



HESPERIA BIG BOX RETAIL PROJECT

FINAL ENVIRONMENTAL IMPACT REPORT

PREPARED FOR
CITY OF HESPERIA
9700 Seventh Avenue
Hesperia, CA 92345

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1.0 SUMMARY OF THE FINAL ENVIRONMENTAL IMPACT REPORT

1.1 INTRODUCTION

The City of Hesperia (City) determined that a project-level environmental impact report (EIR) was required for the Hesperia Big Box Retail Project (Project) pursuant to the requirements of the California Environmental Quality Act (CEQA). CEQA requires the preparation of an EIR prior to approving any project that may have a significant impact on the environment. For the purposes of CEQA, the term "proposed Project" refers to the whole of an action, which has the potential for resulting in a direct physical change or a reasonably foreseeable indirect physical change in the environment (CEQA Guidelines § 15378[a]).

In accordance with CEQA Guidelines Section 15161, a Project EIR "examines the environmental impacts of a specific development project. This type of EIR should focus primarily on the changes in the environment that would result from the development project. The EIR shall examine all phases of the project, including planning, construction, and operation."

The Hesperia Big Box Retail Project EIR evaluates the potentially significant, adverse, and beneficial impacts on the environment resulting from implementation of the proposed Project. This document analyzes the environmental effects of the Project to the degree of specificity appropriate to the currently proposed actions, as required by CEQA Guidelines Section 15146. The EIR analysis considers the activities associated with the Project to determine the short-term and long-term effects associated with their implementation. This EIR discusses both direct and indirect impacts of the Project, as well as cumulative impacts associated with other past, present, and reasonably foreseeable future projects.

Pursuant to CEQA Guidelines Section 15082, as amended, the City prepared and circulated a Notice of Preparation (NOP) to affected agencies and interested parties for a public review period beginning on November 7, 2024. The deadline to submit comments on the NOP was December 6, 2024. Subsequently, a Draft EIR was prepared. The City published a public Notice of Availability (NOA) for the Draft EIR on November 21, 2025, inviting comments from the general public, agencies, organizations, and other interested parties. The NOA was also mailed to various agencies, organizations, and individuals who had previously requested such notice. The NOA was filed with the State Clearinghouse (SCH No. 2024110259) in accordance with the public notice requirements of CEQA. The City of Hesperia released the Draft EIR for public review and comment on November 24, 2025, with a 52-day review period ending on January 14, 2026.

This Final EIR has been prepared to address comments received in response to the Draft EIR. Acting as the Lead Agency, the City has prepared written responses to the Draft EIR. The responses to the comments are set forth in Section 2.0 in this Final EIR. Responses to comments received during the comment period do not require any new information to be added to the EIR. The Final EIR does not contain any new significant impacts or "significant new information" that would require recirculation of the Draft EIR pursuant to CEQA Guidelines Section 15088.5.

1.2 PROJECT SUMMARY

The project site is in the City of Hesperia in the western part of San Bernardino County (County), California. The approximately 25.4-acre site includes three parcels: Assessor Parcel Numbers (APNs) 0405-062-72, 0405-062-73, and 3064-481-25. The site is located north of Main California Aqueduct, east of Key Pointe Drive and Amargosa Road, and west of Interstate 15 (I-15). APN 0405-062-72 is north of Amargosa Road,

while the remaining two parcels are situated south of Amargosa Road and north of Main Street. The project site is currently vacant and undeveloped with existing shrubs, grasslands, and western Joshua trees within its boundaries.

The Project would remove all existing on-site vegetation and grade the site to accommodate the construction and operation of a 167,664-square-foot (sf) big box retail center with 672 spaces on an approximately 16.7-acre parcel north of Amargosa Road (APN 0405-062-72). A 14-pump (28 fueling positions) fuel station with an approximately 205-sf office building and an approximately 2,623-sf automated carwash facility is proposed on approximately 8.67 acres located south of Amargosa Road (APNs 0405-062-73 and 3064-481-25). The parcel containing the retail center is referred to as the northern parcel, while the parcel containing the fuel station and carwash is referred to as the southern parcel.

The project site is within the boundaries of the Main Street and Freeway Corridor Specific Plan (MSFCSP) area and is zoned Regional Commercial (RC). The RC zoning district allows for various commercial uses, including large-scale “big box” regional shopping centers, hotels, restaurants, and entertainment venues. Conditionally permitted uses include vehicle fuel stations, vehicle wash facilities, and off-site alcohol sales. The proposed Project is consistent with the RC zoning designation and the MSFCSP. Surrounding properties are similarly designated and zoned, except for the recreational (RV) and mobile home park to the west, which is designated Low Density Residential.

1.3 PROJECT OBJECTIVES

Section 15124(b) of the CEQA Guidelines requires “A statement of objectives sought by the proposed project.” The following objectives have been identified for the Project.

- Objective 1: Contribute to the economic vitality of the City of Hesperia and the broader region through new capital investment and the productive use of an underutilized, undeveloped site.
- Objective 2: Develop and operate a state-of-the-art big-box retail center that offers competitively priced goods and services from nationally recognized retailers as well as regional and local businesses, serving the needs of the local and regional community.
- Objective 3: Provide a retail facility in a location that is easily accessible to customers, employees, and the community, with proximity to major transportation corridors and existing infrastructure.
- Objective 4: Locate the project in an area already served by adequate roadway, utility, and service infrastructure to minimize the need for new public investment and reduce environmental impacts.
- Objective 5: Incorporate architectural and landscaping design features that reduce the perceived scale and mass of the development, enhance visual appeal, and complement the surrounding built environment.
- Objective 6: Create new employment opportunities and expand the City’s retail and service offerings, contributing to a more diverse and resilient local economy.
- Objective 7: Establish a facility of sufficient size and layout to accommodate a variety of services under one roof.

- Objective 8: Provide sufficient on-site parking to meet customer demand and prevent parking spillover, parking impacts on adjacent businesses, and residential areas.
- Objective 9: Strengthen the City's retail tax base and generate additional sales tax revenue to support municipal services and infrastructure.
- Objective 10: Meet community demand for automotive-related services, including fuel sales, car wash facilities, and tire services, in a convenient and integrated setting.

1.4 REQUIRED ACTIONS AND PERMITS

Pursuant to CEQA Guidelines Section 15121, an EIR is primarily an informational document intended to inform public agency decision-makers and the general public of the potentially significant environmental effects of a project. Prior to taking action on the proposed Project, the City must consider the information in this EIR and certify the Final EIR.

The City of Hesperia, as Lead Agency for the Project, has discretionary authority over the primary approvals. The Applicant has requested the consideration of the following discretionary actions.

- **Certification of the Hesperia Big Box Final Environmental Impact Report.** Environmental review under CEQA is required for the proposed Project.
- **Conditional Use Permit (CUP24-00005).** To allow for the development and operation of the retail building with alcohol sales, a fuel station, and a carwash.

In addition to the approvals identified above, the Project would be subject to other discretionary and ministerial actions by the City during Project implementation. Additional City approvals include, but are not limited to, site development, grading, building, and sign permits.

Approvals would also be required from the following agencies:

Lahontan Regional Water Quality Control Board (RWQCB): Issuance of a National Pollution Discharge Elimination System (NPDES) Permit and Construction General Permit.

Mojave Desert Air Quality Management District: Issuance of a Gasoline Dispensing Equipment Permit.

California Department of Fish and Wildlife. Issuance of an Incidental Take Permit.

2.0 RESPONSES TO COMMENTS

2.1 INTRODUCTION TO RESPONSES TO COMMENTS

The purpose of this section is to present public comments and responses to comments received on the Draft Environmental Impact Report (State Clearinghouse No. 2024110259) for the Hesperia Big Box Retail Project. The Notice of Availability/Notice of Completion and Draft EIR were circulated for public review for a 52-day review period from November 24, 2025, to January 14, 2026.

In accordance with the CEQA Guidelines Section 15088, the City of Hesperia, as the Lead Agency, has evaluated all substantive comments received on the Hesperia Big Box Retail Project Draft EIR and has prepared written responses to these comments. This document has been prepared in accordance with CEQA and represents the independent judgment of the Lead Agency.

The Final EIR for the Hesperia Big Box Retail Project consists of the Draft EIR and its technical appendices; the Responses to Comments included herein; other written documentation prepared during the EIR process; and those documents which may be modified by the Planning Commission at the time of consideration of certification of the Final EIR. The Planning Commission will also consider the adoption of a Mitigation Monitoring and Reporting Program (MMRP), a Statement of Findings of Fact, and a Statement of Overriding Considerations as part of the approval process for the Project.

This Responses to Comments is organized as follows:

Section 2.1 Provides a brief introduction to this section.

Section 2.2 Identifies the Draft EIR commenters.

Section 2.3 Provides responses to substantive comments received on the Draft EIR.

CEQA Guidelines Section 15204(a) directs persons and public agencies to focus their review of a Draft EIR on the sufficiency of the document in identifying and analyzing possible impacts on the environment and ways in which significant effects of the project might be avoided or mitigated. Comments are most helpful when they suggest specific alternatives or mitigation measures that would better avoid or mitigate the significant environmental effects. At the same time, reviewers should be aware that the adequacy of an EIR is determined by what is reasonably feasible. CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commenters. When responding to comments, lead agencies need only respond to significant environmental issues and do not need to provide all information requested by reviewers, as long as a good-faith effort at full disclosure is made in the EIR.

CEQA Guidelines Section 15204(c) further advises, "Reviewers should explain the basis for their comments, and should submit data or references offering facts, reasonable assumptions based on facts, or expert opinion supported by facts in support of the comments. Pursuant to CEQA Guidelines Section 15064, an effect shall not be considered significant in the absence of substantial evidence." Section 15204(d) states, "Each responsible agency and trustee agency shall focus its comments on environmental information germane to that agency's statutory responsibility." CEQA Guidelines Section 15204(e) states, "This section shall not be used to restrict the ability of reviewers to comment on the general adequacy of a document or of the lead agency to reject comments not focused as recommended by this section."

In accordance with CEQA, Public Resources Code Section 21092.5, copies of the written responses to public agencies will be forwarded to those agencies at least ten days prior to the public hearing.

2.2 LIST OF RESPONDENTS

In accordance with CEQA Guidelines Section 15132, the following is a list of public agencies, organizations, individuals, and businesses that submitted comments on the Draft EIR received as of the close of the State Clearinghouse public review period on January 14, 2026.

The City received a comment letter from the Department of Water Resources after the public review period closed. It is important to note that CEQA does not require a lead agency to respond to late comments, to reopen the comment period, or delay acting on an EIR (Public Resources Code §§ 21091(d)(1), 21092.5(c)). Public Resources Code Section 21091(d)(2)(A) notes that a lead agency may respond to comments that are received after the close of the public review period.

In addition to the comment letters received during the public review period, the City of Hesperia has also prepared a response to the late comment letter. All responses are provided in Section 2.3.

Comment Number	Commenter	Date of Correspondence
1	Mojave Water Agency	November 24, 2025
2	Lahontan Regional Water Quality Control Board	December 3, 2025
3	California Department of Fish and Wildlife	January 9, 2026
4	California Department of Transportation, District 8	January 14, 2026
5	Western States Regional Council of Carpenters	January 14, 2026
6	California Department of Water Resources	January 26, 2026

2.3 RESPONSES TO ENVIRONMENTAL COMMENTS

This section is formatted so that the respective comment letters are followed immediately by the corresponding responses. Comment letters and specific comments are given letters and numbers, respectively, for reference purposes. Where sections of the Draft EIR are excerpted in this document, the sections are shown indented. Changes to the EIR text are shown in underlined text for additions and ~~strikeout~~ for deletions.

Comment Letter 1: Mojave Water Agency



November 24, 2025

Edgar Gonzales, Senior Planner
City of Hesperia
Attention: Edgar Gonzales
egonzalez@hesperiaca.gov

Regarding: Hesperia Big Box Retail Project

Dear Edgar,

1-1

The Mojave Water Agency has reviewed the attached project and determined that it does not currently have facilities or infrastructure within the area, based on the information submitted. If any of the information is incomplete, please notify MWA as soon as possible so that we can provide additional information regarding your request

Sincerely,
Christy Huiner
Senior Water Resource Analyst
Engineering Department
Mojave Water Agency
chuiner@mojavewater.org
760-946-7066

13846 Conference Center Drive
Apple Valley, CA 92307
Phone: (760) 946-7000 | Fax: (760) 240-2642
WWW.MOJAVEWATER.ORG

Response to Comment Letter 1

Mojave Water Agency

Christy Huiner, Senior Water Resource Analyst

November 24, 2025

- 1-1 This comment is noted. The Mojave Water Agency (MWA) states that, based on the information provided, it does not currently own or operate facilities or infrastructure on or in the vicinity of the project site. The City appreciates MWA's review of the Project materials. As analyzed in the EIR, the Project would be served by existing municipal water service providers and would not require water supply infrastructure owned or operated by MWA. Therefore, the absence of MWA facilities in the area does not affect the Project's water supply analysis or conclusions regarding hydrology, water quality, or utilities. The City finds that the Project description and water supply information provided in the EIR are complete and adequate for purposes of CEQA. No revisions to the EIR are required as a result of this comment.

Comment Letter 2: Lahontan Regional Water Quality Control Board



Lahontan Regional Water Quality Control Board

December 3, 2025

File: Environmental Doc Review
San Bernardino County

Edgar Gonzalez
Senior Planner
City of Hesperia
9700 Seventh Avenue
Hesperia, CA 92345
egonzalez@hesperiaca.gov

Comments on the Hesperia Big Box Retail Project Draft Environmental Impact Report, San Bernardino County, SCH No. 2024110259

2-1

The California Regional Water Quality Control Board, Lahontan Region (Water Board) staff received the Hesperia Big Box Retail Project (HRP) for the above-referenced Project on November 25, 2025. The HRP was prepared by Kimley-Horn and Associates, Inc. (Kimley-Horn) and submitted in compliance with provisions of the California Environmental Quality Act (CEQA). Based on our review of the HRP, we recommend the following: (1) natural drainage channels and flow paths should be maintained through the Project site to ensure no net loss of function and value of waters of the state; and (2) a site-specific Storm Water Pollution Prevention Plan (SWPPP) should be prepared that identifies a combination of sediment and erosion control best management practices (BMPs) to effectively treat storm water runoff during the life of the Project. Our comments are outlined below.

WATER BOARD'S AUTHORITY

2-2

All groundwater and surface waters are considered waters of the State. All waters of the State are protected under California law. State law assigns responsibility for protection of water quality in the Lahontan Region to the Lahontan Water Board. Some waters of the State are also waters of the United States. The Federal Clean Water Act (CWA) provides additional protection for those waters of the State that are also waters of the United States.

The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) contains policies that the Water Board uses with other laws and regulations to protect the quality of waters of the State within the Lahontan Region.

ROBERT PEARCE, ACTING CHAIR | BEN LETTON, EXECUTIVE OFFICER

2501 Lake Tahoe Blvd., So. Lake Tahoe, CA 96150 | 15095 Amargosa Road, Bldg. 2, Suite 210, Victorville, 92394
www.waterboards.ca.gov/lahontan/

Edgar Gonzalez

- 2 -

December 3, 2025

2-2
cont.

The Basin Plan sets forth water quality standards for surface water and groundwater of the Region, which include designated beneficial uses as well as narrative and numerical objectives which must be maintained or attained to protect those uses. The Basin Plan can be accessed via the Water Board's web site at http://www.waterboards.ca.gov/lahtontan/water_issues/programs/basin_plan/references.shtml.

WATER QUALITY CONCERNS

Our comments on the Project are outlined below.

2-3

1. In general, the construction and operation of a 167,664 square-foot (sf) big box retail center with 774 parking spaces, a 14-pump (28 fueling positions) fuel station with an approximately 205-sf office building, an approximately 2,623-sf automated carwash facility, and a total of six new driveways have the potential to hydrologically modify natural drainage systems. Of particular concern is the collection of onsite storm water runoff and the concentrated discharge of that storm water to natural drainage channels. Design alternatives that are compatible with low impact development (LID) should be considered. LID components include: maintaining natural drainage paths and landscape features to slow and filter runoff and maximize groundwater recharge; managing runoff as close to the source as possible; and maintaining vegetated areas for storm water management and onsite infiltration. The HRP proposes two infiltration basins that will be located on the outer edges of the site. We encourage BMPs to establish and maintain flow of surface water to the infiltration basins.

2-4

2. A Project-specific SWPPP and implementation of site-specific erosion and sediment control BMPs is an effective way to reduce potentially significant water quality impacts to a less than significant level. To that end, we recommend the development and implementation of a Project-specific SWPPP during both the construction and post-construction phases of the Project. The SWPPP should be applicable to all areas of the Project site, including access roads. Please note that temporary BMPs need to be implemented for the Project until such time that permanent BMPs are in place and functioning.

2-5

3. The city should require the preparation and implementation of a comprehensive Spill Prevention and Response Plan for the Project. This plan should outline the site-specific monitoring requirements and list the best management practices necessary to prevent hazardous material spills or to contain and clean up a hazardous material spill, should one occur.

2-6

4. Equipment staging areas, excavated soil stockpiles, and hazardous materials (i.e. oils and fuels) should be sited in upland areas outside surface waters and adjacent flood plain areas. These locations should also be included on Project maps or site plans, which are needed to evaluate the Project impacts.

Edgar Gonzalez

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December 3, 2025

PERMITTING REQUIREMENTS

A number of activities associated with the proposed Project may have the potential to impact waters of the State and, therefore, may require permits issued by either the State Water Board or Lahontan Water Board. The required permits may include the following.

