loss or damage whether arising in contract, warranty, express or implied, tort, or otherwise, and irrespective of fault, negligence, and strict liability.

1.0 INTRODUCTION

TRC Environmental Corporation, Inc. (TRC) has prepared this Phase I Environmental Site Assessment (ESA) for Aypa Power Development, LLC (also known as "Client" or "User"). This report was prepared for and may be relied upon by Client for the purposes set forth herein; it may not be relied on by any party other than the Client. TRC will consider authorization for third-party reliance on this report if requested by the Client.

1.1 Purpose and Scope of Services

The following Phase I ESA was performed for the property located near the intersection of Rosamond Boulevard and 170th Street West in unincorporated Kern County, California (hereinafter the "subject property"). A site location map is included as **Figure 1**. This Phase I ESA has been prepared by TRC in accordance with the ASTM E 1527-21 *Standard Practice for ESA: Phase I ESA Process* (ASTM E 1527-21) and is intended for the sole use of Aypa Power Development, LLC per TRC's proposal dated June 22, 2023.

The purpose of this assessment is to identify *Recognized Environmental Conditions* (RECs) at the subject Property, as defined by the ASTM E 1527-21 standard. The completion of this Phase I ESA report may be used to satisfy one of the requirements for the User to qualify for the *innocent landowner*, *contiguous property owner*, or *bona fide prospective purchaser* liability protections pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), thereby constituting *all appropriate inquiries into the previous ownership and uses of the property consistent with good commercial or customary practice* as defined by 42 U.S.C. §9601(35)(B) of CERCLA. The scope of services for this assessment included the following tasks:

- Subject property and vicinity reconnaissance.
- Subject property and vicinity description and physical setting.
- Historical source review and description of historic subject property conditions.
- Interviews with owners, operators, and/or occupants of the subject property, and/or local officials.
- Review of environmental databases and regulatory agency records.
- Review of previous environmental reports/documentation, as applicable.
- Review of environmental liens, if provided or authorized to obtain by the User.
- Preparation of a report summarizing findings, opinions, and conclusions.

1.2 Additional Services

No additional services were provided, and no non-ASTM topics were evaluated as part of this assessment. Items outside the scope of the ASTM E 1527-21 standard and not included in this review include but are not limited to the following:

- Asbestos Containing Materials
- Lead-based paint
- Wetlands
- Lead-in Drinking Water
- Cultural and historic resources
- Industrial hygiene
- Radon
- Substances not defined as Hazardous Substances or petroleum
- Health and safety
- Ecological resources
- Endangered species
- Indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment
- Biological agents
- Environmental Compliance

1.3 Deviations to ASTM E 1527-21 Standard

No significant deviations or deletions to the ASTM standard were made during this assessment.

1.4 Critical Viability Dates

The critical viability dates for this assessment are summarized below:

- **Interviews** – None of the property owners or others representing the subject property were made available for interviews.
- **Regulatory Records Review** – Regulatory review for the subject property and nearby sites was initiated on October 14, 2024.
- **Site Visit** - A visit to the subject property and an area reconnaissance of the surrounding area was conducted on November 5, 2024.
- **Environmental Declaration** - The Environmental Professional (EP) signed the environmental declaration for this report on December 6, 2024.

To qualify for one of the threshold criteria for satisfying the LLPs to CERCLA liability, all appropriate inquiries components listed above must be conducted or updated within 180 days of and prior to the date of acquisition of the subject property, and all other components of all appropriate inquiries must be conducted within one year prior to the date of acquisition of the subject property. The date of the report generally does not represent the date the individual components of all appropriate inquiries were completed and should not be used when evaluating compliance with the 180-day or 1-year all appropriate inquiries requirement.

2.0 SUBJECT PROPERTY DESCRIPTION

2.1 Subject Property Location

The subject property is located near the intersection of Rosamond Boulevard and 170th Street West in unincorporated Kern County, California. The assessor parcel numbers for the subject property are 261-103-17, 261-103-20, 261-103-21, 261-103-29, 261-104-10, 261-104-13, 261-104-16, 261-104-19, 261-104-20, and 261-104-21. **Figure 1** illustrates the area in which the subject property is located, and **Figure 2** shows the approximate property boundary, key features of the subject property, and abutting properties.

2.2 Subject Property Improvements

A summary of the subject property improvements is provided below.

Table 2.1 - Subject Property Improvements

Feature	Description
Buildings	No buildings are located on the subject property.
Construction date(s)	Not applicable.
Exterior areas	The subject property consists of undeveloped vacant desert. The subject property is bisected by several unimproved roadways, an electrical easement, a fiber optic cable easement, and dry washes. Shrubs, bushes, and grass are scattered throughout the subject property. Several debris piles consisting of construction debris and trash were observed during TRC's site visit.
On-Site roads/rail lines	No onsite roads or rail lines are located at the subject property.
Other large equipment	No large equipment is located at the subject property.
Potable water supply	Potable water is not supplied to the subject property.
Sewage disposal system(s)	Sewage disposal services are not provided to the subject property.
Heating/cooling system fuel source(s)	Heating/cooling systems are not located at the subject property.
Back-up fuel source(s)	No back-up fuel sources, or emergency generators are located at the subject property.
Electricity supplier(s)	Electricity is not provided to the subject property.
Storm water system	Storm water infiltrates into the subsurface or flows over land to the south.
Notes: N/A – Not applicable	

2.3 Current and Historic Property Use

2.3.1 Current Use(s)

The subject property consists of undeveloped land. Unimproved roads and utility easements bisect the subject property. Aside from the periodic maintenance of overhead electrical lines, the subject property is not used for a commercial or industrial purpose.

2.3.2 Previous Owner and Operator Information

The subject property landowners are presented in Table 2.2 below. No prior ownership information was identified. Additional information regarding the history of the subject property is provided in Section 4.0.

Table 2.2 - Subject Property Owners

County Tax ID Number	Subject Property Owner	Acreage
261-103-17	Rishe Sivagnanam	19.33
261-103-20	Carolyn Winifred Drew	10.06
261-103-21	Jose M Bornilla	10.07
261-103-29	Brian K Smith	5.07
261-104-10	Steven J Selak	40.25
261-104-13	Dean A MacVean	5.11
261-104-16	Frances K Stiles	15.25
261-104-19	Benninger Living Trust	4.63
261-104-20	Paul David Methot	5.05
261-104-21	Mai N Truc	5.06

2.4 Physical Setting

According to the USGS 2019 7.5-minute topographic maps for Fairmonte Butte and Tylerhorse Canyon, California (refer to **Figure 1**) and verified via GoogleEarth, the elevation of the subject property ranges from approximately 2,815 feet above mean sea level (msl) in the northernmost portion of the subject property to 2,765 feet msl in the southernmost part of the subject property. The topographic slope observed during the site visit (See Section 5.0) was generally flat with a slight slope to the south. Based on the local topography, the assumed groundwater flow direction is to the south.

No site-specific lithology, geology, or hydrologic information was identified during this assessment. However, according to EDR, the dominant soil composition in the vicinity of the subject property is as follows:

- **Hydric Status**: Not hydric
- **Soil Surface Texture**: Fine sandy loam
- **Soil Component Name**: Hesperia
- **Deeper Soil Types**: Coarse-grained sands

Please refer to the Geocheck Physical Setting Source Summary of the EDR report presented in **Appendix A** for further information regarding the soil composition in the vicinity of the subject property.

2.5 Flooding

According to the Federal Emergency Management Agency (FEMA) Flood Map Service Center, the far eastern portion of the subject property is in Flood Zone A, which has a one percent annual chance of flooding.

3.0 USER PROVIDED INFORMATION

According to the ASTM E 1527-21 standard, certain tasks that may help identify the presence of RECs associated with the subject property are generally conducted by the Phase I ESA User. These tasks include providing or authorizing the *environmental professional* to obtain recorded land title records for environmental liens (ELs) or AULs; providing specialized knowledge related to RECs at the subject property (e.g., information about previous ownership or environmental litigation); providing commonly known or *reasonably ascertainable* information within the local community about the *property* that is material to RECs in connection with the *property*; and informing the *environmental professional* if, as believed by the User, the purchase price of the *property* is lower than the fair market value due to contamination.

3.1 Title and Judicial Records for Environmental Liens or AULs

No information regarding environmental liens and AULs associated with the subject property was provided by the User. However, no ELs or AULs were identified during TRC's historical and regulatory research.

3.2 Specialized Knowledge

No information regarding specialized knowledge was provided by the User.

3.3 Property Value Reduction Issues

No information regarding property valuation reduction issues was provided by the User.

3.4 Commonly Known or Reasonably Ascertainable Information

The User did not have any commonly known or reasonably ascertainable information associated with the subject property.

3.5 Reason for Conducting Phase I ESA

TRC understands the User requires a Phase I ESA for a business transaction involving the subject property.

4.0 RECORDS REVIEW

4.1 Historical Review

Historical information regarding the subject property and local area is based on TRC's review and analysis of historical aerial photographs, topographic maps, city directories, and an environmental database report provided by EDR. Internet searches were conducted to acquire additional historical information regarding the subject property and local area. No one associated with the subject property was made available for an interview. The historical research documentation utilized for this this assessment is included in **Appendix B** and the sources of information used in the compilation of this report are listed in Section 8.0.

4.1.1 Subject Property History

The subject property has consisted of undeveloped desert since at least the early 1900s. The unimproved utility access roads that the bisect portions of the subject property appear to have been graded in approximately 2010. No historical onsite sources of concern were identified.

4.1.2 Area and Adjoining History

Historical research indicates that the adjoining properties to the north, east, south, and west have consisted of undeveloped desert since at least the early 1900s. The Southern California Edison (SCE) substation appears to have been constructed sometime between 2009 and 2012. No historical offsite sources of concern were identified.

4.2 Database Report and Environmental Record Review

In accordance with the scope of work and ASTM Standard E-1527-21, a search of various governmental databases was conducted by EDR. The site-specific environmental database report was reviewed to evaluate if soil and/or groundwater from an on-site and/or off-site source of concern has the potential to impact the subject property. The database abbreviations are provided in the site-specific environmental database report, a copy of is included in **Appendix A**.

4.2.1 Subject Property

The subject property was not listed in a contamination, chemical spill, compliance, or hazardous-waste generation-related database.

4.2.2 Adjoining and Surrounding Property Record Review

When reviewing the EDR report, TRC considered the following factors to assess the potential for contamination from the adjoining and/or surrounding properties to impact the subject property:

1. Whether the property is upgradient or downgradient of the subject property related to potential groundwater migration based on the local topography, and the assumed (or known) groundwater depth and shallow groundwater flow direction.
2. Whether the property is upgradient or downgradient of the subject property related to potential vapor migration based on readily available information pursuant to the ASTM E 1527-21 standard including soil and geological characteristics; contaminant characteristics; contaminated plume migration data; and significant conduits that might provide preferential pathways for vapor migration such as major utility corridors, sanitary sewers, storm sewers, and significant natural conduits such as Karst terrain (vapor migration may also be influenced by the age and design of infrastructure features associated with these conduits);
3. Regulatory case status (i.e., whether the state environmental agency or applicable regulatory authority has issued a No Further Action (NFA) letter or other similar closure document).
4. Type of release (soil only, groundwater, etc.).
5. Depth to groundwater.
6. Type of database (contamination versus compliance only) and whether the presence of contamination is known.
7. Type of contaminant and volume of the release.
8. The distance between the listed property and the subject property.

Based on this evaluation, TRC limited the review of additional environmental records to the properties listed below based on the potential for soil, soil vapor, or groundwater contamination be migrating to the subject property.

4.2.2.1 Adjoining Properties

No records/listings were identified for the adjoining properties (those which share a common property boundary with the subject property) in the environmental database report.

4.2.2.2 Surrounding Properties

The SCE Whirlwind Substation at 3493 170th Street West is located approximately 1,000 feet southeast of the subject property. This site is listed in several environmental compliance-related databases associated with hazardous materials management, stormwater, tank management, and hazardous waste generation. No significant environmental compliance deficiencies are listed. This substation site is not listed in chemical spill or contamination-related database. Based on this information TRC does not consider the substation to be a REC. None of the other surrounding properties were listed in the environmental database report and it is therefore TRC's opinion that a vapor encroachment condition due to surrounding property can be ruled out.

4.3 Previous Reports

No previous environmental reports were provided for TRC's review during this assessment.

4.4 Other Environmental Record Sources

Per the ASTM standard, local or additional state records were reviewed to enhance and supplement the federal and state records reviewed and discussed earlier in this report. These additional records include state agency lists of waste disposal facilities; Brownfield properties; hazardous waste/contaminated facilities; registered storage tanks; records of emergency release reports; and records of contaminated public wells. Local, County, and State sources were contacted to obtain this information. Information from these sources is discussed throughout this this report as applicable and summarized below.

Table 4.1 - Other Environmental Record Sources

Regulatory Agency/ Department	Available Information
California Environmental Protection Agency (CalEPA)	TRC reviewed the CalEPA databases on November 29, 2024, for records pertaining to spills, hazardous materials, USTs, ASTs, notices of violation (NOVs), environmental cleanups, or remedial activities related to the subject property. No records were identified.
California Geologic Energy Management Division (CalGEM)	TRC reviewed the CalGEM database on November 29, 2024, for records pertaining to oil and gas exploration and production activities at the subject property. The subject property was not listed in the CalGEM database.
Department of Toxic Substances Control (DTSC)	TRC reviewed the EnviroStor database on November 29, 2024, for records pertaining environmental cleanups and remediation that may have occurred at the subject property. The subject property was not listed in EnviroStor.
Geotracker	TRC reviewed the California Regional Water Quality Control Boards Geotraker database on November 29, 2024, for records pertaining to spills, hazardous materials releases, environmental cleanups, or remedial activities related to the subject property. The subject property was not listed in Geotracker.
Kern County Environmental Health	TRC reviewed the county website on November 29, 2024. No relevant records were identified.
US EPA – Enforcement and Compliance History Online (ECHO)	TRC reviewed the ECHO database on November 29, 2024, for records pertaining to environmental compliance. No significant historical compliance violations or ongoing complicate-related violations were noted.
US EPA - Envirofacts	TRC reviewed this database on November 29, 2024. Information pertaining to historical hazardous waste generation was listed. No contamination or environmental release information was listed.

The information obtained from these sources is discussed throughout this report as appropriate.

5.0 RECONNAISSANCE

5.1 Methodology and Limiting Conditions

Ms. Rachel Mireles from TRC's Irvine, California office visited the subject property on November 5, 2024, for the purpose of identifying potential RECs, CRECs, HRECs, DMCs, and non-scope issues of concern. Ms. Mireles was unaccompanied during her visit. Weather during the visit consisted of partially cloudy skies and temperatures in the mid-60s. No significant limiting conditions were encountered during the site visit. Representative photographs taken during the site visit are provided in **Appendix C**.

5.2 Interior and Exterior Site Observations

Unless otherwise noted, the items listed in the table below appeared in good condition with no visual evidence of staining, deterioration, or a discharge of hazardous materials; and there are no records of a release in these areas. Items where further description is warranted are discussed in the sections following the table.

Table 5.1 - Interior and Exterior Property Observations

Item	Observed/ Not Observed	Description
Hazardous substances	Not Observed	(see Section 5.2.1)
Hazardous waste	Not Observed	(see Section 5.2.2)
Solid and liquid wastes including municipal wastes	Not Observed	(see Section 5.2.3)
Underground storage tanks (USTs) and associated piping	Not Observed	(see Section 5.2.4)
Aboveground storage tanks (ASTs) and associated piping	Not Observed	(see Section 5.2.5)
Drums and containers (≥5 gallons)	Not Observed	(see Section 5.2.1)
Odors	Not Observed	
Pools of liquid, including surface water bodies and sumps (handling hazardous substances or substances likely to be hazardous only)	Not Observed	
Potential Polychlorinated biphenyls (PCBs) Equipment	Not Observed	
Stains or corrosion	Not Observed	
Drains and sumps	Not observed	
Pits, ponds, and lagoons	Not Observed	
Stressed vegetation	Not Observed	
Historic fill or other fill material	Not Observed	
Wastewater (including storm water or other discharge into a drain, ditch, underground injection system, or stream on or adjacent to the Site)	Not Observed	
Wells (including dry wells, irrigation wells, injection wells, abandoned wells, or other wells)	Not Observed	
Septic systems or cesspools	Not Observed	

5.2.1 ASTs

ASTs were not observed during the site visit and the subject property is not listed in an AST-related database (see Section 4.2.1).

5.2.2 Hazardous Substances

No hazardous substances were observed during TRC's visit.

5.2.3 Hazardous Waste

The subject property is not listed as a generator of hazardous waste in the EDR report, and no hazardous waste was observed during TRC's visit.

5.2.4 Solid Waste

Several small (less than five square feet) piles of wood and miscellaneous construction debris and trash were observed throughout the subject property during TRC's visit. No staining or visual evidence of hazardous materials release was observed in the immediate vicinity of the debris piles.

5.2.5 USTs

No visual evidence (vent pipes, fill ports, etc.) of a UST was observed during the site visit and the subject property is not listed in a UST-related database (see Section 4.2.1).

5.2.6 PFAS

Based on TRC's regulatory research and review of the EDR report (Section 4.0) and Environmental Working Group's (EWG) interactive map it does not appear that a per- and polyfluoroalkyl substances (PFAS) impacted groundwater plume is located upgradient or in the immediate vicinity (within 500 feet) of the subject property. During TRC's visit no indications that fire had previously occurred at the subject property was noted. In addition, no historical information was identified to indicate that biosolids were previously disposed of on the subject property. Based on this information, TRC considers it unlikely that the subject property has been impacted by PFAs.

5.3 Adjoining and Surrounding Properties Reconnaissance

5.3.1 Adjoining Properties

During the site visit, TRC viewed the adjoining properties from the subject property and publicly accessible areas (e.g., public roadways, etc.). A summary of our observation is provided below.

Table 5.2 - Adjoining Properties

Direction from Subject Property	Current Land Use Description
North	The subject property is bordered to the north by undeveloped desert.
East	The subject property is bordered to the east by undeveloped desert.
South	The subject property is bordered to the south by undeveloped desert.
West	The subject property is bordered to the west by undeveloped desert.

5.3.2 Surrounding Properties

The subject property is surrounded by undeveloped desert. The SCE substation is located approximately 1,000 feet to the south of the subject property. No gasoline service stations, dry cleaners, or heavy industrial facilities are in the immediate vicinity (within 500 feet) of the subject property.

6.0 FINDINGS, OPINIONS, AND CONCLUSIONS

Potential Phase I ESA findings can include RECs, CRECs, HRECs, and DMCs pursuant to the ASTM E 1527-21 standard. The definition for these terms is provided below.

- RECs are defined as (1) the presence of hazardous substances or petroleum in, on or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on or at the subject property due to a likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on or at the subject property under conditions that pose a material threat of a future release to the environment.

- CRECs are defined as a REC affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with *hazardous substances* or *petroleum products* allowed to remain in place subject to implementation of controls (e.g., activity and use limitations or other property use limitations).

- HRECs are defined as a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities, without subjecting the property to any controls (e.g., land use limitations, or other property use limitations).

- DMCs are defined as conditions related to a release that generally do not present a threat to human health or the *environment* and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be DMCs are not RECs nor CRECs.

TRC has performed a Phase I ESA in conformance with the scope and limitations of ASTM E 1527-21 at the subject property. Deviations from this standard are described in Sections 1.3 and 8.0 of this report.

6.1 Findings

The following sections summarize the findings from this assessment.

6.1.1 RECs

No RECs were identified in connection with the subject property.

6.1.2 CRECs

No CRECs were identified in connection with the subject property.

6.1.3 HRECs

No HRECs were identified in connection with the subject property.

6.1.4 De Minimis Conditions

No DMCs were identified in connection with the subject property.

6.2 Data Gaps

TRC has made an appropriate inquiry into the commonly known and reasonably ascertainable resources concerning the historic ownership and use of the subject property back to the first development per 40 CFR Part 312.24 (*Reviews of Historical Sources of Information*). In addition, an EL and AUL search were not conducted as part of this assessment, and this remains a User requirement. Based on the vacant and undeveloped nature of the subject property and TRC's historical and regulatory research it is our opinion that an EL and/or AUL is unlikely to have been placed on the subject property. Therefore, the lack of an EL and AUL search is not considered a significant limitation to the results of this assessment.

As noted earlier in the report, TRC was not provided with a site contact/Key Site Manager for this assessment. Given the undeveloped nature of the subject property this data gap is not considered a significant limitation to the results of this assessment. No other data gaps were identified during this assessment.

7.0 LIMITING CONDITIONS AND DEVIATIONS

7.1.1 Accuracy and Completeness

The ASTM E 1527-21 standard recognizes inherent limitations for Phase I ESAs that apply to this report, including:

- Uncertainty Not Eliminated – No Phase I ESA can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Data gaps identified during this Phase I ESA are listed in Section 6.2.
- Not Exhaustive – A Phase I ESA is not an exhaustive investigation.
- Past Uses of the Property – A review of standard historical sources at intervals less than five years is not required.

The Client is advised that the Phase I ESA conducted at the subject property is a limited inquiry into a property's environmental status, cannot wholly eliminate uncertainty, and is not an exhaustive assessment to discover every potential source of environmental liability at the subject property. Therefore, TRC does not make a statement i) of warranty or guarantee, express or implied for any specific use; ii) that the subject property is free of RECs or environmental impairment; iii) that the subject property is "clean;" or iv) that impairments, if any, are limited to those that were discovered while TRC was performing the Phase I ESA. This limiting statement is not meant to compromise the findings of this report; rather, it is meant as a statement of limitations within the ASTM standard and intended scope of this assessment. Specific limiting conditions identified during the site reconnaissance are described in Section 5.1. Subsurface conditions may differ from the conditions implied by surface observations and can be evaluated more thoroughly through intrusive techniques that are beyond the scope of this assessment. Information in this report is not intended to be used as a construction document and should not be used for demolition, renovation, or other construction purposes.

This report presents TRC's site reconnaissance observations, findings, and conclusions as they existed at the time of the site reconnaissance. TRC makes no representation or warranty that the past or current operations at the property are or have been complying with applicable federal, state, and local laws, regulations, and codes. TRC makes no guarantees as to the accuracy or completeness of information obtained from others during this Phase I ESA report. It is possible that information exists beyond the scope of this assessment, or that information was not provided to TRC. Additional information subsequently provided, discovered, or produced may alter findings or conclusions made in this Phase I ESA report. TRC is under no obligation to update this report to reflect such subsequent information. The findings presented in this report are based upon reasonably ascertainable information and observed Site conditions at the time of the assessment.

This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not assessed. Regardless of the findings stated in this report, TRC is not responsible for consequences or conditions arising from facts that were not fully disclosed to TRC during the assessment.

An independent data research company provided the government agency database referenced in this report. Information regarding surrounding area properties was requested for approximate minimum search distances and was assumed to be correct and complete unless obviously contradicted by TRC's observations or other credible referenced sources reviewed during the assessment.

TRC is not a professional title insurance or land surveyor firm and makes no guarantee, explicit or implied, that any land title records acquired or reviewed, or any physical descriptions or depictions of the property in this report, represent a comprehensive definition or precise delineation of property ownership or boundaries.

7.1.2 Warranties and Representations

This report does not warrant against: (1) operations or conditions which were not evident from visual observations or historical information provided; (2) conditions which could only be determined by physical sampling or other intrusive investigation techniques; (3) locations other than the client-provided addresses and/or legal parcel description; or (4) information regarding off-site location(s) (with possible impact to the subject property) not published in publicly available records.

7.1.3 Significant Assumptions

During this Phase I ESA, TRC relied on database information; interviews with subject property representatives, regulatory officials, and other individuals having knowledge of subject property operations; and information provided by the User as requested in our authorized Scope of Work. TRC has assumed that the information provided is true and accurate. Reliance on electronic database search reports is subject to the limitations set forth in those reports. TRC did not independently verify the information provided. TRC found no reason to question the validity of the information received unless explicitly noted elsewhere in this report. If other information is discovered and/or if previous reports exist that were not provided to TRC, our conclusions may not be valid.

7.1.4 Site-Related Limiting Conditions

No site-specific limiting conditions were encountered during the site reconnaissance.

8.0 REFERENCES

8.1 Persons Interviewed

- No one was interviewed as part of this assessment.

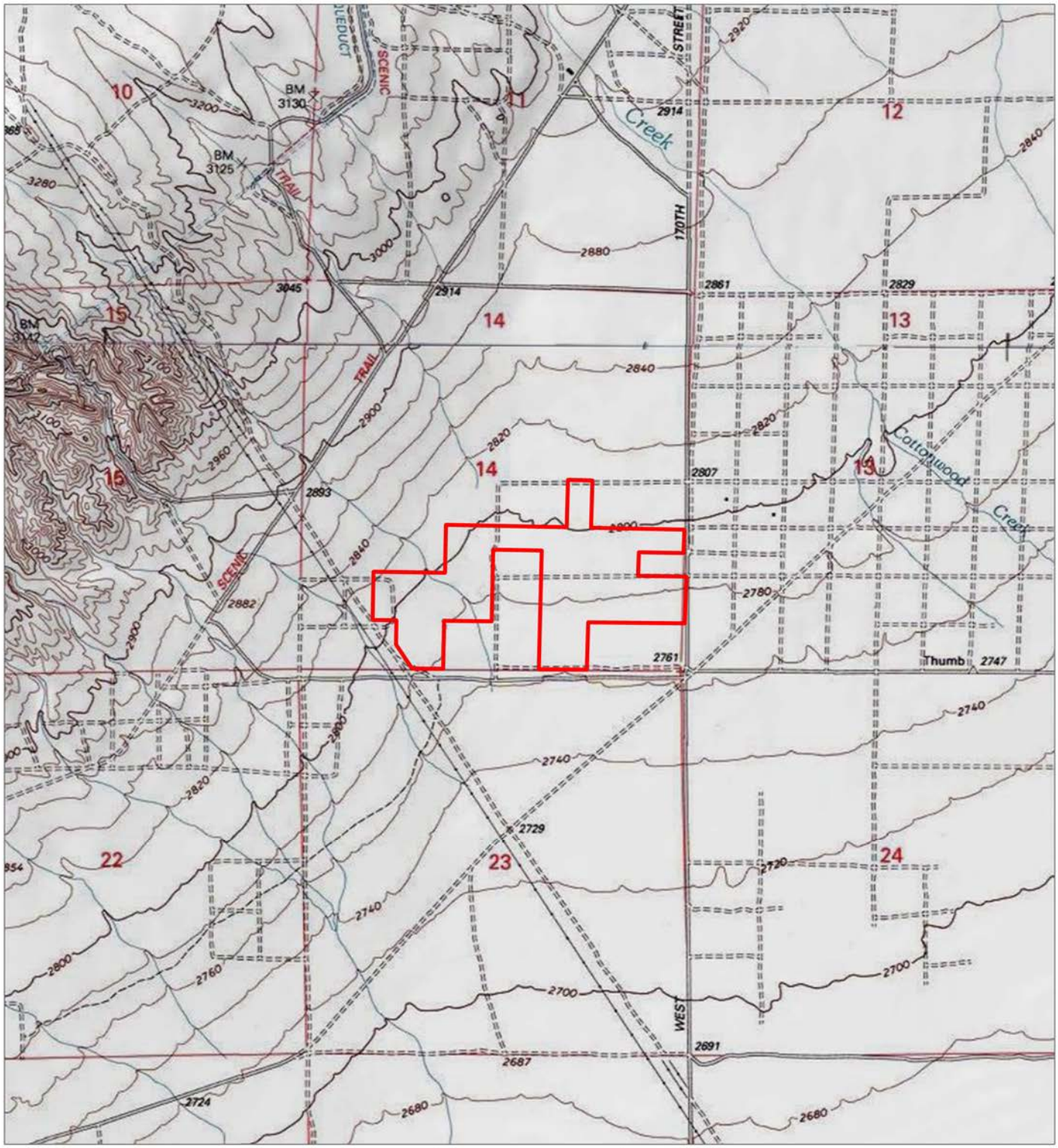
8.2 Agencies Contacted

- California Geologic Energy Management Division (CalGEM), https://www.conservation.ca.gov/calgem/Pages/WellFinder.aspx. The information on this website was reviewed on November 29, 2024.
- Department of Toxic Substances Control EnviroStor, https://dtsc.ca.gov/your-envirostor. The information on this website was reviewed on November 29, 2024.
- Federal Emergency Management Agency, https://msc.fema.gov/portal/search. The information on this website was reviewed on November 29, 2024.
- Kern County Environmental Health, https://kernpublichealth.com/. TRC reviewed this website on November 29, 2024.
- National Wetlands Inventory, https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/. The information on this website was reviewed on November 29, 2024.
- State Water Resources Control Board GeoTracker, https://geotracker.waterboards.ca.gov. The information on this website was reviewed on November 29, 2024.
- U.S. EPA Envirofacts database, http://www.epa.gov/enviro/. The information on this website was reviewed on November 29, 2024.
- U.S. EPA, Enforcement and Compliance History Online (ECHO), https://echo.epa.gov/. The information on this website was reviewed on November 29, 2024.

8.3 Documents Reviewed

- ASTM E1527-21, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, dated December 2021. www.astm.org
- EDR 7.5 Minute Topographic Maps, prepared for Vacant Land, Rosamond Blvd and 170th Street, West, Rosamond, California 93560, dated December 2, 2024. Inquiry number 7837412.4. Topographic Maps for various years between 1915 and 2021. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.
- EDR Aerial Photo Decade Package, prepared for Vacant Land, Rosamond Blvd and 170th Street, West, Rosamond, California 93560, dated December 3, 2024. Inquiry number 7837412.8. Aerial photographs dated between 1948 and 2020. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.
- EDR City Directory Abstract prepared for Vacant Land, Rosamond Blvd and 170th Street, West, Rosamond, California 93560, dated December 5, 2024. Inquiry number 7837412.5. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.
- EDR Radius Map with GeoCheck®, prepared for Vacant Land, Rosamond Blvd and 170th Street, West, Rosamond, California 93560, dated December 2, 2024. Inquiry number 7837412.2s. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.
- EDR Sanborn Map Report, prepared for Vacant Land, Rosamond Blvd and 170th Street, West, Rosamond, California 93560, dated December 2, 2024. Inquiry number 7837412.3. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.
- Interactive Map: PFAS Contamination in the U.S. (November 28, 2023), https://www.ewg.org/interactive-maps/pfas_contamination/map/. The information on this website was reviewed on November 29, 2024.
- Google Earth website, www.google.earth.com. The information on this website was reviewed on November 29, 2024.

Figures



APPROXIMATE SUBJECT PROPERTY BOUNDARY

BASE MAP: USA TOPO MAPS MAP SERVICE, FAIRMONT BUTTE (1975) QUAD

N

0 1,000 2,000

FEET

1:24,000 1" = 2,000'



PROJECT:

UNDEVELOPED LAND
NEAR THE INTERSECTION OF ROSAMOND BLVD & 170TH ST W
KERN COUNTY, CA

TITLE:

SUBJECT PROPERTY LOCATION

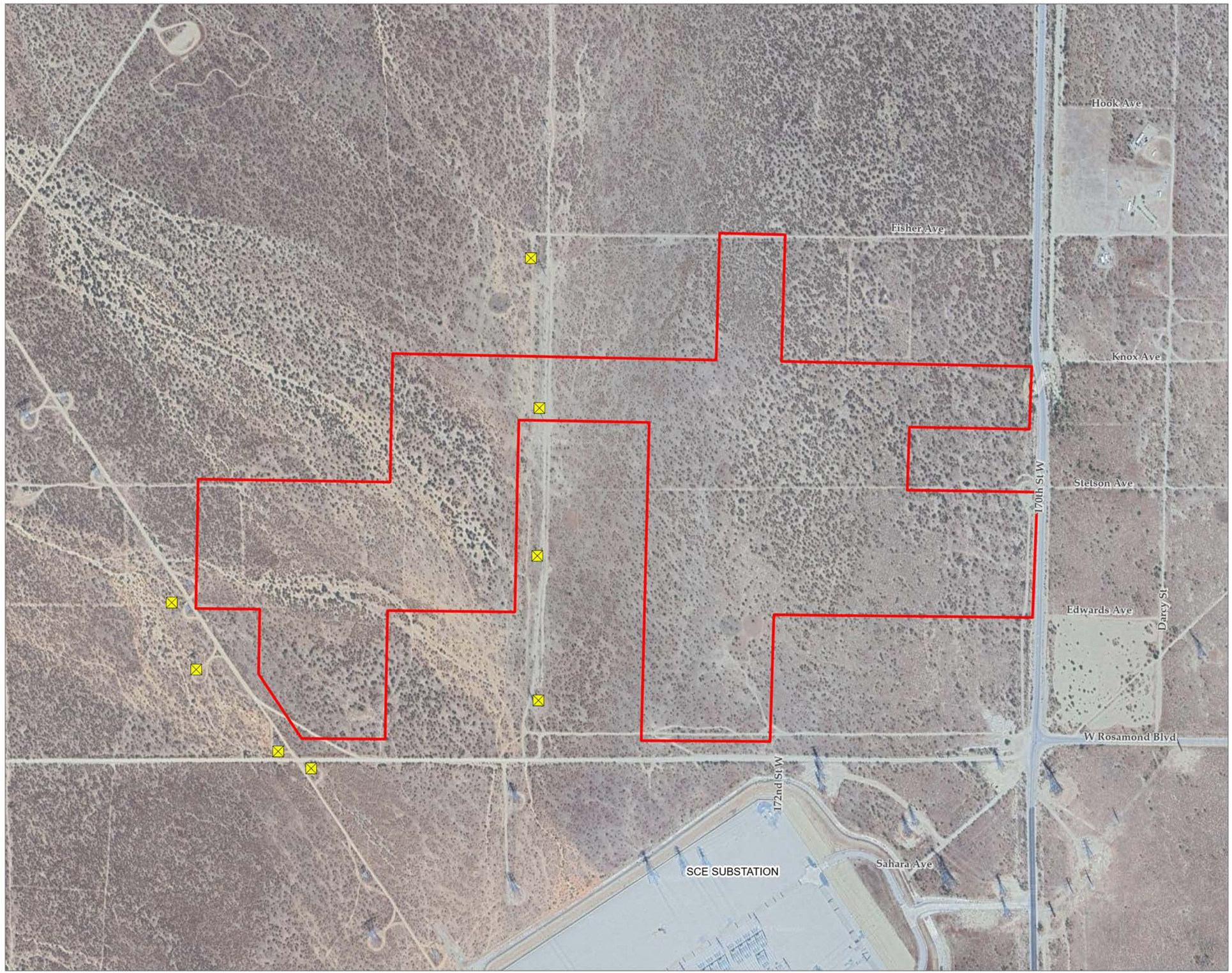
DRAWN BY:	M. OPEL	PROJ. NO.:	552398
CHECKED BY:	J. FICKERSON		
APPROVED BY:	J. FICKERSON	**FIGURE 1**	
DATE:	NOVEMBER 2024		

TRC

1382 WEST NINTH STREET
SUITE 400
CLEVELAND, OH 44113
PHONE: 216-344-3072

FILE: PHASEI

COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET: MAP ROTATION: 0
--SAVED BY: MOPEL ON 11/26/2024, 09:32:48 AM. FILE PATH: T:\1-PROJECTS\PHASE I\552398_KERNCOUNTYCA\2-APRX\PHASEI.APRX: LAYOUT NAME: FIG01_SPI



APPROXIMATE SUBJECT PROPERTY BOUNDARY

TRANSMISSION TOWER

BASE MAP: GOOGLE MAPS, OCTOBER 2024.

1:6,000
1" = 500'

0 500 1,000 FEET

PROJECT:
UNDEVELOPED LAND
NEAR THE INTERSECTION OF ROSAMOND BLVD & 170TH ST W
KERN COUNTY, CA

TITLE:
SUBJECT PROPERTY LAYOUT

DRAWN BY:	M. OPEL	PROJ. NO.:	552398
CHECKED BY:	J. FICKERSON		
APPROVED BY:	J. FICKERSON		**FIGURE 2**
DATE:	NOVEMBER 2024		

TRC
1382 WEST NINTH STREET
SUITE 400
CLEVELAND, OH 44113
PHONE: 216-344-3072

FILE: Phase1.aprx

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet Map Rotation: 0
Saved By: MOPEL on 11/22/2024 10:43:32 PM File Path: T:\PROJECTS\Phase_1\53398_KernCounty\GIS\2-APRX\Phase1.aprx Layout Name: Fig02_PropLayout

Appendix A
Database Radius Report

Vacant Land
Rosamond Blvd and 170th Street, West
Rosamond, CA 93560

Inquiry Number: 7837412.2s
December 02, 2024

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	9
Orphan Summary	22
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-10
Physical Setting Source Map Findings	A-12
Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527 - 21), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E2247 - 16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E1528 - 22) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

ROSAMOND BLVD AND 170TH STREET, WEST
ROSAMOND, CA 93560

COORDINATES

Latitude (North):	34.8654740 - 34° 51' 55.70''
Longitude (West):	118.4380070 - 118° 26' 16.82''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	368557.2
UTM Y (Meters):	3858870.8
Elevation:	2784 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	50004440 FAIRMONT BUTTE, CA
Version Date:	2021
North Map:	50004472 TYLERHORSE CANYON, CA
Version Date:	2021

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20200627, 20200501
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
ROSAMOND BLVD AND 170TH STREET, WEST
ROSAMOND, CA 93560

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	SOUTHERN CALIFORNIA	3493 170TH STREET WE	AST	Lower	1162, 0.220, SE
A2	SCE WHIRLWIND SUBSTA	3493 170TH STREET WE	CUPA Listings, HWTS, NPDES, CIWQS, CERS	Lower	1162, 0.220, SE
A3	WHIRLWIND SUBSTATION	3493 170TH STREET	RCRA NonGen / NLR, E MANIFEST	Lower	1162, 0.220, SE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Lists of Federal Delisted NPL sites

Delisted NPL ---------- National Priority List Deletions

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS ---------- Corrective Action Report

Lists of Federal RCRA TSD facilities

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Lists of Federal RCRA generators

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-VSQG ---------- RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROLS..... Institutional Controls Sites List

Federal ERNS list

ERNS..... Emergency Response Notification System

Lists of state- and tribal (Superfund) equivalent sites

RESPONSE..... State Response Sites

Lists of state- and tribal hazardous waste facilities

ENVIROSTOR..... EnviroStor Database

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF..... Solid Waste Information System

Lists of state and tribal leaking storage tanks

LUST..... Geotracker's Leaking Underground Fuel Tank Report
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land
CPS-SLIC..... Statewide SLIC Cases

Lists of state and tribal registered storage tanks

FEMA UST..... Underground Storage Tank Listing
UST..... Active UST Facilities
INDIAN UST..... Underground Storage Tanks on Indian Land

Lists of state and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing
VCP..... Voluntary Cleanup Program Properties

Lists of state and tribal brownfield sites

BROWNFIELDS..... Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT..... Waste Management Unit Database
SWRCY..... Recycler Database
HAULERS..... Registered Waste Tire Haulers Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory

IHS OPEN DUMPS Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL Delisted National Clandestine Laboratory Register
HIST Cal-Sites Historical Calsites Database
SCH School Property Evaluation Program
CDL Clandestine Drug Labs
Toxic Pits Toxic Pits Cleanup Act Sites
CERS HAZ WASTE California Environmental Reporting System Hazardous Waste
US CDL National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

SWEEPS UST SWEEPS UST Listing
HIST UST Hazardous Substance Storage Container Database
CERS TANKS California Environmental Reporting System (CERS) Tanks
CA FID UST Facility Inventory Database

Local Land Records

LIENS Environmental Liens Listing
LIENS 2 CERCLA Lien Information
DEED Deed Restriction Listing

Records of Emergency Release Reports

HMIRS Hazardous Materials Information Reporting System
CHMIRS California Hazardous Material Incident Report System
LDS Land Disposal Sites Listing
MCS Military Cleanup Sites Listing
SPILLS 90 SPILLS 90 data from FirstSearch

Other Ascertainable Records

FUDS Formerly Used Defense Sites
DOD Department of Defense Sites
SCRD DRYCLEANERS State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR Financial Assurance Information
EPA WATCH LIST EPA WATCH LIST
2020 COR ACTION 2020 Corrective Action Program List
TSCA Toxic Substances Control Act
TRIS Toxic Chemical Release Inventory System
SSTS Section 7 Tracking Systems
ROD Records Of Decision
RMP Risk Management Plans
RAATS RCRA Administrative Action Tracking System
PRP Potentially Responsible Parties
PADS PCB Activity Database System
ICIS Integrated Compliance Information System
FTTS FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS Material Licensing Tracking System
COAL ASH DOE Steam-Electric Plant Operation Data
COAL ASH EPA Coal Combustion Residues Surface Impoundments List

EXECUTIVE SUMMARY

PCB TRANSFORMER - PCB Transformer Registration Database
RADINFO - Radiation Information Database
HIST FTTS - FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS - Incident and Accident Data
CONSENT - Superfund (CERCLA) Consent Decrees
INDIAN RESERV - Indian Reservations
FUSRAP - Formerly Utilized Sites Remedial Action Program
UMTRA - Uranium Mill Tailings Sites
LEAD SMELTERS - Lead Smelter Sites
US AIRS - Aerometric Information Retrieval System Facility Subsystem
US MINES - Mines Master Index File
ABANDONED MINES - Abandoned Mines
MINES MRDS - Mineral Resources Data System
FINDS - Facility Index System/Facility Registry System
UXO - Unexploded Ordnance Sites
ECHO - Enforcement & Compliance History Information
DOCKET HWC - Hazardous Waste Compliance Docket Listing
FUELS PROGRAM - EPA Fuels Program Registered Listing
PFAS NPL - Superfund Sites with PFAS Detections Information
PFAS FEDERAL SITES - Federal Sites PFAS Information
PFAS TSCA - PFAS Manufacture and Imports Information
PFAS TRIS - List of PFAS Added to the TRI
PFAS RCRA MANIFEST - PFAS Transfers Identified In the RCRA Database Listing
PFAS ATSDR - PFAS Contamination Site Location Listing
PFAS WQP - Ambient Environmental Sampling for PFAS
PFAS PROJECT - NORTHEASTERN UNIVERSITY PFAS PROJECT
PFAS NPDES - Clean Water Act Discharge Monitoring Information
PFAS ECHO - Facilities in Industries that May Be Handling PFAS Listing
PFAS ECHO FIRE TRAIN - Facilities in Industries that May Be Handling PFAS Listing
PFAS PT 139 AIRPORT - All Certified Part 139 Airports PFAS Information Listing
AQUEOUS FOAM NRC - Aqueous Foam Related Incidents Listing
BIOSOLIDS - ICIS-NPDES Biosolids Facility Data
UST FINDER - UST Finder Database
UST FINDER RELEASE - UST Finder Releases Database
PFAS - PFAS Investigation Site Location Listing
AQUEOUS FOAM - Former Fire Training Facility Assessments Listing
CA BOND EXP. PLAN - Bond Expenditure Plan
CHROME PLATING - Chrome Plating Facilities Listing
Cortese - "Cortese" Hazardous Waste & Substances Sites List
DRYCLEANERS - Cleaner Facilities
EMI - Emissions Inventory Data
ENF - Enforcement Action Listing
Financial Assurance - Financial Assurance Information Listing
ICE - Inspection, Compliance and Enforcement
HIST CORTESE - Hazardous Waste & Substance Site List
HWP - EnviroStor Permitted Facilities Listing
HWT - Registered Hazardous Waste Transporter Database
HWTS - Hazardous Waste Tracking System
HAZNET - Facility and Manifest Data
MINES - Mines Site Location Listing
MWMP - Medical Waste Management Program Listing
NPDES - NPDES Permits Listing
PEST LIC - Pesticide Regulation Licenses Listing
PROC - Certified Processors Database
Notify 65 - Proposition 65 Records

HAZMAT ---------- Hazardous Material Facilities
UIC ---------- UIC Listing
UIC GEO ---------- UIC GEO (GEOTRACKER)
WASTEWATER PITS ---------- Oil Wastewater Pits Listing
WDS ---------- Waste Discharge System
WIP ---------- Well Investigation Program Case List
MILITARY PRIV SITES ---------- MILITARY PRIV SITES (GEOTRACKER)
PROJECT ---------- PROJECT (GEOTRACKER)
WDR ---------- Waste Discharge Requirements Listing
CIWQS ---------- California Integrated Water Quality System
CERS ---------- CERS
NON-CASE INFO ---------- NON-CASE INFO (GEOTRACKER)
OTHER OIL GAS ---------- OTHER OIL & GAS (GEOTRACKER)
PROD WATER PONDS ---------- PROD WATER PONDS (GEOTRACKER)
SAMPLING POINT ---------- SAMPLING POINT (GEOTRACKER)
WELL STIM PROJ ---------- Well Stimulation Project (GEOTRACKER)

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---------- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---------- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---------- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---------- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---------- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Lists of state and tribal registered storage tanks

AST: A listing of aboveground storage tank petroleum storage tank locations.

A review of the AST list, as provided by EDR, has revealed that there is 1 AST site within

approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SOUTHERN CALIFORNIA	3493 170TH STREET WE	SE 1/8 - 1/4 (0.220 mi.)	A1	9
Database: AST, Date of Government Version: 07/06/2016				

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 06/03/2024 has revealed that there is 1 RCRA NonGen / NLR site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
WHIRLWIND SUBSTATION	***3493 170TH STREET***	***SE 1/8 - 1/4 (0.220 mi.)***	***A3***	***16***
EPA ID:: CAC003203772				

E MANIFEST: EPA established a national system for tracking hazardous waste shipments electronically. This system, known as ?e-Manifest,? will modernize the nation?s cradle-to-grave hazardous waste tracking process while saving valuable time, resources, and dollars for industry and states.

A review of the E MANIFEST list, as provided by EDR, and dated 07/24/2023 has revealed that there is 1 E MANIFEST site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
WHIRLWIND SUBSTATION	***3493 170TH STREET***	***SE 1/8 - 1/4 (0.220 mi.)***	***A3***	***16***

CUPA Listings: A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

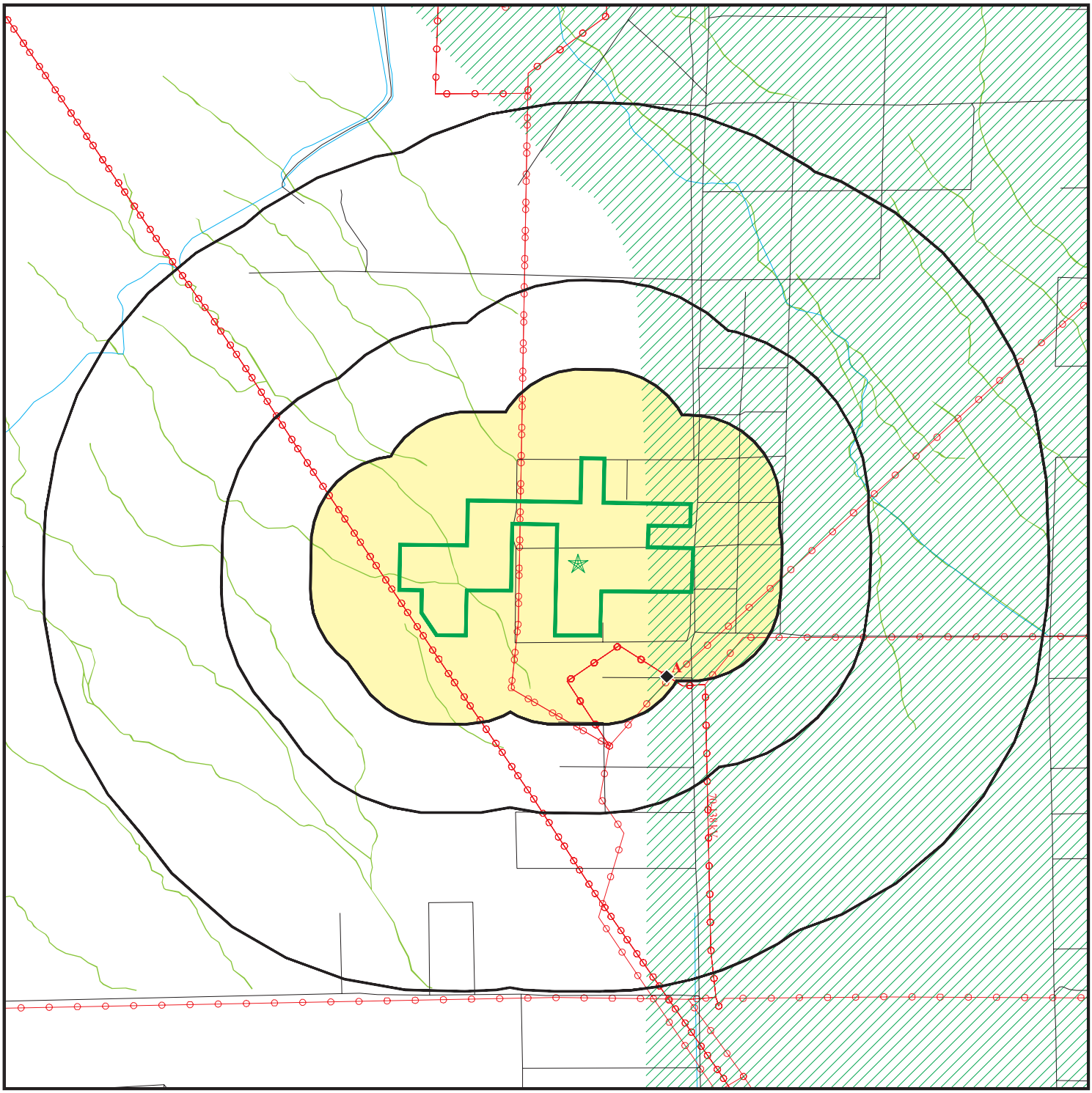
A review of the CUPA Listings list, as provided by EDR, has revealed that there is 1 CUPA Listings site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SCE WHIRLWIND SUBSTA	***3493 170TH STREET WE***	***SE 1/8 - 1/4 (0.220 mi.)***	***A2***	***9***
Database: KERN CO CUPA, Date of Government Version: 07/30/2024				

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 7837412.2S



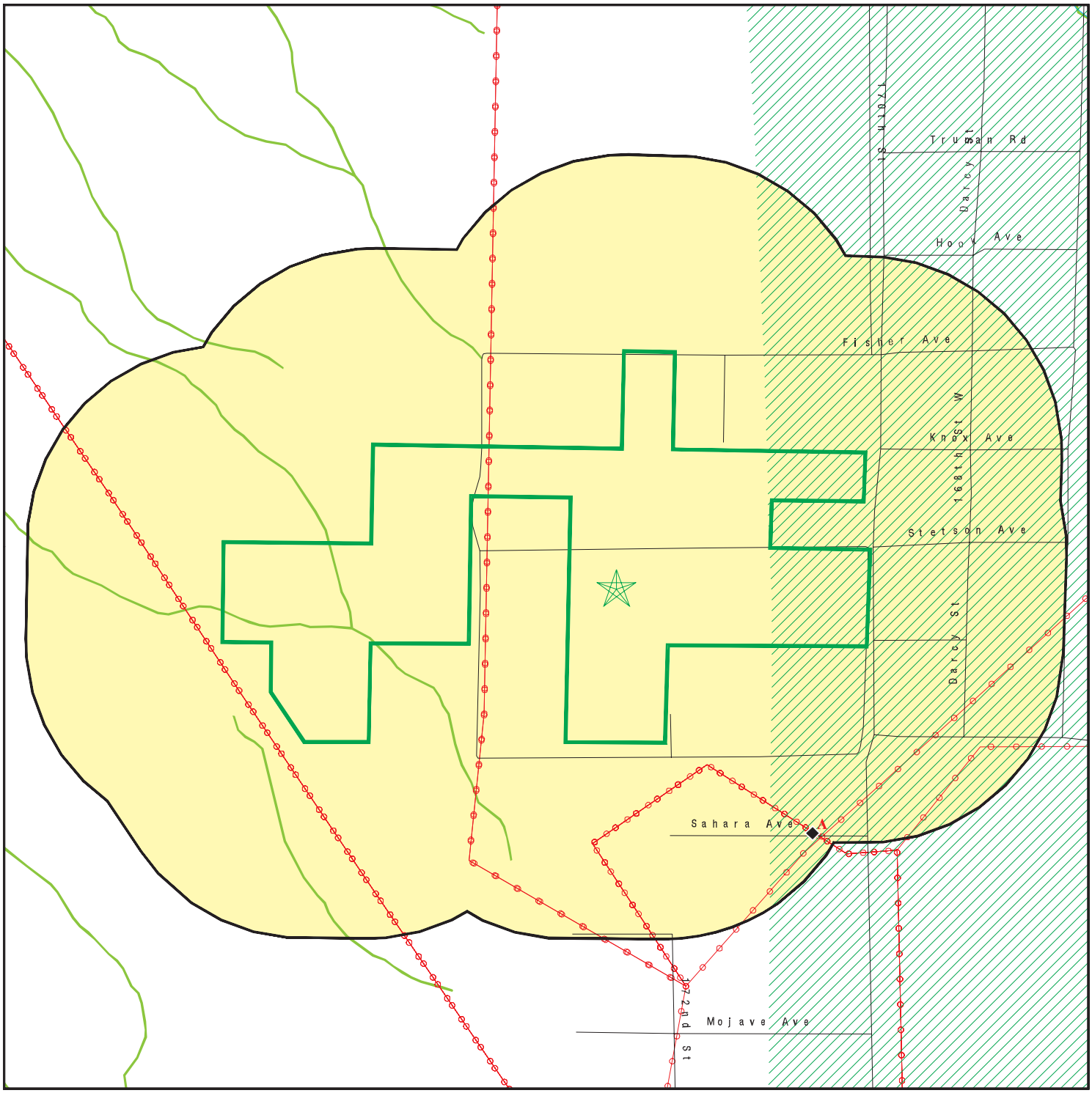
- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Vacant Land	CLIENT:	TRC Environmental Corporation
ADDRESS:	Rosamond Blvd and 170th Street, West Rosamond CA 93560	CONTACT:	Jim K Fickerson
		INQUIRY #:	7837412.2s
LAT/LONG:	34.865474 / 118.438007	DATE:	December 02, 2024 5:11 pm

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DETAIL MAP - 7837412.2S



0 1/8 1/4 1/2 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Vacant Land	CLIENT: TRC Environmental Corporation
ADDRESS: Rosamond Blvd and 170th Street, West Rosamond CA 93560	CONTACT: Jim K Fickerson
LAT/LONG: 34.865474 / 118.438007	INQUIRY #: 7837412.2s DATE: December 02, 2024 5:16 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Lists of Federal NPL (Superfund) sites								
PL	1.000	0	0	0	0	NR	0
oposed NPL	1.000	0	0	0	0	NR	0
PL LIENS	1.000	0	0	0	0	NR	0
Lists of Federal Delisted NPL sites								
elisted NPL	1.000	0	0	0	0	NR	0
Lists of Federal sites subject to CERCLA removals and CERCLA orders								
FEDERAL FACILITY	0.500	0	0	0	NR	NR	0
SEMS	0.500	0	0	0	NR	NR	0
Lists of Federal CERCLA sites with NFRAP								
SEMS-ARCHIVE	0.500	0	0	0	NR	NR	0
Lists of Federal RCRA facilities undergoing Corrective Action								
ORRACTS	1.000	0	0	0	0	NR	0
Lists of Federal RCRA TSD facilities								
RCRA-TSDF	0.500	0	0	0	NR	NR	0
Lists of Federal RCRA generators								
RCRA-LQG	0.250	0	0	NR	NR	NR	0
RCRA-SQG	0.250	0	0	NR	NR	NR	0
RCRA-VSQG	0.250	0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500	0	0	0	NR	NR	0
US ENG CONTROLS	0.500	0	0	0	NR	NR	0
US INST CONTROLS	0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001	0	NR	NR	NR	NR	0
Lists of state- and tribal (Superfund) equivalent sites								
ESPONSE	1.000	0	0	0	0	NR	0
Lists of state- and tribal hazardous waste facilities								
NVIROSTOR	1.000	0	0	0	0	NR	0
Lists of state and tribal landfills and solid waste disposal facilities								
SWF/LF	0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
Lists of state and tribal leaking storage tanks								
LUST	0.500	0	0	0	NR	NR		0
INDIAN LUST	0.500	0	0	0	NR	NR		0
CPS-SLIC	0.500	0	0	0	NR	NR		0
Lists of state and tribal registered storage tanks								
FEMA UST	0.250	0	0	NR	NR	NR		0
UST	0.250	0	0	NR	NR	NR		0
AST	0.250	0	1	NR	NR	NR		1
INDIAN UST	0.250	0	0	NR	NR	NR		0
Lists of state and tribal voluntary cleanup sites								
INDIAN VCP	0.500	0	0	0	NR	NR		0
VCP	0.500	0	0	0	NR	NR		0
Lists of state and tribal brownfield sites								
BROWNFIELDS	0.500	0	0	0	NR	NR		0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500	0	0	0	NR	NR		0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500	0	0	0	NR	NR		0
SWRCY	0.500	0	0	0	NR	NR		0
HAULERS	0.001	0	NR	NR	NR	NR		0
INDIAN ODI	0.500	0	0	0	NR	NR		0
DEBRIS REGION 9	0.500	0	0	0	NR	NR		0
ODI	0.500	0	0	0	NR	NR		0
IHS OPEN DUMPS	0.500	0	0	0	NR	NR		0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001	0	NR	NR	NR	NR		0
ST Cal-Sites	1.000	0	0	0	0	NR		0
SCH	0.250	0	0	NR	NR	NR		0
CDL	0.001	0	NR	NR	NR	NR		0
xic Pits	1.000	0	0	0	0	NR		0
CERS HAZ WASTE	0.250	0	0	NR	NR	NR		0
US CDL	0.001	0	NR	NR	NR	NR		0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250	0	0	NR	NR	NR		0
HIST UST	0.250	0	0	NR	NR	NR		0
CERS TANKS	0.250	0	0	NR	NR	NR		0
CA FID UST	0.250	0	0	NR	NR	NR		0
Local Land Records								
LIENS	0.001	0	NR	NR	NR	NR		0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LIENS 2	0.001	0	NR	NR	NR	NR	NR	0
DEED	0.500	0	0	0	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001	0	NR	NR	NR	NR	NR	0
CHMIRS	0.001	0	NR	NR	NR	NR	NR	0
LDS	0.001	0	NR	NR	NR	NR	NR	0
MCS	0.001	0	NR	NR	NR	NR	NR	0
SPILLS 90	0.001	0	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250	0	1	NR	NR	NR	NR	1
UDS	1.000	0	0	0	0	NR	NR	0
OD	1.000	0	0	0	0	NR	NR	0
SCRD DRYCLEANERS	0.500	0	0	0	NR	NR	NR	0
US FIN ASSUR	0.001	0	NR	NR	NR	NR	NR	0
EPA WATCH LIST	0.001	0	NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250	0	0	NR	NR	NR	NR	0
TSCA	0.001	0	NR	NR	NR	NR	NR	0
TRIS	0.001	0	NR	NR	NR	NR	NR	0
SSTS	0.001	0	NR	NR	NR	NR	NR	0
OD	1.000	0	0	0	0	NR	NR	0
RMP	0.001	0	NR	NR	NR	NR	NR	0
RAATS	0.001	0	NR	NR	NR	NR	NR	0
PRP	0.001	0	NR	NR	NR	NR	NR	0
PADS	0.001	0	NR	NR	NR	NR	NR	0
ICIS	0.001	0	NR	NR	NR	NR	NR	0
FTTS	0.001	0	NR	NR	NR	NR	NR	0
MLTS	0.001	0	NR	NR	NR	NR	NR	0
COAL ASH DOE	0.001	0	NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500	0	0	0	0	NR	NR	0
PCB TRANSFORMER	0.001	0	NR	NR	NR	NR	NR	0
RADINFO	0.001	0	NR	NR	NR	NR	NR	0
HIST FTTS	0.001	0	NR	NR	NR	NR	NR	0
DOT OPS	0.001	0	NR	NR	NR	NR	NR	0
ONSENT	1.000	0	0	0	0	NR	NR	0
DIAN RESERV	1.000	0	0	0	0	NR	NR	0
USRAP	1.000	0	0	0	0	NR	NR	0
UMTRA	0.500	0	0	0	0	NR	NR	0
LEAD SMELTERS	0.001	0	NR	NR	NR	NR	NR	0
US AIRS	0.001	0	NR	NR	NR	NR	NR	0
US MINES	0.250	0	0	NR	NR	NR	NR	0
ABANDONED MINES	0.250	0	0	NR	NR	NR	NR	0
MINES MRDS	0.250	0	0	NR	NR	NR	NR	0
FINDS	0.001	0	NR	NR	NR	NR	NR	0
KO	1.000	0	0	0	0	NR	NR	0
ECHO	0.001	0	NR	NR	NR	NR	NR	0
DOCKET HWC	0.001	0	NR	NR	NR	NR	NR	0
FUELS PROGRAM	0.250	0	0	NR	NR	NR	NR	0
PFAS NPL	0.250	0	0	NR	NR	NR	NR	0
PFAS FEDERAL SITES	0.250	0	0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
PFAS TSCA	0.250		0	0	NR	NR	NR	0
PFAS TRIS	0.250		0	0	NR	NR	NR	0
PFAS RCRA MANIFEST	0.250		0	0	NR	NR	NR	0
PFAS ATSDR	0.250		0	0	NR	NR	NR	0
PFAS WQP	0.250		0	0	NR	NR	NR	0
PFAS PROJECT	0.250		0	0	NR	NR	NR	0
PFAS NPDES	0.250		0	0	NR	NR	NR	0
PFAS ECHO	0.250		0	0	NR	NR	NR	0
PFAS ECHO FIRE TRAIN	0.250		0	0	NR	NR	NR	0
PFAS PT 139 AIRPORT	0.250		0	0	NR	NR	NR	0
AQUEOUS FOAM NRC	0.250		0	0	NR	NR	NR	0
BIOSOLIDS	0.001		0	NR	NR	NR	NR	0
UST FINDER	0.250		0	0	NR	NR	NR	0
UST FINDER RELEASE	0.500		0	0	0	NR	NR	0
E MANIFEST	0.250		0	1	NR	NR	NR	1
PFAS	0.250		0	0	NR	NR	NR	0
AQUEOUS FOAM	0.250		0	0	NR	NR	NR	0
A BOND EXP. PLAN	1.000		0	0	0	0	NR	0
CHROME PLATING	0.500		0	0	0	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	1	NR	NR	NR	1
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
EMI	0.001		0	NR	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
WP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
HWTS	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		0	NR	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
otify 65	1.000		0	0	0	0	NR	0
HAZMAT	0.250		0	0	NR	NR	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
UIC GEO	0.001		0	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
MILITARY PRIV SITES	0.001		0	NR	NR	NR	NR	0
PROJECT	0.001		0	NR	NR	NR	NR	0
WDR	0.001		0	NR	NR	NR	NR	0
CIWQS	0.001		0	NR	NR	NR	NR	0
CERS	0.001		0	NR	NR	NR	NR	0
NON-CASE INFO	0.001		0	NR	NR	NR	NR	0
OTHER OIL GAS	0.001		0	NR	NR	NR	NR	0
PROD WATER PONDS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SAMPLING POINT	0.001	0	NR	NR	NR	NR	NR	0
WELL STIM PROJ	0.001	0	NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
DR MGP	1.000	0	0	0	0	NR		0
EDR Hist Auto	0.125	0	NR	NR	NR	NR		0
EDR Hist Cleaner	0.125	0	NR	NR	NR	NR		0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001	0	NR	NR	NR	NR		0
RGA LUST	0.001	0	NR	NR	NR	NR		0
Totals --		0	0	4	0	0	0	4

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1 **SOUTHERN CALIFORNIA EDISON WHIRLWIND SUBSTATION** **AST** **A100424709**
SE **3493 170TH STREET WEST** **N/A**
1/8-1/4 **ROSAMOND, CA 93560**
0.220 mi.
1162 ft. **Site 1 of 3 in cluster A**

Relative: AST:
Lower
Name: SOUTHERN CALIFORNIA EDISON WHIRLWIND SUBSTATION
Actual: Address: 3493 170TH STREET WEST
2755 ft. City/Zip: ROSAMOND,93560
Certified Unified Program Agencies: Not reported
Owner: Southern California Edison
Total Gallons: Not reported
CERSID: 10198966
Facility ID: FA0036530
Business Name: Southern California Edison, Transmission and Distribution Organization (TD)
Phone: (626) 302-1212
Fax: Not reported
Mailing Address: P.O. Box 800 (Attn: CEH&S Compliance MOB)
Mailing Address City: Rosemead
Mailing Address State: CA
Mailing Address Zip Code: 91770
Operator Name: Southern California Edison
Operator Phone: (626) 302-1212
Owner Phone: (626) 302-1212
Owner Mail Address: P.O. Box 800 (Attn: CEH&S Compliance MOB)
Owner State: CA
Owner Zip Code: 91770
Owner Country: United States
Property Owner Name: Southern California Edison
Property Owner Phone: (626) 302-1212
Property Owner Mailing Address: P.O. Box 800 (Attn: CEH&S Compliance MOB)
Property Owner City: Rosemead
Property Owner Stat : CA
Property Owner Zip Code: 91770
Property Owner Country: United States
EPAID: Not reported

A2 **SCE WHIRLWIND SUBSTATION** **CUPA Listings** **S118606901**
SE **3493 170TH STREET WEST** **HWTS** **N/A**
1/8-1/4 **ROSAMOND, CA 93560** **NPDES**
0.220 mi. **CIWQS**
1162 ft. **Site 2 of 3 in cluster A** **CERS**

Relative: KERN CO CUPA:
Lower
Facility ID: FA0036530
CERS ID: 10198966
Actual: Name: SCE WHIRLWIND SUBSTATION
2755 ft.
Address: 3493 170TH STREET WEST
Address 2: Not reported
City,State,Zip: ROSAMOND, CA
Billing Status: Active, billable
Program Element: BUS PLAN LARGE LOW RISK 1 UNIT
Program Element Code: CB3T
HMIRRP Due Date: 2/28/2013
Current Inspection Date: 8/1/2026
Employee: COGLEY
Mailing Address: P.O. Box 5085 (Attn: ESD, Programs & Governance)
Mailing Address 2: Not reported
Mailing City: Rosemead

SCE WHIRLWIND SUBSTATION (Continued) **S118606901**

Mailing State: CA
Mailing Zip: 91770

HWTS:

Name: WHIRLWIND SUBSTATION
Address: 3493 170TH STREET
Address 2: Not reported
City,State,Zip: ROSAMOND, CA 93560
EPA ID: CAC003203772
Inactive Date: 02/09/2023
Create Date: 11/10/2022
Last Act Date: Not reported
Mailing Name: Not reported
Mailing Address: ESD, PROGRAMS & GOVERNANCE
Mailing Address 2: P.O. BOX 5085
Mailing City,State,Zip: ROSEMEAD, CA 91770
Owner Name: SOUTHERN CALIFORNIA EDISON
Owner Address: ESD, PROGRAMS & GOVERNANCE
Owner Address 2: P.O. BOX 5085
Owner City,State,Zip: ROSEMEAD, CA 91770
Owner Phone: Not reported
Owner Fax: Not reported
Contact Name: SOKHOM MANG
Contact Address: ESD, PROGRAMS & GOVERNANCE
Contact Address 2: P.O. BOX 5085
City,State,Zip: ROSEMEAD, CA 91770
Contact Phone: Not reported
Contact Fax: Not reported
Facility Status: Inactive
Facility Type: Temporary
Category: State
Latitude: 34.869625110000001
Longitude: -118.43244217

NPDES:

Name: SGS ANTELOPE VALLEY INTERCONNECT PROJECT
Address: 3493 170TH STREET
City,State,Zip: ROSAMOND, CA 92560
Facility Status: Not reported
NPDES Number: Not reported
Region: Not reported
Agency Number: Not reported
Regulatory Measure ID: Not reported
Place ID: Not reported
Order Number: Not reported
WDID: 6B15C375984
Regulatory Measure Type: Construction
Program Type: Not reported
Adoption Date Of Regulatory Measure: Not reported
Effective Date Of Regulatory Measure: Not reported
Termination Date Of Regulatory Measure: Not reported
Expiration Date Of Regulatory Measure: Not reported
Discharge Address: Not reported
Discharge Name: Not reported
Discharge City: Not reported
Discharge State: Not reported

SCE WHIRLWIND SUBSTATION (Continued) **S118606901**

Discharge Zip:	Not reported
Status:	Terminated
Status Date:	12/27/2016
Operator Name:	Southern California Edison
Operator Address:	2244 Walnut Grove Ave GO 1 Quad 2C
Operator City:	Rosemead
Operator State:	California
Operator Zip:	91770

NPDES as of 03/2018:

NPDES Number:	Not reported
Status:	Not reported
Agency Number:	Not reported
Region:	6B
Regulatory Measure ID:	470039
Order Number:	Not reported
Regulatory Measure Type:	Construction
Place ID:	Not reported
WDID:	6B15C375984
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	12/09/2016
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
Received Date:	04/13/2016
Processed Date:	04/13/2016
Status:	Terminated
Status Date:	12/27/2016
Place Size:	16
Place Size Unit:	Acres
Contact:	Klaus Wojak
Contact Title:	SCE MPO Compliance Assurance
Contact Phone:	626-862-6750
Contact Phone Ext:	Not reported
Contact Email:	klaus.wojak@sce.com
Operator Name:	Southern California Edison
Operator Address:	2244 Walnut Grove Ave GO-1 Quad 2C
Operator City:	Rosemead
Operator State:	California
Operator Zip:	91770
Operator Contact:	Klaus Wojak
Operator Contact Title:	SCE MPO Compliance Assurance
Operator Contact Phone:	626-862-6750
Operator Contact Phone Ext:	Not reported
Operator Contact Email:	klaus.wojak@sce.com
Operator Type:	Special District
Developer:	Southern California Edison
Developer Address:	6040 N Irwindale Avenue Suite A
Developer City:	Irwindale
Developer State:	California
Developer Zip:	91702
Developer Contact:	Klaus Wojak
Developer Contact Title:	SCE MPO Compliance Assurance

SCE WHIRLWIND SUBSTATION (Continued) **S118606901**

Constype Linear Utility Ind:	Y
Emergency Phone:	626-302-1212
Emergency Phone Ext:	Not reported
Constype Above Ground Ind:	N
Constype Below Ground Ind:	N
Constype Cable Line Ind:	N
Constype Comm Line Ind:	N
Constype Commertial Ind:	N
Constype Electrical Line Ind:	N
Constype Gas Line Ind:	N
Constype Industrial Ind:	N
Constype Other Description:	Not reported
Constype Other Ind:	N
Constype Recons Ind:	N
Constype Residential Ind:	N
Constype Transport Ind:	N
Constype Utility Description:	Not reported
Constype Utility Ind:	N
Constype Water Sewer Ind:	N
Dir Discharge Uswater Ind:	N
Receiving Water Name:	Antelope Watershed
Certifier:	Donald Johnson
Certifier Title:	AS
Certification Date:	13-APR-16
Primary Sic:	Not reported
Secondary Sic:	Not reported
Tertiary Sic:	Not reported
NPDES Number:	CAS000002
Status:	Terminated
Agency Number:	0
Region:	6B
Regulatory Measure ID:	470039
Order Number:	2009-0009-DWQ
Regulatory Measure Type:	Enrollee
Place ID:	Not reported
WDID:	6B15C375984
Program Type:	Construction
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	04/13/2016
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	12/09/2016
Discharge Name:	Southern California Edison
Discharge Address:	2244 Walnut Grove Ave GO 1 Quad 2C
Discharge City:	Rosemead
Discharge State:	California
Discharge Zip:	91770
Received Date:	Not reported
Processed Date:	Not reported
Status:	Not reported
Status Date:	Not reported
Place Size:	Not reported
Place Size Unit:	Not reported
Contact:	Not reported
Contact Title:	Not reported
Contact Phone:	Not reported
Contact Phone Ext:	Not reported

SCE WHIRLWIND SUBSTATION (Continued) **S118606901**

Contact Email:	Not reported
Operator Name:	Not reported
Operator Address:	Not reported
Operator City:	Not reported
Operator State:	Not reported
Operator Zip:	Not reported
Operator Contact:	Not reported
Operator Contact Title:	Not reported
Operator Contact Phone:	Not reported
Operator Contact Phone Ext:	Not reported
Operator Contact Email:	Not reported
Operator Type:	Not reported
Developer:	Not reported
Developer Address:	Not reported
Developer City:	Not reported
Developer State:	Not reported
Developer Zip:	Not reported
Developer Contact:	Not reported
Developer Contact Title:	Not reported
Constype Linear Utility Ind:	Not reported
Emergency Phone:	Not reported
Emergency Phone Ext:	Not reported
Constype Above Ground Ind:	Not reported
Constype Below Ground Ind:	Not reported
Constype Cable Line Ind:	Not reported
Constype Comm Line Ind:	Not reported
Constype Commertial Ind:	Not reported
Constype Electrical Line Ind:	Not reported
Constype Gas Line Ind:	Not reported
Constype Industrial Ind:	Not reported
Constype Other Description:	Not reported
Constype Other Ind:	Not reported
Constype Recons Ind:	Not reported
Constype Residential Ind:	Not reported
Constype Transport Ind:	Not reported
Constype Utility Description:	Not reported
Constype Utility Ind:	Not reported
Constype Water Sewer Ind:	Not reported
Dir Discharge Uswater Ind:	Not reported
Receiving Water Name:	Not reported
Certifier:	Not reported
Certifier Title:	Not reported
Certification Date:	Not reported
Primary Sic:	Not reported
Secondary Sic:	Not reported
Tertiary Sic:	Not reported

CIWQS:

Name:	Sgs Antelope Valley Interconnect Project
Address:	3493 170TH STREET
City,State,Zip:	ROSAMOND, CA 92560
Agency:	Southern California Edison
Agency Address:	2244 Walnut Grove Ave GO 1 Quad 2C, Rosemead, CA 91770
Place/Project Type:	Construction
SIC/NAICS:	Not reported
Region:	6V

SCE WHIRLWIND SUBSTATION (Continued) **S118606901**

Program:	CONSTW
Regulatory Measure Status:	Terminated
Regulatory Measure Type:	Storm water construction
Order Number:	2009-0009-DWQ
WDID:	6B15C375984
NPDES Number:	CAS000002
Adoption Date:	Not reported
Effective Date:	04/13/2016
Termination Date:	12/09/2016
Expiration/Review Date:	Not reported
Design Flow:	Not reported
Major/Minor:	Not reported
Complexity:	Not reported
TTWQ:	Not reported
Enforcement Actions within 5 years:	0
Violations within 5 years:	0
Latitude:	34.860664
Longitude:	-118.43892

CERS:

Name:	SCE WHIRLWIND SUBSTATION
Address:	3493 170TH STREET WEST
City,State,Zip:	ROSAMOND, CA 93560
Site ID:	155413
CERS ID:	10198966
CERS Description:	Chemical Storage Facilities

Evaluation:

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	02-05-2021
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	Kern County Env Health Services Department
Eval Program:	HMRRP
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	08-24-2023
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	Kern County Env Health Services Department
Eval Program:	HMRRP
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	12-15-2017
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	Kern County Env Health Services Department
Eval Program:	HMRRP
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	01-14-2015

SCE WHIRLWIND SUBSTATION (Continued) **S118606901**

Violations Found: No
Eval Type: Routine done by local agency
Eval Notes: Not reported
Eval Division: Kern County Env Health Services Department
Eval Program: HMRRP
Eval Source: CERS,

Affiliation:
Affiliation Type Desc: Document Preparer
Entity Name: Jeremy Gates
Entity Title: Not reported
Affiliation Address: Not reported
Affiliation City: Not reported
Affiliation State: Not reported
Affiliation Country: Not reported
Affiliation Zip: Not reported
Affiliation Phone: ,

Affiliation Type Desc: Facility Mailing Address
Entity Name: Mailing Address
Entity Title: Not reported
Affiliation Address: P.O. Box 5085 (Attn: ESD, Programs & Governance)
Affiliation City: Rosemead
Affiliation State: CA
Affiliation Country: Not reported
Affiliation Zip: 91770
Affiliation Phone: ,

Affiliation Type Desc: CUPA District
Entity Name: Kern County Environmental Health Services Departme
Entity Title: Not reported
Affiliation Address: 2700 M Street, Suite 300
Affiliation City: Bakersfield
Affiliation State: CA
Affiliation Country: Not reported
Affiliation Zip: 93301-2370
Affiliation Phone: (661) 862-8740,

Affiliation Type Desc: Legal Owner
Entity Name: Southern California Edison
Entity Title: Not reported
Affiliation Address: P.O. Box 5085 (Attn: ESD, Programs & Governance)
Affiliation City: Rosemead
Affiliation State: CA
Affiliation Country: United States
Affiliation Zip: 91770
Affiliation Phone: (626) 302-1212,

Affiliation Type Desc: Property Owner
Entity Name: Southern California Edison
Entity Title: Not reported
Affiliation Address: P.O. Box 5085 (Attn: ESD, Programs & Governance)
Affiliation City: Rosemead
Affiliation State: CA
Affiliation Country: United States
Affiliation Zip: 91770
Affiliation Phone: (626) 302-1212,

SCE WHIRLWIND SUBSTATION (Continued) **S118606901**

Affiliation Type Desc: Parent Corporation
Entity Name: Southern California Edison, Transmission and Distribution Organization (TD)
Entity Title: Not reported
Affiliation Address: Not reported
Affiliation City: Not reported
Affiliation State: Not reported
Affiliation Country: Not reported
Affiliation Zip: Not reported
Affiliation Phone: ,

Affiliation Type Desc: Environmental Contact
Entity Name: Environmental Notification Center
Entity Title: Not reported
Affiliation Address: P.O. Box 5085 (Attn: ESD, Programs & Governance)
Affiliation City: Rosemead
Affiliation State: CA
Affiliation Country: Not reported
Affiliation Zip: 91770
Affiliation Phone: ,

Affiliation Type Desc: Identification Signer
Entity Name: Jeremy Gates
Entity Title: Senior Advisor
Affiliation Address: Not reported
Affiliation City: Not reported
Affiliation State: Not reported
Affiliation Country: Not reported
Affiliation Zip: Not reported
Affiliation Phone: ,

Affiliation Type Desc: Operator
Entity Name: Southern California Edison
Entity Title: Not reported
Affiliation Address: Not reported
Affiliation City: Not reported
Affiliation State: Not reported
Affiliation Country: Not reported
Affiliation Zip: Not reported
Affiliation Phone: (626) 302-1212,

A3 **WHIRLWIND SUBSTATION** **RCRA NonGen / NLR** **1027465045**
SE **3493 170TH STREET** **E MANIFEST** **CAC003203772**
1/8-1/4 **ROSAMOND, CA 93560**
0.220 mi.
1162 ft. **Site 3 of 3 in cluster A**

Relative: **Lower**
Actual: **2755 ft.**

RCRA Listings:

ved by Agency:
r Name:
State,Zip:

Name:
Address:
tate,Zip:
e:

20221110
Whirlwind Substation
3493 170th Street
ROSAMOND, CA 93560
CAC003203772
SOKHOM MANG
ESD, PROGRAMS & GOVERNANCE
ROSEMEAD, CA 91770
562-676-2835

WHIRLWIND SUBSTATION (Continued) **1027465045**

	Not reported
ct Email:	SOKHOM.MANG@SCE.COM
	Not reported
	09
	Not reported
rator Description:	Not a generator, verified
	Not reported
ycle:	Not reported
	Not reported
or:	Not reported
er:	Not reported
	Not reported
ddress:	ESD, PROGRAMS & GOVERNANCE
ate,Zip:	ROSEMEAD, CA 91770
	Southern California Edison
	Other
r Name:	Sokhom Mang
	Other
enerator Activity:	No
ity:	No
Generator:	No
ctivity:	No
ity Activity:	No
vity with Storage:	No
y On-Site Burner Exemption:	No
ing and Refining Furnace Exemption:	No
Injection Control:	No
e Receipt:	No
ste Indicator:	No
ste Destination Facility:	No
ersal Waste:	No
eg Handler:	---
dicator:	Not reported
condary Material Indicator:	N
tor:	Not reported
ermit Baseline:	Not on the Baseline
enewals Baseline:	Not on the Baseline
orrective Action Baseline:	No
rrective Action Universe:	No
Where RCRA CA has Been Imposed Universe:	No
tion Priority Ranking:	No NCAPS ranking
l Control Indicator:	No
ontrol Indicator:	No
re Controls Indicator:	N/A
ontrols Indicator:	N/A
n-Complier Universe:	No
Significant Non-Complier Universe:	No
gnificant Non-Complier Universe:	No
n-Complier With a Compliance Schedule Universe:	No
ce Required:	Not reported
ast Change:	20221111
rader-Importer:	No
rader-Exporter:	No
ent Lead Acid Batteries:	No
ent Lead Acid Batteries:	No
vity Without Storage:	No
er:	No

WHIRLWIND SUBSTATION (Continued) **1027465045**

dicator: No

Handler - Owner Operator:

ner/Operator Indicator: Operator
Owner/Operator Name: SOKHOM MANG
gal Status: Other
Became Current: Not reported
Ended Current: Not reported
Owner/Operator Address: ESD, PROGRAMS & GOVERNANCE
wner/Operator City,State,Zip: ROSEMEAD, CA 91770
er/Operator Telephone: 562-676-2835
r/Operator Telephone Ext: Not reported
r/Operator Fax: Not reported
r/Operator Email: Not reported

wner/Operator Indicator: Owner
Owner/Operator Name: SOUTHERN CALIFORNIA EDISON
gal Status: Other
Became Current: Not reported
Ended Current: Not reported
Owner/Operator Address: ESD, PROGRAMS & GOVERNANCE
wner/Operator City,State,Zip: ROSEMEAD, CA 91770
/Operator Telephone: 626-302-1212
r/Operator Telephone Ext: Not reported
r/Operator Fax: Not reported
r/Operator Email: Not reported

Historic Generators:

ive Date: 20221110
Handler Name: WHIRLWIND SUBSTATION
Waste Generator Description: Not a generator, verified
District Owner: Not reported
arge Quantity Handler of Universal Waste: No
ecognized Trader Importer: No
ecognized Trader Exporter: No
pent Lead Acid Battery Importer: No
pent Lead Acid Battery Exporter: No
urrent Record: Yes
on Storage Recycler Activity: No
lectronic Manifest Broker: No

List of NAICS Codes and Descriptions:

NAICS Code: 221121
NAICS Description: ELECTRIC BULK POWER TRANSMISSION AND CONTROL

Facility Has Received Notices of Violations:

Violations: No Violations Found

Evaluation Action Summary:

valuations: No Evaluations Found

E MANIFEST:

WHIRLWIND SUBSTATION (Continued) **1027465045**

Manifest Tracking Number:	017917743FLE
Last Updated Date:	20221227
Shipped Date:	20221121
Received Date:	20221121
Manifest Status:	Signed
Submission Type:	DataImage5Copy
Origin Type:	Web
Generator EPA ID:	CAC003203772
Generator Name:	Whirlwind Substation
Generator Location Street Number:	Not reported
Generator Location Street 1:	3493 170TH STREET
Generator Location Street 2:	Not reported
Generator Location City:	ROSAMOND
Generator Location State:	CA
Generator Location Zip:	93560
Generator Mail Street Number:	Not reported
Generator Mail Street 1:	ESD, PROGRAMS & GOVERNANCE
Generator Mail Street 2:	P.O. BOX 5085
Generator Mail City:	ROSEMEAD
Generator Mail Zip:	91770
Generator Mail State:	CA
Generator Contact Company Name:	Not reported
Designated Facility EPA ID:	CAD050806850
Designated Facility Name:	Emerald Transformer Los Angeles, Llc
Designated Facility Mail Street Number:	5756
Designated Facility Mail Street 1:	Not reported
Designated Facility Mail Street 2:	ALBA STREET
Designated Facility Mail City:	LOS ANGELES
Designated Facility Mail Zip:	90058
Designated Facility Mail State:	CA
Designated Facility Location Street Number:	5756
Designated Facility Location Street 1:	ALBA STREET
Designated Facility Location Street 2:	Not reported
Designated Facility Location City:	LOS ANGELES
Designated Facility Location Zip:	90058
Designated Facility Location State:	CA
Designated Facility Contact Company Name:	Not reported
Manifest Residue Indicator:	N
Rejection Indicator:	N

Federal Waste:

Manifest Tracking Number:	017917743FLE
Waste Line Number:	1
Federal Waste Code:	F001
Federal Waste:	THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Manifest Tracking Number:	017917743FLE
Waste Line Number:	1
Federal Waste Code:	F003
Federal Waste:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL

WHIRLWIND SUBSTATION (Continued) **1027465045**

ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Manifest Tracking Number: 017917743FLE
Waste Line Number: 1
Federal Waste Code: F005
Federal Waste: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

State Waste:
Manifest Tracking Number: 017917743FLE
Waste Line Number: 1
State Waste Code Owner: CA
State Waste Code: 352
State Waste: Other organic solids

Manifest Tracking Number: 017917743FLE
Waste Line Number: 2
State Waste Code Owner: CA
State Waste Code: 221
State Waste: Waste oil and mixed oil

Transporter:
Manifest Tracking Number: 017917743FLE
Transporter Line Number: 1
Transporter EPA ID: FLR000168203
ansporter Name: Florida Transformer Llc Dba Emerald Transformer

Waste Line:
Manifest Tracking Number: 017917743FLE
Waste Line Number: 1
U.S. DOT Hazardous Indicator: Y
U.S. DOT ID Number: NA3077
.S. DOT Description: Na3077, Hazardous Waste, Solid, N.O.S., (Debris W/Metyl Isobutyl Ketone, Methyl Ethyl Ketone),9, Pgiii
Non-Hazardous Waste Description: Not reported
Number of Containers: 1
Container Type Code: DM
Container Type Description: Metal drums, barrels, kegs
Waste Quantity: 100
Quantity Unit of Measure Code: P
Quantity Unit of Measure Description: Pounds
Waste Quantity, in Tons: 0.05
Acute Waste Quantity, in Tons: 0

WHIRLWIND SUBSTATION (Continued) **1027465045**

Non-Acute Waste Quantity, in Tons:	0.05
Waste Quantity, in Kilograms:	45.3515
Acute Waste Quantity, in Kilograms:	0
Non-Acute Waste Quantity, in Kilorgrams:	45.3515
Management Method Code:	H141
Management Method Description:	STORAGE, BULKING AND/OR TRANSFER OFF SITE
Waste Residue Indicator:	N
Quantity Discrepancy Indicator:	N
Waste Type Discrepancy Indicator:	N
Waste Density:	Not reported
Waste Density Unit of Measure Code:	Not reported
Waste Density Unit of Measure Description:	Not reported
Form Code:	Not reported
Form Code Description:	Not reported
Source Code:	Not reported
Source Code Description:	Not reported
Waste Minimization Code:	Not reported
Waste Minimization Code Description:	Not reported
Consent Number:	Not reported
EPA Waste Indicator:	Y
Manifest Tracking Number:	017917743FLE
Waste Line Number:	2
U.S. DOT Hazardous Indicator:	N
U.S. DOT ID Number:	Not reported
U.S. DOT Description:	Not reported
Non-Hazardous Waste Description:	NON- RCRA HAZARDOUS WASTE, LIQUID, (MINERAL OIL)
Number of Containers:	13
Container Type Code:	DM
Container Type Description:	Metal drums, barrels, kegs
Waste Quantity:	4400
Quantity Unit of Measure Code:	P
Quantity Unit of Measure Description:	Pounds
Waste Quantity, in Tons:	2.2
Acute Waste Quantity, in Tons:	0
Non-Acute Waste Quantity, in Tons:	2.2
Waste Quantity, in Kilograms:	1995.4661
Acute Waste Quantity, in Kilograms:	0
Non-Acute Waste Quantity, in Kilorgrams:	1995.4661
Management Method Code:	H141
Management Method Description:	STORAGE, BULKING AND/OR TRANSFER OFF SITE
Waste Residue Indicator:	N
Quantity Discrepancy Indicator:	N
Waste Type Discrepancy Indicator:	N
Waste Density:	Not reported
Waste Density Unit of Measure Code:	Not reported
Waste Density Unit of Measure Description:	Not reported
Form Code:	Not reported
Form Code Description:	Not reported
Source Code:	Not reported
Source Code Description:	Not reported
Waste Minimization Code:	Not reported
Waste Minimization Code Description:	Not reported
Consent Number:	Not reported
EPA Waste Indicator:	N

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 09/25/2024
Date Data Arrived at EDR: 10/01/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 22

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 09/25/2024
Date Data Arrived at EDR: 10/01/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 22

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Lists of Federal Delisted NPL sites

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 09/25/2024
Date Data Arrived at EDR: 10/01/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 22

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Quarterly

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 06/07/2024
Date Data Arrived at EDR: 06/25/2024
Date Made Active in Reports: 09/19/2024
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 09/24/2024
Next Scheduled EDR Contact: 01/09/2025
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 09/25/2024
Date Data Arrived at EDR: 10/01/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 22

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Quarterly

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 09/25/2024
Date Data Arrived at EDR: 10/01/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 22

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Quarterly

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/03/2024
Date Data Arrived at EDR: 06/07/2024
Date Made Active in Reports: 06/20/2024
Number of Days to Update: 13

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

Lists of Federal RCRA TSD facilities

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/03/2024
Date Data Arrived at EDR: 06/07/2024
Date Made Active in Reports: 06/20/2024
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

Lists of Federal RCRA generators

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/03/2024
Date Data Arrived at EDR: 06/07/2024
Date Made Active in Reports: 06/20/2024
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/03/2024
Date Data Arrived at EDR: 06/07/2024
Date Made Active in Reports: 06/20/2024
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/03/2024
Date Data Arrived at EDR: 06/07/2024
Date Made Active in Reports: 06/20/2024
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 07/15/2024
Date Data Arrived at EDR: 07/17/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 84

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 07/24/2024
Date Data Arrived at EDR: 08/08/2024
Date Made Active in Reports: 08/15/2024
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 11/15/2024
Next Scheduled EDR Contact: 12/02/2024
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 07/24/2024
Date Data Arrived at EDR: 08/08/2024
Date Made Active in Reports: 08/15/2024
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 11/15/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/11/2024
Date Data Arrived at EDR: 06/17/2024
Date Made Active in Reports: 09/04/2024
Number of Days to Update: 79

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

Lists of state- and tribal (Superfund) equivalent sites

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 07/22/2024
Date Data Arrived at EDR: 07/22/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 79

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/22/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Quarterly

Lists of state- and tribal hazardous waste facilities

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 07/22/2024
Date Data Arrived at EDR: 07/22/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 79

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/22/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Quarterly

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 08/05/2024
Date Data Arrived at EDR: 08/06/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 83

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Quarterly

Lists of state and tribal leaking storage tanks

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)
Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/30/2024
Number of Days to Update: 2

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Quarterly

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land

Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/11/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 05/07/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/07/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 05/07/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 05/07/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/07/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 05/07/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 05/07/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

CPS-SLIC: Statewide SLIC Cases (GEOTRACKER)

Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: No Update Planned

Lists of state and tribal registered storage tanks

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 03/15/2024
Date Data Arrived at EDR: 03/19/2024
Date Made Active in Reports: 06/17/2024
Number of Days to Update: 90
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/30/2024
Number of Days to Update: 2
Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Semi-Annually

UST CLOSURE: Proposed Closure of Underground Storage Tank (UST) Cases
UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders.

Date of Government Version: 02/13/2024
Date Data Arrived at EDR: 03/05/2024
Date Made Active in Reports: 06/03/2024
Number of Days to Update: 90
Source: State Water Resources Control Board
Telephone: 916-327-7844
Last EDR Contact: 09/04/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Varies

MILITARY UST SITES: Military UST Sites (GEOTRACKER)
Military ust sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69
Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90
Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/11/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 07/29/2024
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 05/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 90

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

Lists of state and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 09/10/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 07/22/2024
Date Data Arrived at EDR: 07/22/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 79
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/22/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Quarterly

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

Lists of state and tribal brownfield sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 06/17/2024
Date Data Arrived at EDR: 06/17/2024
Date Made Active in Reports: 09/10/2024
Number of Days to Update: 85
Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 06/10/2024
Date Data Arrived at EDR: 06/11/2024
Date Made Active in Reports: 09/04/2024
Number of Days to Update: 85
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/11/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: No Update Planned

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 08/28/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 04/04/2024
Date Data Arrived at EDR: 04/05/2024
Date Made Active in Reports: 04/15/2024
Number of Days to Update: 10

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 10/30/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 02/07/2024
Date Data Arrived at EDR: 11/13/2024
Date Made Active in Reports: 11/19/2024
Number of Days to Update: 6

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 05/20/2024
Date Data Arrived at EDR: 08/19/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 51

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/22/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 07/22/2024
Date Data Arrived at EDR: 07/22/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 79

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/22/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2022
Date Data Arrived at EDR: 03/21/2024
Date Made Active in Reports: 06/12/2024
Number of Days to Update: 83

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

CERS HAZ WASTE: California Environmental Reporting System Hazardous Waste

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

Date of Government Version: 07/10/2024
Date Data Arrived at EDR: 07/10/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 2

Source: CalEPA
Telephone: 916-323-2514
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/20/2024
Date Data Arrived at EDR: 08/19/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 51

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/22/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SAN FRANCISCO AST: Aboveground Storage Tank Site Listing

Aboveground storage tank sites

Date of Government Version: 07/29/2024
Date Data Arrived at EDR: 07/30/2024
Date Made Active in Reports: 10/17/2024
Number of Days to Update: 79

Source: San Francisco County Department of Public Health
Telephone: 415-252-3896
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

CERS TANKS: California Environmental Reporting System (CERS) Tanks

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs.

Date of Government Version: 07/10/2024
Date Data Arrived at EDR: 07/10/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 2

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Quarterly

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 05/31/2024
Date Data Arrived at EDR: 06/21/2024
Date Made Active in Reports: 09/11/2024
Number of Days to Update: 82

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 09/25/2024
Date Data Arrived at EDR: 10/01/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 22

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Semi-Annually

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 08/22/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/05/2024
Number of Days to Update: 75

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 06/14/2024
Date Data Arrived at EDR: 06/17/2024
Date Made Active in Reports: 06/24/2024
Number of Days to Update: 7

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 07/19/2024
Date Data Arrived at EDR: 07/22/2024
Date Made Active in Reports: 10/08/2024
Number of Days to Update: 78

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Semi-Annually

LDS: Land Disposal Sites Listing (GEOTRACKER)
Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/30/2024
Number of Days to Update: 2

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)
Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/30/2024
Number of Days to Update: 2

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch
Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/03/2024
Date Data Arrived at EDR: 06/07/2024
Date Made Active in Reports: 06/20/2024
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 07/31/2024
Date Data Arrived at EDR: 08/12/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 58

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 11/12/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 06/07/2021
Date Data Arrived at EDR: 07/13/2021
Date Made Active in Reports: 03/09/2022
Number of Days to Update: 239

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 10/10/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 10/03/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 07/30/2021
Date Data Arrived at EDR: 02/03/2023
Date Made Active in Reports: 02/10/2023
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 11/04/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 06/10/2024
Date Data Arrived at EDR: 06/17/2024
Date Made Active in Reports: 09/04/2024
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA Watch List

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88
Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: No Update Planned

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73
Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 10/31/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 06/14/2022
Date Made Active in Reports: 03/24/2023
Number of Days to Update: 283
Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 10/03/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2022
Date Data Arrived at EDR: 11/13/2023
Date Made Active in Reports: 02/07/2024
Number of Days to Update: 86
Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 11/14/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 07/11/2024
Date Data Arrived at EDR: 07/11/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 1
Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 10/24/2024
Date Data Arrived at EDR: 11/01/2024
Date Made Active in Reports: 11/19/2024
Number of Days to Update: 18

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 12/09/2024
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 07/12/2024
Date Data Arrived at EDR: 07/17/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 09/19/2023
Date Data Arrived at EDR: 10/03/2023
Date Made Active in Reports: 10/19/2023
Number of Days to Update: 16

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 10/01/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 05/23/2024
Date Data Arrived at EDR: 07/02/2024
Date Made Active in Reports: 09/26/2024
Number of Days to Update: 86

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/12/2024
Date Data Arrived at EDR: 10/17/2024
Date Made Active in Reports: 11/19/2024
Number of Days to Update: 33

Source: Nuclear Regulatory Commission
Telephone: 301-415-0717
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2022
Date Data Arrived at EDR: 11/27/2023
Date Made Active in Reports: 02/22/2024
Number of Days to Update: 87

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 10/31/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 09/18/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80
Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 06/30/2024
Date Data Arrived at EDR: 07/08/2024
Date Made Active in Reports: 09/26/2024
Number of Days to Update: 80

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 03/09/2023
Date Made Active in Reports: 03/20/2023
Number of Days to Update: 11

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 11/22/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 10/01/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 03/03/2023
Date Data Arrived at EDR: 03/03/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 98

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 05/08/2024
Date Data Arrived at EDR: 08/14/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 14

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 11/14/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 09/25/2024
Date Data Arrived at EDR: 10/01/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 22

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 11/01/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/06/2024
Date Data Arrived at EDR: 08/14/2024
Date Made Active in Reports: 08/15/2024
Number of Days to Update: 1

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 11/18/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Semi-Annually

MINES VIOLATIONS: MSHA Violation Assessment Data

Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 10/01/2024
Date Data Arrived at EDR: 10/02/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 7

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Quarterly

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/02/2024
Date Data Arrived at EDR: 08/20/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 50

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 11/22/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 11/22/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 09/10/2024
Date Data Arrived at EDR: 09/11/2024
Date Made Active in Reports: 11/19/2024
Number of Days to Update: 69

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Quarterly

MINES MRDS: Mineral Resources Data System

Mineral Resources Data System

Date of Government Version: 08/23/2022
Date Data Arrived at EDR: 11/22/2022
Date Made Active in Reports: 02/28/2023
Number of Days to Update: 98

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 11/22/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Varies

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 08/13/2024
Date Data Arrived at EDR: 08/20/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 8

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 06/23/2024
Date Data Arrived at EDR: 06/28/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 10/01/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/06/2023
Date Data Arrived at EDR: 09/13/2023
Date Made Active in Reports: 12/11/2023
Number of Days to Update: 89

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 10/03/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 08/13/2024
Date Data Arrived at EDR: 08/13/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 57

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 11/08/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Quarterly

PFAS NPL: Superfund Sites with PFAS Detections Information

EPA's Office of Land and Emergency Management and EPA Regional Offices maintain data describing what is known about site investigations, contamination, and remedial actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) where PFAS is present in the environment.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 703-603-8895
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS FEDERAL SITES: Federal Sites PFAS Information

Several federal entities, such as the federal Superfund program, Department of Defense, National Aeronautics and Space Administration, Department of Transportation, and Department of Energy provided information for sites with known or suspected detections at federal facilities.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS TSCA: PFAS Manufacture and Imports Information

EPA issued the Chemical Data Reporting (CDR) Rule under the Toxic Substances Control Act (TSCA) and requires chemical manufacturers and facilities that manufacture or import chemical substances to report data to EPA. EPA publishes non-confidential business information (non-CBI) and includes descriptive information about each site, corporate parent, production volume, other manufacturing information, and processing and use information.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS TRIS: List of PFAS Added to the TRI

Section 7321 of the National Defense Authorization Act for Fiscal Year 2020 (NDAA) immediately added certain per- and polyfluoroalkyl substances (PFAS) to the list of chemicals covered by the Toxics Release Inventory (TRI) under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) and provided a framework for additional PFAS to be added to TRI on an annual basis.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-566-0250
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS RCRA MANIFEST: PFAS Transfers Identified In the RCRA Database Listing

To work around the lack of PFAS waste codes in the RCRA database, EPA developed the PFAS Transfers dataset by mining e-Manifest records containing at least one of these common PFAS keywords: PFAS, PFOA, PFOS, PERFL, AFFF, GENX, GEN-X (plus the VT waste codes). These keywords were searched for in the following text fields: Manifest handling instructions (MANIFEST_HANDLING_INSTR), Non-hazardous waste description (NON_HAZ_WASTE_DESCRIPTION), DOT printed information (DOT_PRINTED_INFORMATION), Waste line handling instructions (WASTE_LINE_HANDLING_INSTR), Waste residue comments (WASTE_RESIDUE_COMMENTS).

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS ATSDR: PFAS Contamination Site Location Listing

PFAS contamination site locations from the Department of Health & Human Services, Center for Disease Control & Prevention. ATSDR is involved at a number of PFAS-related sites, either directly or through assisting state and federal partners. As of now, most sites are related to drinking water contamination connected with PFAS production facilities or fire training areas where aqueous film-forming firefighting foam (AFFF) was regularly used.

Date of Government Version: 06/24/2020
Date Data Arrived at EDR: 03/17/2021
Date Made Active in Reports: 11/08/2022
Number of Days to Update: 601

Source: Department of Health & Human Services
Telephone: 202-741-5770
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

PFAS WQP: Ambient Environmental Sampling for PFAS

The Water Quality Portal (WQP) is a part of a modernized repository storing ambient sampling data for all environmental media and tissue samples. A wide range of federal, state, tribal and local governments, academic and non-governmental organizations and individuals submit project details and sampling results to this public repository. The information is commonly used for research and assessments of environmental quality.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS PROJECT: NORTHEASTERN UNIVERSITY PFAS PROJECT

The PFAS Contamination Site Tracker records qualitative and quantitative data from each site in a chart, specifically examining discovery, contamination levels, government response, litigation, health impacts, media coverage, and community characteristics. All data presented in the chart were extracted from government websites, such as state health departments or the Environmental Protection Agency, and news articles.

Date of Government Version: 05/19/2023
Date Data Arrived at EDR: 04/05/2024
Date Made Active in Reports: 06/06/2024
Number of Days to Update: 62

Source: Social Science Environmental Health Research Institute
Telephone: N/A
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Varies

PFAS NPDES: Clean Water Act Discharge Monitoring Information

Any discharger of pollutants to waters of the United States from a point source must have a National Pollutant Discharge Elimination System (NPDES) permit. The process for obtaining limits involves the regulated entity (permittee) disclosing releases in a NPDES permit application and the permitting authority (typically the state but sometimes EPA) deciding whether to require monitoring or monitoring with limits. Caveats and Limitations: Less than half of states have required PFAS monitoring for at least one of their permittees and fewer states have established PFAS effluent limits for permittees. New rulemakings have been initiated that may increase the number of facilities monitoring for PFAS in the future.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS ECHO: Facilities in Industries that May Be Handling PFAS Listing

Regulators and the public have expressed interest in knowing which regulated entities may be using PFAS. EPA has developed a dataset from various sources that show which industries may be handling PFAS. Approximately 120,000 facilities subject to federal environmental programs have operated or currently operate in industry sectors with processes that may involve handling and/or release of PFAS.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS ECHO FIRE TRAIN: Facilities in Industries that May Be Handling PFAS Listing

A list of fire training sites was added to the Industry Sectors dataset using a keyword search on the permitted facilitys name to identify sites where fire-fighting foam may have been used in training exercises. Additionally, you may view an example spreadsheet of the subset of fire training facility data, as well as the keywords used in selecting or deselecting a facility for the subset. as well as the keywords used in selecting or deselecting a facility for the subset. These keywords were tested to maximize accuracy in selecting facilities that may use fire-fighting foam in training exercises, however, due to the lack of a required reporting field in the data systems for designating fire training sites, this methodology may not identify all fire training sites or may potentially misidentify them.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PFAS PT 139 AIRPORT: All Certified Part 139 Airports PFAS Information Listing

Since July 1, 2006, all certified part 139 airports are required to have fire-fighting foam onsite that meet military specifications (MIL-F-24385) (14 CFR 139.317). To date, these military specification fire-fighting foams are fluorinated and have been historically used for training and extinguishing. The 2018 FAA Reauthorization Act has a provision stating that no later than October 2021, FAA shall not require the use of fluorinated AFFF. This provision does not prohibit the use of fluorinated AFFF at Part 139 civilian airports; it only prohibits FAA from mandating its use. The Federal Aviation Administration?s document AC 150/5210-6D - Aircraft Fire Extinguishing Agents provides guidance on Aircraft Fire Extinguishing Agents, which includes Aqueous Film Forming Foam (AFFF).

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

AQUEOUS FOAM NRC: Aqueous Foam Related Incidents Listing

The National Response Center (NRC) serves as an emergency call center that fields initial reports for pollution and railroad incidents and forwards that information to appropriate federal/state agencies for response. The spreadsheets posted to the NRC website contain initial incident data that has not been validated or investigated by a federal/state response agency. Response center calls from 1990 to the most recent complete calendar year where there was indication of Aqueous Film Forming Foam (AFFF) usage are included in this dataset. NRC calls may reference AFFF usage in the ?Material Involved? or ?Incident Description? fields.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/01/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-267-2675
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

PCS: Permit Compliance System

PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 12/16/2016
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 03/10/2017
Number of Days to Update: 63

Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: No Update Planned

PCS ENF: Enforcement data

No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29

Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

BIOSOLIDS: ICIS-NPDES Biosolids Facility Data

The data reflects compliance information about facilities in the biosolids program.

Date of Government Version: 10/13/2024
Date Data Arrived at EDR: 10/16/2024
Date Made Active in Reports: 10/23/2024
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 202-564-4700
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

UST FINDER RELEASE: UST Finder Releases Database

US EPA's UST Finder data is a national composite of leaking underground storage tanks. This data contains information about, and locations of, leaking underground storage tanks. Data was collected from state sources and standardized into a national profile by EPA's Office of Underground Storage Tanks, Office of Research and Development, and the Association of State and Territorial Solid Waste Management Officials.

Date of Government Version: 06/08/2023
Date Data Arrived at EDR: 10/31/2023
Date Made Active in Reports: 01/18/2024
Number of Days to Update: 79

Source: Environmental Protecton Agency
Telephone: 202-564-0394
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Semi-Annually

UST FINDER: UST Finder Database

EPA developed UST Finder, a web map application containing a comprehensive, state-sourced national map of underground storage tank (UST) and leaking UST (LUST) data. It provides the attributes and locations of active and closed USTs, UST facilities, and LUST sites from states and from Tribal lands and US territories . UST Finder contains information about proximity of UST facilities and LUST sites to: surface and groundwater public drinking water protection areas; estimated number of private domestic wells and number of people living nearby; and flooding and wildfires.

Date of Government Version: 06/08/2023
Date Data Arrived at EDR: 10/04/2023
Date Made Active in Reports: 01/18/2024
Number of Days to Update: 106

Source: Environmental Protection Agency
Telephone: 202-564-0394
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Varies

E MANIFEST: Hazardous Waste Electronic Manifest System

EPA established a national system for tracking hazardous waste shipments electronically. This system, known as ?e-Manifest,? will modernize the nation?s cradle-to-grave hazardous waste tracking process while saving valuable time, resources, and dollars for industry and states.

Date of Government Version: 07/24/2023
Date Data Arrived at EDR: 04/18/2024
Date Made Active in Reports: 06/06/2024
Number of Days to Update: 49

Source: Environmental Protection Agency
Telephone: 833-501-6826
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Varies

PFAS: PFAS Contamination Site Location Listing

A listing of PFAS sites included in the Envirostor and GeoTracker databases. Locations of potential sources of per - and polyfluoroalkyl substances (PFAS). This does not mean that PFAS has been produced, used, or discharged at these sites.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 09/03/2024
Number of Days to Update: 6

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 08/28/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Varies

AQUEOUS FOAM: Former Fire Training Facility Assessments Listing

Airports shown on this list are those believed to use Aqueous Film Forming Foam (AFFF), and certified by the Federal Aviation Administration (FAA) under Title 14, Code of Federal Regulations (CFR), Part 139 (14 CFR Part 139). This list was created by SWRCB using information available from the FAA. Location points shown are from the latitude and longitude listed on the FAA airport master record.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 11/12/2024
Number of Days to Update: 76

Source: State Water Resources Control Board
Telephone: 916-341-5455
Last EDR Contact: 08/28/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Varies

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CHROME PLATING: Chrome Plating Facilities Listing

This listing represents chrome plating facilities the California State Water Resources Control Board staff identified as possibly being a source of Per- and polyfluoroalkyl substance (PFAS) contamination. Sites and locations were identified by staff with the Division of Water Quality in the California State Water Board. Data was collected from the CA Air Resources Board 2013 and 2018 - Cr VI emission survey, CA Emission Inventory, CA HAZ Waste discharge database and by reviewing storm water permits. Former chrome plating sites are also included that are open site investigation or remediation cases with the Regional Water Quality Control Boards and the Department of Toxic Substances Control.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 11/12/2024
Number of Days to Update: 76

Source: State Water Resources Control Board
Telephone: 916-341-5455
Last EDR Contact: 08/28/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Varies

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 06/17/2024
Date Data Arrived at EDR: 06/17/2024
Date Made Active in Reports: 09/10/2024
Number of Days to Update: 85

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

CUPA LIV-PLE: CUPA Facility Listing
list of facilities associated with the various CUPA programs in Livermore-Pleasanton

Date of Government Version: 02/14/2024
Date Data Arrived at EDR: 02/21/2024
Date Made Active in Reports: 05/08/2024
Number of Days to Update: 77

Source: Livermore-Pleasanton Fire Department
Telephone: 925-454-2361
Last EDR Contact: 11/05/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Varies

DRYCLEAN CALAVERAS: Calaveras County Environmental Management Agency Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Calaveras County Environmental Management Agency.

Date of Government Version: 06/17/2019
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 05/01/2023
Number of Days to Update: 1412

Source: Calaveras County Environmental Management Agency
Telephone: 209-754-6399
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Varies

DRYCLEAN N COAST: North Coast Unified Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the North Coast Unified Air Quality Management District.

Date of Government Version: 11/30/2016
Date Data Arrived at EDR: 04/19/2019
Date Made Active in Reports: 05/01/2023
Number of Days to Update: 1473

Source: North Coast Unified Air Quality Management District
Telephone: 707-443-3093
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN SANTA BARB: Santa Barbara County Air Pollution Control District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Santa Barbara County Air Pollution Control District.

Date of Government Version: 02/19/2019
Date Data Arrived at EDR: 04/17/2019
Date Made Active in Reports: 05/01/2023
Number of Days to Update: 1475

Source: Santa Barbara County Air Pollution Control District
Telephone: 805-961-8867
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN TEHAMA: Tehama County Air Pollution Control District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Tehama County Air Pollution Control District.

Date of Government Version: 04/24/2019
Date Data Arrived at EDR: 04/24/2019
Date Made Active in Reports: 05/01/2023
Number of Days to Update: 1468

Source: Tehama County Air Pollution Control District
Telephone: 530-527-3717
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 09/05/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 69

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Annually

DRYCLEAN SHASTA: Shasta County Air Quality Management District District Drycleaner Facility Listing

A listing of drycleaner facility locations, for the Shasta County Air Quality Management District.

Date of Government Version: 08/29/2024
Date Data Arrived at EDR: 09/05/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 69

Source: Shasta County Air Quality Management District
Telephone: 530-225-5674
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN EAST KERN: Eastern Kern Air Pollution Control District District Drycleaner Facility Listing

A listing of drycleaner facility locations, for the Eastern Kern Air Pollution Control District.

Date of Government Version: 08/21/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/05/2024
Number of Days to Update: 75

Source: Eastern Kern Air Pollution Control District
Telephone: 661-862-9684
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN SAN JOAQUIN: San Joaquin Valley Air Pollution Control District District Drycleaner Facility Listing

A listing of drycleaner facility locations, for the San Joaquin Valley Air Pollution Control District.

Date of Government Version: 08/22/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/05/2024
Number of Days to Update: 75

Source: San Joaquin Valley Air Pollution Control District
Telephone: 559-230-6001
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN GLENN: Glenn County Air Pollution Control District Drycleaner Facility Listing

A listing of drycleaner facility locations, for the Glenn County Air Pollution Control District.

Date of Government Version: 08/26/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 77

Source: Glenn County Air Pollution Control District
Telephone: 530-934-6500
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN BUTTE: Butte County Air Quality Management DistrictDrycleaner Facility Listing

Butte County Air Quality Management DistrictDrycleaner Facility Listing.

Date of Government Version: 09/10/2024
Date Data Arrived at EDR: 09/11/2024
Date Made Active in Reports: 11/25/2024
Number of Days to Update: 75

Source: Butte County Air Quality Management District
Telephone: 530-332-9400
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN FEATHER RVR: Feather River Air Quality Management District Drycleaner Facility Listing

A listing of drycleaner facility locations, for the Feather River Air Quality Management District.

Date of Government Version: 03/08/2023
Date Data Arrived at EDR: 03/09/2023
Date Made Active in Reports: 06/05/2023
Number of Days to Update: 88

Source: Feather River Air Quality Management District
Telephone: 530-634-7659
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN AVAQMD: Antelope Valley Air Quality Management District Drycleaner Listing
A listing of dry cleaners in the Antelope Valley Air Quality Management District.

Date of Government Version: 05/29/2024
Date Data Arrived at EDR: 11/07/2024
Date Made Active in Reports: 11/22/2024
Number of Days to Update: 15

Source: Antelope Valley Air Quality Management District
Telephone: 661-723-8070
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Varies

DRYCLEAN N SONOMA: Norther Sonoma County County Air Pollution Control District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Northern Sonoma County Air Pollution Control District.,

Date of Government Version: 08/23/2024
Date Data Arrived at EDR: 08/26/2024
Date Made Active in Reports: 11/05/2024
Number of Days to Update: 71

Source: Santa Barbara County Air Pollution Control District
Telephone: 707-433-5911
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN GRANT: Grant Recipients List
Assembly Bill 998 (AB 998) established the Non-Toxic Dry Cleaning Incentive Program to provide financial assistance to the dry cleaning industry to switch from systems using perchloroethylene (Perc), an identified toxic air contaminant and potential human carcinogen, to non-toxic and non-smog forming alternatives.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 01/26/2024
Date Made Active in Reports: 04/16/2024
Number of Days to Update: 81

Source: California Air Resources Board
Telephone: 916-323-0006
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

DRYCLEAN YOLO-SOLANO: Yolo-Solano Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Yolo-Solano Air Quality Management District.

Date of Government Version: 08/21/2024
Date Data Arrived at EDR: 08/26/2024
Date Made Active in Reports: 11/06/2024
Number of Days to Update: 72

Source: Yolo-Solano Air Quality Management District
Telephone: 530-757-3650
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN LAKE: Lake County Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Lake County Air Quality Management District,

Date of Government Version: 02/15/2024
Date Data Arrived at EDR: 02/16/2024
Date Made Active in Reports: 05/02/2024
Number of Days to Update: 76

Source: Lake County Air Quality Management District
Telephone: 707-263-7000
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN SOUTH COAST: South Coast Air Quality Management District Drycleaner Listing
A listing of dry cleaners in the South Coast Air Quality Management District

Date of Government Version: 08/14/2024
Date Data Arrived at EDR: 09/05/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 69

Source: South Coast Air Quality Management District
Telephone: 909-396-3211
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Varies

DRYCLEAN SAN DIEGO: San Diego County Air Pollution Control District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the San Diego County Air Pollution Control District.

Date of Government Version: 08/21/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 77
Source: San Diego County Air Pollution Control District
Telephone: 858-586-2616
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN MENDOCINO: Mendocino County Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Mendocino County Air Quality Management District.

Date of Government Version: 08/26/2024
Date Data Arrived at EDR: 09/03/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 71
Source: Mendocino County Air Quality Management District
Telephone: 707-463-4354
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN SACRAMENTO: Sacramento Metropolitan Air Quality Management DistrictDrycleaner Facility Listing
A listing of drycleaner facility locations, for the Sacramento Metropolitan Air Quality Management District.

Date of Government Version: 09/03/2024
Date Data Arrived at EDR: 09/05/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 69
Source: Sacramento Metropolitan Air Quality Management District
Telephone: 916-874-3958
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN IMPERIAL: Imperial County Air Pollution Control District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Imperial County Air Pollution Control District

Date of Government Version: 04/25/2023
Date Data Arrived at EDR: 04/26/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 79
Source: Imperial County Air Pollution Control District
Telephone: 442-265-1800
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN SAN LUIS OB: San Luis Obispo County Air Pollution Control District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the San Luis Obispo County Air Pollution Control District.

Date of Government Version: 01/03/2024
Date Data Arrived at EDR: 01/04/2024
Date Made Active in Reports: 03/20/2024
Number of Days to Update: 76
Source: San Luis Obispo County Air Pollution Control District
Telephone: 805-781-5756
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN PLACER: Placer County Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Placer County Air Quality Management District.

Date of Government Version: 05/15/2023
Date Data Arrived at EDR: 05/17/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 89
Source: Placer County Air Quality Management District
Telephone: 530-745-2335
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN BAY AREA: Bay Area Air Quality Management District Drycleaner Facility Listing
Bay Area Air Quality Management District Drycleaner Facility Listing.

Date of Government Version: 02/20/2019
Date Data Arrived at EDR: 05/30/2019
Date Made Active in Reports: 05/01/2023
Number of Days to Update: 1432
Source: Bay Area Air Quality Management District
Telephone: 415-516-1916
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN MOJAVE: Mojave Desert Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Mojave Desert Air Quality Management District.

Date of Government Version: 08/21/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/05/2024
Number of Days to Update: 75
Source: Mojave Desert Air Quality Management District
Telephone: 760-245-1661
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN N SIERRA: Northern Sierra Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Northern Sierra Air Quality Management District,

Date of Government Version: 08/22/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/05/2024
Number of Days to Update: 75
Source: Northern Sierra Air Quality Management District
Telephone: 530-274-9350
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN MONTERY BAY: Monterey Bay Air Quality Management District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Monterey Bay Air Quality Management District.

Date of Government Version: 09/09/2024
Date Data Arrived at EDR: 09/11/2024
Date Made Active in Reports: 11/26/2024
Number of Days to Update: 76
Source: Monterey Bay Air Quality Management District
Telephone: 831-647-9411
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN AMADOR: Amador Air District Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Amador Air Quality Management District

Date of Government Version: 04/26/2023
Date Data Arrived at EDR: 04/27/2023
Date Made Active in Reports: 07/13/2023
Number of Days to Update: 77
Source: Amador Air Quality Management District
Telephone: 209-257-0112
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

DRYCLEAN VENTURA: Drycleaner Facility Listing
A listing of drycleaner facility locations, for the Ventura County Air Pollution Control District.

Date of Government Version: 08/26/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 11/14/2024
Number of Days to Update: 78
Source: Ventura County Air Pollution Control District
Telephone: 805-645-1421
Last EDR Contact: 08/21/2024
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2022
Date Data Arrived at EDR: 06/11/2024
Date Made Active in Reports: 09/03/2024
Number of Days to Update: 84
Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 09/11/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: Varies

ENF: Enforcement Action Listing
A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 07/15/2024
Date Data Arrived at EDR: 07/16/2024
Date Made Active in Reports: 10/08/2024
Number of Days to Update: 84
Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FIN ASSURANCE 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 07/10/2024
Date Data Arrived at EDR: 07/11/2024
Date Made Active in Reports: 09/27/2024
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

FIN ASSURANCE 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 08/07/2024
Date Data Arrived at EDR: 08/14/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 14

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 10/30/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Varies

ICE: Inspection, Compliance and Enforcement
Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 08/12/2024
Date Data Arrived at EDR: 08/12/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 77

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 11/08/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 08/12/2024
Date Data Arrived at EDR: 08/12/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 77

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/08/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 07/01/2024
Date Data Arrived at EDR: 07/02/2024
Date Made Active in Reports: 09/25/2024
Number of Days to Update: 85

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 10/01/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Quarterly

HWTS: Hazardous Waste Tracking System

DTSC maintains the Hazardous Waste Tracking System that stores ID number information since the early 1980s and manifest data since 1993. The system collects both manifest copies from the generator and destination facility.

Date of Government Version: 07/19/2024
Date Data Arrived at EDR: 07/30/2024
Date Made Active in Reports: 08/28/2024
Number of Days to Update: 29

Source: Department of Toxic Substances Control
Telephone: 916-324-2444
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2023
Date Data Arrived at EDR: 07/02/2024
Date Made Active in Reports: 09/25/2024
Number of Days to Update: 85

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 10/03/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Annually

MINES: Mines Site Location Listing

A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 09/03/2024
Date Data Arrived at EDR: 09/04/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 70

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 09/04/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 07/26/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/06/2024
Number of Days to Update: 76

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Varies

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 08/05/2024
Date Data Arrived at EDR: 08/06/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 83

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 11/05/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing

A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 08/22/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/06/2024
Number of Days to Update: 76

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/30/2024
Number of Days to Update: 2
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 08/28/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 09/05/2024
Date Data Arrived at EDR: 09/06/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 68
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: No Update Planned

SAN JOSE HAZMAT: Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/03/2020
Date Data Arrived at EDR: 11/05/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 82
Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Annually

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 09/02/2024
Date Data Arrived at EDR: 09/04/2024
Date Made Active in Reports: 09/05/2024
Number of Days to Update: 1
Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 09/04/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Varies

UIC GEO: Underground Injection Control Sites (GEOTRACKER)
Underground control injection sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1
Source: State Water Resource Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water boards review found that more than one-third of the region's active disposal pits are operating without permission.

Date of Government Version: 02/11/2021
Date Data Arrived at EDR: 07/01/2021
Date Made Active in Reports: 09/29/2021
Number of Days to Update: 90
Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 10/03/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: No Update Planned

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 09/10/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: No Update Planned

MILITARY PRIV SITES: Military Privatized Sites (GEOTRACKER)
Military privatized sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

PROJECT: Project Sites (GEOTRACKER)
Projects sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

WDR: Waste Discharge Requirements Listing
In general, the Waste Discharge Requirements (WDRs) Program (sometimes also referred to as the "Non Chapter 15 (Non 15) Program") regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the Federal Water Pollution Control Act. Exemptions from Title 27 may be granted for nine categories of discharges (e.g., sewage, wastewater, etc.) that meet, and continue to meet, the preconditions listed for each specific exemption. The scope of the WDRs Program also includes the discharge of wastes classified as inert, pursuant to section 20230 of Title 27.

Date of Government Version: 09/03/2024
Date Data Arrived at EDR: 09/04/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 70

Source: State Water Resources Control Board
Telephone: 916-341-5810
Last EDR Contact: 09/04/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Quarterly

CIWQS: California Integrated Water Quality System
The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

Date of Government Version: 08/20/2024
Date Data Arrived at EDR: 08/20/2024
Date Made Active in Reports: 08/22/2024
Number of Days to Update: 2

Source: State Water Resources Control Board
Telephone: 866-794-4977
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Varies

CERS: CalEPA Regulated Site Portal Data
The CalEPA Regulated Site Portal database combines data about environmentally regulated sites and facilities in California into a single database. It combines data from a variety of state and federal databases, and provides an overview of regulated activities across the spectrum of environmental programs for any given location in California. These activities include hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials

Date of Government Version: 07/10/2024
Date Data Arrived at EDR: 07/10/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 2

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

NON-CASE INFO: Non-Case Information Sites (GEOTRACKER)
Non-Case Information sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

OTHER OIL GAS: Other Oil & Gas Projects Sites (GEOTRACKER)
Other Oil & Gas Projects sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

PROD WATER PONDS: Produced Water Ponds Sites (GEOTRACKER)
Produced water ponds sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

SAMPLING POINT: Sampling Point ? Public Sites (GEOTRACKER)
Sampling point - public sites

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

WELL STIM PROJ: Well Stimulation Project (GEOTRACKER)
Includes areas of groundwater monitoring plans, a depiction of the monitoring network, and the facilities, boundaries, and subsurface characteristics of the oilfield and the features (oil and gas wells, produced water ponds, UIC wells, water supply wells, etc?) being monitored

Date of Government Version: 08/28/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 08/29/2024
Number of Days to Update: 1

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

COUNTY RECORDS

ALAMEDA COUNTY:

CS ALAMEDA: Contaminated Sites
A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/09/2019
Date Data Arrived at EDR: 01/11/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 53

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Semi-Annually

UST ALAMEDA: Underground Tanks
Underground storage tank sites located in Alameda county.

Date of Government Version: 12/26/2023
Date Data Arrived at EDR: 12/26/2023
Date Made Active in Reports: 03/19/2024
Number of Days to Update: 84

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA AMADOR: CUPA Facility List
Cupa Facility List

Date of Government Version: 04/27/2023
Date Data Arrived at EDR: 04/27/2023
Date Made Active in Reports: 07/13/2023
Number of Days to Update: 77

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA BUTTE: CUPA Facility Listing
Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA CALVERAS: CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 03/01/2024
Date Data Arrived at EDR: 03/19/2024
Date Made Active in Reports: 06/11/2024
Number of Days to Update: 84

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 09/10/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA COLUSA: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/06/2020
Date Data Arrived at EDR: 04/23/2020
Date Made Active in Reports: 07/10/2020
Number of Days to Update: 78

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

SL CONTRA COSTA: Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 07/22/2024
Date Data Arrived at EDR: 07/23/2024
Date Made Active in Reports: 10/10/2024
Number of Days to Update: 79

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA DEL NORTE: CUPA Facility List
Cupa Facility list

Date of Government Version: 02/05/2024
Date Data Arrived at EDR: 02/08/2024
Date Made Active in Reports: 04/26/2024
Number of Days to Update: 78

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA EL DORADO: CUPA Facility List
CUPA facility list.

Date of Government Version: 08/08/2022
Date Data Arrived at EDR: 08/09/2022
Date Made Active in Reports: 09/01/2022
Number of Days to Update: 23

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA FRESNO: CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 06/28/2021
Date Data Arrived at EDR: 12/21/2021
Date Made Active in Reports: 03/03/2022
Number of Days to Update: 72

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 09/26/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA GLENN: CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: No Update Planned

HUMBOLDT COUNTY:

CUPA HUMBOLDT: CUPA Facility List
CUPA facility list.

Date of Government Version: 08/12/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 88

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA IMPERIAL: CUPA Facility List
Cupa facility list.

Date of Government Version: 07/11/2024
Date Data Arrived at EDR: 07/16/2024
Date Made Active in Reports: 10/03/2024
Number of Days to Update: 79

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

INYO COUNTY:

CUPA INYO: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/03/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 72

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

KERN COUNTY:

CUPA KERN: CUPA Facility List
A listing of sites included in the Kern County Hazardous Material Business Plan.

Date of Government Version: 07/30/2024
Date Data Arrived at EDR: 08/01/2024
Date Made Active in Reports: 10/17/2024
Number of Days to Update: 77

Source: Kern County Public Health
Telephone: 661-321-3000
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

UST KERN: Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 07/30/2024
Date Data Arrived at EDR: 08/01/2024
Date Made Active in Reports: 10/17/2024
Number of Days to Update: 77

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA KINGS: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/03/2020
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/14/2021
Number of Days to Update: 78

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

LAKE COUNTY:

CUPA LAKE: CUPA Facility List
Cupa facility list

Date of Government Version: 07/26/2024
Date Data Arrived at EDR: 07/29/2024
Date Made Active in Reports: 08/08/2024
Number of Days to Update: 10

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 10/03/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA LASSEN: CUPA Facility List
Cupa facility list

Date of Government Version: 07/31/2020
Date Data Arrived at EDR: 08/21/2020
Date Made Active in Reports: 11/09/2020
Number of Days to Update: 80

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

LOS ANGELES COUNTY:

AOCONCERN: Key Areas of Concerns in Los Angeles County
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office. Date of Government Version: 3/30/2009 Exide Site area is a cleanup plan of lead-impacted soil surrounding the former Exide Facility as designated by the DTSC. Date of Government Version: 7/17/2017

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: N/A
Telephone: N/A
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: No Update Planned

HMS LOS ANGELES: HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 07/02/2024
Date Data Arrived at EDR: 07/08/2024
Date Made Active in Reports: 07/10/2024
Number of Days to Update: 2

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Semi-Annually

LF LOS ANGELES: List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 07/09/2024
Date Data Arrived at EDR: 07/09/2024
Date Made Active in Reports: 09/27/2024
Number of Days to Update: 80

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 10/04/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Varies

LF LOS ANGELES CITY: City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 12/31/2022
Date Data Arrived at EDR: 01/12/2023
Date Made Active in Reports: 03/29/2023
Number of Days to Update: 76

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/02/2025
Data Release Frequency: Varies

LOS ANGELES AST: Active & Inactive AST Inventory
A listing of active & inactive above ground petroleum storage tank site locations, located in the City of Los Angeles.

Date of Government Version: 06/01/2019
Date Data Arrived at EDR: 06/25/2019
Date Made Active in Reports: 08/22/2019
Number of Days to Update: 58

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 09/10/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Varies

LOS ANGELES CO LF METHANE: Methane Producing Landfills
This data was created on April 30, 2012 to represent known disposal sites in Los Angeles County that may produce and emanate methane gas. The shapefile contains disposal sites within Los Angeles County that once accepted degradable refuse material. Information used to create this data was extracted from a landfill survey performed by County Engineers (Major Waste System Map, 1973) as well as historical records from CalRecycle, Regional Water Quality Control Board, and Los Angeles County Department of Public Health

Date of Government Version: 05/14/2024
Date Data Arrived at EDR: 07/09/2024
Date Made Active in Reports: 09/27/2024
Number of Days to Update: 80

Source: Los Angeles County Department of Public Works
Telephone: 626-458-6973
Last EDR Contact: 10/10/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: No Update Planned

LOS ANGELES HM: Active & Inactive Hazardous Materials Inventory
A listing of active & inactive hazardous materials facility locations, located in the City of Los Angeles.

Date of Government Version: 06/01/2024
Date Data Arrived at EDR: 06/17/2024
Date Made Active in Reports: 09/10/2024
Number of Days to Update: 85

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Varies

LOS ANGELES UST: Active & Inactive UST Inventory
A listing of active & inactive underground storage tank site locations and underground storage tank historical sites, located in the City of Los Angeles.

Date of Government Version: 06/01/2024
Date Data Arrived at EDR: 06/17/2024
Date Made Active in Reports: 09/10/2024
Number of Days to Update: 85
Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 09/17/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Varies

SITE MIT LOS ANGELES: Site Mitigation LA County List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 05/21/2024
Date Data Arrived at EDR: 07/16/2024
Date Made Active in Reports: 10/07/2024
Number of Days to Update: 83
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Annually

UST EL SEGUNDO: City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: No Update Planned

UST LONG BEACH: City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 04/22/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 65
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

UST TORRANCE: City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 04/16/2024
Date Data Arrived at EDR: 04/17/2024
Date Made Active in Reports: 07/12/2024
Number of Days to Update: 86
Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA MADERA: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 08/10/2020
Date Data Arrived at EDR: 08/12/2020
Date Made Active in Reports: 10/23/2020
Number of Days to Update: 72
Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

MARIN COUNTY:

UST MARIN: Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 09/26/2018
Date Data Arrived at EDR: 10/04/2018
Date Made Active in Reports: 11/02/2018
Number of Days to Update: 29

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 09/18/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Semi-Annually

MENDOCINO COUNTY:

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/22/2021
Date Data Arrived at EDR: 11/18/2021
Date Made Active in Reports: 11/22/2021
Number of Days to Update: 4

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Annually

MERCED COUNTY:

CUPA MERCED: CUPA Facility List
CUPA facility list.

Date of Government Version: 10/08/2024
Date Data Arrived at EDR: 10/09/2024
Date Made Active in Reports: 10/31/2024
Number of Days to Update: 22

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 10/04/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

MONO COUNTY:

CUPA MONO: CUPA Facility List
CUPA Facility List

Date of Government Version: 02/22/2021
Date Data Arrived at EDR: 03/02/2021
Date Made Active in Reports: 05/19/2021
Number of Days to Update: 78

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA MONTEREY: CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 10/04/2021
Date Data Arrived at EDR: 10/06/2021
Date Made Active in Reports: 12/29/2021
Number of Days to Update: 84

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Varies

NAPA COUNTY:

LUST NAPA: Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: No Update Planned

UST NAPA: Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 09/05/2019
Date Data Arrived at EDR: 09/09/2019
Date Made Active in Reports: 10/31/2019
Number of Days to Update: 52

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA NEVADA: CUPA Facility List
CUPA facility list.

Date of Government Version: 04/23/2024
Date Data Arrived at EDR: 04/25/2024
Date Made Active in Reports: 06/26/2024
Number of Days to Update: 62

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

ORANGE COUNTY:

IND_SITE ORANGE: List of Industrial Site Cleanups Orange County
Petroleum and non-petroleum spills.

Date of Government Version: 08/06/2024
Date Data Arrived at EDR: 08/08/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 81

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/28/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Annually

LUST ORANGE: List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 08/06/2024
Date Data Arrived at EDR: 08/08/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 81

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/28/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Quarterly

UST ORANGE: List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 08/06/2024
Date Data Arrived at EDR: 08/08/2024
Date Made Active in Reports: 10/29/2024
Number of Days to Update: 82

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/28/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Quarterly

PLACER COUNTY:

MS PLACER: Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 08/22/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/06/2024
Number of Days to Update: 76

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA PLUMAS: CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 03/31/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/26/2019
Number of Days to Update: 64

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

RIVERSIDE COUNTY:

LUST RIVERSIDE: Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 06/11/2024
Date Data Arrived at EDR: 06/12/2024
Date Made Active in Reports: 06/27/2024
Number of Days to Update: 15

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: Quarterly

UST RIVERSIDE: Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 06/11/2024
Date Data Arrived at EDR: 06/12/2024
Date Made Active in Reports: 06/27/2024
Number of Days to Update: 15

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

CS SACRAMENTO: Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/07/2022
Date Data Arrived at EDR: 12/21/2022
Date Made Active in Reports: 03/16/2023
Number of Days to Update: 85

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 09/23/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Quarterly

ML SACRAMENTO: Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/07/2022
Date Data Arrived at EDR: 12/09/2022
Date Made Active in Reports: 03/01/2023
Number of Days to Update: 82

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 09/23/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA SAN BENITO: CUPA Facility List
Cupa facility list

Date of Government Version: 07/31/2024
Date Data Arrived at EDR: 08/01/2024
Date Made Active in Reports: 08/07/2024
Number of Days to Update: 6

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

PERMITS SAN BERNARDINO: Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 08/13/2024
Date Data Arrived at EDR: 08/14/2024
Date Made Active in Reports: 08/20/2024
Number of Days to Update: 6

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 10/28/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

HMMD SAN DIEGO: Hazardous Materials Management Division Database
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 08/22/2024
Date Data Arrived at EDR: 08/22/2024
Date Made Active in Reports: 11/06/2024
Number of Days to Update: 76

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 11/20/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Quarterly

LF SAN DIEGO: Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2023
Date Data Arrived at EDR: 01/31/2024
Date Made Active in Reports: 04/17/2024
Number of Days to Update: 77

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

SAN DIEGO CO LOP: Local Oversight Program Listing
A listing of all LOP release sites that are or were under the County of San Diego's jurisdiction. Included are closed or transferred cases, open cases, and cases that did not have a case type indicated. The cases without a case type are mostly complaints; however, some of them could be LOP cases.

Date of Government Version: 07/22/2021
Date Data Arrived at EDR: 10/19/2021
Date Made Active in Reports: 01/13/2022
Number of Days to Update: 86

Source: Department of Environmental Health
Telephone: 858-505-6874
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

SAN DIEGO CO SAM: Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

CUPA SAN FRANCISCO CO: CUPA Facility Listing
Cupa facilities

Date of Government Version: 07/29/2024
Date Data Arrived at EDR: 07/30/2024
Date Made Active in Reports: 10/17/2024
Number of Days to Update: 79
Source: San Francisco County Department of Environmental Health
Telephone: 415-252-3896
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

LUST SAN FRANCISCO: Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: No Update Planned

UST SAN FRANCISCO: Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 07/26/2024
Date Data Arrived at EDR: 07/30/2024
Date Made Active in Reports: 10/17/2024
Number of Days to Update: 79
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Quarterly

SAN FRANCISO COUNTY:

SAN FRANCISCO MAHER: Maher Ordinance Property Listing
a listing of properties that fall within a Maher Ordinance, for all of San Francisco

Date of Government Version: 07/15/2024
Date Data Arrived at EDR: 07/16/2024
Date Made Active in Reports: 10/09/2024
Number of Days to Update: 85
Source: San Francisco Planning
Telephone: 628-652-7483
Last EDR Contact: 10/16/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

SAN JOAQUIN COUNTY:

UST SAN JOAQUIN: San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 06/22/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 15
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/23/2024
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA SAN LUIS OBISPO: CUPA Facility List
Cupa Facility List.

Date of Government Version: 08/07/2024
Date Data Arrived at EDR: 08/08/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 81

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

SAN MATEO COUNTY:

BI SAN MATEO: Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 02/20/2020
Date Data Arrived at EDR: 02/20/2020
Date Made Active in Reports: 04/24/2020
Number of Days to Update: 64

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 09/05/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Annually

LUST SAN MATEO: Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/29/2019
Date Data Arrived at EDR: 03/29/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 61

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 11/26/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA SANTA BARBARA: CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: No Update Planned

SANTA CLARA COUNTY:

CUPA SANTA CLARA: Cupa Facility List
Cupa facility list

Date of Government Version: 08/12/2024
Date Data Arrived at EDR: 08/13/2024
Date Made Active in Reports: 10/28/2024
Number of Days to Update: 76

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

HIST LUST SANTA CLARA: HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LUST SANTA CLARA: LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 11/13/2024
Next Scheduled EDR Contact: 03/03/2025
Data Release Frequency: No Update Planned

SANTA CRUZ COUNTY:

CUPA SANTA CRUZ: CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/04/2025
Data Release Frequency: Varies

SITE MIT SANTA CRUZ: Site Mitigation Santa Cruz County List
Sites may become contaminated with toxic chemicals through illegal dumping or disposal, from leaking underground storage tanks, or through industrial or commercial activities.The goal of the site mitigation program is to protect the public health and the environment while facilitating completion of contaminated site clean-up projects in a timely manner.

Date of Government Version: 12/03/2018
Date Data Arrived at EDR: 06/23/2023
Date Made Active in Reports: 07/13/2023
Number of Days to Update: 20

Source: Santa Cruz Environmental Health Services
Telephone: 831-454-2761
Last EDR Contact: 11/06/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA SHASTA: CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Varies

SOLANO COUNTY:

LUST SOLANO: Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 06/04/2019
Date Data Arrived at EDR: 06/06/2019
Date Made Active in Reports: 08/13/2019
Number of Days to Update: 68

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Quarterly

UST SOLANO: Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 09/15/2021
Date Data Arrived at EDR: 09/16/2021
Date Made Active in Reports: 12/09/2021
Number of Days to Update: 84

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Quarterly

SONOMA COUNTY:

CUPA SONOMA: Cupa Facility List
Cupa Facility list

Date of Government Version: 07/02/2021
Date Data Arrived at EDR: 07/06/2021
Date Made Active in Reports: 07/14/2021
Number of Days to Update: 8

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 09/10/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Varies

LUST SONOMA: Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 06/30/2021
Date Made Active in Reports: 09/24/2021
Number of Days to Update: 86

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 09/10/2024
Next Scheduled EDR Contact: 12/30/2024
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA STANISLAUS: CUPA Facility List
Cupa facility list

Date of Government Version: 02/08/2022
Date Data Arrived at EDR: 02/10/2022
Date Made Active in Reports: 05/04/2022
Number of Days to Update: 83

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 10/02/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Varies

SUTTER COUNTY:

UST SUTTER: Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 07/29/2024
Date Data Arrived at EDR: 09/06/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 68

Source: Sutter County Environmental Health Services
Telephone: 530-822-7500
Last EDR Contact: 11/19/2024
Next Scheduled EDR Contact: 03/10/2025
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA TEHAMA: CUPA Facility List
Cupa facilities

Date of Government Version: 08/27/2024
Date Data Arrived at EDR: 08/28/2024
Date Made Active in Reports: 11/12/2024
Number of Days to Update: 76

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA TRINITY: CUPA Facility List
Cupa facility list

Date of Government Version: 07/11/2024
Date Data Arrived at EDR: 07/16/2024
Date Made Active in Reports: 10/03/2024
Number of Days to Update: 79

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

TULARE COUNTY:

CUPA TULARE: CUPA Facility List
Cupa program facilities

Date of Government Version: 10/07/2022
Date Data Arrived at EDR: 10/07/2022
Date Made Active in Reports: 12/21/2022
Number of Days to Update: 75

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/10/2025
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA TUOLUMNE: CUPA Facility List
Cupa facility list

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 61

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 10/09/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Varies

VENTURA COUNTY:

BWT VENTURA: Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 07/02/2024
Date Data Arrived at EDR: 07/17/2024
Date Made Active in Reports: 07/23/2024
Number of Days to Update: 6

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Quarterly

LF VENTURA: Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/18/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: No Update Planned

LUST VENTURA: Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 10/30/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: No Update Planned

MED WASTE VENTURA: Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 07/02/2024
Date Data Arrived at EDR: 07/18/2024
Date Made Active in Reports: 07/23/2024
Number of Days to Update: 5
Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 01/27/2025
Data Release Frequency: Quarterly

UST VENTURA: Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 08/27/2024
Date Data Arrived at EDR: 09/04/2024
Date Made Active in Reports: 11/13/2024
Number of Days to Update: 70
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/04/2024
Next Scheduled EDR Contact: 12/16/2024
Data Release Frequency: Quarterly

YOLO COUNTY:

UST YOLO: Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 06/20/2024
Date Data Arrived at EDR: 06/27/2024
Date Made Active in Reports: 09/24/2024
Number of Days to Update: 89
Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 09/18/2024
Next Scheduled EDR Contact: 01/06/2025
Data Release Frequency: Annually

YUBA COUNTY:

CUPA YUBA: CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 07/18/2024
Date Data Arrived at EDR: 07/19/2024
Date Made Active in Reports: 10/07/2024
Number of Days to Update: 80
Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 10/17/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 08/05/2024
Date Data Arrived at EDR: 08/06/2024
Date Made Active in Reports: 10/25/2024
Number of Days to Update: 80
Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 11/05/2024
Next Scheduled EDR Contact: 02/17/2025
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/16/2019
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 09/25/2024
Next Scheduled EDR Contact: 01/13/2025
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 11/30/2023
Date Made Active in Reports: 12/01/2023
Number of Days to Update: 1

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 10/24/2024
Next Scheduled EDR Contact: 02/03/2025
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 06/30/2018
Date Data Arrived at EDR: 07/19/2019
Date Made Active in Reports: 09/10/2019
Number of Days to Update: 53

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 10/03/2024
Next Scheduled EDR Contact: 01/20/2025
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 11/30/2021
Date Made Active in Reports: 02/18/2022
Number of Days to Update: 80

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 11/07/2024
Next Scheduled EDR Contact: 02/24/2025
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 76

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 11/27/2024
Next Scheduled EDR Contact: 03/17/2025
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: Endeavor Business Media
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data
Source: Endeavor Business Media
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005, 2010 and 2015 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

VACANT LAND
ROSAMOND BLVD AND 170TH STREET, WEST
ROSAMOND, CA 93560

TARGET PROPERTY COORDINATES

Latitude (North):	34.865474 - 34° 51' 55.71''
Longitude (West):	118.438007 - 118° 26' 16.83''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	368557.2
UTM Y (Meters):	3858870.8
Elevation:	2784 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	50004440 FAIRMONT BUTTE, CA
Version Date:	2021
North Map:	50004472 TYLERHORSE CANYON, CA
Version Date:	2021

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

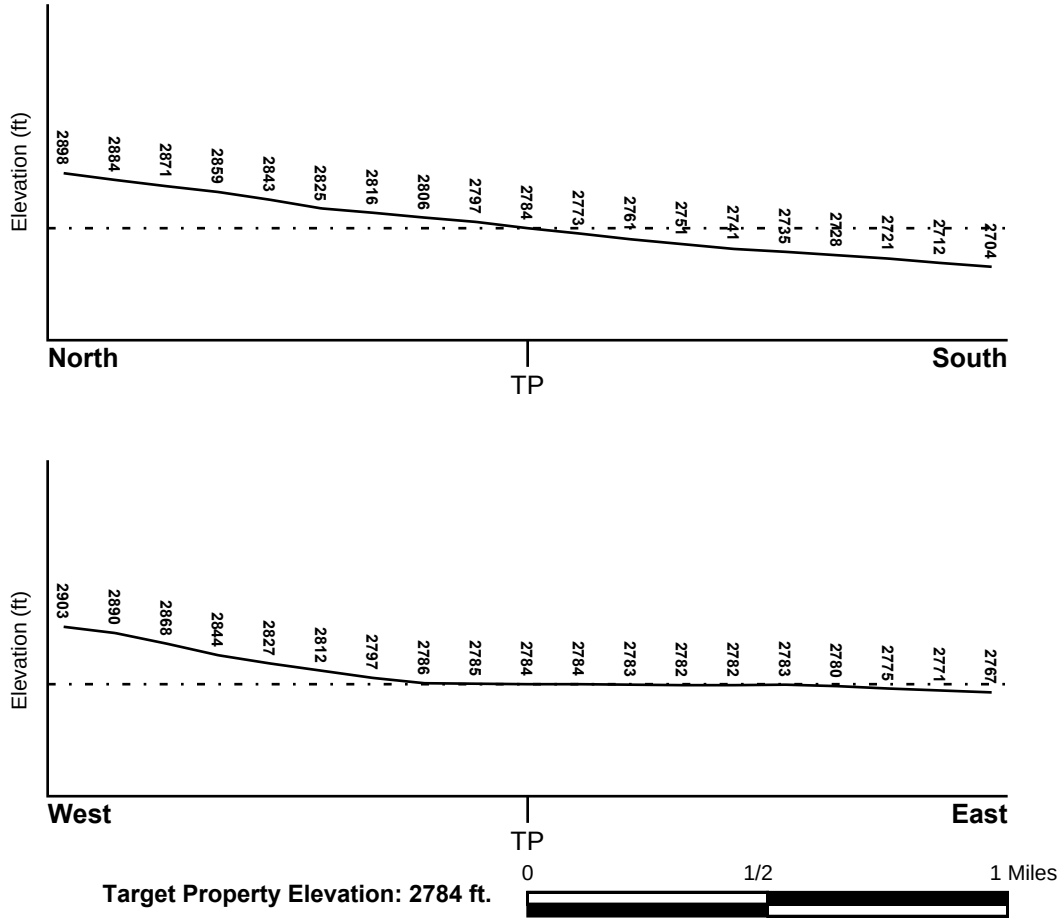
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06037C0125F	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
06029C3625E	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
FAIRMONT BUTTE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

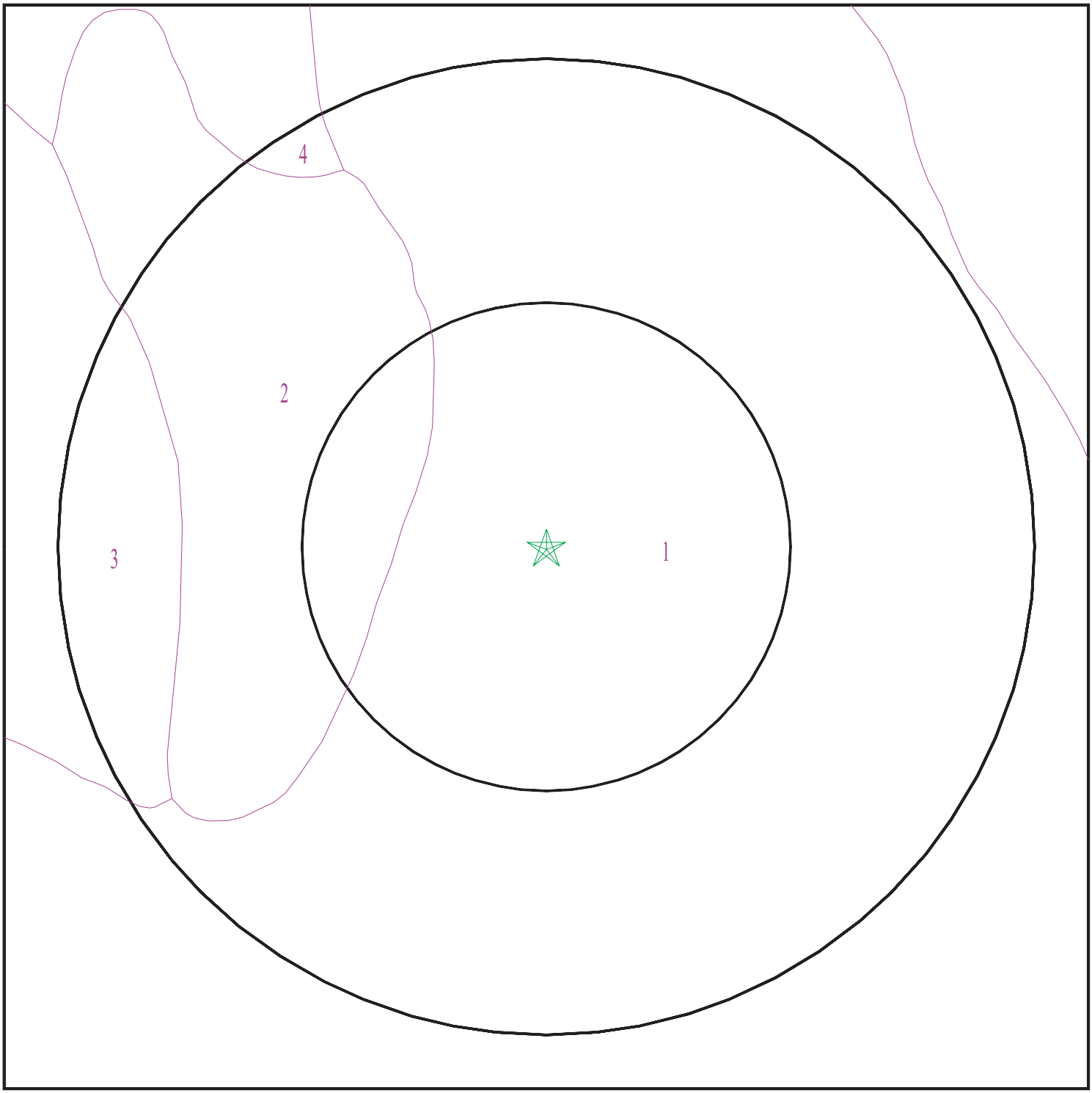
Era:	Cenozoic
System:	Quaternary
Series:	Quaternary
Code:	Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 7837412.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Vacant Land	CLIENT:	TRC Environmental Corporation
ADDRESS:	Rosamond Blvd and 170th Street, West Rosamond CA 93560	CONTACT:	Jim K Fickerson
LAT/LONG:	34.865474 / 118.438007	INQUIRY #:	7837412.2s
		DATE:	December 02, 2024 5:17 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Hesperia

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4
2	3 inches	53 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4
3	53 inches	77 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4

Soil Map ID: 2

Soil Component Name: Rosamond

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 7.9
2	7 inches	59 inches	stratified loam to silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 7.9

Soil Map ID: 3

Soil Component Name: Cajon

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4
2	9 inches	59 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4

Soil Map ID: 4

Soil Component Name: Hanford

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	coarse sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.8 Min: 6.6
2	7 inches	38 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.8 Min: 6.6
3	38 inches	70 inches	gravelly coarse sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.8 Min: 6.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

No PWS System Found

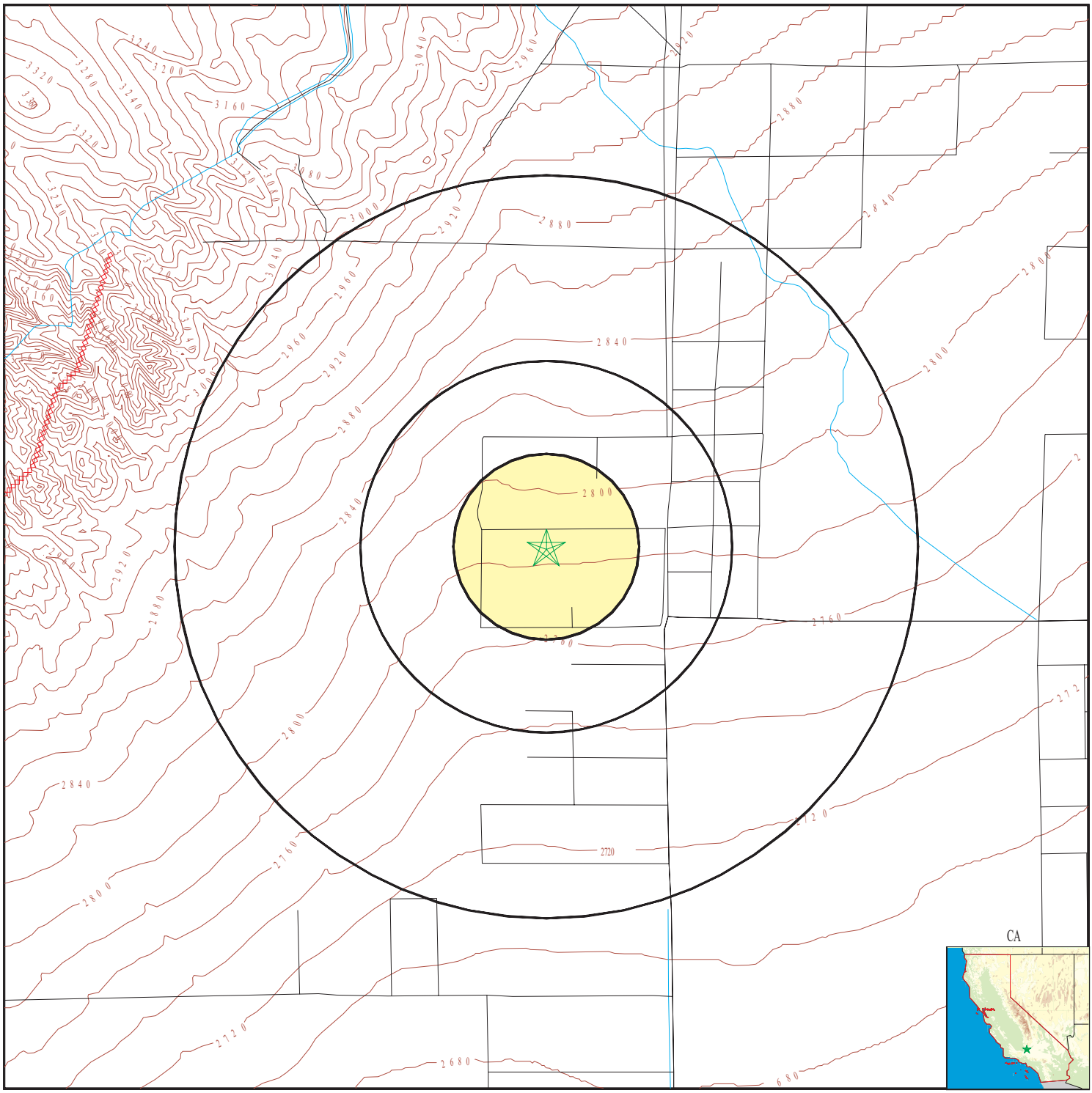
Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

No Wells Found

PHYSICAL SETTING SOURCE MAP - 7837412.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	Vacant Land	CLIENT:	TRC Environmental Corporation
ADDRESS:	Rosamond Blvd and 170th Street, West Rosamond CA 93560	CONTACT:	Jim K Fickerson
		INQUIRY #:	7837412.2s
LAT/LONG:	34.865474 / 118.438007	DATE:	December 02, 2024 5:17 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
93560	12	1

Federal EPA Radon Zone for KERN County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 93560

Number of sites tested: 2

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.250 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005, 2010 and 2015 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

OTHER STATE DATABASE INFORMATION

Groundwater Ambient Monitoring & Assessment Program
State Water Resources Control Board
Telephone: 916-341-5577
The GAMA Program is Californias comprehensive groundwater quality monitoring program. GAMA collects data by testing the untreated, raw water in different types of wells for naturally-occurring and man-made chemicals. The GAMA data includes Domestic, Monitoring and Municipal well types from the following sources, Department of Water Resources, Department of Heath Services, EDF, Agricultural Lands, Lawrence Livermore National Laboratory, Department of Pesticide Regulation, United States Geological Survey, Groundwater Ambient Monitoring and Assessment Program and Local Groundwater Projects.

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

Geothermal Wells Listing
Department of Conservation
Telephone: 916-445-9686
Geothermal well means a well constructed to extract or return water to the ground after it has been used for heating or cooling purposes. Geothermal wells in California (except for wells on federal leases which are administered by the Bureau of Land Management) are permitted, drilled, operated, and permanently sealed and closed (plugged and abandoned) under requirements and procedures administered by the Geothermal Section of the Department of Conservations Geologic Energy Management Division (CalGEM, formerly DOGGR).

California Oil and Gas Well Locations
Source: Dept of Conservation, Geologic Energy Management Division
Telephone: 916-323-1779
Oil and Gas well locations in the state.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

California Earthquake Fault Lines
Source: California Division of Mines and Geology
The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

RADON

State Database: CA Radon
Source: Department of Public Health
Telephone: 916-210-8558
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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Appendix B
Historical Research Documentation

Vacant Land

Rosamond Blvd and 170th Street, West

Rosamond, CA 93560

Inquiry Number: 7837412.3

December 02, 2024

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

12/02/24

Site Name:

Vacant Land
Rosamond Blvd and 170th Stre
Rosamond, CA 93560
EDR Inquiry # 7837412.3

Client Name:

TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, OH 45242
Contact: Jim K Fickerson

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by TRC Environmental Corporation were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 6C3D-4E07-8012

PO # NA

Project 552398

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 6C3D-4E07-8012

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

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Inquiry Number:

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

12/02/24

Site Name:

Vacant Land
Rosamond Blvd and 170th Stre
Rosamond, CA 93560
EDR Inquiry # 7837412.4

Client Name:

TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, OH 45242
Contact: Jim K Fickerson

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by TRC Environmental Corporation were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA
Project: 552398

Coordinates:

Latitude:	34.865474 34° 51' 56" North
Longitude:	-118.438007 -118° 26' 17" West
UTM Zone:	Zone 11 North
UTM X Meters:	368560.26
UTM Y Meters:	3859067.83
Elevation:	2783.88' above sea level

Maps Provided:

2021	1943
2018	1917
2015	1915
2012	
1995	
1974	
1965	
1947	

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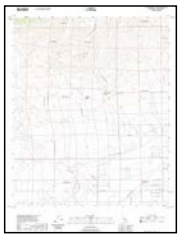
Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2021 Source Sheets



Fairmont Butte
2021
7.5-minute, 24000

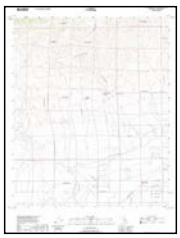


Tylerhorse Canyon
2021
7.5-minute, 24000

2018 Source Sheets



Fairmont Butte
2018
7.5-minute, 24000



Tylerhorse Canyon
2018
7.5-minute, 24000

2015 Source Sheets



Fairmont Butte
2015
7.5-minute, 24000



Tylerhorse Canyon
2015
7.5-minute, 24000

2012 Source Sheets



Fairmont Butte
2012
7.5-minute, 24000



Tylerhorse Canyon
2012
7.5-minute, 24000

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1995 Source Sheets

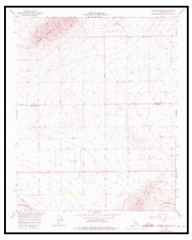


Tylerhorse Canyon
1995
7.5-minute, 24000
Aerial Photo Revised 1989



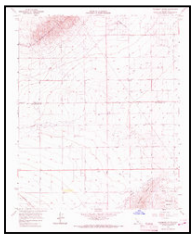
Fairmont Butte
1995
7.5-minute, 24000
Aerial Photo Revised 1994

1974 Source Sheets



Fairmont Butte
1974
7.5-minute, 24000
Aerial Photo Revised 1974

1965 Source Sheets



Fairmont Butte
1965
7.5-minute, 24000
Aerial Photo Revised 1963



Tylerhorse Canyon
1965
7.5-minute, 24000
Aerial Photo Revised 1963

1947 Source Sheets



WILLOW SPRINGS
1947
15-minute, 50000

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1943 Source Sheets



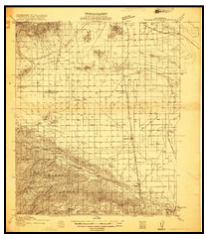
Willow Springs
1943
15-minute, 62500
Aerial Photo Revised 1943

1917 Source Sheets



Elizabeth Lake
1917
30-minute, 125000

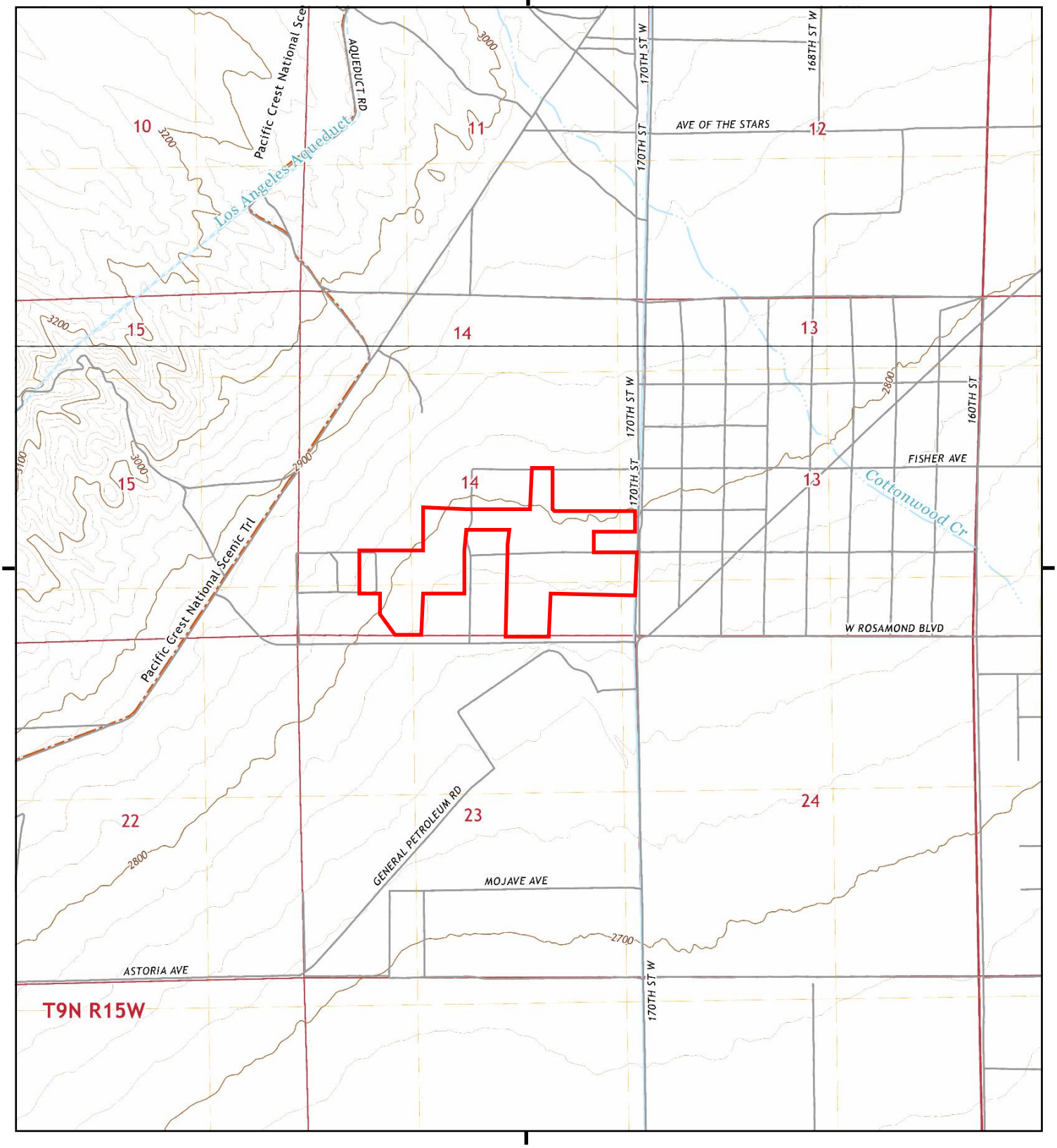
1915 Source Sheets



Elizabeth Lake
1915
30-minute, 96000

Historical Topo Map

2021



This report includes information from the following map sheet(s).

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NW N NE
W E
SW S SE

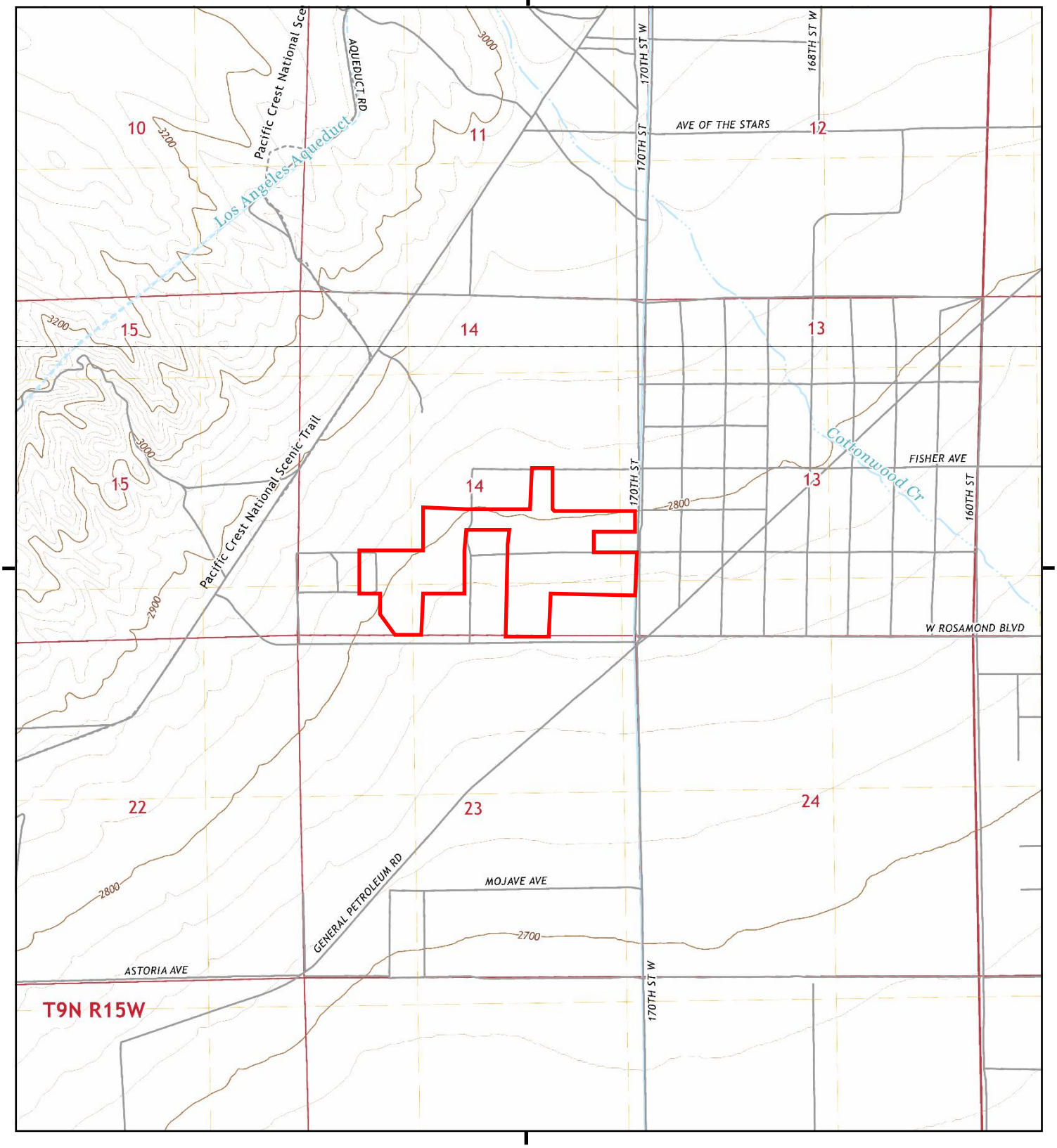
TP, Fairmont Butte, 2021, 7.5-minute
N, Tylerhorse Canyon, 2021, 7.5-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N

Historical Topo Map

2018



This report includes information from the following map sheet(s).

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NW N NE
W E
SW S SE

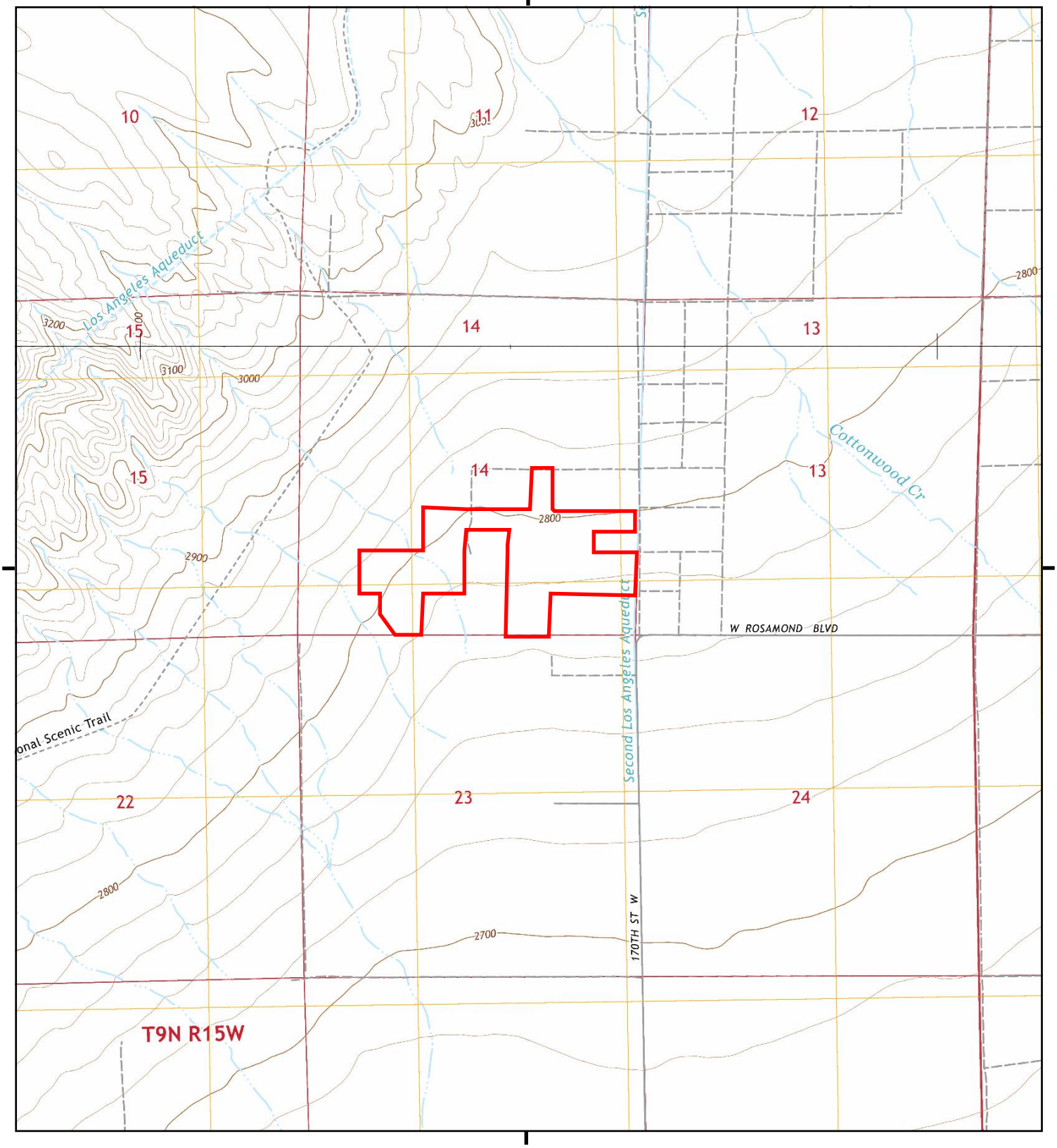
TP, Fairmont Butte, 2018, 7.5-minute
N, Tylerhorse Canyon, 2018, 7.5-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N

Historical Topo Map

2015



This report includes information from the following map sheet(s).

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W E
SW S SE

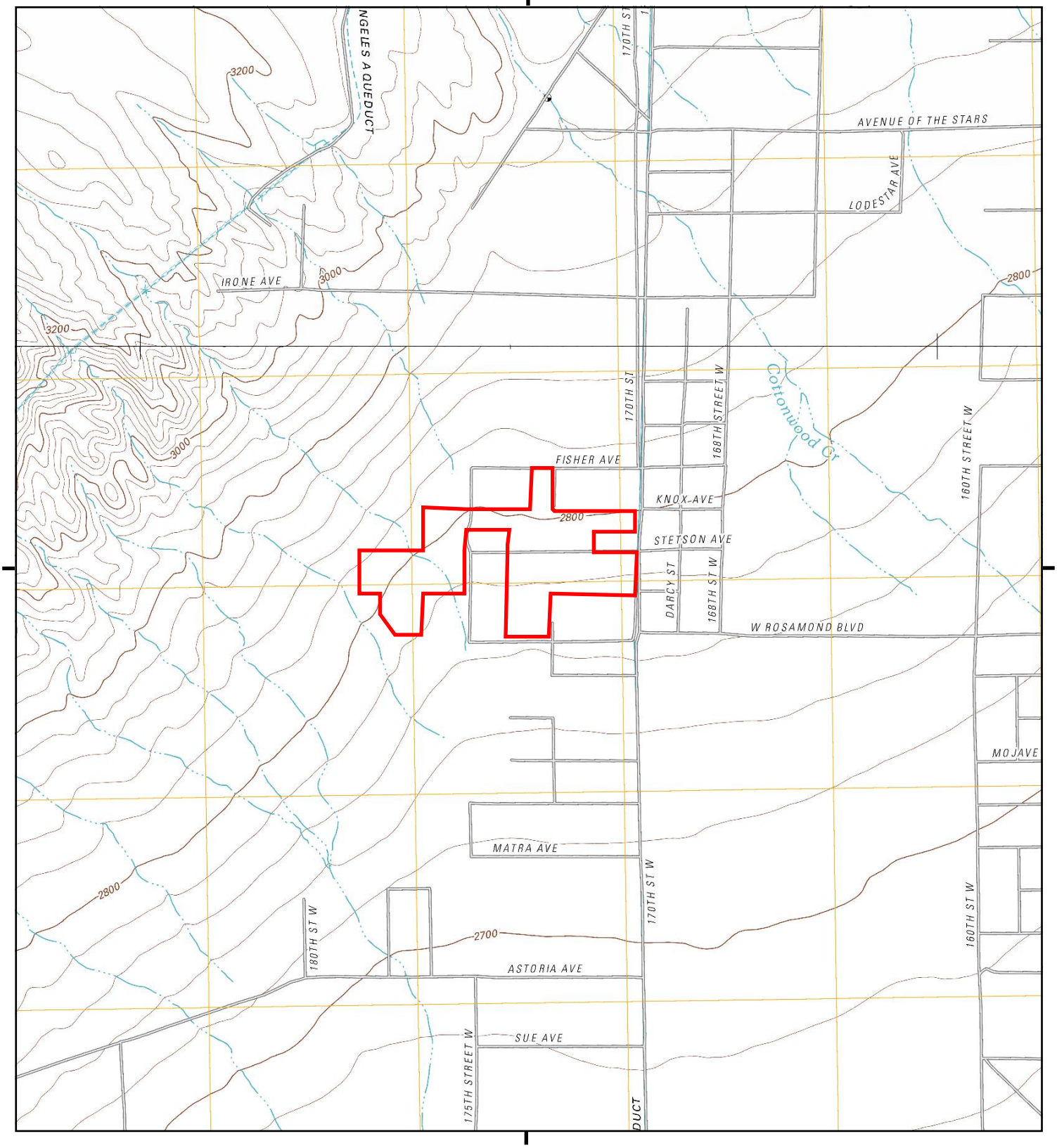
TP, Fairmont Butte, 2015, 7.5-minute
N, Tylerhorse Canyon, 2015, 7.5-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N

Historical Topo Map

2012



This report includes information from the following map sheet(s).

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NW N NE
W E
SW S SE

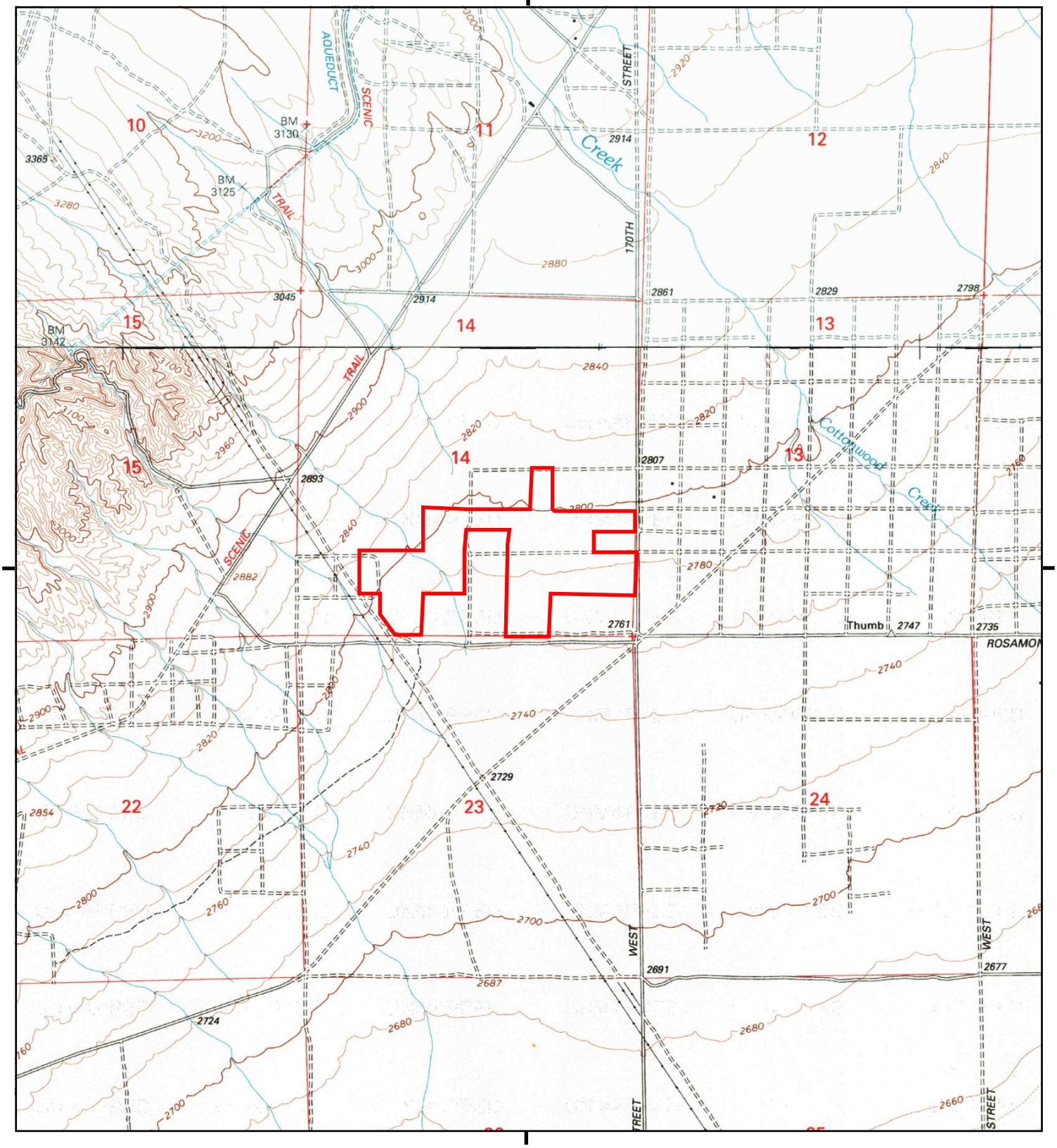
TP, Fairmont Butte, 2012, 7.5-minute
N, Tylerhorse Canyon, 2012, 7.5-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West
Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N

Historical Topo Map

1995



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

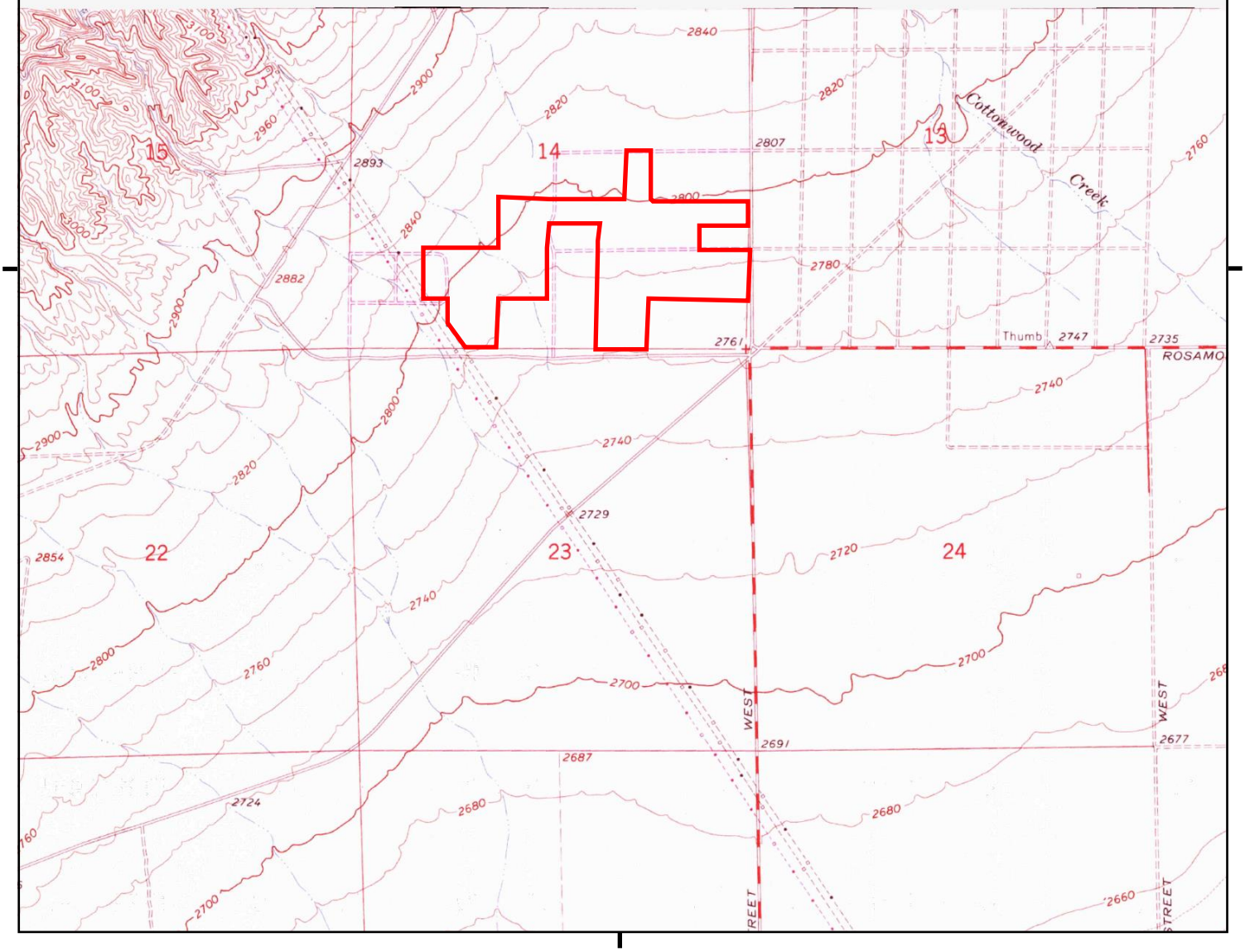
NW N NE
W E
SW S SE

TP, Fairmont Butte, 1995, 7.5-minute
N, Tylerhorse Canyon, 1995, 7.5-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West
Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N

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This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

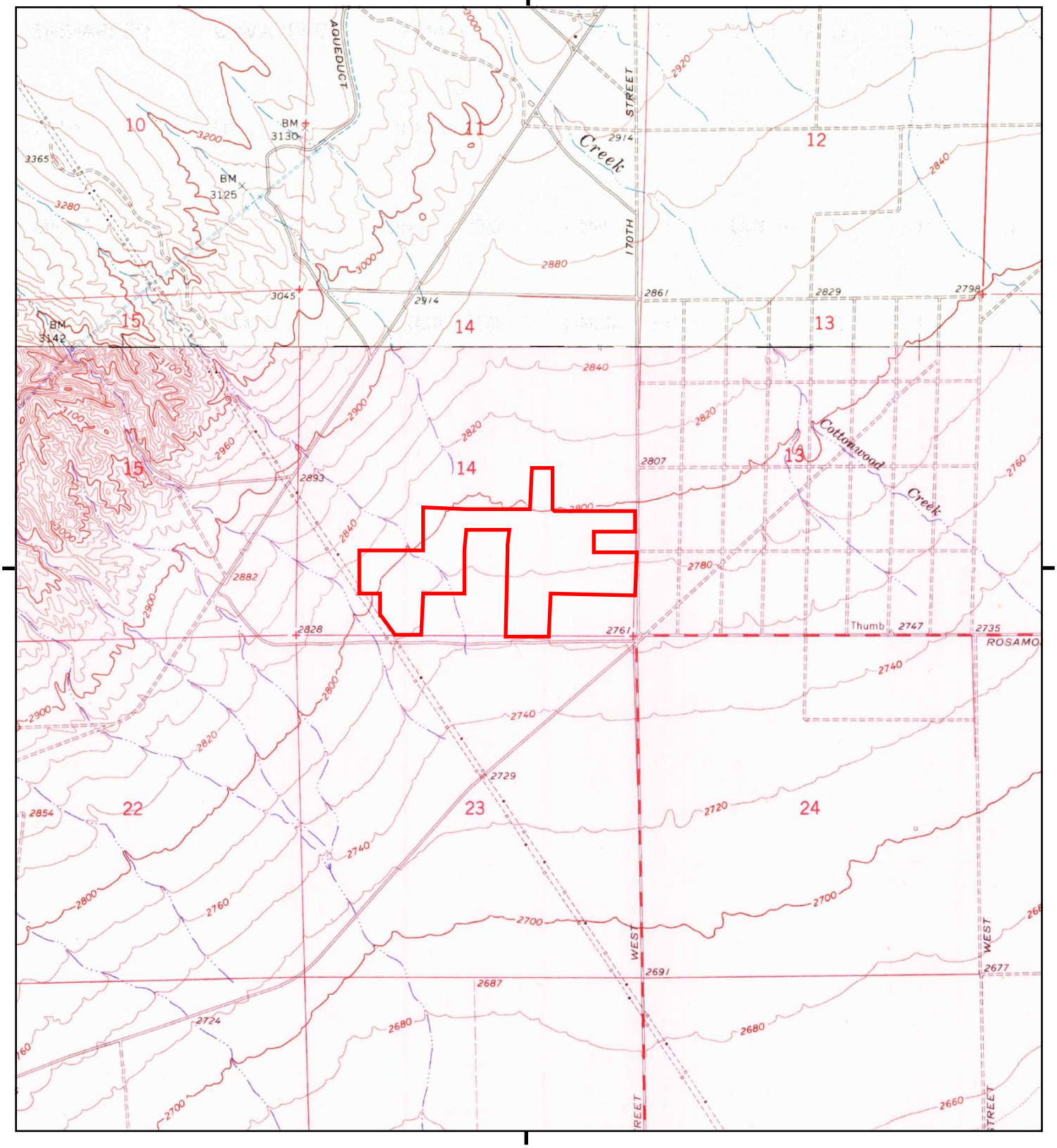
TP, Fairmont Butte, 1974, 7.5-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West
Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N

Historical Topo Map

1965



This report includes information from the following map sheet(s).

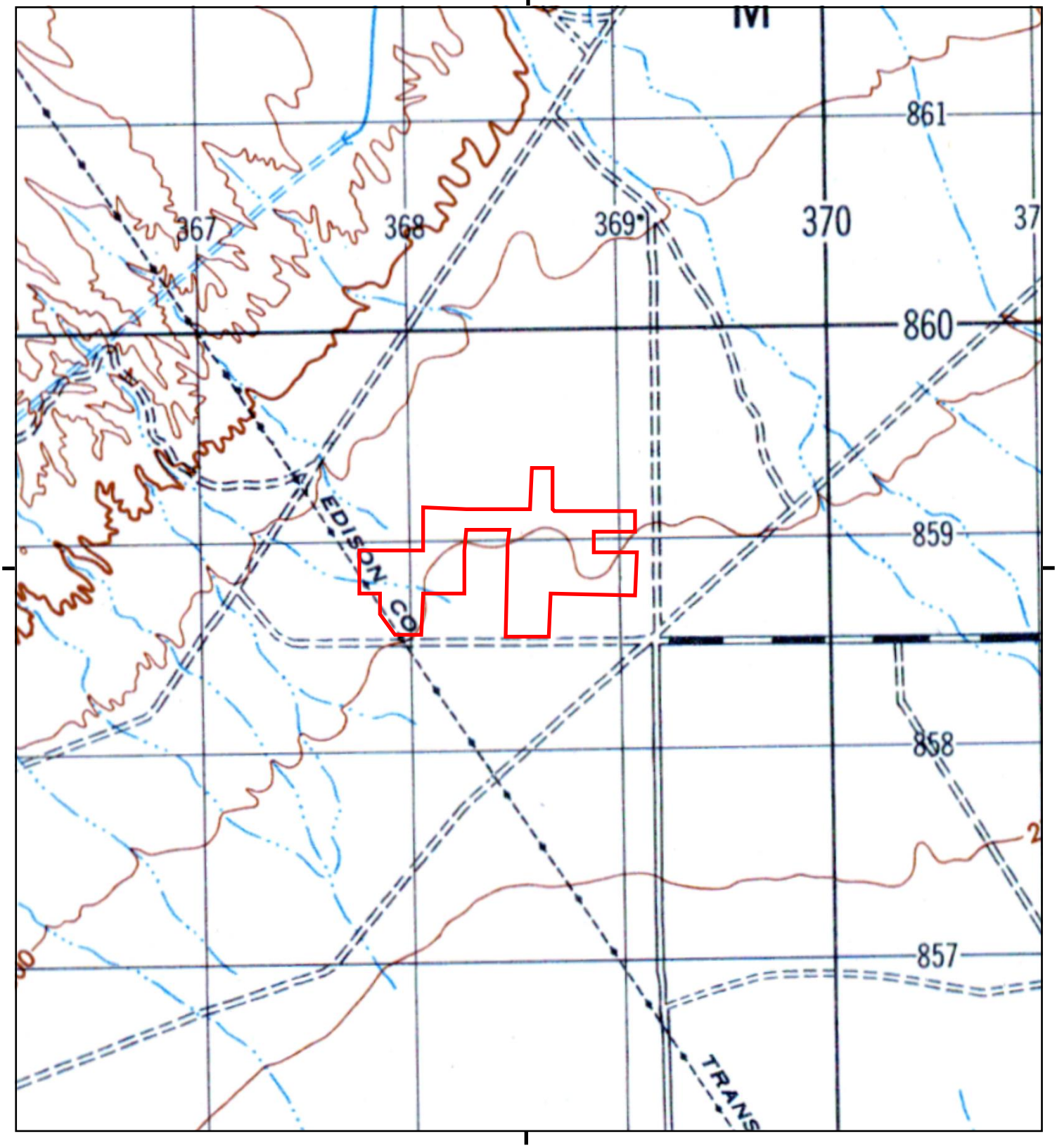
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Fairmont Butte, 1965, 7.5-minute
N, Tylerhorse Canyon, 1965, 7.5-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West
Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N



This report includes information from the following map sheet(s).

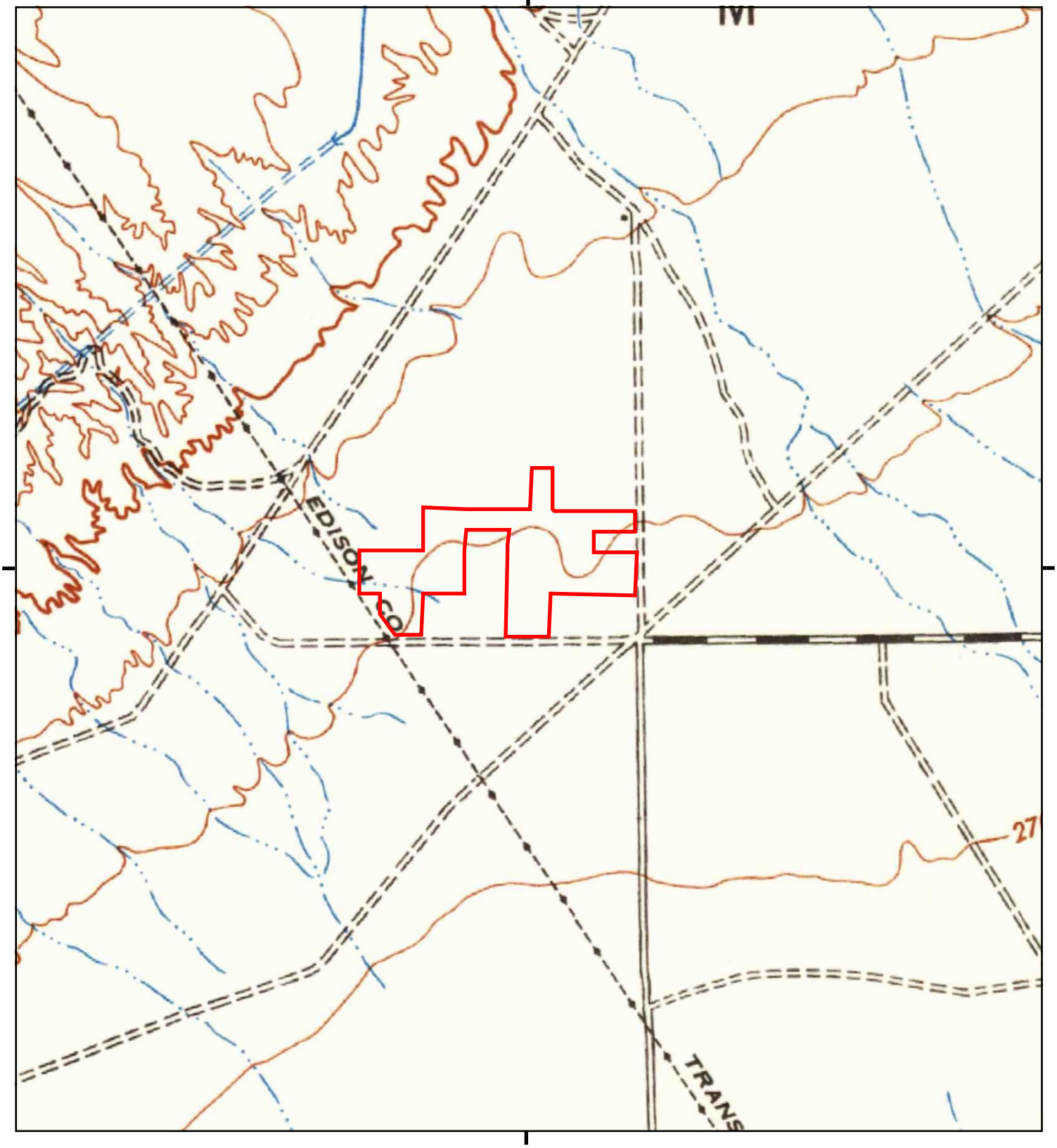
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, WILLOW SPRINGS, 1947, 15-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West
Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N



This report includes information from the following map sheet(s).