2-7

1. Streambed alteration and/or discharge of fill material to a surface water may require a CWA, section 401 water quality certification for impacts to federal waters (waters of the U.S.), or dredge and fill waste discharge requirements for impacts to non-federal waters, both issued by the Lahontan Water Board. All unavoidable permanent impacts to waters of the State must be mitigated to ensure no net loss of beneficial use and wetland function and value. Water Board staff coordinate mitigation requirements with staff from federal and other state regulatory agencies. In determining appropriate mitigation ratios for impacts to waters of the State, we consider Basin Plan requirements (minimum 1.5 to 1 mitigation ratio for impacts to wetlands) and utilize 12501-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios, published December 2012 by the US Army Corps of Engineers, South Pacific Division.
2. Land disturbance of more than 1 acre may require a CWA, section 402(p) storm water permit, including a National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit, Water Quality Order (WQO) 2022-0057-DWQ, obtained from the State Water Board, or individual storm water permit obtained from the Lahontan Water Board.
3. Discharge of designated waste may require WDRs in accordance with California Water Code (CWC) section 13260(a) requirements, obtained from the Lahontan Water Board. A ROWD must be filed with the Water Board that fully characterizes the site and the waste at least 180 days prior to the anticipated discharge. The ROWD must include an adequate assessment of potential threat to water quality from this Project that satisfies CEQA.

2-8

We request that the draft DEIR recognize the potential permits that may be required for the Project, as outlined above, and identify the specific activities that may trigger these permitting actions in the appropriate sections of the environmental document. Information regarding these permits, including application forms, can be downloaded from our web site at <http://www.waterboards.ca.gov/lahontan/>. Early consultation with Water Board staff regarding potential permitting is recommended.

If you have any questions regarding this letter, please contact me at (760) 313-1295 (Luis.Gomez@waterboards.ca.gov) or Christina Guerra, Senior Engineering Geologist, at (760) 241-7333 (Christina.Guerra@waterboards.ca.gov).

Edgar Gonzalez

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December 3, 2025

2-8
cont.

Please send all future correspondence regarding this Project to the Water Board's email address at Lahontan@waterboards.ca.gov and be sure to include the Project name in the subject line.



Luis Gomez
Engineering Geologist

cc: State Clearinghouse (SCH 2024110259) (state.clearinghouse@opr.ca.gov)

Responses to Comment Letter 2

Lahontan Regional Water Quality Control Board

Luis Gomez, Engineering Geologist

December 3, 2025

- 2-1 The Lahontan Regional Water Quality Control Board (Water Board) reviewed the Project and recommends that: (1) natural drainage channels and flow paths be maintained through the project site to ensure no net loss of function and value of waters of the State; and (2) a site-specific Storm Water Pollution Prevention Plan (SWPPP) be prepared identifying sediment and erosion control best management practices (BMPs) to treat storm water runoff during the life of the Project. The City appreciates the Water Board's review of the Project and its recommendations regarding protection of waters of the State and stormwater management.

As analyzed in the EIR, the Project would not result in significant impacts to surface water or groundwater quality. The Project does not involve alteration of the course of a stream or river, and no jurisdictional waters or waters of the State would be filled or removed. Stormwater runoff from the site would be managed through engineered drainage features, including on-site infiltration facilities, designed in accordance with applicable City standards and regional stormwater requirements. These features are intended to manage runoff volumes and flows in a manner consistent with applicable low-impact development principles and to avoid degradation of downstream drainage systems.

With respect to stormwater pollution prevention, the EIR recognizes that Project construction would disturb more than one acre and, therefore, would be subject to the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. Compliance with this permit requires preparing and implementing a site-specific SWPPP that incorporates erosion and sediment control BMPs during construction, as well as post-construction stormwater management measures, as applicable. Compliance with the NPDES permit and other applicable water quality regulations is mandatory and is incorporated into the Project.

The City notes that the Water Board's comments are advisory in nature and address matters that are already governed by existing regulatory programs administered by the State Water Resources Control Board and the Control Board. CEQA does not require the imposition of additional mitigation measures where compliance with existing regulations will avoid or substantially lessen potential impacts. Accordingly, no revisions to the EIR are required as a result of this comment.

- 2-2 This comment summarizes the Water Board's authority over waters of the State and waters of the United States and explains the role of the Water Quality Control Plan for the Lahontan Region (Basin Plan) in establishing beneficial uses and water quality objectives. The Water Board's description of its regulatory authority is informational in nature and does not identify a specific deficiency or inadequacy in the EIR's analysis. Therefore, no revisions to the EIR are required as a result of this comment.
- 2-3 This commenter expresses concern regarding potential hydrologic modification from the collection and discharge of on-site stormwater runoff and recommends the incorporation of Low Impact Development (LID) features and BMPs.

As analyzed in Draft EIR Section 4.9: Hydrology and Water Quality and detailed in the Project's Preliminary Hydrology Report (Draft EIR, Appendix H1) and Preliminary Water Quality Management Plan (WQMP) (Draft EIR, Appendix H2), the Project has been designed to incorporate LID principles and BMPs that minimize hydromodification and protect downstream waters. Post-development drainage patterns would be designed to functionally mimic pre-development conditions by reducing runoff volume, attenuating peak flows, and maximizing on-site infiltration. Consistent with LID principles, the Project would incorporate vegetated areas and large infiltration basins to promote on-site infiltration and maximize groundwater recharge. BMPs would be implemented throughout the site to direct surface runoff to these infiltration features and to slow, filter, and infiltrate stormwater runoff. Runoff would be managed as close to the source as feasible and would not result in significant erosion, flooding, or degradation of waters of the State. Final stormwater design would be subject to review and approval by the City and applicable regulatory agencies through the WQMP, SWPPP, and grading permit processes, ensuring compliance with applicable stormwater and water quality regulations. The comment does not identify a deficiency in the EIR's analysis or a significant environmental impact requiring additional mitigation.

- 2-4 The Water Board recommends preparation and implementation of a project-specific SWPPP and implementation of site-specific erosion and sediment control BMPs during construction and post-construction, including use of temporary BMPs until permanent BMPs are operational. As described in Draft EIR Section 4.9: Hydrology and Water Quality, Project construction would disturb more than one acre and therefore would be subject to the NPDES Construction General Permit. Compliance with this permit requires preparation and implementation of a site-specific SWPPP, including temporary and permanent erosion and sediment control BMPs applicable to all disturbed areas of the project site, including access roads. In addition, post-construction stormwater management would be addressed through compliance with applicable City stormwater requirements and the approved WQMP. These regulatory requirements are mandatory and are incorporated into the Project. Compliance with these existing programs would ensure that potential water quality impacts are reduced to a less than significant level.

The Water Board's comment addresses implementation of established regulatory requirements and does not identify a deficiency in the Draft EIR's analysis or demonstrates the need for additional mitigation. Accordingly, no revisions to the EIR are required as a result of this comment.

- 2-5 The Water Board recommends that the City require preparation and implementation of a comprehensive Spill Prevention and Response Plan outlining site-specific monitoring requirements and BMPs to prevent, contain, or clean up hazardous materials spills. The City acknowledges the Water Board's recommendation regarding spill prevention and response. As described in Section 4.8: Hazards and Hazardous Materials of the Draft EIR, the Project would involve the routine use and storage of hazardous materials typical of commercial retail, fuel station, and carwash operations. Such activities are subject to comprehensive federal, State, and local regulations governing hazardous materials handling, spill prevention, emergency response, and cleanup. Consistent with these regulatory requirements, each proposed use would provide a Spill Prevention and Response Plan that addresses site-specific BMPs to prevent spills and to respond to and clean up spills should they occur. These plans are required under existing hazardous materials, fire, and environmental health regulations and are implemented through

- standard permitting and operational compliance. Compliance with these existing regulatory programs is incorporated into the Project and would ensure that hazardous material spills are properly prevented, managed, and addressed should they occur. The Water Board's comment does not identify a deficiency in the Draft EIR's analysis or demonstrate the need for additional CEQA mitigation. Accordingly, no revisions to the EIR are required as a result of this comment.
- 2-6 The Water Board recommends that equipment staging areas, excavated soil stockpiles, and hazardous materials be sited in upland areas outside surface waters and adjacent floodplain areas and that such locations be identified on Project maps or site plans. As discussed above, Project construction would require coverage under the NPDES Construction General Permit. As part of that process, the Project Applicant would be required to submit a Notice of Intent (NOI) and prepare a site-specific SWPPP. The SWPPP would identify appropriate locations for equipment staging, material storage, and soil stockpiles and would require implementation of BMPs to ensure that such activities are sited and managed to prevent impacts to surface waters and adjacent flood-prone areas. These requirements are administered through existing regulatory and permitting programs and are incorporated into the Project. The Water Board's comment does not identify a deficiency in the EIR's analysis or demonstrate the need for additional mitigation measures. Accordingly, no revisions to the EIR are required as a result of this comment.
- 2-7 The Water Board identifies potential permitting requirements that may apply to the Project, including Clean Water Act Section 401 water quality certification or waste discharge requirements for impacts to waters of the State, NPDES stormwater permitting for land disturbance greater than one acre, and waste discharge requirements pursuant to California Water Code Section 13260(a). The EIR evaluated potential effects on surface water and groundwater quality and concluded that the Project would not result in impacts to waters of the State. To the extent that future Project activities trigger the need for permits under the Clean Water Act, the Porter-Cologne Water Quality Control Act, or other applicable statutes, the Project Applicant would be required to obtain all necessary approvals, including any required water quality certifications, waste discharge requirements, or stormwater permits, prior to undertaking such activities. Compliance with these permitting requirements is mandatory and is administered through existing regulatory programs independent of CEQA. The Water Board's comment provides clarification regarding regulatory processes and does not identify a deficiency in the EIR's analysis or conclusions. Accordingly, no revisions to the EIR are required as a result of this comment.
- 2-8 The Water Board requests that the Draft EIR recognize potential permits that may be required for the Project and identify specific activities that may trigger those permits. The Water Board also recommends early consultation with Water Board staff regarding potential permitting. The EIR identifies the Lahontan Regional Water Quality Control Board as a Responsible Agency pursuant to CEQA Guidelines Section 15050 and 15386 (see Draft EIR Section 3.9: Responsible and Trustee Agencies) and evaluates potential impacts to surface water and groundwater quality in Section 4.9: Hydrology and Water Quality. The EIR concludes that the Project would not result in significant impacts to waters of the State. To the extent that specific Project activities trigger the need for permits administered by the State Water Resources Control Board or the Control Board, the Project Applicant would be required to obtain all applicable approvals prior to undertaking those activities. Identification of precise permitting requirements and jurisdictional determinations is appropriately made by the responsible regulatory agencies during the

permitting process based on detailed, final project design information. It is noted that early consultation with regulatory agencies, including the Water Board, is a standard practice during project implementation and permitting. The Water Board's comment provides clarification regarding regulatory processes but does not identify a deficiency in the EIR's analysis or conclusions. Accordingly, no revisions to the EIR are required as a result of this comment.

Comment Letter 3: California Department of Fish and Wildlife

Docusign Envelope ID: E753405B-DFDC-4D87-A880-5CD954E1D585



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
VALERIE TERMINI, Acting Director



January 9, 2026
Sent via email.

Edgar Gonzalez
Senior Planner
City of Hesperia
9700 Seventh Avenue
Hesperia, CA 92345
egonzalez@hesperiaca.gov

SUBJECT: HESPERIA BIG BOX RETAIL PROJECT (PROJECT)
DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)
SCH# 2024110259

Dear Edgar Gonzalez,

3-1

The California Department of Fish and Wildlife (CDFW) received a Notice of Availability of a DEIR from the City of Hesperia (City) for the Project pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.¹

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may

¹ CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

Conserving California's Wildlife Since 1870

Docusign Envelope ID: E753405B-DFDC-4D87-A860-5CD954E1D585

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City of Hesperia
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cont.

need to exercise regulatory authority as provided by the Fish and Game Code. As **proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority.** (Fish & G. Code, § 1600 et seq.) Likewise, to the extent **implementation of the Project as proposed may result in "take" as defined by State law** of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project Proponent may seek related take authorization as provided by the Fish and Game Code.

3-2

PROJECT DESCRIPTION SUMMARY

Project Proponent: City of Hesperia

Objective: The objective of the Project is to construct a big-box retail center. The Project includes construction of a 167,664-square-foot retail building and 683 parking spaces, with access provided by two new driveways on Amargosa Road and a 26-foot-wide paved access road connecting White Fox Trail to Catapa Road. South of Amargosa Road, the Project will develop a fuel station with 14 pumps and three underground fuel storage tanks, a 205-square-foot office building, and a 2,623-square-foot automated car wash.

Location: The Project is located in the western portion of the City of Hesperia, San Bernardino County, and lies north of Main Street, south of the California Aqueduct, east of Key Pointe Drive and Amargosa Road, and west of Interstate 15. The Project will occur on approximately 27.25 acres on four Assessor's Parcel Numbers (APNs): 0405-062-72, 0405-062-73, 3064-481-06, and 3064-481-07 (Project Site). APN 0405-062-72 is north of Amargosa Road, while the other APNs are located south of Amargosa Road and north of Main Street.

Timeframe: Construction of the Project will occur in two overlapping phases (Phase 1 and Phase 2) over 12 months. Phase 1 will build the fuel station and car wash in five months. Phase 2 will build the big-box retail in nine months.

COMMENTS AND RECOMMENDATIONS

CDFW appreciates that an application for a Western Joshua Tree Conservation Act (WJTCA) Incidental Take Permit (ITP) for the Project has been submitted and that **protocol level surveys for Mohave ground squirrel, western burrowing owl, and Crotch's bumble bee** were conducted to help inform the DEIR.

CDFW offers the minor comments and recommendations below to assist the City in **adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources.** Editorial comments or other suggestions have been included to improve the final EIR.

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3-3

COMMENT 1: Western Burrowing Owl (*Athene Cunicularia*)

Section 4.3, Pages 6-7; 13-14

CDFW appreciates that through Mitigation Measure (MM) BIO-2B, the Project Proponent will obtain a CESA ITP for western burrowing owl, since presence of **western burrowing owl has been confirmed on the Project Site. CDFW's only** concern with MM BIO-2B is that a Mitigation Credit Agreement is considered as an option for compensatory mitigation pursuant to a CESA ITP. A Mitigation Credit **Agreement currently isn't an available option so currently mitigation** can only be fulfilled by one or more of the following options: 1) Conservation or Mitigation Bank credits (if available) 2) Permittee-responsible mitigation land acquisition protected by a conservation easement in perpetuity. Thus, CDFW recommends that the following revisions to MM BIO-2B (edits are in **bold** and ~~striketrough~~) be included in the final EIR:

MM BIO-2B Burrowing Owl Incidental Take Permit. Suitable burrowing owl habitat and burrowing owl presence have been confirmed on the site. Therefore, the Project Applicant shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW) pursuant to the California Endangered Species Act (CESA) prior to the start of any ground disturbance or construction activities.

The ITP shall include, at a minimum: a description of project activities and equipment, proposed avoidance and buffer zones, identification of temporary and permanent impacts, monitoring requirements, proposed relocation or translocation protocols, and compensatory mitigation measures. Compensatory mitigation shall be satisfied through one or more of the following mechanisms:

1. purchase of credits at a CDFW-approved conservation or mitigation bank (if available); **or**

~~2. execution of a Mitigation Credit Agreement; or~~

23. Permittee-responsible mitigation land acquisition.

If burrowing owl is documented within the project site or within the 500-foot buffer during pre-construction surveys or construction-phase biological monitoring, the biological monitor shall notify the CDFW within 48 hours of the observation. All applicable conditions of the ITP shall be fully implemented to avoid unauthorized take.

3-4

COMMENT 2: Desert Tortoise (*Gopherus Agassazii*)

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3-4
cont.

Section 4.3 Biological Resources, Page 4.3-2

CDFW recognizes that the potential for desert tortoise occurring on the Project Site is very low, especially considering that according to the DEIR, no suitable burrows for desert tortoise were observed and no suitable habitat occurs on the Project Site. In addition, the Project Site is largely separated from other areas of native habitat by development. However, because the California Natural Diversity Database indicates that the Project Site is within the predicted range and within suitable habitat for desert tortoise and the Biotic Resources Overlay Map also indicates that the Project Site is in an area with sparse populations of the desert tortoise, CDFW recommends that a pre-construction survey be conducted prior to ground-disturbing activities to confirm absence of desert tortoise. Thus, CDFW recommends the adoption of MM BIO-7 (see below) in the final EIR.

MM BIO-7. Desert Tortoise Pre-Construction Surveys. A qualified biologist shall conduct a protocol-level presence or absence survey within the Project Site, and 50-foot buffer zone no more than 48 hours prior to Project activities commencing in accordance with the U.S. Fish and Wildlife Service 2019 desert tortoise survey methodology (USFWS 2019). The survey shall utilize survey routes that provide 100-percent visual coverage for desert tortoise and their sign. If desert tortoise may be impacted by the Project, Permittee shall fully avoid impacts to desert tortoise or should obtain a CESA ITP if impacts are unavoidable.

3-5

COMMENT 3: Mohave Ground Squirrel (*Xerospermophilus mohavensis*)

Section 4.3 Biological Resources, Page: 4.3-6

Due to the presence of suitable habitat on the Project Site, CDFW appreciates that camera and live trapping occurred in 2024 during which no Mohave ground squirrel (MGS) was found. CDFW generally considers biological field assessments for wildlife to be valid for a one-year period. Therefore, additional surveys are necessary to verify that MGS remain absent from the Project Site within suitable habitat. For this reason, CDFW recommends MM BIO-8 (see below) be adopted in the final EIR.

MM BIO-8 Mohave Ground Squirrel Pre-Construction Surveys. Prior to commencement of ground disturbing Project activities, a visual survey shall be conducted by a qualified biologist during the period of March 15 through April 15 to determine presence of Mohave ground squirrel. The survey shall be conducted on the Project Site according to the *Mohave Ground Squirrel Survey Guidelines* (CDFW, October 2023 Revision 4 or most recent version) during daylight hours by the qualified biologist who can visually identify Mohave ground squirrel and white-tailed antelope squirrel and detect vocalization calls. If the survey or monitoring confirms presence, the Project

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3-5
cont.

Proponents shall contact CDFW immediately (within 24 hours) and fully avoid all impacts to Mohave ground squirrel or obtain an incidental take permit (ITP).