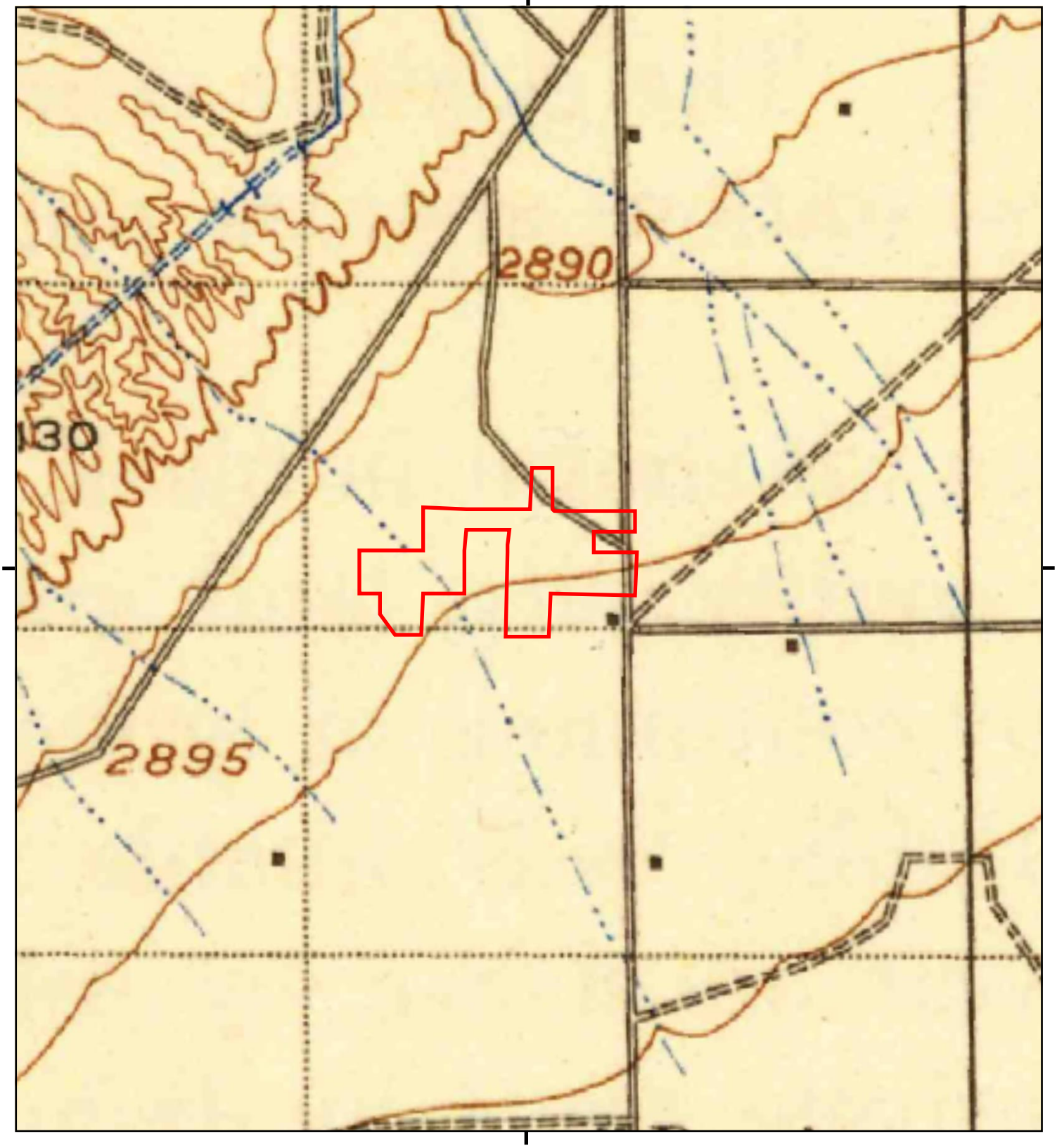
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Willow Springs, 1943, 15-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West
Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N



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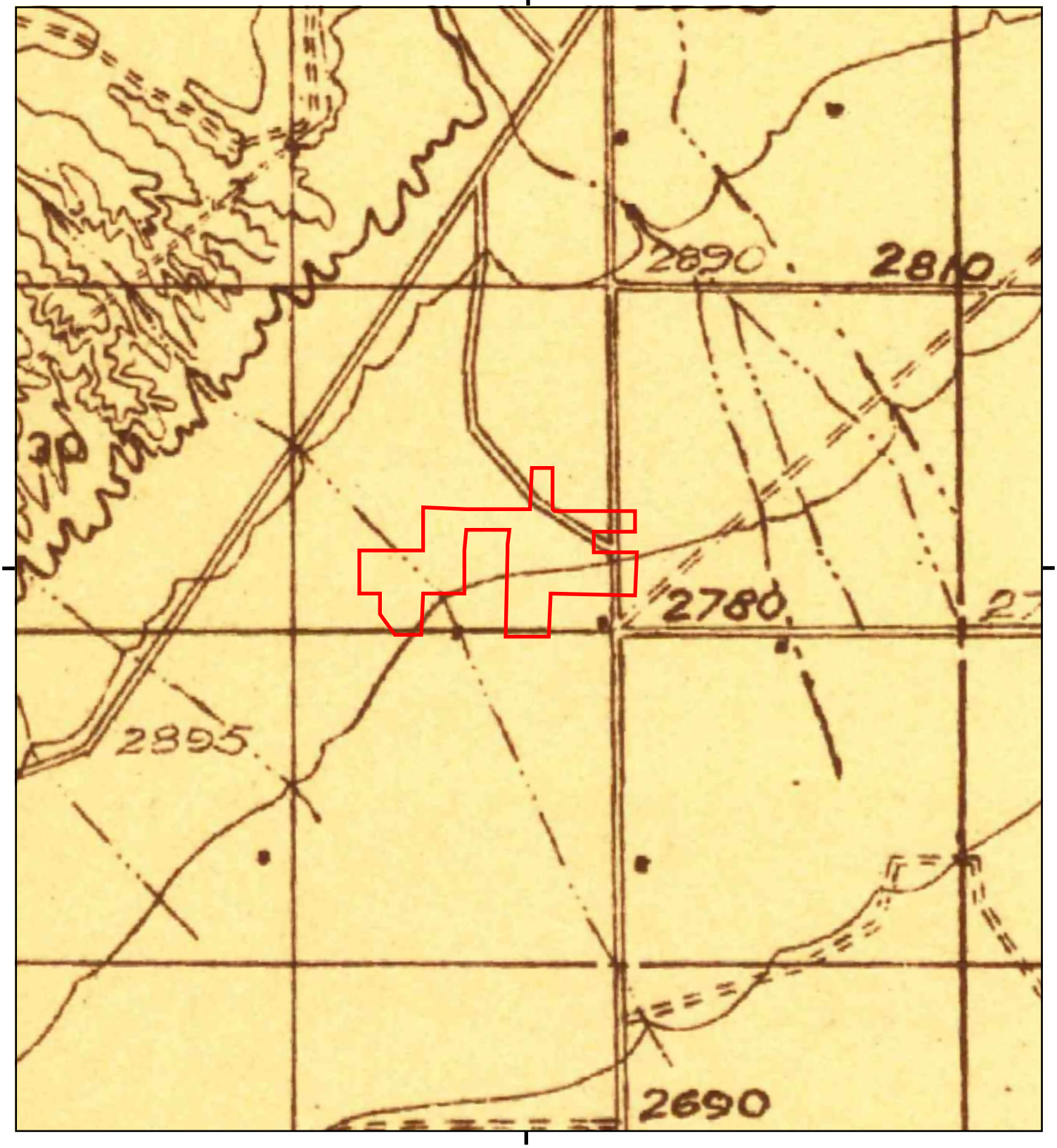
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Elizabeth Lake, 1917, 30-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Elizabeth Lake, 1915, 30-minute

SITE NAME: Vacant Land
ADDRESS: Rosamond Blvd and 170th Street, West
Rosamond, CA 93560
CLIENT: TRC Environmental Corporation

N

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

12/03/24

Site Name:

Vacant Land
Rosamond Blvd and 170th Stre
Rosamond, CA 93560
EDR Inquiry # 7837412.8

Client Name:

TRC Environmental Corporation
11231 Cornell Park Drive
Cincinnati, OH 45242
Contact: Jim K Fickerson

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Search Results:

Year	Scale	Details	Source
2020	1"=625'	Flight Year: 2020	USDA/NAIP
2016	1"=625'	Flight Year: 2016	USDA/NAIP
2012	1"=625'	Flight Year: 2012	USDA/NAIP
2009	1"=625'	Flight Year: 2009	USDA/NAIP
2006	1"=625'	Flight Year: 2006	USDA/NAIP
1994	1"=625'	Acquisition Date: January 01, 1994	USGS/DOQQ
1986	1"=625'	Flight Date: August 16, 1986	USDA
1977	1"=625'	Flight Date: June 04, 1977	USGS
1973	1"=625'	Flight Date: May 01, 1973	USDA
1968	1"=625'	Flight Date: April 25, 1968	Teledyne
1952	1"=500'	Flight Date: January 01, 1952	USDA
1948	1"=625'	Flight Date: November 20, 1948	USDA

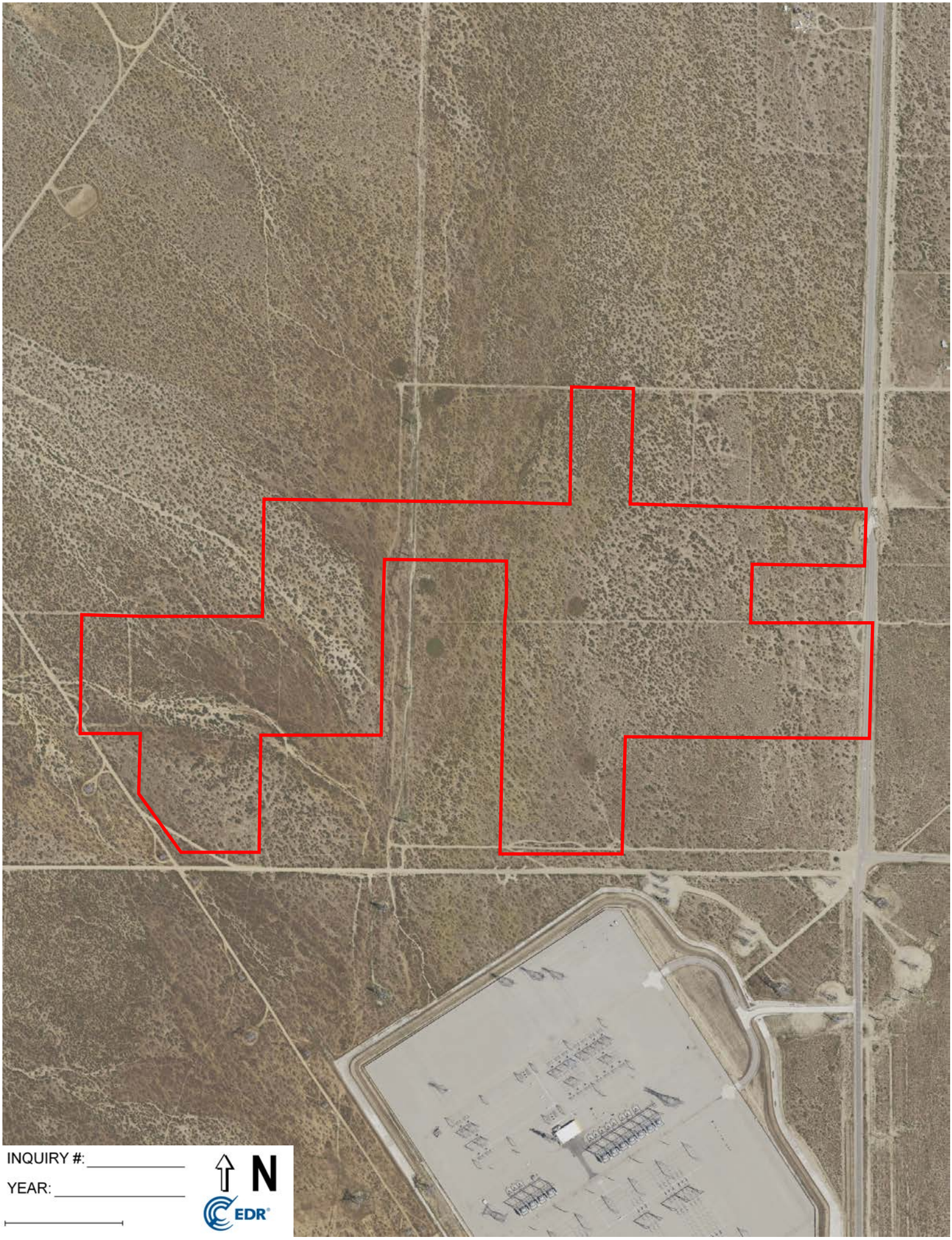
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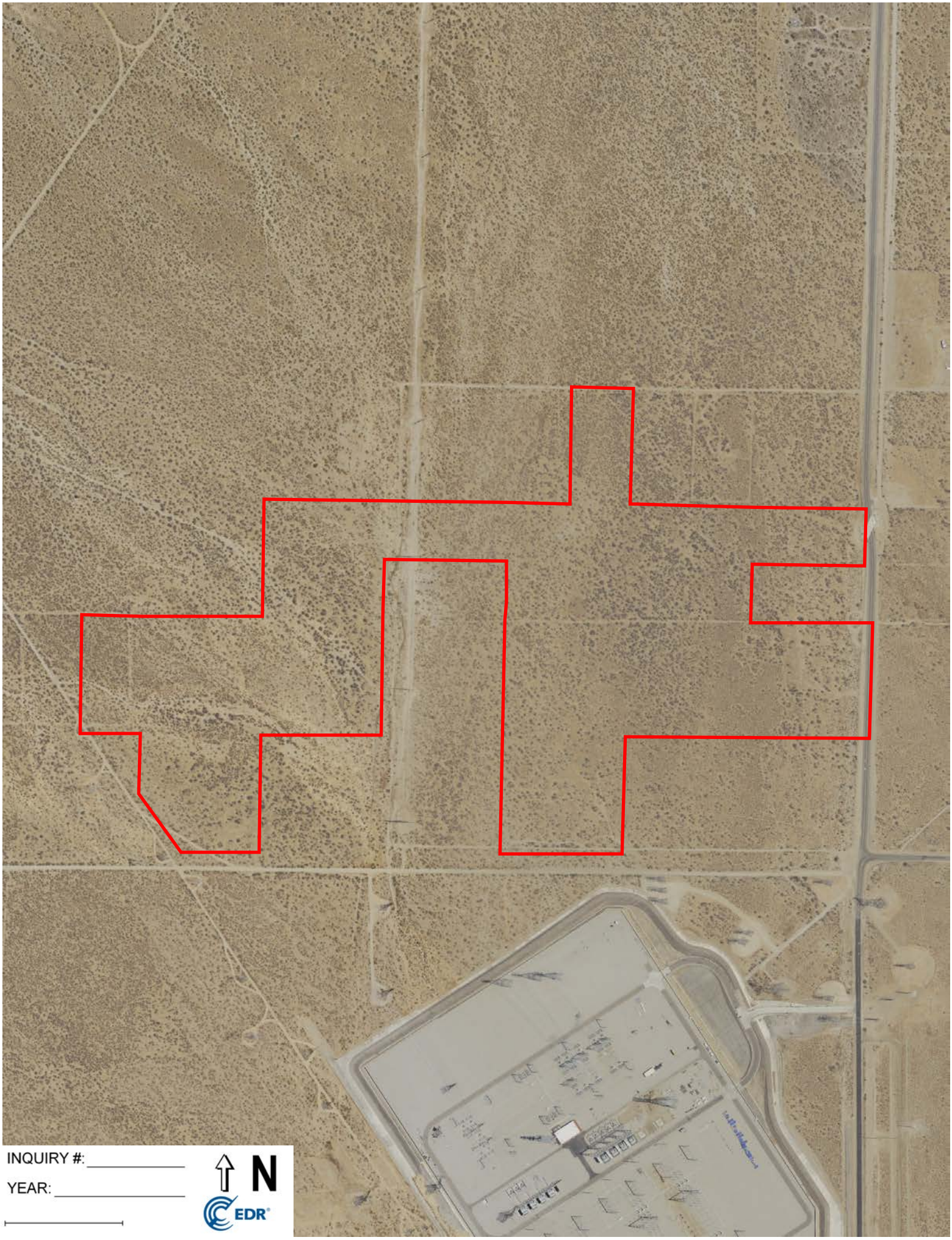


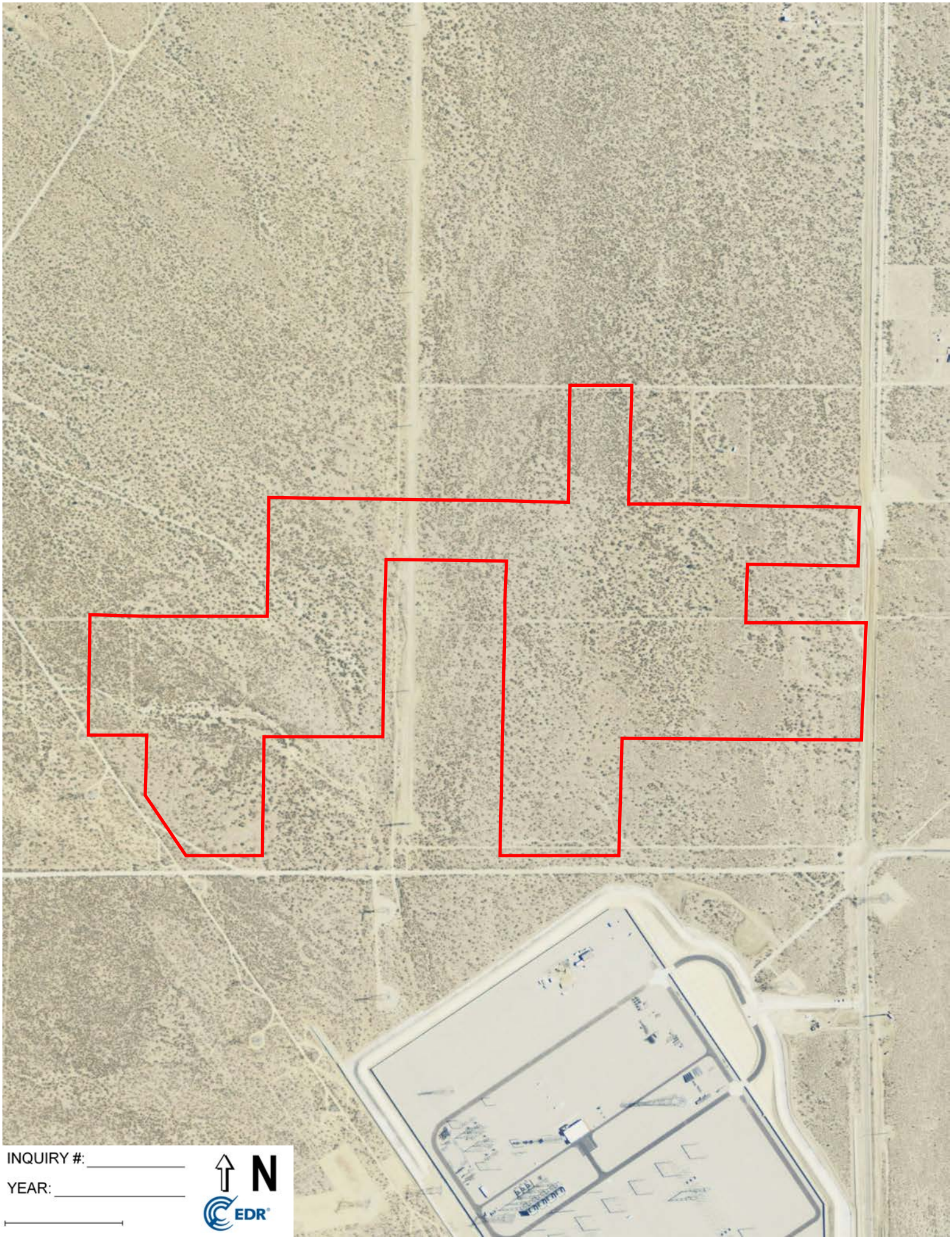
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YEAR: _____

N

EDR


INQUIRY #:
YEAR:
N
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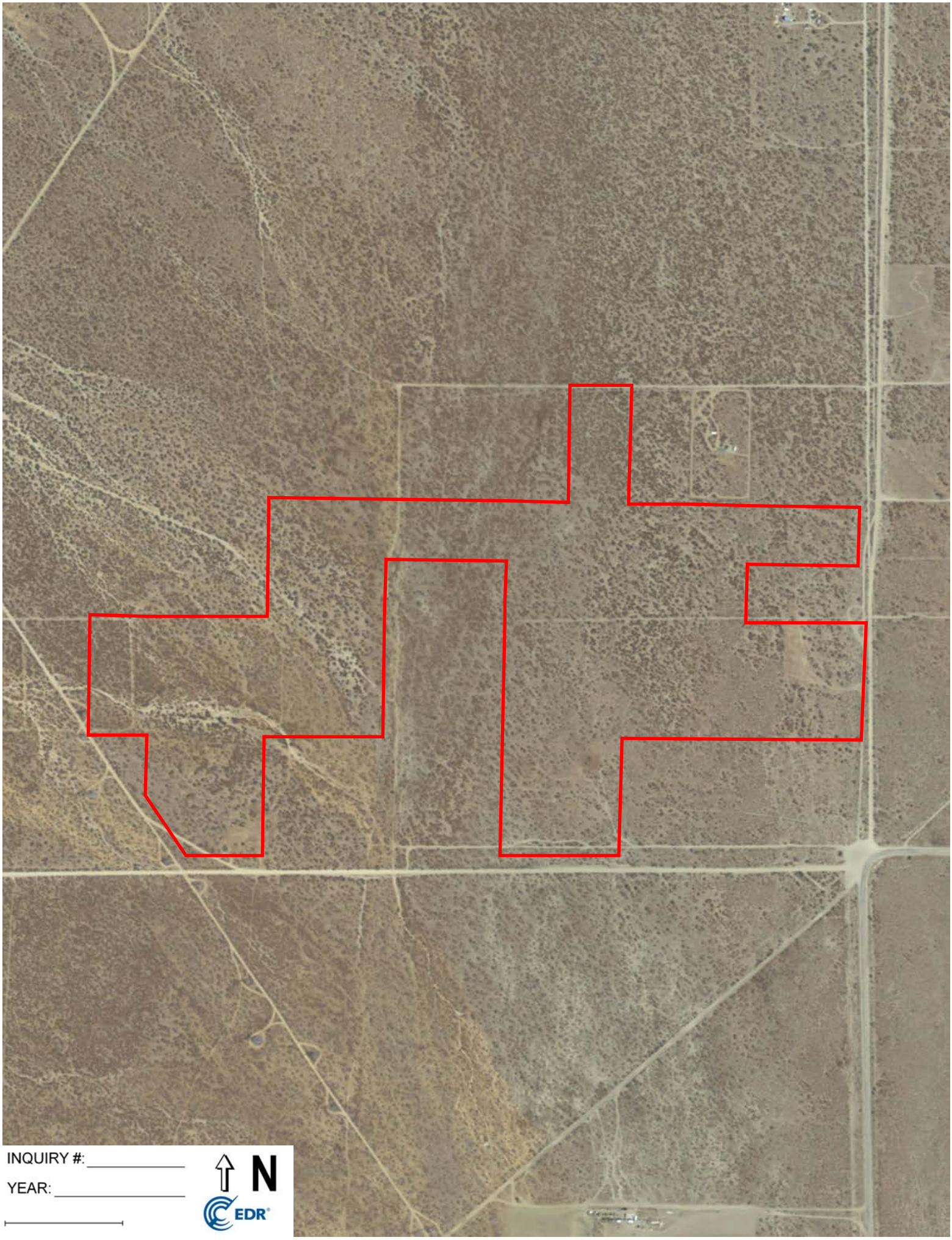


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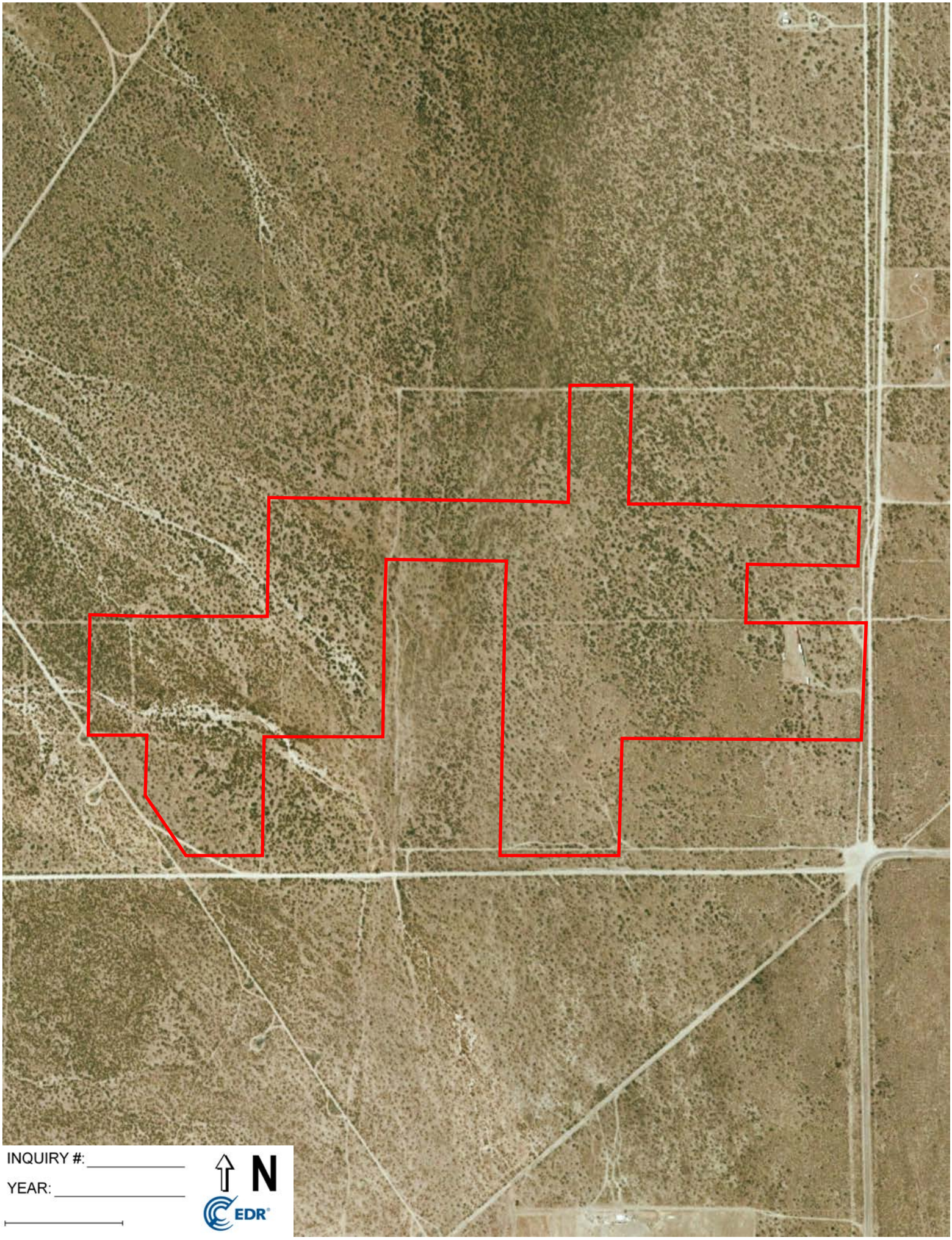


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EDR

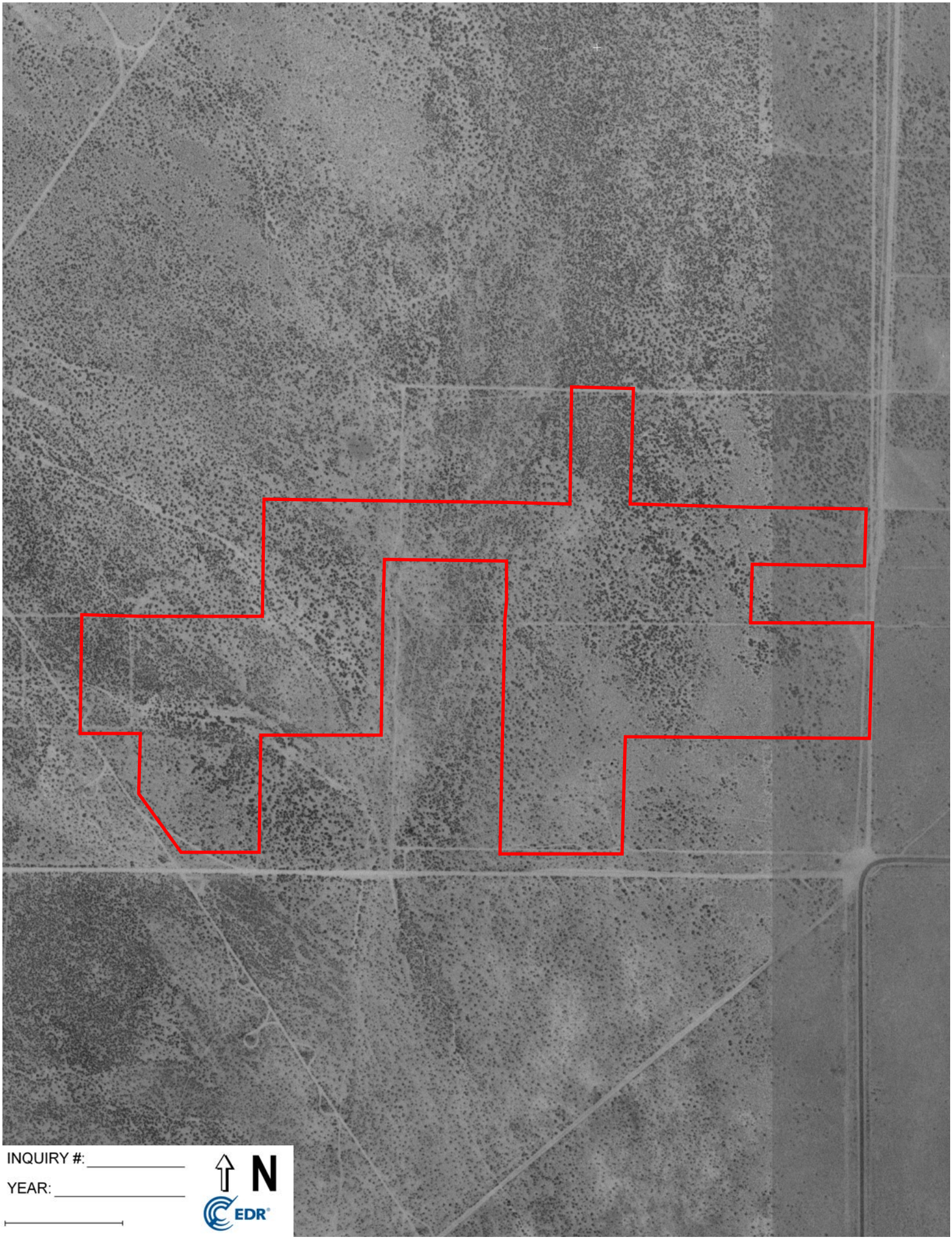


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EDR

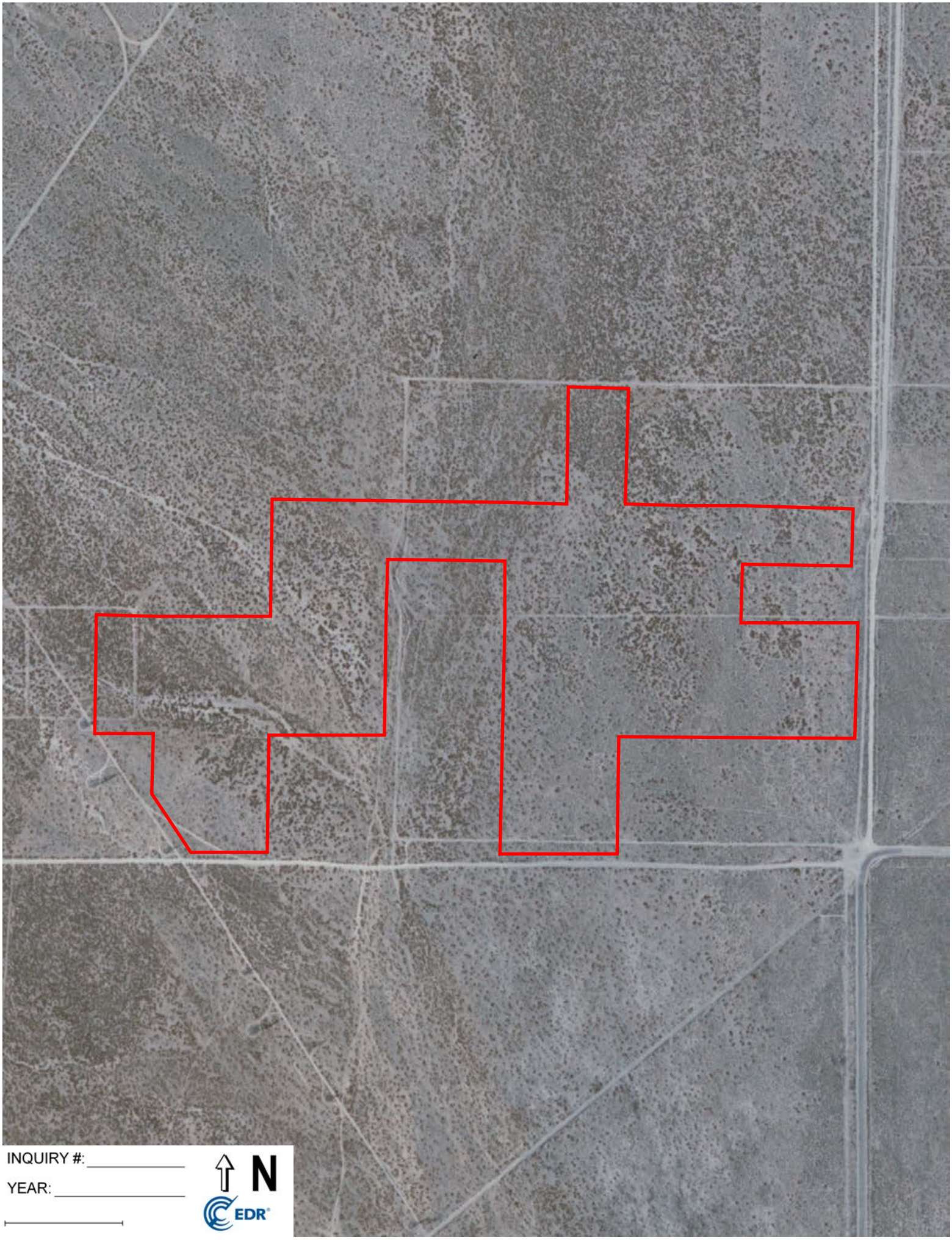


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YEAR: _____

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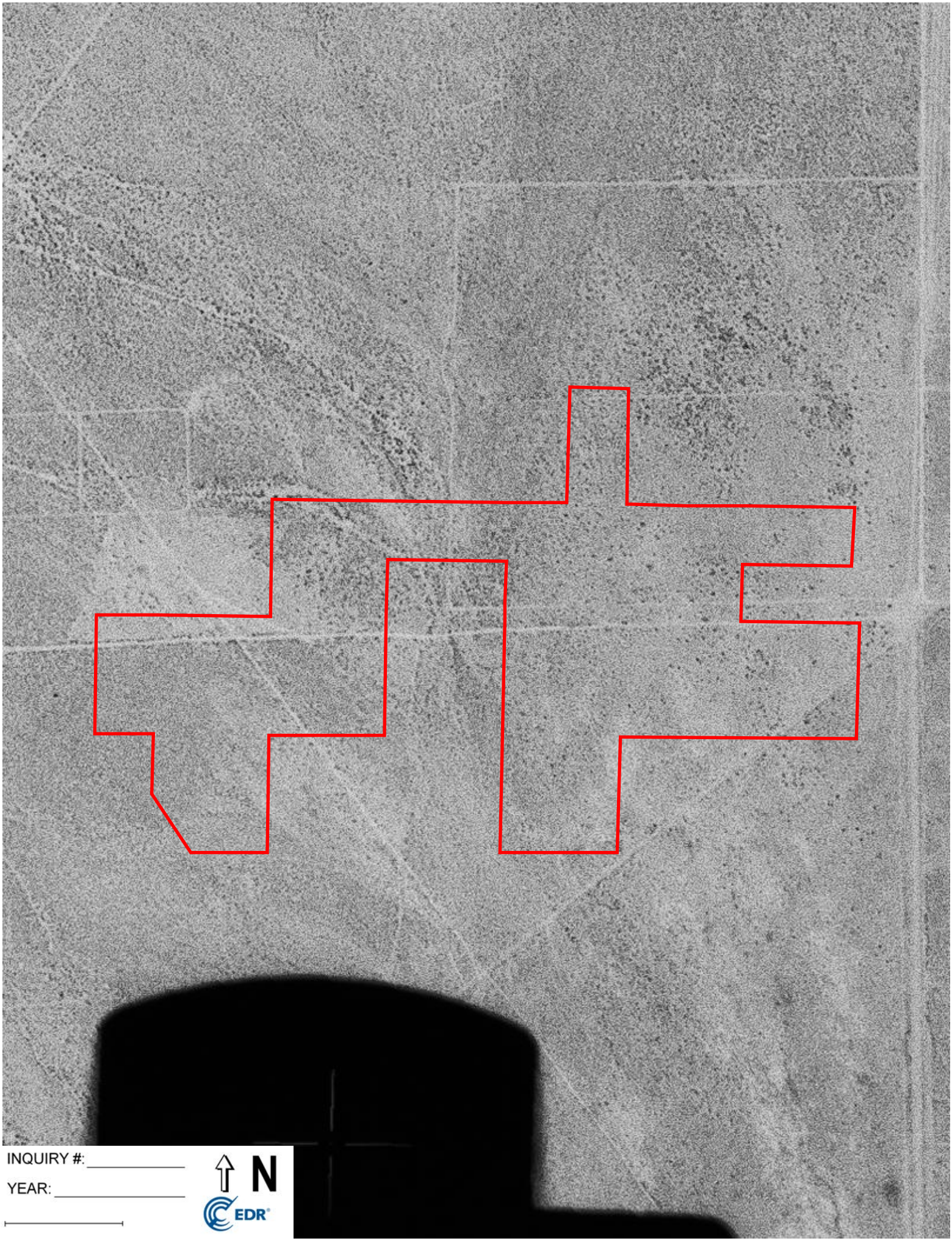


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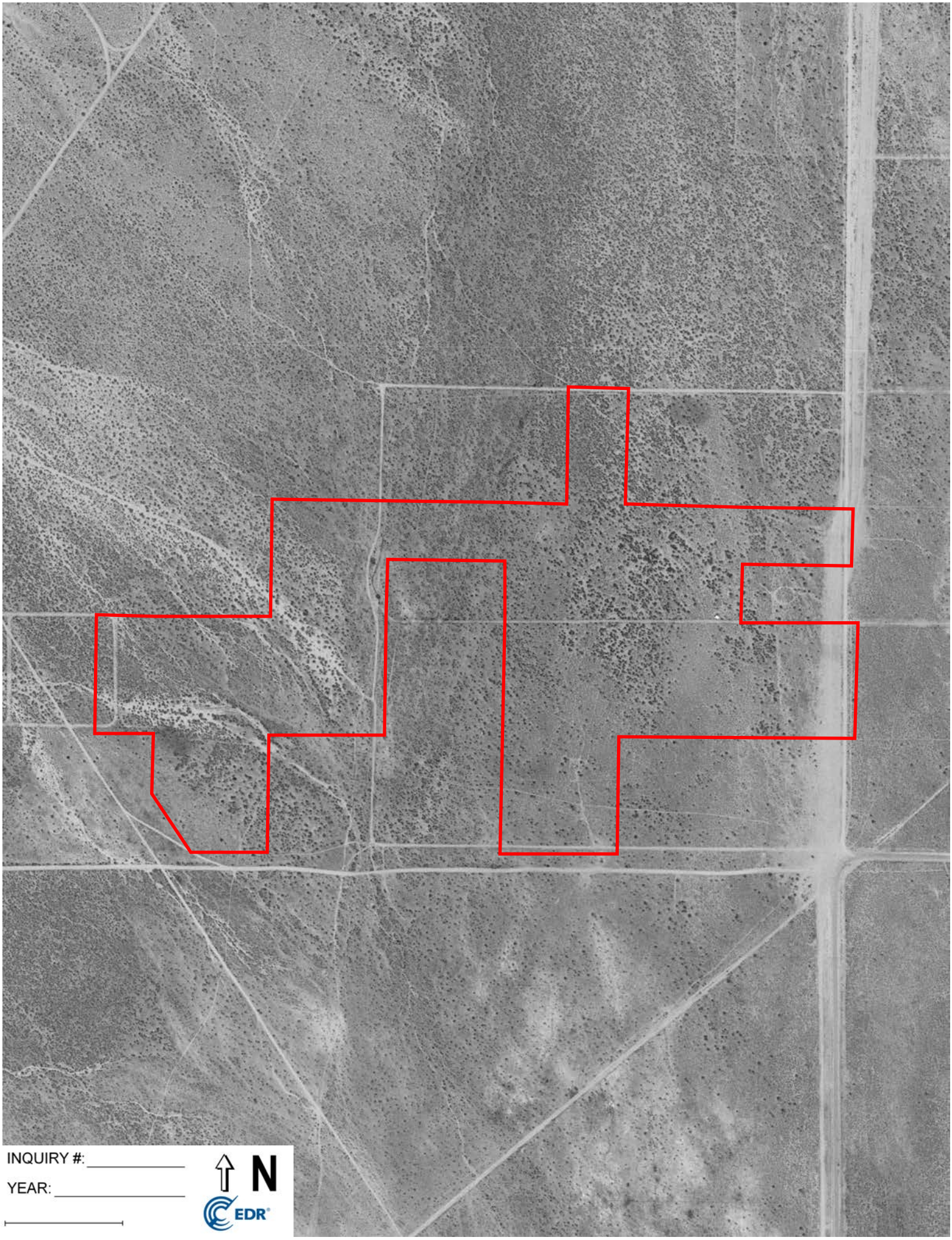


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YEAR: _____

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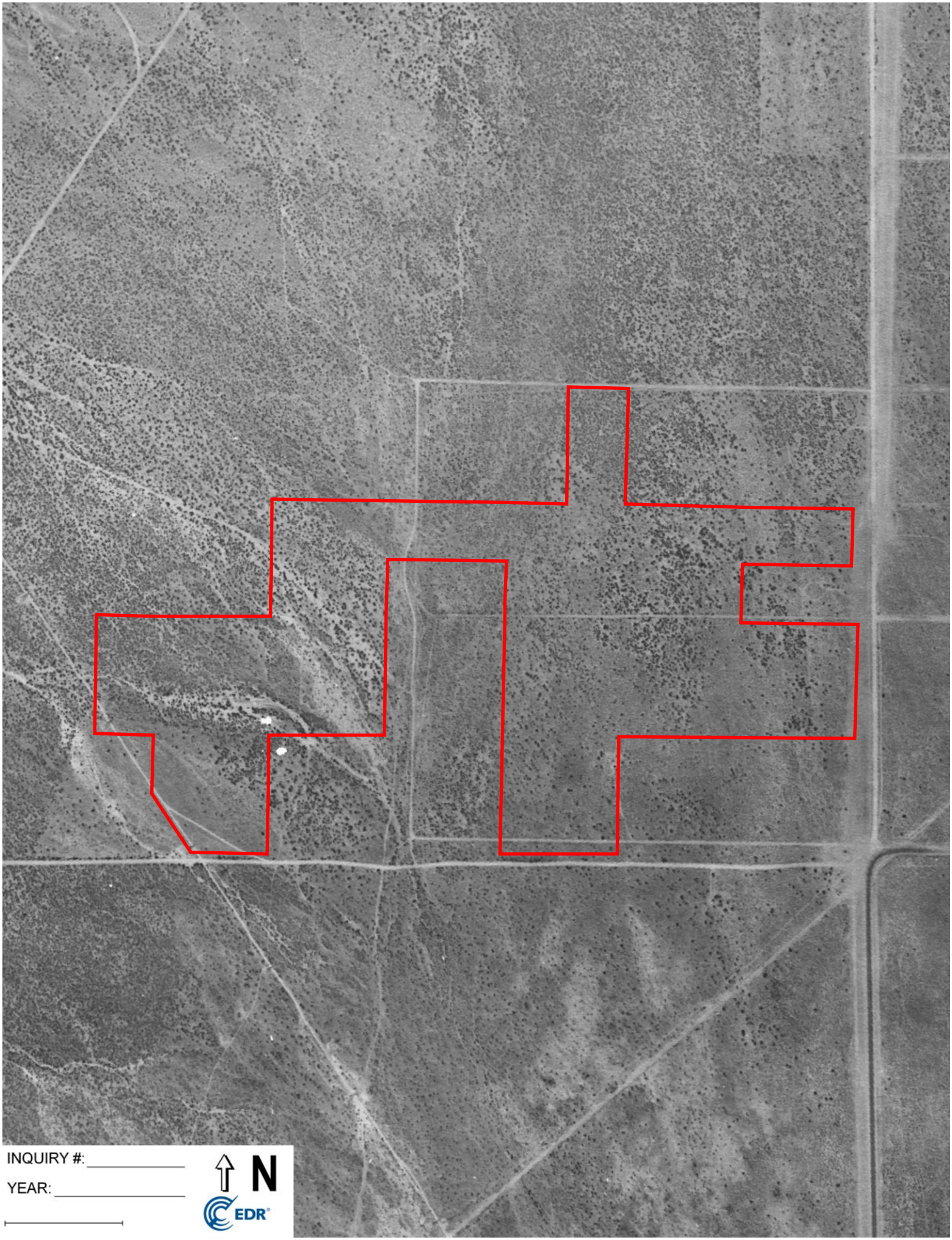


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INQUIRY #: _____

YEAR: _____

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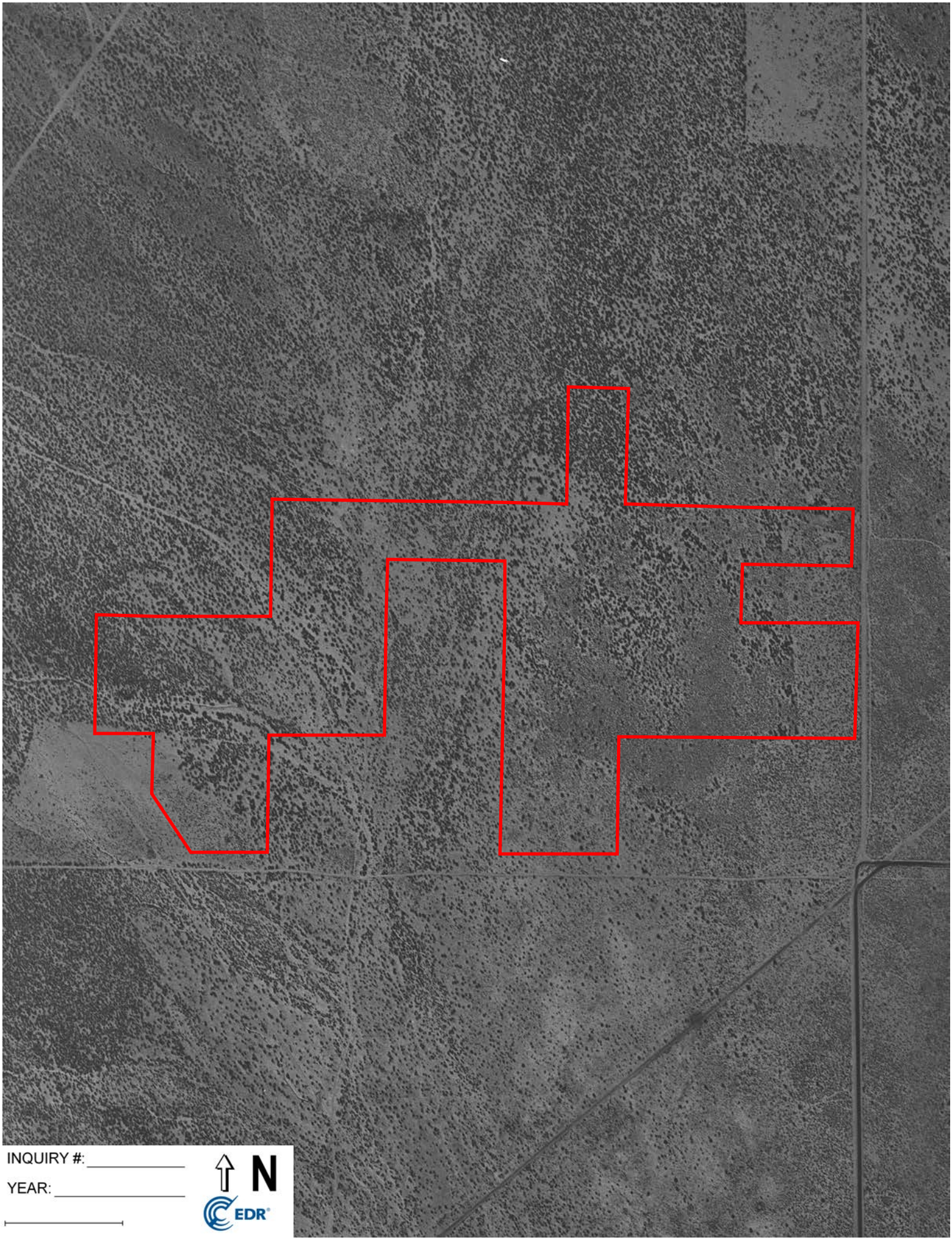
INQUIRY #:

YEAR:

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.



INQUIRY #: _____

YEAR: _____

N

EDR

Vacant Land
Rosamond Blvd and 170th Street, West
Rosamond, CA 93560

Inquiry Number: 7837412.5
December 05, 2024

The EDR-City Directory Image Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

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with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available business directory data at approximately five year intervals.

RECORD SOURCES

The EDR City Directory Report accesses a variety of business directory sources, including Haines, InfoUSA, Polk, Cole, Bresser, and Stewart. Listings marked as EDR Digital Archive access Cole and InfoUSA records. The various directory sources enhance and complement each other to provide a more thorough and accurate report.

EDR is licensed to reproduce certain City Directory works by the copyright holders of those works. The purchaser of this EDR City Directory Report may include it in report(s) delivered to a customer.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	*Target Street*	*Cross Street*	*Source*
2020	☐	☑	EDR Digital Archive
2017	☑	☑	Cole Information
2014	☐	☑	Cole Information
2010	☑	☑	Cole Information
2005	☐	☑	Cole Information
2000	☑	☐	Cole Information
1996	☑	☑	Polk's City Directory
1995	☑	☑	Cole Information
1992	☑	☐	Cole Information
1990	☑	☐	Haines Criss-Cross Directory
1985	☐	☐	Haines Criss-Cross Directory
1980	☐	☐	Haines Criss-Cross Directory
1976	☐	☐	Haines Criss-Cross Directory
1973	☐	☐	Haines Criss-Cross Directory

FINDINGS

TARGET PROPERTY STREET

Rosamond Blvd and 170th Street, West
Rosamond, CA 93560

Year	*CD Image*	*Source*	
ROSAMOND BL			
2000	pg A8	Cole Information	
ROSAMOND BLVD			
2020	-	EDR Digital Archive	Street not listed in Source
2017	pg A3	Cole Information	
2014	-	Cole Information	Street not listed in Source
2010	pg A6	Cole Information	
2005	-	Cole Information	Street not listed in Source
1996	pg A10	Polk's City Directory	
1995	pg A12	Cole Information	
1992	pg A13	Cole Information	
1990	pg A14	Haines Criss-Cross Directory	
1985	-	Haines Criss-Cross Directory	Target and Adjoining not listed in Source
1980	-	Haines Criss-Cross Directory	Target and Adjoining not listed in Source
1976	-	Haines Criss-Cross Directory	Target and Adjoining not listed in Source
1973	-	Haines Criss-Cross Directory	Target and Adjoining not listed in Source

FINDINGS

CROSS STREETS

Year	*CD Image*	*Source*	
170TH ST W			
2020	pg. A1	EDR Digital Archive	
2017	pg. A2	Cole Information	
2014	pg. A4	Cole Information	
2010	pg. A5	Cole Information	
2005	pg. A7	Cole Information	
2000	-	Cole Information	Street not listed in Source
1996	pg. A9	Polk's City Directory	
1995	pg. A11	Cole Information	
1992	-	Cole Information	Street not listed in Source
1990	-	Haines Criss-Cross Directory	Street not listed in Source
1985	-	Haines Criss-Cross Directory	Street not listed in Source
1980	-	Haines Criss-Cross Directory	Street not listed in Source
1976	-	Haines Criss-Cross Directory	Street not listed in Source
1973	-	Haines Criss-Cross Directory	Street not listed in Source

City Directory Images

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

170TH ST W 2020

3410 IRMA SOSA

Target Street	Cross Street	Source
-	✓	Cole Information

170TH ST W 2017

3410 BALLARD, JAMES R

Target Street	Cross Street	Source
✓	-	Cole Information

ROSAMOND BLVD 2017

11936 SUNPOWER

Target Street	Cross Street	Source
-	✓	Cole Information

170TH ST W 2014

3390 OCCUPANT UNKNOWN,
3410 BALLARD, JAMES R

Target Street	Cross Street	Source
-	✓	Cole Information

170TH ST W 2010

3390 OCCUPANT UNKNOWN,
3410 OCCUPANT UNKNOWN,

Target Street	Cross Street	Source
✓	-	Cole Information

ROSAMOND BLVD 2010

1841 TAPIA FARMS

Target Street	Cross Street	Source
-	✓	Cole Information

170TH ST W 2005

3390 MENDOZA, GUADALUPE

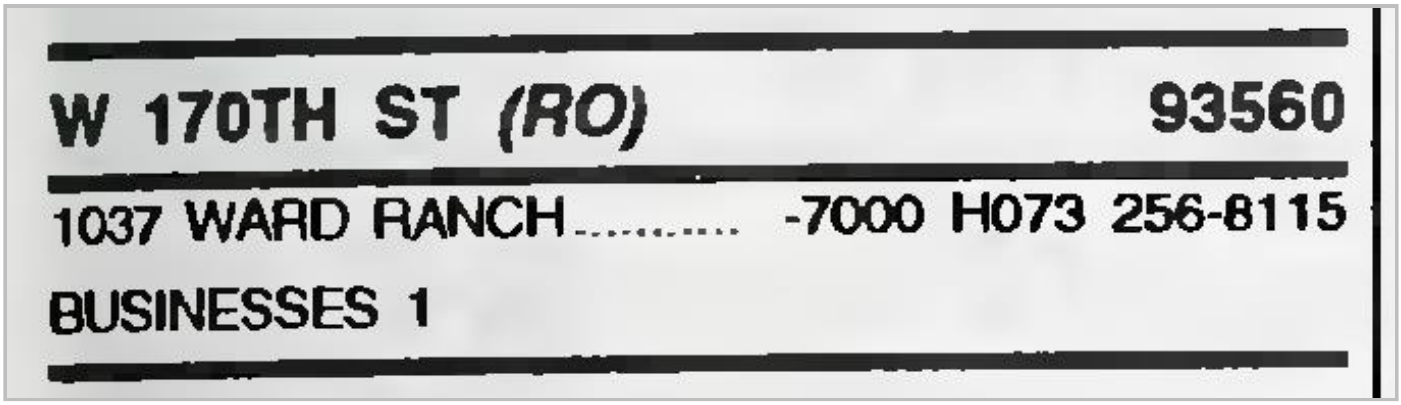
Target Street	Cross Street	Source
✓	-	Cole Information

ROSAMOND BL 2000

2800 SOUTHERN KERN UNIFIED SCHOOL DISTRICT

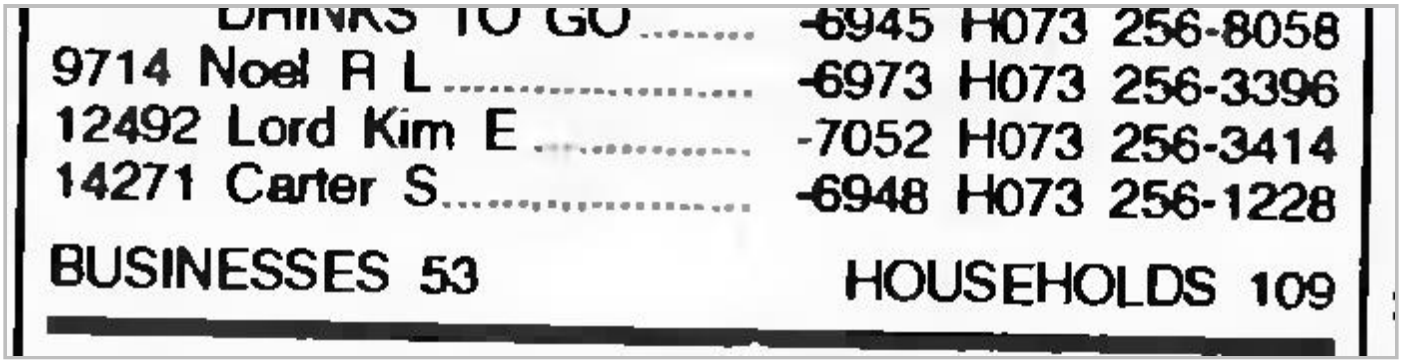
Target Street	Cross Street	Source
-	✓	Polk's City Directory

170TH ST W 1996



Target Street	Cross Street	Source
✓	-	Polk's City Directory

ROSAMOND BLVD 1996



Target Street	Cross Street	Source
-	✓	Cole Information

170TH ST W 1995

1037 WARD RANCH

Target Street	Cross Street	Source
✓	-	Cole Information

ROSAMOND BLVD 1995

4968 TRIPLE R COUNTRY STORE
TRIPLE R MOBILE HOME PARK

Target Street	Cross Street	Source
✓	-	Cole Information

ROSAMOND BLVD 1992

1048	TRAILER HAVEN
1096	GATEWAY PARK APTS
1258	ROSAMOND MBL HM PK
1262	LONJAY MBL HM PK
1315	ROUND UP ROOM
1389	CHURCH OF CHRIST
1595	MOUNTAIN PROPANE
1616	ROSAMOND MINERALS
1816	R&J AUTO PARTS
1840	FEED WORKS THE
	RAINBOW RDG RESCUE
1858	LES PAPILLONS
1950	US POSTAL SERVICE
1981	KERN CO SUPT SCHOOL
	ROSAMOND ELEM SC
2072	ROSAMOND CHEVRON
2076	DEVONSHIRE INN MTL
2080	FOSTERS FREEZE
2800	HAMILTON MIDDLE SC
2925	ROSAMOND H S CAREER
	ROSAMOND HI SC
	SOUTHRN KERN SC
2960	ROSAMOND SANITATION
	TIRE BARN THE
	VILLARINO HOME SHOP
4209	DESERT WIND
4401	SKYPARK PLAZA
4417	VILLA BASQUE
4455	SOUTHRN KERN VET
4500	KERN MOBILE HM SLS
4968	TRIPLE R CNTRY ST
4980	TRIPLE R MBL HM PK
5335	SPACES&PLACES
9917	NADINES CUTE CLASSY

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

ROSAMOND BLVD 1990

7805	HILSINGER Sandy	256-0116	+0
8746	LUJAN George	256-2185	+0
11137	★J O B LINE CONSTR	256-1933	+0
NO #	★BARTLING CERAMICS	258-4328	9
NO #	BAXTER Raymond A	256-3874	2
NO #	BUTLER Kent	256-2785	
NO #	BUTLER Wesley C	256-3450	
NO #	COCHRAN Lee	256-3783	
NO #	★EXOTIC FELINE BRDG	256-3332	+0
NO #	GARCIA Manuela L	256-3133	
NO #	★HAMILTON JR HIGH SC	256-3485	+0
NO #	HARVELL Alsace	268-2503	
NO #	HARVELL C V	256-2603	
NO #	HOLZER John	256-2580	
NO #	IARUSSI Armondo	256-2629	
NO #	JULIAN D D	256-2601	
NO #	LOOMIS Robt	256-2684	
NO #	LUJAN Ramon	256-2112	
NO #	MEER Al	256-2109	
NO #	NOEL R L	256-3396	
NO #	OLDFIELD Kerry	256-4750	7
NO #	★OSAGE INDUSTRIES	258-3888	2
NO #	OZEMENT Henry R	256-3382	
NO #	PAUL Ketherine L	256-2371	
NO #	★ROSAMOND SKY PARK	256-3600	+0
NO #	★ROSAMOND YOUTH CNTR	256-0966	
NO #	SHULT H A	256-2701	
NO #	★SOUTHRN KERN SC NI	250-3431	1
NO #	★SOUTHRN KERN SO MSC	256-4702	5
NO #	★SOUTHRN KRN HS RNS	256-3433	+0
NO #	TARDITO Maria	256-2617	
NO #	THOMAS Betty J	256-4155	9
NO #	THOMAS Jerald E	256-4155	
NO #	TORREZ Doneto	256-2664	
NO #	WEALAND Jack H	256-2333	4

★ 34 BUS 242 RES 58 NEW

Appendix C
Photograph Log

Photograph Number: 1
Date of Photograph: November 5, 2024
Direction of Photograph: East
Description of Photograph: View of the subject property from the western portion.



Photograph Number: 2
Date of Photograph: November 5, 2024
Direction of Photograph: West
Description of Photograph: View of the subject property from the eastern portion.



Photograph Number: 3
Date of Photograph: November 5, 2024
Direction of Photograph: South
Description of Photograph: View of the subject property from the northern portion.



Photograph Number: 4
Date of Photograph: November 5, 2024
Direction of Photograph: North
Description of Photograph: View of the subject property from the southern portion.



Photograph Number: 5
Date of Photograph: November 5, 2024
Direction of Photograph: South
Description of Photograph: View of powerlines and underground fiber optic cables running in the center of the property.



Photograph Number: 6
Date of Photograph: November 5, 2024
Direction of Photograph: Southeast
Description of Photograph: View debris piles observed on the eastern portion of the subject property.



Photograph Number: 7
Date of Photograph: November 5, 2024
Direction of Photograph: North
Description of Photograph: View possible survey marker located at the eastern portion of the subject property.



Photograph Number: 8
Date of Photograph: November 5, 2024
Direction of Photograph: Southeast
Description of Photograph: View of debris piles observed near the northern property boundary.



Appendix D
TRC Staff and Environmental Professional Qualifications/Resumes



Jim Fickerson
Associate Director

Highlights of Mr. Fickerson's expertise:

- **Project and Program Management:** From single site commercial property to multi-site international portfolios, to complex-industrial sites with project values exceeding $5MM, Mr. Fickerson has provided single-point of contact service to a wide variety of commercial and industrial clients across numerous business sectors and international borders.
- **Guidance**: Mr. Fickerson has significant experience providing strategic senior level M&A guidance in support of thousands of projects across the globe.
- **Liability Analysis**: Mr. Fickerson has prepared hundreds of Red Flag reports and other financially analysis that quantify the EHS and EHG risks posed by M&A's.

Jim Fickerson has over 25 years of experience directing large-scale, multidisciplinary environmental, health and safety (EHS) and environmental, social, governance (ESG) management programs for commercial and industrial clients globally. Mr. Fickerson is particularly experienced managing multi-site due diligence programs under considerable logistical and scheduling constraints. Known for his strong communication, cost control, and organizational skills, Mr. Fickerson frequently collaborates with TRC's team of subject matter experts to develop cost-effective solutions to meet his client's needs. He works closely with project teams to ensure that the work is conducted safely, schedules are met, budgets are adhered to, and deliverables are of a high quality.

In addition to his leadership role, Mr. Fickerson is the account manager for several Private Equity and commercial clients including one of the world's largest retail platforms. In this capacity, Mr. Fickerson manages all aspects of the client's EHS and ESG risk management, including due diligence, regulatory compliance, agency negotiations, portfolio acquisition strategy, and liability management.

CREDENTIALS

Education

- Bachelor of Science (Environmental Studies) San Jose State University

Technical Specialties:

- Program Management
- EHS Due Diligence
- ESG Due Diligence
- Project Management
- EHS Compliance
- Liability Analysis
- Risk Management

EXPERIENCE

Professional Summary:

- 25 years' experience managing commercial and industrial due diligence projects globally.
- Experience includes assessment, investigation, remediation, planning, permitting, and compliance.

Areas of Expertise:

- Due Diligence
- Liability Management
- Regulatory Compliance
- Risk Management

PROJECT EXPERIENCE

The Carlyle Group, Project Irving. Mr. Fickerson was the project manager and key due diligence advisor to The Carlyle Group in support of its $3B acquisition of iStar Inc.'s net lease business. The transaction was in support of Carlyle's Real Estate Credit Fund. iStar's business footprint included 247 properties located throughout the United States, Canada, and Puerto Rico that consisted of nine office, 17 industrial, and 221 entertainment properties. Together this portfolio contained over 20 million square feet of rentable space and occupied nearly 2,500 acres. TRC was retained by Carlyle to conduct Phase I ESAs, qualitative evaluations of asbestos, lead-based-paint, mold, radon, and lead in drinking water; estimate potential environmental liability across the portfolio; and develop post-acquisition mitigation strategies to reduce risk. The majority of TRC's due diligence was conducted under a significantly compressed one-month transaction schedule that occurred over the holiday season. TRC collaborated with Kirkland & Ellis, Carlyle's legal advisor, and Carlyle's lending partners during the transaction.

Confidential High-Tech Company, EDD Support, Globally. Mr. Fickerson was the Program Manager responsible for global delivery of EDD services. To guide this program, Mr. Fickerson developed a comprehensive Program Management guide that was used by project staff globally. This document outlines the client's expectations and deliverable requirements to ensure quality and report consistency. In this role, Mr. Fickerson worked closely with his internal team and the client's corporate EDD manager and their internal business teams to ensure that project objectives were met.

Reliance Industries, EDD Assessment, Refining & Marketing Assets of Citgo Petroleum Corporation. Mr. Fickerson led a team of over dozen senior technical experts specializing in remediation, environmental compliance, process engineering, and health and safety to evaluate the environmental risk associated with the potential $10BB acquisition of Citgo Petroleum Corporations refining and terminal assets. At the conclusion of the project the project team identified between $550MM and $1BB in potential environmental liability associated with the refineries and between $4.5MM and $12.5MM in potential environmental liability associated with the terminals. Mr. Fickerson and his team worked closely with the client, its financial advisors, and outside legal counsel to minimize data gaps and negotiate a favorable purchase price.

Public Storage, EDD Services, United States. 2000 to 2020. For 20 years Mr. Fickerson was the client account and program manager responsible for providing EDD services and strategic guidance to support this Real Estate Investment Trust's (REIT) acquisition program. Under Mr. Fickerson' s leadership, his team played an integral role in the expediential growth of this client into the industry leader in the self-storage market. Over the years, Mr. Fickerson managed thousands of Phase I ESAs, asbestos surveys, subsurface assessments, risk assessments, remediation, and regulatory closure projects of commercial and heavy industrial property located throughout the United States. Revenues generated over this timeframe have exceeded $20MM.

Confidential Insurance Company, International Agricultural Acquisition, Australia, Brazil, Chile, Peru, and United States. Mr. Fickerson led a team of two dozen technical experts specializing in EDD, remediation, and environmental compliance to evaluate the risks associated with the $10BB acquisition of over 500,000 acres of agricultural land located across the globe. Mr. Fickerson and his team worked closely with the client, its financial advisors, and outside legal counsel to identify several million dollars of environmental liability that was factored into the purchase and sale agreement.

Confidential Client, Construction Monitoring & Compliance, Wind Farm, Kern County, California. Mr. Fickerson was the project manager responsible for the cultural resource monitoring in support of the construction of a wind farm in a remote and geographically diverse portion of western Kern County. This continuous and politically sensitive $6MM project involved a diverse team of over 50 professional archeologists, environmental scientists, engineers, and over two dozen Native American monitors who oversaw the construction of over 200 miles of roads and nearly 100 wind turbine pads on an approximately 13,000-acre mountainous site. In addition to construction monitoring, the project involved significant data recovery, agency and Native American consultation, laboratory analyses, the curation of nearly 9,000 artifacts, and the compilation of two voluminous reports to document this eight-month long, highly complex construction monitoring project.

Hydrogen Energy California, EDD Support, Kern County, California. Mr. Fickerson was the project manager responsible for a Phase II ESA subsurface assessment of this 1,000-acre proposed alternative energy plant site. This Phase II ESA was conducted to evaluate over 14 RECs including several USTs, a former fertilizer plant, dozens of 55-gallon drums of unknown chemicals, unknown underground structures, and over 40 years of heavy agricultural use. The results of the Phase II ESA were documented in comprehensive technical report that was submitted to the DTSC.

Nufarm Americas, Acquisition Support Services, Seven Chemical Plants, United States, Brazil, Argentina, Mexico, and Slovenia. Mr. Fickerson was the project manager responsible for the EDD of seven complex and large chemical/pesticide manufacturing plants. The EDD program involved conducting Phase I ESAs, environmental compliance assessments, and liability cost estimates for each site under significant time constraints and data challenges. In addition, one of the plants in Argentina was under considerable regulatory scrutiny because several NGOs had accused the facility of contributing to the deaths of hundreds of residents in the local community. To address this complex and nuanced issue, Mr. Fickerson assembled a diverse team of global experts to conduct an ESG study to better understand the exposure this facility presented. At the conclusion of the project, the project team estimated that the acquisition would require our client to taken on approximately $150MM in environmental liability, not including the legal exposure presented by the one Argentina facility. The results of our study were presented to the client's board of directors to help guide their decision-making process.

Sempra Generation, Phase I ESA, Maui, Hawaii. Mr. Fickerson was the project manager and lead environmental assessor responsible for a Phase I ESA of a proposed wind farm on the Ulupalakua Ranch. This large site consisted of over 5,200 acres of rugged ranch land on the windward side of Haleakalā. The assessment involved a site and area reconnaissance; a review of various historical resources; an analysis of a regulatory database report, review of local and state regulatory agency files, researching the physical characteristics of the site, and preparation of a comprehensive report.

Nature Conservancy, EDD Support, Tecopa, California. Mr. Fickerson was the project manager responsible for managing the DD of this former worker camp and precious metals mine in Tecopa, California. RECs identified at the site were further evaluated by the implementation of a comprehensive subsurface trenching program. Total metals including cyanide, mercury, lead, and copper were identified in soil at concentrations that exceed hazardous waste criteria. Potential remedial scenarios were evaluated, a preliminary risk assessment was performed, and discussions with the client's outside legal counsel were conducted. The project team determined that the elevated metals concentrations could be managed in place, thus avoiding costly (more than $1M) remediation and allowing a conservation easement to be placed in perpetuity on this ecologically sensitive site.

Appendix E
Environmental Professional Statement

DEFINITION OF ENVIRONMENTAL PROFESSIONAL AND RELEVANT EXPERIENCE THERETO PURSUANT TO 40 CFR 312

(1) a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases (see §312.1[c]) on, at, in, or to a property, sufficient to meet the objectives and performance factors in §312.20(e) and (f).

(2) Such a person must: (i) hold a current Professional Engineer's or Professional Geologist's license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and have the equivalent of 3 years of full-time relevant experience; or (ii) be licensed or certified by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental inquiries as defined in §312.21 and have the equivalent of 3 years of full-time relevant experience; or (iii) have a Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of 5 years of full-time relevant experience; or (iv) have the equivalent of 10 years of full-time relevant experience.

(3) An environmental professional should remain current in his or her field through participation in continuing education or other activities.

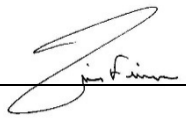
(4) The definition of environmental professional provided above does not preempt state professional licensing or registration requirements such as those for a professional geologist, engineer, or site remediation professional. Before commencing work, a person should determine the applicability of state professional licensing or registration laws to the activities to be undertaken as part of the inquiry identified in §312.21(b).

(5) A person who does not qualify as an environmental professional under the foregoing definition may assist in the conduct of all appropriate inquiries in accordance with this part if such person is under the supervision or responsible charge of a person meeting the definition of an environmental professional provided above when conducting such activities.

Relevant experience, as used in the definition of environmental professional in this section, means: participation in the performance of all appropriate inquiries investigations, environmental site assessments, or other site investigations that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases (see §312.1[c]) to the Site. TRC personnel resume(s) are included in **Appendix D**.

I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Signature of Environmental Professional:  December 6, 2024

Appendix H
Preliminary Hydrology Study

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DRAINAGE STUDY

Euismod Project
Willow Springs, CA 93560
Kern County

Prepared For:

Euismod Project LLC and Euismod Project I LLC

Prepared By:

6 Executive Circle, Suite 200
Irvine, California 92614

Under Supervision of:

Stephen V. Huvane, P.E.



March 2026

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION AND EXECUTIVE SUMMARY 2

2.0 PRE-DEVELOPMENT CONDITIONS 3

3.0 POST-DEVELOPMENT CONDITIONS 3

4.0 OFFSITE FLOWS 4

5.0 PROPOSED STORMWATER MANAGEMENT FEATURES 4

5.1 Retention Pond 4

5.2 Detention Pond 5

5.3 Ditches 5

5.4 Culverts 5

6.0 STORMWATER QUALITY 5

7.0 FLOOD IMPACT ANALYSIS 6

8.0 PEAK FLOW RATES 6

9.0 REFERENCES 8

APPENDICES

Appendix A Rainfall Intensity Data
Appendix B Soil Report
Appendix C Pre-Development Analysis
Appendix D Post-Development Analysis
Appendix E Offsite Analysis
Appendix F Flood Insurance Rate Map

1.0 Project Description and Executive Summary

The Euismod Project (project) is a proposed Battery Energy Storage System (BESS) development that will include construction, operation and eventual decommissioning of energy storage facilities on an approximately 120.35 acre site (site) comprised often (10) assessor's parcels located northwest of the intersection of Rosamond Blvd. and 170th Street West in Willow Springs, CA, within Kern County. The site APNs are:

- 261-103-29
- 261-103-17
- 261-103-20
- 261-103-21
- 261-104-13
- 261-104-10
- 261-104-16
- 261-104-19
- 261-104-20
- 261-104-21

The project includes two proposed 220 kV overhead electric tie-lines between the site and the Whirlwind Substation with overhead or underground communications, and installation of interconnection facilities within the existing Whirlwind Substation. Southern California Edison (SCE) will be responsible for constructing, owning, and operating the electric tie-lines between the site and the Whirlwind Substation, and the interconnection within the Whirlwind Substation. It is expected that there will be no material change to existing grades or drainage conditions from SCE's interconnection work at the Whirlwind Substation or offsite tie-line. Accordingly, this Drainage Study is for the proposed energy storage site.

The ten site parcels encompass 120.35 acres. The Project will use lithium-ion batteries housed in purpose-built free-standing enclosures to store energy. The batteries, together with ancillary equipment including inverters, transformers, and onsite collector substations, will connect to the existing Whirlwind substation just south of the site. Battery and equipment enclosures will be placed on concrete pads or piles. Paved roads/fire lane routes provide access throughout the site in accordance with Kern County Fire Department requirements. Developed areas of the site not covered by paved roads, equipment, or foundations will be surfaced with gravel or rip-rap.

The purpose of this study is to provide engineering calculations to support the Conditional Use Permitting (CUP) process for the Project. The stormwater design and analysis provided herein conforms to Kern County Hydrology Manual (Hydrology Manual), Kern County Public Works Development Standards (Development Standards – December 2023) and California Stormwater Quality Association Best Management Practices Handbook (BMP Handbook – June 2021). The results of this Drainage Study demonstrate that the preliminary project design, including proposed stormwater best management practices, meets County and project stormwater control requirements, maintains the existing drainage pattern in the area, and does not substantially change existing flow depths or velocities offsite. With these controls, the project will not have a substantial impact on water quality, or hydrology or drainage patterns offsite.

2.0 Pre-Development Conditions

Pre-development drainage on the site flows generally to the south and southeast with slopes ranging from 1.8% to 4.8%. The hydraulic soil groups (HSG) present on site are both A and B as shown in **Appendix B**. Both HSG A and B have low runoff class and are drain well. The majority of the surface cover is classified as desert shrub range, with small amounts of dirt and paved roads. Flood zone mapping shows a portion of the site lies in a special flood hazard area subject to inundation by the 1% annual chance flood as shown in **Appendix F**. The site is divided into four separate drainage areas, with four corresponding points of interest, or discharge points. These areas are shown in **Appendix C** on the Pre-Development Drainage Area Map**.** The four discharge points (A, B, C and D) are used to calculate the times of concentration and the flowrates for design storm events. The following storms were evaluated to consider runoff from the site under a wide range of conditions.

- 2-year, 24-hour
- 2-year, 6-hour
- 10-year, 5-Day
- 50-year, 24-hour
- 50-year, 6-hour
- 100-year, 24-hour
- 100-year, 6-hour

The 100-year 24-hour storm is referred to as the capital storm design discharge (CSDD) per division 4 of the Development Standards and in general is used for the design of stormwater controls to protect the property. The 10-year 5-day storm is referred to as the intermediate storm design discharge (ISDD) and it was used to determine the pond volumes as required per the Development Standards section 408-1. All storm events listed were used to compare peak flow rates.

Peak pre-development flow rates were calculated for each design storm using HydroCAD software, version 10.20-5c. The HydroCAD software uses the Soil Conservation Service (SCS) Technical Release-20 (TR-20) runoff method. Storm Type 1 – 24 hour was selected based on the location of this project. Rainfall depths were inputted using NOAA Atlas 14, Volume 6 Version 2, found in **Appendix A** and the pre-development HydroCAD report can be found in **Appendix C.**

3.0 Post-Development Conditions

The project will develop a total of 28.45 acres (24%) of impervious surface. This 28.45 acres make up the asphalt access roads, impervious features in the substations, buildings, storage units, water tanks as well as concrete pads and foundations for equipment.

The conveyance of stormwater runoff includes sheet flow, concentrated and channelized flow. Runoff will be directed towards trapezoidal rip-rap lined ditches and channels via sheet flow and eventually to either an on-site retention pond or detention pond. High Density Polyethylene (HDPE) pipe culverts will be located throughout the site to direct flows under paved access roads. These ponds, ditches, channels and culverts are the proposed stormwater management features discussed in later sections. Post-Development drainage areas were delineated based on the proposed grading. As shown on the Post-

Development Drainage Area Map in **Appendix D**, the four main drainage areas, A, B, C and D are further subdivided according to proposed grading and ponds. The post-development HydroCAD report for all evaluated storms, including flowrates and pond routing can also be found in **Appendix D.**

4.0 Offsite Flows

The offsite drainage area map in **Appendix E** shows the drainage areas north and northwest of the Project site that flow onto the site. A 100-year, 24-hour design storm flowrate was calculated for these areas and used to design the proposed ditches, channels and culverts, and erosion and sediment control measures. This event was used because out of the seven (7) evaluated storms listed in section 2.0 above, the 100-year 24-hour storm had the largest runoff number, additionally this event is required for offsite flood studies and channel design according to the Kern County drainage plan checklist and according to division 4 of the Kern County public works development standards. HEC-HMS version 4.13 was used to calculate these flowrates summarized in **Appendix E**.

5.0 Proposed Stormwater Management Features

5.1 Retention Pond

There are a total of four (4) retention ponds proposed on-site: A1, C2, D2, D3 and D4. These ponds are sized based on the intermediate 5-day rainfall event Storm Design Discharge (ISDD) from the impervious areas. The ISDD is the flow determined by a precipitation event having a ten percent probability of being equaled or exceeded in any given year, i.e. 10-year storm. The volume required comes from the equation shown below and referenced in the Development Standards, and the Kern County Engineering Bulletin 11-02 dated December 21, 2011.

$$\mathrm{V(cf)} = (D_{10\mathrm{yr}-5\mathrm{day}})/12(a_i)(\mathrm{Area})$$

Where:

$D_{10\mathrm{yr}-5\mathrm{day}}$ = 10-year 5-day depth of rainfall (in.). See **Appendix A**
a_i = average percentage of impervious area. See **Appendix D, Pond Design Volume**
Area = Drainage area of total development (sq.ft.)

The Pond Design Volume plan in **Appendix D** shows the amount of imperviousness per area discharging to a pond within the Project boundaries. These areas are similar to those shown on the post-development drainage area map; however, offsite areas were not used to calculate the required pond volumes (As stated in the Kern County Engineering Bulletin: offsite areas cannot be used to decrease the size of the required runoff volume). In addition to the table provided in the Pond Design Volume, in **Appendix D**, the volume for the total development (120.35 acres) was calculated below.

$$\mathrm{V(cf)} = (D_{10\mathrm{yr}-5\mathrm{day}})/12(a_i)(\mathrm{Area})$$
$$\mathrm{V(cf)} = (5.04)/12(0.24)(5{,}242{,}743.82)$$
$$\mathrm{V(cf)} = 521{,}369.63\ cu.ft. = 11.97\ ac-ft$$ (volume required from total development)

Actual pond storage is 16.71 ac-ft which is greater than the volume required from the total development therefore, this standard is satisfied. All ponds are subject to the requirements set forth in Section 408 of the Development Standards. For example, there is a 12 foot wide berm around the pond for access, and discharge from the ponds are controlled with an outlet structure that has an orifice or a broad crested weir. These controls can be seen on the Stormwater Feature Map in **Appendix D**.

5.2 Detention Pond

There are three (3) detention ponds proposed on-site: B2, B3 and C1. The required detention pond volumes were calculated using the same formula as the retention ponds. Calculations for these ponds can be found in **Appendix D**, Pond Design Volume. Similar to the retention ponds, there will be a 12 foot wide berm around the pond for access, and discharge from the pond is controlled with a, 18" culvert or an outlet control structure with an 8" orifice. All other requirements set forth in section 408 of the Development Standards will be implemented upon final design.

5.3 Ditches

Ditches are used to facilitate runoff from on and offsite of the project. Proposed typical cross-sections for these conveyances are found on the Stormwater Feature Map in **Appendix D.** These conveyance features are lined with different sized rip-rap so that flow velocities stay between 1.5 ft/s and 4 ft/s to prevent transport of sediment and erosion of ditches. For example, Ditch D2-5 has the highest flowrate from offsite (i.e. it has the greatest erosion potential) so this ditch will be lined with 12-inch diameter rip-rap to avoid erosion and sediment transport to downstream areas. See Ditch Conveyance Reports in **Appendix D** for input data and results, including depths and flow velocities.

5.4 Culverts

The proposed stormwater conveyance system on-site includes thirty culverts designed to facilitate runoff flow from and through the various drainage areas. The proposed culverts have been sized based on peak flow rates determined from the 100-year, 24-hour storm event, following hydraulic design principles and Manning's equation. Among the thirty culverts, only two sizes were analyzed for the design, the minimum and maximum (see **Appendix D,** Culvert Capacities). The minimum sized culvert will be 18 inches in diameter, suitable for smaller flows, while the maximum sized culvert will be 36 inches in diameter to accommodate larger flows. Culvert material will be High-density polyethylene (HDPE) and slopes have been selected to maintain adequate velocity for prevention of sediment buildup.

6.0 Stormwater Quality

The increase in land disturbance and impervious cover alter hydrological processes, causing hydromodification and an impact to water quality. Stormwater quality requirements will be met by incorporating site design and treatment control BMPs.

The proposed site design incorporates maximum storage capacity and adequate space for the proposed stormwater management features and BMPs. The proposed treatment control BMPs on-site will include rip-rap lined conveyance ditches, and retention and detention ponds. The retention and detention ponds are also considered to be treatment control BMPs. The ponds will capture, treat or infiltrate the 85th percentile average annual runoff volumes. These volumes were calculated using the Urban Runoff Quality

Management approach found in the BMP Handbook. With the BMPs incorporated in the proposed site design, storm water runoff from the project will not substantially affect water quality.

7.0 Flood Impact Analysis

A Portion of the site is located within Zone A, a special flood hazard area (SFHA) that is subject to inundation by the 1% annual chance (100-year) flood. As shown in **Appendix F,** Flood Insurance Rate Map (FIRM): Zone A is defined as having no base flood elevation, which means this area is subject to shallow flooding. The proposed features that are planned inside this zone are the following:

- Detention pond and retention pond
- First responders' station
- Water Tank,
- Pump house
- Water well
- Approximately 2,090 linear feet (LF) of a 26ft wide asphalt roadway
- Approximately 1,100 LF of 8' chain Link fence and three access gates

Pursuant to Kern County Ordinance Chapter 19.70, which governs the Floodplain Combining District, development within a designated flood zone A must not increase flood hazards or adversely impact the water-carrying capacity of the floodplain beyond the project site. Further HEC-RAS modeling discussed later in this section shows no adverse effects beyond the site. In accordance with Section 19.70.130, a development may not cumulatively increase the base flood elevation at any point more than one (1) foot. The proposed preliminary design meets the following criteria and satisfies Kern County Floodplain Management Ordinance:

1. Minimize flood damage by use of materials and drainage pathways per Chapter 17.48.26 of the Kern County Ordinance.
2. In areas of shallow flooding such as Zone A, any structure in a special flood hazard area will be elevated by at least one (1) foot above the shallow flooding depth or depth number specified in feet on the FIRM or at least two (2) feet if no depth number is specified. (reference Chapter 17.48.27 of the Kern County Ordinance)

TRC requested technical data supporting the Federal Emergency Management Agency (FEMA) Flood Insurance Study and found that the FEMA Engineering Library does not have the data to determine base flood elevation. With no data from the agency to determine the base flood elevation, TRC conducted a flood-depth model using HEC-RAS software for both pre-development (existing conditions) and post-development (proposed conditions). The results for depths and velocities for the 100-year, 24-hour storm are found in **Appendix F**. The results show that Project features do not materially change flow conditions within the area designated as flood zone A.

8.0 Peak Flow Rates

Table 1 below summarizes the peak flows at each discharge point. Numbers in green signify that post flow rates are lower than pre-development rates, and the numbers in red signify that post flow rates are higher than pre-development rates.

Table 1 – Peak Flow Summary (CFS)

DA-A	6-hr			24-hr			5-day		
FREQ.	PRE	POST	DIFF.	PRE	POST	DIFF.	PRE	POST	DIFF.
2yr	0	0	0	0.01	0.01	0			
10yr							0.56	0.26	-0.30
50yr	0.10	0.08	-0.02	0.84	0.63	-0.21			
100yr	0.18	0.12	-0.06	1.58	0.87	-0.71			
DA-B	6-hr			24-hr			5-day		
FREQ.	PRE	POST	DIFF.	PRE	POST	DIFF.	PRE	POST	DIFF.
2yr	0	0	0	0	0	0			
10yr							1.18	0.71	-0.47
50yr	0.11	0.11	0	1.33	1.29	-0.04			
100yr	0.37	0.23	-0.14	3.10	1.92	-1.18			
DA-C	6-hr			24-hr			5-day		
FREQ.	PRE	POST	DIFF.	PRE	POST	DIFF.	PRE	POST	DIFF.
2yr	0	0	0	0	0	0			
10yr							1.43	0.56	-0.87
50yr	0.13	0.02	-0.11	1.70	1.07	-0.63			
100yr	0.5	0.09	-0.41	3.69	1.39	-2.30			
DA-D	6-hr			24-hr			5-day		
FREQ.	PRE	POST	DIFF.	PRE	POST	DIFF.	PRE	POST	DIFF.
2yr	0	0	0	0.13	0.16	0.03			
10yr							9.04	7.07	-1.97
50yr	1.70	1.53	-0.17	13.08	11.74	-1.34			
100yr	2.98	2.42	-0.56	23.08	18.58	-4.50			

For DA-D the 2-year, 24-hour storm has a negligible increase in runoff rate of 0.03 cfs in the post-development condition.

The Euismod Project is designed to manage stormwater runoff effectively by implementing appropriately sized conveyance systems, detention and retention ponds, and erosion control and water quality measures. This approach minimizes the risk of flooding or downstream erosion and meets the requirements set forth by Kern County regulations. Additionally, stormwater quality is addressed through the use of rip-rap swales and sedimentation features to reduce pollutant loads before discharge. Overall, the development supports responsible water management and complies with applicable local and regional stormwater standards, ensuring long-term protection of the surrounding environment and infrastructure.

9.0 References

Kern County Hydrology Manual, Unknown date.– *Hydrology Manual.*

Kern County Development Standards. Kern County Public Works Department December 19, 2023. – *Development Standards*

Stormwater BMP Handbook. California Stormwater Quality Association June, 2021. – *BMP Handbook*

Appendix A: Rainfall Intensity Data

- NOAA Atlas 14, Volume 6 Version 2 Point Precipitation Frequency Estimates
- 10-year 5-Day Storm Precipitation (log-log graph)

NOAA Atlas 14, Volume 6, Version 2
Location name: Rosamond, California, USA*
Latitude: 34.8655°, Longitude: -118.4365°
Elevation: 2787 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** (0.069-0.102)	**0.109** (0.090-0.133)	**0.144** (0.118-0.176)	**0.174** (0.142-0.215)	**0.218** (0.172-0.279)	**0.254** (0.196-0.332)	**0.293** (0.221-0.393)	**0.336** (0.246-0.463)	**0.398** (0.280-0.572)	**0.451** (0.306-0.671)
10-min	**0.120** (0.099-0.147)	**0.156** (0.129-0.191)	**0.206** (0.170-0.253)	**0.249** (0.203-0.308)	**0.312** (0.246-0.399)	**0.364** (0.281-0.476)	**0.420** (0.317-0.563)	**0.481** (0.353-0.663)	**0.570** (0.401-0.820)	**0.646** (0.439-0.962)
15-min	**0.145** (0.120-0.178)	**0.188** (0.156-0.230)	**0.249** (0.205-0.305)	**0.301** (0.246-0.372)	**0.377** (0.298-0.483)	**0.440** (0.340-0.575)	**0.508** (0.383-0.681)	**0.582** (0.426-0.802)	**0.690** (0.485-0.992)	**0.782** (0.530-1.16)
30-min	**0.201** (0.166-0.246)	**0.261** (0.215-0.319)	**0.344** (0.284-0.422)	**0.416** (0.340-0.515)	**0.522** (0.412-0.668)	**0.609** (0.471-0.796)	**0.703** (0.530-0.941)	**0.805** (0.590-1.11)	**0.954** (0.670-1.37)	**1.08** (0.733-1.61)
60-min	**0.286** (0.237-0.350)	**0.371** (0.306-0.454)	**0.490** (0.404-0.601)	**0.593** (0.484-0.733)	**0.743** (0.587-0.951)	**0.867** (0.670-1.13)	**1.00** (0.754-1.34)	**1.14** (0.839-1.58)	**1.36** (0.954-1.95)	**1.54** (1.04-2.29)
2-hr	**0.428** (0.353-0.522)	**0.556** (0.459-0.680)	**0.731** (0.602-0.896)	**0.878** (0.717-1.09)	**1.09** (0.858-1.39)	**1.25** (0.969-1.64)	**1.43** (1.08-1.92)	**1.61** (1.18-2.22)	**1.87** (1.32-2.69)	**2.08** (1.41-3.09)
3-hr	**0.540** (0.446-0.660)	**0.703** (0.580-0.860)	**0.923** (0.760-1.13)	**1.11** (0.904-1.37)	**1.36** (1.08-1.74)	**1.57** (1.21-2.05)	**1.78** (1.34-2.38)	**2.00** (1.47-2.76)	**2.30** (1.62-3.31)	**2.54** (1.72-3.78)
6-hr	**0.774** (0.640-0.946)	**1.02** (0.839-1.24)	**1.34** (1.10-1.64)	**1.60** (1.31-1.98)	**1.96** (1.55-2.51)	**2.25** (1.74-2.94)	**2.54** (1.91-3.40)	**2.83** (2.08-3.90)	**3.24** (2.28-4.65)	**3.55** (2.41-5.28)
12-hr	**1.02** (0.846-1.25)	**1.39** (1.15-1.70)	**1.87** (1.54-2.29)	**2.26** (1.84-2.79)	**2.78** (2.20-3.56)	**3.18** (2.46-4.16)	**3.58** (2.70-4.80)	**3.99** (2.92-5.50)	**4.53** (3.18-6.51)	**4.94** (3.35-7.35)
24-hr	**1.34** (1.19-1.54)	**1.88** (1.67-2.17)	**2.59** (2.29-2.99)	**3.16** (2.77-3.68)	**3.92** (3.32-4.71)	**4.49** (3.72-5.52)	**5.06** (4.10-6.38)	**5.64** (4.44-7.32)	**6.41** (4.84-8.68)	**6.99** (5.10-9.80)
2-day	**1.64** (1.46-1.89)	**2.34** (2.07-2.69)	**3.24** (2.86-3.74)	**3.97** (3.48-4.62)	**4.94** (4.19-5.95)	**5.69** (4.72-7.00)	**6.44** (5.21-8.11)	**7.20** (5.66-9.33)	**8.21** (6.19-11.1)	**8.98** (6.54-12.6)
3-day	**1.83** (1.62-2.10)	**2.61** (2.31-3.00)	**3.63** (3.21-4.19)	**4.46** (3.91-5.20)	**5.58** (4.73-6.72)	**6.44** (5.34-7.92)	**7.30** (5.91-9.20)	**8.18** (6.44-10.6)	**9.36** (7.06-12.7)	**10.3** (7.48-14.4)
4-day	**1.96** (1.74-2.25)	**2.80** (2.48-3.22)	**3.91** (3.45-4.51)	**4.81** (4.22-5.60)	**6.03** (5.11-7.26)	**6.96** (5.78-8.56)	**7.91** (6.40-9.97)	**8.88** (6.99-11.5)	**10.2** (7.68-13.8)	**11.2** (8.15-15.7)
7-day	**2.21** (1.96-2.54)	**3.15** (2.79-3.63)	**4.40** (3.89-5.08)	**5.43** (4.76-6.32)	**6.83** (5.79-8.22)	**7.90** (6.56-9.72)	**8.99** (7.28-11.3)	**10.1** (7.95-13.1)	**11.6** (8.75-15.7)	**12.7** (9.28-17.9)
10-day	**2.34** (2.08-2.69)	**3.33** (2.96-3.84)	**4.67** (4.13-5.39)	**5.77** (5.05-6.71)	**7.28** (6.17-8.76)	**8.44** (7.00-10.4)	**9.62** (7.78-12.1)	**10.8** (8.52-14.0)	**12.5** (9.40-16.9)	**13.7** (9.99-19.2)
20-day	**2.73** (2.42-3.14)	**3.92** (3.47-4.51)	**5.55** (4.91-6.41)	**6.91** (6.06-8.04)	**8.81** (7.47-10.6)	**10.3** (8.55-12.7)	**11.8** (9.57-14.9)	**13.4** (10.5-17.4)	**15.5** (11.7-21.0)	**17.2** (12.5-24.1)
30-day	**3.14** (2.79-3.61)	**4.52** (4.01-5.21)	**6.44** (5.70-7.44)	**8.06** (7.07-9.39)	**10.4** (8.77-12.5)	**12.2** (10.1-14.9)	**14.0** (11.3-17.7)	**15.9** (12.5-20.7)	**18.6** (14.0-25.1)	**20.6** (15.0-28.8)
45-day	**3.70** (3.28-4.25)	**5.34** (4.73-6.14)	**7.61** (6.73-8.79)	**9.56** (8.38-11.1)	**12.3** (10.5-14.9)	**14.6** (12.1-17.9)	**16.8** (13.6-21.2)	**19.2** (15.1-24.9)	**22.5** (17.0-30.4)	**25.0** (18.2-35.1)
60-day	**4.17** (3.70-4.80)	**5.98** (5.30-6.89)	**8.54** (7.54-9.85)	**10.7** (9.40-12.5)	**13.9** (11.7-16.7)	**16.4** (13.6-20.1)	**19.0** (15.4-24.0)	**21.7** (17.1-28.2)	**25.5** (19.3-34.5)	**28.5** (20.7-39.9)

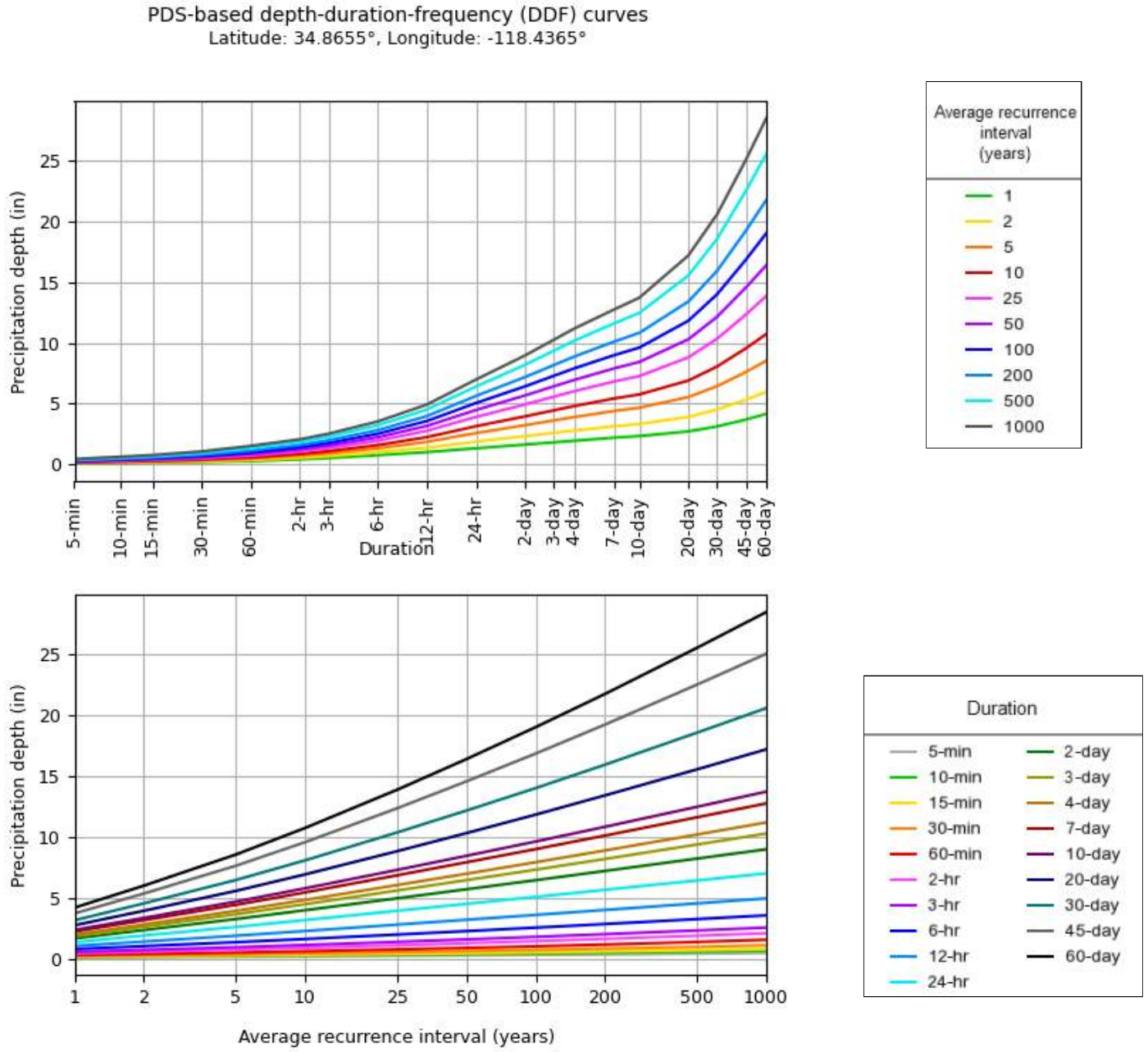
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

Back to Top

PF graphical



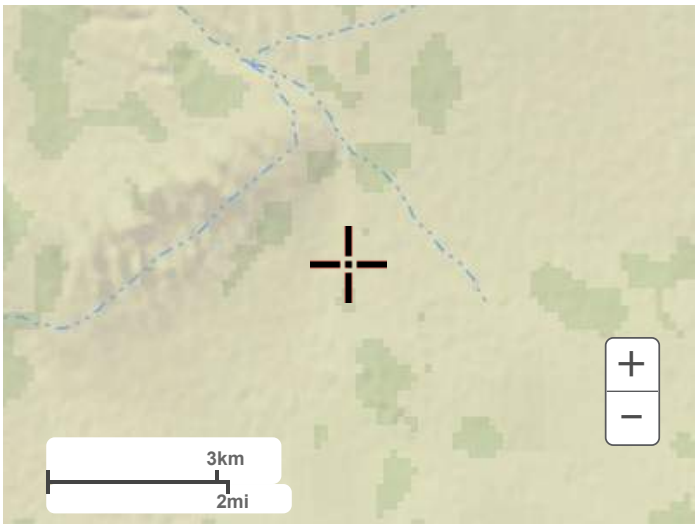
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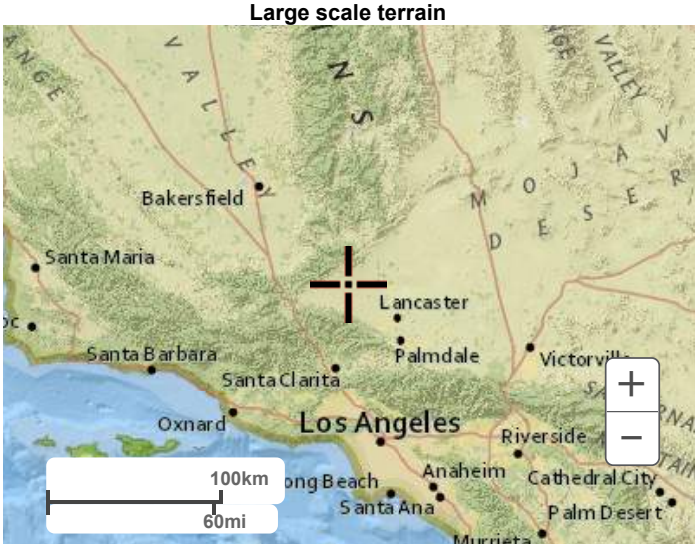
Back to Top

Maps & aerials

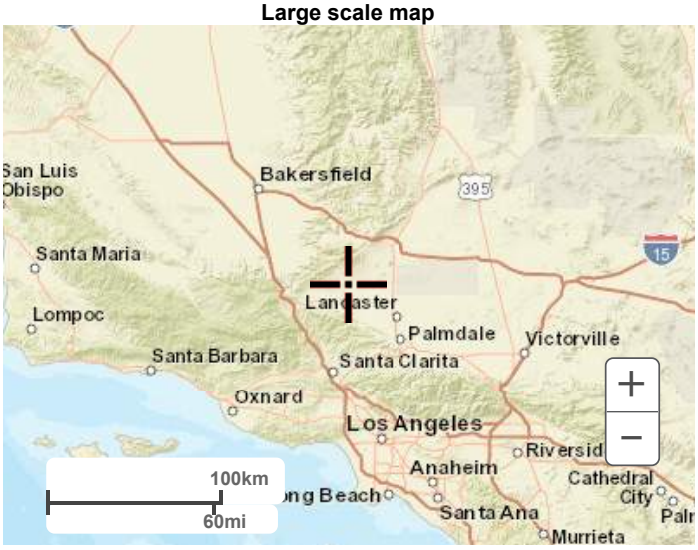
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

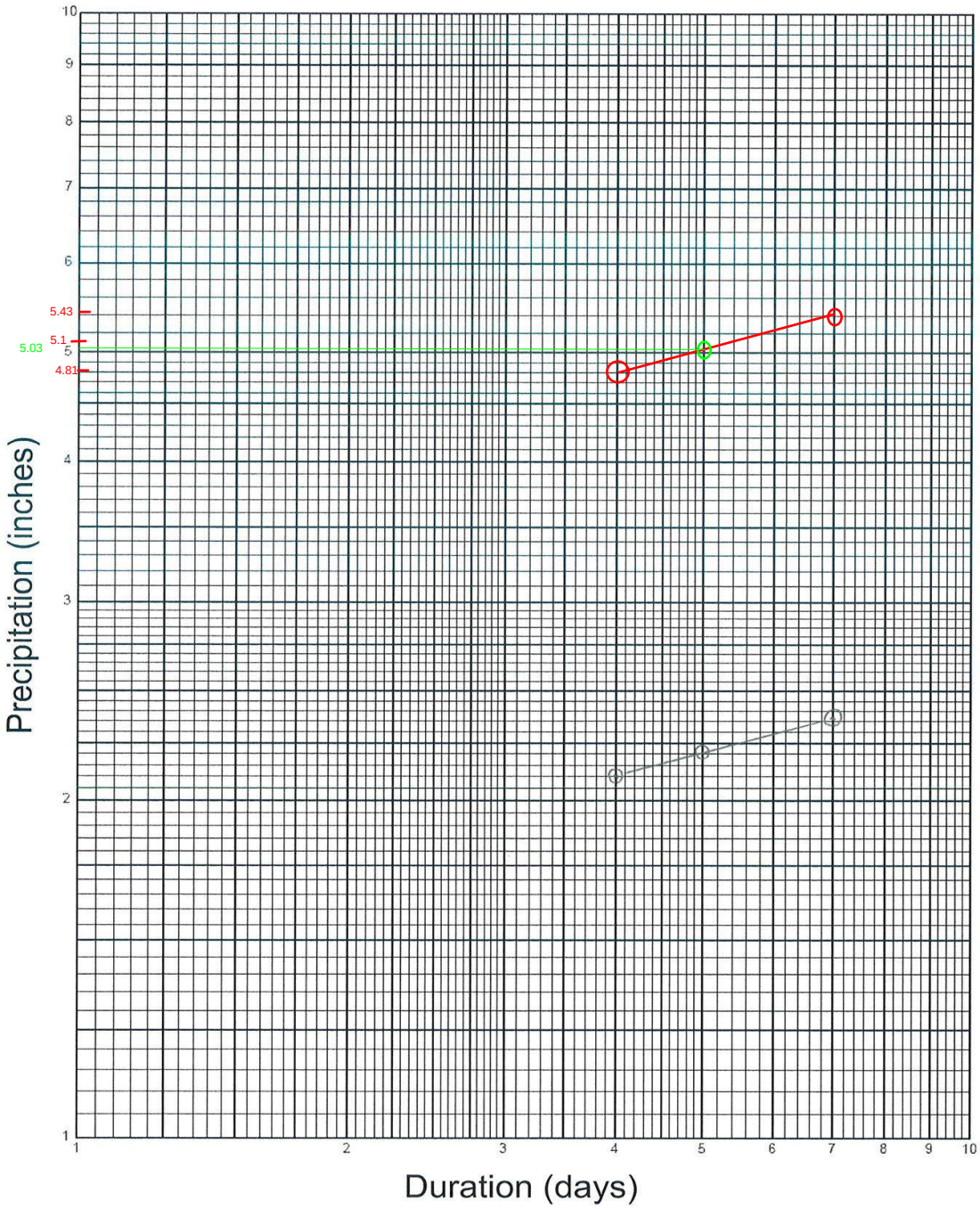


Back to Top

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

Disclaimer

6) Select 10yr 4day rainfall depth – **2.10** and 10yr 7 day rainfall depth – **2.36**
7) Plot points on log–log graph paper.



8) Read the solution for the 10 yr 5 day depth of rainfall– **2.20 inches**

Appendix B: Soil Report

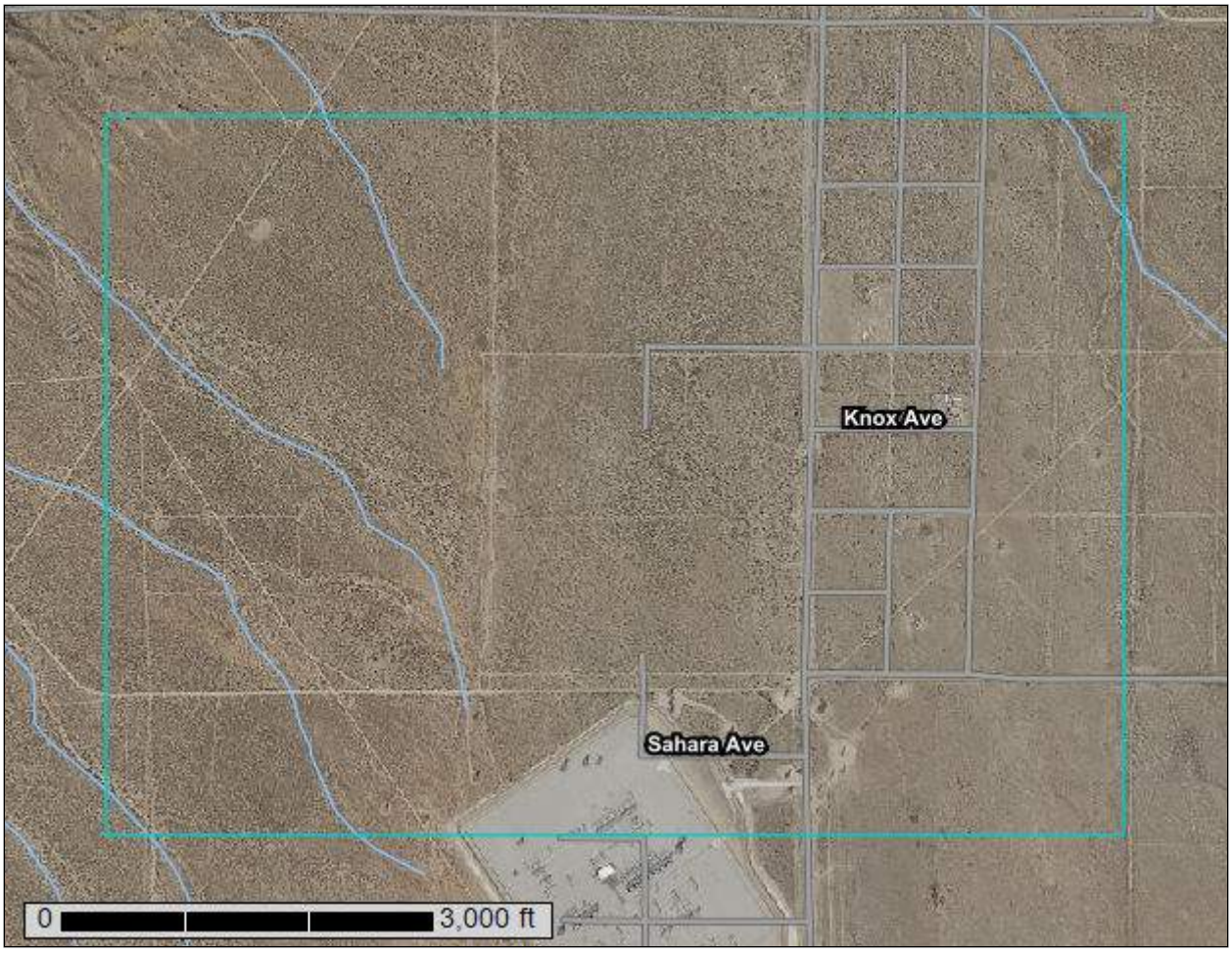
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Antelope Valley Area, California



October 27, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map (Euismod).....9
Legend.....10
Map Unit Legend (Euismod).....11
Map Unit Descriptions (Euismod).....11
Antelope Valley Area, California.....13
AsB—Arizo gravelly loamy sand, 0 to 5 percent slopes.....13
CaC—Cajon loamy sand, 2 to 9 percent slopes.....14
HbC—Hanford coarse sandy loam, 2 to 9 percent slopes.....15
HkA—Hesperia fine sandy loam, 0 to 2 percent slopes.....16
HkB—Hesperia fine sandy loam, 2 to 5 percent slopes.....18
RdE2—Ramona sandy loam, 9 to 30 percent slopes, eroded.....19
Ro—Rosamond fine sandy loam.....21
References.....23
Glossary.....25

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

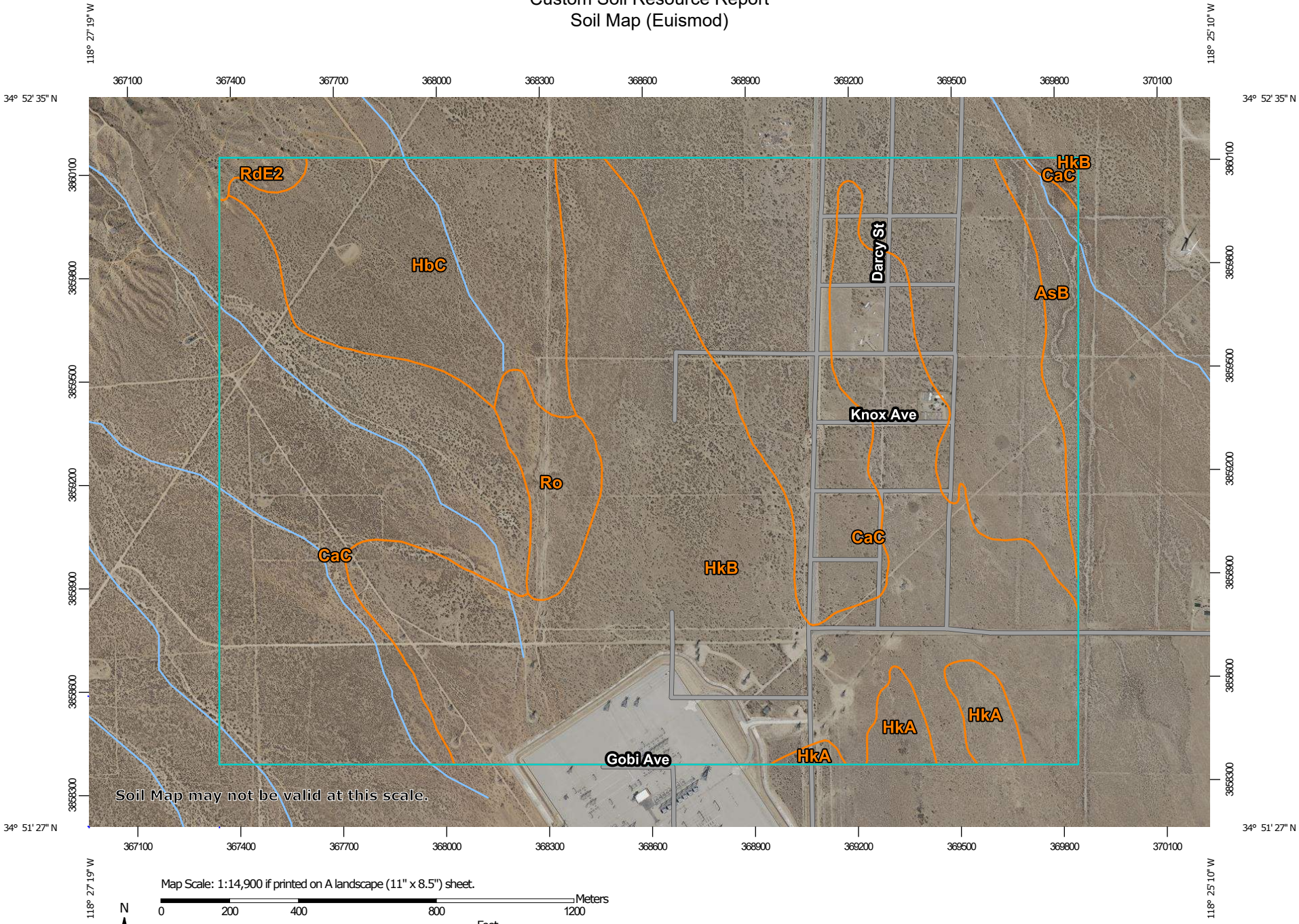
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Euismod)



Map Scale: 1:14,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 18, Sep 8, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 14, 2022—Apr 23, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Euismod)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AsB	Arizo gravelly loamy sand, 0 to 5 percent slopes	24.6	2.2%
CaC	Cajon loamy sand, 2 to 9 percent slopes	458.0	41.9%
HbC	Hanford coarse sandy loam, 2 to 9 percent slopes	126.4	11.6%
HkA	Hesperia fine sandy loam, 0 to 2 percent slopes	22.5	2.1%
HkB	Hesperia fine sandy loam, 2 to 5 percent slopes	428.3	39.2%
RdE2	Ramona sandy loam, 9 to 30 percent slopes, eroded	5.4	0.5%
Ro	Rosamond fine sandy loam	28.4	2.6%
Totals for Area of Interest		**1,093.5**	**100.0%**

Map Unit Descriptions (Euismod)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor

components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Antelope Valley Area, California

AsB—Arizo gravelly loamy sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hcct
Elevation: 1,500 to 3,800 feet
Mean annual precipitation: 4 to 12 inches
Mean annual air temperature: 55 to 70 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Arizo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arizo

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

C1 - 0 to 3 inches: gravelly loamy sand
C2 - 3 to 32 inches: extremely cobbly loamy sand
C3 - 32 to 79 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R030XG022CA - SANDY 4-9"
Hydric soil rating: No

Minor Components

Cajon

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R030XG022CA - SANDY 4-9"
Hydric soil rating: No

Riverwash

Percent of map unit: 5 percent
Landform: Drainageways
Ecological site: R030XG022CA - SANDY 4-9"
Hydric soil rating: Yes

CaC—Cajon loamy sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hccy
Elevation: 400 to 4,000 feet
Mean annual precipitation: 3 to 9 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cajon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cajon

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 9 inches: loamy sand
H2 - 9 to 60 inches: sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R030XG022CA - SANDY 4-9"
Hydric soil rating: No

Minor Components

Arizo

Percent of map unit: 5 percent
Hydric soil rating: No

Hesperia

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

HbC—Hanford coarse sandy loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hcf2
Elevation: 2,600 to 4,200 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hanford and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hanford

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: coarse sandy loam
H2 - 8 to 39 inches: sandy loam
H3 - 39 to 70 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R019XD964CA - LOAMY 9-20"
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 8 percent
Hydric soil rating: No

Ramona

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Hydric soil rating: No

HkA—Hesperia fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hcfd
Elevation: 200 to 4,000 feet
Mean annual precipitation: 4 to 9 inches
Mean annual air temperature: 55 to 70 degrees F

Frost-free period: 210 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hesperia and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hesperia

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 4 inches: fine sandy loam
C2 - 4 to 54 inches: fine sandy loam
C3 - 54 to 77 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R030XG021CA - LOAMY 4-9"
Hydric soil rating: No

Minor Components

Tray

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rosamond

Percent of map unit: 5 percent

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cajon

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R030XG022CA - SANDY 4-9"
Hydric soil rating: No

HkB—Hesperia fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: hcff
Elevation: 200 to 4,000 feet
Mean annual precipitation: 4 to 9 inches
Mean annual air temperature: 54 to 70 degrees F
Frost-free period: 210 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hesperia and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hesperia

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 4 inches: fine sandy loam
C2 - 4 to 54 inches: fine sandy loam
C3 - 54 to 77 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R030XG021CA - LOAMY 4-9"
Hydric soil rating: No

Minor Components

Rosamond

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cajon

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Adelanto

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

RdE2—Ramona sandy loam, 9 to 30 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcgm
Elevation: 2,700 to 3,900 feet

Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 210 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ramona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 23 inches: fine sandy loam
H3 - 23 to 90 inches: sandy clay loam

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R019XD964CA - LOAMY 9-20"
Hydric soil rating: No

Minor Components

Vernalis

Percent of map unit: 5 percent
Hydric soil rating: No

Gullied land

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

Ro—Rosamond fine sandy loam

Map Unit Setting

National map unit symbol: hcgy
Elevation: 1,900 to 3,360 feet
Mean annual precipitation: 3 to 8 inches
Mean annual air temperature: 54 to 64 degrees F
Frost-free period: 210 to 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Rosamond and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rosamond

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 4 inches: fine sandy loam
C2 - 4 to 20 inches: very fine sandy loam
C3 - 20 to 28 inches: silty clay loam
C4 - 28 to 34 inches: sandy clay loam
C5 - 34 to 48 inches: loam
C6 - 48 to 61 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R030XG021CA - LOAMY 4-9"
Hydric soil rating: No

Minor Components

Cajon

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R030XA038CA - Sandy Fan
Hydric soil rating: No

Hesperia

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R030XA038CA - Sandy Fan
Hydric soil rating: No

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the following National Soil Survey Handbook link: “National Soil Survey Handbook.”

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3
Low: 3 to 6
Moderate: 6 to 9
High: 9 to 12
Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology)

from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left

behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2
Low: 0.2 to 0.4
Moderately low: 0.4 to 0.75
Moderate: 0.75 to 1.25
Moderately high: 1.25 to 1.75
High: 1.75 to 2.5
Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth’s crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can

occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent
Low: 0.5 to 1.0 percent
Moderately low: 1.0 to 2.0 percent
Moderate: 2.0 to 4.0 percent
High: 4.0 to 8.0 percent
Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and

promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5
Extremely acid: 3.5 to 4.4
Very strongly acid: 4.5 to 5.0
Strongly acid: 5.1 to 5.5
Moderately acid: 5.6 to 6.0
Slightly acid: 6.1 to 6.5
Neutral: 6.6 to 7.3
Slightly alkaline: 7.4 to 7.8
Moderately alkaline: 7.9 to 8.4
Strongly alkaline: 8.5 to 9.0
Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “Rock outcrop” is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which “severely eroded,” “very severely eroded,” or “gullied” is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1
Moderate: 13-30:1
Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0
Coarse sand: 1.0 to 0.5
Medium sand: 0.5 to 0.25
Fine sand: 0.25 to 0.10
Very fine sand: 0.10 to 0.05
Silt: 0.05 to 0.002
Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated

Prismatic: Vertically elongated and having flat tops

Columnar: Vertically elongated and having rounded tops

Angular blocky: Having faces that intersect at sharp angles (planes)

Subangular blocky: Having subrounded and planar faces (no sharp angles)

Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand

Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field

generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

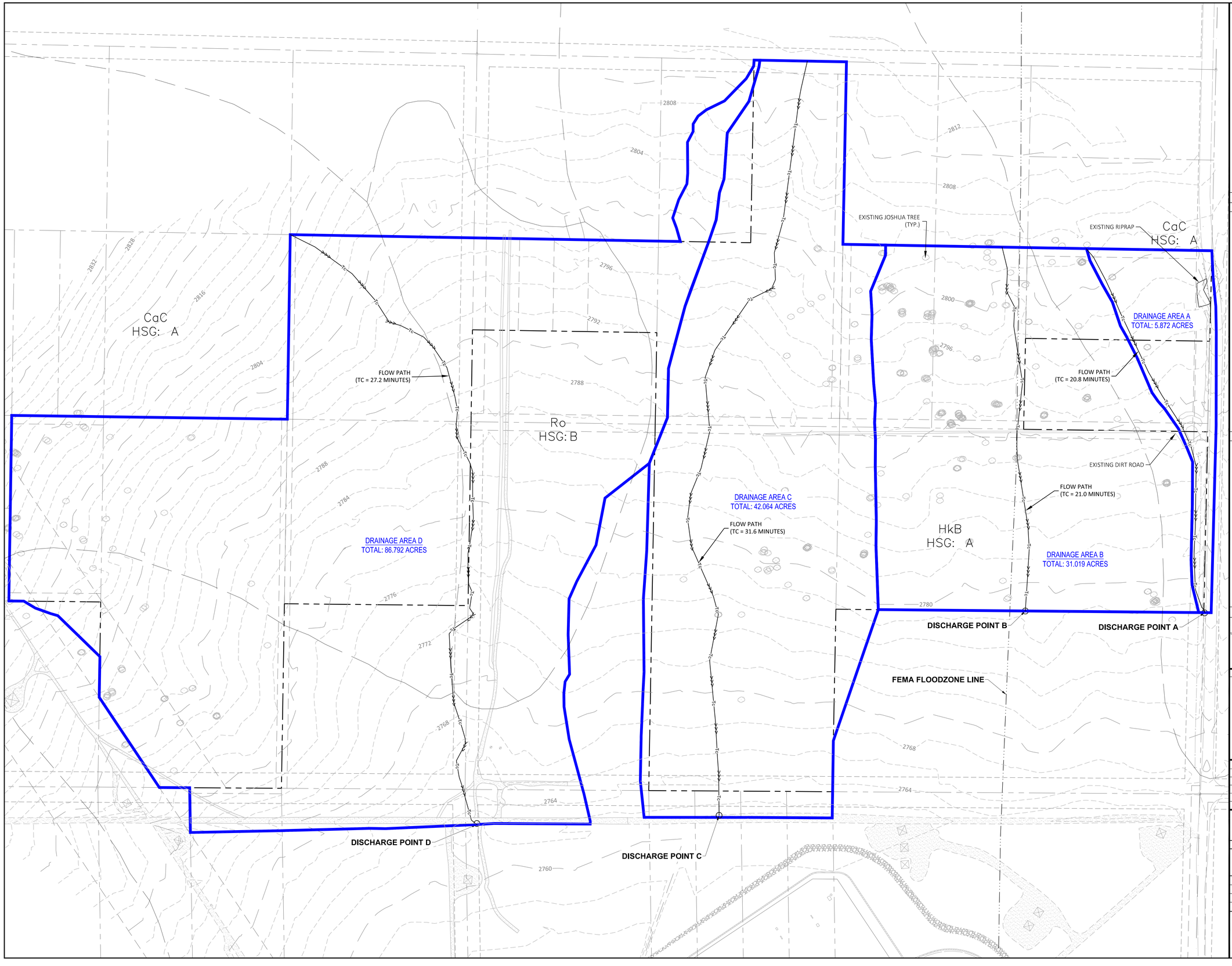
The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

Appendix C: Pre-Development Analysis

- Pre-Development Drainage Area Map
- HydroCAD Report



LEGEND

EXISTING FEATURES

- ADJACENT PARCEL BOUNDARY
- FEMA FLOOD ZONE LINE
- SECTION LINE
- SECTION RESERVATION LINE
- EXISTING EASEMENT LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- RIPRAP
- DIRT ROAD
- CONCRETE
- PAVEMENT
- WALL
- GUARDRAIL
- DRAINAGE AREA
- FLOW PATH (Tc)
- SOIL BOUNDARY
- SOIL MAP UNIT SYMBOL AND HSG (HkB, HSG: A)

GRAPHIC SCALE

150' 0 150'

1" = 150'

NORTH

N

SEAL:

PERMIT PLAN SET
NOT FOR
CONSTRUCTION

NO.	BY	DATE	REVISION	APP'D.

PROJECT: EUISMOD PROJECT LLC
WILLOW SPRINGS, CA 93560
KERN COUNTY

CASE NO:

TITLE: PRE-DEVELOPMENT
DRAINAGE AREA MAPS

DRAWN BY:	TSS	PROJ. NO.:	552398
CHECKED BY:	DG		
APPROVED BY:	SH		D-1
DATE:	2/23/26		

TRC
6 Executive Circle
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Irvine, CA 92614
Phone: 949.727.9336

H:\WORK IN PROGRESS\SOLAR SITES\VIPA POWER\EUISMOD\CAD\PLOT SHEETS\DRAINAGE MAPS\PRE DRAINAGE MAPS.DWG

TABLE OF CONTENTS

Project Reports
1 Routing Diagram
2 Rainfall Events Listing
3 Area Listing (all nodes)
4 Soil Listing (all nodes)
5 Ground Covers (all nodes)

2-year 24hr Event
6 Node Listing
7 Subcat DA-A: Subcat DA-A
8 Subcat DA-B: Subcat DA-B
9 Subcat DA-C: Subcat DA-C
10 Subcat DA-D: Subcat DA-D
11 Link A: DP A
12 Link B: DP B
13 Link C: DP C
14 Link D: DP D

2-year 6hr Event
15 Node Listing
16 Subcat DA-A: Subcat DA-A
18 Subcat DA-B: Subcat DA-B
19 Subcat DA-C: Subcat DA-C
20 Subcat DA-D: Subcat DA-D
22 Link A: DP A
23 Link B: DP B
24 Link C: DP C
25 Link D: DP D

10-year 5 Day Event
26 Node Listing
27 Subcat DA-A: Subcat DA-A
28 Subcat DA-B: Subcat DA-B
29 Subcat DA-C: Subcat DA-C
30 Subcat DA-D: Subcat DA-D
31 Link A: DP A
32 Link B: DP B
33 Link C: DP C
34 Link D: DP D

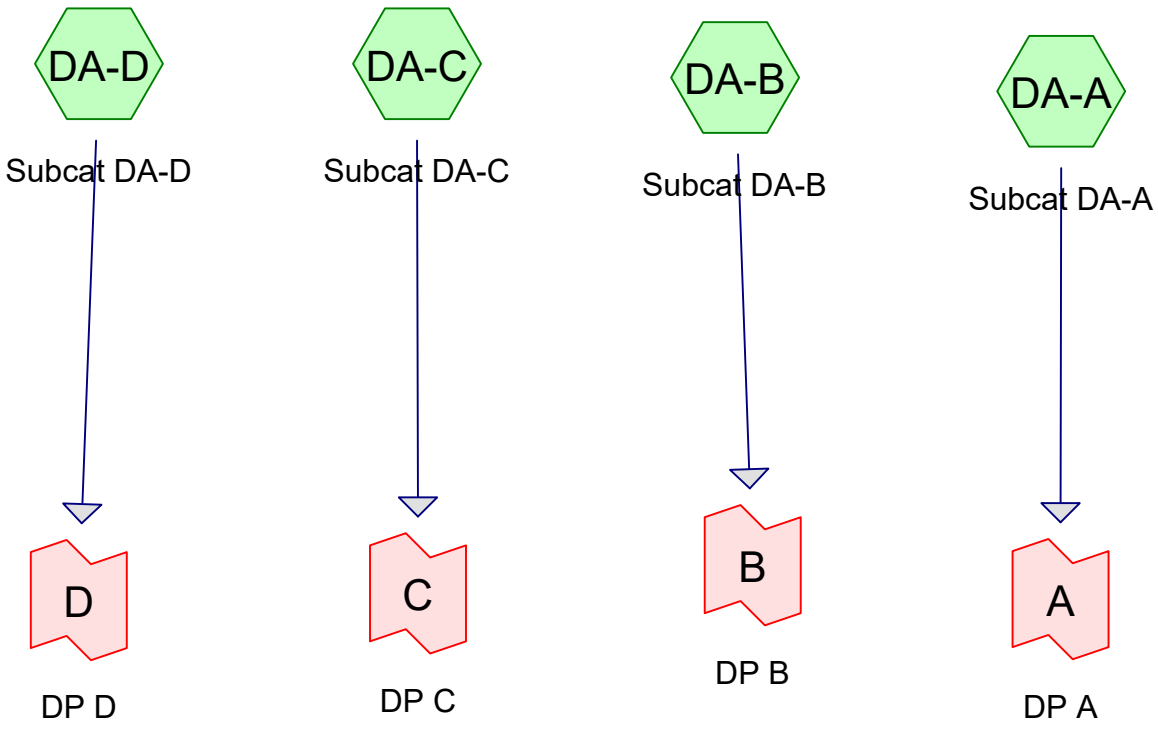
50-year 24hr Event
35 Node Listing
36 Subcat DA-A: Subcat DA-A
37 Subcat DA-B: Subcat DA-B
38 Subcat DA-C: Subcat DA-C
39 Subcat DA-D: Subcat DA-D

40 Link A: DP A
41 Link B: DP B
42 Link C: DP C
43 Link D: DP D

50-year 6hr Event
44 Node Listing
45 Subcat DA-A: Subcat DA-A
47 Subcat DA-B: Subcat DA-B
48 Subcat DA-C: Subcat DA-C
49 Subcat DA-D: Subcat DA-D
51 Link A: DP A
52 Link B: DP B
53 Link C: DP C
54 Link D: DP D

100-year 24hr Event
55 Node Listing
56 Subcat DA-A: Subcat DA-A
57 Subcat DA-B: Subcat DA-B
58 Subcat DA-C: Subcat DA-C
59 Subcat DA-D: Subcat DA-D
60 Link A: DP A
61 Link B: DP B
62 Link C: DP C
63 Link D: DP D

100-year 6hr Event
64 Node Listing
65 Subcat DA-A: Subcat DA-A
67 Subcat DA-B: Subcat DA-B
68 Subcat DA-C: Subcat DA-C
69 Subcat DA-D: Subcat DA-D
71 Link A: DP A
72 Link B: DP B
73 Link C: DP C
74 Link D: DP D



Subcat Reach Pond Link

Routing Diagram for Existing
Prepared by TRC Companies, Printed 2/23/2026
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year 24hr	Type I 24-hr		Default	24.00	1	1.88	2
2	2-year 6hr	Type I 24-hr		Scale	6.00	1	1.02	2
3	10-year 5 Day	Type I 24-hr		Scale	120.00	5	5.04	2
4	50-year 24hr	Type I 24-hr		Default	24.00	1	4.49	2
5	50-year 6hr	Type I 24-hr		Scale	6.00	1	2.25	2
6	100-year 24hr	Type I 24-hr		Default	24.00	1	5.06	2
7	100-year 6hr	Type I 24-hr		Scale	6.00	1	2.54	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.657	55	Desert shrub range, Fair, HSG A (DA-D)
9.988	72	Desert shrub range, Fair, HSG B (DA-D)
137.275	49	Desert shrub range, Good, HSG A (DA-A, DA-B, DA-C, DA-D)
12.584	68	Desert shrub range, Good, HSG B (DA-D)
0.206	63	Desert shrub range, Poor, HSG A (DA-A)
1.634	72	Dirt roads, HSG A (DA-A, DA-B, DA-C, DA-D)
0.687	82	Dirt roads, HSG B (DA-D)
0.068	96	Gravel surface, HSG A (DA-A)
0.649	98	Unconnected pavement, HSG A (DA-A)
165.747	**53**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
142.488	HSG A	DA-A, DA-B, DA-C, DA-D
23.258	HSG B	DA-D
0.000	HSG C	
0.000	HSG D	
0.000	Other	
165.747		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.657	9.988	0.000	0.000	0.000	12.644	Desert shrub range, Fair	DA-D
137.275	12.584	0.000	0.000	0.000	149.859	Desert shrub range, Good	DA-A, DA-B, DA-C, DA-D
0.206	0.000	0.000	0.000	0.000	0.206	Desert shrub range, Poor	DA-A
1.634	0.687	0.000	0.000	0.000	2.320	Dirt roads	DA-A, DA-B, DA-C, DA-D
0.068	0.000	0.000	0.000	0.000	0.068	Gravel surface	DA-A
0.649	0.000	0.000	0.000	0.000	0.649	Unconnected pavement	DA-A
142.488	**23.258**	**0.000**	**0.000**	**0.000**	**165.747**	**TOTAL AREA**	

Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A: Subcat DA-A Runoff Area=5.873 ac 11.04% Impervious Runoff Depth=0.00"
Flow Length=1,415' Tc=20.8 min UI Adjusted CN=54 Runoff=0.01 cfs 0.002 af

Subcatchment DA-B: Subcat DA-B Runoff Area=31.019 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,331' Tc=21.0 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment DA-C: Subcat DA-C Runoff Area=42.064 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=2,780' Tc=31.6 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment DA-D: Subcat DA-D Runoff Area=86.792 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=2,512' Tc=27.2 min CN=55 Runoff=0.13 cfs 0.051 af

Link A: DP A Inflow=0.01 cfs 0.002 af
Primary=0.01 cfs 0.002 af

Link B: DP B Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link C: DP C Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link D: DP D Inflow=0.13 cfs 0.051 af
Primary=0.13 cfs 0.051 af

Total Runoff Area = 165.747 ac Runoff Volume = 0.053 af Average Runoff Depth = 0.00"
99.61% Pervious = 165.098 ac 0.39% Impervious = 0.649 ac

Summary for Subcatchment DA-A: Subcat DA-A

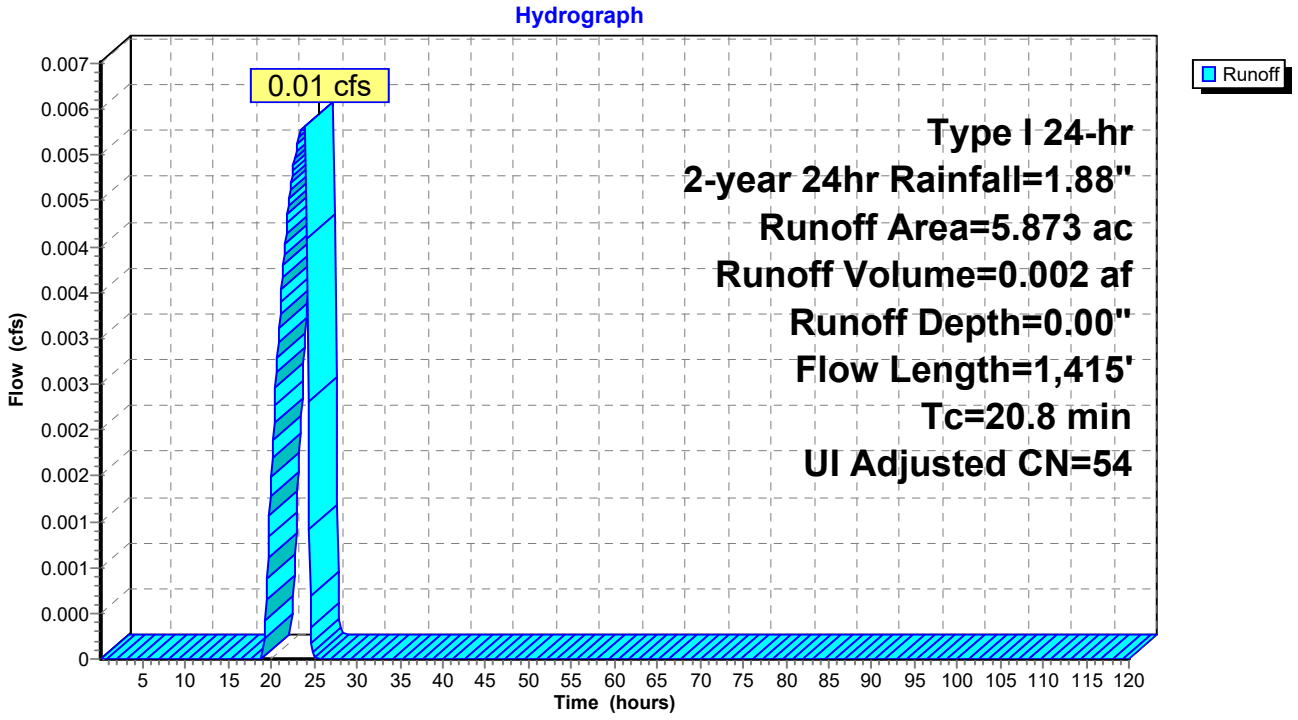
Runoff = 0.01 cfs @ 24.00 hrs, Volume= 0.002 af, Depth= 0.00"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Adj	Description
4.726	49		Desert shrub range, Good, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.223	72		Dirt roads, HSG A
0.068	96		Gravel surface, HSG A
0.649	98		Unconnected pavement, HSG A
5.873	56	54	Weighted Average, UI Adjusted
5.224			88.96% Pervious Area
0.649			11.04% Impervious Area
0.649			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0234	0.16		**Sheet Flow, sheet 2803-2800.66** Range n= 0.130 P2= 1.88"
10.1	1,315	0.0180	2.16		**Shallow Concentrated Flow, shallow 2800.66-2776.94** Unpaved Kv= 16.1 fps
20.8	1,415	Total			

Subcatchment DA-A: Subcat DA-A



Summary for Subcatchment DA-B: Subcat DA-B

[45] Hint: Runoff=Zero

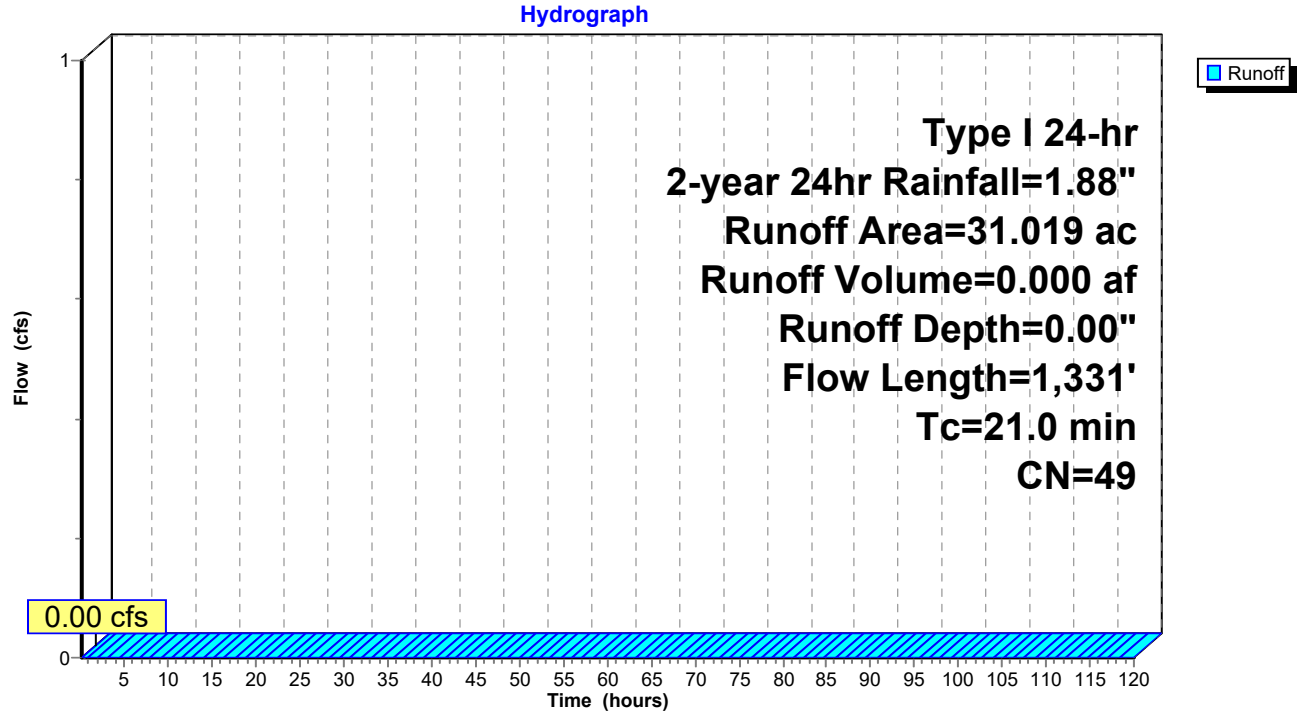
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Description
30.829	49	Desert shrub range, Good, HSG A
0.190	72	Dirt roads, HSG A
31.019	49	Weighted Average
31.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0194	0.14		**Sheet Flow, Sheet 2802.81-2800.87** Range n= 0.130 P2= 1.88"
9.5	1,231	0.0181	2.17		**Shallow Concentrated Flow, shallow range 2800.87-2797.25** Unpaved Kv= 16.1 fps
21.0	1,331	Total			

Subcatchment DA-B: Subcat DA-B



Summary for Subcatchment DA-C: Subcat DA-C

[45] Hint: Runoff=Zero

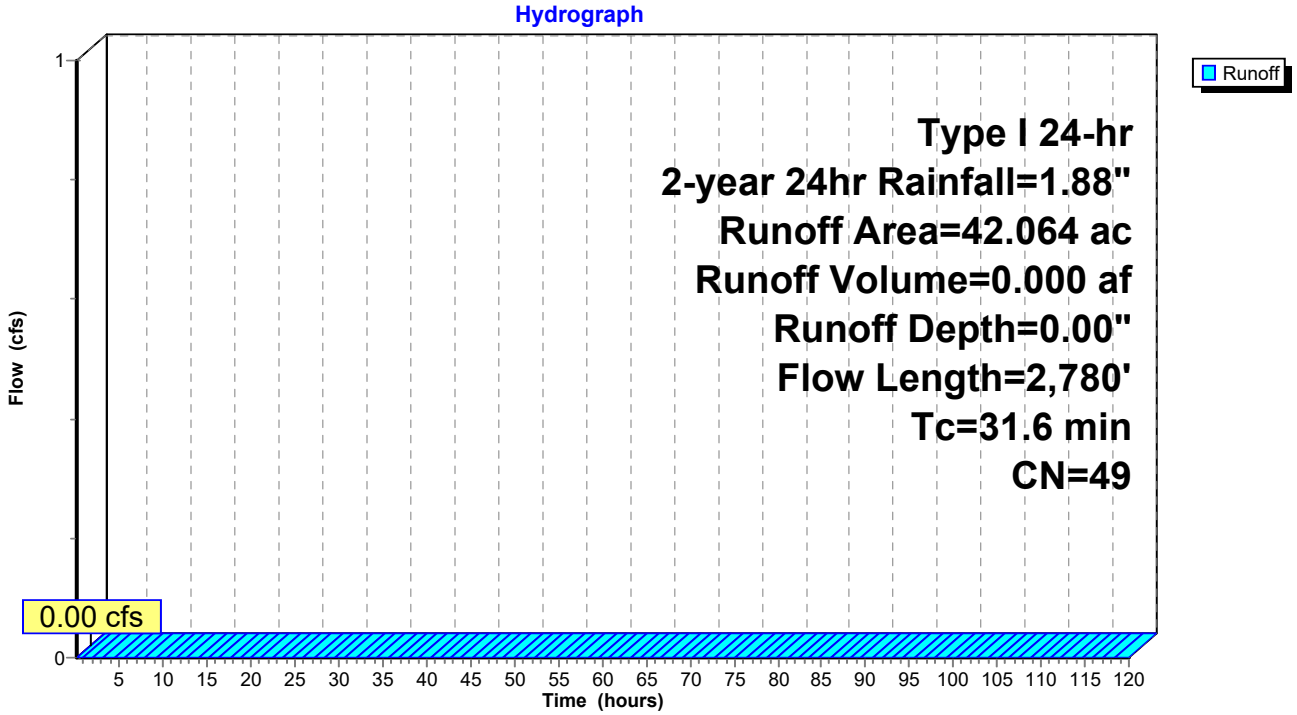
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Description
41.978	49	Desert shrub range, Good, HSG A
0.085	72	Dirt roads, HSG A
42.064	49	Weighted Average
42.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0237	0.16		**Sheet Flow, sheet 2813.23-2810.86** Range n= 0.130 P2= 1.88"
20.9	2,680	0.0177	2.14		**Shallow Concentrated Flow, shallow range 2810.86-2763.38** Unpaved Kv= 16.1 fps
31.6	2,780	Total			

Subcatchment DA-C: Subcat DA-C



Summary for Subcatchment DA-D: Subcat DA-D

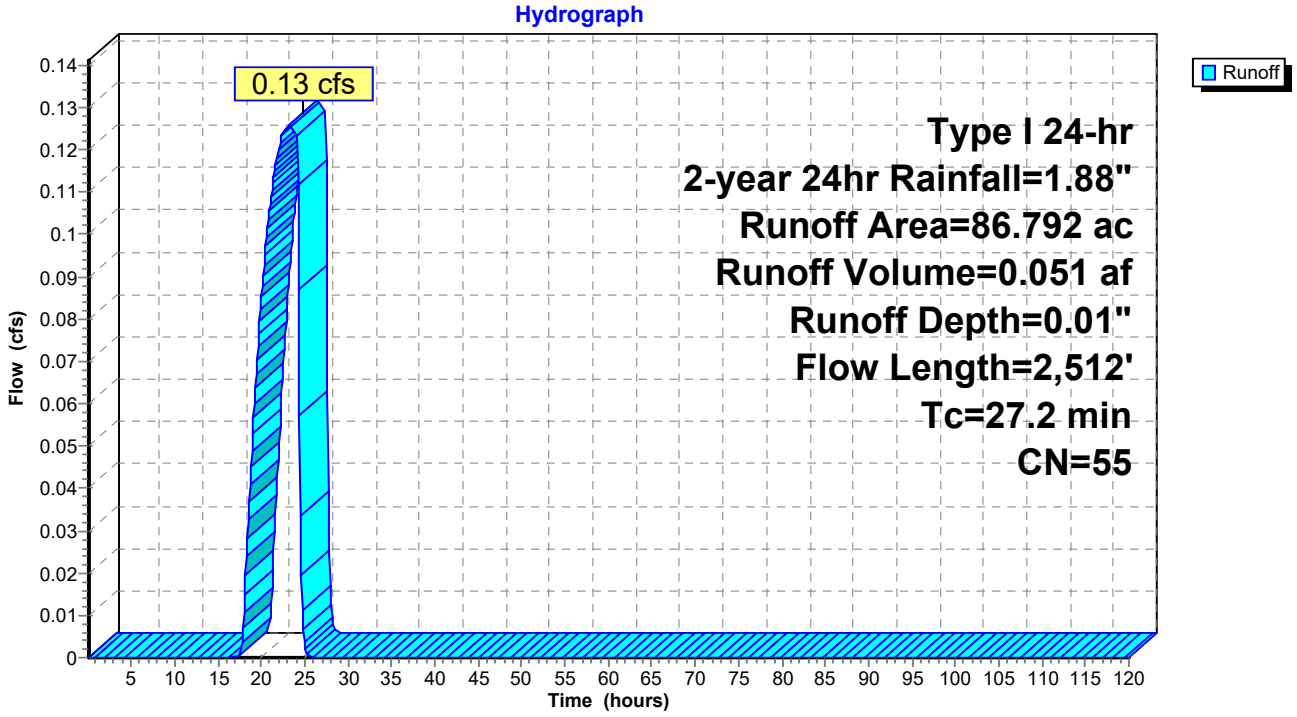
Runoff = 0.13 cfs @ 23.23 hrs, Volume= 0.051 af, Depth= 0.01"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Description
2.657	55	Desert shrub range, Fair, HSG A
9.988	72	Desert shrub range, Fair, HSG B
59.741	49	Desert shrub range, Good, HSG A
12.584	68	Desert shrub range, Good, HSG B
1.136	72	Dirt roads, HSG A
0.687	82	Dirt roads, HSG B
86.792	55	Weighted Average
86.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0353	0.18		**Sheet Flow, sheet 2810.70-2807.17** Range n= 0.130 P2= 1.88"
18.1	2,412	0.0190	2.22		**Shallow Concentrated Flow, shallow 2807.17-2761** Unpaved Kv= 16.1 fps
27.2	2,512	Total			

Subcatchment DA-D: Subcat DA-D

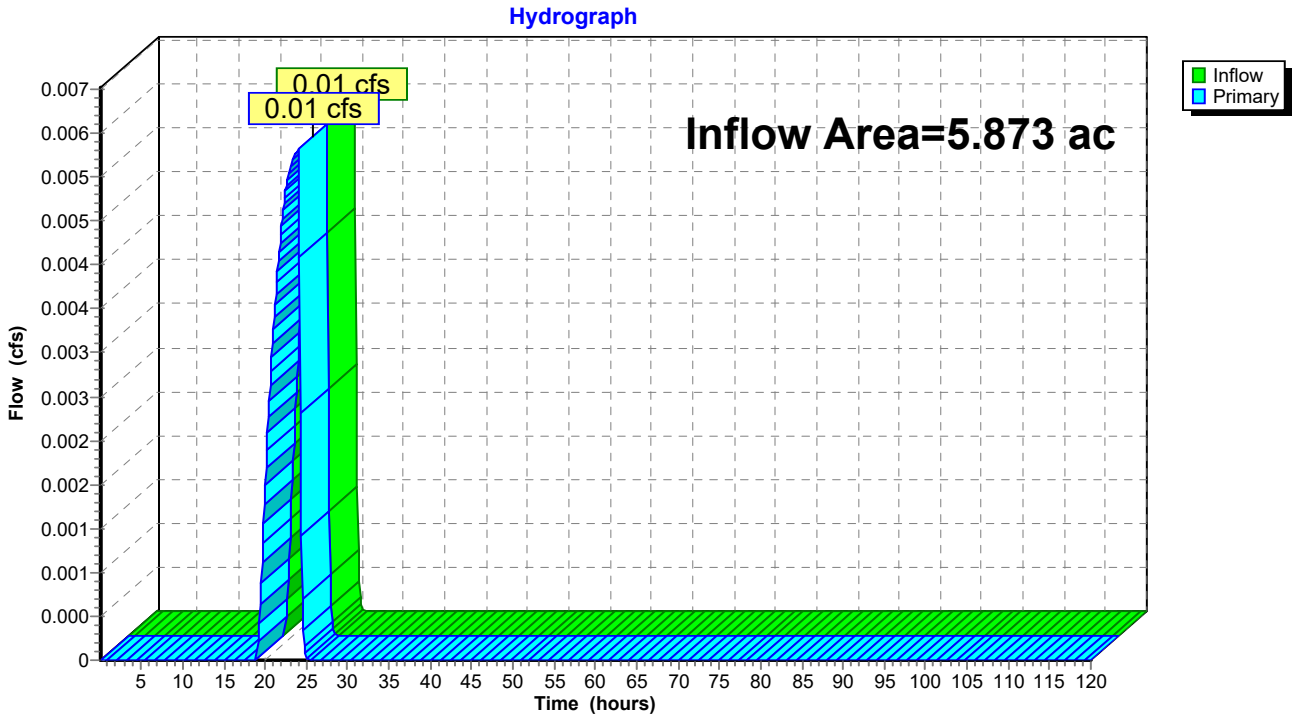


Summary for Link A: DP A

Inflow Area = 5.873 ac, 11.04% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.01 cfs @ 24.00 hrs, Volume= 0.002 af
Primary = 0.01 cfs @ 24.00 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

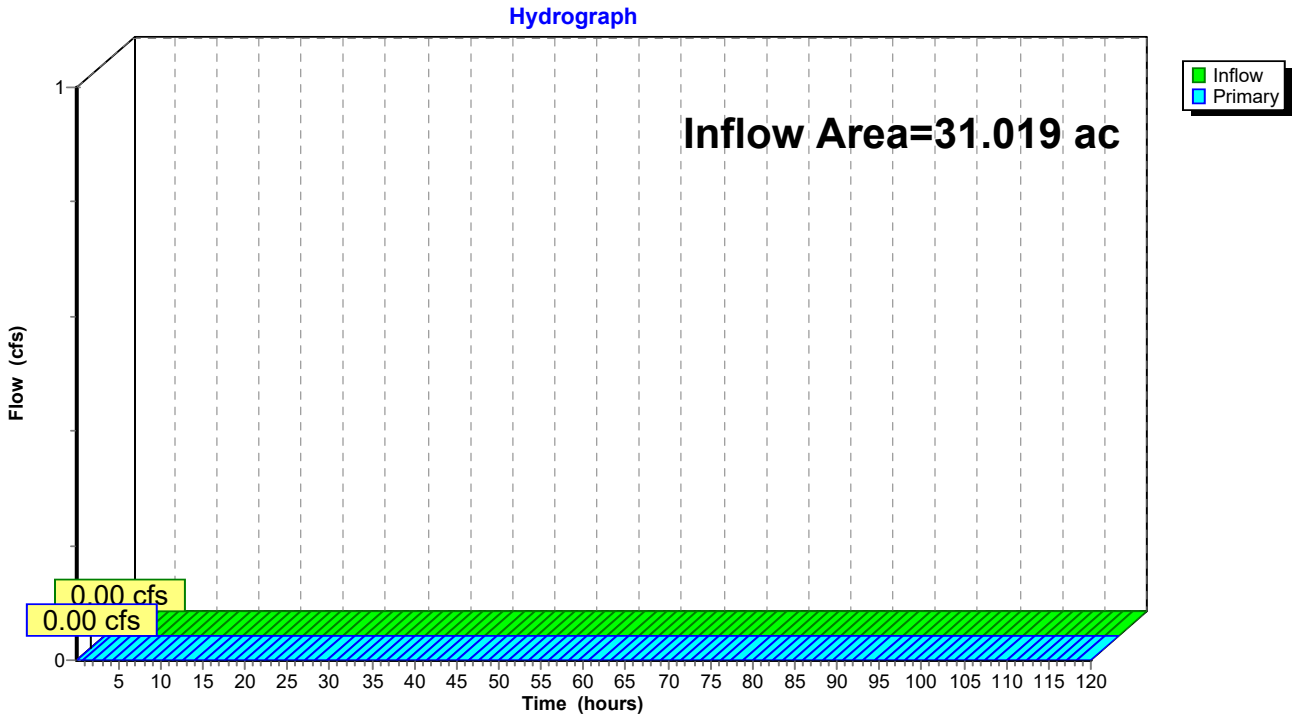


Summary for Link B: DP B

Inflow Area = 31.019 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

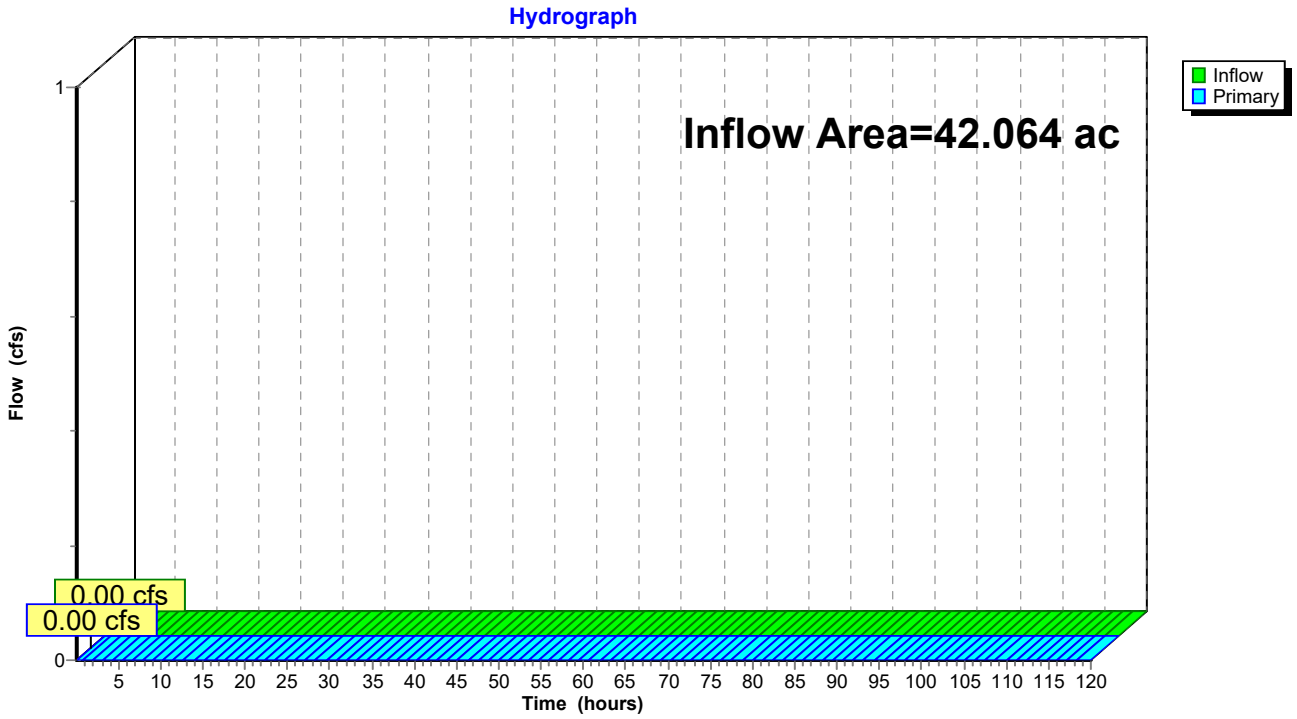


Summary for Link C: DP C

Inflow Area = 42.064 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

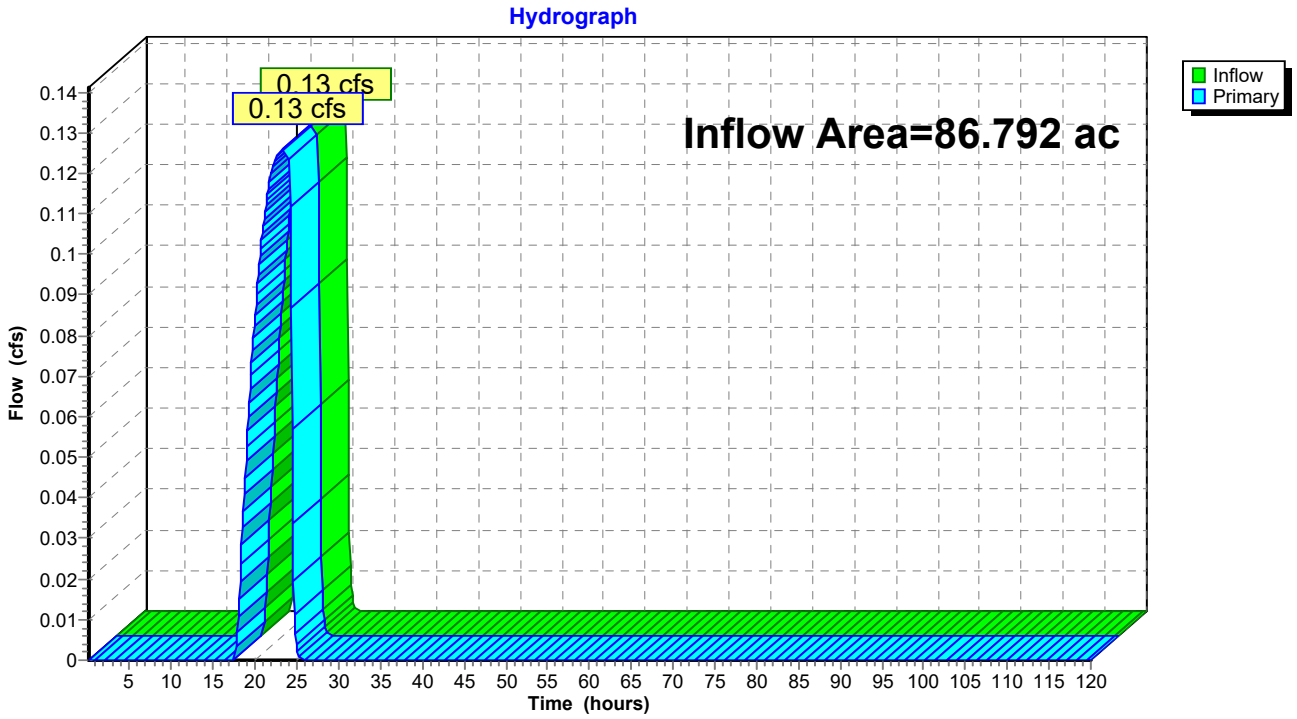


Summary for Link D: DP D

Inflow Area = 86.792 ac, 0.00% Impervious, Inflow Depth = 0.01" for 2-year 24hr event
Inflow = 0.13 cfs @ 23.23 hrs, Volume= 0.051 af
Primary = 0.13 cfs @ 23.23 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A: Subcat DA-A Runoff Area=5.873 ac 11.04% Impervious Runoff Depth=0.00"
Flow Length=1,415' Tc=20.8 min UI Adjusted CN=54 Runoff=0.00 cfs 0.000 af

Subcatchment DA-B: Subcat DA-B Runoff Area=31.019 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,331' Tc=21.0 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment DA-C: Subcat DA-C Runoff Area=42.064 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=2,780' Tc=31.6 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment DA-D: Subcat DA-D Runoff Area=86.792 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=2,512' Tc=27.2 min CN=55 Runoff=0.00 cfs 0.000 af

Link A: DP A Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link B: DP B Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link C: DP C Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link D: DP D Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 165.747 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
99.61% Pervious = 165.098 ac 0.39% Impervious = 0.649 ac

Summary for Subcatchment DA-A: Subcat DA-A

[45] Hint: Runoff=Zero

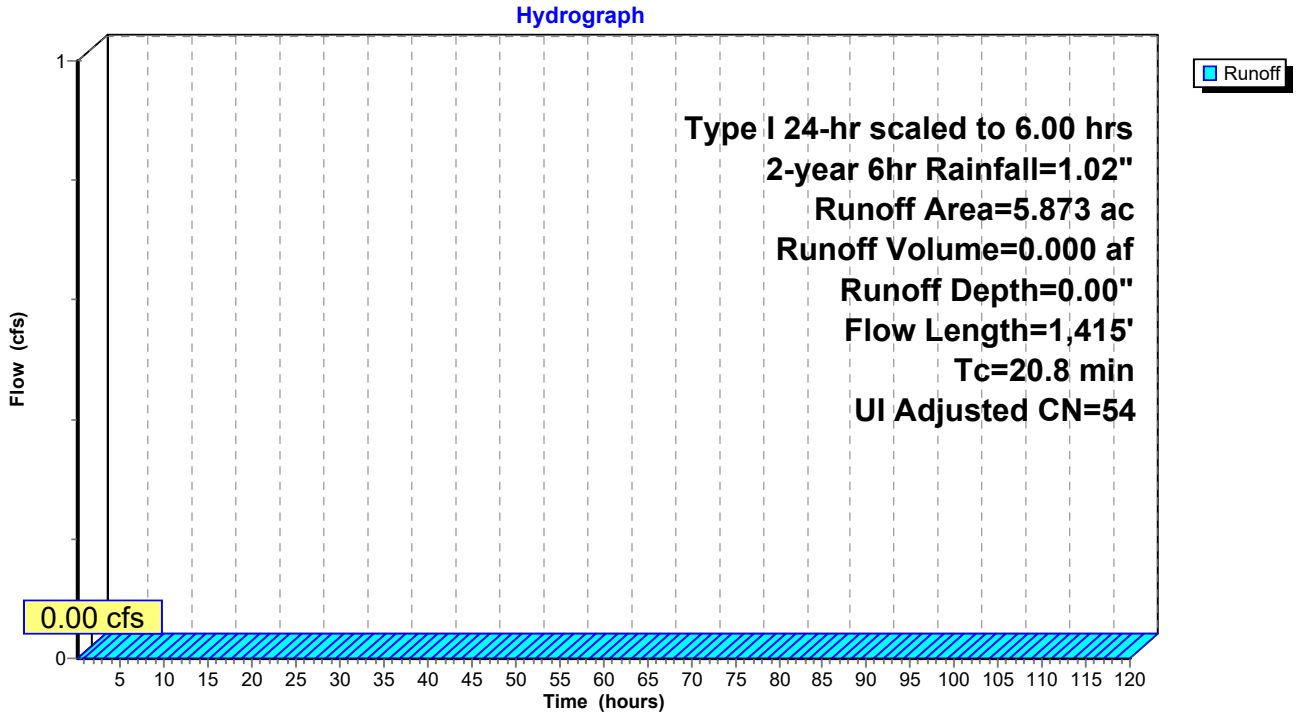
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Adj	Description
4.726	49		Desert shrub range, Good, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.223	72		Dirt roads, HSG A
0.068	96		Gravel surface, HSG A
0.649	98		Unconnected pavement, HSG A
5.873	56	54	Weighted Average, UI Adjusted
5.224			88.96% Pervious Area
0.649			11.04% Impervious Area
0.649			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0234	0.16		**Sheet Flow, sheet 2803-2800.66** Range n= 0.130 P2= 1.88"
10.1	1,315	0.0180	2.16		**Shallow Concentrated Flow, shallow 2800.66-2776.94** Unpaved Kv= 16.1 fps
20.8	1,415	Total			

Subcatchment DA-A: Subcat DA-A



Summary for Subcatchment DA-B: Subcat DA-B

[45] Hint: Runoff=Zero

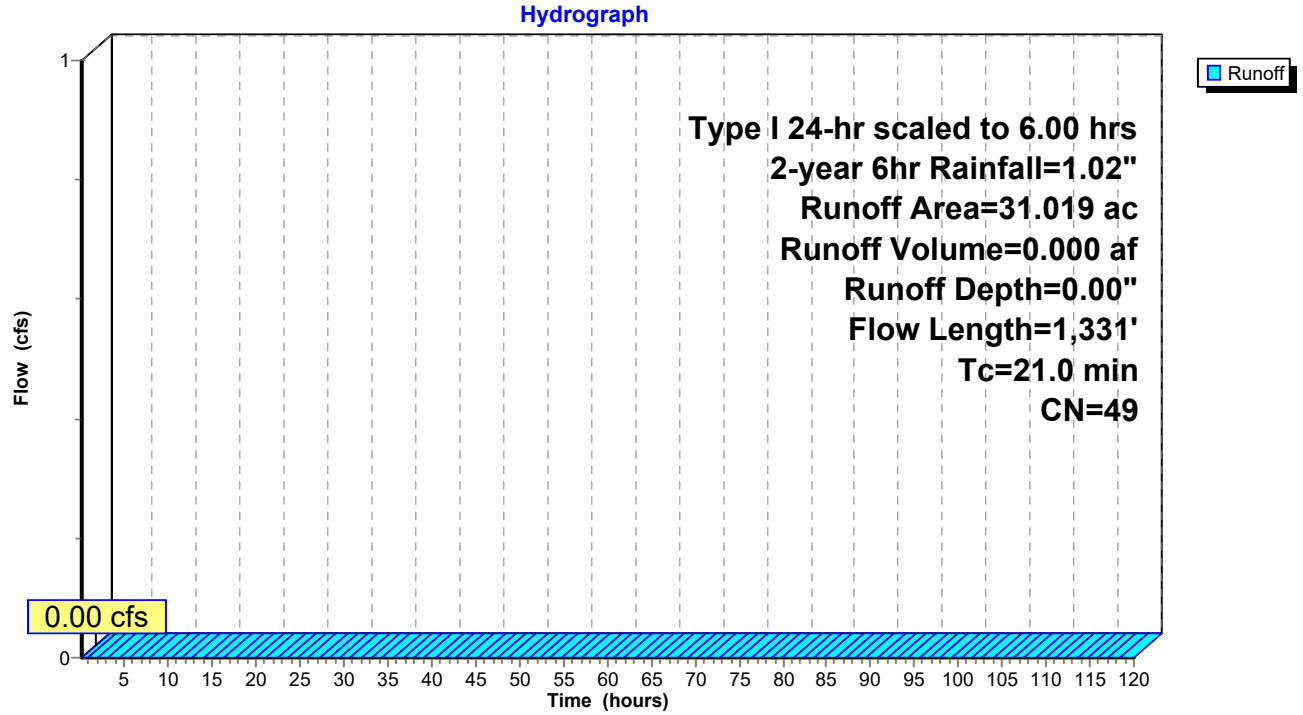
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Description
30.829	49	Desert shrub range, Good, HSG A
0.190	72	Dirt roads, HSG A
31.019	49	Weighted Average
31.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0194	0.14		**Sheet Flow, Sheet 2802.81-2800.87** Range n= 0.130 P2= 1.88"
9.5	1,231	0.0181	2.17		**Shallow Concentrated Flow, shallow range 2800.87-2797.25** Unpaved Kv= 16.1 fps
21.0	1,331	Total			

Subcatchment DA-B: Subcat DA-B



Summary for Subcatchment DA-C: Subcat DA-C

[45] Hint: Runoff=Zero

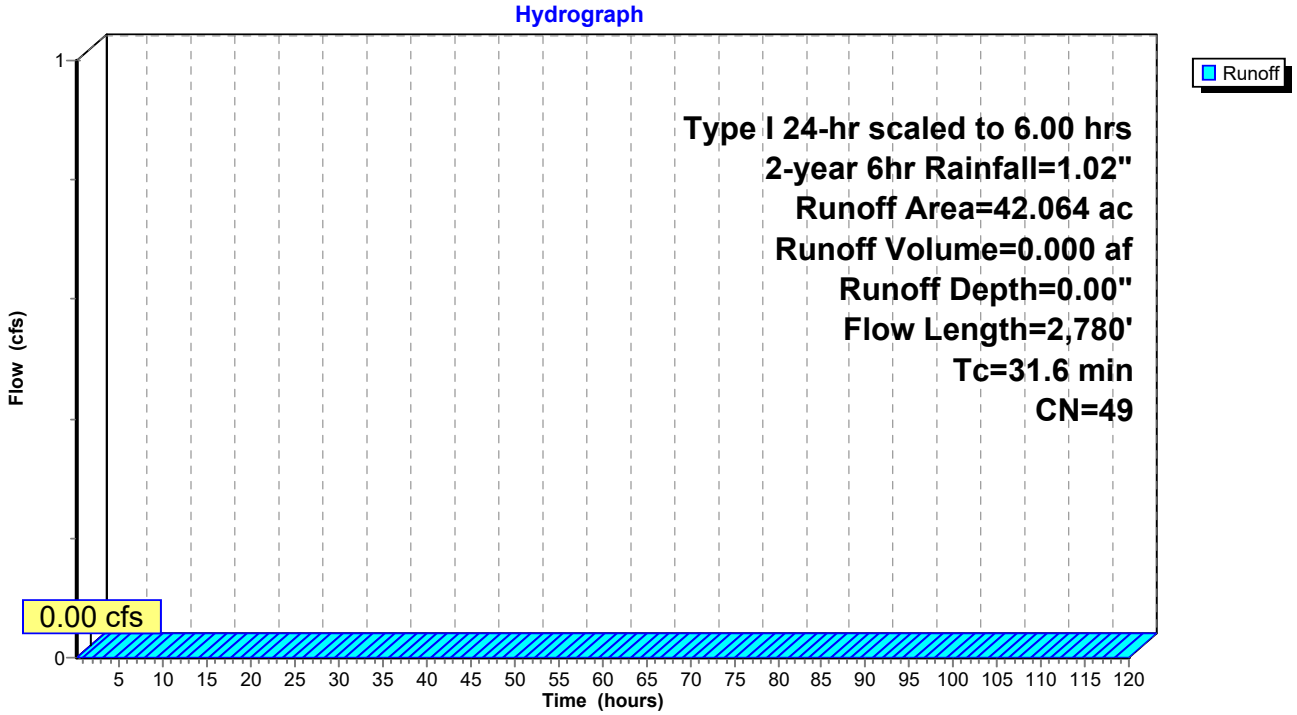
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Description
41.978	49	Desert shrub range, Good, HSG A
0.085	72	Dirt roads, HSG A
42.064	49	Weighted Average
42.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0237	0.16		**Sheet Flow, sheet 2813.23-2810.86** Range n= 0.130 P2= 1.88"
20.9	2,680	0.0177	2.14		**Shallow Concentrated Flow, shallow range 2810.86-2763.38** Unpaved Kv= 16.1 fps
31.6	2,780	Total			

Subcatchment DA-C: Subcat DA-C



Summary for Subcatchment DA-D: Subcat DA-D

[45] Hint: Runoff=Zero

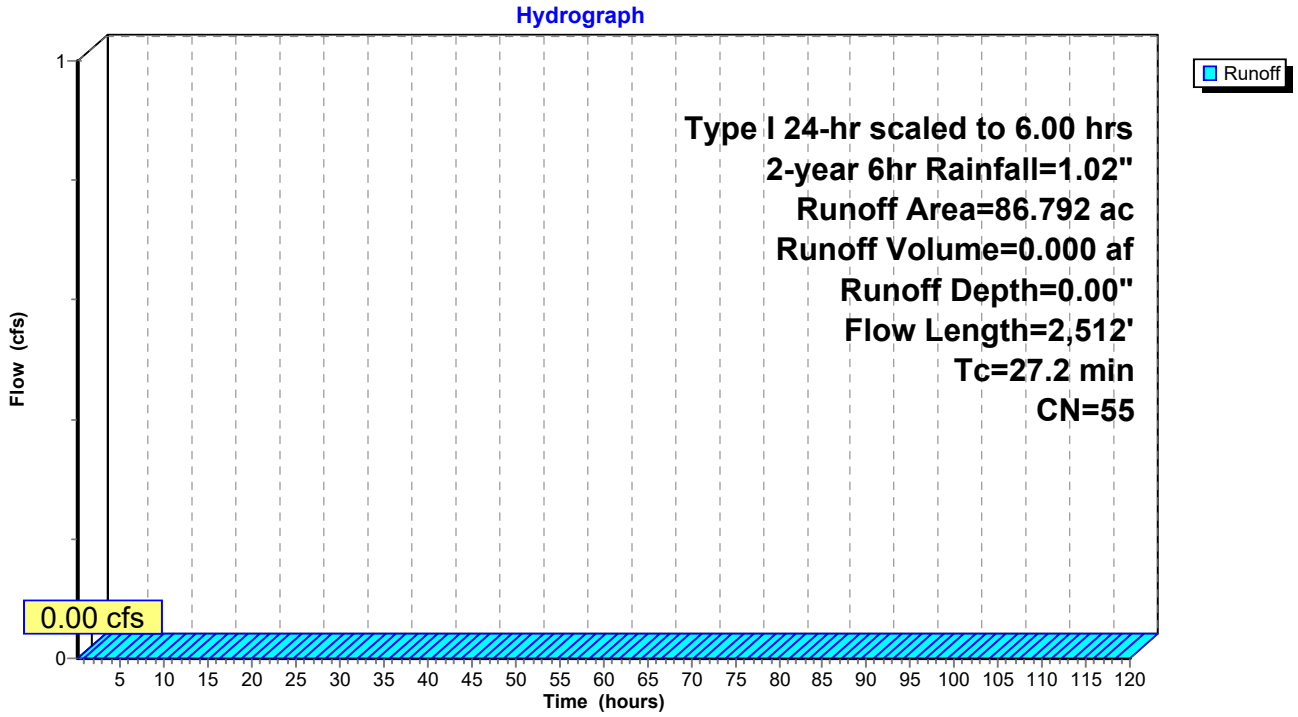
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Description
2.657	55	Desert shrub range, Fair, HSG A
9.988	72	Desert shrub range, Fair, HSG B
59.741	49	Desert shrub range, Good, HSG A
12.584	68	Desert shrub range, Good, HSG B
1.136	72	Dirt roads, HSG A
0.687	82	Dirt roads, HSG B
86.792	55	Weighted Average
86.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0353	0.18		**Sheet Flow, sheet 2810.70-2807.17** Range n= 0.130 P2= 1.88"
18.1	2,412	0.0190	2.22		**Shallow Concentrated Flow, shallow 2807.17-2761** Unpaved Kv= 16.1 fps
27.2	2,512	Total			

Subcatchment DA-D: Subcat DA-D

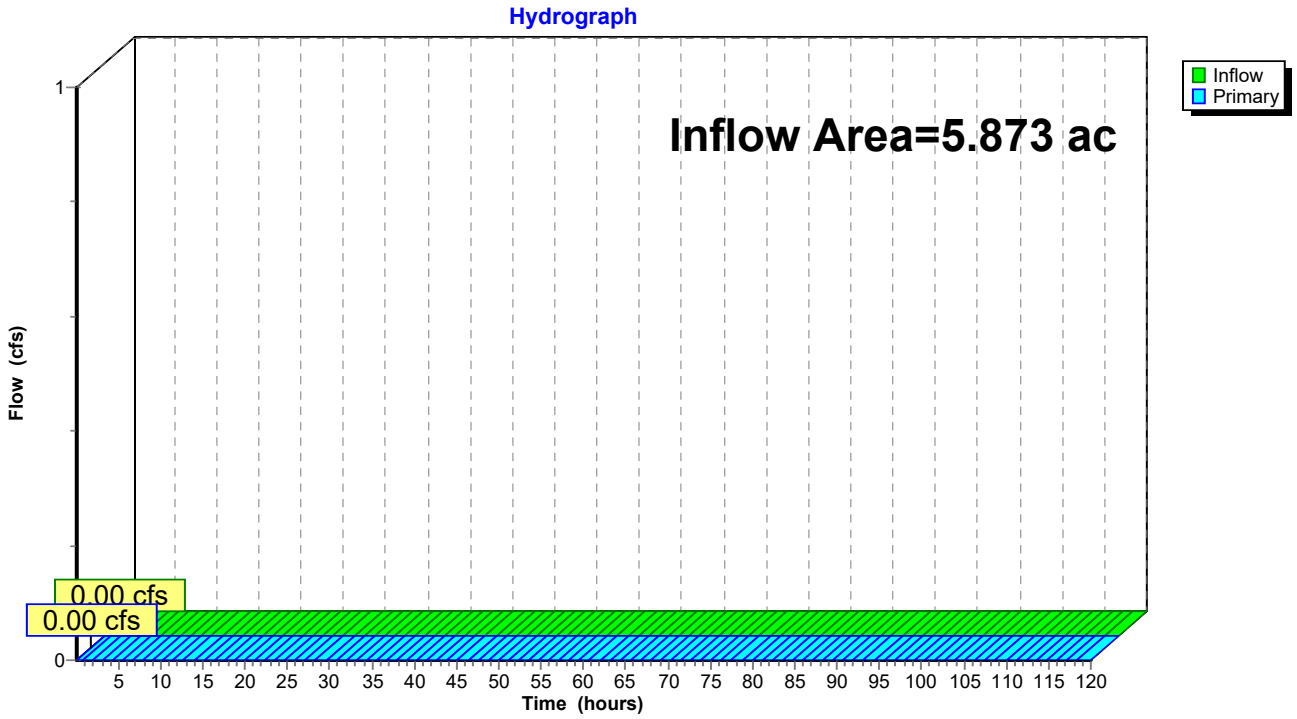


Summary for Link A: DP A

Inflow Area = 5.873 ac, 11.04% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

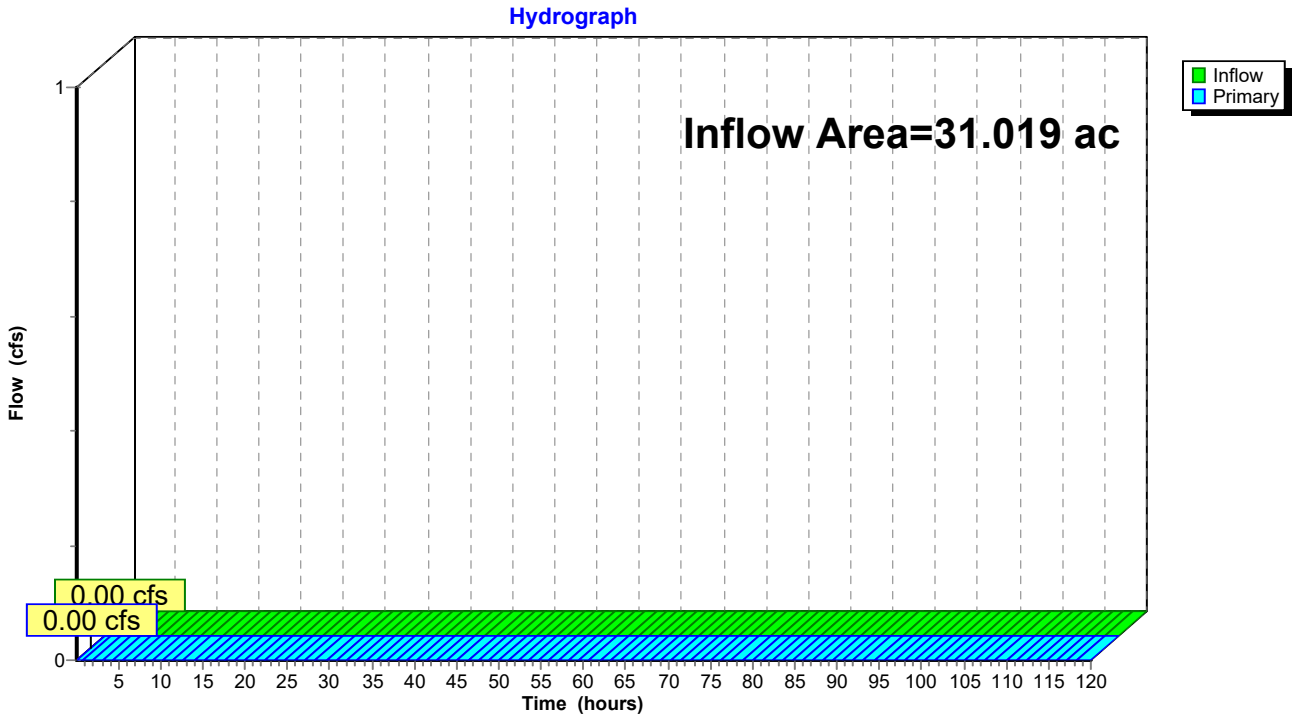


Summary for Link B: DP B

Inflow Area = 31.019 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

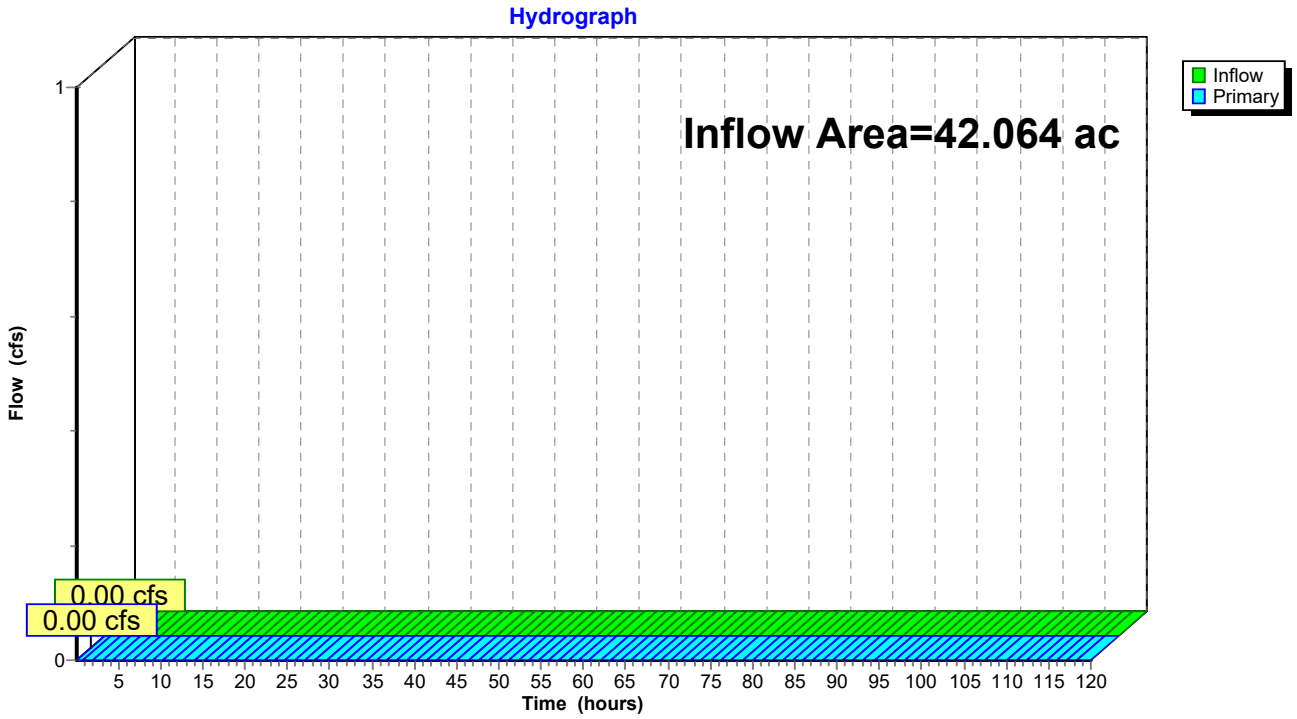


Summary for Link C: DP C

Inflow Area = 42.064 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

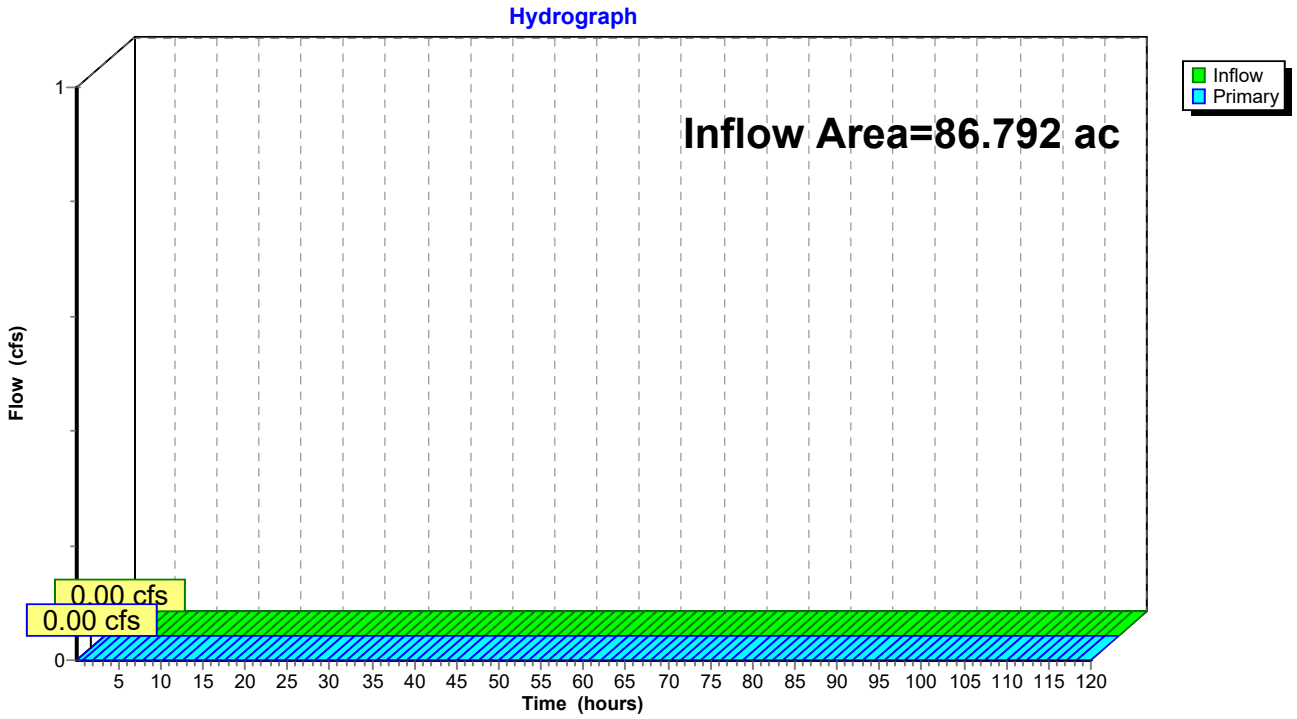


Summary for Link D: DP D

Inflow Area = 86.792 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A: Subcat DA-A Runoff Area=5.873 ac 11.04% Impervious Runoff Depth>0.94"
Flow Length=1,415' Tc=20.8 min UI Adjusted CN=54 Runoff=0.56 cfs 0.459 af

Subcatchment DA-B: Subcat DA-B Runoff Area=31.019 ac 0.00% Impervious Runoff Depth>0.65"
Flow Length=1,331' Tc=21.0 min CN=49 Runoff=1.18 cfs 1.689 af

Subcatchment DA-C: Subcat DA-C Runoff Area=42.064 ac 0.00% Impervious Runoff Depth>0.65"
Flow Length=2,780' Tc=31.6 min CN=49 Runoff=1.43 cfs 2.287 af

Subcatchment DA-D: Subcat DA-D Runoff Area=86.792 ac 0.00% Impervious Runoff Depth>1.00"
Flow Length=2,512' Tc=27.2 min CN=55 Runoff=9.04 cfs 7.214 af

Link A: DP A Inflow=0.56 cfs 0.459 af
Primary=0.56 cfs 0.459 af

Link B: DP B Inflow=1.18 cfs 1.689 af
Primary=1.18 cfs 1.689 af

Link C: DP C Inflow=1.43 cfs 2.287 af
Primary=1.43 cfs 2.287 af

Link D: DP D Inflow=9.04 cfs 7.214 af
Primary=9.04 cfs 7.214 af

Total Runoff Area = 165.747 ac Runoff Volume = 11.649 af Average Runoff Depth = 0.84"
99.61% Pervious = 165.098 ac 0.39% Impervious = 0.649 ac

Summary for Subcatchment DA-A: Subcat DA-A

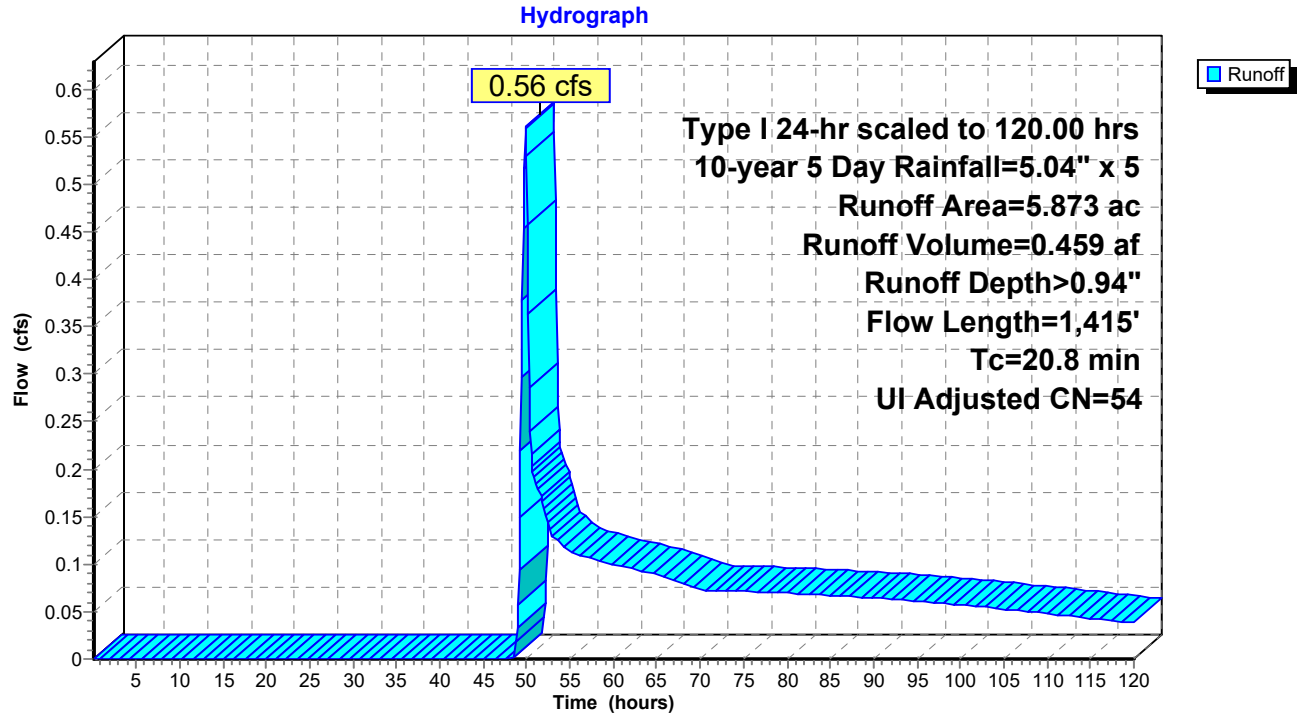
Runoff = 0.56 cfs @ 49.87 hrs, Volume= 0.459 af, Depth> 0.94"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5 Day Rainfall=5.04" x 5