3-6

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDDB). The CNDDDB field survey form can be filled out and submitted online at the following link: <https://wildlife.ca.gov/Data/CNDDDB/Submitting-Data>. The types of information reported to CNDDDB can be found at the following link: <https://www.wildlife.ca.gov/Data/CNDDDB/Plants-and-Animals>.

3-7

ENVIRONMENTAL DOCUMENT FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of environmental document filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the environmental document filing fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

3-8

CONCLUSION

CDFW appreciates the opportunity to comment on the DEIR to assist the City in identifying and mitigating Project impacts on biological resources.

Questions regarding this letter or further coordination should be directed to Scott Jakubowski, Senior Environmental Scientist (Specialist), at (909) 354-0919 or scott.jakubowski@wildlife.ca.gov.

Sincerely,

DocuSigned by:



84FB68273E4C480...

Alisa Ellsworth

Environmental Program Manager

Responses to Comment Letter 3

California Department of Fish and Wildlife
Alisa Ellsworth, Environmental Program Manager
January 9, 2026

- 3-1 The California Department of Fish and Wildlife (CDFW) describes its role as a Trustee Agency for fish and wildlife resources and as a Responsible Agency under CEQA and notes its potential regulatory authority under the Fish and Game Code, including streambed alteration authority and potential authorization requirements under the California Endangered Species Act. CDFW's description of its authority and role does not identify a deficiency in the EIR's analysis or conclusions. Accordingly, no revisions to the EIR are required as a result of this comment.
- 3-2 This comment consists of a summary of the Project and introduces CDFW's comments and recommendations. This comment does not specifically state the concerns or issues with environmental analysis in the EIR. Accordingly, no revisions to the EIR are required as a result of this comment.
- 3-3 CDFW acknowledges that Mitigation Measure (MM) BIO-2B requires the Project Applicant to obtain a California Endangered Species Act (CESA) Incidental Take Permit (ITP) for western burrowing owls. However, CDFW notes that because a Mitigation Credit Agreement is not currently an available option, mitigation can only be fulfilled by one or more of the following options: (1) Conservation or Mitigation Bank credits (if available) or (2) Permittee- responsible mitigation land acquisition protected by a conservation easement in perpetuity. CDFW recommends revising MM BIO-2B to remove the Mitigation Credit Agreement option.

In response to CDFW's comment, MM BIO-2B has been revised as follows:

MM BIO-2B Burrowing Owl Incidental Take Permit. Suitable burrowing owl habitat and burrowing owl presence have been confirmed on the site. Therefore, the Project Applicant shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW) pursuant to the California Endangered Species Act (CESA) prior to the start of any ground disturbance or construction activities.

The ITP shall include, at a minimum: a description of Project activities and equipment, proposed avoidance and buffer zones, identification of temporary and permanent impacts, monitoring requirements, proposed relocation or translocation protocols, and compensatory mitigation measures. Compensatory mitigation shall be satisfied through one or more of the following mechanisms:

1. purchase of credits at a CDFW-approved conservation or mitigation bank (if available); or
- ~~2. execution of a Mitigation Credit Agreement; or~~
- 2.3-Permittee-responsible mitigation land acquisition.

If burrowing owl is documented within the project site or within the 500-foot buffer during pre-construction surveys or construction-phase biological monitoring, the biological monitor shall notify the CDFW within 48 hours of the observation. All applicable conditions of the ITP shall be fully implemented to avoid unauthorized take.

- 3-4 The CDFW acknowledges that the potential for desert tortoise occurrence on the project site is very low based on-site conditions and the absence of suitable burrows or habitat. However, because the project site is within the predicted range and is mapped as an area with sparse desert tortoise populations, CDFW recommends that a pre-construction survey be conducted prior to ground-disturbing activities to confirm the absence, and that a mitigation measure be adopted in the Final EIR.

The City appreciates CDFW's review and its recommendation regarding desert tortoise. Although the Draft EIR concludes that the potential for desert tortoise occurrence on the project site is very low (Draft EIR page 4.3-2), out of an abundance of caution, the following mitigation measure has been incorporated into the Final EIR.

MM BIO-2D. Desert Tortoise Pre-Construction Surveys. A qualified biologist shall conduct a protocol-level presence or absence survey on the project site, and 50-foot buffer zone no more than 48 hours prior to Project activities commencing in accordance with the U.S. Fish and Wildlife Service 2019 desert tortoise survey methodology (USFWS 2019). The survey shall utilize survey routes that provide 100 percent visual coverage for desert tortoise and their sign. If desert tortoise may be impacted by the Project, Permittee shall fully avoid impacts to desert tortoise or should obtain a CESA ITP if impacts are unavoidable.

- 3-5 The CDFW acknowledges that camera and live-trapping surveys conducted in 2024 did not detect the Mohave ground squirrel on the project site, but notes that such surveys are generally considered valid for one year. Because suitable habitat is present, CDFW recommends that additional pre-construction surveys be conducted to verify continued absence and that a mitigation measure be adopted in the Final EIR.

The City appreciates CDFW's review and its recommendation regarding the Mohave ground squirrel. As documented in the Draft EIR on page 4.3-4, focused camera and live-trapping surveys conducted in 2024 did not detect the Mohave ground squirrel on the project site. However, consistent with CDFW guidance regarding survey validity periods and given the presence of suitable habitat, the City agrees that a precautionary pre-construction survey is appropriate. Accordingly, the following mitigation measure has been incorporated into the Final EIR.

MM BIO-2C Mohave Ground Squirrel Pre-Construction Surveys. Prior to commencement of ground disturbing Project activities, a visual survey shall be conducted by a qualified biologist during the period of March 15 through April 15 to determine presence of Mohave ground squirrel. The survey shall be conducted on the project site according to the Mohave Ground Squirrel Survey Guidelines (CDFW, October 2023 Revision 4 or most recent version) during daylight hours by the qualified biologist who can visually identify Mohave ground squirrel and white-tailed antelope squirrel and detect vocalization calls. If the survey or monitoring confirms presence, the Project Applicant shall contact CDFW immediately (within 24 hours) and fully avoid all impacts to Mohave ground squirrel or obtain an incidental take permit (ITP).

- 3-6 CDFW requests that any special-status species and natural communities detected during project surveys be uploaded to the California Natural Diversity Database (CNDDDB), to comply with the requirements of CEQA and Public Resources Code Section 21003 subdivision(e). Additionally, this comment provides parameters for the type of incorporation to be reported, as well as instructions

for finding and submitting the required field survey forms to the CNDDDB. The Project Applicant will coordinate with the qualified biologist performing project surveys to ensure that special-status species and natural communities detected during surveys are uploaded to the CNDDDB. This comment is noted but does not pertain to the analysis or conclusions of the Draft EIR.

- 3-7 CDFW indicates that because the Project would have an impact on fish and/or wildlife, the Project is subject to payment of filing fees to the CDFW upon filing of the Notice of Determination by the Lead Agency to cover the costs of environmental review by CDFW. The Project's mitigation would prevent significant impacts on fish and wildlife, but the Project must pay the CDFW filing fee because the Project required an EIR. The Project Applicant will be responsible for the payment of all applicable filing fees to the CDFW upon the City's filing of the Notice of Determination for the EIR. This comment is noted, but it does not pertain to the analysis or conclusions of the Draft EIR.
- 3-8 This comment provides a closing to the comment letter and does not raise any issues regarding the adequacy of the Draft EIR.

Comment Letter 4: Caltrans, District 8

CALIFORNIA STATE TRANSPORTATION AGENCY

GAVIN NEWSOM, GOVERNOR

California Department of Transportation

DISTRICT 8
464 WEST 4TH STREET
SAN BERNARDINO CA, 92401
(909) 963-8604
www.dot.ca.gov



January 14, 2025

Route & Postmile: I-15/34.178
Cross Street: Amargosa Rd. and Key Pointe Dr.
GTS ID: 35716
SCH: 2024110259

City of Hesperia
Planning Division
Attn: Edgar Gonzalez
9700 Seventh Ave.
Hesperia, CA 92345

Subject: Comments on Draft Environmental Impact Review (EIR) for Hesperia Big Box Retail Project - APNs: 0405-062-72, 0405-062-73, 3064-481-06, 3064-481-07

4-1

The California Department of Transportation (Caltrans), District 8, Local Development Review (LDR) branch has completed its review of the Draft Environmental Impact Report (EIR) and related documents for the proposed Hesperia Big Box Retail Project.

The proposed project consists of development of a commercial retail project on approximately 25.4 acres within the City of Hesperia, located near the intersection of **Key pointe Drive and Amargosa Road**, north of Interstate 15 (I-15). The project includes construction of a big-box retail building on the northern portion of the site and fuel station with an automated car wash on the southern portion, along with associated parking, internal circulation, and site access improvements. Caltrans reviewed the Draft Environmental Impact Report (EIR) to evaluate potential impacts of the project on the State Highway System, including traffic operations, Stormwater, and Hydraulics.

Based on the information presented in the environmental documents available for public review, we submit the following comments and recommendations for your consideration.

4-2

Traffic Operations:

Traffic Impact Analysis:

1. Please provide the queue length analysis at the intersection of SR-395 and Phelan Road/Main Street, intersection of I-15 SB ramps and Main Street, Intersection of I-15 NB Ramps for opening year 2026 cumulative plus project conditions and horizon year 2045 cumulative plus project conditions.
2. Provide Queuing Analysis at the I-15 off-ramps and SB SR-395/Main St. left turn lane for AM/PM peak hours of opening year and future conditions.

4-3

3. Although recommended improvements show an improvement in LOS for opening and horizon year of SR-395/Main St intersection, the PTV Vistro analysis does not capture the

4-3
cont.

correct receiving lane configurations that would make the analysis feasible. For example, proposing three through lanes on SB 395, but there are 2 receiving lanes that merge into 1 lane. Additional analysis is needed to show accurate results from the proposed improvements. Please elaborate on the mitigation measures for traffic impact analysis on State Facilities.

4-4

4. Please add the Civil PE stamp on the Traffic Study.

4-5

Safety Reviews:

5. Please provide traffic safety review as a stand-alone report for proposed land use projects and plans affecting the State Highway System **I-15** and **SR-395**. See the attached [Local Development Review \(LDR\) Safety Review Practitioner's Guidance](#).
 - a. To request crash data on the State Highway System, please submit your request via our California Public Records Act (CPRA) portal at mycusthelp.com.
 - b. Please analyze the existing crash data and discuss project's impact on safety as needed.
 - c. Perform safety analysis using HSM for the proposed project in the following conditions:
 - i. Existing condition
 - ii. Opening year: with and without project
 - iii. Horizon year: with and without project
 - d. Please provide appropriate safety countermeasures (if any) to mitigate/reduce project's safety impact.

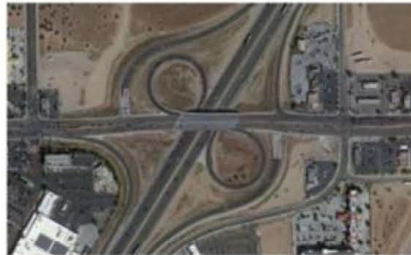
4-6

Traffic Forecasting and Analysis:

Roadway Network:

6. A recent Caltrans project (EA 0K122) was recently completed which resulted in the modification of intersections 5&6.
 - a. Please make sure the intersection analysis for the Opening and Future Year scenarios reflects this change (e.g. pocket length)
 - b. As a suggestion, please update the figures for Opening Year and Future scenarios.

NB/SB I-15 at Main Street



Google Earth, 2020



Google Earth, May 2025

4-7

Traffic Volumes:

7. The existing traffic counts do not include truck counts. In terms of the analyses performed in the study, we noticed the truck percentage of 2% was used for all intersections. Although it's commonly accepted that 2% truck percentage be used when data is unavailable, the values are low at State Highway System (SHS) facilities. For example, United States Highway 395 (US-395) is a principal north-south freight corridor known to

4.7
cont.

have heavy truck traffic. Per the Freight analysis Framework (FAF5), the truck percentage along US-395 at the intersection with Main Street is roughly 17% daily. Per the San Bernardino Transportation Analysis Model (SBTAM), the truck percentage is roughly 15% in the AM peak period and 13% in the PM peak period.

- Please update the truck percentage to better reflect the traffic along US-395 and the I-15/Main Street ramps.
- If no other counts/sources are available, we recommend using the truck percentages from the recently updated SBTAM.
- Please update the analysis to reflect these changes.

4.8

8. Page 11 states:

"In addition to ambient growth, Cumulative Project traffic volumes were added to existing traffic volumes." The study cites several local projects to be included."

After review, we noticed some inconsistencies in the trip generation and trip assignments from the cited project (see below):

This Project	I-15 Industrial Park

As shown in the table above, the trips attributed to some of the intersections are lower than trips assigned to one of the projects cited.

- Please update the cumulative project volumes to incorporate all projects.
- Furthermore, please attach in the appendix the trip assignment figures/tables from the original studies which the cumulative projects are sourced.
- Please update the analysis to reflect these changes.

4-9

Recommended Improvements:

9. According to the FTIP, Main Street should have been widened from 4 to 6 lanes in 2025 (FTIP ID: SBD55025). These improvements aren't shown in the opening year scenarios.
 - a. We recommend the city coordinate with the project applicant to verify if the widening project will be completed before or after the opening of the project.
 - b. Furthermore, we suggest augmenting the mitigation discussion to quantitatively demonstrate nexus and proportional responsibility, clearly linking proposed improvements to measurable project-related impacts, particularly where state highway facilities are affected.

4-10

Hydraulics:

10. On the Post Development Hydrology Exhibit part of flow path 3.1 to 3.2 appears to be flowing uphill. Please verify this flow direction for accuracy.
11. Please verify the flow arrow shown on the Post Development Hydrology Exhibit, as it contradicts the grading contours.
12. The storm events analyzed do not appear to align with the San Bernardino Detention Pond Criteria. Please refer to the criteria to ensure compliance.
13. Please evaluate the detention ponds for 1-hour, 3-hour, 6-hour, and 24-hour storm events as required.
14. Detention pond routing was provided for only two of the three detention basins. Please include routing for the third basin or clarify why it was omitted.
15. Please illustrate where the proposed outflow (i.e., the portion not infiltrated) is directed for each of the detention basins. Clarify the downstream conveyance or discharge points as applicable.

4-11

Stormwater Compliance:

16. Any stormwater discharges from within city or county limits that must enter or be conveyed through Caltrans right-of-way must be treated prior to entering Caltrans right-of-way.

4-12

17. This area along interstate 15 (**I-15**) is designated as a Significant Trash Generating Area (**STGA**) and has been reported to the State Water Resources Control Board. If drainage to Caltrans right-of-way is anticipated, treatment BMPs and full trash capture devices must be incorporated into the project plans.

4-13

18. Caltrans NPDES permit order **No. 2022-0033-DWQ** applies to all run-on stormwater water.

4-14

19. The project must not hinder Caltrans' access to existing or proposed drainage facilities located within or near the project limits. Please ensure that adequate access is maintained and clearly shown in the project plans.

4-15

Equitable Access:

If any Caltrans facilities are impacted by the project, they must comply with the American Disabilities Act (ADA) Standards upon project completion. Additionally, the project must ensure the maintenance of bicycle and pedestrian access throughout the construction phase. These access considerations align with Caltrans' equity mission to provide a safe, sustainable, and equitable transportation network for all users.

4-16

Caltrans Encroachment Permit:

Please be advised that any permanent work or temporary traffic control that encroaches onto Caltrans' Right-of-Way (R/W) requires a Caltrans-issued encroachment permit.

4-16
cont.

For information regarding the Encroachment Permit application and submittal requirements, contact:

Caltrans Office of Encroachment Permits
464 West 4th Street, Basement, MS 619
San Bernardino, CA 92401-1400
(909) 383-4526

D8.E-permits@dot.ca.gov

<https://dot.ca.gov/programs/traffic-operations/ep>

Important Note: All permit applications must now be submitted through our CEPS Online Portal at: <https://ceps.dot.ca.gov/>

Please be advised that LDR's point of contact role will conclude upon the completion of the development entitlement process. Once the project is entitled, the Encroachment Permit Office will serve as the primary point of contact moving forward.

Thank you again for including Caltrans in the review process. Should you have any questions regarding this letter, or for future notifications and requests for review of new projects, please email LDR-D8@dot.ca.gov or call 909-963-8604.

Sincerely,



Janki Patel
Branch Chief - Local Development Review
Division of Transportation Planning
Caltrans District 8

Responses to Comment Letter 4

California Department of Transportation, District 8

Janki Patel, Local Development Review

January 14, 2026

- 4-1 The California Department of Transportation (Caltrans), District 8, Local Development Review Branch, states that it has reviewed the Draft EIR and related documents for the Project to evaluate potential impacts to the State Highway System, including traffic operations, stormwater, and hydraulics. This comment does not specifically state the concerns or issues with environmental analysis in the Draft EIR. The City appreciates the input provided by Caltrans; please refer to the subsequent responses.
- 4-2 Caltrans requests preparation of queue length analyses at the intersection of US-395 and Phelan Road/Main Street, the I-15 southbound ramps at Main Street, and the I-15 northbound ramps at Main Street for Opening Year 2026 Cumulative Plus Project conditions and Horizon Year 2045 Cumulative Plus Project conditions. Caltrans further requests a queuing analysis for the I-15 off-ramps and at the southbound US-395/Main Street left-turn lane during the AM and PM peak hours, for both opening year and future conditions.

The Traffic Impact Analysis (TIA) (provided as Appendix J of the Draft EIR) was prepared in accordance with the City of Hesperia's adopted Traffic Impact Analysis Guidelines for Vehicle Miles Traveled (VMT) and Level of Service (LOS) Assessment (July 2020). The study locations, analytical methodology, and required level of analysis were established in consultation between the traffic consultant and City staff through the Scoping Agreement process and documented in the approved Scoping Agreement. Through that process, the City did not identify queue-length analyses for State Highway System facilities operated by Caltrans.