Area (ac)	CN	Adj	Description
4.726	49		Desert shrub range, Good, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.223	72		Dirt roads, HSG A
0.068	96		Gravel surface, HSG A
0.649	98		Unconnected pavement, HSG A
5.873	56	54	Weighted Average, UI Adjusted
5.224			88.96% Pervious Area
0.649			11.04% Impervious Area
0.649			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0234	0.16		**Sheet Flow, sheet 2803-2800.66** Range n= 0.130 P2= 1.88"
10.1	1,315	0.0180	2.16		**Shallow Concentrated Flow, shallow 2800.66-2776.94** Unpaved Kv= 16.1 fps
20.8	1,415	Total			

Subcatchment DA-A: Subcat DA-A



Summary for Subcatchment DA-B: Subcat DA-B

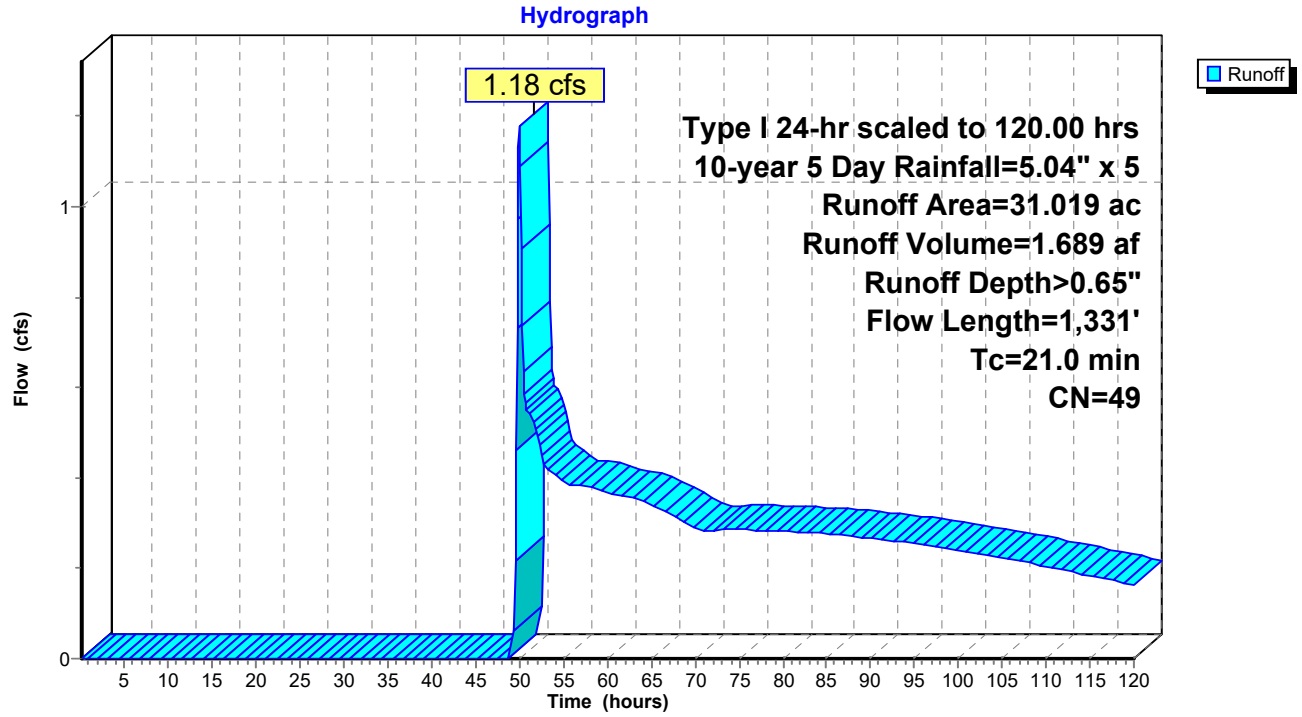
Runoff = 1.18 cfs @ 49.98 hrs, Volume= 1.689 af, Depth> 0.65"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5 Day Rainfall=5.04" x 5

Area (ac)	CN	Description
30.829	49	Desert shrub range, Good, HSG A
0.190	72	Dirt roads, HSG A
31.019	49	Weighted Average
31.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0194	0.14		**Sheet Flow, Sheet 2802.81-2800.87** Range n= 0.130 P2= 1.88"
9.5	1,231	0.0181	2.17		**Shallow Concentrated Flow, shallow range 2800.87-2797.25** Unpaved Kv= 16.1 fps
21.0	1,331	Total			

Subcatchment DA-B: Subcat DA-B



Summary for Subcatchment DA-C: Subcat DA-C

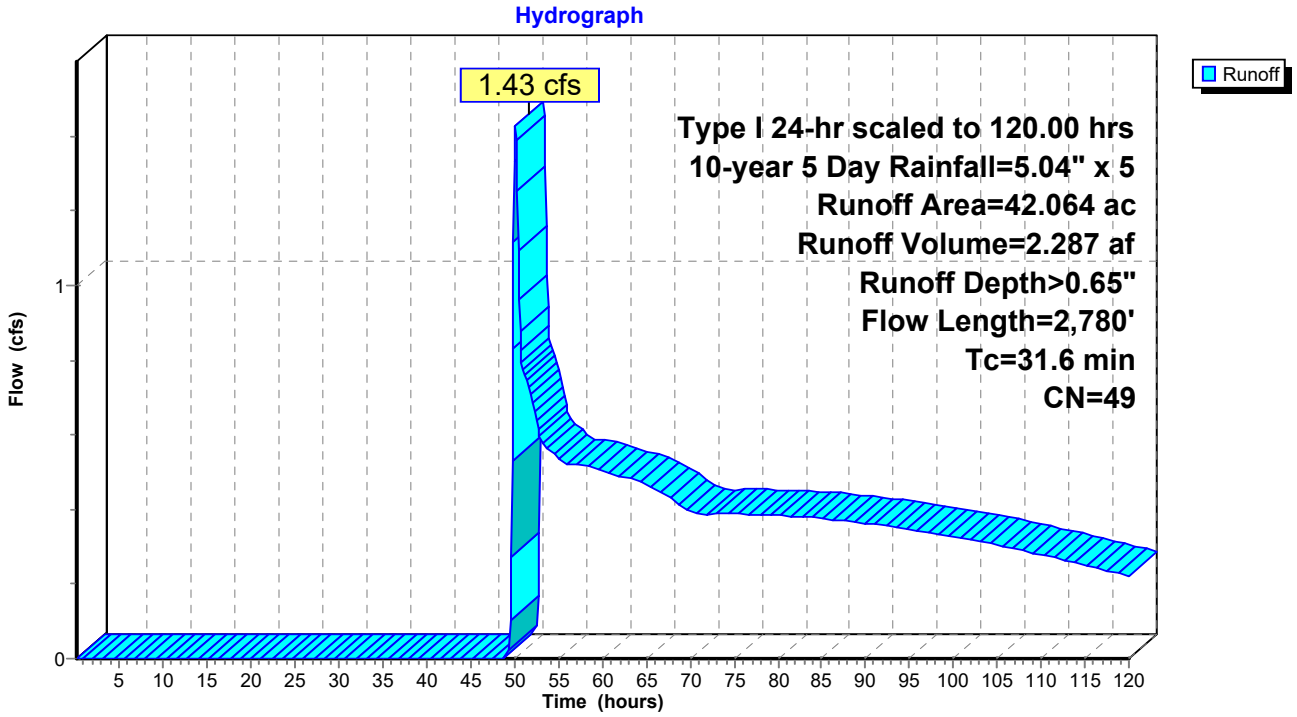
Runoff = 1.43 cfs @ 50.12 hrs, Volume= 2.287 af, Depth> 0.65"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5 Day Rainfall=5.04" x 5

Area (ac)	CN	Description
41.978	49	Desert shrub range, Good, HSG A
0.085	72	Dirt roads, HSG A
42.064	49	Weighted Average
42.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0237	0.16		**Sheet Flow, sheet 2813.23-2810.86** Range n= 0.130 P2= 1.88"
20.9	2,680	0.0177	2.14		**Shallow Concentrated Flow, shallow range 2810.86-2763.38** Unpaved Kv= 16.1 fps
31.6	2,780	Total			

Subcatchment DA-C: Subcat DA-C



Summary for Subcatchment DA-D: Subcat DA-D

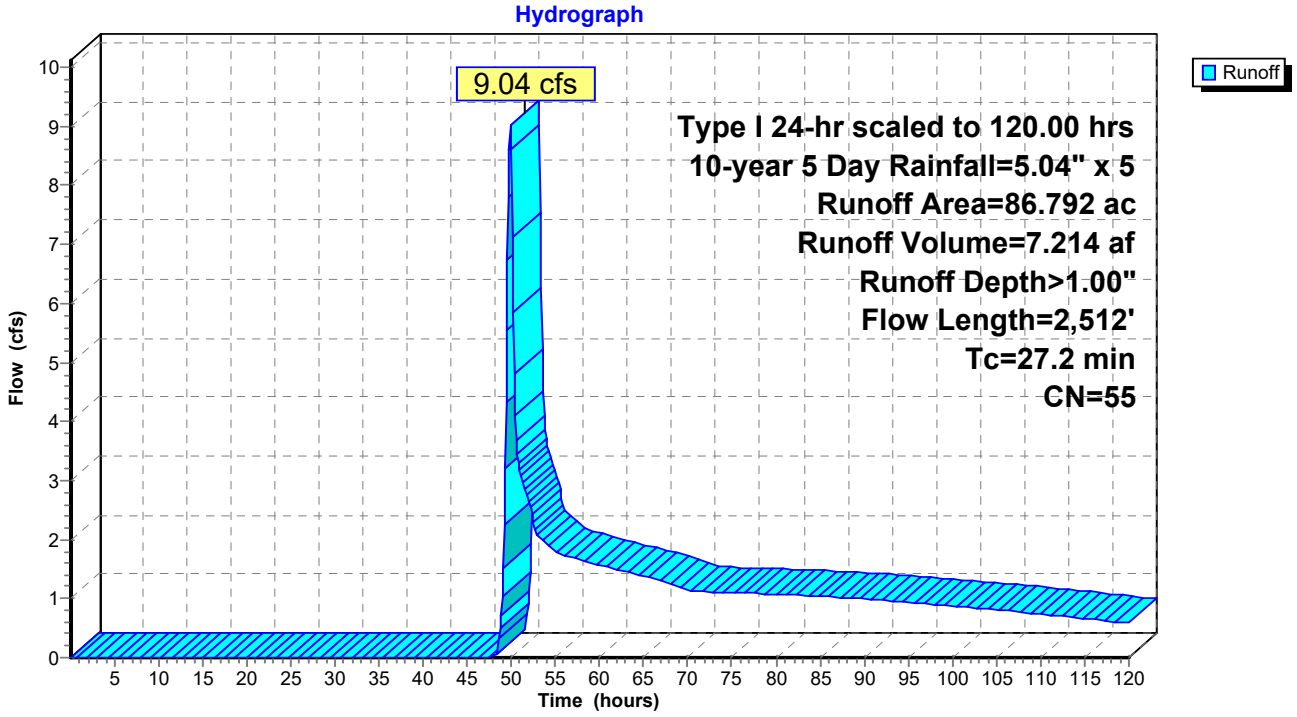
Runoff = 9.04 cfs @ 49.93 hrs, Volume= 7.214 af, Depth> 1.00"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5 Day Rainfall=5.04" x 5

Area (ac)	CN	Description
2.657	55	Desert shrub range, Fair, HSG A
9.988	72	Desert shrub range, Fair, HSG B
59.741	49	Desert shrub range, Good, HSG A
12.584	68	Desert shrub range, Good, HSG B
1.136	72	Dirt roads, HSG A
0.687	82	Dirt roads, HSG B
86.792	55	Weighted Average
86.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0353	0.18		**Sheet Flow, sheet 2810.70-2807.17** Range n= 0.130 P2= 1.88"
18.1	2,412	0.0190	2.22		**Shallow Concentrated Flow, shallow 2807.17-2761** Unpaved Kv= 16.1 fps
27.2	2,512	Total			

Subcatchment DA-D: Subcat DA-D

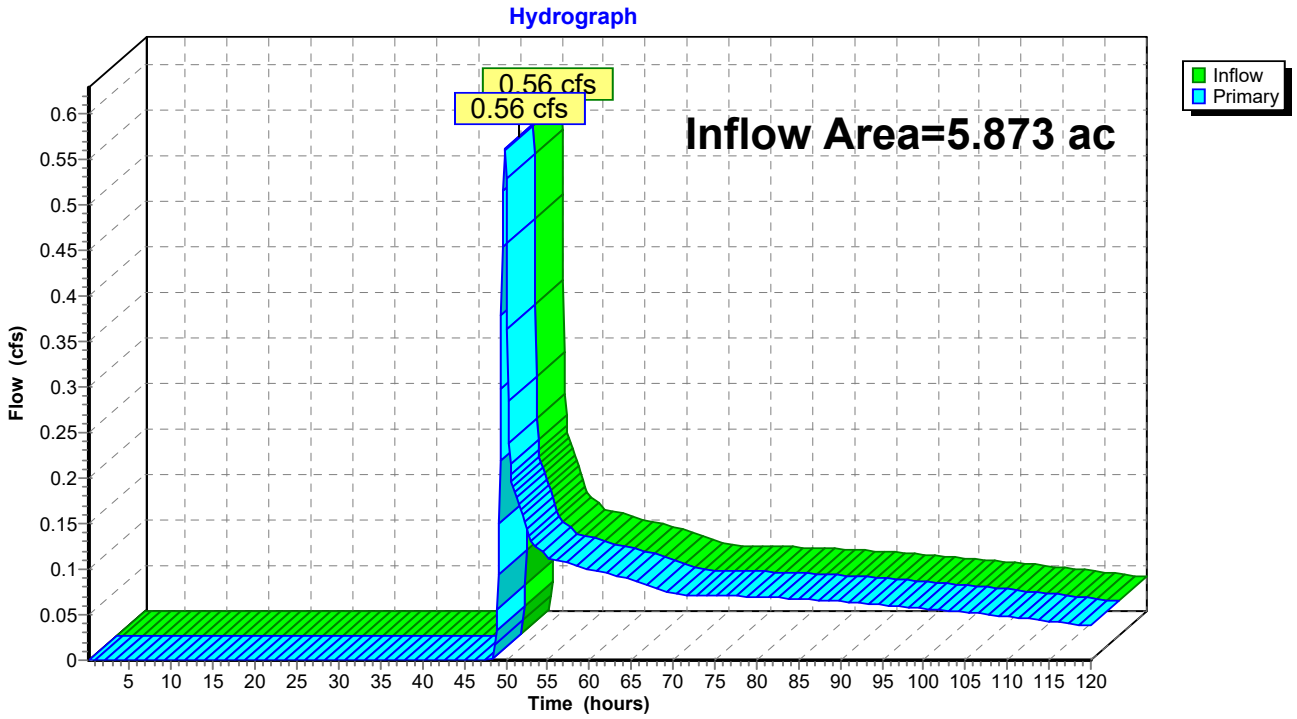


Summary for Link A: DP A

Inflow Area = 5.873 ac, 11.04% Impervious, Inflow Depth > 0.94" for 10-year 5 Day event
Inflow = 0.56 cfs @ 49.87 hrs, Volume= 0.459 af
Primary = 0.56 cfs @ 49.87 hrs, Volume= 0.459 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

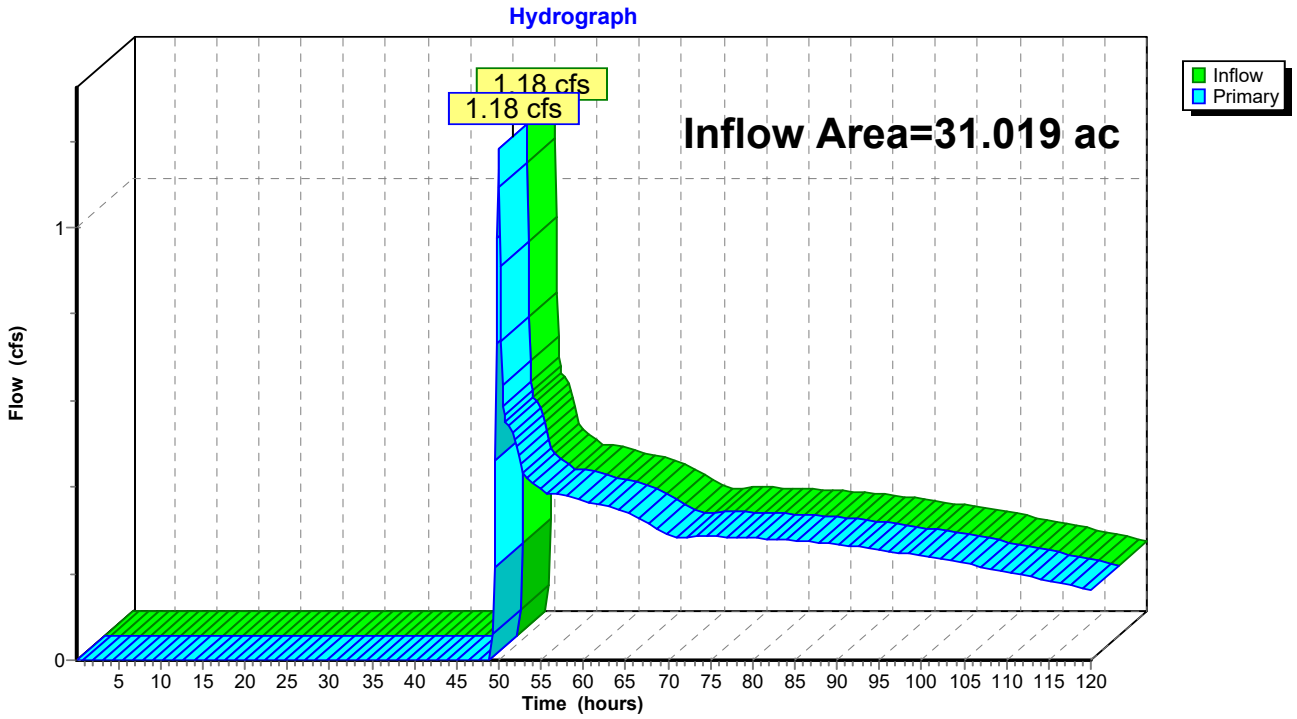


Summary for Link B: DP B

Inflow Area = 31.019 ac, 0.00% Impervious, Inflow Depth > 0.65" for 10-year 5 Day event
Inflow = 1.18 cfs @ 49.98 hrs, Volume= 1.689 af
Primary = 1.18 cfs @ 49.98 hrs, Volume= 1.689 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

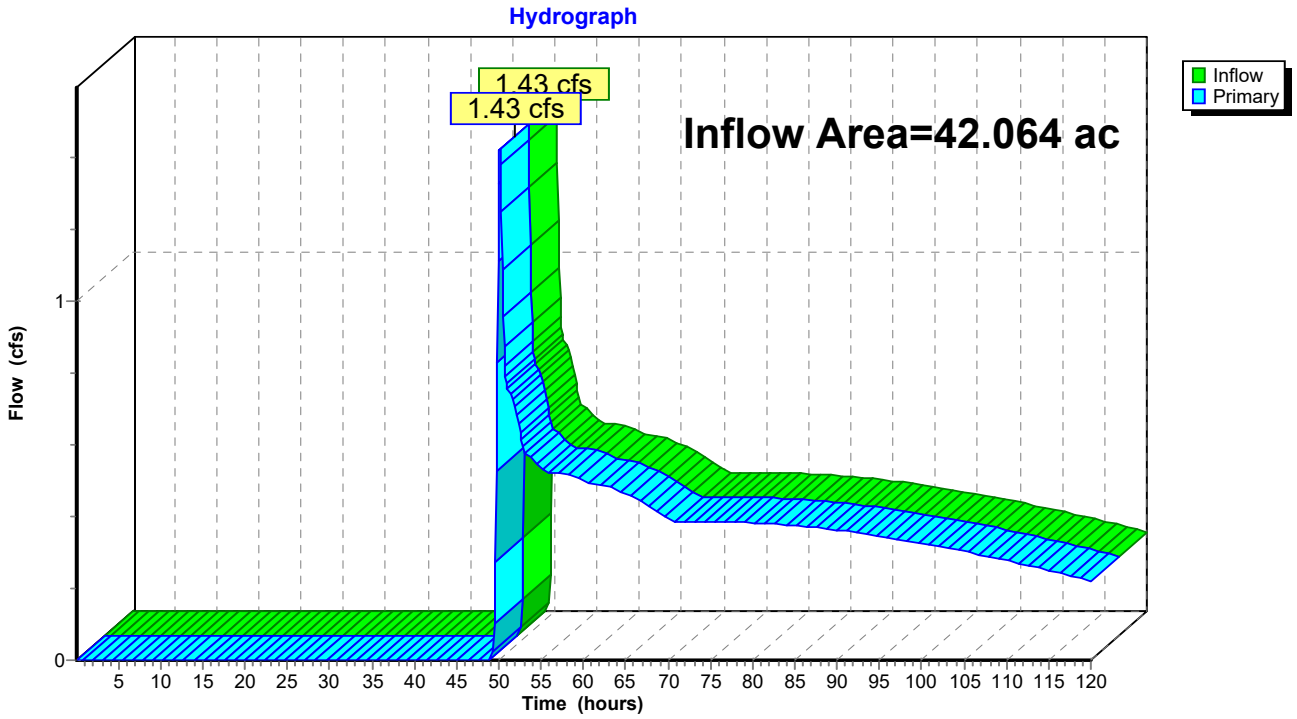


Summary for Link C: DP C

Inflow Area = 42.064 ac, 0.00% Impervious, Inflow Depth > 0.65" for 10-year 5 Day event
Inflow = 1.43 cfs @ 50.12 hrs, Volume= 2.287 af
Primary = 1.43 cfs @ 50.12 hrs, Volume= 2.287 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

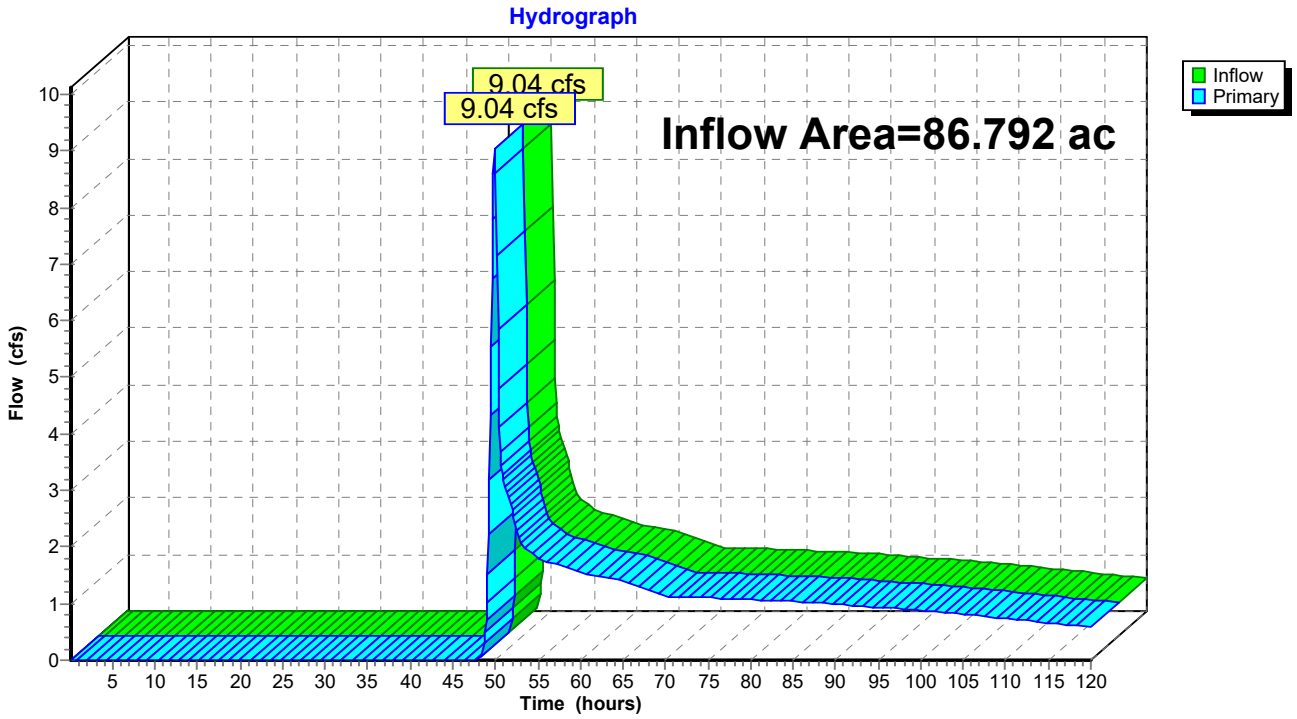


Summary for Link D: DP D

Inflow Area = 86.792 ac, 0.00% Impervious, Inflow Depth > 1.00" for 10-year 5 Day event
Inflow = 9.04 cfs @ 49.93 hrs, Volume= 7.214 af
Primary = 9.04 cfs @ 49.93 hrs, Volume= 7.214 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A: Subcat DA-A Runoff Area=5.873 ac 11.04% Impervious Runoff Depth=0.69"
Flow Length=1,415' Tc=20.8 min UI Adjusted CN=54 Runoff=0.84 cfs 0.336 af

Subcatchment DA-B: Subcat DA-B Runoff Area=31.019 ac 0.00% Impervious Runoff Depth=0.45"
Flow Length=1,331' Tc=21.0 min CN=49 Runoff=1.33 cfs 1.170 af

Subcatchment DA-C: Subcat DA-C Runoff Area=42.064 ac 0.00% Impervious Runoff Depth=0.45"
Flow Length=2,780' Tc=31.6 min CN=49 Runoff=1.70 cfs 1.586 af

Subcatchment DA-D: Subcat DA-D Runoff Area=86.792 ac 0.00% Impervious Runoff Depth=0.74"
Flow Length=2,512' Tc=27.2 min CN=55 Runoff=13.08 cfs 5.337 af

Link A: DP A Inflow=0.84 cfs 0.336 af
Primary=0.84 cfs 0.336 af

Link B: DP B Inflow=1.33 cfs 1.170 af
Primary=1.33 cfs 1.170 af

Link C: DP C Inflow=1.70 cfs 1.586 af
Primary=1.70 cfs 1.586 af

Link D: DP D Inflow=13.08 cfs 5.337 af
Primary=13.08 cfs 5.337 af

Total Runoff Area = 165.747 ac Runoff Volume = 8.429 af Average Runoff Depth = 0.61"
99.61% Pervious = 165.098 ac 0.39% Impervious = 0.649 ac

Summary for Subcatchment DA-A: Subcat DA-A

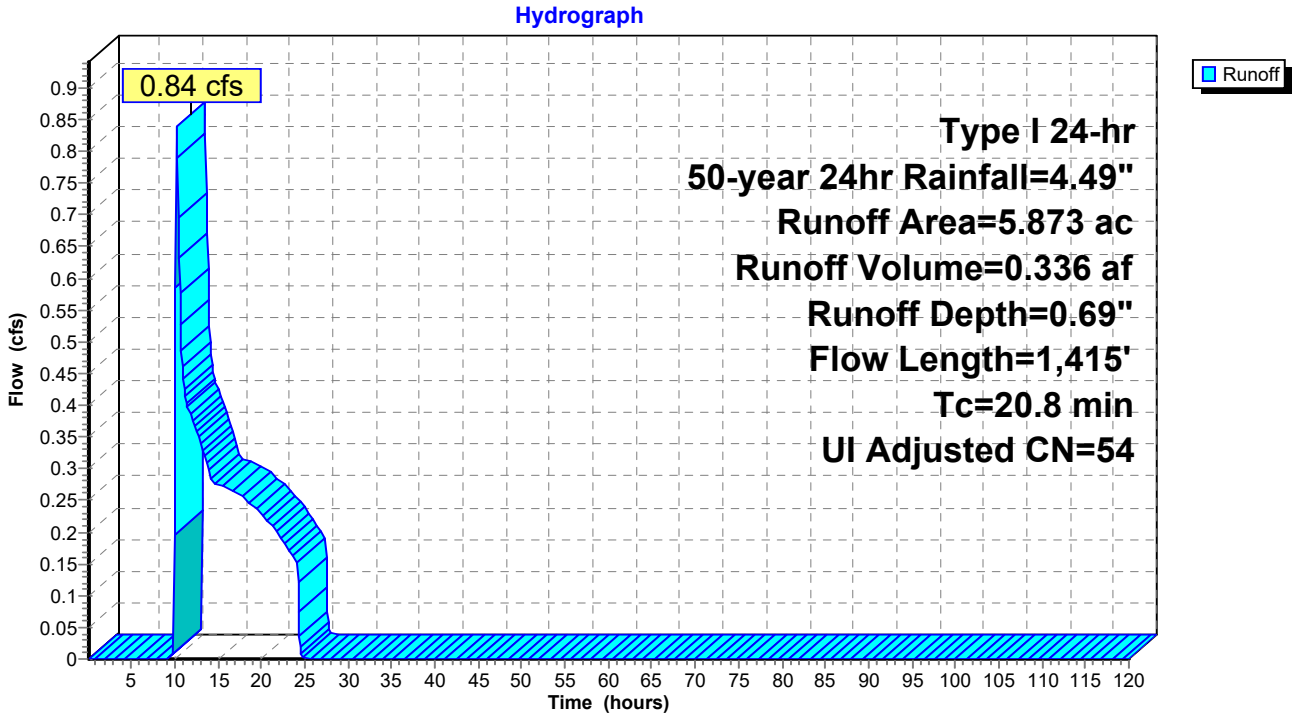
Runoff = 0.84 cfs @ 10.24 hrs, Volume= 0.336 af, Depth= 0.69"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Adj	Description
4.726	49		Desert shrub range, Good, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.223	72		Dirt roads, HSG A
0.068	96		Gravel surface, HSG A
0.649	98		Unconnected pavement, HSG A
5.873	56	54	Weighted Average, UI Adjusted
5.224			88.96% Pervious Area
0.649			11.04% Impervious Area
0.649			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0234	0.16		**Sheet Flow, sheet 2803-2800.66** Range n= 0.130 P2= 1.88"
10.1	1,315	0.0180	2.16		**Shallow Concentrated Flow, shallow 2800.66-2776.94** Unpaved Kv= 16.1 fps
20.8	1,415	Total			

Subcatchment DA-A: Subcat DA-A



Summary for Subcatchment DA-B: Subcat DA-B

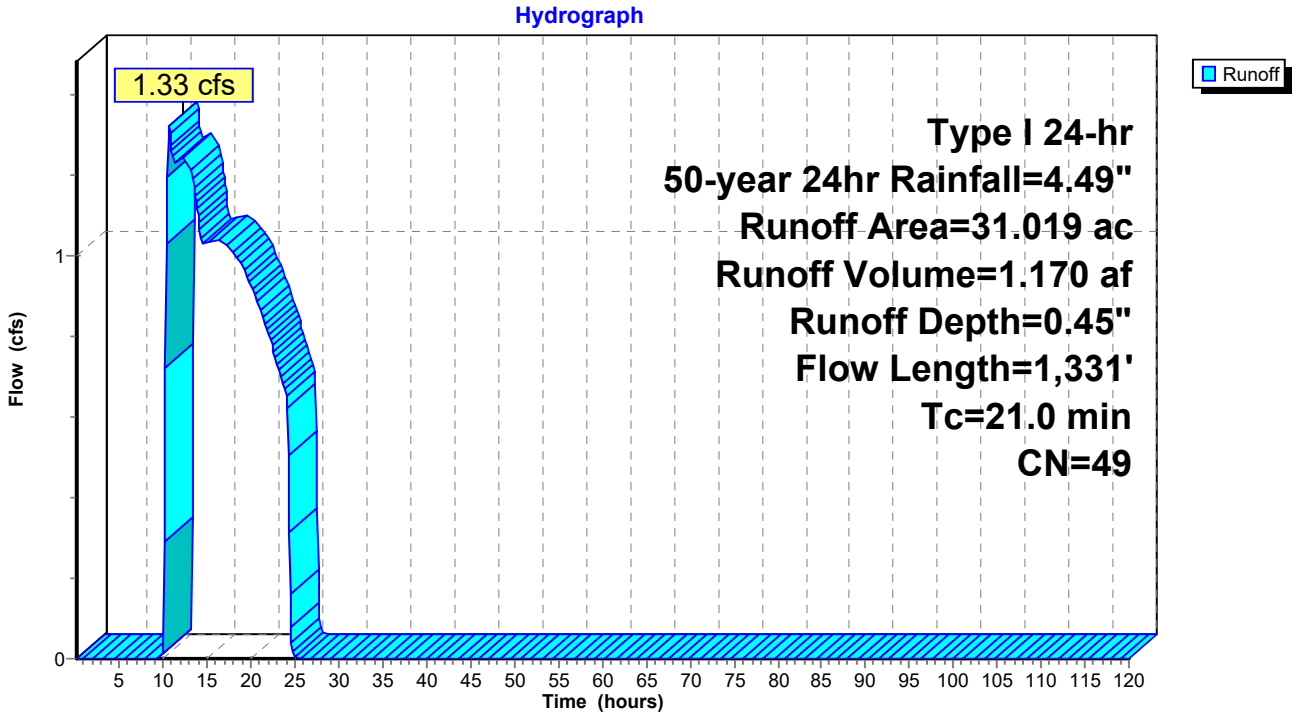
Runoff = 1.33 cfs @ 10.61 hrs, Volume= 1.170 af, Depth= 0.45"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Description
30.829	49	Desert shrub range, Good, HSG A
0.190	72	Dirt roads, HSG A
31.019	49	Weighted Average
31.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0194	0.14		**Sheet Flow, Sheet 2802.81-2800.87** Range n= 0.130 P2= 1.88"
9.5	1,231	0.0181	2.17		**Shallow Concentrated Flow, shallow range 2800.87-2797.25** Unpaved Kv= 16.1 fps
21.0	1,331	Total			

Subcatchment DA-B: Subcat DA-B



Summary for Subcatchment DA-C: Subcat DA-C

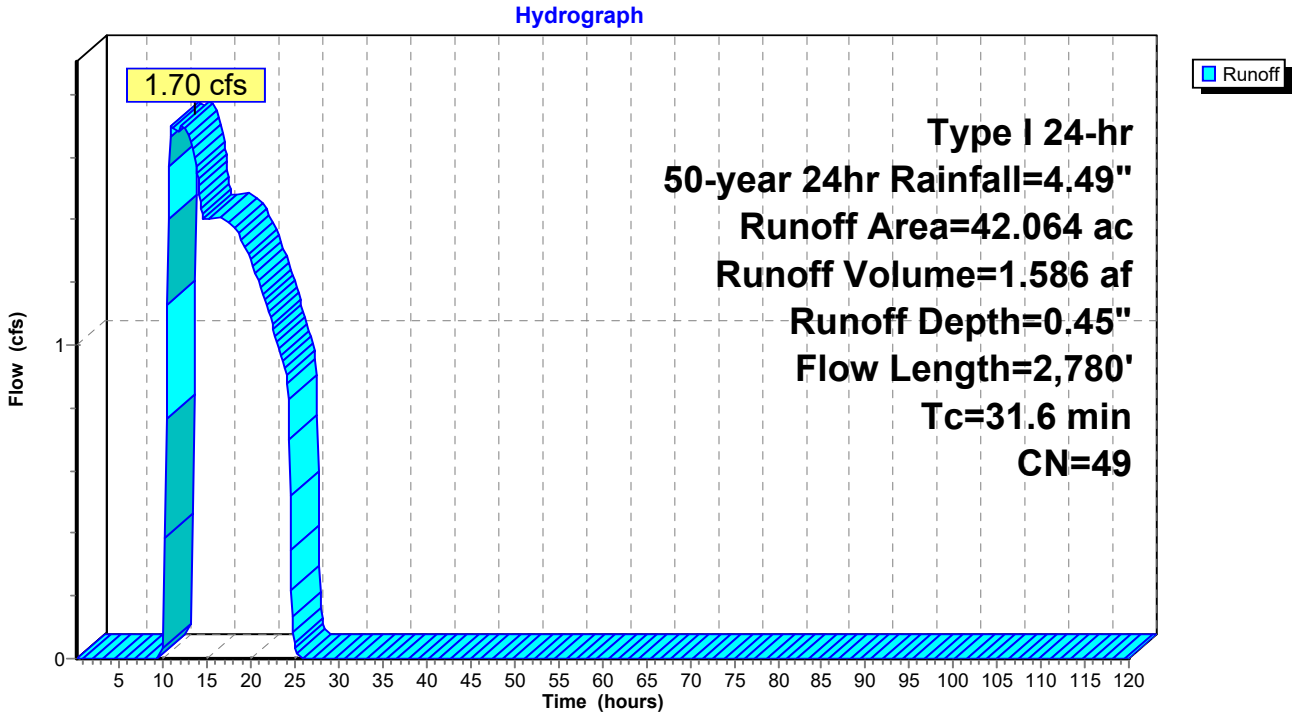
Runoff = 1.70 cfs @ 12.03 hrs, Volume= 1.586 af, Depth= 0.45"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Description
41.978	49	Desert shrub range, Good, HSG A
0.085	72	Dirt roads, HSG A
42.064	49	Weighted Average
42.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0237	0.16		**Sheet Flow, sheet 2813.23-2810.86** Range n= 0.130 P2= 1.88"
20.9	2,680	0.0177	2.14		**Shallow Concentrated Flow, shallow range 2810.86-2763.38** Unpaved Kv= 16.1 fps
31.6	2,780	Total			

Subcatchment DA-C: Subcat DA-C



Summary for Subcatchment DA-D: Subcat DA-D

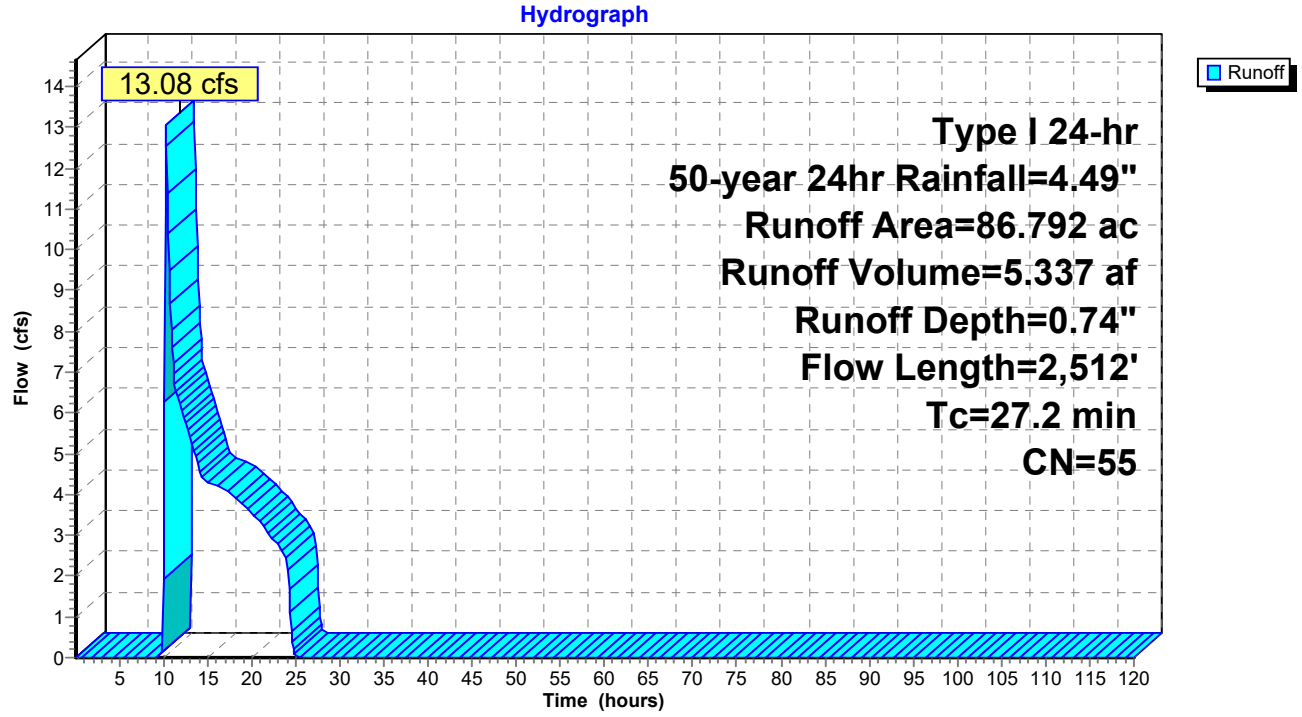
Runoff = 13.08 cfs @ 10.33 hrs, Volume= 5.337 af, Depth= 0.74"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Description
2.657	55	Desert shrub range, Fair, HSG A
9.988	72	Desert shrub range, Fair, HSG B
59.741	49	Desert shrub range, Good, HSG A
12.584	68	Desert shrub range, Good, HSG B
1.136	72	Dirt roads, HSG A
0.687	82	Dirt roads, HSG B
86.792	55	Weighted Average
86.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0353	0.18		**Sheet Flow, sheet 2810.70-2807.17** Range n= 0.130 P2= 1.88"
18.1	2,412	0.0190	2.22		**Shallow Concentrated Flow, shallow 2807.17-2761** Unpaved Kv= 16.1 fps
27.2	2,512	Total			

Subcatchment DA-D: Subcat DA-D

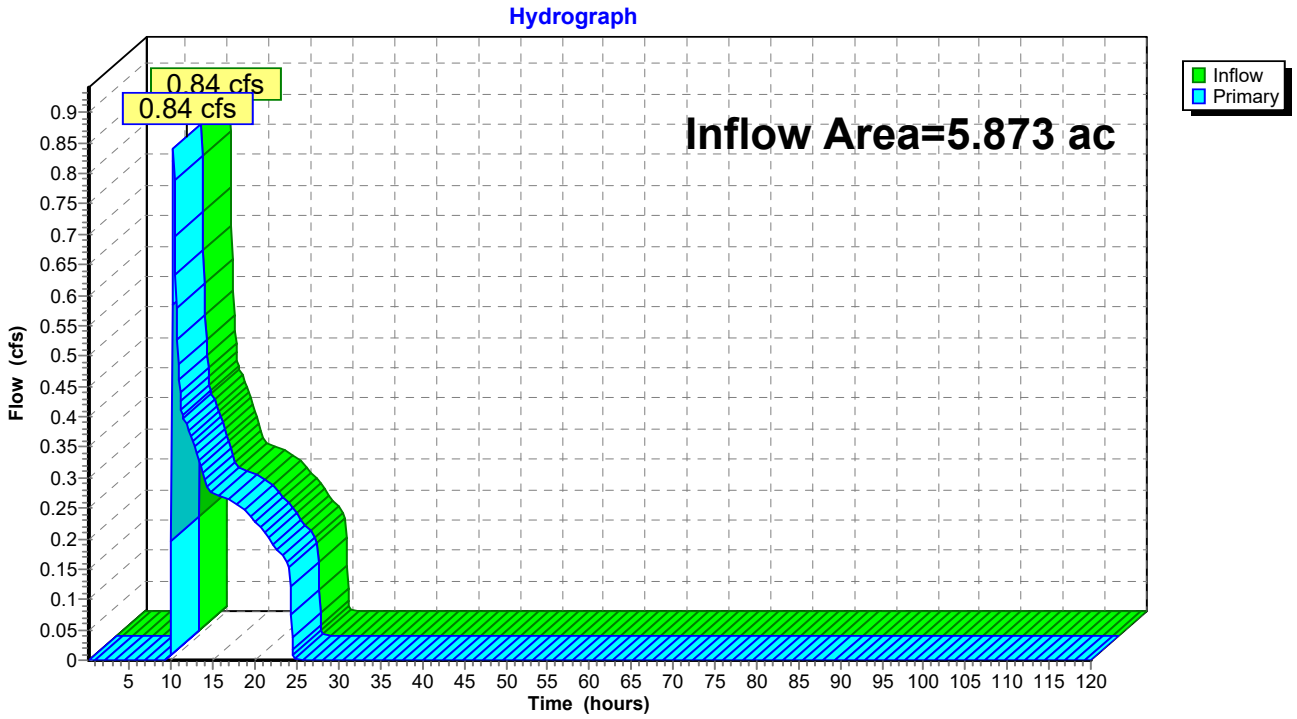


Summary for Link A: DP A

Inflow Area = 5.873 ac, 11.04% Impervious, Inflow Depth = 0.69" for 50-year 24hr event
Inflow = 0.84 cfs @ 10.24 hrs, Volume= 0.336 af
Primary = 0.84 cfs @ 10.24 hrs, Volume= 0.336 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

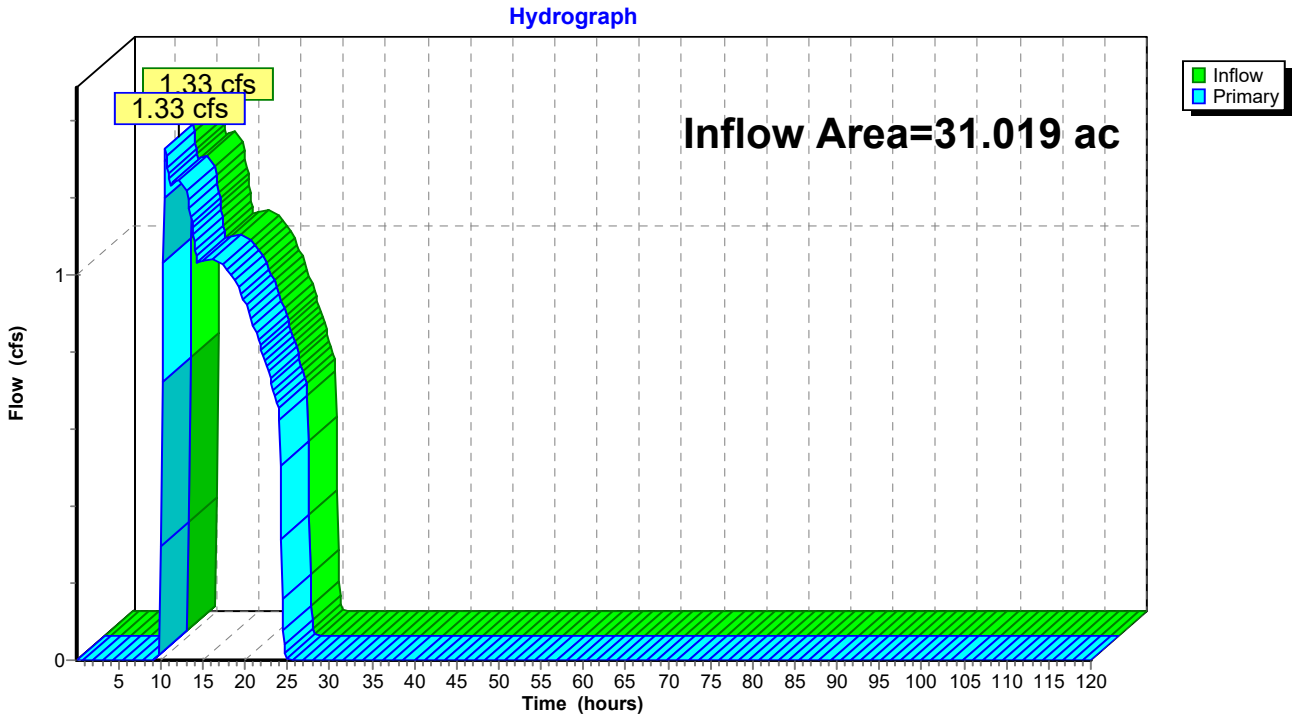


Summary for Link B: DP B

Inflow Area = 31.019 ac, 0.00% Impervious, Inflow Depth = 0.45" for 50-year 24hr event
Inflow = 1.33 cfs @ 10.61 hrs, Volume= 1.170 af
Primary = 1.33 cfs @ 10.61 hrs, Volume= 1.170 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

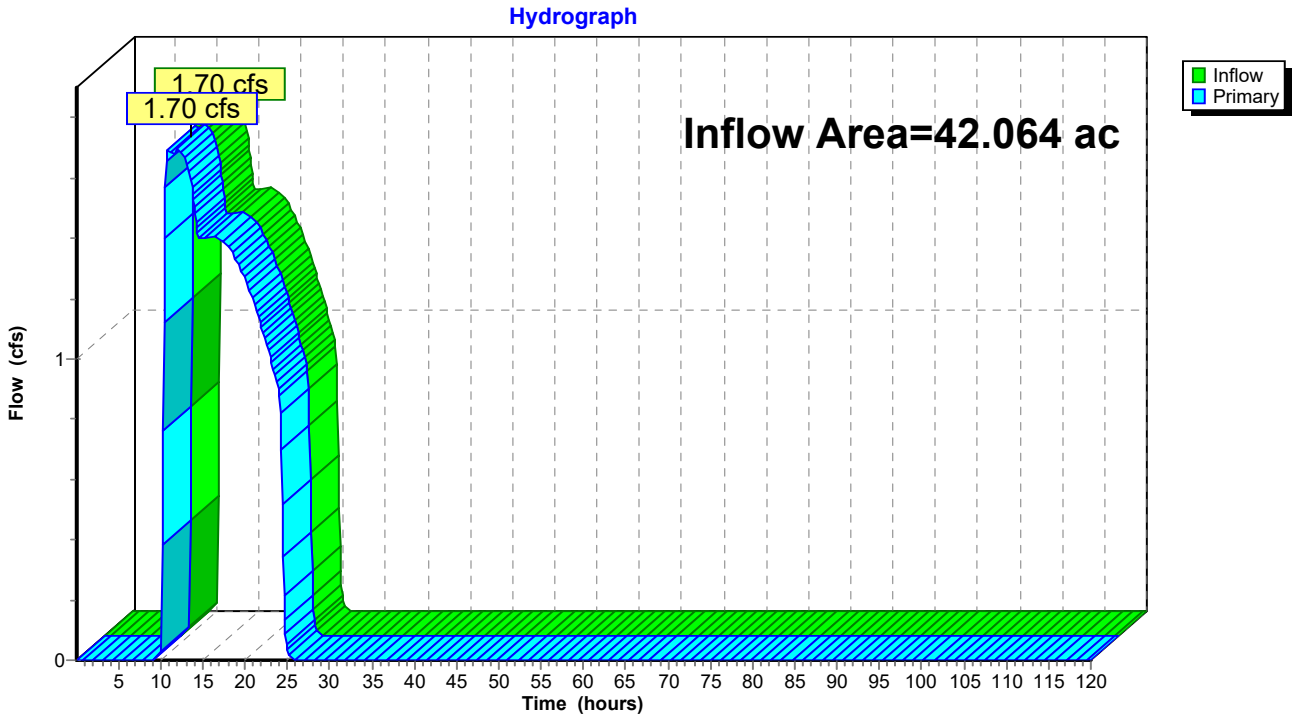


Summary for Link C: DP C

Inflow Area = 42.064 ac, 0.00% Impervious, Inflow Depth = 0.45" for 50-year 24hr event
Inflow = 1.70 cfs @ 12.03 hrs, Volume= 1.586 af
Primary = 1.70 cfs @ 12.03 hrs, Volume= 1.586 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

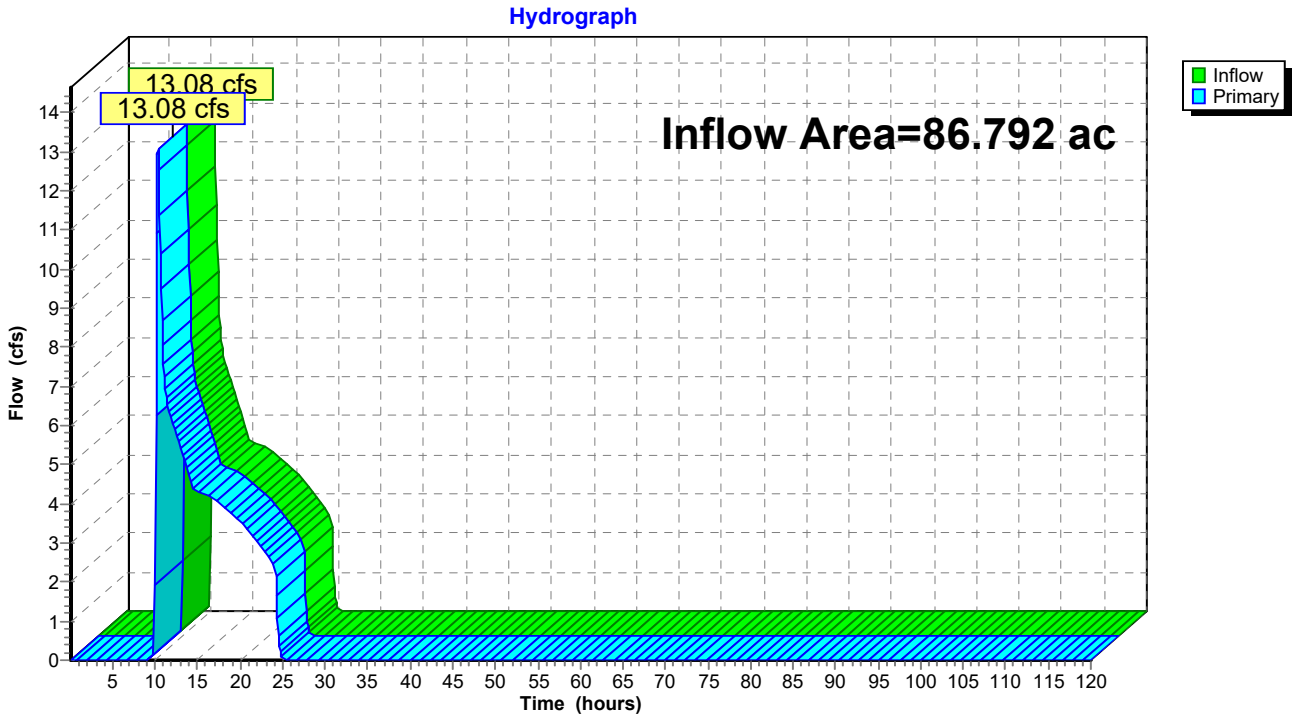


Summary for Link D: DP D

Inflow Area = 86.792 ac, 0.00% Impervious, Inflow Depth = 0.74" for 50-year 24hr event
Inflow = 13.08 cfs @ 10.33 hrs, Volume= 5.337 af
Primary = 13.08 cfs @ 10.33 hrs, Volume= 5.337 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A: Subcat DA-A Runoff Area=5.873 ac 11.04% Impervious Runoff Depth=0.03"
Flow Length=1,415' Tc=20.8 min UI Adjusted CN=54 Runoff=0.10 cfs 0.016 af

Subcatchment DA-B: Subcat DA-B Runoff Area=31.019 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,331' Tc=21.0 min CN=49 Runoff=0.11 cfs 0.007 af

Subcatchment DA-C: Subcat DA-C Runoff Area=42.064 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=2,780' Tc=31.6 min CN=49 Runoff=0.13 cfs 0.009 af

Subcatchment DA-D: Subcat DA-D Runoff Area=86.792 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=2,512' Tc=27.2 min CN=55 Runoff=1.70 cfs 0.310 af

Link A: DP A Inflow=0.10 cfs 0.016 af
Primary=0.10 cfs 0.016 af

Link B: DP B Inflow=0.11 cfs 0.007 af
Primary=0.11 cfs 0.007 af

Link C: DP C Inflow=0.13 cfs 0.009 af
Primary=0.13 cfs 0.009 af

Link D: DP D Inflow=1.70 cfs 0.310 af
Primary=1.70 cfs 0.310 af

Total Runoff Area = 165.747 ac Runoff Volume = 0.342 af Average Runoff Depth = 0.02"
99.61% Pervious = 165.098 ac 0.39% Impervious = 0.649 ac

Summary for Subcatchment DA-A: Subcat DA-A

[73] Warning: Peak may fall outside time span

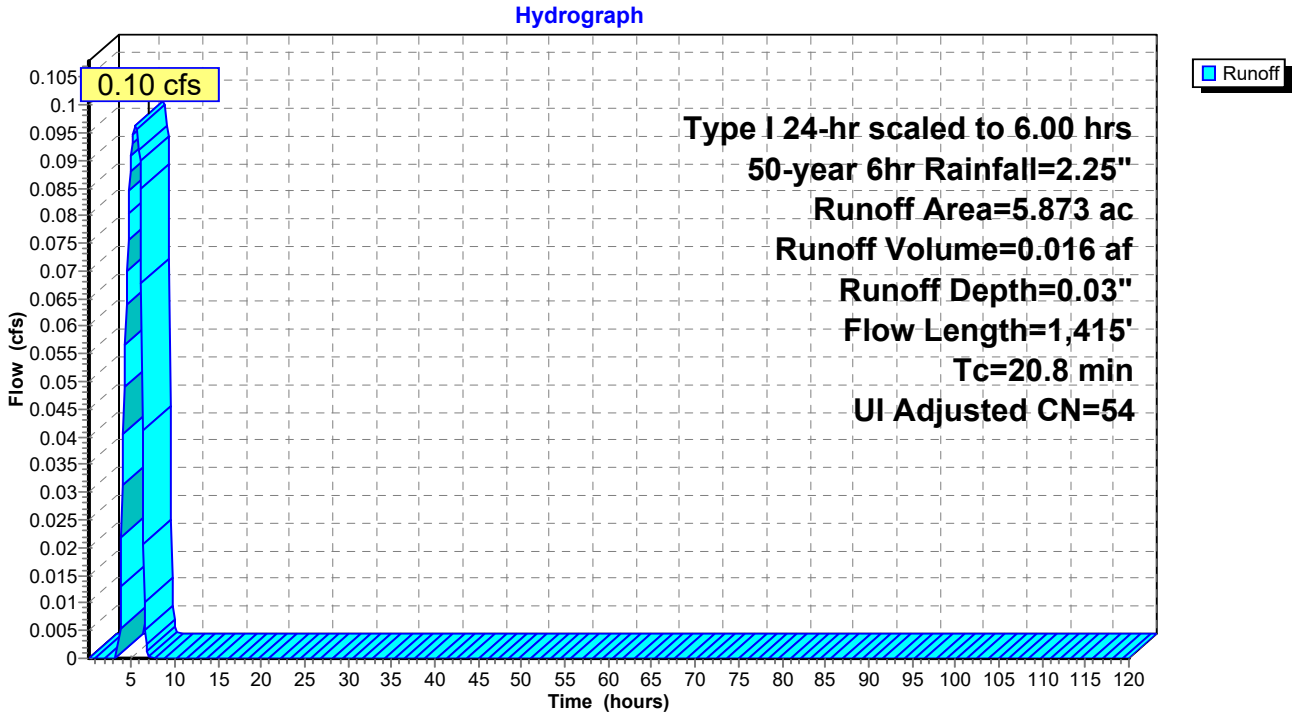
Runoff = 0.10 cfs @ 5.46 hrs, Volume= 0.016 af, Depth= 0.03"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Adj	Description
4.726	49		Desert shrub range, Good, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.223	72		Dirt roads, HSG A
0.068	96		Gravel surface, HSG A
0.649	98		Unconnected pavement, HSG A
5.873	56	54	Weighted Average, UI Adjusted
5.224			88.96% Pervious Area
0.649			11.04% Impervious Area
0.649			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0234	0.16		**Sheet Flow, sheet 2803-2800.66** Range n= 0.130 P2= 1.88"
10.1	1,315	0.0180	2.16		**Shallow Concentrated Flow, shallow 2800.66-2776.94** Unpaved Kv= 16.1 fps
20.8	1,415	Total			

Subcatchment DA-A: Subcat DA-A



Summary for Subcatchment DA-B: Subcat DA-B

[73] Warning: Peak may fall outside time span

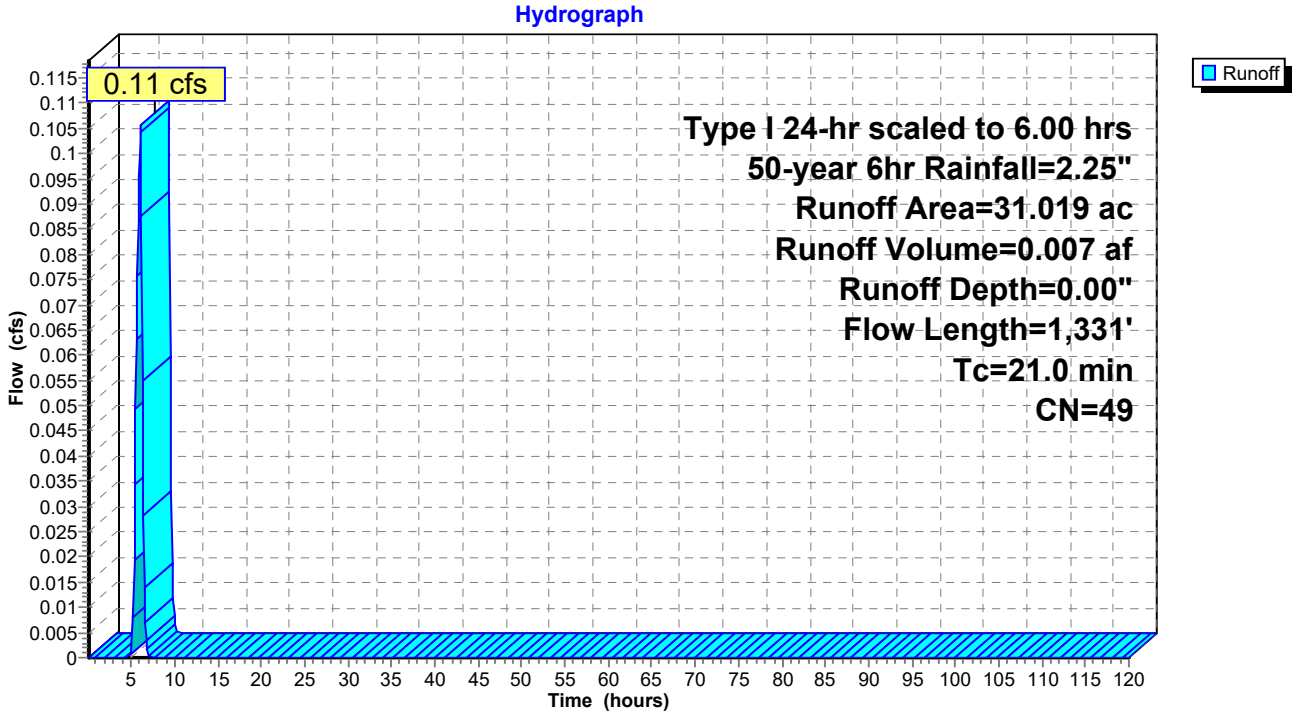
Runoff = 0.11 cfs @ 6.06 hrs, Volume= 0.007 af, Depth= 0.00"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Description
30.829	49	Desert shrub range, Good, HSG A
0.190	72	Dirt roads, HSG A
31.019	49	Weighted Average
31.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0194	0.14		**Sheet Flow, Sheet 2802.81-2800.87** Range n= 0.130 P2= 1.88"
9.5	1,231	0.0181	2.17		**Shallow Concentrated Flow, shallow range 2800.87-2797.25** Unpaved Kv= 16.1 fps
21.0	1,331	Total			

Subcatchment DA-B: Subcat DA-B



Summary for Subcatchment DA-C: Subcat DA-C

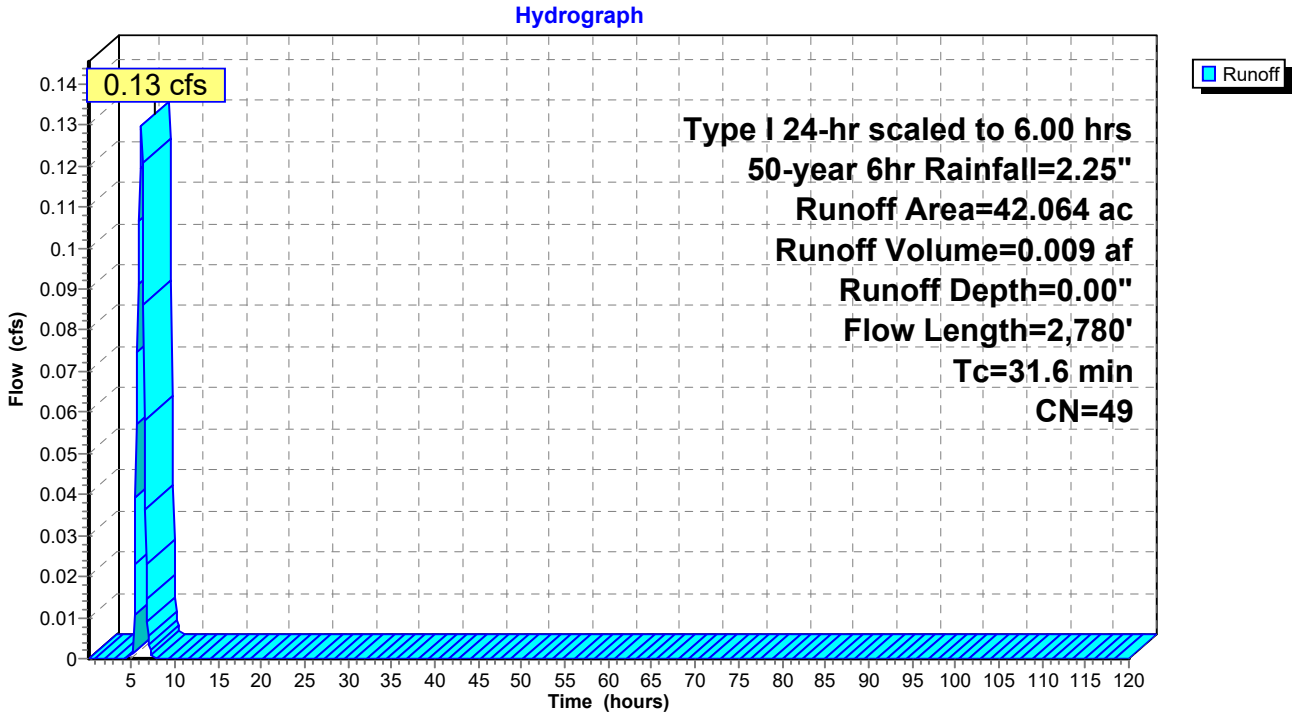
Runoff = 0.13 cfs @ 6.15 hrs, Volume= 0.009 af, Depth= 0.00"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Description
41.978	49	Desert shrub range, Good, HSG A
0.085	72	Dirt roads, HSG A
42.064	49	Weighted Average
42.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0237	0.16		**Sheet Flow, sheet 2813.23-2810.86** Range n= 0.130 P2= 1.88"
20.9	2,680	0.0177	2.14		**Shallow Concentrated Flow, shallow range 2810.86-2763.38** Unpaved Kv= 16.1 fps
31.6	2,780	Total			

Subcatchment DA-C: Subcat DA-C



Summary for Subcatchment DA-D: Subcat DA-D

[73] Warning: Peak may fall outside time span

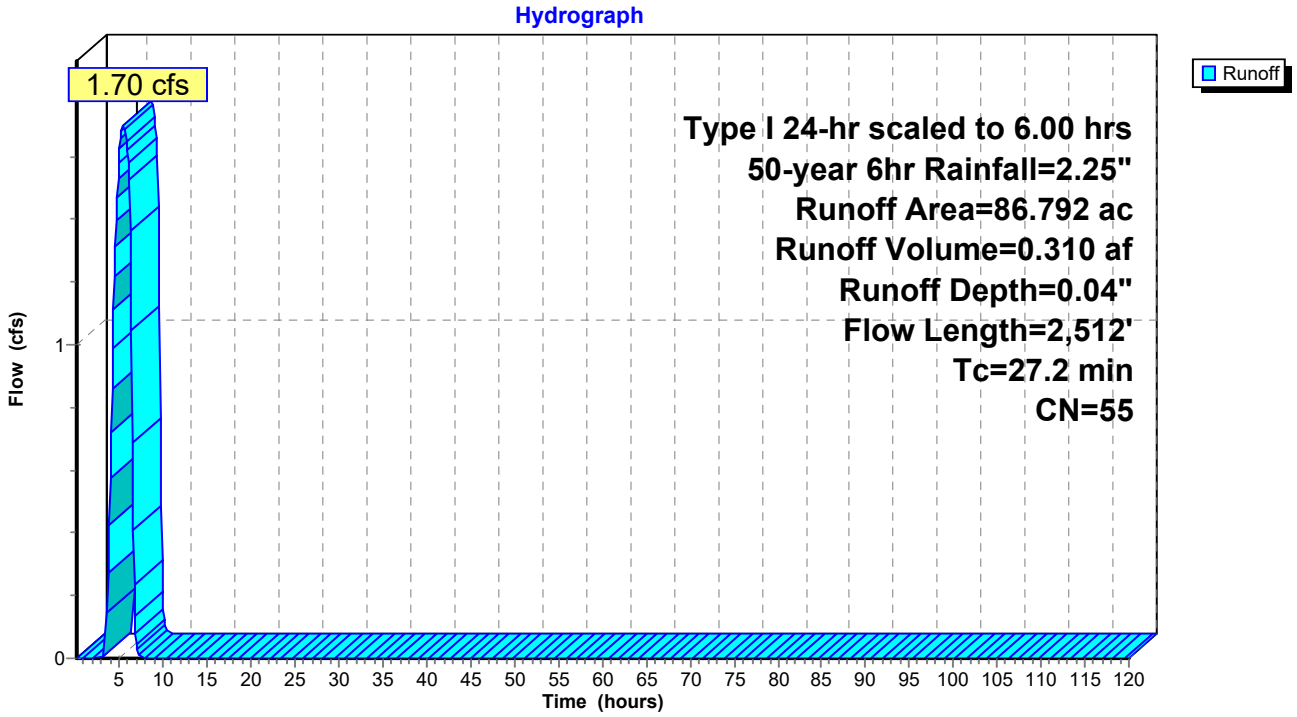
Runoff = 1.70 cfs @ 5.43 hrs, Volume= 0.310 af, Depth= 0.04"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Description
2.657	55	Desert shrub range, Fair, HSG A
9.988	72	Desert shrub range, Fair, HSG B
59.741	49	Desert shrub range, Good, HSG A
12.584	68	Desert shrub range, Good, HSG B
1.136	72	Dirt roads, HSG A
0.687	82	Dirt roads, HSG B
86.792	55	Weighted Average
86.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0353	0.18		**Sheet Flow, sheet 2810.70-2807.17** Range n= 0.130 P2= 1.88"
18.1	2,412	0.0190	2.22		**Shallow Concentrated Flow, shallow 2807.17-2761** Unpaved Kv= 16.1 fps
27.2	2,512	Total			

Subcatchment DA-D: Subcat DA-D

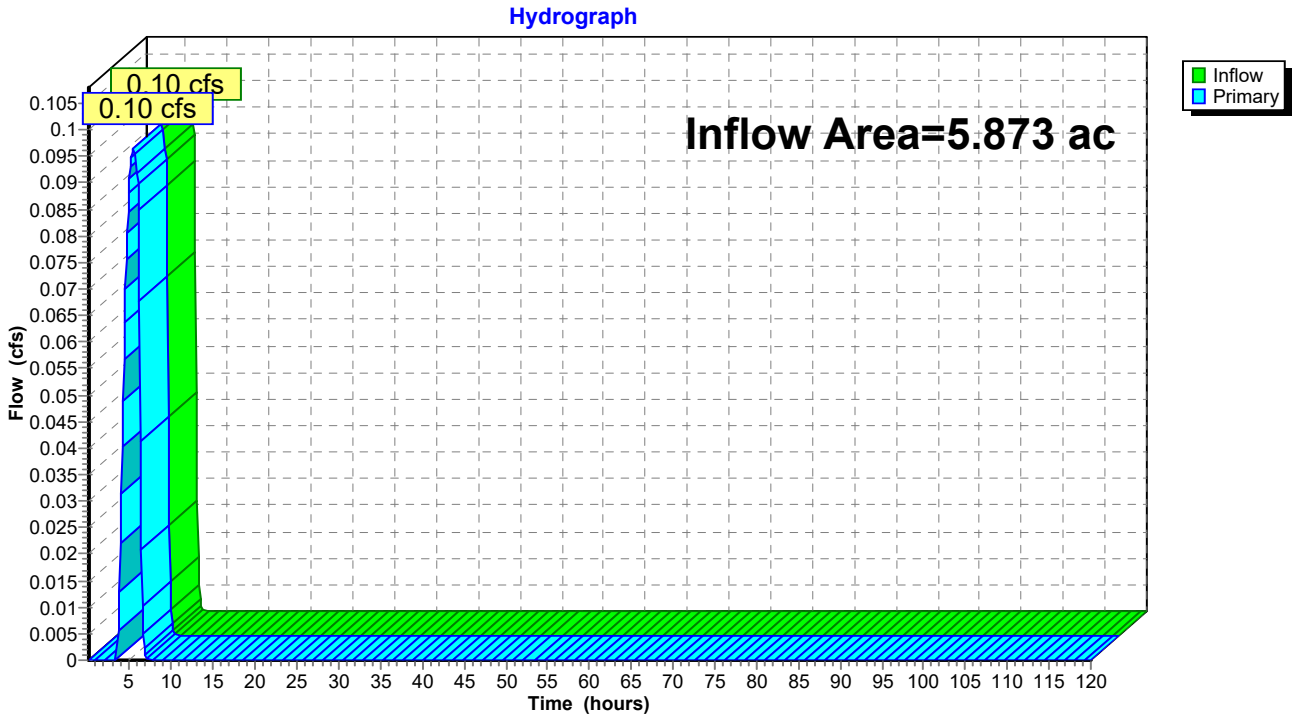


Summary for Link A: DP A

Inflow Area = 5.873 ac, 11.04% Impervious, Inflow Depth = 0.03" for 50-year 6hr event
Inflow = 0.10 cfs @ 5.46 hrs, Volume= 0.016 af
Primary = 0.10 cfs @ 5.46 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

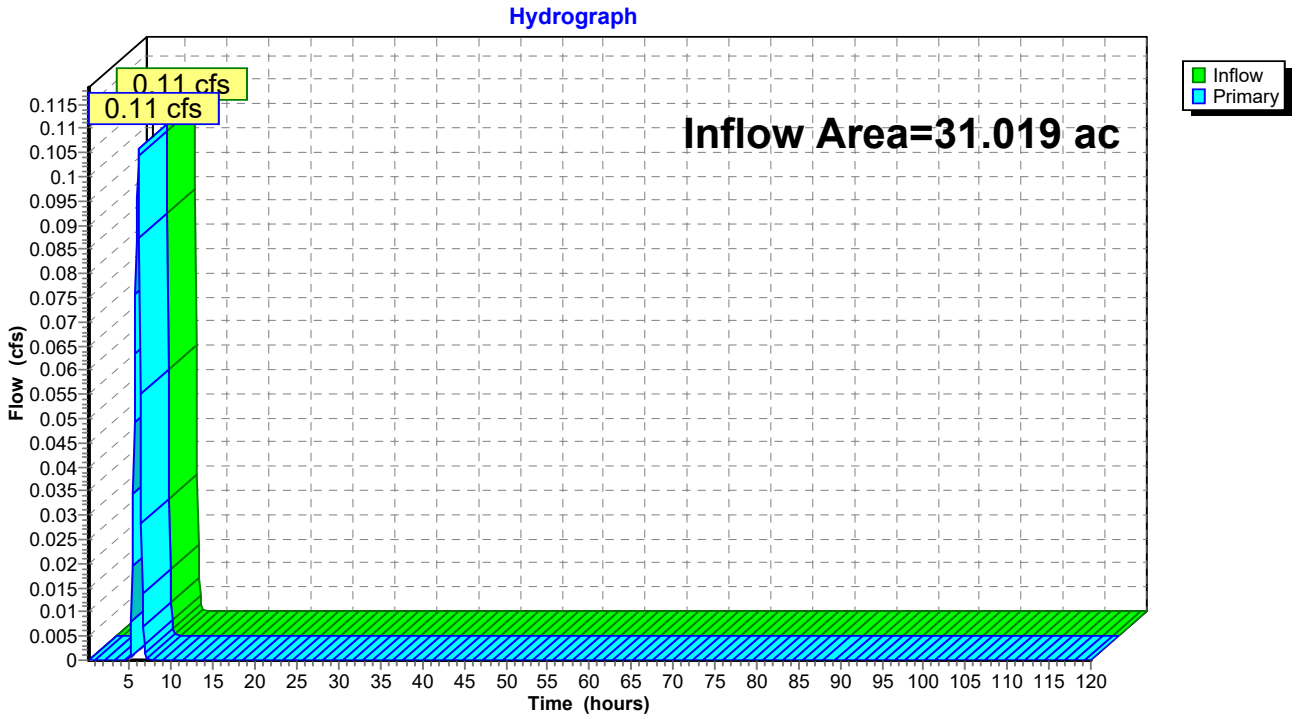


Summary for Link B: DP B

Inflow Area = 31.019 ac, 0.00% Impervious, Inflow Depth = 0.00" for 50-year 6hr event
Inflow = 0.11 cfs @ 6.06 hrs, Volume= 0.007 af
Primary = 0.11 cfs @ 6.06 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

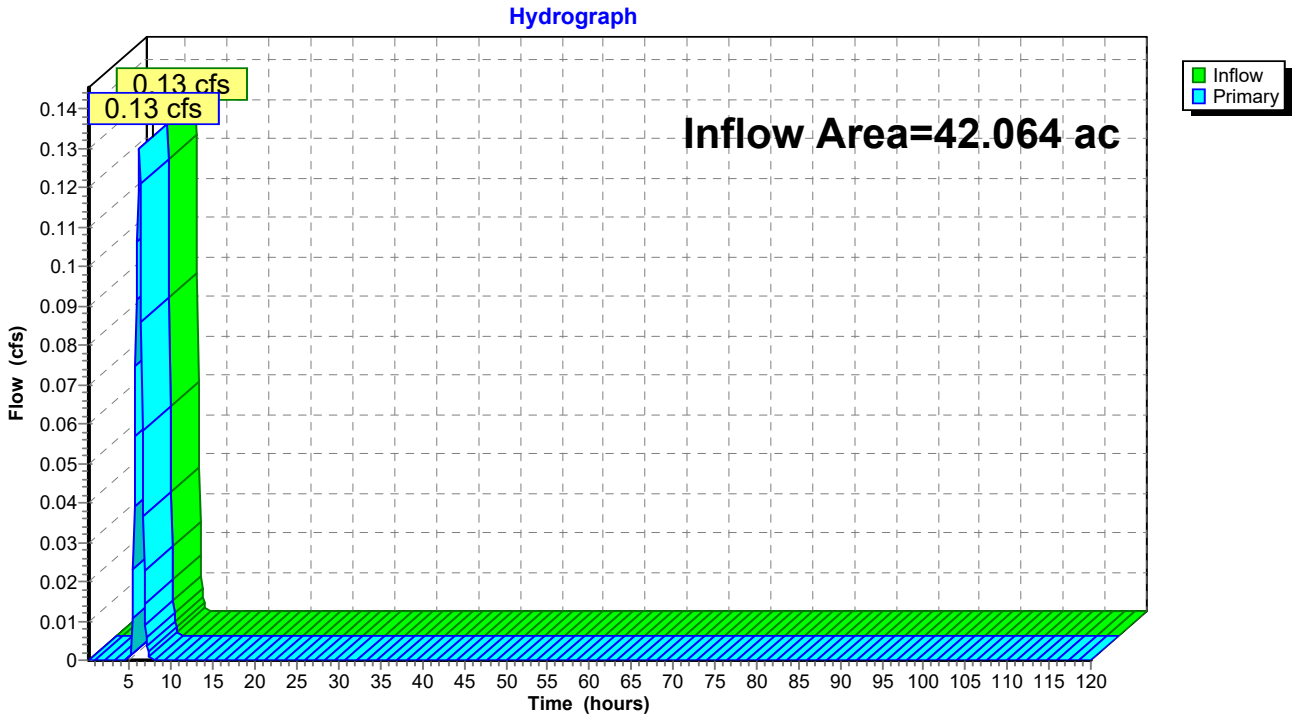


Summary for Link C: DP C

Inflow Area = 42.064 ac, 0.00% Impervious, Inflow Depth = 0.00" for 50-year 6hr event
Inflow = 0.13 cfs @ 6.15 hrs, Volume= 0.009 af
Primary = 0.13 cfs @ 6.15 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

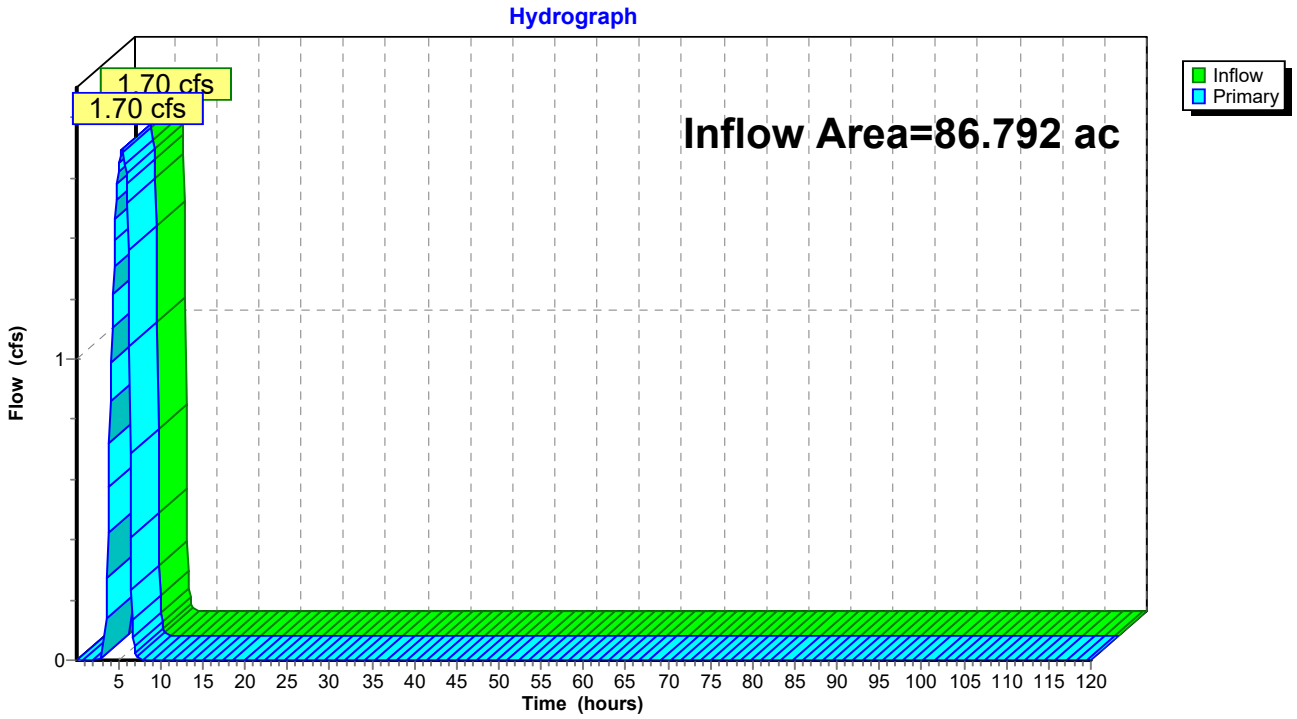


Summary for Link D: DP D

Inflow Area = 86.792 ac, 0.00% Impervious, Inflow Depth = 0.04" for 50-year 6hr event
Inflow = 1.70 cfs @ 5.43 hrs, Volume= 0.310 af
Primary = 1.70 cfs @ 5.43 hrs, Volume= 0.310 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A: Subcat DA-A Runoff Area=5.873 ac 11.04% Impervious Runoff Depth=0.95"
Flow Length=1,415' Tc=20.8 min UI Adjusted CN=54 Runoff=1.58 cfs 0.464 af

Subcatchment DA-B: Subcat DA-B Runoff Area=31.019 ac 0.00% Impervious Runoff Depth=0.66"
Flow Length=1,331' Tc=21.0 min CN=49 Runoff=3.10 cfs 1.713 af

Subcatchment DA-C: Subcat DA-C Runoff Area=42.064 ac 0.00% Impervious Runoff Depth=0.66"
Flow Length=2,780' Tc=31.6 min CN=49 Runoff=3.69 cfs 2.323 af

Subcatchment DA-D: Subcat DA-D Runoff Area=86.792 ac 0.00% Impervious Runoff Depth=1.01"
Flow Length=2,512' Tc=27.2 min CN=55 Runoff=23.08 cfs 7.305 af

Link A: DP A Inflow=1.58 cfs 0.464 af
Primary=1.58 cfs 0.464 af

Link B: DP B Inflow=3.10 cfs 1.713 af
Primary=3.10 cfs 1.713 af

Link C: DP C Inflow=3.69 cfs 2.323 af
Primary=3.69 cfs 2.323 af

Link D: DP D Inflow=23.08 cfs 7.305 af
Primary=23.08 cfs 7.305 af

Total Runoff Area = 165.747 ac Runoff Volume = 11.805 af Average Runoff Depth = 0.85"
99.61% Pervious = 165.098 ac 0.39% Impervious = 0.649 ac

Summary for Subcatchment DA-A: Subcat DA-A

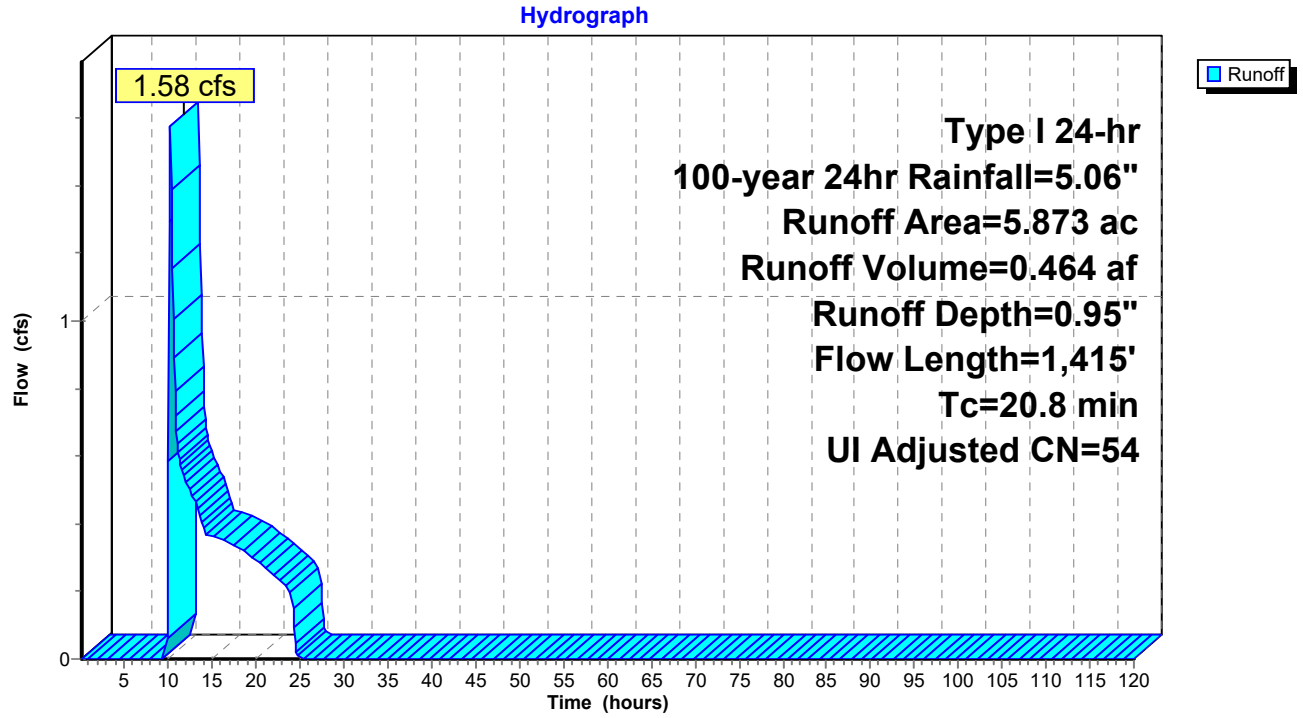
Runoff = 1.58 cfs @ 10.21 hrs, Volume= 0.464 af, Depth= 0.95"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Adj	Description
4.726	49		Desert shrub range, Good, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.223	72		Dirt roads, HSG A
0.068	96		Gravel surface, HSG A
0.649	98		Unconnected pavement, HSG A
5.873	56	54	Weighted Average, UI Adjusted
5.224			88.96% Pervious Area
0.649			11.04% Impervious Area
0.649			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0234	0.16		**Sheet Flow, sheet 2803-2800.66** Range n= 0.130 P2= 1.88"
10.1	1,315	0.0180	2.16		**Shallow Concentrated Flow, shallow 2800.66-2776.94** Unpaved Kv= 16.1 fps
20.8	1,415	Total			

Subcatchment DA-A: Subcat DA-A



Summary for Subcatchment DA-B: Subcat DA-B

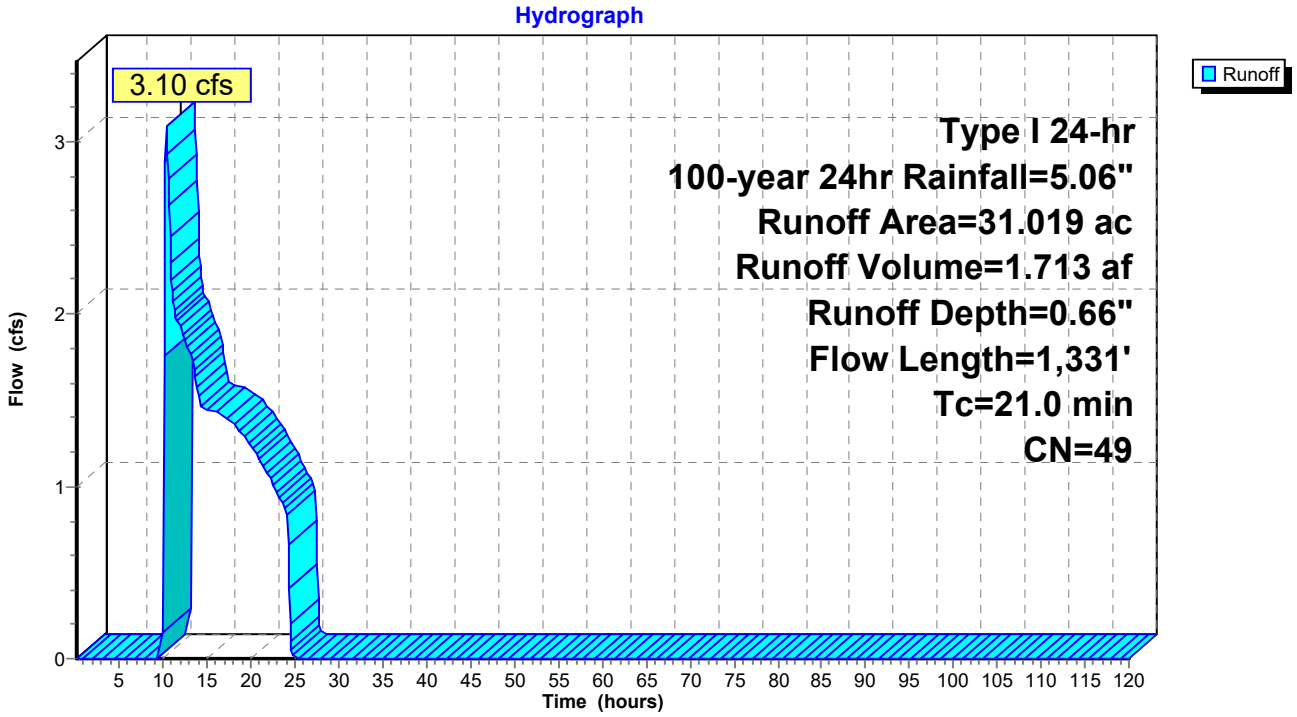
Runoff = 3.10 cfs @ 10.30 hrs, Volume= 1.713 af, Depth= 0.66"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Description
30.829	49	Desert shrub range, Good, HSG A
0.190	72	Dirt roads, HSG A
31.019	49	Weighted Average
31.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0194	0.14		**Sheet Flow, Sheet 2802.81-2800.87** Range n= 0.130 P2= 1.88"
9.5	1,231	0.0181	2.17		**Shallow Concentrated Flow, shallow range 2800.87-2797.25** Unpaved Kv= 16.1 fps
21.0	1,331	Total			

Subcatchment DA-B: Subcat DA-B



Summary for Subcatchment DA-C: Subcat DA-C

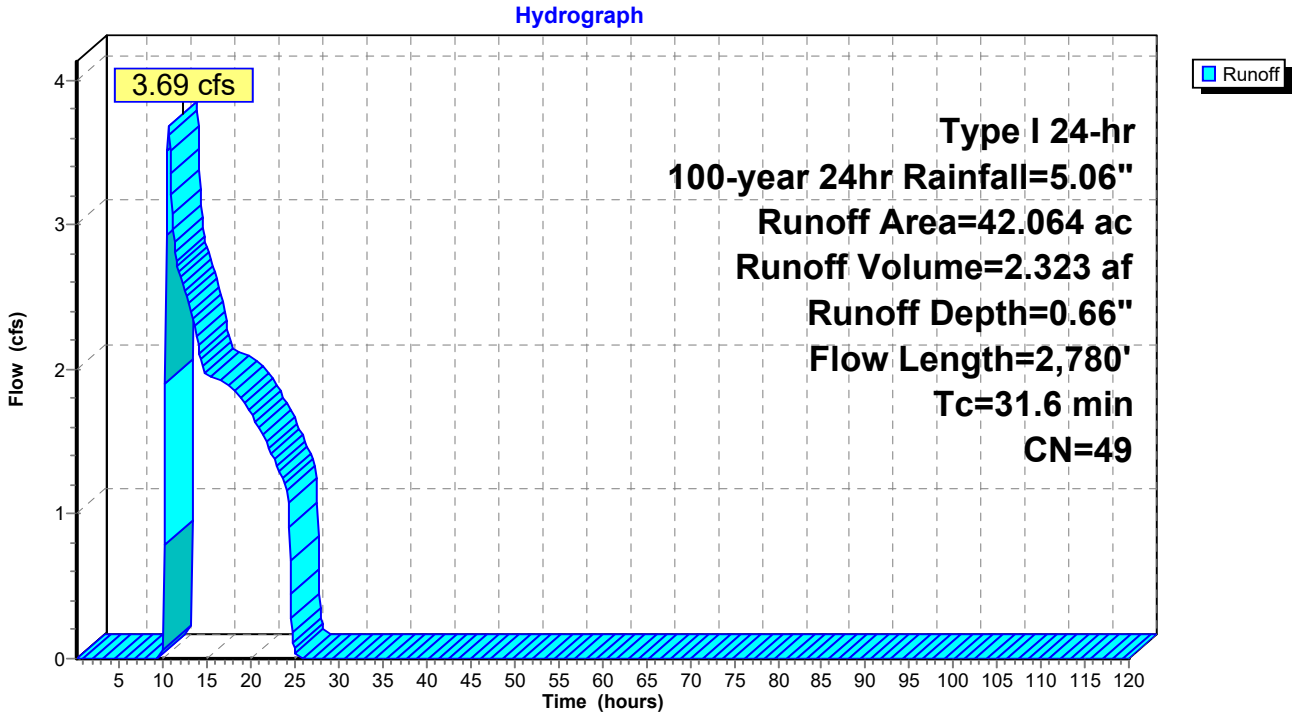
Runoff = 3.69 cfs @ 10.52 hrs, Volume= 2.323 af, Depth= 0.66"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Description
41.978	49	Desert shrub range, Good, HSG A
0.085	72	Dirt roads, HSG A
42.064	49	Weighted Average
42.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0237	0.16		**Sheet Flow, sheet 2813.23-2810.86** Range n= 0.130 P2= 1.88"
20.9	2,680	0.0177	2.14		**Shallow Concentrated Flow, shallow range 2810.86-2763.38** Unpaved Kv= 16.1 fps
31.6	2,780	Total			

Subcatchment DA-C: Subcat DA-C



Summary for Subcatchment DA-D: Subcat DA-D

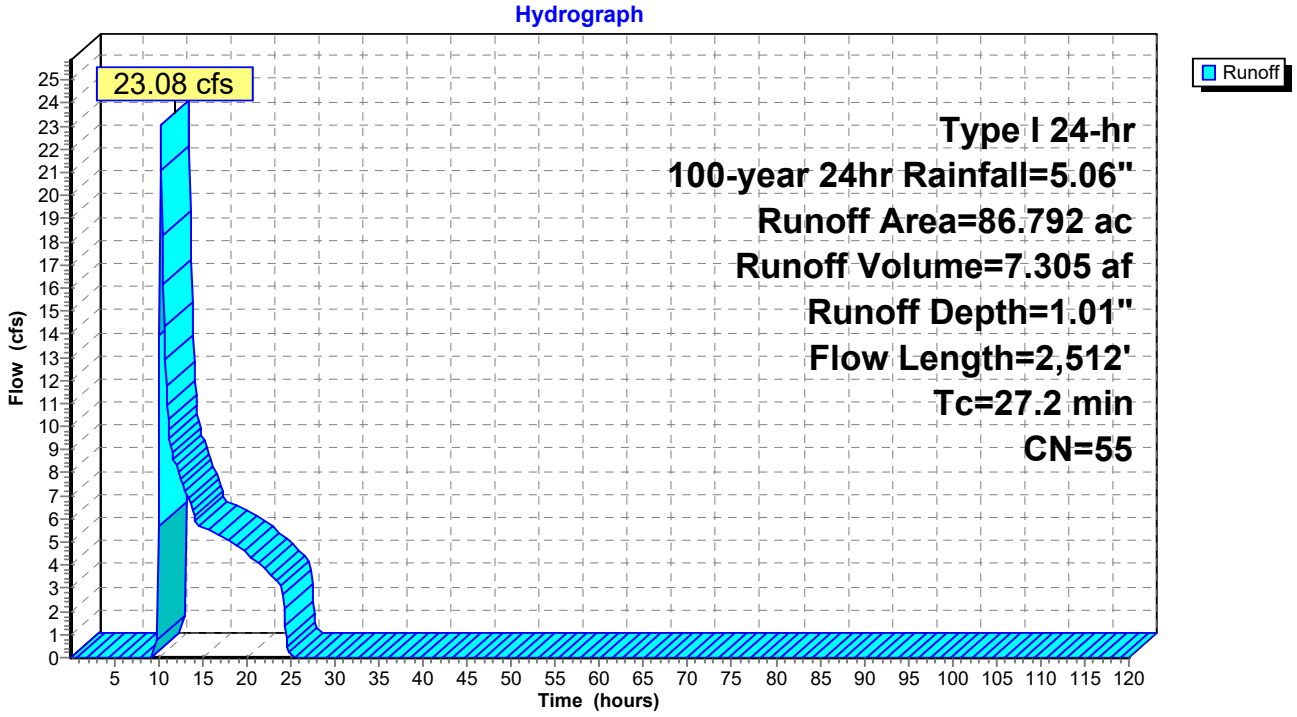
Runoff = 23.08 cfs @ 10.30 hrs, Volume= 7.305 af, Depth= 1.01"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Description
2.657	55	Desert shrub range, Fair, HSG A
9.988	72	Desert shrub range, Fair, HSG B
59.741	49	Desert shrub range, Good, HSG A
12.584	68	Desert shrub range, Good, HSG B
1.136	72	Dirt roads, HSG A
0.687	82	Dirt roads, HSG B
86.792	55	Weighted Average
86.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0353	0.18		**Sheet Flow, sheet 2810.70-2807.17** Range n= 0.130 P2= 1.88"
18.1	2,412	0.0190	2.22		**Shallow Concentrated Flow, shallow 2807.17-2761** Unpaved Kv= 16.1 fps
27.2	2,512	Total			

Subcatchment DA-D: Subcat DA-D

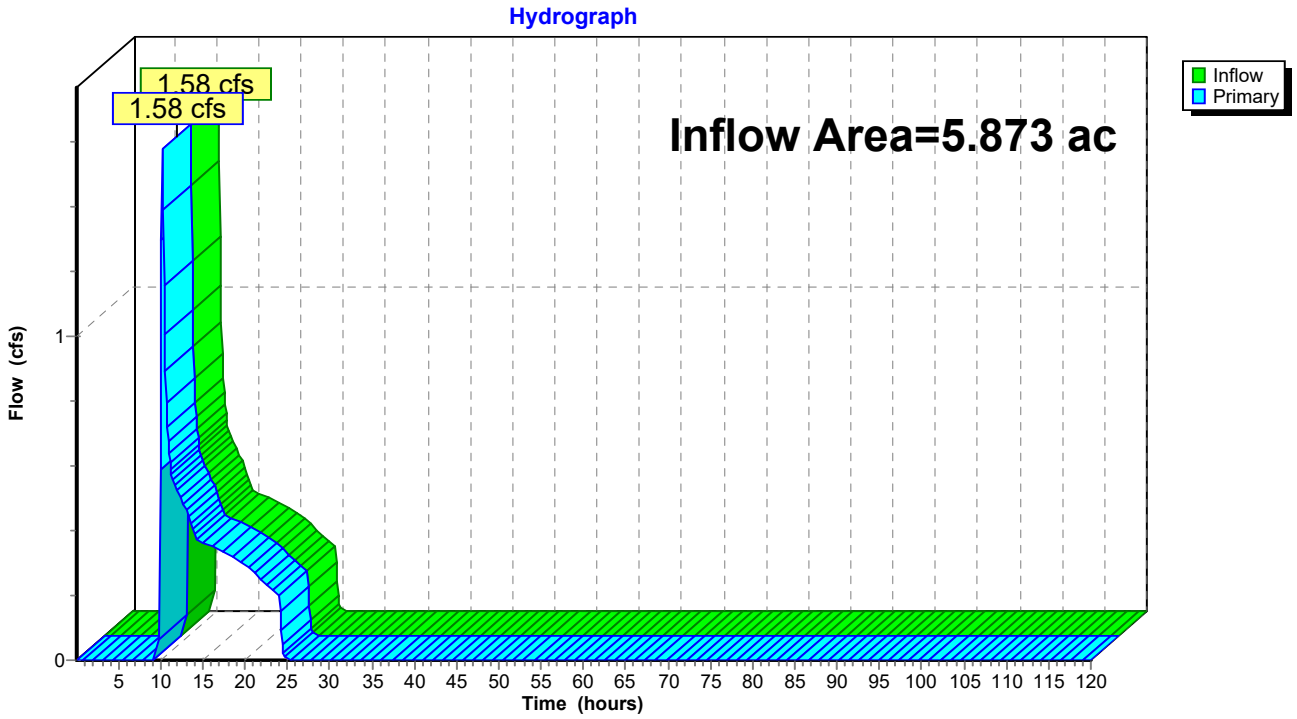


Summary for Link A: DP A

Inflow Area = 5.873 ac, 11.04% Impervious, Inflow Depth = 0.95" for 100-year 24hr event
Inflow = 1.58 cfs @ 10.21 hrs, Volume= 0.464 af
Primary = 1.58 cfs @ 10.21 hrs, Volume= 0.464 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

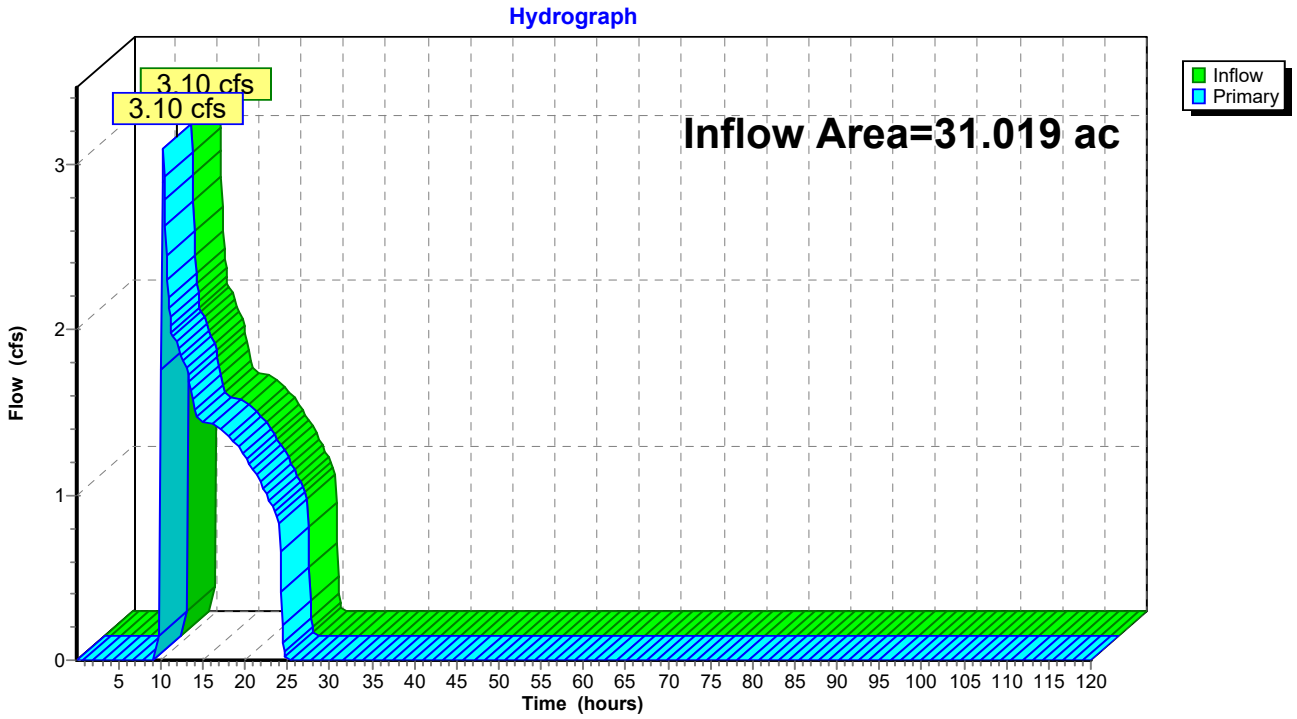


Summary for Link B: DP B

Inflow Area = 31.019 ac, 0.00% Impervious, Inflow Depth = 0.66" for 100-year 24hr event
Inflow = 3.10 cfs @ 10.30 hrs, Volume= 1.713 af
Primary = 3.10 cfs @ 10.30 hrs, Volume= 1.713 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

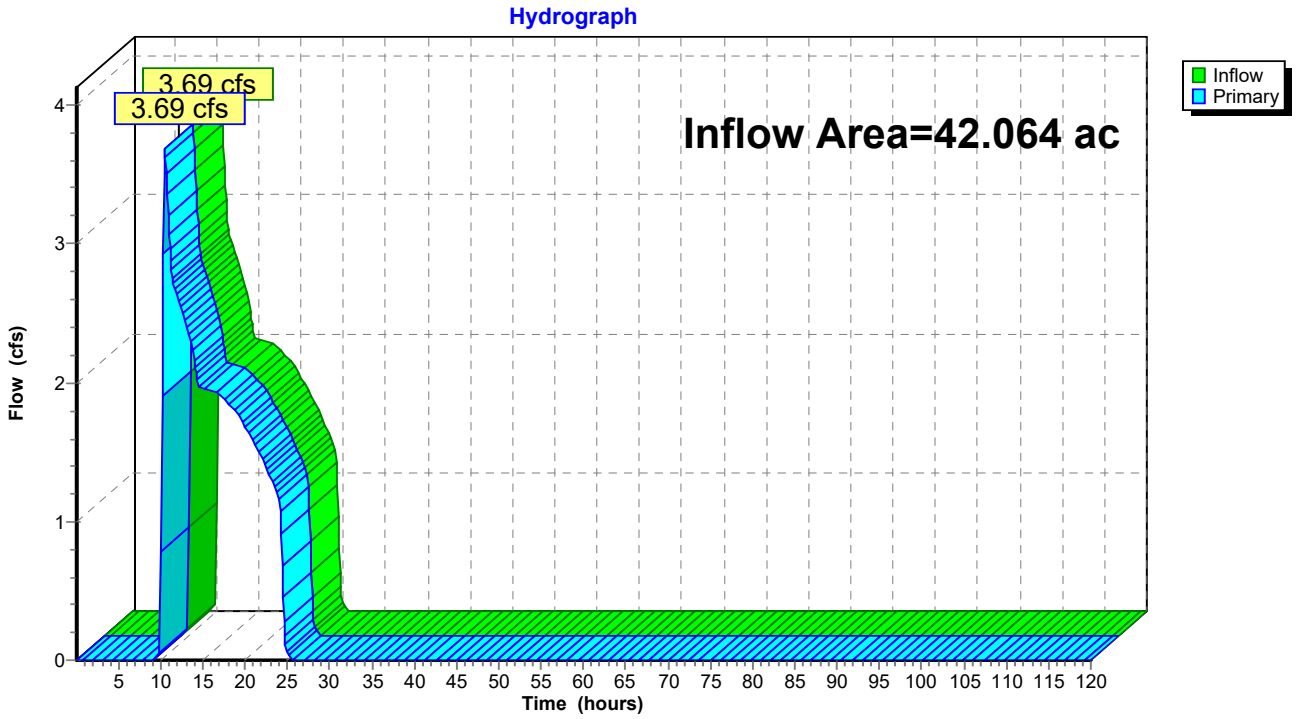


Summary for Link C: DP C

Inflow Area = 42.064 ac, 0.00% Impervious, Inflow Depth = 0.66" for 100-year 24hr event
Inflow = 3.69 cfs @ 10.52 hrs, Volume= 2.323 af
Primary = 3.69 cfs @ 10.52 hrs, Volume= 2.323 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

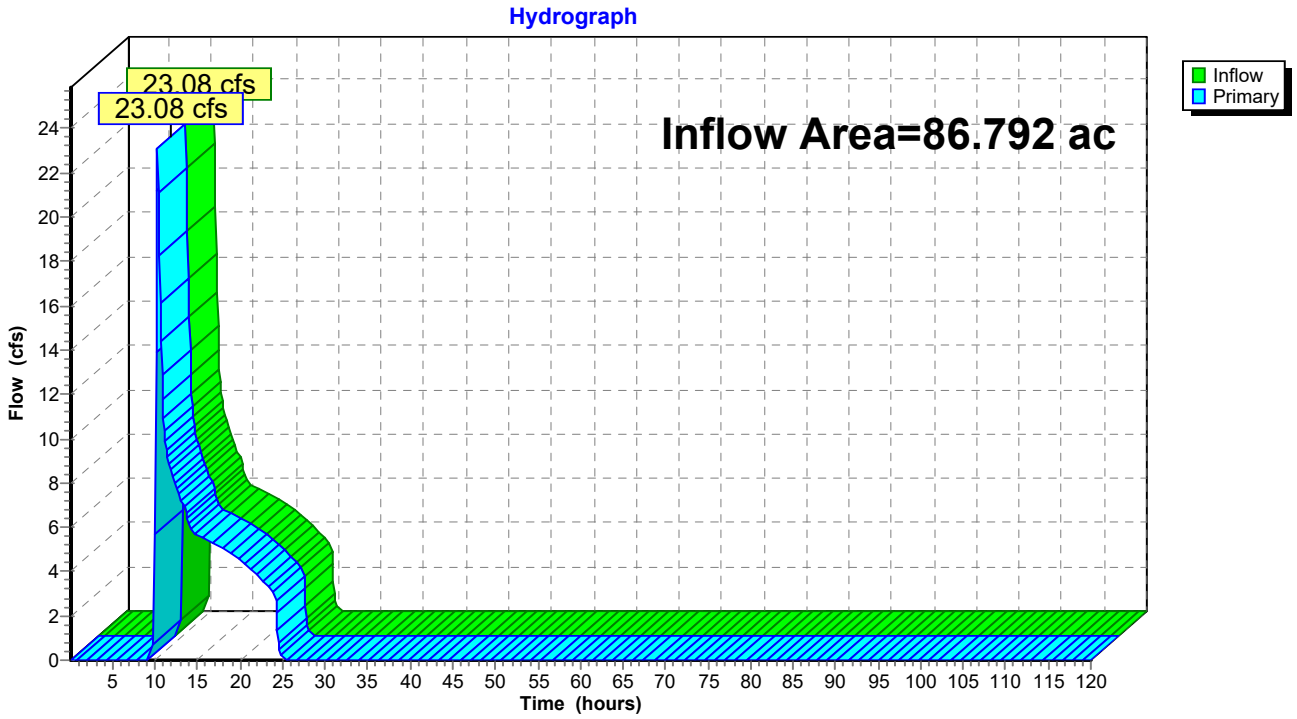


Summary for Link D: DP D

Inflow Area = 86.792 ac, 0.00% Impervious, Inflow Depth = 1.01" for 100-year 24hr event
Inflow = 23.08 cfs @ 10.30 hrs, Volume= 7.305 af
Primary = 23.08 cfs @ 10.30 hrs, Volume= 7.305 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A: Subcat DA-A Runoff Area=5.873 ac 11.04% Impervious Runoff Depth=0.07"
Flow Length=1,415' Tc=20.8 min UI Adjusted CN=54 Runoff=0.18 cfs 0.037 af

Subcatchment DA-B: Subcat DA-B Runoff Area=31.019 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=1,331' Tc=21.0 min CN=49 Runoff=0.37 cfs 0.050 af

Subcatchment DA-C: Subcat DA-C Runoff Area=42.064 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=2,780' Tc=31.6 min CN=49 Runoff=0.50 cfs 0.068 af

Subcatchment DA-D: Subcat DA-D Runoff Area=86.792 ac 0.00% Impervious Runoff Depth=0.09"
Flow Length=2,512' Tc=27.2 min CN=55 Runoff=2.98 cfs 0.650 af

Link A: DP A Inflow=0.18 cfs 0.037 af
Primary=0.18 cfs 0.037 af

Link B: DP B Inflow=0.37 cfs 0.050 af
Primary=0.37 cfs 0.050 af

Link C: DP C Inflow=0.50 cfs 0.068 af
Primary=0.50 cfs 0.068 af

Link D: DP D Inflow=2.98 cfs 0.650 af
Primary=2.98 cfs 0.650 af

Total Runoff Area = 165.747 ac Runoff Volume = 0.804 af Average Runoff Depth = 0.06"
99.61% Pervious = 165.098 ac 0.39% Impervious = 0.649 ac

Summary for Subcatchment DA-A: Subcat DA-A

[73] Warning: Peak may fall outside time span

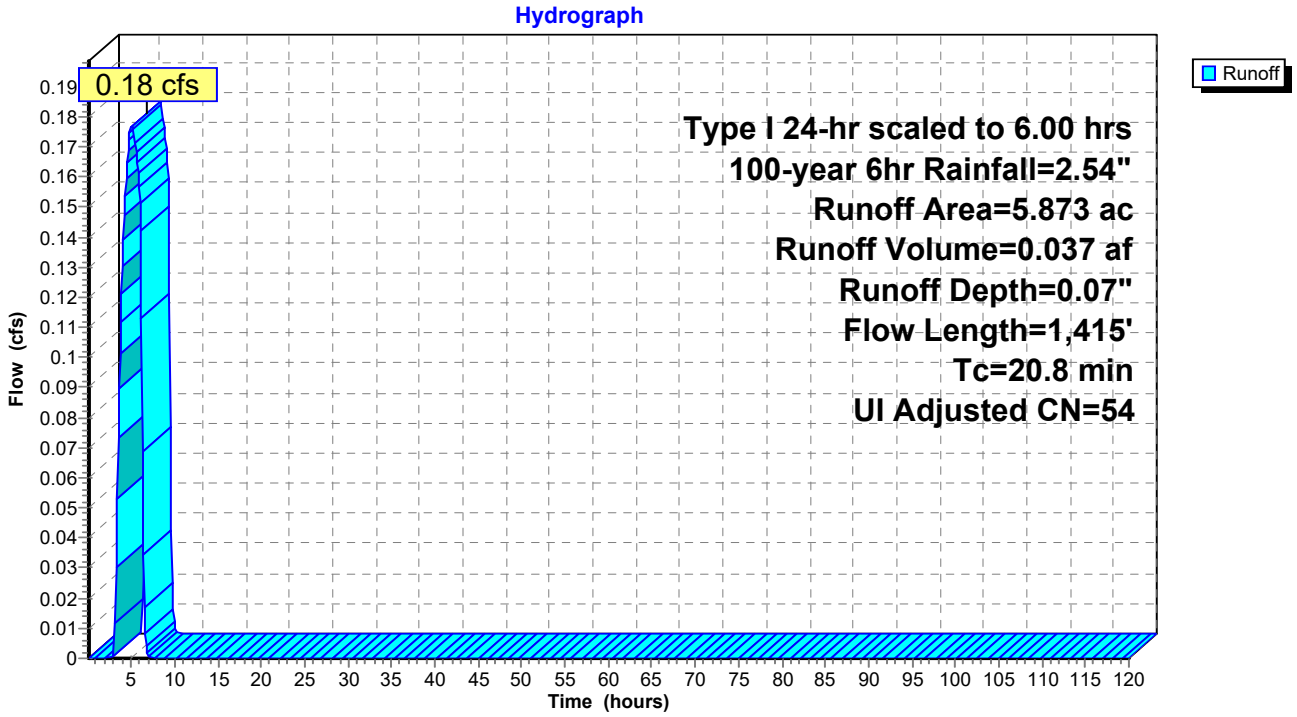
Runoff = 0.18 cfs @ 5.08 hrs, Volume= 0.037 af, Depth= 0.07"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Adj	Description
4.726	49		Desert shrub range, Good, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.223	72		Dirt roads, HSG A
0.068	96		Gravel surface, HSG A
0.649	98		Unconnected pavement, HSG A
5.873	56	54	Weighted Average, UI Adjusted
5.224			88.96% Pervious Area
0.649			11.04% Impervious Area
0.649			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0234	0.16		**Sheet Flow, sheet 2803-2800.66** Range n= 0.130 P2= 1.88"
10.1	1,315	0.0180	2.16		**Shallow Concentrated Flow, shallow 2800.66-2776.94** Unpaved Kv= 16.1 fps
20.8	1,415	Total			

Subcatchment DA-A: Subcat DA-A



Summary for Subcatchment DA-B: Subcat DA-B

[73] Warning: Peak may fall outside time span

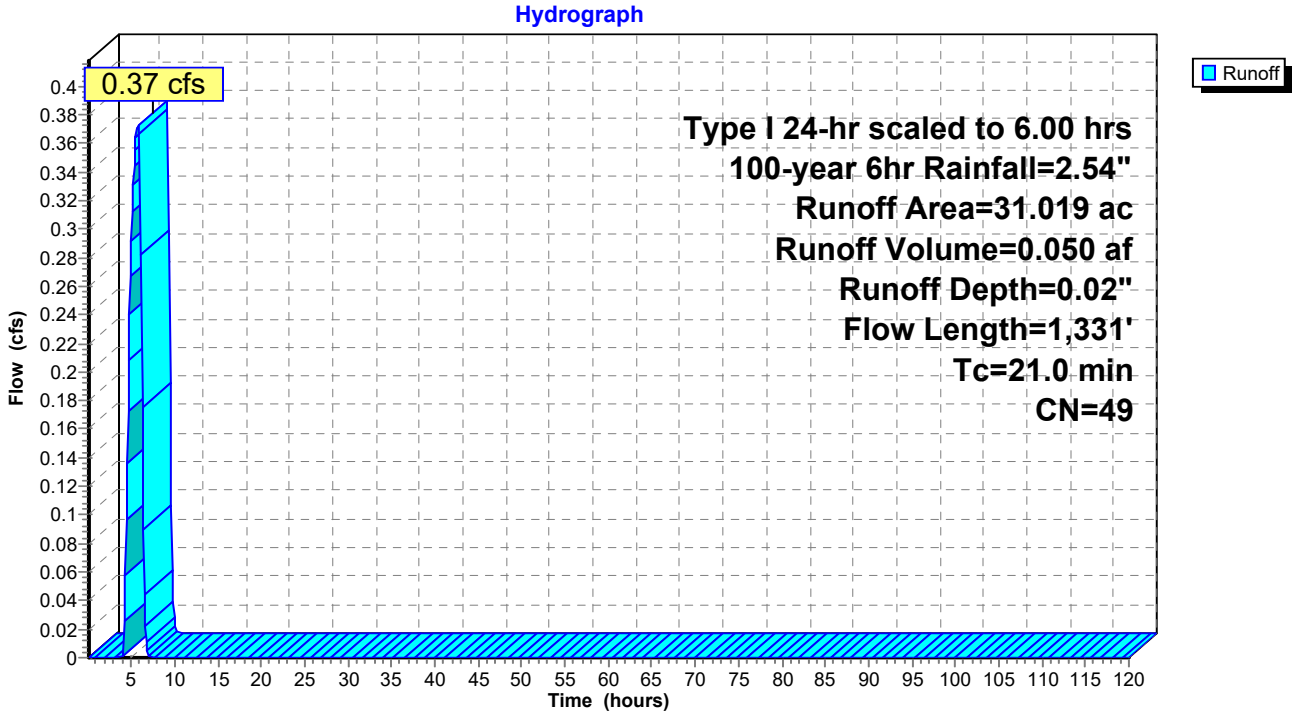
Runoff = 0.37 cfs @ 5.77 hrs, Volume= 0.050 af, Depth= 0.02"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Description
30.829	49	Desert shrub range, Good, HSG A
0.190	72	Dirt roads, HSG A
31.019	49	Weighted Average
31.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0194	0.14		**Sheet Flow, Sheet 2802.81-2800.87** Range n= 0.130 P2= 1.88"
9.5	1,231	0.0181	2.17		**Shallow Concentrated Flow, shallow range 2800.87-2797.25** Unpaved Kv= 16.1 fps
21.0	1,331	Total			

Subcatchment DA-B: Subcat DA-B



Summary for Subcatchment DA-C: Subcat DA-C

[73] Warning: Peak may fall outside time span

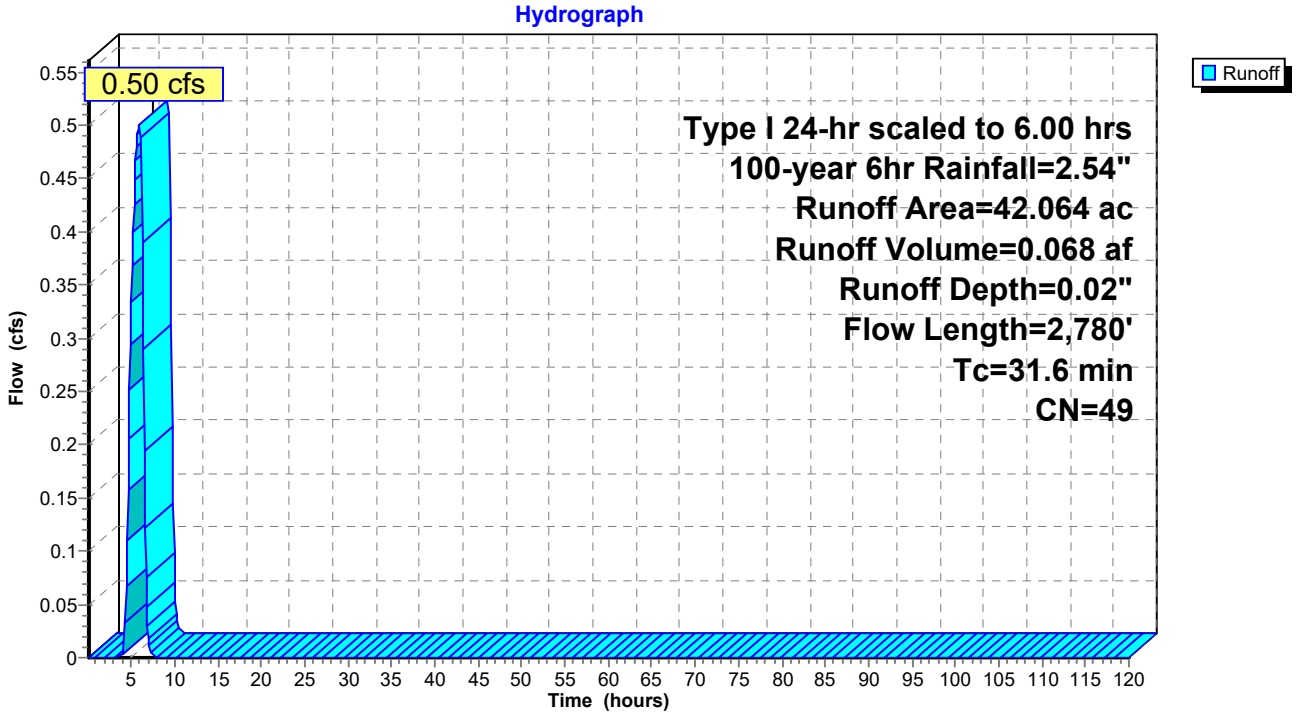
Runoff = 0.50 cfs @ 5.93 hrs, Volume= 0.068 af, Depth= 0.02"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Description
41.978	49	Desert shrub range, Good, HSG A
0.085	72	Dirt roads, HSG A
42.064	49	Weighted Average
42.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0237	0.16		**Sheet Flow, sheet 2813.23-2810.86** Range n= 0.130 P2= 1.88"
20.9	2,680	0.0177	2.14		**Shallow Concentrated Flow, shallow range 2810.86-2763.38** Unpaved Kv= 16.1 fps
31.6	2,780	Total			

Subcatchment DA-C: Subcat DA-C



Summary for Subcatchment DA-D: Subcat DA-D

[73] Warning: Peak may fall outside time span

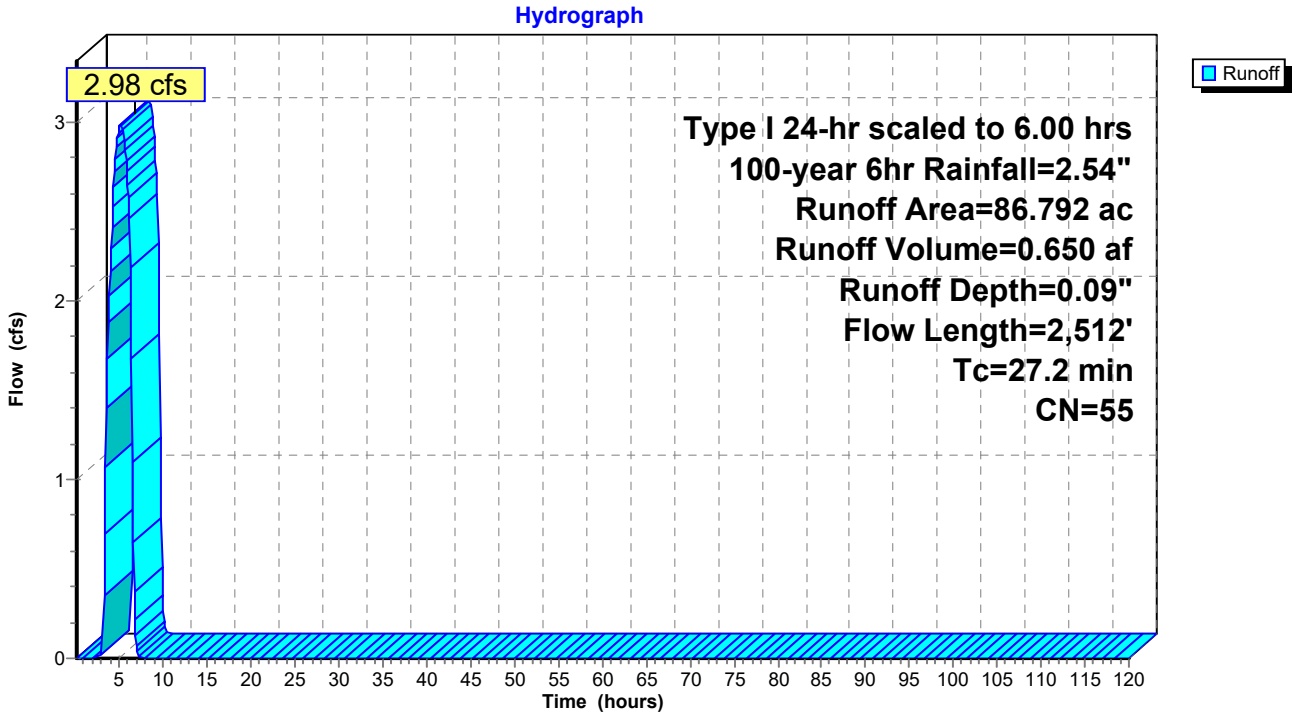
Runoff = 2.98 cfs @ 5.07 hrs, Volume= 0.650 af, Depth= 0.09"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Description
2.657	55	Desert shrub range, Fair, HSG A
9.988	72	Desert shrub range, Fair, HSG B
59.741	49	Desert shrub range, Good, HSG A
12.584	68	Desert shrub range, Good, HSG B
1.136	72	Dirt roads, HSG A
0.687	82	Dirt roads, HSG B
86.792	55	Weighted Average
86.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0353	0.18		**Sheet Flow, sheet 2810.70-2807.17** Range n= 0.130 P2= 1.88"
18.1	2,412	0.0190	2.22		**Shallow Concentrated Flow, shallow 2807.17-2761** Unpaved Kv= 16.1 fps
27.2	2,512	Total			

Subcatchment DA-D: Subcat DA-D

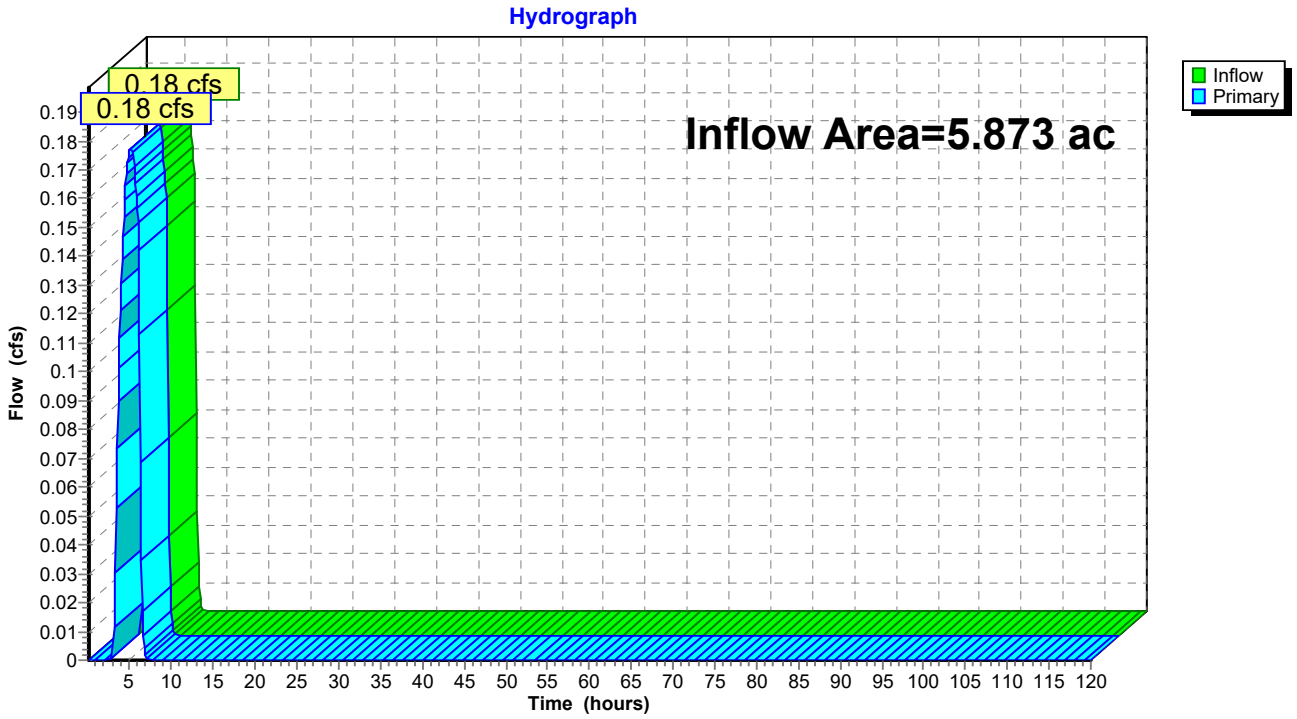


Summary for Link A: DP A

Inflow Area = 5.873 ac, 11.04% Impervious, Inflow Depth = 0.07" for 100-year 6hr event
Inflow = 0.18 cfs @ 5.08 hrs, Volume= 0.037 af
Primary = 0.18 cfs @ 5.08 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

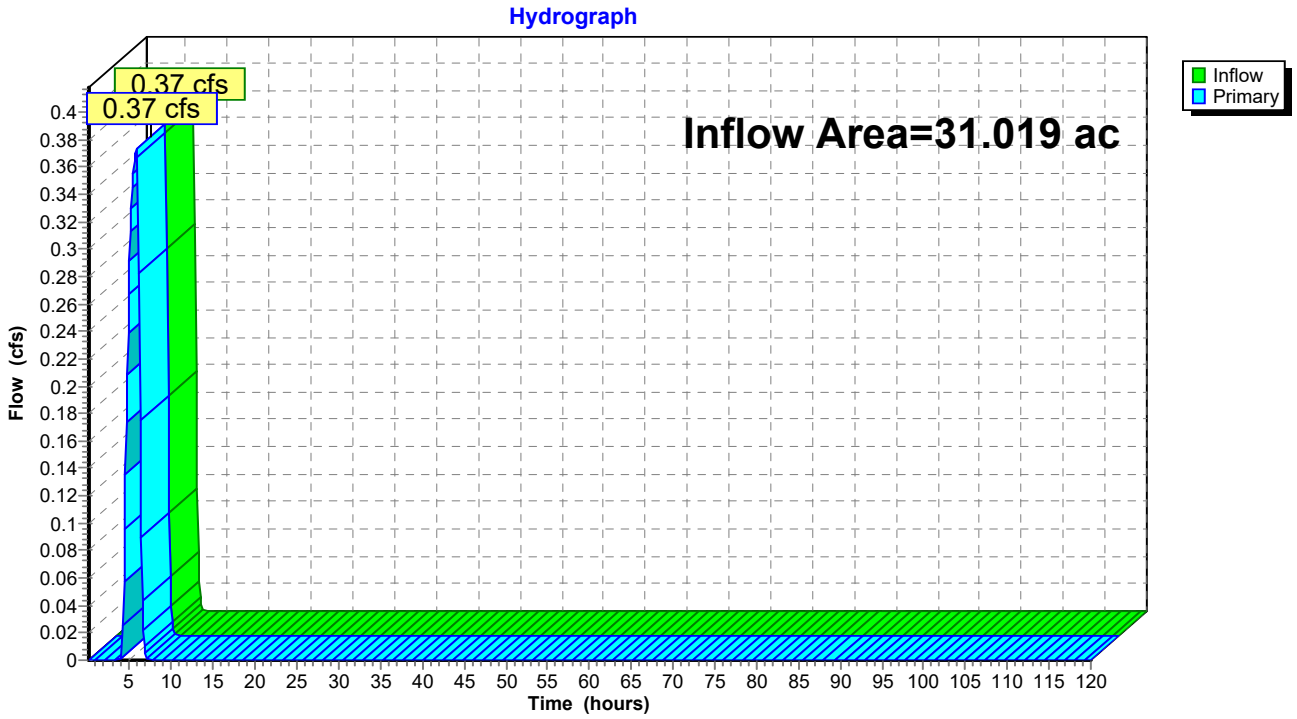


Summary for Link B: DP B

Inflow Area = 31.019 ac, 0.00% Impervious, Inflow Depth = 0.02" for 100-year 6hr event
Inflow = 0.37 cfs @ 5.77 hrs, Volume= 0.050 af
Primary = 0.37 cfs @ 5.77 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

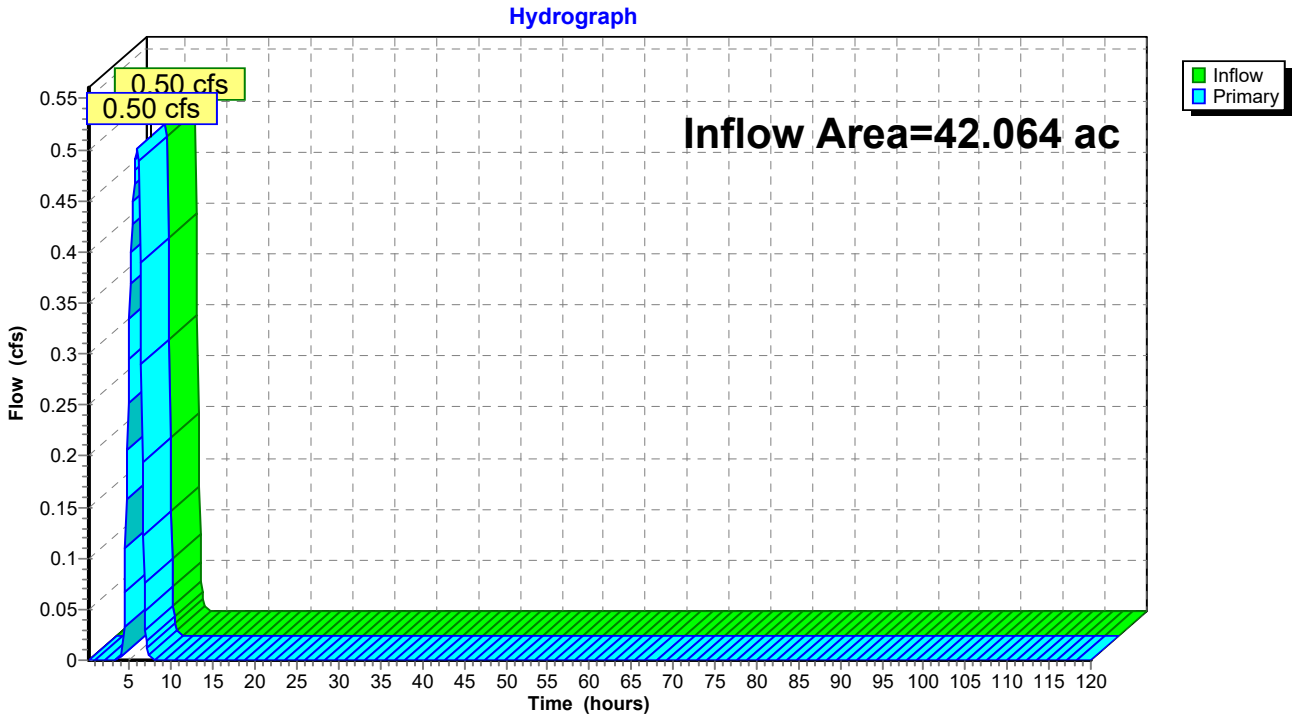


Summary for Link C: DP C

Inflow Area = 42.064 ac, 0.00% Impervious, Inflow Depth = 0.02" for 100-year 6hr event
Inflow = 0.50 cfs @ 5.93 hrs, Volume= 0.068 af
Primary = 0.50 cfs @ 5.93 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

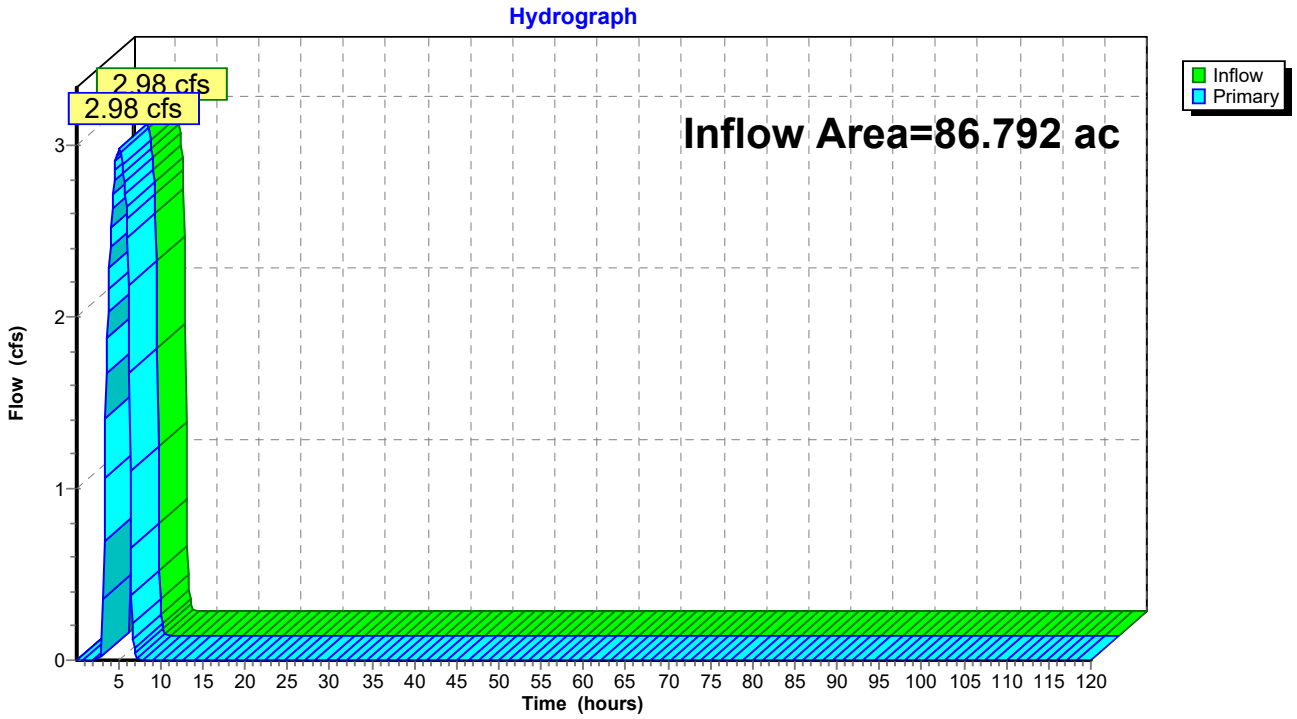


Summary for Link D: DP D

Inflow Area = 86.792 ac, 0.00% Impervious, Inflow Depth = 0.09" for 100-year 6hr event
Inflow = 2.98 cfs @ 5.07 hrs, Volume= 0.650 af
Primary = 2.98 cfs @ 5.07 hrs, Volume= 0.650 af, Atten= 0%, Lag= 0.0 min

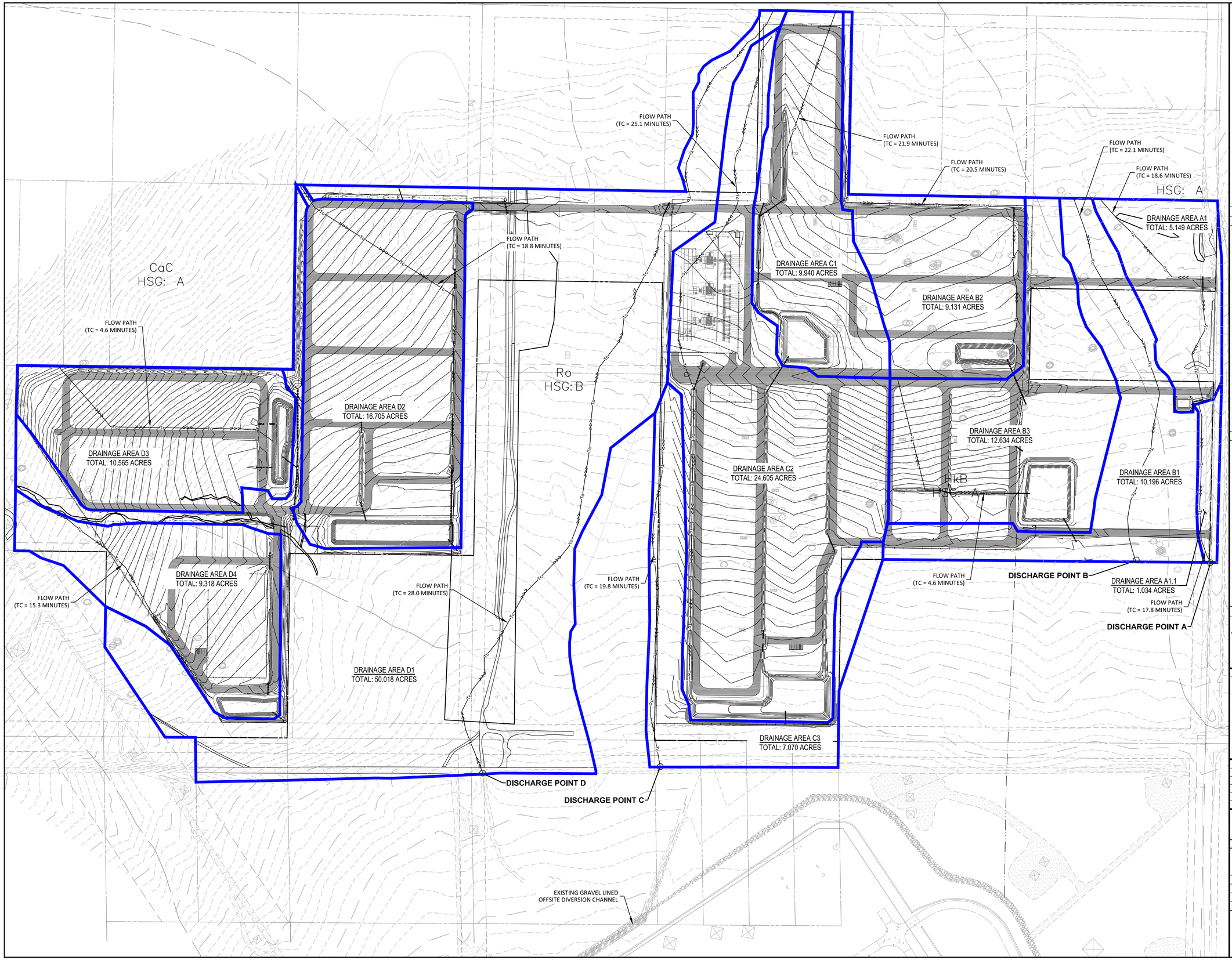
Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Appendix D: Post-Development Analysis

- Post-Development Drainage Area Map
- HydroCAD report
- Stormwater Feature Kep Map
- FlowMaster – Ditch Conveyance Reports
- FlowMaster – Culvert Capacities
- Pond Design Volume
- Water Quality Volumes



LEGEND

EXISTING FEATURES

- ADJACENT PARCEL BOUNDARY
- FEMA FLOOD ZONE LINE
- SECTION LINE
- SECTION RESERVATION LINE
- EXISTING EASEMENT LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- RIPRAP
- DIRT ROAD
- CONCRETE
- PAVEMENT
- WALL
- GUARDRAIL
- SOIL BOUNDARY
- SOILS MAP UNIT SYMBOL — HkB
- HSG — HSG: A

PROPOSED FEATURES

- PROJECT BOUNDARY
- UTILITY EASEMENT
- DITCH FLOW LINE
- CULVERT
- CHAIN LINK FENCE
- ASPHALT PAVEMENT
- ACCESS GATE
- PROPOSED DRAINAGE AREA
- PROPOSED FLOW PATH — Tc
- PROPOSED MAJOR CONTOUR — 2810
- PROPOSED MINOR CONTOUR — 2812

GRAPHIC SCALE

150' 0 150'

1" = 150'

NORTH

N

SEAL:

PERMIT PLAN SET
NOT FOR
CONSTRUCTION

NO.	BY	DATE	REVISION	APP'D.

PROJECT: EUISMOD PROJECT LLC
WILLOW SPRINGS, CA 93560
KERN COUNTY

CASE NO:

TITLE: POST-DEVELOPMENT
DRAINAGE AREA MAP

DRAWN BY:	TSS	PROJ. NO.:	552398
CHECKED BY:	DG		
APPROVED BY:	SH		D-2
DATE:	2/24/26		

TRC
6 Executive Circle
Suite 200
Irvine, CA 92614
Phone: 949.727.9336

H:\WORK IN PROGRESS\SOLAR SITES\VPA POWER\EUISMOD\CAD\PLOT SHEETS\DRAINAGE MAPS\POST DRAINAGE MAPS.DWG

TABLE OF CONTENTS

Project Reports
1 Routing Diagram
2 Rainfall Events Listing
3 Area Listing (all nodes)
4 Soil Listing (all nodes)
5 Ground Covers (all nodes)
6 Pipe Listing (all nodes)

2-year 24hr Event
7 Node Listing
9 Subcat DA-A1: Subcat DA-A1
11 Subcat DA-A1.1: Subcat DA-A1.1
13 Subcat DA-B1: Subcat DA-B1
15 Subcat DA-B2: Subcat DA-B2
17 Subcat DA-B3: Subcat DA-B3
19 Subcat DA-C1: Subcat DA-C1
21 Subcat DA-C2: Subcat DA-C2
23 Subcat DA-C3: Subcat DA-C3
24 Subcat DA-D1: Subcat DA-D1
26 Subcat DA-D2: Subcat DA-D2
27 Subcat DA-D3: Subcat DA-D3
29 Subcat DA-D4: Subcat DA-D4
30 Reach 3R: Culvert Crossing
32 Reach 4R: (new Reach)
33 Pond A1: A1 Pond
35 Pond B2: B2 Pond
37 Pond B3: B3 Pond
39 Pond C1: C1 Pond
41 Pond C2: C2 Pond
43 Pond D2: D2 Pond
45 Pond D3: D3 Pond
47 Pond D4: D4 Pond
49 Link A: DP A
50 Link B: DP B
51 Link C: DP C
52 Link D: DP D

2-year 6hr Event
53 Node Listing
55 Subcat DA-A1: Subcat DA-A1
57 Subcat DA-A1.1: Subcat DA-A1.1
59 Subcat DA-B1: Subcat DA-B1
61 Subcat DA-B2: Subcat DA-B2
63 Subcat DA-B3: Subcat DA-B3
65 Subcat DA-C1: Subcat DA-C1
67 Subcat DA-C2: Subcat DA-C2

69 Subcat DA-C3: Subcat DA-C3
70 Subcat DA-D1: Subcat DA-D1
72 Subcat DA-D2: Subcat DA-D2
74 Subcat DA-D3: Subcat DA-D3
76 Subcat DA-D4: Subcat DA-D4
78 Reach 3R: Culvert Crossing
80 Reach 4R: (new Reach)
81 Pond A1: A1 Pond
83 Pond B2: B2 Pond
85 Pond B3: B3 Pond
87 Pond C1: C1 Pond
89 Pond C2: C2 Pond
91 Pond D2: D2 Pond
93 Pond D3: D3 Pond
95 Pond D4: D4 Pond
97 Link A: DP A
98 Link B: DP B
99 Link C: DP C
100 Link D: DP D

10-year 5-day Event
101 Node Listing
103 Subcat DA-A1: Subcat DA-A1
105 Subcat DA-A1.1: Subcat DA-A1.1
107 Subcat DA-B1: Subcat DA-B1
109 Subcat DA-B2: Subcat DA-B2
111 Subcat DA-B3: Subcat DA-B3
113 Subcat DA-C1: Subcat DA-C1
115 Subcat DA-C2: Subcat DA-C2
117 Subcat DA-C3: Subcat DA-C3
118 Subcat DA-D1: Subcat DA-D1
120 Subcat DA-D2: Subcat DA-D2
121 Subcat DA-D3: Subcat DA-D3
123 Subcat DA-D4: Subcat DA-D4
124 Reach 3R: Culvert Crossing
126 Reach 4R: (new Reach)
127 Pond A1: A1 Pond
129 Pond B2: B2 Pond
131 Pond B3: B3 Pond
133 Pond C1: C1 Pond
135 Pond C2: C2 Pond
137 Pond D2: D2 Pond
139 Pond D3: D3 Pond
141 Pond D4: D4 Pond
143 Link A: DP A
144 Link B: DP B
145 Link C: DP C
146 Link D: DP D

50-year 24hr Event

147 Node Listing
149 Subcat DA-A1: Subcat DA-A1
151 Subcat DA-A1.1: Subcat DA-A1.1
153 Subcat DA-B1: Subcat DA-B1
155 Subcat DA-B2: Subcat DA-B2
157 Subcat DA-B3: Subcat DA-B3
159 Subcat DA-C1: Subcat DA-C1
161 Subcat DA-C2: Subcat DA-C2
163 Subcat DA-C3: Subcat DA-C3
164 Subcat DA-D1: Subcat DA-D1
166 Subcat DA-D2: Subcat DA-D2
167 Subcat DA-D3: Subcat DA-D3
169 Subcat DA-D4: Subcat DA-D4
170 Reach 3R: Culvert Crossing
172 Reach 4R: (new Reach)
173 Pond A1: A1 Pond
175 Pond B2: B2 Pond
177 Pond B3: B3 Pond
179 Pond C1: C1 Pond
181 Pond C2: C2 Pond
183 Pond D2: D2 Pond
185 Pond D3: D3 Pond
187 Pond D4: D4 Pond
189 Link A: DP A
190 Link B: DP B
191 Link C: DP C
192 Link D: DP D

50-year 6hr Event

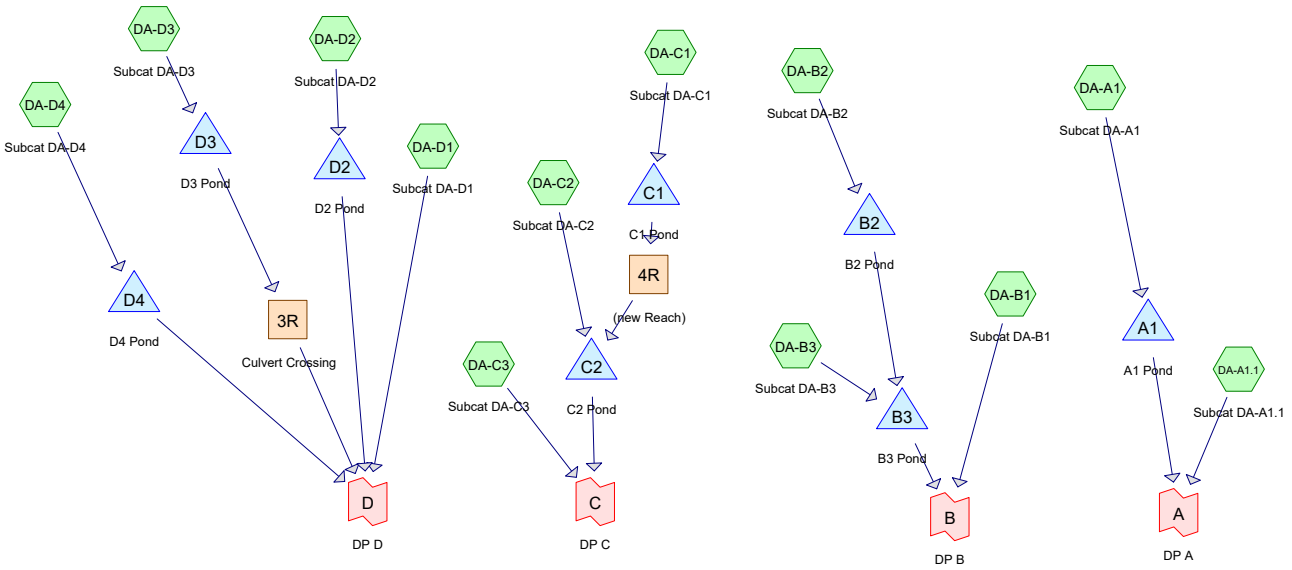
193 Node Listing
195 Subcat DA-A1: Subcat DA-A1
197 Subcat DA-A1.1: Subcat DA-A1.1
199 Subcat DA-B1: Subcat DA-B1
201 Subcat DA-B2: Subcat DA-B2
203 Subcat DA-B3: Subcat DA-B3
205 Subcat DA-C1: Subcat DA-C1
207 Subcat DA-C2: Subcat DA-C2
209 Subcat DA-C3: Subcat DA-C3
210 Subcat DA-D1: Subcat DA-D1
212 Subcat DA-D2: Subcat DA-D2
214 Subcat DA-D3: Subcat DA-D3
216 Subcat DA-D4: Subcat DA-D4
218 Reach 3R: Culvert Crossing
220 Reach 4R: (new Reach)
221 Pond A1: A1 Pond
223 Pond B2: B2 Pond
225 Pond B3: B3 Pond

227 Pond C1: C1 Pond
229 Pond C2: C2 Pond
231 Pond D2: D2 Pond
233 Pond D3: D3 Pond
235 Pond D4: D4 Pond
237 Link A: DP A
238 Link B: DP B
239 Link C: DP C
240 Link D: DP D

100-year 24hr Event
241 Node Listing
243 Subcat DA-A1: Subcat DA-A1
245 Subcat DA-A1.1: Subcat DA-A1.1
247 Subcat DA-B1: Subcat DA-B1
249 Subcat DA-B2: Subcat DA-B2
251 Subcat DA-B3: Subcat DA-B3
253 Subcat DA-C1: Subcat DA-C1
255 Subcat DA-C2: Subcat DA-C2
257 Subcat DA-C3: Subcat DA-C3
258 Subcat DA-D1: Subcat DA-D1
260 Subcat DA-D2: Subcat DA-D2
261 Subcat DA-D3: Subcat DA-D3
263 Subcat DA-D4: Subcat DA-D4
264 Reach 3R: Culvert Crossing
266 Reach 4R: (new Reach)
267 Pond A1: A1 Pond
269 Pond B2: B2 Pond
271 Pond B3: B3 Pond
273 Pond C1: C1 Pond
275 Pond C2: C2 Pond
277 Pond D2: D2 Pond
279 Pond D3: D3 Pond
281 Pond D4: D4 Pond
283 Link A: DP A
284 Link B: DP B
285 Link C: DP C
286 Link D: DP D

100-year 6hr Event
287 Node Listing
289 Subcat DA-A1: Subcat DA-A1
291 Subcat DA-A1.1: Subcat DA-A1.1
293 Subcat DA-B1: Subcat DA-B1
295 Subcat DA-B2: Subcat DA-B2
297 Subcat DA-B3: Subcat DA-B3
299 Subcat DA-C1: Subcat DA-C1
301 Subcat DA-C2: Subcat DA-C2

303 Subcat DA-C3: Subcat DA-C3
304 Subcat DA-D1: Subcat DA-D1
306 Subcat DA-D2: Subcat DA-D2
308 Subcat DA-D3: Subcat DA-D3
310 Subcat DA-D4: Subcat DA-D4
312 Reach 3R: Culvert Crossing
314 Reach 4R: (new Reach)
315 Pond A1: A1 Pond
317 Pond B2: B2 Pond
319 Pond B3: B3 Pond
321 Pond C1: C1 Pond
323 Pond C2: C2 Pond
325 Pond D2: D2 Pond
327 Pond D3: D3 Pond
329 Pond D4: D4 Pond
331 Link A: DP A
332 Link B: DP B
333 Link C: DP C
334 Link D: DP D



Subcat Reach Pond Link

Routing Diagram for Proposed_2026
Prepared by TRC Companies, Printed 2/23/2026
HydroCAD® 10.20-7a s/n 01402 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year 24hr	Type I 24-hr		Default	24.00	1	1.88	2
2	2-year 6hr	Type I 24-hr		Scale	6.00	1	1.02	2
3	10-year 5-day	Type I 24-hr		Scale	120.00	1	5.03	2
4	50-year 24hr	Type I 24-hr		Default	24.00	1	4.49	2
5	50-year 6hr	Type I 24-hr		Scale	6.00	1	2.25	2
6	100-year 24hr	Type I 24-hr		Default	24.00	1	5.06	2
7	100-year 6hr	Type I 24-hr		Scale	6.00	1	2.54	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
73.102	49	Desert shrub range, Good, HSG A (DA-A1, DA-A1.1, DA-B1, DA-B2, DA-B3, DA-C1, DA-C2, DA-C3, DA-D1, DA-D2, DA-D3, DA-D4)
20.822	68	Desert shrub range, Good, HSG B (DA-D1)
0.206	63	Desert shrub range, Poor, HSG A (DA-A1)
1.181	72	Dirt roads, HSG A (DA-A1, DA-D1, DA-D4)
0.264	82	Dirt roads, HSG B (DA-D1)
0.068	96	Gravel surface, HSG A (DA-A1)
39.780	55	Surrounding Equip. Cover, HSG A (DA-B1, DA-B2, DA-B3, DA-C1, DA-C2, DA-D2, DA-D3, DA-D4)
29.776	98	Unconnected pavement, HSG A (DA-A1, DA-A1.1, DA-B1, DA-B2, DA-B3, DA-C1, DA-C2, DA-D1, DA-D2, DA-D3, DA-D4)
1.165	98	Unconnected pavement, HSG B (DA-D1, DA-D2)
166.364	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
144.113	HSG A	DA-A1, DA-A1.1, DA-B1, DA-B2, DA-B3, DA-C1, DA-C2, DA-C3, DA-D1, DA-D2, DA-D3, DA-D4
22.251	HSG B	DA-D1, DA-D2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
166.364		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
73.102	20.822	0.000	0.000	0.000	93.924	Desert shrub range, Good	DA-A1, DA-A1.1, DA-B1, DA-B2, DA-B3, DA-C1, DA-C2, DA-C3, DA-D1, DA-D2, DA-D3, DA-D4
0.206	0.000	0.000	0.000	0.000	0.206	Desert shrub range, Poor	DA-A1
1.181	0.264	0.000	0.000	0.000	1.445	Dirt roads	DA-A1, DA-D1, DA-D4
0.068	0.000	0.000	0.000	0.000	0.068	Gravel surface	DA-A1
39.780	0.000	0.000	0.000	0.000	39.780	Surrounding Equip. Cover	DA-B1, DA-B2, DA-B3, DA-C1, DA-C2, DA-D2, DA-D3, DA-D4
29.776	1.165	0.000	0.000	0.000	30.941	Unconnected pavement	DA-A1, DA-A1.1, DA-B1, DA-B2, DA-B3, DA-C1, DA-C2, DA-D1, DA-D2, DA-D3, DA-D4
144.113	**22.251**	**0.000**	**0.000**	**0.000**	**166.364**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	DA-A1	0.00	0.00	40.0	0.0050	0.013	0.0	18.0	0.0	
2	DA-B2	0.00	0.00	52.0	0.0050	0.013	0.0	18.0	0.0	
3	DA-B3	0.00	0.00	42.0	0.0209	0.013	0.0	18.0	0.0	
4	DA-B3	0.00	0.00	86.0	0.0054	0.013	0.0	18.0	0.0	
5	DA-C1	0.00	0.00	102.0	0.0356	0.013	0.0	18.0	0.0	
6	DA-C1	0.00	0.00	64.0	0.0064	0.011	0.0	18.0	0.0	
7	DA-D1	0.00	0.00	57.0	0.0080	0.013	0.0	18.0	0.0	
8	DA-D3	0.00	0.00	43.0	0.0340	0.012	0.0	18.0	0.0	
9	3R	2,783.46	2,782.00	187.0	0.0078	0.013	0.0	36.0	0.0	
10	B2	2,794.50	2,788.00	175.0	0.0371	0.013	0.0	18.0	0.0	
11	B3	2,779.00	2,778.50	93.0	0.0054	0.013	0.0	18.0	0.0	
12	C1	2,792.00	2,790.84	150.0	0.0077	0.013	0.0	18.0	0.0	
13	C2	2,765.00	2,764.37	90.0	0.0070	0.013	0.0	18.0	0.0	
14	D2	2,774.50	2,773.50	80.0	0.0125	0.013	0.0	18.0	0.0	
15	D3	2,788.00	2,786.00	81.0	0.0247	0.013	0.0	18.0	0.0	
16	D4	2,779.23	2,778.57	66.0	0.0100	0.013	0.0	12.0	0.0	

Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A1: Subcat DA-A1 Runoff Area=5.149 ac 12.33% Impervious Runoff Depth=0.00"
Flow Length=1,005' Tc=18.6 min UI Adjusted CN=54 Runoff=0.01 cfs 0.002 af

Subcatchment DA-A1.1: Subcat DA-A1.1 Runoff Area=1.034 ac 32.98% Impervious Runoff Depth=0.10"
Flow Length=590' Tc=17.8 min CN=65 Runoff=0.01 cfs 0.009 af

Subcatchment DA-B1: Subcat DA-B1 Runoff Area=10.196 ac 10.65% Impervious Runoff Depth=0.00"
Flow Length=1,408' Tc=22.1 min UI Adjusted CN=52 Runoff=0.00 cfs 0.000 af

Subcatchment DA-B2: Subcat DA-B2 Runoff Area=9.131 ac 33.40% Impervious Runoff Depth=0.16"
Flow Length=1,387' Tc=20.5 min CN=68 Runoff=0.12 cfs 0.119 af

Subcatchment DA-B3: Subcat DA-B3 Runoff Area=12.634 ac 21.87% Impervious Runoff Depth=0.01"
Flow Length=786' Tc=4.6 min UI Adjusted CN=56 Runoff=0.02 cfs 0.012 af

Subcatchment DA-C1: Subcat DA-C1 Runoff Area=9.940 ac 30.38% Impervious Runoff Depth=0.12"
Flow Length=1,218' Tc=21.9 min CN=66 Runoff=0.10 cfs 0.100 af

Subcatchment DA-C2: Subcat DA-C2 Runoff Area=24.605 ac 28.17% Impervious Runoff Depth=0.03"
Flow Length=2,502' Tc=25.1 min UI Adjusted CN=59 Runoff=0.09 cfs 0.066 af

Subcatchment DA-C3: Subcat DA-C3 Runoff Area=7.070 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,331' Tc=19.8 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment DA-D1: Subcat DA-D1 Runoff Area=50.018 ac 1.44% Impervious Runoff Depth=0.02"
Flow Length=2,494' Tc=28.0 min CN=58 Runoff=0.16 cfs 0.101 af

Subcatchment DA-D2: Subcat DA-D2 Runoff Area=16.705 ac 39.56% Impervious Runoff Depth=0.22"
Flow Length=1,582' Tc=18.8 min CN=71 Runoff=0.44 cfs 0.306 af

Subcatchment DA-D3: Subcat DA-D3 Runoff Area=10.564 ac 37.08% Impervious Runoff Depth=0.20"
Flow Length=769' Tc=4.6 min CN=70 Runoff=0.25 cfs 0.173 af

Subcatchment DA-D4: Subcat DA-D4 Runoff Area=9.318 ac 20.08% Impervious Runoff Depth=0.02"
Flow Length=1,055' Tc=15.3 min UI Adjusted CN=57 Runoff=0.02 cfs 0.014 af

Reach 3R: Culvert Crossing Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
36.0" Round Pipe n=0.013 L=187.0' S=0.0078 '/' Capacity=58.93 cfs Outflow=0.00 cfs 0.000 af

Reach 4R: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond A1: A1 Pond Peak Elev=2,785.05' Storage=0.002 af Inflow=0.01 cfs 0.002 af
Outflow=0.00 cfs 0.000 af

Pond B2: B2 Pond Peak Elev=2,794.21' Storage=0.119 af Inflow=0.12 cfs 0.119 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0371 '/' Outflow=0.00 cfs 0.000 af

Pond B3: B3 Pond Peak Elev=2,778.52' Storage=0.012 af Inflow=0.02 cfs 0.012 af
Outflow=0.00 cfs 0.000 af

Pond C1: C1 Pond Peak Elev=2,791.27' Storage=0.100 af Inflow=0.10 cfs 0.100 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0077 '/' Outflow=0.00 cfs 0.000 af

Pond C2: C2 Pond Peak Elev=2,765.12' Storage=0.066 af Inflow=0.09 cfs 0.066 af
Outflow=0.00 cfs 0.000 af

Pond D2: D2 Pond Peak Elev=2,773.52' Storage=0.306 af Inflow=0.44 cfs 0.306 af
Outflow=0.00 cfs 0.000 af

Pond D3: D3 Pond Peak Elev=2,785.18' Storage=0.173 af Inflow=0.25 cfs 0.173 af
Outflow=0.00 cfs 0.000 af

Pond D4: D4 Pond Peak Elev=2,779.07' Storage=0.014 af Inflow=0.02 cfs 0.014 af
Outflow=0.00 cfs 0.000 af

Link A: DP A Inflow=0.01 cfs 0.009 af
Primary=0.01 cfs 0.009 af

Link B: DP B Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link C: DP C Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link D: DP D Inflow=0.16 cfs 0.101 af
Primary=0.16 cfs 0.101 af

Total Runoff Area = 166.364 ac Runoff Volume = 0.901 af Average Runoff Depth = 0.07"
81.40% Pervious = 135.423 ac 18.60% Impervious = 30.941 ac

Summary for Subcatchment DA-A1: Subcat DA-A1

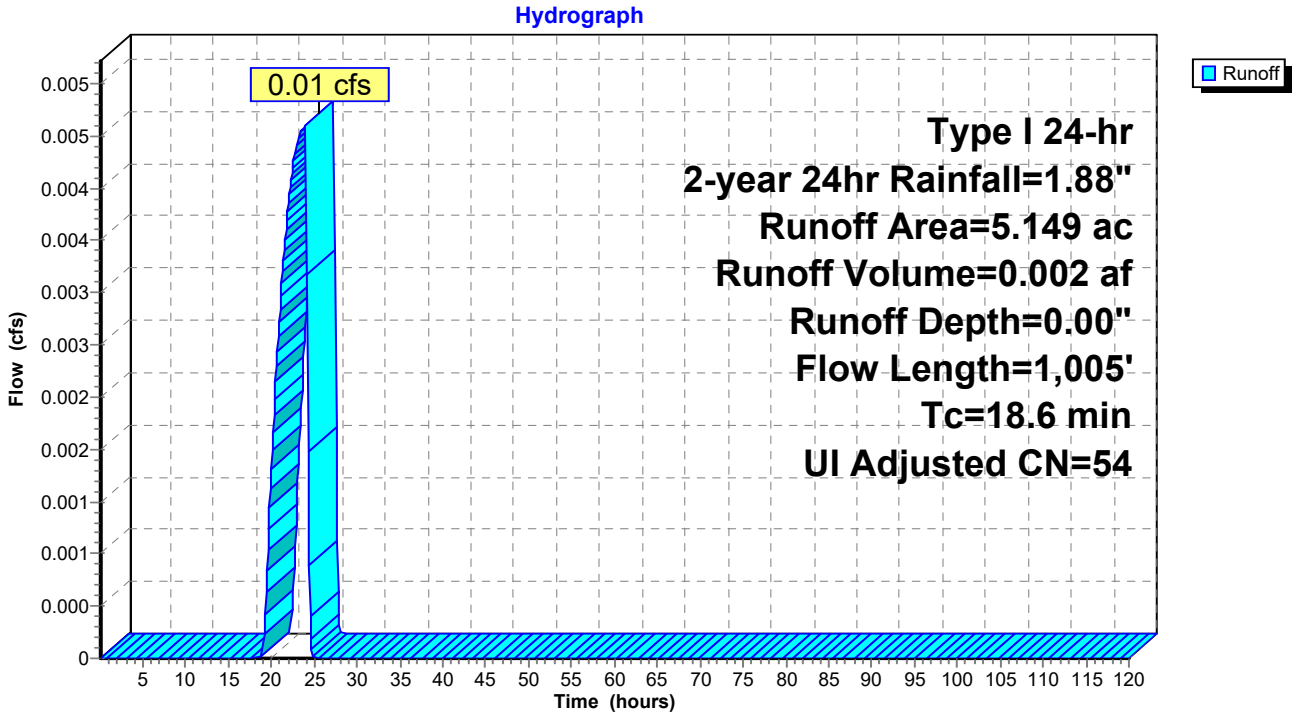
Runoff = 0.01 cfs @ 23.93 hrs, Volume= 0.002 af, Depth= 0.00"
Routed to Pond A1 : A1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Adj	Description
4.141	49		Desert shrub range, Good, HSG A
0.635	98		Unconnected pavement, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.068	96		Gravel surface, HSG A
0.099	72		Dirt roads, HSG A
5.149	57	54	Weighted Average, UI Adjusted
4.514			87.67% Pervious Area
0.635			12.33% Impervious Area
0.635			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0208	0.15		**Sheet Flow, sheet 2802.48-2800.40** Range n= 0.130 P2= 1.88"
3.2	385	0.0158	2.02		**Shallow Concentrated Flow, shallow 2800.40-2794.30** Unpaved Kv= 16.1 fps
0.2	40	0.0050	4.20	7.43	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.5	398	0.0142	1.92		**Shallow Concentrated Flow, shallow 2793.57-2788.24** Unpaved Kv= 16.1 fps
0.5	82	0.0151	2.49		**Shallow Concentrated Flow, paved 2788.24-2787** Paved Kv= 20.3 fps
18.6	1,005	Total			

Subcatchment DA-A1: Subcat DA-A1



Summary for Subcatchment DA-A1.1: Subcat DA-A1.1

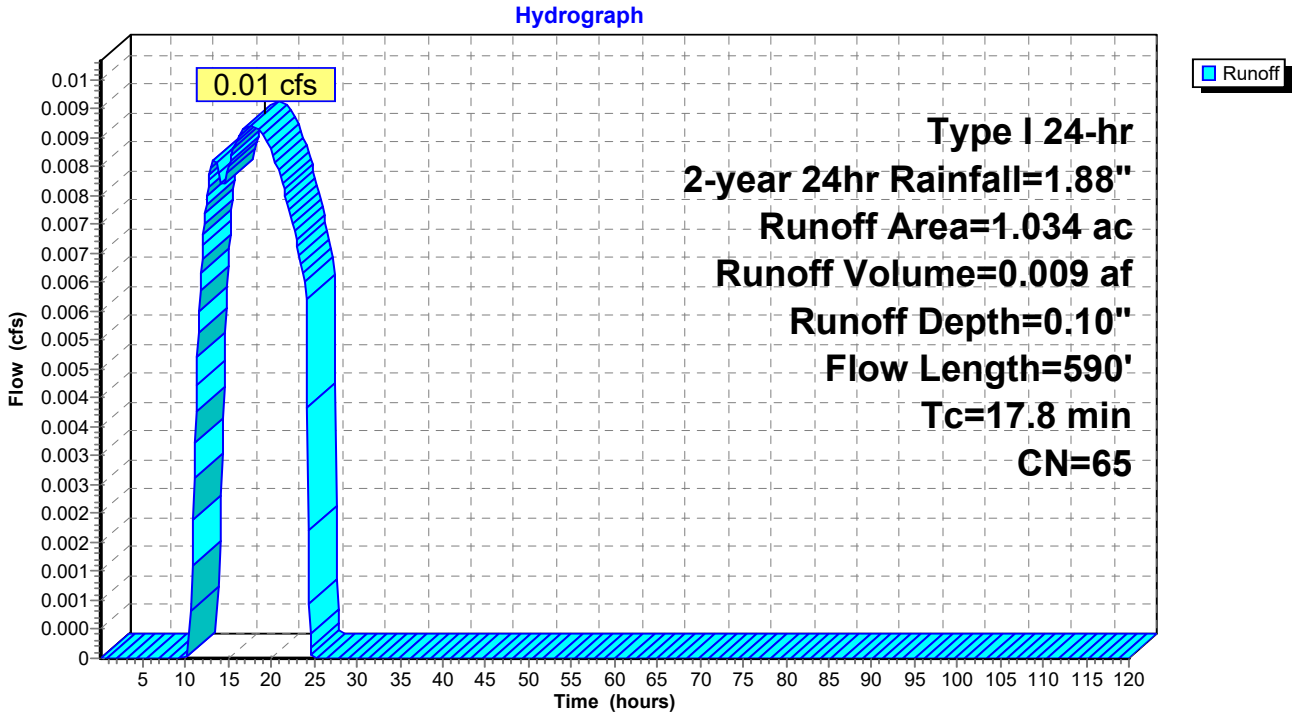
Runoff = 0.01 cfs @ 17.68 hrs, Volume= 0.009 af, Depth= 0.10"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Description
0.693	49	Desert shrub range, Good, HSG A
0.341	98	Unconnected pavement, HSG A
1.034	65	Weighted Average
0.693		67.02% Pervious Area
0.341		32.98% Impervious Area
0.341		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0182	0.14		**Sheet Flow, sheet 2787.94-2786.12** Range n= 0.130 P2= 1.88"
4.7	369	0.0172	1.31		**Shallow Concentrated Flow, shallow 2786.12-2779.76** Nearly Bare & Untilled Kv= 10.0 fps
0.2	26	0.0200	2.87		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.1	95	0.0211	1.45		**Shallow Concentrated Flow, shallow 2779-2776.99** Nearly Bare & Untilled Kv= 10.0 fps
17.8	590	Total			

Subcatchment DA-A1.1: Subcat DA-A1.1



Summary for Subcatchment DA-B1: Subcat DA-B1

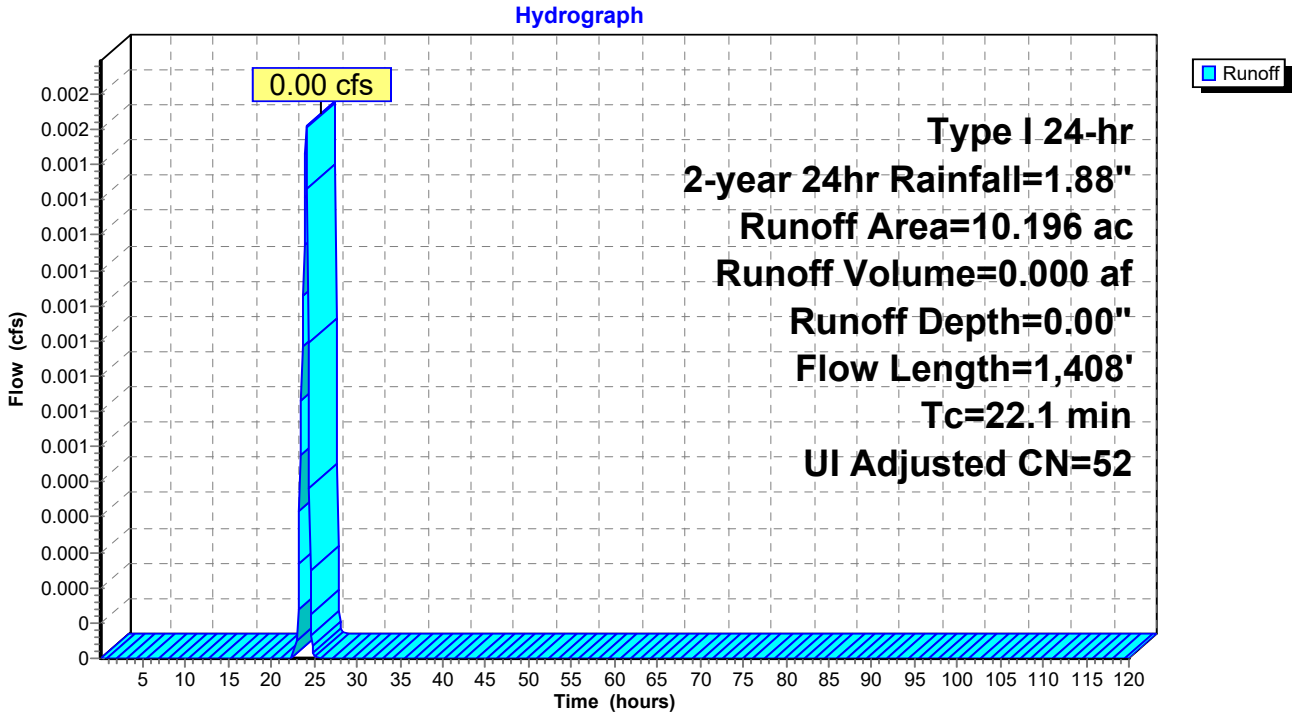
Runoff = 0.00 cfs @ 24.08 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Adj	Description
	8.673	49		Desert shrub range, Good, HSG A
	1.086	98		Unconnected pavement, HSG A
*	0.437	55		Surrounding Equip. Cover, HSG A
	10.196	54	52	Weighted Average, UI Adjusted
	9.110			89.35% Pervious Area
	1.086			10.65% Impervious Area
	1.086			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0185	0.14		**Sheet Flow, Sheet Flow 2803.05-2801.20** Range n= 0.130 P2= 1.88"
1.6	207	0.0189	2.21		**Shallow Concentrated Flow, shallow 2801.20-2797.28** Unpaved Kv= 16.1 fps
0.2	31	0.0200	2.87		**Shallow Concentrated Flow, shallow 2797.28-2796.65** Paved Kv= 20.3 fps
3.1	416	0.0191	2.23		**Shallow Concentrated Flow, shallow 2796.65-2788.70** Unpaved Kv= 16.1 fps
0.2	28	0.0160	2.57		**Shallow Concentrated Flow, shallow paved 2788.70-2788.25** Paved Kv= 20.3 fps
4.1	507	0.0161	2.04		**Shallow Concentrated Flow, shallow unpaved 2788.25-2780.00** Unpaved Kv= 16.1 fps
0.2	27	0.0200	2.87		**Shallow Concentrated Flow, shallow paved** Paved Kv= 20.3 fps
0.9	92	0.0107	1.67		**Shallow Concentrated Flow, shallow unpaved 2779.05-2778.06** Unpaved Kv= 16.1 fps
22.1	1,408	Total			

Subcatchment DA-B1: Subcat DA-B1



Summary for Subcatchment DA-B2: Subcat DA-B2

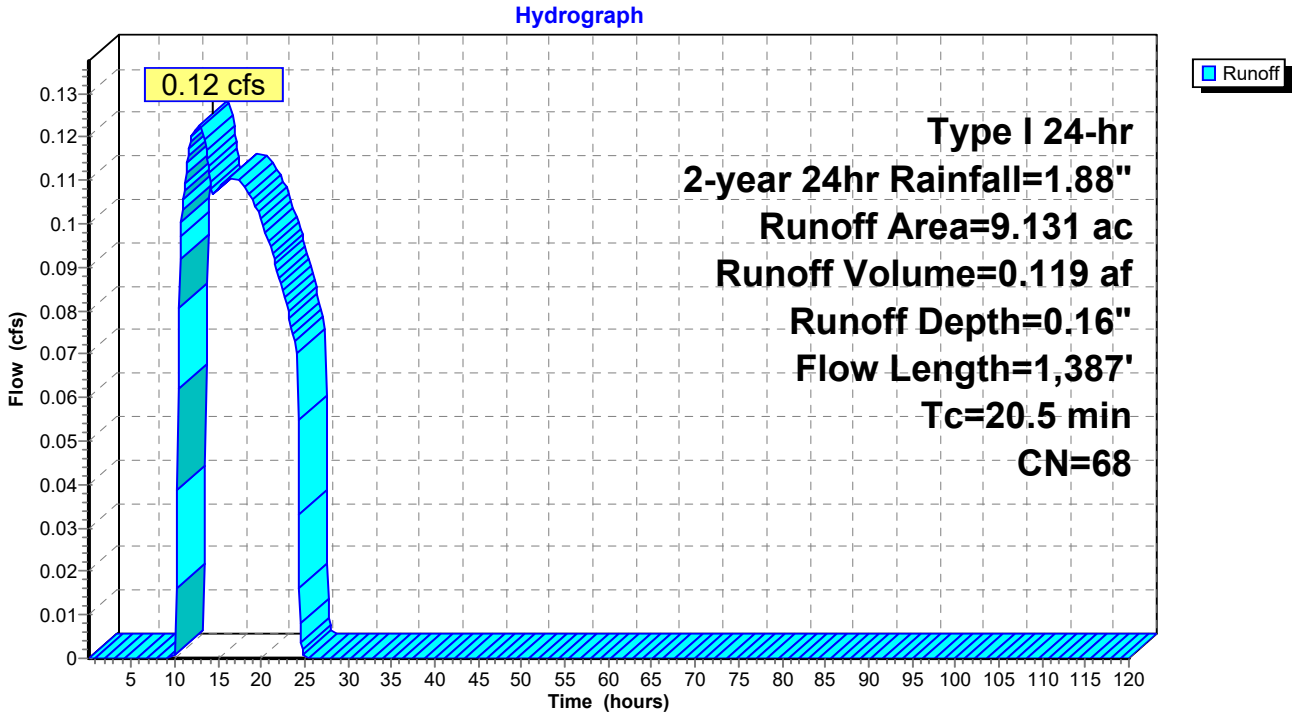
Runoff = 0.12 cfs @ 12.78 hrs, Volume= 0.119 af, Depth= 0.16"
Routed to Pond B2 : B2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Description
	2.467	49	Desert shrub range, Good, HSG A
	3.050	98	Unconnected pavement, HSG A
*	3.614	55	Surrounding Equip. Cover, HSG A
	9.131	68	Weighted Average
	6.081		66.60% Pervious Area
	3.050		33.40% Impervious Area
	3.050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0319	0.18		**Sheet Flow, sheet 2808-2804.81** Range n= 0.130 P2= 1.88"
6.6	792	0.0156	2.01		**Shallow Concentrated Flow, shallow range 2804.81-2802.44** Unpaved Kv= 16.1 fps
0.2	52	0.0050	4.20	7.43	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
2.2	187	0.0080	1.44		**Shallow Concentrated Flow, shallow unpaved 2802-2800.37** Unpaved Kv= 16.1 fps
2.0	256	0.0110	2.13		**Shallow Concentrated Flow, paved 2800.37-2797.53** Paved Kv= 20.3 fps
20.5	1,387	Total			

Subcatchment DA-B2: Subcat DA-B2



Summary for Subcatchment DA-B3: Subcat DA-B3

[49] Hint: Tc<2dt may require smaller dt

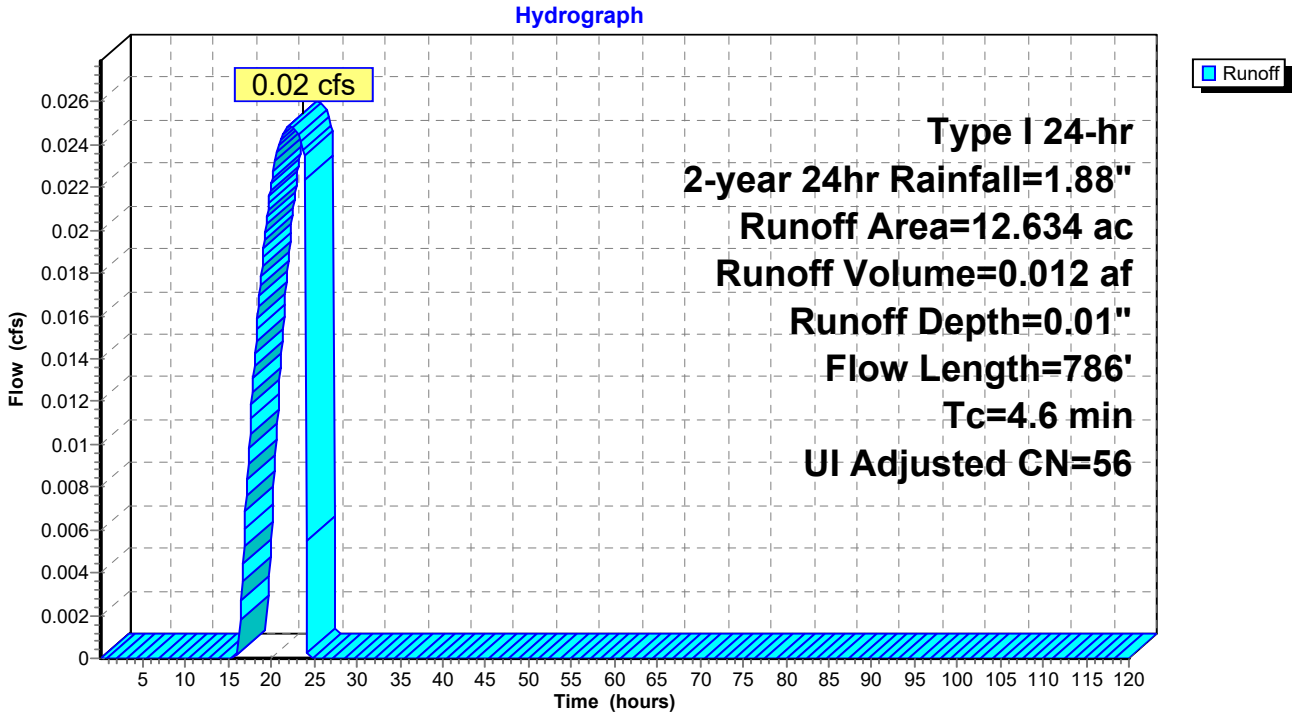
Runoff = 0.02 cfs @ 22.14 hrs, Volume= 0.012 af, Depth= 0.01"
Routed to Pond B3 : B3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Adj	Description
	6.592	49		Desert shrub range, Good, HSG A
	2.763	98		Unconnected pavement, HSG A
*	3.279	55		Surrounding Equip. Cover, HSG A
	12.634	61	56	Weighted Average, UI Adjusted
	9.871			78.13% Pervious Area
	2.763			21.87% Impervious Area
	2.763			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0190	0.81		**Sheet Flow, sheet paved 2799.71-2799.14** Smooth surfaces n= 0.011 P2= 1.88"
1.1	80	0.0340	1.25		**Sheet Flow, sheet unpaved 2799.14-2796.37** Smooth surfaces n= 0.011 P2= 1.88"
1.4	304	0.0480	3.53		**Shallow Concentrated Flow, shallow 2796.37-2781.77** Unpaved Kv= 16.1 fps
0.2	51	0.0075	4.04	72.81	**Channel Flow, channel 2781.77-2781.39** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.1	42	0.0209	8.59	15.19	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.9	193	0.0054	3.43	61.78	**Channel Flow, channel 2780.52-2779.48** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.3	86	0.0054	4.37	7.72	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
4.6	786	Total			

Subcatchment DA-B3: Subcat DA-B3



Summary for Subcatchment DA-C1: Subcat DA-C1

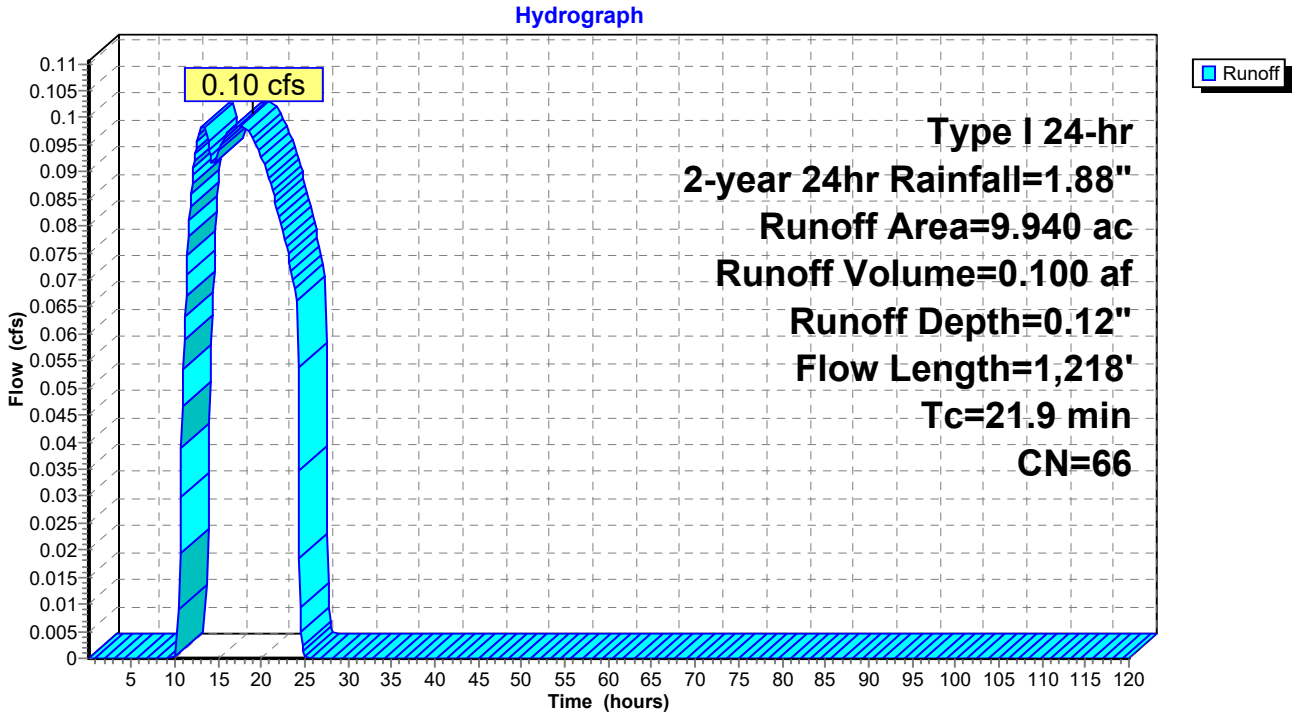
Runoff = 0.10 cfs @ 17.31 hrs, Volume= 0.100 af, Depth= 0.12"
Routed to Pond C1 : C1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Description
	3.160	49	Desert shrub range, Good, HSG A
	3.020	98	Unconnected pavement, HSG A
*	3.760	55	Surrounding Equip. Cover, HSG A
	9.940	66	Weighted Average
	6.920		69.62% Pervious Area
	3.020		30.38% Impervious Area
	3.020		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	58	0.0030	0.06		**Sheet Flow, Sheet 2813.48-2813.30** Range n= 0.130 P2= 1.88"
0.8	42	0.0205	0.90		**Sheet Flow, Sheet paved 2813.30-2812.44** Smooth surfaces n= 0.011 P2= 1.88"
3.1	450	0.0226	2.42		**Shallow Concentrated Flow, shallow 2812.44-2802.24** Unpaved Kv= 16.1 fps
0.4	152	0.0120	7.08	70.78	**Channel Flow, ditch 2802.24-2800.41** Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.023
0.2	102	0.0356	11.22	19.82	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.8	183	0.0050	3.78	83.06	**Channel Flow, channel 2796.77-2795.91** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035 Riprap, 6-inch
0.2	64	0.0064	5.62	9.93	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.7	167	0.0050	3.78	83.06	**Channel Flow, channel 2795.50-2794.65** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035
21.9	1,218	Total			

Subcatchment DA-C1: Subcat DA-C1



Summary for Subcatchment DA-C2: Subcat DA-C2

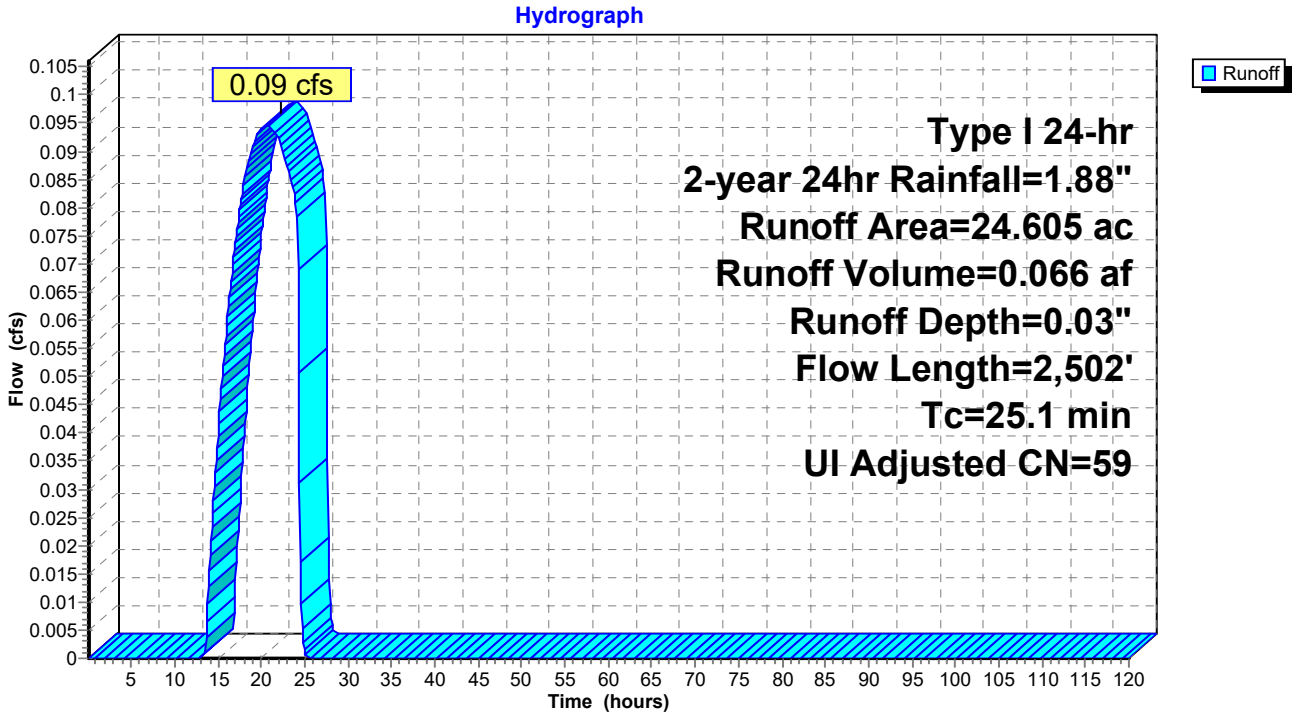
Runoff = 0.09 cfs @ 20.60 hrs, Volume= 0.066 af, Depth= 0.03"
Routed to Pond C2 : C2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Adj	Description
	6.655	49		Desert shrub range, Good, HSG A
	6.930	98		Unconnected pavement, HSG A
*	11.020	55		Surrounding Equip. Cover, HSG A
	24.605	65	59	Weighted Average, UI Adjusted
	17.675			71.83% Pervious Area
	6.930			28.17% Impervious Area
	6.930			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0153	0.13		**Sheet Flow, Sheet Flow 2811-2809.47** Range n= 0.130 P2= 1.88"
9.8	1,280	0.0182	2.17		**Shallow Concentrated Flow, Shallow 2809.47-2786.17** Unpaved Kv= 16.1 fps
2.6	1,122	0.0175	7.21	230.73	**Channel Flow, channel 2787.62-2768** Area= 32.0 sf Perim= 22.0' r= 1.45' n= 0.035 Riprap, 6-inch
25.1	2,502	Total			

Subcatchment DA-C2: Subcat DA-C2



Summary for Subcatchment DA-C3: Subcat DA-C3

[45] Hint: Runoff=Zero

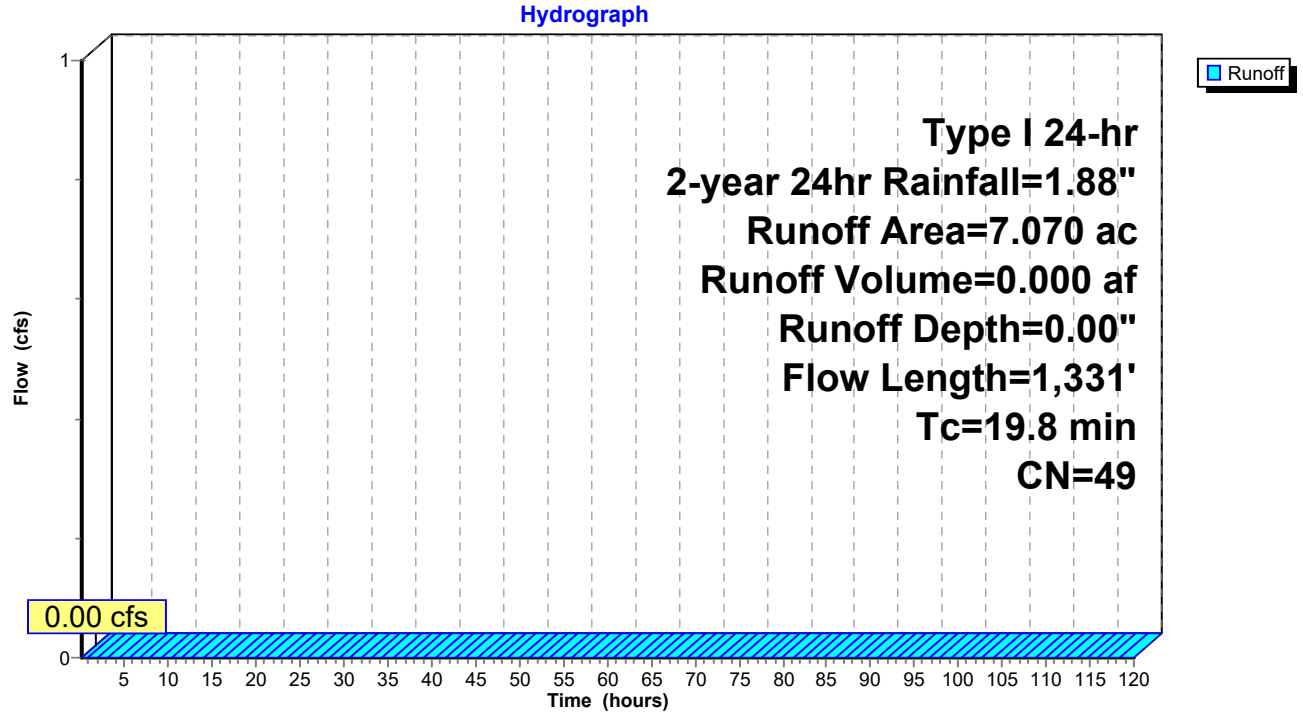
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Description
7.070	49	Desert shrub range, Good, HSG A
0.000	98	Unconnected pavement, HSG A
7.070	49	Weighted Average
7.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0224	0.15		**Sheet Flow, sheet 2785.88-2783.64** Range n= 0.130 P2= 1.88"
8.9	1,231	0.0205	2.31		**Shallow Concentrated Flow, shallow unpaved 2786.64-2761.34** Unpaved Kv= 16.1 fps
19.8	1,331	Total			

Subcatchment DA-C3: Subcat DA-C3



Summary for Subcatchment DA-D1: Subcat DA-D1

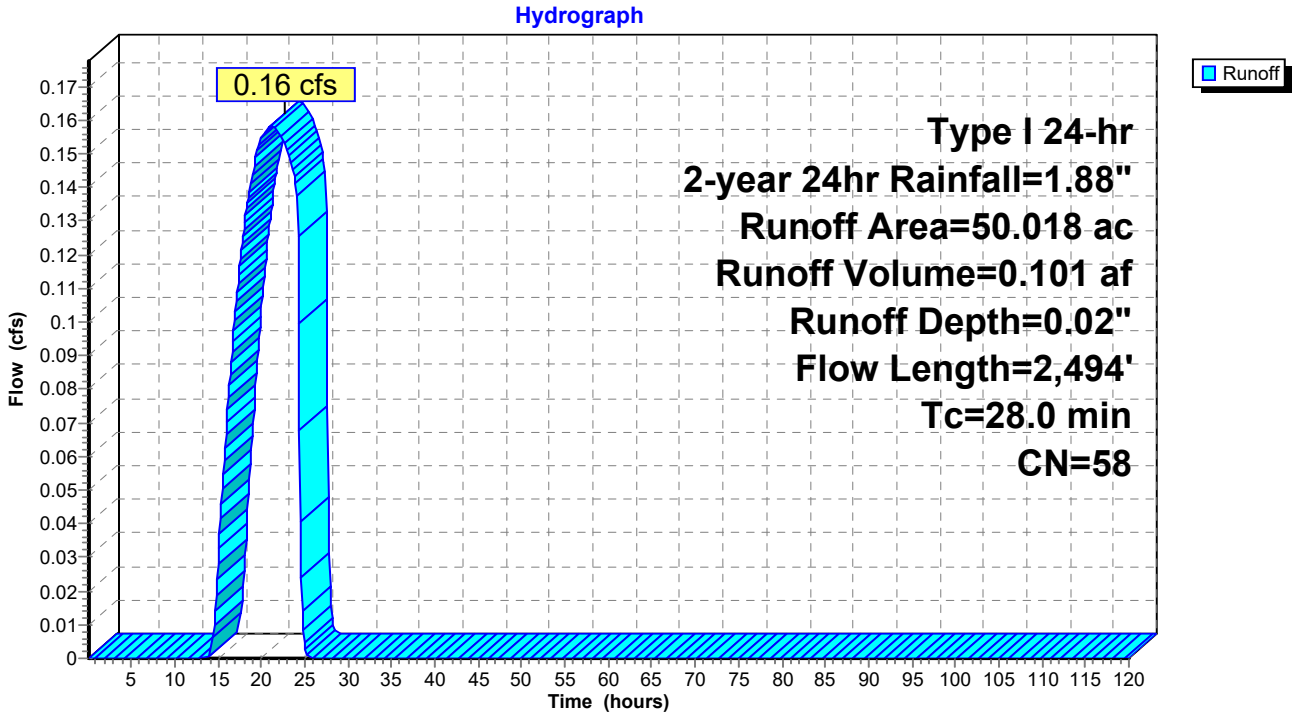
Runoff = 0.16 cfs @ 21.17 hrs, Volume= 0.101 af, Depth= 0.02"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

Area (ac)	CN	Description
27.134	49	Desert shrub range, Good, HSG A
20.822	68	Desert shrub range, Good, HSG B
1.078	72	Dirt roads, HSG A
0.264	82	Dirt roads, HSG B
0.400	98	Unconnected pavement, HSG A
0.320	98	Unconnected pavement, HSG B
50.018	58	Weighted Average
49.298		98.56% Pervious Area
0.720		1.44% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0270	0.16		**Sheet Flow, sheet 2810.70-2808** Range n= 0.130 P2= 1.88"
7.2	1,058	0.0230	2.44		**Shallow Concentrated Flow, shallow 2808-2783.46** Unpaved Kv= 16.1 fps
0.2	57	0.0080	5.32	9.40	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
10.5	1,279	0.0160	2.04		**Shallow Concentrated Flow, shallow 2783-2761** Unpaved Kv= 16.1 fps
28.0	2,494	Total			

Subcatchment DA-D1: Subcat DA-D1



Summary for Subcatchment DA-D2: Subcat DA-D2

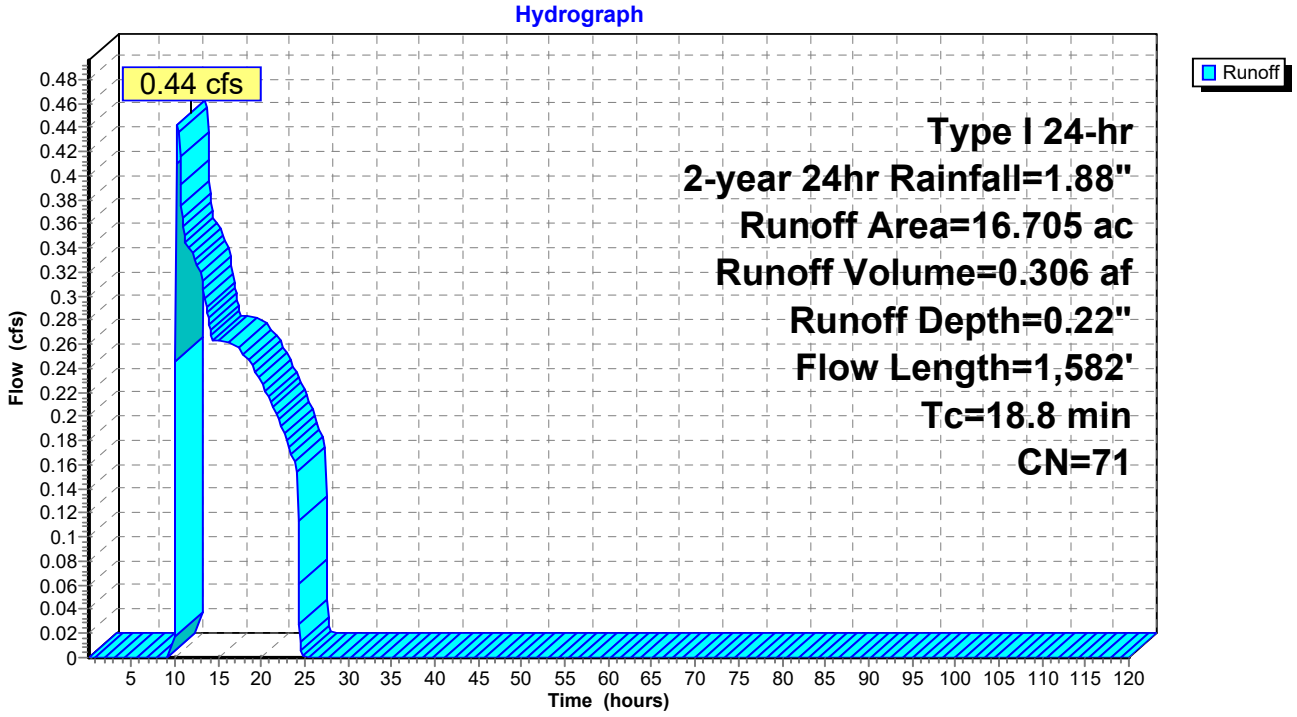
Runoff = 0.44 cfs @ 10.30 hrs, Volume= 0.306 af, Depth= 0.22"
Routed to Pond D2 : D2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Description
	1.577	49	Desert shrub range, Good, HSG A
	5.763	98	Unconnected pavement, HSG A
	0.845	98	Unconnected pavement, HSG B
*	8.520	55	Surrounding Equip. Cover, HSG A
	16.705	71	Weighted Average
	10.097		60.44% Pervious Area
	6.608		39.56% Impervious Area
	6.608		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	57	0.0520	0.19		**Sheet Flow, sheet 2800-2797** Range n= 0.130 P2= 1.88"
13.8	1,525	0.0130	1.84		**Shallow Concentrated Flow, shallow 2797-2777.25** Unpaved Kv= 16.1 fps
18.8	1,582	Total			

Subcatchment DA-D2: Subcat DA-D2



Summary for Subcatchment DA-D3: Subcat DA-D3

[49] Hint: Tc<2dt may require smaller dt

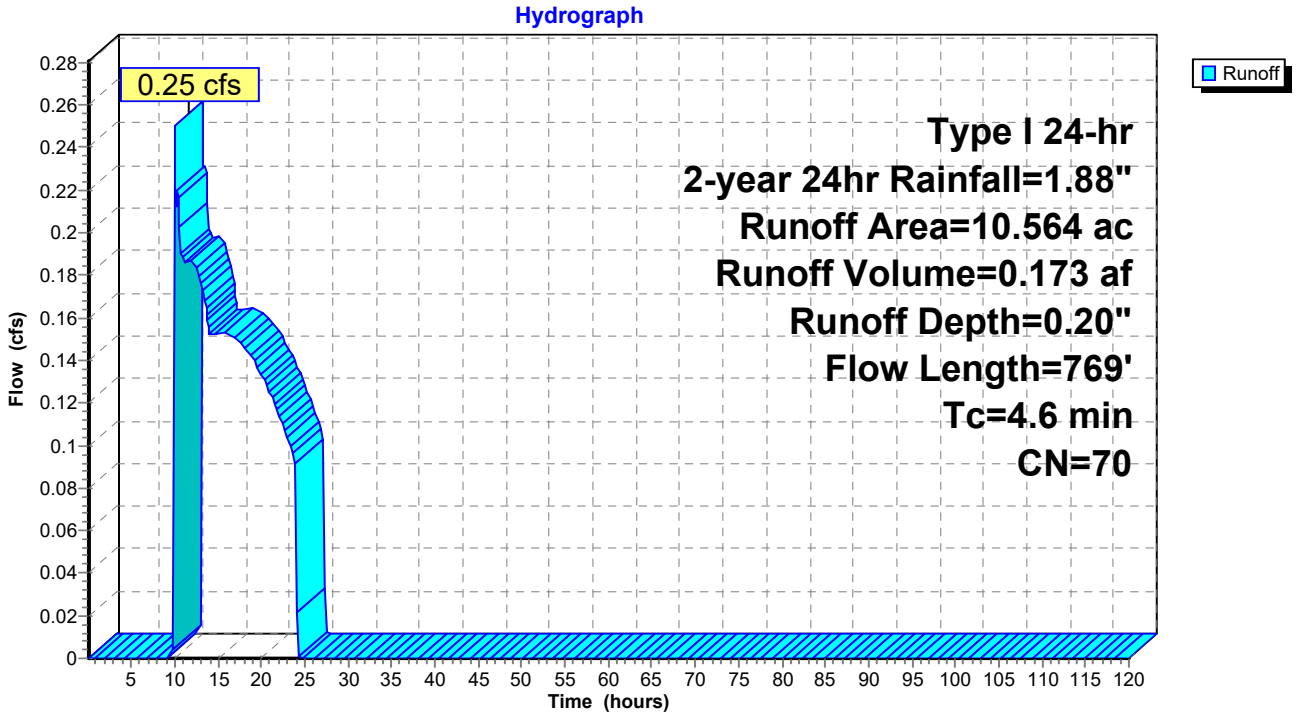
Runoff = 0.25 cfs @ 10.05 hrs, Volume= 0.173 af, Depth= 0.20"
Routed to Pond D3 : D3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Description
	1.397	49	Desert shrub range, Good, HSG A
	3.917	98	Unconnected pavement, HSG A
*	5.250	55	Surrounding Equip. Cover, HSG A
	10.564	70	Weighted Average
	6.647		62.92% Pervious Area
	3.917		37.08% Impervious Area
	3.917		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0500	1.52		**Sheet Flow, Sheet 2819-2814** Smooth surfaces n= 0.011 P2= 1.88"
3.4	626	0.0360	3.05		**Shallow Concentrated Flow, shallow 2814-2791.5** Unpaved Kv= 16.1 fps
0.1	43	0.0340	11.87	20.98	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
4.6	769	Total			

Subcatchment DA-D3: Subcat DA-D3



Summary for Subcatchment DA-D4: Subcat DA-D4

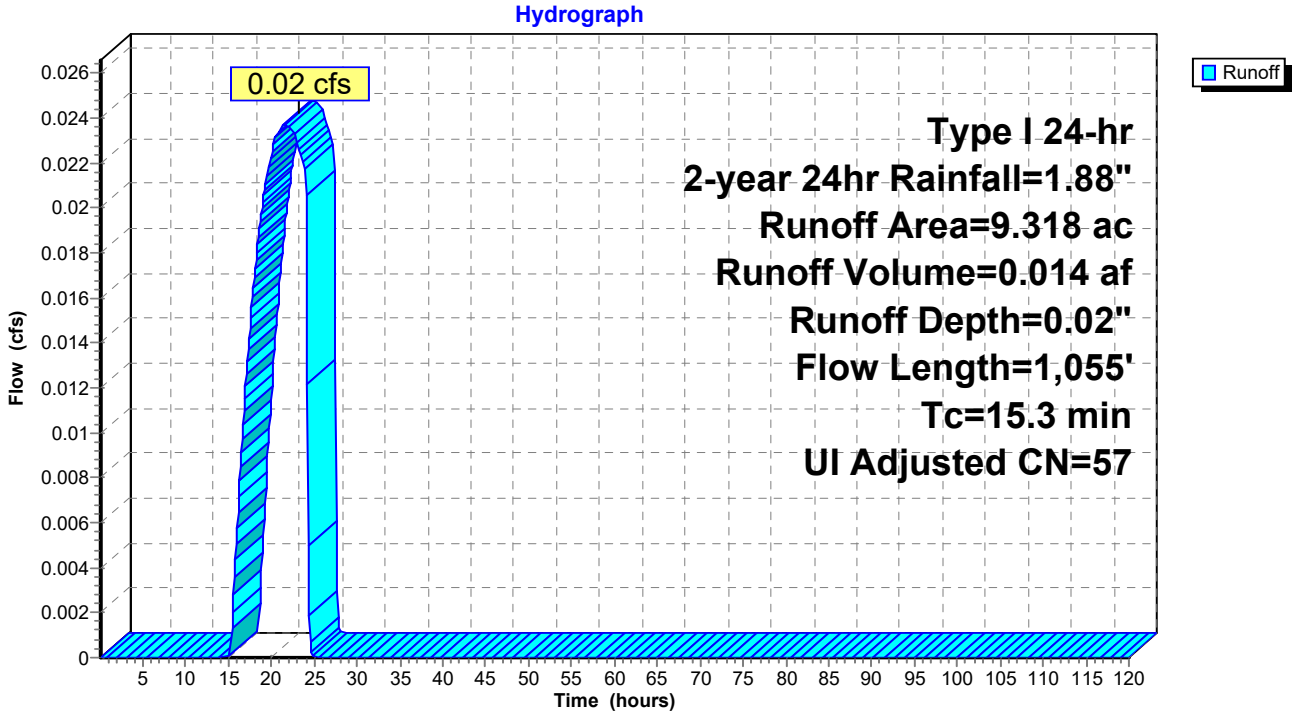
Runoff = 0.02 cfs @ 21.63 hrs, Volume= 0.014 af, Depth= 0.02"
Routed to Pond D4 : D4 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 2-year 24hr Rainfall=1.88"

	Area (ac)	CN	Adj	Description
	3.543	49		Desert shrub range, Good, HSG A
	0.004	72		Dirt roads, HSG A
	1.871	98		Unconnected pavement, HSG A
*	3.900	55		Surrounding Equip. Cover, HSG A
	9.318	61	57	Weighted Average, UI Adjusted
	7.447			79.92% Pervious Area
	1.871			20.08% Impervious Area
	1.871			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		**Sheet Flow, sheet 2817-2814** Range n= 0.130 P2= 1.88"
5.6	955	0.0314	2.85		**Shallow Concentrated Flow, shallow 2814-2784** Unpaved Kv= 16.1 fps
15.3	1,055	Total			

Subcatchment DA-D4: Subcat DA-D4



Summary for Reach 3R: Culvert Crossing

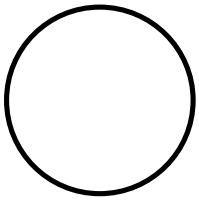
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Link D : DP D

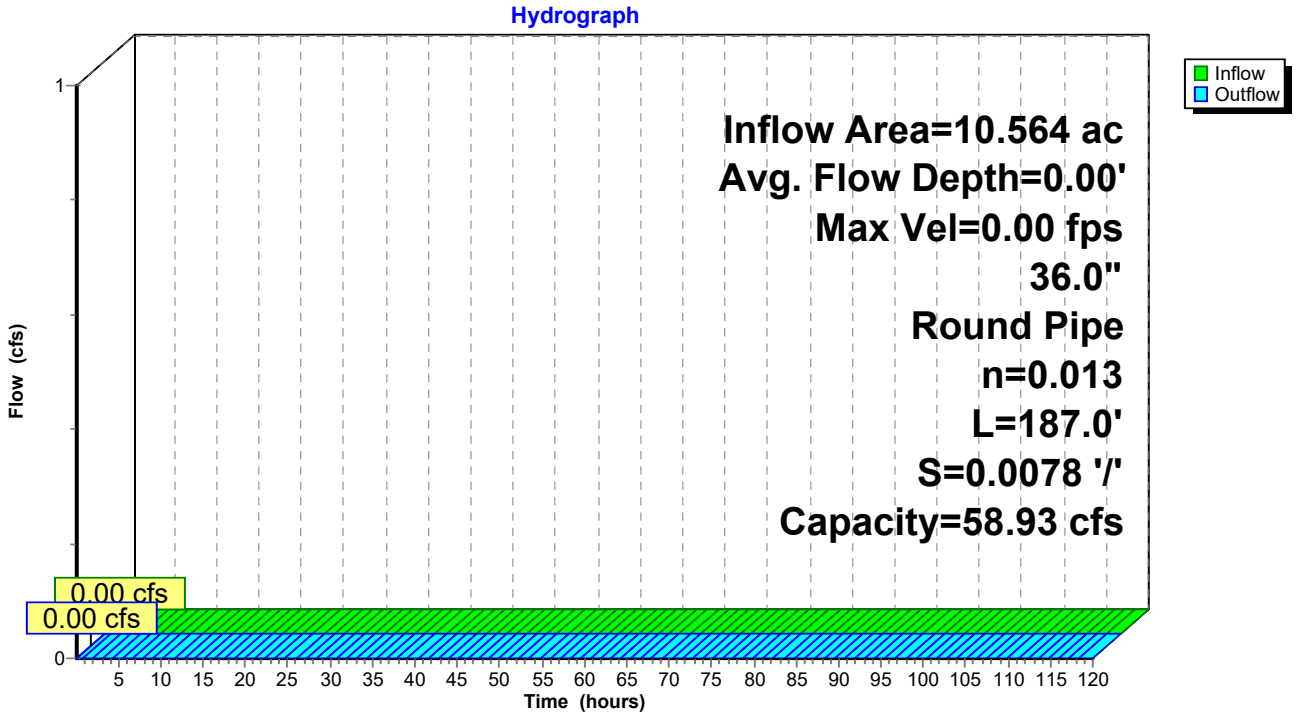
Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 58.93 cfs

36.0" Round Pipe
n= 0.013
Length= 187.0' Slope= 0.0078 '/'
Inlet Invert= 2,783.46', Outlet Invert= 2,782.00'



Reach 3R: Culvert Crossing



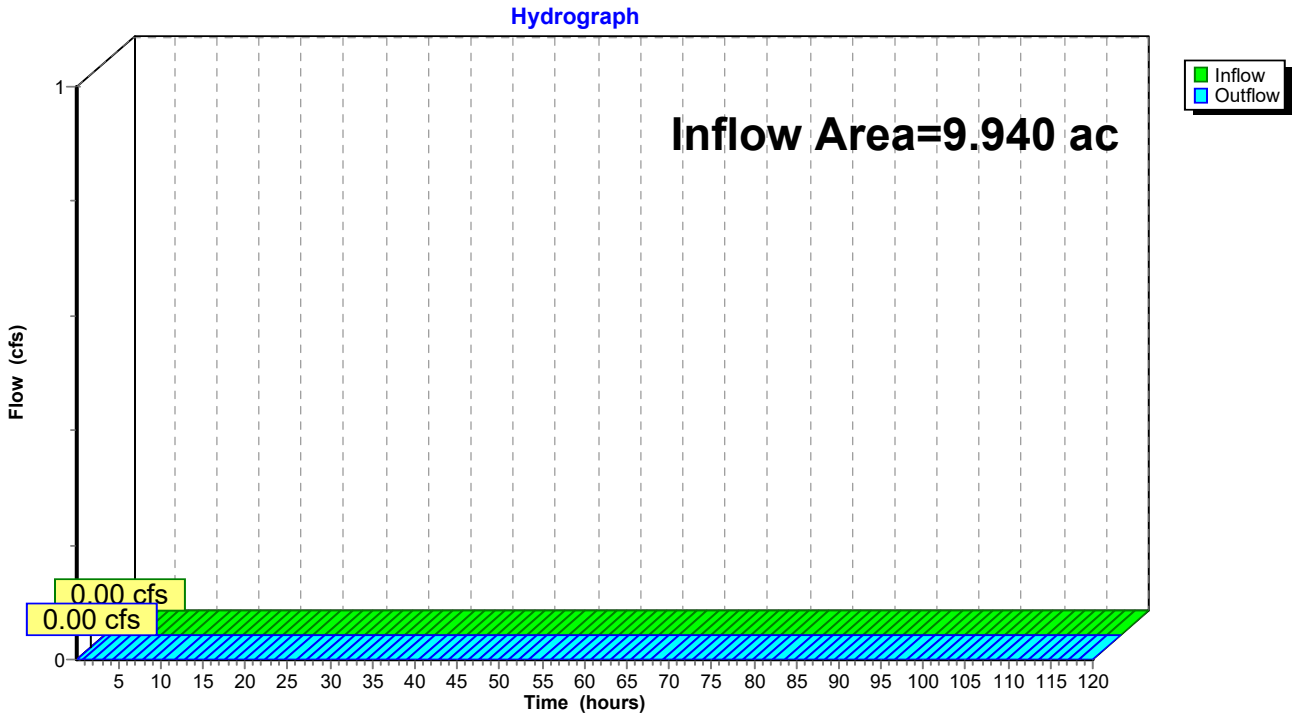
Summary for Reach 4R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond C2 : C2 Pond

Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Reach 4R: (new Reach)



Summary for Pond A1: A1 Pond

Inflow Area = 5.149 ac, 12.33% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.01 cfs @ 23.93 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link A : DP A

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,785.05' @ 25.10 hrs Surf.Area= 0.031 ac Storage= 0.002 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

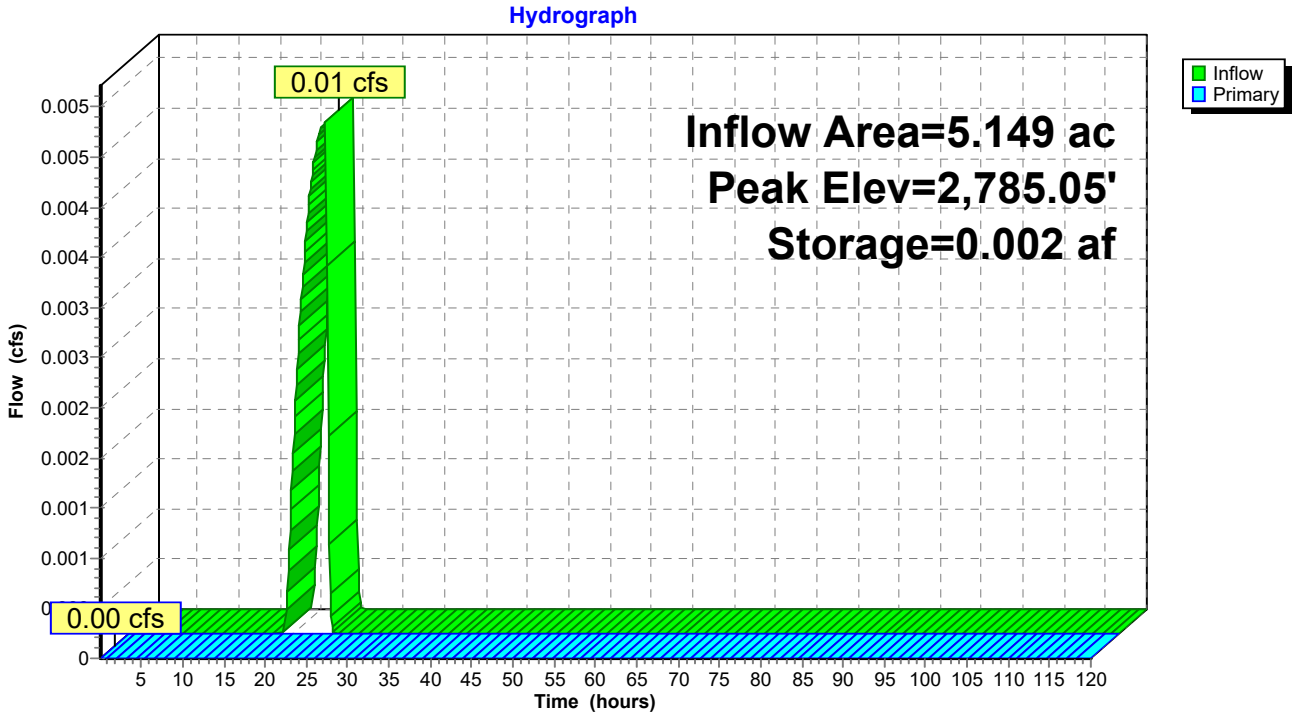
Volume	Invert	Avail.Storage	Storage Description
#1	2,785.00'	0.162 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,785.00	0.030	0.000	0.000
2,786.00	0.045	0.037	0.037
2,787.00	0.061	0.053	0.090
2,788.00	0.081	0.071	0.162

Device	Routing	Invert	Outlet Devices
#1	Primary	2,787.50'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,785.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond A1: A1 Pond



Summary for Pond B2: B2 Pond

Inflow Area = 9.131 ac, 33.40% Impervious, Inflow Depth = 0.16" for 2-year 24hr event
Inflow = 0.12 cfs @ 12.78 hrs, Volume= 0.119 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Pond B3 : B3 Pond

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,794.21' @ 25.20 hrs Surf.Area= 0.175 ac Storage= 0.119 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

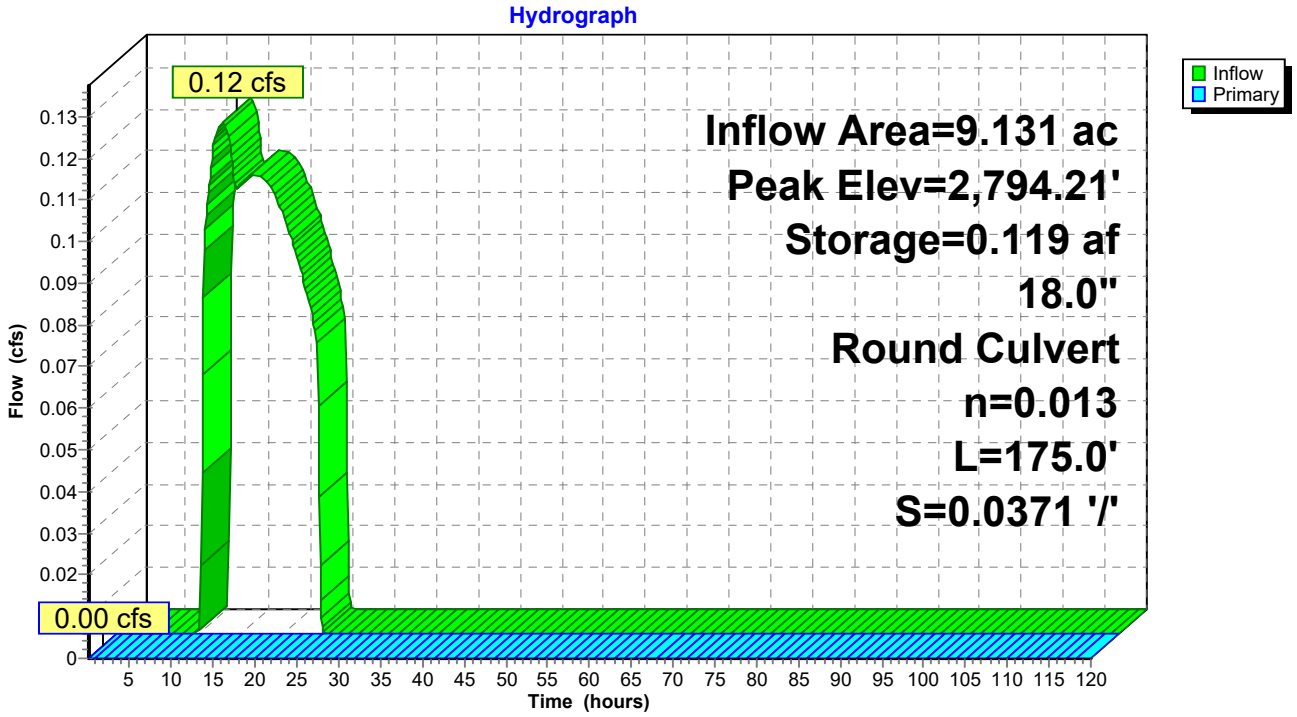
Volume	Invert	Avail.Storage	Storage Description
#1	2,793.50'	1.283 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,793.50	0.147	0.000	0.000
2,794.50	0.187	0.167	0.167
2,795.50	0.231	0.209	0.376
2,796.50	0.277	0.254	0.630
2,797.50	0.326	0.301	0.931
2,798.50	0.377	0.351	1.283

Device	Routing	Invert	Outlet Devices
#1	Primary	2,794.50'	**18.0" Round Culvert** L= 175.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,794.50' / 2,788.00' S= 0.0371 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,793.50' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond B2: B2 Pond



Summary for Pond B3: B3 Pond

Inflow Area = 21.765 ac, 26.71% Impervious, Inflow Depth = 0.01" for 2-year 24hr event
Inflow = 0.02 cfs @ 22.14 hrs, Volume= 0.012 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link B : DP B

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,778.52' @ 24.40 hrs Surf.Area= 0.592 ac Storage= 0.012 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

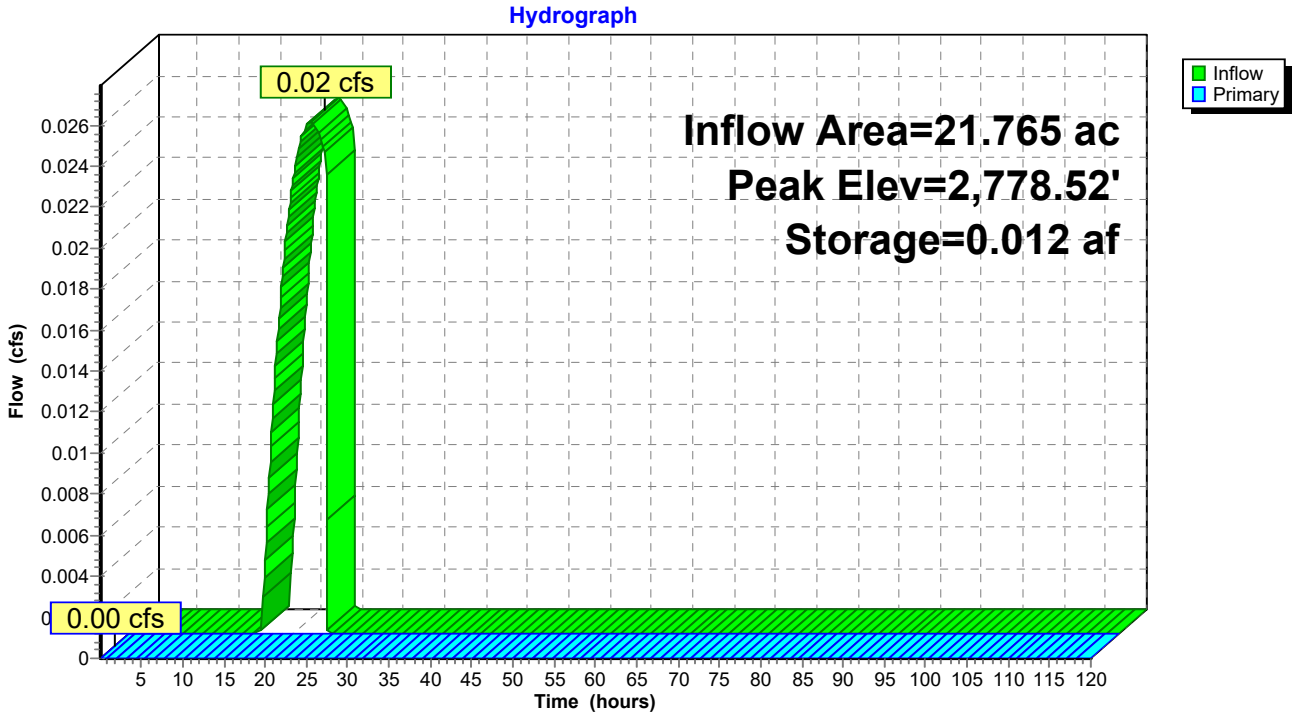
Volume	Invert	Avail.Storage	Storage Description
#1	2,778.50'	2.054 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,778.50	0.591	0.000	0.000
2,779.50	0.652	0.621	0.621
2,780.50	0.716	0.684	1.305
2,781.50	0.781	0.748	2.054

Device	Routing	Invert	Outlet Devices
#1	Primary	2,779.00'	**18.0" Round Culvert** L= 93.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.00' / 2,778.50' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,779.67'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,778.50' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond B3: B3 Pond



Summary for Pond C1: C1 Pond

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.12" for 2-year 24hr event
Inflow = 0.10 cfs @ 17.31 hrs, Volume= 0.100 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 4R : (new Reach)

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,791.27' @ 25.40 hrs Surf.Area= 0.376 ac Storage= 0.100 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

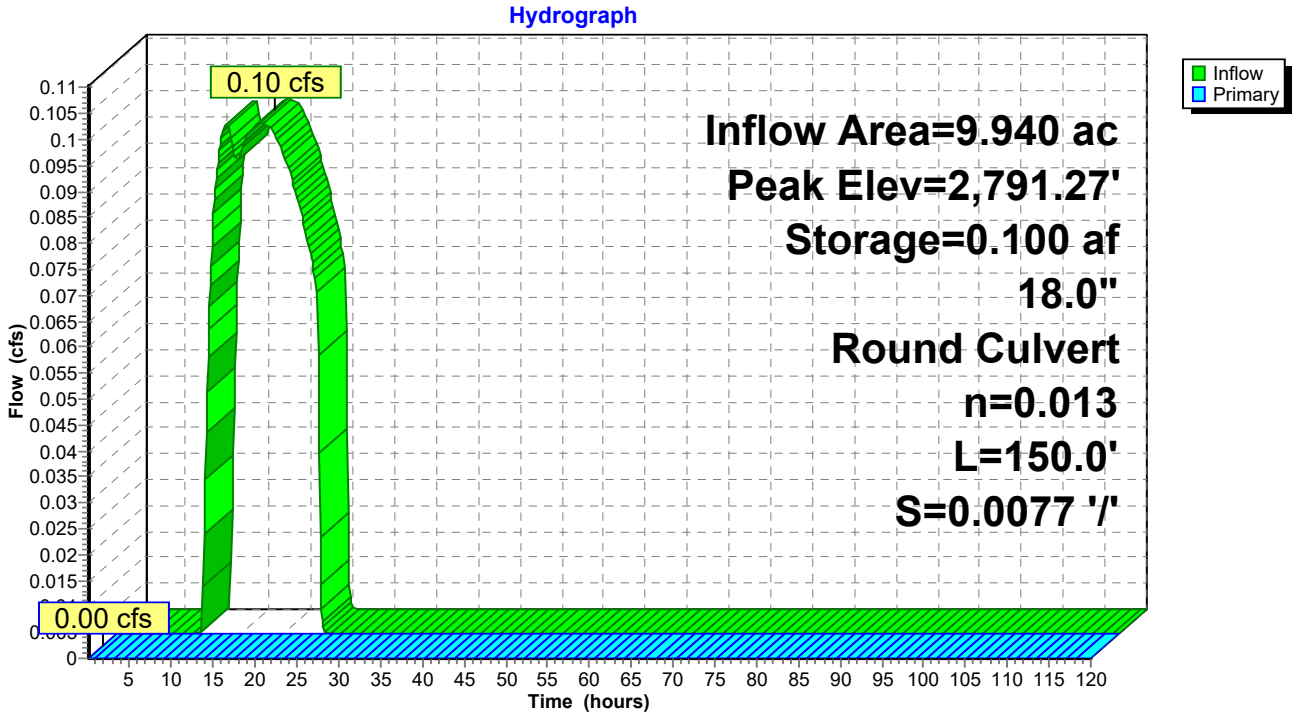
Volume	Invert	Avail.Storage	Storage Description
#1	2,791.00'	1.912 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,791.00	0.363	0.000	0.000
2,792.00	0.411	0.387	0.387
2,793.00	0.461	0.436	0.823
2,794.00	0.514	0.487	1.311
2,795.00	0.570	0.542	1.853
2,795.10	0.627	0.060	1.912

Device	Routing	Invert	Outlet Devices
#1	Primary	2,792.00'	**18.0" Round Culvert** L= 150.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,792.00' / 2,790.84' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,791.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond C1: C1 Pond



Summary for Pond C2: C2 Pond

Inflow Area = 34.545 ac, 28.80% Impervious, Inflow Depth = 0.02" for 2-year 24hr event
Inflow = 0.09 cfs @ 20.60 hrs, Volume= 0.066 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link C : DP C

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,765.12' @ 25.50 hrs Surf.Area= 0.559 ac Storage= 0.066 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

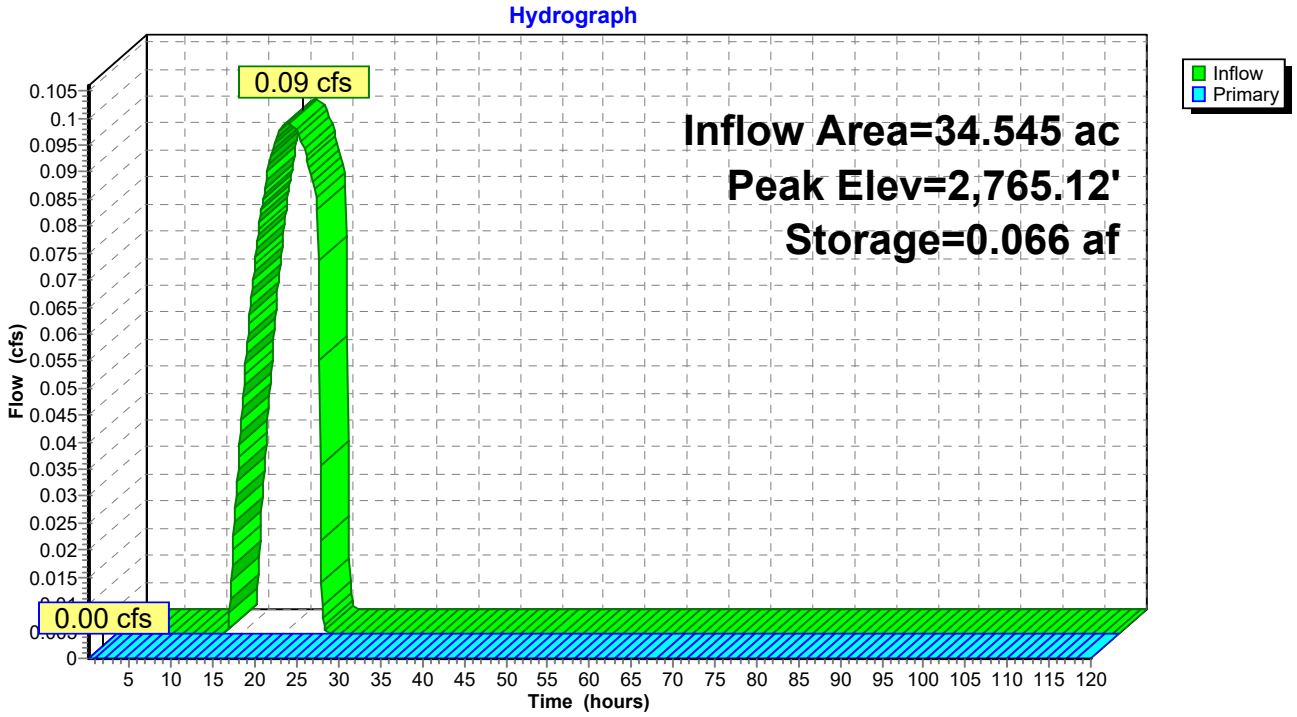
Volume	Invert	Avail.Storage	Storage Description
#1	2,765.00'	4.496 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,765.00	0.543	0.000	0.000
2,766.00	0.680	0.612	0.612
2,767.00	0.866	0.773	1.385
2,768.00	0.978	0.922	2.307
2,769.00	1.094	1.036	3.343
2,770.00	1.212	1.153	4.496

Device	Routing	Invert	Outlet Devices
#1	Primary	2,765.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,765.00' / 2,764.37' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,766.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,769.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,765.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
└─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond C2: C2 Pond



Summary for Pond D2: D2 Pond

Inflow Area = 16.705 ac, 39.56% Impervious, Inflow Depth = 0.22" for 2-year 24hr event
Inflow = 0.44 cfs @ 10.30 hrs, Volume= 0.306 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,773.52' @ 25.20 hrs Surf.Area= 0.605 ac Storage= 0.306 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

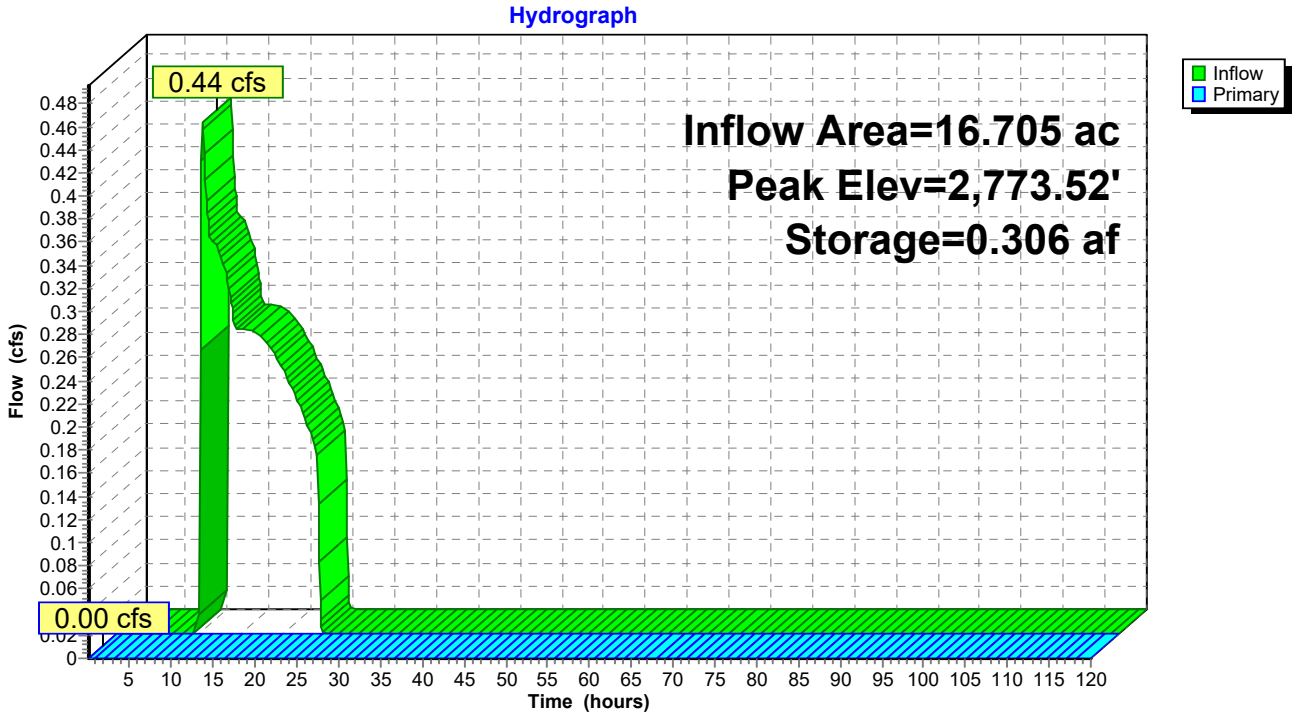
Volume	Invert	Avail.Storage	Storage Description
#1	2,773.00'	3.691 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,773.00	0.571	0.000	0.000
2,773.75	0.620	0.447	0.447
2,774.00	0.636	0.157	0.604
2,775.00	0.703	0.670	1.273
2,776.00	0.771	0.737	2.010
2,777.00	0.840	0.806	2.816
2,778.00	0.910	0.875	3.691

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,774.50'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,774.50' / 2,773.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,776.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,773.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D2: D2 Pond



Summary for Pond D3: D3 Pond

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.20" for 2-year 24hr event
Inflow = 0.25 cfs @ 10.05 hrs, Volume= 0.173 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 3R : Culvert Crossing

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,785.18' @ 24.40 hrs Surf.Area= 0.178 ac Storage= 0.173 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

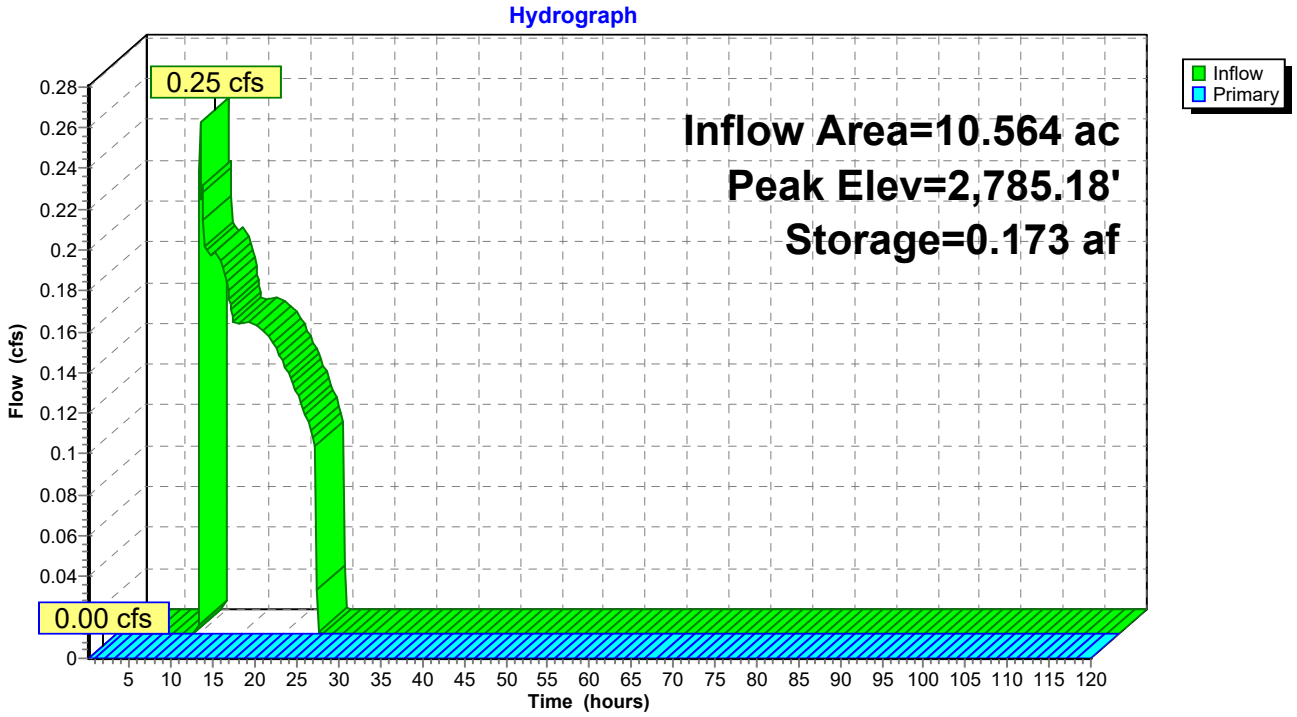
Volume	Invert	Avail.Storage	Storage Description
#1	2,784.00'	2.083 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,784.00	0.116	0.000	0.000
2,785.00	0.168	0.142	0.142
2,786.00	0.221	0.194	0.336
2,787.00	0.282	0.251	0.588
2,788.00	0.327	0.304	0.893
2,789.00	0.373	0.350	1.243
2,790.00	0.420	0.397	1.639
2,791.00	0.469	0.445	2.083

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,788.00'	**18.0" Round Culvert** L= 81.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,788.00' / 2,786.00' S= 0.0247 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,789.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,784.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D3: D3 Pond



Summary for Pond D4: D4 Pond

Inflow Area = 9.318 ac, 20.08% Impervious, Inflow Depth = 0.02" for 2-year 24hr event
Inflow = 0.02 cfs @ 21.63 hrs, Volume= 0.014 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,779.07' @ 25.00 hrs Surf.Area= 0.188 ac Storage= 0.014 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

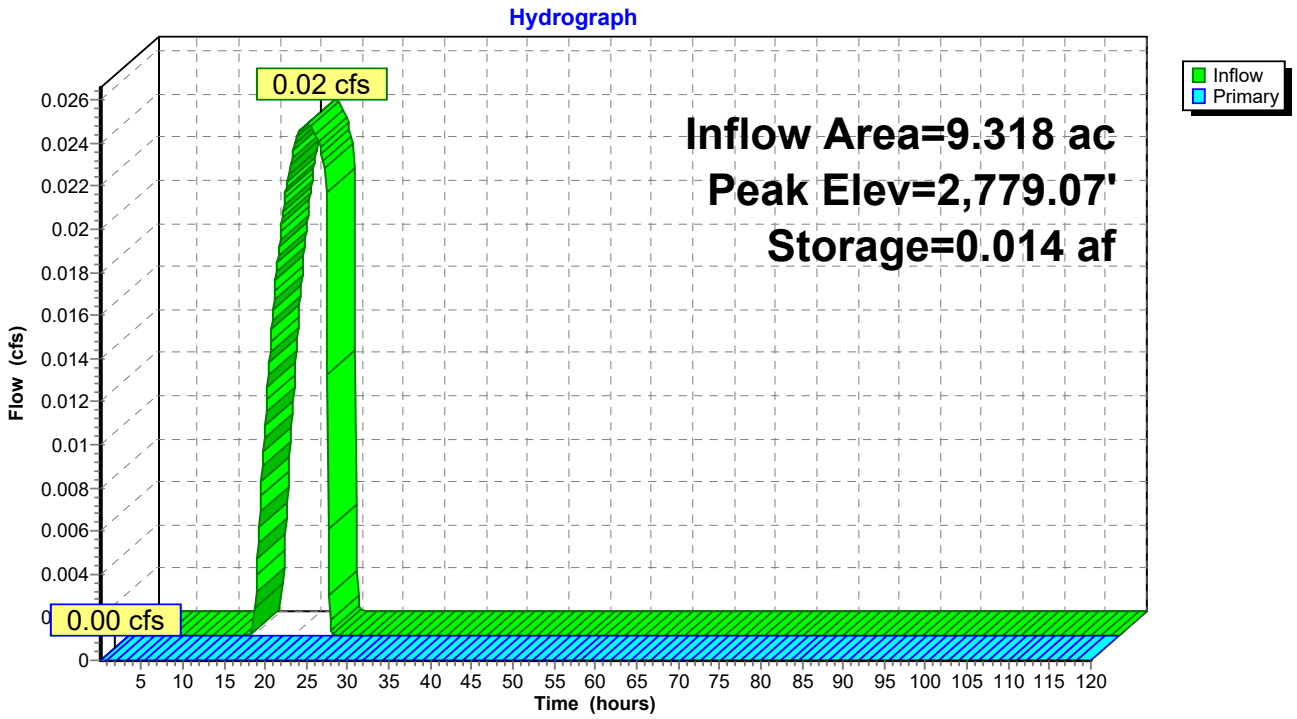
Volume	Invert	Avail.Storage	Storage Description
#1	2,779.00'	1.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,779.00	0.186	0.000	0.000
2,780.00	0.220	0.203	0.203
2,781.00	0.255	0.237	0.440
2,782.00	0.293	0.274	0.715
2,783.00	0.331	0.312	1.027

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,779.23'	**12.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.23' / 2,778.57' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Primary	2,781.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,779.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D4: D4 Pond

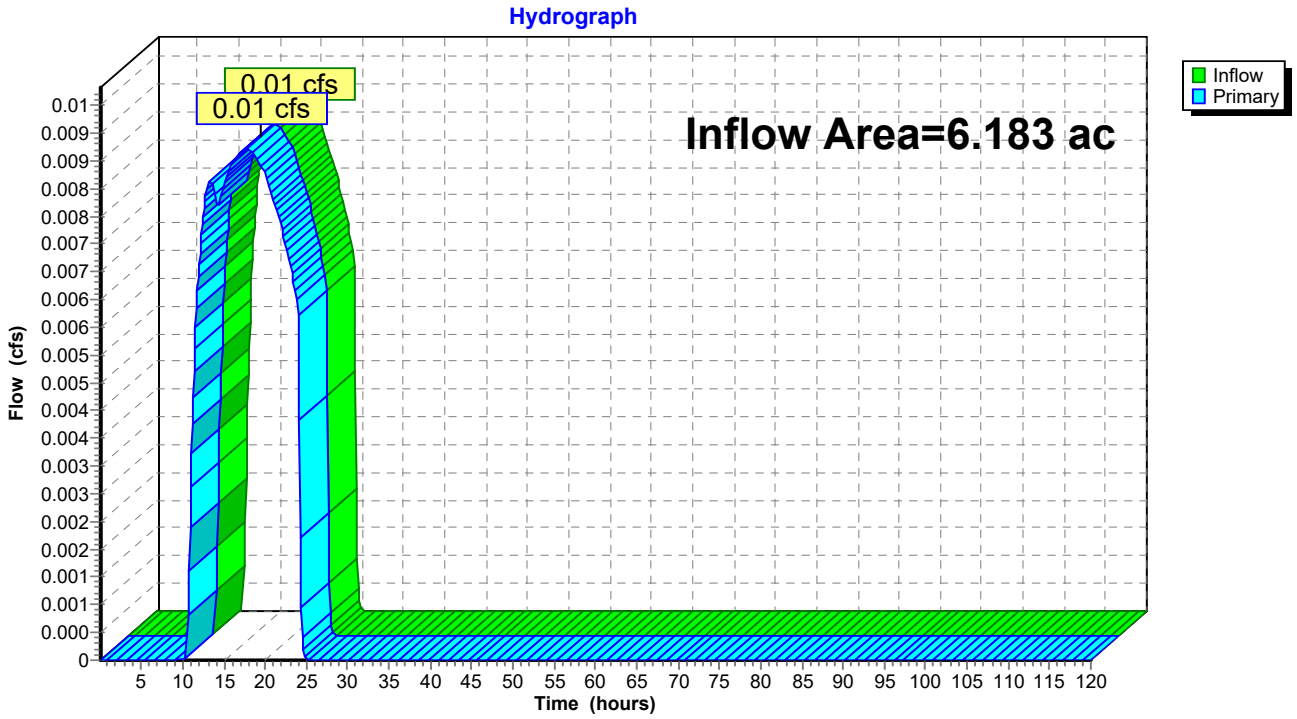


Summary for Link A: DP A

Inflow Area = 6.183 ac, 15.79% Impervious, Inflow Depth = 0.02" for 2-year 24hr event
Inflow = 0.01 cfs @ 17.68 hrs, Volume= 0.009 af
Primary = 0.01 cfs @ 17.68 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

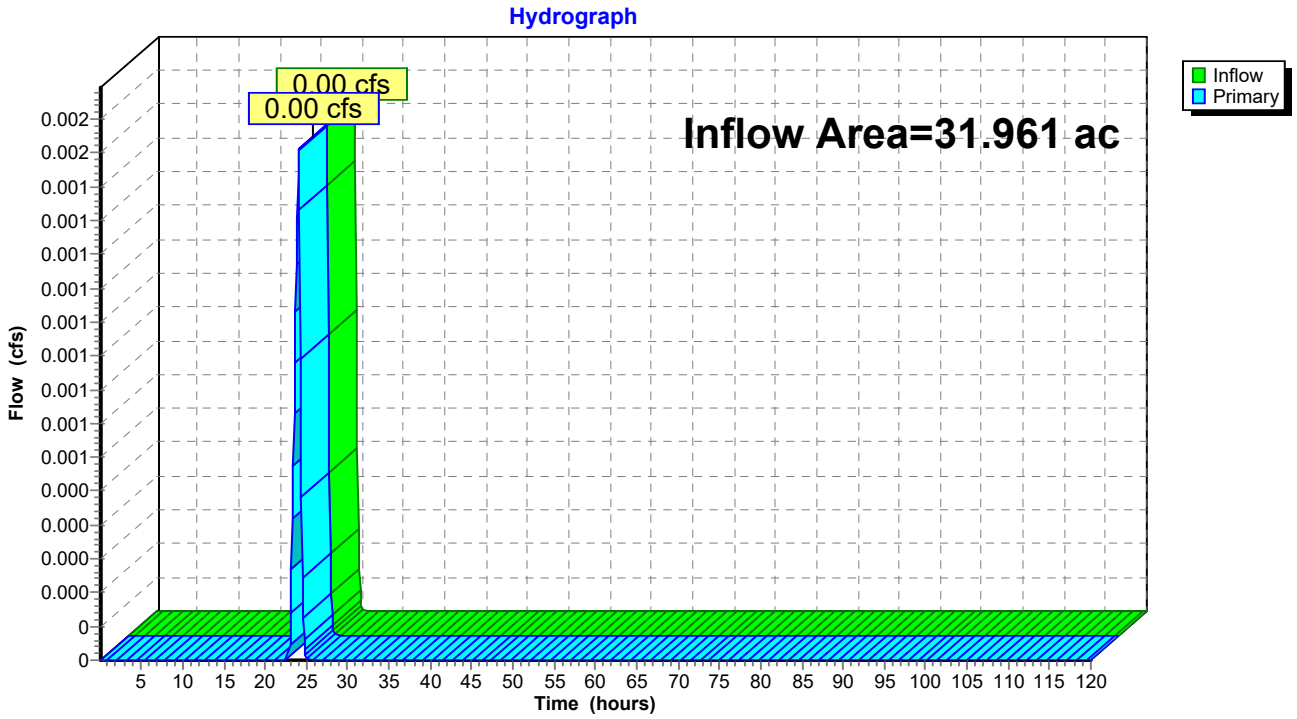


Summary for Link B: DP B

Inflow Area = 31.961 ac, 21.59% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.00 cfs @ 24.08 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 24.08 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

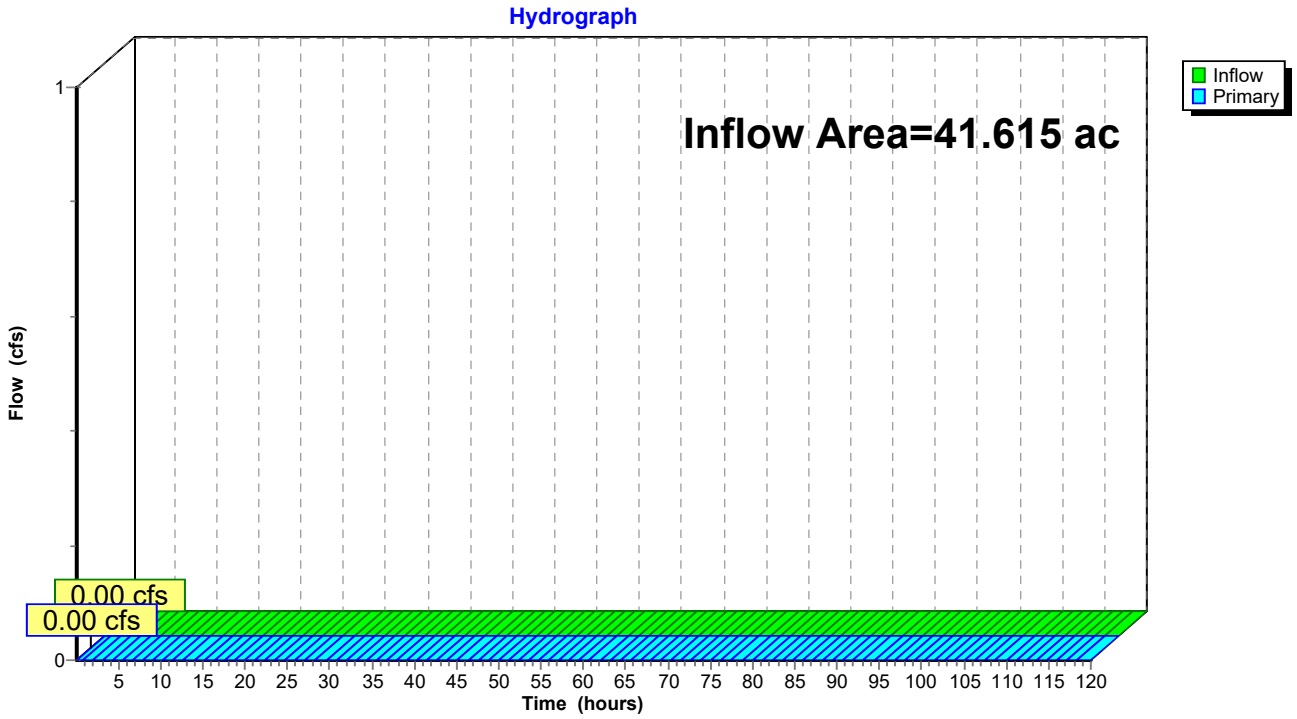


Summary for Link C: DP C

Inflow Area = 41.615 ac, 23.91% Impervious, Inflow Depth = 0.00" for 2-year 24hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

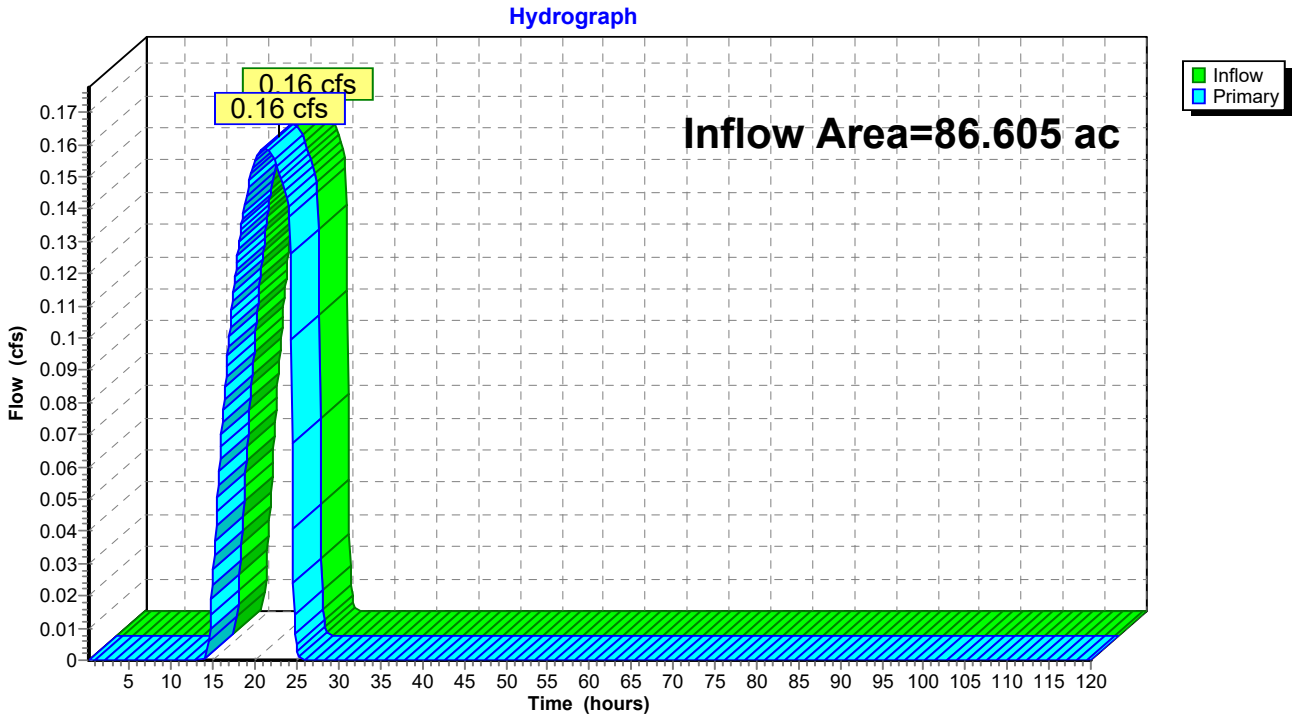


Summary for Link D: DP D

Inflow Area = 86.605 ac, 15.14% Impervious, Inflow Depth = 0.01" for 2-year 24hr event
Inflow = 0.16 cfs @ 21.17 hrs, Volume= 0.101 af
Primary = 0.16 cfs @ 21.17 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A1: Subcat DA-A1 Runoff Area=5.149 ac 12.33% Impervious Runoff Depth=0.00"
Flow Length=1,005' Tc=18.6 min UI Adjusted CN=54 Runoff=0.00 cfs 0.000 af

Subcatchment DA-A1.1: Subcat DA-A1.1 Runoff Area=1.034 ac 32.98% Impervious Runoff Depth=0.00"
Flow Length=590' Tc=17.8 min CN=65 Runoff=0.00 cfs 0.000 af

Subcatchment DA-B1: Subcat DA-B1 Runoff Area=10.196 ac 10.65% Impervious Runoff Depth=0.00"
Flow Length=1,408' Tc=22.1 min UI Adjusted CN=52 Runoff=0.00 cfs 0.000 af

Subcatchment DA-B2: Subcat DA-B2 Runoff Area=9.131 ac 33.40% Impervious Runoff Depth=0.00"
Flow Length=1,387' Tc=20.5 min CN=68 Runoff=0.01 cfs 0.001 af

Subcatchment DA-B3: Subcat DA-B3 Runoff Area=12.634 ac 21.87% Impervious Runoff Depth=0.00"
Flow Length=786' Tc=4.6 min UI Adjusted CN=56 Runoff=0.00 cfs 0.000 af

Subcatchment DA-C1: Subcat DA-C1 Runoff Area=9.940 ac 30.38% Impervious Runoff Depth=0.00"
Flow Length=1,218' Tc=21.9 min CN=66 Runoff=0.00 cfs 0.000 af

Subcatchment DA-C2: Subcat DA-C2 Runoff Area=24.605 ac 28.17% Impervious Runoff Depth=0.00"
Flow Length=2,502' Tc=25.1 min UI Adjusted CN=59 Runoff=0.00 cfs 0.000 af

Subcatchment DA-C3: Subcat DA-C3 Runoff Area=7.070 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,331' Tc=19.8 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment DA-D1: Subcat DA-D1 Runoff Area=50.018 ac 1.44% Impervious Runoff Depth=0.00"
Flow Length=2,494' Tc=28.0 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment DA-D2: Subcat DA-D2 Runoff Area=16.705 ac 39.56% Impervious Runoff Depth=0.01"
Flow Length=1,582' Tc=18.8 min CN=71 Runoff=0.09 cfs 0.013 af

Subcatchment DA-D3: Subcat DA-D3 Runoff Area=10.564 ac 37.08% Impervious Runoff Depth=0.01"
Flow Length=769' Tc=4.6 min CN=70 Runoff=0.04 cfs 0.005 af

Subcatchment DA-D4: Subcat DA-D4 Runoff Area=9.318 ac 20.08% Impervious Runoff Depth=0.00"
Flow Length=1,055' Tc=15.3 min UI Adjusted CN=57 Runoff=0.00 cfs 0.000 af

Reach 3R: Culvert Crossing Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
36.0" Round Pipe n=0.013 L=187.0' S=0.0078 '/' Capacity=58.93 cfs Outflow=0.00 cfs 0.000 af

Reach 4R: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond A1: A1 Pond Peak Elev=2,785.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond B2: B2 Pond Peak Elev=2,793.51' Storage=0.001 af Inflow=0.01 cfs 0.001 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0371 '/' Outflow=0.00 cfs 0.000 af

Pond B3: B3 Pond Peak Elev=2,778.50' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond C1: C1 Pond Peak Elev=2,791.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0077 '/' Outflow=0.00 cfs 0.000 af

Pond C2: C2 Pond Peak Elev=2,765.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond D2: D2 Pond Peak Elev=2,773.02' Storage=0.013 af Inflow=0.09 cfs 0.013 af
Outflow=0.00 cfs 0.000 af

Pond D3: D3 Pond Peak Elev=2,784.04' Storage=0.005 af Inflow=0.04 cfs 0.005 af
Outflow=0.00 cfs 0.000 af

Pond D4: D4 Pond Peak Elev=2,779.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Link A: DP A Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link B: DP B Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link C: DP C Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link D: DP D Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 166.364 ac Runoff Volume = 0.020 af Average Runoff Depth = 0.00"
81.40% Pervious = 135.423 ac 18.60% Impervious = 30.941 ac

Summary for Subcatchment DA-A1: Subcat DA-A1

[45] Hint: Runoff=Zero

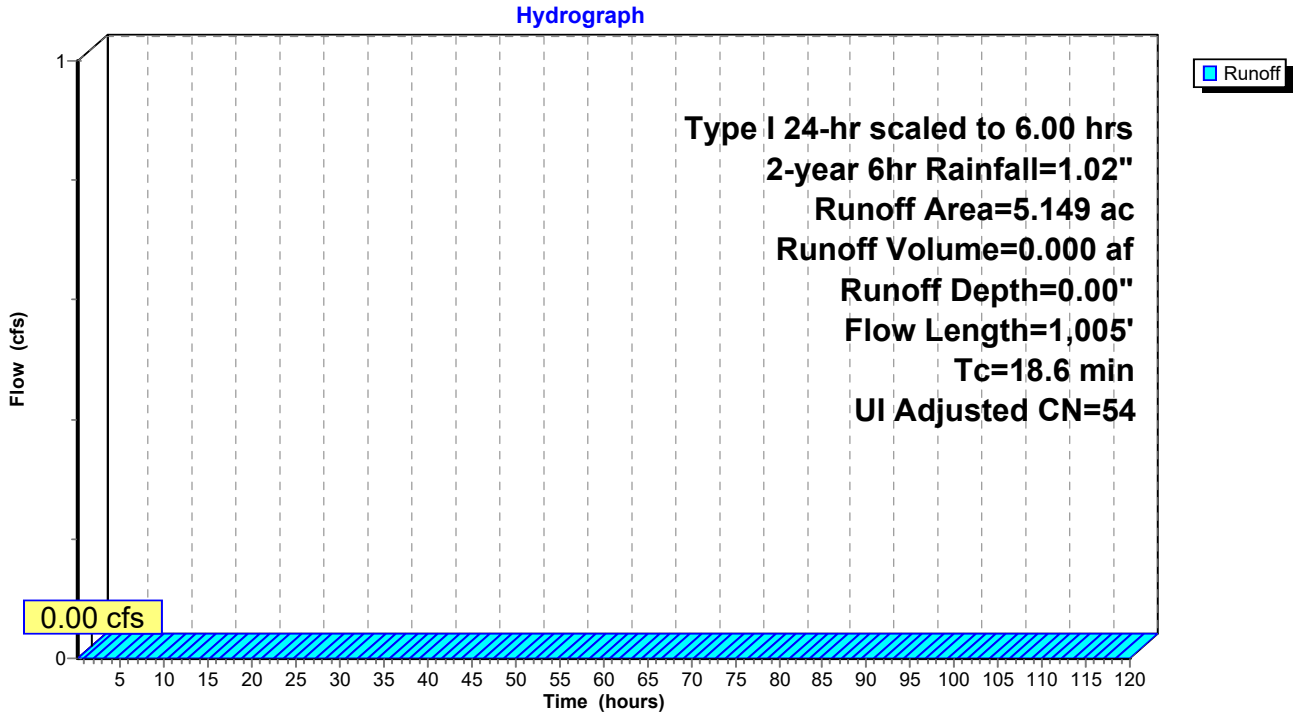
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond A1 : A1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Adj	Description
4.141	49		Desert shrub range, Good, HSG A
0.635	98		Unconnected pavement, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.068	96		Gravel surface, HSG A
0.099	72		Dirt roads, HSG A
5.149	57	54	Weighted Average, UI Adjusted
4.514			87.67% Pervious Area
0.635			12.33% Impervious Area
0.635			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0208	0.15		**Sheet Flow, sheet 2802.48-2800.40** Range n= 0.130 P2= 1.88"
3.2	385	0.0158	2.02		**Shallow Concentrated Flow, shallow 2800.40-2794.30** Unpaved Kv= 16.1 fps
0.2	40	0.0050	4.20	7.43	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.5	398	0.0142	1.92		**Shallow Concentrated Flow, shallow 2793.57-2788.24** Unpaved Kv= 16.1 fps
0.5	82	0.0151	2.49		**Shallow Concentrated Flow, paved 2788.24-2787** Paved Kv= 20.3 fps
18.6	1,005	Total			

Subcatchment DA-A1: Subcat DA-A1



Summary for Subcatchment DA-A1.1: Subcat DA-A1.1

[45] Hint: Runoff=Zero

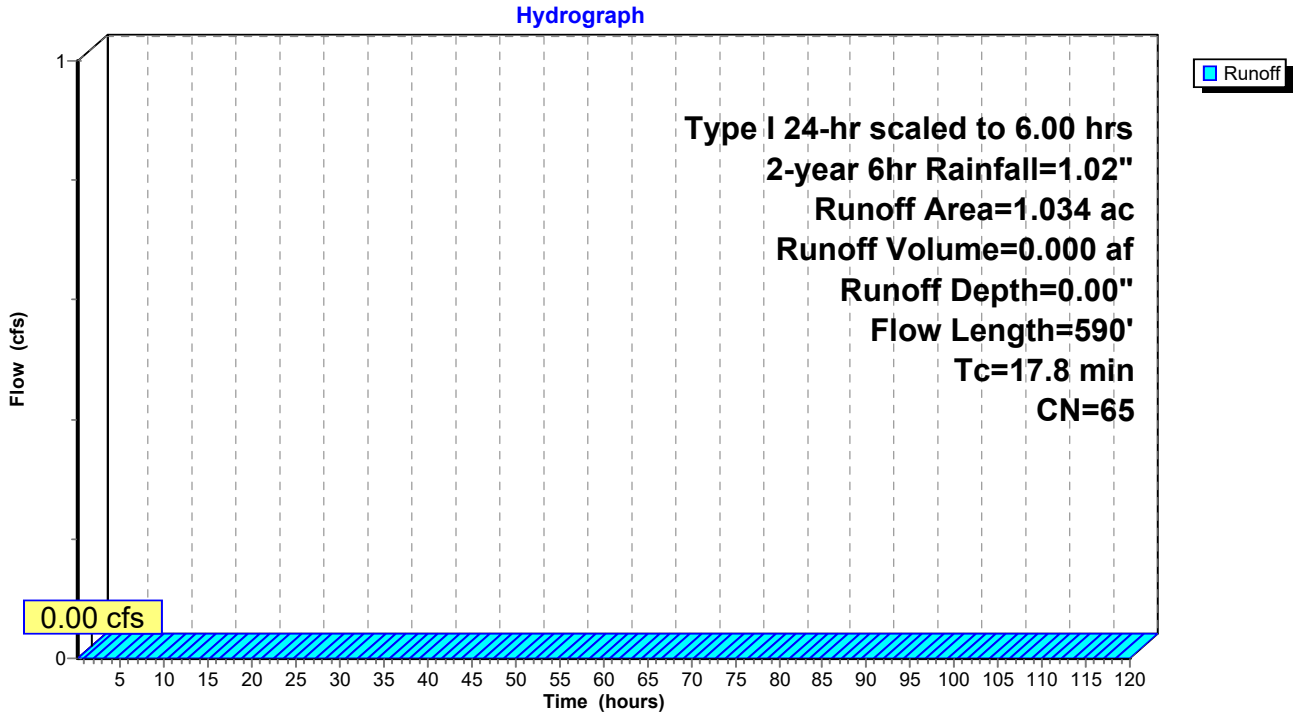
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Description
0.693	49	Desert shrub range, Good, HSG A
0.341	98	Unconnected pavement, HSG A
1.034	65	Weighted Average
0.693		67.02% Pervious Area
0.341		32.98% Impervious Area
0.341		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0182	0.14		**Sheet Flow, sheet 2787.94-2786.12** Range n= 0.130 P2= 1.88"
4.7	369	0.0172	1.31		**Shallow Concentrated Flow, shallow 2786.12-2779.76** Nearly Bare & Untilled Kv= 10.0 fps
0.2	26	0.0200	2.87		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.1	95	0.0211	1.45		**Shallow Concentrated Flow, shallow 2779-2776.99** Nearly Bare & Untilled Kv= 10.0 fps
17.8	590	Total			

Subcatchment DA-A1.1: Subcat DA-A1.1



Summary for Subcatchment DA-B1: Subcat DA-B1

[45] Hint: Runoff=Zero

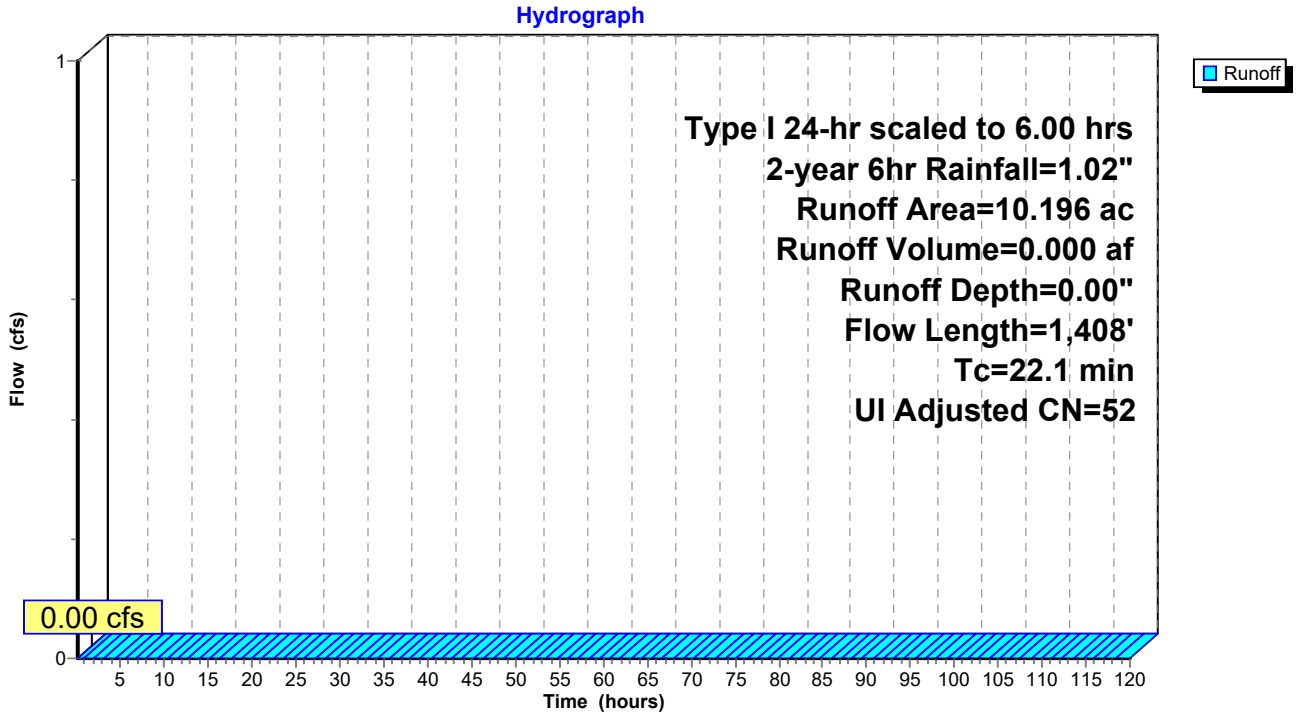
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Adj	Description
	8.673	49		Desert shrub range, Good, HSG A
	1.086	98		Unconnected pavement, HSG A
*	0.437	55		Surrounding Equip. Cover, HSG A
	10.196	54	52	Weighted Average, UI Adjusted
	9.110			89.35% Pervious Area
	1.086			10.65% Impervious Area
	1.086			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0185	0.14		**Sheet Flow, Sheet Flow 2803.05-2801.20** Range n= 0.130 P2= 1.88"
1.6	207	0.0189	2.21		**Shallow Concentrated Flow, shallow 2801.20-2797.28** Unpaved Kv= 16.1 fps
0.2	31	0.0200	2.87		**Shallow Concentrated Flow, shallow 2797.28-2796.65** Paved Kv= 20.3 fps
3.1	416	0.0191	2.23		**Shallow Concentrated Flow, shallow 2796.65-2788.70** Unpaved Kv= 16.1 fps
0.2	28	0.0160	2.57		**Shallow Concentrated Flow, shallow paved 2788.70-2788.25** Paved Kv= 20.3 fps
4.1	507	0.0161	2.04		**Shallow Concentrated Flow, shallow unpaved 2788.25-2780.00** Unpaved Kv= 16.1 fps
0.2	27	0.0200	2.87		**Shallow Concentrated Flow, shallow paved** Paved Kv= 20.3 fps
0.9	92	0.0107	1.67		**Shallow Concentrated Flow, shallow unpaved 2779.05-2778.06** Unpaved Kv= 16.1 fps
22.1	1,408	Total			

Subcatchment DA-B1: Subcat DA-B1



Summary for Subcatchment DA-B2: Subcat DA-B2

[73] Warning: Peak may fall outside time span

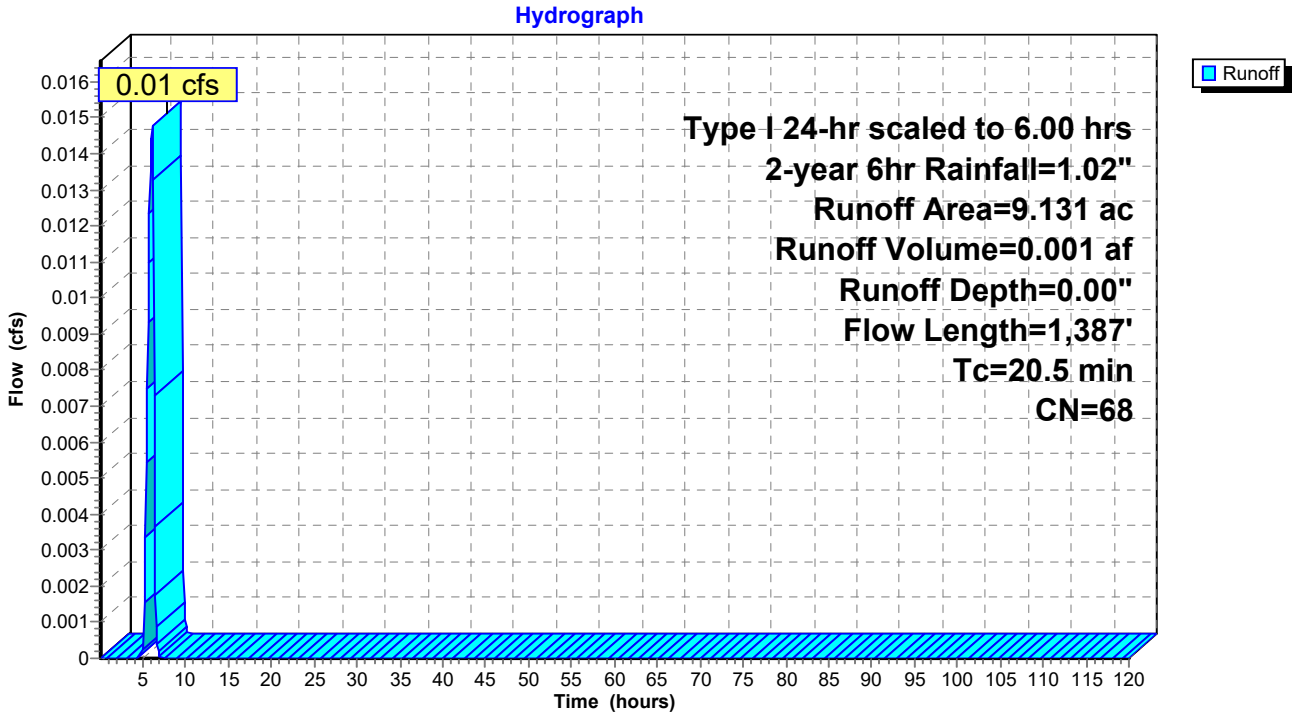
Runoff = 0.01 cfs @ 6.06 hrs, Volume= 0.001 af, Depth= 0.00"
Routed to Pond B2 : B2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Description
	2.467	49	Desert shrub range, Good, HSG A
	3.050	98	Unconnected pavement, HSG A
*	3.614	55	Surrounding Equip. Cover, HSG A
	9.131	68	Weighted Average
	6.081		66.60% Pervious Area
	3.050		33.40% Impervious Area
	3.050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0319	0.18		**Sheet Flow, sheet 2808-2804.81** Range n= 0.130 P2= 1.88"
6.6	792	0.0156	2.01		**Shallow Concentrated Flow, shallow range 2804.81-2802.44** Unpaved Kv= 16.1 fps
0.2	52	0.0050	4.20	7.43	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
2.2	187	0.0080	1.44		**Shallow Concentrated Flow, shallow unpaved 2802-2800.37** Unpaved Kv= 16.1 fps
2.0	256	0.0110	2.13		**Shallow Concentrated Flow, paved 2800.37-2797.53** Paved Kv= 20.3 fps
20.5	1,387	Total			

Subcatchment DA-B2: Subcat DA-B2



Summary for Subcatchment DA-B3: Subcat DA-B3

[49] Hint: Tc<2dt may require smaller dt
[45] Hint: Runoff=Zero

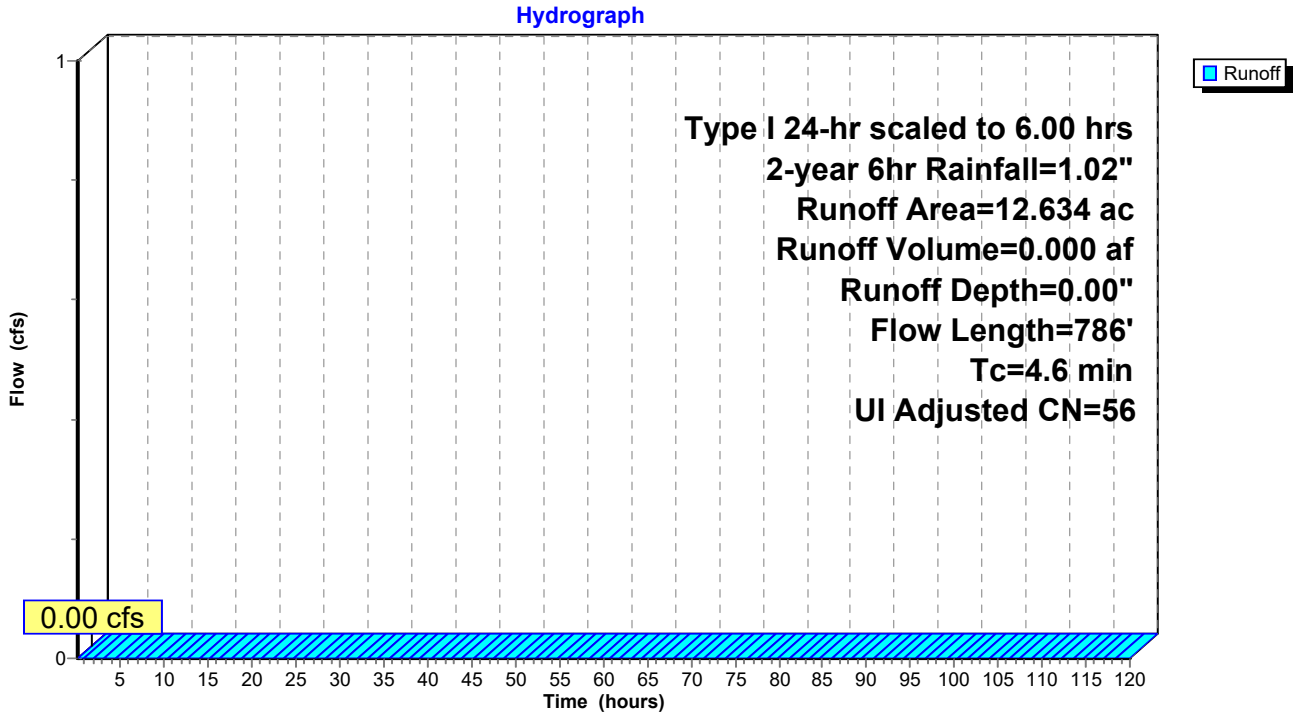
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond B3 : B3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Adj	Description
	6.592	49		Desert shrub range, Good, HSG A
	2.763	98		Unconnected pavement, HSG A
*	3.279	55		Surrounding Equip. Cover, HSG A
	12.634	61	56	Weighted Average, UI Adjusted
	9.871			78.13% Pervious Area
	2.763			21.87% Impervious Area
	2.763			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0190	0.81		**Sheet Flow, sheet paved 2799.71-2799.14** Smooth surfaces n= 0.011 P2= 1.88"
1.1	80	0.0340	1.25		**Sheet Flow, sheet unpaved 2799.14-2796.37** Smooth surfaces n= 0.011 P2= 1.88"
1.4	304	0.0480	3.53		**Shallow Concentrated Flow, shallow 2796.37-2781.77** Unpaved Kv= 16.1 fps
0.2	51	0.0075	4.04	72.81	**Channel Flow, channel 2781.77-2781.39** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.1	42	0.0209	8.59	15.19	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.9	193	0.0054	3.43	61.78	**Channel Flow, channel 2780.52-2779.48** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.3	86	0.0054	4.37	7.72	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
4.6	786	Total			

Subcatchment DA-B3: Subcat DA-B3



Summary for Subcatchment DA-C1: Subcat DA-C1

[45] Hint: Runoff=Zero

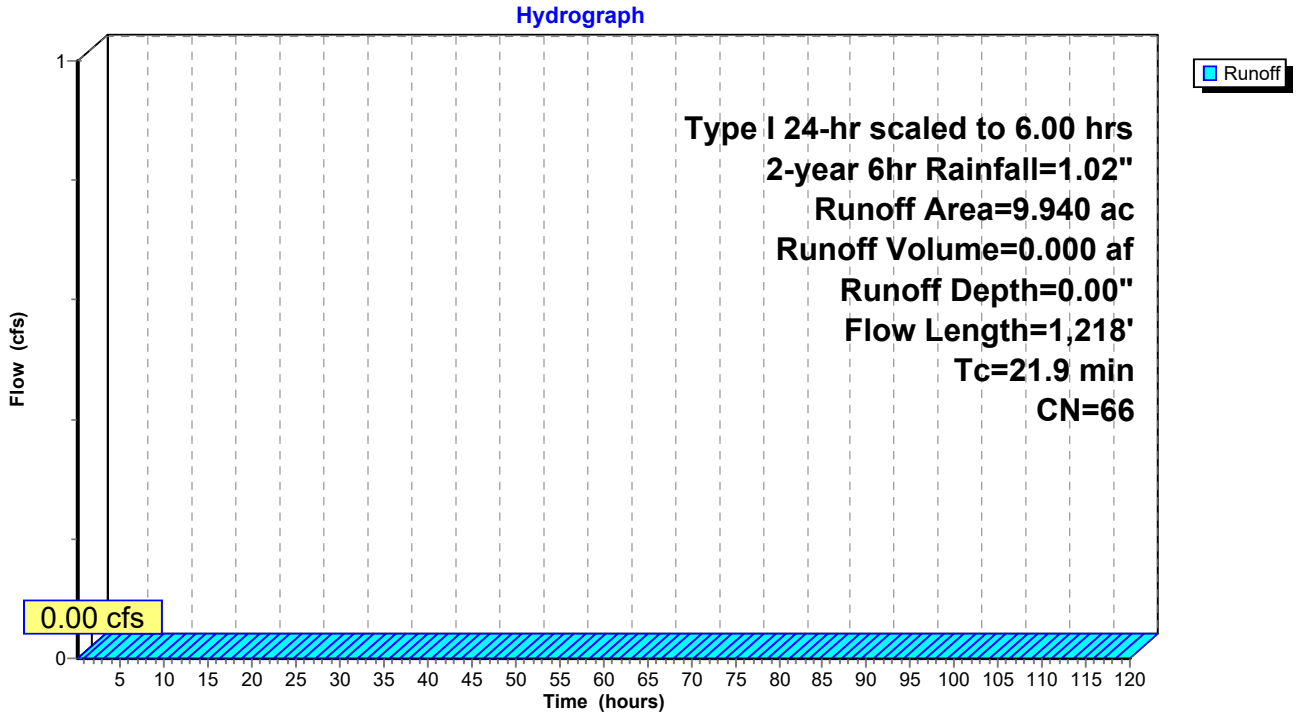
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond C1 : C1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Description
	3.160	49	Desert shrub range, Good, HSG A
	3.020	98	Unconnected pavement, HSG A
*	3.760	55	Surrounding Equip. Cover, HSG A
	9.940	66	Weighted Average
	6.920		69.62% Pervious Area
	3.020		30.38% Impervious Area
	3.020		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	58	0.0030	0.06		**Sheet Flow, Sheet 2813.48-2813.30** Range n= 0.130 P2= 1.88"
0.8	42	0.0205	0.90		**Sheet Flow, Sheet paved 2813.30-2812.44** Smooth surfaces n= 0.011 P2= 1.88"
3.1	450	0.0226	2.42		**Shallow Concentrated Flow, shallow 2812.44-2802.24** Unpaved Kv= 16.1 fps
0.4	152	0.0120	7.08	70.78	**Channel Flow, ditch 2802.24-2800.41** Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.023
0.2	102	0.0356	11.22	19.82	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.8	183	0.0050	3.78	83.06	**Channel Flow, channel 2796.77-2795.91** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035 Riprap, 6-inch
0.2	64	0.0064	5.62	9.93	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.7	167	0.0050	3.78	83.06	**Channel Flow, channel 2795.50-2794.65** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035
21.9	1,218	Total			

Subcatchment DA-C1: Subcat DA-C1



Summary for Subcatchment DA-C2: Subcat DA-C2

[45] Hint: Runoff=Zero

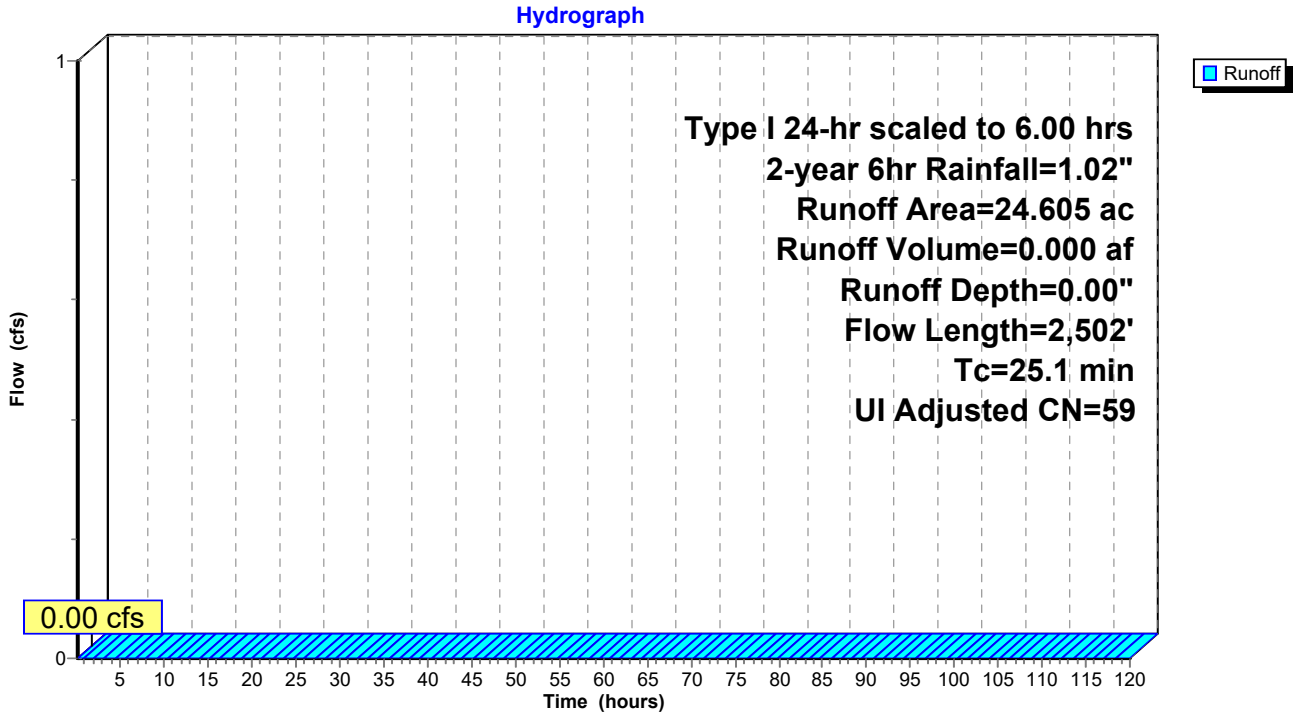
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond C2 : C2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Adj	Description
	6.655	49		Desert shrub range, Good, HSG A
	6.930	98		Unconnected pavement, HSG A
*	11.020	55		Surrounding Equip. Cover, HSG A
	24.605	65	59	Weighted Average, UI Adjusted
	17.675			71.83% Pervious Area
	6.930			28.17% Impervious Area
	6.930			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0153	0.13		**Sheet Flow, Sheet Flow 2811-2809.47** Range n= 0.130 P2= 1.88"
9.8	1,280	0.0182	2.17		**Shallow Concentrated Flow, Shallow 2809.47-2786.17** Unpaved Kv= 16.1 fps
2.6	1,122	0.0175	7.21	230.73	**Channel Flow, channel 2787.62-2768** Area= 32.0 sf Perim= 22.0' r= 1.45' n= 0.035 Riprap, 6-inch
25.1	2,502	Total			

Subcatchment DA-C2: Subcat DA-C2



Summary for Subcatchment DA-C3: Subcat DA-C3

[45] Hint: Runoff=Zero

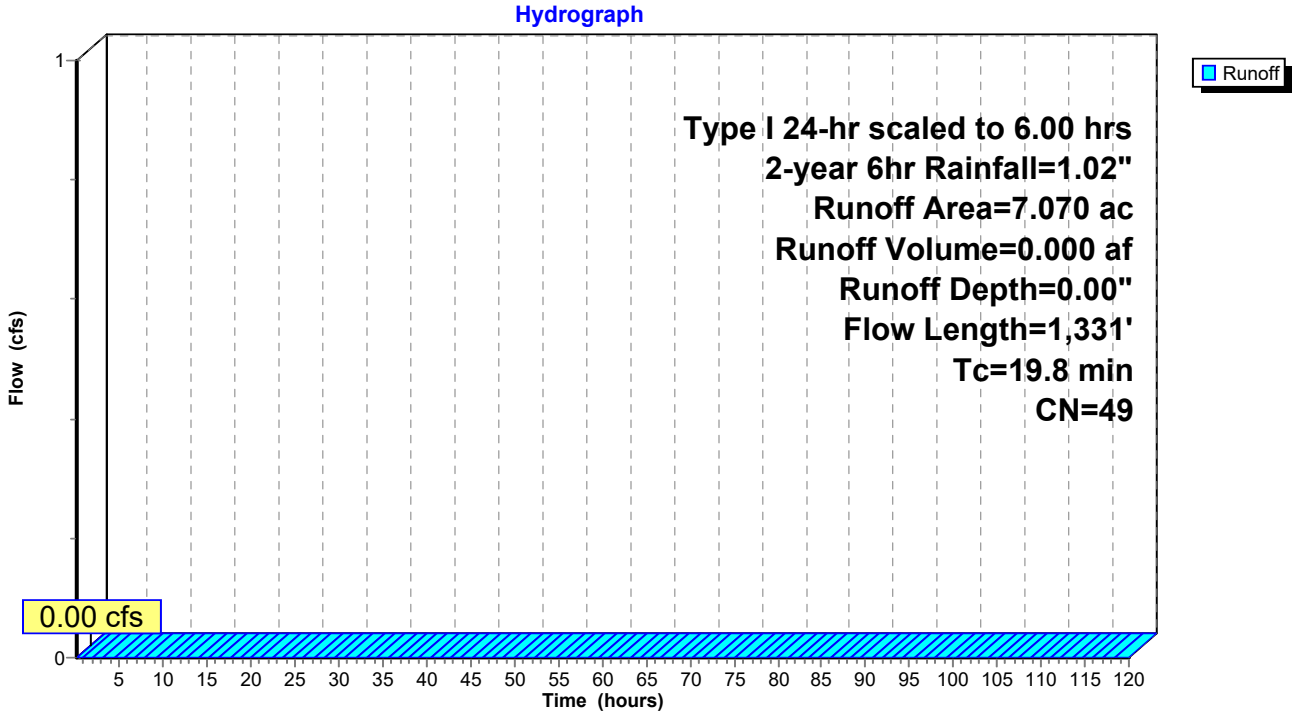
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Description
7.070	49	Desert shrub range, Good, HSG A
0.000	98	Unconnected pavement, HSG A
7.070	49	Weighted Average
7.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0224	0.15		**Sheet Flow, sheet 2785.88-2783.64** Range n= 0.130 P2= 1.88"
8.9	1,231	0.0205	2.31		**Shallow Concentrated Flow, shallow unpaved 2786.64-2761.34** Unpaved Kv= 16.1 fps
19.8	1,331	Total			

Subcatchment DA-C3: Subcat DA-C3



Summary for Subcatchment DA-D1: Subcat DA-D1

[45] Hint: Runoff=Zero

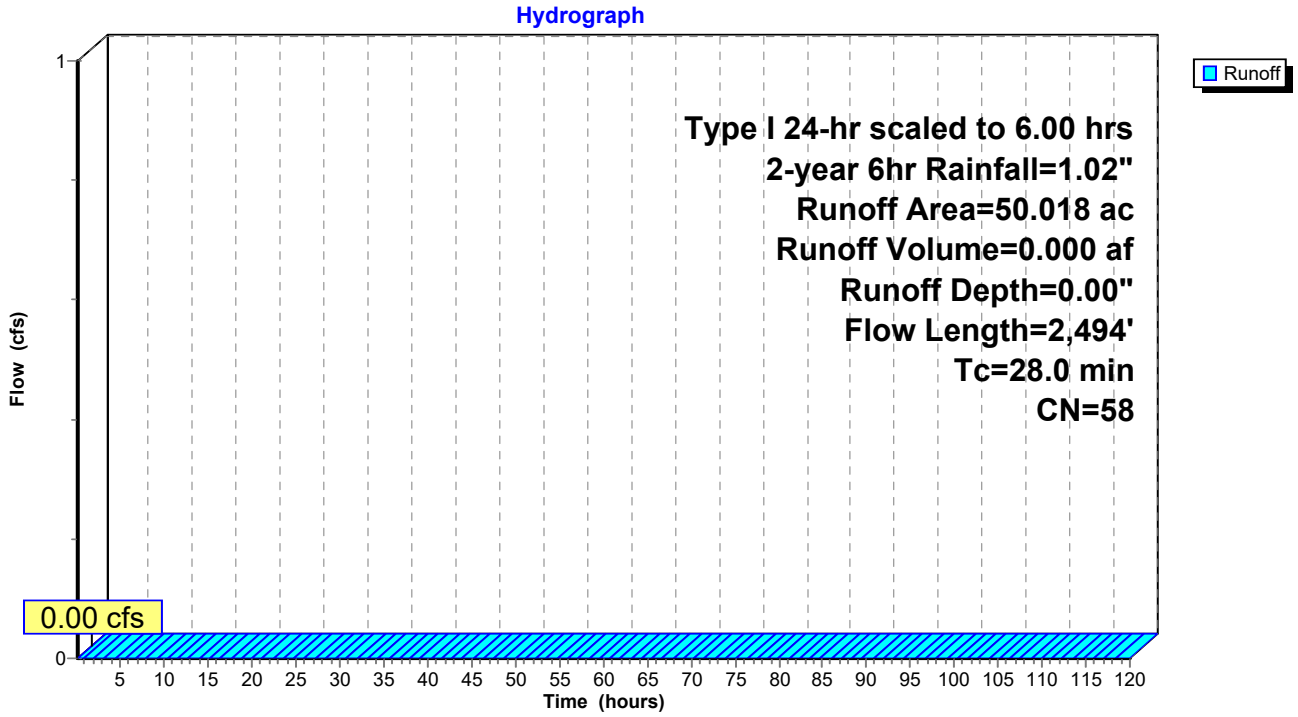
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

Area (ac)	CN	Description
27.134	49	Desert shrub range, Good, HSG A
20.822	68	Desert shrub range, Good, HSG B
1.078	72	Dirt roads, HSG A
0.264	82	Dirt roads, HSG B
0.400	98	Unconnected pavement, HSG A
0.320	98	Unconnected pavement, HSG B
50.018	58	Weighted Average
49.298		98.56% Pervious Area
0.720		1.44% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0270	0.16		**Sheet Flow, sheet 2810.70-2808** Range n= 0.130 P2= 1.88"
7.2	1,058	0.0230	2.44		**Shallow Concentrated Flow, shallow 2808-2783.46** Unpaved Kv= 16.1 fps
0.2	57	0.0080	5.32	9.40	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
10.5	1,279	0.0160	2.04		**Shallow Concentrated Flow, shallow 2783-2761** Unpaved Kv= 16.1 fps
28.0	2,494	Total			

Subcatchment DA-D1: Subcat DA-D1



Summary for Subcatchment DA-D2: Subcat DA-D2

[73] Warning: Peak may fall outside time span

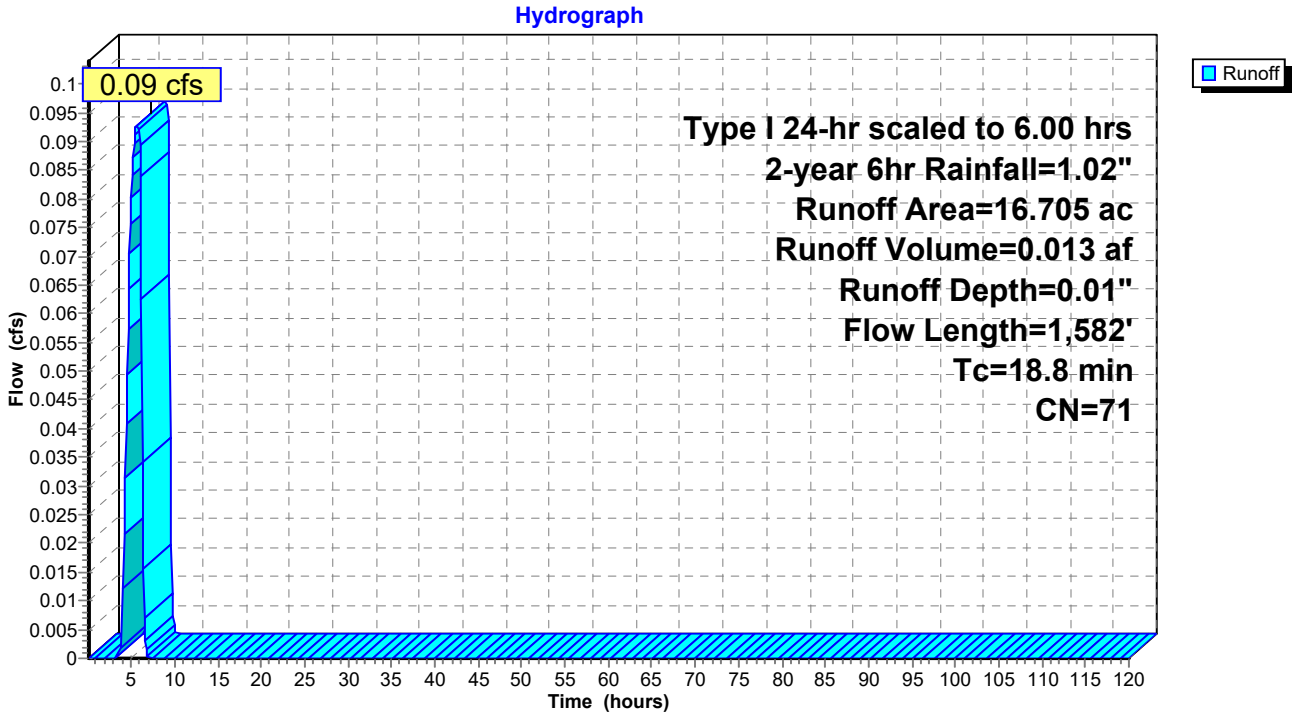
Runoff = 0.09 cfs @ 5.64 hrs, Volume= 0.013 af, Depth= 0.01"
Routed to Pond D2 : D2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Description
	1.577	49	Desert shrub range, Good, HSG A
	5.763	98	Unconnected pavement, HSG A
	0.845	98	Unconnected pavement, HSG B
*	8.520	55	Surrounding Equip. Cover, HSG A
	16.705	71	Weighted Average
	10.097		60.44% Pervious Area
	6.608		39.56% Impervious Area
	6.608		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	57	0.0520	0.19		**Sheet Flow, sheet 2800-2797** Range n= 0.130 P2= 1.88"
13.8	1,525	0.0130	1.84		**Shallow Concentrated Flow, shallow 2797-2777.25** Unpaved Kv= 16.1 fps
18.8	1,582	Total			

Subcatchment DA-D2: Subcat DA-D2



Summary for Subcatchment DA-D3: Subcat DA-D3

[49] Hint: Tc<2dt may require smaller dt
[73] Warning: Peak may fall outside time span

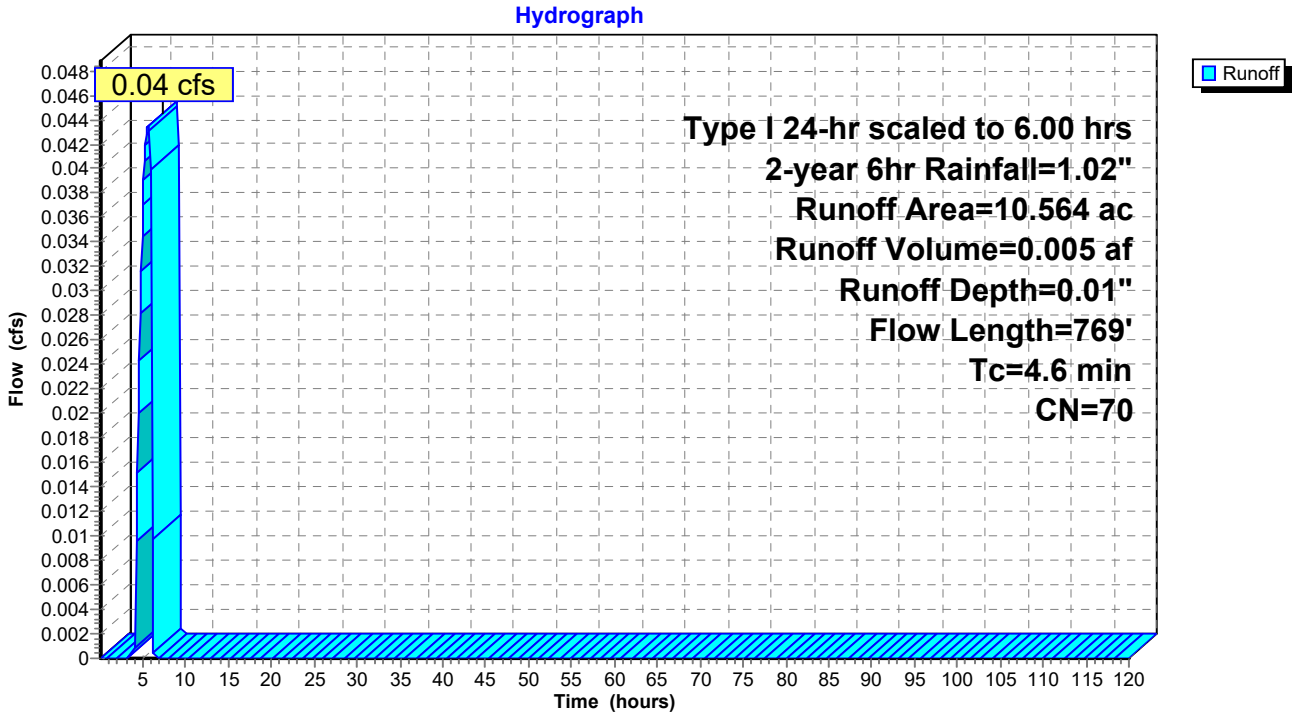
Runoff = 0.04 cfs @ 5.61 hrs, Volume= 0.005 af, Depth= 0.01"
Routed to Pond D3 : D3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Description
	1.397	49	Desert shrub range, Good, HSG A
	3.917	98	Unconnected pavement, HSG A
*	5.250	55	Surrounding Equip. Cover, HSG A
	10.564	70	Weighted Average
	6.647		62.92% Pervious Area
	3.917		37.08% Impervious Area
	3.917		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0500	1.52		**Sheet Flow, Sheet 2819-2814** Smooth surfaces n= 0.011 P2= 1.88"
3.4	626	0.0360	3.05		**Shallow Concentrated Flow, shallow 2814-2791.5** Unpaved Kv= 16.1 fps
0.1	43	0.0340	11.87	20.98	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
4.6	769	Total			

Subcatchment DA-D3: Subcat DA-D3



Summary for Subcatchment DA-D4: Subcat DA-D4

[45] Hint: Runoff=Zero

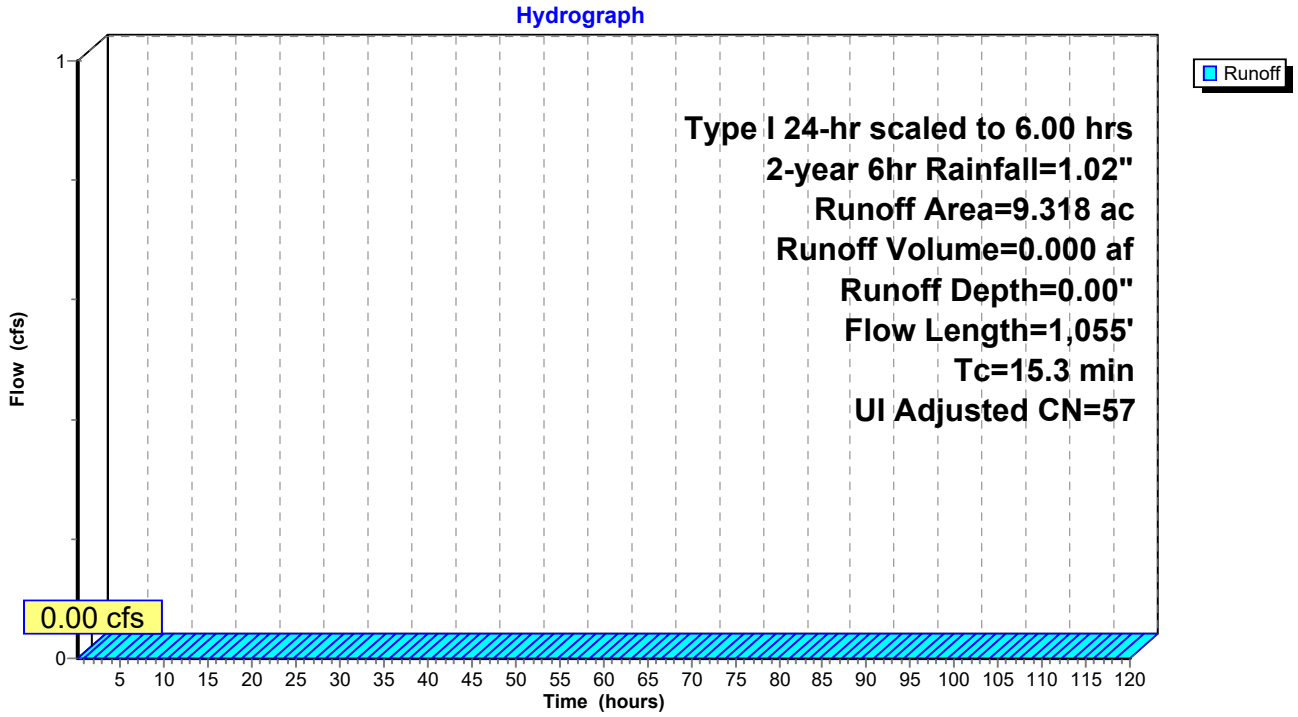
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond D4 : D4 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 2-year 6hr Rainfall=1.02"

	Area (ac)	CN	Adj	Description
	3.543	49		Desert shrub range, Good, HSG A
	0.004	72		Dirt roads, HSG A
	1.871	98		Unconnected pavement, HSG A
*	3.900	55		Surrounding Equip. Cover, HSG A
	9.318	61	57	Weighted Average, UI Adjusted
	7.447			79.92% Pervious Area
	1.871			20.08% Impervious Area
	1.871			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		**Sheet Flow, sheet 2817-2814** Range n= 0.130 P2= 1.88"
5.6	955	0.0314	2.85		**Shallow Concentrated Flow, shallow 2814-2784** Unpaved Kv= 16.1 fps
15.3	1,055	Total			

Subcatchment DA-D4: Subcat DA-D4



Summary for Reach 3R: Culvert Crossing

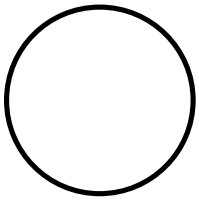
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Link D : DP D

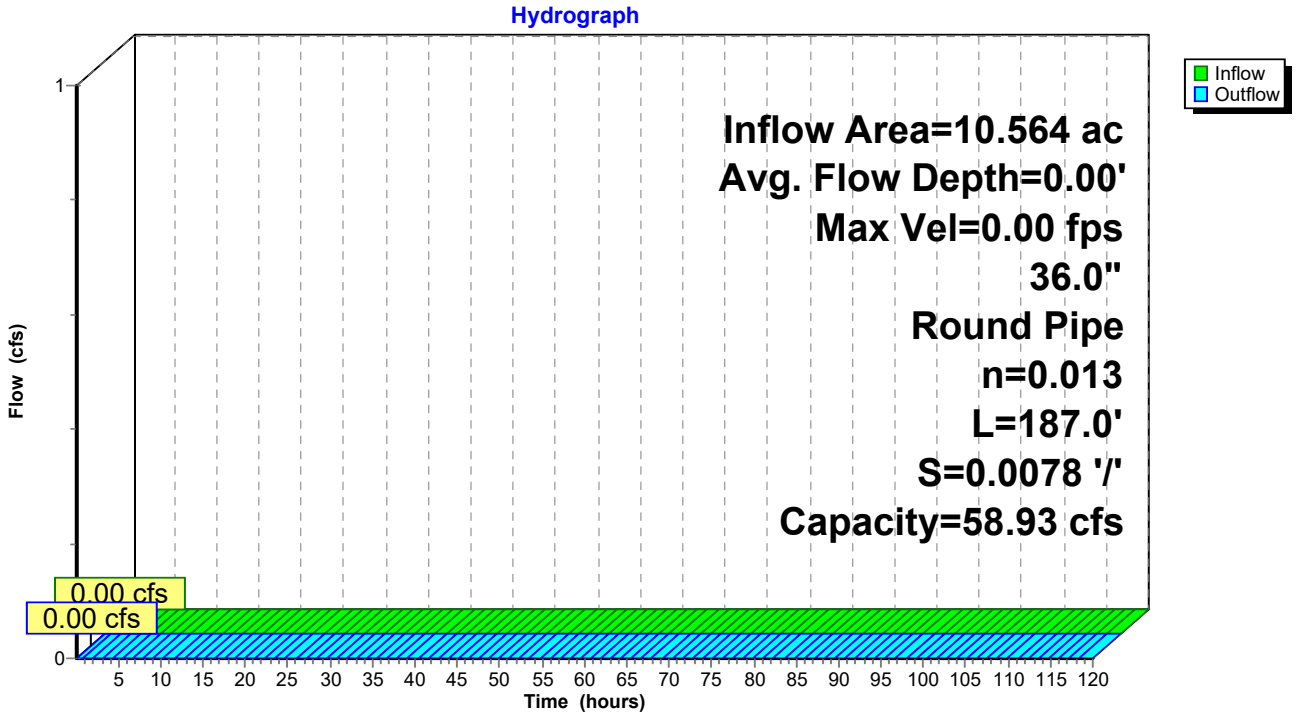
Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 58.93 cfs

36.0" Round Pipe
n= 0.013
Length= 187.0' Slope= 0.0078 '/'
Inlet Invert= 2,783.46', Outlet Invert= 2,782.00'



Reach 3R: Culvert Crossing



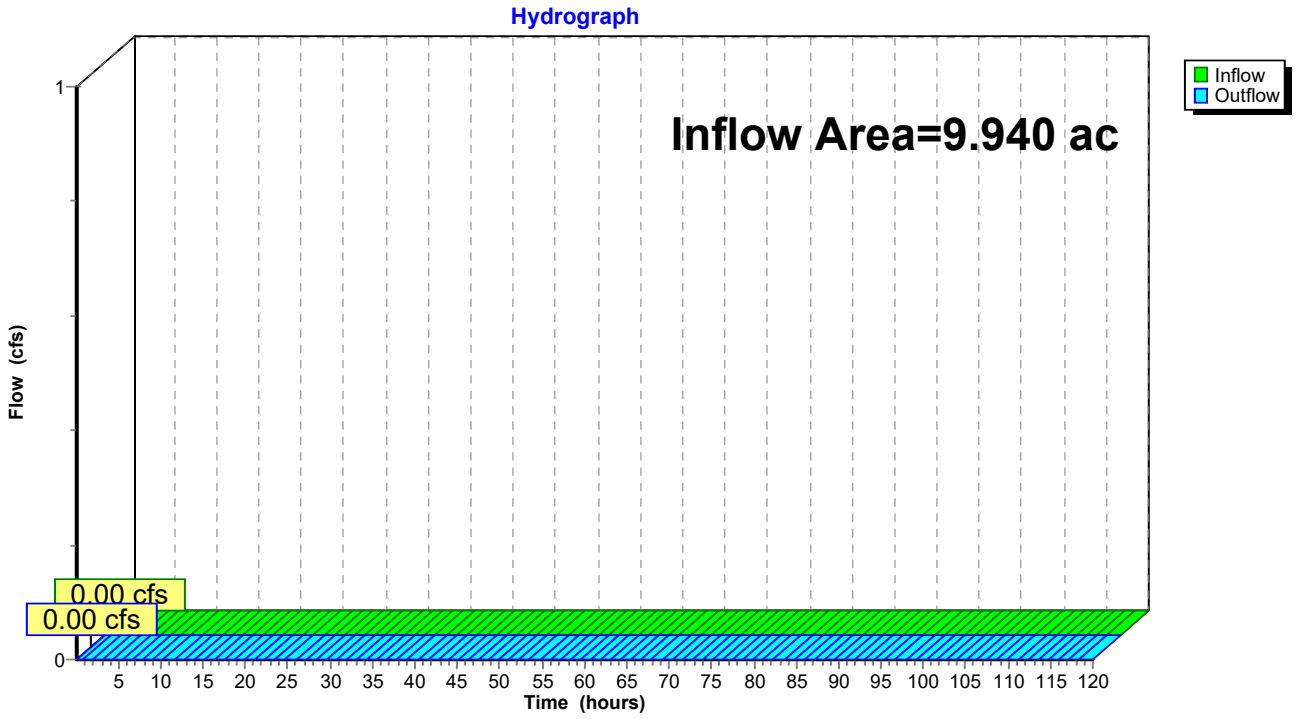
Summary for Reach 4R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond C2 : C2 Pond

Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Reach 4R: (new Reach)



Summary for Pond A1: A1 Pond

Inflow Area = 5.149 ac, 12.33% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link A : DP A

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,785.00' @ 0.10 hrs Surf.Area= 0.030 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

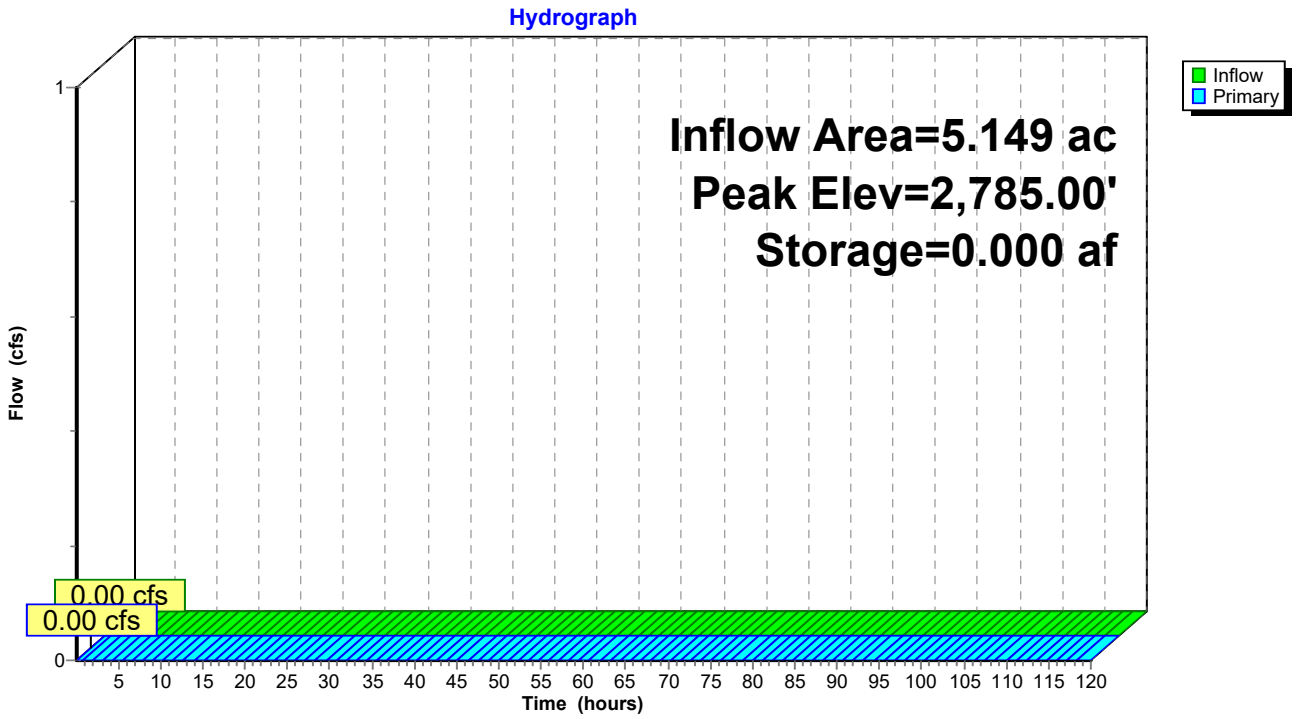
Volume	Invert	Avail.Storage	Storage Description
#1	2,785.00'	0.162 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,785.00	0.030	0.000	0.000
2,786.00	0.045	0.037	0.037
2,787.00	0.061	0.053	0.090
2,788.00	0.081	0.071	0.162

Device	Routing	Invert	Outlet Devices
#1	Primary	2,787.50'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,785.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond A1: A1 Pond



Summary for Pond B2: B2 Pond

Inflow Area = 9.131 ac, 33.40% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.01 cfs @ 6.06 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Pond B3 : B3 Pond

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,793.51' @ 7.30 hrs Surf.Area= 0.147 ac Storage= 0.001 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

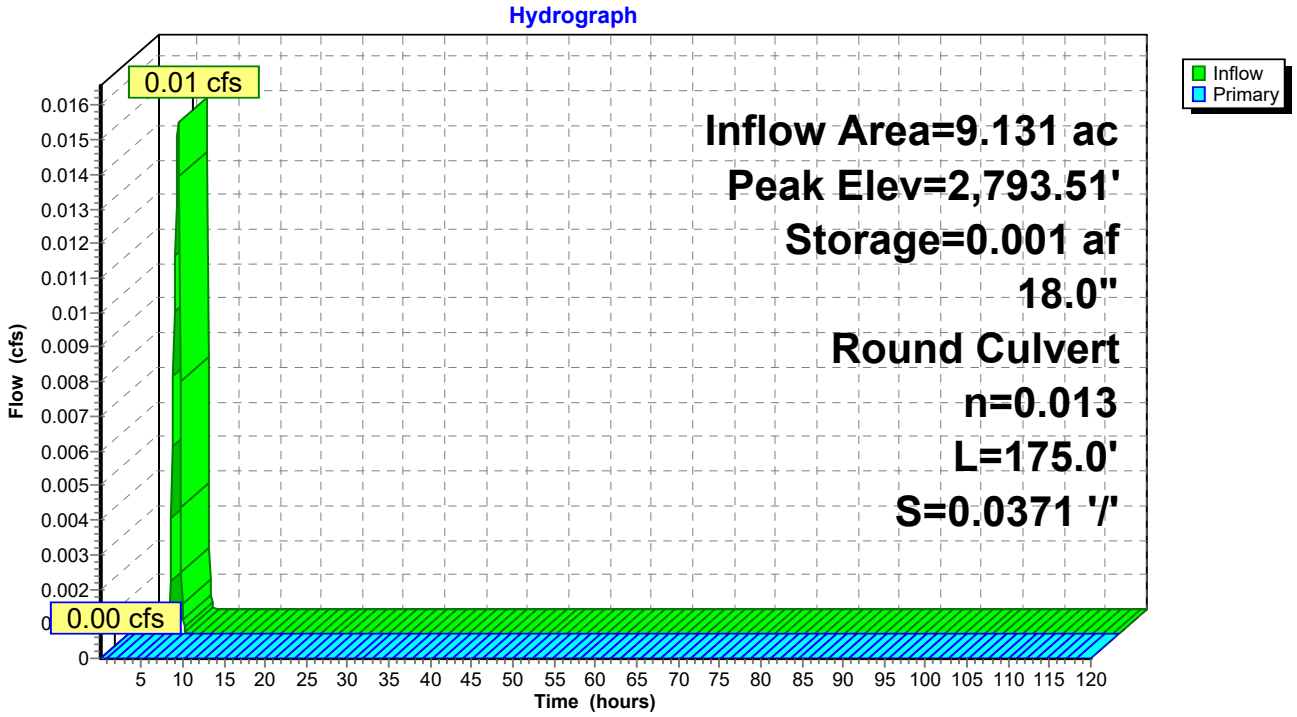
Volume	Invert	Avail.Storage	Storage Description
#1	2,793.50'	1.283 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,793.50	0.147	0.000	0.000
2,794.50	0.187	0.167	0.167
2,795.50	0.231	0.209	0.376
2,796.50	0.277	0.254	0.630
2,797.50	0.326	0.301	0.931
2,798.50	0.377	0.351	1.283

Device	Routing	Invert	Outlet Devices
#1	Primary	2,794.50'	**18.0" Round Culvert** L= 175.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,794.50' / 2,788.00' S= 0.0371 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,793.50' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond B2: B2 Pond



Summary for Pond B3: B3 Pond

Inflow Area = 21.765 ac, 26.71% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link B : DP B

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,778.50' @ 0.10 hrs Surf.Area= 0.591 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

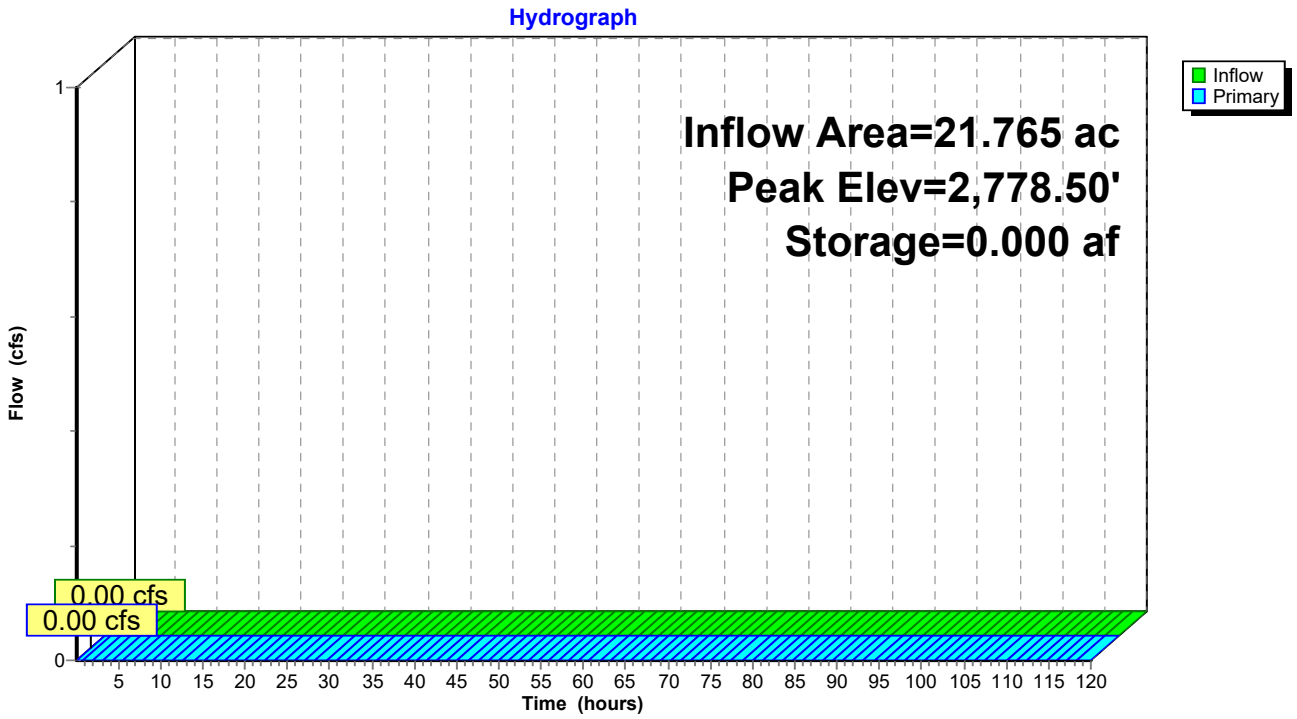
Volume	Invert	Avail.Storage	Storage Description
#1	2,778.50'	2.054 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,778.50	0.591	0.000	0.000
2,779.50	0.652	0.621	0.621
2,780.50	0.716	0.684	1.305
2,781.50	0.781	0.748	2.054

Device	Routing	Invert	Outlet Devices
#1	Primary	2,779.00'	**18.0" Round Culvert** L= 93.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.00' / 2,778.50' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,779.67'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,778.50' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond B3: B3 Pond



Summary for Pond C1: C1 Pond

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 4R : (new Reach)

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,791.00' @ 0.10 hrs Surf.Area= 0.363 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

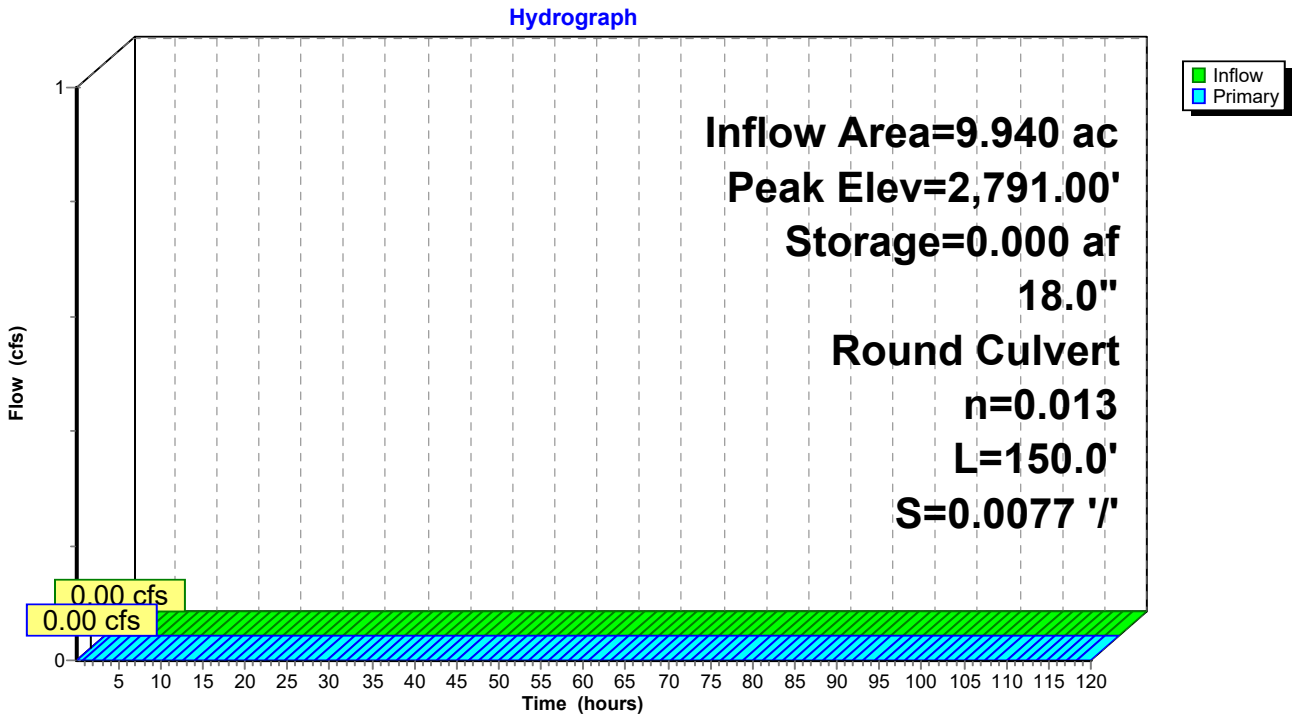
Volume	Invert	Avail.Storage	Storage Description
#1	2,791.00'	1.912 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,791.00	0.363	0.000	0.000
2,792.00	0.411	0.387	0.387
2,793.00	0.461	0.436	0.823
2,794.00	0.514	0.487	1.311
2,795.00	0.570	0.542	1.853
2,795.10	0.627	0.060	1.912

Device	Routing	Invert	Outlet Devices
#1	Primary	2,792.00'	**18.0" Round Culvert** L= 150.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,792.00' / 2,790.84' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,791.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond C1: C1 Pond



Summary for Pond C2: C2 Pond

Inflow Area = 34.545 ac, 28.80% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link C : DP C

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,765.00' @ 0.10 hrs Surf.Area= 0.543 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

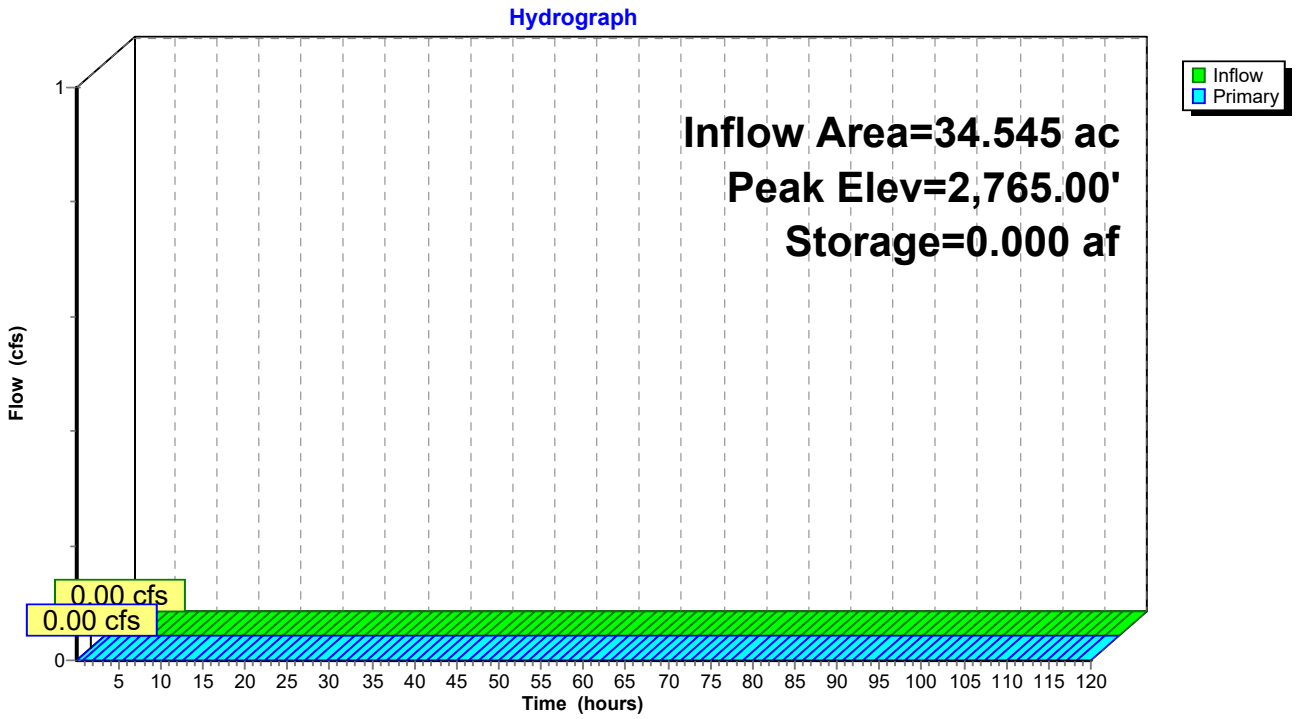
Volume	Invert	Avail.Storage	Storage Description
#1	2,765.00'	4.496 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,765.00	0.543	0.000	0.000
2,766.00	0.680	0.612	0.612
2,767.00	0.866	0.773	1.385
2,768.00	0.978	0.922	2.307
2,769.00	1.094	1.036	3.343
2,770.00	1.212	1.153	4.496

Device	Routing	Invert	Outlet Devices
#1	Primary	2,765.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,765.00' / 2,764.37' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,766.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,769.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,765.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
└─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond C2: C2 Pond



Summary for Pond D2: D2 Pond

Inflow Area = 16.705 ac, 39.56% Impervious, Inflow Depth = 0.01" for 2-year 6hr event
Inflow = 0.09 cfs @ 5.64 hrs, Volume= 0.013 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,773.02' @ 7.20 hrs Surf.Area= 0.573 ac Storage= 0.013 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

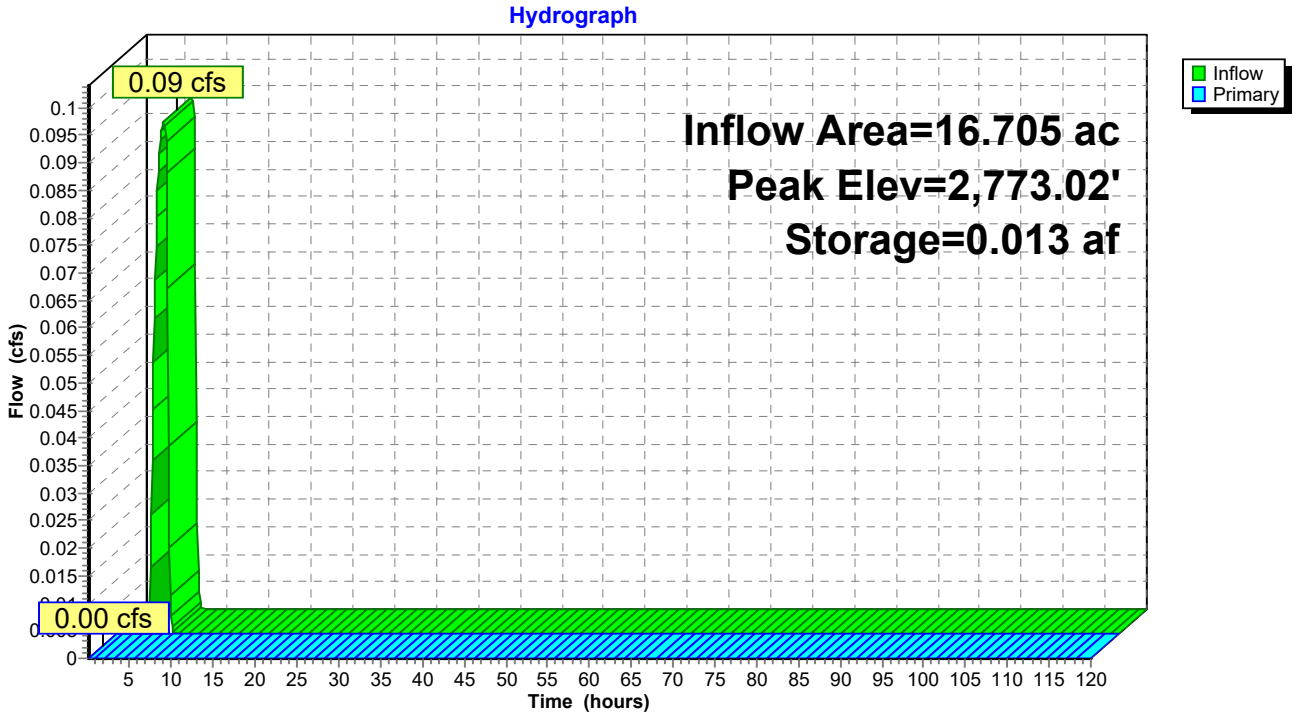
Volume	Invert	Avail.Storage	Storage Description
#1	2,773.00'	3.691 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,773.00	0.571	0.000	0.000
2,773.75	0.620	0.447	0.447
2,774.00	0.636	0.157	0.604
2,775.00	0.703	0.670	1.273
2,776.00	0.771	0.737	2.010
2,777.00	0.840	0.806	2.816
2,778.00	0.910	0.875	3.691

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,774.50'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,774.50' / 2,773.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,776.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,773.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D2: D2 Pond



Summary for Pond D3: D3 Pond

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.01" for 2-year 6hr event
Inflow = 0.04 cfs @ 5.61 hrs, Volume= 0.005 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 3R : Culvert Crossing

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,784.04' @ 6.40 hrs Surf.Area= 0.118 ac Storage= 0.005 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

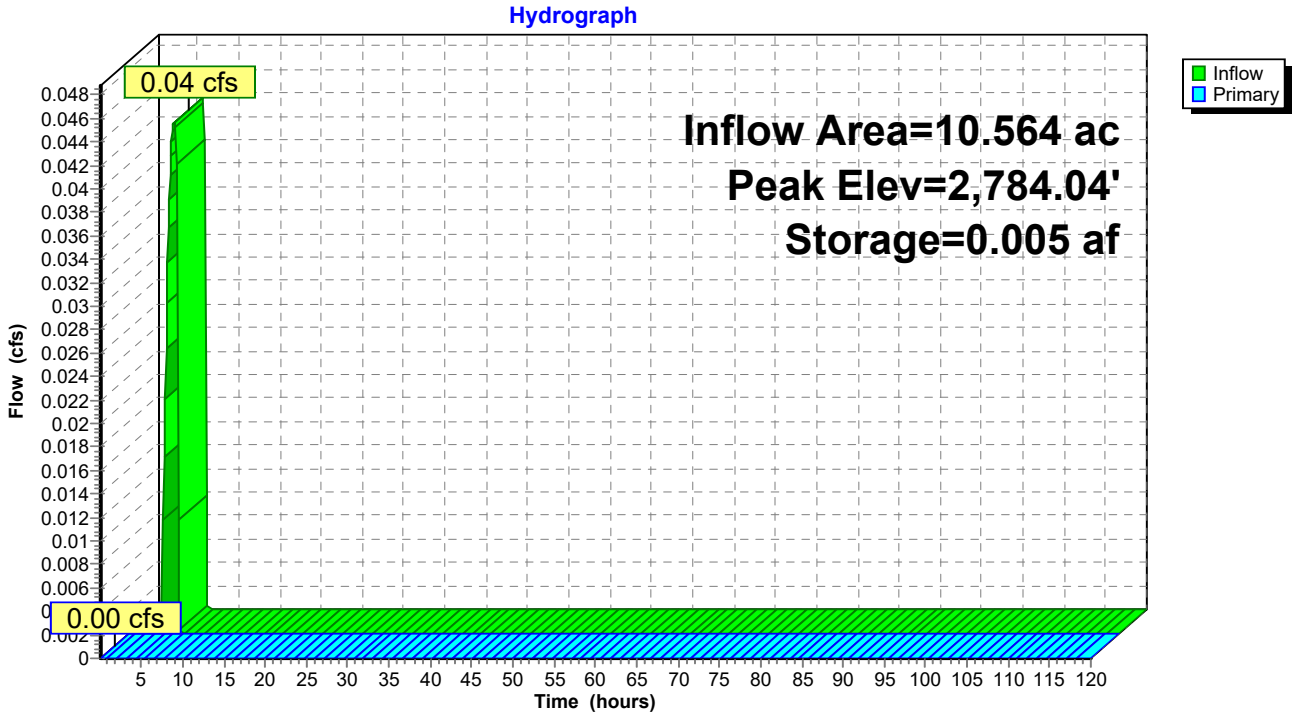
Volume	Invert	Avail.Storage	Storage Description
#1	2,784.00'	2.083 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,784.00	0.116	0.000	0.000
2,785.00	0.168	0.142	0.142
2,786.00	0.221	0.194	0.336
2,787.00	0.282	0.251	0.588
2,788.00	0.327	0.304	0.893
2,789.00	0.373	0.350	1.243
2,790.00	0.420	0.397	1.639
2,791.00	0.469	0.445	2.083

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,788.00'	**18.0" Round Culvert** L= 81.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,788.00' / 2,786.00' S= 0.0247 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,789.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,784.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D3: D3 Pond



Summary for Pond D4: D4 Pond

Inflow Area = 9.318 ac, 20.08% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,779.00' @ 0.10 hrs Surf.Area= 0.186 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

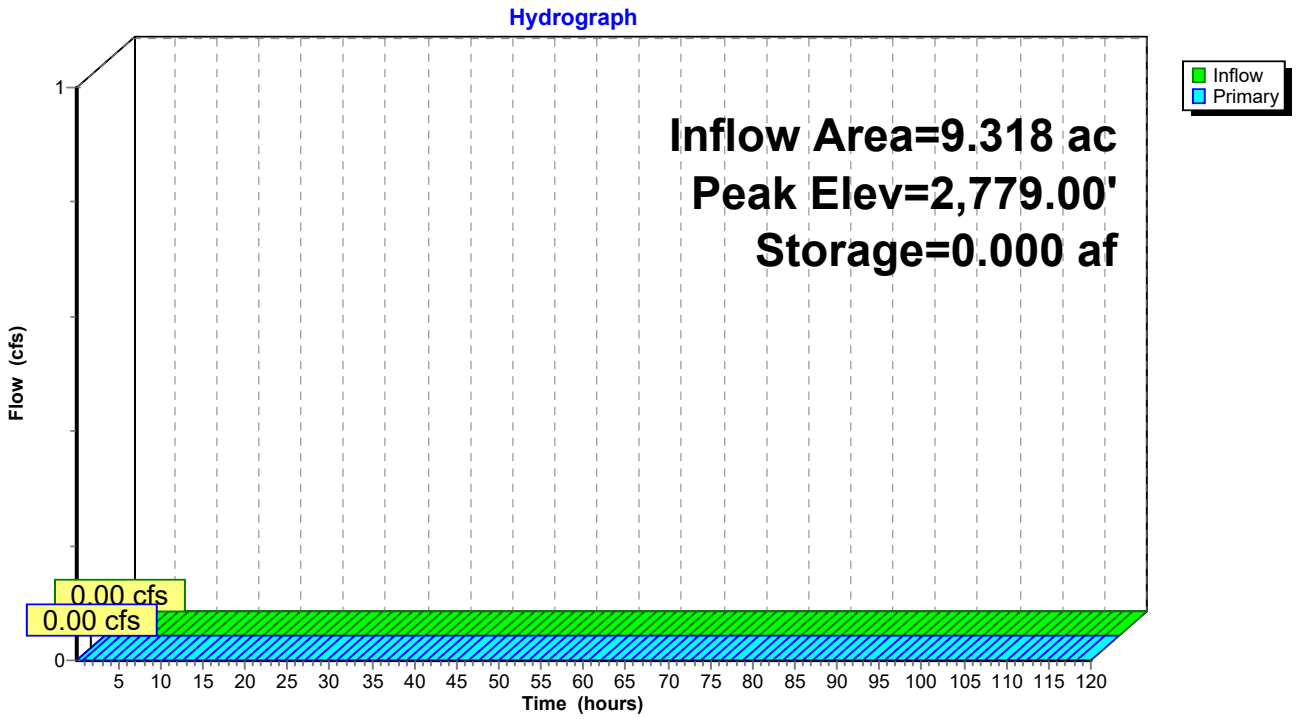
Volume	Invert	Avail.Storage	Storage Description
#1	2,779.00'	1.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,779.00	0.186	0.000	0.000
2,780.00	0.220	0.203	0.203
2,781.00	0.255	0.237	0.440
2,782.00	0.293	0.274	0.715
2,783.00	0.331	0.312	1.027

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,779.23'	**12.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.23' / 2,778.57' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Primary	2,781.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,779.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D4: D4 Pond

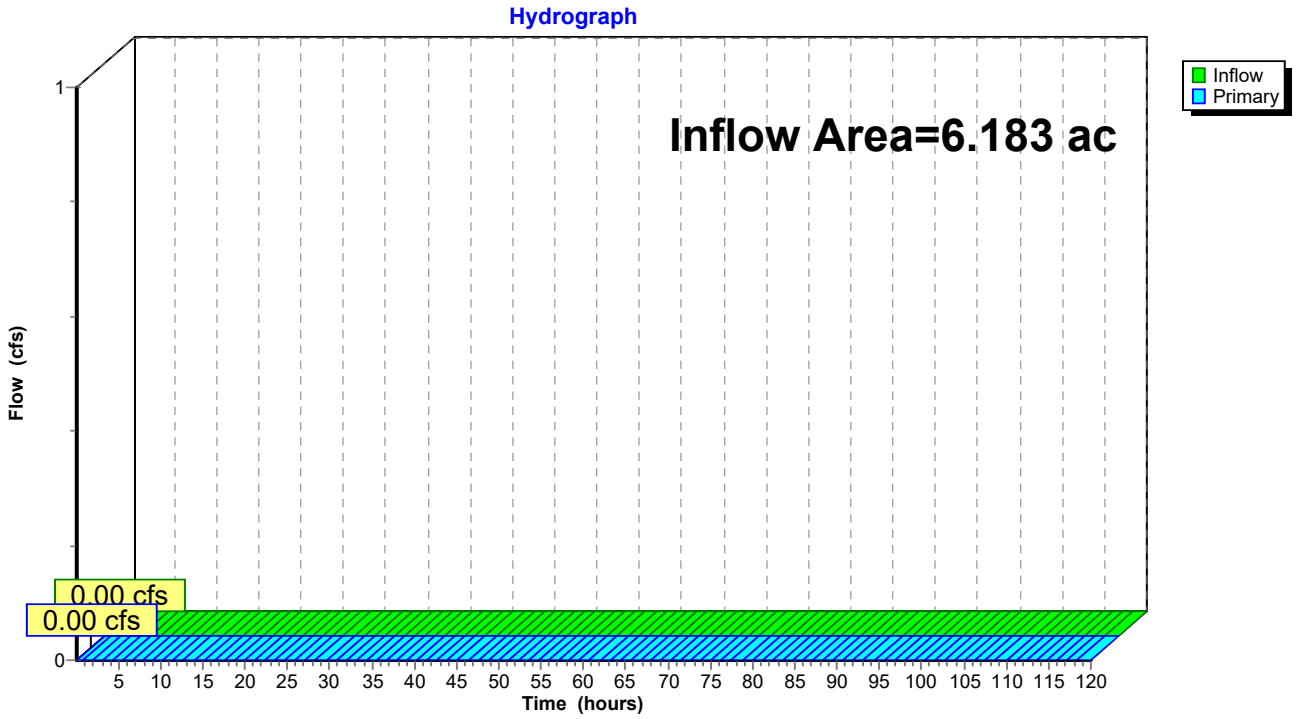


Summary for Link A: DP A

Inflow Area = 6.183 ac, 15.79% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

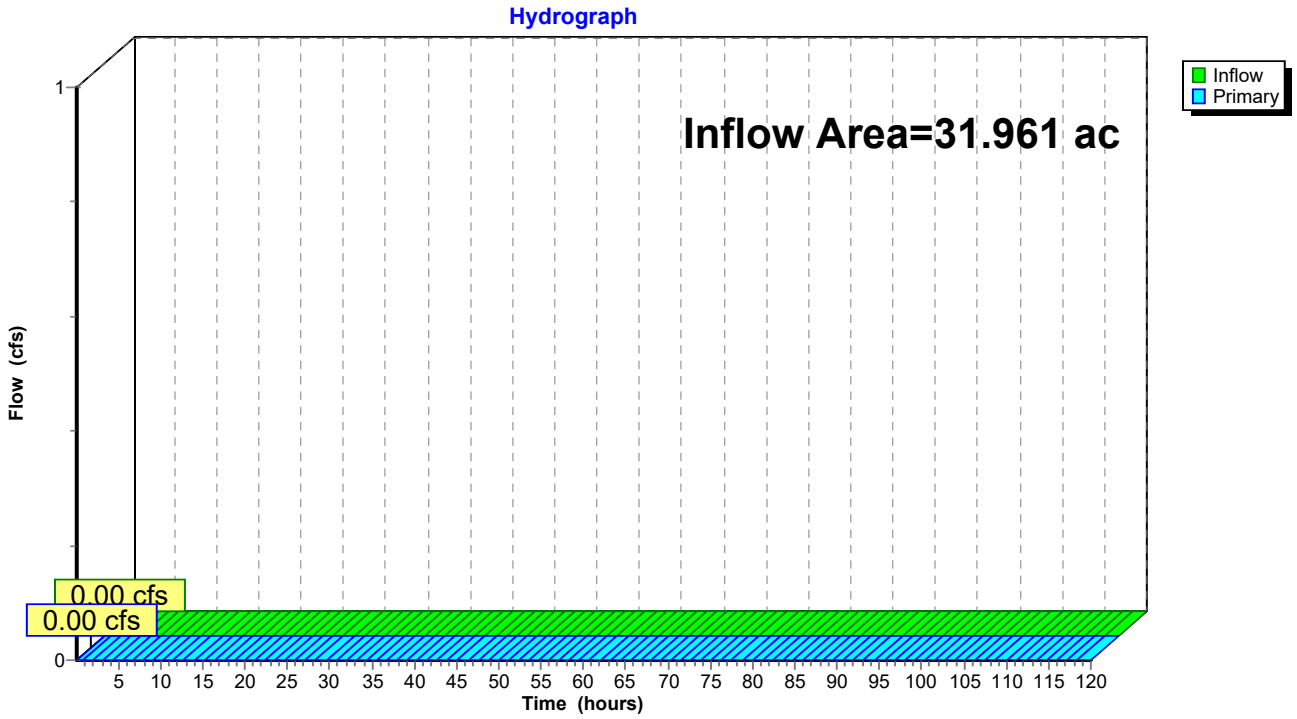


Summary for Link B: DP B

Inflow Area = 31.961 ac, 21.59% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

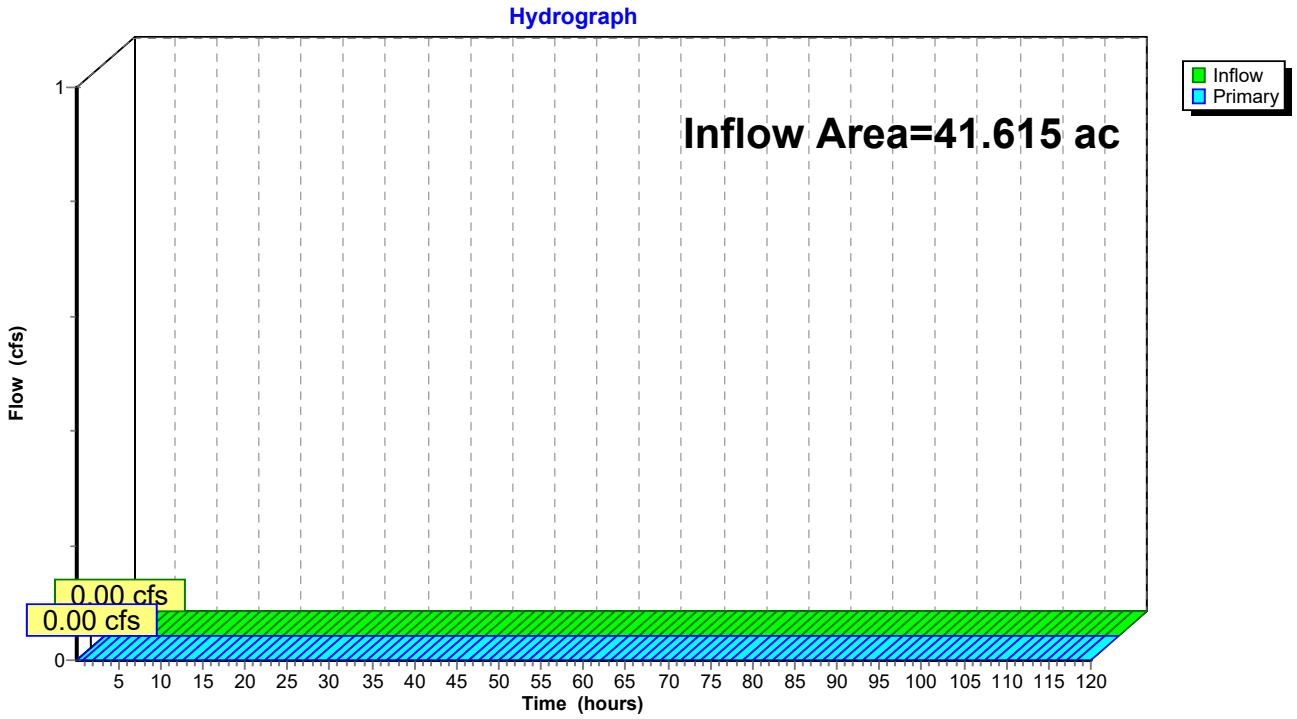


Summary for Link C: DP C

Inflow Area = 41.615 ac, 23.91% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

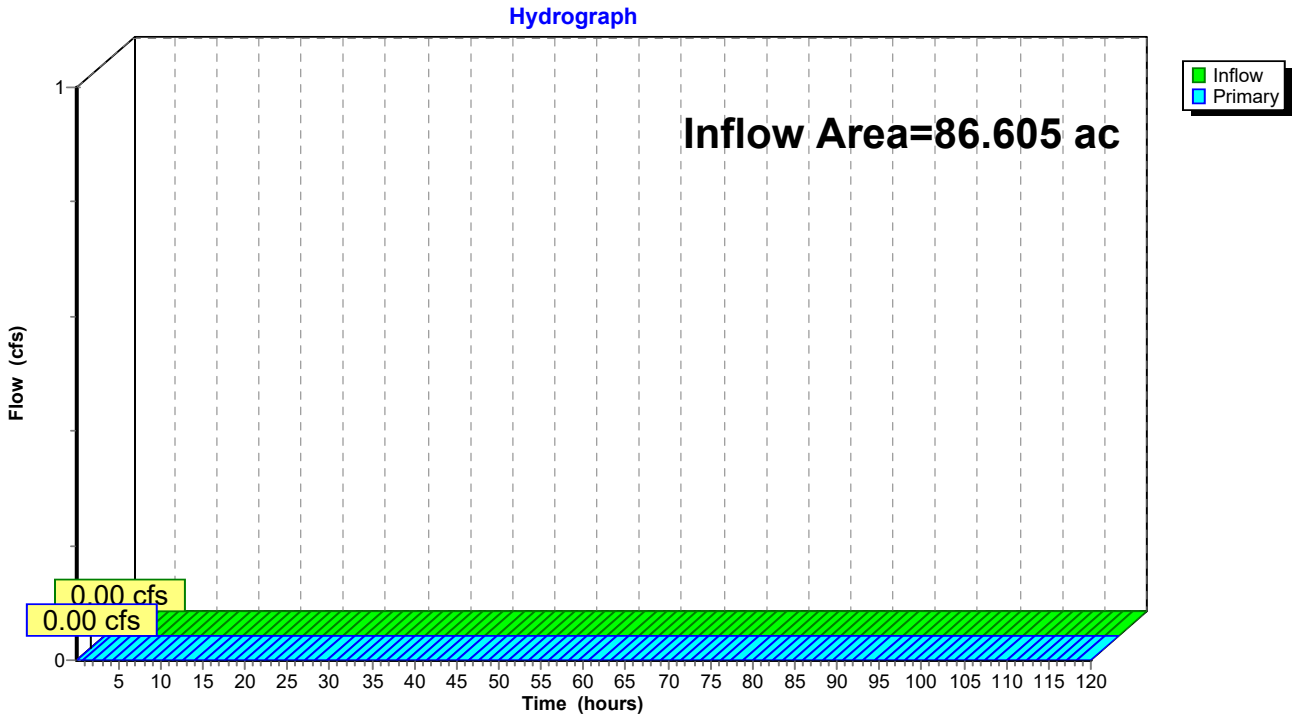


Summary for Link D: DP D

Inflow Area = 86.605 ac, 15.14% Impervious, Inflow Depth = 0.00" for 2-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A1: Subcat DA-A1 Runoff Area=5.149 ac 12.33% Impervious Runoff Depth>0.93"
Flow Length=1,005' Tc=18.6 min UI Adjusted CN=54 Runoff=0.49 cfs 0.400 af

Subcatchment DA-A1.1: Subcat DA-A1.1 Runoff Area=1.034 ac 32.98% Impervious Runoff Depth>1.67"
Flow Length=590' Tc=17.8 min CN=65 Runoff=0.26 cfs 0.144 af

Subcatchment DA-B1: Subcat DA-B1 Runoff Area=10.196 ac 10.65% Impervious Runoff Depth>0.81"
Flow Length=1,408' Tc=22.1 min UI Adjusted CN=52 Runoff=0.71 cfs 0.692 af

Subcatchment DA-B2: Subcat DA-B2 Runoff Area=9.131 ac 33.40% Impervious Runoff Depth>1.90"
Flow Length=1,387' Tc=20.5 min CN=68 Runoff=2.69 cfs 1.445 af

Subcatchment DA-B3: Subcat DA-B3 Runoff Area=12.634 ac 21.87% Impervious Runoff Depth>1.06"
Flow Length=786' Tc=4.6 min UI Adjusted CN=56 Runoff=1.61 cfs 1.113 af

Subcatchment DA-C1: Subcat DA-C1 Runoff Area=9.940 ac 30.38% Impervious Runoff Depth>1.75"
Flow Length=1,218' Tc=21.9 min CN=66 Runoff=2.60 cfs 1.446 af

Subcatchment DA-C2: Subcat DA-C2 Runoff Area=24.605 ac 28.17% Impervious Runoff Depth>1.25"
Flow Length=2,502' Tc=25.1 min UI Adjusted CN=59 Runoff=3.87 cfs 2.561 af

Subcatchment DA-C3: Subcat DA-C3 Runoff Area=7.070 ac 0.00% Impervious Runoff Depth>0.65"
Flow Length=1,331' Tc=19.8 min CN=49 Runoff=0.27 cfs 0.383 af

Subcatchment DA-D1: Subcat DA-D1 Runoff Area=50.018 ac 1.44% Impervious Runoff Depth>1.18"
Flow Length=2,494' Tc=28.0 min CN=58 Runoff=7.07 cfs 4.929 af

Subcatchment DA-D2: Subcat DA-D2 Runoff Area=16.705 ac 39.56% Impervious Runoff Depth>2.14"
Flow Length=1,582' Tc=18.8 min CN=71 Runoff=5.77 cfs 2.975 af

Subcatchment DA-D3: Subcat DA-D3 Runoff Area=10.564 ac 37.08% Impervious Runoff Depth>2.06"
Flow Length=769' Tc=4.6 min CN=70 Runoff=3.59 cfs 1.812 af

Subcatchment DA-D4: Subcat DA-D4 Runoff Area=9.318 ac 20.08% Impervious Runoff Depth>1.12"
Flow Length=1,055' Tc=15.3 min UI Adjusted CN=57 Runoff=1.27 cfs 0.869 af

Reach 3R: Culvert Crossing Avg. Flow Depth=0.12' Max Vel=1.89 fps Inflow=0.18 cfs 0.500 af
36.0" Round Pipe n=0.013 L=187.0' S=0.0078 '/' Capacity=58.93 cfs Outflow=0.18 cfs 0.500 af

Reach 4R: (new Reach) Inflow=0.30 cfs 0.998 af
Outflow=0.30 cfs 0.998 af

Pond A1: A1 Pond Peak Elev=2,787.54' Storage=0.126 af Inflow=0.49 cfs 0.400 af
Outflow=0.08 cfs 0.275 af

Pond B2: B2 Pond Peak Elev=2,795.01' Storage=0.273 af Inflow=2.69 cfs 1.445 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0371 '/' Outflow=1.28 cfs 1.251 af

Pond B3: B3 Pond Peak Elev=2,780.02' Storage=0.976 af Inflow=1.96 cfs 2.364 af
Outflow=0.37 cfs 1.455 af

Pond C1: C1 Pond Peak Elev=2,792.25' Storage=0.492 af Inflow=2.60 cfs 1.446 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0077 '/' Outflow=0.30 cfs 0.998 af

Pond C2: C2 Pond Peak Elev=2,767.07' Storage=1.443 af Inflow=3.87 cfs 3.559 af
Outflow=0.53 cfs 2.268 af

Pond D2: D2 Pond Peak Elev=2,776.30' Storage=2.242 af Inflow=5.77 cfs 2.975 af
Outflow=0.28 cfs 0.773 af

Pond D3: D3 Pond Peak Elev=2,789.24' Storage=1.332 af Inflow=3.59 cfs 1.812 af
Outflow=0.18 cfs 0.500 af

Pond D4: D4 Pond Peak Elev=2,781.17' Storage=0.484 af Inflow=1.27 cfs 0.869 af
Outflow=0.12 cfs 0.396 af

Link A: DP A Inflow=0.26 cfs 0.419 af
Primary=0.26 cfs 0.419 af

Link B: DP B Inflow=0.71 cfs 2.148 af
Primary=0.71 cfs 2.148 af

Link C: DP C Inflow=0.60 cfs 2.651 af
Primary=0.60 cfs 2.651 af

Link D: DP D Inflow=7.07 cfs 6.598 af
Primary=7.07 cfs 6.598 af

Total Runoff Area = 166.364 ac Runoff Volume = 18.768 af Average Runoff Depth = 1.35"
81.40% Pervious = 135.423 ac 18.60% Impervious = 30.941 ac

Summary for Subcatchment DA-A1: Subcat DA-A1

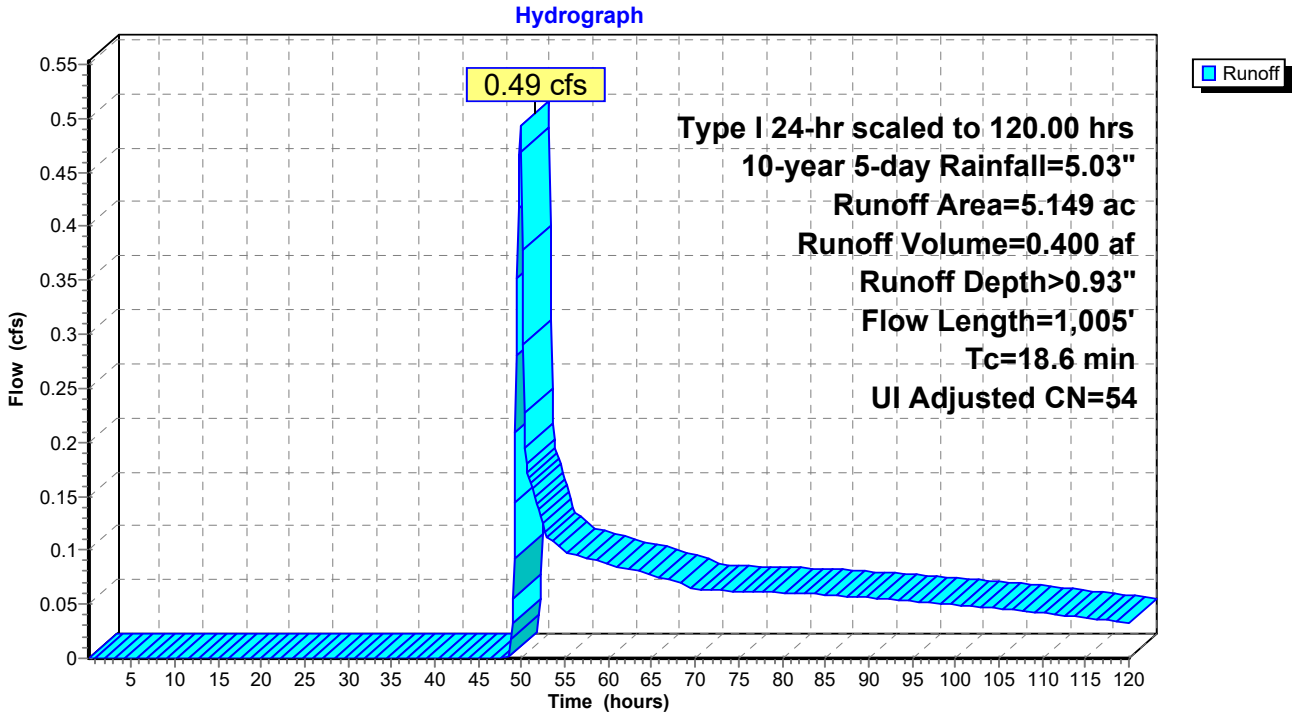
Runoff = 0.49 cfs @ 49.84 hrs, Volume= 0.400 af, Depth> 0.93"
Routed to Pond A1 : A1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

Area (ac)	CN	Adj	Description
4.141	49		Desert shrub range, Good, HSG A
0.635	98		Unconnected pavement, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.068	96		Gravel surface, HSG A
0.099	72		Dirt roads, HSG A
5.149	57	54	Weighted Average, UI Adjusted
4.514			87.67% Pervious Area
0.635			12.33% Impervious Area
0.635			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0208	0.15		**Sheet Flow, sheet 2802.48-2800.40** Range n= 0.130 P2= 1.88"
3.2	385	0.0158	2.02		**Shallow Concentrated Flow, shallow 2800.40-2794.30** Unpaved Kv= 16.1 fps
0.2	40	0.0050	4.20	7.43	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.5	398	0.0142	1.92		**Shallow Concentrated Flow, shallow 2793.57-2788.24** Unpaved Kv= 16.1 fps
0.5	82	0.0151	2.49		**Shallow Concentrated Flow, paved 2788.24-2787** Paved Kv= 20.3 fps
18.6	1,005	Total			

Subcatchment DA-A1: Subcat DA-A1



Summary for Subcatchment DA-A1.1: Subcat DA-A1.1

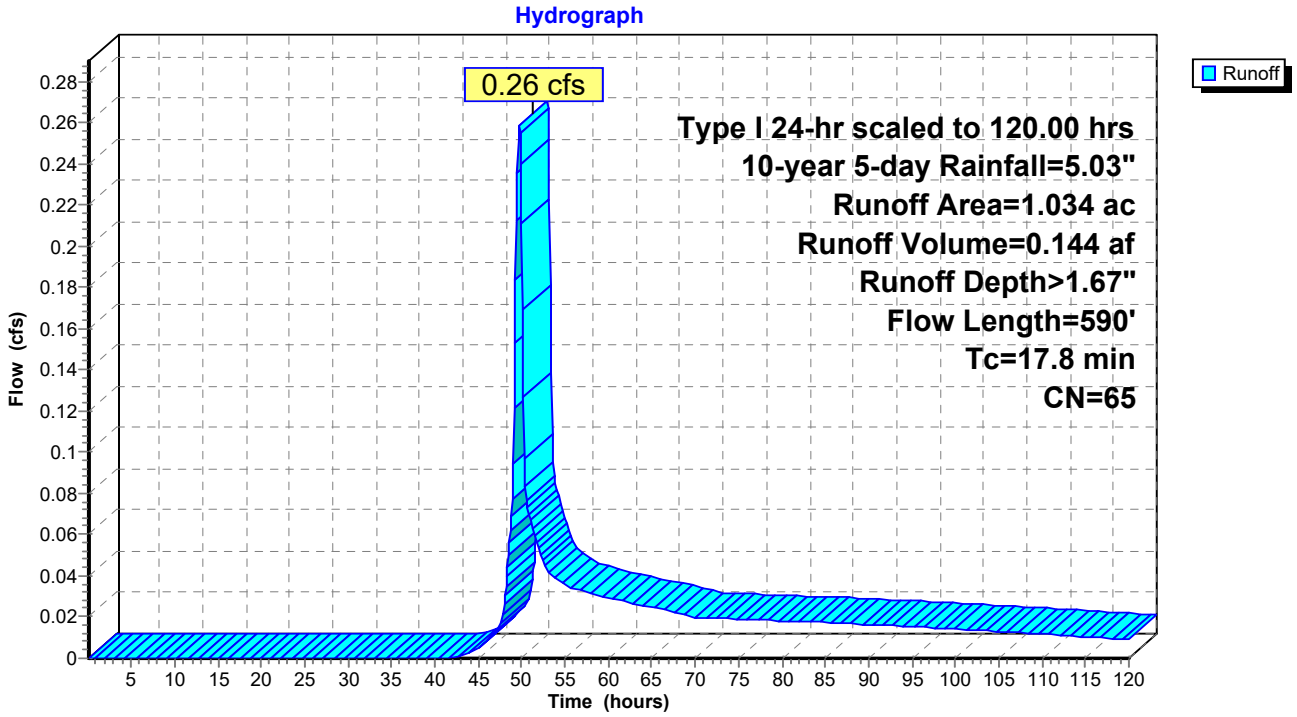
Runoff = 0.26 cfs @ 49.72 hrs, Volume= 0.144 af, Depth> 1.67"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

Area (ac)	CN	Description
0.693	49	Desert shrub range, Good, HSG A
0.341	98	Unconnected pavement, HSG A
1.034	65	Weighted Average
0.693		67.02% Pervious Area
0.341		32.98% Impervious Area
0.341		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0182	0.14		**Sheet Flow, sheet 2787.94-2786.12** Range n= 0.130 P2= 1.88"
4.7	369	0.0172	1.31		**Shallow Concentrated Flow, shallow 2786.12-2779.76** Nearly Bare & Untilled Kv= 10.0 fps
0.2	26	0.0200	2.87		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.1	95	0.0211	1.45		**Shallow Concentrated Flow, shallow 2779-2776.99** Nearly Bare & Untilled Kv= 10.0 fps
17.8	590	Total			

Subcatchment DA-A1.1: Subcat DA-A1.1



Summary for Subcatchment DA-B1: Subcat DA-B1

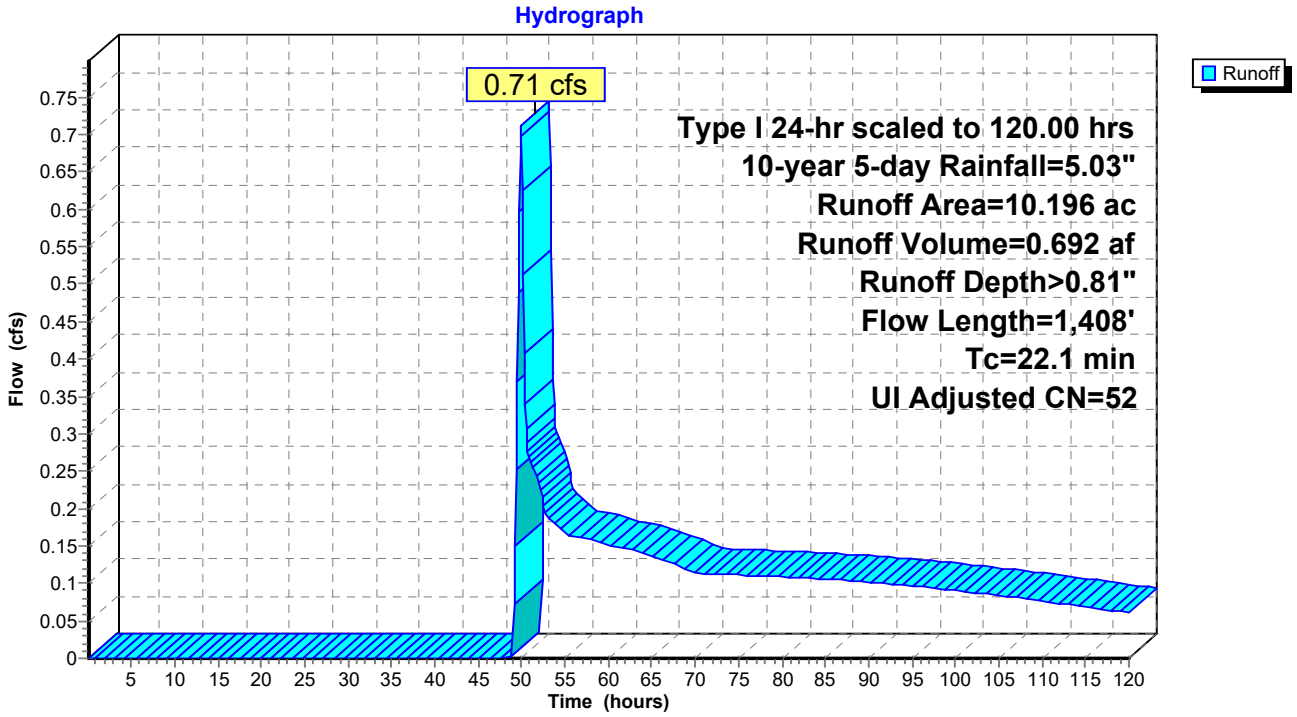
Runoff = 0.71 cfs @ 49.92 hrs, Volume= 0.692 af, Depth> 0.81"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Adj	Description
	8.673	49		Desert shrub range, Good, HSG A
	1.086	98		Unconnected pavement, HSG A
*	0.437	55		Surrounding Equip. Cover, HSG A
	10.196	54	52	Weighted Average, UI Adjusted
	9.110			89.35% Pervious Area
	1.086			10.65% Impervious Area
	1.086			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0185	0.14		**Sheet Flow, Sheet Flow 2803.05-2801.20** Range n= 0.130 P2= 1.88"
1.6	207	0.0189	2.21		**Shallow Concentrated Flow, shallow 2801.20-2797.28** Unpaved Kv= 16.1 fps
0.2	31	0.0200	2.87		**Shallow Concentrated Flow, shallow 2797.28-2796.65** Paved Kv= 20.3 fps
3.1	416	0.0191	2.23		**Shallow Concentrated Flow, shallow 2796.65-2788.70** Unpaved Kv= 16.1 fps
0.2	28	0.0160	2.57		**Shallow Concentrated Flow, shallow paved 2788.70-2788.25** Paved Kv= 20.3 fps
4.1	507	0.0161	2.04		**Shallow Concentrated Flow, shallow unpaved 2788.25-2780.00** Unpaved Kv= 16.1 fps
0.2	27	0.0200	2.87		**Shallow Concentrated Flow, shallow paved** Paved Kv= 20.3 fps
0.9	92	0.0107	1.67		**Shallow Concentrated Flow, shallow unpaved 2779.05-2778.06** Unpaved Kv= 16.1 fps
22.1	1,408	Total			

Subcatchment DA-B1: Subcat DA-B1



Summary for Subcatchment DA-B2: Subcat DA-B2

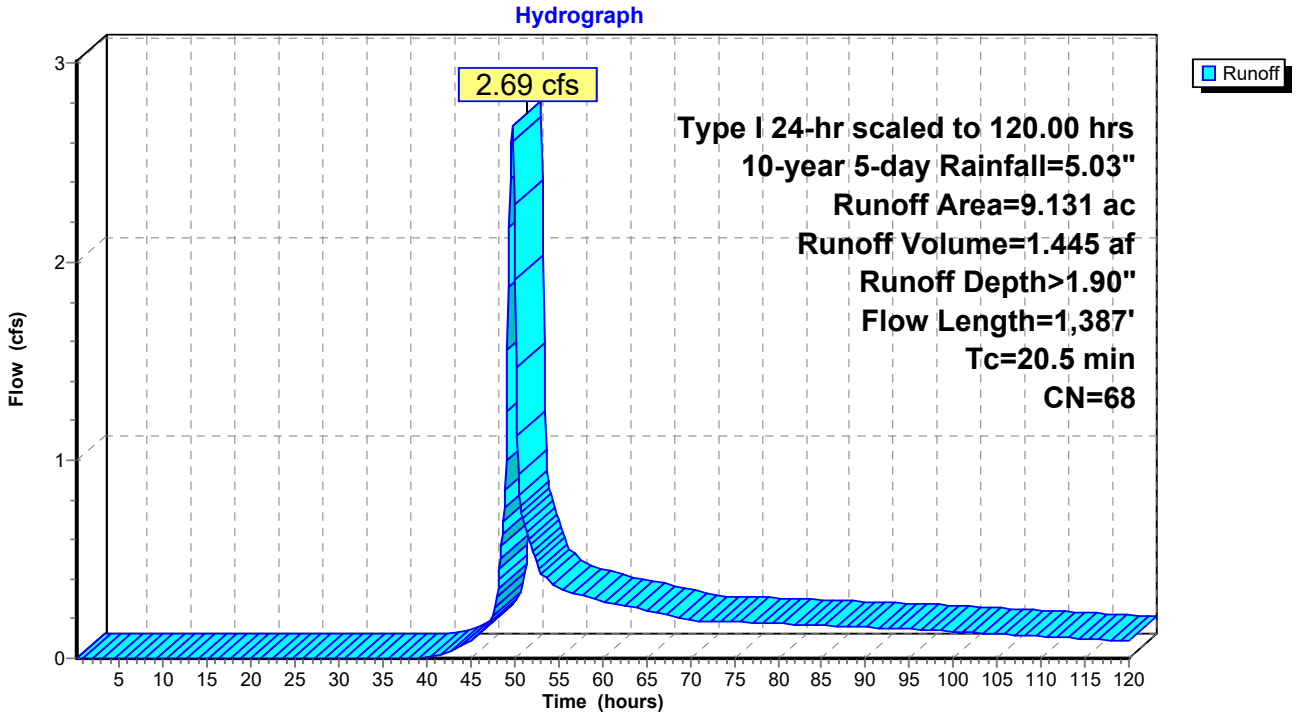
Runoff = 2.69 cfs @ 49.74 hrs, Volume= 1.445 af, Depth> 1.90"
Routed to Pond B2 : B2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Description
	2.467	49	Desert shrub range, Good, HSG A
	3.050	98	Unconnected pavement, HSG A
*	3.614	55	Surrounding Equip. Cover, HSG A
	9.131	68	Weighted Average
	6.081		66.60% Pervious Area
	3.050		33.40% Impervious Area
	3.050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0319	0.18		**Sheet Flow, sheet 2808-2804.81** Range n= 0.130 P2= 1.88"
6.6	792	0.0156	2.01		**Shallow Concentrated Flow, shallow range 2804.81-2802.44** Unpaved Kv= 16.1 fps
0.2	52	0.0050	4.20	7.43	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
2.2	187	0.0080	1.44		**Shallow Concentrated Flow, shallow unpaved 2802-2800.37** Unpaved Kv= 16.1 fps
2.0	256	0.0110	2.13		**Shallow Concentrated Flow, paved 2800.37-2797.53** Paved Kv= 20.3 fps
20.5	1,387	Total			