The TIA did evaluate traffic operations at all Caltrans facilities in the traffic study area, including the US-395 at Phelan Road/Main Street intersection and the I-15 northbound and southbound ramp intersections at Main Street, using the Caltrans traffic study requirements outlined in the Caltrans Transportation Study Guide (February 2020). Peak hour intersection operations at the study intersections and driveways were evaluated using the methods prescribed in the Highway Capacity Manual 7th Edition (HCM), consistent with the traffic study requirements of the City of Hesperia. This methodology evaluates intersection performance using average control delay and level of service (LOS), the operational metrics adopted by the City for determining transportation impacts under CEQA. LOS analyses were completed for Existing, Opening Year 2026 Cumulative, Opening Year 2026 Cumulative Plus Project, Horizon Year 2045, and Horizon Year 2045 Plus Project conditions. These analyses provide a comprehensive assessment of intersection operations during the AM and PM peak hours for both the opening year and future conditions.

Additionally, queue-length and storage capacity analyses were conducted to evaluate project-specific operational effects, including on-site fueling queues and project site-adjacent intersections where potential queue spillback could directly affect project site access or nearby local streets. The City did not identify a need for queue-length modeling at the I-15 off-ramps or the southbound US-395/Main Street left-turn lane because the LOS analysis did not indicate project-related conditions that would result in queue spillback, lane blockage, or operational

failure attributable to the project at those locations. The City also recognizes that the corridor is planned for future widening by Caltrans, which will increase capacity and accommodate higher traffic volumes. For these reasons, the City has determined that additional analysis of US-395 at Pheland Road/Main Street is not needed.

The City feels that the TIA represents a good-faith, reasonable, and technically sound analysis of traffic operations under opening-year and horizon-year conditions within the traffic study area inclusive of Caltrans facilities. The City appreciates Caltrans' input on this issue but feels that revisions to the Draft EIR, including TIA, are not necessary to address queuing.

- 4-3 Caltrans states that although the recommended improvements show an improvement in LOS at the US-395/Main Street intersection under Opening Year and Horizon Year conditions, the PTV Vistro analysis does not capture the correct downstream receiving lane configuration, and therefore, additional analysis is needed. Caltrans further requests elaboration on mitigation measures for traffic impacts on State facilities.

The PTV Vistro model was coded to include the number of receiving lanes relative to the approach lanes, added with the recommended improvements. While not expressly stated in the TIA narrative, the recommended improvements would also encompass the necessary receiving lanes to accommodate the additional approach lanes. The receiving lanes, together with the recommended improvements identified in the TIA, including those described on page 47, collectively encompass the identified recommended improvements for this location. The operational analysis, therefore, accounts for downstream capacity constraints consistent with the HCM methodology and standard traffic engineering practice.

Recommended improvements under Opening Year 2026 Cumulative Project and Horizon Year 2045 Plus Project conditions were provided to address the Project's effect at the traffic study area intersections. The City determined that the Project would not be required to construct the identified improvements at the US-395/Main Street intersection, which is part of the State Highway System. The City appreciates Caltrans' comments and believes this additional explanation regarding the lane configurations addresses this comment. Accordingly, no additional analysis or modification of mitigation measures is required, and no changes to the Draft EIR are necessary.

- 4-4 Caltrans requests that a Civil Professional Engineer stamp be added to the TIA. The comment is noted; however, the City did not require the TIA to be stamped by a Civil Professional Engineer. The absence of a Civil PE stamp does not affect the substance, credibility, or conclusions of the traffic analysis for CEQA purposes. Accordingly, while the comment is acknowledged, it does not identify a CEQA issue or require changes to the TIA or the Draft EIR.

- 4-5 Caltrans requests preparation of a stand-alone traffic safety report for the proposed Project affecting the State Highway System, including crash data analysis, Highway Safety Manual (HSM) safety analysis under multiple scenarios, and identification of safety countermeasures. The comment is noted.

The TIA does evaluate safety-related aspects of Project traffic, including signal warrant analysis, site access and circulation design, fuel station queuing, potential off-site queuing, signal

progression analysis, left-turn pocket storage capacity, and LOS analysis. These analyses collectively address how Project traffic would interact with the existing and planned roadway system and determine whether operational or geometric conditions would result in unsafe conditions attributable to the Project. The results of these analyses do not identify project-related safety impacts requiring additional mitigation. Through the TIA scoping process and subsequent review of the TIA, the City did not require a stand-alone safety review, crash data analysis, or HSM-based safety modeling. The City appreciates Caltrans' input but believes that the TIA adequately addresses traffic safety considerations relevant to the Project.

- 4-6 Caltrans notes that a recent Caltrans project (EA 0K122) modified the geometry at Intersections 5 and 6 and requests that the intersection analysis for the Opening Year and Future Year scenarios reflect these changes (e.g., pocket length), and suggests updating the Opening Year and Future Year figures accordingly. The comment is noted.

Existing traffic counts used in the TIA were collected in 2024, prior to the referenced geometric modifications. The intersection operations analyses for Existing, Opening Year, and Horizon Year scenarios were therefore based on the roadway geometry and operating conditions present at the time of data collection. The TIA is intended to provide a reasonable, good-faith evaluation of traffic operations and project effects based on the best available information at the time it was prepared. CEQA does not require an EIR to be revised where an agency implements operational or geometric changes to roadway facilities, absent substantial evidence that such changes would materially alter the impact analysis conclusions.

To the extent that Caltrans has since modified pocket lengths or lane configurations at Intersections 5 and 6, those changes would generally be expected to maintain or improve traffic operations and storage capacity relative to pre-project conditions. The comment does not identify, and the record does not contain substantial evidence that the referenced changes would worsen operations or create a new or increased project-related impact. Final design and operational details for State facilities also remain subject to Caltrans review and permitting processes independent of CEQA. The City appreciates Caltrans' input regarding Intersections 5 and 6 but believes that no changes to the Draft EIR or TIA are required.

- 4-7 Caltrans states that existing traffic counts did not include truck counts and that the TIA assumed a 2 percent heavy-vehicle (truck) factor at all intersections. Caltrans notes that, although a 2 percent truck factor is commonly accepted, this assumption is low for State Highway System facilities, particularly along US-395 and at the I-15/Main Street ramp intersections, and requests that truck percentages be updated (potentially using San Bernardino Transportation Analysis Model values) and that the intersection analysis be revised accordingly.

It is noted that the City did not require the collection of turning-movement truck counts or the application of facility-specific truck percentages at State Highway System intersections and therefore the TIA was prepared using a conservative and standardized truck factor consistent with City practice for the operational intersection analysis. This procedure is standard and is utilized in other neighboring jurisdictions within the County.

Importantly, the Project is not anticipated to generate a substantial amount of truck traffic relative to existing and cumulative traffic on US-395 or I-15. The Project's trip generation is

primarily passenger vehicle-oriented retail traffic, and truck activity would be limited to periodic deliveries and service vehicles typical of commercial retail and fuel station operations. As a result, even if higher existing truck percentages do occur on US-395 or at I-15 ramps, the incremental change in heavy vehicles attributable to the Project would be negligible compared to baseline truck volumes on those freight corridors, and would not be expected to materially change the Project's contribution to intersection operations or the Draft EIR's conclusions.

Accordingly, while the comment is acknowledged, the City does not believe there is a CEQA deficiency and does not require updating the heavy-vehicle assumptions for the TIA or changes to the Draft EIR are required in response to this comment.

- 4-8 Caltrans states that page 11 of the TIA indicates Cumulative Project traffic volumes were added to existing traffic volumes and that there are inconsistencies between trip generation and trip assignments attributed to certain cumulative projects. Caltrans requests that Cumulative Project volumes be updated to incorporate all projects, that original trip assignment figures or tables from source studies be appended, and that the analysis be updated accordingly.

The comment is acknowledged by the City. As explained in the TIA, trip generation information for Cumulative Projects was derived either from approved traffic studies, when available, or from the traffic consultant if no approved traffic studies were available. Likewise, trip distribution and assignment for Cumulative Projects were either derived from approved traffic studies, when available, or developed from the traffic consultant when approved traffic studies were not available. This methodology was reviewed and approved by the City through the traffic study scoping and review process. It is recognized that cumulative traffic forecasts may not precisely replicate traffic volumes from subsequently completed or unavailable project-level studies because traffic studies prepared for different projects over a period of time may use different trip generation rates (on account of subsequent revisions to published rates or land use categories), distribution assumptions, etc. CEQA requires a reasonable, good-faith effort to disclose cumulative conditions and evaluate whether a project's incremental contribution to cumulative impacts is significant. The cumulative Project assumptions used in the TIA meet this standard and provide decision-makers with an adequate understanding of future traffic conditions in the study area. The City appreciates Caltrans' input but feels that the Project and cumulative traffic assumptions are adequate and that the Draft EIR, inclusive of the TIA does not need to be updated.

- 4-9 Caltrans notes that a Main Street widening project identified in the Federal Transportation Improvement Program (FTIP) is not reflected in the Opening Year traffic scenarios and recommends coordination regarding Project timing and augmentation of the mitigation discussion to demonstrate nexus and proportional responsibility for improvements affecting State highway facilities.

The comment is noted. In accordance with CEQA requirements, transportation impacts are evaluated based on vehicle miles traveled (VMT). The recommended roadway improvements discussed in the TIA are operational in nature and relate to LOS-based conditions. These recommended improvements are not CEQA mitigation and are not relied upon to reduce the Project's transportation-related impacts. The TIA includes recommended improvements for informational and planning purposes only. These recommendations were coordinated between

the City and the San Bernardino County Transportation Authority (SBCTA). SBCTA has identified future regional improvements, including a US-395 widening project, which would encompass some of the improvements noted in the TIA. Based on coordination with the City and the traffic consultant, it was determined that the Project would not be responsible for constructing certain improvements on State highway facilities. Unless programming would be completed prior to the opening year of the proposed Project, the inclusion of such transportation projects in Opening Year scenarios could be misleading. Further, a nexus or proportionality analysis for roadway improvements would not be needed because they would not be adopted as CEQA mitigation. Accordingly, no changes to the Draft EIR are required in response to this comment.

- 4-10 Caltrans questions the accuracy and completeness of the post-development hydrology analysis. It identifies potential inconsistencies in the Post-Development Hydrology Exhibit, including flow paths and flow direction arrows that appear to conflict with grading contours or indicate uphill flow. Caltrans also suggests that the storm events analyzed may not be consistent with San Bernardino County detention pond criteria and requests the evaluation of detention basin performance for additional storm durations. In addition, Caltrans notes that detention routing was provided for only two of the three proposed detention basins and requests inclusion of routing for the third basin or clarification for its omission. Finally, the comment seeks clarification regarding the ultimate discharge locations and downstream conveyance for post-development outflows from each detention basin.

Caltrans comments are noted. The post-development grading and hydrology exhibits have been revised to address the identified issues, including clarifying site drainage, correcting flow directions to align with grading contours, and confirming compliance with San Bernardino County detention basin criteria. Additional storm events have been analyzed and included for informational purposes, and the required 24-hour storm event analysis has been completed in accordance with County standards. The detention basin design has been revised to include an equalizer pipe connecting the two southerly basins, and the proposed post-development discharge has been modified to drain to the storm drain system along Amargosa Road, with associated overflow structures shown on the exhibits. These revisions are documented in the updated hydrology study, which is included as **Appendix A** to the Final EIR. This additional information does not change the conclusions of the technical analysis provided in the Draft EIR.

- 4-11 Caltrans states that any stormwater discharges from within City or County limits that enter or are conveyed through Caltrans right-of-way must be treated prior to entering Caltrans right-of-way. The comment is noted. The Project does not propose any stormwater discharge to, or conveyance through, Caltrans right-of-way. All post-development stormwater runoff will be managed and treated within the project site and conveyed to the local storm drain system consistent with applicable City and County requirements. Accordingly, no changes to the Draft EIR are required.
- 4-12 Caltrans notes that the area along I-15 is designated as a Significant Trash Generating Area (STGA) and states that if stormwater drainage to the Caltrans right-of-way is proposed, BMPs for treatment and full trash-capture devices would be required. The comment is noted. The Project does not propose any stormwater discharge to, or drainage through, Caltrans right-of-way. All stormwater runoff will be managed and treated within the project site and conveyed to the local storm drain system in compliance with applicable City and County stormwater requirements.

Accordingly, the STGA designation for Caltrans facilities does not apply to the Project. Accordingly, no changes to the Draft EIR are required.

- 4-13 Caltrans states that Caltrans NPDES Permit Order No. 2022-0033-DWQ applies to all run-on stormwater. The comment is noted. The proposed Project has been designed to comply with all applicable stormwater regulations, including requirements related to run-on stormwater. Therefore, no changes to the Draft EIR are required.
- 4-14 Caltrans states that the Project must not hinder Caltrans's access to existing or proposed drainage facilities located within or near the project site limits and requests that adequate access be maintained and shown on the Project plans. The comment is noted. The Project will not restrict or hinder Caltrans's access to any existing or proposed drainage facilities. No Caltrans facilities are located within the project site, and the Project design does not interfere with access to facilities within or adjacent to Caltrans right-of-way. Accordingly, no changes to the EIR are required.
- 4-15 Caltrans states that if its facilities are impacted by the Project, they must comply with ADA standards upon Project completion and that bicycle and pedestrian access should be maintained during construction, consistent with Caltrans' equity and access objectives. The comment is noted. The Project does not propose modifications to Caltrans' facilities. To the extent that any work associated with the Project affects public pedestrian or bicycle facilities under local jurisdiction, such facilities will be designed and constructed in compliance with applicable ADA requirements. Temporary construction activities will be managed in accordance with City standards to maintain safe pedestrian and bicycle access where required.
- 4-16 Caltrans advises that any permanent work or temporary traffic control encroaching into Caltrans right-of-way requires a Caltrans-issued encroachment permit and provides contact information for the appropriate Caltrans offices following project entitlement. The comment is noted. Any future work associated with the Project that encroaches into Caltrans right-of-way would be subject to Caltrans encroachment permit requirements and review. This comment provides regulatory guidance and does not identify a CEQA issue or require changes to the EIR.

Comment Letter 5: Western States Regional Council of Carpenters



P: (626) 314-3821
F: info@mitchtsailaw.com

Mitchell M. Tsai
Law Firm

139 S. Hudson Ave., Suite 200
Pasadena, California 91101

VIA E-MAIL

January 14, 2026

Edgar Gonzalez, Senior Planner
City of Hesperia, Planning Department
9700 Seventh Avenue
Hesperia, CA 92345
Em: egonzalez@hesperiaca.gov

**RE: City of Hesperia – Draft Environmental Impact Report for
Hesperia Big Box Retail Project (SCH No. 2024110259)**

5-1

Dear Senior Planner and Planning Department,

On behalf of the Western States Regional Council of Carpenters (“**Western Carpenters**” or “**WSRCC**”) and pursuant to California Environmental Quality Act (“**CEQA**”) Guidelines Section 15087, our Office is submitting these comments regarding the Draft Environmental Impact Report (“**DEIR**”) for the proposed development project known as the “Hesperia Big Box Retail Project,” located at Assessor Parcel Numbers (APNs) 0405-062-72, 0405-062-73, 3064-481-06, and 3064-481-07 (SCH No. 2024110259) (“**Project**”).

The Western States Regional Council of Carpenters is a labor union representing almost 90,000 union carpenters in 12 states, including California, and has a strong interest in well-ordered land use planning and in addressing the environmental impacts of development projects.

According to the DEIR, the proposed Project “would remove all existing on-site vegetation and grade the site to accommodate the construction and operation of a 167,664-square-foot (sf) big box retail center with 683 parking spaces on an approximately 16.7-acre parcel north of Amargosa Road (APN 0405-062-72). A 14-pump (28 fueling positions) fuel station with an approximately 205-sf office building and an approximately 2,623-sf automated carwash facility is proposed on approximately 8.67 acres located south of Amargosa Road (APNs 0405-062-73, 3064-481-06, and 3064-481-07). The parcel containing the retail center is referred to

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as the northern parcel, while the parcel containing the fuel station and carwash is referred to as the southern parcel.” (See Project DEIR, SCH No. 2024110259, Project Overview, p. 1-1.)

Individual members of the Western Carpenters live, work, and recreate in the City and surrounding communities and would be directly affected by the Project’s environmental impacts.

The Western Carpenters expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearing and proceeding related to this Project. Gov. Code, § 65009, subd. (b); Pub. Res. Code, § 21177, subd. (a); see *Bakersfield Citizens for Local Control v. Bakersfield* (2004) 124 Cal.App.4th 1184, 1199-1203; see also *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal.App.4th 1109, 1121.

Moreover, the Western Carpenters requests that the City provide notice for any and all notices referring or related to the Project issued under the California Environmental Quality Act (CEQA) (Pub. Res. Code, § 21000 *et seq.*), and the California Planning and Zoning Law (“**Planning and Zoning Law**”) (Gov. Code, §§ 65000–65010). California Public Resources Code Sections 21092.2, and 21167(f) and California Government Code Section 65092 require agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency’s governing body.

5-2

I. THE CITY SHOULD REQUIRE THE USE OF A LOCAL WORKFORCE TO BENEFIT THE COMMUNITY’S ECONOMIC DEVELOPMENT AND ENVIRONMENT

The City should require the Project to be built using a local workers who have graduated from a Joint Labor-Management Apprenticeship Program approved by the State of California, have at least as many hours of on-the-job experience in the applicable craft which would be required to graduate from such a state-approved apprenticeship training program, or who are registered apprentices in a state-approved apprenticeship training program.

Community benefits such as local hire can also be helpful to reduce environmental impacts and improve the positive economic impact of the Project. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project site can reduce the length of vendor trips, reduce greenhouse gas

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emissions, and provide localized economic benefits. As environmental consultants Matt Hagemann and Paul E. Rosenfeld note:

[A]ny local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

March 8, 2021 SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling.

Workforce requirements promote the development of skilled trades that yield sustainable economic development. As the California Workforce Development Board and the University of California, Berkeley Center for Labor Research and Education concluded:

[L]abor should be considered an investment rather than a cost—and investments in growing, diversifying, and upskilling California’s workforce can positively affect returns on climate mitigation efforts. In other words, well-trained workers are key to delivering emissions reductions and moving California closer to its climate targets.¹

Furthermore, workforce policies have significant environmental benefits given that they improve an area’s jobs-housing balance, decreasing the amount and length of job commutes and the associated greenhouse gas (GHG) emissions. In fact, on May 7, 2021, the South Coast Air Quality Management District found that that the “[u]se of a local state-certified apprenticeship program” can result in air pollutant reductions.²

Locating jobs closer to residential areas can have significant environmental benefits. As the California Planning Roundtable noted in 2008:

¹ California Workforce Development Board (2020) Putting California on the High Road: A Jobs and Climate Action Plan for 2030 at p. ii, *available at* <https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf>.

² South Coast Air Quality Management District (May 7, 2021) Certify Final Environmental Assessment and Adopt Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions Program, and Proposed Rule 316 – Fees for Rule 2305, Submit Rule 2305 for Inclusion Into the SIP, and Approve Supporting Budget Actions, *available at* <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-May7-027.pdf?sfvrsn=10>.

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People who live and work in the same jurisdiction would be more likely to take transit, walk, or bicycle to work than residents of less balanced communities and their vehicle trips would be shorter. Benefits would include potential reductions in both vehicle miles traveled and vehicle hours traveled.³

Moreover, local hire mandates and skill-training are critical facets of a strategy to reduce vehicle miles traveled (VMT). As planning experts Robert Cervero and Michael Duncan have noted, simply placing jobs near housing stock is insufficient to achieve VMT reductions given that the skill requirements of available local jobs must match those held by local residents.⁴ Some municipalities have even tied local hire and other workforce policies to local development permits to address transportation issues. Cervero and Duncan note that:

In nearly built-out Berkeley, CA, the approach to balancing jobs and housing is to create local jobs rather than to develop new housing. The city's First Source program encourages businesses to hire local residents, especially for entry- and intermediate-level jobs, and sponsors vocational training to ensure residents are employment-ready. While the program is voluntary, some 300 businesses have used it to date, placing more than 3,000 city residents in local jobs since it was launched in 1986. When needed, these carrots are matched by sticks, since the city is not shy about negotiating corporate participation in First Source as a condition of approval for development permits.

Recently, the State of California verified its commitment towards workforce development through the Affordable Housing and High Road Jobs Act of 2022, otherwise known as Assembly Bill No. 2011 ("AB2011"). AB2011 amended the Planning and Zoning Law to allow ministerial, by-right approval for projects being built alongside commercial corridors that meet affordability and labor requirements.

³ California Planning Roundtable (2008) Deconstructing Jobs-Housing Balance at p. 6, *available at*

<https://cproundtable.org/static/media/uploads/publications/cpr-jobs-housing.pdf>

⁴ Cervero, Robert and Duncan, Michael (2006) Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mixing? *Journal of the American Planning Association* 72 (4), 475-490, 482, *available at*

<http://reconnectingamerica.org/assets/Uploads/UTCT-825.pdf>

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The City should consider utilizing local workforce policies and requirements to benefit the local area economically and to mitigate greenhouse gas, improve air quality, and reduce transportation impacts.

5-3

II. THE CITY SHOULD IMPOSE TRAINING REQUIREMENTS FOR THE PROJECT'S CONSTRUCTION ACTIVITIES TO PREVENT COMMUNITY SPREAD OF COVID-19 AND OTHER INFECTIOUS DISEASES

Construction work has been defined as a Lower to High-risk activity for COVID-19 spread by the Occupational Safety and Health Administration. Recently, several construction sites have been identified as sources of community spread of COVID-19.⁵

Western Carpenters recommend that the Lead Agency adopt additional requirements to mitigate public health risks from the Project's construction activities. Western Carpenters requests that the Lead Agency require safe on-site construction work practices as well as training and certification for any construction workers on the Project Site.

In particular, based upon Western Carpenters' experience with safe construction site work practices, Western Carpenters recommends that the Lead Agency require that while construction activities are being conducted at the Project Site:

Construction Site Design:

- The Project Site will be limited to two controlled entry points.
- Entry points will have temperature screening technicians taking temperature readings when the entry point is open.
- The Temperature Screening Site Plan shows details regarding access to the Project Site and Project Site logistics for conducting temperature screening.
- A 48-hour advance notice will be provided to all trades prior to the first day of temperature screening.

⁵ Santa Clara County Public Health (June 12, 2020) COVID-19 CASES AT CONSTRUCTION SITES HIGHLIGHT NEED FOR CONTINUED VIGILANCE IN SECTORS THAT HAVE REOPENED, available at <https://www.sccgov.org/sites/covid19/Pages/press-release-06-12-2020-cases-at-construction-sites.aspx>.

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- The perimeter fence directly adjacent to the entry points will be clearly marked indicating the appropriate 6-foot social distancing position for when you approach the screening area. Please reference the Apex temperature screening site map for additional details.
- There will be clear signage posted at the project site directing you through temperature screening.
- Provide hand washing stations throughout the construction site.

Testing Procedures:

- The temperature screening being used are non-contact devices.
- Temperature readings will not be recorded.
- Personnel will be screened upon entering the testing center and should only take 1-2 seconds per individual.
- Hard hats, head coverings, sweat, dirt, sunscreen or any other cosmetics must be removed on the forehead before temperature screening.
- Anyone who refuses to submit to a temperature screening or does not answer the health screening questions will be refused access to the Project Site.
- Screening will be performed at both entrances from 5:30 am to 7:30 am.; main gate [ZONE 1] and personnel gate [ZONE 2]
- After 7:30 am only the main gate entrance [ZONE 1] will continue to be used for temperature testing for anybody gaining entry to the project site such as returning personnel, deliveries, and visitors.
- If the digital thermometer displays a temperature reading above 100.0 degrees Fahrenheit, a second reading will be taken to verify an accurate reading.
- If the second reading confirms an elevated temperature, DHS will instruct the individual that he/she will not be allowed to enter the Project Site. DHS will also instruct the individual to promptly notify his/her supervisor and his/her human resources (HR) representative and provide them with a copy of Annex A.

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- Require the development of an Infectious Disease Preparedness and Response Plan that will include basic infection prevention measures (requiring the use of personal protection equipment), policies and procedures for prompt identification and isolation of sick individuals, social distancing (prohibiting gatherings of no more than 10 people including all-hands meetings and all-hands lunches) communication and training and workplace controls that meet standards that may be promulgated by the Center for Disease Control, Occupational Safety and Health Administration, Cal/OSHA, California Department of Public Health or applicable local public health agencies.⁶

The United Brotherhood of Carpenters and Carpenters International Training Fund has developed COVID-19 Training and Certification to ensure that Carpenter union members and apprentices conduct safe work practices. The Agency should require that all construction workers undergo COVID-19 Training and Certification before being allowed to conduct construction activities at the Project Site.

Western Carpenters has also developed a rigorous Infection Control Risk Assessment (“ICRA”) training program to ensure it delivers a workforce that understands how to identify and control infection risks by implementing protocols to protect themselves and all others during renovation and construction projects in healthcare environments.⁷

ICRA protocols are intended to contain pathogens, control airflow, and protect patients during the construction, maintenance and renovation of healthcare facilities. ICRA protocols prevent cross contamination, minimizing the risk of secondary infections in patients at hospital facilities.

The City should require the Project to be built using a workforce trained in ICRA protocols.

⁶ See also The Center for Construction Research and Training, North America’s Building Trades Unions (April 27 2020) NABTU and CPWR COVID-19 Standards for U.S. Construction Sites, available at https://www.cpwr.com/sites/default/files/NABTU_CPWR_Standards_COVID-19.pdf; Los Angeles County Department of Public Works (2020) Guidelines for Construction Sites During COVID-19 Pandemic, available at https://dpw.lacounty.gov/building-and-safety/docs/pw_guidelines-construction-sites.pdf.

⁷ For details concerning Western Carpenters’s ICRA training program, see <https://www.swmsctf.org/courses/icra-best-practices-in-health-care-construction/>.

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III. THE CITY SHOULD EXERCISE ITS AUTHORITY IN NEGOTIATING A DEVELOPMENT AGREEMENT TO OBTAIN ADDITIONAL COMMUNITY BENEFITS, ENVIRONMENTAL MITIGATION, AND PROJECT IMPROVEMENTS

Development agreements are a tool for municipalities to capture and receive community benefits while granting project proponents certainty for project entitlements.⁸ The City should exercise its lawful authority to enter into a Development Agreement with the Project applicant to secure additional community benefits (including local hire and apprenticeship requirements to spur local economic development) and additional environmental mitigation for the impacted community as well as project revisions that ameliorate potential environmental impacts consistent with this comment letter.

5-5

IV. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA is a California statute designed to inform decision-makers and the public about the potential significant environmental effects of a project. 14 California Code of Regulations (“CEQA Guidelines”), § 15002, subd. (a)(1).⁹ At its core, its purpose is to “inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made. Thus, the EIR ‘protects not only the environment but also informed self-government[.]’” *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564 (internal citation omitted).

To achieve this purpose, CEQA mandates preparation of an Environmental Impact Report (“EIR”) for projects so that the foreseeable impacts of pursuing the project can be understood and weighed. *Communities for a Better Environment v. Richmond* (2010) 184 Cal. App. 4th 70, 80. The EIR requirement “is the heart of CEQA.” CEQA Guidelines, § 15003(a).

CEQA directs public agencies to avoid or reduce environmental damage, when possible, by requiring alternatives or mitigation measures. CEQA Guidelines, § 15002,

⁸ Hanson Hom, Vivian Kahn, and Matt Taecker (2017) *Best Practices for Implementing a Community Benefits Program* California Planning Roundtable, available at https://cproundtable.org/static/media/uploads/infill/community_benefits_final_07152017.docx.pdf

⁹ The CEQA Guidelines, codified in Title 14 of the California Code of Regulations, section 15000 et seq., are regulatory guidelines promulgated by the state Natural Resources Agency for the implementation of CEQA. Pub. Res. Code, § 21083. The CEQA Guidelines are given “great weight in interpreting CEQA except when . . . clearly unauthorized or erroneous.” *Center for Biological Diversity v. Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204, 217.

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subds. (a)(2)-(3); see also *Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners of the City of Oakland* (2001) 91 Cal.App.4th 1344, 1354; *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 400. The Environmental Impact Report (EIR) serves to provide public agencies and the public in general with information about the effect that a proposed project is likely to have on the environment and to “identify ways that environmental damage can be avoided or significantly reduced.” CEQA Guidelines, § 15002, subd. (a)(2).

A public agency must prepare an EIR whenever substantial evidence supports a “fair argument” that a proposed project “may have a significant effect on the environment.” Pub. Res. Code, §§ 21100, 21151; CEQA Guidelines, §§ 15002, subds. (f)(1)-(2), 15063; *No Oil, supra*, 13 Cal.App.3d at p. 75; *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 111-112. If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has “eliminated or substantially lessened all significant effects on the environment where feasible” and that any unavoidable significant effects on the environment are “acceptable due to overriding concerns” specified in Public Resources Code section 21081. See CEQA Guidelines, §§ 15092, subds. (b)(2)(A)-(B).

Essentially, should a lead agency be presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect. CEQA Guidelines, §§ 15064(f)(1)-(2); see *No Oil, supra*, 13 Cal.App.3d at p. 75 (internal citations and quotations omitted). Substantial evidence includes “enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached.” CEQA Guidelines, § 15384, subd. (a).

The EIR has been described as “an environmental ‘alarm bell’ whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return.” *Berkeley Keep Jets Over the Bay v. Bd. of Port Comm’rs.* (2001) 91 Cal. App. 4th 1344, 1354 (“*Berkeley Jets*”); *County of Inyo v. Yorty* (1973) 32 Cal. App. 3d 795, 810.

The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. *Communities for a Better Environment v. Richmond* (2010) 184 Cal.App.4th 70, 80 (quoting *Vineyard Area Citizens for Responsible Growth, Inc.*

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cont.

v. City of Rancho Cordova (2007) 40 Cal.4th 412, 449-450). The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been considered. *Id.* For the EIR to serve these goals it must present information so that the foreseeable impacts of pursuing the project can be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. *Id.*

A strong presumption in favor of requiring preparation of an EIR is built into CEQA. This presumption is reflected in what is known as the "fair argument" standard under which an EIR must be prepared whenever substantial evidence in the record supports a fair argument that a project may have a significant effect on the environment. *Quail Botanical Gardens Found., Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1602; *Friends of "B" St. v. City of Hayward* (1980) 106 Cal.3d 988, 1002.

Further, it is the duty of the lead agency, not the public, to conduct the proper environmental studies. "The agency should not be allowed to hide behind its own failure to gather relevant data." *Sundstrom, supra*, 202 Cal.App.3d at p. 311. "Deficiencies in the record may actually enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Ibid*; see also *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1382 (lack of study enlarges the scope of the fair argument which may be made based on the limited facts in the record).

Thus, refusal to complete recommended studies lowers the already low threshold to establish a fair argument. The court may not exercise its independent judgment on the omitted material by determining whether the ultimate decision of the lead agency would have been affected had the law been followed. *Environmental Protection Information Center v. Cal. Dept. of Forestry* (2008) 44 Cal.4th 459, 486 (internal citations and quotations omitted). The remedy for this deficiency would be for the trial court to issue a writ of mandate. *Ibid*.

While the courts review an EIR using an 'abuse of discretion' standard, the reviewing court is not to *uncritically* rely on every study or analysis presented by a project proponent in support of its position. *Berkeley Keep Jets, supra*, 91 Cal.App.4th at p. 1355 (quoting *Laurel Heights, supra*, 47 Cal.3d at pp. 391, 409 fn. 12) (internal quotations omitted). A clearly inadequate or unsupported study is entitled to no judicial deference. *Ibid*. Drawing this line and determining whether the EIR complies with

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CEQA's information disclosure requirements presents a question of law subject to independent review by the courts. *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 515; *Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 102, 131. As the First District Court of Appeal has previously stated, prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decision-making and informed public participation, thereby thwarting the statutory goals of the EIR process. *Berkeley Keep Jets, supra*, 91 Cal.App.4th at p. 1355 (internal quotations omitted).

Both the review for failure to follow CEQA's procedures and the fair argument test are questions of law, thus, the de novo standard of review applies. *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435. Whether the agency's record contains substantial evidence that would support a fair argument that the project may have a significant effect on the environment is treated as a question of law. *Consolidated Irrigation Dist., supra*, 204 Cal.App.4th at p. 207; Kostka and Zischke, *Practice Under the Environmental Quality Act* (2017, 2d ed.) at § 6.76.

Section 15088.5(a) of the CEQA Guidelines provides that an EIR must be recirculated whenever there is disclosure of significant new information. Significant new information includes: (1) disclosure of a new significant environmental impact resulting from the project or from a new proposed mitigation measure; (2) disclosure of a substantial increase in the severity of an environmental impact unless mitigation measures are adopted that reduce the impact to a level of insignificance; and (3) disclosure of a feasible project alternative or mitigation measure considerably different from others previously analyzed which would clearly lessen the significant environmental impacts of the project which the project proponents decline to adopt. *Id.*

Additionally, an EIR must be recirculated when it is so fundamentally inadequate and conclusory in nature that meaningful public review and comment is precluded. *Id.* [citing *Mountain Lion Coalition v. Fish & Game Com.* (1989) 214 Cal.App.3d 1043].

Here, as discussed below, the DEIR fails to substantiate all of its conclusions to allow meaningful public review and comment, provide adequate mitigation measures, and fully assess all pertinent environmental factors. Accordingly, this comment letter discloses significant new information, necessitating revision and recirculation of the DEIR.

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V. THE DEIR IS INADEQUATE UNDER CEQA AND SHOULD BE REVISED AND RECIRCULATED

A. The DEIR Fails to Support Various Findings Regarding Environmental Impacts with Substantial Evidence

CEQA requires that an EIR identify and discuss the significant effects of a Project, and how those significant effects can be mitigated or avoided. CEQA Guidelines § 15126.2; PRC §§ 21100(b)(1), 21002.1(a). If a project has a significant effect on the environment, an agency may approve the project only upon finding that it has “eliminated or substantially lessened all significant effects on the environment where feasible” and that any unavoidable significant effects on the environment are “acceptable due to overriding concerns.” CEQA Guidelines § 15092(b)(2) (A–B). Such findings must be supported by substantial evidence. CEQA Guidelines § 15091(b).

When new information is brought to light showing that an impact previously discussed in the DEIR but found to be insignificant with or without mitigation in the DEIR’s analysis has the potential for a significant environmental impact supported by substantial evidence, the DEIR must consider and resolve the conflict in the evidence. See *Visalia Retail, L.P. v. City of Visalia* (2018) 20 Cal. App. 5th 1, 13, 17; see also *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal. App. 4th 1099, 1109. While a lead agency has discretion to formulate standards for determining significance and the need for mitigation measures—the choice of any standards or thresholds of significance must be “based to the extent possible on scientific and factual data and an exercise of reasoned judgment based on substantial evidence. CEQA Guidelines § 15064(b); *Cleveland Nat’l Forest Found. v. San Diego Ass’n of Gov’ts* (2017) 3 Cal. App. 5th 497, 515; *Mission Bay Alliance v. Office of Community Inv. & Infrastructure* (2016) 6 Cal. App. 5th 160, 206. And when there is evidence that an impact could be significant, an EIR cannot adopt a contrary finding without providing an adequate explanation along with supporting evidence. *East Sacramento Partnership for a Livable City v. City of Sacramento* (2016) 5 Cal. App. 5th 281, 302.