Subcatchment DA-B2: Subcat DA-B2



Summary for Subcatchment DA-B3: Subcat DA-B3

[49] Hint: Tc<2dt may require smaller dt

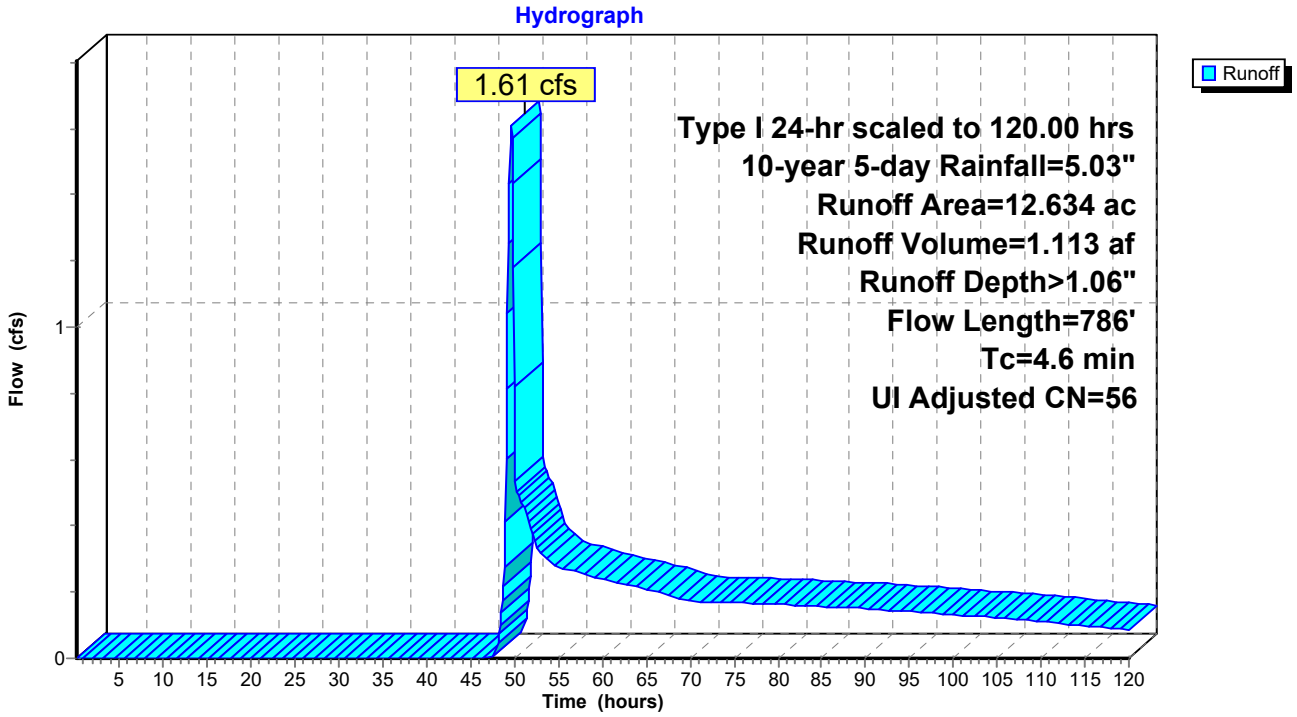
Runoff = 1.61 cfs @ 49.61 hrs, Volume= 1.113 af, Depth> 1.06"
Routed to Pond B3 : B3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Adj	Description
	6.592	49		Desert shrub range, Good, HSG A
	2.763	98		Unconnected pavement, HSG A
*	3.279	55		Surrounding Equip. Cover, HSG A
	12.634	61	56	Weighted Average, UI Adjusted
	9.871			78.13% Pervious Area
	2.763			21.87% Impervious Area
	2.763			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0190	0.81		**Sheet Flow, sheet paved 2799.71-2799.14** Smooth surfaces n= 0.011 P2= 1.88"
1.1	80	0.0340	1.25		**Sheet Flow, sheet unpaved 2799.14-2796.37** Smooth surfaces n= 0.011 P2= 1.88"
1.4	304	0.0480	3.53		**Shallow Concentrated Flow, shallow 2796.37-2781.77** Unpaved Kv= 16.1 fps
0.2	51	0.0075	4.04	72.81	**Channel Flow, channel 2781.77-2781.39** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.1	42	0.0209	8.59	15.19	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.9	193	0.0054	3.43	61.78	**Channel Flow, channel 2780.52-2779.48** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.3	86	0.0054	4.37	7.72	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
4.6	786	Total			

Subcatchment DA-B3: Subcat DA-B3



Summary for Subcatchment DA-C1: Subcat DA-C1

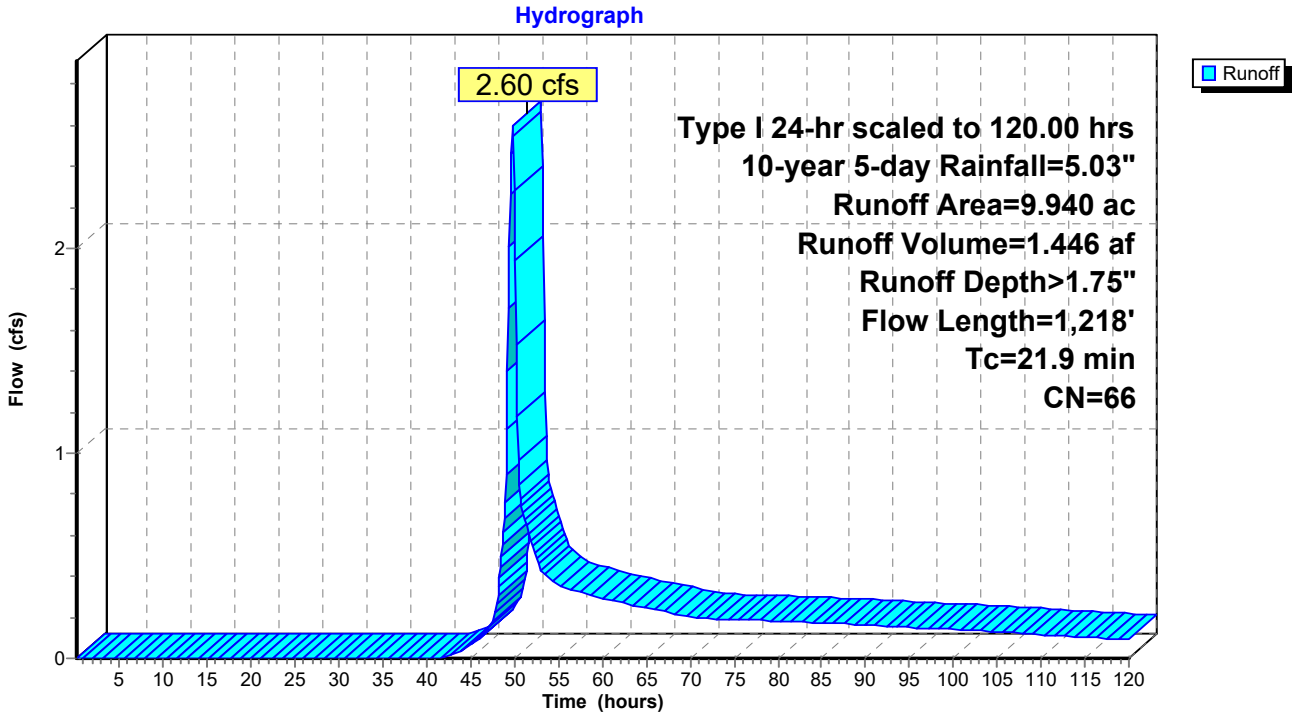
Runoff = 2.60 cfs @ 49.77 hrs, Volume= 1.446 af, Depth> 1.75"
Routed to Pond C1 : C1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Description
	3.160	49	Desert shrub range, Good, HSG A
	3.020	98	Unconnected pavement, HSG A
*	3.760	55	Surrounding Equip. Cover, HSG A
	9.940	66	Weighted Average
	6.920		69.62% Pervious Area
	3.020		30.38% Impervious Area
	3.020		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	58	0.0030	0.06		**Sheet Flow, Sheet 2813.48-2813.30** Range n= 0.130 P2= 1.88"
0.8	42	0.0205	0.90		**Sheet Flow, Sheet paved 2813.30-2812.44** Smooth surfaces n= 0.011 P2= 1.88"
3.1	450	0.0226	2.42		**Shallow Concentrated Flow, shallow 2812.44-2802.24** Unpaved Kv= 16.1 fps
0.4	152	0.0120	7.08	70.78	**Channel Flow, ditch 2802.24-2800.41** Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.023
0.2	102	0.0356	11.22	19.82	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.8	183	0.0050	3.78	83.06	**Channel Flow, channel 2796.77-2795.91** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035 Riprap, 6-inch
0.2	64	0.0064	5.62	9.93	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.7	167	0.0050	3.78	83.06	**Channel Flow, channel 2795.50-2794.65** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035
21.9	1,218	Total			

Subcatchment DA-C1: Subcat DA-C1



Summary for Subcatchment DA-C2: Subcat DA-C2

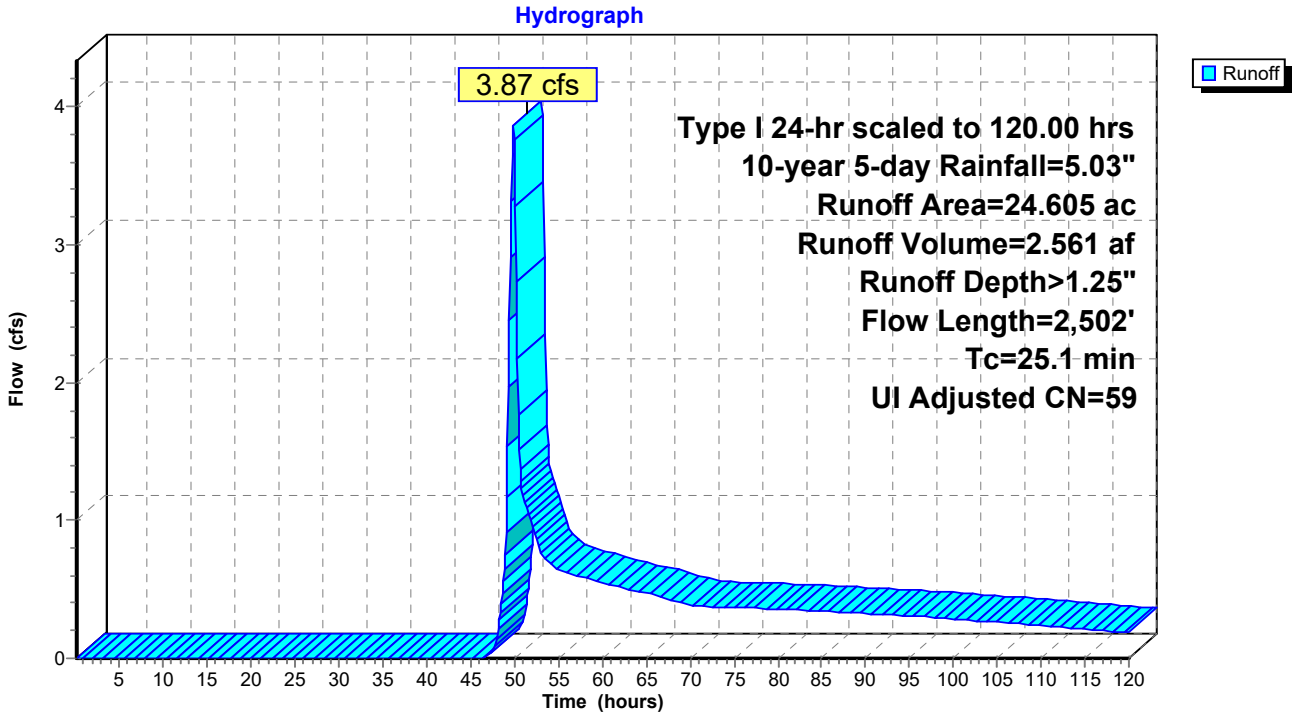
Runoff = 3.87 cfs @ 49.86 hrs, Volume= 2.561 af, Depth> 1.25"
Routed to Pond C2 : C2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Adj	Description
	6.655	49		Desert shrub range, Good, HSG A
	6.930	98		Unconnected pavement, HSG A
*	11.020	55		Surrounding Equip. Cover, HSG A
	24.605	65	59	Weighted Average, UI Adjusted
	17.675			71.83% Pervious Area
	6.930			28.17% Impervious Area
	6.930			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0153	0.13		**Sheet Flow, Sheet Flow 2811-2809.47** Range n= 0.130 P2= 1.88"
9.8	1,280	0.0182	2.17		**Shallow Concentrated Flow, Shallow 2809.47-2786.17** Unpaved Kv= 16.1 fps
2.6	1,122	0.0175	7.21	230.73	**Channel Flow, channel 2787.62-2768** Area= 32.0 sf Perim= 22.0' r= 1.45' n= 0.035 Riprap, 6-inch
25.1	2,502	Total			

Subcatchment DA-C2: Subcat DA-C2



Summary for Subcatchment DA-C3: Subcat DA-C3

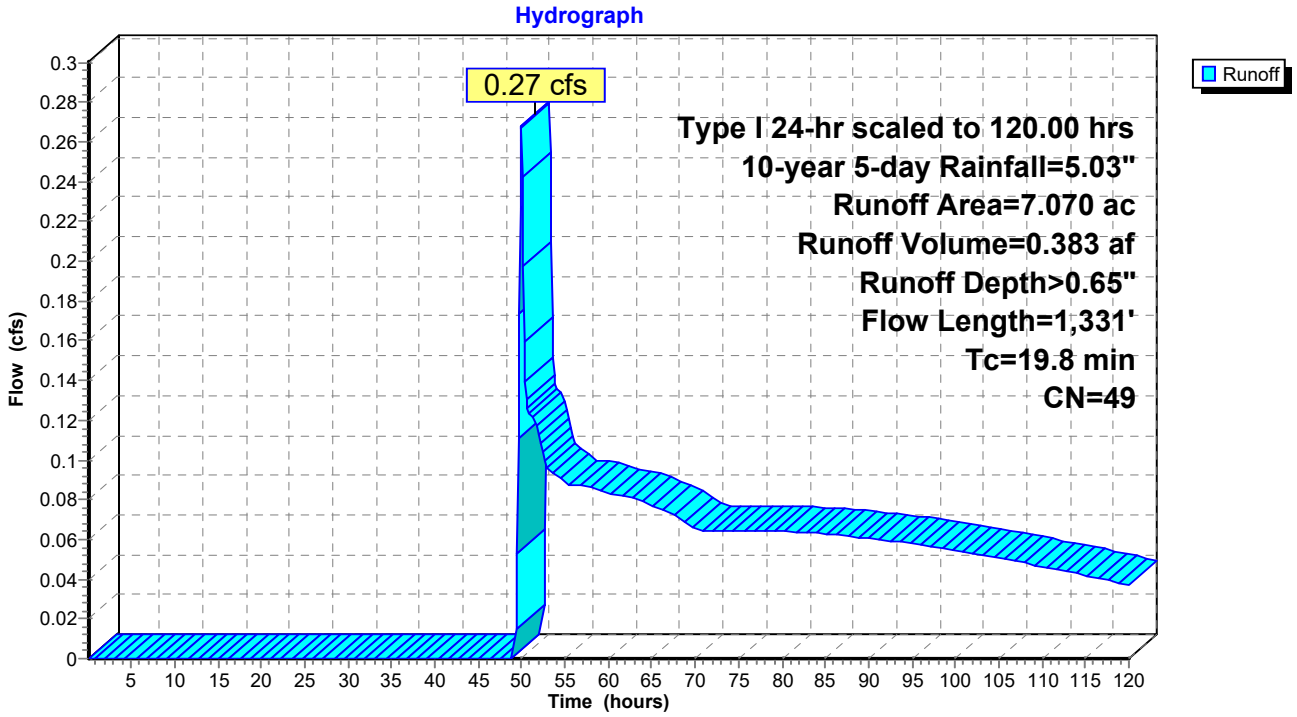
Runoff = 0.27 cfs @ 49.97 hrs, Volume= 0.383 af, Depth> 0.65"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

Area (ac)	CN	Description
7.070	49	Desert shrub range, Good, HSG A
0.000	98	Unconnected pavement, HSG A
7.070	49	Weighted Average
7.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0224	0.15		**Sheet Flow, sheet 2785.88-2783.64** Range n= 0.130 P2= 1.88"
8.9	1,231	0.0205	2.31		**Shallow Concentrated Flow, shallow unpaved 2786.64-2761.34** Unpaved Kv= 16.1 fps
19.8	1,331	Total			

Subcatchment DA-C3: Subcat DA-C3



Summary for Subcatchment DA-D1: Subcat DA-D1

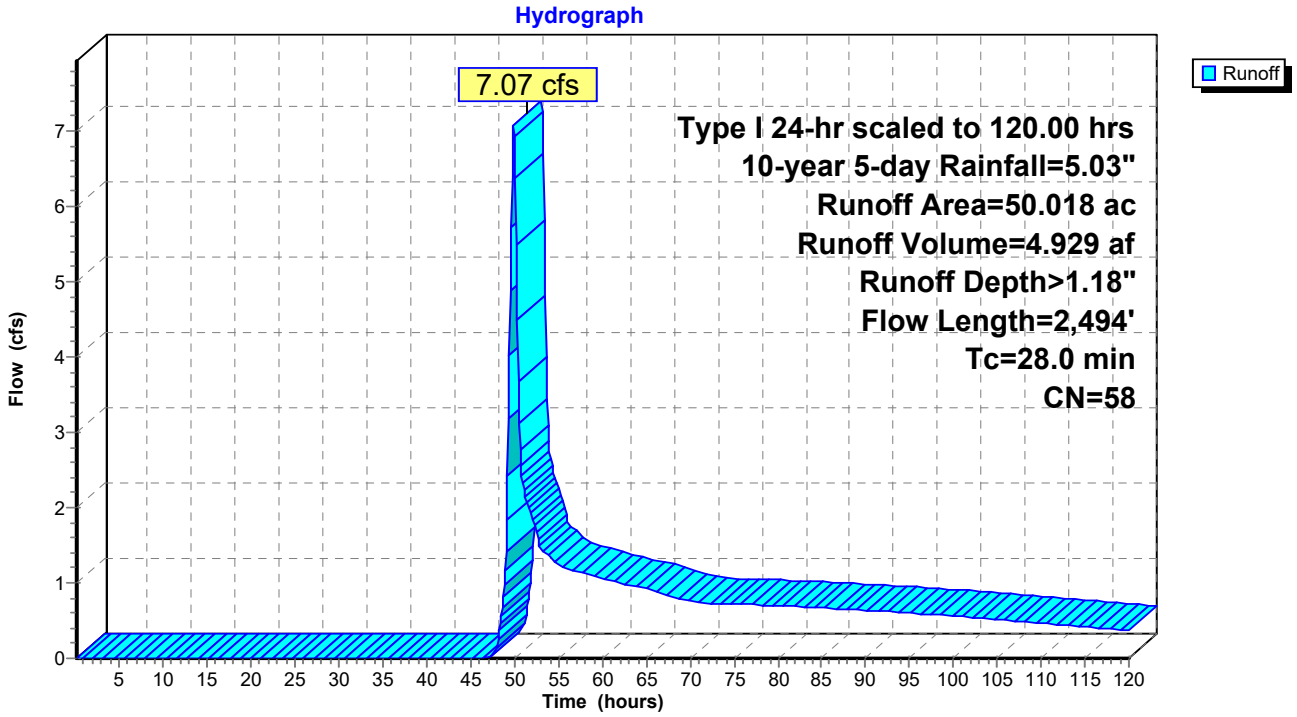
Runoff = 7.07 cfs @ 49.91 hrs, Volume= 4.929 af, Depth> 1.18"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

Area (ac)	CN	Description
27.134	49	Desert shrub range, Good, HSG A
20.822	68	Desert shrub range, Good, HSG B
1.078	72	Dirt roads, HSG A
0.264	82	Dirt roads, HSG B
0.400	98	Unconnected pavement, HSG A
0.320	98	Unconnected pavement, HSG B
50.018	58	Weighted Average
49.298		98.56% Pervious Area
0.720		1.44% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0270	0.16		**Sheet Flow, sheet 2810.70-2808** Range n= 0.130 P2= 1.88"
7.2	1,058	0.0230	2.44		**Shallow Concentrated Flow, shallow 2808-2783.46** Unpaved Kv= 16.1 fps
0.2	57	0.0080	5.32	9.40	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
10.5	1,279	0.0160	2.04		**Shallow Concentrated Flow, shallow 2783-2761** Unpaved Kv= 16.1 fps
28.0	2,494	Total			

Subcatchment DA-D1: Subcat DA-D1



Summary for Subcatchment DA-D2: Subcat DA-D2

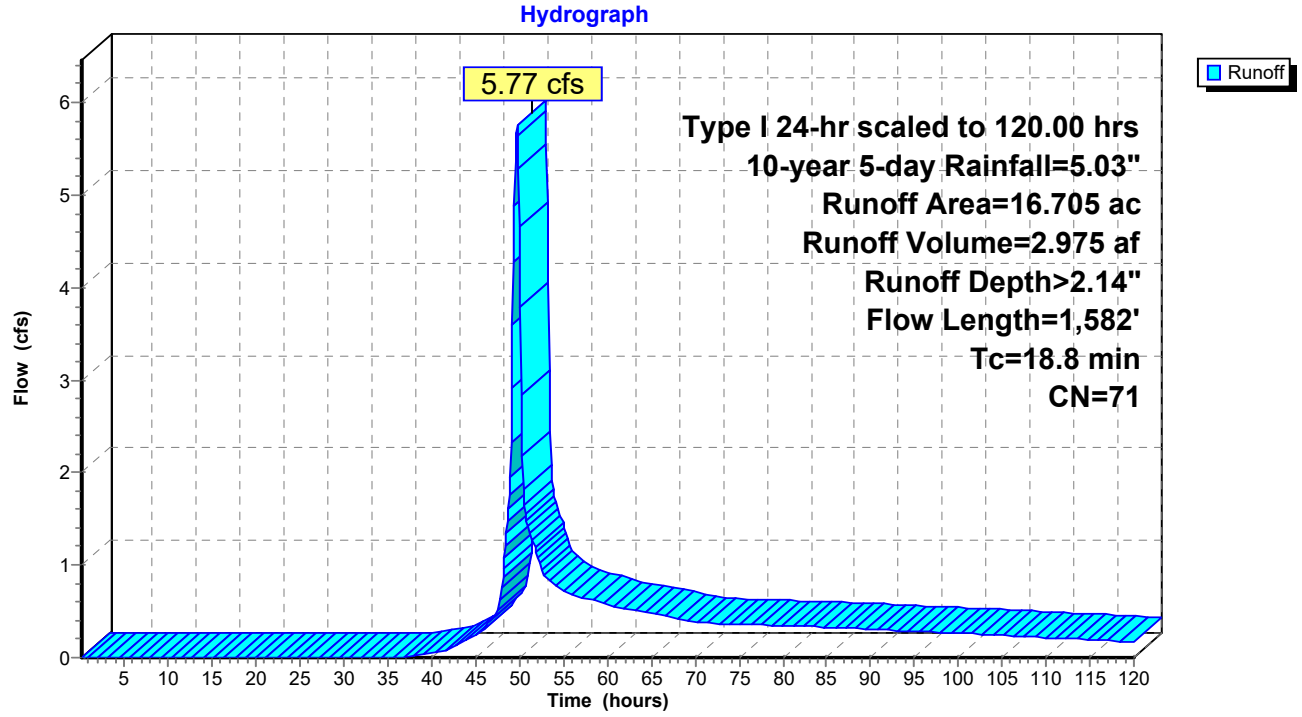
Runoff = 5.77 cfs @ 49.70 hrs, Volume= 2.975 af, Depth> 2.14"
Routed to Pond D2 : D2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Description
	1.577	49	Desert shrub range, Good, HSG A
	5.763	98	Unconnected pavement, HSG A
	0.845	98	Unconnected pavement, HSG B
*	8.520	55	Surrounding Equip. Cover, HSG A
	16.705	71	Weighted Average
	10.097		60.44% Pervious Area
	6.608		39.56% Impervious Area
	6.608		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	57	0.0520	0.19		**Sheet Flow, sheet 2800-2797** Range n= 0.130 P2= 1.88"
13.8	1,525	0.0130	1.84		**Shallow Concentrated Flow, shallow 2797-2777.25** Unpaved Kv= 16.1 fps
18.8	1,582	Total			

Subcatchment DA-D2: Subcat DA-D2



Summary for Subcatchment DA-D3: Subcat DA-D3

[49] Hint: Tc<2dt may require smaller dt

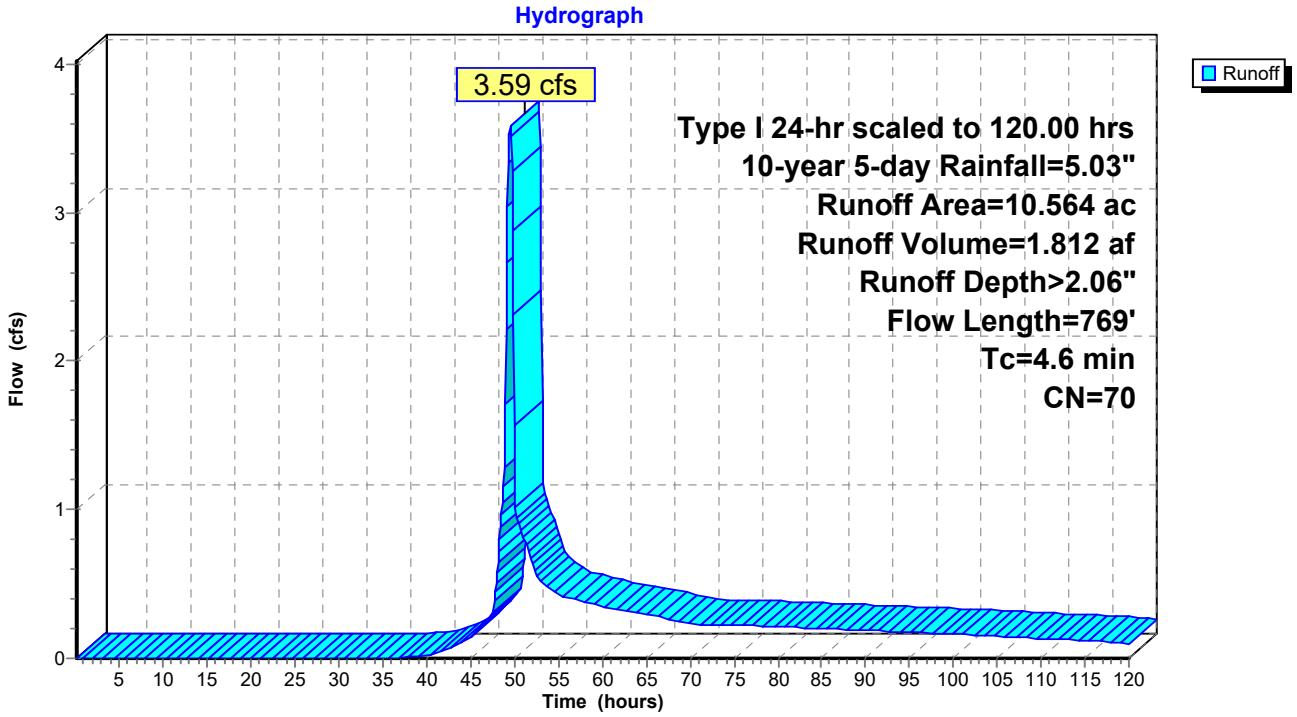
Runoff = 3.59 cfs @ 49.49 hrs, Volume= 1.812 af, Depth> 2.06"
Routed to Pond D3 : D3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Description
	1.397	49	Desert shrub range, Good, HSG A
	3.917	98	Unconnected pavement, HSG A
*	5.250	55	Surrounding Equip. Cover, HSG A
	10.564	70	Weighted Average
	6.647		62.92% Pervious Area
	3.917		37.08% Impervious Area
	3.917		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0500	1.52		**Sheet Flow, Sheet 2819-2814** Smooth surfaces n= 0.011 P2= 1.88"
3.4	626	0.0360	3.05		**Shallow Concentrated Flow, shallow 2814-2791.5** Unpaved Kv= 16.1 fps
0.1	43	0.0340	11.87	20.98	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
4.6	769	Total			

Subcatchment DA-D3: Subcat DA-D3



Summary for Subcatchment DA-D4: Subcat DA-D4

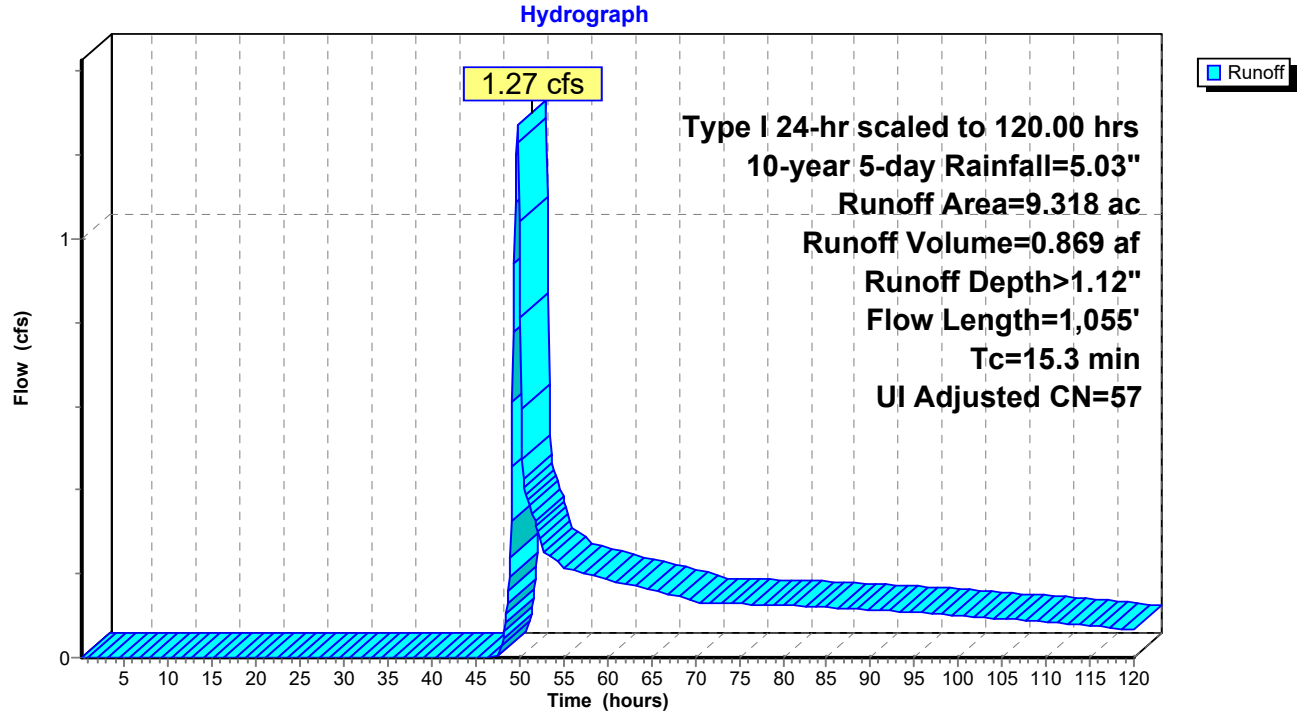
Runoff = 1.27 cfs @ 49.75 hrs, Volume= 0.869 af, Depth> 1.12"
Routed to Pond D4 : D4 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 120.00 hrs 10-year 5-day Rainfall=5.03"

	Area (ac)	CN	Adj	Description
	3.543	49		Desert shrub range, Good, HSG A
	0.004	72		Dirt roads, HSG A
	1.871	98		Unconnected pavement, HSG A
*	3.900	55		Surrounding Equip. Cover, HSG A
	9.318	61	57	Weighted Average, UI Adjusted
	7.447			79.92% Pervious Area
	1.871			20.08% Impervious Area
	1.871			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		**Sheet Flow, sheet 2817-2814** Range n= 0.130 P2= 1.88"
5.6	955	0.0314	2.85		**Shallow Concentrated Flow, shallow 2814-2784** Unpaved Kv= 16.1 fps
15.3	1,055	Total			

Subcatchment DA-D4: Subcat DA-D4



Summary for Reach 3R: Culvert Crossing

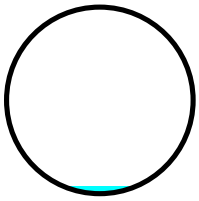
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth > 0.57" for 10-year 5-day event
Inflow = 0.18 cfs @ 91.62 hrs, Volume= 0.500 af
Outflow = 0.18 cfs @ 91.66 hrs, Volume= 0.500 af, Atten= 0%, Lag= 2.7 min
Routed to Link D : DP D

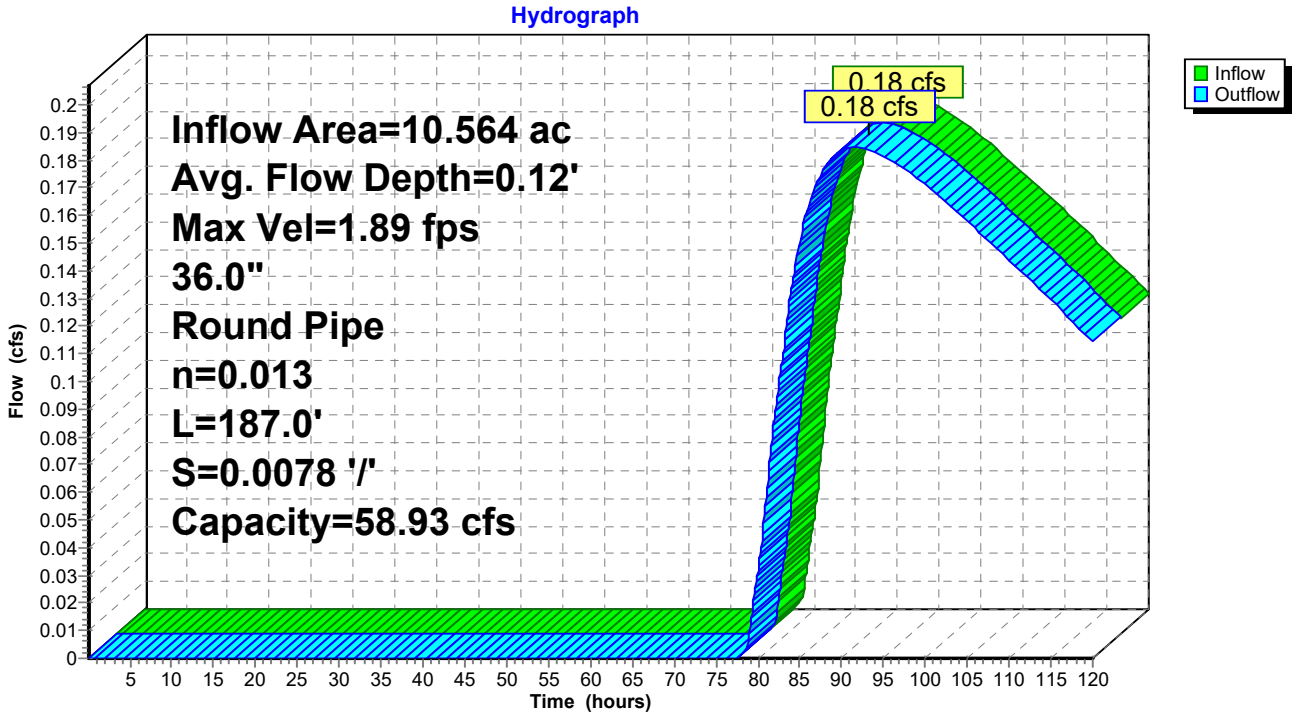
Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.89 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.72 fps, Avg. Travel Time= 1.8 min

Peak Storage= 18 cf @ 91.64 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 1.19'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 58.93 cfs

36.0" Round Pipe
n= 0.013
Length= 187.0' Slope= 0.0078 '/'
Inlet Invert= 2,783.46', Outlet Invert= 2,782.00'



Reach 3R: Culvert Crossing



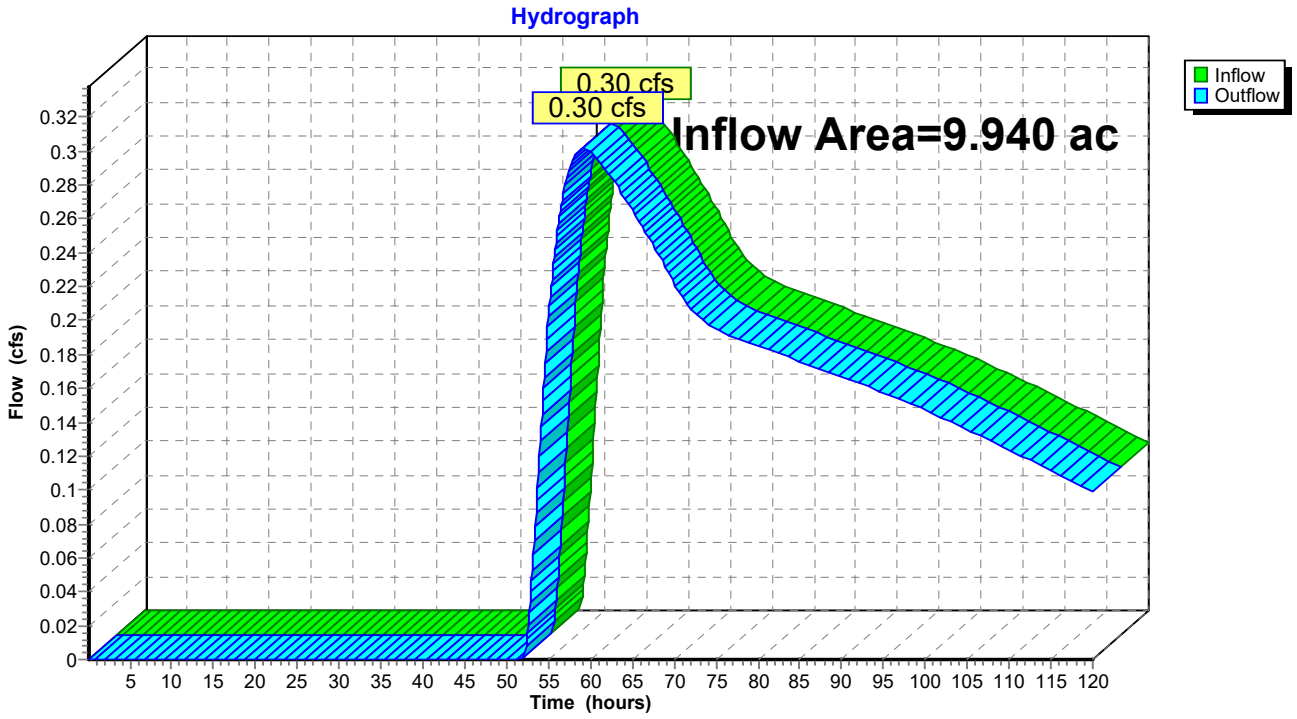
Summary for Reach 4R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth > 1.20" for 10-year 5-day event
Inflow = 0.30 cfs @ 59.19 hrs, Volume= 0.998 af
Outflow = 0.30 cfs @ 59.19 hrs, Volume= 0.998 af, Atten= 0%, Lag= 0.0 min
Routed to Pond C2 : C2 Pond

Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Reach 4R: (new Reach)



Summary for Pond A1: A1 Pond

Inflow Area = 5.149 ac, 12.33% Impervious, Inflow Depth > 0.93" for 10-year 5-day event
Inflow = 0.49 cfs @ 49.84 hrs, Volume= 0.400 af
Outflow = 0.08 cfs @ 61.44 hrs, Volume= 0.275 af, Atten= 83%, Lag= 696.0 min
Primary = 0.08 cfs @ 61.44 hrs, Volume= 0.275 af
Routed to Link A : DP A

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,787.54' @ 61.44 hrs Surf.Area= 0.072 ac Storage= 0.126 af

Plug-Flow detention time= 1,341.9 min calculated for 0.275 af (69% of inflow)
Center-of-Mass det. time= 624.4 min (5,180.0 - 4,555.6)

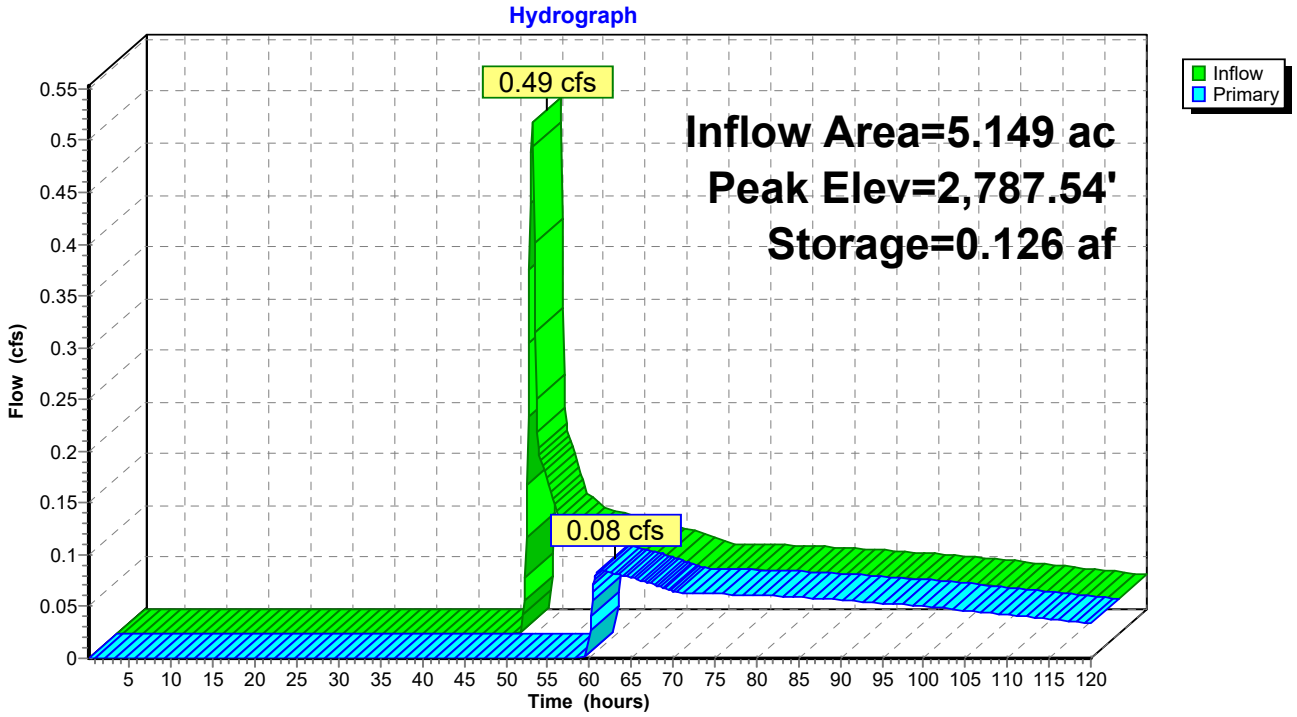
Volume	Invert	Avail.Storage	Storage Description
#1	2,785.00'	0.162 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,785.00	0.030	0.000	0.000
2,786.00	0.045	0.037	0.037
2,787.00	0.061	0.053	0.090
2,788.00	0.081	0.071	0.162

Device	Routing	Invert	Outlet Devices
#1	Primary	2,787.50'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.08 cfs @ 61.44 hrs HW=2,787.54' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.08 cfs @ 0.45 fps)

Pond A1: A1 Pond



Summary for Pond B2: B2 Pond

Inflow Area = 9.131 ac, 33.40% Impervious, Inflow Depth > 1.90" for 10-year 5-day event
Inflow = 2.69 cfs @ 49.74 hrs, Volume= 1.445 af
Outflow = 1.28 cfs @ 50.26 hrs, Volume= 1.251 af, Atten= 52%, Lag= 31.4 min
Primary = 1.28 cfs @ 50.26 hrs, Volume= 1.251 af
Routed to Pond B3 : B3 Pond

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,795.01' @ 50.26 hrs Surf.Area= 0.209 ac Storage= 0.273 af

Plug-Flow detention time= 608.1 min calculated for 1.251 af (87% of inflow)
Center-of-Mass det. time= 247.6 min (4,447.6 - 4,199.9)

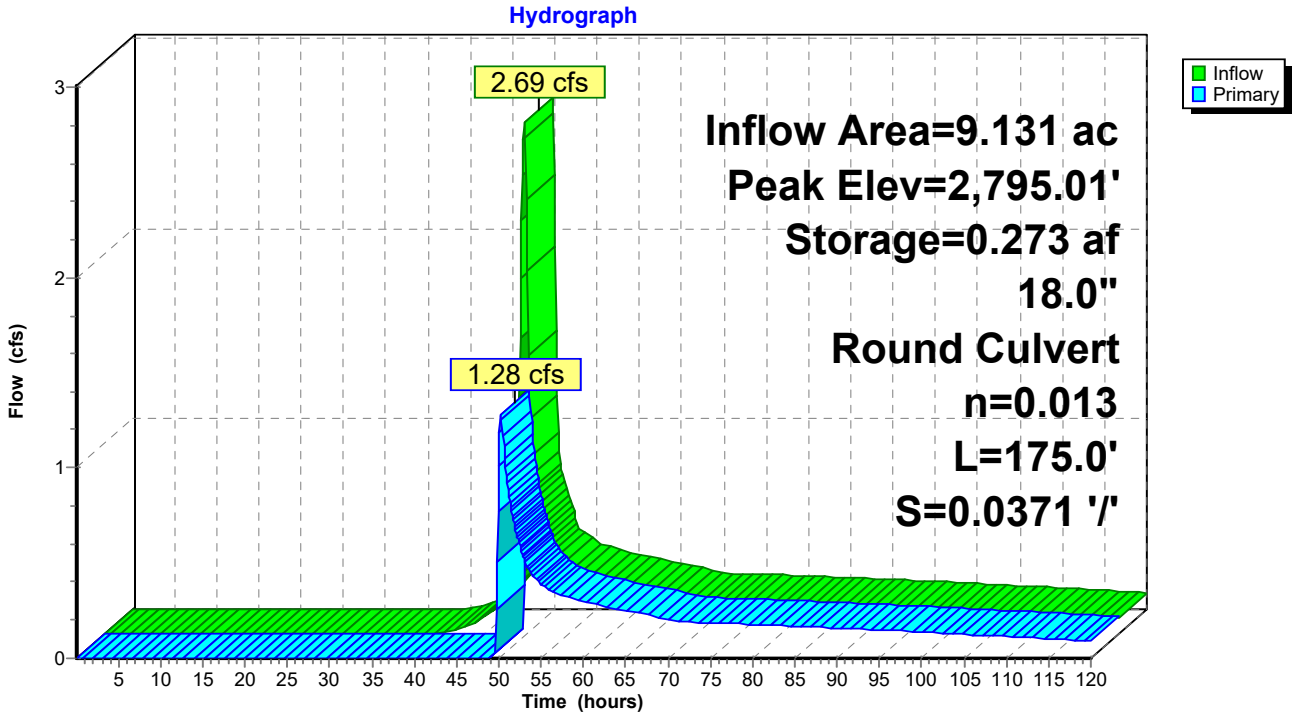
Volume	Invert	Avail.Storage	Storage Description
#1	2,793.50'	1.283 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,793.50	0.147	0.000	0.000
2,794.50	0.187	0.167	0.167
2,795.50	0.231	0.209	0.376
2,796.50	0.277	0.254	0.630
2,797.50	0.326	0.301	0.931
2,798.50	0.377	0.351	1.283

Device	Routing	Invert	Outlet Devices
#1	Primary	2,794.50'	**18.0" Round Culvert** L= 175.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,794.50' / 2,788.00' S= 0.0371 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.27 cfs @ 50.26 hrs HW=2,795.01' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.27 cfs @ 2.42 fps)

Pond B2: B2 Pond



Summary for Pond B3: B3 Pond

Inflow Area = 21.765 ac, 26.71% Impervious, Inflow Depth > 1.30" for 10-year 5-day event
Inflow = 1.96 cfs @ 49.86 hrs, Volume= 2.364 af
Outflow = 0.37 cfs @ 70.43 hrs, Volume= 1.455 af, Atten= 81%, Lag= 1,233.9 min
Primary = 0.37 cfs @ 70.43 hrs, Volume= 1.455 af
Routed to Link B : DP B

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,780.02' @ 70.43 hrs Surf.Area= 0.685 ac Storage= 0.976 af

Plug-Flow detention time= 1,717.7 min calculated for 1.455 af (62% of inflow)
Center-of-Mass det. time= 857.3 min (5,321.9 - 4,464.6)

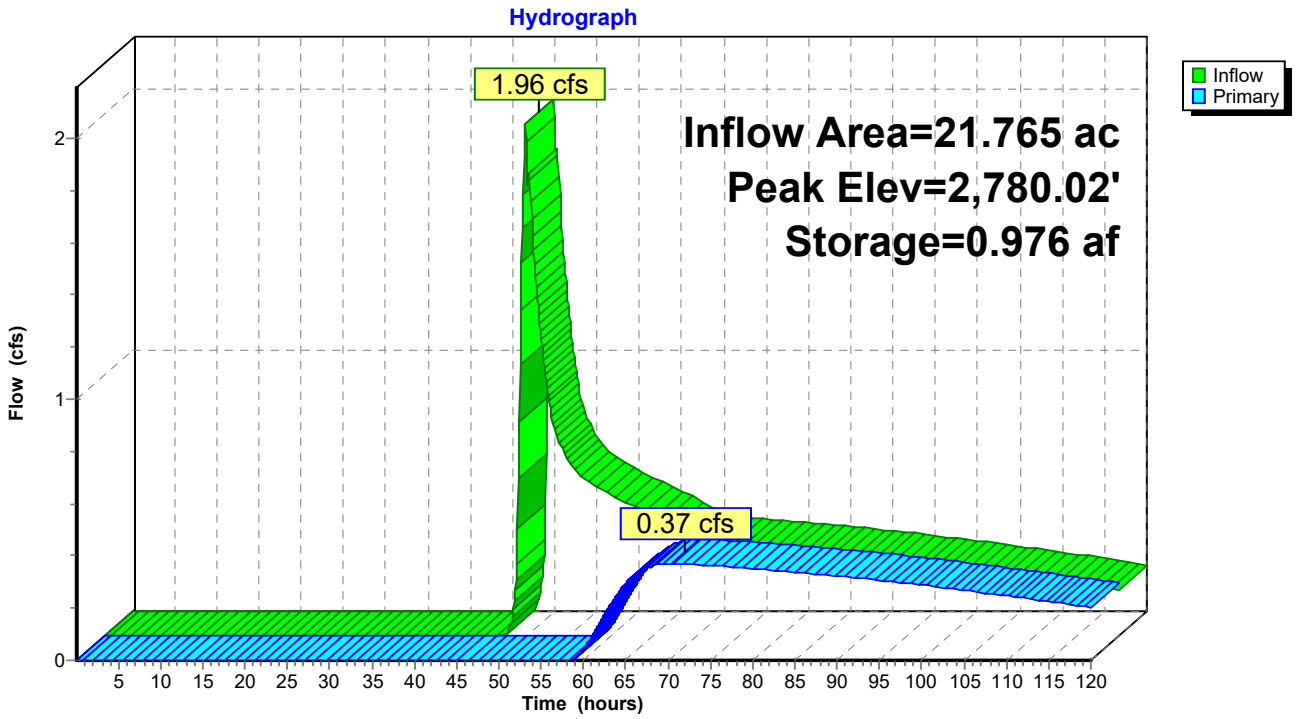
Volume	Invert	Avail.Storage	Storage Description
#1	2,778.50'	2.054 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,778.50	0.591	0.000	0.000
2,779.50	0.652	0.621	0.621
2,780.50	0.716	0.684	1.305
2,781.50	0.781	0.748	2.054

Device	Routing	Invert	Outlet Devices
#1	Primary	2,779.00'	**18.0" Round Culvert** L= 93.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.00' / 2,778.50' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,779.67'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.37 cfs @ 70.43 hrs HW=2,780.02' (Free Discharge)
↑—**1=Culvert** (Passes 0.37 cfs of 3.54 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 2.01 fps)

Pond B3: B3 Pond



Summary for Pond C1: C1 Pond

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth > 1.75" for 10-year 5-day event
Inflow = 2.60 cfs @ 49.77 hrs, Volume= 1.446 af
Outflow = 0.30 cfs @ 59.19 hrs, Volume= 0.998 af, Atten= 88%, Lag= 565.5 min
Primary = 0.30 cfs @ 59.19 hrs, Volume= 0.998 af
Routed to Reach 4R : (new Reach)

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,792.25' @ 59.19 hrs Surf.Area= 0.424 ac Storage= 0.492 af

Plug-Flow detention time= 1,377.3 min calculated for 0.998 af (69% of inflow)
Center-of-Mass det. time= 636.9 min (4,880.8 - 4,243.9)

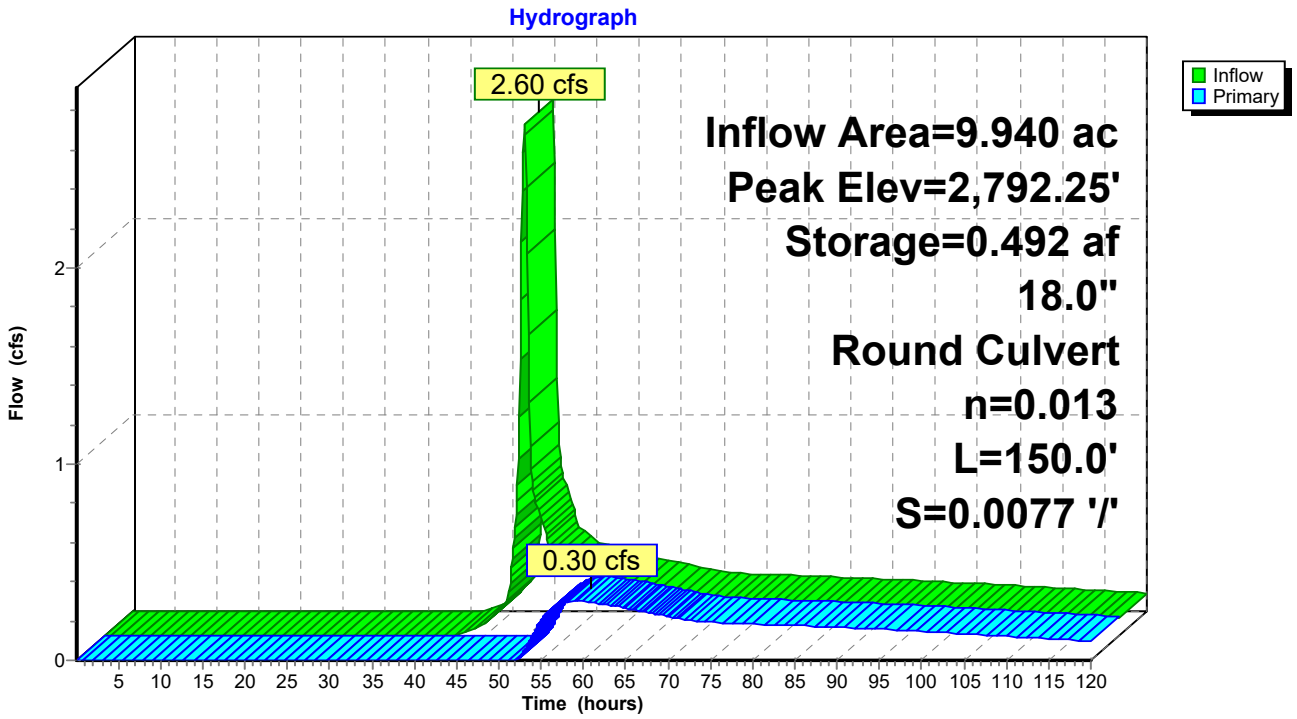
Volume	Invert	Avail.Storage	Storage Description
#1	2,791.00'	1.912 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,791.00	0.363	0.000	0.000
2,792.00	0.411	0.387	0.387
2,793.00	0.461	0.436	0.823
2,794.00	0.514	0.487	1.311
2,795.00	0.570	0.542	1.853
2,795.10	0.627	0.060	1.912

Device	Routing	Invert	Outlet Devices
#1	Primary	2,792.00'	**18.0" Round Culvert** L= 150.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,792.00' / 2,790.84' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.30 cfs @ 59.19 hrs HW=2,792.25' (Free Discharge)
1=Culvert (Barrel Controls 0.30 cfs @ 2.34 fps)

Pond C1: C1 Pond



Summary for Pond C2: C2 Pond

Inflow Area = 34.545 ac, 28.80% Impervious, Inflow Depth > 1.24" for 10-year 5-day event
Inflow = 3.87 cfs @ 49.86 hrs, Volume= 3.559 af
Outflow = 0.53 cfs @ 82.12 hrs, Volume= 2.268 af, Atten= 86%, Lag= 1,935.4 min
Primary = 0.53 cfs @ 82.12 hrs, Volume= 2.268 af
Routed to Link C : DP C

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,767.07' @ 82.12 hrs Surf.Area= 0.874 ac Storage= 1.443 af

Plug-Flow detention time= 1,679.5 min calculated for 2.268 af (64% of inflow)
Center-of-Mass det. time= 868.2 min (5,412.5 - 4,544.2)

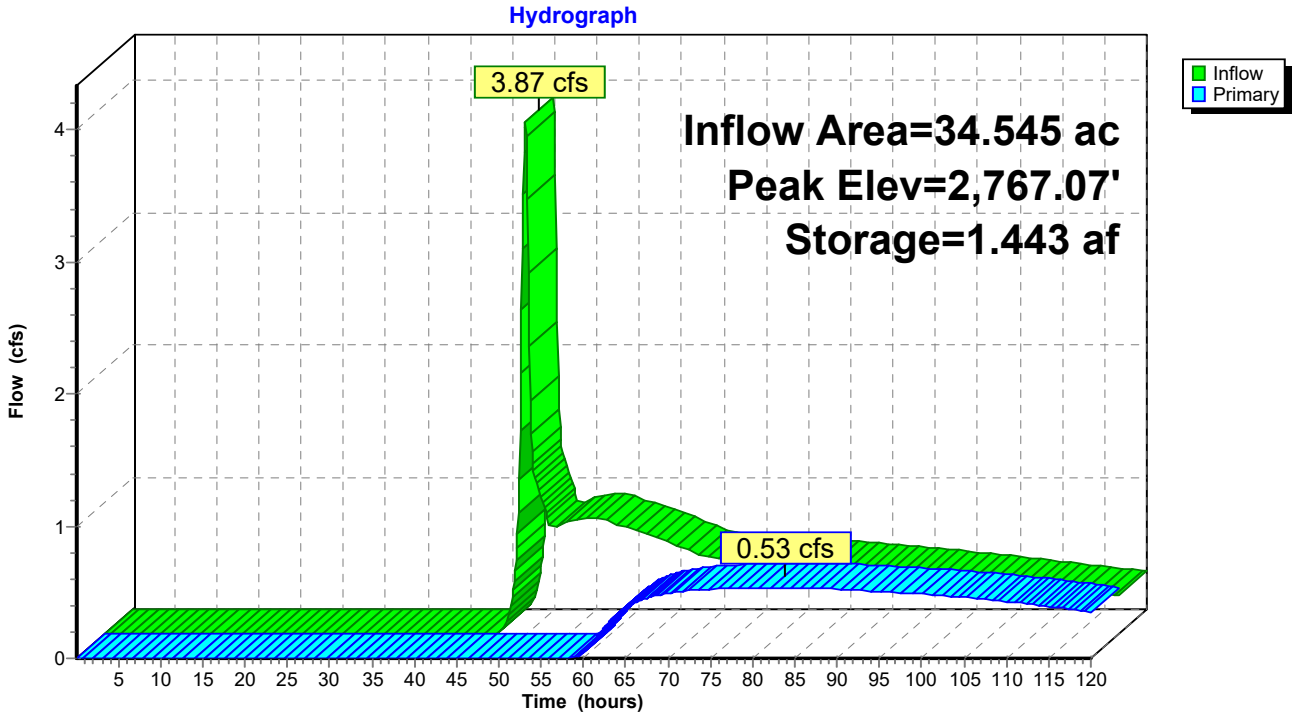
Volume	Invert	Avail.Storage	Storage Description
#1	2,765.00'	4.496 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,765.00	0.543	0.000	0.000
2,766.00	0.680	0.612	0.612
2,767.00	0.866	0.773	1.385
2,768.00	0.978	0.922	2.307
2,769.00	1.094	1.036	3.343
2,770.00	1.212	1.153	4.496

Device	Routing	Invert	Outlet Devices
#1	Primary	2,765.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,765.00' / 2,764.37' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,766.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,769.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.53 cfs @ 82.12 hrs HW=2,767.07' (Free Discharge)
└─**1=Culvert** (Passes 0.53 cfs of 8.75 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.71 fps)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond C2: C2 Pond



Summary for Pond D2: D2 Pond

Inflow Area = 16.705 ac, 39.56% Impervious, Inflow Depth > 2.14" for 10-year 5-day event
Inflow = 5.77 cfs @ 49.70 hrs, Volume= 2.975 af
Outflow = 0.28 cfs @ 96.43 hrs, Volume= 0.773 af, Atten= 95%, Lag= 2,803.7 min
Primary = 0.28 cfs @ 96.43 hrs, Volume= 0.773 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,776.30' @ 96.43 hrs Surf.Area= 0.791 ac Storage= 2.242 af

Plug-Flow detention time= 3,121.0 min calculated for 0.773 af (26% of inflow)
Center-of-Mass det. time= 1,903.6 min (6,040.0 - 4,136.4)

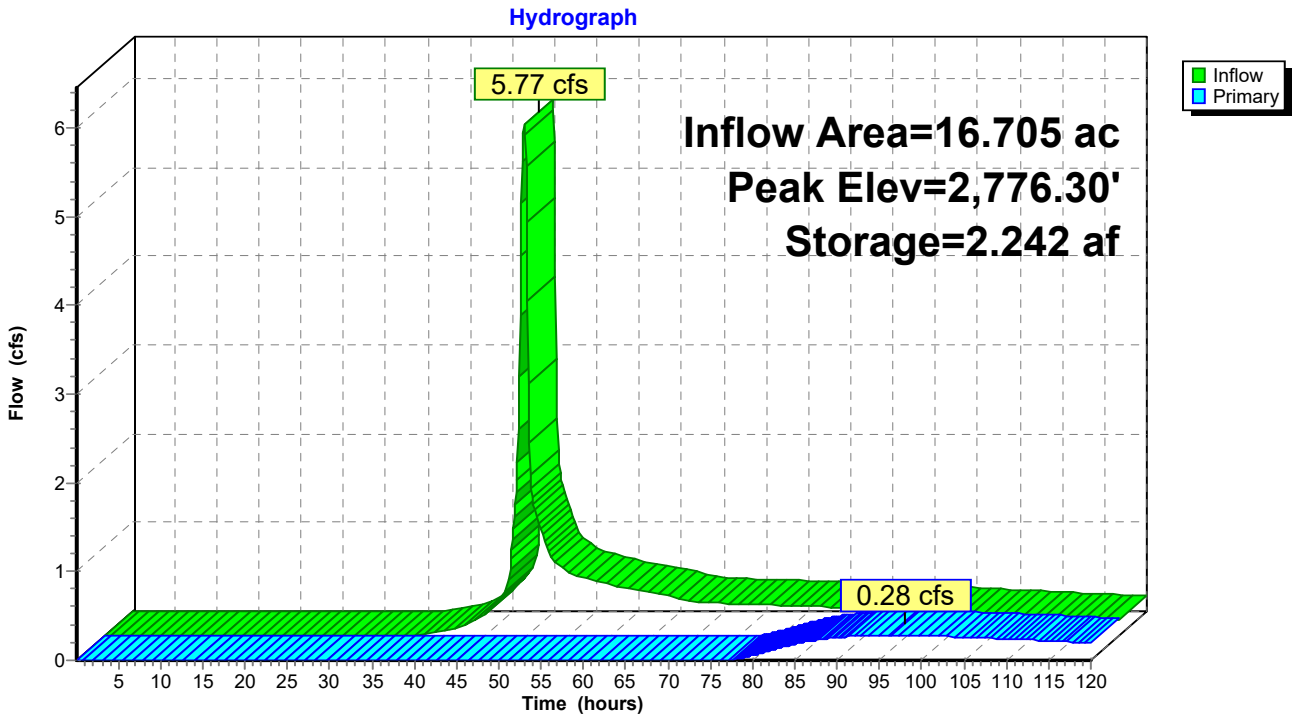
Volume	Invert	Avail.Storage	Storage Description
#1	2,773.00'	3.691 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,773.00	0.571	0.000	0.000
2,773.75	0.620	0.447	0.447
2,774.00	0.636	0.157	0.604
2,775.00	0.703	0.670	1.273
2,776.00	0.771	0.737	2.010
2,777.00	0.840	0.806	2.816
2,778.00	0.910	0.875	3.691

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,774.50'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,774.50' / 2,773.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,776.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 96.43 hrs HW=2,776.30' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 1.86 fps)
↑**1=Culvert** (Passes 0.28 cfs of 4.49 cfs potential flow)

Pond D2: D2 Pond



Summary for Pond D3: D3 Pond

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth > 2.06" for 10-year 5-day event
Inflow = 3.59 cfs @ 49.49 hrs, Volume= 1.812 af
Outflow = 0.18 cfs @ 91.62 hrs, Volume= 0.500 af, Atten= 95%, Lag= 2,527.4 min
Primary = 0.18 cfs @ 91.62 hrs, Volume= 0.500 af
Routed to Reach 3R : Culvert Crossing

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,789.24' @ 91.62 hrs Surf.Area= 0.384 ac Storage= 1.332 af

Plug-Flow detention time= 3,059.6 min calculated for 0.500 af (28% of inflow)
Center-of-Mass det. time= 1,835.5 min (5,982.5 - 4,146.9)

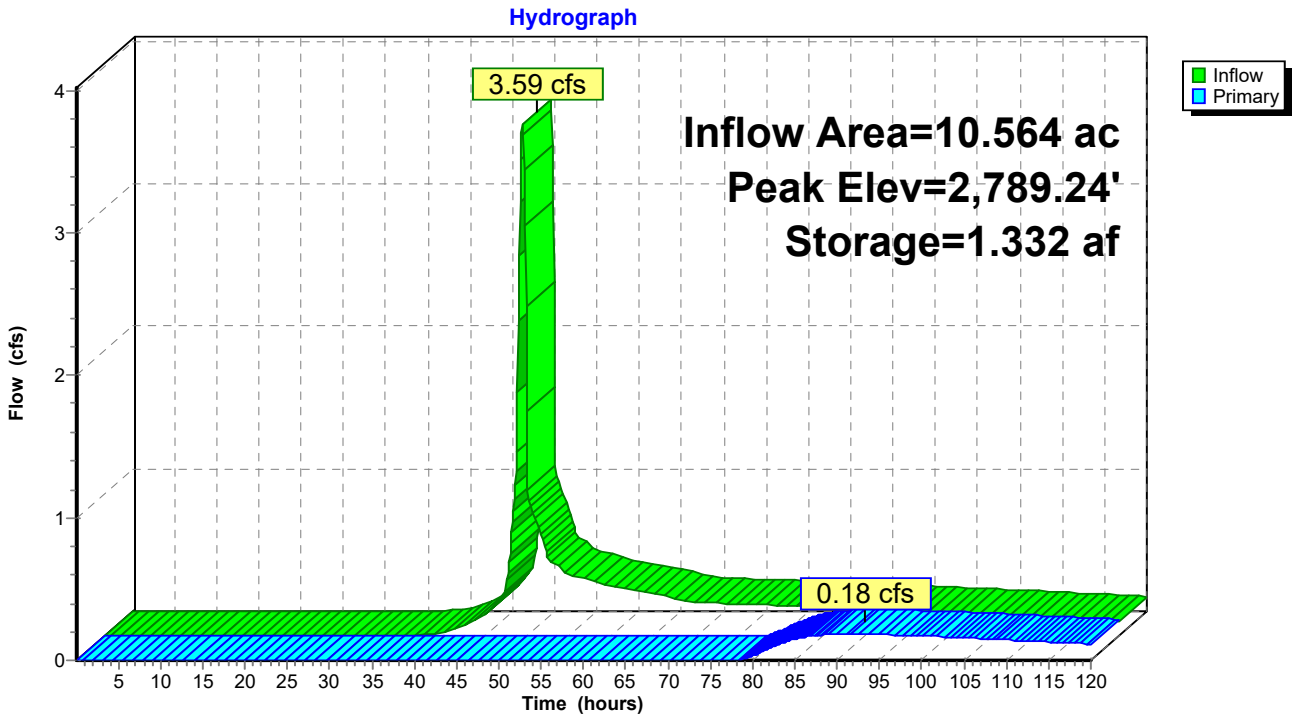
Volume	Invert	Avail.Storage	Storage Description
#1	2,784.00'	2.083 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,784.00	0.116	0.000	0.000
2,785.00	0.168	0.142	0.142
2,786.00	0.221	0.194	0.336
2,787.00	0.282	0.251	0.588
2,788.00	0.327	0.304	0.893
2,789.00	0.373	0.350	1.243
2,790.00	0.420	0.397	1.639
2,791.00	0.469	0.445	2.083

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,788.00'	**18.0" Round Culvert** L= 81.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,788.00' / 2,786.00' S= 0.0247 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,789.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 91.62 hrs HW=2,789.24' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 1.65 fps)
↑—**1=Culvert** (Passes 0.18 cfs of 2.69 cfs potential flow)

Pond D3: D3 Pond



Summary for Pond D4: D4 Pond

Inflow Area = 9.318 ac, 20.08% Impervious, Inflow Depth > 1.12" for 10-year 5-day event
Inflow = 1.27 cfs @ 49.75 hrs, Volume= 0.869 af
Outflow = 0.12 cfs @ 82.36 hrs, Volume= 0.396 af, Atten= 90%, Lag= 1,956.7 min
Primary = 0.12 cfs @ 82.36 hrs, Volume= 0.396 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,781.17' @ 82.36 hrs Surf.Area= 0.261 ac Storage= 0.484 af

Plug-Flow detention time= 2,389.7 min calculated for 0.396 af (46% of inflow)
Center-of-Mass det. time= 1,243.6 min (5,705.2 - 4,461.6)

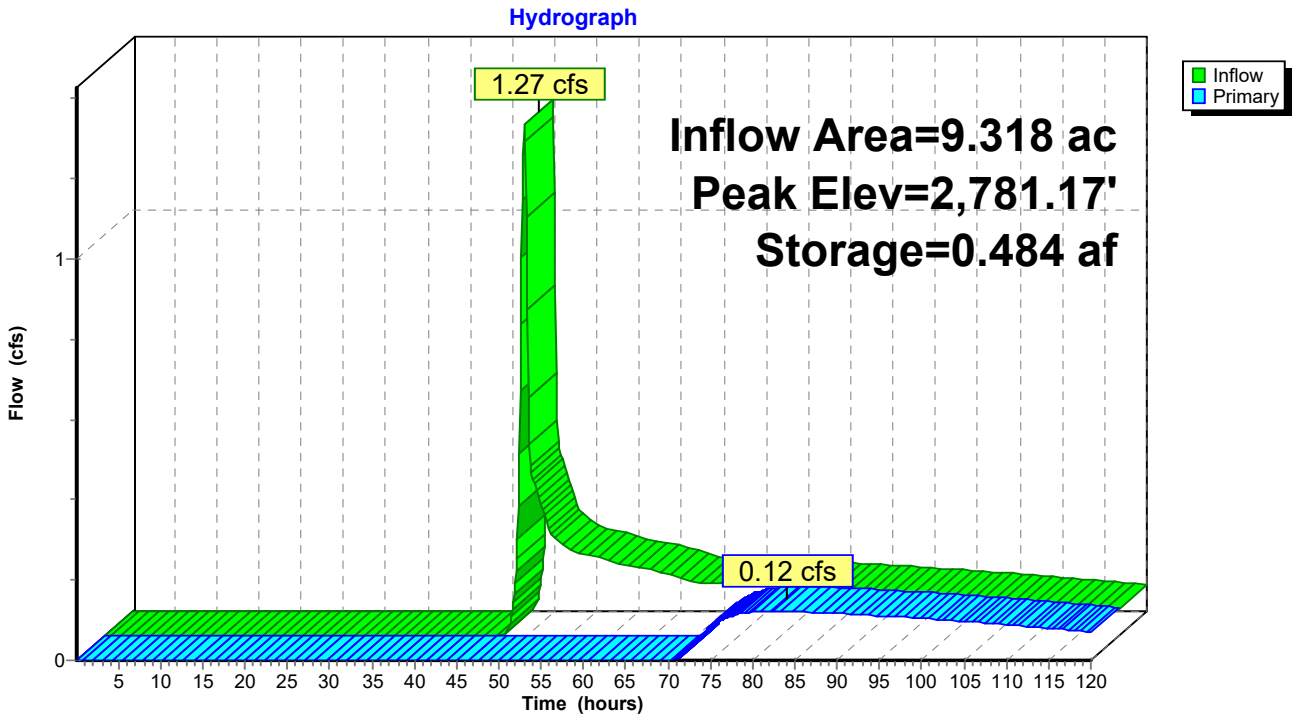
Volume	Invert	Avail.Storage	Storage Description
#1	2,779.00'	1.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,779.00	0.186	0.000	0.000
2,780.00	0.220	0.203	0.203
2,781.00	0.255	0.237	0.440
2,782.00	0.293	0.274	0.715
2,783.00	0.331	0.312	1.027

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,779.23'	**12.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.23' / 2,778.57' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Primary	2,781.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 82.36 hrs HW=2,781.17' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 1.40 fps)
↑**1=Culvert** (Passes 0.12 cfs of 1.37 cfs potential flow)

Pond D4: D4 Pond

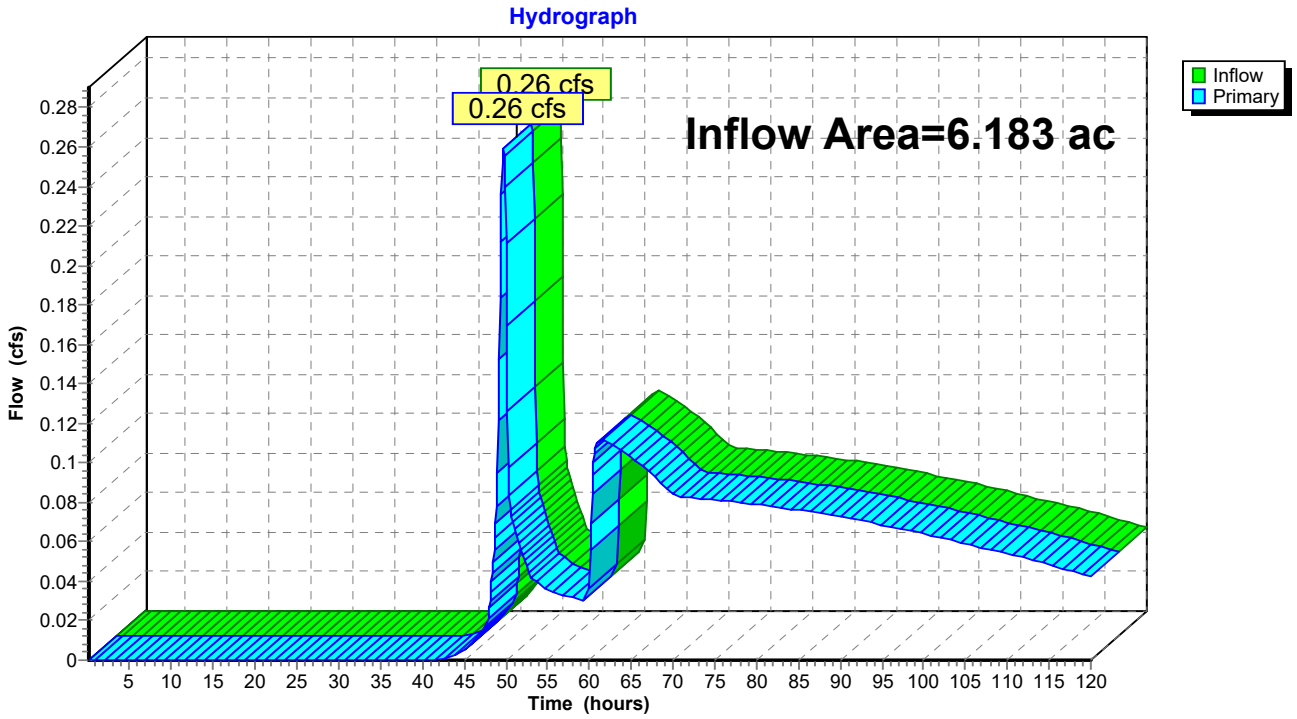


Summary for Link A: DP A

Inflow Area = 6.183 ac, 15.79% Impervious, Inflow Depth > 0.81" for 10-year 5-day event
Inflow = 0.26 cfs @ 49.72 hrs, Volume= 0.419 af
Primary = 0.26 cfs @ 49.72 hrs, Volume= 0.419 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

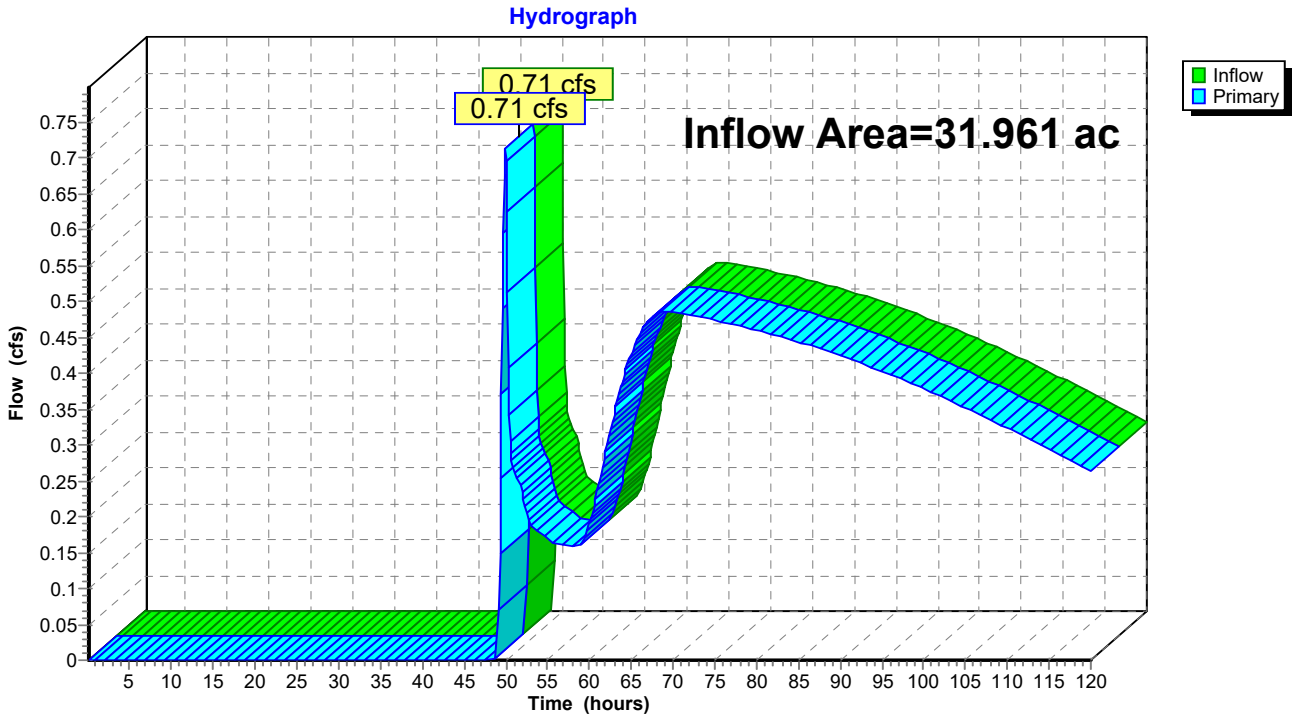


Summary for Link B: DP B

Inflow Area = 31.961 ac, 21.59% Impervious, Inflow Depth > 0.81" for 10-year 5-day event
Inflow = 0.71 cfs @ 49.92 hrs, Volume= 2.148 af
Primary = 0.71 cfs @ 49.92 hrs, Volume= 2.148 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

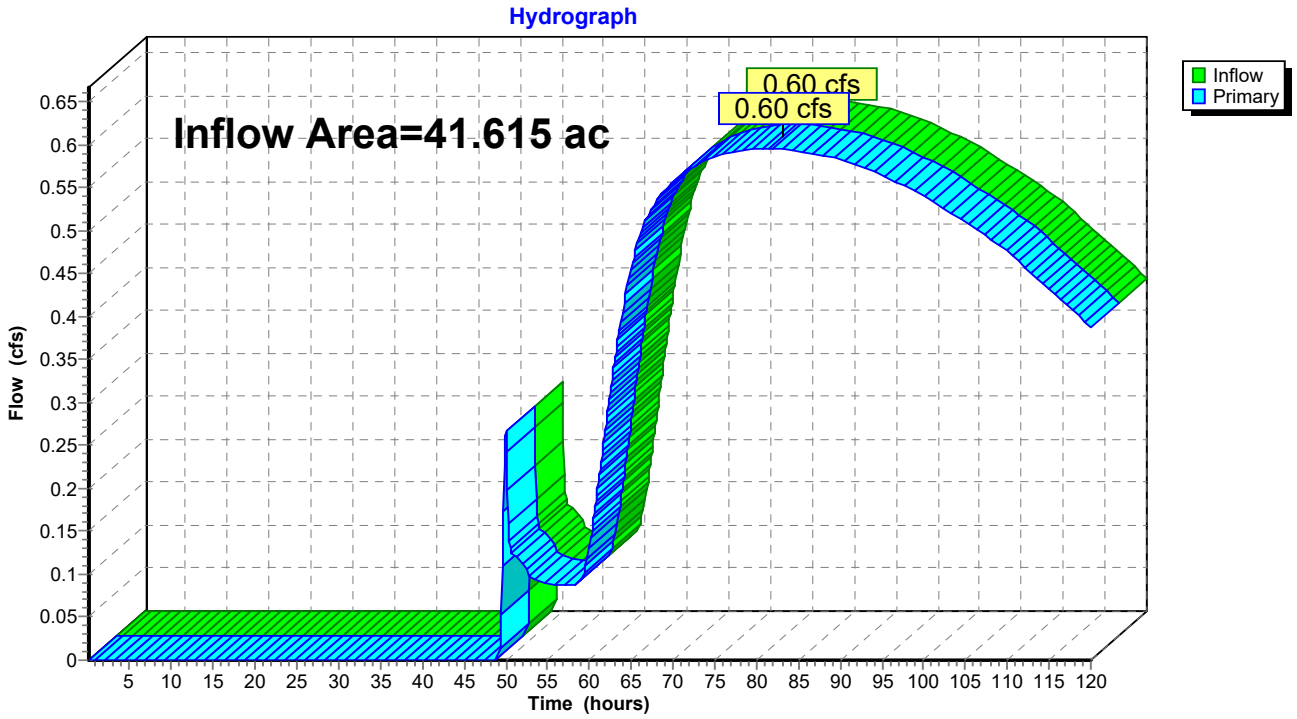


Summary for Link C: DP C

Inflow Area = 41.615 ac, 23.91% Impervious, Inflow Depth > 0.76" for 10-year 5-day event
Inflow = 0.60 cfs @ 81.54 hrs, Volume= 2.651 af
Primary = 0.60 cfs @ 81.54 hrs, Volume= 2.651 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

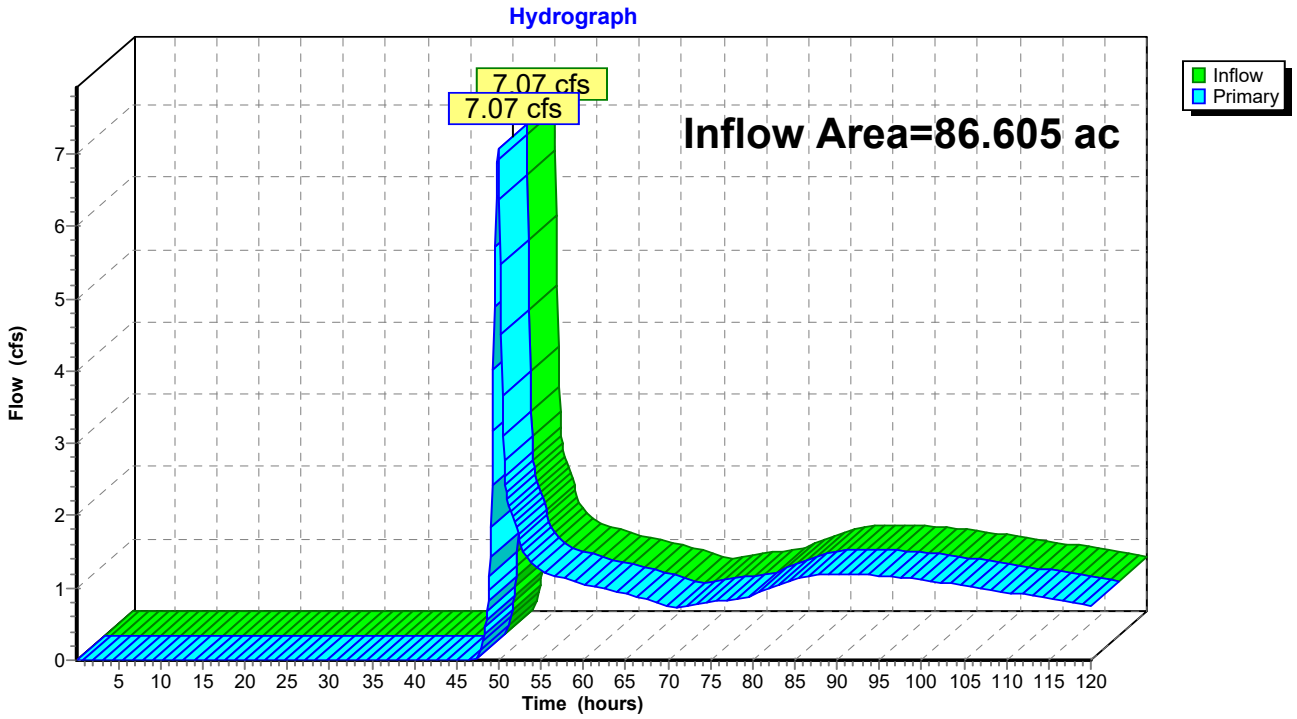


Summary for Link D: DP D

Inflow Area = 86.605 ac, 15.14% Impervious, Inflow Depth > 0.91" for 10-year 5-day event
Inflow = 7.07 cfs @ 49.91 hrs, Volume= 6.598 af
Primary = 7.07 cfs @ 49.91 hrs, Volume= 6.598 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A1: Subcat DA-A1 Runoff Area=5.149 ac 12.33% Impervious Runoff Depth=0.69"
Flow Length=1,005' Tc=18.6 min UI Adjusted CN=54 Runoff=0.77 cfs 0.295 af

Subcatchment DA-A1.1: Subcat DA-A1.1 Runoff Area=1.034 ac 32.98% Impervious Runoff Depth=1.32"
Flow Length=590' Tc=17.8 min CN=65 Runoff=0.63 cfs 0.114 af

Subcatchment DA-B1: Subcat DA-B1 Runoff Area=10.196 ac 10.65% Impervious Runoff Depth=0.59"
Flow Length=1,408' Tc=22.1 min UI Adjusted CN=52 Runoff=0.90 cfs 0.500 af

Subcatchment DA-B2: Subcat DA-B2 Runoff Area=9.131 ac 33.40% Impervious Runoff Depth=1.53"
Flow Length=1,387' Tc=20.5 min CN=68 Runoff=6.36 cfs 1.161 af

Subcatchment DA-B3: Subcat DA-B3 Runoff Area=12.634 ac 21.87% Impervious Runoff Depth=0.79"
Flow Length=786' Tc=4.6 min UI Adjusted CN=56 Runoff=4.28 cfs 0.832 af

Subcatchment DA-C1: Subcat DA-C1 Runoff Area=9.940 ac 30.38% Impervious Runoff Depth=1.39"
Flow Length=1,218' Tc=21.9 min CN=66 Runoff=5.87 cfs 1.151 af

Subcatchment DA-C2: Subcat DA-C2 Runoff Area=24.605 ac 28.17% Impervious Runoff Depth=0.96"
Flow Length=2,502' Tc=25.1 min UI Adjusted CN=59 Runoff=7.02 cfs 1.961 af

Subcatchment DA-C3: Subcat DA-C3 Runoff Area=7.070 ac 0.00% Impervious Runoff Depth=0.45"
Flow Length=1,331' Tc=19.8 min CN=49 Runoff=0.30 cfs 0.267 af

Subcatchment DA-D1: Subcat DA-D1 Runoff Area=50.018 ac 1.44% Impervious Runoff Depth=0.90"
Flow Length=2,494' Tc=28.0 min CN=58 Runoff=11.74 cfs 3.750 af

Subcatchment DA-D2: Subcat DA-D2 Runoff Area=16.705 ac 39.56% Impervious Runoff Depth=1.74"
Flow Length=1,582' Tc=18.8 min CN=71 Runoff=14.90 cfs 2.421 af

Subcatchment DA-D3: Subcat DA-D3 Runoff Area=10.564 ac 37.08% Impervious Runoff Depth=1.67"
Flow Length=769' Tc=4.6 min CN=70 Runoff=12.17 cfs 1.467 af

Subcatchment DA-D4: Subcat DA-D4 Runoff Area=9.318 ac 20.08% Impervious Runoff Depth=0.84"
Flow Length=1,055' Tc=15.3 min UI Adjusted CN=57 Runoff=2.63 cfs 0.656 af

Reach 3R: Culvert Crossing Avg. Flow Depth=0.18' Max Vel=2.38 fps Inflow=0.40 cfs 0.223 af
36.0" Round Pipe n=0.013 L=187.0' S=0.0078 '/' Capacity=58.93 cfs Outflow=0.40 cfs 0.223 af

Reach 4R: (new Reach) Inflow=0.76 cfs 0.761 af
Outflow=0.76 cfs 0.761 af

Pond A1: A1 Pond Peak Elev=2,787.57' Storage=0.129 af Inflow=0.77 cfs 0.295 af
Outflow=0.24 cfs 0.171 af

Pond B2: B2 Pond Peak Elev=2,795.08' Storage=0.288 af Inflow=6.36 cfs 1.161 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0371 '/' Outflow=1.64 cfs 0.994 af

Pond B3: B3 Pond Peak Elev=2,780.33' Storage=1.186 af Inflow=4.28 cfs 1.826 af
Outflow=0.96 cfs 1.073 af

Pond C1: C1 Pond Peak Elev=2,792.40' Storage=0.555 af Inflow=5.87 cfs 1.151 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0077 '/' Outflow=0.76 cfs 0.761 af

Pond C2: C2 Pond Peak Elev=2,767.71' Storage=2.032 af Inflow=7.02 cfs 2.722 af
Outflow=0.93 cfs 1.718 af

Pond D2: D2 Pond Peak Elev=2,776.39' Storage=2.320 af Inflow=14.90 cfs 2.421 af
Outflow=0.46 cfs 0.396 af

Pond D3: D3 Pond Peak Elev=2,789.36' Storage=1.380 af Inflow=12.17 cfs 1.467 af
Outflow=0.40 cfs 0.223 af

Pond D4: D4 Pond Peak Elev=2,781.29' Storage=0.516 af Inflow=2.63 cfs 0.656 af
Outflow=0.35 cfs 0.215 af

Link A: DP A Inflow=0.63 cfs 0.285 af
Primary=0.63 cfs 0.285 af

Link B: DP B Inflow=1.29 cfs 1.573 af
Primary=1.29 cfs 1.573 af

Link C: DP C Inflow=1.07 cfs 1.984 af
Primary=1.07 cfs 1.984 af

Link D: DP D Inflow=11.74 cfs 4.585 af
Primary=11.74 cfs 4.585 af

Total Runoff Area = 166.364 ac Runoff Volume = 14.575 af Average Runoff Depth = 1.05"
81.40% Pervious = 135.423 ac 18.60% Impervious = 30.941 ac

Summary for Subcatchment DA-A1: Subcat DA-A1

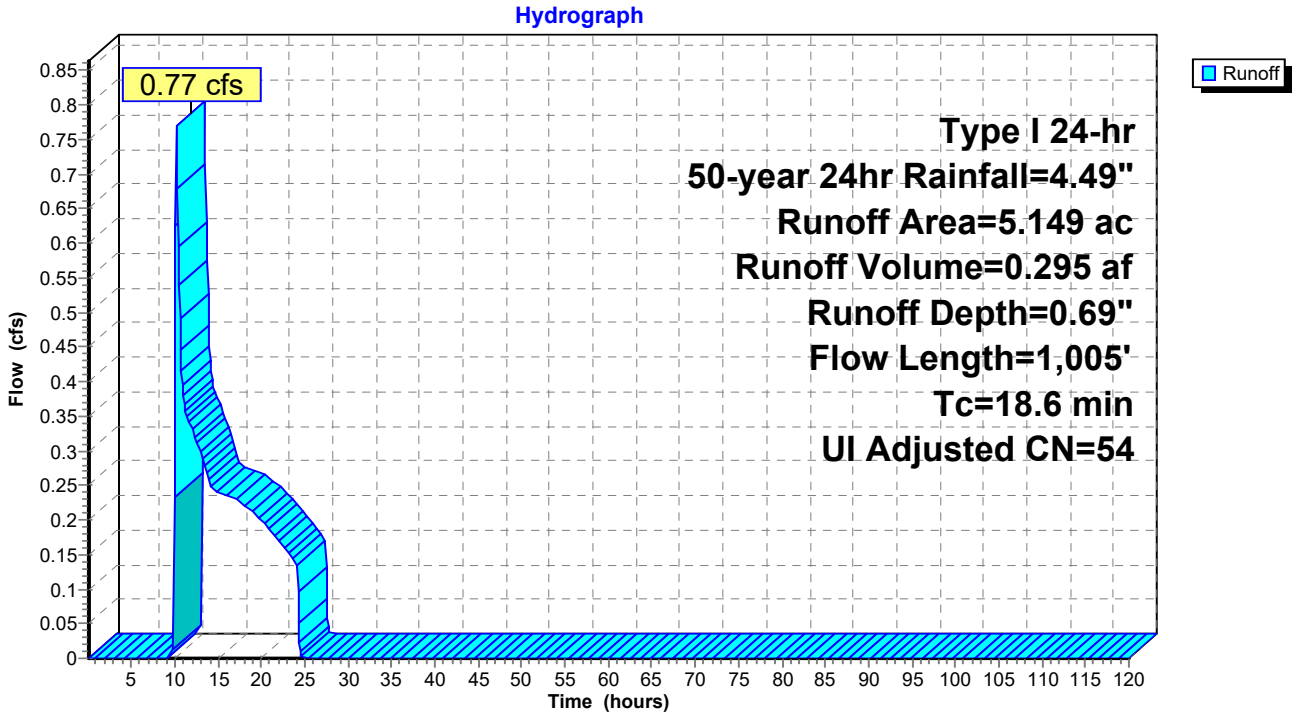
Runoff = 0.77 cfs @ 10.21 hrs, Volume= 0.295 af, Depth= 0.69"
Routed to Pond A1 : A1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Adj	Description
4.141	49		Desert shrub range, Good, HSG A
0.635	98		Unconnected pavement, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.068	96		Gravel surface, HSG A
0.099	72		Dirt roads, HSG A
5.149	57	54	Weighted Average, UI Adjusted
4.514			87.67% Pervious Area
0.635			12.33% Impervious Area
0.635			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0208	0.15		**Sheet Flow, sheet 2802.48-2800.40** Range n= 0.130 P2= 1.88"
3.2	385	0.0158	2.02		**Shallow Concentrated Flow, shallow 2800.40-2794.30** Unpaved Kv= 16.1 fps
0.2	40	0.0050	4.20	7.43	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.5	398	0.0142	1.92		**Shallow Concentrated Flow, shallow 2793.57-2788.24** Unpaved Kv= 16.1 fps
0.5	82	0.0151	2.49		**Shallow Concentrated Flow, paved 2788.24-2787** Paved Kv= 20.3 fps
18.6	1,005	Total			

Subcatchment DA-A1: Subcat DA-A1



Summary for Subcatchment DA-A1.1: Subcat DA-A1.1

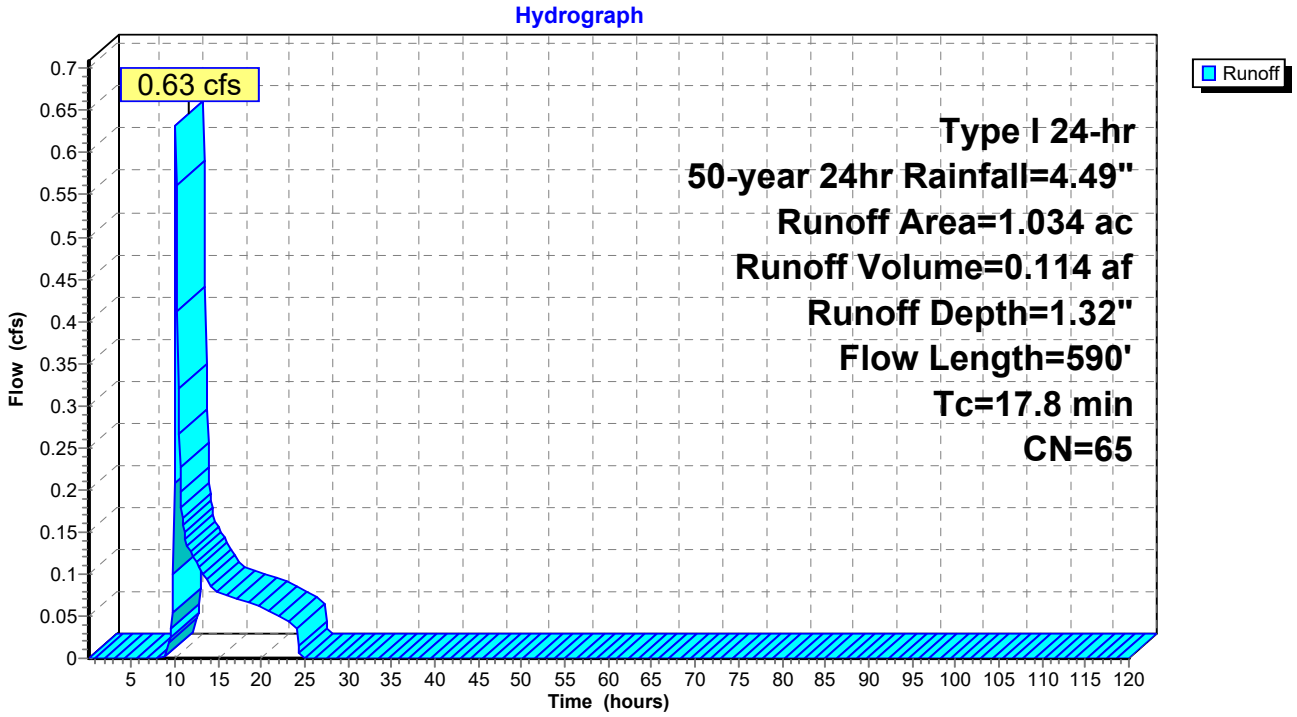
Runoff = 0.63 cfs @ 10.12 hrs, Volume= 0.114 af, Depth= 1.32"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Description
0.693	49	Desert shrub range, Good, HSG A
0.341	98	Unconnected pavement, HSG A
1.034	65	Weighted Average
0.693		67.02% Pervious Area
0.341		32.98% Impervious Area
0.341		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0182	0.14		**Sheet Flow, sheet 2787.94-2786.12** Range n= 0.130 P2= 1.88"
4.7	369	0.0172	1.31		**Shallow Concentrated Flow, shallow 2786.12-2779.76** Nearly Bare & Untilled Kv= 10.0 fps
0.2	26	0.0200	2.87		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.1	95	0.0211	1.45		**Shallow Concentrated Flow, shallow 2779-2776.99** Nearly Bare & Untilled Kv= 10.0 fps
17.8	590	Total			

Subcatchment DA-A1.1: Subcat DA-A1.1



Summary for Subcatchment DA-B1: Subcat DA-B1

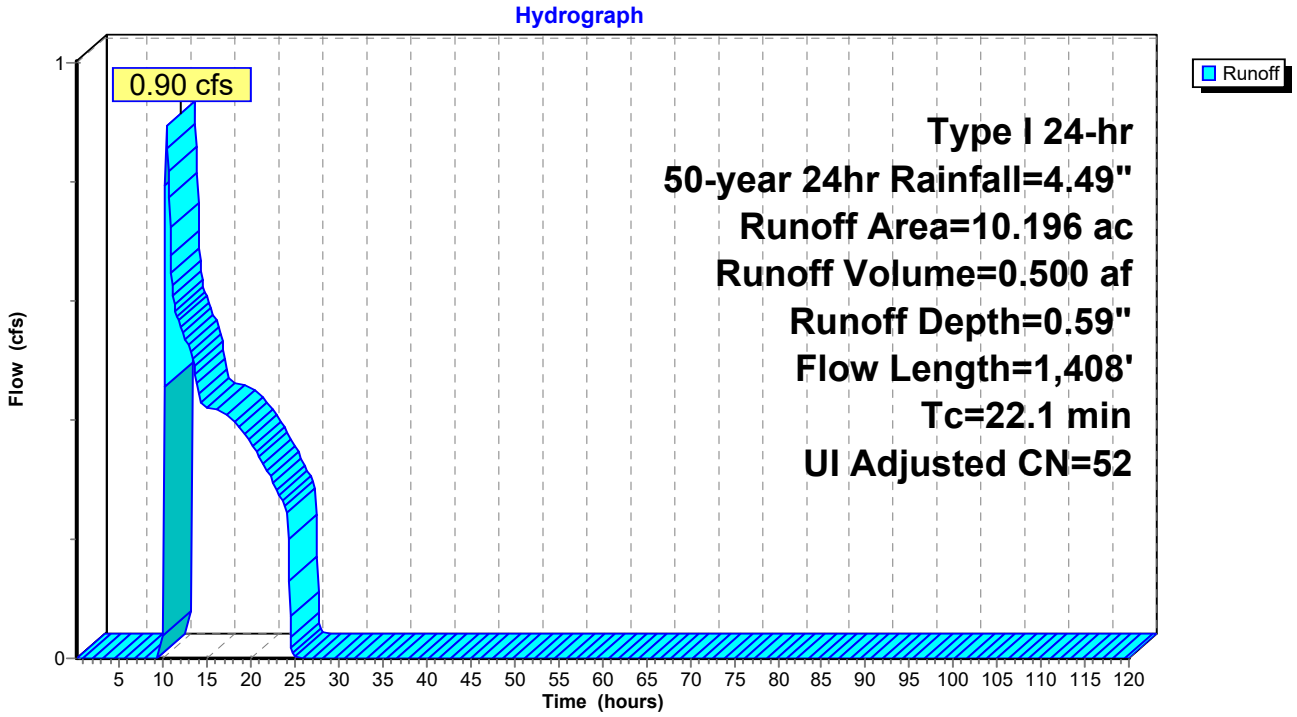
Runoff = 0.90 cfs @ 10.32 hrs, Volume= 0.500 af, Depth= 0.59"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Adj	Description
	8.673	49		Desert shrub range, Good, HSG A
	1.086	98		Unconnected pavement, HSG A
*	0.437	55		Surrounding Equip. Cover, HSG A
	10.196	54	52	Weighted Average, UI Adjusted
	9.110			89.35% Pervious Area
	1.086			10.65% Impervious Area
	1.086			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0185	0.14		**Sheet Flow, Sheet Flow 2803.05-2801.20** Range n= 0.130 P2= 1.88"
1.6	207	0.0189	2.21		**Shallow Concentrated Flow, shallow 2801.20-2797.28** Unpaved Kv= 16.1 fps
0.2	31	0.0200	2.87		**Shallow Concentrated Flow, shallow 2797.28-2796.65** Paved Kv= 20.3 fps
3.1	416	0.0191	2.23		**Shallow Concentrated Flow, shallow 2796.65-2788.70** Unpaved Kv= 16.1 fps
0.2	28	0.0160	2.57		**Shallow Concentrated Flow, shallow paved 2788.70-2788.25** Paved Kv= 20.3 fps
4.1	507	0.0161	2.04		**Shallow Concentrated Flow, shallow unpaved 2788.25-2780.00** Unpaved Kv= 16.1 fps
0.2	27	0.0200	2.87		**Shallow Concentrated Flow, shallow paved** Paved Kv= 20.3 fps
0.9	92	0.0107	1.67		**Shallow Concentrated Flow, shallow unpaved 2779.05-2778.06** Unpaved Kv= 16.1 fps
22.1	1,408	Total			

Subcatchment DA-B1: Subcat DA-B1



Summary for Subcatchment DA-B2: Subcat DA-B2

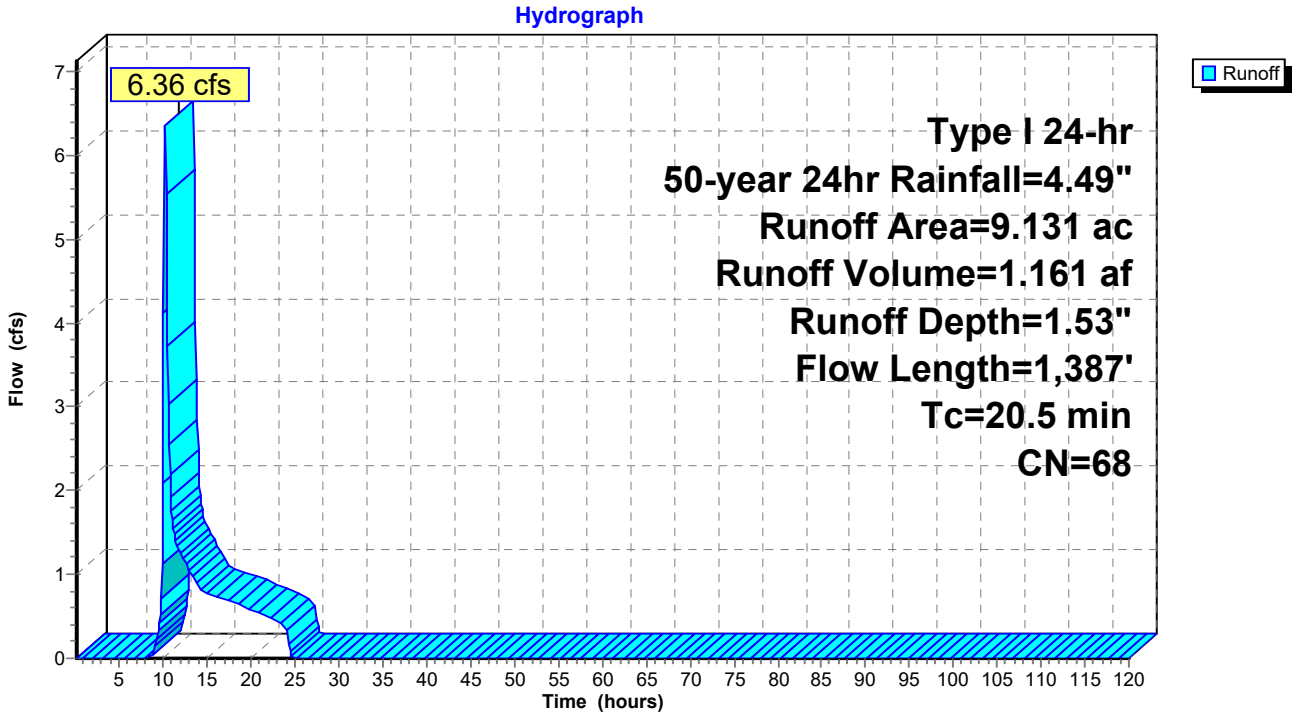
Runoff = 6.36 cfs @ 10.15 hrs, Volume= 1.161 af, Depth= 1.53"
Routed to Pond B2 : B2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Description
	2.467	49	Desert shrub range, Good, HSG A
	3.050	98	Unconnected pavement, HSG A
*	3.614	55	Surrounding Equip. Cover, HSG A
	9.131	68	Weighted Average
	6.081		66.60% Pervious Area
	3.050		33.40% Impervious Area
	3.050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0319	0.18		**Sheet Flow, sheet 2808-2804.81** Range n= 0.130 P2= 1.88"
6.6	792	0.0156	2.01		**Shallow Concentrated Flow, shallow range 2804.81-2802.44** Unpaved Kv= 16.1 fps
0.2	52	0.0050	4.20	7.43	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
2.2	187	0.0080	1.44		**Shallow Concentrated Flow, shallow unpaved 2802-2800.37** Unpaved Kv= 16.1 fps
2.0	256	0.0110	2.13		**Shallow Concentrated Flow, paved 2800.37-2797.53** Paved Kv= 20.3 fps
20.5	1,387	Total			

Subcatchment DA-B2: Subcat DA-B2



Summary for Subcatchment DA-B3: Subcat DA-B3

[49] Hint: Tc<2dt may require smaller dt

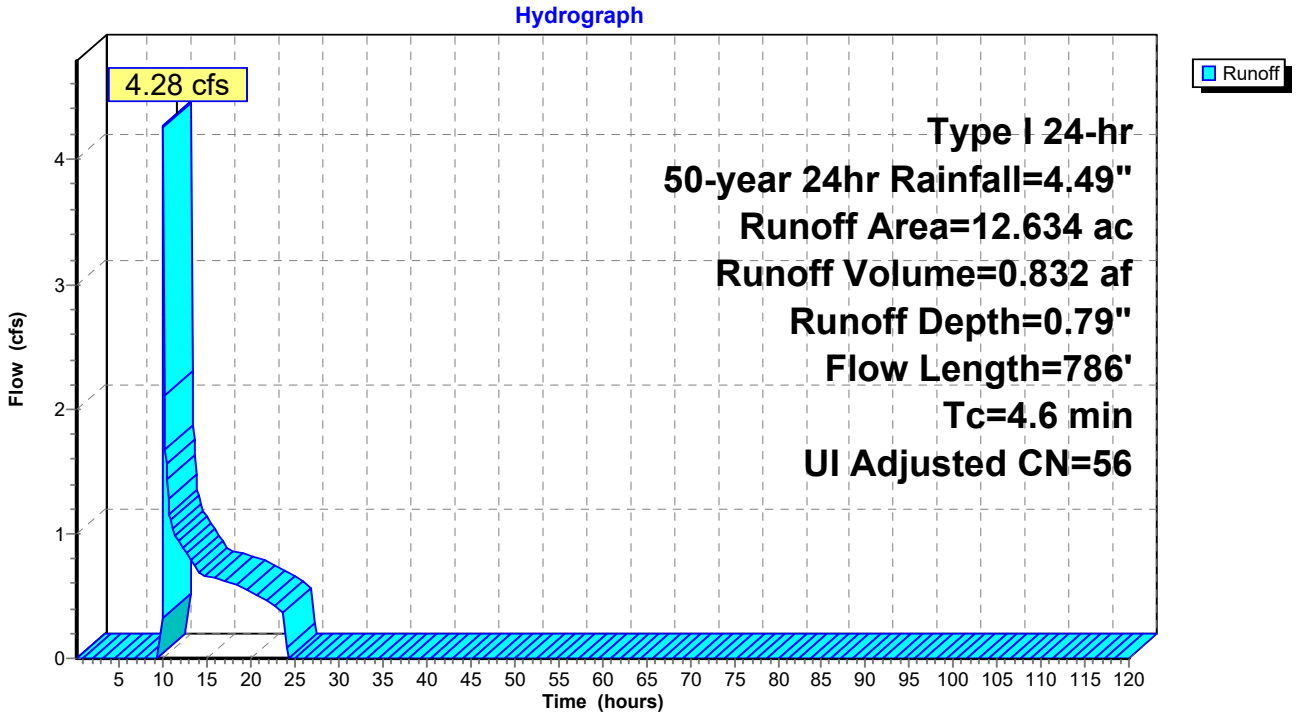
Runoff = 4.28 cfs @ 9.99 hrs, Volume= 0.832 af, Depth= 0.79"
Routed to Pond B3 : B3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Adj	Description
	6.592	49		Desert shrub range, Good, HSG A
	2.763	98		Unconnected pavement, HSG A
*	3.279	55		Surrounding Equip. Cover, HSG A
	12.634	61	56	Weighted Average, UI Adjusted
	9.871			78.13% Pervious Area
	2.763			21.87% Impervious Area
	2.763			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0190	0.81		**Sheet Flow, sheet paved 2799.71-2799.14** Smooth surfaces n= 0.011 P2= 1.88"
1.1	80	0.0340	1.25		**Sheet Flow, sheet unpaved 2799.14-2796.37** Smooth surfaces n= 0.011 P2= 1.88"
1.4	304	0.0480	3.53		**Shallow Concentrated Flow, shallow 2796.37-2781.77** Unpaved Kv= 16.1 fps
0.2	51	0.0075	4.04	72.81	**Channel Flow, channel 2781.77-2781.39** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.1	42	0.0209	8.59	15.19	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.9	193	0.0054	3.43	61.78	**Channel Flow, channel 2780.52-2779.48** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.3	86	0.0054	4.37	7.72	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
4.6	786	Total			

Subcatchment DA-B3: Subcat DA-B3



Summary for Subcatchment DA-C1: Subcat DA-C1

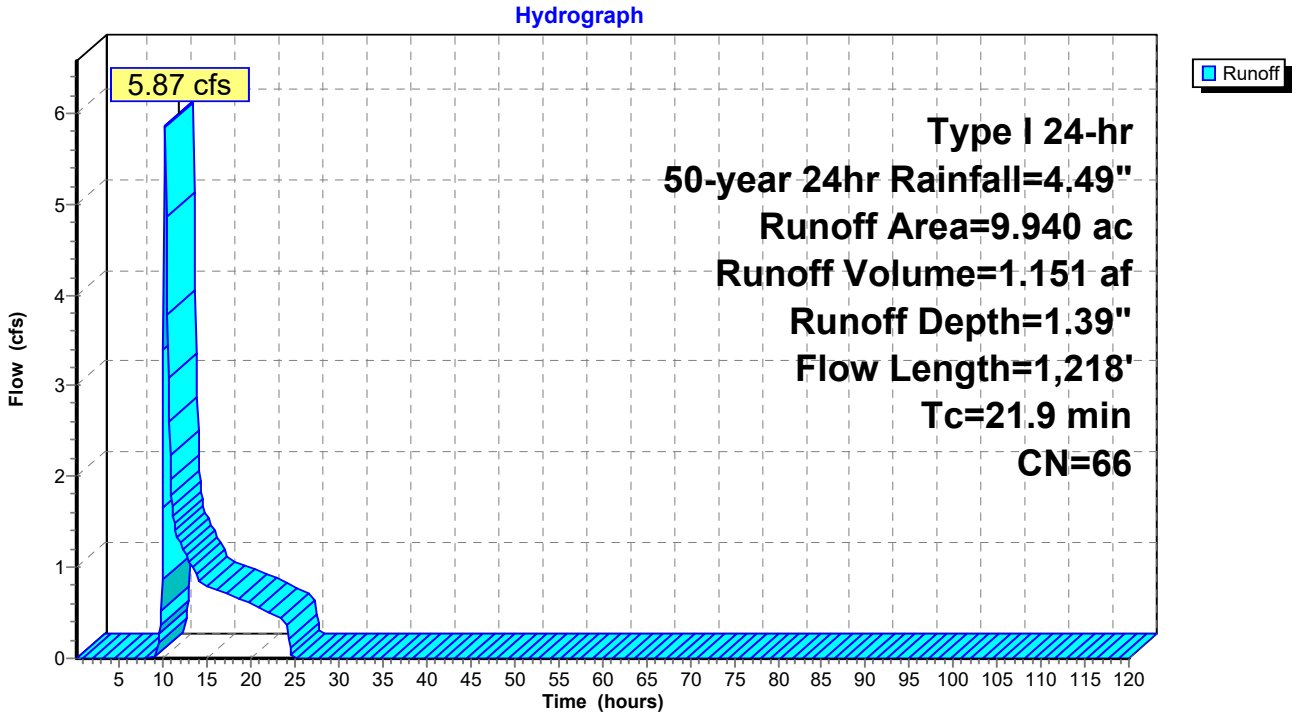
Runoff = 5.87 cfs @ 10.18 hrs, Volume= 1.151 af, Depth= 1.39"
Routed to Pond C1 : C1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Description
	3.160	49	Desert shrub range, Good, HSG A
	3.020	98	Unconnected pavement, HSG A
*	3.760	55	Surrounding Equip. Cover, HSG A
	9.940	66	Weighted Average
	6.920		69.62% Pervious Area
	3.020		30.38% Impervious Area
	3.020		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	58	0.0030	0.06		**Sheet Flow, Sheet 2813.48-2813.30** Range n= 0.130 P2= 1.88"
0.8	42	0.0205	0.90		**Sheet Flow, Sheet paved 2813.30-2812.44** Smooth surfaces n= 0.011 P2= 1.88"
3.1	450	0.0226	2.42		**Shallow Concentrated Flow, shallow 2812.44-2802.24** Unpaved Kv= 16.1 fps
0.4	152	0.0120	7.08	70.78	**Channel Flow, ditch 2802.24-2800.41** Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.023
0.2	102	0.0356	11.22	19.82	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.8	183	0.0050	3.78	83.06	**Channel Flow, channel 2796.77-2795.91** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035 Riprap, 6-inch
0.2	64	0.0064	5.62	9.93	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.7	167	0.0050	3.78	83.06	**Channel Flow, channel 2795.50-2794.65** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035
21.9	1,218	Total			

Subcatchment DA-C1: Subcat DA-C1



Summary for Subcatchment DA-C2: Subcat DA-C2

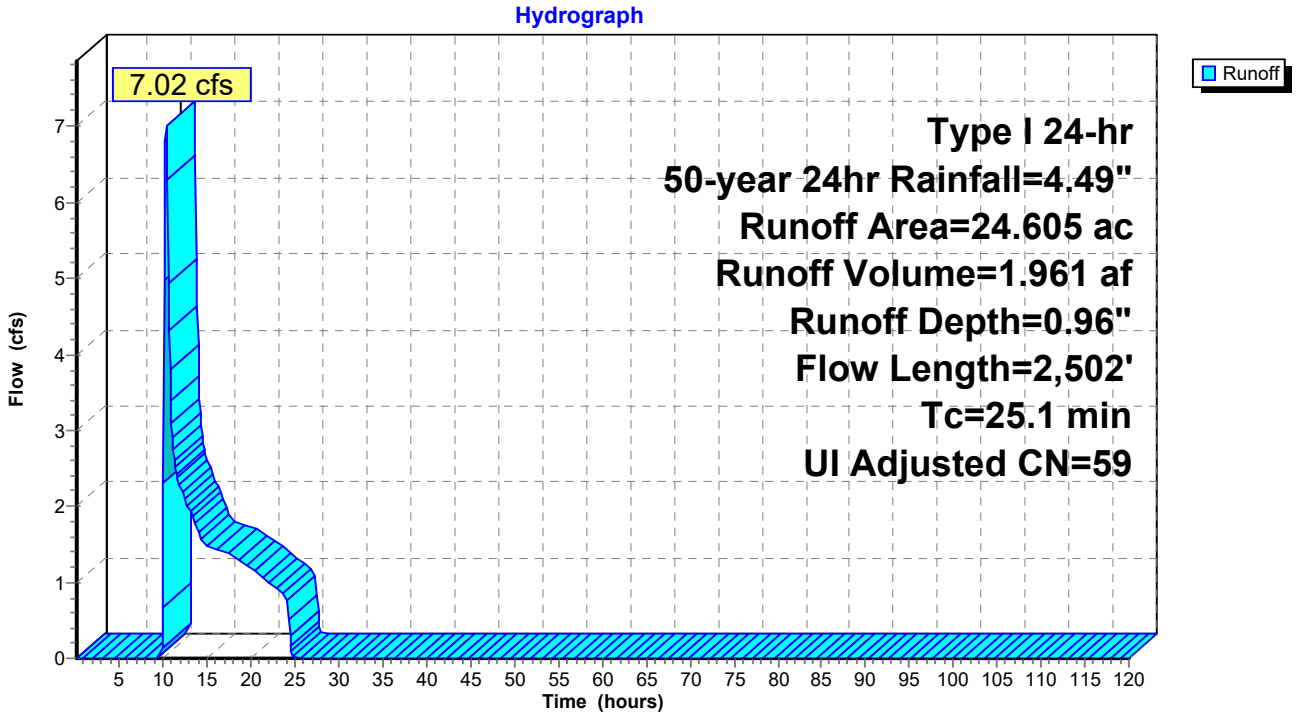
Runoff = 7.02 cfs @ 10.25 hrs, Volume= 1.961 af, Depth= 0.96"
Routed to Pond C2 : C2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Adj	Description
	6.655	49		Desert shrub range, Good, HSG A
	6.930	98		Unconnected pavement, HSG A
*	11.020	55		Surrounding Equip. Cover, HSG A
	24.605	65	59	Weighted Average, UI Adjusted
	17.675			71.83% Pervious Area
	6.930			28.17% Impervious Area
	6.930			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0153	0.13		**Sheet Flow, Sheet Flow 2811-2809.47** Range n= 0.130 P2= 1.88"
9.8	1,280	0.0182	2.17		**Shallow Concentrated Flow, Shallow 2809.47-2786.17** Unpaved Kv= 16.1 fps
2.6	1,122	0.0175	7.21	230.73	**Channel Flow, channel 2787.62-2768** Area= 32.0 sf Perim= 22.0' r= 1.45' n= 0.035 Riprap, 6-inch
25.1	2,502	Total			

Subcatchment DA-C2: Subcat DA-C2



Summary for Subcatchment DA-C3: Subcat DA-C3

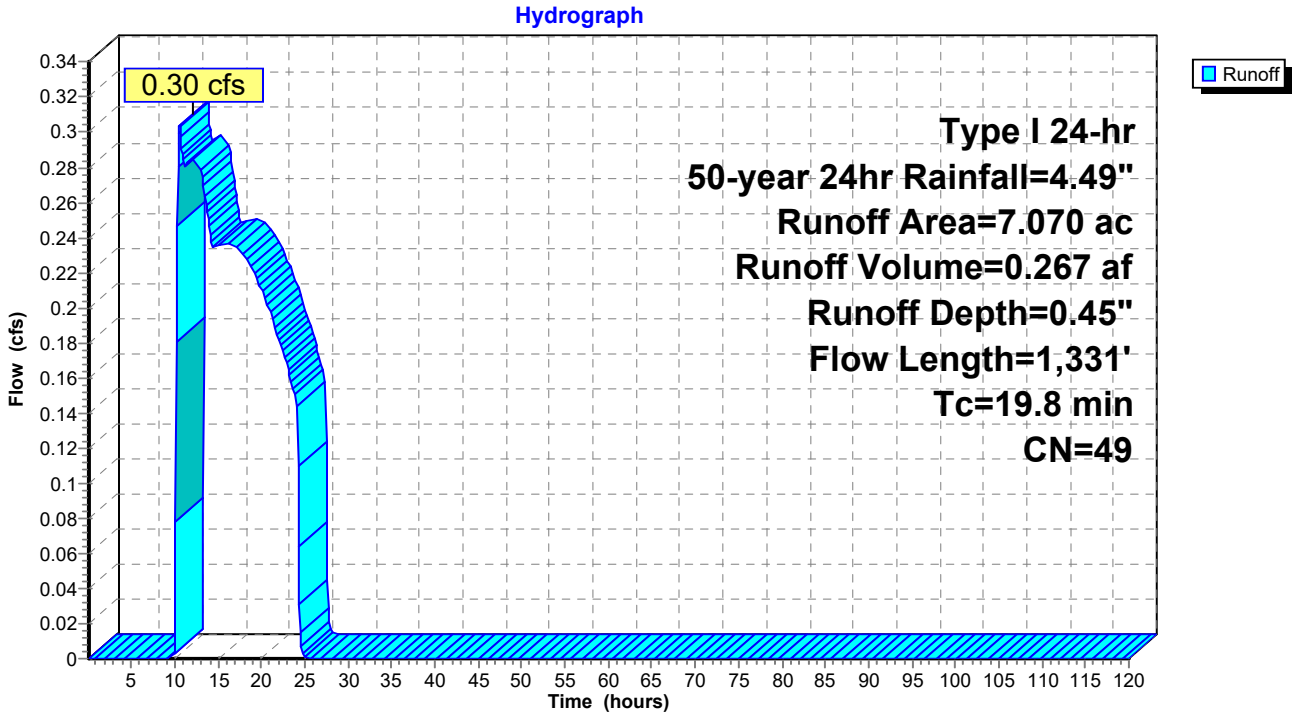
Runoff = 0.30 cfs @ 10.59 hrs, Volume= 0.267 af, Depth= 0.45"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Description
7.070	49	Desert shrub range, Good, HSG A
0.000	98	Unconnected pavement, HSG A
7.070	49	Weighted Average
7.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0224	0.15		**Sheet Flow, sheet 2785.88-2783.64** Range n= 0.130 P2= 1.88"
8.9	1,231	0.0205	2.31		**Shallow Concentrated Flow, shallow unpaved 2786.64-2761.34** Unpaved Kv= 16.1 fps
19.8	1,331	Total			

Subcatchment DA-C3: Subcat DA-C3



Summary for Subcatchment DA-D1: Subcat DA-D1

[47] Hint: Peak is 125% of capacity of segment #3

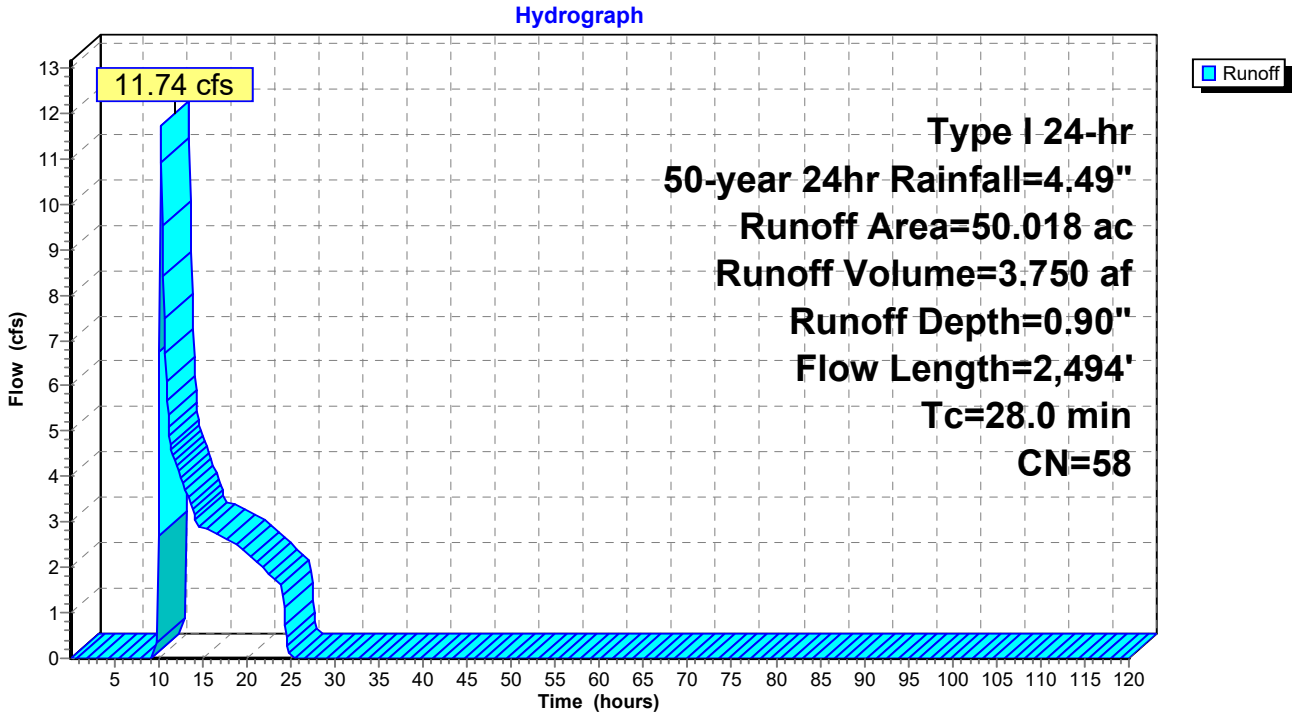
Runoff = 11.74 cfs @ 10.31 hrs, Volume= 3.750 af, Depth= 0.90"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

Area (ac)	CN	Description
27.134	49	Desert shrub range, Good, HSG A
20.822	68	Desert shrub range, Good, HSG B
1.078	72	Dirt roads, HSG A
0.264	82	Dirt roads, HSG B
0.400	98	Unconnected pavement, HSG A
0.320	98	Unconnected pavement, HSG B
50.018	58	Weighted Average
49.298		98.56% Pervious Area
0.720		1.44% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0270	0.16		**Sheet Flow, sheet 2810.70-2808** Range n= 0.130 P2= 1.88"
7.2	1,058	0.0230	2.44		**Shallow Concentrated Flow, shallow 2808-2783.46** Unpaved Kv= 16.1 fps
0.2	57	0.0080	5.32	9.40	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
10.5	1,279	0.0160	2.04		**Shallow Concentrated Flow, shallow 2783-2761** Unpaved Kv= 16.1 fps
28.0	2,494	Total			

Subcatchment DA-D1: Subcat DA-D1



Summary for Subcatchment DA-D2: Subcat DA-D2

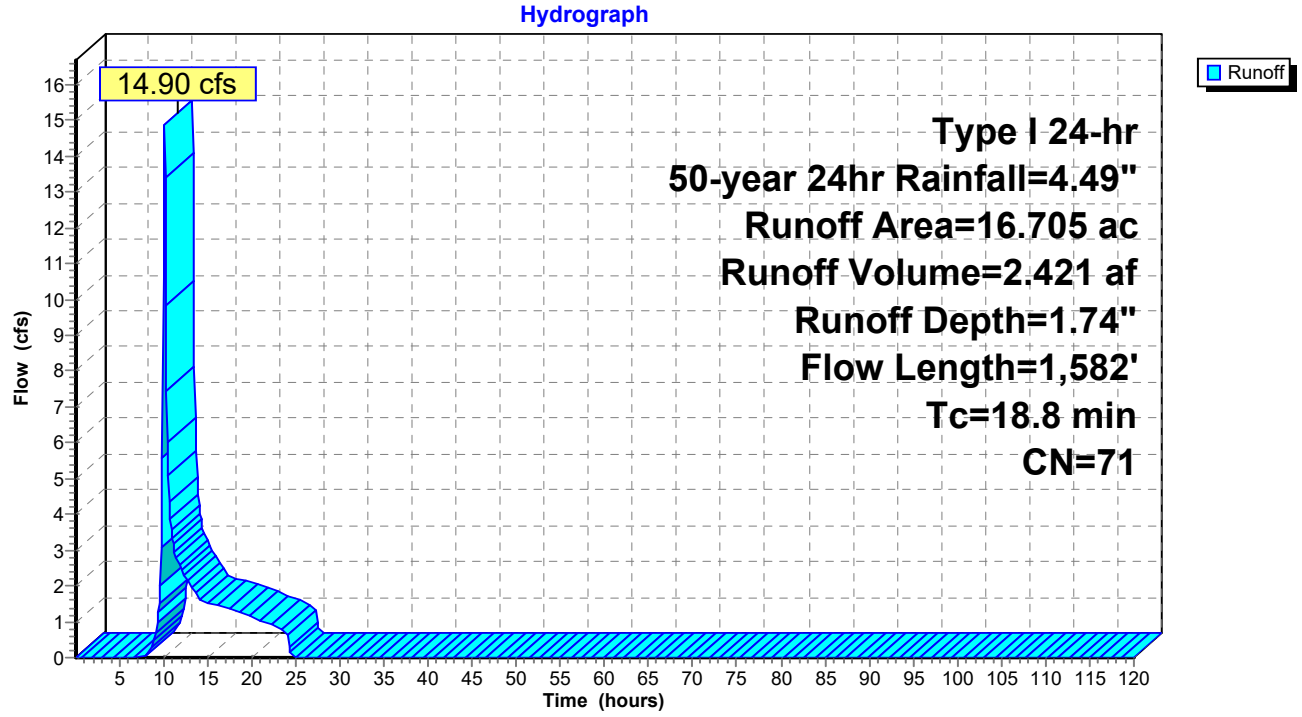
Runoff = 14.90 cfs @ 10.13 hrs, Volume= 2.421 af, Depth= 1.74"
Routed to Pond D2 : D2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Description
	1.577	49	Desert shrub range, Good, HSG A
	5.763	98	Unconnected pavement, HSG A
	0.845	98	Unconnected pavement, HSG B
*	8.520	55	Surrounding Equip. Cover, HSG A
	16.705	71	Weighted Average
	10.097		60.44% Pervious Area
	6.608		39.56% Impervious Area
	6.608		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	57	0.0520	0.19		**Sheet Flow, sheet 2800-2797** Range n= 0.130 P2= 1.88"
13.8	1,525	0.0130	1.84		**Shallow Concentrated Flow, shallow 2797-2777.25** Unpaved Kv= 16.1 fps
18.8	1,582	Total			

Subcatchment DA-D2: Subcat DA-D2



Summary for Subcatchment DA-D3: Subcat DA-D3

[49] Hint: Tc<2dt may require smaller dt

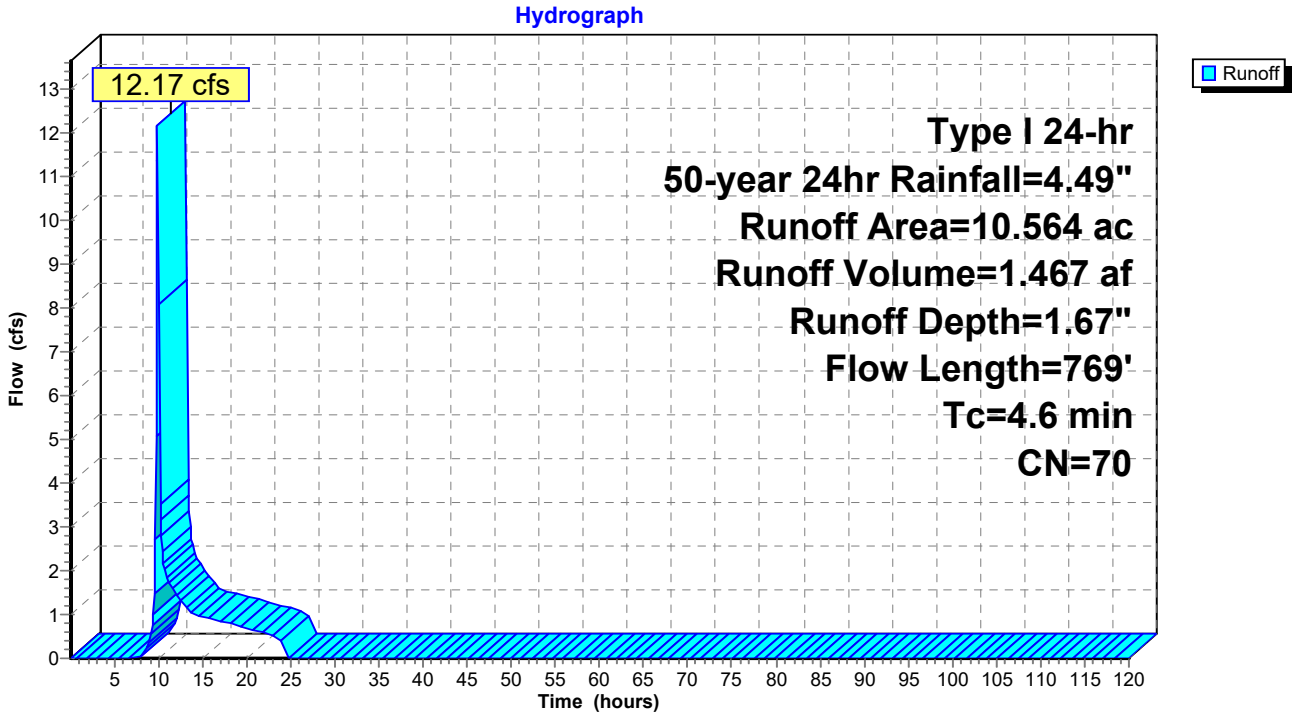
Runoff = 12.17 cfs @ 9.95 hrs, Volume= 1.467 af, Depth= 1.67"
Routed to Pond D3 : D3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Description
	1.397	49	Desert shrub range, Good, HSG A
	3.917	98	Unconnected pavement, HSG A
*	5.250	55	Surrounding Equip. Cover, HSG A
	10.564	70	Weighted Average
	6.647		62.92% Pervious Area
	3.917		37.08% Impervious Area
	3.917		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0500	1.52		**Sheet Flow, Sheet 2819-2814** Smooth surfaces n= 0.011 P2= 1.88"
3.4	626	0.0360	3.05		**Shallow Concentrated Flow, shallow 2814-2791.5** Unpaved Kv= 16.1 fps
0.1	43	0.0340	11.87	20.98	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
4.6	769	Total			

Subcatchment DA-D3: Subcat DA-D3



Summary for Subcatchment DA-D4: Subcat DA-D4

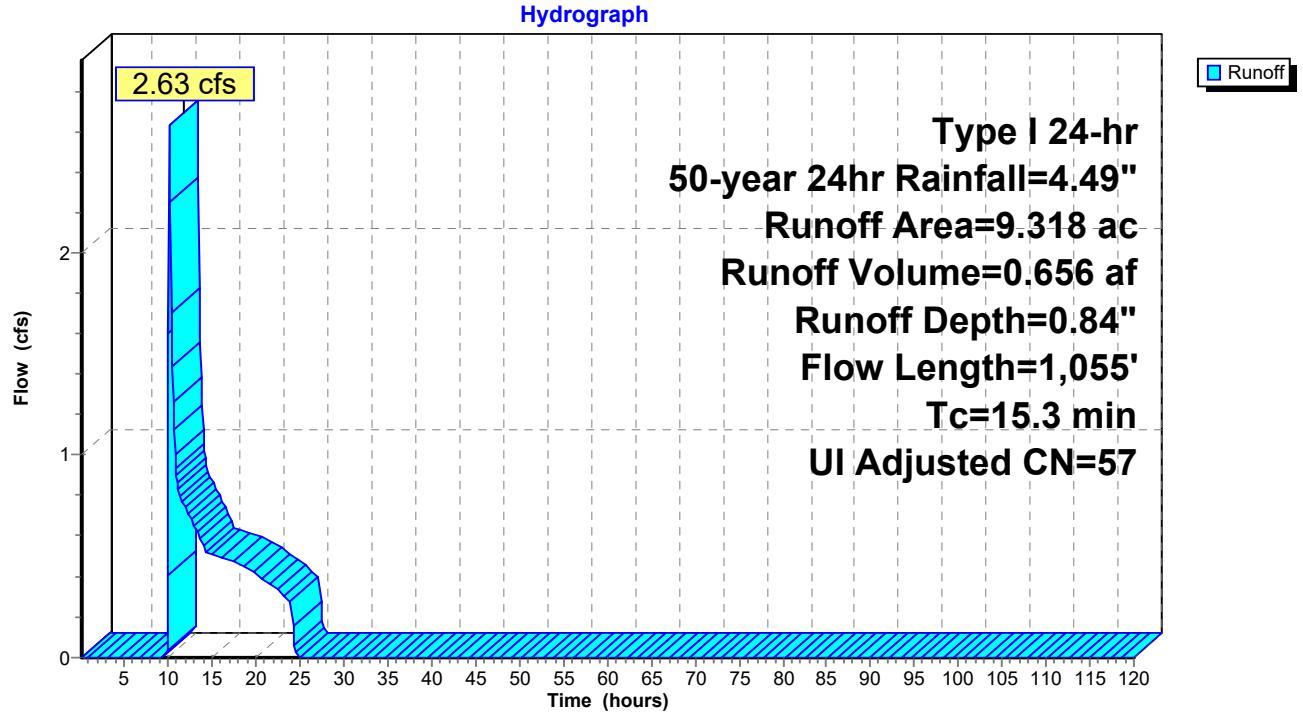
Runoff = 2.63 cfs @ 10.12 hrs, Volume= 0.656 af, Depth= 0.84"
Routed to Pond D4 : D4 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 50-year 24hr Rainfall=4.49"

	Area (ac)	CN	Adj	Description
	3.543	49		Desert shrub range, Good, HSG A
	0.004	72		Dirt roads, HSG A
	1.871	98		Unconnected pavement, HSG A
*	3.900	55		Surrounding Equip. Cover, HSG A
	9.318	61	57	Weighted Average, UI Adjusted
	7.447			79.92% Pervious Area
	1.871			20.08% Impervious Area
	1.871			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		**Sheet Flow, sheet 2817-2814** Range n= 0.130 P2= 1.88"
5.6	955	0.0314	2.85		**Shallow Concentrated Flow, shallow 2814-2784** Unpaved Kv= 16.1 fps
15.3	1,055	Total			

Subcatchment DA-D4: Subcat DA-D4



Summary for Reach 3R: Culvert Crossing

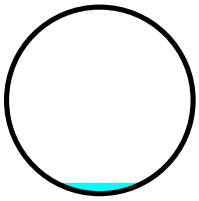
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth > 0.25" for 50-year 24hr event
Inflow = 0.40 cfs @ 23.98 hrs, Volume= 0.223 af
Outflow = 0.40 cfs @ 24.00 hrs, Volume= 0.223 af, Atten= 0%, Lag= 1.2 min
Routed to Link D : DP D

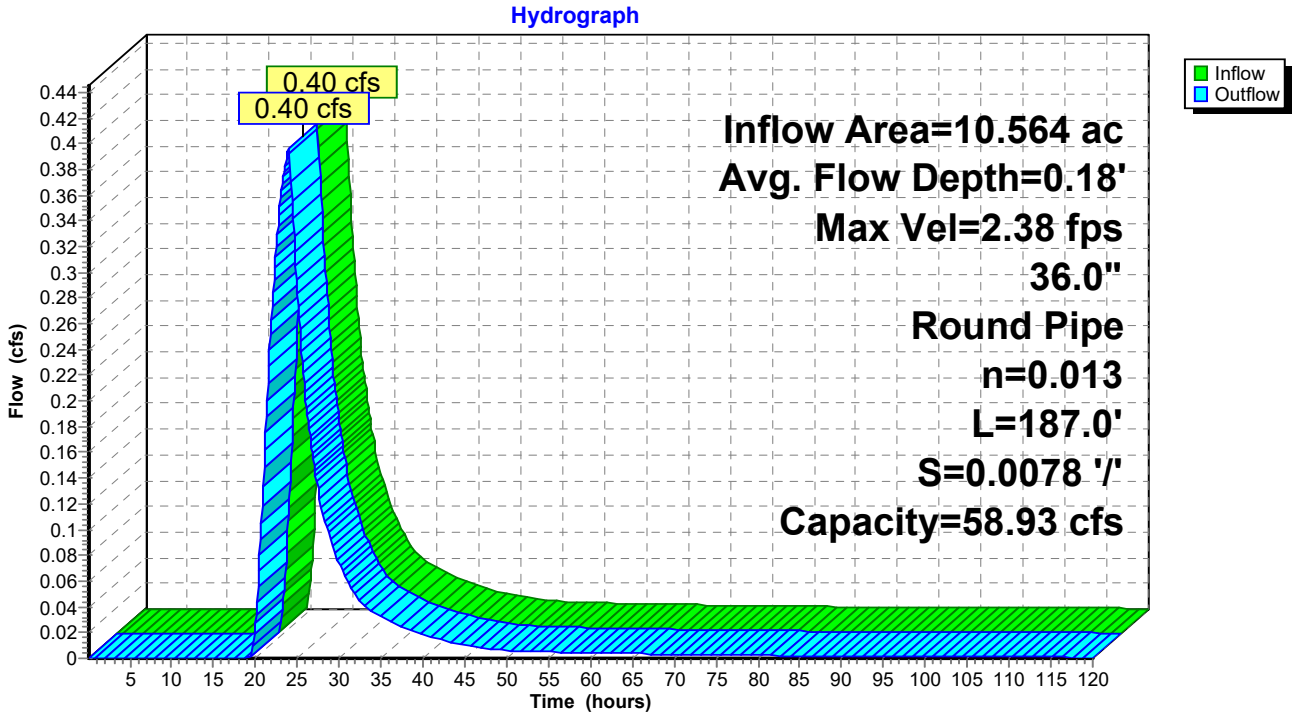
Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.38 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 3.4 min

Peak Storage= 31 cf @ 23.98 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 1.41'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 58.93 cfs

36.0" Round Pipe
n= 0.013
Length= 187.0' Slope= 0.0078 '/'
Inlet Invert= 2,783.46', Outlet Invert= 2,782.00'



Reach 3R: Culvert Crossing



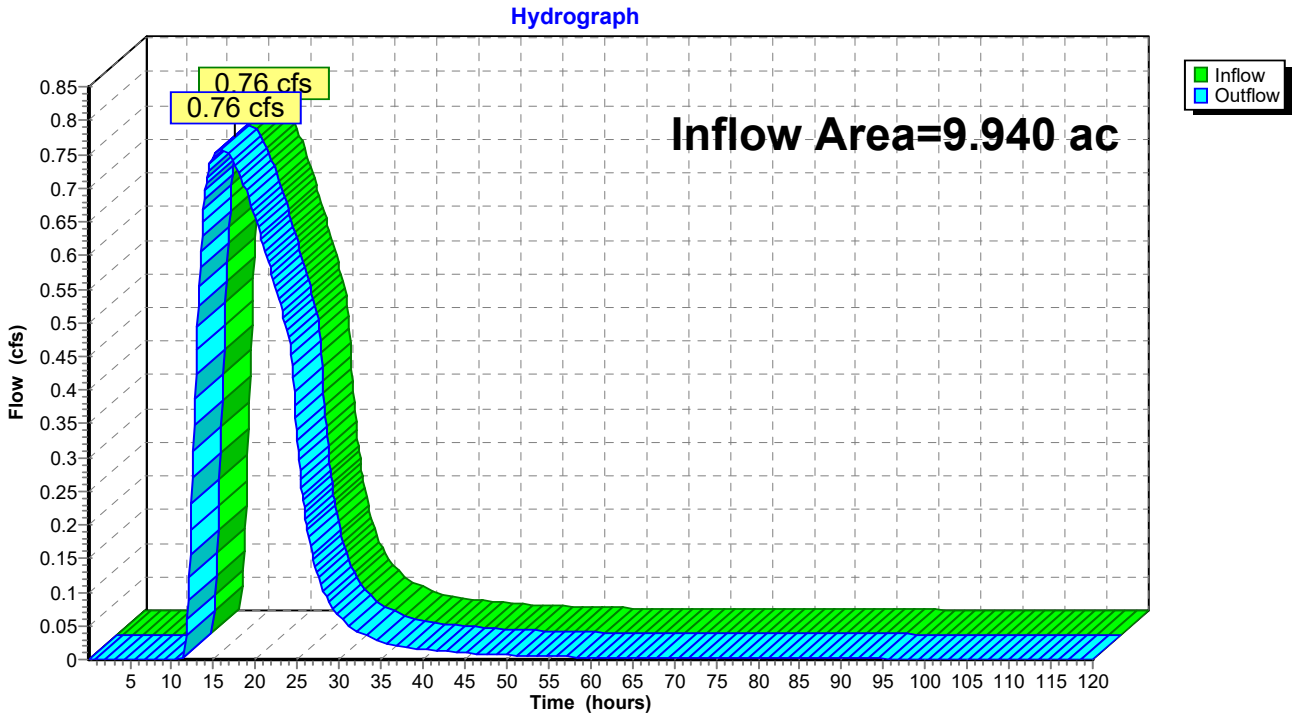
Summary for Reach 4R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth > 0.92" for 50-year 24hr event
Inflow = 0.76 cfs @ 15.84 hrs, Volume= 0.761 af
Outflow = 0.76 cfs @ 15.84 hrs, Volume= 0.761 af, Atten= 0%, Lag= 0.0 min
Routed to Pond C2 : C2 Pond

Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Reach 4R: (new Reach)



Summary for Pond A1: A1 Pond

Inflow Area = 5.149 ac, 12.33% Impervious, Inflow Depth = 0.69" for 50-year 24hr event
Inflow = 0.77 cfs @ 10.21 hrs, Volume= 0.295 af
Outflow = 0.24 cfs @ 15.34 hrs, Volume= 0.171 af, Atten= 69%, Lag= 307.8 min
Primary = 0.24 cfs @ 15.34 hrs, Volume= 0.171 af
Routed to Link A : DP A

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,787.57' @ 15.34 hrs Surf.Area= 0.072 ac Storage= 0.129 af

Plug-Flow detention time= 375.9 min calculated for 0.171 af (58% of inflow)
Center-of-Mass det. time= 192.3 min (1,138.1 - 945.9)

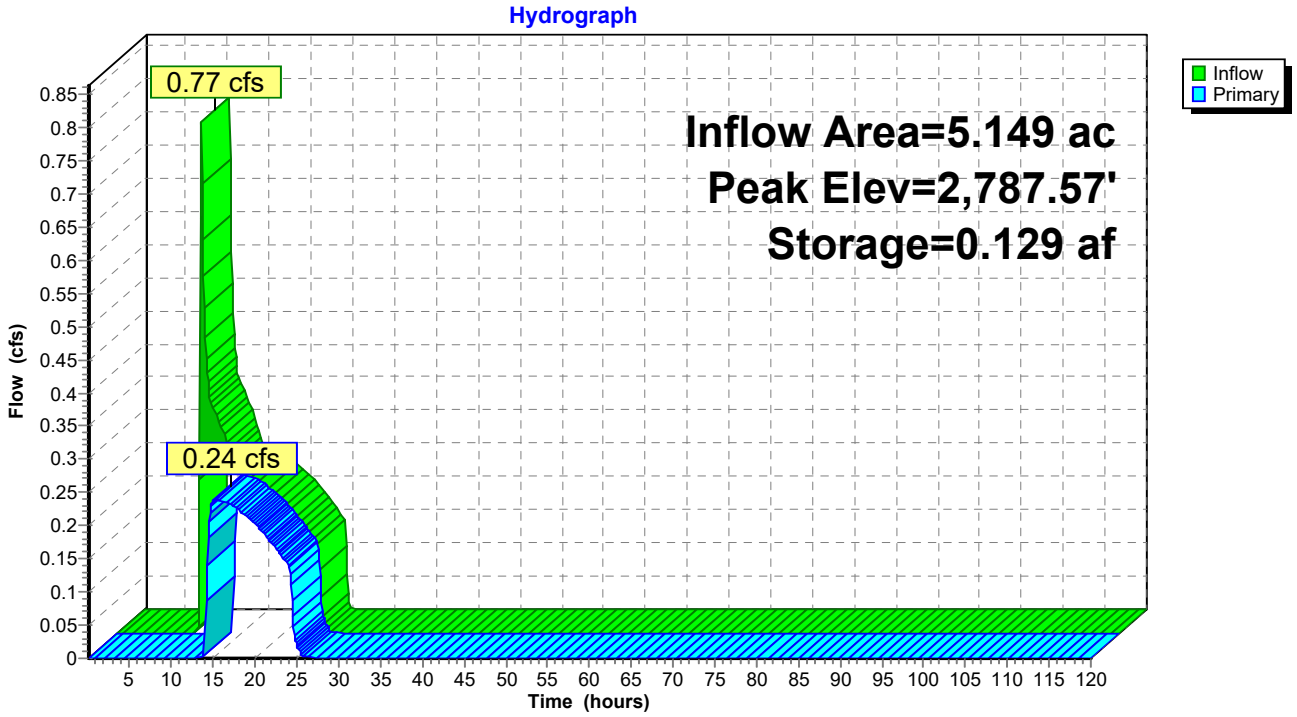
Volume	Invert	Avail.Storage	Storage Description
#1	2,785.00'	0.162 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,785.00	0.030	0.000	0.000
2,786.00	0.045	0.037	0.037
2,787.00	0.061	0.053	0.090
2,788.00	0.081	0.071	0.162

Device	Routing	Invert	Outlet Devices
#1	Primary	2,787.50'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.24 cfs @ 15.34 hrs HW=2,787.57' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.24 cfs @ 0.64 fps)

Pond A1: A1 Pond



Summary for Pond B2: B2 Pond

Inflow Area = 9.131 ac, 33.40% Impervious, Inflow Depth = 1.53" for 50-year 24hr event
Inflow = 6.36 cfs @ 10.15 hrs, Volume= 1.161 af
Outflow = 1.64 cfs @ 11.01 hrs, Volume= 0.994 af, Atten= 74%, Lag= 51.7 min
Primary = 1.64 cfs @ 11.01 hrs, Volume= 0.994 af
Routed to Pond B3 : B3 Pond

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,795.08' @ 11.01 hrs Surf.Area= 0.213 ac Storage= 0.288 af

Plug-Flow detention time= 204.3 min calculated for 0.993 af (86% of inflow)
Center-of-Mass det. time= 130.0 min (996.9 - 866.9)

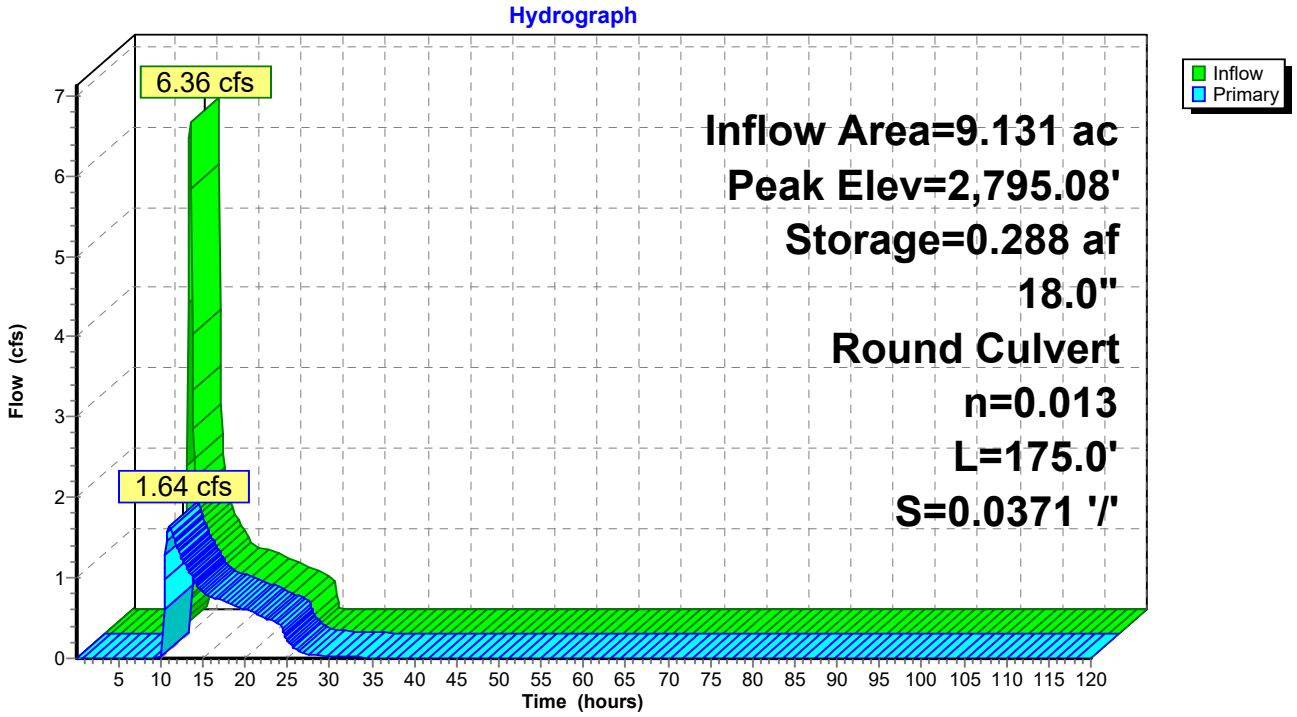
Volume	Invert	Avail.Storage	Storage Description
#1	2,793.50'	1.283 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,793.50	0.147	0.000	0.000
2,794.50	0.187	0.167	0.167
2,795.50	0.231	0.209	0.376
2,796.50	0.277	0.254	0.630
2,797.50	0.326	0.301	0.931
2,798.50	0.377	0.351	1.283

Device	Routing	Invert	Outlet Devices
#1	Primary	2,794.50'	**18.0" Round Culvert** L= 175.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,794.50' / 2,788.00' S= 0.0371 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.64 cfs @ 11.01 hrs HW=2,795.08' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.64 cfs @ 2.59 fps)

Pond B2: B2 Pond



Summary for Pond B3: B3 Pond

Inflow Area = 21.765 ac, 26.71% Impervious, Inflow Depth = 1.01" for 50-year 24hr event
Inflow = 4.28 cfs @ 9.99 hrs, Volume= 1.826 af
Outflow = 0.96 cfs @ 22.09 hrs, Volume= 1.073 af, Atten= 78%, Lag= 726.0 min
Primary = 0.96 cfs @ 22.09 hrs, Volume= 1.073 af
Routed to Link B : DP B

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,780.33' @ 22.09 hrs Surf.Area= 0.705 ac Storage= 1.186 af

Plug-Flow detention time= 821.0 min calculated for 1.073 af (59% of inflow)
Center-of-Mass det. time= 625.0 min (1,586.1 - 961.1)

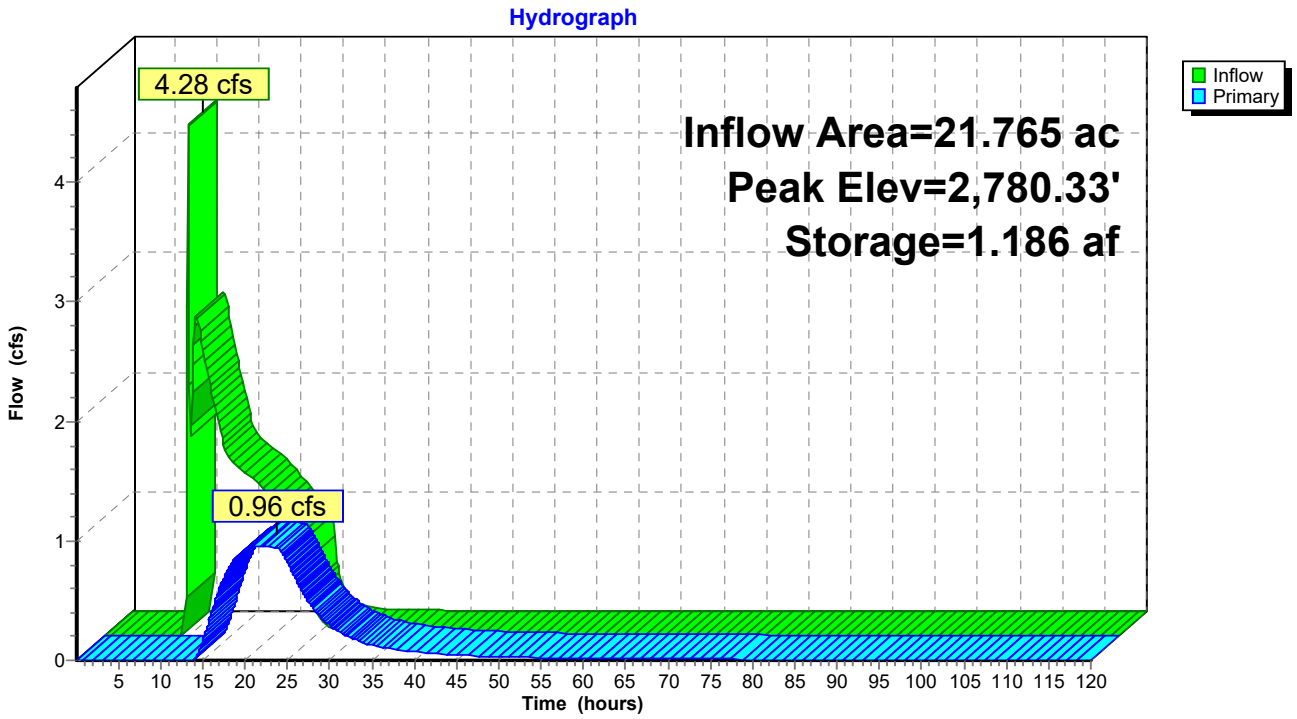
Volume	Invert	Avail.Storage	Storage Description
#1	2,778.50'	2.054 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,778.50	0.591	0.000	0.000
2,779.50	0.652	0.621	0.621
2,780.50	0.716	0.684	1.305
2,781.50	0.781	0.748	2.054

Device	Routing	Invert	Outlet Devices
#1	Primary	2,779.00'	**18.0" Round Culvert** L= 93.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.00' / 2,778.50' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,779.67'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.96 cfs @ 22.09 hrs HW=2,780.33' (Free Discharge)
↑—**1=Culvert** (Passes 0.96 cfs of 5.35 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.96 cfs @ 2.76 fps)

Pond B3: B3 Pond



Summary for Pond C1: C1 Pond

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 1.39" for 50-year 24hr event
Inflow = 5.87 cfs @ 10.18 hrs, Volume= 1.151 af
Outflow = 0.76 cfs @ 15.84 hrs, Volume= 0.761 af, Atten= 87%, Lag= 339.8 min
Primary = 0.76 cfs @ 15.84 hrs, Volume= 0.761 af
Routed to Reach 4R : (new Reach)

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,792.40' @ 15.84 hrs Surf.Area= 0.431 ac Storage= 0.555 af

Plug-Flow detention time= 520.9 min calculated for 0.761 af (66% of inflow)
Center-of-Mass det. time= 361.3 min (1,238.9 - 877.6)

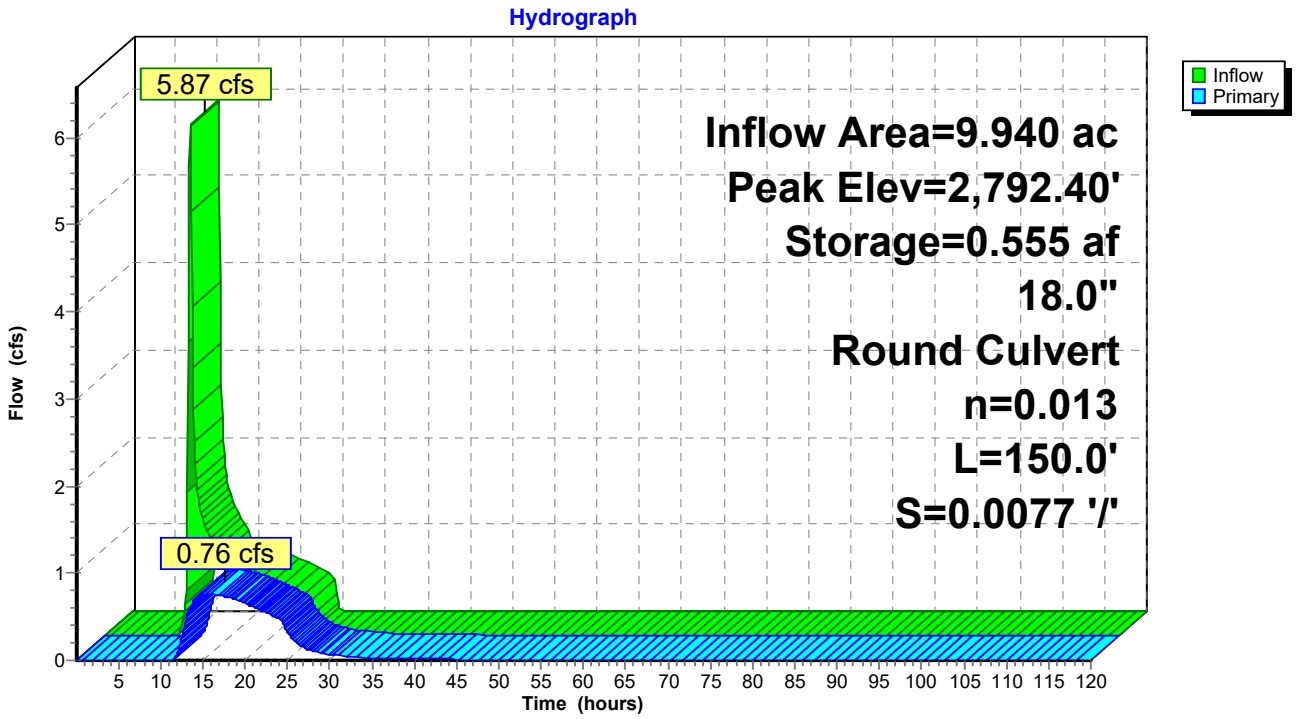
Volume	Invert	Avail.Storage	Storage Description
#1	2,791.00'	1.912 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,791.00	0.363	0.000	0.000
2,792.00	0.411	0.387	0.387
2,793.00	0.461	0.436	0.823
2,794.00	0.514	0.487	1.311
2,795.00	0.570	0.542	1.853
2,795.10	0.627	0.060	1.912

Device	Routing	Invert	Outlet Devices
#1	Primary	2,792.00'	**18.0" Round Culvert** L= 150.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,792.00' / 2,790.84' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.76 cfs @ 15.84 hrs HW=2,792.40' (Free Discharge)
1=Culvert (Barrel Controls 0.76 cfs @ 3.04 fps)

Pond C1: C1 Pond



Summary for Pond C2: C2 Pond

Inflow Area = 34.545 ac, 28.80% Impervious, Inflow Depth > 0.95" for 50-year 24hr event
Inflow = 7.02 cfs @ 10.25 hrs, Volume= 2.722 af
Outflow = 0.93 cfs @ 24.31 hrs, Volume= 1.718 af, Atten= 87%, Lag= 843.7 min
Primary = 0.93 cfs @ 24.31 hrs, Volume= 1.718 af
Routed to Link C : DP C

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,767.71' @ 24.31 hrs Surf.Area= 0.946 ac Storage= 2.032 af

Plug-Flow detention time= 1,100.1 min calculated for 1.718 af (63% of inflow)
Center-of-Mass det. time= 900.9 min (1,908.6 - 1,007.6)

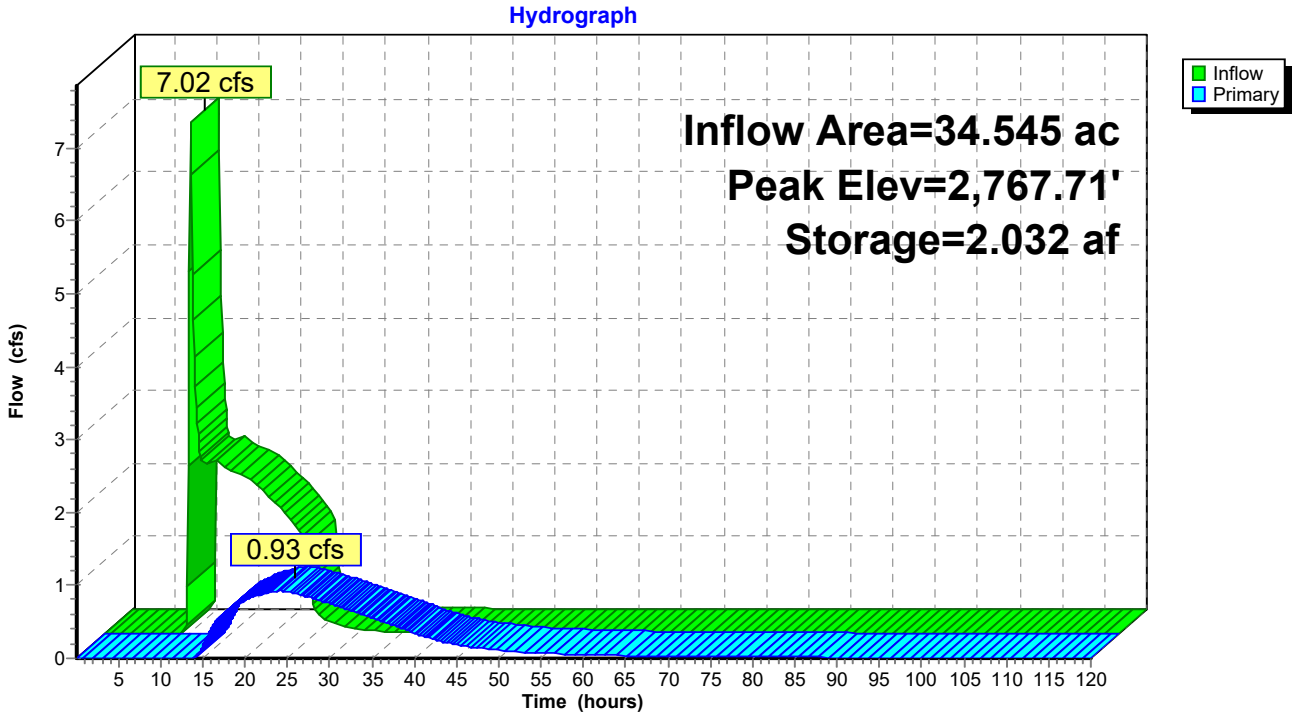
Volume	Invert	Avail.Storage	Storage Description
#1	2,765.00'	4.496 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,765.00	0.543	0.000	0.000
2,766.00	0.680	0.612	0.612
2,767.00	0.866	0.773	1.385
2,768.00	0.978	0.922	2.307
2,769.00	1.094	1.036	3.343
2,770.00	1.212	1.153	4.496

Device	Routing	Invert	Outlet Devices
#1	Primary	2,765.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,765.00' / 2,764.37' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,766.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,769.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.93 cfs @ 24.31 hrs HW=2,767.71' (Free Discharge)
└─**1=Culvert** (Passes 0.93 cfs of 10.86 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.93 cfs @ 4.73 fps)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond C2: C2 Pond



Summary for Pond D2: D2 Pond

Inflow Area = 16.705 ac, 39.56% Impervious, Inflow Depth = 1.74" for 50-year 24hr event
Inflow = 14.90 cfs @ 10.13 hrs, Volume= 2.421 af
Outflow = 0.46 cfs @ 24.22 hrs, Volume= 0.396 af, Atten= 97%, Lag= 845.9 min
Primary = 0.46 cfs @ 24.22 hrs, Volume= 0.396 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,776.39' @ 24.22 hrs Surf.Area= 0.798 ac Storage= 2.320 af

Plug-Flow detention time= 1,482.0 min calculated for 0.396 af (16% of inflow)
Center-of-Mass det. time= 1,222.4 min (2,074.2 - 851.9)

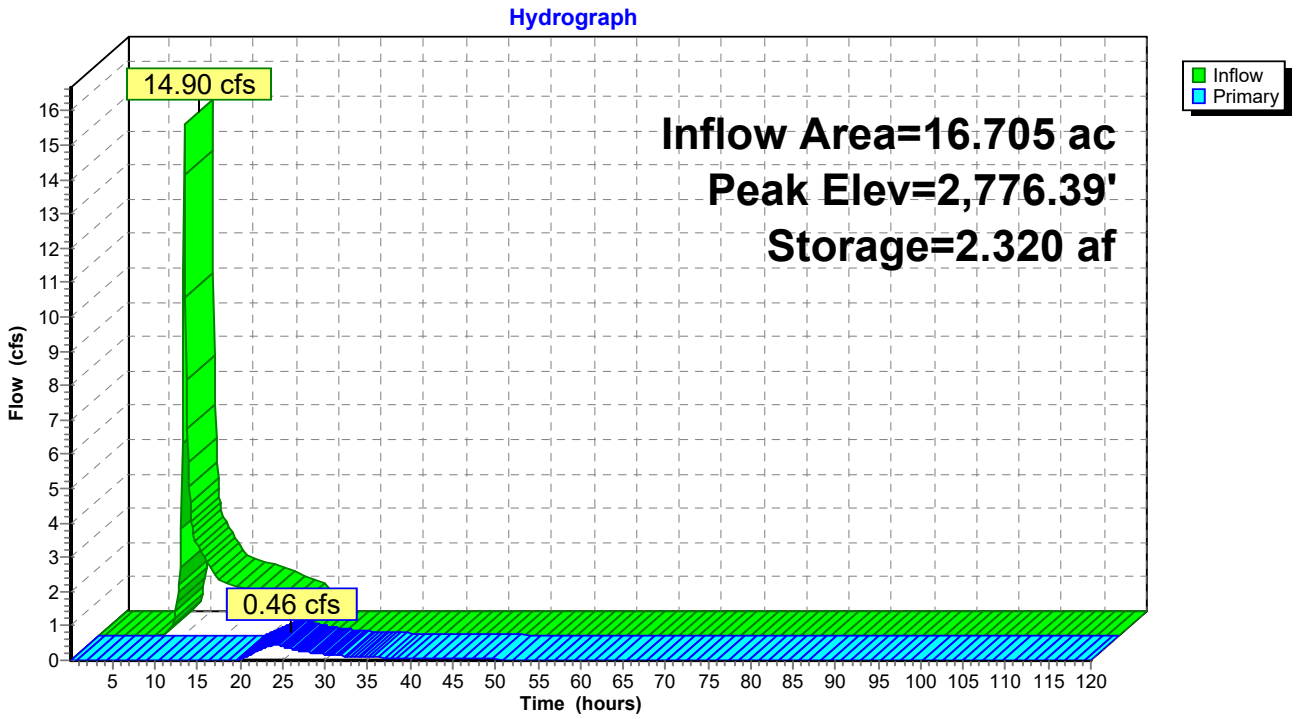
Volume	Invert	Avail.Storage	Storage Description
#1	2,773.00'	3.691 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,773.00	0.571	0.000	0.000
2,773.75	0.620	0.447	0.447
2,774.00	0.636	0.157	0.604
2,775.00	0.703	0.670	1.273
2,776.00	0.771	0.737	2.010
2,777.00	0.840	0.806	2.816
2,778.00	0.910	0.875	3.691

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,774.50'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,774.50' / 2,773.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,776.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.46 cfs @ 24.22 hrs HW=2,776.39' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 2.14 fps)
↑—**1=Culvert** (Passes 0.46 cfs of 5.30 cfs potential flow)

Pond D2: D2 Pond



Summary for Pond D3: D3 Pond

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 1.67" for 50-year 24hr event
Inflow = 12.17 cfs @ 9.95 hrs, Volume= 1.467 af
Outflow = 0.40 cfs @ 23.98 hrs, Volume= 0.223 af, Atten= 97%, Lag= 841.5 min
Primary = 0.40 cfs @ 23.98 hrs, Volume= 0.223 af
Routed to Reach 3R : Culvert Crossing

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,789.36' @ 23.98 hrs Surf.Area= 0.390 ac Storage= 1.380 af

Plug-Flow detention time= 1,171.7 min calculated for 0.223 af (15% of inflow)
Center-of-Mass det. time= 915.0 min (1,758.1 - 843.1)

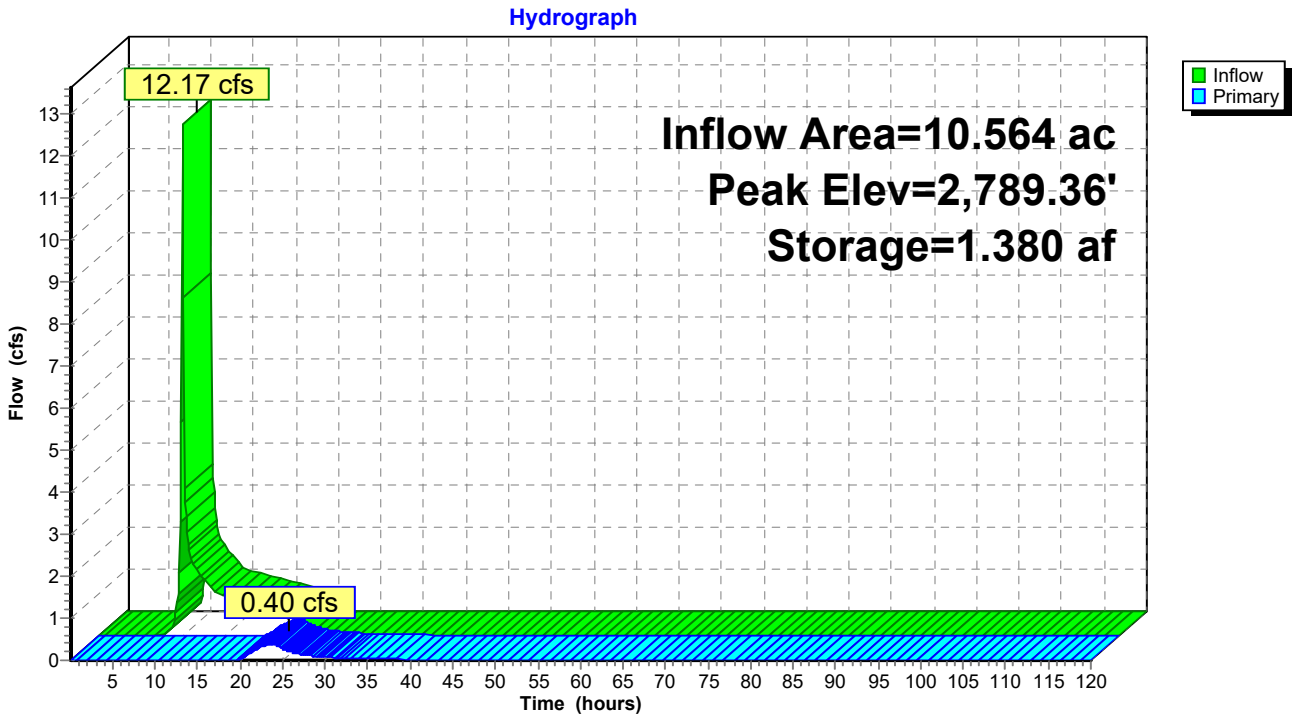
Volume	Invert	Avail.Storage	Storage Description
#1	2,784.00'	2.083 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,784.00	0.116	0.000	0.000
2,785.00	0.168	0.142	0.142
2,786.00	0.221	0.194	0.336
2,787.00	0.282	0.251	0.588
2,788.00	0.327	0.304	0.893
2,789.00	0.373	0.350	1.243
2,790.00	0.420	0.397	1.639
2,791.00	0.469	0.445	2.083

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,788.00'	**18.0" Round Culvert** L= 81.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,788.00' / 2,786.00' S= 0.0247 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,789.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.40 cfs @ 23.98 hrs HW=2,789.36' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.40 cfs @ 2.05 fps)
↑—**1=Culvert** (Passes 0.40 cfs of 3.76 cfs potential flow)

Pond D3: D3 Pond



Summary for Pond D4: D4 Pond

Inflow Area = 9.318 ac, 20.08% Impervious, Inflow Depth = 0.84" for 50-year 24hr event
Inflow = 2.63 cfs @ 10.12 hrs, Volume= 0.656 af
Outflow = 0.35 cfs @ 21.93 hrs, Volume= 0.215 af, Atten= 87%, Lag= 708.4 min
Primary = 0.35 cfs @ 21.93 hrs, Volume= 0.215 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,781.29' @ 21.93 hrs Surf.Area= 0.266 ac Storage= 0.516 af

Plug-Flow detention time= 836.1 min calculated for 0.215 af (33% of inflow)
Center-of-Mass det. time= 567.5 min (1,488.9 - 921.4)

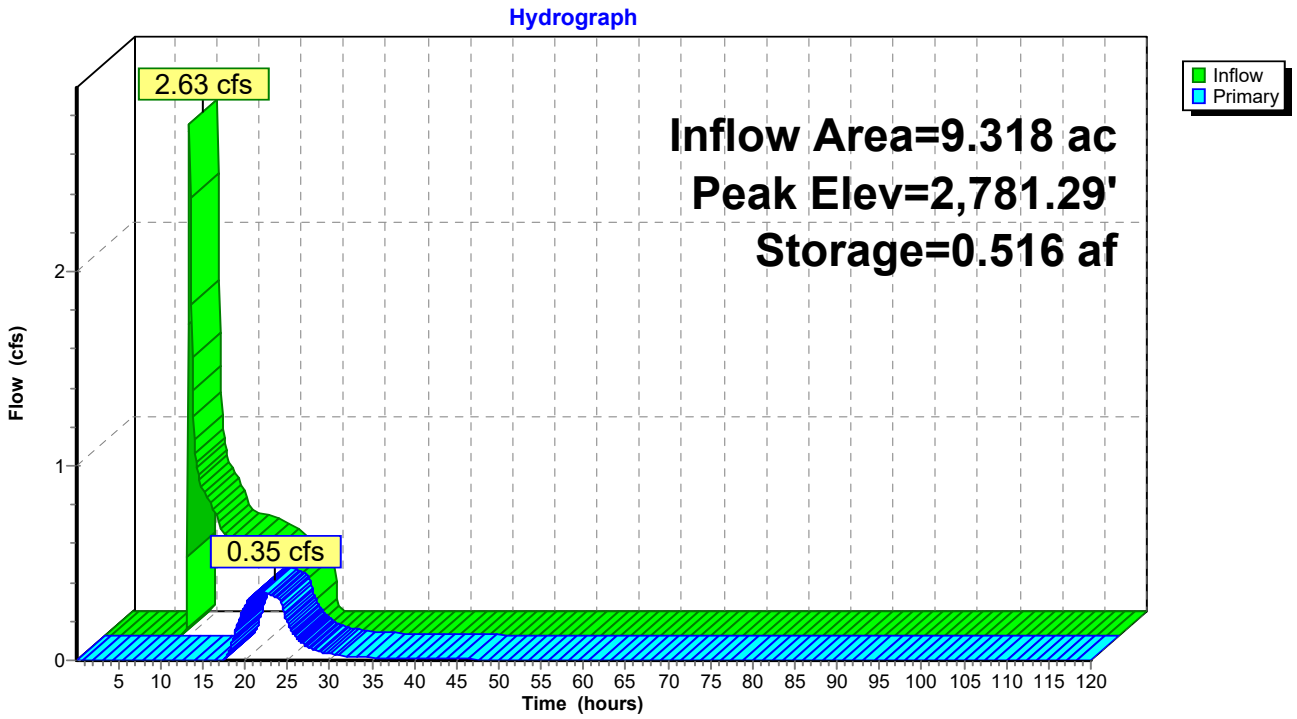
Volume	Invert	Avail.Storage	Storage Description
#1	2,779.00'	1.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,779.00	0.186	0.000	0.000
2,780.00	0.220	0.203	0.203
2,781.00	0.255	0.237	0.440
2,782.00	0.293	0.274	0.715
2,783.00	0.331	0.312	1.027

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,779.23'	**12.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.23' / 2,778.57' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Primary	2,781.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.35 cfs @ 21.93 hrs HW=2,781.29' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.35 cfs @ 1.84 fps)
↑—**1=Culvert** (Passes 0.35 cfs of 1.80 cfs potential flow)

Pond D4: D4 Pond

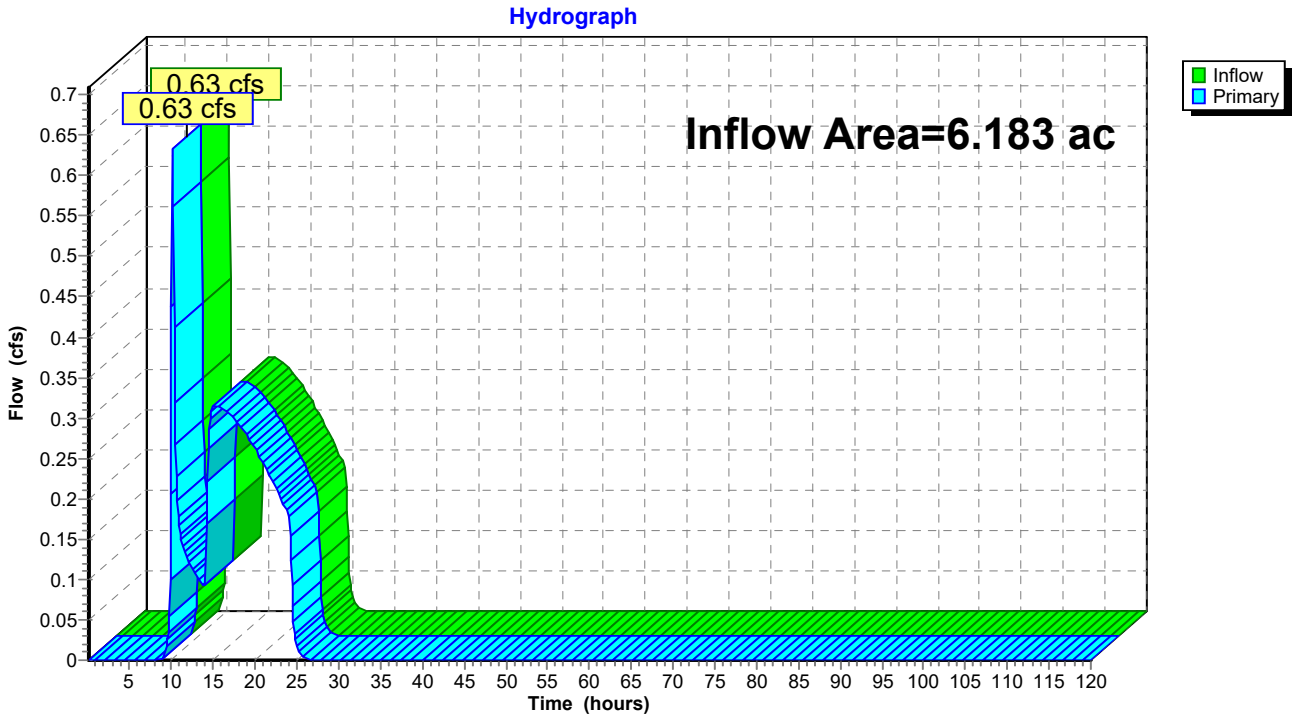


Summary for Link A: DP A

Inflow Area = 6.183 ac, 15.79% Impervious, Inflow Depth = 0.55" for 50-year 24hr event
Inflow = 0.63 cfs @ 10.12 hrs, Volume= 0.285 af
Primary = 0.63 cfs @ 10.12 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

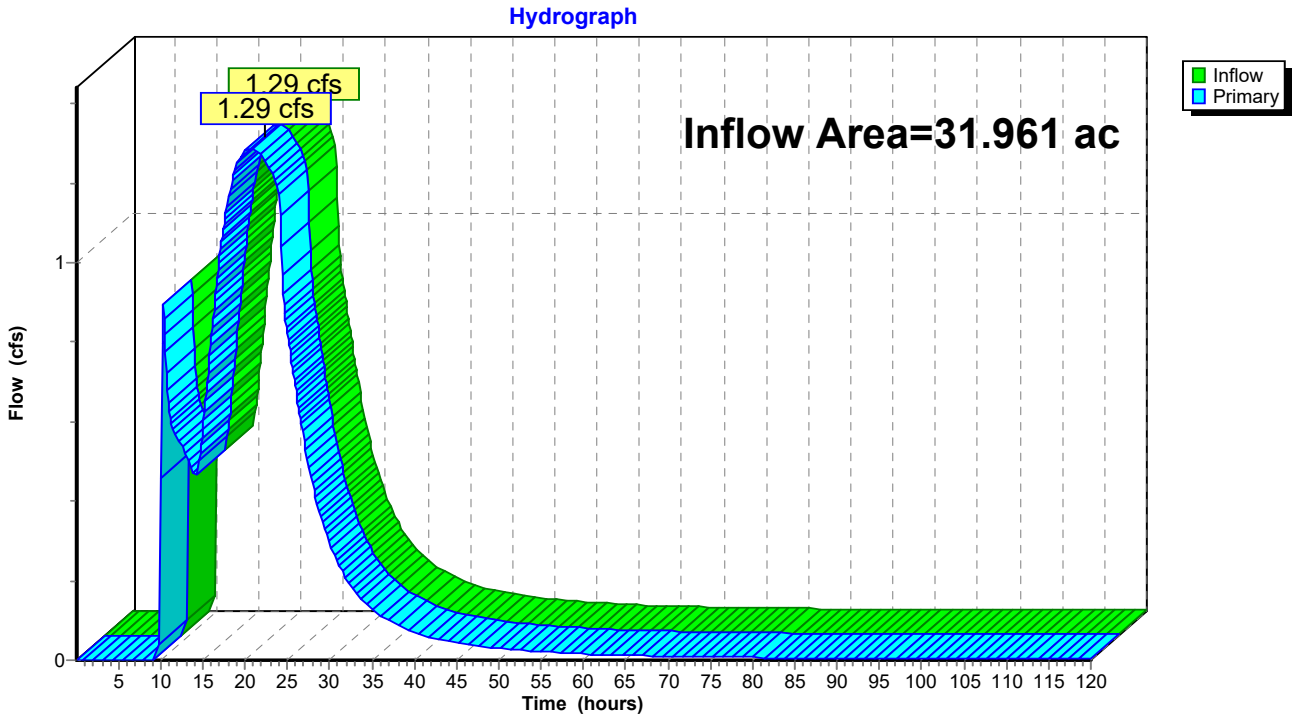


Summary for Link B: DP B

Inflow Area = 31.961 ac, 21.59% Impervious, Inflow Depth > 0.59" for 50-year 24hr event
Inflow = 1.29 cfs @ 20.62 hrs, Volume= 1.573 af
Primary = 1.29 cfs @ 20.62 hrs, Volume= 1.573 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

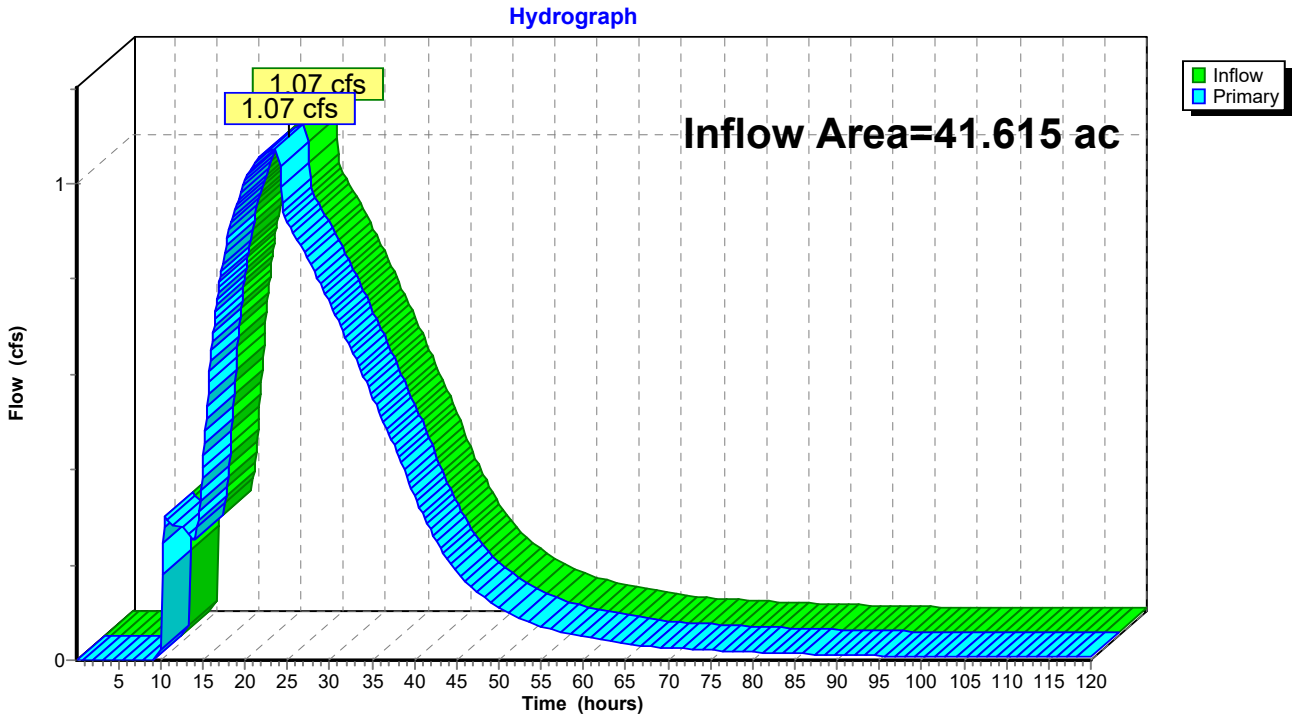


Summary for Link C: DP C

Inflow Area = 41.615 ac, 23.91% Impervious, Inflow Depth > 0.57" for 50-year 24hr event
Inflow = 1.07 cfs @ 23.57 hrs, Volume= 1.984 af
Primary = 1.07 cfs @ 23.57 hrs, Volume= 1.984 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

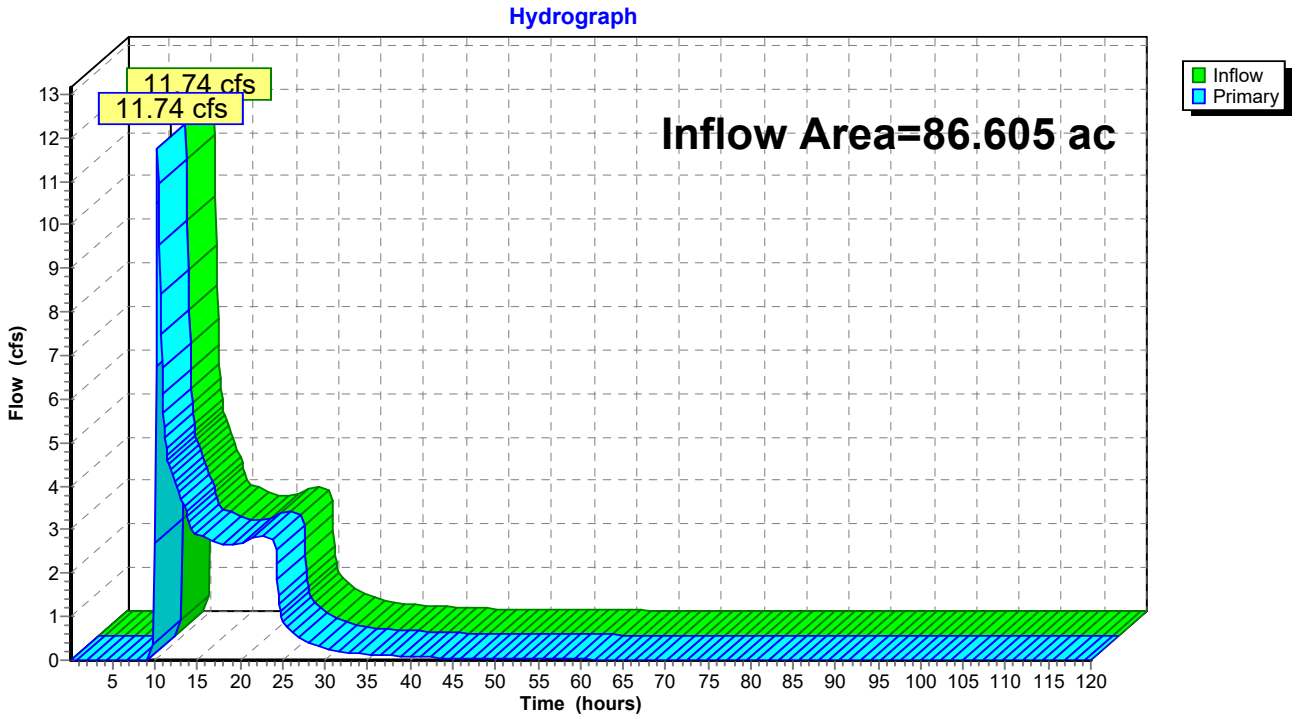


Summary for Link D: DP D

Inflow Area = 86.605 ac, 15.14% Impervious, Inflow Depth > 0.64" for 50-year 24hr event
Inflow = 11.74 cfs @ 10.31 hrs, Volume= 4.585 af
Primary = 11.74 cfs @ 10.31 hrs, Volume= 4.585 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A1: Subcat DA-A1 Runoff Area=5.149 ac 12.33% Impervious Runoff Depth=0.03"
Flow Length=1,005' Tc=18.6 min UI Adjusted CN=54 Runoff=0.08 cfs 0.014 af