In addition, a determination that regulatory compliance will be sufficient to prevent significant adverse impacts must be based on a project-specific analysis of potential impacts and the effect of regulatory compliance. In *Californians for Alternatives to Toxics v. Department of Food & Agric.* (2005) 136 Cal. App. 4th 1, the court set aside an EIR for a statewide crop disease control plan because it did not include an evaluation of the risks to the environment and human health from the proposed program but simply

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presumed that no adverse impacts would occur from use of pesticides in accordance with the registration and labeling program of the California Department of Pesticide Regulation. *See also Ebbetts Pass Forest Watch v Department of Forestry & Fire Protection* (2008) 43 Cal. App. 4th 936, 956 (fact that Department of Pesticide Regulation had assessed environmental effects of certain herbicides in general did not excuse failure to assess effects of their use for specific timber harvesting project).

Here, for the reasons discussed in detail below, the DEIR fails to comply with the foregoing requirements.

5-7

1. The DEIR's Analysis of the Project's Impacts on Transportation and VMT Omits Critical Information

First, the DEIR clearly identifies a significant and unavoidable transportation impact yet fails to fully justify this conclusion as required by CEQA. Specifically, the document acknowledges that the proposed Project's Vehicle Miles Traveled (VMT) impact exceeds the City's own adopted significance thresholds under both existing and cumulative conditions. This admission and outcome reveals a fundamental conflict: the DEIR concludes that a major and unmitigated detriment to regional sustainability goals is apparently an acceptable consequence of the Project. Pursuant to CEQA Guidelines Section 15093, a finding of "significant and unavoidable" should typically be supported by a robust public interest analysis, demonstrating why the Project's economic or social benefits outweigh the specific and severe burdens it creates on regional transportation and traffic.

5-8

Second, the methodology used to establish the VMT impact, specifically the Origin-Destination (OD) VMT per service population, presents significant analytical shortcomings that warrant further scrutiny. For instance, the VMT efficiency metric for the Project's Traffic Analysis Zone (TAZ) substantially surpasses the San Bernardino County average threshold in the existing scenario (64.93 versus 37.99). In the cumulative scenario, the disparity remains pronounced, with the Project's TAZ reaching 74.76 VMT per service population against the 37.99 County threshold. These high metrics indicate a design that is fundamentally focused on automobiles and fundamentally inconsistent with the State's objective of promoting efficient and sustainable modes of transit as alternatives.

5-9

Third, and relatedly, a key limitation of the DEIR is its narrow focus on VMT, which overlooks potential non-VMT transportation problems that still warrant attention

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under CEQA. The DEIR essentially dismisses the significance of other non-VMT-related transportation factors as less than significant, without providing extensive justification for this prioritization. For example, the project proposes significant changes to local roadways, including the restriping of the Key Pointe Drive at Main Street intersection and the addition of multiple driveways along Amargosa Road. While these elements may not increase VMT, their potential for traffic hazards due to altered circulation patterns or design features remains a valid concern that must be thoroughly addressed to ensure public safety.

5-10

Lastly, the DEIR's analysis of project alternatives fails to examine a scenario capable of truly avoiding the identified significant transportation impact, demonstrating a critical shortcoming in the DEIR's scope. Because the DEIR finds that the Project's increase in Vehicle Miles Traveled (VMT) to be "significant and unavoidable," CEQA Guidelines Section 15021 generally requires analysis of alternatives that could "avoid" or "substantially lessen" that effect. However, the document's alternatives (Alternative 2: Retail-Only and Alternative 3: Reduced-Development) are explicitly projected to result in the same "significant and unavoidable" VMT conclusion as the proposed Project, despite generating fewer trips. A true consideration of alternatives supported by substantial evidence would help reveal potential changes to the Project that would address its VMT impacts.

5-11

B. The DEIR's Mitigation Measures Are Insufficient

A fundamental purpose of an EIR is to identify ways in which a proposed project's significant environmental impacts can be mitigated or avoided. Pub. Res. Code §§ 21002.1(a), 21061. To implement this statutory purpose, an EIR must describe any feasible mitigation measures that can minimize the project's significant environmental effects. PRC §§ 21002.1(a), 21100(b)(3); CEQA Guidelines §§ 15121(a), 15126.4(a).

If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" PRC §§ 21002; 21002.1, 21081; CEQA Guidelines §§ 15091, 15092(b)(2)(A); and find that "specific overriding economic, legal, social, technology or other benefits of the project outweigh the significant effects on the environment." PRC §§ 21002; 21002.1, 21081; CEQA Guidelines §§ 15091, 15092(b)(2)(B). "A gloomy forecast of environmental degradation is of little or no value without pragmatic, concrete means to minimize the

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impacts and restore ecological equilibrium.” *Environmental Council of Sacramento v. City of Sacramento* (2006) 142 Cal.App.4th 1018, 1039.

CEQA mitigation measures proposed and adopted are required to describe what actions will be taken to reduce or avoid an environmental impact. (CEQA Guidelines § 15126.4(a)(1)(B) [providing “[f]ormulation of mitigation measures should not be deferred until some future time.”].) While the same Guidelines section 15126.5(a)(1)(B) acknowledges an exception to the rule against deferrals, such exception is narrowly proscribed to situations where it is impractical or infeasible to include those details during the project's environmental review.

According to CEQA Guidelines, “[w]hen an EIR has been prepared for a project, the Responsible Agency shall not approve the project as proposed if the agency finds any feasible alternative or feasible mitigation measures within its powers that would substantially lessen or avoid any significant effect the project would have on the environment.” CEQA Guidelines Section 15096(g)(2).

Here, the EIR’s mitigation measures for the Project are inadequate as described below.

5-12

1. The DEIR Fails to Consider and Deploy All Feasible Mitigation Measures

A fundamental purpose of an EIR is to identify ways in which a proposed project's significant environmental impacts can be mitigated or avoided. Pub. Res. Code §§ 21002.1(a), 21061. To implement this statutory purpose, an EIR must describe any feasible mitigation measures that can minimize the project's significant environmental effects. PRC §§ 21002.1(a), 21100(b)(3); CEQA Guidelines §§ 15121(a), 15126.4(a).

If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has “eliminated or substantially lessened all significant effects on the environment where feasible” PRC §§ 21002; 21002.1, 21081.

Mitigation measures, under CEQA proposed and adopted, are required to describe what actions will be taken to reduce or avoid an environmental impact. (CEQA Guidelines § 15126.4(a)(1)(B) [providing “[f]ormulation of mitigation measures should not be deferred until some future time.”].) While the same Guidelines section 15126.5(a)(1)(B) acknowledges an exception to the rule against deferrals, such exception is narrowly proscribed to situations where it is impractical or infeasible to include those details during the project's environmental review.

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According to CEQA Guidelines, “[w]hen an EIR has been prepared for a project, the Responsible Agency shall not approve the project as proposed if the agency finds any feasible alternative or feasible mitigation measures within its powers that would substantially lessen or avoid any significant effect the project would have on the environment.” CEQA Guidelines Section 15096(g)(2).

However, an impact can only be labeled as significant-and-unavoidable after all available, feasible mitigation is considered and the EIR lacks substantial evidence to support a finding that no other feasible mitigation existed to mitigate the Project’s significant impacts.

Here, the DEIR is fundamentally flawed in its failure to identify and commit to feasible mitigation measures that could reduce the Project’s transportation impacts below the threshold of significance, resulting in an unjustifiable “significant and unavoidable” conclusion. The document clearly establishes that the Project’s calculated Vehicle Miles Traveled (VMT) per service population exceeds the City-adopted thresholds under all tested scenarios. However, the proposed mitigation is grossly insufficient: the sole VMT-reducing measure included is the addition of an eight-foot-wide pedestrian sidewalk along Amargosa Road, which is acknowledged to reduce VMT by only approximately two percent. This minuscule reduction essentially guarantees a permanent, unmitigated impact on the community’s goal of improving transportation efficiency, failing to meet the legal mandate under CEQA to lessen significant effects to the maximum extent feasible.

5-13

The DEIR’s analysis also exhibits a notable failure to provide sufficient justification for rejecting alternative and established Transportation Demand Management (TDM) measures that could collectively contribute to an acceptable VMT reduction. The DEIR summarily dismisses proven TDM strategies, such as carpool programs, transit subsidies, or telecommuting options, claiming they are infeasible or ineffective primarily due to the Project’s emphasis and focus on automobiles and limited employee base. The DEIR’s dismissal of reasonable alternatives demonstrates a limitation in the range of solutions considered, as it prioritizes the Project’s current retail model over the required commitment to environmental protection and fails to provide a rigorous, data-driven analysis to support the summary rejection of these measures. The City as lead agency must rigorously explore a broader suite of enforceable and site-appropriate TDM mitigation measures before concluding that a significant, growth-inducing transportation impact is simply entirely unavoidable.

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2. The DEIR Improperly Mischaracterizes Mitigation Measures as “Project Design Features”

The DEIR improperly labels mitigation measures as “Project Design Features” or “PDFs,” which the DEIR purports will minimize any potentially significant environmental impacts. Relying on the PDFs, the DEIR concludes in many instances that the Project’s impacts are less than significant and that no mitigation is required.

However, it is established that “[a]voidance, minimization and / or mitigation measure’ . . . are not ‘part of the project.’ . . . compressing the analysis of impacts and mitigation measures into a single issue . . . disregards the requirements of CEQA.” (*Lotus v. Department of Transportation* (2014) 223 Cal. App. 4th 645, 656.) When “an agency decides to incorporate mitigation measures into its significance determination, and relies on those mitigation measures to determine that no significant effects will occur, that agency must treat those measures as though there were adopted following a finding of significance.” (*Lotus, supra*, 223 Cal. App. 4th at 652 [*citing* CEQA Guidelines § 15091(a)(1) and Cal. Public Resources Code § 21081(a)(1).])

By labeling mitigation measures as project design features, the City violates CEQA by failing to disclose “the analytic route that the agency took from the evidence to its findings.” (Cal. Public Resources Code § 21081.5; CEQA Guidelines § 15093; *Village Laguna of Laguna Beach, Inc. v. Board of Supervisors* (1982) 134 Cal. App. 3d 1022, 1035 [*quoting Topanga Assn for a Scenic Community v. County of Los Angeles* (1974) 11 Cal. 3d 506, 515.])

The DEIR’s use of “Project Design Features” further violates CEQA because such measures would not be included in the Project’s Mitigation Monitoring and Reporting Program. CEQA requires lead agencies to adopt mitigation measures that are fully enforceable and to adopt a monitoring and/or reporting program to ensure that the measures are implemented to reduce the Project’s significant environmental effects to the extent feasible. (PRC § 21081.6; CEQA Guidelines § 15091(d).) Therefore, using Project Design Features in lieu of mitigation measures violates CEQA.

The DEIR is laden with mitigation measures that are improperly characterized as PDFs. The DEIR should be revised to adequately address and analyze impacts from any proposed mitigation measures.

Specifically, the DEIR improperly relies on passive project design elements as substantive mitigation, thereby avoiding the adoption of binding, quantifiable measures

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necessary to reduce the significant transportation impact. For example, the DEIR notes the inclusion of on-site bicycle racks and electric vehicle (EV)-capable parking spaces. However, the DEIR itself also indicates that the efficacy of the bicycle racks is limited, given the lack of existing or planned bicycle facilities on surrounding public roads like Amargosa Road and Key Pointe Drive. Similarly, while the provision of EV infrastructure and solar canopies contributes to general energy efficiency, these features are explicitly described as reducing the electrical grid usage or improving energy efficiency rather than achieving a measurable reduction in vehicle trips or Vehicle Miles Traveled (VMT) generation. The DEIR's strategy of equating passive design features with active mitigation overstates the environmental commitment and fails to provide a legal mechanism for addressing the Project's core impact.

5-15

Further, the DEIR's reliance on design features is further compounded by the conclusion that additional, effective Transportation Demand Management (TDM) strategies are infeasible. The document dismisses proven TDM measures, such as carpool programs, transit subsidies, or telecommuting options, citing the Project's focus on automobile traffic and limited employee base. However, the DEIR's rationale is unconvincing, as it allows the applicant's business model to dictate the scope of environmental analysis, thereby precluding analysis of feasible methods for VMT reduction. The DEIR's failure to commit to enforceable TDM measures demonstrates that the Project has not exhausted all reasonable options before declaring the impact significant and unavoidable.

5-16

3. Similarly, the Project Improperly Relies on Model or Optional Rules that are Not Legally Enforceable or Binding Rather Than Mandatory Mitigation Measures

CEQA Guidelines generally require that mitigation measures for significant impacts be mandatory or legally enforceable on a project applicant rather than permissive or voluntary. Specifically, CEQA Guidelines Section 15126.4(2) requires that "mitigation measures must be fully enforceable through permit conditions, agreements, or other legally-binding instruments."

However, in several instances, the DEIR merely invokes model or optional rules that the project applicant *may* comply with to address potentially significant environmental impacts.

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For example, the DEIR improperly minimizes the Project's environmental consequences by citing compliance with mandatory building codes and non-project-specific regulatory standards as adequate mitigation measures. For example, the Project's stated energy and water efficiencies are frequently tied to compliance with the California Energy Code (Title 24) and the California Green Building Standards Code (CALGreen Code). However, these codes represent minimum, legally required standards for all new construction and do not represent additional, discretionary mitigation efforts put forth by the Project to address its unique environmental effects. Compliance with the latest building codes, while necessary, simply establishes the regulatory baseline and cannot serve as a substitute for project-specific mitigation, especially in light of a significant and unavoidable impact.

Further, the DEIR dismisses impacts to public services, such as fire and police protection, as less than significant based on the mandatory payment of development impact fees. For instance, the DEIR states that the payment of statutory fees, specifically mandated by Senate Bill 50, is "deemed to be full and complete mitigation" for impacts to school services or facilities. However, this approach confuses a financial obligation to fund future infrastructure (which all development must meet) with an actual environmental mitigation measure. By relying on baseline fees and compliance with minimum standards, the DEIR does not demonstrate that the Project itself has adopted feasible, project-specific measures to reduce its demand on or physical disruption to public services to the maximum extent possible.

Thus, the DEIR avoids requiring strict compliance with mandatory mitigation measures by instead requiring voluntary compliance with optional or model rules, potentially contravening the CEQA Guidelines.

5-17

C. The DEIR Fails to Adequately Evaluate the Project's Cumulative Impacts

A DEIR must discuss cumulative impacts when they are significant and the project's incremental contribution is "cumulatively considerable." CEQA Guidelines §15130(a). A project's incremental contribution is cumulatively considerable if the incremental effects of the project are significant "when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." 14 Cal Code Regs §15065(a)(3).

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An EIR must discuss a cumulative impact if the project's incremental effect combined with the effects of other projects is "cumulatively considerable." 14 C.C.R. §15130(a). This determination is based on an assessment of the project's incremental effects "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." 14 C.C.R. §15065(a)(3)(emphasis added); *Banning Ranch Conservancy v City of Newport Beach* (2012) 211 CA4th 1209, 1228. See also 14 C.C.R. §15355(b).

The CEQA Guidelines require that an EIR implement the provisions of Pub. Res. Code §21083(b)(2), which specifies that the Guidelines must include criteria requiring public agencies to find that a project may have a significant effect on the environment if its possible effects "are individually limited but cumulatively considerable."

The purpose of the cumulative impacts analysis is to avoid considering projects in a vacuum, because failure to consider cumulative harm may risk environmental disaster. *Whitman v. Board of Supervisors* (1979) 88 Cal.App.3d 397, 408 (citing *Natural Resources Defense Council v. Callaway* (2d Cir 1975) 524 F2d 79). Without this analysis, piecemeal approval of several projects with related impacts could lead to severe environmental harm. *Golden Door Props., LLC v. County of San Diego* (2020) 50 Cal.App.5th 467, 527; *San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 720; *Las Virgenes Homeowners Fed'n v County of Los Angeles* (1986) 177 Cal.App.3d 300, 306. An adequate analysis of cumulative impacts is particularly important when another related project might significantly worsen the project's adverse environmental impacts. *Friends of the Eel River v. Sonoma County Water Agency* (2003) 108 CA4th 859.

Here, a critical deficiency exists in the DEIR's cumulative analysis because it narrowly focuses solely on VMT, thereby ignoring other foreseeable, non-VMT transportation impacts when considering multiple concurrent projects. The cumulative setting includes related development projects such as the I-15 Industrial Park, the Pixior high-cube fulfillment center, the Industrial Building project, and the Grid (Phase 1) retail plaza, all located in the vicinity. Although the EIR finds the Project's individual contribution to non-VMT impacts (like geometric design hazards or inadequate emergency access) to be less than significant, it does not rigorously analyze the combined operational changes from multiple new commercial centers on local circulation and safety. The compounded effects of increased heavy truck traffic from these nearby industrial and retail centers on local roadway integrity, maintenance needs, and public safety remain largely unaddressed in the cumulative assessment.

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Further, the DEIR's cumulative impact analysis for several other resource areas relies heavily on compliance with existing regulations without providing adequate project-specific analysis of resulting combined effects. For instance, the DEIR frequently dismisses cumulative impacts by asserting that compliance with regulatory frameworks, such as the Municipal Code, General Plan, or development fees, will adequately mitigate all effects. The DEIR's conclusory approach is evident in the analyses for Land Use, Public Services, and Utilities, where the EIR assumes other projects will also adhere to standards and fees, precluding any 'cumulatively considerable' contributions. The DEIR's methodology fails to transparently disclose and quantify the real-world, localized burdens that result when multiple new developments concurrently place demands on the same public services and infrastructure within a focused geographic area.

5-19

D. The Project is Inconsistent and in Conflict with Land Use Plans for the Project Site, including the General Plan, Housing Element, etc.

Each California city and county must adopt a comprehensive, long-term general plan governing development. *Napa Citizens for Honest Gov. v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 352, *citing* Gov. Code §§ 65030, 65300. The general plan sits at the top of the land use planning hierarchy, and serves as a "constitution" or "charter" for all future development. *DeVita v. County of Napa* (1995) 9 Cal.4th 763, 773; *Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal.3d 531, 540.