Subcatchment DA-A1.1: Subcat DA-A1.1 Runoff Area=1.034 ac 32.98% Impervious Runoff Depth=0.21"
Flow Length=590' Tc=17.8 min CN=65 Runoff=0.08 cfs 0.018 af

Subcatchment DA-B1: Subcat DA-B1 Runoff Area=10.196 ac 10.65% Impervious Runoff Depth=0.02"
Flow Length=1,408' Tc=22.1 min UI Adjusted CN=52 Runoff=0.11 cfs 0.014 af

Subcatchment DA-B2: Subcat DA-B2 Runoff Area=9.131 ac 33.40% Impervious Runoff Depth=0.28"
Flow Length=1,387' Tc=20.5 min CN=68 Runoff=1.00 cfs 0.217 af

Subcatchment DA-B3: Subcat DA-B3 Runoff Area=12.634 ac 21.87% Impervious Runoff Depth=0.05"
Flow Length=786' Tc=4.6 min UI Adjusted CN=56 Runoff=0.29 cfs 0.057 af

Subcatchment DA-C1: Subcat DA-C1 Runoff Area=9.940 ac 30.38% Impervious Runoff Depth=0.23"
Flow Length=1,218' Tc=21.9 min CN=66 Runoff=0.82 cfs 0.193 af

Subcatchment DA-C2: Subcat DA-C2 Runoff Area=24.605 ac 28.17% Impervious Runoff Depth=0.09"
Flow Length=2,502' Tc=25.1 min UI Adjusted CN=59 Runoff=0.85 cfs 0.194 af

Subcatchment DA-C3: Subcat DA-C3 Runoff Area=7.070 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,331' Tc=19.8 min CN=49 Runoff=0.02 cfs 0.002 af

Subcatchment DA-D1: Subcat DA-D1 Runoff Area=50.018 ac 1.44% Impervious Runoff Depth=0.08"
Flow Length=2,494' Tc=28.0 min CN=58 Runoff=1.53 cfs 0.333 af

Subcatchment DA-D2: Subcat DA-D2 Runoff Area=16.705 ac 39.56% Impervious Runoff Depth=0.37"
Flow Length=1,582' Tc=18.8 min CN=71 Runoff=3.19 cfs 0.518 af

Subcatchment DA-D3: Subcat DA-D3 Runoff Area=10.564 ac 37.08% Impervious Runoff Depth=0.34"
Flow Length=769' Tc=4.6 min CN=70 Runoff=2.48 cfs 0.301 af

Subcatchment DA-D4: Subcat DA-D4 Runoff Area=9.318 ac 20.08% Impervious Runoff Depth=0.07"
Flow Length=1,055' Tc=15.3 min UI Adjusted CN=57 Runoff=0.25 cfs 0.051 af

Reach 3R: Culvert Crossing Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
36.0" Round Pipe n=0.013 L=187.0' S=0.0078 '/' Capacity=58.93 cfs Outflow=0.00 cfs 0.000 af

Reach 4R: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond A1: A1 Pond Peak Elev=2,785.43' Storage=0.014 af Inflow=0.08 cfs 0.014 af
Outflow=0.00 cfs 0.000 af

Pond B2: B2 Pond Peak Elev=2,794.69' Storage=0.206 af Inflow=1.00 cfs 0.217 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0371 '/' Outflow=0.19 cfs 0.050 af

Pond B3: B3 Pond Peak Elev=2,778.67' Storage=0.107 af Inflow=0.39 cfs 0.107 af
Outflow=0.00 cfs 0.000 af

Pond C1: C1 Pond Peak Elev=2,791.52' Storage=0.193 af Inflow=0.82 cfs 0.193 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0077 '/' Outflow=0.00 cfs 0.000 af

Pond C2: C2 Pond Peak Elev=2,765.34' Storage=0.194 af Inflow=0.85 cfs 0.194 af
Outflow=0.00 cfs 0.000 af

Pond D2: D2 Pond Peak Elev=2,773.86' Storage=0.518 af Inflow=3.19 cfs 0.518 af
Outflow=0.00 cfs 0.000 af

Pond D3: D3 Pond Peak Elev=2,785.83' Storage=0.301 af Inflow=2.48 cfs 0.301 af
Outflow=0.00 cfs 0.000 af

Pond D4: D4 Pond Peak Elev=2,779.27' Storage=0.051 af Inflow=0.25 cfs 0.051 af
Outflow=0.00 cfs 0.000 af

Link A: DP A Inflow=0.08 cfs 0.018 af
Primary=0.08 cfs 0.018 af

Link B: DP B Inflow=0.11 cfs 0.014 af
Primary=0.11 cfs 0.014 af

Link C: DP C Inflow=0.02 cfs 0.002 af
Primary=0.02 cfs 0.002 af

Link D: DP D Inflow=1.53 cfs 0.333 af
Primary=1.53 cfs 0.333 af

Total Runoff Area = 166.364 ac Runoff Volume = 1.913 af Average Runoff Depth = 0.14"
81.40% Pervious = 135.423 ac 18.60% Impervious = 30.941 ac

Summary for Subcatchment DA-A1: Subcat DA-A1

[73] Warning: Peak may fall outside time span

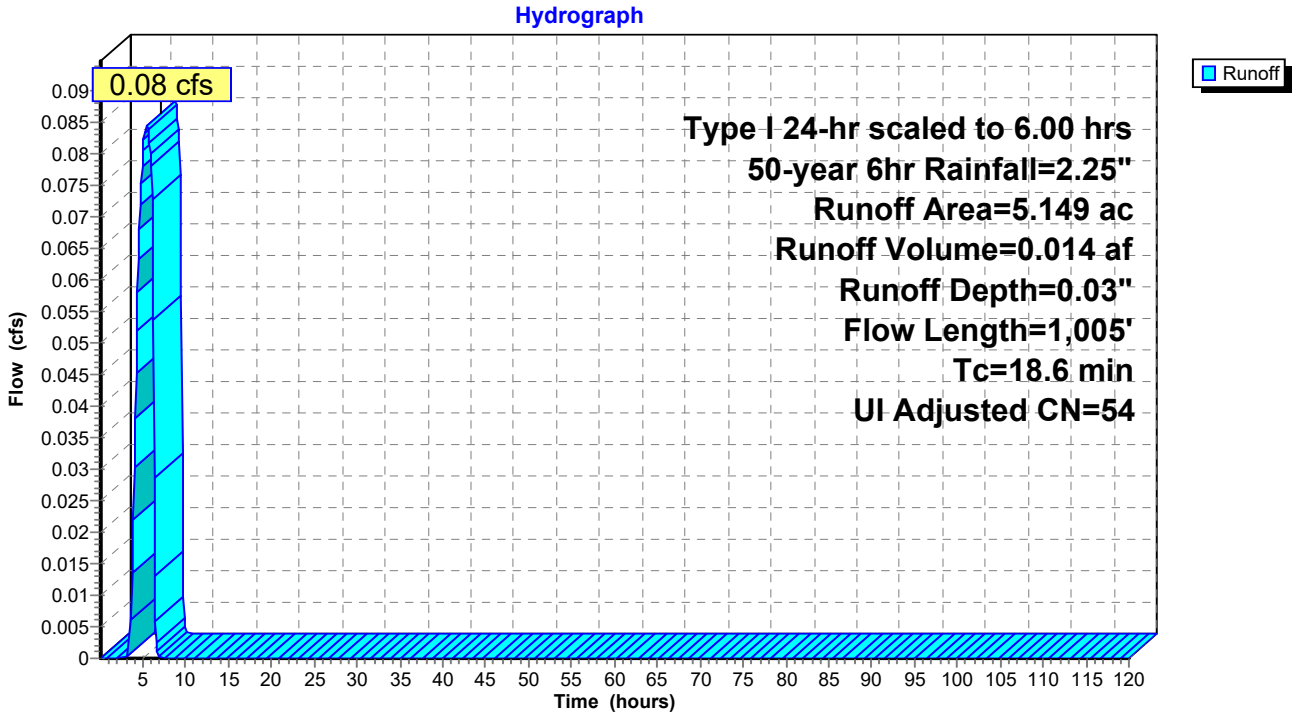
Runoff = 0.08 cfs @ 5.42 hrs, Volume= 0.014 af, Depth= 0.03"
Routed to Pond A1 : A1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Adj	Description
4.141	49		Desert shrub range, Good, HSG A
0.635	98		Unconnected pavement, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.068	96		Gravel surface, HSG A
0.099	72		Dirt roads, HSG A
5.149	57	54	Weighted Average, UI Adjusted
4.514			87.67% Pervious Area
0.635			12.33% Impervious Area
0.635			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0208	0.15		**Sheet Flow, sheet 2802.48-2800.40** Range n= 0.130 P2= 1.88"
3.2	385	0.0158	2.02		**Shallow Concentrated Flow, shallow 2800.40-2794.30** Unpaved Kv= 16.1 fps
0.2	40	0.0050	4.20	7.43	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.5	398	0.0142	1.92		**Shallow Concentrated Flow, shallow 2793.57-2788.24** Unpaved Kv= 16.1 fps
0.5	82	0.0151	2.49		**Shallow Concentrated Flow, paved 2788.24-2787** Paved Kv= 20.3 fps
18.6	1,005	Total			

Subcatchment DA-A1: Subcat DA-A1



Summary for Subcatchment DA-A1.1: Subcat DA-A1.1

[73] Warning: Peak may fall outside time span

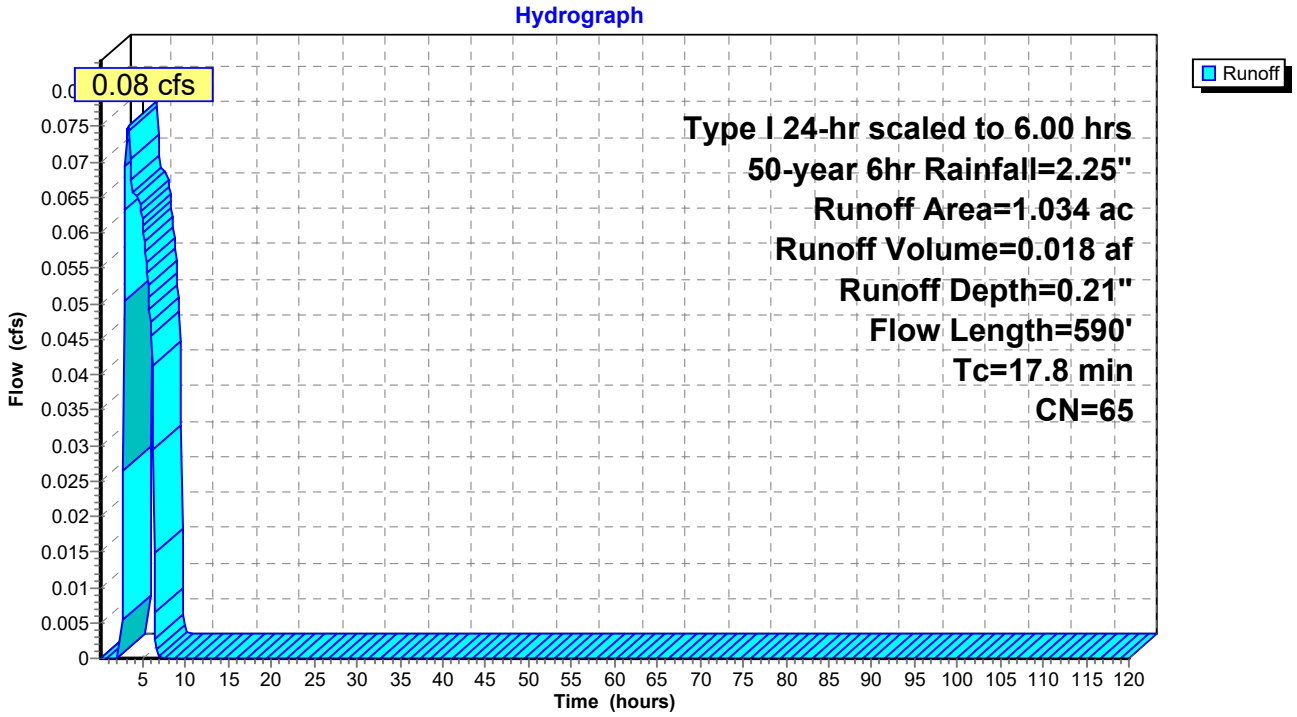
Runoff = 0.08 cfs @ 3.30 hrs, Volume= 0.018 af, Depth= 0.21"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Description
0.693	49	Desert shrub range, Good, HSG A
0.341	98	Unconnected pavement, HSG A
1.034	65	Weighted Average
0.693		67.02% Pervious Area
0.341		32.98% Impervious Area
0.341		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0182	0.14		**Sheet Flow, sheet 2787.94-2786.12** Range n= 0.130 P2= 1.88"
4.7	369	0.0172	1.31		**Shallow Concentrated Flow, shallow 2786.12-2779.76** Nearly Bare & Untilled Kv= 10.0 fps
0.2	26	0.0200	2.87		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.1	95	0.0211	1.45		**Shallow Concentrated Flow, shallow 2779-2776.99** Nearly Bare & Untilled Kv= 10.0 fps
17.8	590	Total			

Subcatchment DA-A1.1: Subcat DA-A1.1



Summary for Subcatchment DA-B1: Subcat DA-B1

[73] Warning: Peak may fall outside time span

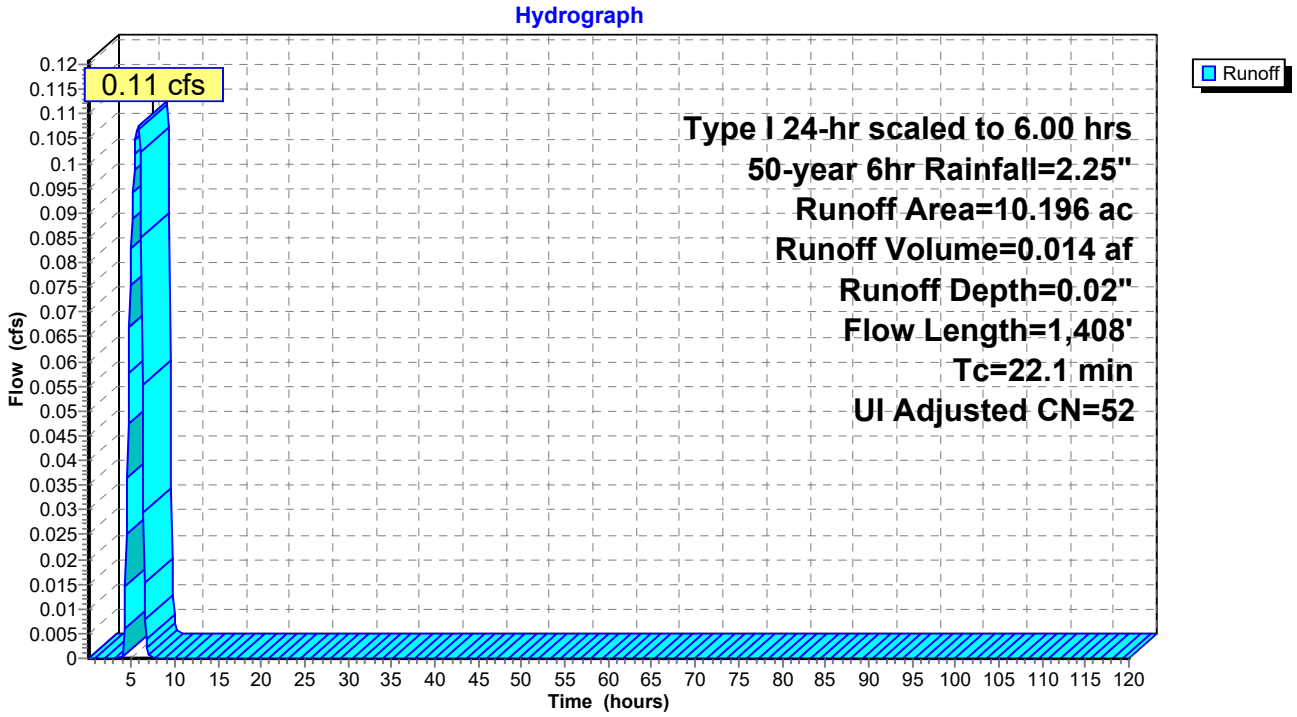
Runoff = 0.11 cfs @ 5.79 hrs, Volume= 0.014 af, Depth= 0.02"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Adj	Description
	8.673	49		Desert shrub range, Good, HSG A
	1.086	98		Unconnected pavement, HSG A
*	0.437	55		Surrounding Equip. Cover, HSG A
	10.196	54	52	Weighted Average, UI Adjusted
	9.110			89.35% Pervious Area
	1.086			10.65% Impervious Area
	1.086			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0185	0.14		**Sheet Flow, Sheet Flow 2803.05-2801.20** Range n= 0.130 P2= 1.88"
1.6	207	0.0189	2.21		**Shallow Concentrated Flow, shallow 2801.20-2797.28** Unpaved Kv= 16.1 fps
0.2	31	0.0200	2.87		**Shallow Concentrated Flow, shallow 2797.28-2796.65** Paved Kv= 20.3 fps
3.1	416	0.0191	2.23		**Shallow Concentrated Flow, shallow 2796.65-2788.70** Unpaved Kv= 16.1 fps
0.2	28	0.0160	2.57		**Shallow Concentrated Flow, shallow paved 2788.70-2788.25** Paved Kv= 20.3 fps
4.1	507	0.0161	2.04		**Shallow Concentrated Flow, shallow unpaved 2788.25-2780.00** Unpaved Kv= 16.1 fps
0.2	27	0.0200	2.87		**Shallow Concentrated Flow, shallow paved** Paved Kv= 20.3 fps
0.9	92	0.0107	1.67		**Shallow Concentrated Flow, shallow unpaved 2779.05-2778.06** Unpaved Kv= 16.1 fps
22.1	1,408	Total			

Subcatchment DA-B1: Subcat DA-B1



Summary for Subcatchment DA-B2: Subcat DA-B2

[73] Warning: Peak may fall outside time span

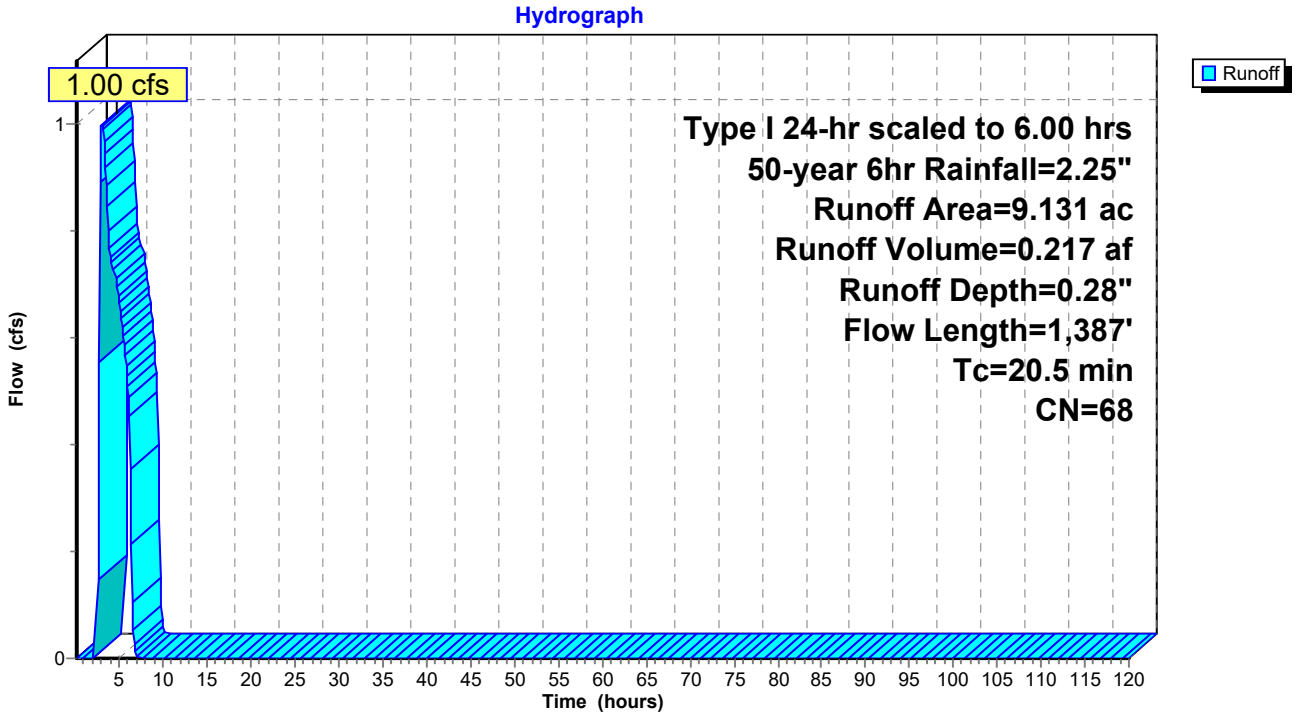
Runoff = 1.00 cfs @ 2.96 hrs, Volume= 0.217 af, Depth= 0.28"
Routed to Pond B2 : B2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Description
	2.467	49	Desert shrub range, Good, HSG A
	3.050	98	Unconnected pavement, HSG A
*	3.614	55	Surrounding Equip. Cover, HSG A
	9.131	68	Weighted Average
	6.081		66.60% Pervious Area
	3.050		33.40% Impervious Area
	3.050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0319	0.18		**Sheet Flow, sheet 2808-2804.81** Range n= 0.130 P2= 1.88"
6.6	792	0.0156	2.01		**Shallow Concentrated Flow, shallow range 2804.81-2802.44** Unpaved Kv= 16.1 fps
0.2	52	0.0050	4.20	7.43	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
2.2	187	0.0080	1.44		**Shallow Concentrated Flow, shallow unpaved 2802-2800.37** Unpaved Kv= 16.1 fps
2.0	256	0.0110	2.13		**Shallow Concentrated Flow, paved 2800.37-2797.53** Paved Kv= 20.3 fps
20.5	1,387	Total			

Subcatchment DA-B2: Subcat DA-B2



Summary for Subcatchment DA-B3: Subcat DA-B3

[49] Hint: Tc<2dt may require smaller dt
[73] Warning: Peak may fall outside time span

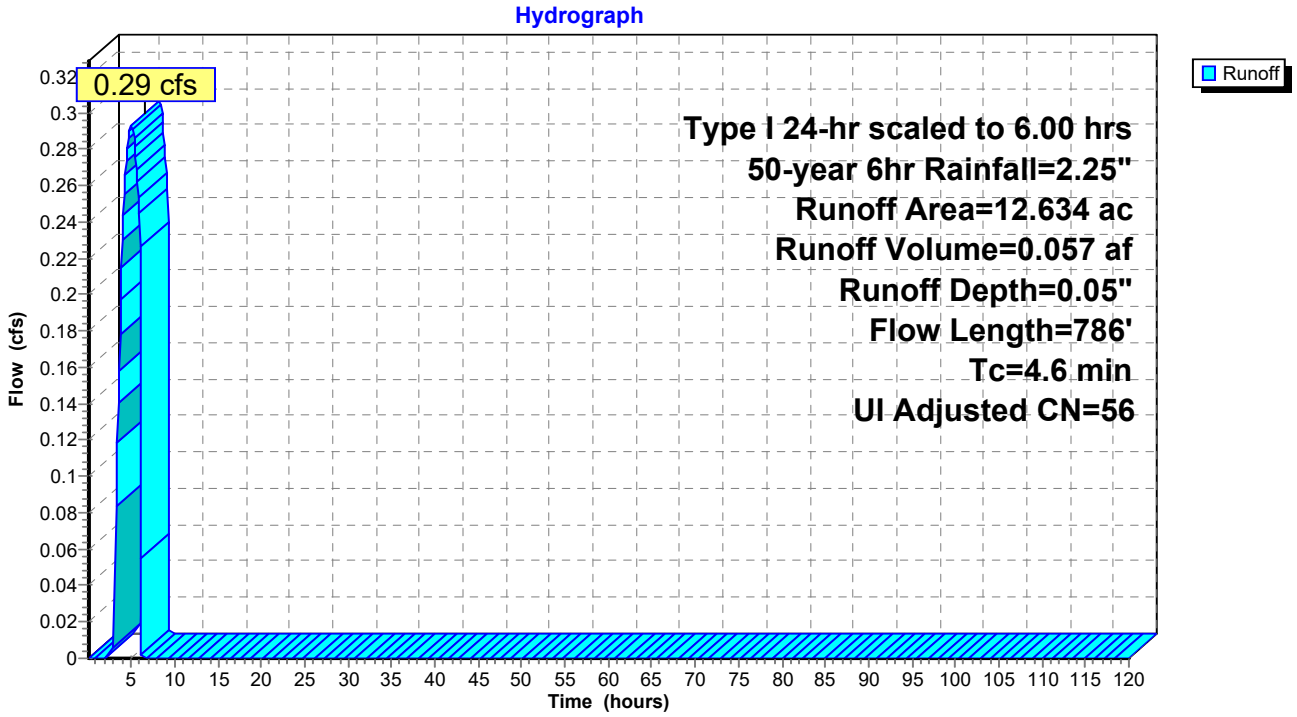
Runoff = 0.29 cfs @ 4.94 hrs, Volume= 0.057 af, Depth= 0.05"
Routed to Pond B3 : B3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Adj	Description
	6.592	49		Desert shrub range, Good, HSG A
	2.763	98		Unconnected pavement, HSG A
*	3.279	55		Surrounding Equip. Cover, HSG A
	12.634	61	56	Weighted Average, UI Adjusted
	9.871			78.13% Pervious Area
	2.763			21.87% Impervious Area
	2.763			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0190	0.81		**Sheet Flow, sheet paved 2799.71-2799.14** Smooth surfaces n= 0.011 P2= 1.88"
1.1	80	0.0340	1.25		**Sheet Flow, sheet unpaved 2799.14-2796.37** Smooth surfaces n= 0.011 P2= 1.88"
1.4	304	0.0480	3.53		**Shallow Concentrated Flow, shallow 2796.37-2781.77** Unpaved Kv= 16.1 fps
0.2	51	0.0075	4.04	72.81	**Channel Flow, channel 2781.77-2781.39** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.1	42	0.0209	8.59	15.19	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.9	193	0.0054	3.43	61.78	**Channel Flow, channel 2780.52-2779.48** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.3	86	0.0054	4.37	7.72	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
4.6	786	Total			

Subcatchment DA-B3: Subcat DA-B3



Summary for Subcatchment DA-C1: Subcat DA-C1

[73] Warning: Peak may fall outside time span

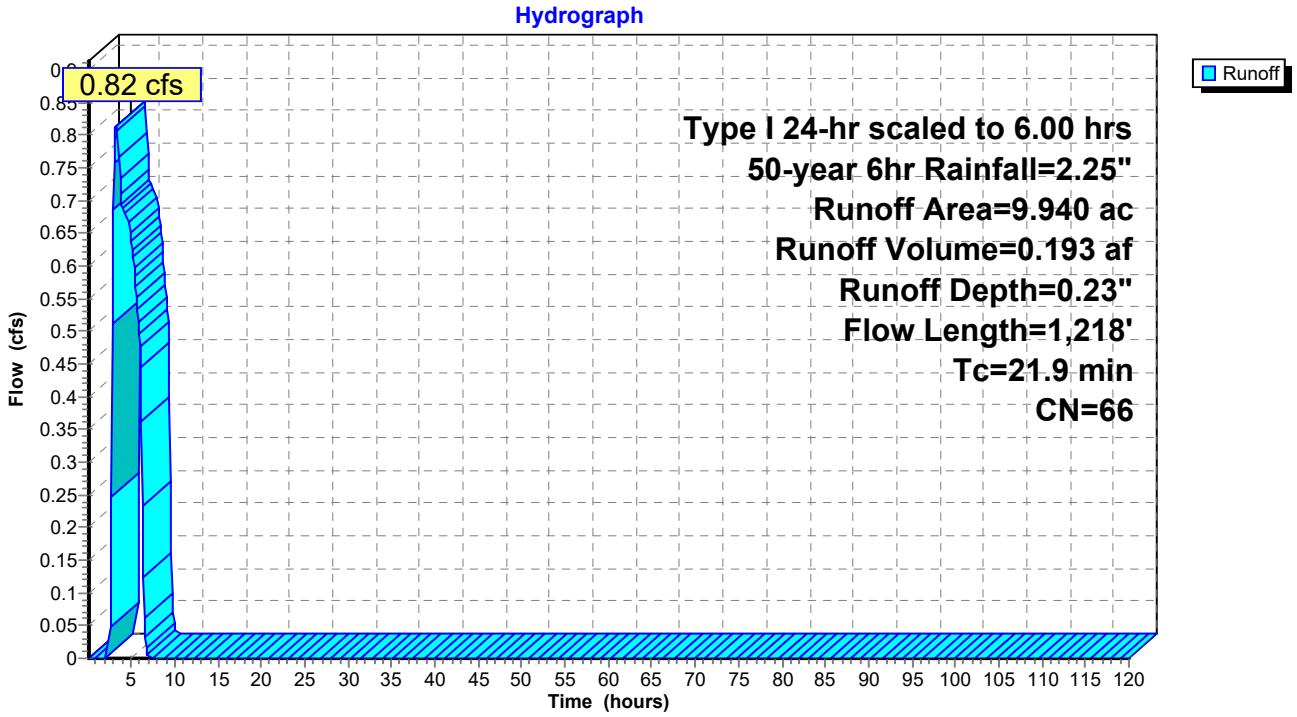
Runoff = 0.82 cfs @ 3.29 hrs, Volume= 0.193 af, Depth= 0.23"
Routed to Pond C1 : C1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Description
	3.160	49	Desert shrub range, Good, HSG A
	3.020	98	Unconnected pavement, HSG A
*	3.760	55	Surrounding Equip. Cover, HSG A
	9.940	66	Weighted Average
	6.920		69.62% Pervious Area
	3.020		30.38% Impervious Area
	3.020		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	58	0.0030	0.06		**Sheet Flow, Sheet 2813.48-2813.30** Range n= 0.130 P2= 1.88"
0.8	42	0.0205	0.90		**Sheet Flow, Sheet paved 2813.30-2812.44** Smooth surfaces n= 0.011 P2= 1.88"
3.1	450	0.0226	2.42		**Shallow Concentrated Flow, shallow 2812.44-2802.24** Unpaved Kv= 16.1 fps
0.4	152	0.0120	7.08	70.78	**Channel Flow, ditch 2802.24-2800.41** Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.023
0.2	102	0.0356	11.22	19.82	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.8	183	0.0050	3.78	83.06	**Channel Flow, channel 2796.77-2795.91** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035 Riprap, 6-inch
0.2	64	0.0064	5.62	9.93	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.7	167	0.0050	3.78	83.06	**Channel Flow, channel 2795.50-2794.65** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035
21.9	1,218	Total			

Subcatchment DA-C1: Subcat DA-C1



Summary for Subcatchment DA-C2: Subcat DA-C2

[73] Warning: Peak may fall outside time span

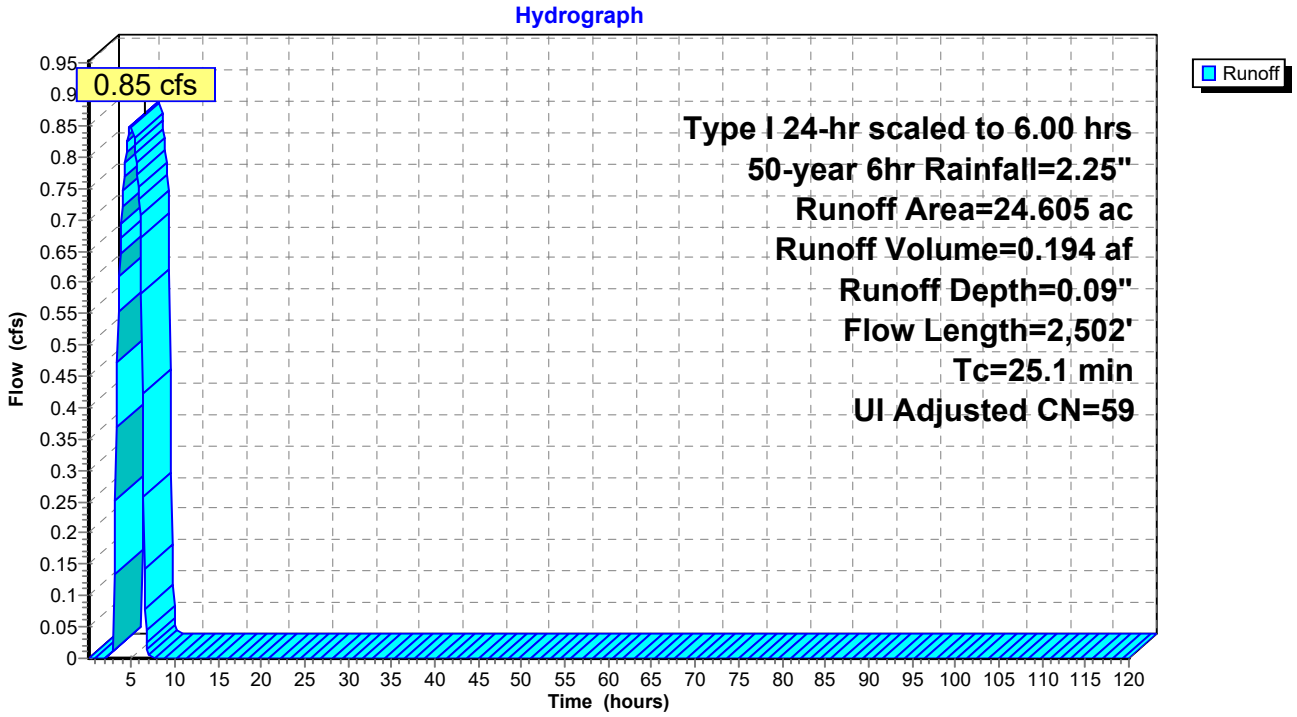
Runoff = 0.85 cfs @ 4.92 hrs, Volume= 0.194 af, Depth= 0.09"
Routed to Pond C2 : C2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Adj	Description
	6.655	49		Desert shrub range, Good, HSG A
	6.930	98		Unconnected pavement, HSG A
*	11.020	55		Surrounding Equip. Cover, HSG A
	24.605	65	59	Weighted Average, UI Adjusted
	17.675			71.83% Pervious Area
	6.930			28.17% Impervious Area
	6.930			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0153	0.13		**Sheet Flow, Sheet Flow 2811-2809.47** Range n= 0.130 P2= 1.88"
9.8	1,280	0.0182	2.17		**Shallow Concentrated Flow, Shallow 2809.47-2786.17** Unpaved Kv= 16.1 fps
2.6	1,122	0.0175	7.21	230.73	**Channel Flow, channel 2787.62-2768** Area= 32.0 sf Perim= 22.0' r= 1.45' n= 0.035 Riprap, 6-inch
25.1	2,502	Total			

Subcatchment DA-C2: Subcat DA-C2



Summary for Subcatchment DA-C3: Subcat DA-C3

[73] Warning: Peak may fall outside time span

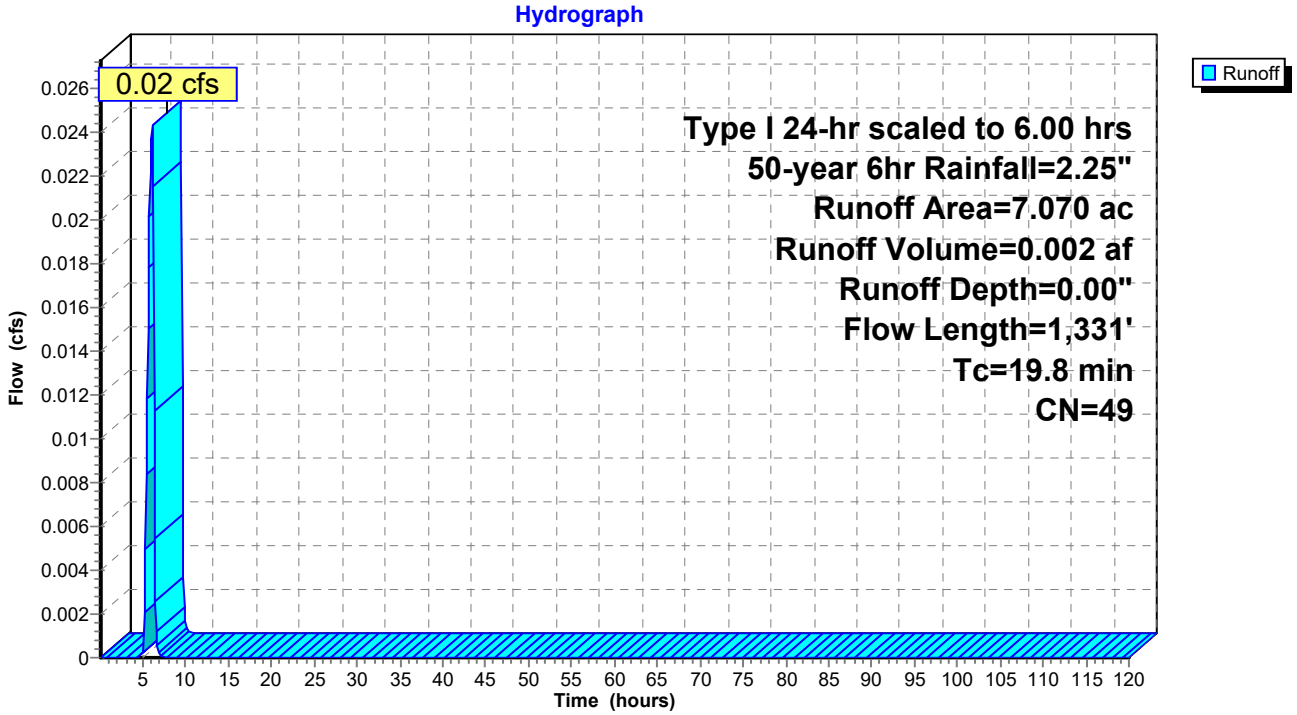
Runoff = 0.02 cfs @ 6.05 hrs, Volume= 0.002 af, Depth= 0.00"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Description
7.070	49	Desert shrub range, Good, HSG A
0.000	98	Unconnected pavement, HSG A
7.070	49	Weighted Average
7.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0224	0.15		**Sheet Flow, sheet 2785.88-2783.64** Range n= 0.130 P2= 1.88"
8.9	1,231	0.0205	2.31		**Shallow Concentrated Flow, shallow unpaved 2786.64-2761.34** Unpaved Kv= 16.1 fps
19.8	1,331	Total			

Subcatchment DA-C3: Subcat DA-C3



Summary for Subcatchment DA-D1: Subcat DA-D1

[73] Warning: Peak may fall outside time span

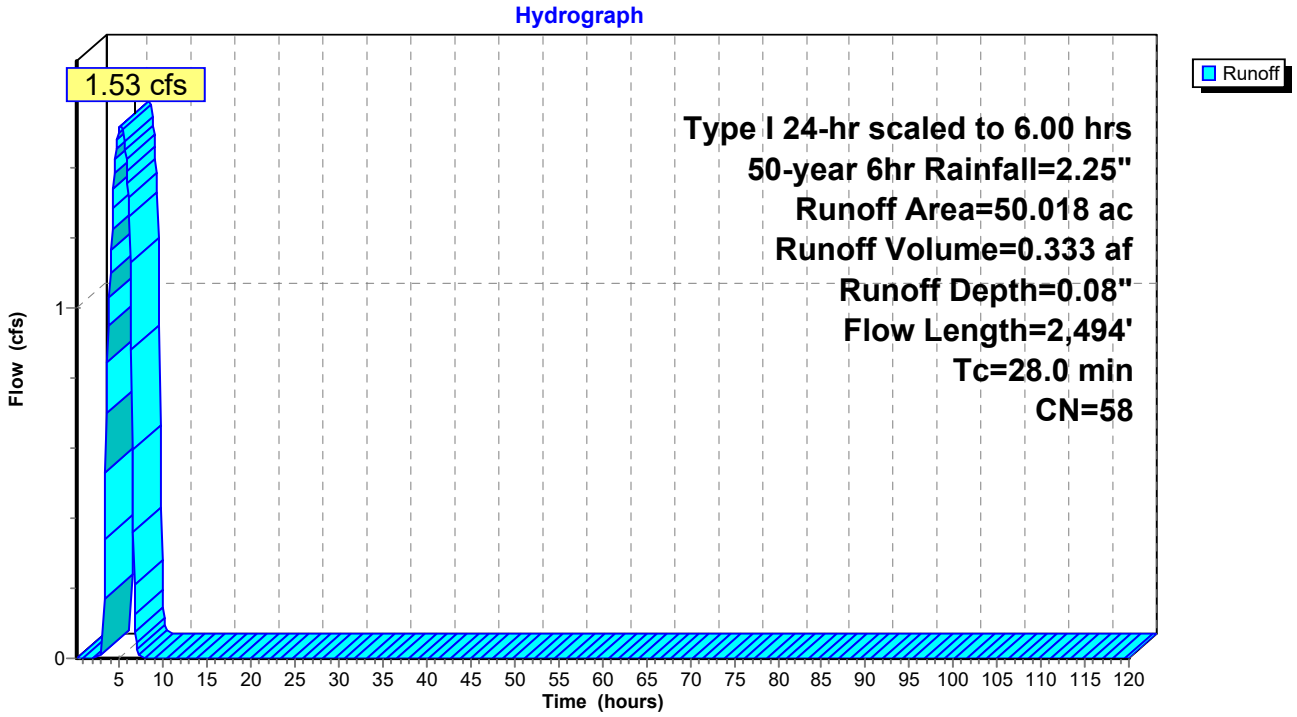
Runoff = 1.53 cfs @ 5.08 hrs, Volume= 0.333 af, Depth= 0.08"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

Area (ac)	CN	Description
27.134	49	Desert shrub range, Good, HSG A
20.822	68	Desert shrub range, Good, HSG B
1.078	72	Dirt roads, HSG A
0.264	82	Dirt roads, HSG B
0.400	98	Unconnected pavement, HSG A
0.320	98	Unconnected pavement, HSG B
50.018	58	Weighted Average
49.298		98.56% Pervious Area
0.720		1.44% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0270	0.16		**Sheet Flow, sheet 2810.70-2808** Range n= 0.130 P2= 1.88"
7.2	1,058	0.0230	2.44		**Shallow Concentrated Flow, shallow 2808-2783.46** Unpaved Kv= 16.1 fps
0.2	57	0.0080	5.32	9.40	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
10.5	1,279	0.0160	2.04		**Shallow Concentrated Flow, shallow 2783-2761** Unpaved Kv= 16.1 fps
28.0	2,494	Total			

Subcatchment DA-D1: Subcat DA-D1



Summary for Subcatchment DA-D2: Subcat DA-D2

[73] Warning: Peak may fall outside time span

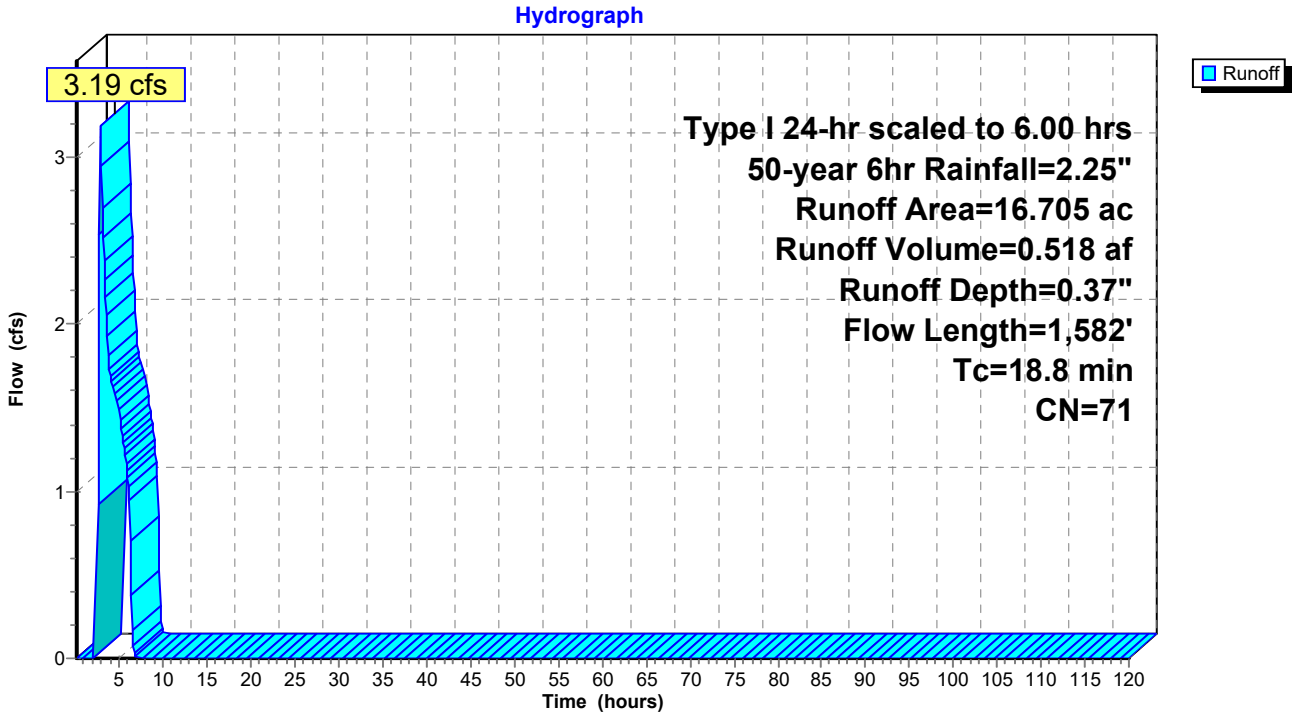
Runoff = 3.19 cfs @ 2.82 hrs, Volume= 0.518 af, Depth= 0.37"
Routed to Pond D2 : D2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Description
	1.577	49	Desert shrub range, Good, HSG A
	5.763	98	Unconnected pavement, HSG A
	0.845	98	Unconnected pavement, HSG B
*	8.520	55	Surrounding Equip. Cover, HSG A
	16.705	71	Weighted Average
	10.097		60.44% Pervious Area
	6.608		39.56% Impervious Area
	6.608		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	57	0.0520	0.19		**Sheet Flow, sheet 2800-2797** Range n= 0.130 P2= 1.88"
13.8	1,525	0.0130	1.84		**Shallow Concentrated Flow, shallow 2797-2777.25** Unpaved Kv= 16.1 fps
18.8	1,582	Total			

Subcatchment DA-D2: Subcat DA-D2



Summary for Subcatchment DA-D3: Subcat DA-D3

[49] Hint: Tc<2dt may require smaller dt
[73] Warning: Peak may fall outside time span

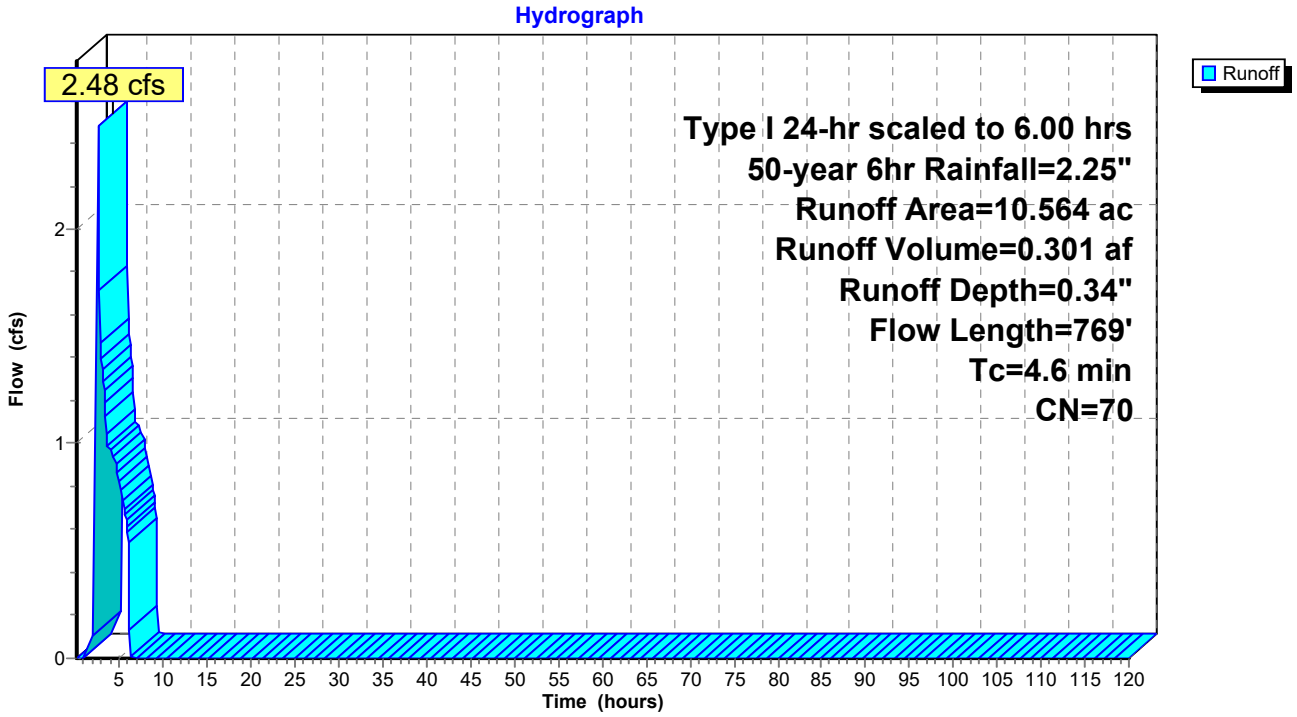
Runoff = 2.48 cfs @ 2.61 hrs, Volume= 0.301 af, Depth= 0.34"
Routed to Pond D3 : D3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Description
	1.397	49	Desert shrub range, Good, HSG A
	3.917	98	Unconnected pavement, HSG A
*	5.250	55	Surrounding Equip. Cover, HSG A
	10.564	70	Weighted Average
	6.647		62.92% Pervious Area
	3.917		37.08% Impervious Area
	3.917		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0500	1.52		**Sheet Flow, Sheet 2819-2814** Smooth surfaces n= 0.011 P2= 1.88"
3.4	626	0.0360	3.05		**Shallow Concentrated Flow, shallow 2814-2791.5** Unpaved Kv= 16.1 fps
0.1	43	0.0340	11.87	20.98	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
4.6	769	Total			

Subcatchment DA-D3: Subcat DA-D3



Summary for Subcatchment DA-D4: Subcat DA-D4

[73] Warning: Peak may fall outside time span

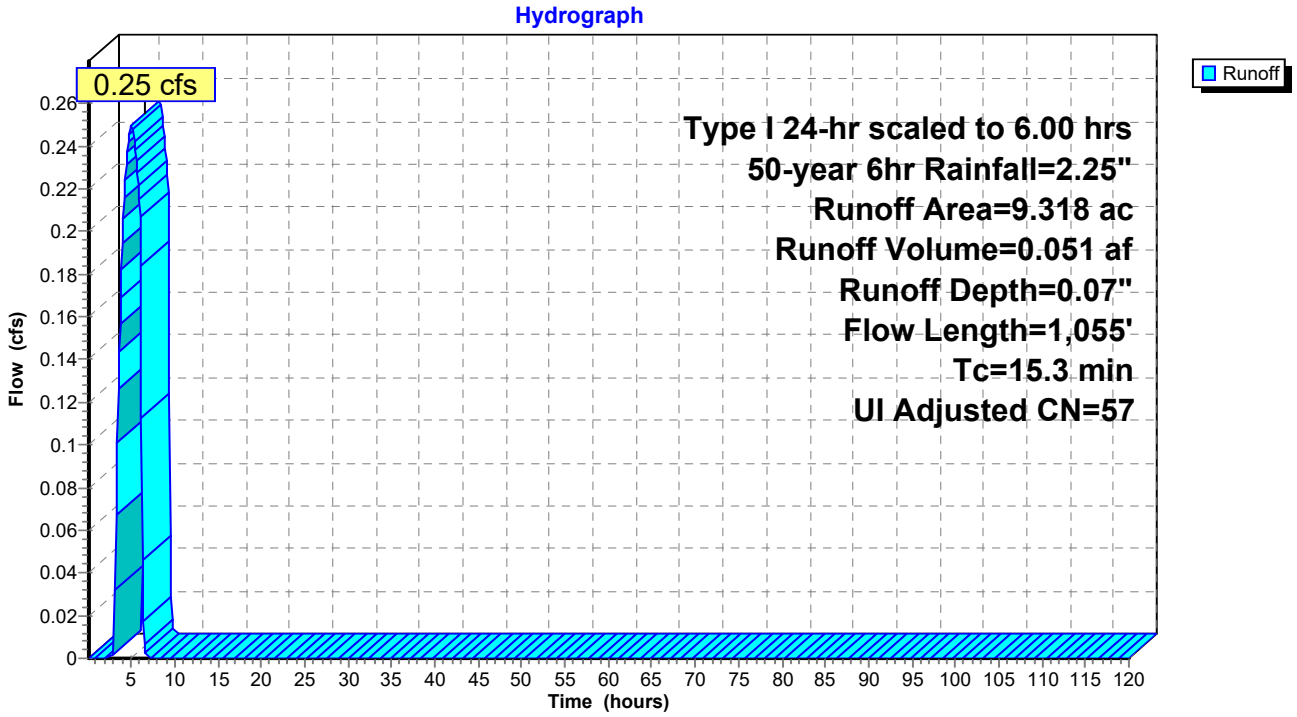
Runoff = 0.25 cfs @ 4.99 hrs, Volume= 0.051 af, Depth= 0.07"
Routed to Pond D4 : D4 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 50-year 6hr Rainfall=2.25"

	Area (ac)	CN	Adj	Description
	3.543	49		Desert shrub range, Good, HSG A
	0.004	72		Dirt roads, HSG A
	1.871	98		Unconnected pavement, HSG A
*	3.900	55		Surrounding Equip. Cover, HSG A
	9.318	61	57	Weighted Average, UI Adjusted
	7.447			79.92% Pervious Area
	1.871			20.08% Impervious Area
	1.871			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		**Sheet Flow, sheet 2817-2814** Range n= 0.130 P2= 1.88"
5.6	955	0.0314	2.85		**Shallow Concentrated Flow, shallow 2814-2784** Unpaved Kv= 16.1 fps
15.3	1,055	Total			

Subcatchment DA-D4: Subcat DA-D4



Summary for Reach 3R: Culvert Crossing

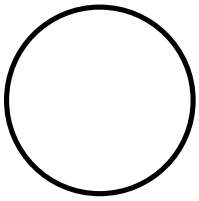
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.00" for 50-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Link D : DP D

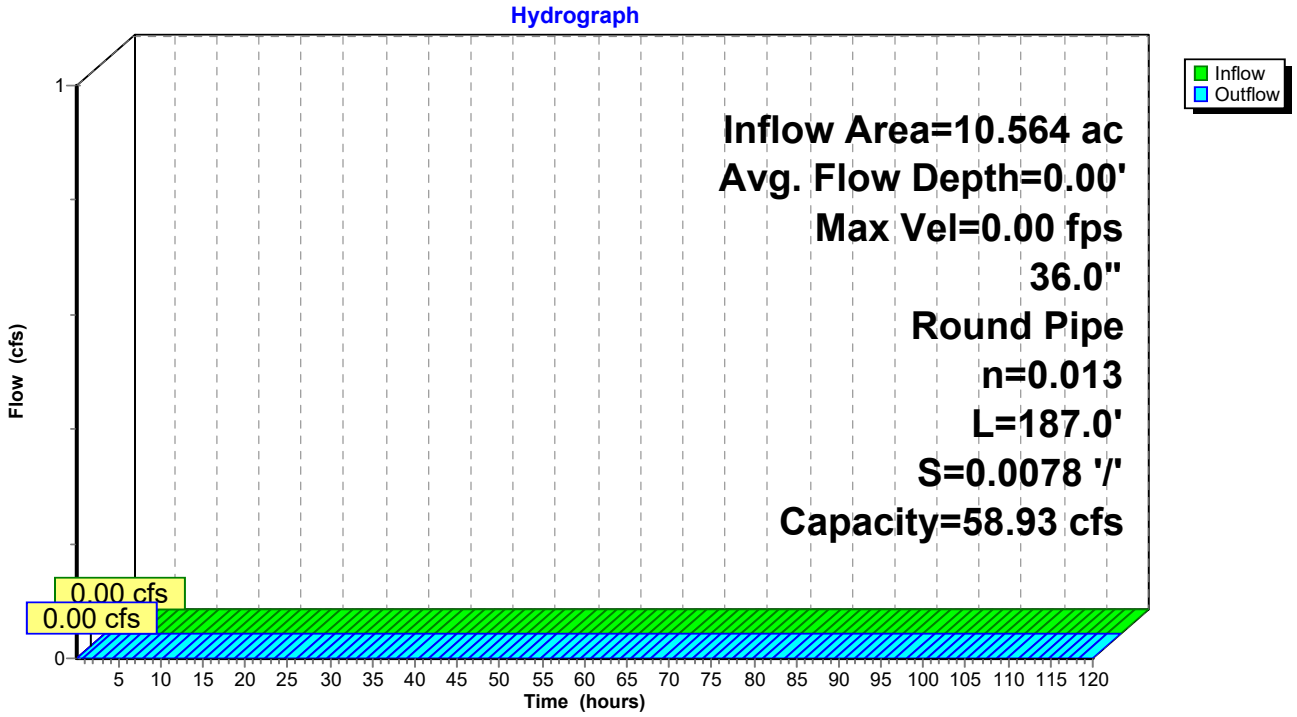
Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 58.93 cfs

36.0" Round Pipe
n= 0.013
Length= 187.0' Slope= 0.0078 '/'
Inlet Invert= 2,783.46', Outlet Invert= 2,782.00'



Reach 3R: Culvert Crossing



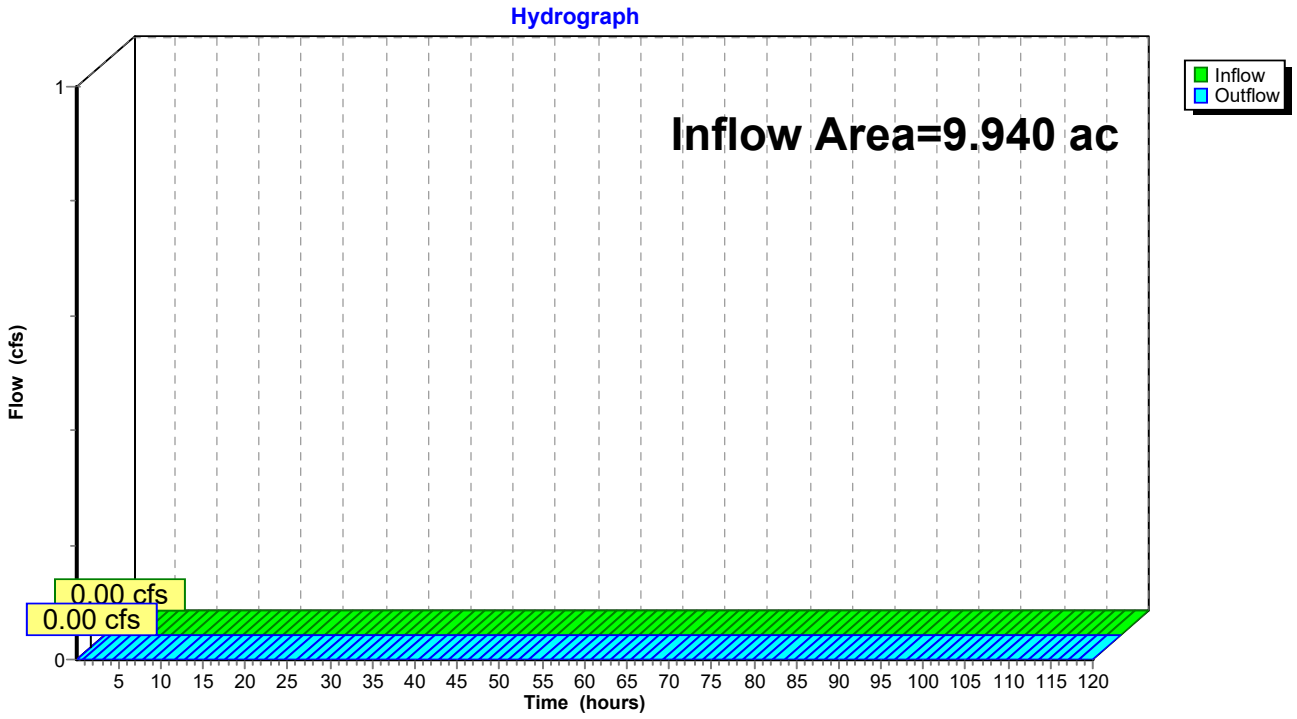
Summary for Reach 4R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.00" for 50-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond C2 : C2 Pond

Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Reach 4R: (new Reach)



Summary for Pond A1: A1 Pond

Inflow Area = 5.149 ac, 12.33% Impervious, Inflow Depth = 0.03" for 50-year 6hr event
Inflow = 0.08 cfs @ 5.42 hrs, Volume= 0.014 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link A : DP A

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,785.43' @ 7.20 hrs Surf.Area= 0.036 ac Storage= 0.014 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

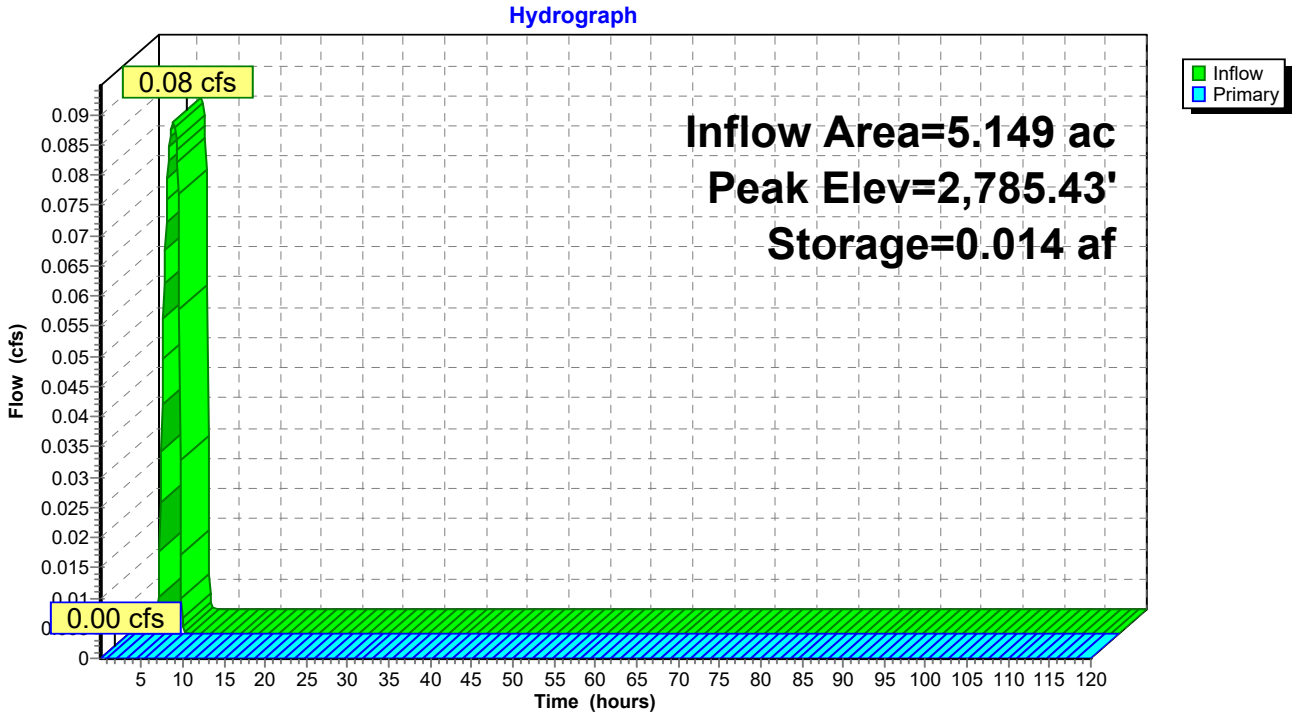
Volume	Invert	Avail.Storage	Storage Description
#1	2,785.00'	0.162 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,785.00	0.030	0.000	0.000
2,786.00	0.045	0.037	0.037
2,787.00	0.061	0.053	0.090
2,788.00	0.081	0.071	0.162

Device	Routing	Invert	Outlet Devices
#1	Primary	2,787.50'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,785.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond A1: A1 Pond



Summary for Pond B2: B2 Pond

Inflow Area = 9.131 ac, 33.40% Impervious, Inflow Depth = 0.28" for 50-year 6hr event
Inflow = 1.00 cfs @ 2.96 hrs, Volume= 0.217 af
Outflow = 0.19 cfs @ 6.33 hrs, Volume= 0.050 af, Atten= 81%, Lag= 202.1 min
Primary = 0.19 cfs @ 6.33 hrs, Volume= 0.050 af
Routed to Pond B3 : B3 Pond

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,794.69' @ 6.33 hrs Surf.Area= 0.195 ac Storage= 0.206 af

Plug-Flow detention time= 464.0 min calculated for 0.050 af (23% of inflow)
Center-of-Mass det. time= 390.1 min (646.2 - 256.2)

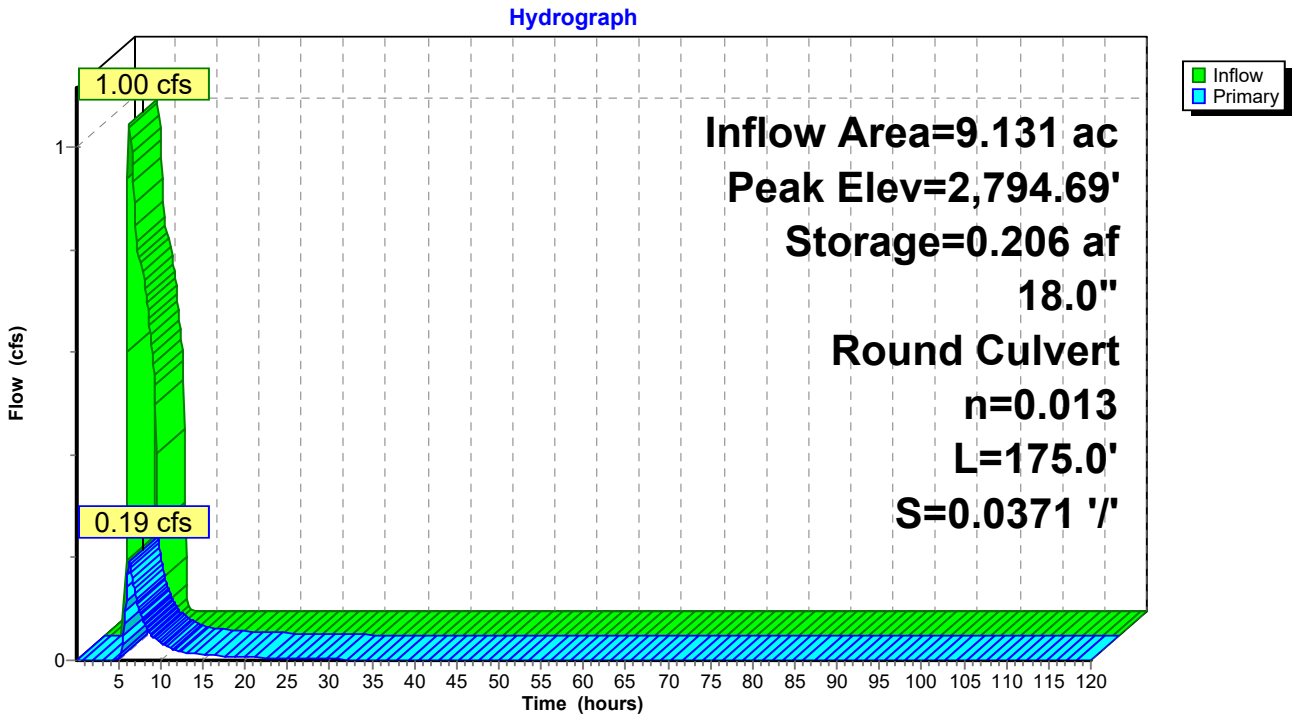
Volume	Invert	Avail.Storage	Storage Description
#1	2,793.50'	1.283 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,793.50	0.147	0.000	0.000
2,794.50	0.187	0.167	0.167
2,795.50	0.231	0.209	0.376
2,796.50	0.277	0.254	0.630
2,797.50	0.326	0.301	0.931
2,798.50	0.377	0.351	1.283

Device	Routing	Invert	Outlet Devices
#1	Primary	2,794.50'	**18.0" Round Culvert** L= 175.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,794.50' / 2,788.00' S= 0.0371 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.19 cfs @ 6.33 hrs HW=2,794.69' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.19 cfs @ 1.47 fps)

Pond B2: B2 Pond



Summary for Pond B3: B3 Pond

Inflow Area = 21.765 ac, 26.71% Impervious, Inflow Depth = 0.06" for 50-year 6hr event
Inflow = 0.39 cfs @ 5.95 hrs, Volume= 0.107 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link B : DP B

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,778.67' @ 120.00 hrs Surf.Area= 0.601 ac Storage= 0.107 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

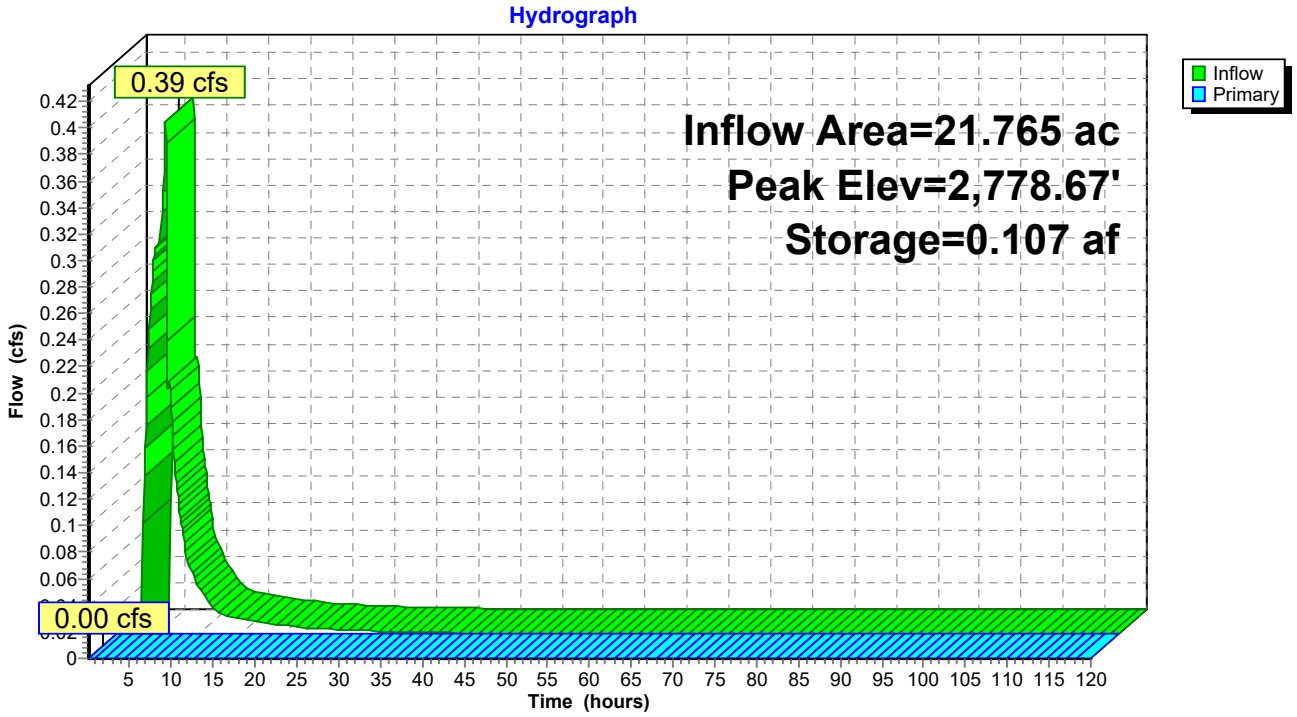
Volume	Invert	Avail.Storage	Storage Description
#1	2,778.50'	2.054 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,778.50	0.591	0.000	0.000
2,779.50	0.652	0.621	0.621
2,780.50	0.716	0.684	1.305
2,781.50	0.781	0.748	2.054

Device	Routing	Invert	Outlet Devices
#1	Primary	2,779.00'	**18.0" Round Culvert** L= 93.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.00' / 2,778.50' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,779.67'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,778.50' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond B3: B3 Pond



Summary for Pond C1: C1 Pond

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.23" for 50-year 6hr event
Inflow = 0.82 cfs @ 3.29 hrs, Volume= 0.193 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 4R : (new Reach)

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,791.52' @ 7.40 hrs Surf.Area= 0.388 ac Storage= 0.193 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

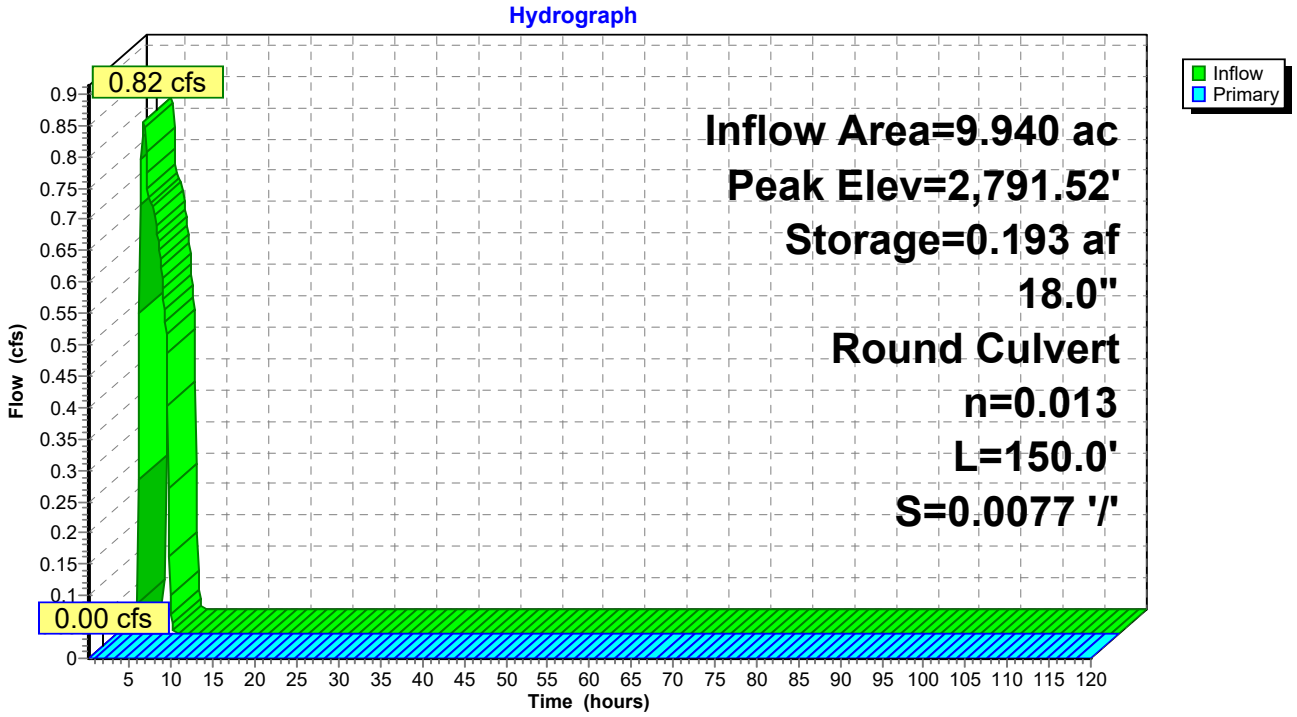
Volume	Invert	Avail.Storage	Storage Description
#1	2,791.00'	1.912 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,791.00	0.363	0.000	0.000
2,792.00	0.411	0.387	0.387
2,793.00	0.461	0.436	0.823
2,794.00	0.514	0.487	1.311
2,795.00	0.570	0.542	1.853
2,795.10	0.627	0.060	1.912

Device	Routing	Invert	Outlet Devices
#1	Primary	2,792.00'	**18.0" Round Culvert** L= 150.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,792.00' / 2,790.84' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,791.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond C1: C1 Pond



Summary for Pond C2: C2 Pond

Inflow Area = 34.545 ac, 28.80% Impervious, Inflow Depth = 0.07" for 50-year 6hr event
Inflow = 0.85 cfs @ 4.92 hrs, Volume= 0.194 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link C : DP C

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,765.34' @ 7.50 hrs Surf.Area= 0.590 ac Storage= 0.194 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

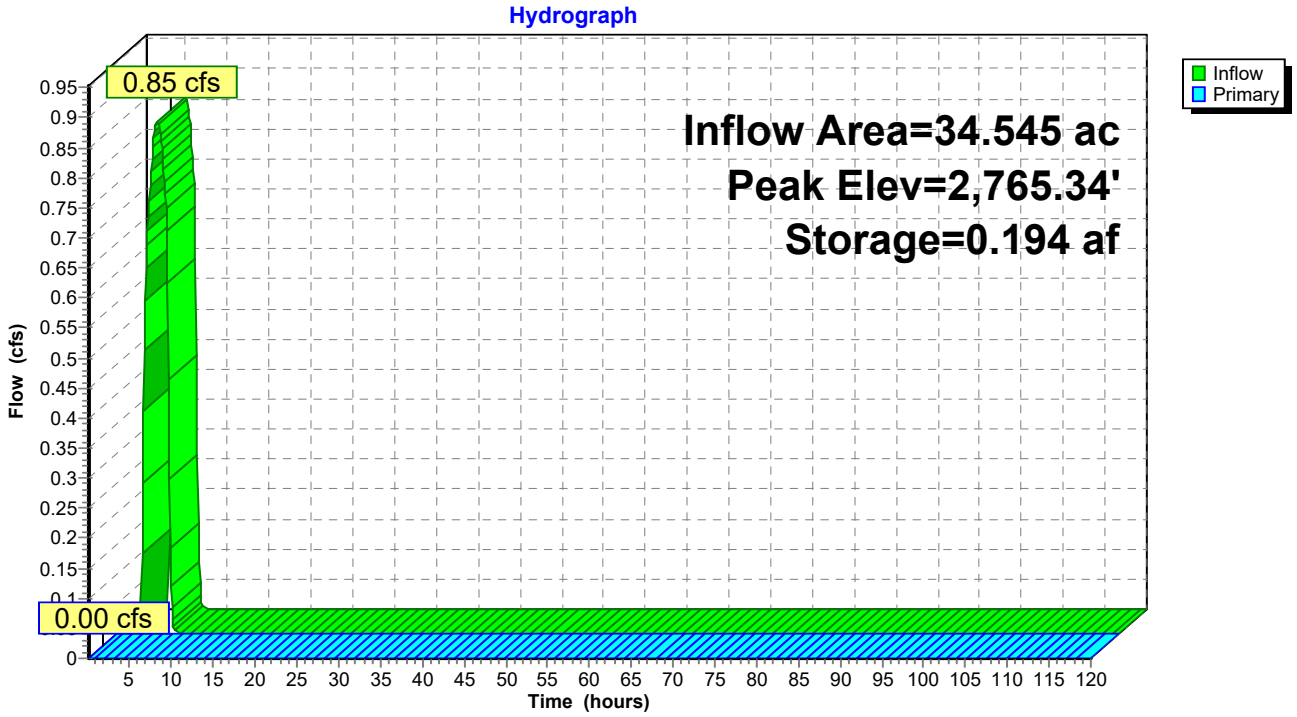
Volume	Invert	Avail.Storage	Storage Description
#1	2,765.00'	4.496 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,765.00	0.543	0.000	0.000
2,766.00	0.680	0.612	0.612
2,767.00	0.866	0.773	1.385
2,768.00	0.978	0.922	2.307
2,769.00	1.094	1.036	3.343
2,770.00	1.212	1.153	4.496

Device	Routing	Invert	Outlet Devices
#1	Primary	2,765.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,765.00' / 2,764.37' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,766.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,769.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,765.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
└─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond C2: C2 Pond



Summary for Pond D2: D2 Pond

Inflow Area = 16.705 ac, 39.56% Impervious, Inflow Depth = 0.37" for 50-year 6hr event
Inflow = 3.19 cfs @ 2.82 hrs, Volume= 0.518 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,773.86' @ 7.20 hrs Surf.Area= 0.627 ac Storage= 0.518 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

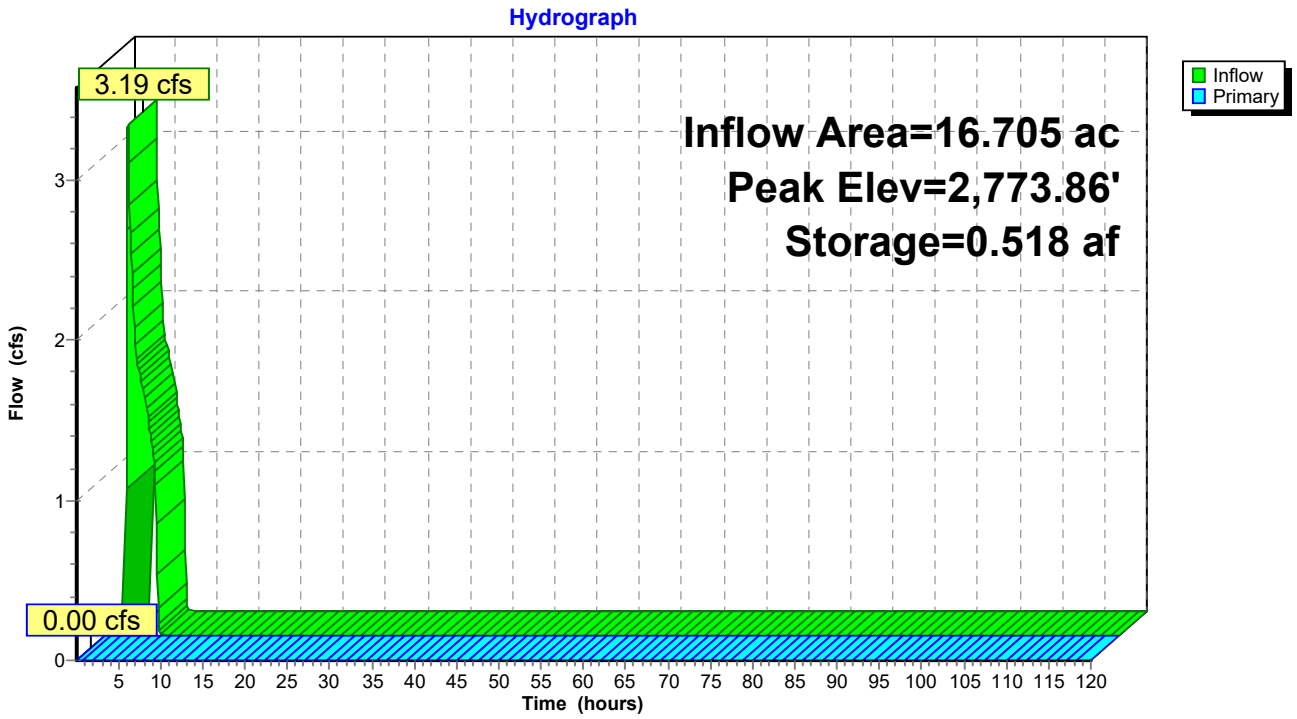
Volume	Invert	Avail.Storage	Storage Description
#1	2,773.00'	3.691 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,773.00	0.571	0.000	0.000
2,773.75	0.620	0.447	0.447
2,774.00	0.636	0.157	0.604
2,775.00	0.703	0.670	1.273
2,776.00	0.771	0.737	2.010
2,777.00	0.840	0.806	2.816
2,778.00	0.910	0.875	3.691

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,774.50'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,774.50' / 2,773.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,776.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,773.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D2: D2 Pond



Summary for Pond D3: D3 Pond

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.34" for 50-year 6hr event
Inflow = 2.48 cfs @ 2.61 hrs, Volume= 0.301 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 3R : Culvert Crossing

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,785.83' @ 6.40 hrs Surf.Area= 0.212 ac Storage= 0.301 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

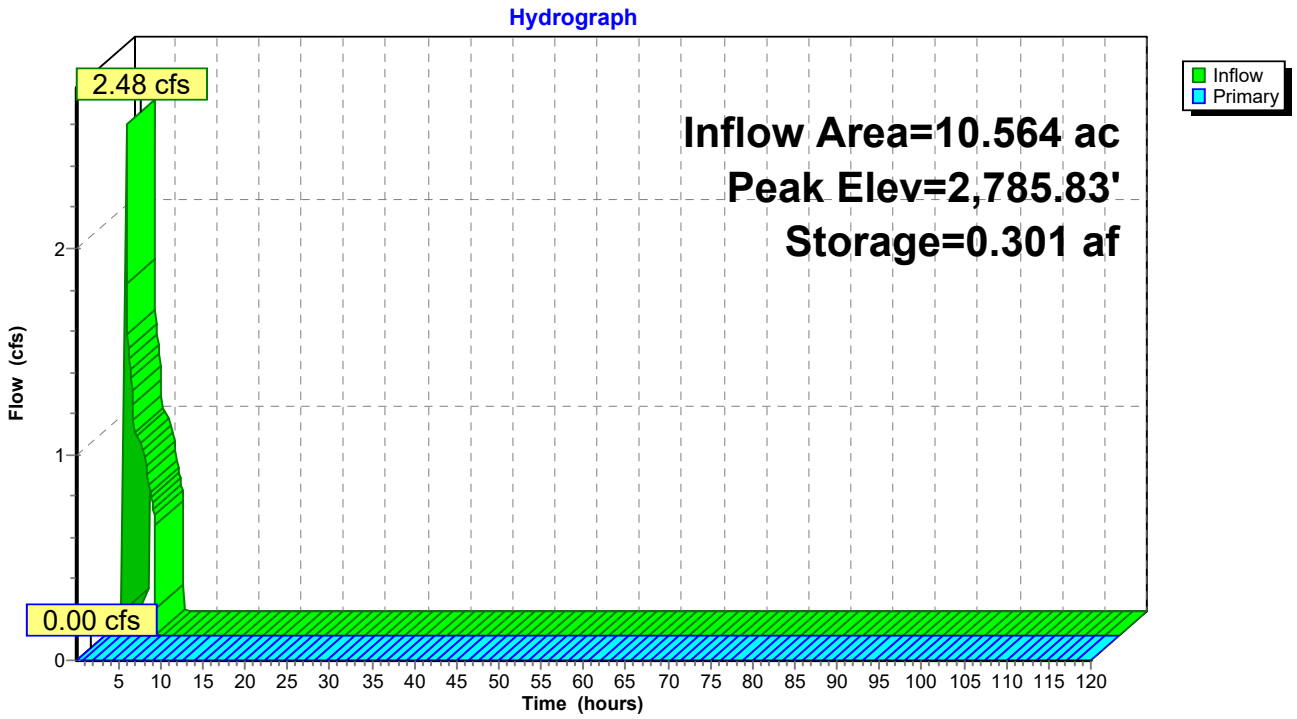
Volume	Invert	Avail.Storage	Storage Description
#1	2,784.00'	2.083 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,784.00	0.116	0.000	0.000
2,785.00	0.168	0.142	0.142
2,786.00	0.221	0.194	0.336
2,787.00	0.282	0.251	0.588
2,788.00	0.327	0.304	0.893
2,789.00	0.373	0.350	1.243
2,790.00	0.420	0.397	1.639
2,791.00	0.469	0.445	2.083

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,788.00'	**18.0" Round Culvert** L= 81.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,788.00' / 2,786.00' S= 0.0247 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,789.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,784.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D3: D3 Pond



Summary for Pond D4: D4 Pond

Inflow Area = 9.318 ac, 20.08% Impervious, Inflow Depth = 0.07" for 50-year 6hr event
Inflow = 0.25 cfs @ 4.99 hrs, Volume= 0.051 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,779.27' @ 7.00 hrs Surf.Area= 0.195 ac Storage= 0.051 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

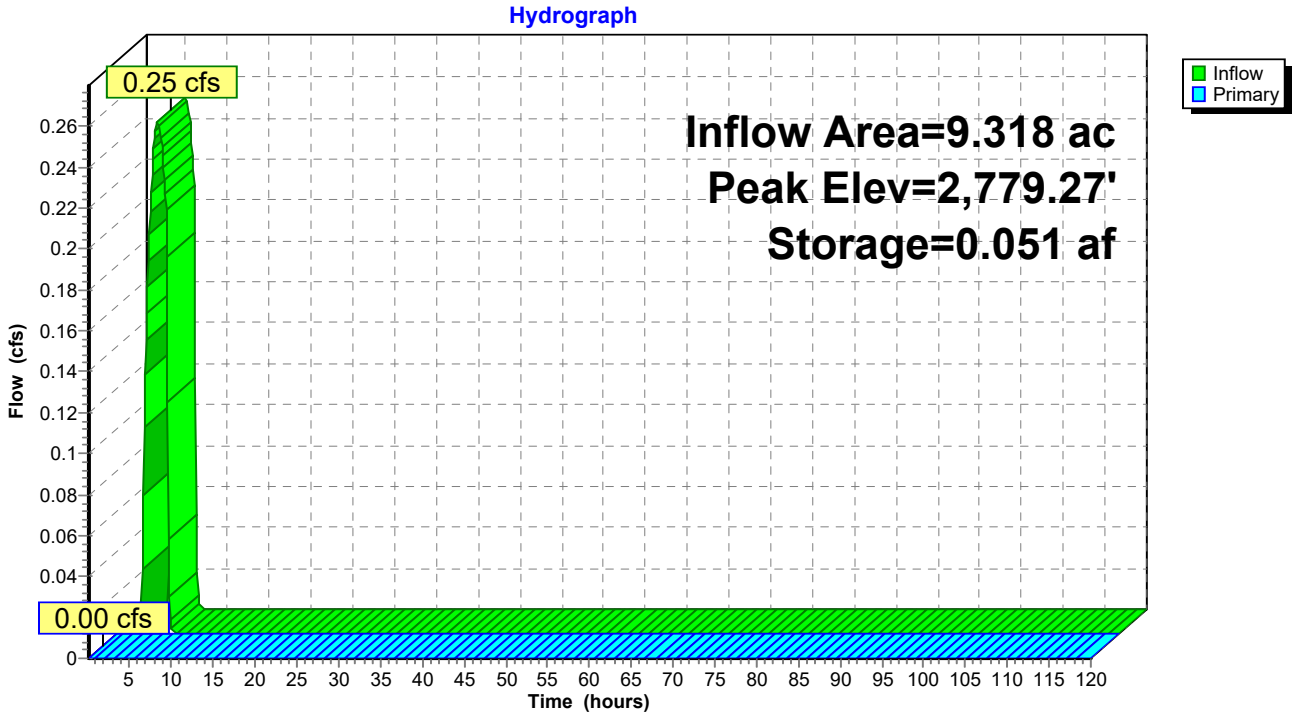
Volume	Invert	Avail.Storage	Storage Description
#1	2,779.00'	1.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,779.00	0.186	0.000	0.000
2,780.00	0.220	0.203	0.203
2,781.00	0.255	0.237	0.440
2,782.00	0.293	0.274	0.715
2,783.00	0.331	0.312	1.027

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,779.23'	**12.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.23' / 2,778.57' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Primary	2,781.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,779.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D4: D4 Pond

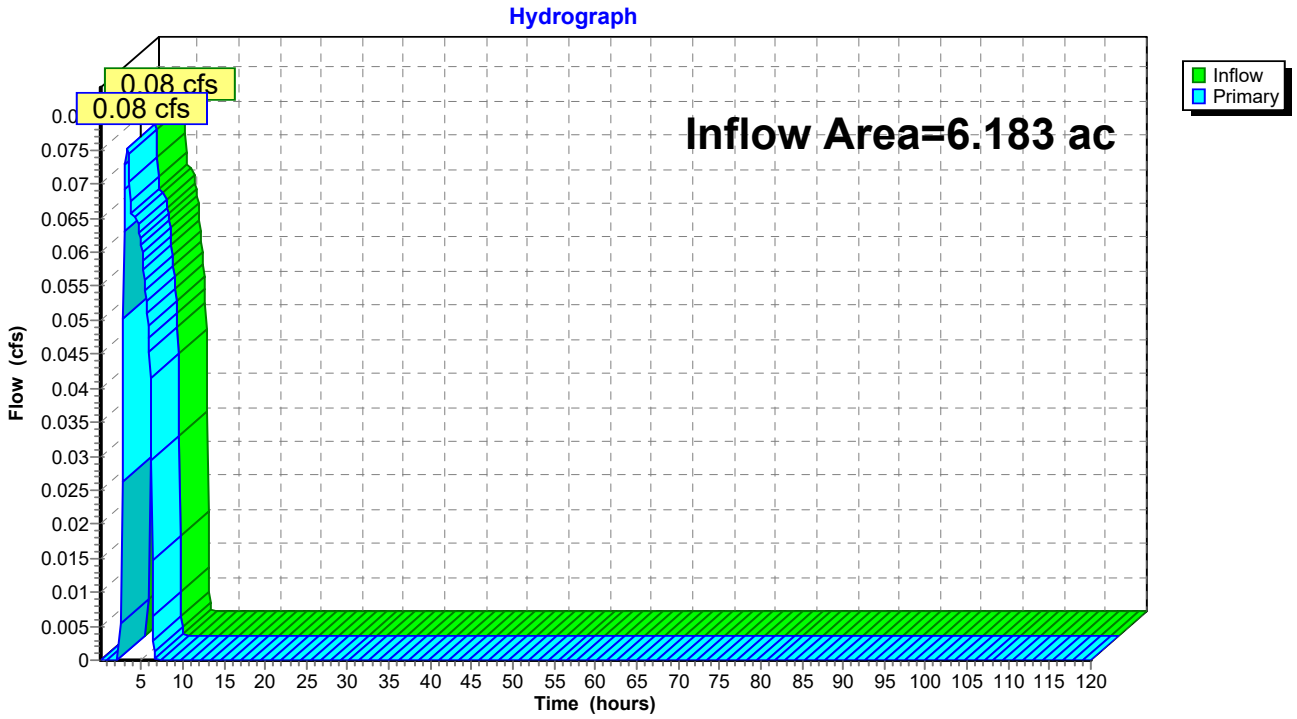


Summary for Link A: DP A

Inflow Area = 6.183 ac, 15.79% Impervious, Inflow Depth = 0.04" for 50-year 6hr event
Inflow = 0.08 cfs @ 3.30 hrs, Volume= 0.018 af
Primary = 0.08 cfs @ 3.30 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

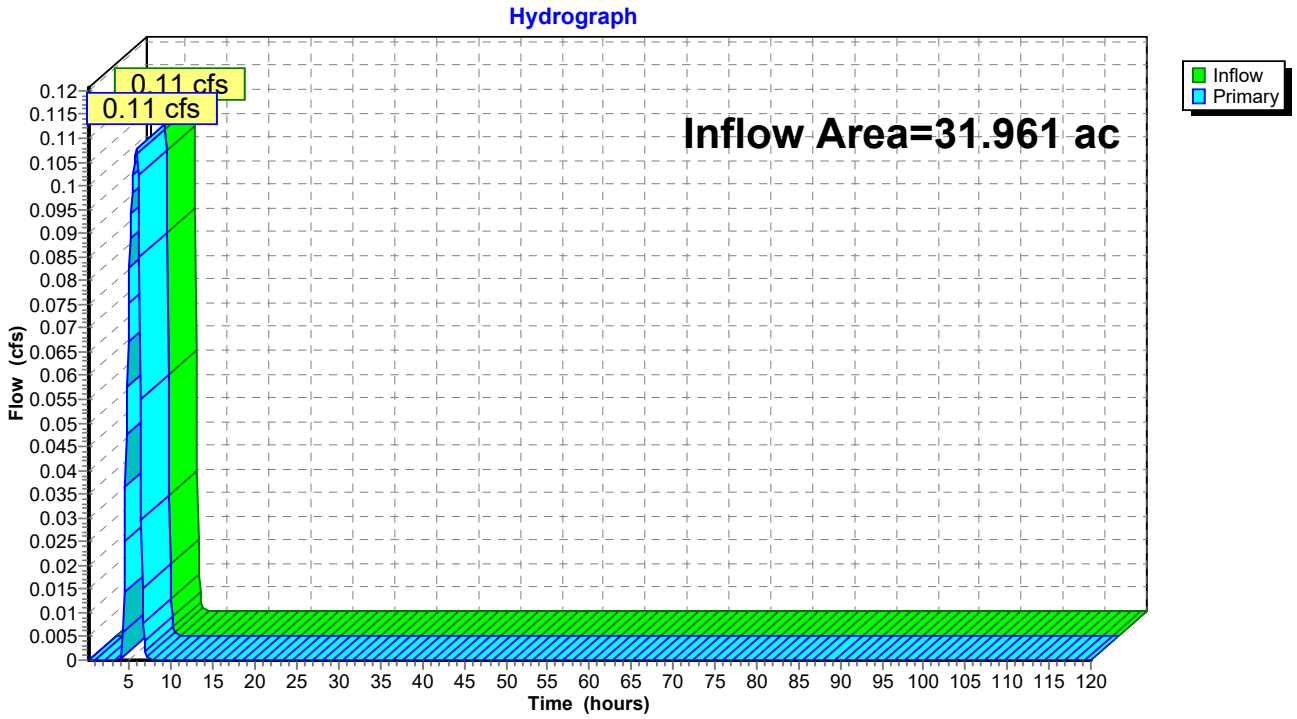


Summary for Link B: DP B

Inflow Area = 31.961 ac, 21.59% Impervious, Inflow Depth = 0.01" for 50-year 6hr event
Inflow = 0.11 cfs @ 5.79 hrs, Volume= 0.014 af
Primary = 0.11 cfs @ 5.79 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

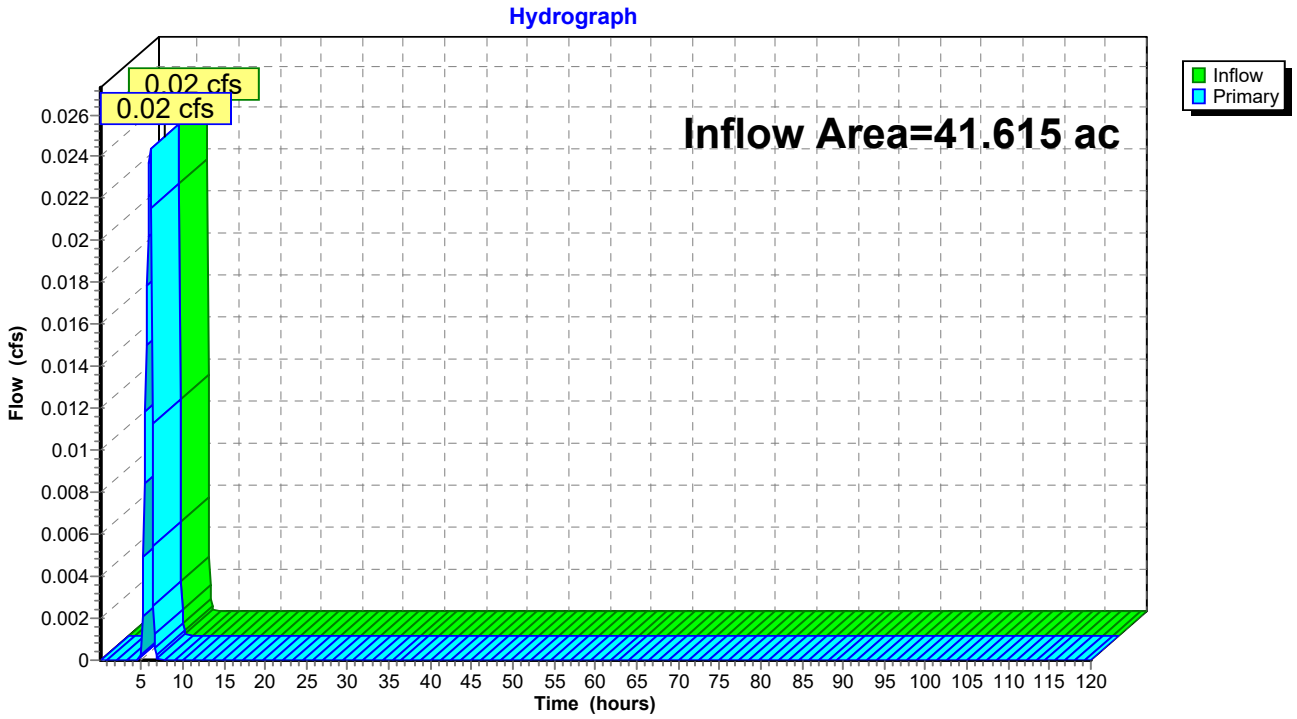


Summary for Link C: DP C

Inflow Area = 41.615 ac, 23.91% Impervious, Inflow Depth = 0.00" for 50-year 6hr event
Inflow = 0.02 cfs @ 6.05 hrs, Volume= 0.002 af
Primary = 0.02 cfs @ 6.05 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

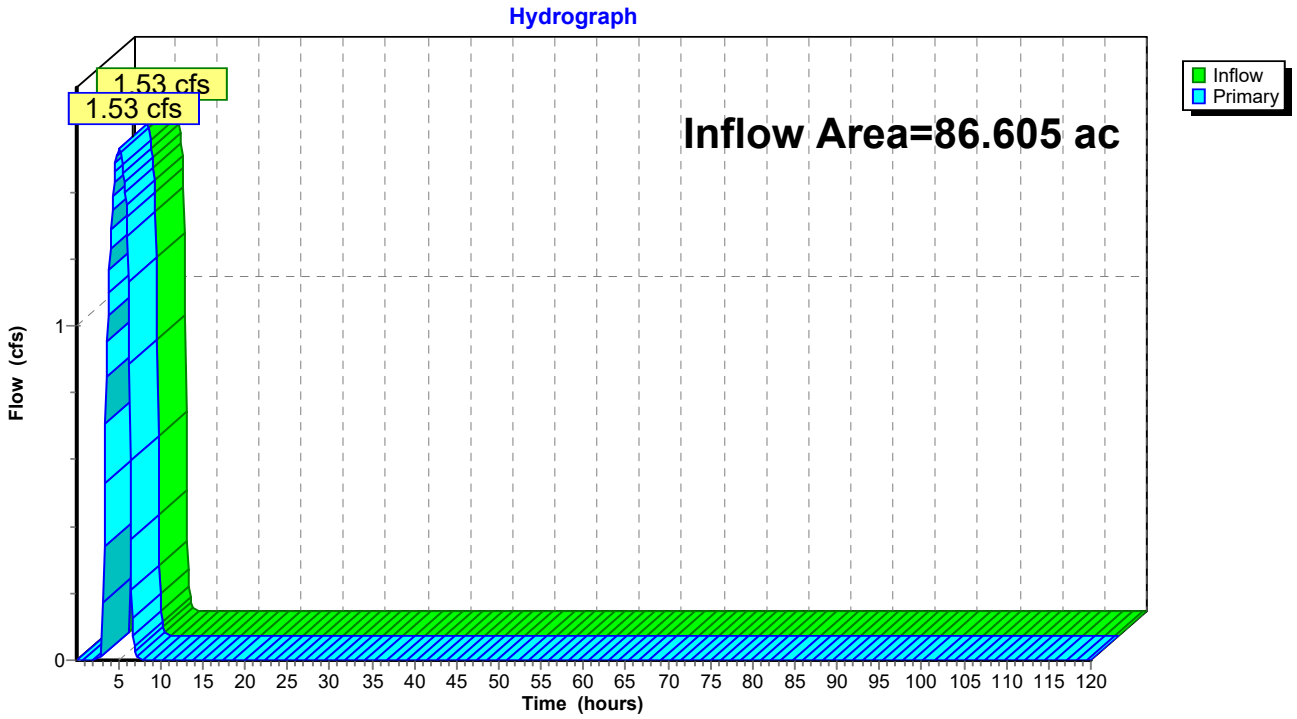


Summary for Link D: DP D

Inflow Area = 86.605 ac, 15.14% Impervious, Inflow Depth = 0.05" for 50-year 6hr event
Inflow = 1.53 cfs @ 5.08 hrs, Volume= 0.333 af
Primary = 1.53 cfs @ 5.08 hrs, Volume= 0.333 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A1: Subcat DA-A1 Runoff Area=5.149 ac 12.33% Impervious Runoff Depth=0.95"
Flow Length=1,005' Tc=18.6 min UI Adjusted CN=54 Runoff=1.44 cfs 0.407 af

Subcatchment DA-A1.1: Subcat DA-A1.1 Runoff Area=1.034 ac 32.98% Impervious Runoff Depth=1.69"
Flow Length=590' Tc=17.8 min CN=65 Runoff=0.87 cfs 0.146 af

Subcatchment DA-B1: Subcat DA-B1 Runoff Area=10.196 ac 10.65% Impervious Runoff Depth=0.83"
Flow Length=1,408' Tc=22.1 min UI Adjusted CN=52 Runoff=1.92 cfs 0.705 af

Subcatchment DA-B2: Subcat DA-B2 Runoff Area=9.131 ac 33.40% Impervious Runoff Depth=1.92"
Flow Length=1,387' Tc=20.5 min CN=68 Runoff=8.53 cfs 1.463 af

Subcatchment DA-B3: Subcat DA-B3 Runoff Area=12.634 ac 21.87% Impervious Runoff Depth=1.07"
Flow Length=786' Tc=4.6 min UI Adjusted CN=56 Runoff=6.95 cfs 1.129 af

Subcatchment DA-C1: Subcat DA-C1 Runoff Area=9.940 ac 30.38% Impervious Runoff Depth=1.77"
Flow Length=1,218' Tc=21.9 min CN=66 Runoff=7.93 cfs 1.465 af

Subcatchment DA-C2: Subcat DA-C2 Runoff Area=24.605 ac 28.17% Impervious Runoff Depth=1.27"
Flow Length=2,502' Tc=25.1 min UI Adjusted CN=59 Runoff=10.83 cfs 2.601 af

Subcatchment DA-C3: Subcat DA-C3 Runoff Area=7.070 ac 0.00% Impervious Runoff Depth=0.66"
Flow Length=1,331' Tc=19.8 min CN=49 Runoff=0.71 cfs 0.390 af

Subcatchment DA-D1: Subcat DA-D1 Runoff Area=50.018 ac 1.44% Impervious Runoff Depth=1.20"
Flow Length=2,494' Tc=28.0 min CN=58 Runoff=18.58 cfs 5.010 af

Subcatchment DA-D2: Subcat DA-D2 Runoff Area=16.705 ac 39.56% Impervious Runoff Depth=2.16"
Flow Length=1,582' Tc=18.8 min CN=71 Runoff=19.18 cfs 3.010 af

Subcatchment DA-D3: Subcat DA-D3 Runoff Area=10.564 ac 37.08% Impervious Runoff Depth=2.08"
Flow Length=769' Tc=4.6 min CN=70 Runoff=15.71 cfs 1.832 af

Subcatchment DA-D4: Subcat DA-D4 Runoff Area=9.318 ac 20.08% Impervious Runoff Depth=1.14"
Flow Length=1,055' Tc=15.3 min UI Adjusted CN=57 Runoff=4.30 cfs 0.883 af

Reach 3R: Culvert Crossing Avg. Flow Depth=0.24' Max Vel=2.88 fps Inflow=0.75 cfs 0.588 af
36.0" Round Pipe n=0.013 L=187.0' S=0.0078 '/' Capacity=58.93 cfs Outflow=0.75 cfs 0.588 af

Reach 4R: (new Reach) Inflow=1.18 cfs 1.074 af
Outflow=1.18 cfs 1.074 af

Pond A1: A1 Pond Peak Elev=2,787.61' Storage=0.131 af Inflow=1.44 cfs 0.407 af
Outflow=0.41 cfs 0.284 af

Pond B2: B2 Pond Peak Elev=2,795.30' Storage=0.335 af Inflow=8.53 cfs 1.463 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0371 '/' Outflow=2.94 cfs 1.296 af

Pond B3: B3 Pond Peak Elev=2,780.59' Storage=1.370 af Inflow=6.95 cfs 2.425 af
Outflow=1.28 cfs 1.672 af

Pond C1: C1 Pond Peak Elev=2,792.50' Storage=0.599 af Inflow=7.93 cfs 1.465 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0077 '/' Outflow=1.18 cfs 1.074 af

Pond C2: C2 Pond Peak Elev=2,768.33' Storage=2.636 af Inflow=10.83 cfs 3.675 af
Outflow=1.19 cfs 2.669 af

Pond D2: D2 Pond Peak Elev=2,776.65' Storage=2.530 af Inflow=19.18 cfs 3.010 af
Outflow=0.96 cfs 0.984 af

Pond D3: D3 Pond Peak Elev=2,789.54' Storage=1.450 af Inflow=15.71 cfs 1.832 af
Outflow=0.75 cfs 0.588 af

Pond D4: D4 Pond Peak Elev=2,781.38' Storage=0.539 af Inflow=4.30 cfs 0.883 af
Outflow=0.56 cfs 0.442 af

Link A: DP A Inflow=0.87 cfs 0.429 af
Primary=0.87 cfs 0.429 af

Link B: DP B Inflow=1.92 cfs 2.377 af
Primary=1.92 cfs 2.377 af

Link C: DP C Inflow=1.39 cfs 3.059 af
Primary=1.39 cfs 3.059 af

Link D: DP D Inflow=18.58 cfs 7.024 af
Primary=18.58 cfs 7.024 af

Total Runoff Area = 166.364 ac Runoff Volume = 19.041 af Average Runoff Depth = 1.37"
81.40% Pervious = 135.423 ac 18.60% Impervious = 30.941 ac

Summary for Subcatchment DA-A1: Subcat DA-A1

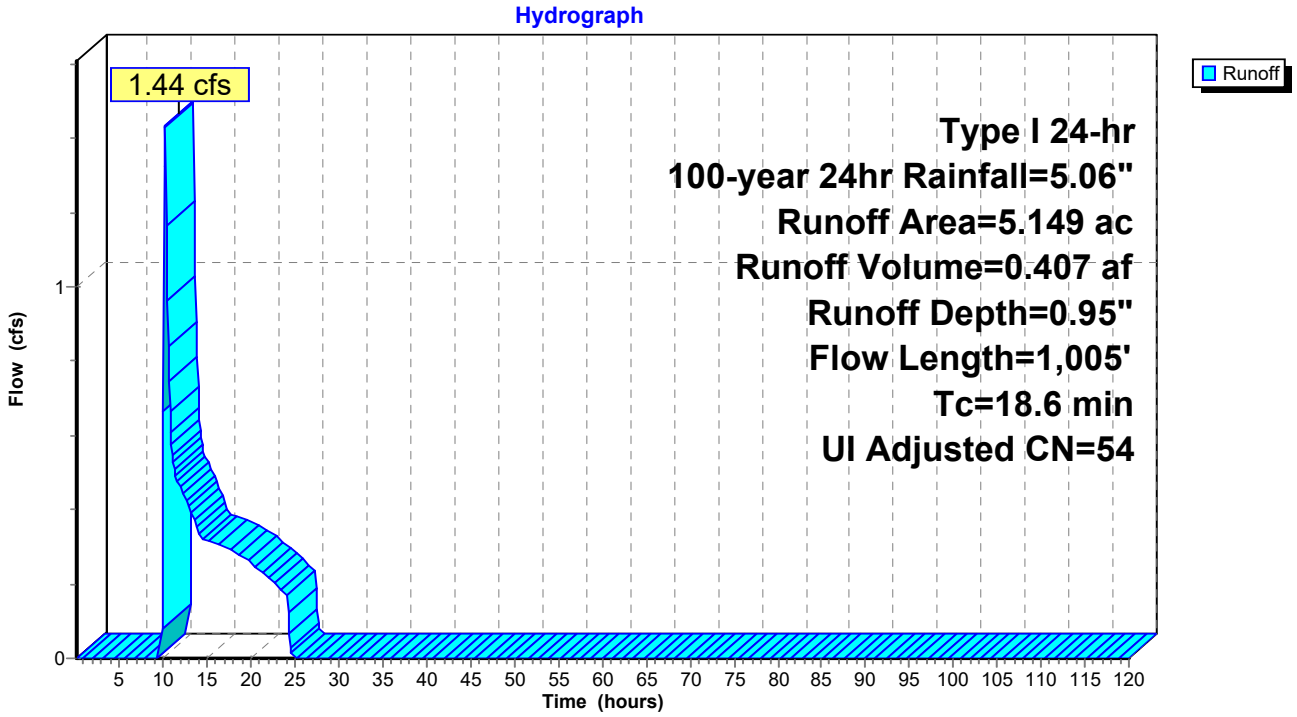
Runoff = 1.44 cfs @ 10.18 hrs, Volume= 0.407 af, Depth= 0.95"
Routed to Pond A1 : A1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Adj	Description
4.141	49		Desert shrub range, Good, HSG A
0.635	98		Unconnected pavement, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.068	96		Gravel surface, HSG A
0.099	72		Dirt roads, HSG A
5.149	57	54	Weighted Average, UI Adjusted
4.514			87.67% Pervious Area
0.635			12.33% Impervious Area
0.635			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0208	0.15		**Sheet Flow, sheet 2802.48-2800.40** Range n= 0.130 P2= 1.88"
3.2	385	0.0158	2.02		**Shallow Concentrated Flow, shallow 2800.40-2794.30** Unpaved Kv= 16.1 fps
0.2	40	0.0050	4.20	7.43	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.5	398	0.0142	1.92		**Shallow Concentrated Flow, shallow 2793.57-2788.24** Unpaved Kv= 16.1 fps
0.5	82	0.0151	2.49		**Shallow Concentrated Flow, paved 2788.24-2787** Paved Kv= 20.3 fps
18.6	1,005	Total			

Subcatchment DA-A1: Subcat DA-A1



Summary for Subcatchment DA-A1.1: Subcat DA-A1.1

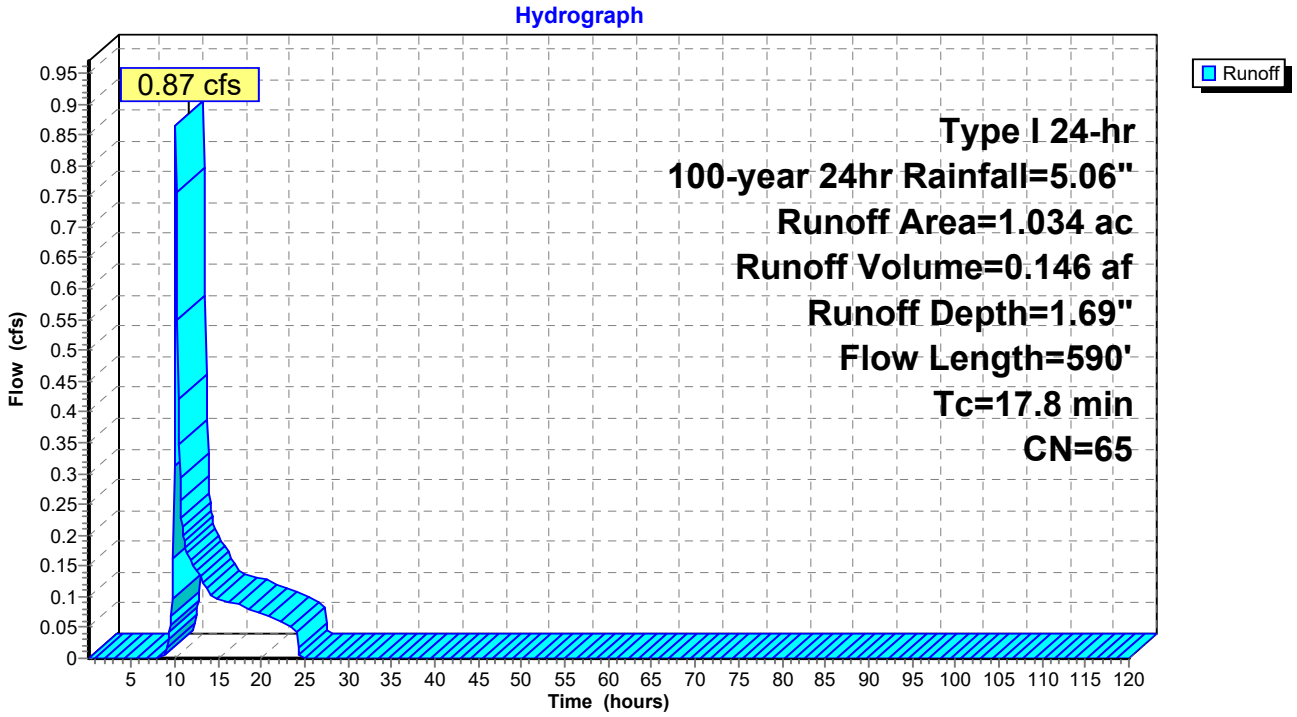
Runoff = 0.87 cfs @ 10.12 hrs, Volume= 0.146 af, Depth= 1.69"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Description
0.693	49	Desert shrub range, Good, HSG A
0.341	98	Unconnected pavement, HSG A
1.034	65	Weighted Average
0.693		67.02% Pervious Area
0.341		32.98% Impervious Area
0.341		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0182	0.14		**Sheet Flow, sheet 2787.94-2786.12** Range n= 0.130 P2= 1.88"
4.7	369	0.0172	1.31		**Shallow Concentrated Flow, shallow 2786.12-2779.76** Nearly Bare & Untilled Kv= 10.0 fps
0.2	26	0.0200	2.87		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.1	95	0.0211	1.45		**Shallow Concentrated Flow, shallow 2779-2776.99** Nearly Bare & Untilled Kv= 10.0 fps
17.8	590	Total			

Subcatchment DA-A1.1: Subcat DA-A1.1



Summary for Subcatchment DA-B1: Subcat DA-B1

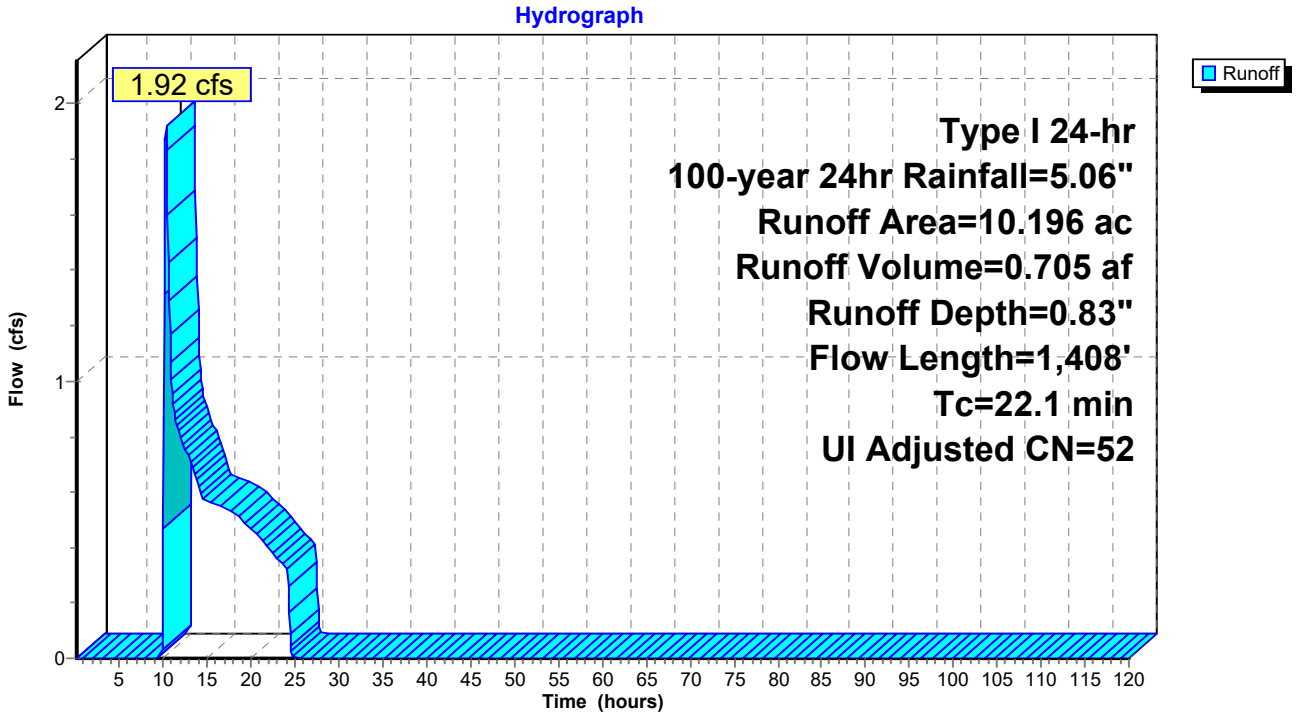
Runoff = 1.92 cfs @ 10.24 hrs, Volume= 0.705 af, Depth= 0.83"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Adj	Description
	8.673	49		Desert shrub range, Good, HSG A
	1.086	98		Unconnected pavement, HSG A
*	0.437	55		Surrounding Equip. Cover, HSG A
	10.196	54	52	Weighted Average, UI Adjusted
	9.110			89.35% Pervious Area
	1.086			10.65% Impervious Area
	1.086			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0185	0.14		**Sheet Flow, Sheet Flow 2803.05-2801.20** Range n= 0.130 P2= 1.88"
1.6	207	0.0189	2.21		**Shallow Concentrated Flow, shallow 2801.20-2797.28** Unpaved Kv= 16.1 fps
0.2	31	0.0200	2.87		**Shallow Concentrated Flow, shallow 2797.28-2796.65** Paved Kv= 20.3 fps
3.1	416	0.0191	2.23		**Shallow Concentrated Flow, shallow 2796.65-2788.70** Unpaved Kv= 16.1 fps
0.2	28	0.0160	2.57		**Shallow Concentrated Flow, shallow paved 2788.70-2788.25** Paved Kv= 20.3 fps
4.1	507	0.0161	2.04		**Shallow Concentrated Flow, shallow unpaved 2788.25-2780.00** Unpaved Kv= 16.1 fps
0.2	27	0.0200	2.87		**Shallow Concentrated Flow, shallow paved** Paved Kv= 20.3 fps
0.9	92	0.0107	1.67		**Shallow Concentrated Flow, shallow unpaved 2779.05-2778.06** Unpaved Kv= 16.1 fps
22.1	1,408	Total			

Subcatchment DA-B1: Subcat DA-B1



Summary for Subcatchment DA-B2: Subcat DA-B2

[47] Hint: Peak is 115% of capacity of segment #3

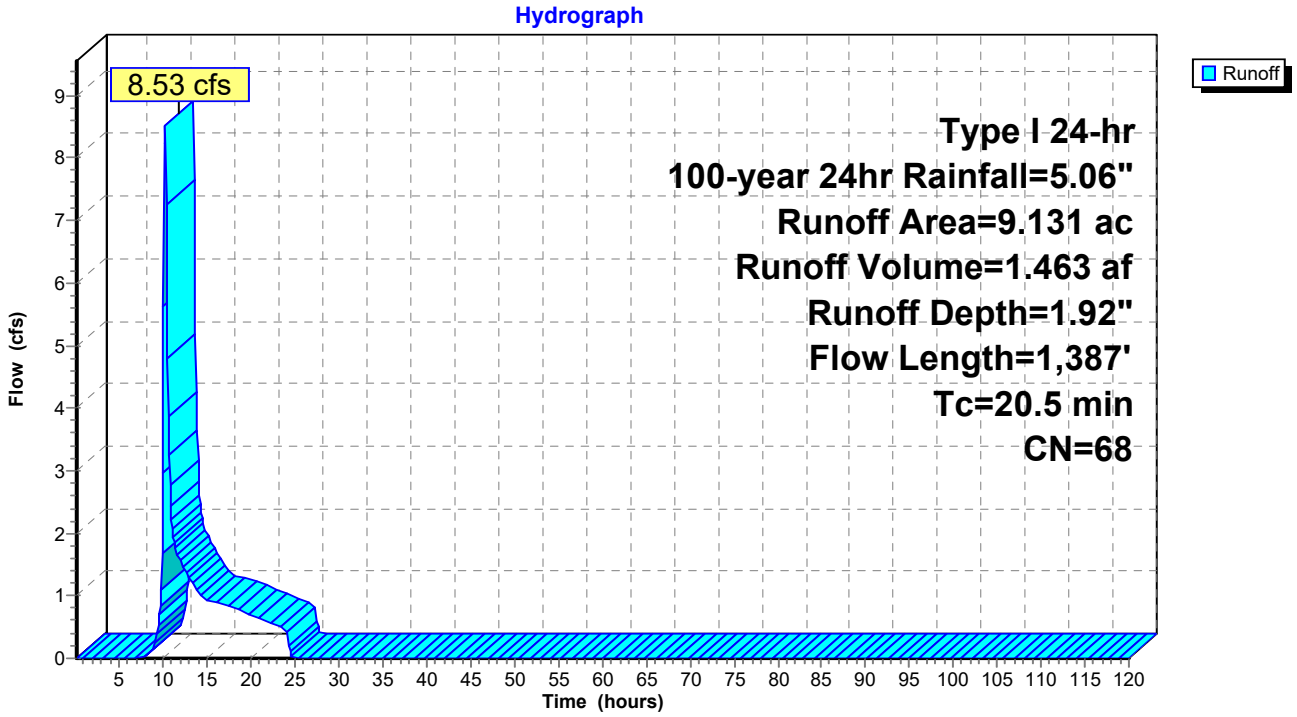
Runoff = 8.53 cfs @ 10.15 hrs, Volume= 1.463 af, Depth= 1.92"
Routed to Pond B2 : B2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Description
	2.467	49	Desert shrub range, Good, HSG A
	3.050	98	Unconnected pavement, HSG A
*	3.614	55	Surrounding Equip. Cover, HSG A
	9.131	68	Weighted Average
	6.081		66.60% Pervious Area
	3.050		33.40% Impervious Area
	3.050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0319	0.18		**Sheet Flow, sheet 2808-2804.81** Range n= 0.130 P2= 1.88"
6.6	792	0.0156	2.01		**Shallow Concentrated Flow, shallow range 2804.81-2802.44** Unpaved Kv= 16.1 fps
0.2	52	0.0050	4.20	7.43	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
2.2	187	0.0080	1.44		**Shallow Concentrated Flow, shallow unpaved 2802-2800.37** Unpaved Kv= 16.1 fps
2.0	256	0.0110	2.13		**Shallow Concentrated Flow, paved 2800.37-2797.53** Paved Kv= 20.3 fps
20.5	1,387	Total			

Subcatchment DA-B2: Subcat DA-B2



Summary for Subcatchment DA-B3: Subcat DA-B3

[49] Hint: Tc<2dt may require smaller dt

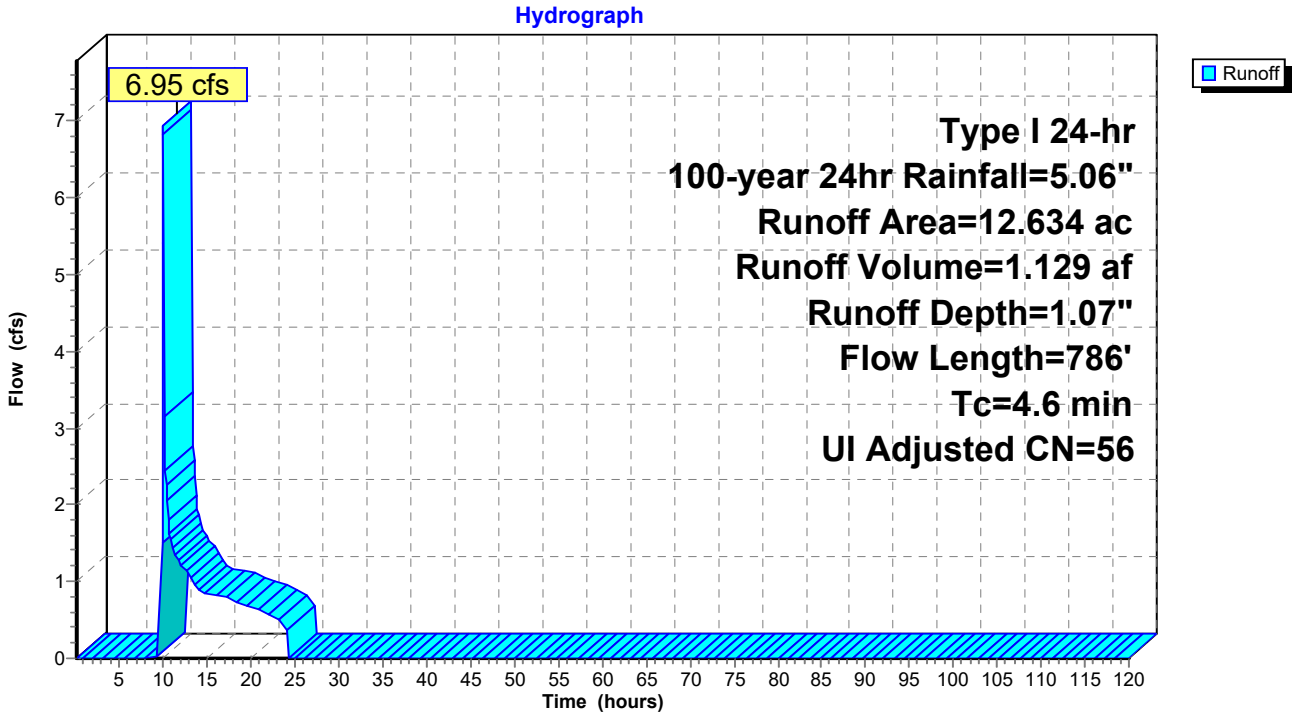
Runoff = 6.95 cfs @ 9.98 hrs, Volume= 1.129 af, Depth= 1.07"
Routed to Pond B3 : B3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Adj	Description
	6.592	49		Desert shrub range, Good, HSG A
	2.763	98		Unconnected pavement, HSG A
*	3.279	55		Surrounding Equip. Cover, HSG A
	12.634	61	56	Weighted Average, UI Adjusted
	9.871			78.13% Pervious Area
	2.763			21.87% Impervious Area
	2.763			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0190	0.81		**Sheet Flow, sheet paved 2799.71-2799.14** Smooth surfaces n= 0.011 P2= 1.88"
1.1	80	0.0340	1.25		**Sheet Flow, sheet unpaved 2799.14-2796.37** Smooth surfaces n= 0.011 P2= 1.88"
1.4	304	0.0480	3.53		**Shallow Concentrated Flow, shallow 2796.37-2781.77** Unpaved Kv= 16.1 fps
0.2	51	0.0075	4.04	72.81	**Channel Flow, channel 2781.77-2781.39** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.1	42	0.0209	8.59	15.19	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.9	193	0.0054	3.43	61.78	**Channel Flow, channel 2780.52-2779.48** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.3	86	0.0054	4.37	7.72	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
4.6	786	Total			

Subcatchment DA-B3: Subcat DA-B3



Summary for Subcatchment DA-C1: Subcat DA-C1

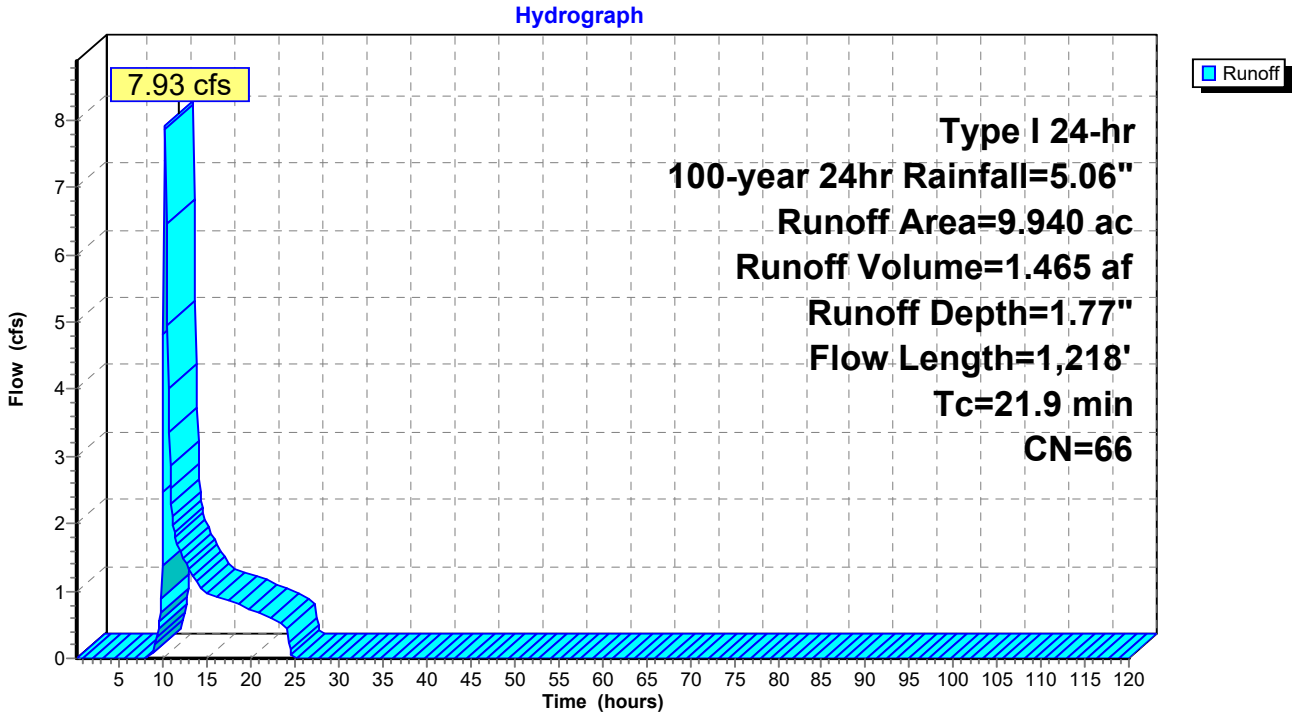
Runoff = 7.93 cfs @ 10.17 hrs, Volume= 1.465 af, Depth= 1.77"
Routed to Pond C1 : C1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Description
	3.160	49	Desert shrub range, Good, HSG A
	3.020	98	Unconnected pavement, HSG A
*	3.760	55	Surrounding Equip. Cover, HSG A
	9.940	66	Weighted Average
	6.920		69.62% Pervious Area
	3.020		30.38% Impervious Area
	3.020		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	58	0.0030	0.06		**Sheet Flow, Sheet 2813.48-2813.30** Range n= 0.130 P2= 1.88"
0.8	42	0.0205	0.90		**Sheet Flow, Sheet paved 2813.30-2812.44** Smooth surfaces n= 0.011 P2= 1.88"
3.1	450	0.0226	2.42		**Shallow Concentrated Flow, shallow 2812.44-2802.24** Unpaved Kv= 16.1 fps
0.4	152	0.0120	7.08	70.78	**Channel Flow, ditch 2802.24-2800.41** Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.023
0.2	102	0.0356	11.22	19.82	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.8	183	0.0050	3.78	83.06	**Channel Flow, channel 2796.77-2795.91** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035 Riprap, 6-inch
0.2	64	0.0064	5.62	9.93	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.7	167	0.0050	3.78	83.06	**Channel Flow, channel 2795.50-2794.65** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035
21.9	1,218	Total			

Subcatchment DA-C1: Subcat DA-C1



Summary for Subcatchment DA-C2: Subcat DA-C2

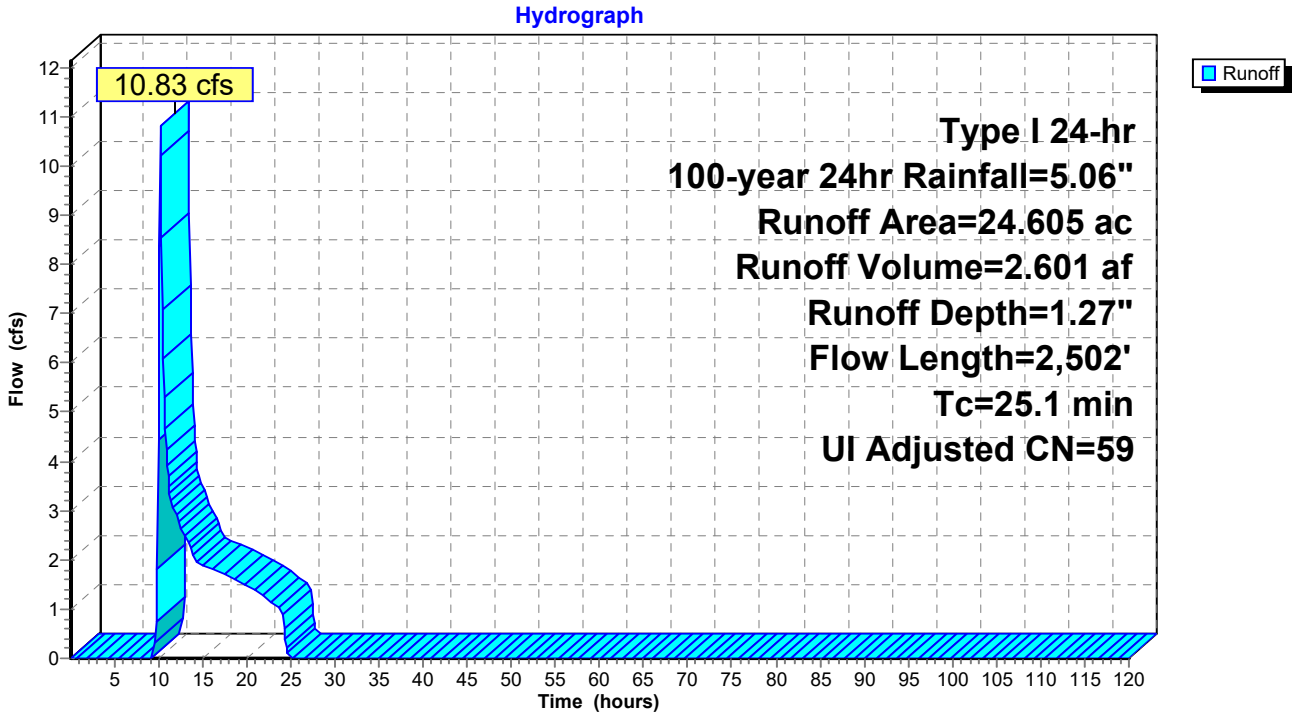
Runoff = 10.83 cfs @ 10.23 hrs, Volume= 2.601 af, Depth= 1.27"
Routed to Pond C2 : C2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Adj	Description
	6.655	49		Desert shrub range, Good, HSG A
	6.930	98		Unconnected pavement, HSG A
*	11.020	55		Surrounding Equip. Cover, HSG A
	24.605	65	59	Weighted Average, UI Adjusted
	17.675			71.83% Pervious Area
	6.930			28.17% Impervious Area
	6.930			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0153	0.13		**Sheet Flow, Sheet Flow 2811-2809.47** Range n= 0.130 P2= 1.88"
9.8	1,280	0.0182	2.17		**Shallow Concentrated Flow, Shallow 2809.47-2786.17** Unpaved Kv= 16.1 fps
2.6	1,122	0.0175	7.21	230.73	**Channel Flow, channel 2787.62-2768** Area= 32.0 sf Perim= 22.0' r= 1.45' n= 0.035 Riprap, 6-inch
25.1	2,502	Total			

Subcatchment DA-C2: Subcat DA-C2



Summary for Subcatchment DA-C3: Subcat DA-C3

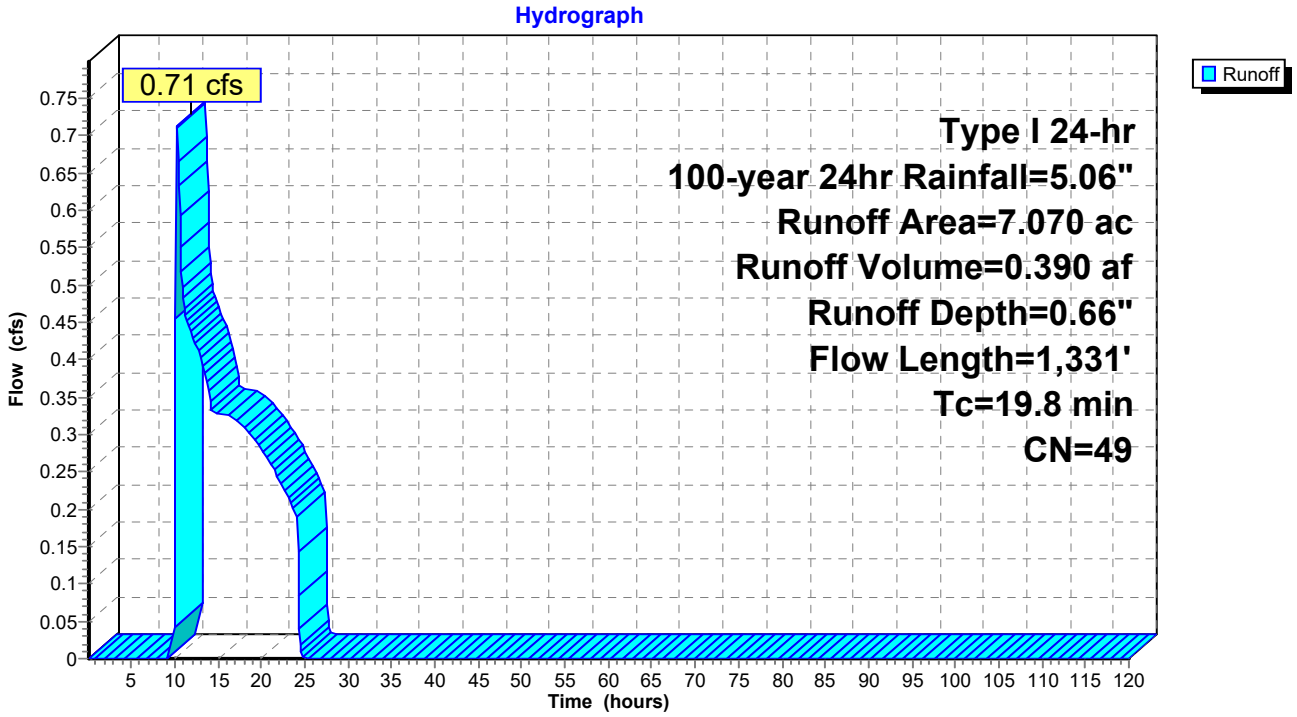
Runoff = 0.71 cfs @ 10.27 hrs, Volume= 0.390 af, Depth= 0.66"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Description
7.070	49	Desert shrub range, Good, HSG A
0.000	98	Unconnected pavement, HSG A
7.070	49	Weighted Average
7.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0224	0.15		**Sheet Flow, sheet 2785.88-2783.64** Range n= 0.130 P2= 1.88"
8.9	1,231	0.0205	2.31		**Shallow Concentrated Flow, shallow unpaved 2786.64-2761.34** Unpaved Kv= 16.1 fps
19.8	1,331	Total			

Subcatchment DA-C3: Subcat DA-C3



Summary for Subcatchment DA-D1: Subcat DA-D1

[47] Hint: Peak is 198% of capacity of segment #3

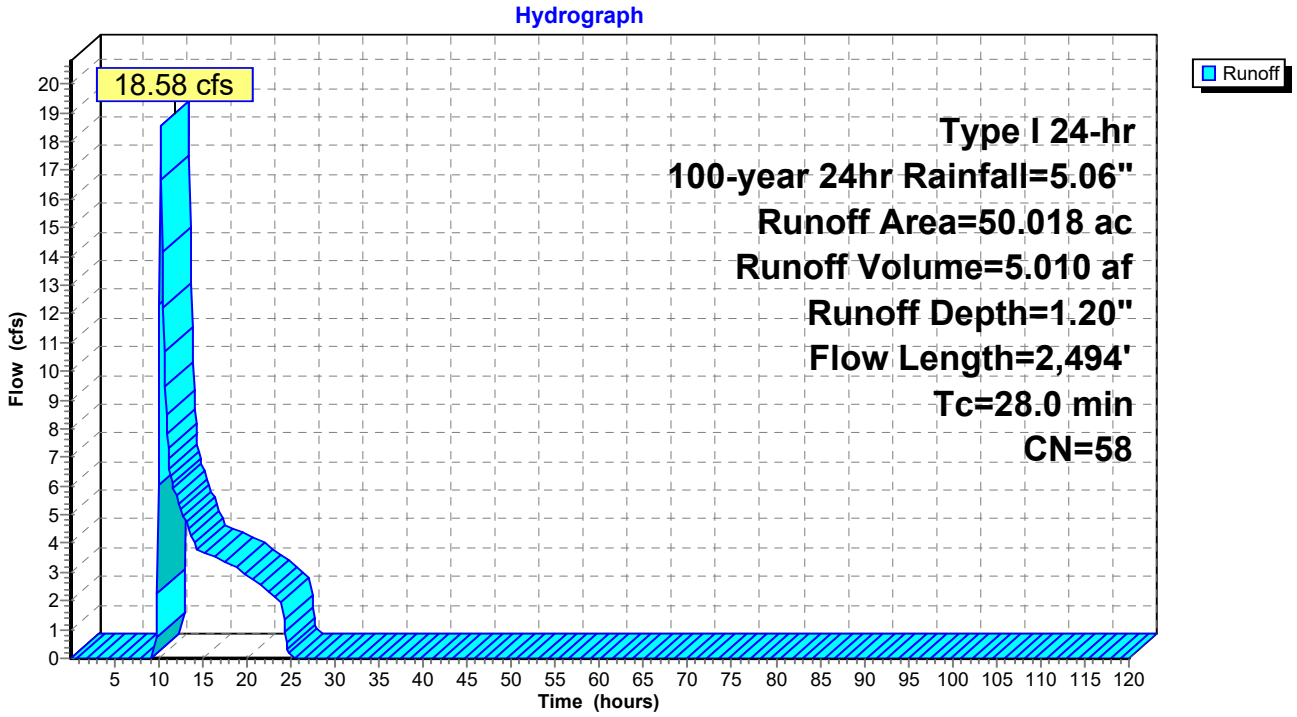
Runoff = 18.58 cfs @ 10.29 hrs, Volume= 5.010 af, Depth= 1.20"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

Area (ac)	CN	Description
27.134	49	Desert shrub range, Good, HSG A
20.822	68	Desert shrub range, Good, HSG B
1.078	72	Dirt roads, HSG A
0.264	82	Dirt roads, HSG B
0.400	98	Unconnected pavement, HSG A
0.320	98	Unconnected pavement, HSG B
50.018	58	Weighted Average
49.298		98.56% Pervious Area
0.720		1.44% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0270	0.16		**Sheet Flow, sheet 2810.70-2808** Range n= 0.130 P2= 1.88"
7.2	1,058	0.0230	2.44		**Shallow Concentrated Flow, shallow 2808-2783.46** Unpaved Kv= 16.1 fps
0.2	57	0.0080	5.32	9.40	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
10.5	1,279	0.0160	2.04		**Shallow Concentrated Flow, shallow 2783-2761** Unpaved Kv= 16.1 fps
28.0	2,494	Total			

Subcatchment DA-D1: Subcat DA-D1



Summary for Subcatchment DA-D2: Subcat DA-D2

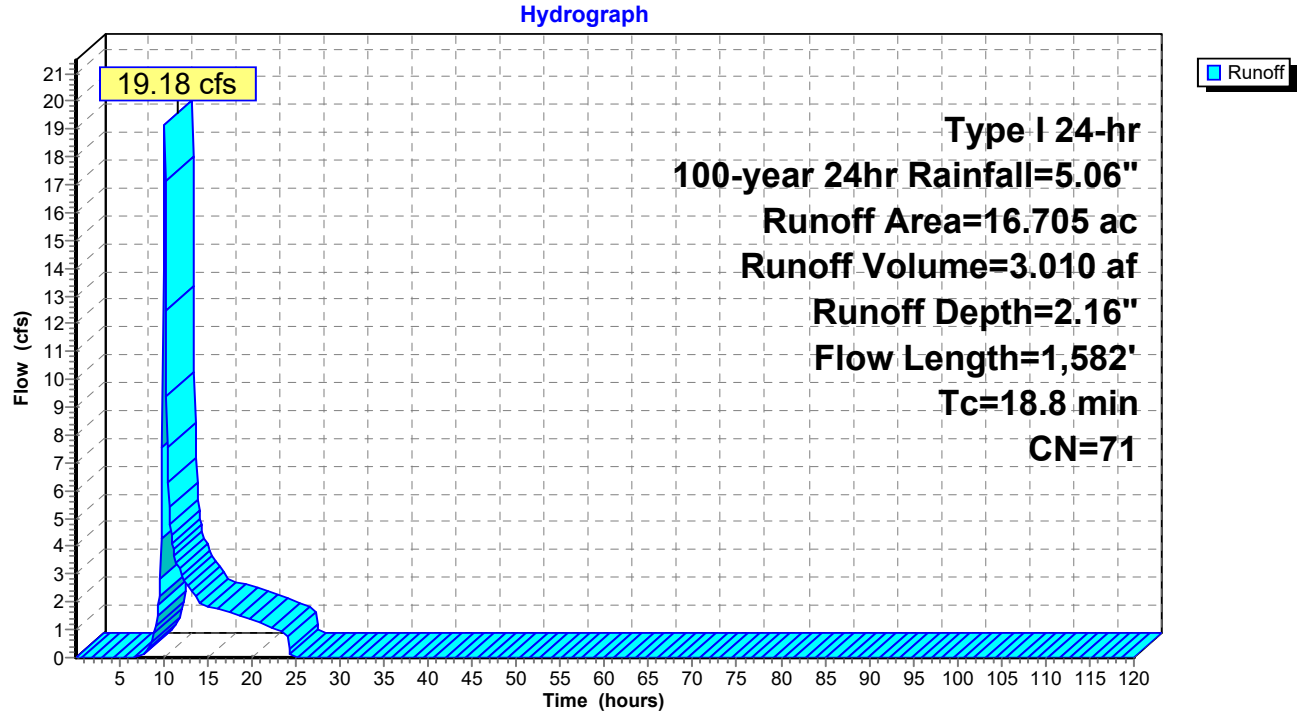
Runoff = 19.18 cfs @ 10.12 hrs, Volume= 3.010 af, Depth= 2.16"
Routed to Pond D2 : D2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Description
	1.577	49	Desert shrub range, Good, HSG A
	5.763	98	Unconnected pavement, HSG A
	0.845	98	Unconnected pavement, HSG B
*	8.520	55	Surrounding Equip. Cover, HSG A
	16.705	71	Weighted Average
	10.097		60.44% Pervious Area
	6.608		39.56% Impervious Area
	6.608		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	57	0.0520	0.19		**Sheet Flow, sheet 2800-2797** Range n= 0.130 P2= 1.88"
13.8	1,525	0.0130	1.84		**Shallow Concentrated Flow, shallow 2797-2777.25** Unpaved Kv= 16.1 fps
18.8	1,582	Total			

Subcatchment DA-D2: Subcat DA-D2



Summary for Subcatchment DA-D3: Subcat DA-D3

[49] Hint: Tc<2dt may require smaller dt

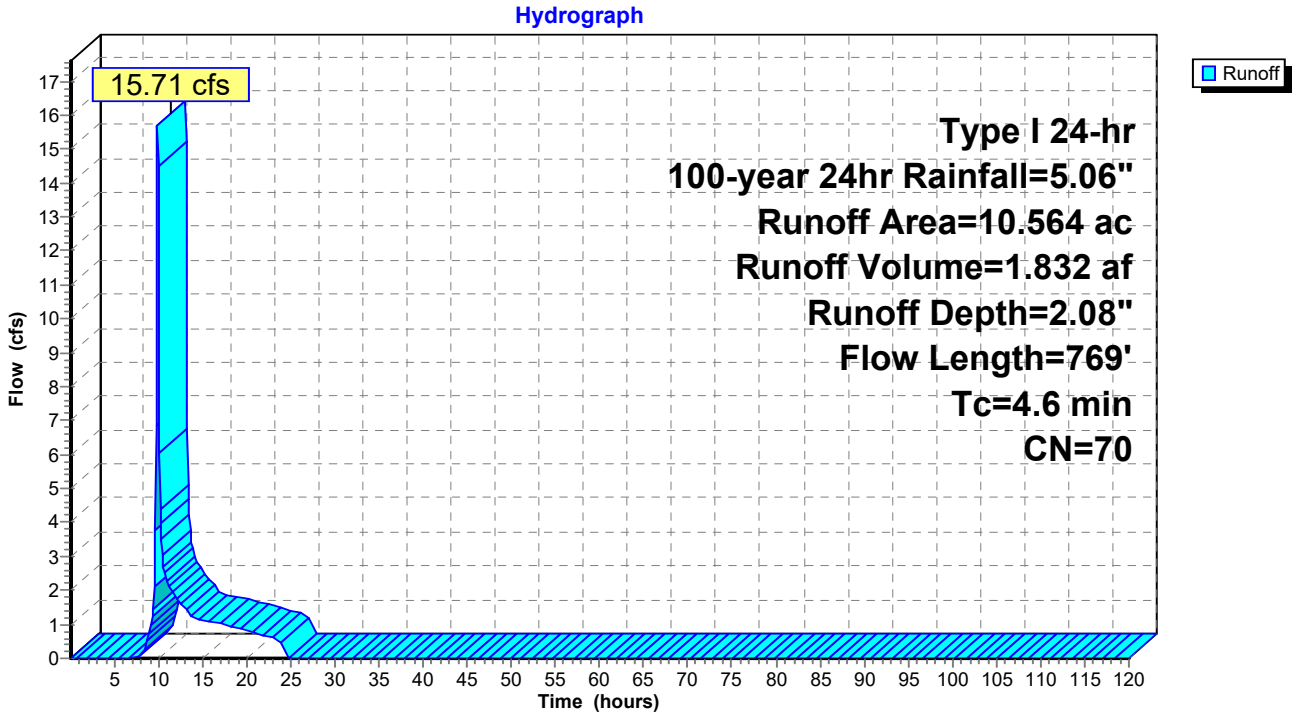
Runoff = 15.71 cfs @ 9.95 hrs, Volume= 1.832 af, Depth= 2.08"
Routed to Pond D3 : D3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Description
	1.397	49	Desert shrub range, Good, HSG A
	3.917	98	Unconnected pavement, HSG A
*	5.250	55	Surrounding Equip. Cover, HSG A
	10.564	70	Weighted Average
	6.647		62.92% Pervious Area
	3.917		37.08% Impervious Area
	3.917		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0500	1.52		**Sheet Flow, Sheet 2819-2814** Smooth surfaces n= 0.011 P2= 1.88"
3.4	626	0.0360	3.05		**Shallow Concentrated Flow, shallow 2814-2791.5** Unpaved Kv= 16.1 fps
0.1	43	0.0340	11.87	20.98	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
4.6	769	Total			

Subcatchment DA-D3: Subcat DA-D3



Summary for Subcatchment DA-D4: Subcat DA-D4

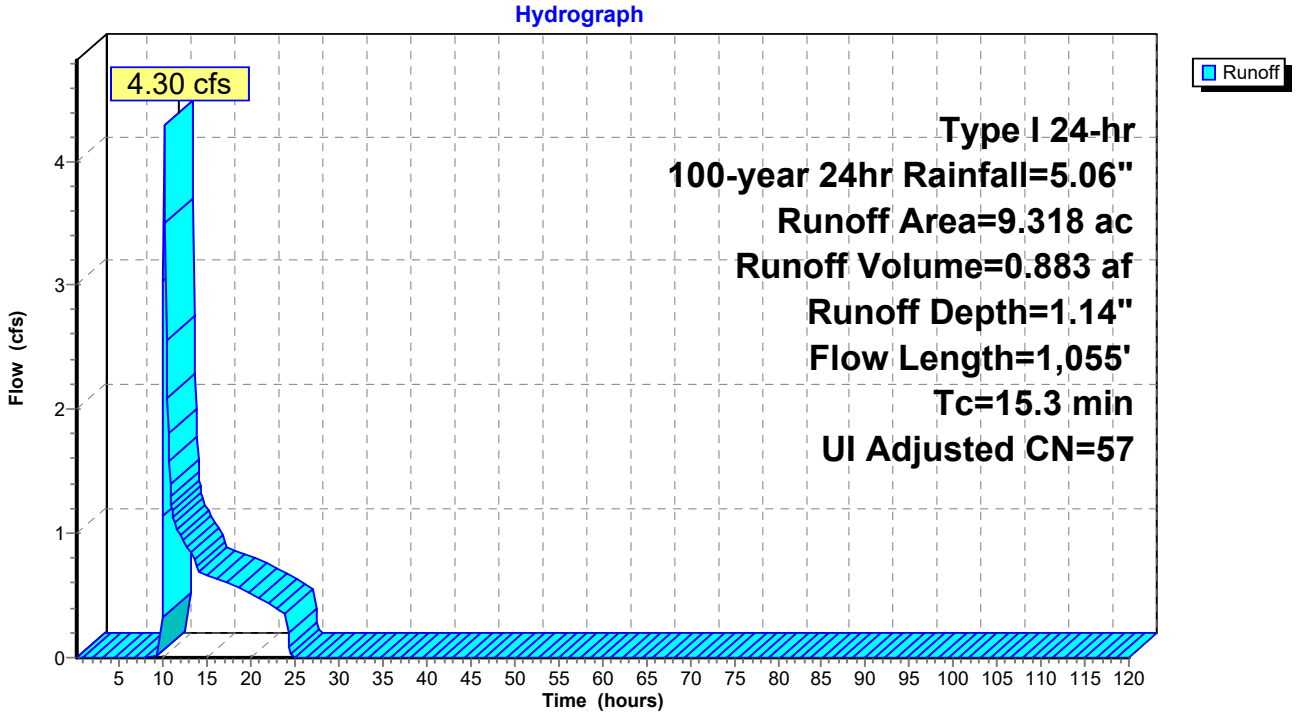
Runoff = 4.30 cfs @ 10.11 hrs, Volume= 0.883 af, Depth= 1.14"
Routed to Pond D4 : D4 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr 100-year 24hr Rainfall=5.06"

	Area (ac)	CN	Adj	Description
	3.543	49		Desert shrub range, Good, HSG A
	0.004	72		Dirt roads, HSG A
	1.871	98		Unconnected pavement, HSG A
*	3.900	55		Surrounding Equip. Cover, HSG A
	9.318	61	57	Weighted Average, UI Adjusted
	7.447			79.92% Pervious Area
	1.871			20.08% Impervious Area
	1.871			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		**Sheet Flow, sheet 2817-2814** Range n= 0.130 P2= 1.88"
5.6	955	0.0314	2.85		**Shallow Concentrated Flow, shallow 2814-2784** Unpaved Kv= 16.1 fps
15.3	1,055	Total			

Subcatchment DA-D4: Subcat DA-D4



Summary for Reach 3R: Culvert Crossing

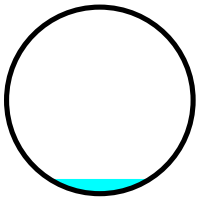
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth > 0.67" for 100-year 24hr event
Inflow = 0.75 cfs @ 21.02 hrs, Volume= 0.588 af
Outflow = 0.75 cfs @ 21.06 hrs, Volume= 0.588 af, Atten= 0%, Lag= 1.9 min
Routed to Link D : DP D

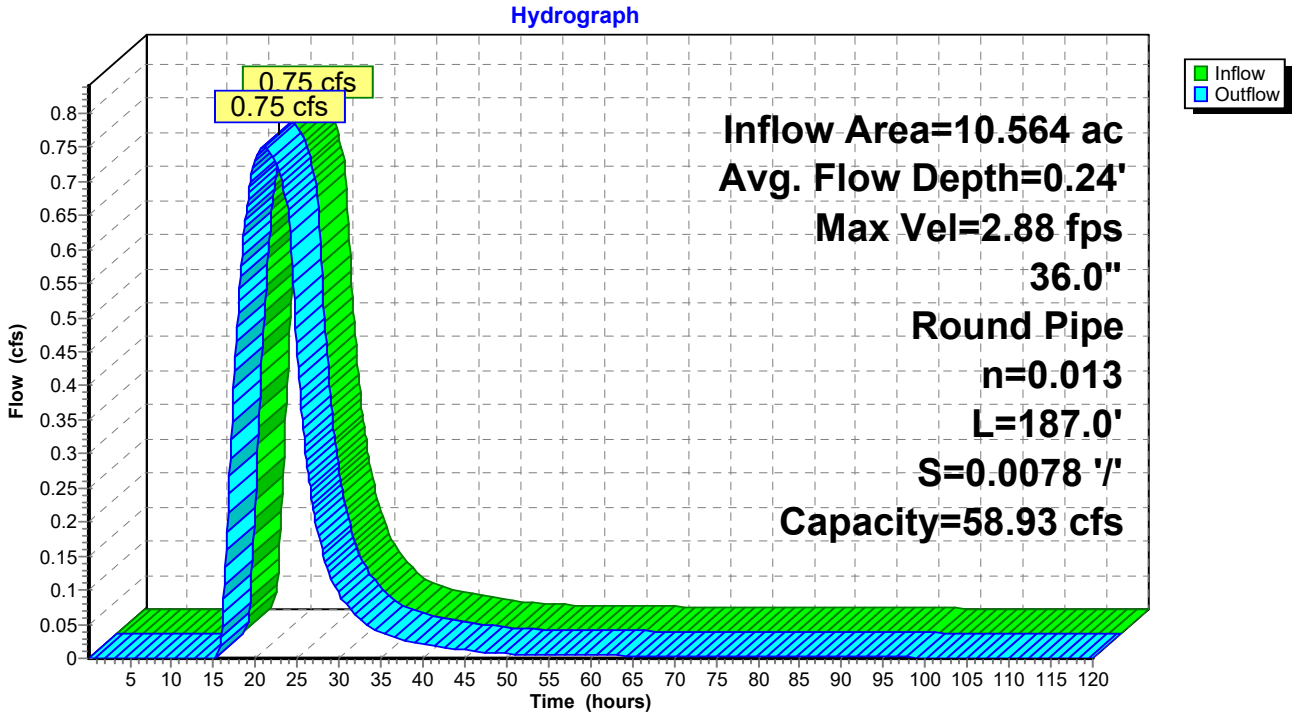
Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.88 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 3.1 min

Peak Storage= 49 cf @ 21.04 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 1.62'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 58.93 cfs

36.0" Round Pipe
n= 0.013
Length= 187.0' Slope= 0.0078 '/'
Inlet Invert= 2,783.46', Outlet Invert= 2,782.00'



Reach 3R: Culvert Crossing



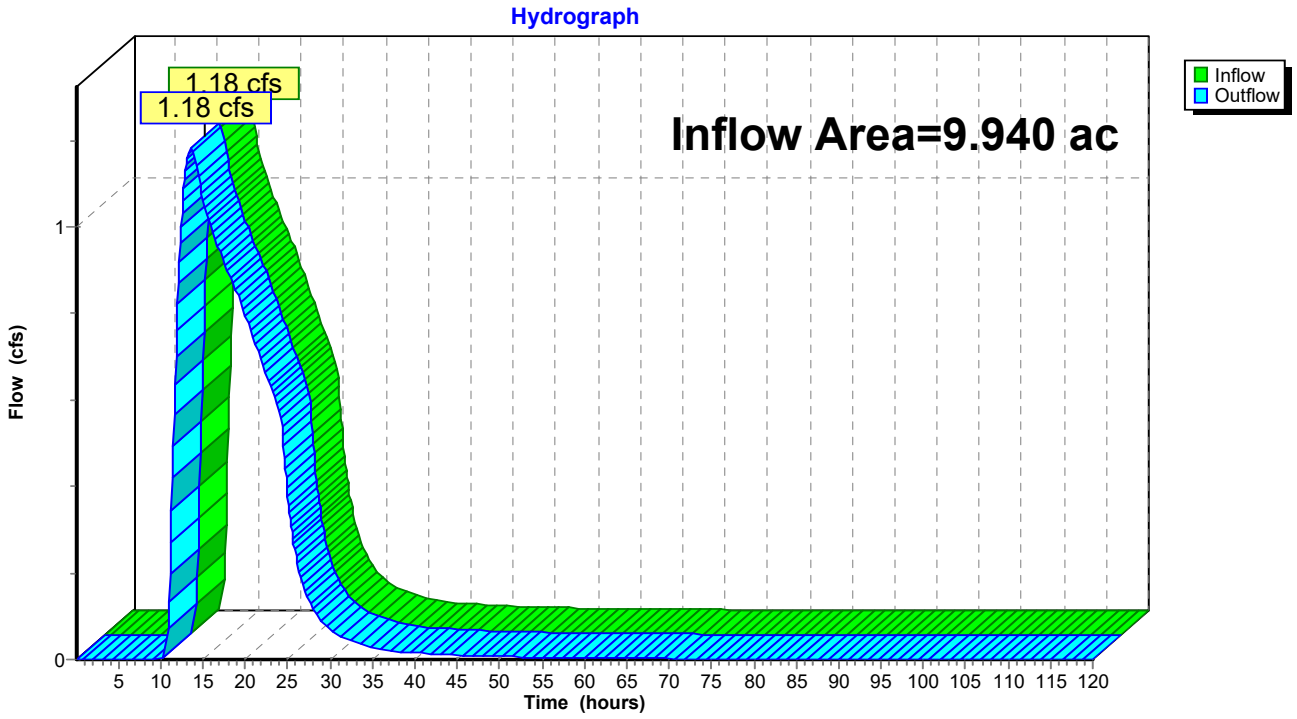
Summary for Reach 4R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth > 1.30" for 100-year 24hr event
Inflow = 1.18 cfs @ 13.56 hrs, Volume= 1.074 af
Outflow = 1.18 cfs @ 13.56 hrs, Volume= 1.074 af, Atten= 0%, Lag= 0.0 min
Routed to Pond C2 : C2 Pond

Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Reach 4R: (new Reach)



Summary for Pond A1: A1 Pond

Inflow Area = 5.149 ac, 12.33% Impervious, Inflow Depth = 0.95" for 100-year 24hr event
Inflow = 1.44 cfs @ 10.18 hrs, Volume= 0.407 af
Outflow = 0.41 cfs @ 12.87 hrs, Volume= 0.284 af, Atten= 71%, Lag= 161.5 min
Primary = 0.41 cfs @ 12.87 hrs, Volume= 0.284 af
Routed to Link A : DP A

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,787.61' @ 12.87 hrs Surf.Area= 0.073 ac Storage= 0.131 af

Plug-Flow detention time= 276.1 min calculated for 0.284 af (70% of inflow)
Center-of-Mass det. time= 135.2 min (1,060.0 - 924.8)

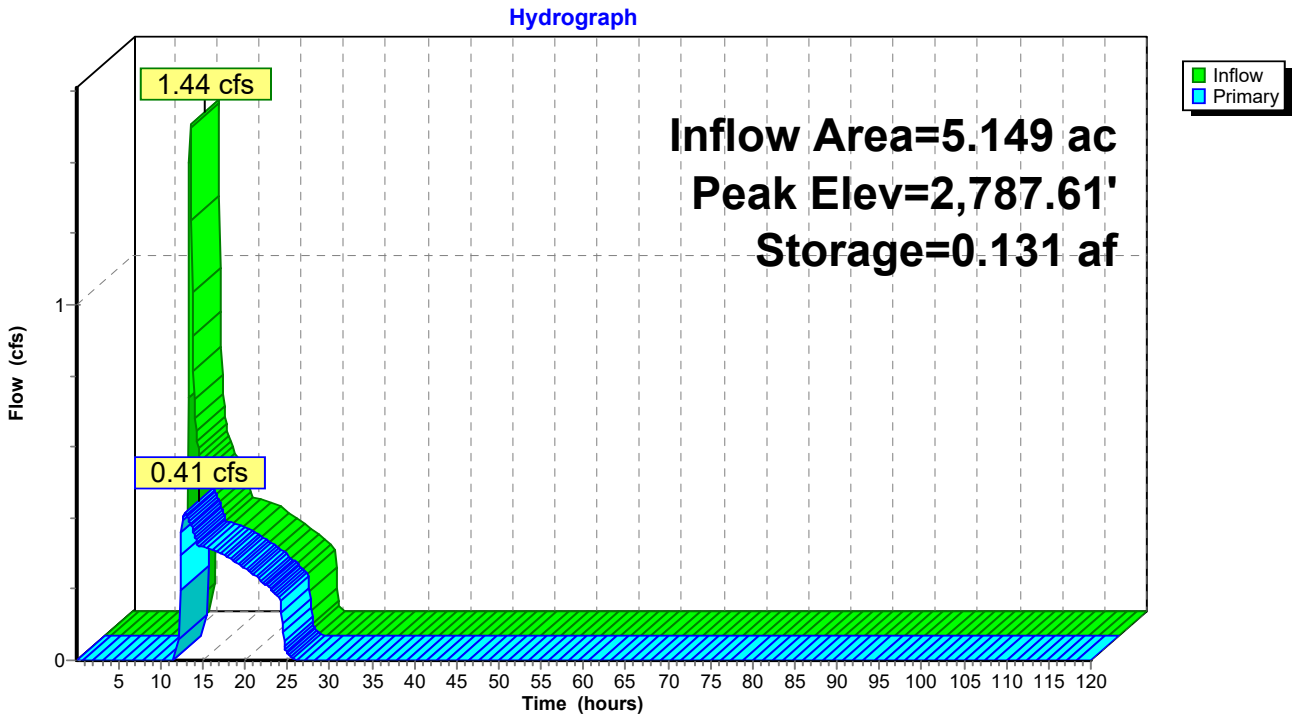
Volume	Invert	Avail.Storage	Storage Description
#1	2,785.00'	0.162 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,785.00	0.030	0.000	0.000
2,786.00	0.045	0.037	0.037
2,787.00	0.061	0.053	0.090
2,788.00	0.081	0.071	0.162

Device	Routing	Invert	Outlet Devices
#1	Primary	2,787.50'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.41 cfs @ 12.87 hrs HW=2,787.61' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.41 cfs @ 0.77 fps)

Pond A1: A1 Pond



Summary for Pond B2: B2 Pond

Inflow Area = 9.131 ac, 33.40% Impervious, Inflow Depth = 1.92" for 100-year 24hr event
Inflow = 8.53 cfs @ 10.15 hrs, Volume= 1.463 af
Outflow = 2.94 cfs @ 10.67 hrs, Volume= 1.296 af, Atten= 66%, Lag= 31.4 min
Primary = 2.94 cfs @ 10.67 hrs, Volume= 1.296 af
Routed to Pond B3 : B3 Pond

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,795.30' @ 10.67 hrs Surf.Area= 0.222 ac Storage= 0.335 af

Plug-Flow detention time= 171.8 min calculated for 1.296 af (89% of inflow)
Center-of-Mass det. time= 108.0 min (963.4 - 855.4)

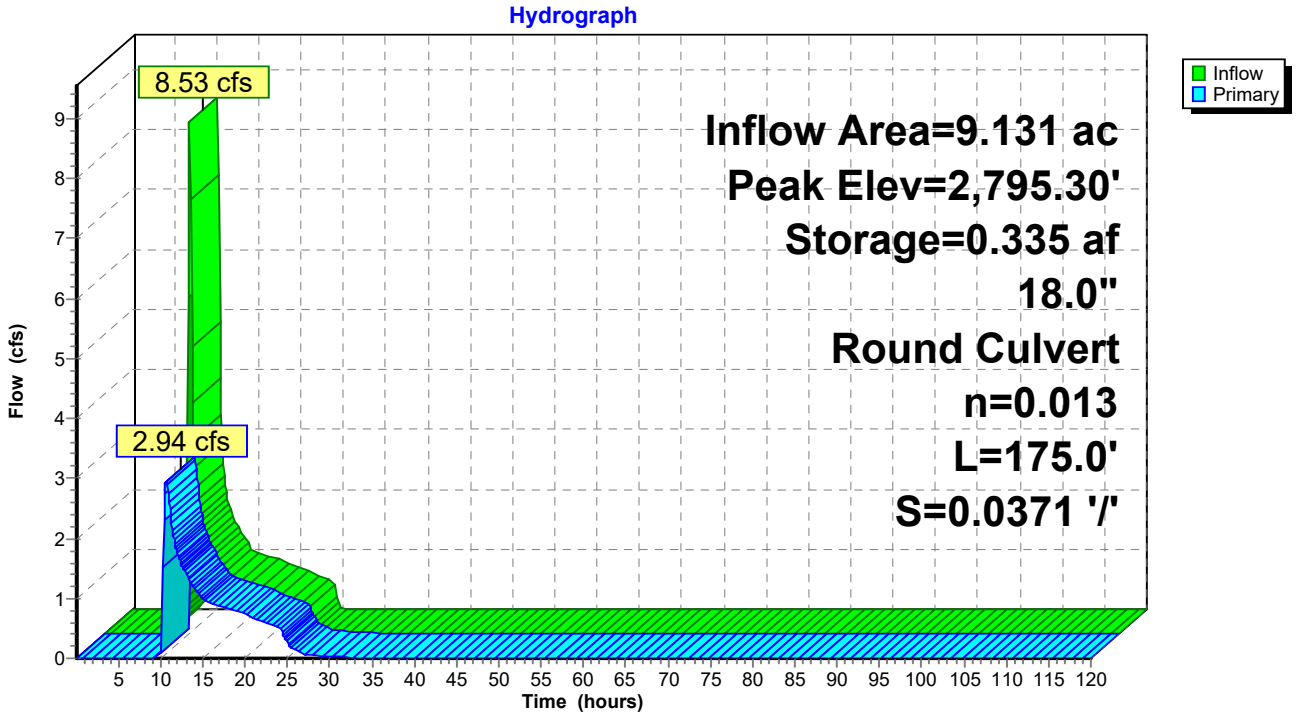
Volume	Invert	Avail.Storage	Storage Description
#1	2,793.50'	1.283 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,793.50	0.147	0.000	0.000
2,794.50	0.187	0.167	0.167
2,795.50	0.231	0.209	0.376
2,796.50	0.277	0.254	0.630
2,797.50	0.326	0.301	0.931
2,798.50	0.377	0.351	1.283

Device	Routing	Invert	Outlet Devices
#1	Primary	2,794.50'	**18.0" Round Culvert** L= 175.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,794.50' / 2,788.00' S= 0.0371 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.93 cfs @ 10.67 hrs HW=2,795.30' (Free Discharge)
1=Culvert (Inlet Controls 2.93 cfs @ 3.05 fps)

Pond B2: B2 Pond



Summary for Pond B3: B3 Pond

Inflow Area = 21.765 ac, 26.71% Impervious, Inflow Depth = 1.34" for 100-year 24hr event
Inflow = 6.95 cfs @ 9.98 hrs, Volume= 2.425 af
Outflow = 1.28 cfs @ 21.08 hrs, Volume= 1.672 af, Atten= 82%, Lag= 666.2 min
Primary = 1.28 cfs @ 21.08 hrs, Volume= 1.672 af
Routed to Link B : DP B

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,780.59' @ 21.08 hrs Surf.Area= 0.722 ac Storage= 1.370 af

Plug-Flow detention time= 689.3 min calculated for 1.672 af (69% of inflow)
Center-of-Mass det. time= 533.4 min (1,467.0 - 933.6)

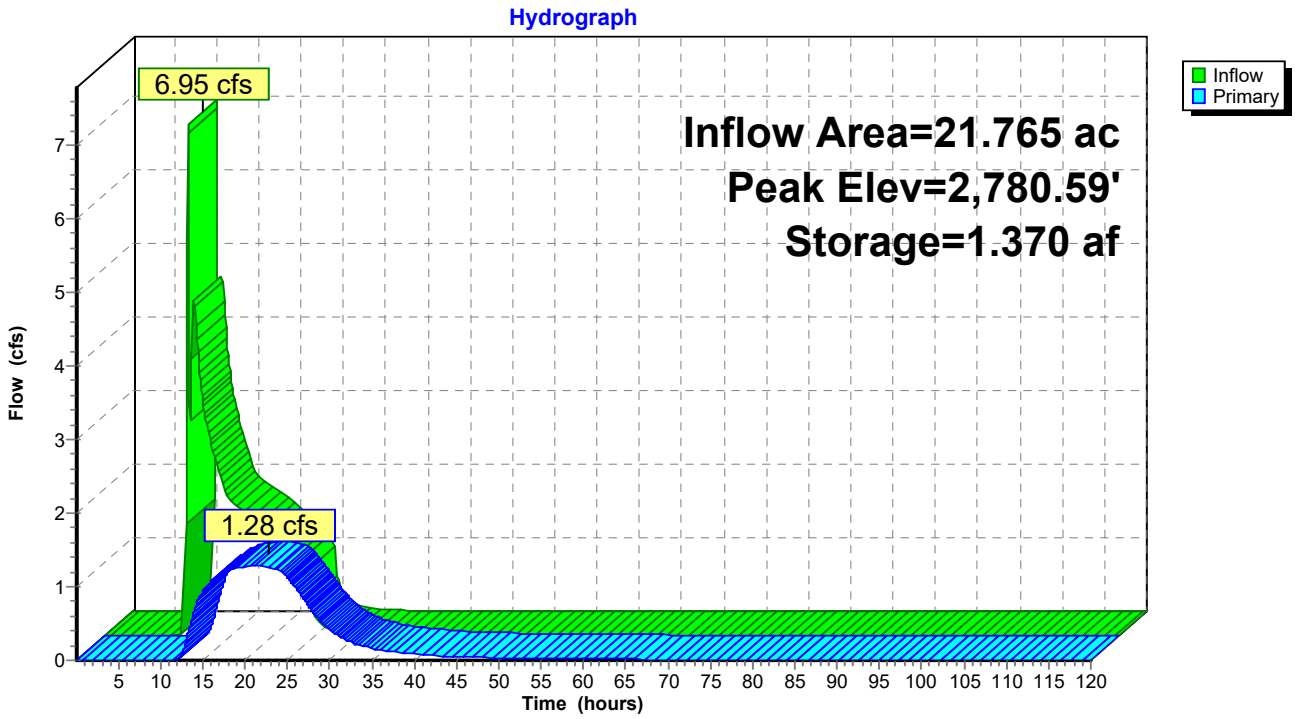
Volume	Invert	Avail.Storage	Storage Description
#1	2,778.50'	2.054 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,778.50	0.591	0.000	0.000
2,779.50	0.652	0.621	0.621
2,780.50	0.716	0.684	1.305
2,781.50	0.781	0.748	2.054

Device	Routing	Invert	Outlet Devices
#1	Primary	2,779.00'	**18.0" Round Culvert** L= 93.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.00' / 2,778.50' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,779.67'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.28 cfs @ 21.08 hrs HW=2,780.59' (Free Discharge)
↑—**1=Culvert** (Passes 1.28 cfs of 6.81 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 1.28 cfs @ 3.68 fps)

Pond B3: B3 Pond



Summary for Pond C1: C1 Pond

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 1.77" for 100-year 24hr event
Inflow = 7.93 cfs @ 10.17 hrs, Volume= 1.465 af
Outflow = 1.18 cfs @ 13.56 hrs, Volume= 1.074 af, Atten= 85%, Lag= 203.2 min
Primary = 1.18 cfs @ 13.56 hrs, Volume= 1.074 af
Routed to Reach 4R : (new Reach)

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,792.50' @ 13.56 hrs Surf.Area= 0.436 ac Storage= 0.599 af

Plug-Flow detention time= 418.7 min calculated for 1.074 af (73% of inflow)
Center-of-Mass det. time= 287.2 min (1,152.5 - 865.3)

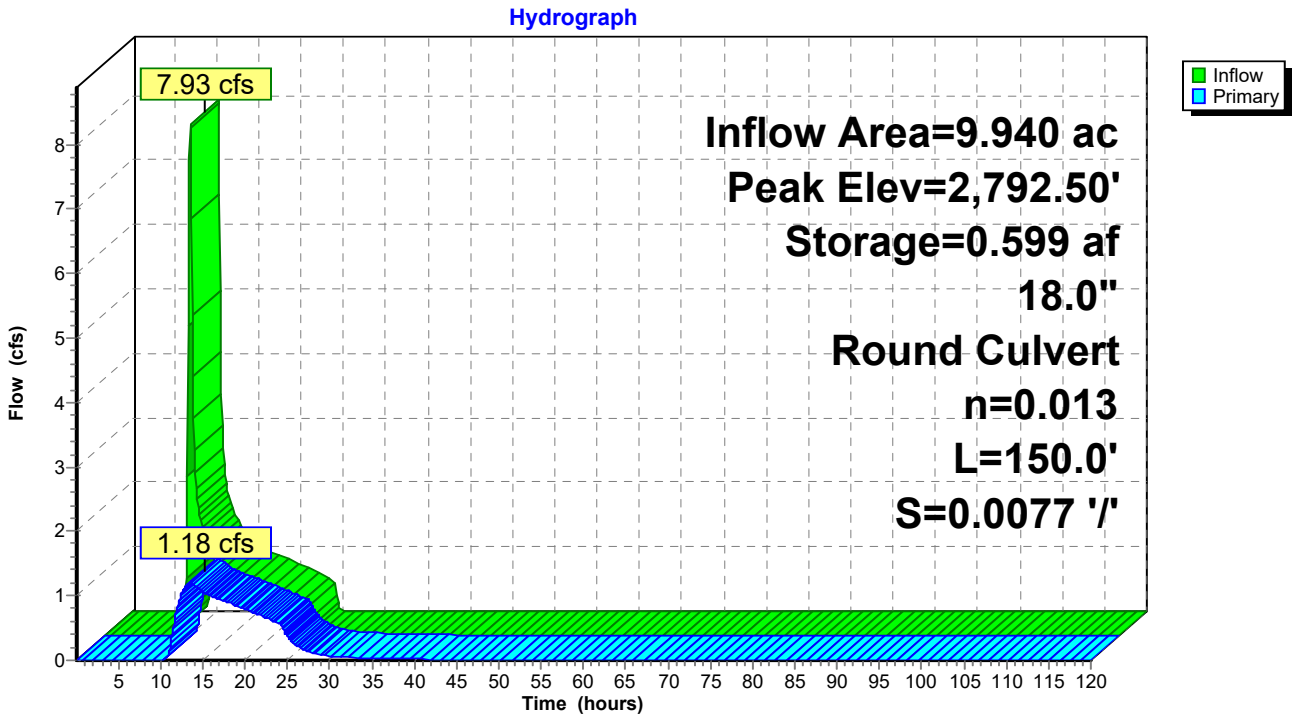
Volume	Invert	Avail.Storage	Storage Description
#1	2,791.00'	1.912 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,791.00	0.363	0.000	0.000
2,792.00	0.411	0.387	0.387
2,793.00	0.461	0.436	0.823
2,794.00	0.514	0.487	1.311
2,795.00	0.570	0.542	1.853
2,795.10	0.627	0.060	1.912

Device	Routing	Invert	Outlet Devices
#1	Primary	2,792.00'	**18.0" Round Culvert** L= 150.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,792.00' / 2,790.84' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.18 cfs @ 13.56 hrs HW=2,792.50' (Free Discharge)
1=Culvert (Barrel Controls 1.18 cfs @ 3.42 fps)

Pond C1: C1 Pond



Summary for Pond C2: C2 Pond

Inflow Area = 34.545 ac, 28.80% Impervious, Inflow Depth = 1.28" for 100-year 24hr event
Inflow = 10.83 cfs @ 10.23 hrs, Volume= 3.675 af
Outflow = 1.19 cfs @ 24.28 hrs, Volume= 2.669 af, Atten= 89%, Lag= 843.1 min
Primary = 1.19 cfs @ 24.28 hrs, Volume= 2.669 af
Routed to Link C : DP C

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,768.33' @ 24.28 hrs Surf.Area= 1.016 ac Storage= 2.636 af

Plug-Flow detention time= 1,085.4 min calculated for 2.667 af (73% of inflow)
Center-of-Mass det. time= 935.8 min (1,910.7 - 975.0)

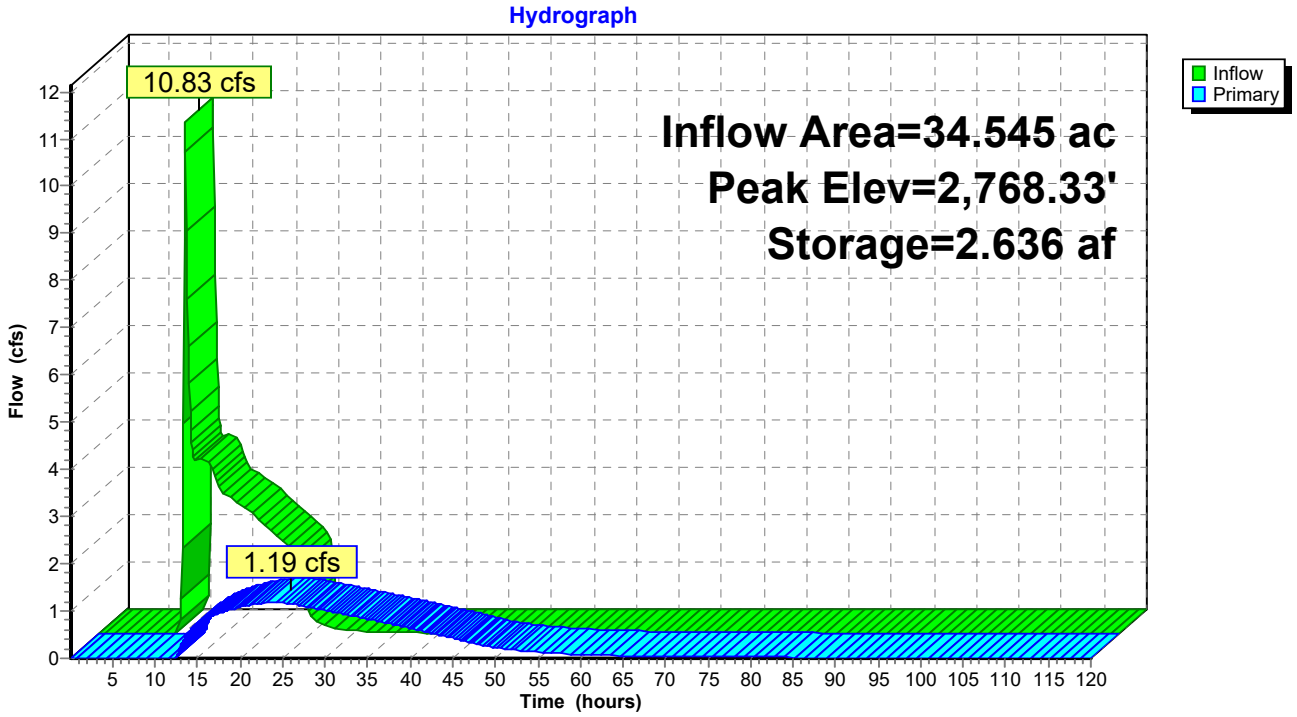
Volume	Invert	Avail.Storage	Storage Description
#1	2,765.00'	4.496 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,765.00	0.543	0.000	0.000
2,766.00	0.680	0.612	0.612
2,767.00	0.866	0.773	1.385
2,768.00	0.978	0.922	2.307
2,769.00	1.094	1.036	3.343
2,770.00	1.212	1.153	4.496

Device	Routing	Invert	Outlet Devices
#1	Primary	2,765.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,765.00' / 2,764.37' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,766.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,769.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 24.28 hrs HW=2,768.33' (Free Discharge)
└─**1=Culvert** (Passes 1.19 cfs of 12.54 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 1.19 cfs @ 6.05 fps)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond C2: C2 Pond



Summary for Pond D2: D2 Pond

Inflow Area = 16.705 ac, 39.56% Impervious, Inflow Depth = 2.16" for 100-year 24hr event
Inflow = 19.18 cfs @ 10.12 hrs, Volume= 3.010 af
Outflow = 0.96 cfs @ 23.35 hrs, Volume= 0.984 af, Atten= 95%, Lag= 793.6 min
Primary = 0.96 cfs @ 23.35 hrs, Volume= 0.984 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,776.65' @ 23.35 hrs Surf.Area= 0.816 ac Storage= 2.530 af

Plug-Flow detention time= 1,093.0 min calculated for 0.984 af (33% of inflow)
Center-of-Mass det. time= 855.4 min (1,696.8 - 841.4)

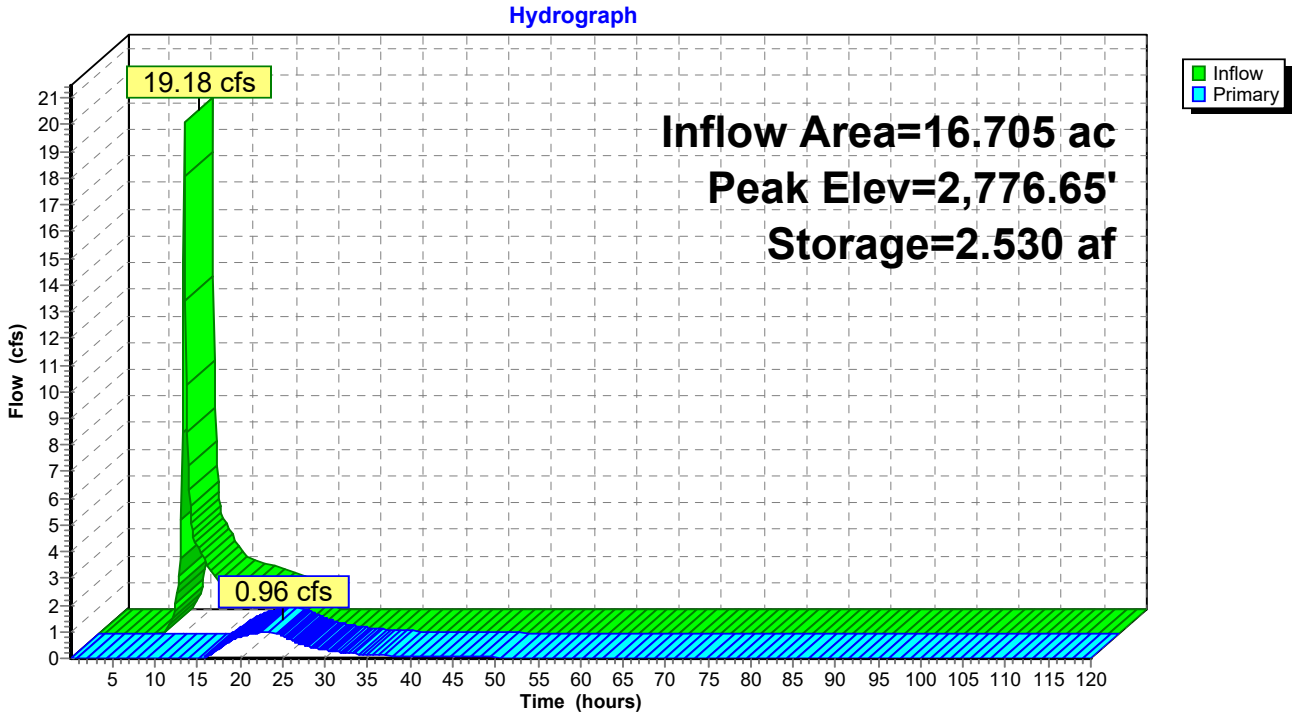
Volume	Invert	Avail.Storage	Storage Description
#1	2,773.00'	3.691 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,773.00	0.571	0.000	0.000
2,773.75	0.620	0.447	0.447
2,774.00	0.636	0.157	0.604
2,775.00	0.703	0.670	1.273
2,776.00	0.771	0.737	2.010
2,777.00	0.840	0.806	2.816
2,778.00	0.910	0.875	3.691

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,774.50'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,774.50' / 2,773.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,776.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.96 cfs @ 23.35 hrs HW=2,776.65' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.96 cfs @ 2.76 fps)
↑**1=Culvert** (Passes 0.96 cfs of 6.67 cfs potential flow)

Pond D2: D2 Pond



Summary for Pond D3: D3 Pond

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 2.08" for 100-year 24hr event
Inflow = 15.71 cfs @ 9.95 hrs, Volume= 1.832 af
Outflow = 0.75 cfs @ 21.02 hrs, Volume= 0.588 af, Atten= 95%, Lag= 664.7 min
Primary = 0.75 cfs @ 21.02 hrs, Volume= 0.588 af
Routed to Reach 3R : Culvert Crossing

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,789.54' @ 21.02 hrs Surf.Area= 0.398 ac Storage= 1.450 af

Plug-Flow detention time= 860.8 min calculated for 0.588 af (32% of inflow)
Center-of-Mass det. time= 620.8 min (1,453.2 - 832.4)

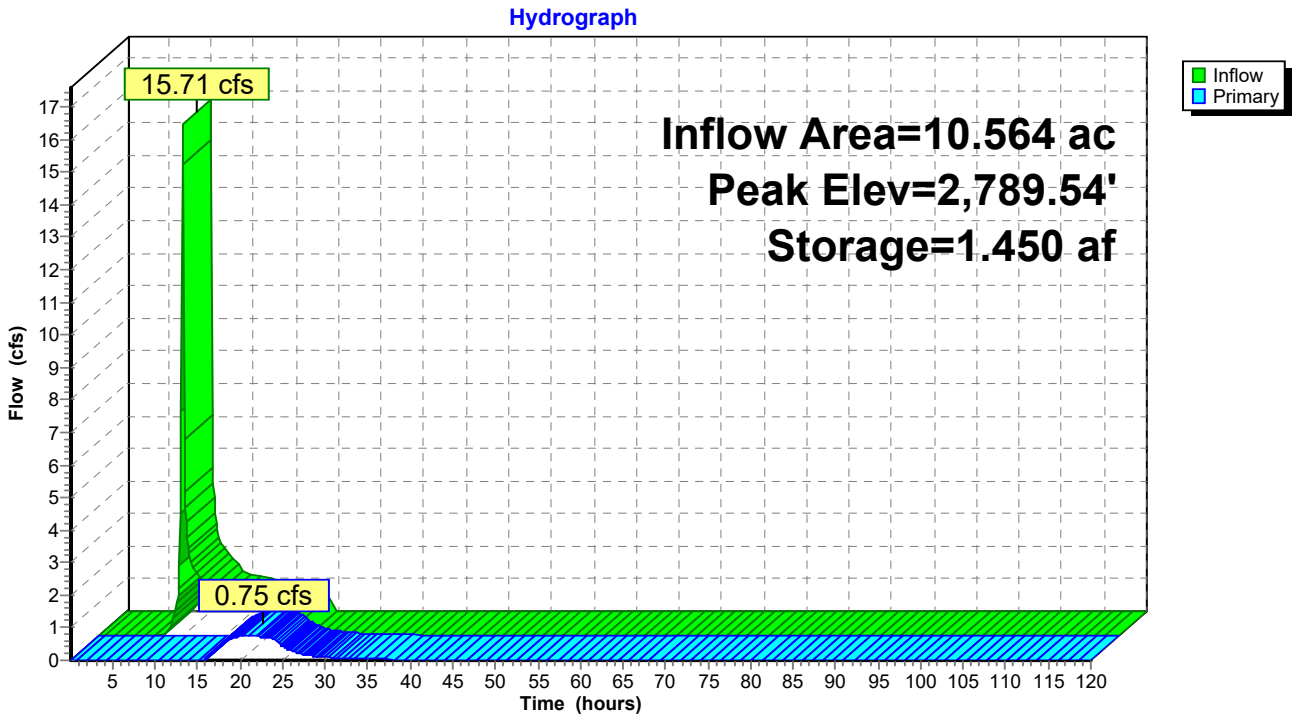
Volume	Invert	Avail.Storage	Storage Description
#1	2,784.00'	2.083 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,784.00	0.116	0.000	0.000
2,785.00	0.168	0.142	0.142
2,786.00	0.221	0.194	0.336
2,787.00	0.282	0.251	0.588
2,788.00	0.327	0.304	0.893
2,789.00	0.373	0.350	1.243
2,790.00	0.420	0.397	1.639
2,791.00	0.469	0.445	2.083

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,788.00'	**18.0" Round Culvert** L= 81.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,788.00' / 2,786.00' S= 0.0247 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,789.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.75 cfs @ 21.02 hrs HW=2,789.54' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.75 cfs @ 2.49 fps)
↑—**1=Culvert** (Passes 0.75 cfs of 5.27 cfs potential flow)

Pond D3: D3 Pond



Summary for Pond D4: D4 Pond

Inflow Area = 9.318 ac, 20.08% Impervious, Inflow Depth = 1.14" for 100-year 24hr event
Inflow = 4.30 cfs @ 10.11 hrs, Volume= 0.883 af
Outflow = 0.56 cfs @ 18.68 hrs, Volume= 0.442 af, Atten= 87%, Lag= 514.0 min
Primary = 0.56 cfs @ 18.68 hrs, Volume= 0.442 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,781.38' @ 18.68 hrs Surf.Area= 0.269 ac Storage= 0.539 af

Plug-Flow detention time= 613.3 min calculated for 0.442 af (50% of inflow)
Center-of-Mass det. time= 401.6 min (1,305.1 - 903.5)

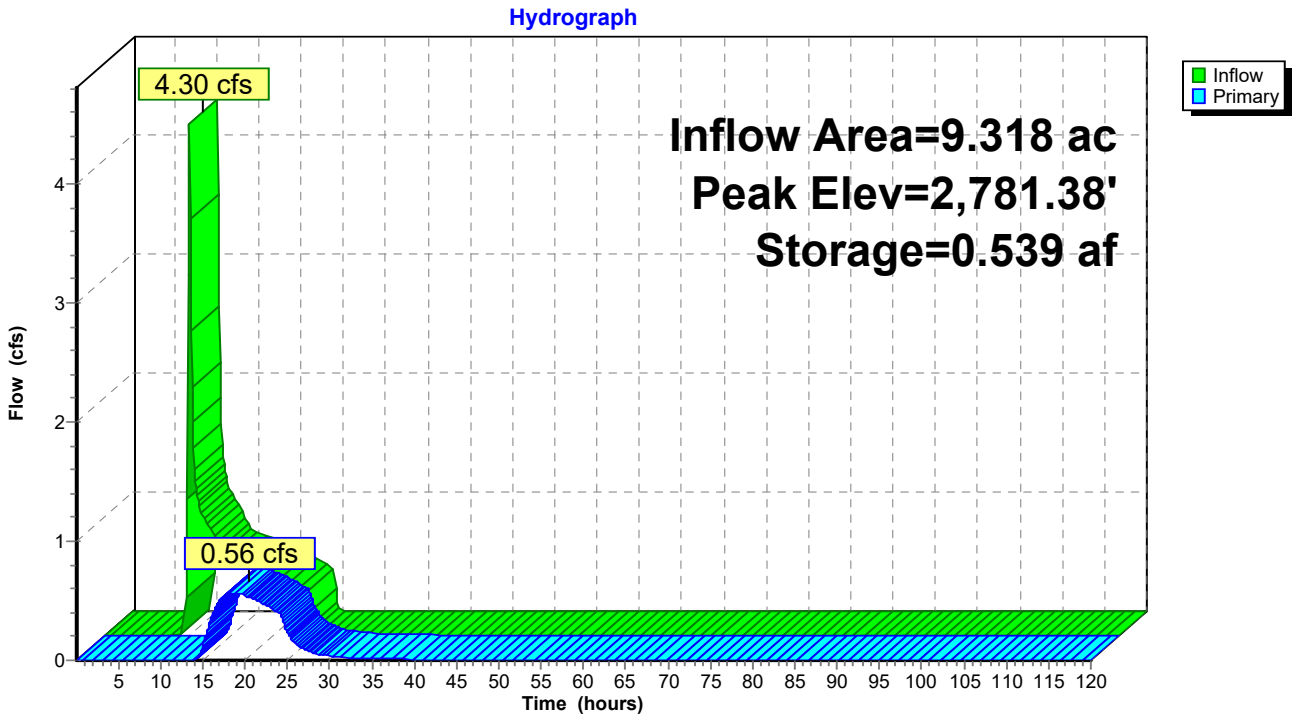
Volume	Invert	Avail.Storage	Storage Description
#1	2,779.00'	1.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,779.00	0.186	0.000	0.000
2,780.00	0.220	0.203	0.203
2,781.00	0.255	0.237	0.440
2,782.00	0.293	0.274	0.715
2,783.00	0.331	0.312	1.027

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,779.23'	**12.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.23' / 2,778.57' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Primary	2,781.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.56 cfs @ 18.68 hrs HW=2,781.38' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.56 cfs @ 2.09 fps)
↑—**1=Culvert** (Passes 0.56 cfs of 2.04 cfs potential flow)

Pond D4: D4 Pond

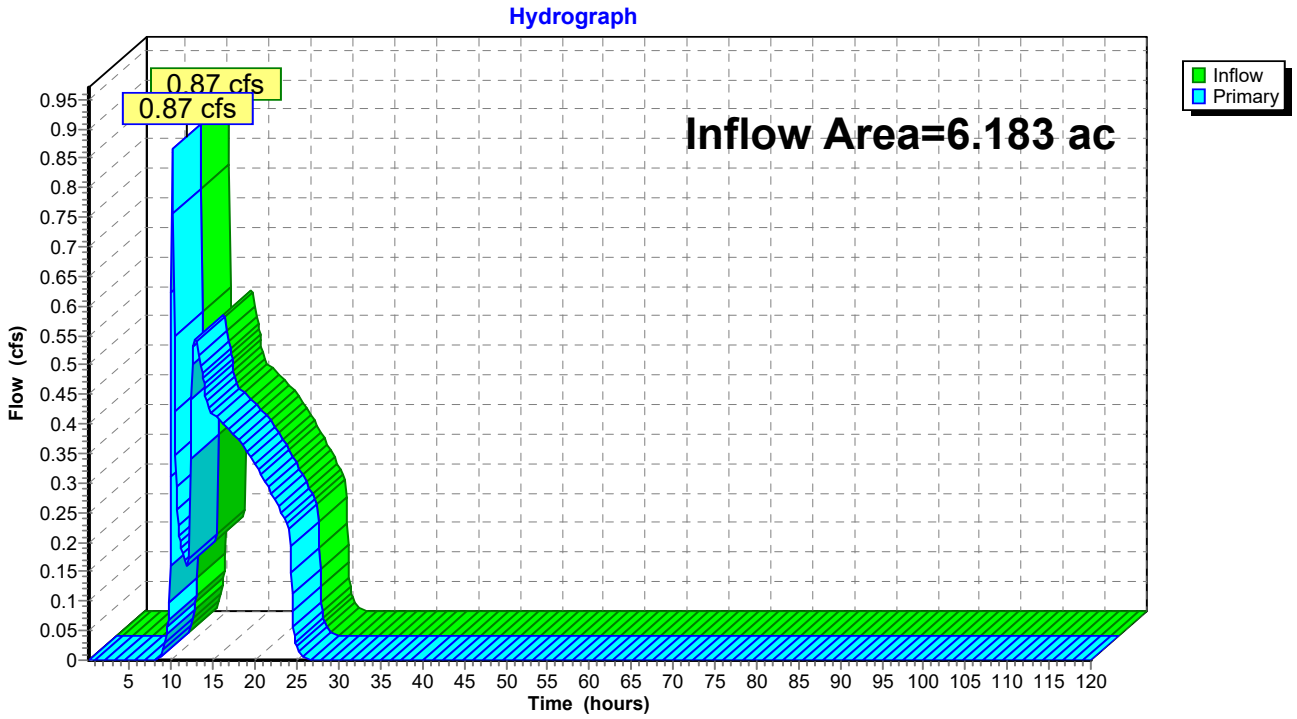


Summary for Link A: DP A

Inflow Area = 6.183 ac, 15.79% Impervious, Inflow Depth = 0.83" for 100-year 24hr event
Inflow = 0.87 cfs @ 10.12 hrs, Volume= 0.429 af
Primary = 0.87 cfs @ 10.12 hrs, Volume= 0.429 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

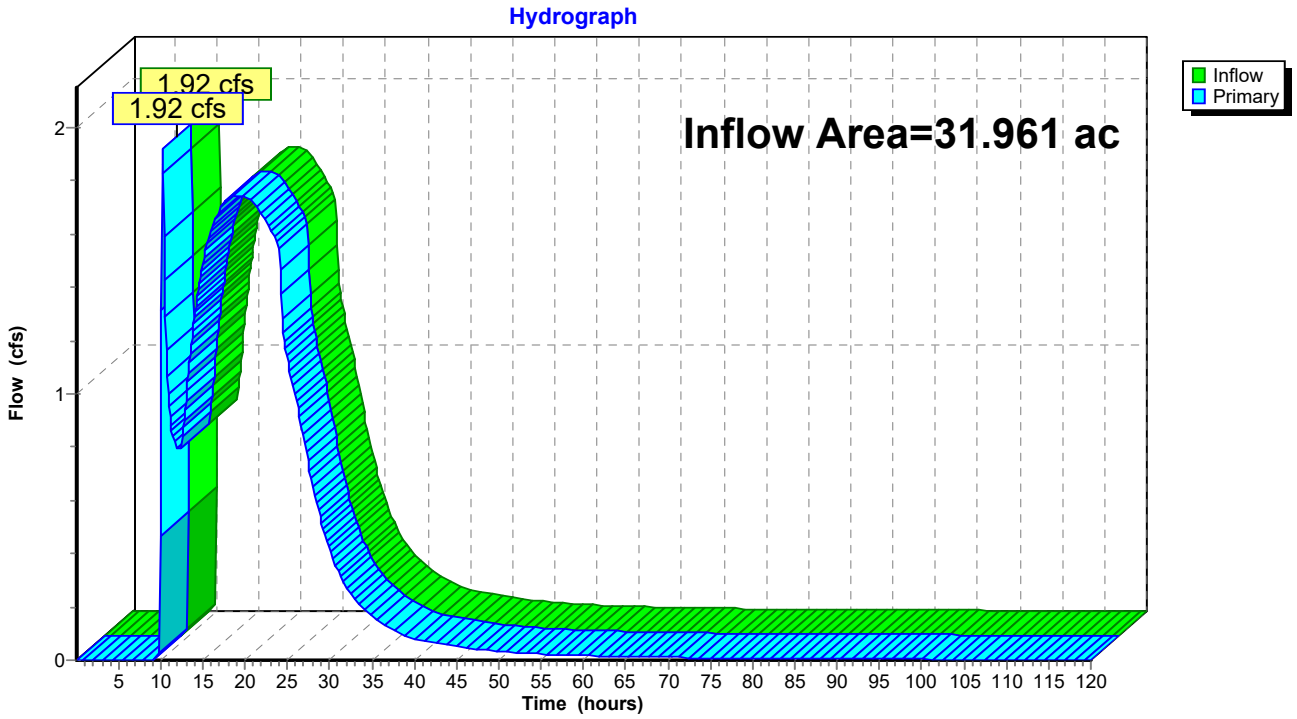


Summary for Link B: DP B

Inflow Area = 31.961 ac, 21.59% Impervious, Inflow Depth > 0.89" for 100-year 24hr event
Inflow = 1.92 cfs @ 10.24 hrs, Volume= 2.377 af
Primary = 1.92 cfs @ 10.24 hrs, Volume= 2.377 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

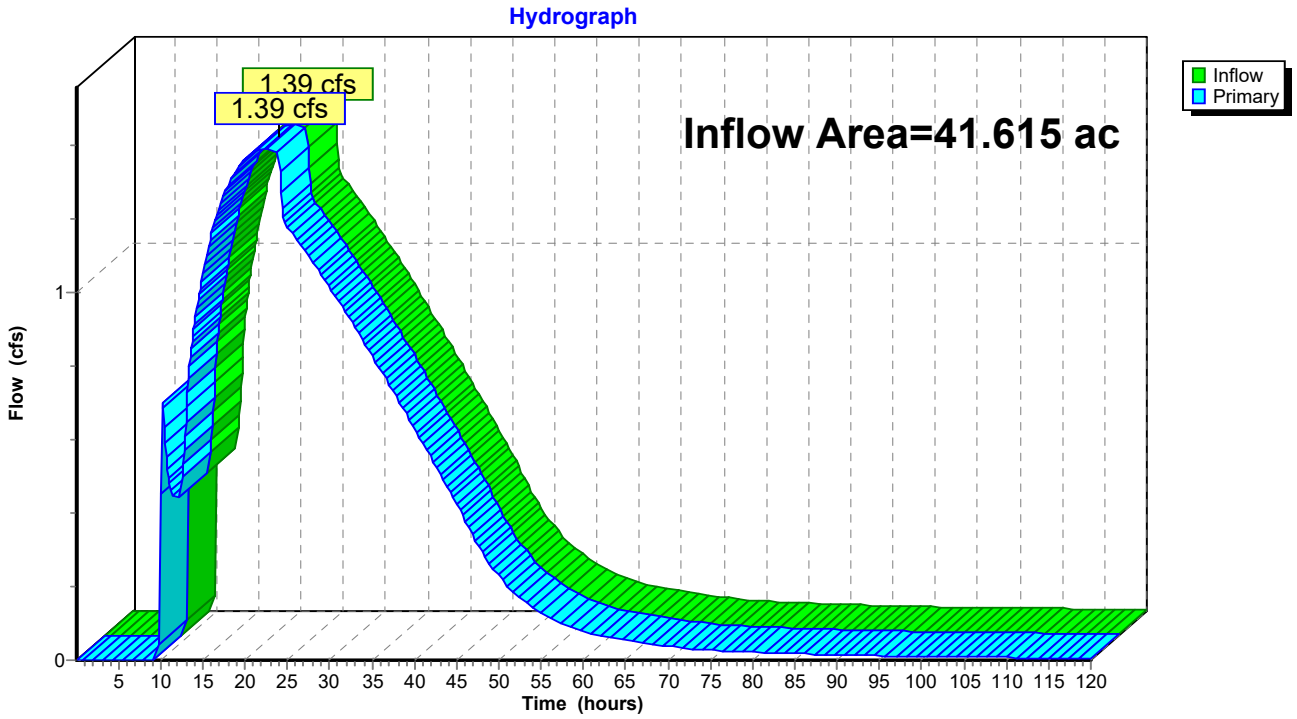


Summary for Link C: DP C

Inflow Area = 41.615 ac, 23.91% Impervious, Inflow Depth > 0.88" for 100-year 24hr event
Inflow = 1.39 cfs @ 22.30 hrs, Volume= 3.059 af
Primary = 1.39 cfs @ 22.30 hrs, Volume= 3.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

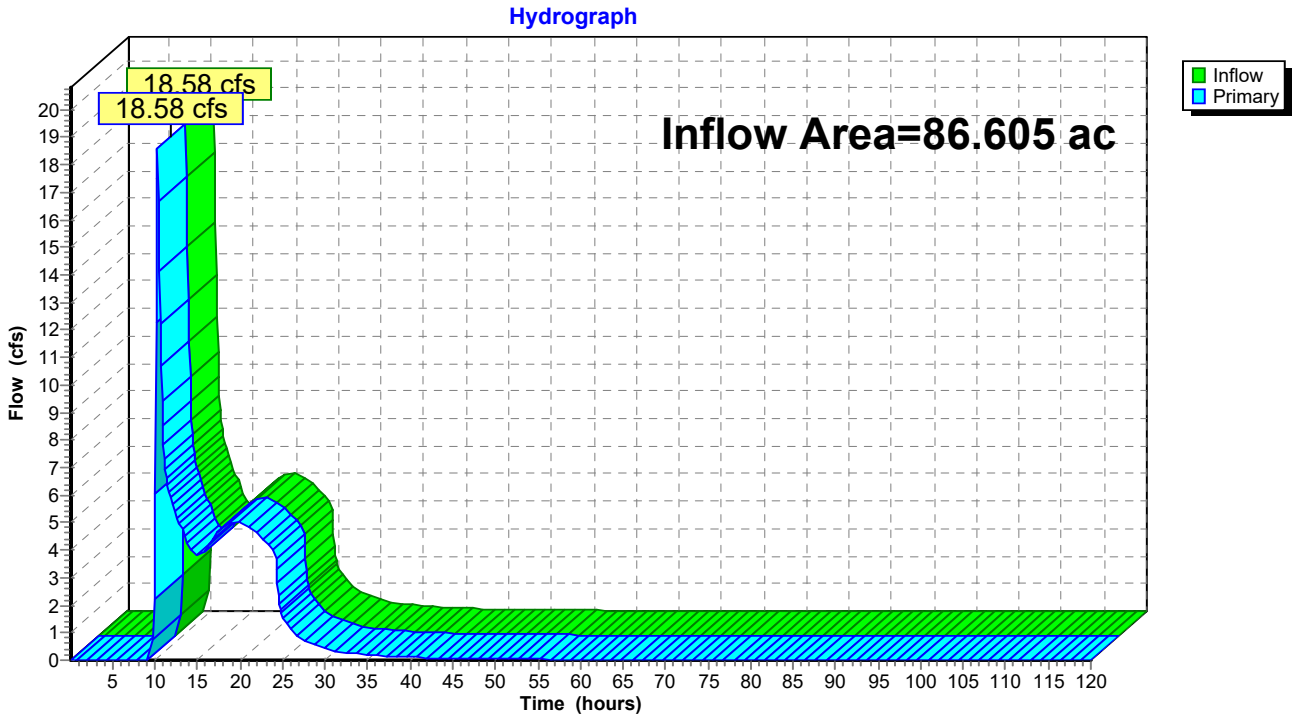


Summary for Link D: DP D

Inflow Area = 86.605 ac, 15.14% Impervious, Inflow Depth > 0.97" for 100-year 24hr event
Inflow = 18.58 cfs @ 10.29 hrs, Volume= 7.024 af
Primary = 18.58 cfs @ 10.29 hrs, Volume= 7.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D



Time span=0.10-120.00 hrs, dt=0.10 hrs, 1200 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-A1: Subcat DA-A1 Runoff Area=5.149 ac 12.33% Impervious Runoff Depth=0.07"
Flow Length=1,005' Tc=18.6 min UI Adjusted CN=54 Runoff=0.16 cfs 0.032 af

Subcatchment DA-A1.1: Subcat DA-A1.1 Runoff Area=1.034 ac 32.98% Impervious Runoff Depth=0.31"
Flow Length=590' Tc=17.8 min CN=65 Runoff=0.12 cfs 0.027 af

Subcatchment DA-B1: Subcat DA-B1 Runoff Area=10.196 ac 10.65% Impervious Runoff Depth=0.05"
Flow Length=1,408' Tc=22.1 min UI Adjusted CN=52 Runoff=0.23 cfs 0.041 af

Subcatchment DA-B2: Subcat DA-B2 Runoff Area=9.131 ac 33.40% Impervious Runoff Depth=0.41"
Flow Length=1,387' Tc=20.5 min CN=68 Runoff=1.78 cfs 0.309 af

Subcatchment DA-B3: Subcat DA-B3 Runoff Area=12.634 ac 21.87% Impervious Runoff Depth=0.11"
Flow Length=786' Tc=4.6 min UI Adjusted CN=56 Runoff=0.49 cfs 0.112 af

Subcatchment DA-C1: Subcat DA-C1 Runoff Area=9.940 ac 30.38% Impervious Runoff Depth=0.34"
Flow Length=1,218' Tc=21.9 min CN=66 Runoff=1.37 cfs 0.283 af

Subcatchment DA-C2: Subcat DA-C2 Runoff Area=24.605 ac 28.17% Impervious Runoff Depth=0.16"
Flow Length=2,502' Tc=25.1 min UI Adjusted CN=59 Runoff=1.32 cfs 0.335 af

Subcatchment DA-C3: Subcat DA-C3 Runoff Area=7.070 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=1,331' Tc=19.8 min CN=49 Runoff=0.09 cfs 0.011 af

Subcatchment DA-D1: Subcat DA-D1 Runoff Area=50.018 ac 1.44% Impervious Runoff Depth=0.14"
Flow Length=2,494' Tc=28.0 min CN=58 Runoff=2.42 cfs 0.596 af

Subcatchment DA-D2: Subcat DA-D2 Runoff Area=16.705 ac 39.56% Impervious Runoff Depth=0.51"
Flow Length=1,582' Tc=18.8 min CN=71 Runoff=5.17 cfs 0.712 af

Subcatchment DA-D3: Subcat DA-D3 Runoff Area=10.564 ac 37.08% Impervious Runoff Depth=0.47"
Flow Length=769' Tc=4.6 min CN=70 Runoff=4.13 cfs 0.418 af

Subcatchment DA-D4: Subcat DA-D4 Runoff Area=9.318 ac 20.08% Impervious Runoff Depth=0.12"
Flow Length=1,055' Tc=15.3 min UI Adjusted CN=57 Runoff=0.41 cfs 0.096 af

Reach 3R: Culvert Crossing Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
36.0" Round Pipe n=0.013 L=187.0' S=0.0078 '/' Capacity=58.93 cfs Outflow=0.00 cfs 0.000 af

Reach 4R: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond A1: A1 Pond Peak Elev=2,785.88' Storage=0.032 af Inflow=0.16 cfs 0.032 af
Outflow=0.00 cfs 0.000 af

Pond B2: B2 Pond Peak Elev=2,794.85' Storage=0.240 af Inflow=1.78 cfs 0.309 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0371 '/' Outflow=0.62 cfs 0.142 af

Pond B3: B3 Pond Peak Elev=2,778.91' Storage=0.253 af Inflow=1.01 cfs 0.253 af
Outflow=0.00 cfs 0.000 af

Pond C1: C1 Pond Peak Elev=2,791.74' Storage=0.283 af Inflow=1.37 cfs 0.283 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0077 '/' Outflow=0.00 cfs 0.000 af

Pond C2: C2 Pond Peak Elev=2,765.57' Storage=0.335 af Inflow=1.32 cfs 0.335 af
Outflow=0.00 cfs 0.000 af

Pond D2: D2 Pond Peak Elev=2,774.17' Storage=0.712 af Inflow=5.17 cfs 0.712 af
Outflow=0.00 cfs 0.000 af

Pond D3: D3 Pond Peak Elev=2,786.35' Storage=0.418 af Inflow=4.13 cfs 0.418 af
Outflow=0.00 cfs 0.000 af

Pond D4: D4 Pond Peak Elev=2,779.50' Storage=0.096 af Inflow=0.41 cfs 0.096 af
Outflow=0.00 cfs 0.000 af

Link A: DP A Inflow=0.12 cfs 0.027 af
Primary=0.12 cfs 0.027 af

Link B: DP B Inflow=0.23 cfs 0.041 af
Primary=0.23 cfs 0.041 af

Link C: DP C Inflow=0.09 cfs 0.011 af
Primary=0.09 cfs 0.011 af

Link D: DP D Inflow=2.42 cfs 0.596 af
Primary=2.42 cfs 0.596 af

Total Runoff Area = 166.364 ac Runoff Volume = 2.972 af Average Runoff Depth = 0.21"
81.40% Pervious = 135.423 ac 18.60% Impervious = 30.941 ac

Summary for Subcatchment DA-A1: Subcat DA-A1

[73] Warning: Peak may fall outside time span

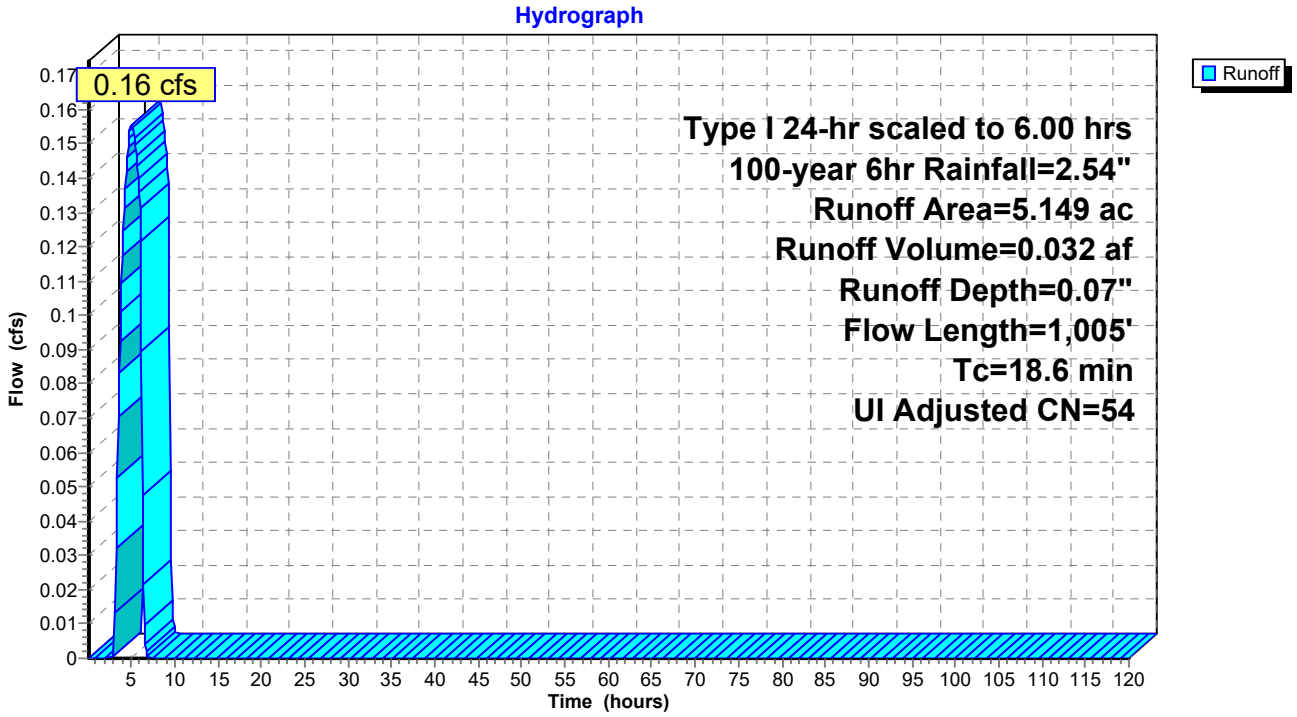
Runoff = 0.16 cfs @ 5.04 hrs, Volume= 0.032 af, Depth= 0.07"
Routed to Pond A1 : A1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Adj	Description
4.141	49		Desert shrub range, Good, HSG A
0.635	98		Unconnected pavement, HSG A
0.206	63		Desert shrub range, Poor, HSG A
0.068	96		Gravel surface, HSG A
0.099	72		Dirt roads, HSG A
5.149	57	54	Weighted Average, UI Adjusted
4.514			87.67% Pervious Area
0.635			12.33% Impervious Area
0.635			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0208	0.15		**Sheet Flow, sheet 2802.48-2800.40** Range n= 0.130 P2= 1.88"
3.2	385	0.0158	2.02		**Shallow Concentrated Flow, shallow 2800.40-2794.30** Unpaved Kv= 16.1 fps
0.2	40	0.0050	4.20	7.43	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.5	398	0.0142	1.92		**Shallow Concentrated Flow, shallow 2793.57-2788.24** Unpaved Kv= 16.1 fps
0.5	82	0.0151	2.49		**Shallow Concentrated Flow, paved 2788.24-2787** Paved Kv= 20.3 fps
18.6	1,005	Total			

Subcatchment DA-A1: Subcat DA-A1



Summary for Subcatchment DA-A1.1: Subcat DA-A1.1

[73] Warning: Peak may fall outside time span

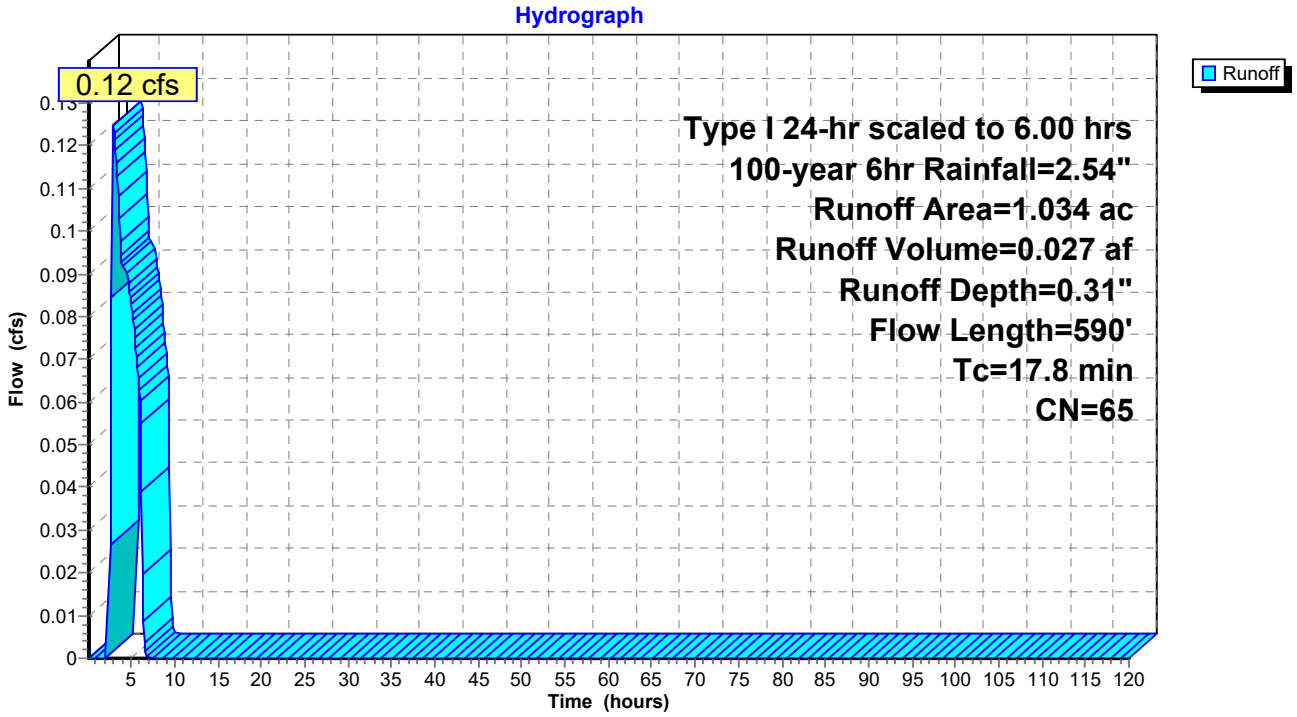
Runoff = 0.12 cfs @ 2.93 hrs, Volume= 0.027 af, Depth= 0.31"
Routed to Link A : DP A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Description
0.693	49	Desert shrub range, Good, HSG A
0.341	98	Unconnected pavement, HSG A
1.034	65	Weighted Average
0.693		67.02% Pervious Area
0.341		32.98% Impervious Area
0.341		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0182	0.14		**Sheet Flow, sheet 2787.94-2786.12** Range n= 0.130 P2= 1.88"
4.7	369	0.0172	1.31		**Shallow Concentrated Flow, shallow 2786.12-2779.76** Nearly Bare & Untilled Kv= 10.0 fps
0.2	26	0.0200	2.87		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.1	95	0.0211	1.45		**Shallow Concentrated Flow, shallow 2779-2776.99** Nearly Bare & Untilled Kv= 10.0 fps
17.8	590	Total			

Subcatchment DA-A1.1: Subcat DA-A1.1



Summary for Subcatchment DA-B1: Subcat DA-B1

[73] Warning: Peak may fall outside time span

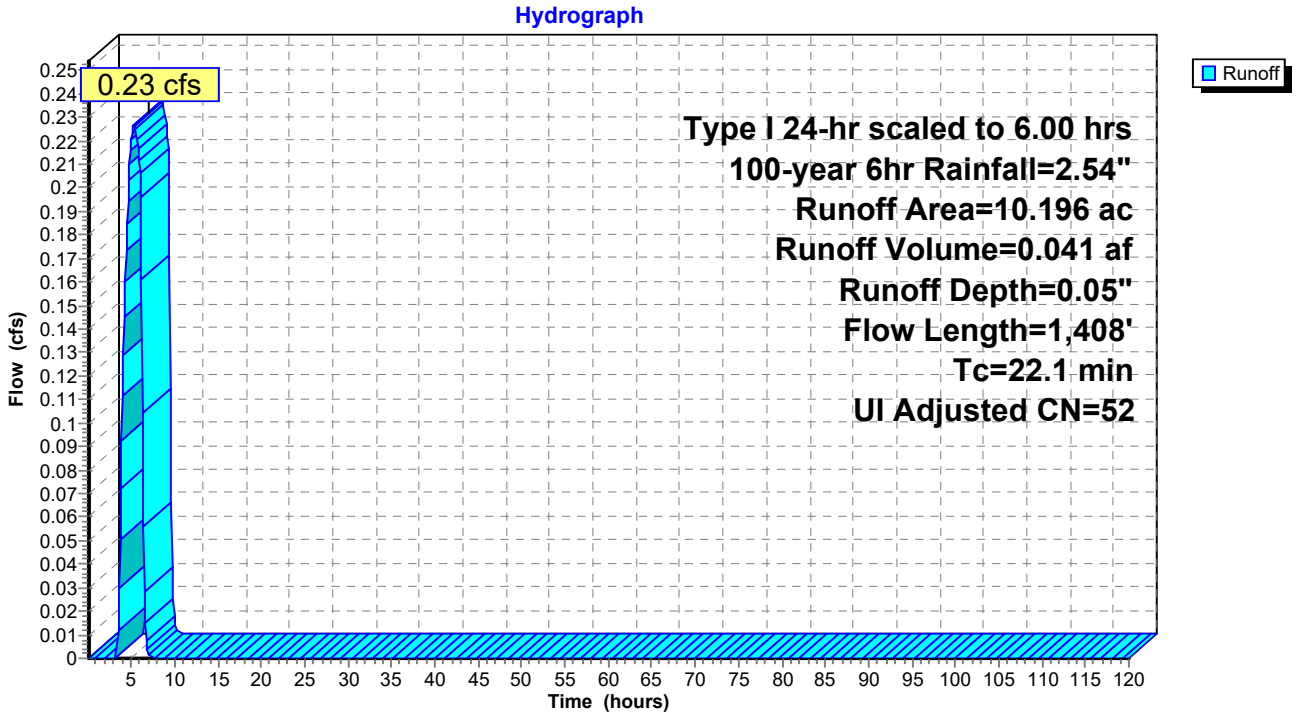
Runoff = 0.23 cfs @ 5.34 hrs, Volume= 0.041 af, Depth= 0.05"
Routed to Link B : DP B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Adj	Description
	8.673	49		Desert shrub range, Good, HSG A
	1.086	98		Unconnected pavement, HSG A
*	0.437	55		Surrounding Equip. Cover, HSG A
	10.196	54	52	Weighted Average, UI Adjusted
	9.110			89.35% Pervious Area
	1.086			10.65% Impervious Area
	1.086			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0185	0.14		**Sheet Flow, Sheet Flow 2803.05-2801.20** Range n= 0.130 P2= 1.88"
1.6	207	0.0189	2.21		**Shallow Concentrated Flow, shallow 2801.20-2797.28** Unpaved Kv= 16.1 fps
0.2	31	0.0200	2.87		**Shallow Concentrated Flow, shallow 2797.28-2796.65** Paved Kv= 20.3 fps
3.1	416	0.0191	2.23		**Shallow Concentrated Flow, shallow 2796.65-2788.70** Unpaved Kv= 16.1 fps
0.2	28	0.0160	2.57		**Shallow Concentrated Flow, shallow paved 2788.70-2788.25** Paved Kv= 20.3 fps
4.1	507	0.0161	2.04		**Shallow Concentrated Flow, shallow unpaved 2788.25-2780.00** Unpaved Kv= 16.1 fps
0.2	27	0.0200	2.87		**Shallow Concentrated Flow, shallow paved** Paved Kv= 20.3 fps
0.9	92	0.0107	1.67		**Shallow Concentrated Flow, shallow unpaved 2779.05-2778.06** Unpaved Kv= 16.1 fps
22.1	1,408	Total			

Subcatchment DA-B1: Subcat DA-B1



Summary for Subcatchment DA-B2: Subcat DA-B2

[73] Warning: Peak may fall outside time span

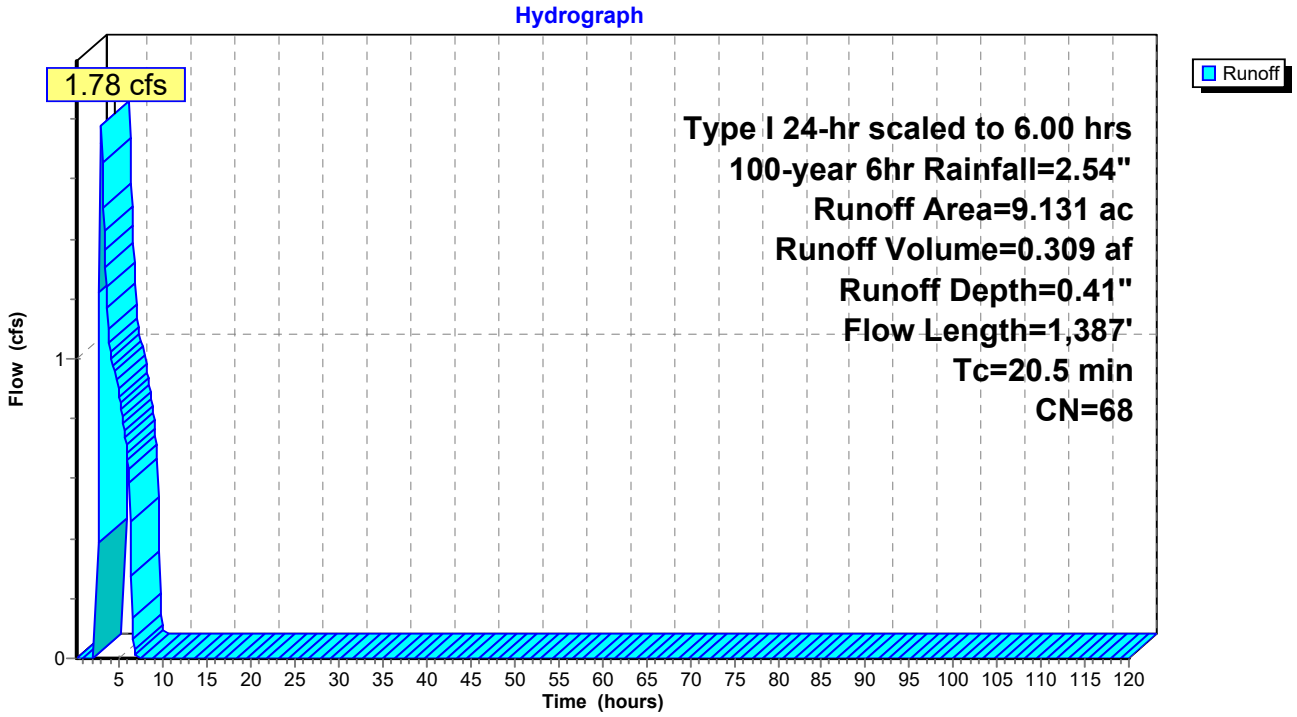
Runoff = 1.78 cfs @ 2.85 hrs, Volume= 0.309 af, Depth= 0.41"
Routed to Pond B2 : B2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Description
	2.467	49	Desert shrub range, Good, HSG A
	3.050	98	Unconnected pavement, HSG A
*	3.614	55	Surrounding Equip. Cover, HSG A
	9.131	68	Weighted Average
	6.081		66.60% Pervious Area
	3.050		33.40% Impervious Area
	3.050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0319	0.18		**Sheet Flow, sheet 2808-2804.81** Range n= 0.130 P2= 1.88"
6.6	792	0.0156	2.01		**Shallow Concentrated Flow, shallow range 2804.81-2802.44** Unpaved Kv= 16.1 fps
0.2	52	0.0050	4.20	7.43	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
2.2	187	0.0080	1.44		**Shallow Concentrated Flow, shallow unpaved 2802-2800.37** Unpaved Kv= 16.1 fps
2.0	256	0.0110	2.13		**Shallow Concentrated Flow, paved 2800.37-2797.53** Paved Kv= 20.3 fps
20.5	1,387	Total			

Subcatchment DA-B2: Subcat DA-B2



Summary for Subcatchment DA-B3: Subcat DA-B3

[49] Hint: Tc<2dt may require smaller dt
[73] Warning: Peak may fall outside time span

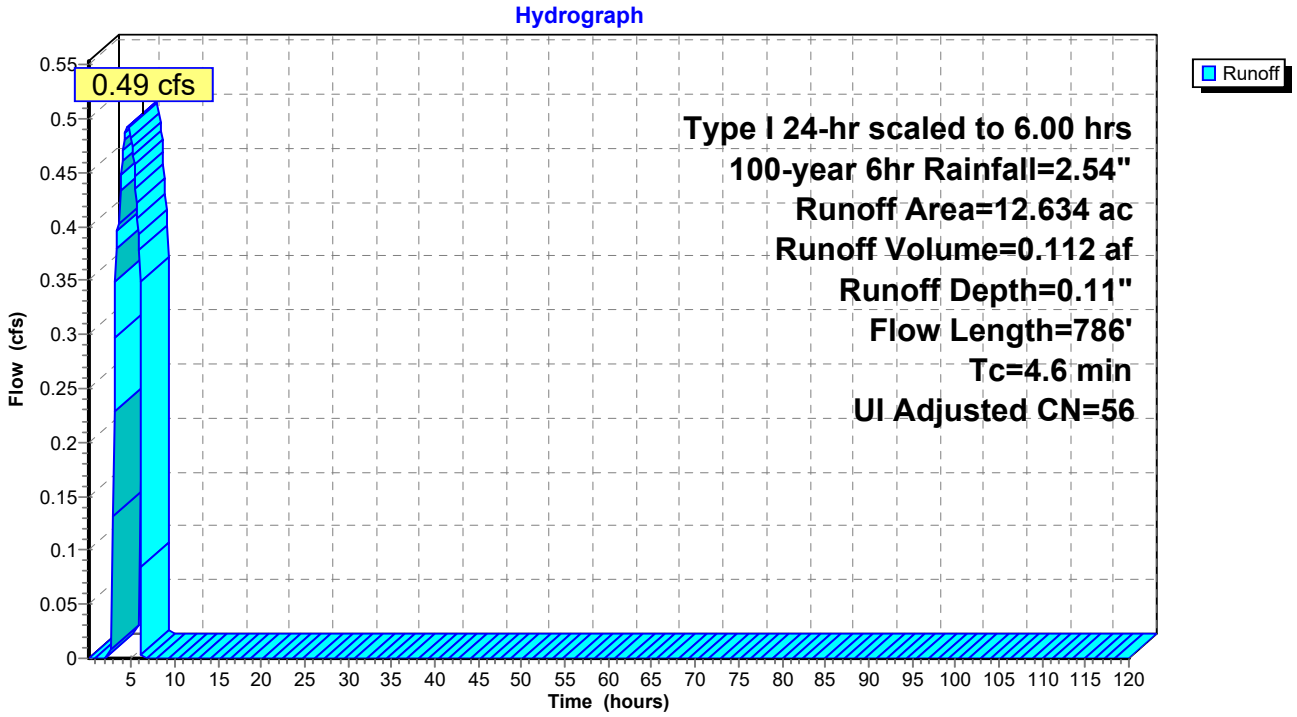
Runoff = 0.49 cfs @ 4.60 hrs, Volume= 0.112 af, Depth= 0.11"
Routed to Pond B3 : B3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Adj	Description
	6.592	49		Desert shrub range, Good, HSG A
	2.763	98		Unconnected pavement, HSG A
*	3.279	55		Surrounding Equip. Cover, HSG A
	12.634	61	56	Weighted Average, UI Adjusted
	9.871			78.13% Pervious Area
	2.763			21.87% Impervious Area
	2.763			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0190	0.81		**Sheet Flow, sheet paved 2799.71-2799.14** Smooth surfaces n= 0.011 P2= 1.88"
1.1	80	0.0340	1.25		**Sheet Flow, sheet unpaved 2799.14-2796.37** Smooth surfaces n= 0.011 P2= 1.88"
1.4	304	0.0480	3.53		**Shallow Concentrated Flow, shallow 2796.37-2781.77** Unpaved Kv= 16.1 fps
0.2	51	0.0075	4.04	72.81	**Channel Flow, channel 2781.77-2781.39** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.1	42	0.0209	8.59	15.19	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.9	193	0.0054	3.43	61.78	**Channel Flow, channel 2780.52-2779.48** Area= 18.0 sf Perim= 15.6' r= 1.15' n= 0.035 Riprap, 6-inch
0.3	86	0.0054	4.37	7.72	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
4.6	786	Total			

Subcatchment DA-B3: Subcat DA-B3



Summary for Subcatchment DA-C1: Subcat DA-C1

[73] Warning: Peak may fall outside time span

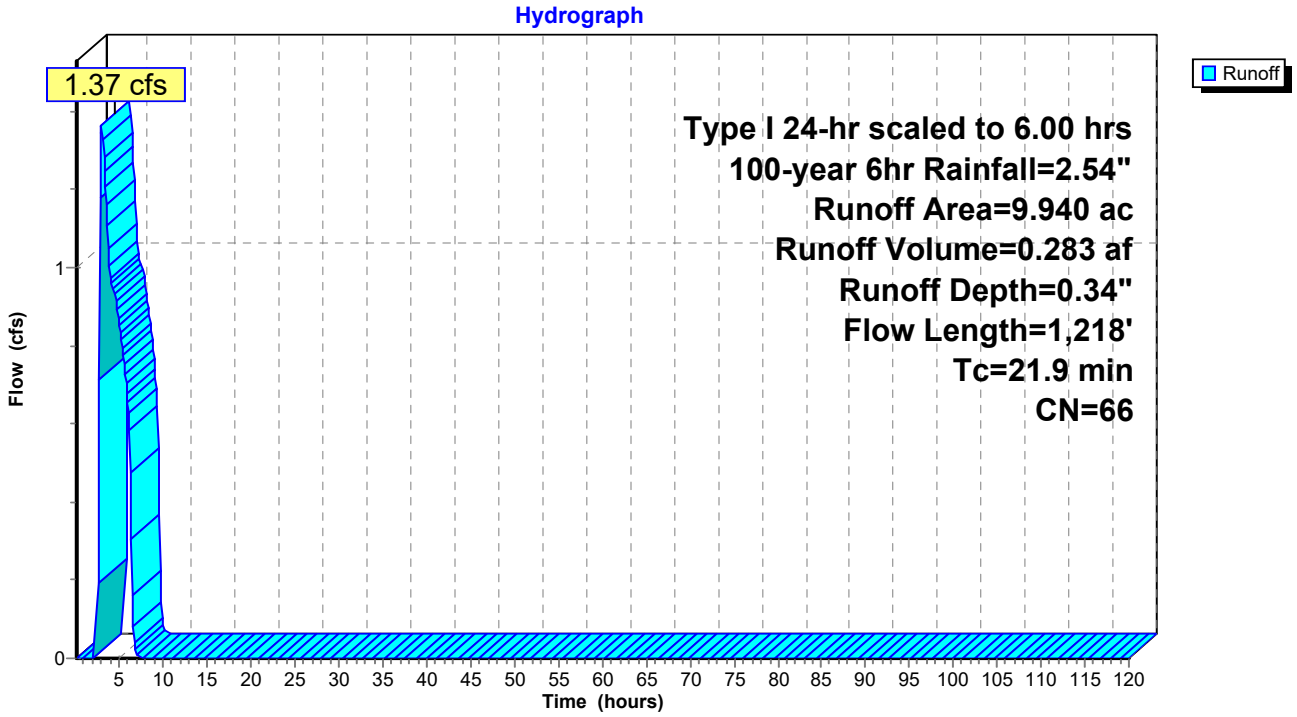
Runoff = 1.37 cfs @ 2.95 hrs, Volume= 0.283 af, Depth= 0.34"
Routed to Pond C1 : C1 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Description
	3.160	49	Desert shrub range, Good, HSG A
	3.020	98	Unconnected pavement, HSG A
*	3.760	55	Surrounding Equip. Cover, HSG A
	9.940	66	Weighted Average
	6.920		69.62% Pervious Area
	3.020		30.38% Impervious Area
	3.020		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	58	0.0030	0.06		**Sheet Flow, Sheet 2813.48-2813.30** Range n= 0.130 P2= 1.88"
0.8	42	0.0205	0.90		**Sheet Flow, Sheet paved 2813.30-2812.44** Smooth surfaces n= 0.011 P2= 1.88"
3.1	450	0.0226	2.42		**Shallow Concentrated Flow, shallow 2812.44-2802.24** Unpaved Kv= 16.1 fps
0.4	152	0.0120	7.08	70.78	**Channel Flow, ditch 2802.24-2800.41** Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.023
0.2	102	0.0356	11.22	19.82	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.8	183	0.0050	3.78	83.06	**Channel Flow, channel 2796.77-2795.91** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035 Riprap, 6-inch
0.2	64	0.0064	5.62	9.93	**Pipe Channel, Culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.7	167	0.0050	3.78	83.06	**Channel Flow, channel 2795.50-2794.65** Area= 22.0 sf Perim= 15.6' r= 1.41' n= 0.035
21.9	1,218	Total			

Subcatchment DA-C1: Subcat DA-C1



Summary for Subcatchment DA-C2: Subcat DA-C2

[73] Warning: Peak may fall outside time span

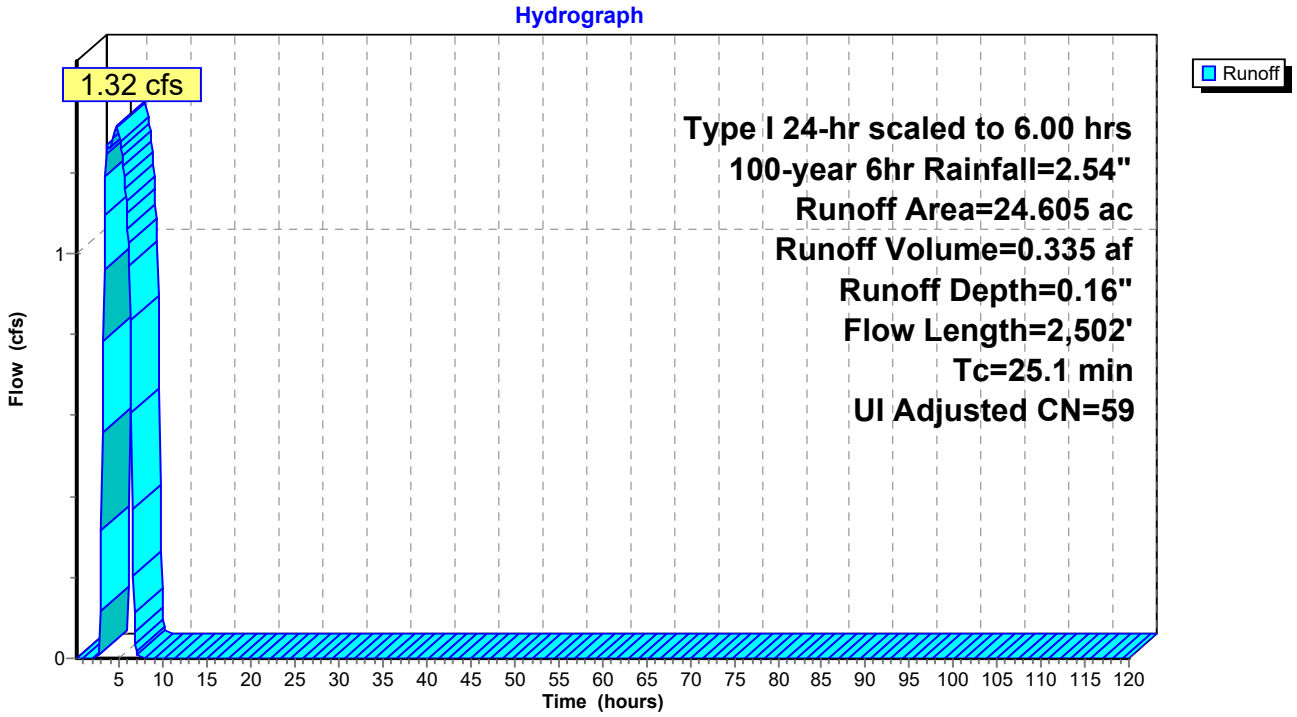
Runoff = 1.32 cfs @ 4.63 hrs, Volume= 0.335 af, Depth= 0.16"
Routed to Pond C2 : C2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Adj	Description
	6.655	49		Desert shrub range, Good, HSG A
	6.930	98		Unconnected pavement, HSG A
*	11.020	55		Surrounding Equip. Cover, HSG A
	24.605	65	59	Weighted Average, UI Adjusted
	17.675			71.83% Pervious Area
	6.930			28.17% Impervious Area
	6.930			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0153	0.13		**Sheet Flow, Sheet Flow 2811-2809.47** Range n= 0.130 P2= 1.88"
9.8	1,280	0.0182	2.17		**Shallow Concentrated Flow, Shallow 2809.47-2786.17** Unpaved Kv= 16.1 fps
2.6	1,122	0.0175	7.21	230.73	**Channel Flow, channel 2787.62-2768** Area= 32.0 sf Perim= 22.0' r= 1.45' n= 0.035 Riprap, 6-inch
25.1	2,502	Total			

Subcatchment DA-C2: Subcat DA-C2



Summary for Subcatchment DA-C3: Subcat DA-C3

[73] Warning: Peak may fall outside time span

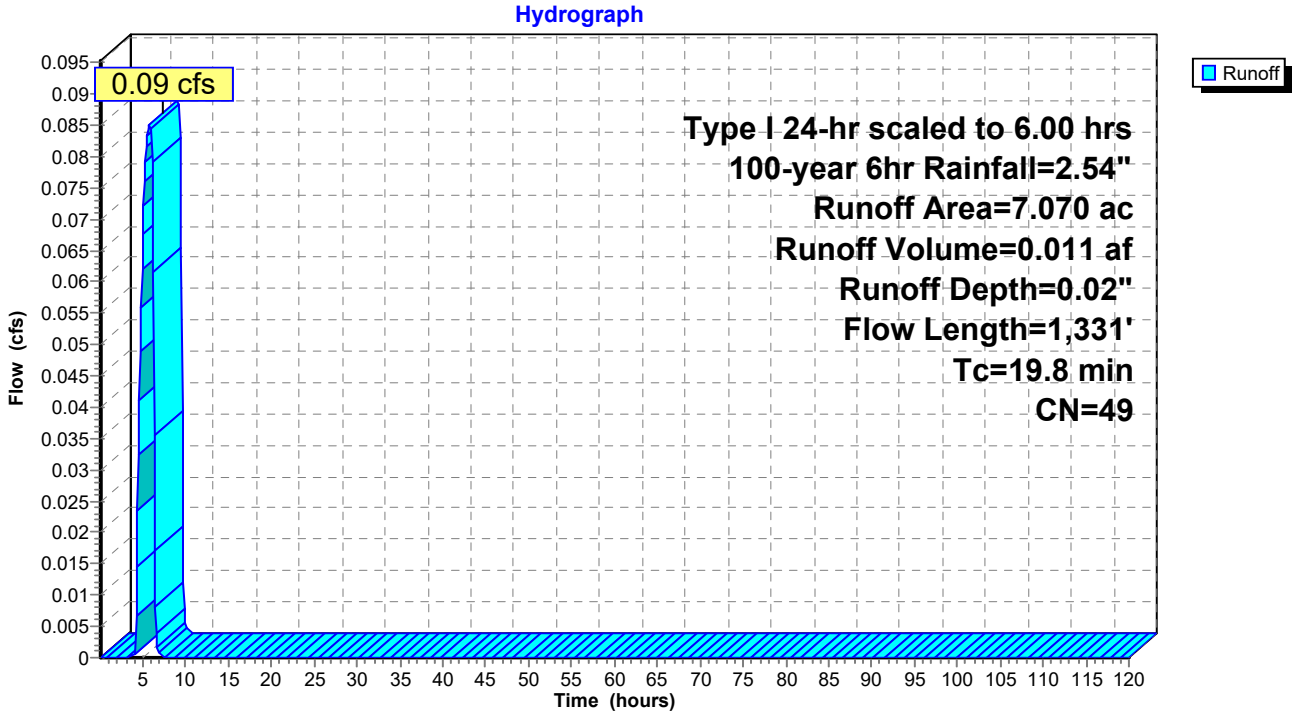
Runoff = 0.09 cfs @ 5.74 hrs, Volume= 0.011 af, Depth= 0.02"
Routed to Link C : DP C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Description
7.070	49	Desert shrub range, Good, HSG A
0.000	98	Unconnected pavement, HSG A
7.070	49	Weighted Average
7.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0224	0.15		**Sheet Flow, sheet 2785.88-2783.64** Range n= 0.130 P2= 1.88"
8.9	1,231	0.0205	2.31		**Shallow Concentrated Flow, shallow unpaved 2786.64-2761.34** Unpaved Kv= 16.1 fps
19.8	1,331	Total			

Subcatchment DA-C3: Subcat DA-C3



Summary for Subcatchment DA-D1: Subcat DA-D1

[73] Warning: Peak may fall outside time span

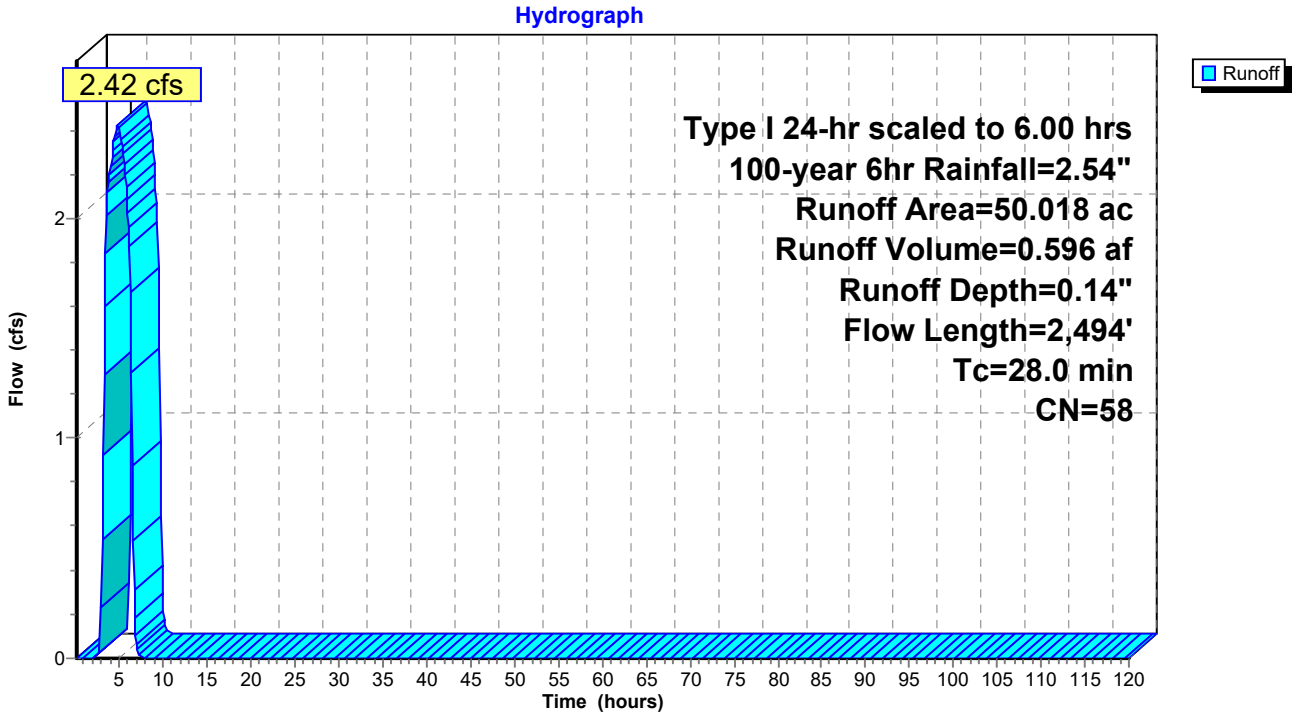
Runoff = 2.42 cfs @ 4.77 hrs, Volume= 0.596 af, Depth= 0.14"
Routed to Link D : DP D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

Area (ac)	CN	Description
27.134	49	Desert shrub range, Good, HSG A
20.822	68	Desert shrub range, Good, HSG B
1.078	72	Dirt roads, HSG A
0.264	82	Dirt roads, HSG B
0.400	98	Unconnected pavement, HSG A
0.320	98	Unconnected pavement, HSG B
50.018	58	Weighted Average
49.298		98.56% Pervious Area
0.720		1.44% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0270	0.16		**Sheet Flow, sheet 2810.70-2808** Range n= 0.130 P2= 1.88"
7.2	1,058	0.0230	2.44		**Shallow Concentrated Flow, shallow 2808-2783.46** Unpaved Kv= 16.1 fps
0.2	57	0.0080	5.32	9.40	**Pipe Channel, culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
10.5	1,279	0.0160	2.04		**Shallow Concentrated Flow, shallow 2783-2761** Unpaved Kv= 16.1 fps
28.0	2,494	Total			

Subcatchment DA-D1: Subcat DA-D1



Summary for Subcatchment DA-D2: Subcat DA-D2

[73] Warning: Peak may fall outside time span

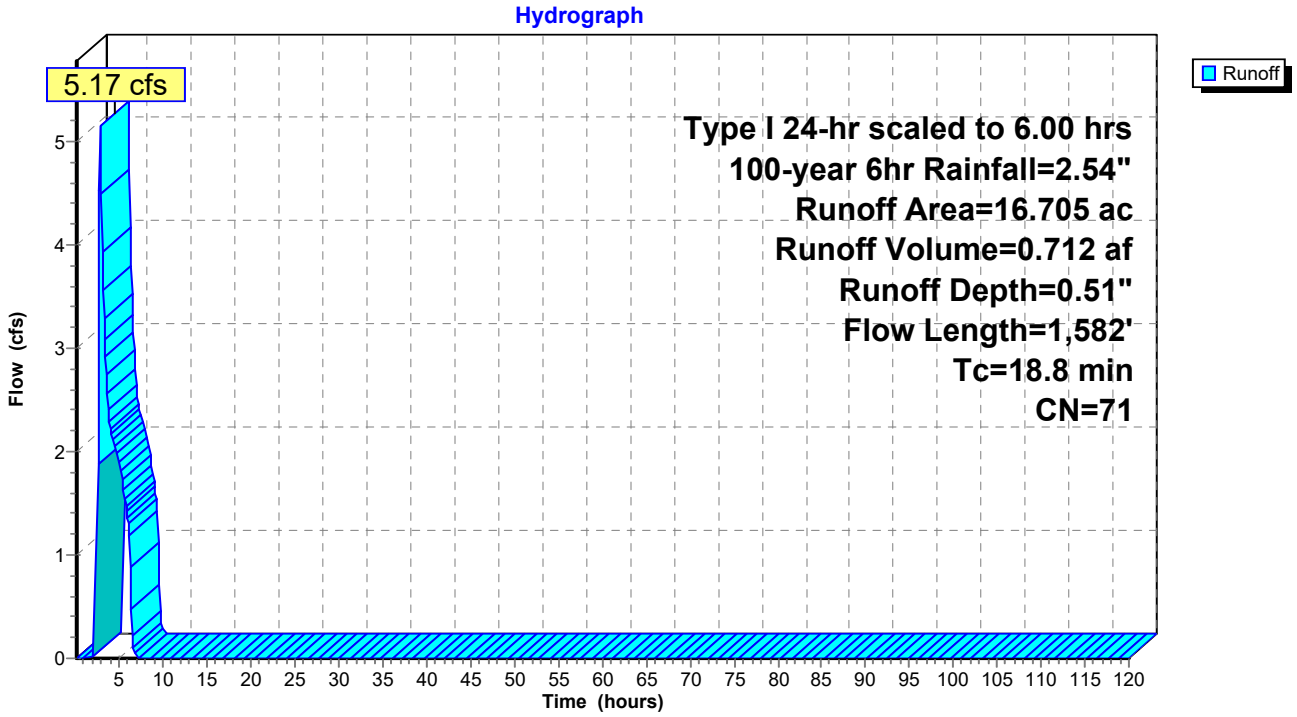
Runoff = 5.17 cfs @ 2.80 hrs, Volume= 0.712 af, Depth= 0.51"
Routed to Pond D2 : D2 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Description
	1.577	49	Desert shrub range, Good, HSG A
	5.763	98	Unconnected pavement, HSG A
	0.845	98	Unconnected pavement, HSG B
*	8.520	55	Surrounding Equip. Cover, HSG A
	16.705	71	Weighted Average
	10.097		60.44% Pervious Area
	6.608		39.56% Impervious Area
	6.608		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	57	0.0520	0.19		**Sheet Flow, sheet 2800-2797** Range n= 0.130 P2= 1.88"
13.8	1,525	0.0130	1.84		**Shallow Concentrated Flow, shallow 2797-2777.25** Unpaved Kv= 16.1 fps
18.8	1,582	Total			

Subcatchment DA-D2: Subcat DA-D2



Summary for Subcatchment DA-D3: Subcat DA-D3

[49] Hint: Tc<2dt may require smaller dt
[73] Warning: Peak may fall outside time span

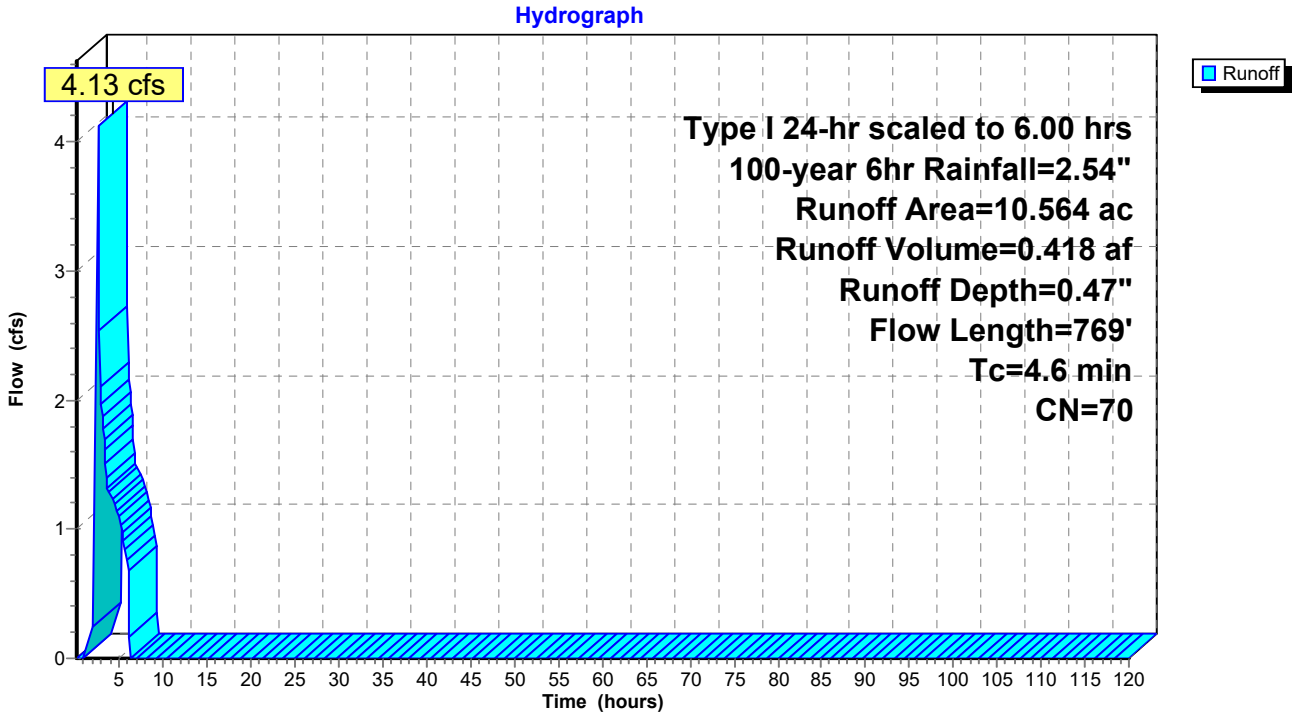
Runoff = 4.13 cfs @ 2.59 hrs, Volume= 0.418 af, Depth= 0.47"
Routed to Pond D3 : D3 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Description
	1.397	49	Desert shrub range, Good, HSG A
	3.917	98	Unconnected pavement, HSG A
*	5.250	55	Surrounding Equip. Cover, HSG A
	10.564	70	Weighted Average
	6.647		62.92% Pervious Area
	3.917		37.08% Impervious Area
	3.917		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0500	1.52		**Sheet Flow, Sheet 2819-2814** Smooth surfaces n= 0.011 P2= 1.88"
3.4	626	0.0360	3.05		**Shallow Concentrated Flow, shallow 2814-2791.5** Unpaved Kv= 16.1 fps
0.1	43	0.0340	11.87	20.98	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
4.6	769	Total			

Subcatchment DA-D3: Subcat DA-D3



Summary for Subcatchment DA-D4: Subcat DA-D4

[73] Warning: Peak may fall outside time span

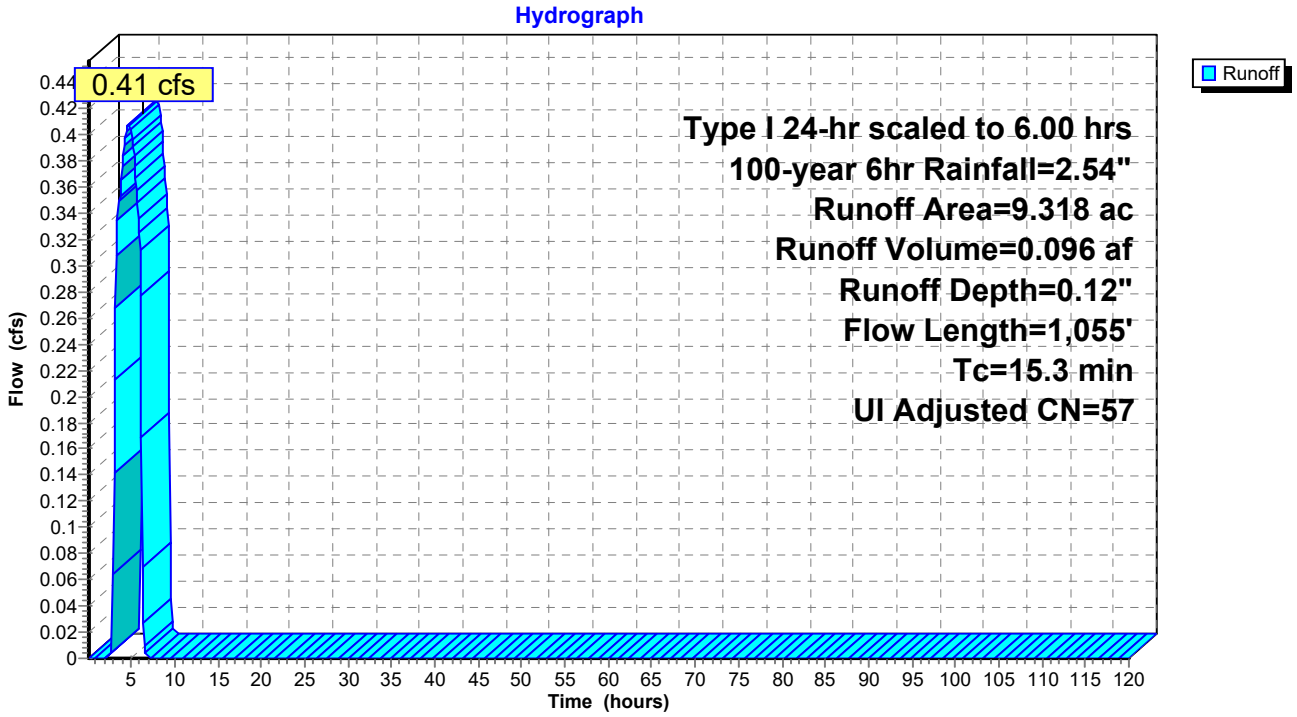
Runoff = 0.41 cfs @ 4.67 hrs, Volume= 0.096 af, Depth= 0.12"
Routed to Pond D4 : D4 Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Type I 24-hr scaled to 6.00 hrs 100-year 6hr Rainfall=2.54"

	Area (ac)	CN	Adj	Description
	3.543	49		Desert shrub range, Good, HSG A
	0.004	72		Dirt roads, HSG A
	1.871	98		Unconnected pavement, HSG A
*	3.900	55		Surrounding Equip. Cover, HSG A
	9.318	61	57	Weighted Average, UI Adjusted
	7.447			79.92% Pervious Area
	1.871			20.08% Impervious Area
	1.871			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		**Sheet Flow, sheet 2817-2814** Range n= 0.130 P2= 1.88"
5.6	955	0.0314	2.85		**Shallow Concentrated Flow, shallow 2814-2784** Unpaved Kv= 16.1 fps
15.3	1,055	Total			

Subcatchment DA-D4: Subcat DA-D4



Summary for Reach 3R: Culvert Crossing

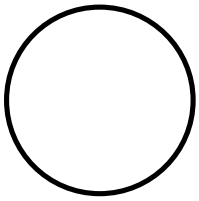
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.00" for 100-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Link D : DP D

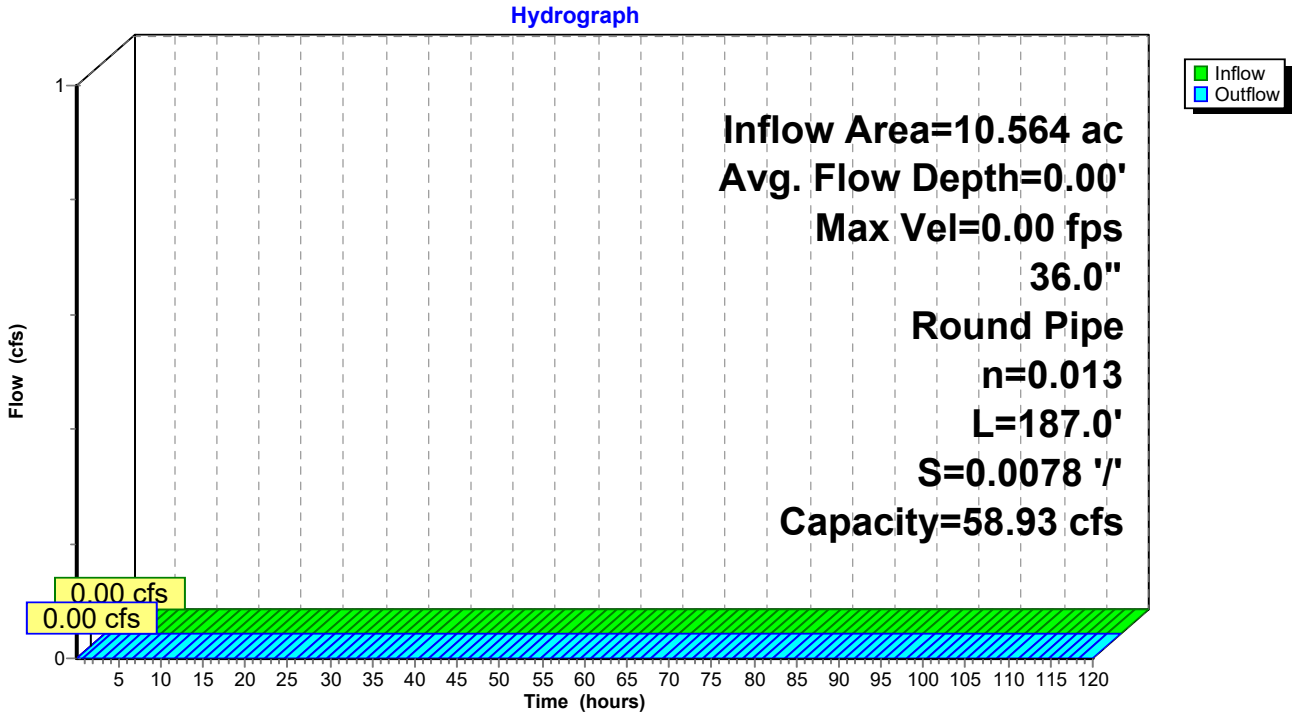
Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 58.93 cfs

36.0" Round Pipe
n= 0.013
Length= 187.0' Slope= 0.0078 '/'
Inlet Invert= 2,783.46', Outlet Invert= 2,782.00'



Reach 3R: Culvert Crossing



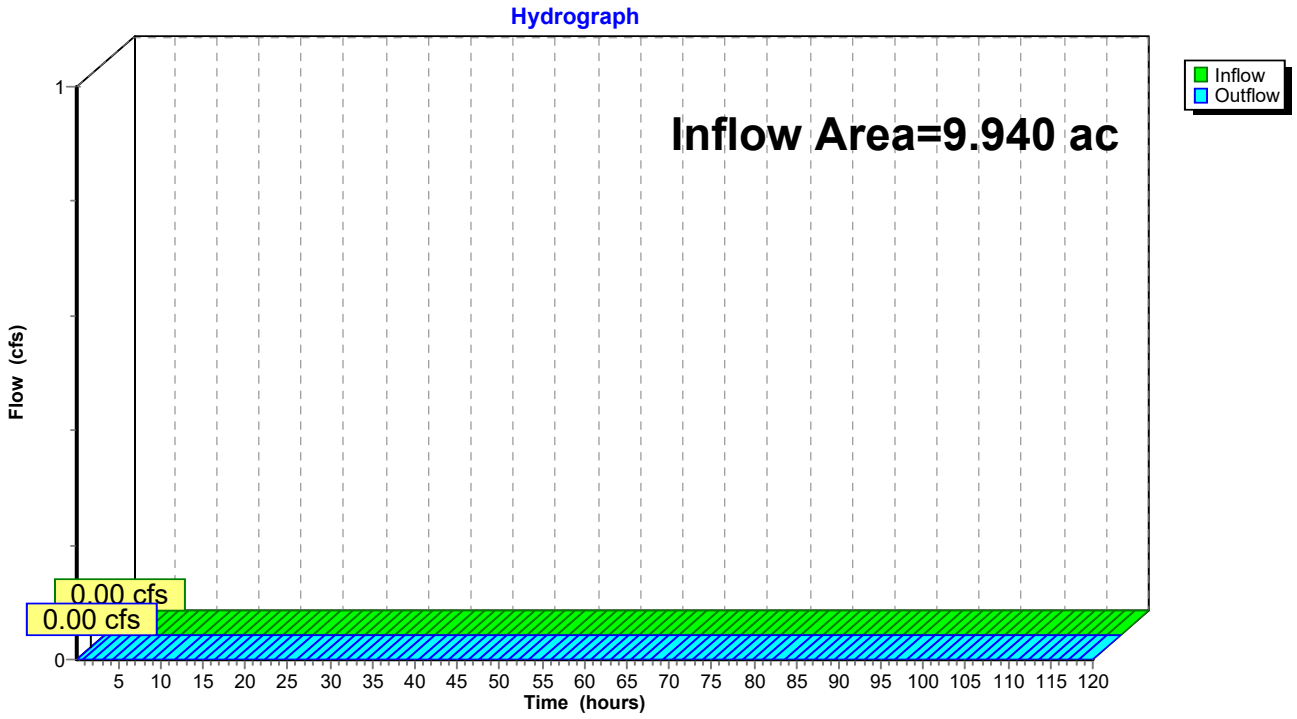
Summary for Reach 4R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.00" for 100-year 6hr event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond C2 : C2 Pond

Routing by Stor-Ind+Trans method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Reach 4R: (new Reach)



Summary for Pond A1: A1 Pond

Inflow Area = 5.149 ac, 12.33% Impervious, Inflow Depth = 0.07" for 100-year 6hr event
Inflow = 0.16 cfs @ 5.04 hrs, Volume= 0.032 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link A : DP A

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,785.88' @ 7.20 hrs Surf.Area= 0.043 ac Storage= 0.032 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

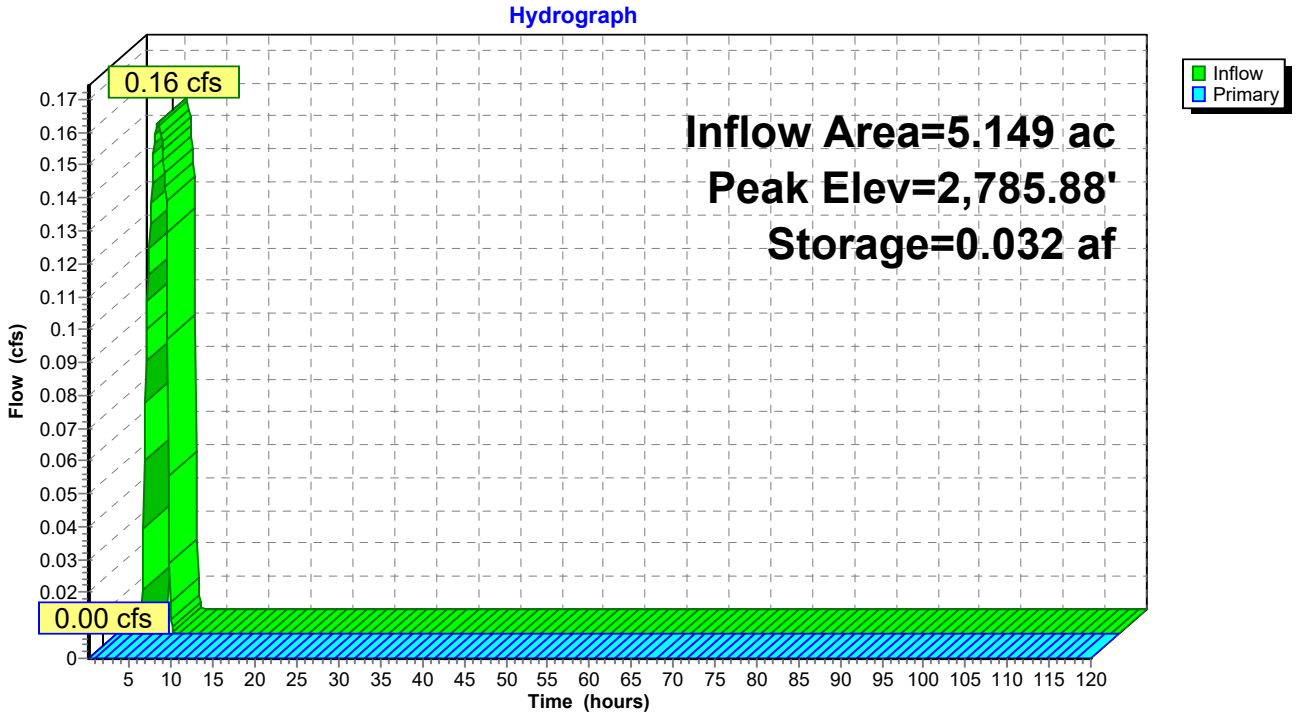
Volume	Invert	Avail.Storage	Storage Description
#1	2,785.00'	0.162 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,785.00	0.030	0.000	0.000
2,786.00	0.045	0.037	0.037
2,787.00	0.061	0.053	0.090
2,788.00	0.081	0.071	0.162

Device	Routing	Invert	Outlet Devices
#1	Primary	2,787.50'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,785.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond A1: A1 Pond



Summary for Pond B2: B2 Pond

Inflow Area = 9.131 ac, 33.40% Impervious, Inflow Depth = 0.41" for 100-year 6hr event
Inflow = 1.78 cfs @ 2.85 hrs, Volume= 0.309 af
Outflow = 0.62 cfs @ 6.02 hrs, Volume= 0.142 af, Atten= 65%, Lag= 190.1 min
Primary = 0.62 cfs @ 6.02 hrs, Volume= 0.142 af
Routed to Pond B3 : B3 Pond

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,794.85' @ 6.02 hrs Surf.Area= 0.202 ac Storage= 0.240 af

Plug-Flow detention time= 281.0 min calculated for 0.141 af (46% of inflow)
Center-of-Mass det. time= 226.0 min (476.0 - 250.1)

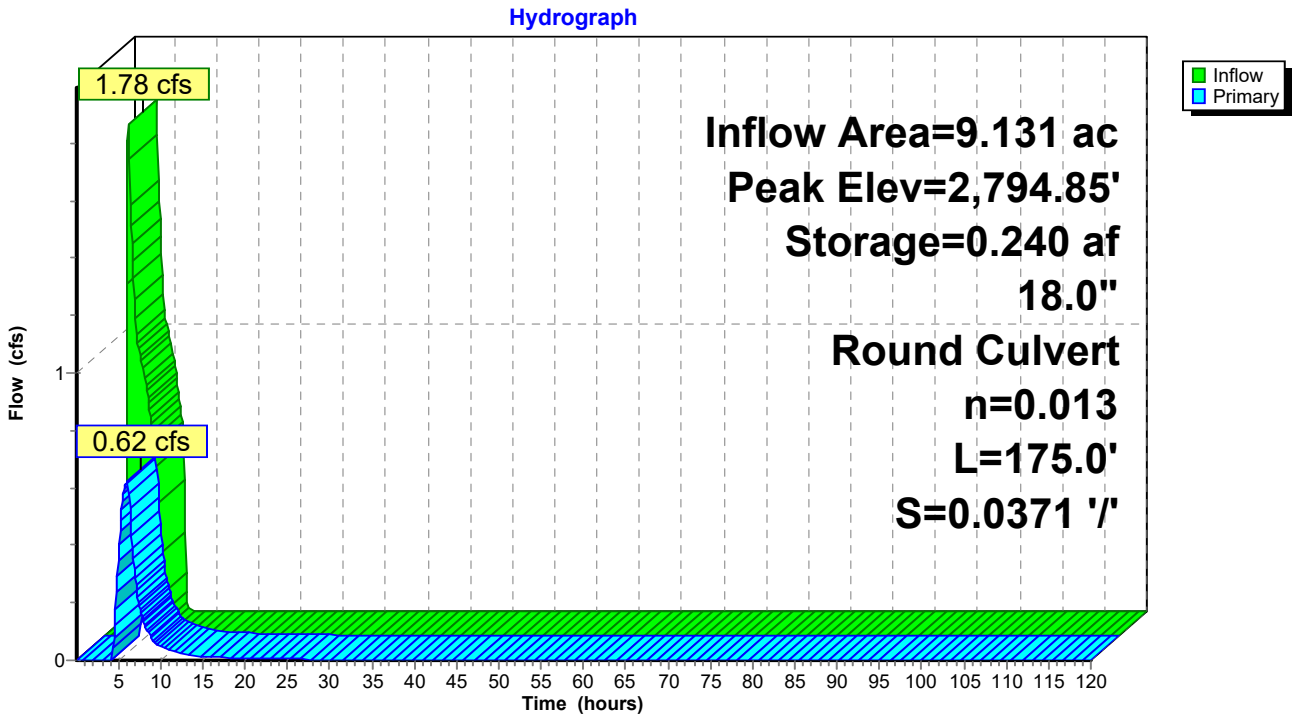
Volume	Invert	Avail.Storage	Storage Description
#1	2,793.50'	1.283 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,793.50	0.147	0.000	0.000
2,794.50	0.187	0.167	0.167
2,795.50	0.231	0.209	0.376
2,796.50	0.277	0.254	0.630
2,797.50	0.326	0.301	0.931
2,798.50	0.377	0.351	1.283

Device	Routing	Invert	Outlet Devices
#1	Primary	2,794.50'	**18.0" Round Culvert** L= 175.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,794.50' / 2,788.00' S= 0.0371 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.62 cfs @ 6.02 hrs HW=2,794.85' (Free Discharge)
1=Culvert (Inlet Controls 0.62 cfs @ 2.01 fps)

Pond B2: B2 Pond



Summary for Pond B3: B3 Pond

Inflow Area = 21.765 ac, 26.71% Impervious, Inflow Depth = 0.14" for 100-year 6hr event
Inflow = 1.01 cfs @ 5.71 hrs, Volume= 0.253 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link B : DP B

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,778.91' @ 120.00 hrs Surf.Area= 0.616 ac Storage= 0.253 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

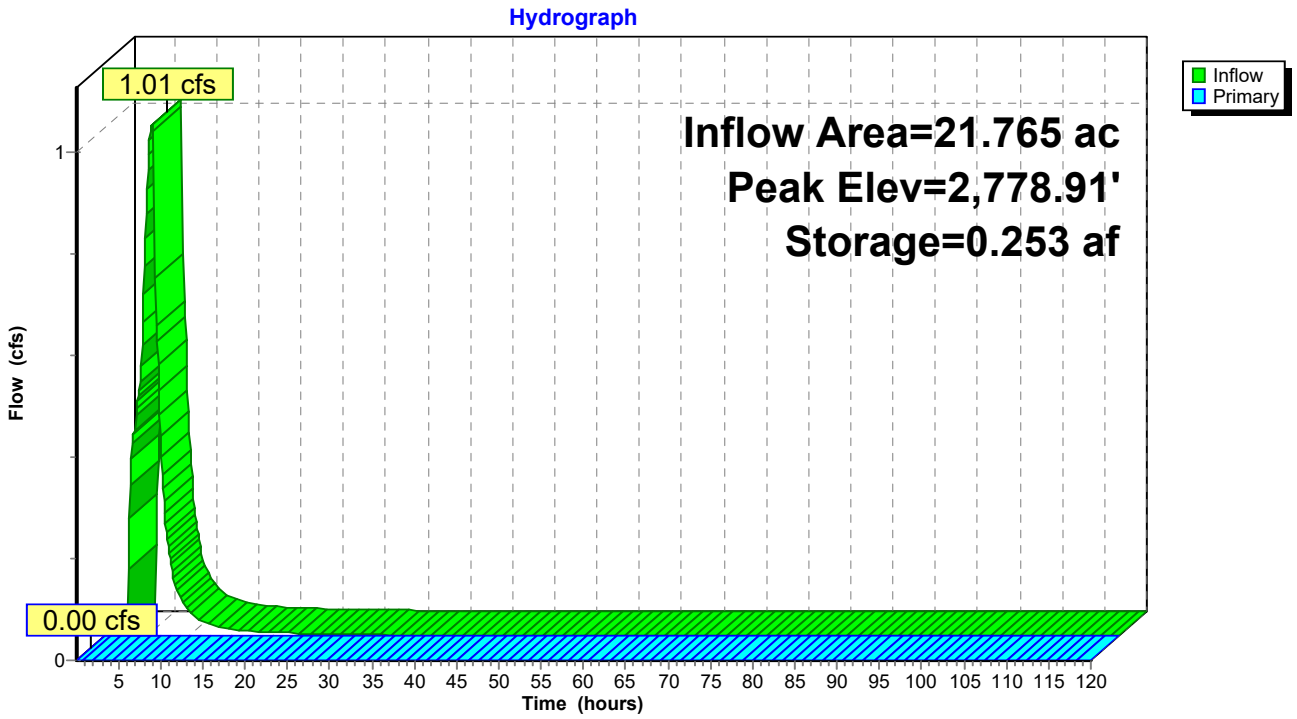
Volume	Invert	Avail.Storage	Storage Description
#1	2,778.50'	2.054 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,778.50	0.591	0.000	0.000
2,779.50	0.652	0.621	0.621
2,780.50	0.716	0.684	1.305
2,781.50	0.781	0.748	2.054

Device	Routing	Invert	Outlet Devices
#1	Primary	2,779.00'	**18.0" Round Culvert** L= 93.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.00' / 2,778.50' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,779.67'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,778.50' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond B3: B3 Pond



Summary for Pond C1: C1 Pond

Inflow Area = 9.940 ac, 30.38% Impervious, Inflow Depth = 0.34" for 100-year 6hr event
Inflow = 1.37 cfs @ 2.95 hrs, Volume= 0.283 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 4R : (new Reach)

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,791.74' @ 7.40 hrs Surf.Area= 0.399 ac Storage= 0.283 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

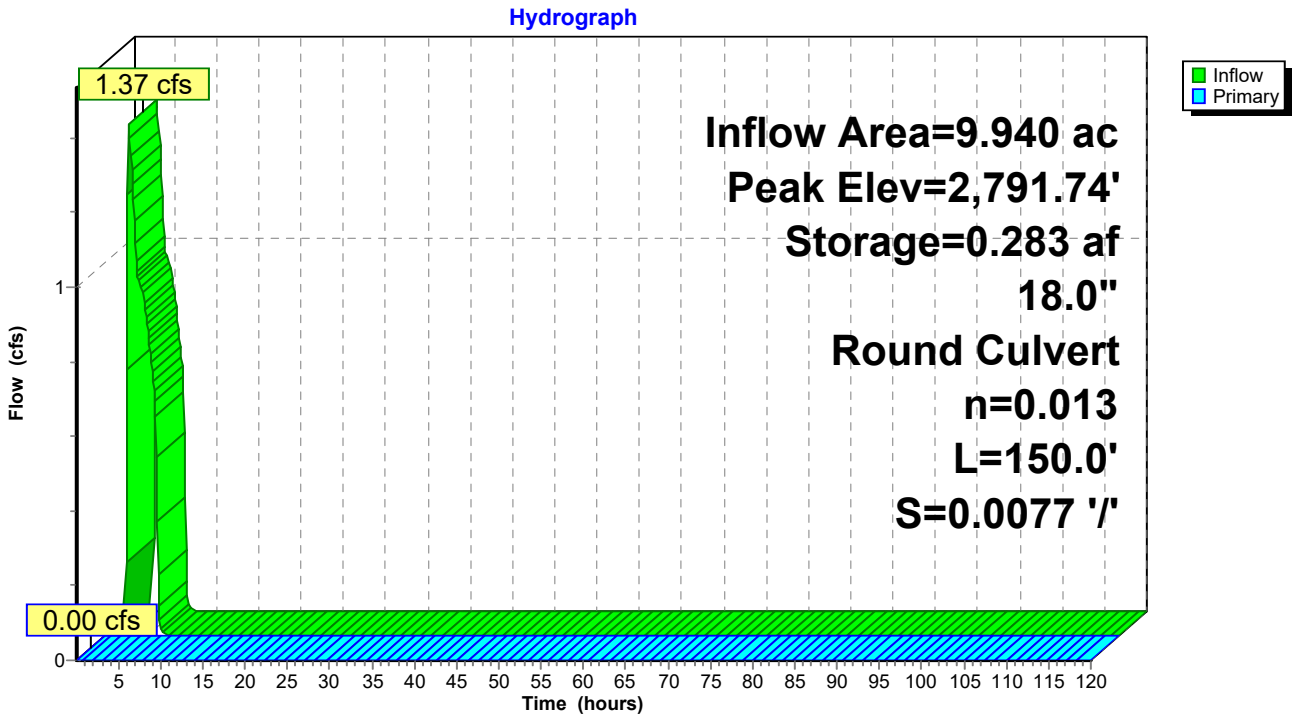
Volume	Invert	Avail.Storage	Storage Description
#1	2,791.00'	1.912 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,791.00	0.363	0.000	0.000
2,792.00	0.411	0.387	0.387
2,793.00	0.461	0.436	0.823
2,794.00	0.514	0.487	1.311
2,795.00	0.570	0.542	1.853
2,795.10	0.627	0.060	1.912

Device	Routing	Invert	Outlet Devices
#1	Primary	2,792.00'	**18.0" Round Culvert** L= 150.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,792.00' / 2,790.84' S= 0.0077 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,791.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond C1: C1 Pond



Summary for Pond C2: C2 Pond

Inflow Area = 34.545 ac, 28.80% Impervious, Inflow Depth = 0.12" for 100-year 6hr event
Inflow = 1.32 cfs @ 4.63 hrs, Volume= 0.335 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link C : DP C

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,765.57' @ 7.50 hrs Surf.Area= 0.622 ac Storage= 0.335 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

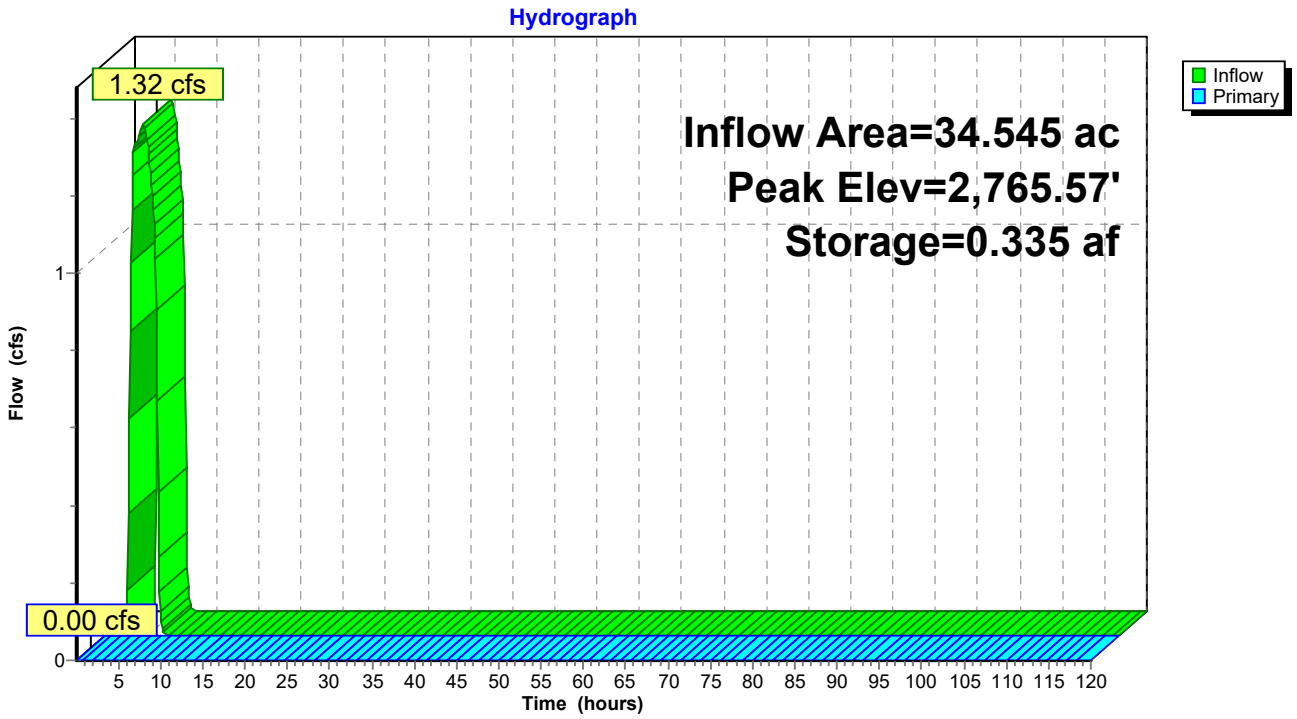
Volume	Invert	Avail.Storage	Storage Description
#1	2,765.00'	4.496 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,765.00	0.543	0.000	0.000
2,766.00	0.680	0.612	0.612
2,767.00	0.866	0.773	1.385
2,768.00	0.978	0.922	2.307
2,769.00	1.094	1.036	3.343
2,770.00	1.212	1.153	4.496

Device	Routing	Invert	Outlet Devices
#1	Primary	2,765.00'	**18.0" Round Culvert** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,765.00' / 2,764.37' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	2,766.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,769.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,765.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond C2: C2 Pond



Summary for Pond D2: D2 Pond

Inflow Area = 16.705 ac, 39.56% Impervious, Inflow Depth = 0.51" for 100-year 6hr event
Inflow = 5.17 cfs @ 2.80 hrs, Volume= 0.712 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,774.17' @ 7.20 hrs Surf.Area= 0.647 ac Storage= 0.712 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

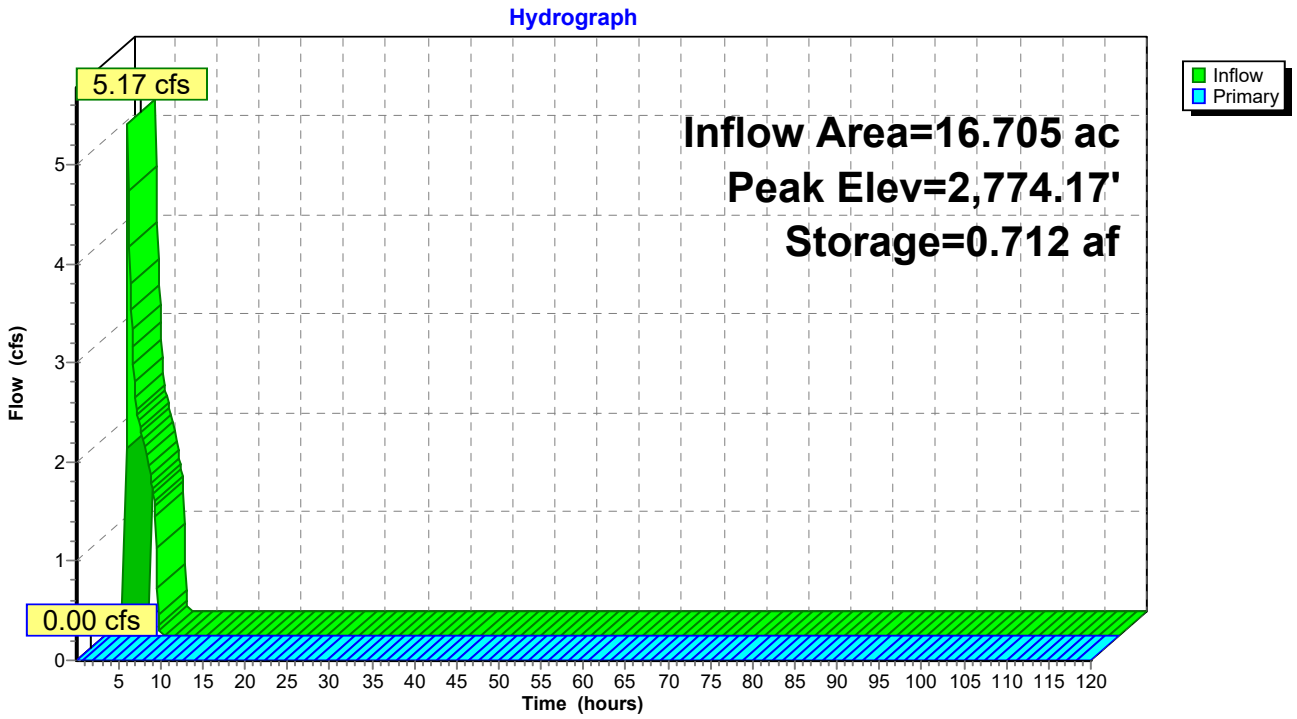
Volume	Invert	Avail.Storage	Storage Description
#1	2,773.00'	3.691 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,773.00	0.571	0.000	0.000
2,773.75	0.620	0.447	0.447
2,774.00	0.636	0.157	0.604
2,775.00	0.703	0.670	1.273
2,776.00	0.771	0.737	2.010
2,777.00	0.840	0.806	2.816
2,778.00	0.910	0.875	3.691

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,774.50'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,774.50' / 2,773.50' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,776.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,773.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D2: D2 Pond



Summary for Pond D3: D3 Pond

Inflow Area = 10.564 ac, 37.08% Impervious, Inflow Depth = 0.47" for 100-year 6hr event
Inflow = 4.13 cfs @ 2.59 hrs, Volume= 0.418 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Reach 3R : Culvert Crossing

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,786.35' @ 6.40 hrs Surf.Area= 0.242 ac Storage= 0.418 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

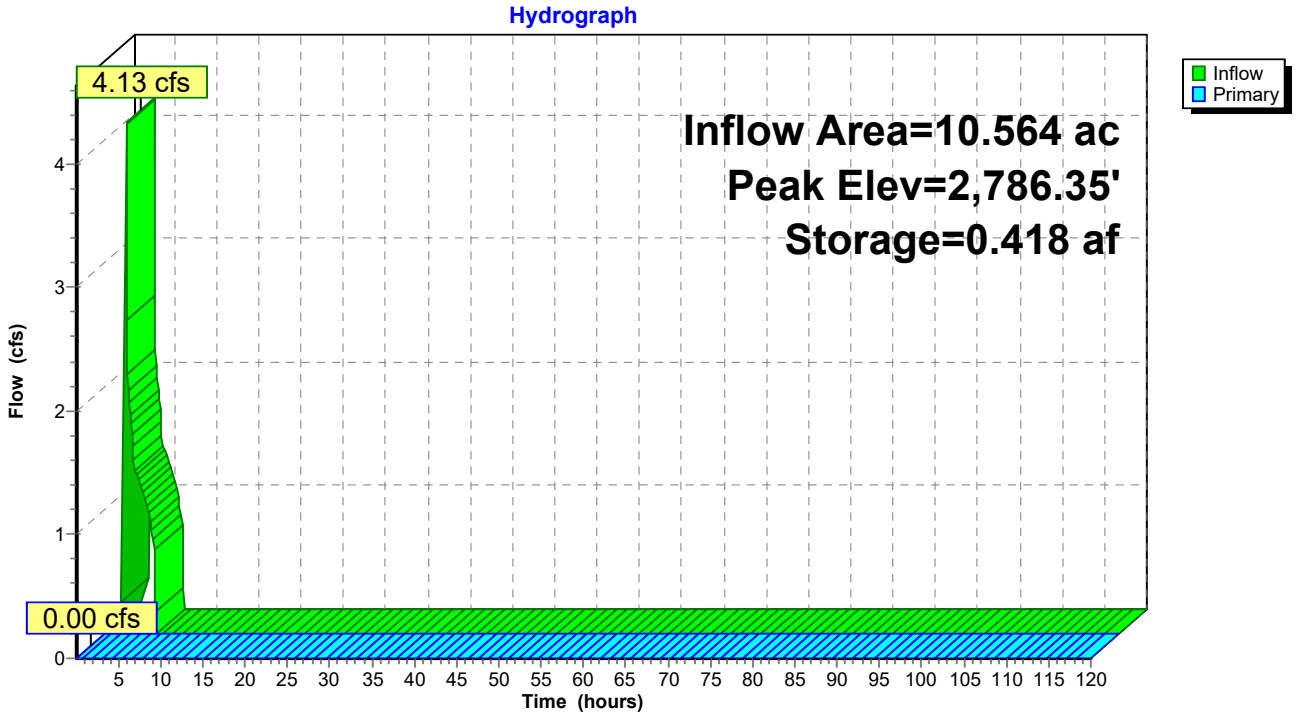
Volume	Invert	Avail.Storage	Storage Description
#1	2,784.00'	2.083 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,784.00	0.116	0.000	0.000
2,785.00	0.168	0.142	0.142
2,786.00	0.221	0.194	0.336
2,787.00	0.282	0.251	0.588
2,788.00	0.327	0.304	0.893
2,789.00	0.373	0.350	1.243
2,790.00	0.420	0.397	1.639
2,791.00	0.469	0.445	2.083

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,788.00'	**18.0" Round Culvert** L= 81.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,788.00' / 2,786.00' S= 0.0247 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	2,789.00'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,784.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D3: D3 Pond



Summary for Pond D4: D4 Pond

Inflow Area = 9.318 ac, 20.08% Impervious, Inflow Depth = 0.12" for 100-year 6hr event
Inflow = 0.41 cfs @ 4.67 hrs, Volume= 0.096 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Routed to Link D : DP D

Routing by Stor-Ind method, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs
Peak Elev= 2,779.50' @ 7.00 hrs Surf.Area= 0.203 ac Storage= 0.096 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

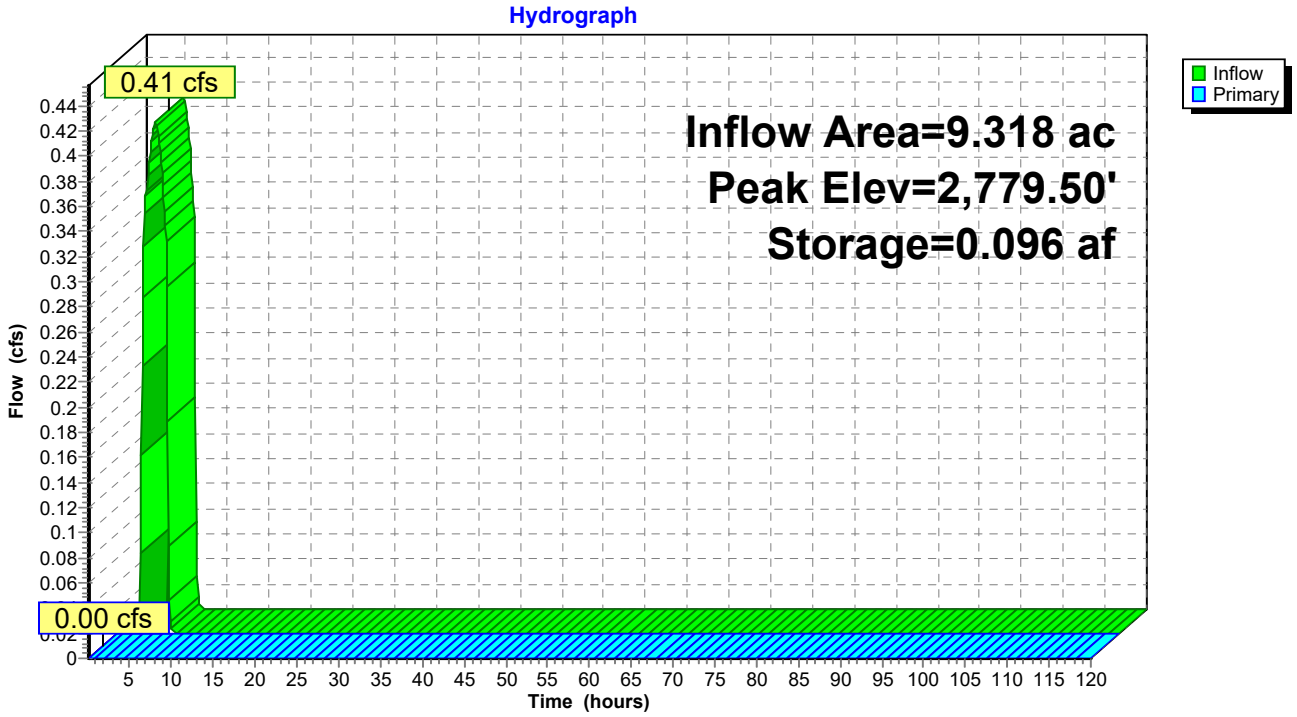
Volume	Invert	Avail.Storage	Storage Description
#1	2,779.00'	1.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
2,779.00	0.186	0.000	0.000
2,780.00	0.220	0.203	0.203
2,781.00	0.255	0.237	0.440
2,782.00	0.293	0.274	0.715
2,783.00	0.331	0.312	1.027

Device	Routing	Invert	Outlet Devices
#1	Device 2	2,779.23'	**12.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,779.23' / 2,778.57' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Primary	2,781.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=2,779.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond D4: D4 Pond

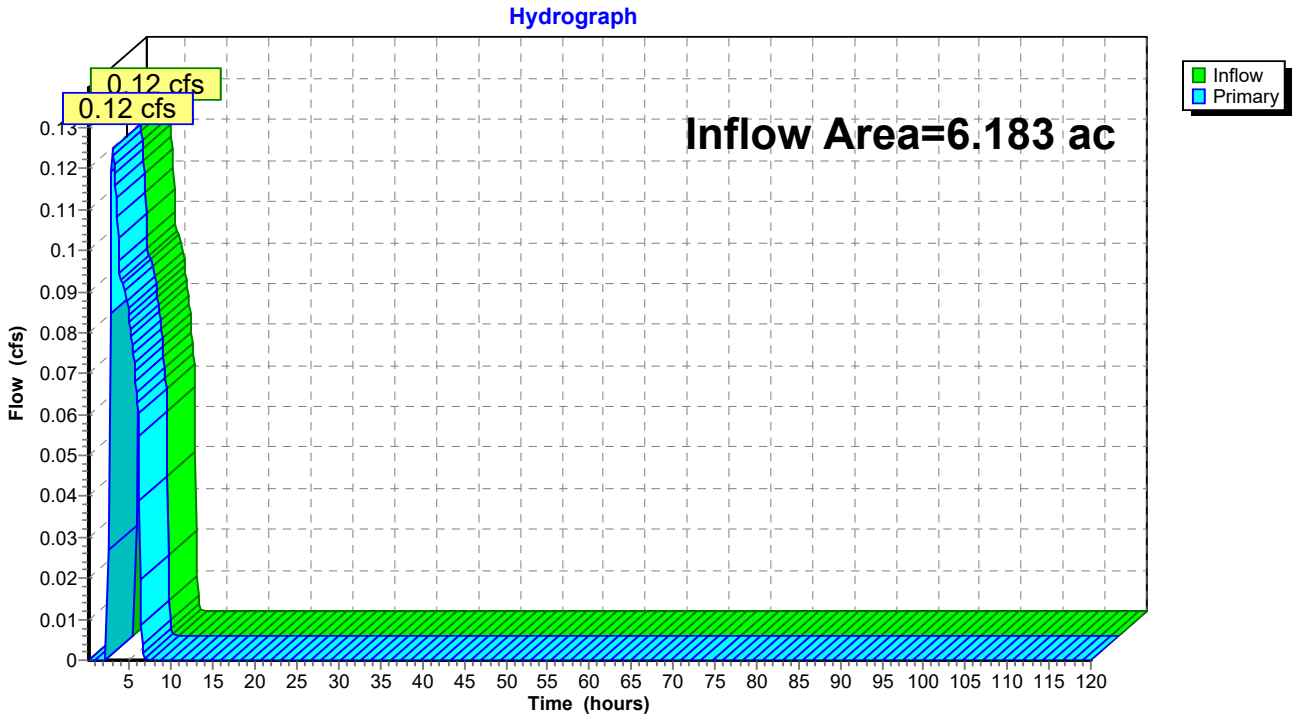


Summary for Link A: DP A

Inflow Area = 6.183 ac, 15.79% Impervious, Inflow Depth = 0.05" for 100-year 6hr event
Inflow = 0.12 cfs @ 2.93 hrs, Volume= 0.027 af
Primary = 0.12 cfs @ 2.93 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link A: DP A

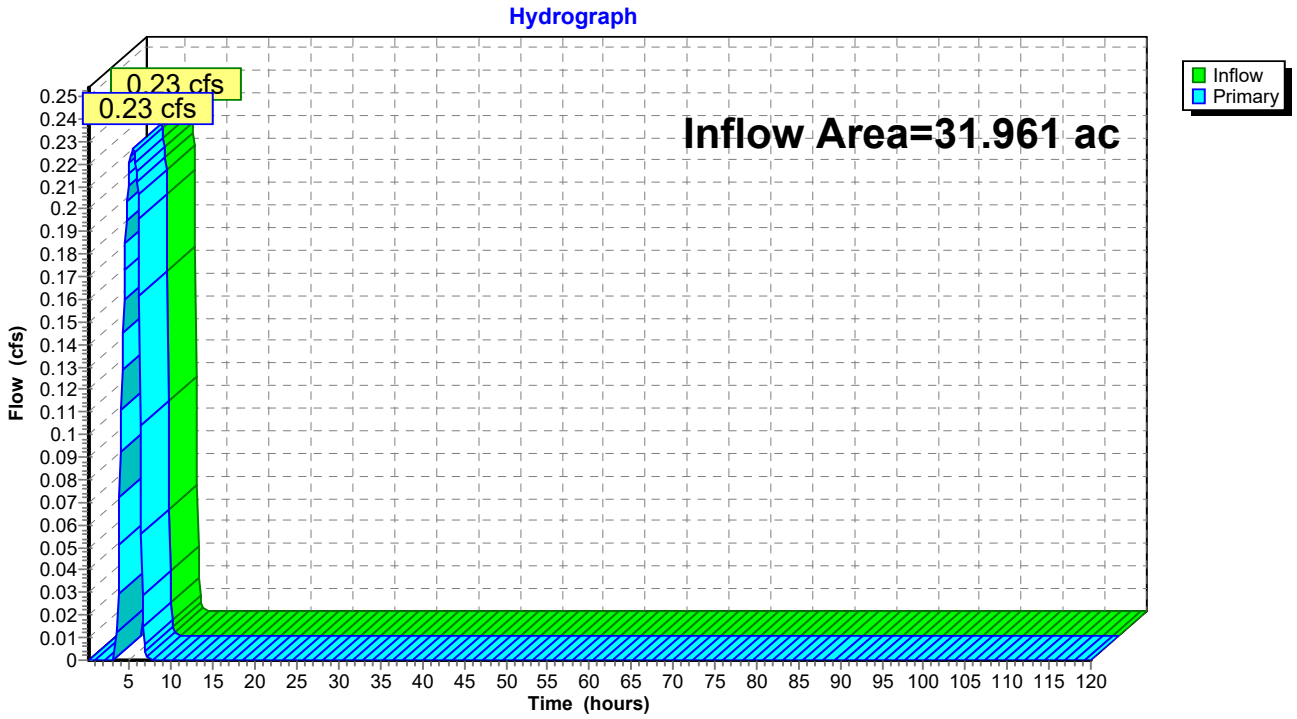


Summary for Link B: DP B

Inflow Area = 31.961 ac, 21.59% Impervious, Inflow Depth = 0.02" for 100-year 6hr event
Inflow = 0.23 cfs @ 5.34 hrs, Volume= 0.041 af
Primary = 0.23 cfs @ 5.34 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link B: DP B

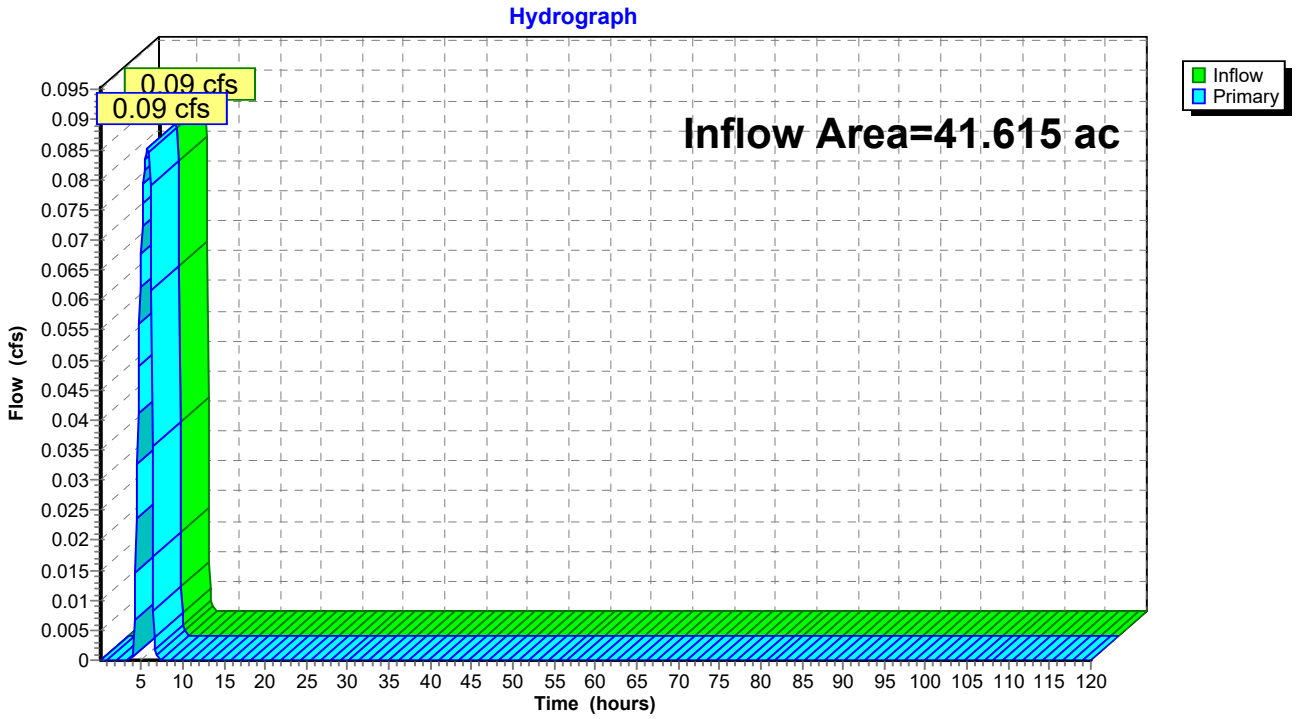


Summary for Link C: DP C

Inflow Area = 41.615 ac, 23.91% Impervious, Inflow Depth = 0.00" for 100-year 6hr event
Inflow = 0.09 cfs @ 5.74 hrs, Volume= 0.011 af
Primary = 0.09 cfs @ 5.74 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link C: DP C

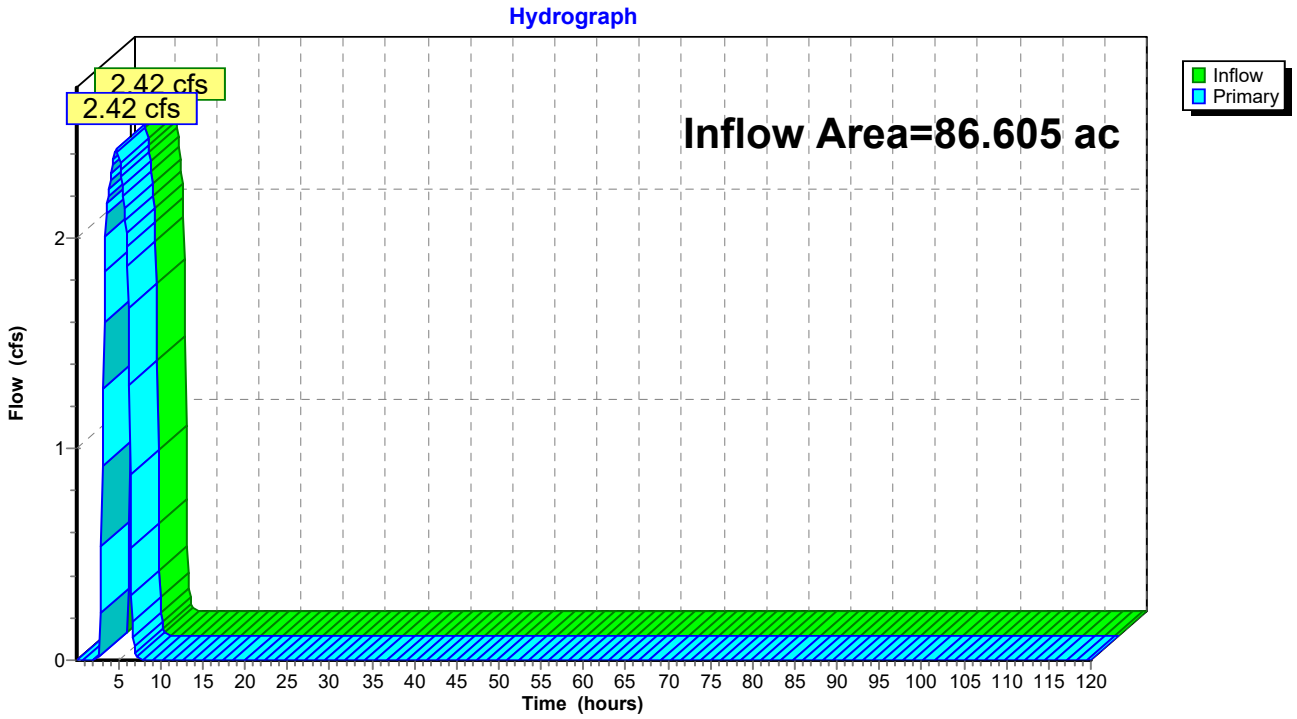


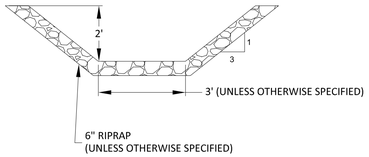
Summary for Link D: DP D

Inflow Area = 86.605 ac, 15.14% Impervious, Inflow Depth = 0.08" for 100-year 6hr event
Inflow = 2.42 cfs @ 4.77 hrs, Volume= 0.596 af
Primary = 2.42 cfs @ 4.77 hrs, Volume= 0.596 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-120.00 hrs, dt= 0.10 hrs

Link D: DP D





TYPICAL DITCH SECTION

DITCH D2-5
(5' BOTTOM WIDTH 12"
RIPRAP)

DITCH D2-4
(5' BOTTOM WIDTH
2" RIPRAP)

30" HDPE CULVERT (TYP)

DITCH D2-3
(5' BOTTOM WIDTH)

DITCH D3-1
(5' BOTTOM WIDTH
12" RIPRAP)

36" HDPE CULVERT (TYP)

RETENTION POND D3

DITCH D2-1

DITCH C2-3
(10' BOTTOM WIDTH)

RETENTION
POND D2

OUTLET PROTECTION

DITCH D4-2
(2" RIPRAP)

DITCH D4-1
(2" RIPRAP)

PONT OUTLET
STRUCTURE (TYP)

RETENTION
POND D4

DITCH C1-2
(2" RIPRAP)

DITCH C1-1
(2" RIPRAP)

DETENTION
POND C1

DETENTION
POND B2

RETENTION POND A1

DITCH B3-3
(2" RIPRAP)

WEIR OUTLET
(RIPRAP LINED)

DITCH B3-2
(2' BOTTOM WIDTH
2" RIPRAP)

DETENTION
POND B3

POND OUTLET
STRUCTURE (TYP)

POND OUTLET
PROTECTION (TYP)

DITCH C2-2
(2' BOTTOM WIDTH)

DITCH B3-1
(2" RIPRAP)

DITCH C2-1

RETENTION
POND C2

PONT OUTLET
STRUCTURE (TYP)

LEGEND

EXISTING FEATURES

- ADJACENT PARCEL BOUNDARY
- FEMA FLOOD ZONE LINE
- SECTION LINE
- SECTION RESERVATION LINE
- EXISTING EASEMENT LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- RIPRAP
- DIRT ROAD
- CONCRETE
- PAVEMENT
- WALL
- GUARDRAIL

PROPOSED FEATURES

- PROJECT BOUNDARY
- UTILITY EASEMENT
- DITCH FLOW LINE
- CULVERT
- CHAIN LINK FENCE
- 30" HDPE CULVERT
- 18" HDPE CULVERT
- 36" HDPE CULVERT
- 24" HDPE CULVERT

GRAPHIC SCALE

150' 0 150'

1" = 150'

NORTH

N

SEAL:

PERMIT PLAN SET
NOT FOR
CONSTRUCTION

NO.	BY	DATE	REVISION	APP'D.

PROJECT:
EUISMOD PROJECT LLC
WILLOW SPRINGS, CA 93560
KERN COUNTY

CASE NO:

TITLE:
STORMWATER FEATURE MAP

DRAWN BY:	TSS	PROJ. NO.:	552398
CHECKED BY:	DG		
APPROVED BY:	SH		D-3
DATE:	2/24/26		

TRC
6 Executive Circle
Suite 200
Irvine, CA 92614
Phone: 949.727.9336

H:\WORK IN PROGRESS\SOLAR SITES\VIPA POWER\EUISMOD\CAD\PLOT SHEETS\DRAINAGE MAPS\STPM FEATURES KEY MAP.DWG

Ditch B3-1 (2 Inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.007 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	3.00 ft
Discharge	5.63 cfs

Results	
Normal Depth	7.7 in
Flow Area	3.2 ft²
Wetted Perimeter	7.1 ft
Hydraulic Radius	5.4 in
Top Width	6.86 ft
Critical Depth	5.0 in
Critical Slope	0.037 ft/ft
Velocity	1.78 ft/s
Velocity Head	0.05 ft
Specific Energy	0.69 ft
Froude Number	0.460
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.7 in
Critical Depth	5.0 in
Channel Slope	0.007 ft/ft
Critical Slope	0.037 ft/ft

Ditch B3-2 (2 Inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.039 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	1.04 cfs

Results	
Normal Depth	2.3 in
Flow Area	0.5 ft²
Wetted Perimeter	3.2 ft
Hydraulic Radius	1.9 in
Top Width	3.17 ft
Critical Depth	2.2 in
Critical Slope	0.047 ft/ft
Velocity	2.07 ft/s
Velocity Head	0.07 ft
Specific Energy	0.26 ft
Froude Number	0.916
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.3 in
Critical Depth	2.2 in
Channel Slope	0.039 ft/ft
Critical Slope	0.047 ft/ft

Ditch B3-3 (2 Inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.007 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	3.00 ft
Discharge	1.04 cfs

Results	
Normal Depth	3.1 in
Flow Area	1.0 ft²
Wetted Perimeter	4.6 ft
Hydraulic Radius	2.5 in
Top Width	4.54 ft
Critical Depth	1.8 in
Critical Slope	0.049 ft/ft
Velocity	1.07 ft/s
Velocity Head	0.02 ft
Specific Energy	0.28 ft
Froude Number	0.408
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.1 in
Critical Depth	1.8 in
Channel Slope	0.007 ft/ft
Critical Slope	0.049 ft/ft

Ditch C1-1 (2 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.007 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	3.00 ft
Discharge	7.50 cfs

Results	
Normal Depth	8.9 in
Flow Area	3.9 ft²
Wetted Perimeter	7.7 ft
Hydraulic Radius	6.1 in
Top Width	7.47 ft
Critical Depth	5.9 in
Critical Slope	0.035 ft/ft
Velocity	1.92 ft/s
Velocity Head	0.06 ft
Specific Energy	0.80 ft
Froude Number	0.470
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.9 in
Critical Depth	5.9 in
Channel Slope	0.007 ft/ft
Critical Slope	0.035 ft/ft

Ditch C1-2 (2 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.010 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	3.00 ft
Discharge	4.41 cfs

Results	
Normal Depth	6.2 in
Flow Area	2.3 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	4.5 in
Top Width	6.09 ft
Critical Depth	4.3 in
Critical Slope	0.038 ft/ft
Velocity	1.88 ft/s
Velocity Head	0.06 ft
Specific Energy	0.57 ft
Froude Number	0.535
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.2 in
Critical Depth	4.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.038 ft/ft

Ditch C2-1 (6 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.069
Channel Slope	0.031 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	3.00 ft
Discharge	7.20 cfs

Results	
Normal Depth	7.8 in
Flow Area	3.2 ft²
Wetted Perimeter	7.1 ft
Hydraulic Radius	5.4 in
Top Width	6.90 ft
Critical Depth	5.7 in
Critical Slope	0.101 ft/ft
Velocity	2.24 ft/s
Velocity Head	0.08 ft
Specific Energy	0.73 ft
Froude Number	0.577
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.8 in
Critical Depth	5.7 in
Channel Slope	0.031 ft/ft
Critical Slope	0.101 ft/ft

Ditch C2-2 (6 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.069
Channel Slope	0.021 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	6.29 cfs

Results	
Normal Depth	9.2 in
Flow Area	3.3 ft²
Wetted Perimeter	6.8 ft
Hydraulic Radius	5.8 in
Top Width	6.59 ft
Critical Depth	6.2 in
Critical Slope	0.102 ft/ft
Velocity	1.91 ft/s
Velocity Head	0.06 ft
Specific Energy	0.82 ft
Froude Number	0.478
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.2 in
Critical Depth	6.2 in
Channel Slope	0.021 ft/ft
Critical Slope	0.102 ft/ft

Ditch C2-3 (6 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.069
Channel Slope	0.019 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	10.00 ft
Discharge	11.92 cfs

Results	
Normal Depth	6.7 in
Flow Area	6.5 ft²
Wetted Perimeter	13.5 ft
Hydraulic Radius	5.8 in
Top Width	13.36 ft
Critical Depth	4.1 in
Critical Slope	0.104 ft/ft
Velocity	1.82 ft/s
Velocity Head	0.05 ft
Specific Energy	0.61 ft
Froude Number	0.460
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.7 in
Critical Depth	4.1 in
Channel Slope	0.019 ft/ft
Critical Slope	0.104 ft/ft

Worksheet for Ditch D2-1 & 2 (6 Inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.069
Channel Slope	0.030 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	3.00 ft
Discharge	5.69 cfs

Results	
Normal Depth	7.0 in
Flow Area	2.8 ft²
Wetted Perimeter	6.7 ft
Hydraulic Radius	5.0 in
Top Width	6.48 ft
Critical Depth	5.0 in
Critical Slope	0.105 ft/ft
Velocity	2.07 ft/s
Velocity Head	0.07 ft
Specific Energy	0.65 ft
Froude Number	0.559
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.0 in
Critical Depth	5.0 in
Channel Slope	0.030 ft/ft
Critical Slope	0.105 ft/ft

Ditch D2-3 (6 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.069
Channel Slope	0.013 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	5.00 ft
Discharge	13.30 cfs

Results	
Normal Depth	11.0 in
Flow Area	7.1 ft²
Wetted Perimeter	10.8 ft
Hydraulic Radius	7.9 in
Top Width	10.52 ft
Critical Depth	6.5 in
Critical Slope	0.094 ft/ft
Velocity	1.86 ft/s
Velocity Head	0.05 ft
Specific Energy	0.97 ft
Froude Number	0.398
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.0 in
Critical Depth	6.5 in
Channel Slope	0.013 ft/ft
Critical Slope	0.094 ft/ft

Ditch D2-4 (2 Inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.025 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	5.00 ft
Discharge	1.65 cfs

Results	
Normal Depth	2.1 in
Flow Area	1.0 ft²
Wetted Perimeter	6.1 ft
Hydraulic Radius	1.9 in
Top Width	6.06 ft
Critical Depth	1.8 in
Critical Slope	0.048 ft/ft
Velocity	1.69 ft/s
Velocity Head	0.04 ft
Specific Energy	0.22 ft
Froude Number	0.741
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.1 in
Critical Depth	1.8 in
Channel Slope	0.025 ft/ft
Critical Slope	0.048 ft/ft

Ditch D2-5 (12 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.078
Channel Slope	0.014 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	10.00 ft
Discharge	44.27 cfs

Results	
Normal Depth	16.4 in
Flow Area	19.2 ft²
Wetted Perimeter	18.6 ft
Hydraulic Radius	12.4 in
Top Width	18.19 ft
Critical Depth	9.4 in
Critical Slope	0.104 ft/ft
Velocity	2.30 ft/s
Velocity Head	0.08 ft
Specific Energy	1.45 ft
Froude Number	0.395
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	16.4 in
Critical Depth	9.4 in
Channel Slope	0.014 ft/ft
Critical Slope	0.104 ft/ft

Ditch D3-1 (12 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.078
Channel Slope	0.033 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	5.00 ft
Discharge	41.13 cfs

Results	
Normal Depth	16.5 in
Flow Area	12.6 ft²
Wetted Perimeter	13.7 ft
Hydraulic Radius	11.0 in
Top Width	13.27 ft
Critical Depth	12.4 in
Critical Slope	0.102 ft/ft
Velocity	3.27 ft/s
Velocity Head	0.17 ft
Specific Energy	1.54 ft
Froude Number	0.592
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	16.5 in
Critical Depth	12.4 in
Channel Slope	0.033 ft/ft
Critical Slope	0.102 ft/ft

Ditch D4-1 (2 Inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.030 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	3.00 ft
Discharge	0.84 cfs

Results	
Normal Depth	1.8 in
Flow Area	0.5 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	1.6 in
Top Width	3.90 ft
Critical Depth	1.5 in
Critical Slope	0.051 ft/ft
Velocity	1.62 ft/s
Velocity Head	0.04 ft
Specific Energy	0.19 ft
Froude Number	0.786
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.8 in
Critical Depth	1.5 in
Channel Slope	0.030 ft/ft
Critical Slope	0.051 ft/ft

Ditch D4-2 (2 inch Riprap)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.041
Channel Slope	0.007 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.50 ft
Discharge	5.74 cfs

Results	
Normal Depth	11.2 in
Flow Area	3.1 ft²
Wetted Perimeter	6.4 ft
Hydraulic Radius	5.8 in
Top Width	6.10 ft
Critical Depth	8.0 in
Critical Slope	0.036 ft/ft
Velocity	1.86 ft/s
Velocity Head	0.05 ft
Specific Energy	0.99 ft
Froude Number	0.462
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.2 in
Critical Depth	8.0 in
Channel Slope	0.007 ft/ft
Critical Slope	0.036 ft/ft

Capacity-18" HDPE @ 0.5%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.005 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in

Results	
Discharge	8.05 cfs
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	13.2 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	4.55 ft/s
Velocity Head	0.32 ft
Specific Energy	1.82 ft
Froude Number	(N/A)
Maximum Discharge	8.66 cfs
Discharge Full	8.05 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	13.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Capacity-24" HDPE @ 1.0%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.010 ft/ft
Normal Depth	24.0 in
Diameter	24.0 in

Results	
Discharge	24.51 cfs
Flow Area	3.1 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	6.0 in
Top Width	0.00 ft
Critical Depth	21.0 in
Percent Full	100.0 %
Critical Slope	0.009 ft/ft
Velocity	7.80 ft/s
Velocity Head	0.95 ft
Specific Energy	2.95 ft
Froude Number	(N/A)
Maximum Discharge	26.36 cfs
Discharge Full	24.51 cfs
Slope Full	0.010 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	24.0 in
Critical Depth	21.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.009 ft/ft

Capacity -30" HDPE @ 1.2%

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.012 ft/ft
Normal Depth	30.0 in
Diameter	30.0 in
Discharge	48.67 cfs

Results	
Discharge	48.67 cfs
Normal Depth	30.0 in
Flow Area	4.9 ft²
Wetted Perimeter	7.9 ft
Hydraulic Radius	7.5 in
Top Width	0.00 ft
Critical Depth	27.4 in
Percent Full	100.0 %
Critical Slope	0.010 ft/ft
Velocity	9.92 ft/s
Velocity Head	1.53 ft
Specific Energy	4.03 ft
Froude Number	(N/A)
Maximum Discharge	52.36 cfs
Discharge Full	48.67 cfs
Slope Full	0.012 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	30.0 in
Critical Depth	27.4 in
Channel Slope	0.012 ft/ft
Critical Slope	0.010 ft/ft

Capacity -36" HDPE @ 1.0%

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

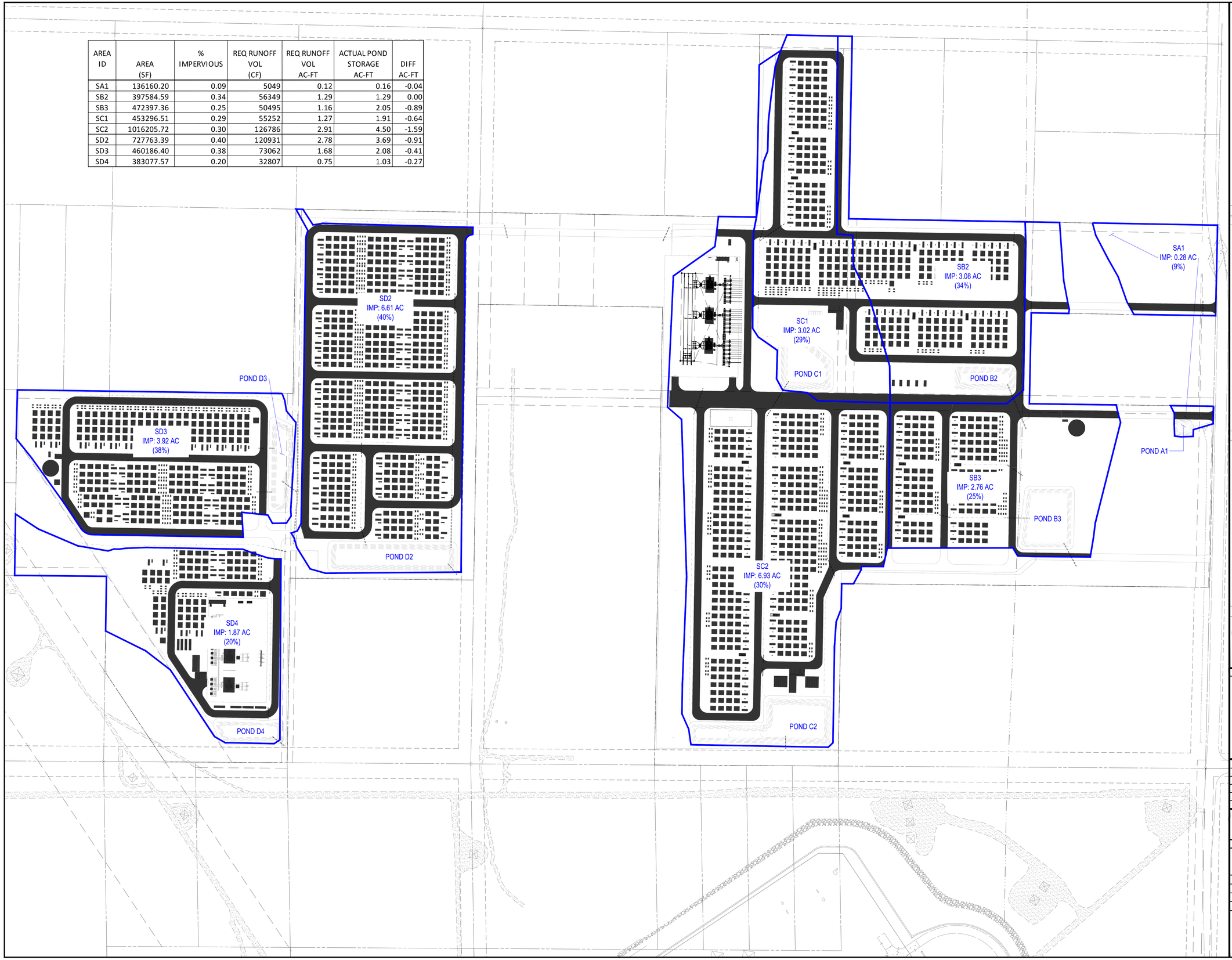
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.010 ft/ft
Normal Depth	36.0 in
Diameter	36.0 in
Discharge	72.25 cfs

Results	
Discharge	72.25 cfs
Normal Depth	36.0 in
Flow Area	7.1 ft²
Wetted Perimeter	9.4 ft
Hydraulic Radius	9.0 in
Top Width	0.00 ft
Critical Depth	32.2 in
Percent Full	100.0 %
Critical Slope	0.009 ft/ft
Velocity	10.22 ft/s
Velocity Head	1.62 ft
Specific Energy	4.62 ft
Froude Number	(N/A)
Maximum Discharge	77.72 cfs
Discharge Full	72.25 cfs
Slope Full	0.010 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	36.0 in
Critical Depth	32.2 in
Channel Slope	0.010 ft/ft
Critical Slope	0.009 ft/ft

AREA ID	AREA (SF)	% IMPERVIOUS	REQ RUNOFF VOL (CF)	REQ RUNOFF VOL AC-FT	ACTUAL POND STORAGE AC-FT	DIFF AC-FT
SA1	136160.20	0.09	5049	0.12	0.16	-0.04
SB2	397584.59	0.34	56349	1.29	1.29	0.00
SB3	472397.36	0.25	50495	1.16	2.05	-0.89
SC1	453296.51	0.29	55252	1.27	1.91	-0.64
SC2	1016205.72	0.30	126786	2.91	4.50	-1.59
SD2	727763.39	0.40	120931	2.78	3.69	-0.91
SD3	460186.40	0.38	73062	1.68	2.08	-0.41
SD4	383077.57	0.20	32807	0.75	1.03	-0.27



LEGEND

EXISTING FEATURES

- ADJACENT PARCEL BOUNDARY
- FEMA FLOOD ZONE LINE
- SECTION LINE
- SECTION RESERVATION LINE
- EXISTING EASEMENT LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- RIPRAP
- DIRT ROAD
- CONCRETE
- PAVEMENT
- WALL
- GUARDRAIL

PROPOSED FEATURES

- PROJECT BOUNDARY
- UTILITY EASEMENT
- DITCH FLOW LINE
- CULVERT
- CHAIN LINK FENCE
- IMP. WITHIN DRAINAGE AREA
- ACCESS GATE
- POND DRAINAGE AREA

GR□□□I□ □□□E

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SEAL:

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PROJECT: EUI□M□D □R□□E□□ □□□
□ I□□□□ □□RI□G□□□□ □□□□□
□ER□ □□U□□□

CASE NO:

TITLE: □□□D DE□IG□ □□□UME

DRAWN BY:	□□□	PROJ. NO.:	552398
CHECKED BY:	DG		
APPROVED BY:	□□		D□4
DATE:	□□□□□□		

TRC
6 Executive Circle
Suite 200
Irvine, CA 92614
Phone: 949.727.9336

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Drawdown(48hr): 1.963 hrs
Drawdown(24hr): 1.852 hrs

	VOLUME BASED BMP SIZING FOR WATER QUALITY						
	AREA (SF)	RUNOFF COEFF. C	IMPERVIOUS RATIO	DRAWDOWN TIME (HR)	MAX. DET. VOL (IN)	REQ. CAPTURE VOLUME (CF)	REQ. CAPTURE VOLUME AC-FT
SA1	136160.20	0.10	0.09	48	0.11	1270.25	0.03
SB2	397584.59	0.25	0.34	48	0.26	8775.89	0.20
SB3	472543.36	0.20	0.25	48	0.22	8526.97	0.20
SC1	453296.51	0.22	0.29	48	0.24	8968.32	0.21
SC2	1016205.72	0.22	0.30	48	0.24	20441.98	0.47
SD2	727763.39	0.28	0.40	48	0.30	18154.71	0.42
SD3	460186.40	0.27	0.38	48	0.29	11074.18	0.25
SD4	383077.57	0.17	0.20	48	0.19	5951.11	0.14

P6 = 0.55 in (Station Name: Bakersfield Airport)

The two regression equations that form the Urban Runoff Quality Management approach are as follows:

$$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

$$P_o = (a \bullet C) \bullet P_6$$

Where

C = runoff coefficient

i = watershed imperviousness ratio which is equal to the percent total imperviousness divided by 100

P_o = Maximized Detention Volume, in watershed inches

a = regression constant, a=1.582 and a=1.963 for 24 and 48 hour draw down, respectively

P_6 = mean annual runoff-producing rainfall depths, in watershed inches. See Appendix D, "Rain Gage Data Table."

Appendix E: Offsite Analysis

- Offsite Drainage Area Map
- HEC-HMS Offsite Calculations

DRAINAGE AREA 2
TOTAL: 689.037 ACRES
Q100 = 41.13 CFS

DRAINAGE AREA 4
TOTAL: 939.382 ACRES
Q100 = 44.27 CFS

DRAINAGE AREA 6
TOTAL: 132.339 ACRES
Q100 = 3.27 CFS

DRAINAGE AREA 7
TOTAL: 82.406 ACRES
Q100 = 2.23 CFS

DRAINAGE AREA 8
TOTAL: 37.730 ACRES
Q100 = 0.57 CFS

DRAINAGE AREA 3
TOTAL: 78.323 ACRES
Q100 = 1.65 CFS

DRAINAGE AREA 5
TOTAL: 7.183 ACRES
Q100 = 0.12 CFS

DRAINAGE AREA 1
TOTAL: 30.512 ACRES
Q100 = 0.59 CFS

LEGEND

EXISTING FEATURES

- FEMA FLOOD ZONE LINE
- EXISTING MAJOR CONTOUR
- RIPRAP
- DIRT ROAD
- CONCRETE
- PAVEMENT
- GUARDRAIL
- OFFSITE DRAINAGE AREA

PROPOSED FEATURES

- PROJECT BOUNDARY
- PROPOSED DRAINAGE AREA

GRAPHIC SCALE
700' 0 700'
1" = 700'

NORTH
N

SEAL:

PERMIT PLAN SET
NOT FOR
CONSTRUCTION

NO.	BY	DATE	REVISION	APP'D.

PROJECT:
EUISMOD PROJECT LLC
WILLOW SPRINGS, CA 93560
KERN COUNTY

CASE NO:

TITLE:
OFFSITE FLOW
DRAINAGE AREA MAP

DRAWN BY:	TSS	PROJ. NO:	552398
CHECKED BY:	DG		
APPROVED BY:	SH		D-5
DATE:	2/24/26		

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Suite 200
Irvine, CA 92614
Phone: 949.727.9336

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Project: Euismod
Simulation Run: 100-YR
Simulation Start: 31 December 2029, 24:00
Simulation End: 2 January 2030, 24:00

HMS Version: 4.13
Executed: 04 August 2025, 22:18

Global Parameter Summary - Subbasin

Area (MI2)

Element Name	Area (MI2)
DA - 1	0.05
DA - 2	1.08
DA - 4	1.52
DA - 5	0.01
DA - 6	0.21
DA - 3	0.12
DA - 7	0.13
DA - 8	0.06

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number
DA - 1	0	37
DA - 2	0	48.6
DA - 4	0	48.1
DA - 5	0	35.9
DA - 6	0	39.4
DA - 3	0	38
DA - 7	0	40.65
DA - 8	0	35.1

Transform: Scs

Element Name	Lag	Unitgraph Type
DA - 1	62.3	Standard
DA - 2	154.8	Standard
DA - 4	381.8	Standard
DA - 5	6.5	Standard
DA - 6	28.4	Standard
DA - 3	74.4	Standard
DA - 7	22.38	Standard
DA - 8	12.54	Standard

Global Results Summary

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
DA - 1	0.05	0.59	02Jan2030, 00:05	0.16
DA - 2	1.08	41.13	01Jan2030, 16:40	0.68

DA - 4	1.52	44.27	02Jan2030, 00:20	0.65
DA - 5	0.01	0.12	01Jan2030, 24:00	0.13
DA - 6	0.21	3.27	01Jan2030, 24:00	0.25
DA - 3	0.12	1.65	02Jan2030, 00:05	0.2
DA - 7	0.13	2.23	01Jan2030, 20:30	0.3
DA - 8	0.06	0.57	01Jan2030, 24:00	0.11

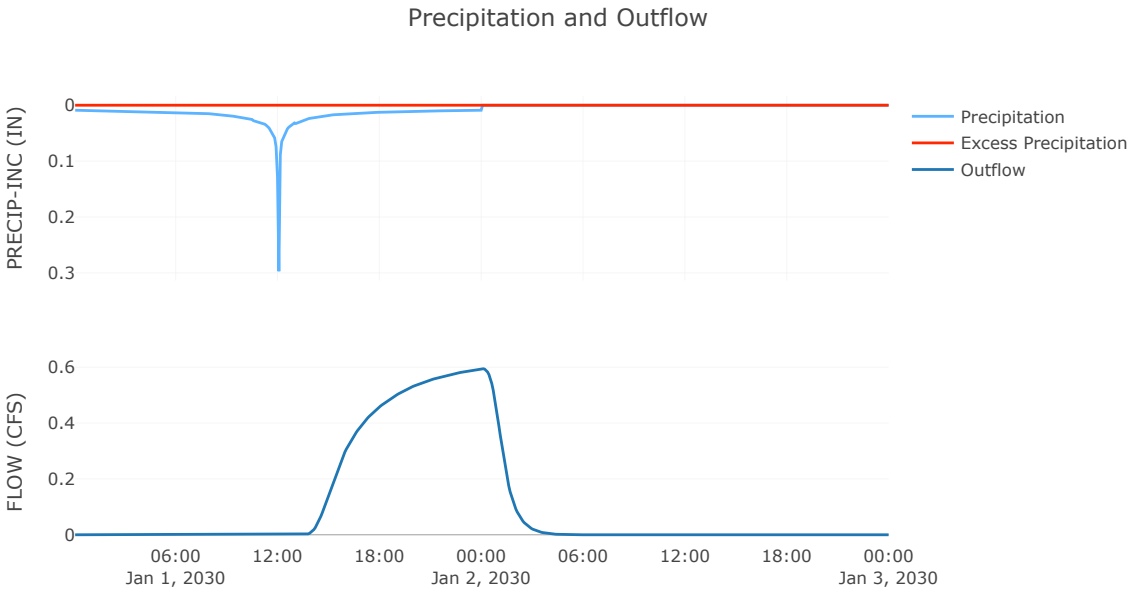
Subbasin: DA-1

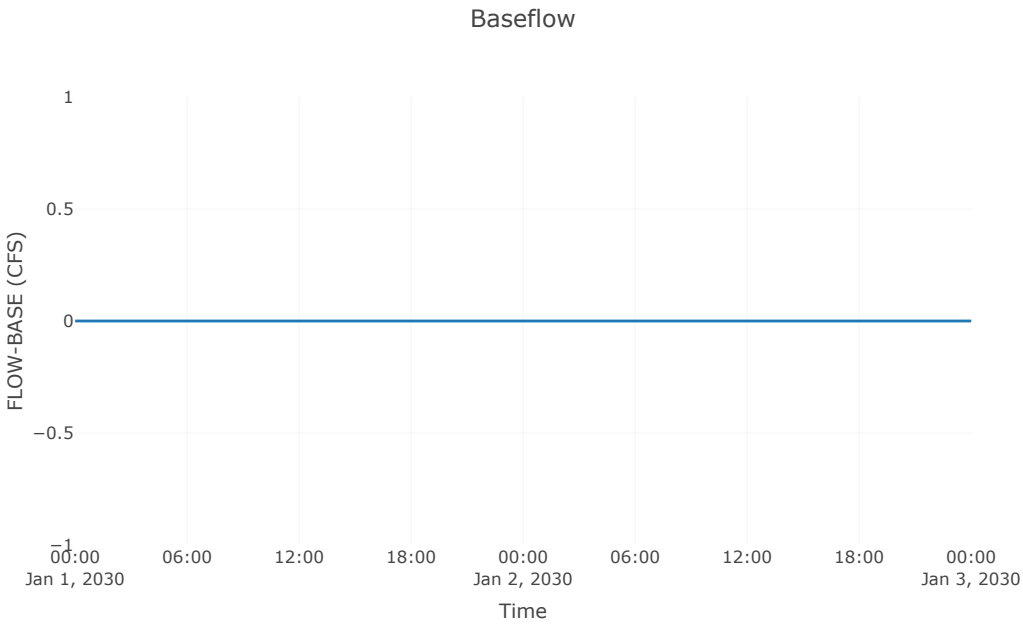
Area (MI2) : 0.05

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	37

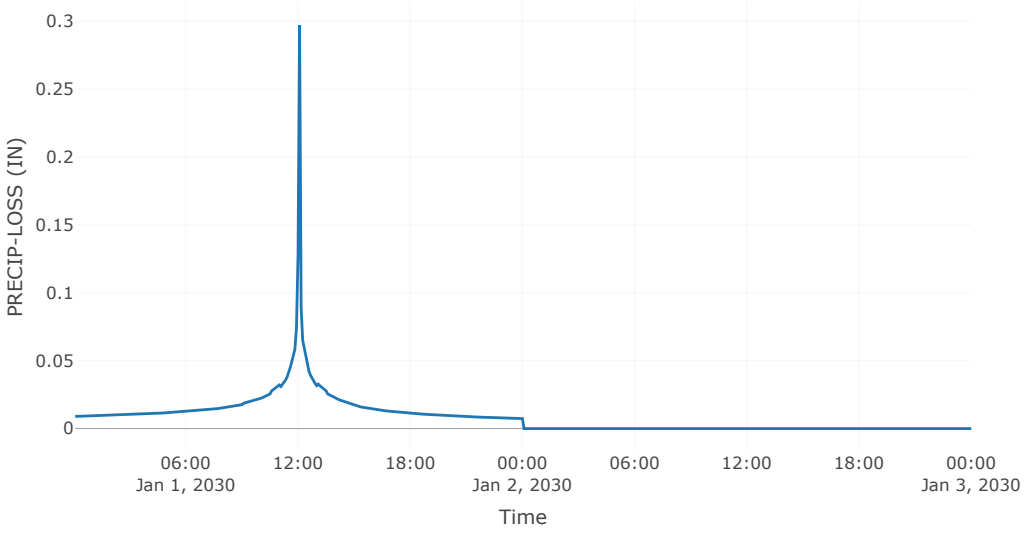
Transform: Scs	
Lag	62.3
Unitgraph Type	Standard

Results: DA-1	
Peak Discharge (CFS)	0.59
Time of Peak Discharge	02Jan2030, 00:05
Volume (IN)	0.16
Precipitation Volume (AC - FT)	13.48
Loss Volume (AC - FT)	13.06
Excess Volume (AC - FT)	0.43
Direct Runoff Volume (AC - FT)	0.43
Baseflow Volume (AC - FT)	0

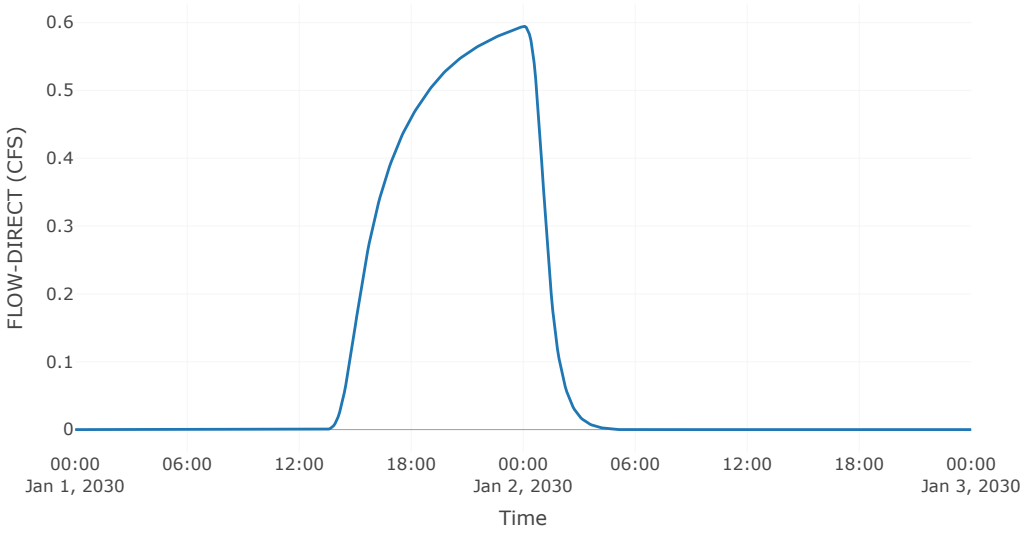

Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
0.6
0.4
0.2
0
06:00
12:00
18:00
00:00
Jan 1, 2030
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030

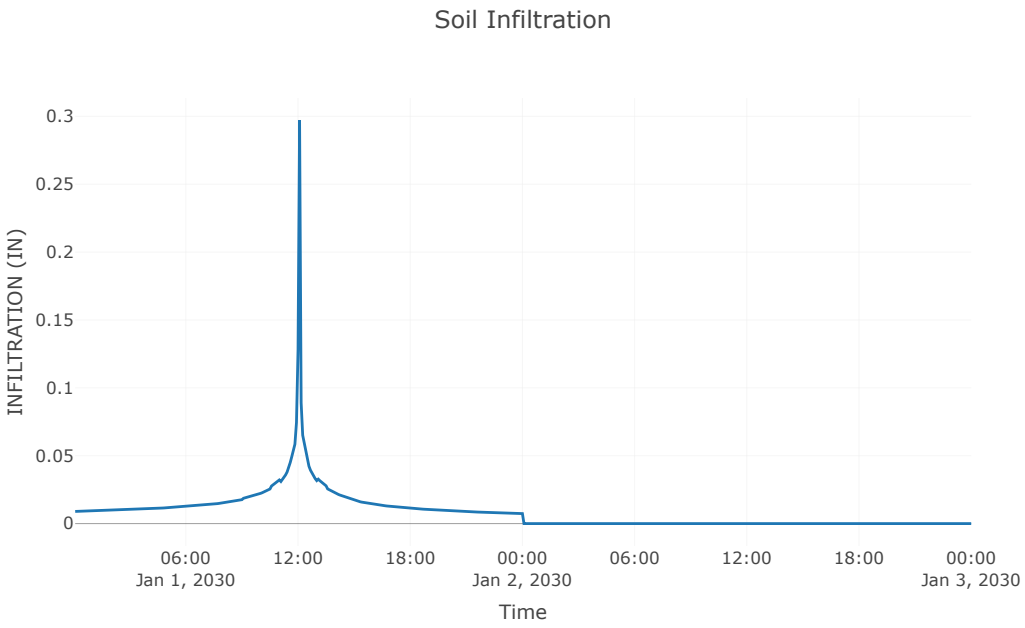

Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

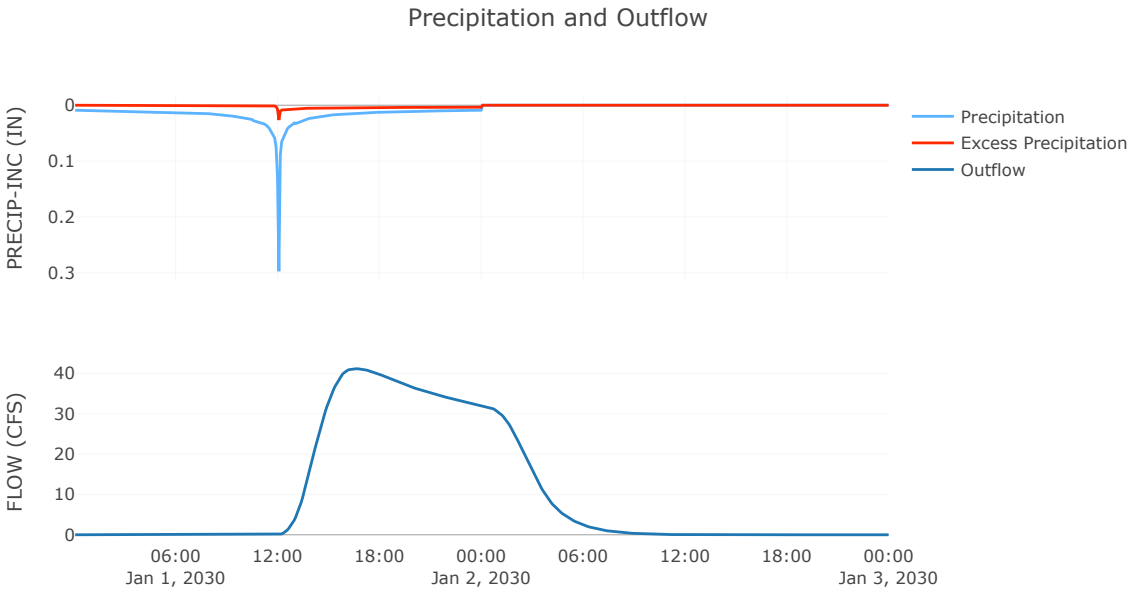
Subbasin: DA-2

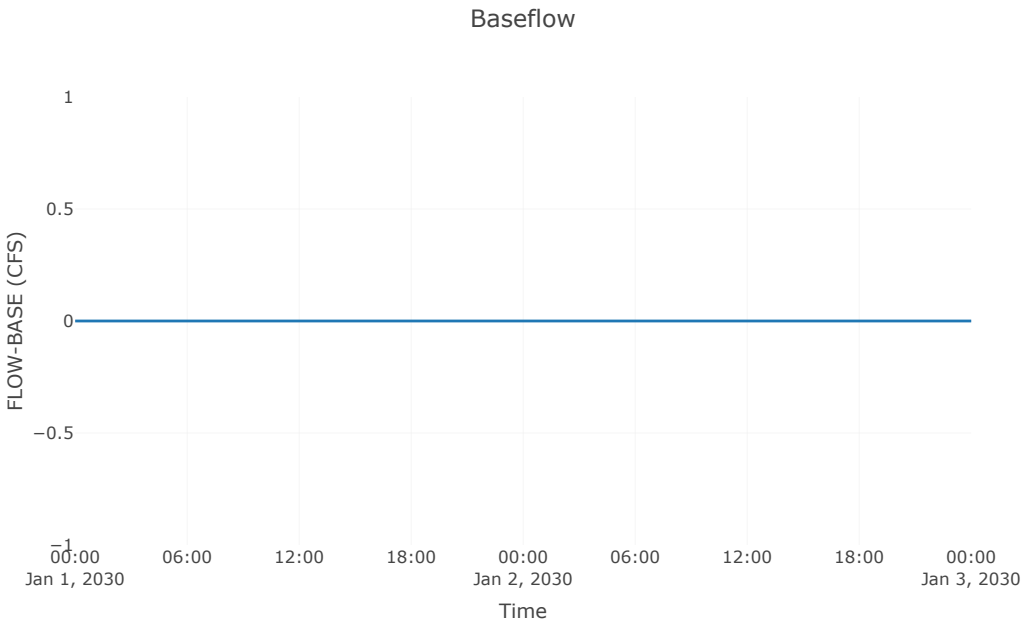
Area (MI2) : 1.08

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	48.6

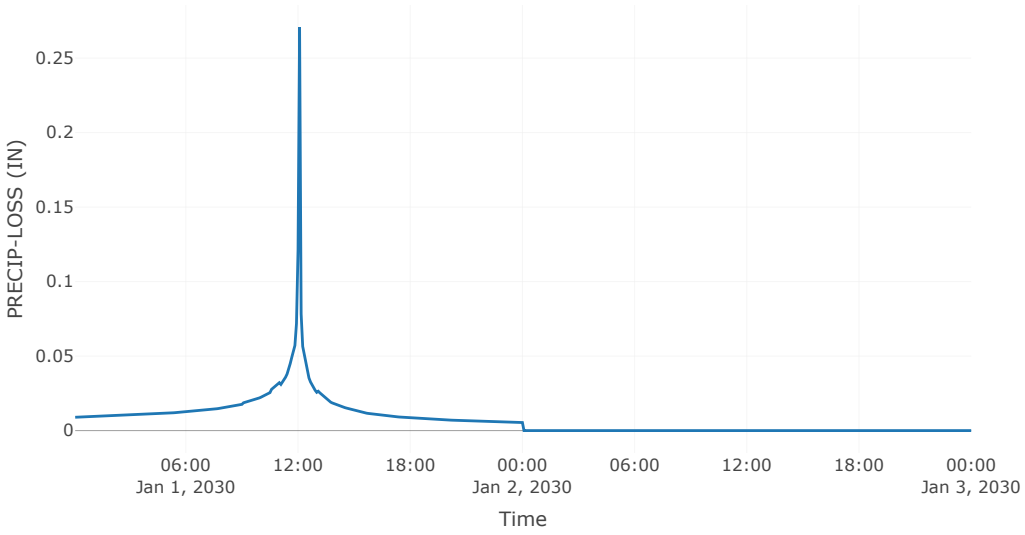
Transform: Scs	
Lag	154.8
Unitgraph Type	Standard

Results: DA-2	
Peak Discharge (CFS)	41.13
Time of Peak Discharge	01Jan2030, 16:40
Volume (IN)	0.68
Precipitation Volume (AC - FT)	297.22
Loss Volume (AC - FT)	258.01
Excess Volume (AC - FT)	39.2
Direct Runoff Volume (AC - FT)	39.2
Baseflow Volume (AC - FT)	0

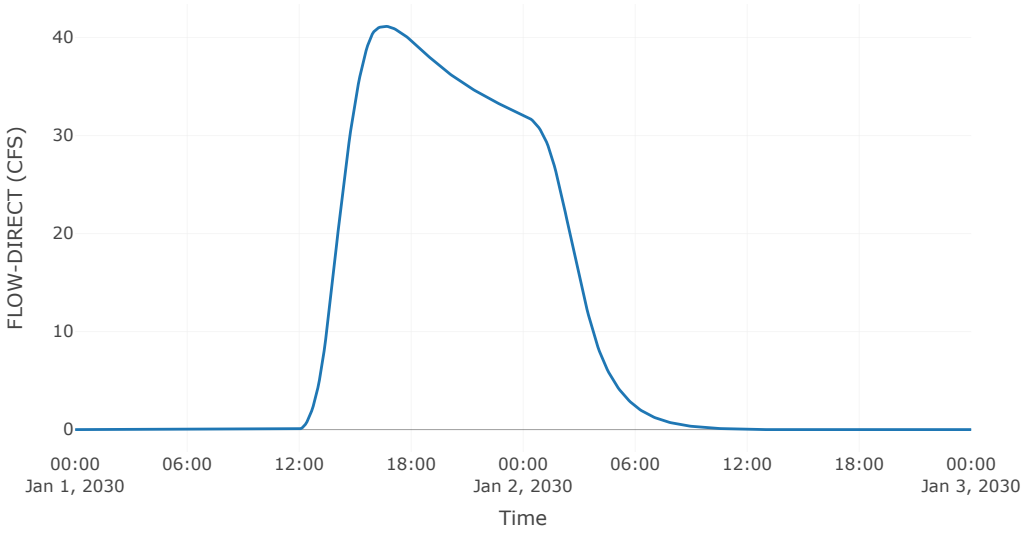

Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
40
30
20
10
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030

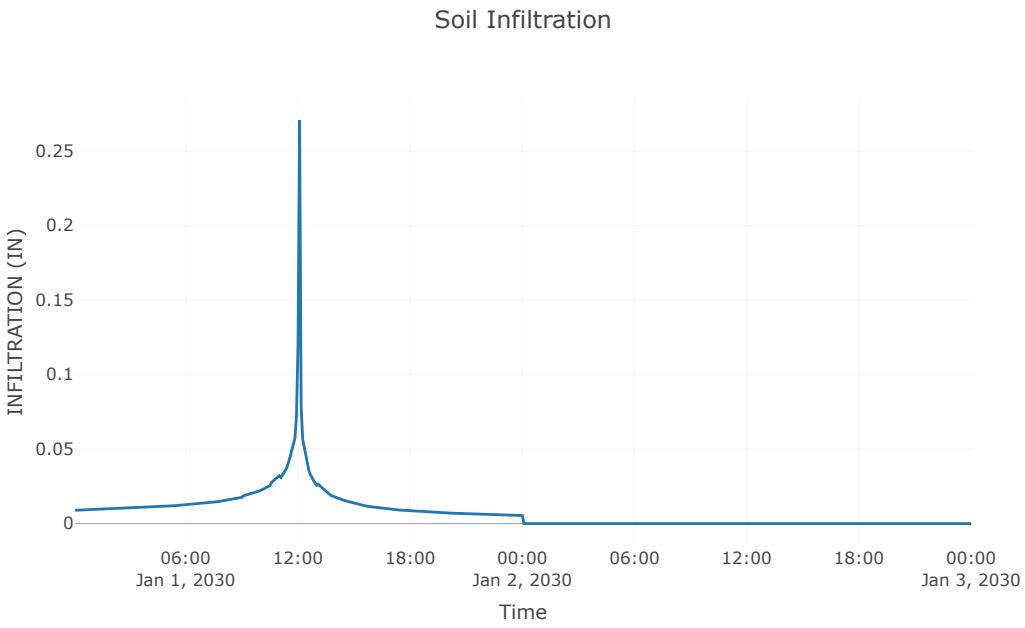

Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (IN)
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

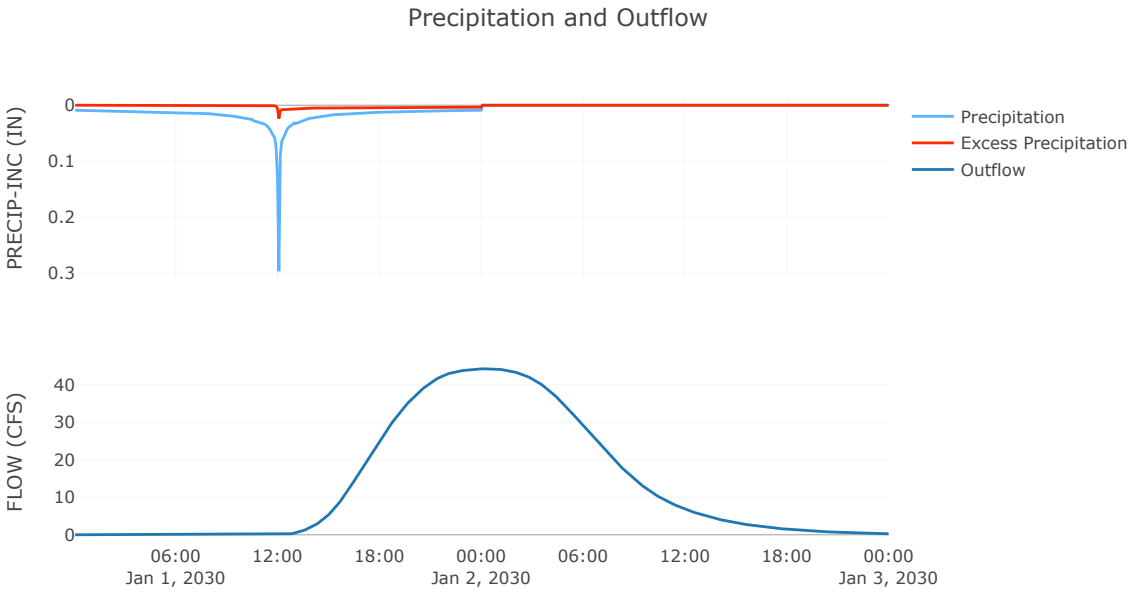
Subbasin: DA-4

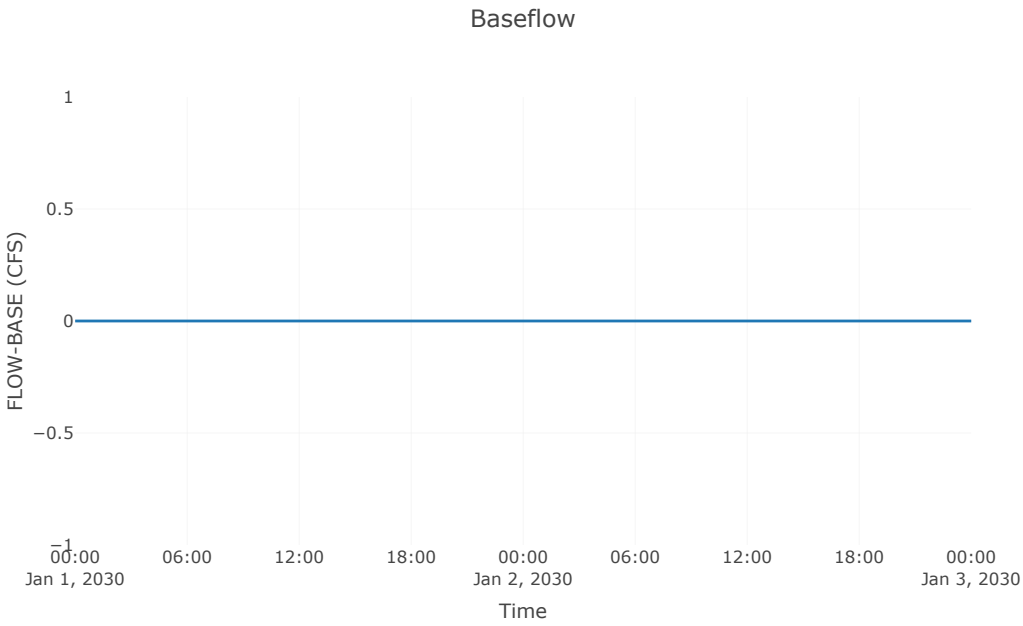
Area (MI2) : 1.52

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	48.1

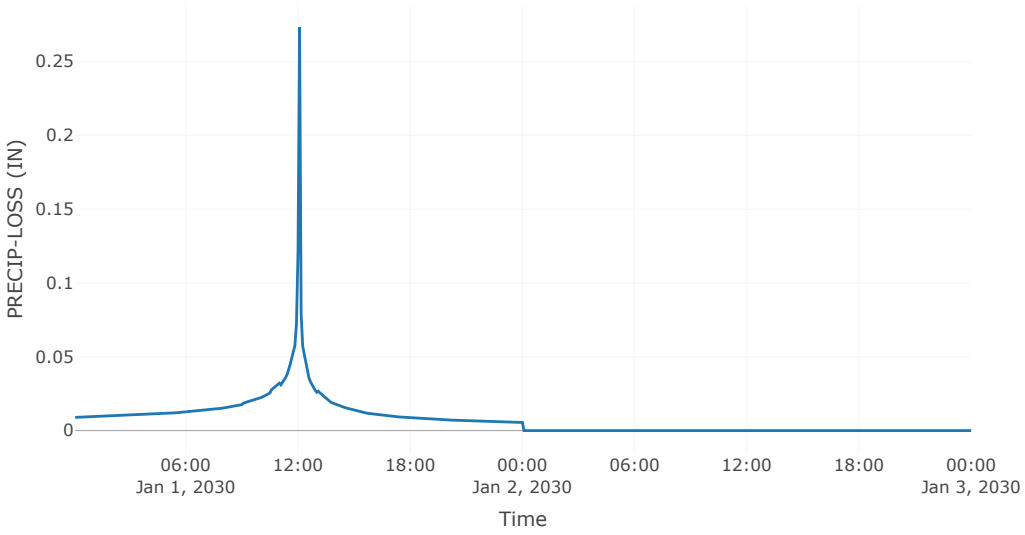
Transform: Scs	
Lag	381.8
Unitgraph Type	Standard

Results: DA-4	
Peak Discharge (CFS)	44.27
Time of Peak Discharge	02Jan2030, 00:20
Volume (IN)	0.65
Precipitation Volume (AC - FT)	418.3
Loss Volume (AC - FT)	365.33
Excess Volume (AC - FT)	52.97
Direct Runoff Volume (AC - FT)	52.91
Baseflow Volume (AC - FT)	0

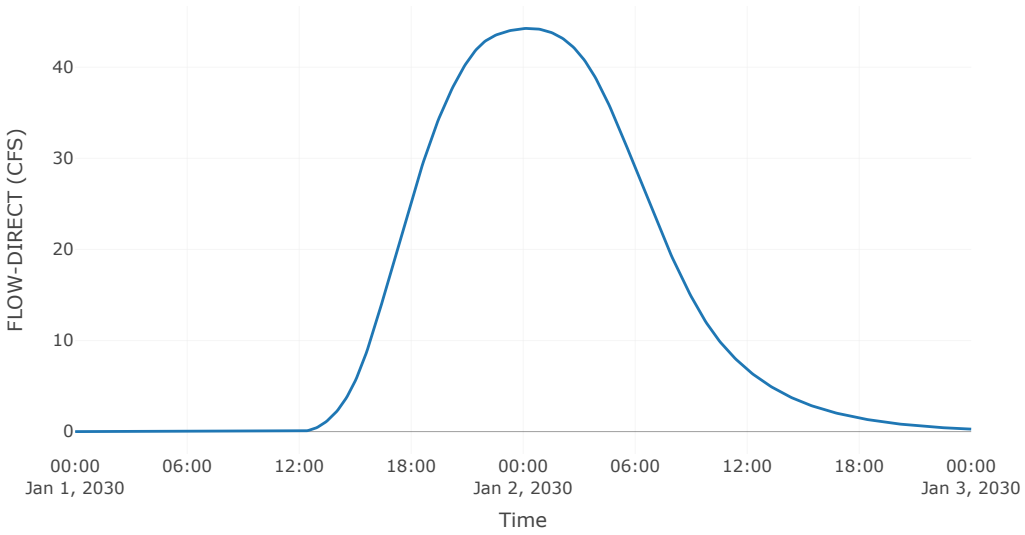

Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
40
30
20
10
0
06:00
12:00
18:00
00:00
Jan 1, 2030
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030

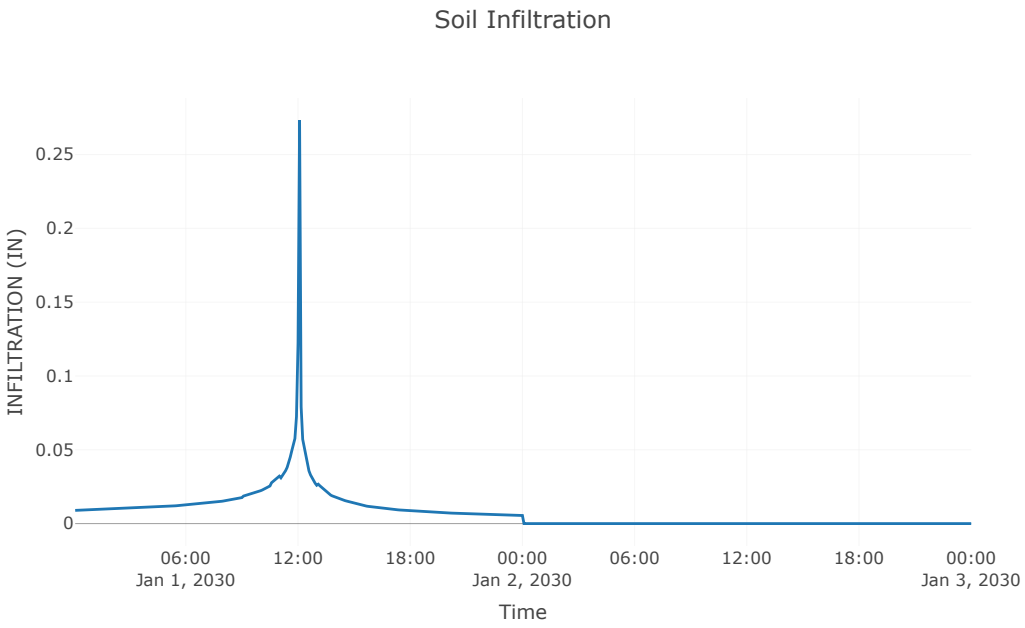

Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (IN)
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

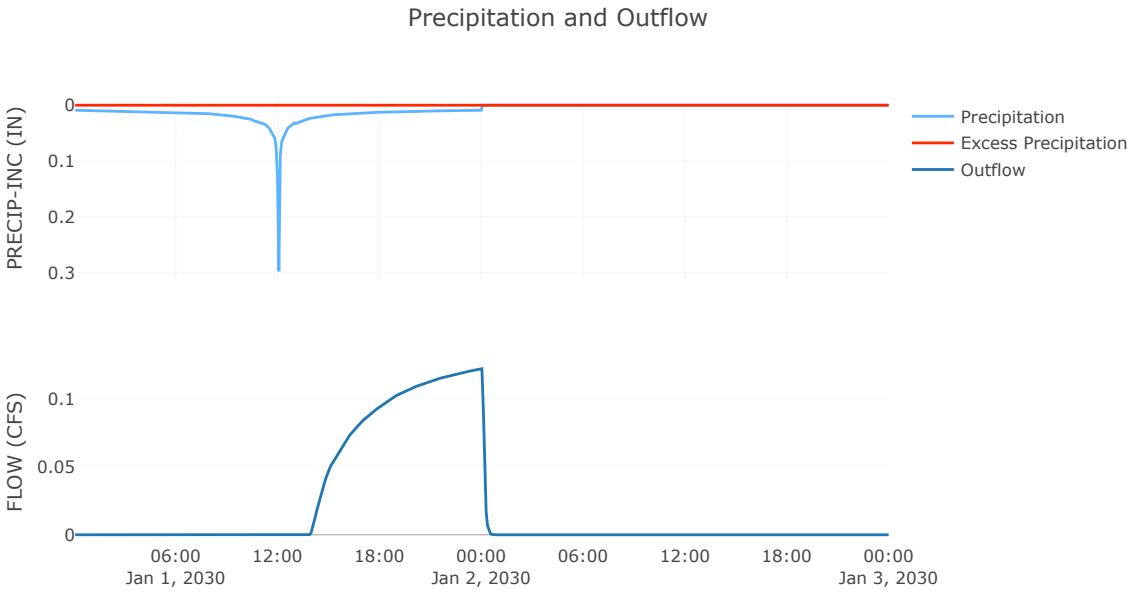
Subbasin: DA-5

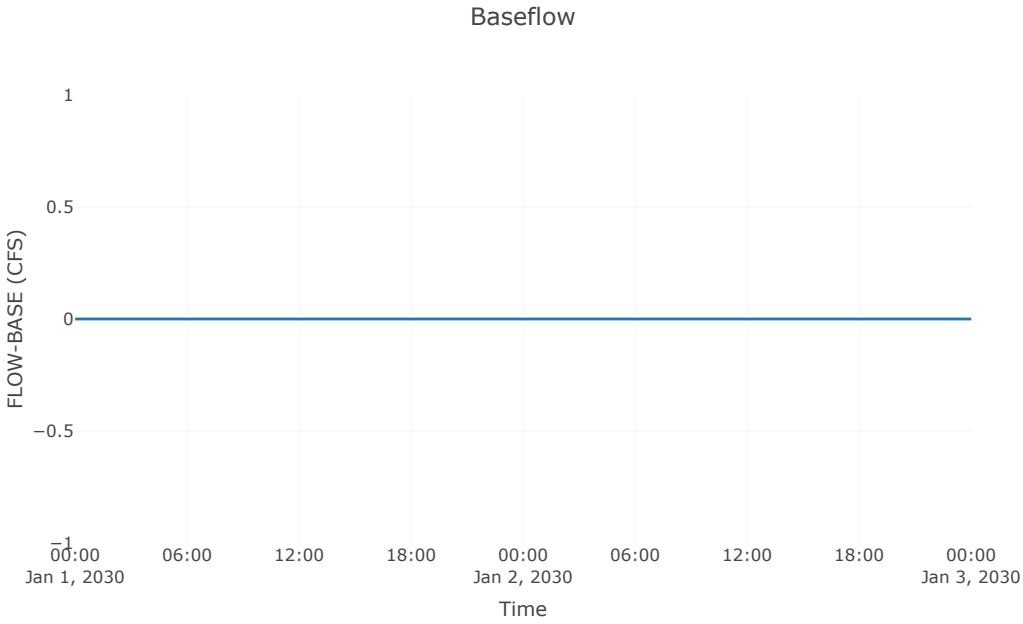
Area (MI2) : 0.01

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	35.9

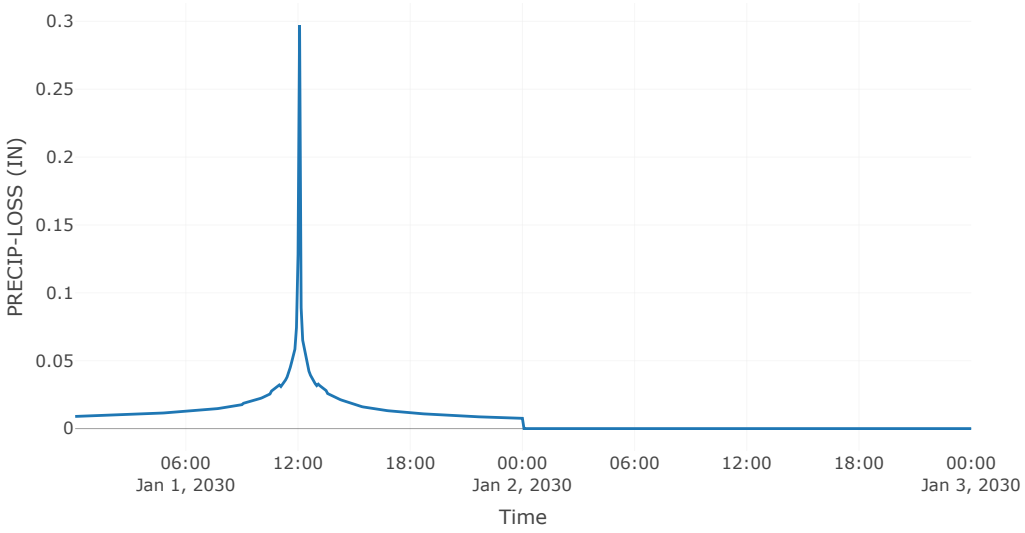
Transform: Scs	
Lag	6.5
Unitgraph Type	Standard

Results: DA-5	
Peak Discharge (CFS)	0.12
Time of Peak Discharge	01Jan2030, 24:00
Volume (IN)	0.13
Precipitation Volume (AC - FT)	3.1
Loss Volume (AC - FT)	3.02
Excess Volume (AC - FT)	0.08
Direct Runoff Volume (AC - FT)	0.08
Baseflow Volume (AC - FT)	0

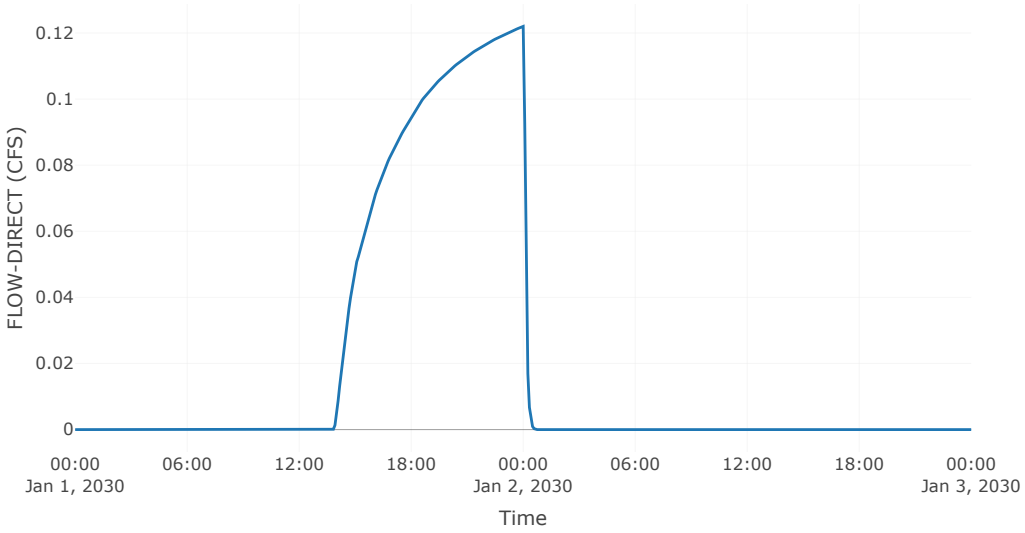

Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
0.1
0.05
0
06:00
12:00
18:00
00:00
06:00
12:00
18:00
00:00
Jan 1, 2030
Jan 2, 2030
Jan 3, 2030

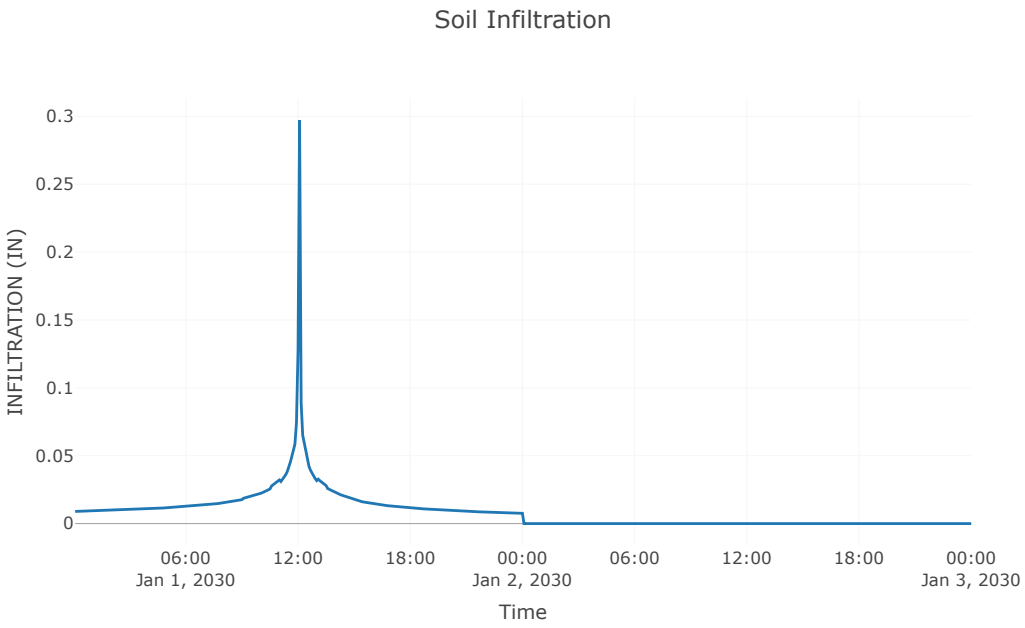

Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
06:00
12:00
18:00
00:00
06:00
12:00
18:00
00:00
Jan 1, 2030
Jan 2, 2030
Jan 3, 2030
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