General plan consistency is "the linchpin of California's land use and development laws; it is the principle which infused the concept of planned growth with the force of law." *Debottari v. Norco City Council* (1985) 171 Cal.App.3d 1204, 1213. It is well established that development projects may not be approved if they interfere with, or frustrate, the general plan's policies and objectives. *See Napa Citizens*, 91 Cal.App.4th at 378-79; *see also, Lesher*, 52 Cal.3d at 544. Thus, CEQA requires EIRs to analyze the consistency of a project with the general plan. CEQA Guidelines § 15125(d); *see also, Families Unafraid to Uphold Rural El Dorado County v. El Dorado County Bd. of Sup'rs* (1998) 62 Cal.App.4th 1332, 1336. Because an EIR must analyze inconsistencies with the general plan, deficiencies in the plan may affect the legal adequacy of the EIR. If the general plan does not meet state standards, an EIR analysis based on the plan may also be defective.

CEQA also mandates "good faith effort in full disclosure." Guidelines § 15204. An agency is not acting in good faith when "it gives conflicting signals to decision makers

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and the public about the nature and scope of the activity being proposed.” *San Joaquin Raptor Rescue Center v. County of Merced* (2007) 149 Cal.App.4th 645, 655–656.

Here, although the DEIR asserts that the Project is consistent with the City’s land use plans and zoning, its findings related to Vehicle Miles Traveled (VMT) directly contradict the core policy goals of the General Plan. The City’s General Plan seeks to prioritize growth that furthers a regional balance of jobs and housing to reduce VMT, increase job opportunities, and improve the quality of life. However, the DEIR acknowledges that the Project’s VMT per service population substantially exceeds the San Bernardino County average threshold under both existing (64.93 versus 37.99) and cumulative (74.76 versus 37.99) conditions. The DEIR’s finding demonstrates an inherent conflict: the Project promotes a major auto-oriented land use that works against the General Plan’s explicit objectives of creating a more sustainable and VMT-efficient community.

The Project’s severe and unavoidable VMT impact, therefore, renders it inconsistent with the fundamental planning documents adopted to mitigate environmental effects, including regional sustainability strategies. The Project’s inability to meet the VMT efficiency metric conflicts with CEQA Guidelines Section 15064.3(b) and regional policy goals like Connect SoCal, which aim to integrate land use and transportation to reduce greenhouse gas emissions. The DEIR concludes that the Project would support local job creation, which aligns with Policy LU-6.1. However, this benefit is undermined by the creation of new employment that relies on an unsustainable level of automobile use. By confirming that the Project would result in a cumulatively considerable, significant, and unavoidable VMT impact, the DEIR implicitly acknowledges the Project’s long-term conflict with the transportation efficiency and climate-related objectives embedded within the City’s land use planning framework.

5-20

VI. CONCLUSION

The City should direct City Staff and the Project applicant to evaluate and address the issues raised herein prior to approving the project, including requiring recirculation of the DEIR.

Should the Council have any questions or concerns regarding this comment letter, please do not hesitate to contact our office.

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Sincerely,



Omar Corona
Attorneys for Western States
Regional Council of Carpenters

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Attached:

March 8, 2021 SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling (Exhibit A);

Air Quality and GHG Expert Paul Rosenfeld CV (Exhibit B); and

Air Quality and GHG Expert Matt Hagemann CV (Exhibit C).

Responses to Comment Letter 5

Omar Corona

Attorneys for Western States Regional Council of Carpenters

January 14, 2026

- 5-1 The commenter, the Western States Regional Council of Carpenters (WSRCC), provides introductory remarks summarizing the Project description and expressing general interest in environmental review and proper land use planning. The commenter notes that they reserve the right to supplement their comments at or before future hearings, incorporate by reference all other comments submitted on the Draft EIR prior to certification, and request to receive future CEQA and Planning and Zoning Law notices.

This comment is acknowledged. As of the close of the public review period, this is the only comment letter received from WSRCC. No specific environmental issue or alleged deficiency in the Draft EIR is raised in this portion of the letter. The City will add WSRCC to the mailing list for all future CEQA notices related to the Project in accordance with Public Resources Code Sections 21092.2 and 21167(f) and Government Code Section 65092. No revisions to the Draft EIR are required in response to this comment.

- 5-2 The commenter encourages the City to require the use of a local, state-certified workforce and cites potential environmental and economic benefits, including reduced greenhouse gas (GHG) emissions and vehicle miles traveled (VMT). This comment is acknowledged. CEQA does not require analysis of labor practices unless their absence would result in a significant physical environmental impact. The Draft EIR evaluates GHG and VMT impacts using modeling assumptions and does not rely on workforce location or training status for its conclusions. Local-hire provisions may be considered by the City as part of project approvals but are outside the scope of CEQA. No revisions to the Draft EIR are required in response to this comment.

- 5-3 The commenter requests that the City requires detailed infectious disease prevention protocols and training during construction, including COVID-19 screening procedures and the use of workers trained in Infection Control Risk Assessment (ICRA) protocols.

This comment is acknowledged. As of the time of this Final EIR, there are no active Statewide or local emergency declarations related to COVID-19, and the California Department of Public Health has lifted nearly all pandemic-era mandates. CEQA does not require the imposition of specific occupational health and safety measures unless their absence would result in a significant physical environmental impact. The Draft EIR fully evaluates construction-related impacts, including air quality and health risks, and identifies appropriate mitigation measures. The Project will comply with all applicable worker health and safety regulations, including those administered by Cal/OSHA. Any additional health and safety protocols adopted by the contractor or required by the City through its permitting authority are beyond the scope of CEQA. No revisions to the Draft EIR are required in response to this comment.

- 5-4 The commenter recommends that the City negotiate a development agreement with the Project Applicant to secure additional community benefits, environmental mitigation, and project revisions. This recommendation reflects a policy preference, not a CEQA requirement, and does

not identify a deficiency in the Draft EIR. CEQA requires that an EIR identify and analyze a project's environmental impacts, evaluate feasible mitigation measures and alternatives, and disclose significant unavoidable impacts where no feasible mitigation is available (Public Resources Code §§21002.1, 21081; CEQA Guidelines §§ 15002, 15091). CEQA does not require a lead agency to negotiate or adopt a development agreement, nor does it require the imposition of additional community benefits, labor requirements, or project modifications that are unrelated to reducing a specific environmental impact to a less than significant level.

As disclosed in the Draft EIR, the Project's only significant unavoidable impact relates to transportation VMT. The EIR evaluated applicable VMT-reduction strategies, including those identified in the California Air Pollution Control Officers Association (CAPCOA) Handbook, and concluded, based on substantial evidence, that no feasible mitigation measures or alternatives are available that would reduce the Project's VMT impact to a less than significant level. Similarly, requests for community benefits, such as local hiring or apprenticeship programs, constitute land use and economic policy considerations, not environmental mitigation requirements under CEQA. The City retains discretion, independent of CEQA, to determine whether to pursue a development agreement as a matter of municipal policy. However, the absence of a development agreement does not affect the adequacy of the environmental analysis, the validity of the EIR's conclusions, or the City's ability to adopt Findings of Fact and a Statement of Overriding Considerations pursuant to CEQA Guidelines Sections 15091 and 15093. Accordingly, no revisions to the Draft EIR are required in response to this comment.

- 5-5 The commenter provides a summary of CEQA requirements, including legal standards for EIRs, the fair argument test, and the conditions under which recirculation is required. The commenter asserts that the Draft EIR fails to substantiate its conclusions, does not fully assess environmental impacts, and lacks sufficient mitigation measures; therefore, it must be revised and recirculated.

This comment is acknowledged. However, it does not identify a specific factual or analytical deficiency in the Draft EIR. The Draft EIR was prepared in full compliance with CEQA, including the requirements for disclosure, analysis, and mitigation of significant environmental impacts. Substantial evidence supports the impact conclusions, and mitigation measures have been identified and incorporated where required. As no significant new information has been presented that would trigger the need for recirculation under CEQA Guidelines Section 15088.5, no revisions or recirculation of the Draft EIR are required in response to this comment.

- 5-6 The commenter asserts that the Draft EIR fails to support its conclusions with substantial evidence and must be revised and recirculated under CEQA. The commenter references legal standards regarding significance thresholds, mitigation requirements, and evidentiary support for EIR findings, but does not identify any specific impact area in which the Draft EIR's analysis is deficient.

This comment is acknowledged. The Draft EIR was prepared in accordance with CEQA and the CEQA Guidelines and includes substantial evidence to support its findings and conclusions. The analysis relies on scientific and factual data, technical studies, modeling tools, and agency-adopted thresholds to determine significance and to identify feasible mitigation measures. The Draft EIR does not dismiss any potentially significant effects without explanation or evidentiary support. To the extent that subsequent comments raise specific concerns about particular issue areas, responses are provided below. However, the general assertion that the Draft EIR lacks

substantial evidence does not, on its own, demonstrate a need for revision or recirculation under CEQA Guidelines Section 15088.5. No changes to the Draft EIR are required in response to this comment.

- 5-7 The comment asserts that the Draft EIR's analysis of transportation and VMT impacts omits critical information and is analytically deficient. These assertions are not supported by the commenter and are based on misunderstandings of CEQA, CEQA Guidelines Section 15064.3, and the role of a Statement of Overriding Considerations under CEQA Guidelines Section 15093. The comment contends that the Draft EIR fails to "fully justify" its conclusion that the Project's VMT impact is significant and unavoidable and suggests that such a conclusion is inconsistent with CEQA absent a public interest analysis. This contention is incorrect.

The Draft EIR properly identifies, quantifies, and discloses the Project's significant and unavoidable VMT impact in accordance with CEQA Guidelines Section 15064.3(b) and the City of Hesperia Transportation Impact Analysis Guidelines (July 2020). As described in the Transportation Impact Analysis (Draft EIR, Appendix J), the Project's Origin-Destination (OD) VMT per service population exceeds the applicable San Bernardino County significance threshold of 37.99 VMT per service population under both scenarios analyzed: Existing (2024) Conditions (64.93 VMT per service population) and Cumulative (2050) Conditions (74.76 VMT per service population). CEQA requires an EIR to identify significant environmental impacts and evaluate feasible mitigation measures and alternatives. Where, as here, no feasible mitigation measures or alternatives are available that would reduce the impact to a less than significant level, CEQA expressly contemplates a finding of significant and unavoidable impact (Public Resources Code §§21002, 21081; CEQA Guidelines § 15091(a)(3)). A Statement of Overriding Considerations is not part of the Draft EIR analysis and is not required to be included in the Draft EIR. Rather, it is a separate discretionary finding adopted by the decision-making body at the time of project approval pursuant to CEQA Guidelines Section 15093. Accordingly, the absence of a public interest balancing discussion in the Draft EIR does not constitute a deficiency. That analysis is appropriately provided in the Findings of Fact and Statement of Overriding Considerations, which rely on substantial evidence in the EIR and the administrative record. Accordingly, the comment does not identify a deficiency in the Draft EIR's identification or disclosure of the Project's significant and unavoidable VMT impact, and no revisions to the Draft EIR are required in response to this comment.

- 5-8 The commenter challenges the use of OD VMT per service population and cites the Project's Traffic Analysis Zone (TAZ) VMT values relative to the San Bernardino County threshold as evidence of analytical flaws. This critique misunderstands the methodology and, in fact, confirms the EIR's conclusions. The Draft EIR applied the City of Hesperia Transportation Impact Analysis Guidelines (July 2020) and San Bernardino County-adopted VMT thresholds, and the San Bernardino County Transportation Authority (SBCTA) Travel Demand Model (SBTAM v3.2), consistent with CEQA Guidelines Section 15064.3 and the OPR Technical Advisory on Evaluating Transportation Impacts. OD VMT per service population is an accepted and commonly used metric for evaluating retail projects and is expressly required under City guidelines. As documented in Draft EIR, Appendix J, the Project's OD VMT per service population exceeds the County threshold under both existing and cumulative conditions, which is the basis for the Draft EIR's conclusion that the Project would result in a significant VMT impact. CEQA does not require that a project be

designed to meet VMT thresholds; rather, it requires that exceedances be identified, analyzed, and disclosed. The Draft EIR does exactly that.

In addition, the Transportation Impact Analysis (TIA) evaluated boundary VMT (10-mile and countywide) and found that the Project would result in no meaningful increase in boundary VMT per service population, with cumulative changes of 0.02 percent or less, indicating that the Project does not meaningfully worsen regional travel efficiency beyond existing conditions. However, because the City's adopted significance criteria are based on project-generated OD VMT, the impact is appropriately deemed significant, notwithstanding the boundary VMT results. CEQA does not require a project to be redesigned to conform to broader transportation policy preferences; the role of an EIR is environmental disclosure, not policy enforcement or project redesign. In conclusion, the Draft EIR's VMT methodology is consistent with City guidelines, CEQA Guidelines Section 15064.3, and accepted professional practice, and the commenter has not provided substantial evidence demonstrating an analytical flaw; therefore, no revisions to the Draft EIR are required.

- 5-9 This commenter asserts that the Draft EIR improperly "dismisses" non-VMT transportation issues such as roadway design and circulation changes. This assertion is incorrect. Pursuant to CEQA Guidelines Section 15064.3(a), VMT is the appropriate metric for evaluating vehicular transportation impacts for purposes of CEQA significance. Nonetheless, the Draft EIR includes a detailed analysis of roadway operations, access design, circulation, and safety in Section 4.13: Transportation, supported by a detailed Transportation Impact Analysis (Draft EIR, Appendix J).

The TIA identifies that under Opening Year 2026 Cumulative Plus Project and Horizon Year 2045 Plus Project conditions, certain intersections (i.e., Key Pointe Drive/Amargosa Road, Key Pointe Drive/Main Street, and US-395/Phelan Road/Main Street) would experience operational deficiencies absent improvements. The TIA therefore recommends roadway and signalization improvements at these locations. As noted in the TIA and confirmed through coordination with the City, improvements at US-395/Phelan Road/Main Street are not required by the City or SBCTA, while improvements at Key Pointe Drive/Amargosa Road and Key Pointe Drive/Main Street will be required and implemented as conditions of project approval. With implementation of the recommended and required improvements, the TIA demonstrates that all affected intersections would operate at acceptable levels of service consistent with City standards. In addition, the Draft EIR evaluates the Project's proposed transportation improvements, including restriping at the Key Pointe Drive/Main Street intersection, new and modified driveway access along Amargosa Road, internal circulation design, pedestrian facilities, and signal modifications for operational performance and safety. No hazardous conditions were identified, and no substantial evidence has been provided demonstrating that the proposed roadway design or circulation would result in unsafe conditions or significant environmental impacts. Moreover, roadway design and traffic safety are also addressed through the City's engineering review, permitting, and operational approval processes, independent of CEQA. The commenter has not provided substantial evidence that the Project's non-VMT transportation impacts would be significant or that the Draft EIR's analysis is inadequate; accordingly, no revisions to the Draft EIR are required in response to this comment.

- 5-10 This commenter argues that the alternatives analysis is deficient because none of the analyzed alternatives avoid the Project's significant VMT impact. This argument misstates CEQA's requirements. CEQA Guidelines Section 15126.6 requires analysis of a reasonable range of alternatives capable of feasibly attaining most of a project's objectives while avoiding or substantially lessening significant impacts, where feasible. CEQA does not require identification or adoption of an alternative that successfully eliminates a significant impact where no such feasible alternative exists. The Draft EIR analyzed the No Development Alternative, the Retail-Only Alternative, and the Reduced Development Alternative. Each alternative was evaluated for feasibility, ability to meet Project objectives, and environmental impacts, including VMT. As documented in Section 6.0: Alternatives of the Draft EIR, although Alternatives 2 and 3 would generate fewer vehicle trips than the proposed Project, both alternatives would still exceed the City's adopted VMT significance thresholds due to the Project's regional-serving retail nature and site context.

Substantial evidence demonstrates that no feasible alternative would reduce the Project's VMT impact to a less than significant level. CEQA does not require endless iteration of alternatives where the record shows that additional alternatives would not meaningfully change the outcome. The fact that reduced-intensity alternatives continue to result in significant VMT impacts reflects the Project's characteristics and location, not a flaw in the alternatives analysis. Because the Draft EIR evaluates a reasonable range of feasible alternatives and substantial evidence demonstrates that no alternative would reduce the Project's VMT impact to a less than significant level, the alternatives analysis complies with CEQA and no revisions to the Draft EIR are required.

- 5-11 The commenter generally asserts that the Draft EIR fails to include adequate mitigation measures but does not identify any specific impact or mitigation measure that is deficient. As such, the comment does not raise a significant environmental issue or provide substantial evidence requiring further response under CEQA Guidelines Section 15088. The Draft EIR meets CEQA's requirements by identifying all significant environmental impacts and proposing specific, feasible, and enforceable mitigation measures or regulatory compliance measures. All measures are included in the Project's MMRP and will be imposed as conditions of approval. No mitigation is improperly deferred, and all measures include performance standards consistent with CEQA Guidelines Section 15126.4. No revisions to the Draft EIR are required in response to this comment.
- 5-12 The commenter asserts that the Draft EIR is fundamentally flawed because it allegedly fails to identify and commit to all feasible mitigation measures capable of reducing the Project's VMT impacts below the applicable threshold of significance. This assertion is not supported by substantial evidence and reflects a misunderstanding of CEQA's mitigation requirements, particularly as they apply to VMT under CEQA Guidelines Section 15064.3. As correctly cited by the commenter, CEQA requires an EIR to identify and evaluate feasible mitigation measures that could substantially lessen significant environmental effects (Public Resources Code §§21002, 21002.1, 21100(b)(3); CEQA Guidelines §§ 15121(a), 15126.4(a)). However, CEQA does not require that mitigation measures reduce a significant impact to a less than significant level in all cases. Where no feasible mitigation measures exist that would achieve that result, CEQA expressly allows the impact to be identified as significant and unavoidable, provided the analysis is supported by substantial evidence (Public Resources Code §21081; CEQA Guidelines §

15091(a)(3)). The Draft EIR complies with these requirements. The TIA (Draft EIR, Appendix J) identifies, evaluates, and documents the effectiveness of feasible VMT-reduction strategies applicable to the Project, and explains why additional measures would not be feasible or effective in reducing Project-generated VMT below the adopted threshold.