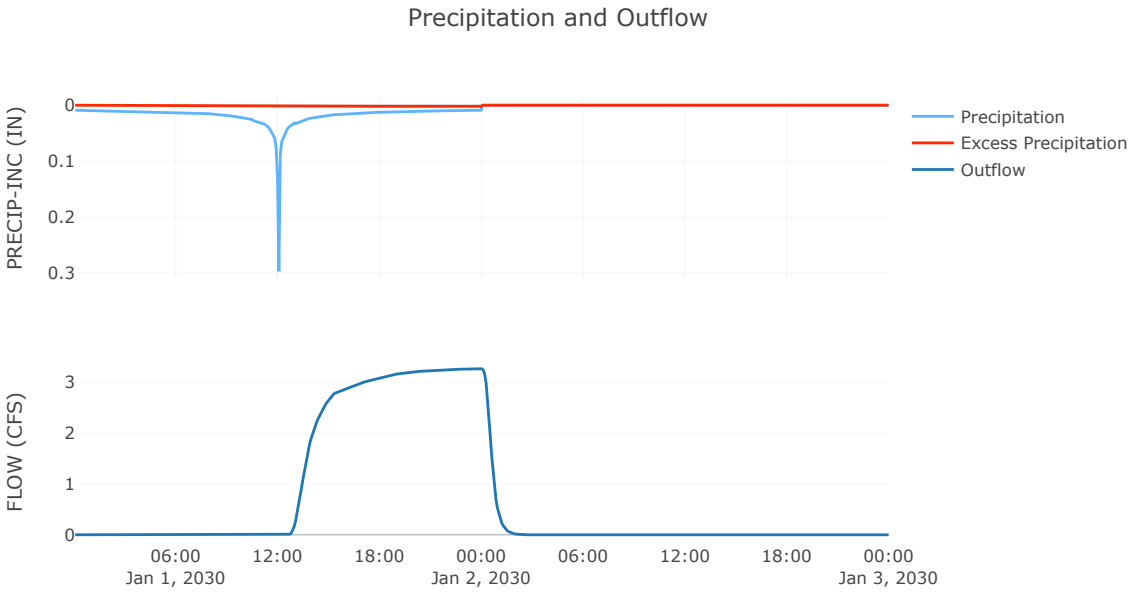
Subbasin: DA-6

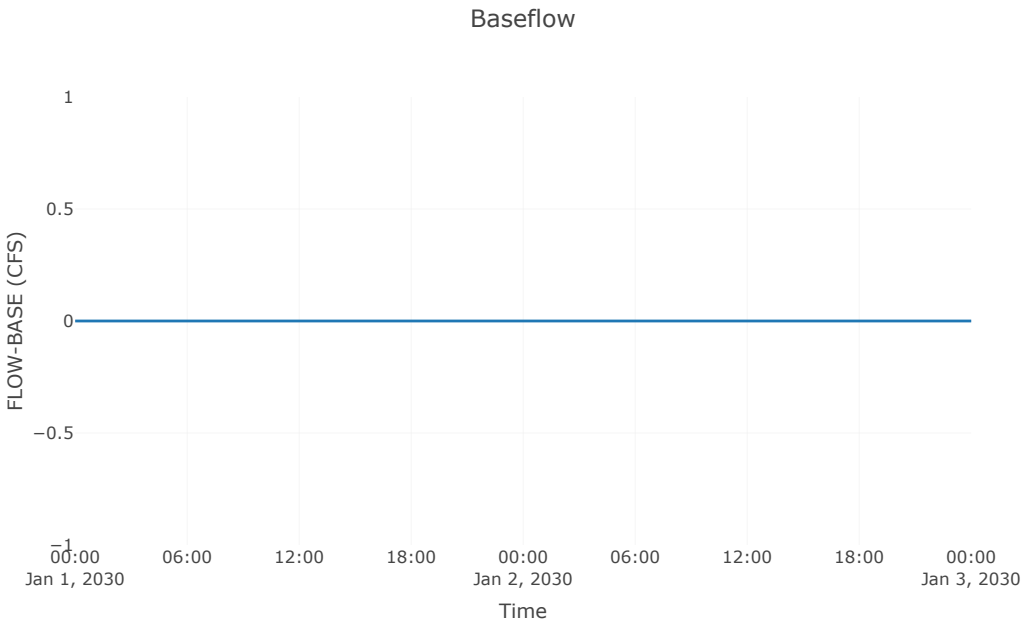
Area (MI2) : 0.21

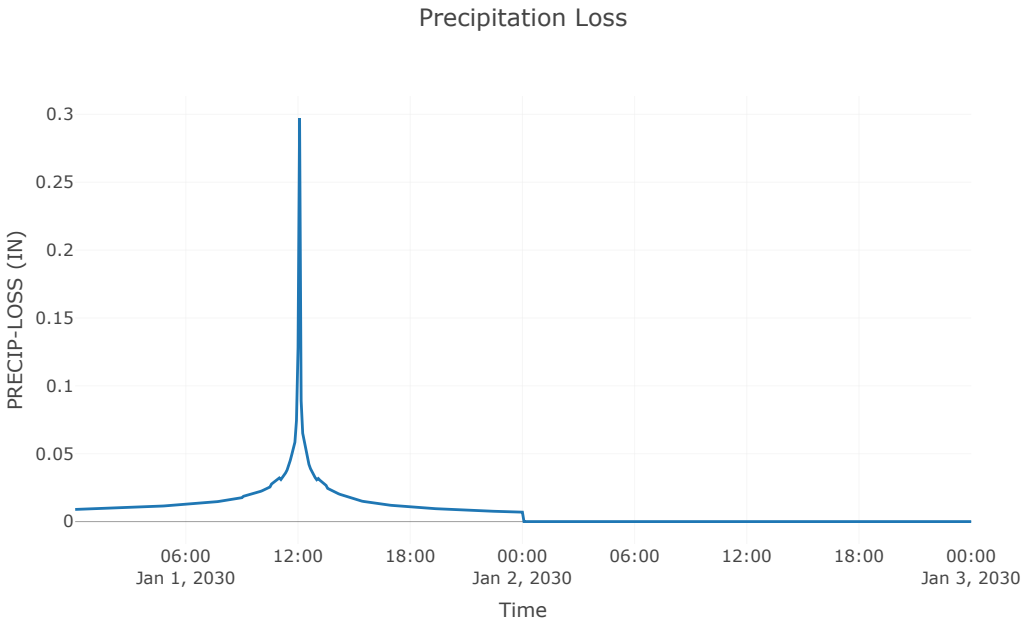
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	39.4

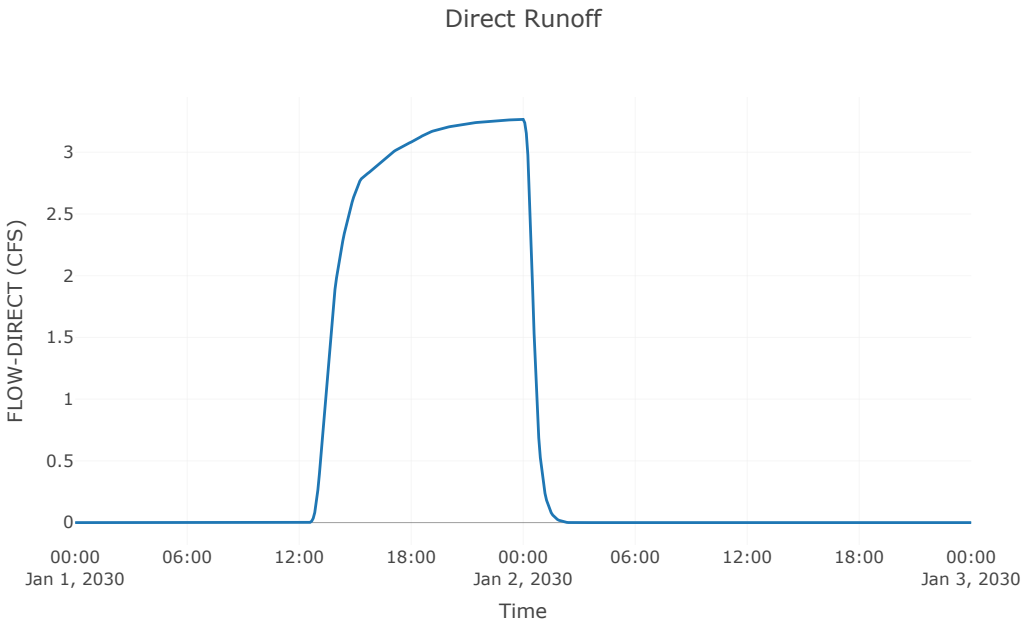
Transform: Scs	
Lag	28.4
Unitgraph Type	Standard

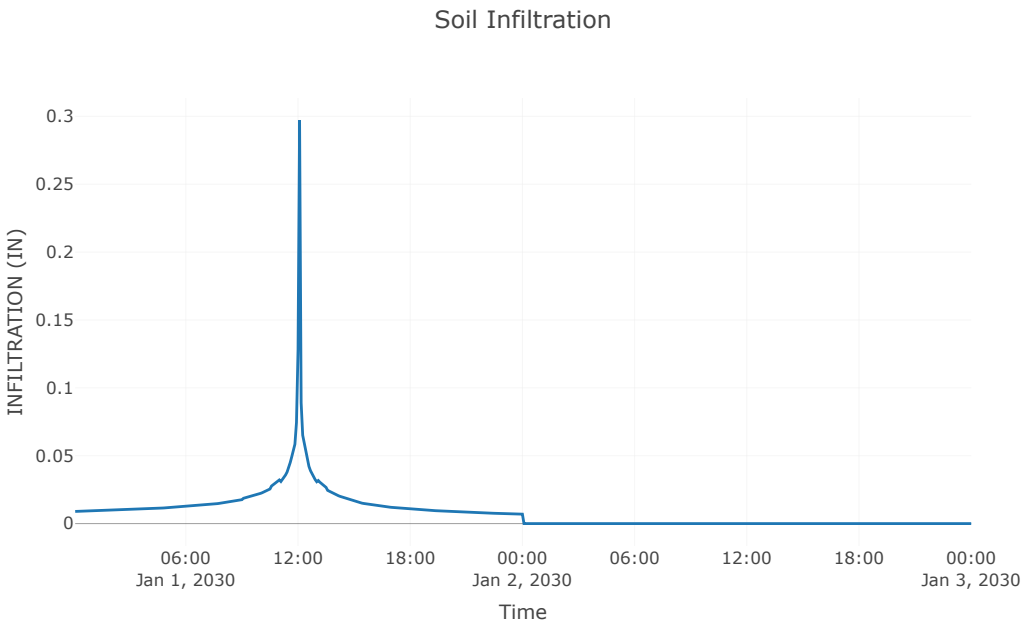
Results: DA-6	
Peak Discharge (CFS)	3.27
Time of Peak Discharge	01Jan2030, 24:00
Volume (IN)	0.25
Precipitation Volume (AC - FT)	57.79
Loss Volume (AC - FT)	55.01
Excess Volume (AC - FT)	2.78
Direct Runoff Volume (AC - FT)	2.78
Baseflow Volume (AC - FT)	0


Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
3
2
1
0
06:00
12:00
18:00
00:00
06:00
12:00
18:00
00:00
Jan 1, 2030
Jan 2, 2030
Jan 3, 2030


Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
06:00
12:00
18:00
00:00
06:00
12:00
18:00
00:00
Jan 1, 2030
Jan 2, 2030
Jan 3, 2030
Time


Precipitation Loss
PRECIP-LOSS (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time


Direct Runoff
FLOW-DIRECT (CFS)
3
2.5
2
1.5
1
0.5
0
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time


Soil Infiltration
INFILTRATION (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

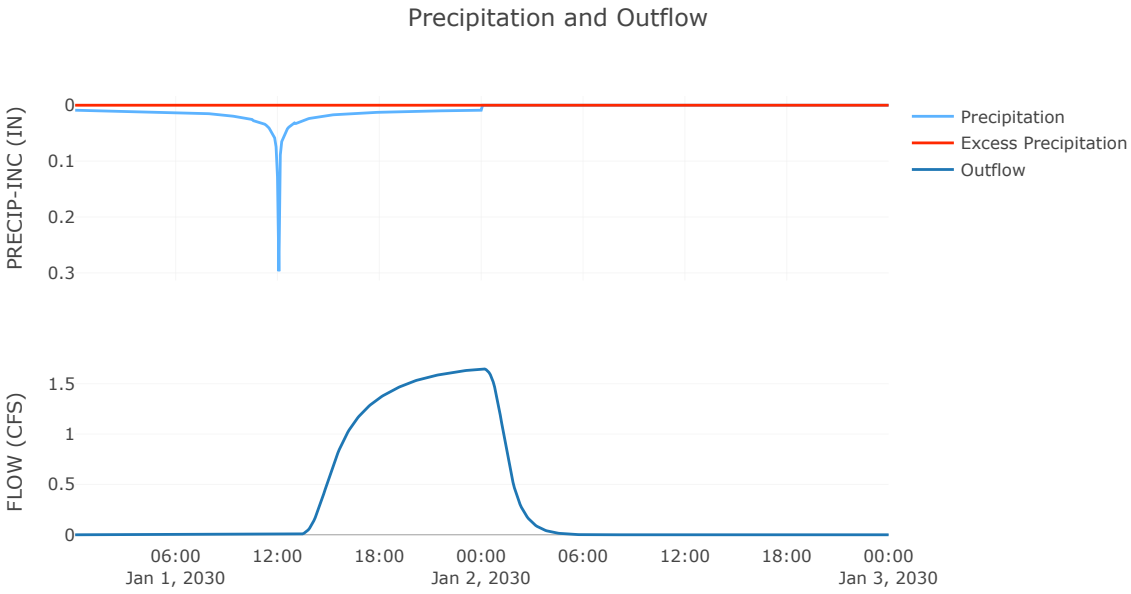
Subbasin: DA-3

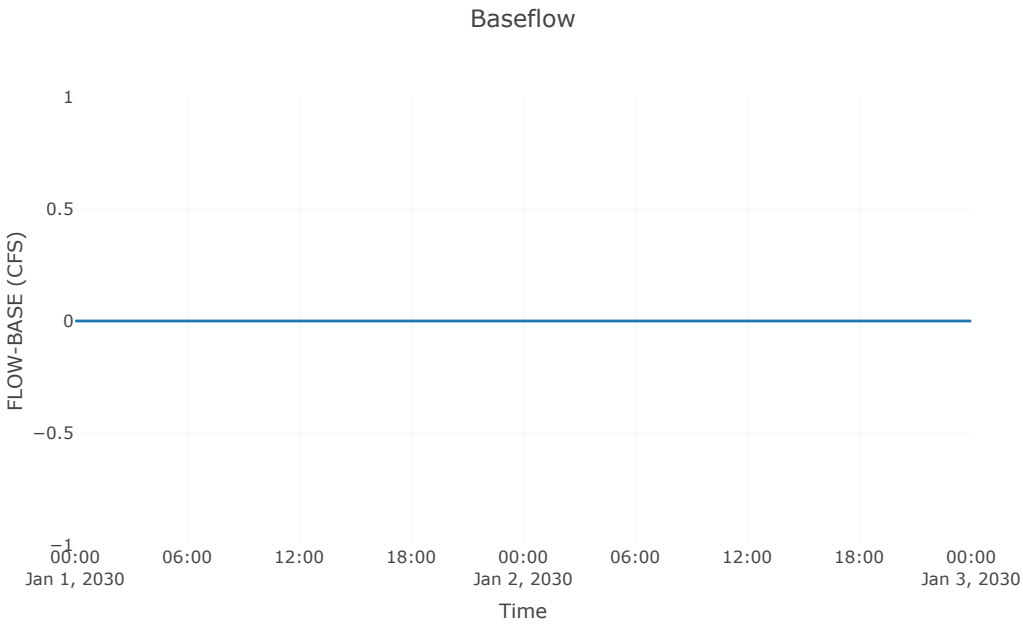
Area (MI2) : 0.12

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	38

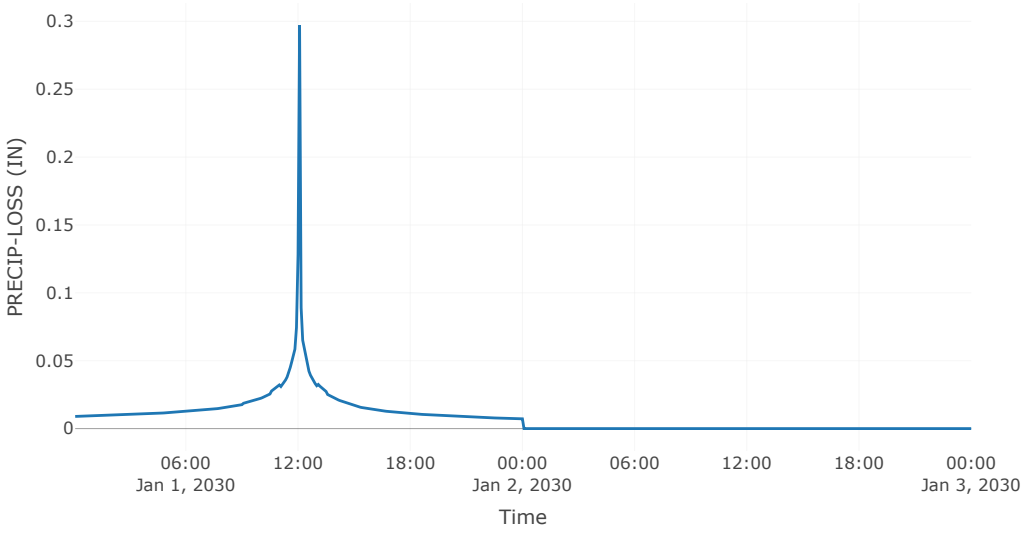
Transform: Scs	
Lag	74.4
Unitgraph Type	Standard

Results: DA-3	
Peak Discharge (CFS)	1.65
Time of Peak Discharge	02Jan2030, 00:05
Volume (IN)	0.2
Precipitation Volume (AC - FT)	33.57
Loss Volume (AC - FT)	32.29
Excess Volume (AC - FT)	1.29
Direct Runoff Volume (AC - FT)	1.29
Baseflow Volume (AC - FT)	0

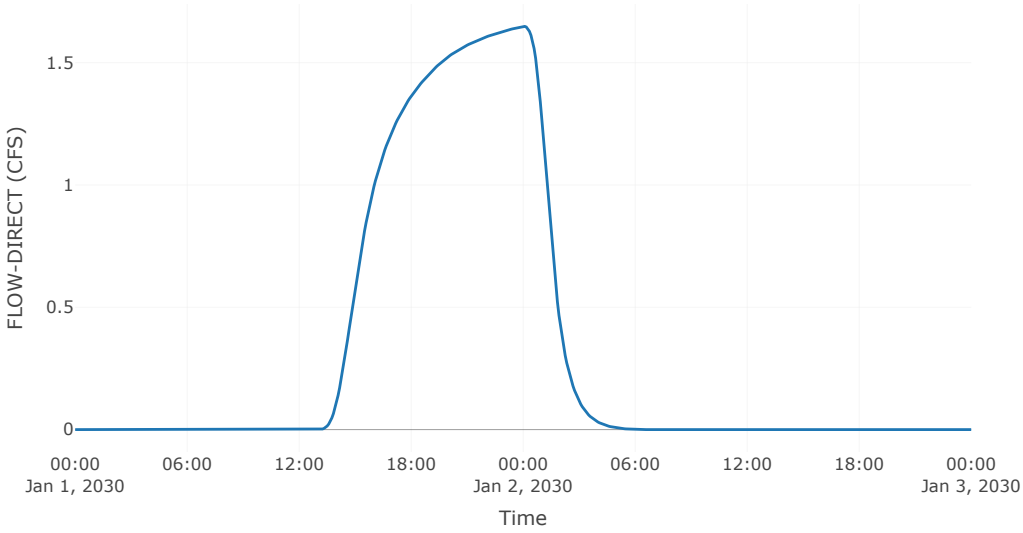

Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
1.5
1
0.5
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030

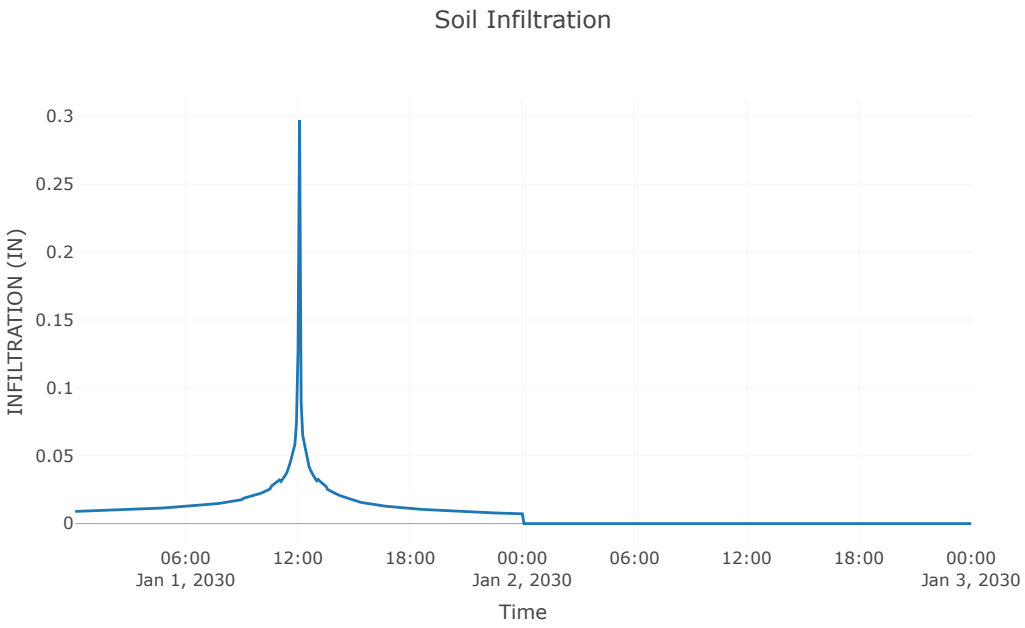

Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

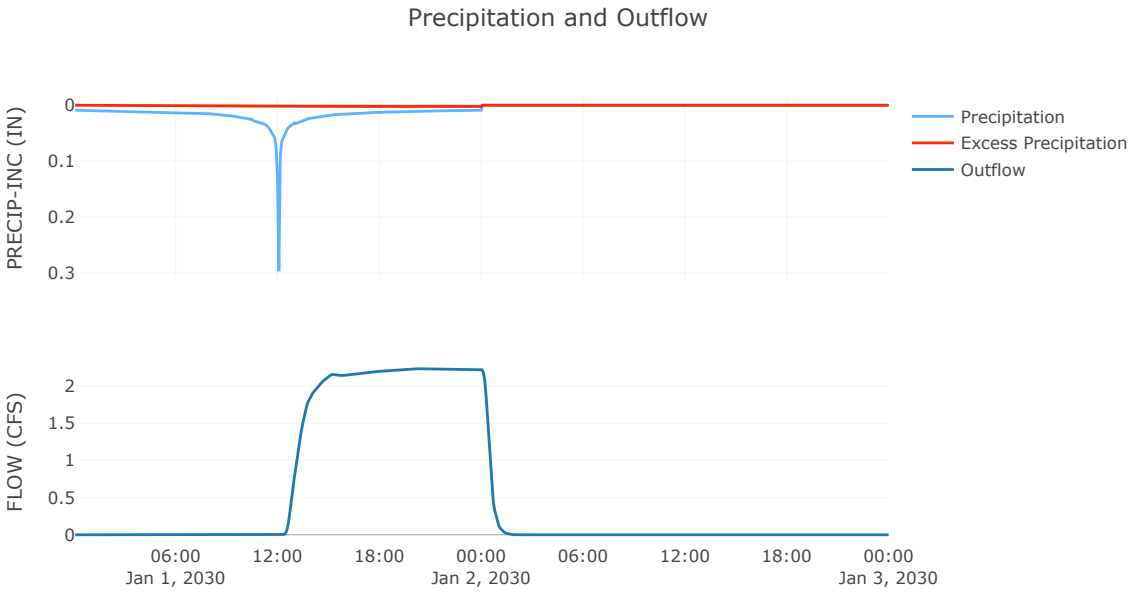
Subbasin: DA-7

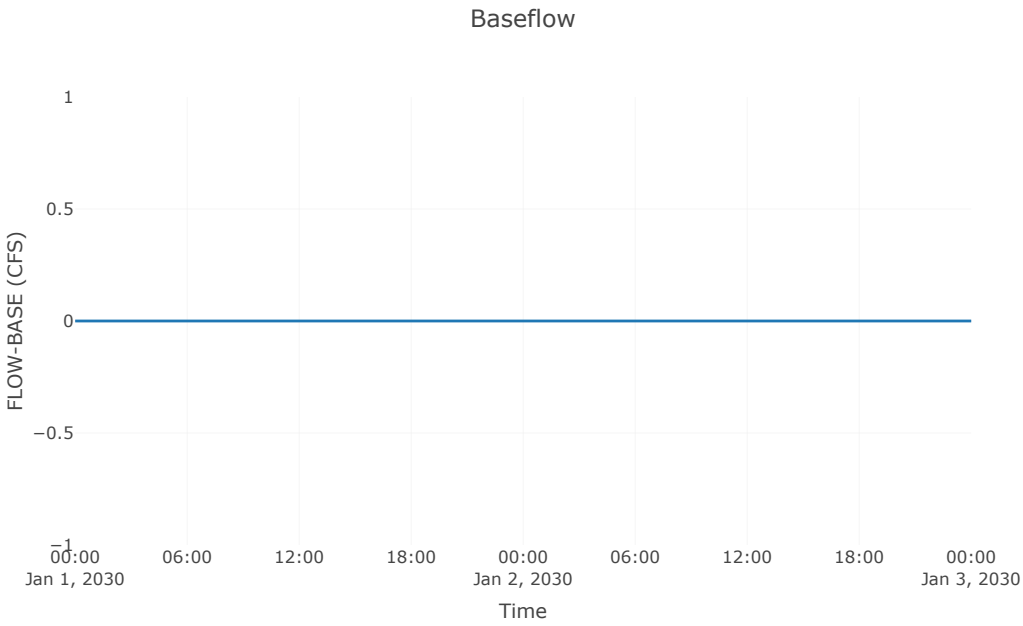
Area (MI2) : 0.13

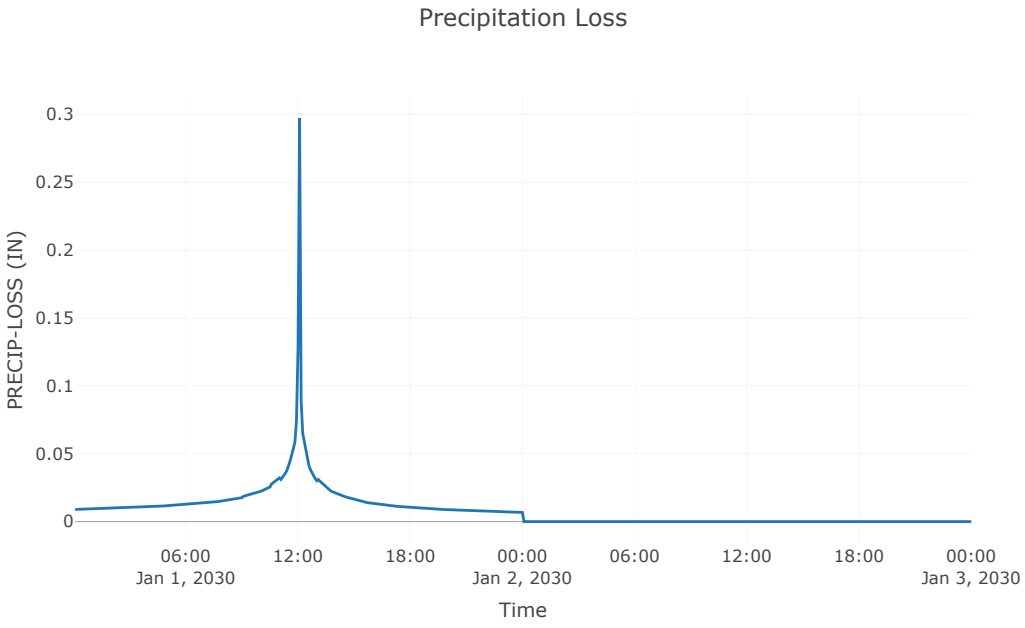
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	40.65

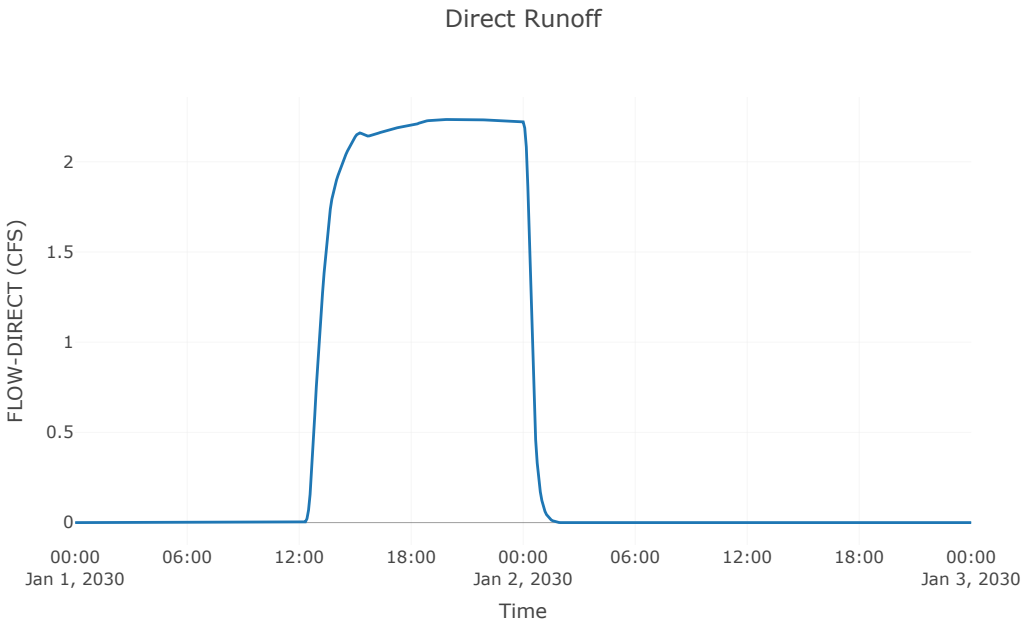
Transform: Scs	
Lag	22.38
Unitgraph Type	Standard

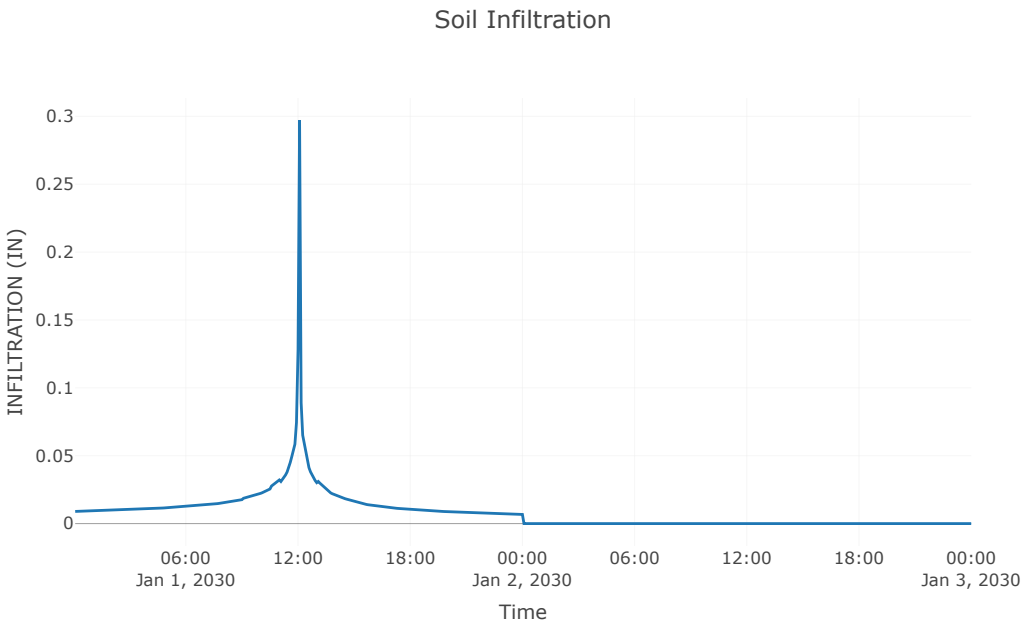
Results: DA-7	
Peak Discharge (CFS)	2.23
Time of Peak Discharge	01Jan2030, 20:30
Volume (IN)	0.3
Precipitation Volume (AC - FT)	35.43
Loss Volume (AC - FT)	33.39
Excess Volume (AC - FT)	2.05
Direct Runoff Volume (AC - FT)	2.05
Baseflow Volume (AC - FT)	0


Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
2
1.5
1
0.5
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030


Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time


Precipitation Loss
PRECIP-LOSS (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time


Direct Runoff
FLOW-DIRECT (CFS)
2
1.5
1
0.5
0
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time


Soil Infiltration
INFILTRATION (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

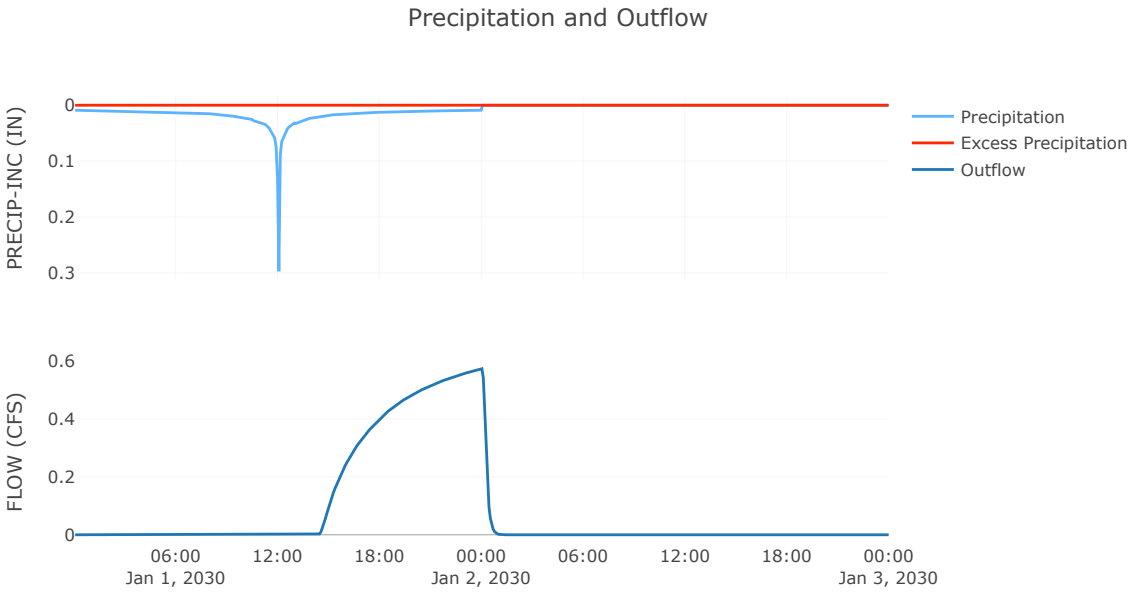
Subbasin: DA-8

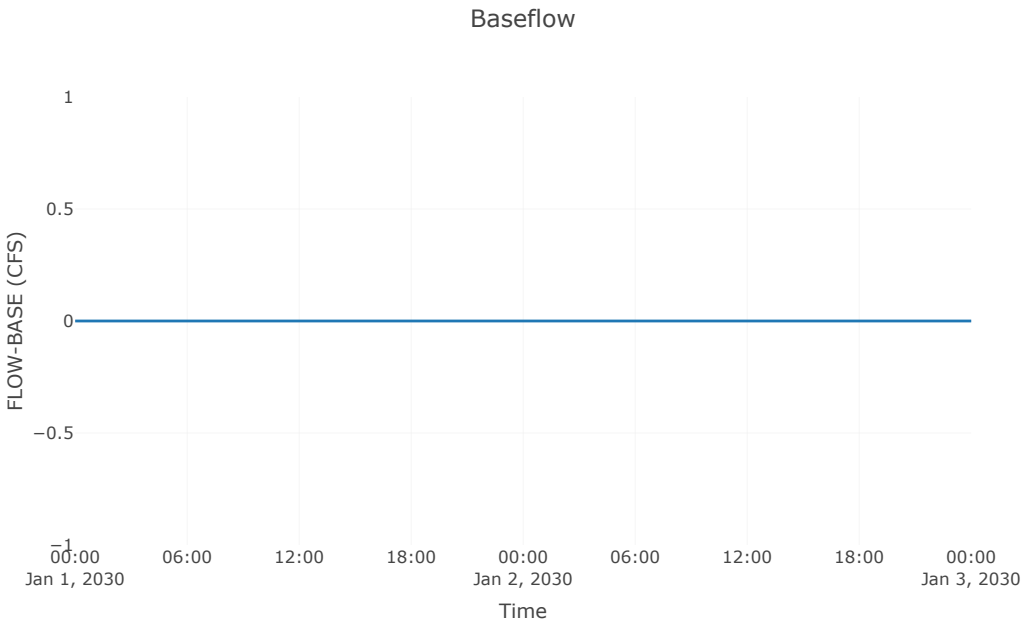
Area (MI2) : 0.06

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	35.1

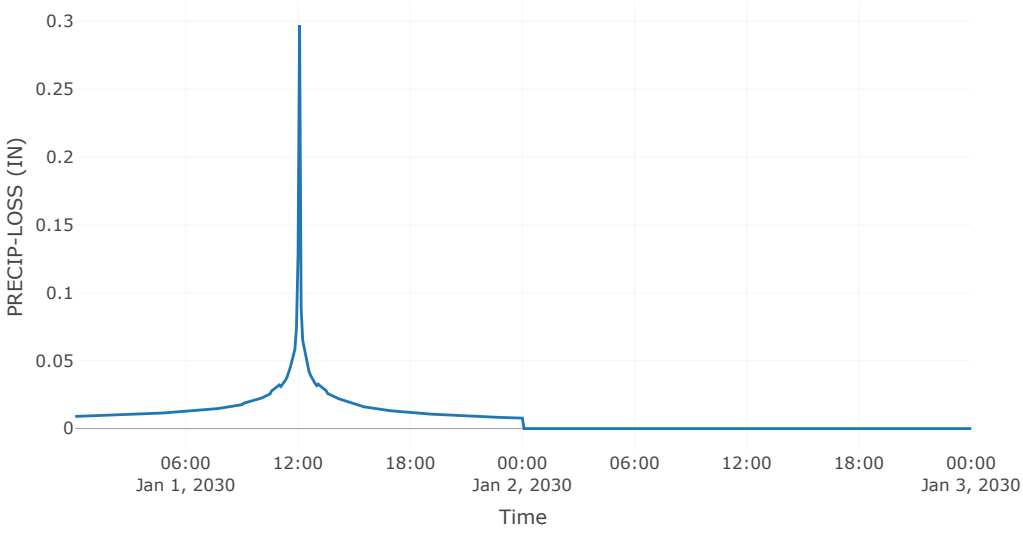
Transform: Scs	
Lag	12.54
Unitgraph Type	Standard

Results: DA-8	
Peak Discharge (CFS)	0.57
Time of Peak Discharge	01Jan2030, 24:00
Volume (IN)	0.11
Precipitation Volume (AC - FT)	16.21
Loss Volume (AC - FT)	15.87
Excess Volume (AC - FT)	0.34
Direct Runoff Volume (AC - FT)	0.34
Baseflow Volume (AC - FT)	0

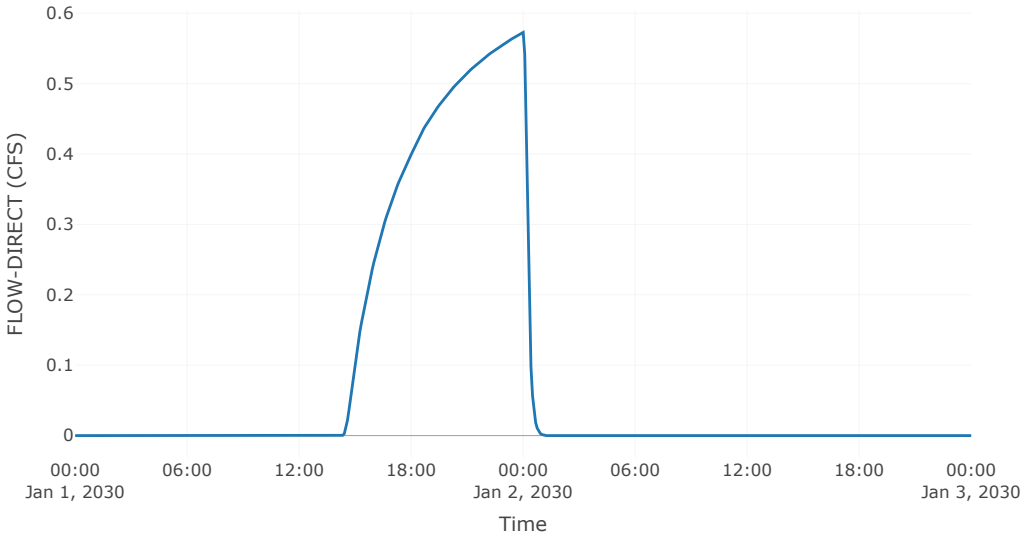

Precipitation and Outflow
PRECIP-INC (IN)
0
0.1
0.2
0.3
Precipitation
Excess Precipitation
Outflow
FLOW (CFS)
0.6
0.4
0.2
0
06:00
12:00
18:00
00:00
Jan 1, 2030
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030

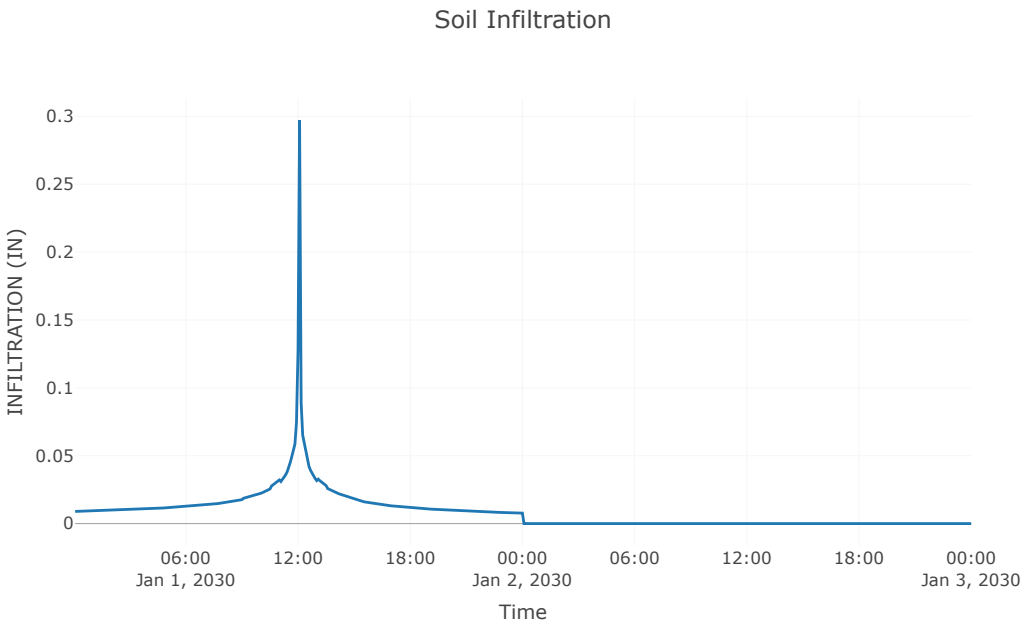

Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2030
06:00
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (IN)
0.3
0.25
0.2
0.15
0.1
0.05
0
06:00
Jan 1, 2030
12:00
18:00
00:00
Jan 2, 2030
06:00
12:00
18:00
00:00
Jan 3, 2030
Time

Appendix F: Flood Insurance Rate Map

- FIRM Map
- Figure 1 - Existing 100-year Depth Exhibit
- Figure 2 - Existing 100-year Velocity Exhibit
- Figure 3 - Proposed 100-year Depth Exhibit
- Figure 4 - Proposed 100-year Velocity Exhibit

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole–foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from USDA –Farm Service Agency –Aerial Photography Field Office dated 2005 and from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1992 or later.

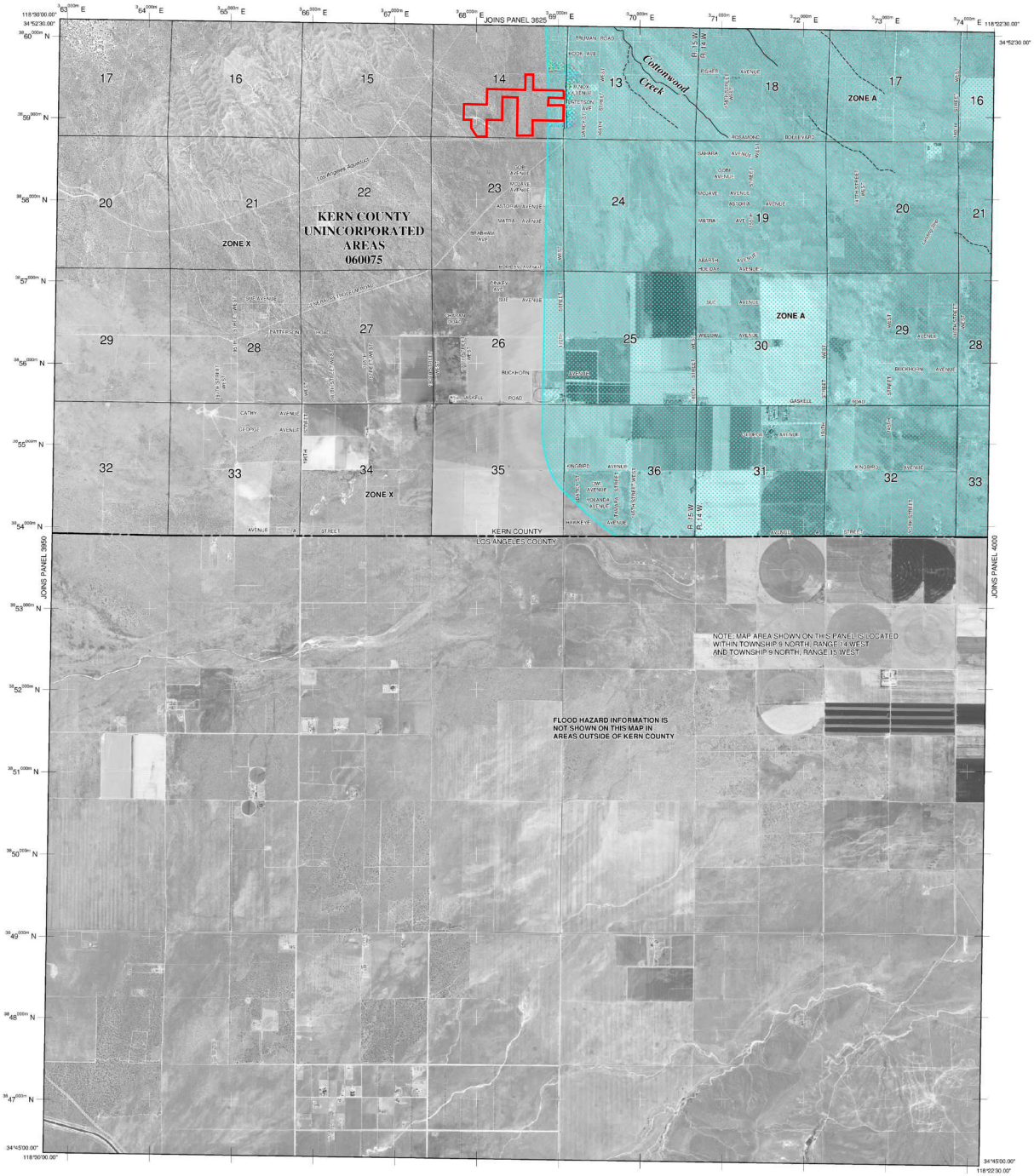
This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a *Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1–877–FEMA MAP**(1–877–336–2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 Base Flood Elevation line and value; elevation in feet*
(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A Cross section line
23 — 23 Transect line
97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN 1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 M 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1–800–638–6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 800 1200 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 3975E

FIRM
FLOOD INSURANCE RATE MAP
KERN COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 3975 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

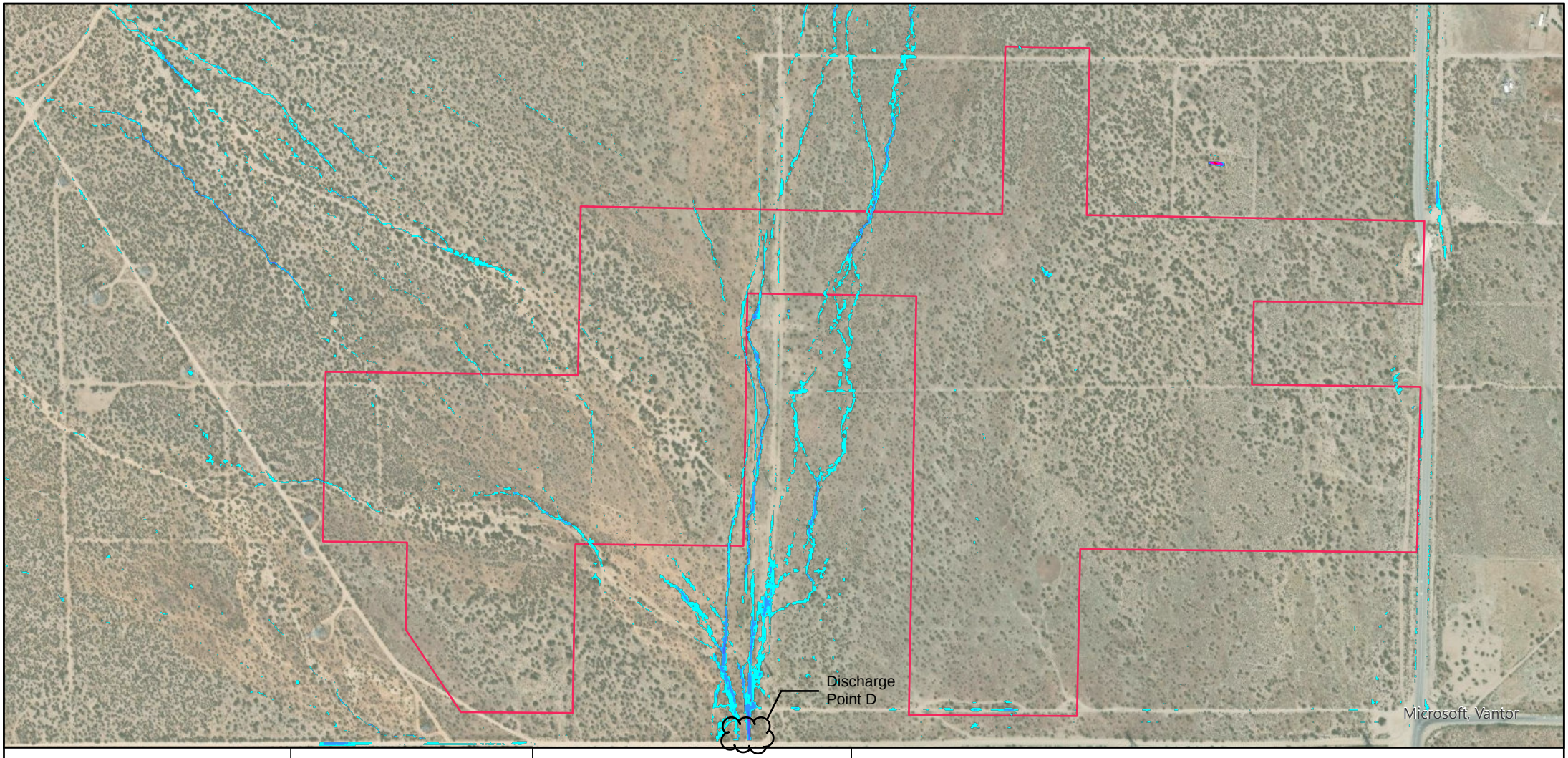
COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	3975	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06029C3975E

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency



Legend

Project Area

Existing Depth

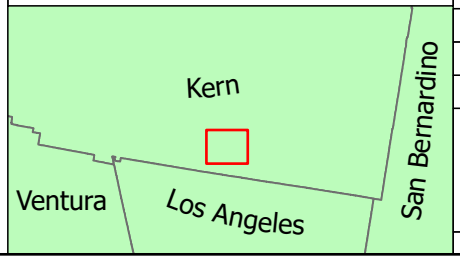
- 0.25 (MIN) - 0.5 FT
- 0.5 - 1 FT
- 1 - 1.5 FT
- 1.5 - 2 FT
- 2 - 2.5 FT
- 2.5 - 3 FT
- 3 - 3.1 FT (MAX)

Notes:
1. This figure is intended to be viewed or printed in color on A4 size paper in landscape orientation

Base Map: ArcGIS Map Service
Data Sources: TRC, USGS

N

0 0.07 0.15 Miles



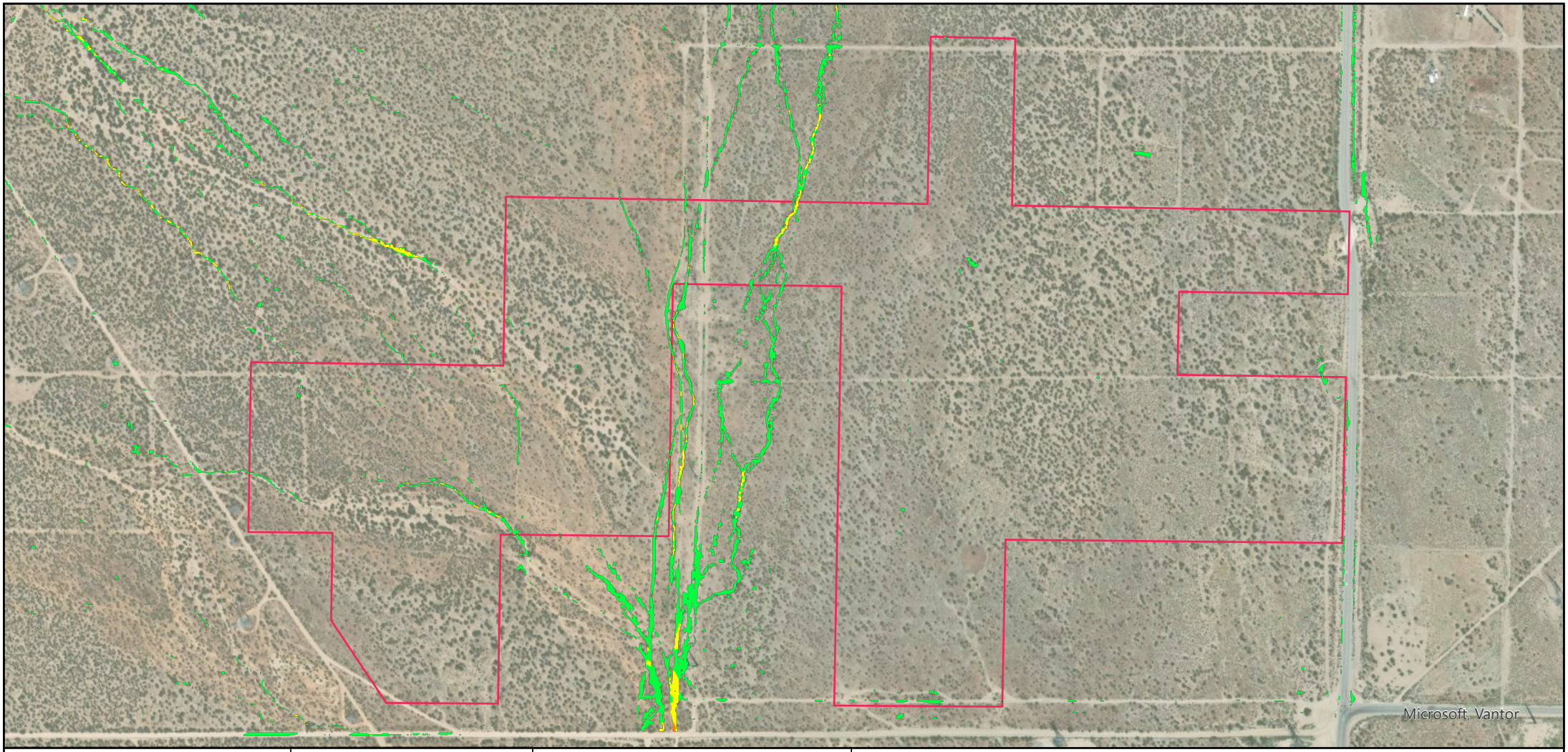
PROJECT:
EUISMOD PROJECT
KERN COUNTY, CA

TITLE:
EXISTING CONDITIONS DEPTH MAP - 100YR

DRAWN BY:	M. BROWN	PROJ. NO:	552398
CHECKED BY:	F. CANTU		
APPROVED BY:	M. LUNA	FIGURE 1	
DATE:	NOV 2025		

TRC
505 HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE:



Legend

Project Area

Existing Velocity

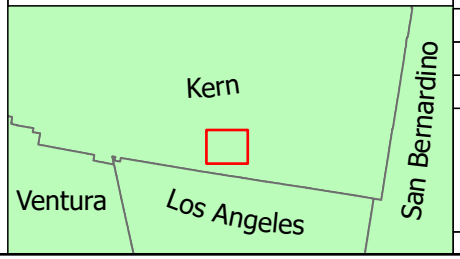
- 0.0004 (MIN) - 2 FPS
- 2 - 4 FPS
- 4 - 4.86 FPS (MAX)

Notes:
1. This figure is intended to be viewed or printed in color on A4 size paper in landscape orientation

Base Map: ArcGIS Map Service
Data Sources: TRC, USGS

N

0 0.07 0.15 Miles



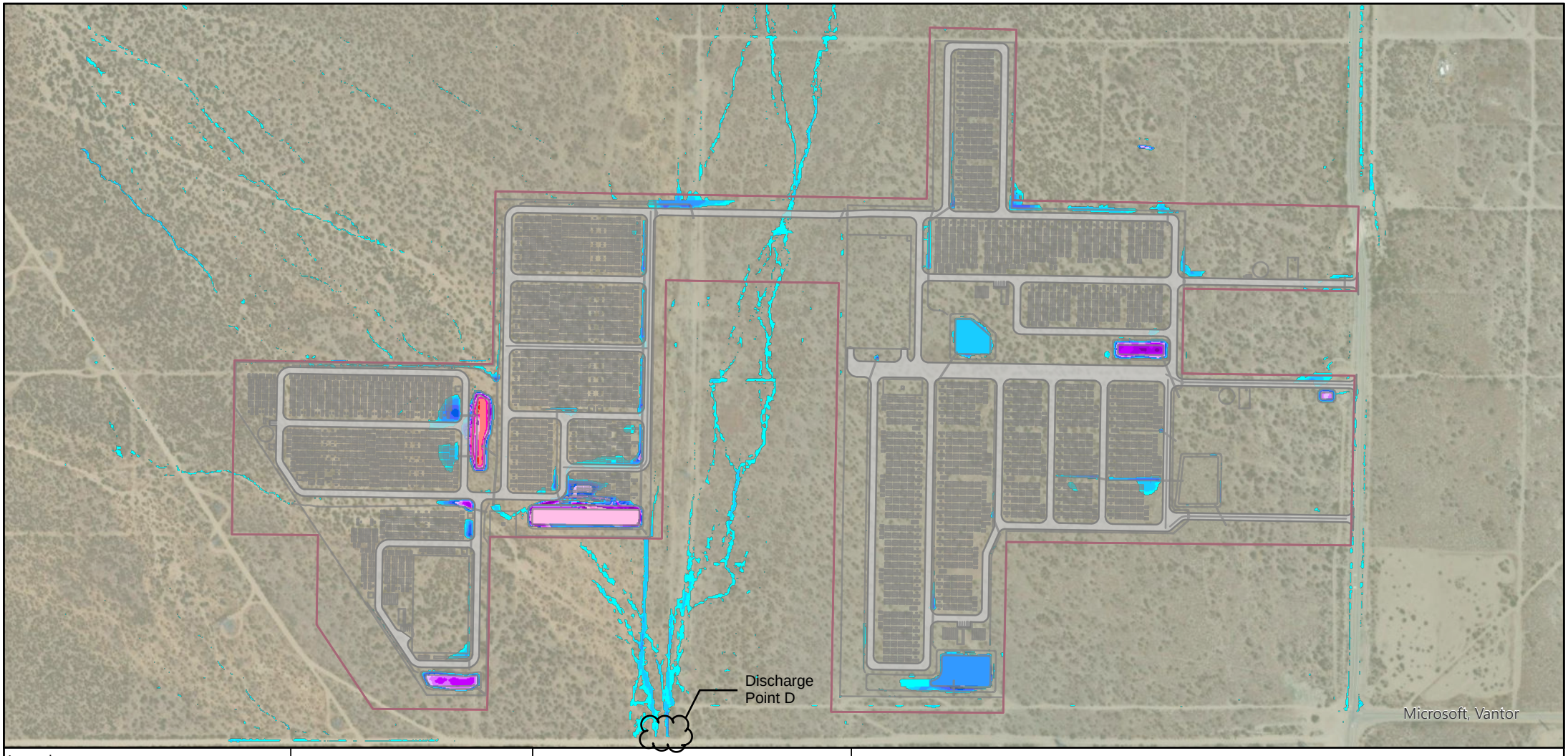
PROJECT: **EUISMOD PROJECT KERN COUNTY, CA**

TITLE: **EXISTING CONDITIONS VELOCITY MAP - 100YR**

DRAWN BY:	M. BROWN	PROJ. NO:	552398
CHECKED BY:	F. CANTU		
APPROVED BY:	M. LUNA	FIGURE 2	
DATE:	NOV 2025		

FILE:

TRC
505 HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080



Legend
- Project Area
- Battery Layout
- Roads

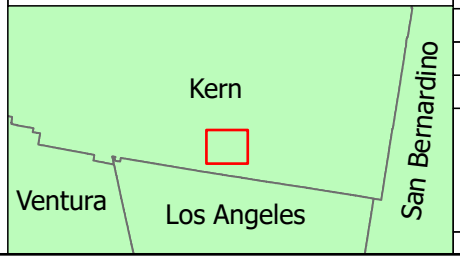
Maximum Depth
- 0.25 (MIN) - 0.5 FT
- 0.5 - 1 FT
- 1 - 1.5 FT
- 1.5 - 2 FT
- 2 - 2.5 FT
- 2.5 - 3 FT
- 3 - 3.5 FT
- 3.5 - 4 FT
- 4 - 4.5 FT
- 4.5 - 5 FT
- 5 - 5.5 FT
- 5.5 - 6 FT
- 6 - 6.5 FT
- 6.5 - 7 FT
- 7 - 7.5 FT
- 7.5 - 8.046 (MAX) FT

Notes:
1. This figure is intended to be viewed or printed in color on A4 size paper in landscape orientation

Base Map: ArcGIS Map Service
Data Sources: TRC, USGS

N

0 0.07 0.15 Miles



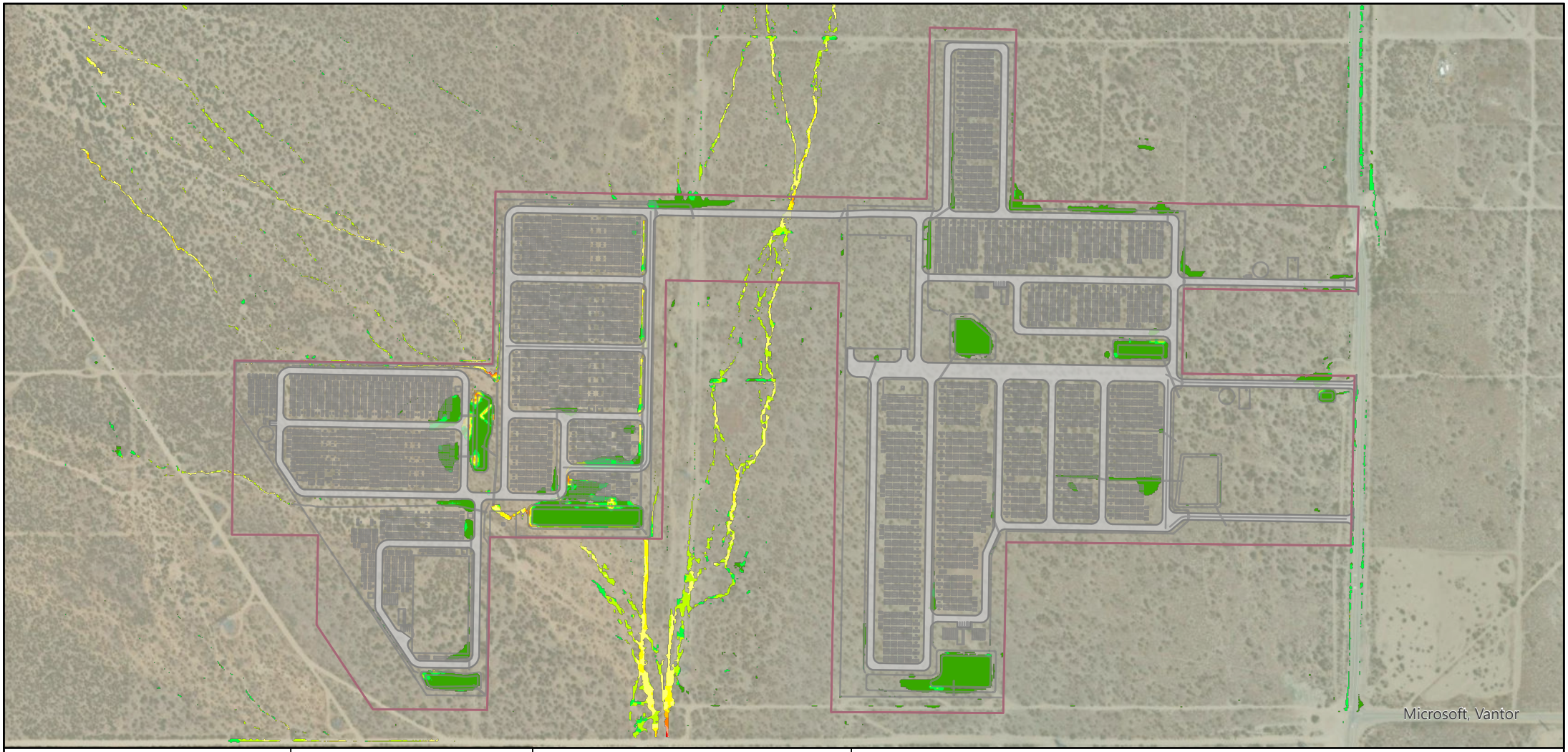
PROJECT:
EUISMOD PROJECT
KERN COUNTY, CA

TITLE:
PROPOSED CONDITIONS DEPTH MAP - 100YR

DRAWN BY:	M. BROWN	PROJ. NO:	552398
CHECKED BY:	M. LUNA		
APPROVED BY:	M. LUNA	FIGURE 3	
DATE:	MAR 2026		

505 HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE:



Legend

- Project Area
- Battery Layout
- Roads

Maximum Velocity

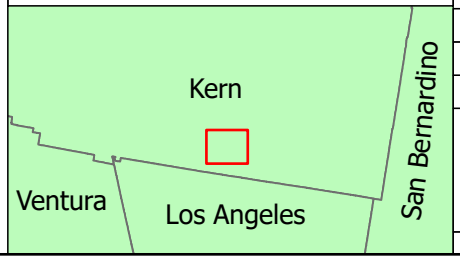
- 0 (MIN) - 0.5 FPS
- 0.5 - 1 FPS
- 1 - 1.5 FPS
- 1.5 - 2 FPS
- 2 - 2.5 FPS
- 2.5 - 3 FPS
- 3 - 3.5 FPS
- 3.5 - 4 FPS
- 4 - 4.64 (MAX) FPS

Notes:
1. This figure is intended to be viewed or printed in color on A4 size paper in landscape orientation

Base Map: ArcGIS Map Service
Data Sources: TRC, USGS

N

0 0.07 0.15 Miles



PROJECT:
EUISMOD PROJECT
KERN COUNTY, CA

TITLE:
PROPOSED CONDITIONS VELOCITY MAP - 100YR

DRAWN BY:	M. BROWN	PROJ. NO:	552398
CHECKED BY:	M. LUNA		
APPROVED BY:	M. LUNA	FIGURE 4	
DATE:	MAR 2026		

TRC
505 HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE:

Appendix I
Noise Impact Assessment Report

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Euismod Project

Noise Impact Assessment Report

May 2026

Kern County, California

Prepared For:

CAISO Euismod Project LLC
and Euismod Project I LLC

Prepared By:

TRC Solutions, Inc.
6 Executive Circle, Suite 200
Irvine, CA 92614



TABLE OF CONTENTS

1.0 INTRODUCTION AND EXECUTIVE SUMMARY 1
- 1.1 Project Description 1
- 1.2 Summary of Findings 1
  - 1.2.1 Ambient Noise Survey 1
  - 1.2.2 Noise Modeling Results 1
  - 1.2.3 Compliance with Standards 1
  - 1.2.4 Groundborne Vibration 2
  - 1.2.5 Conclusion 2

2.0 CONCEPTS OF ENVIRONMENTAL SOUND 2

3.0 APPLICABLE STANDARDS AND REGULATIONS 4
- 3.1 U.S. Environmental Protection Agency 4
- 3.2 U.S. Federal Transit Administration 4
- 3.3 California General Plan Guidelines 4
- 3.4 Kern County Code of Ordinances & General Plan 4
- 3.5 Willow Springs Specific Plan 5
- 3.6 Noise Sensitive Areas 6

4.0 SHORT TERM AMBIENT NOISE SURVEY 6

5.0 AMBIENT NOISE MONITORING RESULTS 6

6.0 OPERATIONAL NOISE IMPACTS 7
- 6.1 Modeling Inputs 7
- 6.2 Modeling Results 9
- 6.3 Cumulative Impacts 10

7.0 CONSTRUCTION NOISE IMPACTS 11
- 7.1 Construction Equipment Noise 11
- 7.2 Construction Traffic Noise 14
- 7.3 Construction Vibration 14

8.0 CONCLUSIONS 14

9.0 REFERENCES 16

TABLES

Table 2.0-1 Examples of Common Sound Pressure Levels 2
Table 3.5-1 Willow Springs Noise Level Standards 5
Table 5.0-1 Ambient Noise Survey Results 7
Table 5.0-2 Ambient Noise Survey Octave Band Results 7
Table 6.1-1 Equipment Octave Band Sound Levels 9
Table 6.2-1 Predicted Noise Levels 10
Table 6.3-1 Cumulative Impact Noise Levels (L_{eq}, dBA) 11
Table 7.1-1 Construction Phases and Equipment Sound Levels (Lmax at 50 ft) 11
Table 7.1-2 Construction Noise Levels at Nearest Receptor 13

FIGURES

Figure 1 Site Layout
Figure 2 Modeling Results
Figure 3 Zoning Map

1.0 Introduction and Executive Summary

TRC Solutions, Inc. (TRC) has prepared this Noise Impact Assessment Report for the Euismod Project battery energy storage development (the Project), located in the Willow Springs area of eastern Kern County, California. The Project area is depicted on the attached Figure 1. The assessment evaluates the potential noise impacts of the project on the surrounding environment, including nearby Noise-Sensitive Areas (NSAs).

1.1 Project Description

The Project is a proposed electric energy storage facility that will utilize lithium-ion batteries and ancillary equipment to store energy received from the regional electric grid to then be returned to the grid when needed. The Project site is located on an approximately 120-acre parcel with an average elevation of 850 meters (2,789 feet) and a slight downward slope from northwest to southeast. The Project area and adjacent lands are largely undeveloped except for electrical infrastructure, primarily the Whirlwind Substation and high voltage transmission corridors. The Project includes two proposed 220 kV overhead electric tie-lines between the Project site and the Whirlwind Substation with overhead or underground communications, and installation of interconnection facilities within the existing Whirlwind Substation. Southern California Edison will be responsible for constructing, owning, and operating the electric tie-lines between the Project site and the Whirlwind Substation, and the interconnection at the Whirlwind Substation.

1.2 Summary of Findings

1.2.1 Ambient Noise Survey

Pre-construction noise measurements were conducted at five locations within the project site. Background noise levels (L_{90}) ranged from 32.9 to 37.5 dBA (decibels, A-weighted), reflecting a quiet rural environment.

1.2.2 Noise Modeling Results

Operational noise modeled using Cadna-A® software estimated worst-case daytime (L_d) operational noise levels at the property boundary to be 57.9 dBA and at the NSAs to be 32.3 to 33.9 dBA. The corresponding worst-case 24-hour day-night levels (L_{dn}) are 64.6 dBA at the property line and 40.5 dBA at the nearest NSA. Construction noise modeled using the Federal Transit Administration's (FTA's) Roadway Noise Construction Model estimated worst-case construction noise levels (1-hour L_{eq}) at the nearest NSA to be 63.4 dBA.

1.2.3 Compliance with Standards

The Project's operational levels at NSAs would be below Kern County General Plan Noise Element (Kern County Planning and Natural Resources Department, 2005) design goal limit of 65 dBA (L_{dn}), and below the recommended threshold set by the United States Environmental Protection Agency (USEPA, 1978) of 55 dBA (L_{dn}) for residential areas. Worst-case levels at the property line would exceed the California General Plan Guidelines (California, no date) limit of 60 dBA (L_{dn}) for Normally Acceptable operations affecting Residential - Low Density land uses by 4.6 dBA and the Willow Springs Specific Plan nighttime L_{50} guideline value of 60 dBA by 4.6 dBA.

The Project's construction noise levels would comply with all requirements, since construction activities would not occur within the county's time-of-day restrictions listed in Chapter 8.36 of the Kern County Code of Ordinances, and construction noise would be less than FTA's guideline criteria for residential areas. No other federal, state, or local noise restrictions apply to the Project.

1.2.4 Groundborne Vibration

Groundborne vibration is not expected to be perceptible at any NSA during operation or construction.

1.2.5 Conclusion

The Euismod Project is expected to operate and be constructed within acceptable noise and vibration thresholds, ensuring minimal impact on the surrounding environment and nearby NSAs. The project meets all local, state, and federal noise and vibration guidelines. Therefore, no significant adverse effects are anticipated.

2.0 Concepts of Environmental Sound

Sounds are generated by a variety of sources (e.g., a musical instrument, a voice speaking, or an airplane that passes overhead). Energy is required to produce sound, and this sound energy is transmitted through the air in the form of sound waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear. The range of sound pressures that can be detected by a person with normal hearing is very wide, ranging from about 20 micro-pascals (μPa) for very faint sounds at the threshold of hearing to nearly 10 million μPa for extremely loud sounds, such as a jet during take-off at a distance of 300 feet. Because the range of human hearing is so wide, sound levels are reported using "sound pressure levels", which are expressed in terms of decibels. The sound pressure level in decibels is the logarithm of the ratio of the sound pressure of the source to the reference sound pressure of 20 μPa, multiplied by 20.

Table 2.0-1 provides some examples of common sources of sound and their sound pressure levels. All sound levels in this assessment are provided in A-weighted decibels, abbreviated "dB(A)" or "dBA." The A-weighted sound level reflects how the human ear responds to sound, by deemphasizing sounds that occur in frequencies at which the human ear is least sensitive to sound (at frequencies below about 100 hertz and above 10,000 hertz) and emphasizing sounds that occur in frequencies at which the human ear is most sensitive to sound (in the mid-frequency range from about 200 to 8,000 hertz). In the context of environmental sound, noise is defined as "unwanted sound."

Table 2.0-1 Examples of Common Sound Pressure Levels

Sound Level dB(A)	Common Indoor Sounds	Common Outdoor Sounds
110	Rock Band	Car Horn at 3 feet
100	Inside NYC Subway Train	-
90	Food Blender at 3 feet	Gas Lawn Mower at 3 feet Diesel Truck at 150 feet
80	Garbage Disposal at 3 feet Shouting at 3 feet	Noisy Urban

Table 2.0-1 Examples of Common Sound Pressure Levels

Sound Level dB(A)	Common Indoor Sounds	Common Outdoor Sounds
70	Vacuum Cleaner at 10 feet	Busy Highway at 50 feet
60	Normal Speech at 3 feet	Commercial Area
50	Large Business Office Dishwasher in Next Room	Quiet Urban
40	Small Theatre Large Conference Room (Background)	Quiet Rural
30	Library Bedroom at Night Concert Hall (Background)	-

Source: U.S. Federal Aviation Administration (FAA), 2022

Sound pressure levels are typically presented in community noise assessments utilizing the noise metrics described below and expressed in terms of A-weighted decibels.

- "L_{10}" is the sound level that is exceeded for 10 percent of the time. This metric is a measure of the intrusiveness of relatively short-duration noise events that occurred during the measurement period.
- "L_{50}" is the sound level that is exceeded for 50 percent of the measurement period.
- "L_{90}" is the sound level that is exceeded for 90 percent of the time and is a measure of the background or residual sound levels in the absence of recurring noise events.
- "L_{eq}" is the is the constant sound level which would contain the same acoustic energy as the varying sound levels during the time period and is representative of the average noise exposure level for that time period.
- "L_{max}" is the instantaneous maximum sound level for the time period.
- "LC" is the C-weighted, energy-equivalent sound level, appropriate for characterizing sounds dominated by low frequencies over long distances.
- "L_d" is the average of daytime L_{eq} sound levels.
- "L_{dn}" is the day-night average sound level, averaged over 24 hours with a 10 dBA penalty added to nighttime noise (between 10PM and 7AM)
- "CNEL" is the community noise exposure level, averaged over 24 hours with a 5 dBA penalty added to evening noise (7PM to 10PM) and a 10 dBA penalty added to nighttime noise (10PM to 7AM).

It is often necessary to combine the sound pressure levels from one or more sources. Because decibels are logarithmic quantities, it is not possible to simply add the values of the sound pressure levels together. For example, if two sound sources each produce 70 dB and they are operated together, their combined impact is 73 dB – not 140 dB as might be expected. Four equal 70 dB sources operating simultaneously result in a total sound pressure level of 76 dB. In fact, for every doubling of the number of equal sources, the sound pressure level goes up another three decibels. A tenfold increase in the number of sources makes the sound pressure level increase by 10 dB, while a hundredfold increase makes the level increase by 20 dB. The logarithmic combination of *n* different sound levels is calculated by the following equation:

$$L_{total}=10*\log_{10}\left(10^{\frac{L_1}{10}}+10^{\frac{L_2}{10}}+\ldots+10^{\frac{L_n}{10}}\right)$$

Perceived changes in sound level can be slightly more subjective; the average person will not notice a change of 1-2 dB, a 3 dB increase is just barely perceptible, while a 5 dB change is clearly noticeable.

3.0 Applicable Standards and Regulations

3.1 U.S. Environmental Protection Agency

In 1974, the USEPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (USEPA 1974), which includes widely accepted recommendations for long-term exposure to environmental noise with the goal of protecting public health and safety. This report includes a large database of community reaction to long-term noise impacts to which Project operation can be readily compared. This publication evaluates the effects of environmental noise with respect to health and safety and provides information for state and local governments to use in developing their own ambient noise standards. For the outdoors in residential areas and other places in which quiet is a basis for use, the recommended USEPA guideline is a noise level of 55 dBA. If Project operations meet this criteria level, receptors are expected to regard the noise levels as generally acceptable.

3.2 U.S. Federal Transit Administration

In 2018, the U.S. Federal Transit Administration (FTA) issued a Transit Noise and Vibration Impact Assessment Manual that includes guidance regarding construction noise (FTA 2018). The manual notes that "While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction." The guideline criteria provided in the manual for residential areas is an 8-hour daytime L_{eq} of 80 dBA.

3.3 California General Plan Guidelines

In California, there are no overarching state-level regulations specifically governing noise. Instead, the responsibility for managing noise falls to local governments, such as cities, towns, and counties. Local municipalities typically establish noise ordinances tailored to their community's needs, addressing issues like acceptable noise levels, quiet hours, and restrictions on certain activities or equipment. However, California's General Plan Guidelines (California, no date) provide Noise Element Guidelines in Appendix D. For the Residential - Low Density land use category shown in Figure 2 of these guidelines, the normally acceptable noise range limit is 60 dBA (L_{dn}).

3.4 Kern County Code of Ordinances & General Plan

Chapter 8.36 of the Kern County Code of Ordinances, entitled "Noise Control," does not include noise requirements applicable to facility operation, but does specify noise limits for construction activities. Section H of this chapter states that it is unlawful "to create noise from construction, between the hours of nine (9:00) p.m. and six (6:00) a.m. on weekdays and nine (9:00) p.m. and eight (8:00) a.m. on weekends, which is audible to a person with average hearing faculties or

capacity at a distance of one hundred fifty (150) feet from the construction site, if the construction site is within one thousand (1,000) feet of an occupied residential dwelling." The nearest occupied residential dwelling is approximately 906 feet from the nearest Project property boundary. However, since no Project construction activities would occur during the hours covered by this ordinance, this ordinance is not applicable. In the County's Zoning ordinance, there are specific octave band limits for wind installations but no limits regarding noise pertinent to the Project.

The Kern County General Plan contains a Noise Element that includes design goals for receiving properties designated as noise-sensitive land uses. These areas include residential areas, schools, hospitals, parks, and churches. The implementation measures in the policy "require proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise sensitive land uses to exterior noise levels in excess of 65 dB L_{dn}."

3.5 Willow Springs Specific Plan

The Willow Springs Specific Plan's Noise Element includes the following policy and mitigation/implementation measures. The project is located within the plan area; therefore, the noise impact assessment needs to model and calculate impacts based on the plan's implementation measures.

Policy 3: Land uses will be categorized in the following manner, and the noise level standards adopted in accordance with the Kern County Noise Element:

- [In]sensitive Land Uses. Noise level does not affect the successful operation of these particular activities. A wide variety of uses can be included in this category, including public utilities, transportation systems, and other noise-related uses.
- Moderately Sensitive Land Uses. Some degree of noise control must be present if these activities are to be successfully carried out. Included here are general business and recreational uses.
- Sensitive Uses. Lack of noise control will severely impact these uses, reducing the quality of life. This category primarily contains residential uses.
- Highly Sensitive Uses. A high degree of noise control is necessary for the successful operation of these activities. Examples include hospitals and churches.

Measure 1: The following standards are established as the maximum desired ambient noise levels. Noise shall be attenuated so as not exceed these standards.

Table 3.5-1 Willow Springs Noise Level Standards

Land Use	L_{50} dB(A) "L_{dn}"		CNEL
	Day	Night	
Insensitive Uses	65	60	75
Moderately Sensitive Uses	60	55	70
Sensitive Uses	55	45	65
Highly Sensitive Uses	50	40	60

The Plan provides separate L_{dn} values for day and night. TRC assumes these are intended to be separate daytime (L_d) and nighttime (L_n) values. Since all equipment is modeled as operating continuously, the modeled L_{50} values would be the same as the L_{EQ} (see section 6.0).

3.6 Noise Sensitive Areas

Lands adjacent to the Project are undeveloped other than electrical and other utility infrastructure including the Whirlwind Substation. Development in the larger surrounding area consists mostly of solar and wind electric generation projects and to a lesser extent agriculture with scattered rural residences. Zoning is either "A WE," "Exclusive Agriculture and Wind Energy Combining District," or "E RS," "Estate and Residential Suburban Combining District." Noise-Sensitive Areas (NSAs) are defined as areas that may be particularly sensitive to noise and may require additional protection. NSAs may include properties such as residences, schools, or hospitals. TRC has identified the nearest potential residential NSAs to the northwest and west of the Project site between approximately 900 and 3800 feet from the property line.

4.0 Short Term Ambient Noise Survey

A short-term pre-construction ambient noise survey was conducted at the Project site on April 16, 2025, to characterize the existing sound environment (i.e., background) in the Project area. The methodology and results of the survey are further described below.

Short term sound level measurements were taken at various locations within the proposed site for approximately ten minutes at each location. The locations were identified as measurement points (MP) MP-1 through MP-5. The measurements were taken using a Larson Davis Model 831C sound level meter that meets the requirements of the American National Standards Institute (ANSI) Standards for Type I instruments. The sound level meter was calibrated before and after each monitoring period using a CAL200 acoustic calibrator. The microphone was positioned according to the ANSI Standard on a tripod 1.5 meters above ground, 7.5 meters from large reflecting surfaces, and at least 1.5 meters from tall trees. The proposed Project layout and location of the measurement points are shown in Figure 1.

5.0 Ambient Noise Monitoring Results

The results of the short-term measurements collected at the Project site are summarized in Table 5.1-1 below. Background levels, represented by the L_{90} metric, ranged from 32.9 to 37.5 dBA at the short-term measurement sites. The following metrics provided in Tables 5.0-1 and 5.0-2 were measured at each measurement location and over each measurement period:

- L_{eq}, LC, L_{10}, L_{50}, and L_{90}
- Unweighted octave-band analysis (16, 31.5, 63, 125, 250, 500, 1K, 2K, 4K, 8K Hz)

Table 5.0-1 Ambient Noise Survey Results

Location	L_{eq}	LC	L_{10}	L_{50}	L_{90}
MP-1	41.3	69.9	42.7	37.7	35.2
MP-2	42.9	69.5	45.6	41.0	37.3
MP-3	39.1	67.8	42.2	35.8	32.9
MP-4	40.4	70.1	42.7	35.8	33.1
MP-5	51.5	75.6	49.9	43.0	37.5

Table 5.0-2 Ambient Noise Survey Octave Band Results

Location	Octave Band Center Frequency (Hz)									
	16	31.5	63	125	250	500	1000	2000	4000	8000
MP-1	70.1	63.1	53.5	44.3	40.0	31.8	27.5	24.2	17.1	11.0
MP-2	70.1	62.5	51.5	44.8	40.6	29.8	29.9	29.3	25.3	23.1
MP-3	67.4	61.1	50.0	40.8	39.9	28.5	24.2	22.2	18.2	13.5
MP-4	69.6	63.8	52.6	43.5	40.7	31.1	26.3	20.1	14.5	10.4
MP-5	75.7	69.2	57.6	49.3	46.1	42.5	43.5	36.8	29.9	22.4

6.0 Operational Noise Impacts

Changes to existing noise levels due to operation of the Project were quantified using predictive noise modeling based on the proposed equipment layout and specifications. The Cadna-A® computer noise model was used to predict future sound pressure levels from the operation of the Project at the property line.

6.1 Modeling Inputs

An industry standard, Cadna A® was developed by DataKustik GmbH to provide an estimate of sound levels at distances from specific noise sources. This model takes into account:

- Sound power levels from stationary and mobile sources;
- The effects of terrain features including relative elevations of noise sources;
- Intervening objects including buildings and sound barrier walls; and
- Ground effects due to areas of pavement and unpaved ground.

Cadna-A® accounts for shielding and reflections due to intervening buildings or other structures in the propagation path, as well as diffracted paths around and over structures, which tend to reduce computed noise levels. The shielding effects due to intervening terrain are included in the model. The shielding effects due to the proposed equipment and existing off-site buildings and ground vegetation were excluded from the model to provide a level of conservatism to the analysis.

For ground effects, the reflectivity of the surface is described by a “ground factor” variable (G), which ranges from 0 for ‘hard’ ground (paved surfaces, concrete, etc.) and 1 for “porous” ground (grassland and other vegetated areas). Based on the proposed paved site design, a ground factor of 0 was used for the model, as well as for the surrounding area for conservatism.

The International Standards Organization current standard for outdoor sound propagation (ISO 9613 Part 2 – “Attenuation of sound during propagation outdoors”) was used within Cadna-A®. This standard provides a method for calculating environmental noise in communities from a variety of sources with known emission levels. The method contained within the standard calculates the attenuation over the entire sound path under weather conditions that are favorable for sound propagation, such as for downwind propagation or “under a well-developed moderate ground-based temperature inversion.” Application of conditions that are favorable for sound propagation yields conservative estimates of operational noise levels in the surrounding area.

Inputs to the noise model include the equipment listed in Table 6.1-1. The table shows both un-weighted and A-weighted overall levels in units of dB and dBA, respectively. Since the sound-producing equipment were assumed to be continuously operating, the L_{90} (background level) and L_{eq} (equivalent constant level) of the proposed equipment are the same for the purposes of this assessment. The primary noise-producing sources on the site during Project operation will be the BESS containers, medium-voltage transformers, DC converters, and substation step-up transformers. A total of 2,898 BESS containers, 361 transformers, 1,172 DC converters, and 6 substation step-up transformers are proposed throughout the site. The location of these sources is shown on Figure 1.

The source model inputs and locations were based on proposed electrical equipment specifications in design drawings by TRC dated February 19, 2026. The sound pressure level for the proposed SolBank 3.0 battery containers is less than 75 dBA at one meter according to manufacturer specifications, resulting in a sound power level of 81.5 dBA. The sound level for the transformer units, the Power Electronics Multi PCSM, is not listed in manufacturer specifications, so the modeled sound levels are based on a 3060 kVA transformer with a sound power level of 98.0 dBA. The sound level for the DC converters, the Power Electronics DC/DC, was also not listed in manufacturer specifications, so the modeled sound levels were based on a comparable DC converter with a sound power level of 86.2 dBA. Step up transformers were modeled based on National Electrical Manufacturers Association standard sound pressure level of 87 dB at 1 meter (3.28 feet), with an equivalent sound power level of 98 dBA. Since the sound-producing equipment were assumed to be continuously operating, the L_{90} (background level) and L_{eq} (equivalent constant level) of the proposed equipment are the same for the purposes of this assessment. The Project tie-line interconnections at the Whirlwind Substation will not include any sources of substantial routine operational noise. Corona from the high voltage infrastructure is not anticipated to be a significant source of noise given the region’s typically dry atmospheric conditions and absence of nearby receptors.

Table 6.1-1 Equipment Octave Band Sound Levels

Equipment	Octave Band Center Frequency (Hz)									Overall dB	Overall dBA
	31.5	63	125	250	500	1000	2000	4000	8000		
Battery Containers	78.0	73.0	73.0	81.0	80.0	75.0	73.0	69.0	70.0	86.0	81.5
BESS Transformers	73.7	89.4	89.9	90.3	90.4	88.4	84.7	94.3	91.7	99.6	98.0
DC Converter	87.6	91.6	87.6	83.6	87.6	76.6	72.6	68.6	70.6	95.4	86.2
Step-Up Transformers	86.0	92.0	94.0	89.0	89.0	83.0	78.0	73.0	66.0	98.0	89.4

6.2 Modeling Results

Cadna-A® allows the user to place receptors at selected locations and predicts noise levels at those specific receptor locations. For this analysis, specific receptors were placed within the Project site property near the property boundaries and at nearby potential NSA locations. The five measurement points were selected as the receptors within the property, as shown in Figures 1 and 2 and labeled MP-1 through MP-5. The potential NSA receptors are shown in Figure 2 and are labeled NSA-1 through NSA-3. Background levels at potential NSA locations were based on the nearest measurement point.

Table 6.2-1, below, presents the background and predicted noise levels at each receptor. As shown in Table 6.2-1, the predicted noise level (L_{dn}) along the Project site property line at the measurement points ranged from 46.5 (MP-2) to 65.6 (MP-4) dBA. Since MP-4 is inside the property line, the noise level predicted at property line at this location is expected to be 1 dBA lower (64.6 dBA). This value represents the highest level predicted at any point along the Project boundary, along the north boundary in the western portion of the Project. The L_{dn} noise levels at the nearest NSAs are predicted to range from 38.9 to 40.5 dBA.

The model also calculated noise levels for the surrounding area, using a 2-meter receptor grid, with a receptor height of 1.55 meters (5.09 feet). This data is displayed in the isopleths on Figure 2, which show lines of equal daytime noise levels (L_d) at the site. Day-night noise levels (L_{dn}) would be approximately 6 dBA higher. Figure 3 shows that the area along the northwest boundary of the Project is zoned as E(5)RS and E(10)RS, which are zones for 5- and 10-acre estate residential serving uses, respectively. While the modeled noise levels would not exceed County guidelines of 65 dBA (L_{dn}) for residential uses, they would exceed state of California General Plan guidelines of 60 dBA (L_{dn}) for residential areas by up to 4.6 dBA within an area about 100 feet outside the boundaries of the northwest corner of the Project. Since no residential uses exist in this area at this time, this impact would be avoided by the County requiring a 100-foot setback from the Project property line for any residential development in this area.

Table 6.2-1 Predicted Noise Levels

Receptor ID	Background Sound Level, L_{90} (dBA)	Predicted Sound Level, L_{eq} (dBA)	Predicted Sound Level, L_{dn} (dBA)
MP-1	35.2	53.6	60.2
MP-2	37.3	39.9	46.5
MP-3	32.9	42.9	49.5
MP-4	33.1	58.9*	65.6*
MP-5	37.5	42.2	48.8
NSA-1	35.2	32.6	39.2
NSA-2	37.3	33.9	40.5
NSA-3	37.3	32.3	38.9

*Since MP-4 is inside property line, levels at property line would be 1 dBA lower than those shown.

6.3 Cumulative Impacts

One reasonably foreseeable project was identified close enough to the Euismod Project to potentially cause a cumulative noise impact. That project is the Keyhole Wind Energy Project proposed by EDF Renewables. The noise study included in the 2023 Kern County Final Environmental Impact Report (EIR) does not include modeling of operational noise levels but concludes the noise levels from the Keyhole Wind Energy Project would be lower than those indicated by the previous study conducted for the Pacific Wind Project. The 2010 Pacific Wind EIR noise report predicted noise levels (L_{eq}) for NSA-1, 2, and 3 to be 46.5 to 47.4 dBA (Bollard, 2022 and Sapphos, 2010). Because the Keyhole Wind Energy Project would have lower noise levels than the original Pacific Wind Project, use of the noise values from the 2010 EIR is conservative for estimating cumulative noise impacts, potentially overestimating the impact.

Table 6.3-1 shows the existing ambient noise levels, the Euismod Project Only noise levels, the Pacific Wind predicted noise levels, and the predicted cumulative noise levels at NSA-1, 2, and 3 (all L_{eq}). As shown, since ambient levels are greater than Project levels, and since the total contribution of ambient and Project levels to cumulative noise levels would be only 0.1 to 0.2 dBA, the contribution of the Project to cumulative noise impacts at the NSAs would be negligible. Further, the resulting cumulative noise level at any NSA does not exceed acceptable noise level ranges set forth in the California General Plan Guidelines or receptor thresholds established by USEPA.

Table 6.3-1 Cumulative Impact Noise Levels (L_{eq}, dBA)

Receptor ID	Ambient (TRC)	Project Only (TRC)	Pacific Wind (Sapphos)	Cumulative
NSA-1	35.2	32.6	47.1	47.3
NSA-2	37.3	33.9	46.5	46.7
NSA-3	37.3	32.3	47.4	47.5

7.0 Construction Noise Impacts

Short-term, localized increases in noise levels are likely to occur during construction. Standard construction equipment will be used in the construction of the Project. However, weather conditions, site conditions, specialized construction techniques, emergencies, or other atypical circumstances may alter noise levels.

7.1 Construction Equipment Noise

Based on the Project equipment usage predictions, a noise level calculation was performed using the Federal Highway Administration's Roadway Construction Noise Model (RCNM) version 1.1 (FHWA, 2006). To be conservative, all Project construction equipment for each phase was included in the noise model as operating at the same time and at the same location. The highest noise levels during construction are expected during activities involving drilling rig equipment, which has the highest assumed sound level of all the equipment being considered for use. A list of the major proposed noise-producing construction equipment is included in Table 7.1-1 below. The activities shown in the table would occur in each of the two years of construction.

Table 7.1-1 Construction Phases and Equipment Sound Levels (Lmax at 50 ft)

Construction Phase	Schedule	Equipment	HP	Qty	Hours/Day	Sound Level (dBA)
SCE IT/Telecom	Month 1	Plate Compactor	5	2	4	82
		Skid Steer Loader	70	1	8	80
		Bucket Truck	100	1	2	84
		Small Cable Puller	15	1	4	85
		Trencher	20	1	4	82
Onsite Clearing/Grading	Month 1-6	Crawler Tractor	150	2	8	80
		Chipper	25	1	8	85
		Grader	140	2	8	85
		Water Truck	180	2	8	84
		Rollers	75	2	8	85
		Tractor/Loader/Backhoe	100	1	5	80
	Month 2-3	Bore/Drill Rig	160	1	8	95
		Crane	150	1	8	83

Table 7.1-1 Construction Phases and Equipment Sound Levels (Lmax at 50 ft)

Construction Phase	Schedule	Equipment	HP	Qty	Hours/Day	Sound Level (dBA)
SCE Clear Veg. & Install T-line Supports & UG		Crawler Tractor	150	1	8	80
		Chipper	25	1	8	85
		Generator Set	60	1	8	82
		Water Truck	180	1	2	84
		Plate Compactor	5	2	4	82
Onsite Trench/Backfill	Month 3-6	Water Truck	180	1	3	84
		Plate Compactor	5	2	8	82
		Skid Steer Loader	70	1	8	80
		Tractor/Loader/Backhoe	100	2	8	80
Onsite Equipment Foundations & T-Poles	Month 3-9	Bore/Drill Rig	160	1	8	95
		Crane	150	1	8	83
		Forklift	60	1	4	85
		Generator Set	60	1	8	82
		Water Truck	180	1	3	84
		Concrete Pump	40	2	4	82
		Skid Steer Loader	70	2	5	80
		Tractor/Loader/Backhoe	100	2	8	80
		Bucket Truck	100	1	8	84
		Small Cable Puller	15	1	8	85
		Large Cable Puller	100	1	8	85
SCE T-line OH	Month 4	Generator Set	60	1	8	82
		Bucket Truck	100	1	2	84
		Small Cable Puller	15	1	8	85
		Large Cable Puller	100	1	8	85
SCE Whirlwind SS Civil & Elect.	Month 5-6	Aerial Lift	25	2	8	85
		Crane	150	1	8	83
		Forklift	60	1	2	85
		Plate Compactor	5	2	4	82
		Skid Steer Loader	70	1	8	80
		Bucket Truck	100	1	2	84
Onsite SS Construction	Month 6-11	Aerial Lift	25	2	8	85
		Crane	150	1	8	83
		Forklift	60	1	4	85
		Generator Set	60	1	10	82
	Month 4-11	Crane	150	4	8	83

Table 7.1-1 Construction Phases and Equipment Sound Levels (Lmax at 50 ft)

Construction Phase	Schedule	Equipment	HP	Qty	Hours/Day	Sound Level (dBA)
Onsite Equipment Installation		Forklift	60	2	8	85
		Generator Set	60	2	10	82
		Water Truck	180	1	2	84
		Skid Steer Loader	70	2	4	80
		Tractor/Loader/Backhoe	100	2	2	80
Onsite Pave/Gravel/Landscape	Month 5-12	Grader	140	2	8	85
		Paving Equipment	150	1	8	85
		Rollers	75	1	8	85
		Skid Steer Loader	70	1	8	80
		Tractor/Loader/Backhoe	100	2	8	80

Table 7.1-2 below shows the resulting worst-case 1-hour predicted noise levels (L_{eq}) during each phase of construction. The model conservatively assumes that all equipment noise sources for each phase are operating at their maximum level (L_{max}) simultaneously on the nearest property line location to the nearest receptor (NSA-2, approximately 900 feet), using standard RCNM usage factors.

Table 7.1-2 Construction Noise Levels at Nearest Receptor

Construction Phase	Sound Level (L_{eq}, dBA)
SCE IT/Telecom	59.7
Onsite Clearing/Grading	60.9
SCE Clear Veg. & Install T-line Supports & UG	60.5
Onsite Trench/Backfill	60.5
Onsite Equipment Foundations & T-Poles	63.4
SCE T-line OH	60.8
SCE Whirlwind SS Civil & Elect.	59.2
Onsite SS Construction	58.6
Onsite Equipment Installation	59.7
Onsite Pave/Gravel/Landscape	58.4

The worst-case noise levels based on RCNM modeling do not exceed the recommended construction noise criteria of 80 dBA (8-hour L_{eq}) for residential areas provided in the FTA's construction impact guidelines. Construction activities would also comply with the Kern County

time-of-day restrictions listed in Chapter 8.36 of the Kern County Code of Ordinances since no construction would occur at night.

7.2 Construction Traffic Noise

Additional vehicle traffic associated with construction activities will also contribute minor noise increases in the surrounding area. Based on the Fehr & Peers Traffic Study (2026), the peak AM construction hour would consist of 12 material delivery truck trips and no worker trips (assumed all workers would arrive before peak traffic hours 7-9 AM). The resulting peak AM sound level is 48.9 dBA at 50 feet. The peak PM construction hour (5-6 PM) would consist of approximately 220 worker trips, resulting in a 1-hour L_{eq} of 60.1 dBA at 50 feet from the roadway, 170th Street W (FTA 2018, Table 4-12). At the nearest NSA, this noise level would be approximately 35 dBA, which is well below applicable standards noted above in Section 3.0.

7.3 Construction Vibration

Ground-borne vibration resulting from Project construction will be temporary and localized, and limited to certain activities. The majority of proposed equipment generates little to no ground vibration. Potential sources of vibration may include drill rigs, loaded trucks, and vibratory rollers. The maximum source vibration level of the proposed equipment is 94 VdB (RMS velocity in decibels, VdB re 1 micro-in/sec) at 25 feet, which results in a vibration level of 47.2 VdB at the nearest NSA. This level is below typical background vibration (50 VdB) and well below the generally accepted thresholds for human perceptibility and strong annoyance of 65 vdB and 85 VdB, respectively (FTA 2018).

8.0 Conclusions

The results of this Noise Impact Assessment demonstrate that the Project's worst-case predicted operational day-night noise level (L_{dn}) at the property line is 64.6 dBA. While this modeled noise level would not exceed County guidelines of 65 dBA (Ldn) for residential uses, it would exceed state of California General Plan guidelines of 60 dBA (Ldn) for residential areas by up to 4.6 dBA within an area about 100 feet outside the boundaries of the northwest corner of the Project. Since no residential uses exist in this area at this time, this is a potential future impact would be avoided by the County requiring a 100-foot setback from the Project property line for any residential development in this area. Operational noise would not exceed the CNEL limit of 74 dBA or the daytime limit of 65 dBA specified for insensitive land uses in the Willow Springs Specific Plan, but would exceed the nighttime threshold of 60 dBA.

.

Anticipated operational noise levels at the nearest Noise-Sensitive Area (NSA) locations are between 38.9 and 40.5 dBA, which are well below USEPA's recommended threshold noise level for public health and welfare and below Kern County design goal of 65 dB for exterior noise levels in residential areas. The anticipated cumulative impact of the project with the Keyhole Wind Project is also well below these standards. This noise level is below the Willow Springs Specific Plan noise standards for sensitive (residential) land uses.

The Project's construction noise levels would comply with all requirements, since construction activities would not occur within the county's time-of-day restrictions listed in Chapter 8.36 of the

Kern County Code of Ordinances, and construction noise would be less than FTA's guideline criteria for residential areas. No other federal, state, or local noise restrictions apply to the Project.

The project also would not generate excessive groundborne vibration or groundborne noise levels because groundborne vibrations would be attenuated to imperceptible levels before reaching sensitive receptors.

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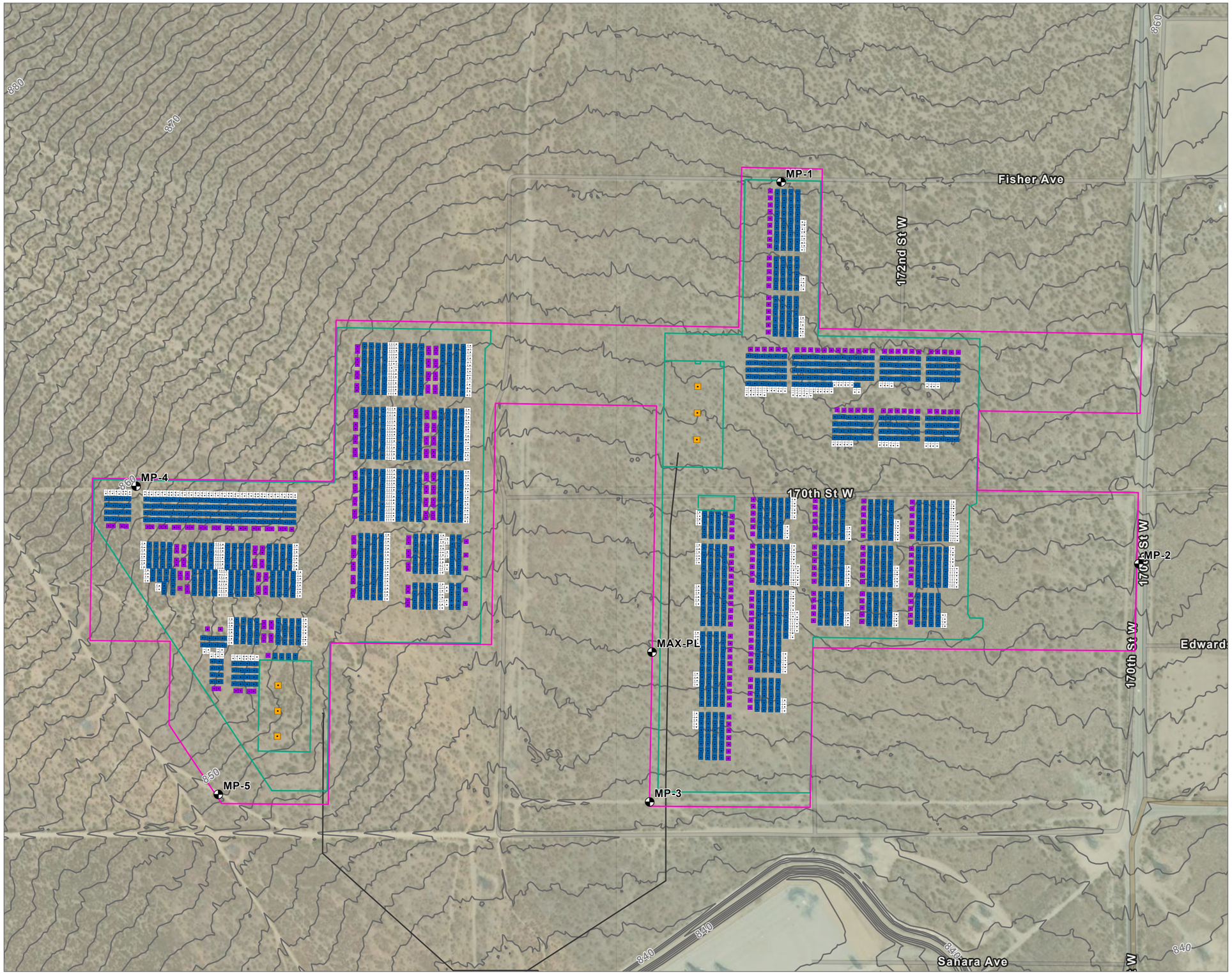
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- PROPERTY LINE RECEPTORS
- PROPERTY LINE
- FENCE LINE
- 1-METER CONTOURS (USGS)
- BATTERY CONTAINER
- DC CONVERTER
- BESS TRANSFORMER
- STEP-UP TRANSFORMER

BASE MAP: ESRI WORLD IMAGERY, 09/25/2023
DATA SOURCES:
1. SITE LAYOUT, TRC, FEB. 19, 2026
2. ELEVATION DATA, USGS, 2025



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1" = 400'
0 200 400 FEET

EUISMOD PROJECT
KERN COUNTY, CALIFORNIA

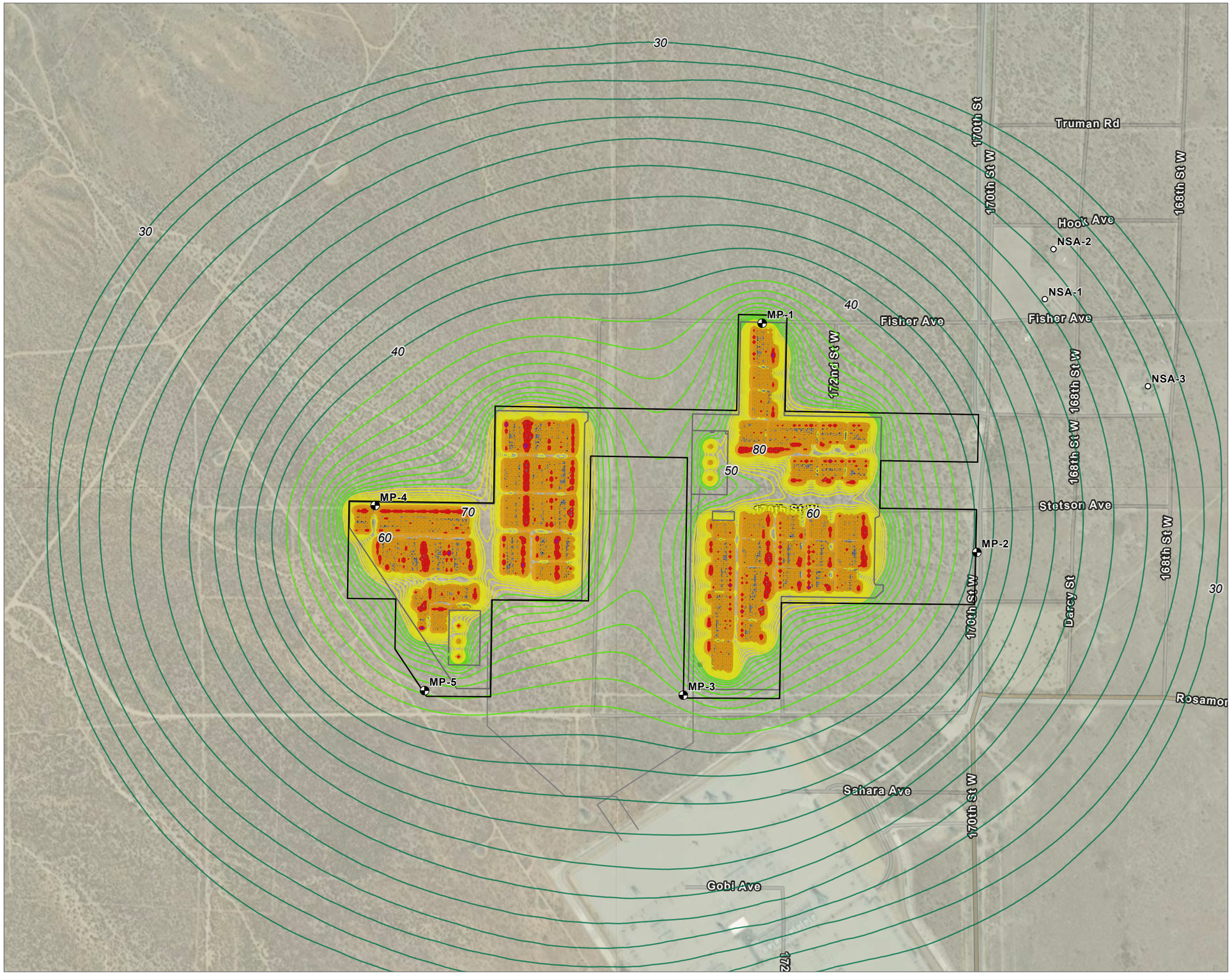
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NOISE IMPACT ASSESSMENT
SITE LAYOUT

DRAWN BY:	M. ERNSTING	PROJ. NO.:	552398
CHECKED BY:	M. PROKO		
APPROVED BY:	M. FEINBLATT		**FIGURE 1**
DATE:	APRIL 2026		

TRC
6 EXECUTIVE CIRCLE
SUITE 200
IRVINE, CA 92614

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PROPERTY LINE RECEPTORS
NOISE-PRODUCING EQUIPMENT
POTENTIAL NSAS
PROPERTY LINE
FENCE LINE

NOISE LEVEL (DBA)*
30 - 40
41 - 50
51 - 60
61 - 70
71 - 80
81 - 100

*LDN, AVERAGE DAY-NIGHT NOISE LEVEL

BASE MAP: ESRI WORLD IMAGERY, 09/25/2023
DATA SOURCES:
1. SITE LAYOUT, TRC, FEB. 19, 2026
2. ELEVATION DATA, USGS, 2025
3. NOISE CONTOURS, TRC, 2026



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EUISMOD PROJECT
KERN COUNTY, CALIFORNIA

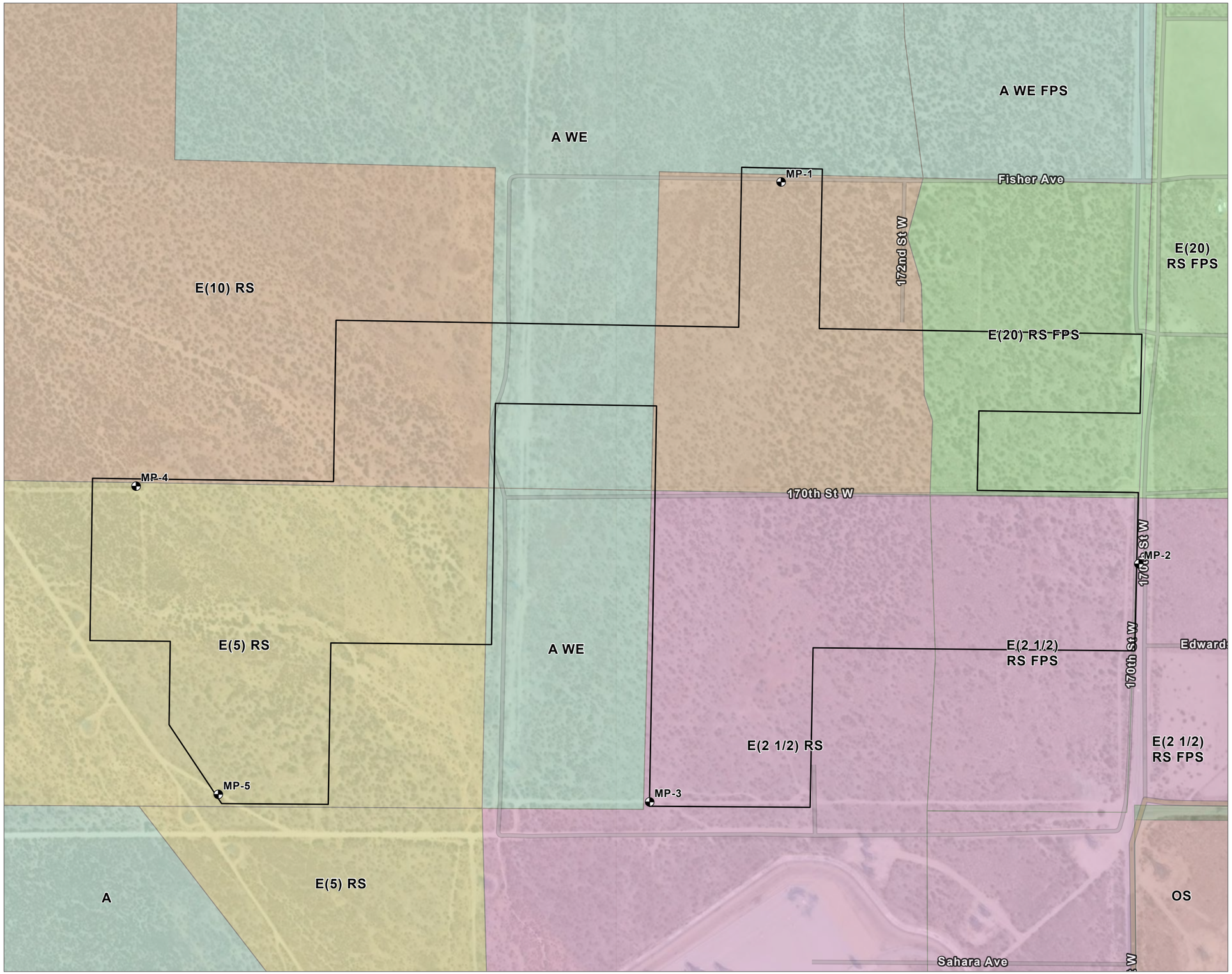
TITLE:
NOISE IMPACT ASSESSMENT
MODEL RESULTS

DRAWN BY:	M. ERNSTING	PROJ. NO.:	552398
CHECKED BY:	M. PROKO		
APPROVED BY:	M. FEINBLATT		**FIGURE 2**
DATE:	MAY 2026		

TRC
6 EXECUTIVE CIRCLE
SUITE 200
IRVINE, CA 92614

FILE: 552398_AypaEuismod.aprx

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PROPERTY LINE RECEPTORS

PROPERTY LINE

ZONING CODE

- A
- E(2 1/2)
- E(10)
- E(20)
- E(5)
- OS

BASE MAP: ESRI WORLD IMAGERY, 09/25/2023
DATA SOURCES:
1. SITE LAYOUT, TRC, FEB. 19, 2026
2. KERN COUNTY GIS, ZONING, 2026



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1" = 400'
0 200 400 FEET

EUISMOD PROJECT
KERN COUNTY, CALIFORNIA

TITLE:
NOISE IMPACT ASSESSMENT
ZONING MAP

DRAWN BY:	M. ERNSTING	PROJ. NO.:	552398
CHECKED BY:	R. BURKE		
APPROVED BY:	J. STENGER		**FIGURE 3**
DATE:	APRIL 2026		

TRC

6 EXECUTIVE CIRCLE
SUITE 200
IRVINE, CA 92614

FILE: 552398_AypaEuismod.aprx

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Appendix J
Preliminary Plume Study

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Preliminary Euismod Plume Study

HD-24043-Euismod-Plume-1.1

May 20, 2026

Prepared for:

AYPA

By:

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Erik Archibald, Ph.D. P.E.
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This report is confidential and contains proprietary information.

Contents

1 Executive Summary **2**

2 Introduction **3**

3 Background on Lithium-Ion ESS Toxicity Hazards **3**
3.1 Toxicity Hazards . . . 3
3.2 Toxic Gases of Interest . . . 4

4 Site and System Descriptions **5**
4.1 Site Description . . . 5
4.1.1 Typical Wind Conditions . . . 6
4.2 Energy Storage System Description . . . 7

5 UL 9540A Test Results **9**
5.1 Cell Test . . . 10
5.2 Module Test . . . 11
5.3 Unit Test . . . 13

6 Fire and Toxicity Modeling **15**
6.1 Model Setup . . . 16
6.2 Results . . . 17

7 Conclusion **22**

8 Limitations **24**

References **26**

A Appendix **27**
A.1 Gas Release Rate . . . 27
A.2 Heat Release Rate . . . 27

B Revisions **28**

1 Executive Summary

A plume study was conducted for the Euismod BESS (battery energy storage system) site to determine toxicity hazards posed to nearby areas during possible battery failure scenarios. The study considers toxic species, including carbon monoxide and hydrogen fluoride, that can be released by Li-ion batteries during thermal failures. Computational fluid dynamics (CFD) models were utilized to simulate plumes resulting from theoretical battery failure scenarios. The modeled scenarios considered (1) a non-fire scenario in which battery vent gas is released, (2) a small fire scenario, and (3) a large fire scenario. The fire scenarios considered low and high wind conditions based on nearby meteorological data.

Based on the modeled scenarios, toxic gas species concentrations 2 m (6.6 ft) from ground level were estimated using Fire Dynamics Simulator (FDS), which is a CFD software developed by the National Institute of Standards and Technology (NIST) for fire modeling. A summary of the findings of the study is as follows:

- The small fire, high wind condition was found to result in the highest battery plume concentrations at locations beyond approximately 192 m (630 ft) from the BESS enclosure. At these distances, the modeled average carbon monoxide concentration at 2 m (6.6 ft) from ground level was less than the AEGL-2 level.
- The large fire, high wind condition was found to result in the highest battery plume concentrations at locations less than approximately 192 m (630 ft) from the BESS enclosure. The modeled average carbon monoxide concentrations may cause serious health effects (exceed the AEGL-2 level) up to approximately 40 m (131 ft) from the unit in a large fire scenario with high winds. High wind speeds at or above 31 mph occur approximately 1% of the time at the Euismod site. For first responders who may be operating within this region, guidance for appropriate personal protective equipment (PPE) can be found in relevant Emergency Response Protocol (ERP) documents.
- Modeled carbon monoxide levels beyond the project boundary are below the AEGL-3 limit (600 ppm). CO concentrations may exceed the AEGL-2 limit (150 ppm) a short distance past the project boundary.
- The Euismod BESS is in a remote location. The nearest home is approximately 942 ft away from the ESS site. At this distance, CO levels are expected to be well below the AEGL-2 limit.
- Hydrogen fluoride (HF) levels were not evaluated as HF was not measured during the UL 9540A testing for this system. HF has been measured in laboratory-scale battery thermal runaway tests; however, the range of reported measurements is wide. Thus, hydrogen fluoride may be a risk, but the exact magnitude of this risk is unknown. Hydrogen fluoride is highly reactive with a range of materials including metals and various organic compounds. It is unclear whether substantial HF concentrations persist at a distance away from larger module, rack, and ESS scales. HF can also be emitted from the combustion of plastic components in the ESS, such as wiring insulation and module or rack enclosure casings. Although these plastics are commonly fire-retarded, fire-retardant plastics can be overwhelmed if the severity of the fire is sufficiently large. Similar fire-retardant plastics are commonly found in non-battery applications and may pose similar emission hazards during fire conditions.
- Other toxic organic gases, such as volatile organic compounds (VOCs) make up only trace amounts of the battery vent gas. VOC release quantities are too small to exceed hazardous levels at any distance from the unit.

Note that this Executive Summary does not contain all of Hazard Dynamics' technical evaluations, analyses, conclusions, and recommendations. Hence, the main body of this report is at all times the controlling document.

2 Introduction

This report describes the results of a plume dispersion study conducted for the Euismod battery energy storage system (BESS), which is being constructed in Kern County, California. The Euismod site uses the SolBank 3.0 system for lithium-ion battery energy storage. The purpose of a plume study is to identify and quantify potential risks associated with toxic gases produced by a battery energy storage system (BESS) under abnormal conditions.

Where appropriate toxicity data is unavailable, reasonable engineering assumptions will be made. These assumptions will be drawn from the available body of technical literature. This analysis was conducted using a set of probable worst-case scenarios based upon available test data such as UL 9540A reports and includes up to a fully-involved fire in a single unit.

This report will first provide background on the toxicity hazards of lithium-ion battery systems. Next, it will review the details of the Euismod site as well as the energy storage system itself. Finally, the report will evaluate possible toxic gas scenarios and their consequences.

This analysis relies on the following information:

- Plans for the Euismod site [1]
- Specifications for the SolBank 3.0 system [2]
- UL 9540A Cell test report for cell model LFP71173207/314Ah, TUV Rheinland (Shenzhen) Co., Ltd. report number CN23F118 001 dated 12/6/2023 [3]
- UL 9540A Module test report for module model CSI-SolBank-P-104.5-2h-H and CSI-SolBank-P-104.5-4h-H, TUV Rheinland (Shanghai) Co., Ltd. report number CN248UKE 001 dated 6/28/2024 [4]
- UL 9540A Unit test report for unit model CSI-SolBank-R-418-2h-H and CSI-SolBank-R-418-4h-H, TUV Rheinland (Shanghai) Co., Ltd. report number CN24M32L 001 dated 6/28/2024 [5]
- Analyses for the SolBank 3.0 [6] [7]

3 Background on Lithium-Ion ESS Toxicity Hazards

3.1 Toxicity Hazards

Toxicity hazards may exist alone or in combination with fire and explosion hazards. A significant amount of the gas released during thermal runaway is carbon monoxide (CO), which is toxic. Depending on the conditions, the combustion of battery gases may burn off some carbon monoxide or create additional carbon monoxide from partially reacted hydrocarbons. Smaller amounts of other toxic gases may also be released depending on the cell, whether the gases burn, and if water or other suppression agents are added. Experiments show that lithium-ion cells in thermal runaway may release hydrogen fluoride (HF), hydrogen chloride (HCl), hydrogen cyanide (HCN), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and other gases [8]. When the gases burn, some of the toxic components may be consumed, although others may be generated. Smoke from many fires, including battery fires, is considered hazardous. Smoke typically includes asphyxiant gases, irritant toxic gases, and particulate matter. The introduction of water to a fire may change the composition of the smoke and can create water runoff, which may also

contain hazardous substances. The use of other fire suppression agents may also alter the toxic release profile. For example, the clean agent Novec-1230, which is often used on ESS systems, can cause the generation of HF during fire conditions [9].

3.2 Toxic Gases of Interest

Abuse and failure of lithium-ion cells may result in gas production inside of the cells. When enough gas is produced, a safety vent may open, or the cell package may rupture. The gas mixture released is flammable and toxic and is primarily made up of carbon monoxide (CO), carbon dioxide (CO_2), hydrogen (H_2), and an assortment of hydrocarbons. If ignited, the combustion of these gases can lead to a fire or an explosion.

When a lithium-ion cell is exposed to high temperatures such as those due to fire exposure or propagating thermal runaway, it produces toxic compounds. Plastic contained in the battery system may contribute to these toxic combustion products. Such products may include carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), hydrogen chloride (HCl), and hydrogen fluoride (HF). The quantity of HF produced is related to the electrolyte solvent and the chemical reactions initiated. CO_2, H_2, and CH_4 are asphyxiant gases, or gases that can cause unconsciousness or death by suffocation because they displace oxygen in the air [8]. CO blocks the transport of oxygen by sticking to the hemoglobin in red blood cells. Poisoning by CO is often the major cause of death related to fire in which burns are not present [10]. Hydrogen cyanide (HCN) obstructs the function of mitochondria so that oxygen cannot be absorbed into the cells. Irritant gases include HF, HCl, SO_2, and NO_2. These gases have a toxic and irritating effect that can be significant even at very low concentrations. HCl is corrosive, highly irritating, and can cause severe injury to the respiratory tract if inhaled. SO_2 is extremely irritating and can form sulfurous acid when in contact with moisture. NO_2 and NO are especially irritating to the respiratory tract and lungs even at low concentrations. None of these irritants can be absorbed through the skin. HF, on the other hand, is not only severely irritating to the respiratory tract but can also penetrate skin and other tissues as the fluoride ion. When HF comes into contact with moisture, it can form hydrofluoric acid [11].

In evaluating harmful levels of toxic gases, it is helpful to reference levels known as IDLH (immediately dangerous to life or health) and AEGLs (acute exposure guideline levels). According to the Code of Federal Regulations, IDLH is defined as a concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life, would cause irreversible or delayed adverse health effects, or would interfere with an individual's ability to escape from a dangerous atmosphere [11]. IDLH values were developed to address occupational exposures to chemicals and to help protect workers from acute or short-term exposures to high concentrations of some airborne chemicals that could result in undesirable health outcomes [12]. The AEGLs were developed by the EPA to define the health effects of a once-in-a-lifetime exposure to airborne chemicals. AEGLs are used by emergency responders when dealing with major chemical leaks, spills, or other exposures. AEGL concentrations are provided for different exposure times and health effect levels. Level 1 is discomfort or irritation, Level 2 is the onset of irreversible or serious health effects, and Level 3 describes life-threatening health effects [13]. Toxic gases related to battery energy storage systems along with their IDLH, AEGL-2, and AEGL-1 concentrations are shown in Table 1. The AEGL values presented in the table are based on an exposure time of 30 minutes, which is characteristic of how long someone evacuating might be exposed to a substance.

Table 1: Toxic chemicals that can be present during battery failure and concentrations of interest. The AEGL values shown are for a 30-minute exposure. (NR = Not recommended due to insufficient data)

Chemical	IDLH (ppm)	AEGL-3 (ppm)	AEGL-2 (ppm)	AEGL-1 (ppm)
Carbon Monoxide (CO)	1,200	600	150	NR
Carbon Dioxide (CO_2)	40,000	NR	NR	NR
Hydrogen Chloride (HCl)	50	210	43	1.8
Hydrogen Cyanide (HCN)	50	21	10	2.5
Hydrogen Fluoride (HF)	30	62	34	1
Nitrogen Dioxide (NO_2)	13	25	15	0.50
Nitric Oxide (NO)	100	NR	NR	NR
Sulfur Dioxide (SO_2)	100	30	0.75	0.20
Benzene (C_6H_6)	500	5,600	1,100	73
Toluene ($C_6H_5CH_3$)	500	5,200	760	67

4 Site and System Descriptions

4.1 Site Description

The Euismod project is a lithium-ion BESS facility that will be located in Kern County, California. The location of the site can be seen in Figure 1.



Figure 1: A map showing the location of the Euismod site. This image was taken from Google Maps 2024.

The Euismod project will be located on 119.85 acres of land and includes lithium-ion battery energy storage equipment made by e-Storage, a subsidiary of Canadian Solar [1] [2]. The Euismod site will be in a remote location with three houses located within half a mile. The nearest house is about 942 ft from the site. The site and its close surroundings are shown in Figure 2. Nearby exposures and their approximate distances are also shown in Figure 2.

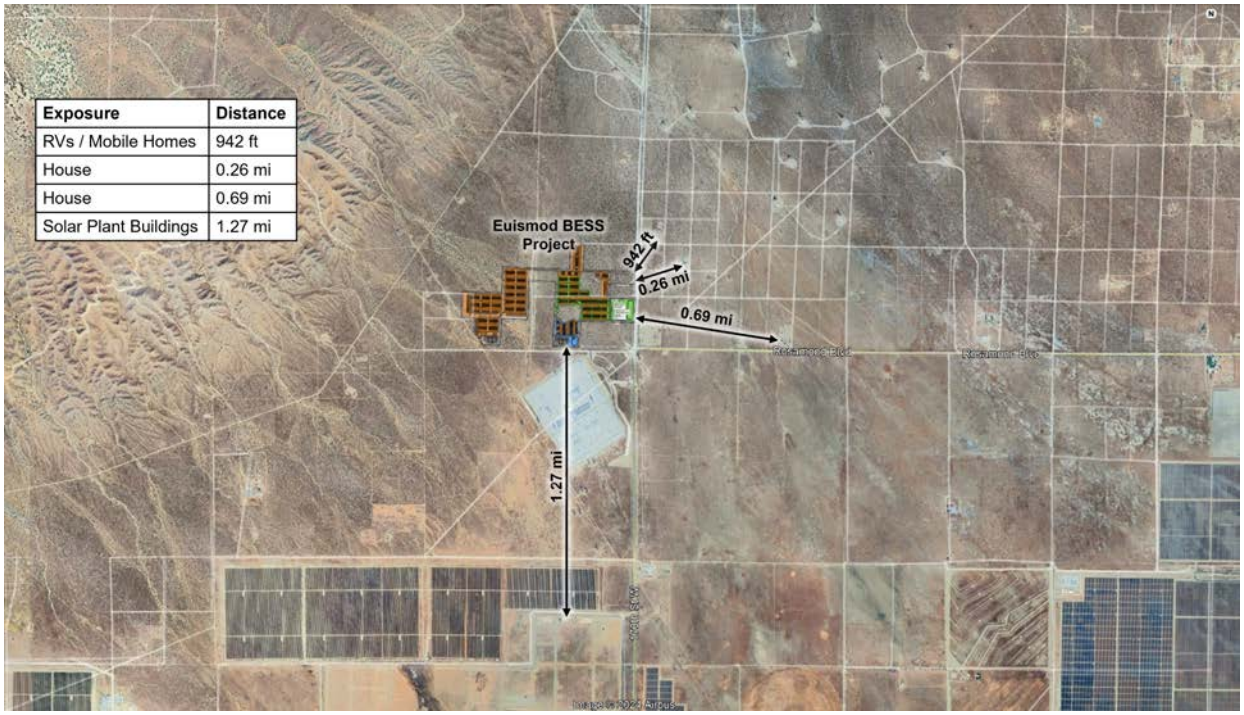


Figure 2: A satellite view of the Euismod site location and its surroundings with the site drawing overlaid. This image was taken from Google Earth 2024

4.1.1 Typical Wind Conditions

In case of a toxic gas release, it is expected that the impacted area would be downwind of the site. The closest weather station for historical data is the General William J. Fox Airfield site. According to historical wind information from 1974 to 2024, the prevailing winds generally come from the west-southwest (see Figure 3). The average wind speed is 11.3 mph or 5 m/s. Because the wind rose for the General William J. Fox Airfield site has a high percentage of wind above 20 mph, the wind data was further analyzed to find the 99th percentile wind speed. Peak wind speeds may exceed 31 mph or 13.9 m/s approximately 1% of the time. Conditions are calm 17% of the time [14].

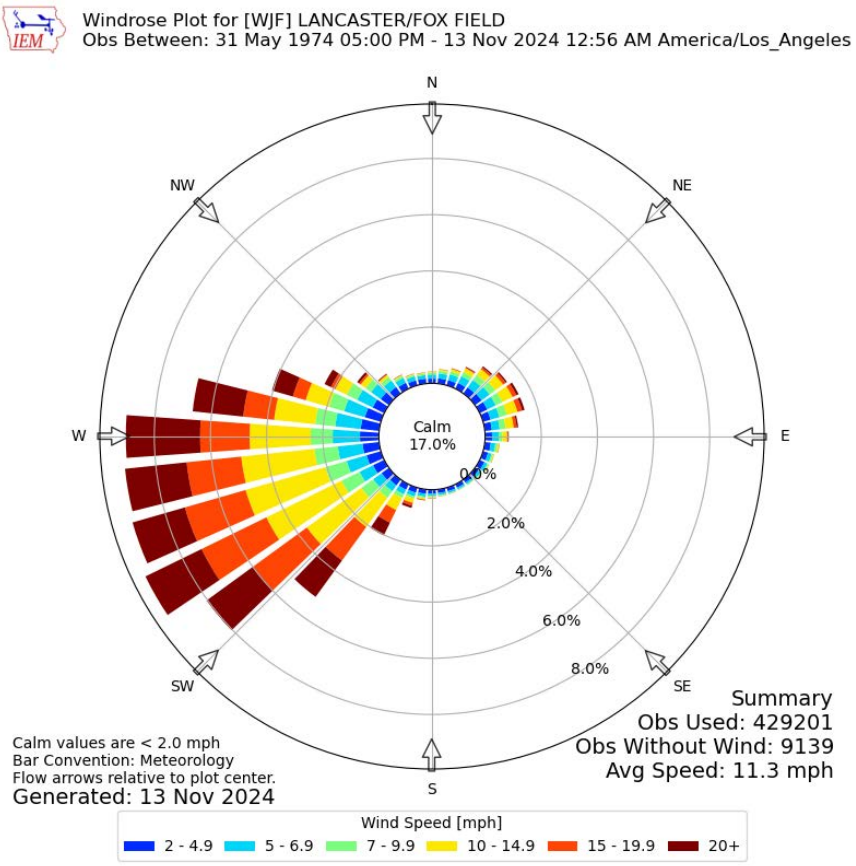


Figure 3: The wind rose for the General William J. Fox Airfield weather station, which is the closest available station to the Euismod site. This image was taken from the Iowa State University Iowa Environmental Mesonet website [14].

4.2 Energy Storage System Description

The Euismod project uses modular IP55 rated SolBank 3.0 battery units made by e-Storage, a subsidiary of Canadian Solar. These units contain Xiamen Hithium Energy Storage Technology Co., Ltd. lithium-ion batteries installed in racks inside the enclosure. Each enclosure contains 12 racks for a total of 48 liquid-cooled battery modules. The SolBank 3.0 includes a fire protection system, a BMS box, a distribution and control cabinet, and a junction box. The layout and features of the SolBank 3.0 can be seen in Figure 4 [2].



Figure 4: An image of a SolBank 3.0 battery storage system [2].

The Euismod BESS will consist of 2574 enclosures and will provide a total of 12911 MWh of energy storage [1]. An additional 858 battery units are planned for future augmentation of the energy storage system. The site includes power conversion systems and other equipment. Figure 5 shows the planned layout of the site.

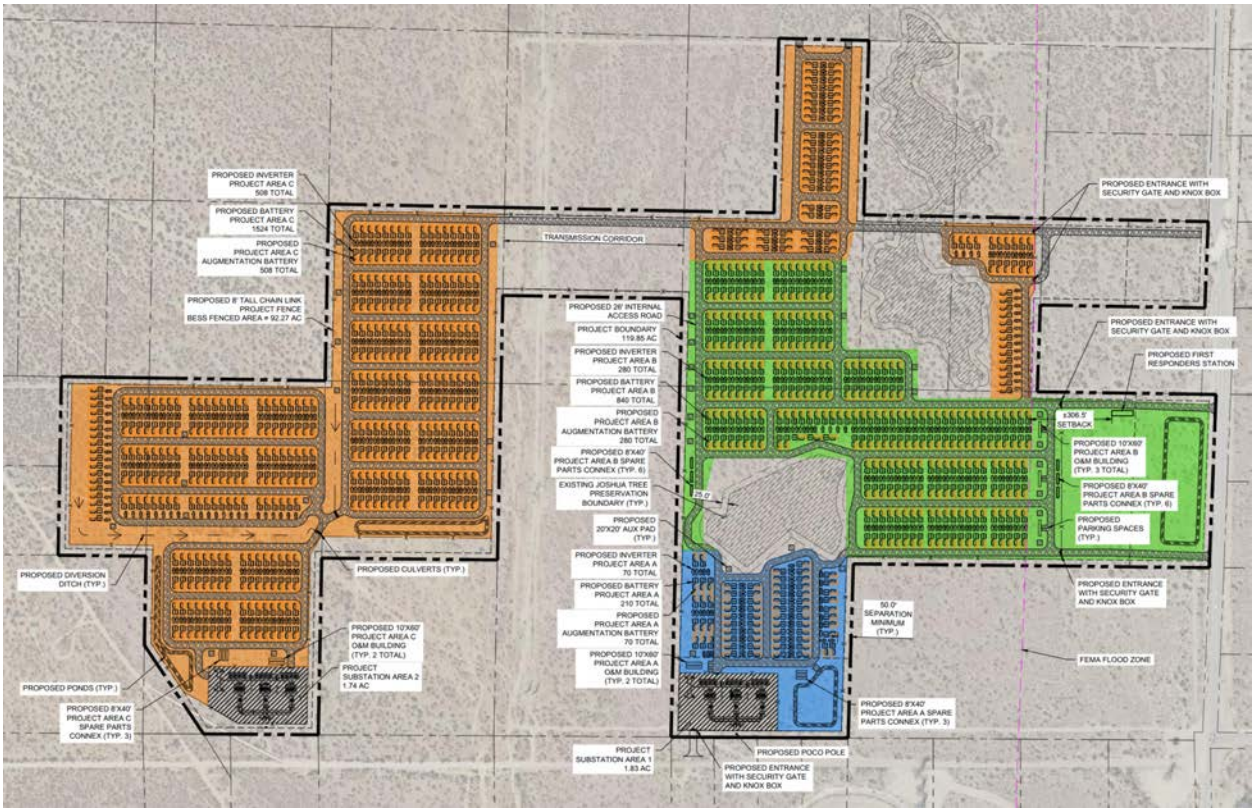


Figure 5: An engineering drawing indicating the planned layout of the Euismod site, including the battery enclosures, power conversion systems, and other equipment [1].

5 UL 9540A Test Results

This analysis is based on test data from UL 9540A cell, module, and unit test results. During this testing, a cell is forced into thermal runaway while the outcome is observed. Gases released from the battery or batteries during thermal runaway are captured and analyzed for select chemical species. Depending on the outcome of cell-level testing, additional testing at the module level and full unit level may also be required. For this plume analysis, UL 9540A data from cell-level [3], module-level [4], and unit-level [5] testing was reviewed. The results of these tests are described in Sections 5.1-5.3.

Since UL 9540A is primarily concerned with fire and explosion hazards, typical UL 9540A gas measurements are focused on major combustible gases and combustion products, such as hydrogen, carbon monoxide, carbon dioxide, and various hydrocarbons. Typically, carbon monoxide is the most significant toxicity hazard among the measured gases due to a comparatively low IDLH value and relative abundance in most battery gas. The UL 9540A test report for the Xiamen Hithium Energy Storage Technology Co., Ltd. cells indicates that 130 L of gas was captured from a single cell. Of the gas captured, 16.202% by volume was carbon monoxide. This information, along with the remaining composition information, is listed in Table 3.

Cell-level gas composition information is collected by failing an individual cell inside of a sealed pressure vessel that is filled with an inert gas to prevent combustion. This method allows for the capture of the entire volume of emitted gas. Gas compositions from cell experiments are

usually measured using a gas chromatograph (GC), which is typically more accurate than measurements taken from exhaust hoods during module and unit testing.

5.1 Cell Test

The system under consideration is comprised of Xiamen Hithium Energy Storage Technology Co., Ltd. LFP71173207/314Ah cells, which are 314 Ahr lithium-ion LFP cells [3]. This cell was tested using the UL 9540A method. The results are given in TUV Rheinland (Shenzhen) Co., Ltd. report CN23F118 001 dated 12/6/2023. Figure 6 shows a cell with a ruler for scale.

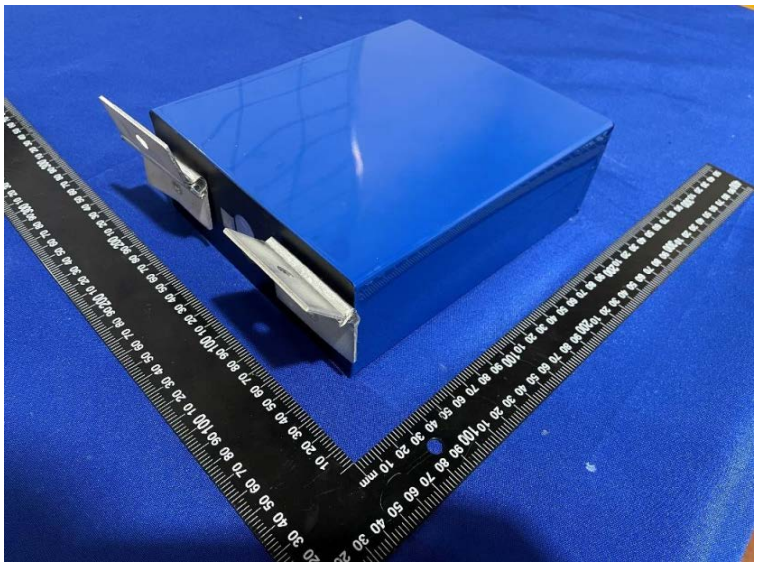


Figure 6: A Xiamen Hithium Energy Storage Technology Co., Ltd. LFP71173207/314Ah cell with a ruler for scale. This image was taken from the UL 9540A cell-level test report [3].

For UL 9540A testing, the LFP71173207/314Ah cells were heated until failure occurred. Cell details and results from UL 9540A testing are provided in Table 2.

Table 2: Key cell properties from the UL 9540A cell test [3].

Parameter	Value
Cell Manufacturer	Xiamen Hithium Energy Storage Technology Co., Ltd.
Cell Model	LFP71173207/314Ah
Cell Chemistry	LFP
Cell Nominal Voltage	3.2 V
Cell Capacity	314 Ahr
Volume of Gas Released	130 L
Lower Flammability Limit (LFL) at ambient temperature	8.1%
Lower Flammability Limit (LFL) at venting temperature	6.5%
Burning Velocity (Su)	0.779 $\mathrm{m/s}$
Maximum Pressure (P_{max})	0.78 MPa

The UL 9540A cell report showed that the cells go into thermal runaway and release a mixture of flammable gases when heated externally until failure. The vent gas composition from the UL 9540A cell report is listed in Table 3.

Table 3: The gas composition from the UL 9540A cell test [3]. Model Volume Percent will be addressed in Section 6 later in this document.

Name	Formula	Experimental Volume Percent	Model Volume Percent
Carbon Monoxide	CO	16.202	16.202
Carbon Dioxide	$CO2$	26.861	26.861
Hydrogen	$H2$	49.875	49.875
Methane	$CH4$	3.671	3.671
Ethylene	$C2H4$	1.389	1.389
Ethane	$C2H6$	0.548	0.548
Propylene	$C3H6$	0.745	0
Propane	$C3H8$	0.180	1.454
C4 Total	$C4H10$	0.288	0
C5 Total	$C5H12$	0.241	0

5.2 Module Test

The Xiamen Hithium Energy Storage Technology Co., Ltd. cells are located inside of modules with model numbers CSI-SolBank-P-104.5-2h-H and CSI-SolBank-P-104.5-4h-H. A module was also tested using the UL 9540A method, and the results can be found in TUV Rheinland (Shanghai) Co., Ltd. test report CN248UKE 001 dated 6/28/2024. Each module contains 104 cells in a 1P104S configuration [4]. Multiple thermocouples were attached as seen in Figure 7.



Figure 7: A module prepared for the UL 9540A test. This image was taken from the UL 9540A module-level test report [4].

Heaters were placed between cells 39, 40, and 41, which were chosen as the initiating cells due to their central location within the module. A diagram of the module construction, the location of the initiating cells, and thermocouple locations can be seen in Figure 8. The temperature time history for the test is shown in Figure 9.

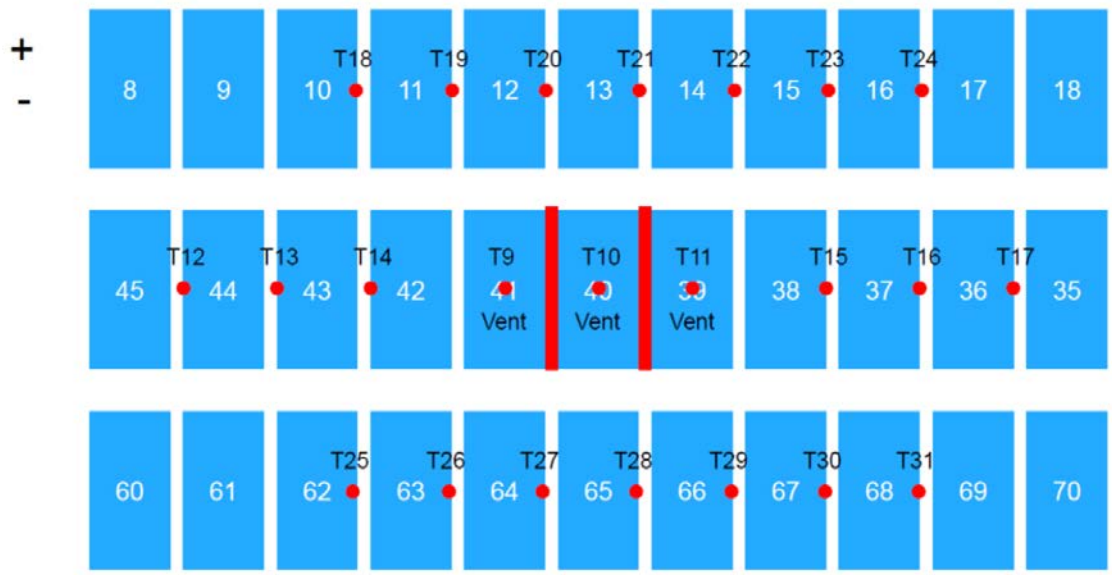


Figure 8: A diagram of the module setup for the UL 9540A test. This image was taken from the UL 9540A module-level test report [4].

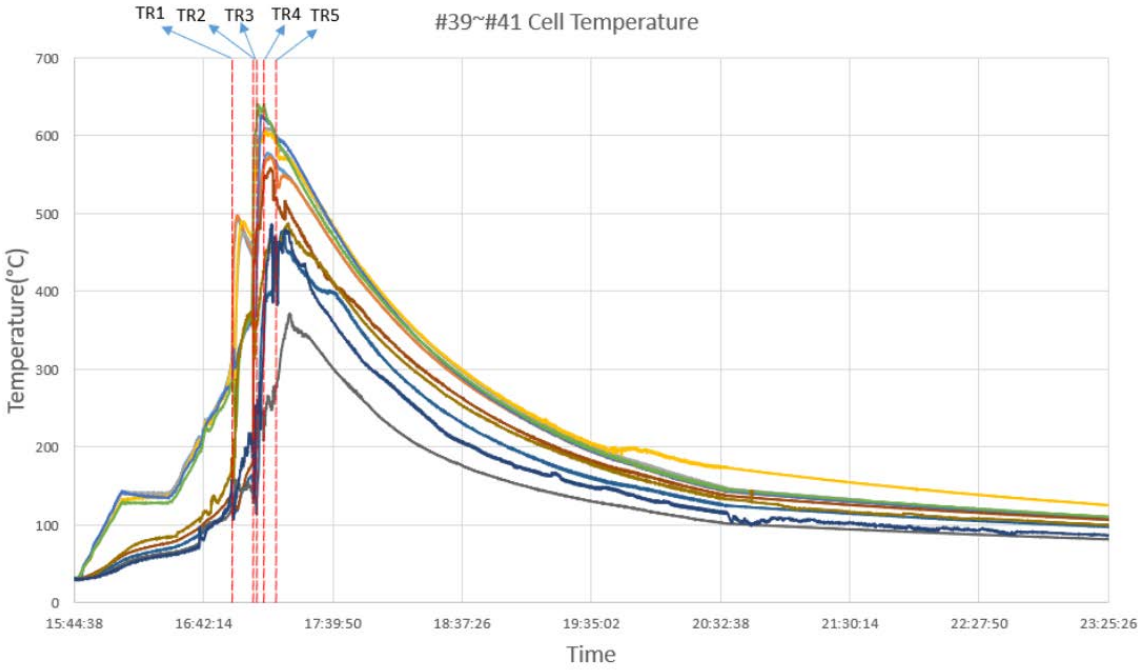


Figure 9: The temperature time history for the initiating cells from the UL 9540A module test. This image taken was from the UL 9540A module-level test report [4].

The initiating cells were heated until thermal runaway occurred. The three initiating cells went into thermal runaway and propagated to two adjacent cells, making five cells in total that failed in thermal runaway [4]. Sparks, flying debris, and external flaming were not observed during the test. Figure 10 shows the internal contents of the module after the test.



Figure 10: The internal contents of the module after the UL 9540A test. This image was taken from the UL 9540A module-level test report [4].

5.3 Unit Test

The UL 9540A unit test for unit models CSI-SolBank-R-418-2h-H and CSI-SolBank-R-418-4h-H is described in TUV Rheinland (Shanghai) Co., Ltd. report CN24M32L 001 dated 6/28/2024. In this test, a unit comprised of four modules was tested. The unit contained 416 individual cells [5]. The initiating module was configured identically to the module test. This module was then inserted into a full unit, which was placed in proximity to walls and target units. The configuration of the initiating unit is shown in Figure 11, a diagram of the test setup is shown in Figure 12, and a picture of the test units is shown in Figure 13.

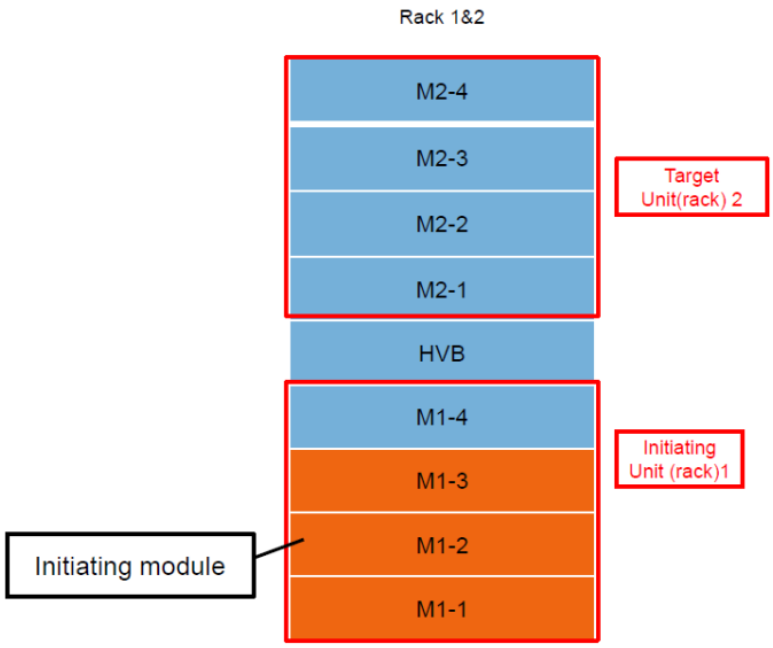


Figure 11: The initiating unit with the initiating module and target modules labeled. This image was taken from the UL 9540A unit-level test report [5].

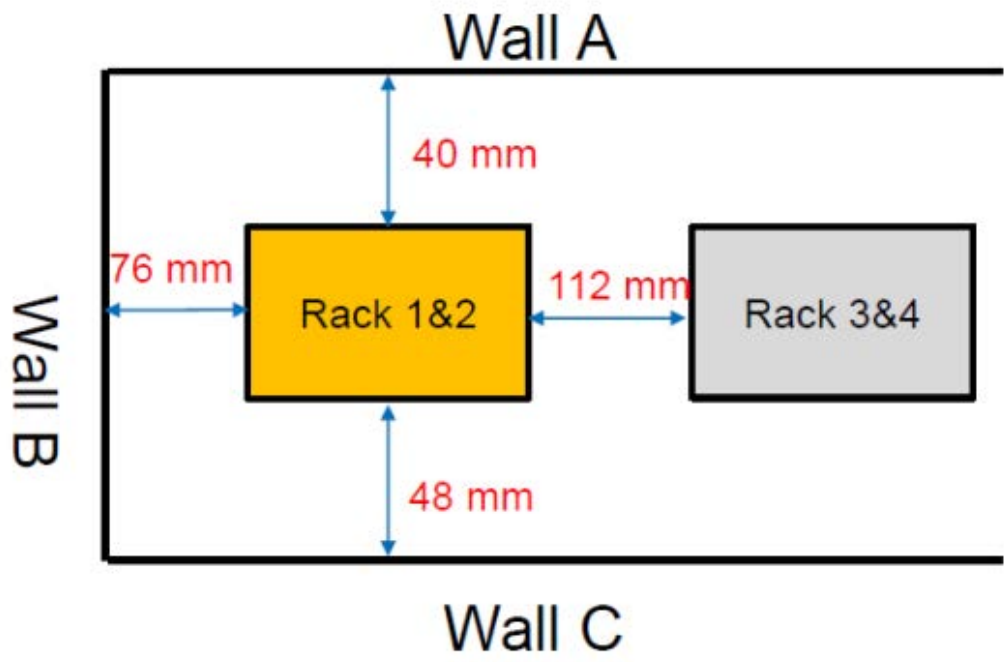


Figure 12: A diagram of the unit test setup. This image was taken from the UL 9540A unit-level test report [5].



Figure 13: A picture of the test units. This image was taken from the UL 9540A unit-level test report [5].

Thermal runaway was initiated by activating the heaters in the initiating module. Once thermal runaway began, the power to the heater was disconnected. The three initiating cells went into thermal runaway and propagated to two adjacent cells, making a total of five failed cells inside the initiating module [5]. Thermal runaway did not propagate outside of the initiating module. Sparks, flying debris, and external flaming were not observed during the test.

6 Fire and Toxicity Modeling

Hazard Dynamics used data from the UL 9540A test reports to conduct plume modeling for a number of different failure scenarios. These models included cases of varying wind conditions, differing levels of failure severity, and with or without burning.

Two different heat release rates (HRR) were used to represent two different sizes of fire. The large HRR of 34 MW represents a full enclosure burning. This value was calculated using cell and module information from the UL 9540A cell and module tests [4] [3]. Details of this calculation are shown in the appendix. Flaming propagation between adjacent enclosures was not modeled as available UL 9540A test data did not demonstrate propagation between modules inside of a unit or between units. The small HRR of 3.4 MW was taken to be 10% of the large fire. This HRR was used to evaluate the consequences of a smaller fire in which the entire enclosure does not burn.

The non-fire scenario models the release of lithium-ion battery vent gas from a segment in the absence of burning. This scenario considers gas release without an active ventilation system. A gas release rate of 0.0004808 kg/s was calculated using the overall time cells entered into thermal runaway during the module-level test, the amount of gas released by a single cell during the cell-level test, and the number of cells failed during the module-level test [4] [3]. The calculation can be found in the appendix of this report. This gas release rate approximates the average release rate expected from five failing cells as demonstrated in the module-level test.

Actual gas release rates may be slightly above or below this value during portions of the thermal runaway process.

Each scenario assumes a steady-state release and was modeled for 300 seconds. Although the heat release rate was estimated assuming a two-hour burning period, a steady-state model was evaluated to determine the upper bound of the worst-case, credible scenario. The steady-state model assumed a steady HRR equal to the peak HRR. The gas release scenario was also modeled using a steady gas release rate. Steady-state concentrations for both gas release and fire scenarios were reached well before the 300 seconds simulation time. Averaged concentrations were determined once the model reached steady-state. The scenarios are summarized in Table 4. The wind speeds used in the models will be discussed in Section 6.1.

Table 4: Euismod plume model scenarios.

Name	Wind Speed (m/s)	Mass Release Rate (kg/s)	HRR (MW)
Gas Release, Low Wind	1.5	0.0004808	No Fire
Small Fire, Low Wind	1.5	0.272	3.4
Small Fire, High Wind	13.9	0.272	3.4
Large Fire, Low Wind	1.5	2.72	34
Large Fire, High Wind	13.9	2.72	34

For modeling purposes, the most significant components which account for more than 95% of the gas are modeled in the non-fire gas release mixture, while minor hydrocarbon elements are approximated as propane. The volume percents used in the model can be found in column four of Table 3.

6.1 Model Setup

Computational fluid dynamics (CFD) models of possible toxic plumes were created using Fire Dynamics Simulator (FDS) version 6.9.1. Fire Dynamics Simulator is a CFD software developed by the National Institute of Standards and Technology (NIST) for fire modeling. The code solves the Navier-Stokes equations using a large-eddy-simulation (LES) approach and is mainly intended for low-speed flows with an emphasis on smoke and heat transport from fires. The code has been extensively validated for a variety of scenarios involving fire, smoke, gas dispersion, and other transport phenomenon. The model uses grid sizes ranging from 0.25 m (9.8 in) to 2 m (6.6 ft) to capture both the flow near the source (starting 2 m from the enclosure) as well as the dispersion over a large flat downwind area up to 320 m (1050 ft) away from the source as shown in Figure 14.

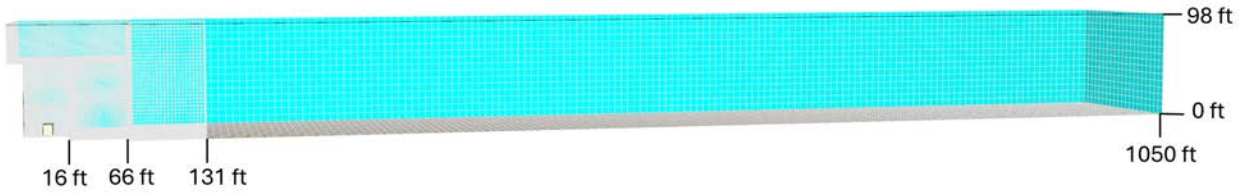


Figure 14: The model with the grid displayed. The grid varies in size from 9.8 in near the unit to 6.6 ft starting 131 ft away from the unit. The distances shown are measured from the front of the enclosure.

The EPA Risk Management Program recommends using a wind speed of 1.5 m/s (3.4 mph) and atmospheric stability class F conditions (stable atmosphere) for worst-case plume analysis for

accidental chemical releases [15]. This wind speed was used in the model as well as the 99th percentile wind speed for the Euismod site, which is roughly 13.9 m/s or 31 mph (see Figure 3). Winds at or above this speed occur approximately 1% of the time and may act to partially overcome the upward tendency of a fire plume. The results presented here approximate worst-case results based on the wind speeds modeled and using stable atmospheric conditions with an Obukhov length of 350 meters. The ambient temperature was modeled as being 20°C or 68°F.

The wind speeds used in the models are intended to be worst-case. Therefore, results from other wind speeds are expected to be bounded by the wind speeds used. Likewise, modeling a stable atmosphere, in which released gases would tend to stay near ground-level, is considered worst-case. Stable conditions may include fog, because the stability prevents vertical movement of the moist air near the ground. The moisture in fog conditions is not expected to make a plume resulting from battery vent gas release or a fire any worse. Rain during a BESS failure incident is expected to result in a less severe plume than modeled because the falling water could encourage mixing and dispersion over a wider area.

6.2 Results

Model results were collected for battery vent gas concentrations (non-fire scenario) and combustion product concentrations (fire scenarios). The gas concentration of interest was the concentration at 2 m (6.6 ft) above ground level. This corresponds to the concentration that people would experience when standing on level ground near an incident. Figure 15 shows the average vent gas and combustion product gas concentrations at 2 m (6.6 ft) above ground level at different distances downwind of the unit. Figure 15 shows that concentrations 2 m above ground level stay low for the non-fire scenario and for the fire scenarios with low wind. For the high-wind fire scenarios, overall combustion product concentrations may be high near the BESS enclosures but drop quickly away from the enclosures. High wind speeds occur approximately 1% of the time at the Euismod site. However, since toxic gases are only a fraction of the total battery vent gas or combustion products, toxic gas concentrations would be a fraction of these values. As the battery vent gas has a lower flammability limit (LFL) of 8.1% by volume (81000 ppm), the concentration of battery gas does not achieve a flammable condition beyond 2 m (6.6 ft) of the BESS unit.

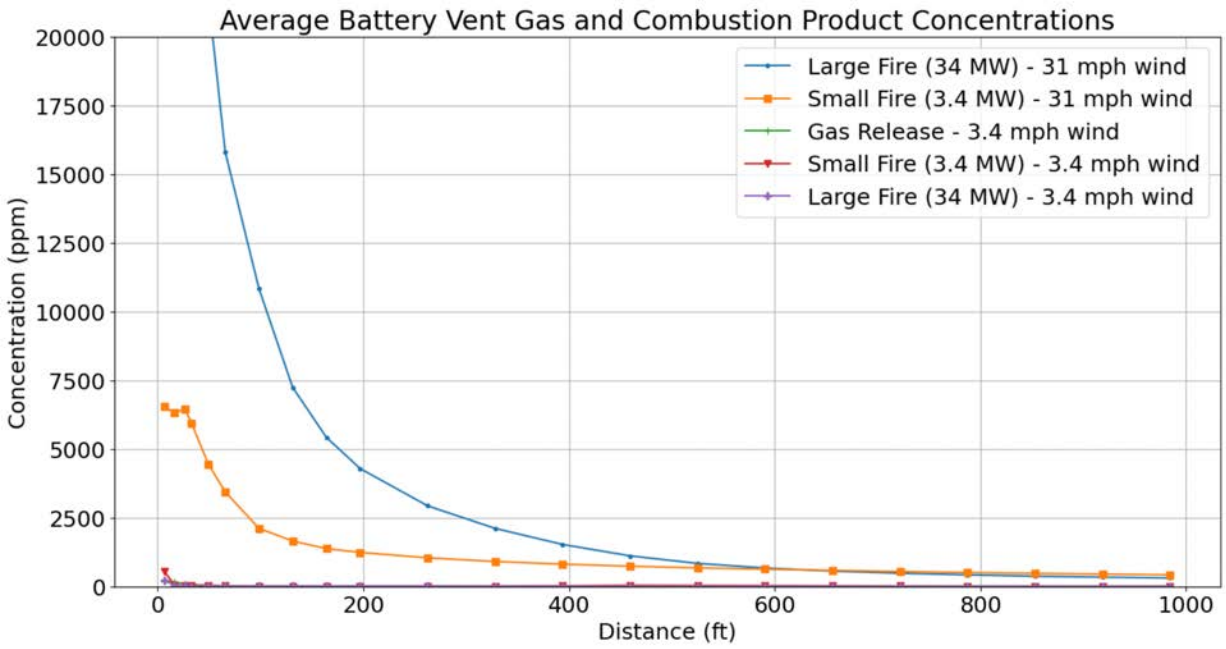


Figure 15: The average battery vent gas or combustion products concentration versus the downwind distance for different model scenarios.

Battery gas concentrations were very small away from the battery enclosure for the non-fire scenario, as shown in Figure 16.

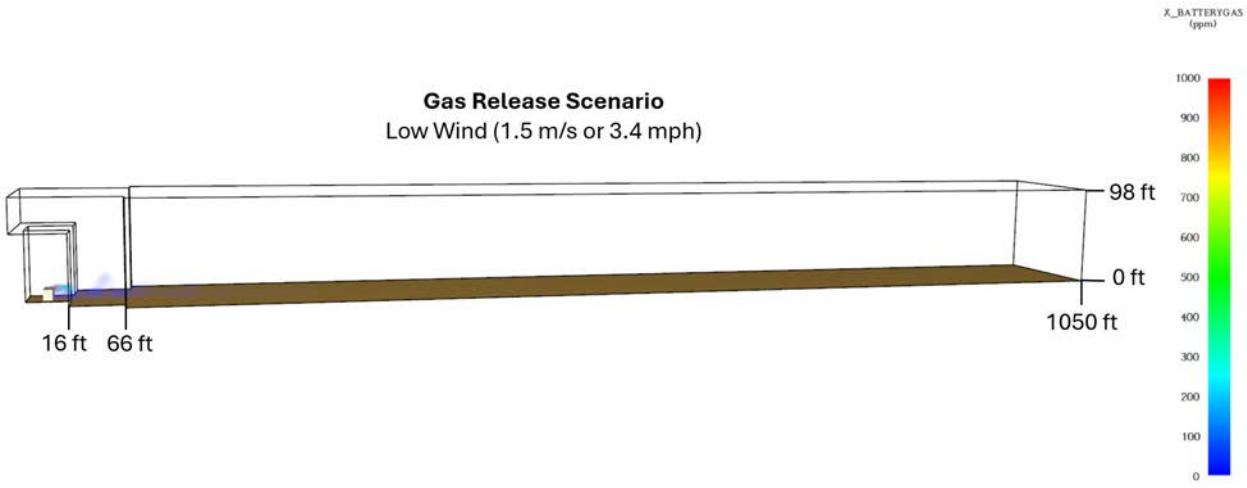


Figure 16: The model for a non-fire scenario with low wind speeds. X_BATTERYGAS is the concentration of battery vent gas in ppm. The distances shown are measured from the front of the enclosure.

The fire scenarios with greater wind speeds resulted in higher concentrations of combustion products 2 m (6.6 ft) above ground level. The heat from fire conditions makes gases more buoyant such that they rise away from the ground. In most common wind conditions, fire product concentrations are low at ground level. However, under conditions of high wind, this buoyant effect may be partially overcome. The scenarios with both fire and high winds yielded the highest gas concentrations near ground level at the greatest distances. Figure 17 shows the model

with a full unit fire at high wind speeds. This figure shows that the hot combustion products do not rise immediately due to high wind conditions, but they do rise gradually. Additionally, mixing occurs as the combustion products move away from the enclosure. In contrast, Figure 18 shows that the combustion products rise immediately under low wind conditions.

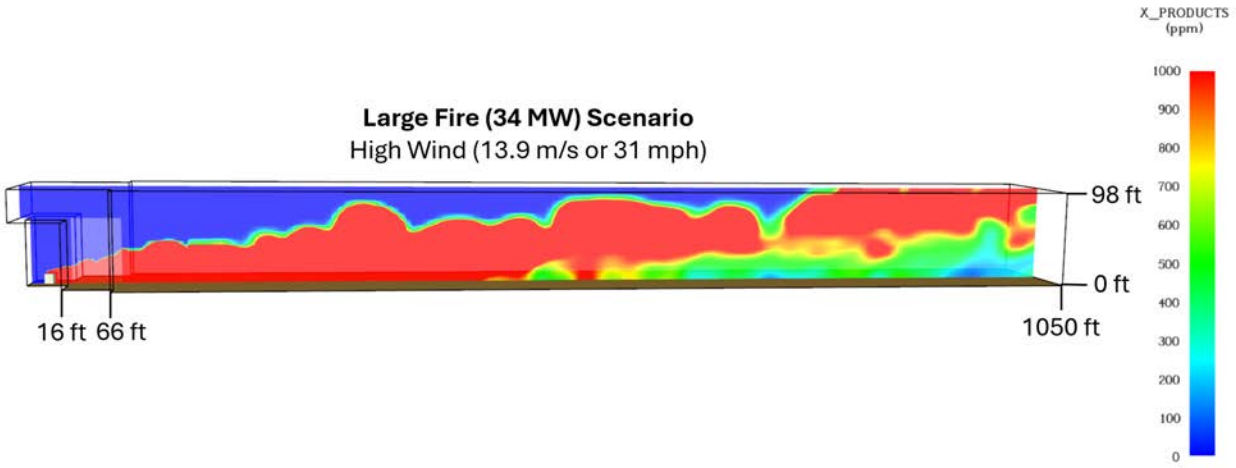


Figure 17: The model of a full unit fire with high wind conditions. In this scenario, the combustion products do not rise immediately due to high wind conditions, but they do rise over time while also mixing with air. X_PRODUCTS is the concentration of combustion products in ppm. The distances shown are measured from the front of the enclosure.

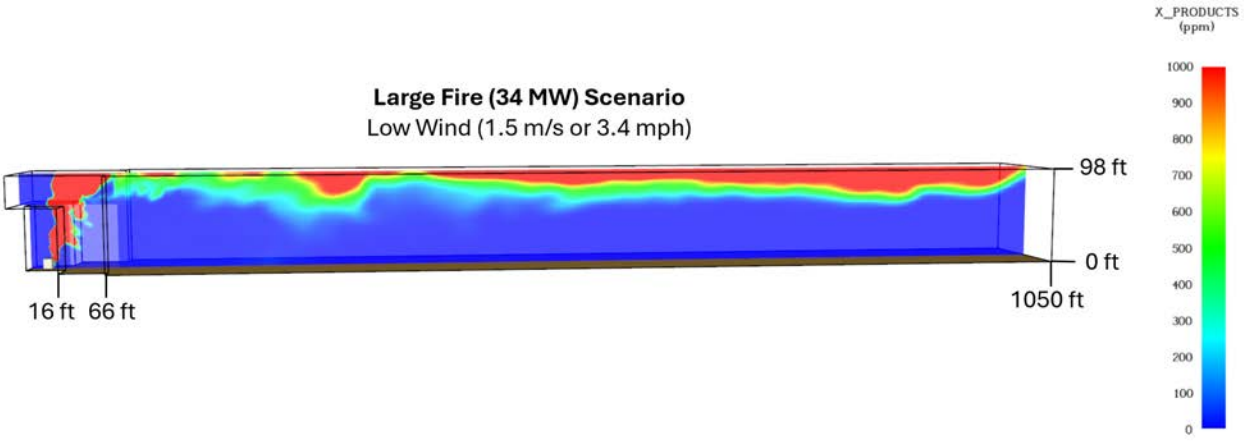


Figure 18: The model of a full unit fire with low wind conditions. In this scenario, the combustion products rise immediately and stay elevated for long distances. X_PRODUCTS is the concentration of combustion products in ppm. The distances shown are measured from the front of the enclosure.

Figure 19 shows that for a smaller fire with high winds, the combustion products stay near ground level for some distance before mixing occurs. Consequently, the combustion product concentration at 2 m (6.6 ft) from ground level far from the enclosure is somewhat greater under high wind conditions for the small fire even though the overall combustion product concentration is greater for the large fire. In low wind conditions, combustion products for a small fire also rise but to a lesser degree than for a large fire scenario as shown in Figure 20.

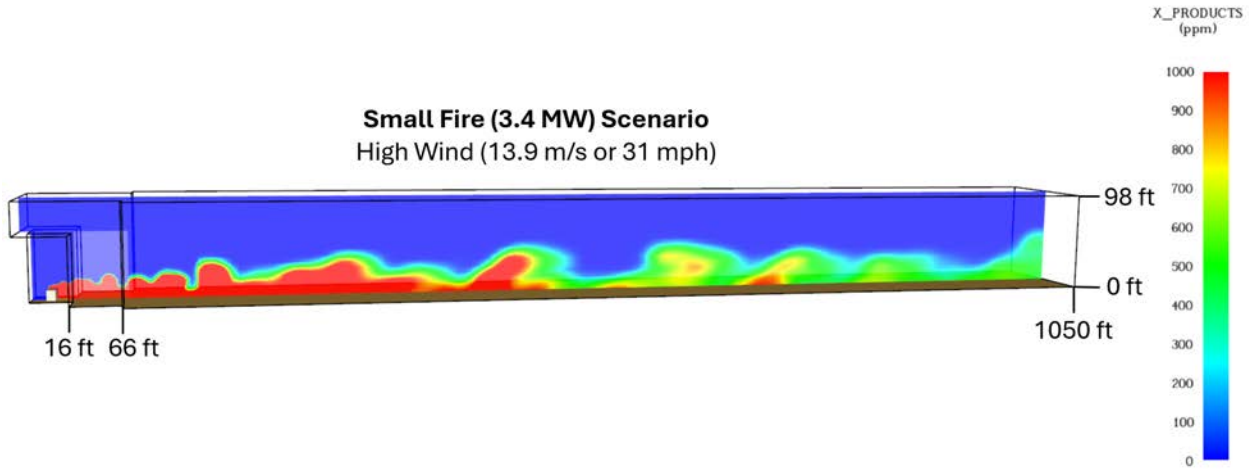


Figure 19: The model of a small fire with high wind conditions. In this scenario, the buoyant effects of the hot gas are partially overcome by the high wind such that the combustion products stay near ground level until mixing occurs. X_PRODUCTS is the concentration of combustion products in ppm. The distances shown are measured from the front of the enclosure.

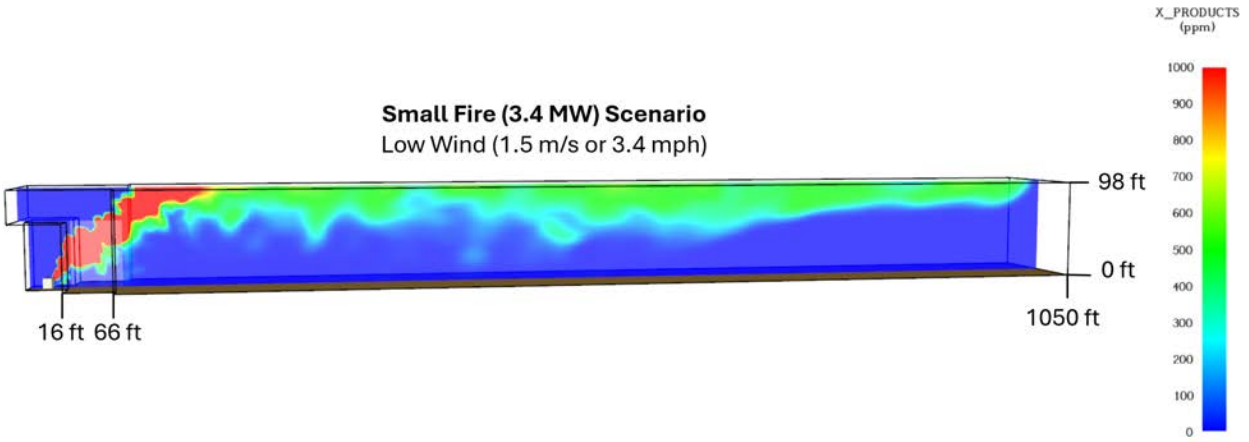


Figure 20: The model of a small fire with low wind conditions. In this scenario, combustion products rise to a lesser degree than in the large fire scenario. X_PRODUCTS is the concentration of combustion products in ppm. The distances shown are measured from the front of the enclosure.

Although multiple toxic gases may be components of battery vent gas, carbon monoxide (CO) is generally the most abundant toxic gas of concern that is regularly reported as part of UL 9540A testing. The UL 9540A cell test report for the SolBank 3.0 listed the carbon monoxide concentration as being 16.202%. This value was used to quantify the amount of carbon monoxide in the non-fire scenario. However, it is unclear what concentration of carbon monoxide may persist through a fire. Carbon monoxide concentration in burned gas is likely to be much lower than in the battery gas, as CO is flammable. Carbon monoxide due to incomplete combustion from the fire can also vary depending on the burning environment. Consequently, Hazard Dynamics estimated what amount of carbon monoxide might be present during a fire event using knowledge from work with many battery systems. The CO production was assumed to be 2% of the

combustion products. This estimation was based on the measured combustion product concentration from the FDS models. The average carbon monoxide concentration over the 300 m (984 ft) model domain for both the gas release and fire scenarios is shown in Figure 21. The IDLH (Immediately Dangerous to Life and Health) level for carbon monoxide is 1200 ppm, the AEGL-3 (life-threatening health effects) level for a 30-minute exposure is 600 ppm, and the AEGL-2 (serious health effects) level for a 30-minute exposure is 150 ppm. Model results show that the carbon monoxide concentration may be immediately dangerous to life and health (above the IDLH level) up to approximately 16 ft, cause life-threatening effects (exceed the AEGL-3 level) up to approximately 26 ft, and cause serious health effects (exceed the AEGL-2 level) up to approximately 131 ft from the burning enclosure. The EPA does not provide an AEGL-1 (temporary irritation) concentration for carbon monoxide.

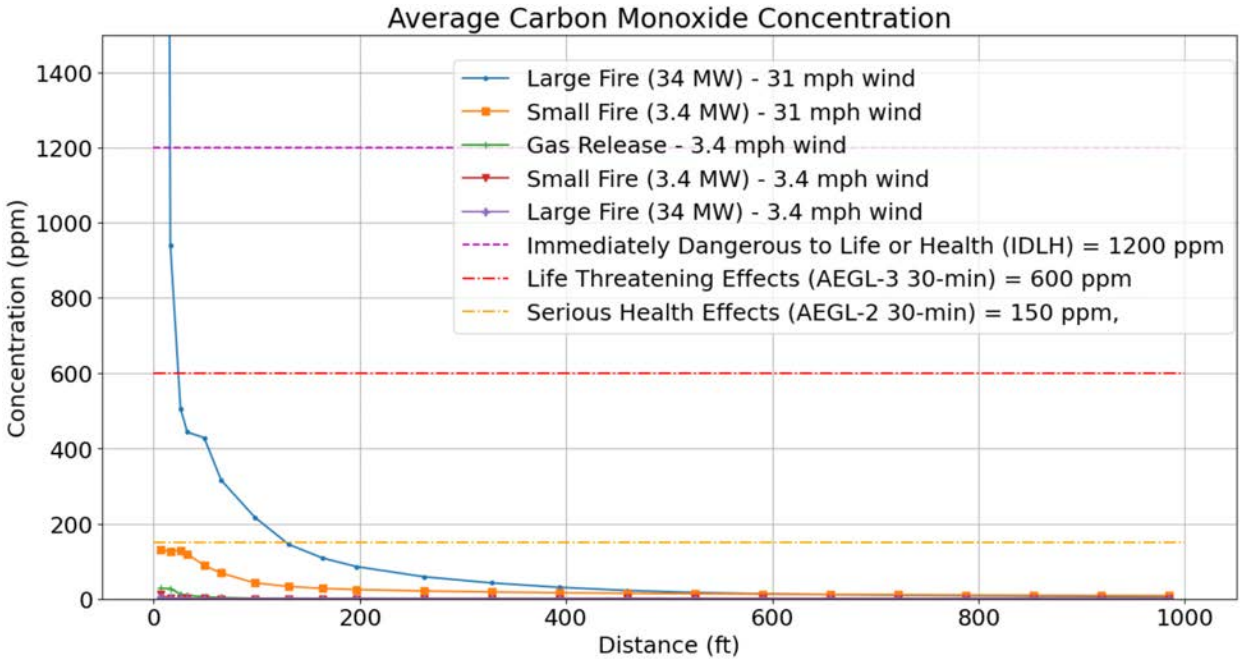


Figure 21: Average carbon monoxide concentrations as a function of distance for different battery vent gas or combustion product release scenarios. From this chart, we see that the carbon monoxide concentration may be immediately dangerous to life and health up to approximately 16 ft from the unit, may cause life-threatening effects up to approximately 26 ft from the unit, and may cause serious health effects up to approximately 131 ft from the unit in a large fire scenario with high winds. Wind speeds at or above 31 mph occur approximately 1% of the time at the Euismod site.

Hydrogen fluoride (HF) is an acutely toxic gas species whose presence has been reported in some battery failure cases. Due to the high toxicity of hydrogen fluoride at quite low concentrations, it is of growing concern for safety analyses of lithium-ion battery systems. It is well accepted by researchers that a lithium-ion cell can generate HF during thermal runaway. However, HF measurements from large-scale fire tests of ESS are not publicly available. In large-scale ESS fires, hydrogen fluoride production is most likely dominated by the burning of fire-retardant plastics in battery systems rather than by the actual cells. HF generated from the cells can also react with other components such as the module casing or rack structure. In general, the publicly available data on hydrogen fluoride in battery failures remains limited, and the reported quantities vary widely. Amounts of hydrogen fluoride between 0 L/Wh and 0.24 L/Wh have been reported [8]. This indicates that HF could represent a significant percentage of the produced gas or not be present in significant amounts. The manner in which this value depends

on cell chemistry, state of charge, or other factors is not well understood. Hydrogen fluoride is highly reactive with a range of materials including metals and various organic compounds. It is unclear whether substantial HF concentrations persist at a distance away from larger module, rack, and ESS scales. Hydrogen fluoride can be emitted from combustion of plastic components in the ESS, such as wiring insulation and module or rack enclosure casings. Although these plastics are commonly fire-retarded, fire-retardant plastics can be overwhelmed if the severity of the fire is sufficiently large. Such fire-retardant plastics are commonly found in non-battery applications and may pose similar emission hazards during fire conditions. While some testing laboratories will provide HF data, it is not currently required by UL 9540A or other standards currently in use in the United States. Hydrogen fluoride data was not provided for the SolBank 3.0 system. It is recommended that additional fire testing be performed in order to quantify what levels of hydrogen fluoride may exist for the SolBank 3.0.

Typically, hydrocarbons such as benzene and toluene are the only toxic gas concentrations other than carbon monoxide that are measured as part of the UL 9540A testing process. These do not present significant toxicity hazards compared to carbon monoxide and hydrogen fluoride, as their concentrations in battery gas are usually orders of magnitude less while having generally higher AEGL concentrations than CO and HF. For the Xiamen Hithium Energy Storage Technology Co., Ltd. cells, the benzene and toluene concentrations were not reported.

7 Conclusion

Of the measured toxic gas species for which test data is available, carbon monoxide is of primary concern due to its comparatively high concentrations and toxicity. Carbon monoxide has an IDLH (immediately dangerous to life and health) level of 1200 ppm, an AEGL-3 (life-threatening health effects) level for a 30-minute exposure of 600 ppm, and an AEGL-2 (serious health effects) level for a 30-minute exposure of 150 ppm. No AEGL-1 level is provided for CO. Carbon monoxide may constitute up to 16.202% of the unburned battery vent gas based upon the provided UL 9540A cell-level report. Carbon monoxide concentrations 2 m (6.6 ft) from ground level were measured by FDS for the non-fire scenario and calculated using modeled fire product concentrations and typical carbon monoxide levels present during lithium-ion battery fires for the fire scenarios. The modeled average carbon monoxide concentrations may be immediately dangerous to life and health (exceed the IDLH level) up to 16 ft, cause life-threatening health effects (exceed the AEGL-3 level) up to 26 ft, and cause serious health effects (exceed the AEGL-2 level) up to approximately 131 ft from the unit in a large fire scenario with high winds. Wind speeds at or above 31 mph occur approximately 1% of the time at the Euismod site. No toxicity consequences were present for the modeled scenarios with low wind conditions. Hydrogen fluoride data was not provided from the UL 9540A testing for this system. However, it is has been reported in some battery failure cases. Thus, hydrogen fluoride may be a risk, but the exact magnitude of this risk is unknown. It is recommended that additional fire testing be performed in order to quantify what levels of hydrogen fluoride may exist for the SolBank 3.0. Other measured toxic gases make up only trace amounts of the battery vent gas. Hydrocarbon release quantities are too small to exceed IDLH or AEGL levels at any distance from the unit.

Provided planning documents [1] and publicly available maps indicate that the Euismod site is located in a remote location with three houses located within half a mile. The nearest house is about 942 ft from the site (see Figure 2). Based on the model results, it is unlikely that toxic levels of carbon monoxide would reach populated areas in the event of a single BESS unit experiencing a failure event.

Given the potential risk of toxicity hazards during failure scenarios of the ESS, appropriate emergency response protocols should be considered and developed in collaboration with local emergency personnel. During an incident, site conditions may change and should be monitored throughout the incident. Changes in conditions may require appropriate adjustment to re-

sponse measures. Additional discussion of emergency response protocols may be provided in a separate emergency response guideline document. Figure 22 shows the areas that could have toxic carbon monoxide gas concentrations exceeding the IDLH level (immediately dangerous to life and health), the AEGL-3 level (life-threatening health effects), and the AEGL-2 level (serious health effects) based on the worst-case modeled scenarios for high winds at the Euismod project site. These distances were measured from the outermost BESS enclosures. Note that this figure does not consider possible hydrogen fluoride concentrations.

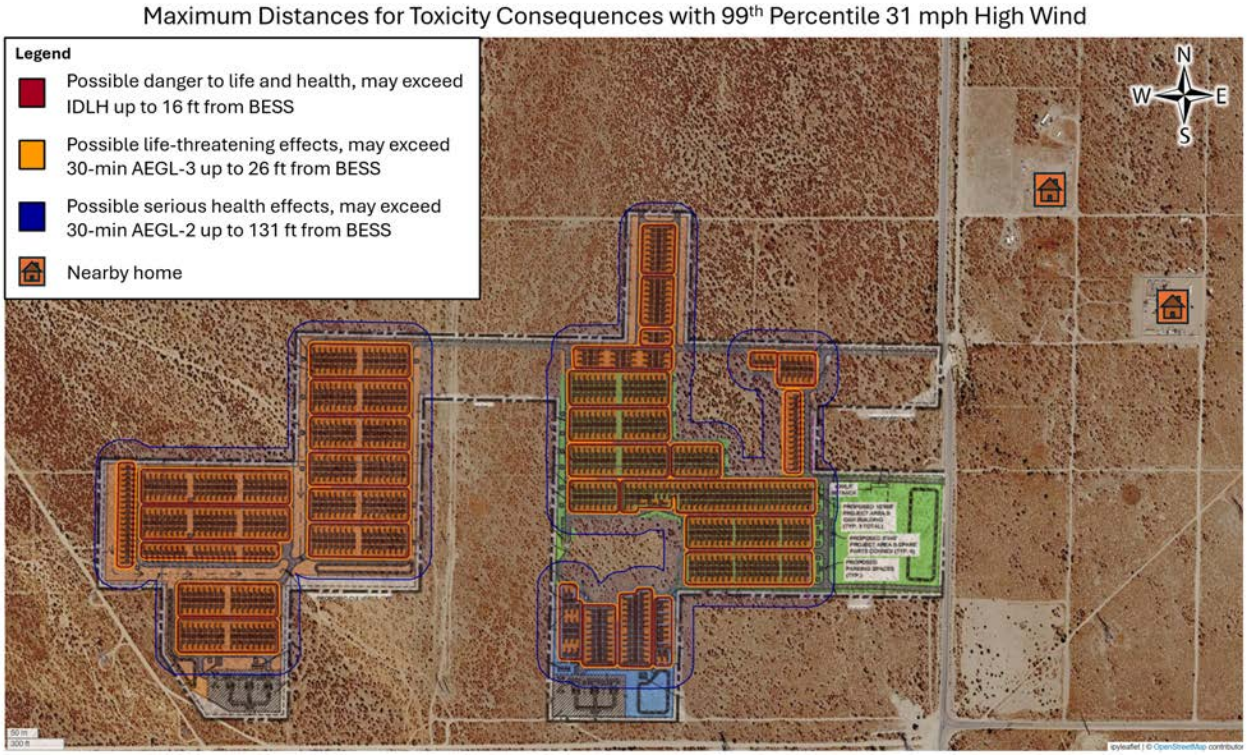


Figure 22: Satellite imagery of the immediate site surroundings with overlaid areas containing possible IDLH, AEGL-3, and AEGL-2 levels of toxic gases with steady 13.9 m/s (31 mph) wind, which occurs at the Euismod approximately 1% of the time. No toxicity consequences were present for the modeled scenarios with low wind conditions. Note that these buffers do not account for possible hydrogen fluoride concentrations. This image was produced using Open Street Map and Google Maps.

The buffers in Figure 22 show the maximum modeled distances for critical concentrations in all possible wind conditions. In reality, the wind will only come from one direction at a time, so a plume resulting from BESS failure will travel predominantly in one direction. Figure 23 shows a modeled plume from an enclosure on the northeast corner of the site with a high wind coming from the west.

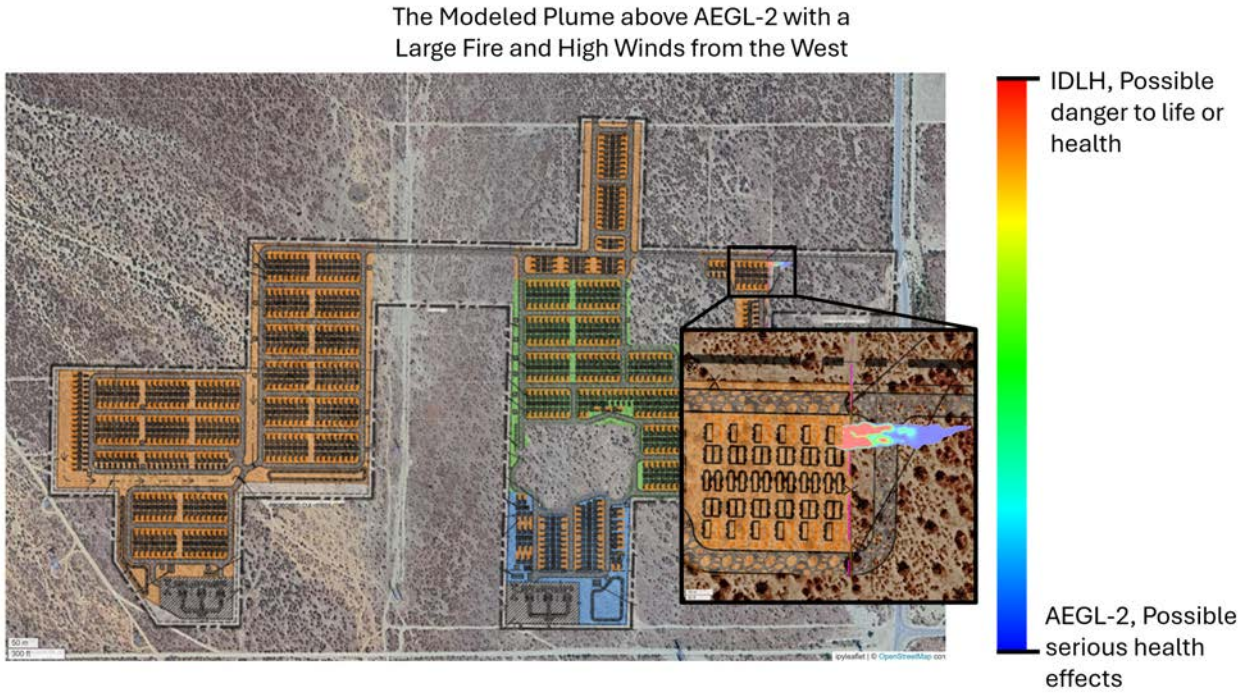


Figure 23: Satellite imagery of the immediate site surroundings with an overlaid plume that was modeled with 31 mph wind from the west. Note that this plume does not consider possible hydrogen fluoride levels. This image was produced using Open Street Map and Google Maps.

The analysis in this report assumes that only one battery unit fails or burns at a time and that gas release scenarios are consistent with UL 9540A testing. There are several conditions that may lead to worse consequences than those predicted by this model. Thermal runaway propagation exceeding the measured release rate, involvement of multiple units, and an inversion atmospheric condition–where the air near the ground is cooler than the air above it–can act to trap plumes and pollutants near ground level and could lead to worse consequences.

8 Limitations

- The study presented in this report is intended for use by client to assist with their decision making related to toxicity risks due to plume transport and evolution from Lithium-ion Battery Energy Storage Systems (BESS). This study specifically does not address other energy storage designs, feasibility of other toxic gas mitigation methods, or compliance to local codes and standards. The scope of the analysis was strictly limited to collection of data relevant to scope.
- The scope of services performed may not adequately address the needs of other users of this report, and any re-use of this report is at the sole risk of the user. This study is based on observations and information available at the time of the analysis. No guarantee or warranty as to future life or performance of any reviewed condition is expressed or implied.
- In the analysis, we have relied on documentation, including but not limited to facility design, BESS design, and other siting documents provided by the client. We cannot verify the correctness of this data and rely on the client for their accuracy. Although we

have exercised usual and customary care in the conduct of this analysis, the responsibility for the design and manufacture of the product remains fully with the client.

- The methodology forming the basis of the results presented in this report is based on mathematical modeling of physical systems and data from third parties. Given the nature of these evaluations, significant uncertainties are associated with the various computations. These uncertainties are inherent in the methodology and subsequently in the generated results. Furthermore, the assumptions adopted do not constitute the exclusive set of reasonable assumptions, and use of a different set of assumptions or methodology could produce materially different results.

References

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A Appendix

A.1 Gas Release Rate

1.1 Gas Release Rate

Module propagation time

$$t_{modulepropagation} = 1140.00000 \text{ second}$$

The amount of gas released by a cell in the cell-level test

$$V_{gascell} = 0.13000 \text{ meter}^3$$

Cells failed in module test

$$n_{cells} = 5$$

Average module release rate

$$r_{gasrelease} = V_{gascell} \cdot \frac{n_{cells}}{t_{modulepropagation}} = 0.13000 \text{ meter}^3 \cdot \frac{5}{1140.00000 \text{ second}} = 0.00057 \frac{\text{meter}^3}{\text{second}}$$

Density of the battery gas

$$\rho_{gas} = 0.84318 \frac{\text{kilogram}}{\text{meter}^3}$$

$$G = r_{gasrelease} \cdot \rho_{gas} = 0.00057 \frac{\text{meter}^3}{\text{second}} \cdot 0.84318 \frac{\text{kilogram}}{\text{meter}^3} = 0.00048 \frac{\text{kilogram}}{\text{second}}$$

$0.0004807619705336236 \frac{\text{kilogram}}{\text{second}}$

A.2 Heat Release Rate

The heat release rate (HRR) was estimated using available information about the energy capacity of the batteries within the enclosure. A time history of 120 minutes was assumed as a realistic and conservative time for the batteries to be completely consumed. A ramp-up of 30 minutes for the fire to grow and a 30-minute ramp-down as the fire burned out were also assumed. Figure 24 illustrates the time assumptions used to estimate the peak heat release rate of the fire. To be conservative in modeling, the large fire scenarios were run using the constant heat release rate that was reached during this time. The calculations done for this HRR estimate are outlined below in Equation 1. Table 5 shows the assumed values used for the calculation along with their sources.

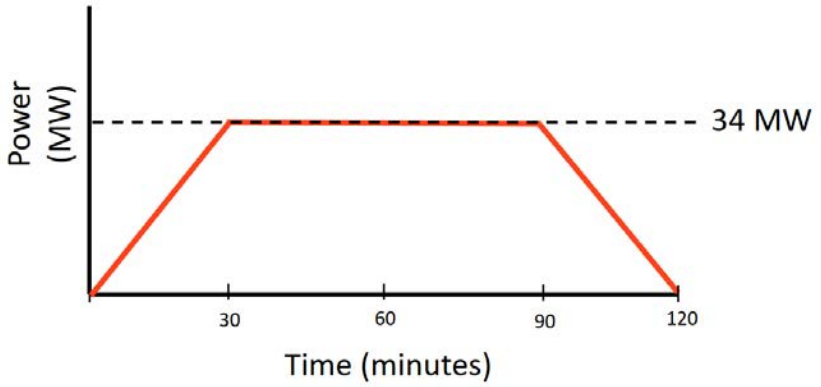


Figure 24: A plot of the estimated time history of a burning enclosure representative of the BESS in this study.

$$\frac{(h_{comb,e} \cdot f_e \cdot m_{pack} + h_{comb,p} \cdot f_p \cdot m_{pack}) \cdot N}{0.75 \cdot t} = HRR \tag{1}$$

Table 5: Values for Heat Release Rate estimation

Symbol	Quantity	Value	Source
m_{pack}	Module Mass	660 kg	[4]
f_e	Mass Fraction of Electrolyte	0.149	[16]
f_p	Mass Fraction of Plastic	0.044	[16]
$h_{comb,e}$	Electrolyte Heat of Combustion	28 MJ/kg	[17]
$h_{comb,p}$	Plastic Heat of Combustion	38 MJ/kg	[17]
N	Number of Packs in Enclosure	48	[2]
t	Amount of time system burns	120 minutes	-
HRR	**Heat Release Rate**	34 MW	-

B Revisions

Table 6: Document revision history.

Revision	Date	Description
0.1	January 15 2025	Initial draft version submitted to client for review.
0.2	March 1 2025	Figure 4 updated.
1.0	May 19 2026	Final issued with requested updates.
1.1	May 20 2026	Minor update per client request.

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