The Draft EIR acknowledges that the Project's OD VMT per service population exceeds the City-adopted significance threshold under both existing and cumulative conditions. Consistent with the City of Hesperia Transportation Impact Analysis Guidelines (July 2020) and the CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reductions, the Draft EIR evaluated feasible VMT-reduction measures applicable to a regional-serving retail project. The Project incorporates Pedestrian Network Improvements, including construction of an 8-foot-wide sidewalk along Amargosa Road, consistent with CAPCOA Measure T-18. As disclosed in the Draft EIR, this measure is expected to reduce Project VMT by approximately two percent. The Draft EIR does not claim that this measure alone would reduce the impact below the threshold; rather, it accurately discloses that the reduction is insufficient to do so. CEQA does not require adoption of mitigation measures that are speculative, infeasible, unenforceable, or unlikely to result in a meaningful reduction in the identified impact. Accordingly, the Draft EIR appropriately evaluates and discloses the effectiveness of feasible VMT-reduction measures and identifies that no feasible mitigation measures were identified that would reduce project-generated VMT below the adopted threshold. In conclusion, the commenter has not provided substantial evidence demonstrating that the Draft EIR failed to identify or evaluate feasible mitigation measures or that additional feasible measures exist that would reduce Project-generated VMT below the adopted significance threshold. The Draft EIR complies with CEQA's mitigation requirements, and no revisions to the Draft EIR are required in response to this comment.

- 5-13 The commenter asserts that the Draft EIR improperly rejected Transportation Demand Management (TDM) measures without adequate justification. This assertion is incorrect and is not supported by the record. The Draft EIR evaluated VMT-reduction measures consistent with CEQA Guidelines Section 15064.3, the OPR Technical Advisory on Evaluating Transportation Impacts, the City of Hesperia Transportation Impact Analysis Guidelines (July 2020), and the CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity. As documented in the TIA (Draft EIR, Appendix J), the Project is a regional-serving retail use with a predominantly vehicle-oriented customer base and a widely dispersed customer base. The Project's VMT impact is driven primarily by customer trip patterns rather than employee commute behavior. The Draft EIR appropriately considered the applicability and effectiveness of common TDM measures, including carpool incentives, transit subsidies, and telecommuting. Substantial evidence demonstrates that these measures would not be feasible or effective in materially reducing project-generated VMT. Telecommuting is not applicable to on-site retail employment. Carpool and transit subsidy programs, while potentially applicable to certain office or employment-centric land uses, would affect only a small fraction of total Project trips and would not meaningfully reduce VMT associated with customer travel, which constitutes the majority of project-generated VMT. As such, these measures would not result in a measurable reduction sufficient to reduce the Project's VMT below the adopted significance threshold.

CEQA does not require the adoption or analysis of mitigation measures that are speculative, unenforceable, or unlikely to result in a meaningful reduction in the identified impact (CEQA Guidelines § 15126.4(a)). Nor does CEQA require a lead agency to redesign a project or alter its fundamental operational characteristics to achieve VMT reductions. The Draft EIR's evaluation reflects a reasoned, evidence-based determination regarding the limited effectiveness of TDM measures for this specific Project type and location. Accordingly, the Draft EIR does not "summarily dismiss" TDM measures, but rather appropriately evaluates their applicability and effectiveness and discloses that no feasible TDM measures were identified that would reduce Project-generated VMT below the adopted threshold. The commenter has not provided substantial evidence demonstrating that additional site-appropriate, enforceable TDM measures exist that would materially change this conclusion. No revisions to the Draft EIR are required in response to this comment.

- 5-14 The commenter asserts that the Draft EIR improperly characterizes mitigation measures as "Project Design Features" (PDFs) and relies on those PDFs to avoid the adoption of enforceable mitigation measures. This assertion is factually incorrect. The Draft EIR does not identify or label any measures as "Project Design Features" nor does it rely on alleged PDFs to reduce significant impacts to a less than significant level. Instead, the Draft EIR evaluates the Project as proposed, identifies environmental impacts based on that Project description, and separately identifies mitigation measures where required. Measures that are part of the Project as proposed (e.g., compliance with applicable building codes, inclusion of required infrastructure, or provision of on-site amenities) are described as components of the Project and are not characterized as mitigation. Importantly, the Draft EIR does not rely on any Project components to conclude that the Project's transportation or VMT impacts are less than significant. On the contrary, the Draft EIR expressly discloses that the Project's VMT impact exceeds the City's adopted significance threshold and that no feasible mitigation measures were identified that would reduce that impact to a less than significant level. As a result, there is no instance in which the Draft EIR relies on alleged PDFs to avoid identifying a significant impact or to substitute for mitigation.

The legal cases cited by the commenter, including *Lotus v. Department of Transportation* (2014) 223 Cal.App.4th 645, address circumstances where an agency improperly relies on mitigation measures embedded within a project description to avoid a finding of significance.¹ That circumstance is not present here. Because the Draft EIR does not treat any mitigation measures as PDFs or rely on such features to reduce significant impacts, the concerns raised in *Lotus* are inapplicable. Further, the commenter's discussion of features such as bicycle racks, electric vehicle-capable parking, and solar canopies does not demonstrate a CEQA violation. The Draft EIR does not identify these elements as mitigation, does not attribute VMT reductions to them, and does not rely on them to support a less than significant impact conclusion. Accordingly, there is no requirement to include such Project components in the MMRP. Because the Draft EIR does not mischaracterize mitigation measures as PDFs and does not rely on Project components in lieu of required mitigation, the commenter's claim lacks factual and legal support. The commenter has not demonstrated that the Draft EIR improperly relies on PDFs rather than mitigation measures.

¹ *Lotus v. Department of Transportation* (2014) 223 Cal.App.4th 645, 652–656.

The Draft EIR accurately identifies Project impacts, properly distinguishes Project components from mitigation, and complies with CEQA. No revisions to the Draft EIR are required in response to this comment.

- 5-15 The commenter asserts that the Draft EIR improperly allows the Project’s “business model” to dictate the scope of environmental analysis and mitigation, thereby precluding analysis of feasible methods for VMT reduction, specifically TDM strategies. This argument misstates CEQA. CEQA requires environmental impacts to be analyzed based on the Project as proposed, including its land use type, operational characteristics, and trip-generating behavior (CEQA Guidelines §§ 15124, 15378). An EIR is not required to assume a different land use, alter a project’s fundamental operational purpose, or impose mitigation measures that would effectively transform the nature of the project to reduce impacts. It is further noted that the proposed land use is consistent with the City’s land use and zoning for the project site. Here, the Draft EIR appropriately evaluates VMT impacts based on the Project’s regional-serving retail use and the associated travel behavior. TDM measures such as telecommuting, employee-focused transit subsidies, or carpool incentives were considered and determined to be infeasible or ineffective because they would not materially affect the Project’s primary source of VMT, which is customer travel. CEQA does not require a lead agency to impose mitigation measures that are not reasonably related to the Project’s actual impact mechanism, or that would not result in a meaningful reduction in the identified impact (CEQA Guidelines § 15126.4(a)).

The absence of enforceable TDM mitigation measures in this case reflects a reasoned, evidence-based determination that such measures would not substantially lessen the Project’s VMT impact, not a failure to consider them. Accordingly, the conclusion that no feasible mitigation measures exist to reduce the Project’s VMT impact below the adopted threshold is supported by substantial evidence and is consistent with CEQA. The commenter has not provided substantial evidence demonstrating that additional feasible, enforceable TDM measures exist that would materially reduce Project-generated VMT. The Draft EIR appropriately evaluates and discloses the effectiveness and feasibility of potential TDM measures, and no revisions to the Draft EIR are required in response to this comment.

- 5-16 This commenter asserts that the Draft EIR improperly relies on optional, voluntary, or non-binding rules (e.g., compliance with building codes, regulatory standards, or payment of development impact fees) in lieu of mandatory, enforceable mitigation measures, in violation of CEQA Guidelines Section 15126.4. This assertion is incorrect and based on a misunderstanding of CEQA’s distinction between regulatory compliance and baseline conditions, and mitigation measures required to reduce significant environmental impacts. CEQA does not prohibit an EIR from identifying compliance with existing laws, regulations, and codes when determining whether a project would result in a significant impact. On the contrary, CEQA Guidelines expressly recognize that compliance with applicable regulations may be considered in the environmental analysis where such compliance avoids or minimizes an impact (CEQA Guidelines §§ 15125(d), 15126.2(d)). Where compliance with mandatory regulations ensures that an impact would be less than significant, CEQA does not require the imposition of additional mitigation measures. Here, the Draft EIR does not rely on compliance with Title 24, CALGreen, or other generally applicable codes as “mitigation” for significant environmental impacts. Rather, these requirements are described as part of the regulatory framework and Project conditions that apply to all development of this

type and are appropriately considered in the impact analysis to determine whether impacts would occur. Where impacts are identified as significant, the Draft EIR separately evaluates mitigation measures, assesses feasibility, and identifies mitigation where required.

With respect to public services and utilities, the Draft EIR concludes that impacts would be less than significant based on substantial evidence demonstrating that adequate facilities and services are available to serve the Project. The Draft EIR explains that payment of applicable development impact fees, where required by law, ensures that the Project contributes its fair share toward public infrastructure and services. CEQA expressly allows reliance on development impact fees where such fees are supported by an adopted nexus study and are designed to address growth-related impacts (CEQA Guidelines § 15130(a)(3); Gov. Code §66001). Where impacts are less than significant, CEQA does not require additional mitigation measures or inclusion of a fee payment in an MMRP. The commenter's reliance on CEQA Guidelines Section 15126.4(a)(2) is misplaced. That provision requires enforceability only for mitigation measures adopted to reduce significant impacts. It does not require that regulatory compliance measures or baseline conditions be transformed into mitigation measures, nor does it require adoption of project-specific mitigation where no significant impact has been identified. Finally, the Draft EIR does not characterize any optional or voluntary measures as mitigation, nor does it rely on unenforceable commitments to avoid identifying significant impacts. Where mitigation measures are required, they are clearly identified, mandatory, and enforceable through conditions of approval and included in the MMRP, consistent with Public Resources Code Section 21081.6 and CEQA Guidelines Section 15091(d). Accordingly, the Draft EIR does not improperly rely on non-binding rules or voluntary measures in lieu of mandatory mitigation, and it fully complies with CEQA's requirements for enforceability and disclosure. The commenter has not provided substantial evidence demonstrating that the Draft EIR relies on unenforceable or voluntary measures in lieu of mandatory mitigation for significant impacts. The Draft EIR appropriately distinguishes between regulatory compliance, baseline conditions, and enforceable mitigation measures, and complies with CEQA Guidelines Section 15126.4. No revisions to the Draft EIR are required in response to this comment.

- 5-17 The commenter asserts that the Draft EIR fails to adequately evaluate cumulative transportation impacts by focusing on VMT and allegedly ignoring other foreseeable non-VMT effects, such as circulation safety, roadway design hazards, and emergency access, when considered in combination with nearby development. This assertion is incorrect and is contradicted by the cumulative analysis set forth in Draft EIR Section 4.13.7: Cumulative Impacts. As disclosed in Section 4.13.7, the Project would connect to the existing circulation system and would be designed and constructed in compliance with the City's adopted traffic engineering and circulation standards. The Project includes circulation improvements, such as signalized intersections, driveways, and sidewalks, intended to enhance vehicular and pedestrian mobility. The Draft EIR expressly evaluates whether the Project, when combined with other cumulative development, would conflict with adopted plans, ordinances, or policies addressing circulation, and concludes that it would not. The Draft EIR further explains that cumulative development within the City and surrounding jurisdictions is subject to independent, site-specific discretionary review and must comply with the same adopted circulation plans, design standards, and regulatory requirements. These processes ensure that potentially cumulatively considerable

circulation conflicts are identified and avoided at the project level. Accordingly, the Draft EIR reasonably concludes that the Project would not combine with other past, present, or reasonably foreseeable projects to result in significant cumulative circulation impacts.

Consistent with CEQA Guidelines Section 15064.3 and OPR's Technical Advisory on Evaluating Transportation Impacts, the Draft EIR separately evaluates cumulative VMT impacts. As stated in Draft EIR Section 4.13.7, because the Project's VMT impact exceeds the applicable efficiency-based threshold, the Project's VMT impact is cumulatively considerable, significant, and unavoidable. This conclusion appropriately discloses the Project's cumulative transportation impact. Importantly, the Draft EIR does not minimize or obscure this impact. Rather, it expressly acknowledges that the Project's VMT impact is significant at both the project and cumulative levels and that no feasible mitigation measures were identified that would reduce the impact to a less than significant level. Contrary to the commenter's assertion, the Draft EIR does not ignore cumulative effects related to roadway design, incompatible land uses, or emergency access. Section 4.13.7 expressly addresses these issues and explains why the Project would not result in cumulatively considerable impacts. The Draft EIR finds that the Project would not introduce design hazards or incompatible uses and would not impair emergency access because all circulation features would be required to conform to City design standards and applicable building and fire code requirements. These requirements are enforced through the City's development permitting process and through review by engineering and fire authorities. The Draft EIR further explains that other cumulative development in the area would be subject to the same regulatory oversight, thereby limiting the potential for cumulative design hazards or emergency access deficiencies. Speculative assertions regarding increased truck traffic, roadway wear, or generalized safety concerns associated with other nearby development do not constitute substantial evidence of a cumulatively considerable impact where, as here, the Draft EIR demonstrates that applicable standards and review processes prevent such impacts from occurring.

CEQA does not require an EIR to assume that multiple compliant projects will collectively create significant impacts absent evidence demonstrating a cumulatively considerable contribution (CEQA Guidelines § 15130(a)). The Draft EIR's cumulative transportation analysis evaluates the relevant impact categories, applies the appropriate CEQA metrics, and discloses where impacts would be significant and unavoidable. This satisfies CEQA's requirement to avoid piecemeal review while remaining focused on impacts supported by substantial evidence. The commenter has not provided substantial evidence demonstrating that the Draft EIR's cumulative transportation analysis is inadequate or that the Project's incremental contribution to non-VMT transportation effects is cumulatively considerable. The Draft EIR's cumulative analysis in Section 4.13.7 complies with CEQA Guidelines Sections 15130 and 15064.3, and no revisions to the Draft EIR are required in response to this comment.

- 5-18 The commenter asserts that the Draft EIR inadequately evaluates cumulative impacts for land use, public services, and utilities by relying on compliance with existing regulatory frameworks, adopted plans, and development impact fees, rather than providing project-specific analysis of combined effects. This assertion is incorrect and reflects a misunderstanding of CEQA's cumulative impact requirements. CEQA does not require an EIR to speculate about cumulative impacts where substantial evidence demonstrates that compliance with adopted plans,

ordinances, and regulatory programs prevents a project's incremental contribution from being cumulatively considerable. CEQA Guidelines Section 15130(a) requires discussion of cumulative impacts only where a project's incremental contribution is "cumulatively considerable." Where the record demonstrates that a project's impacts are less than significant and do not meaningfully contribute to a cumulative condition, further quantitative analysis is not required.

For land use, the Draft EIR evaluates consistency with the City of Hesperia General Plan, applicable zoning, and the Main Street Freeway Corridor Specific Plan. The Draft EIR concludes that the Project would be consistent with these adopted land use policies and would not result in land use conflicts. Consistency with an adopted general plan and zoning framework is substantial evidence that a project would not result in significant or cumulatively considerable land use impacts (CEQA Guidelines § 15125(d)). The Draft EIR appropriately explains that additional cumulative development would also be required to comply with the same adopted planning framework, which is designed to manage growth and land use compatibility at a programmatic level. Under these circumstances, CEQA does not require additional cumulative land use analysis.

With respect to public services, the Draft EIR evaluates police, fire protection, schools, and other services and concludes that impacts would be less than significant. These conclusions are supported by substantial evidence demonstrating that service providers have adequate capacity to serve the Project and that the Project would be required to pay all applicable development impact fees and comply with service provider requirements. CEQA expressly recognizes that payment of impact fees, when supported by adopted nexus studies, is an appropriate mechanism to address growth-related demands on public facilities (CEQA Guidelines § 15130(a)(3); Gov. Code §66001). The Draft EIR does not assume that regulatory compliance alone "mitigates" a significant cumulative impact. Rather, it concludes that the Project's incremental demand on public services is not cumulatively considerable because applicable planning, funding, and service provision mechanisms are in place to accommodate cumulative growth. CEQA does not require an EIR to quantify speculative future service shortfalls or to assume that multiple compliant projects will collectively overwhelm public services absent substantial evidence to that effect.

Similarly, for utilities, the Draft EIR evaluates water supply, wastewater, stormwater, and solid waste services and concludes that adequate capacity exists or will be provided in accordance with adopted plans and service provider requirements. The Draft EIR appropriately relies on adopted Urban Water Management Plans, wastewater planning documents, and utility service standards to evaluate both project-level and cumulative conditions. CEQA allows reliance on such adopted plans and projections to assess cumulative impacts, particularly where those plans are expressly intended to accommodate projected growth (CEQA Guidelines §§ 15130(b)(1), 15152). The commenter's assertion that the Draft EIR fails to disclose "real-world, localized burdens" lacks evidence. CEQA does not require localized capacity modeling or independent infrastructure forecasting where adopted service plans demonstrate sufficient capacity and where the project's incremental contribution is not cumulatively considerable.

The Draft EIR does not analyze cumulative impacts in a conclusive manner. Rather, it applies the appropriate CEQA standard (i.e., whether the Project's incremental contribution to a cumulative contribution would be cumulatively considerable) and explains why, for land use, public services, and utilities, that standard for a significant cumulative impact is not met. Courts have repeatedly

held that an EIR may rely on adopted plans, regulatory programs, and service provider determinations to support a conclusion of no cumulatively considerable impact, provided the analysis is supported by substantial evidence. The commenter has not provided substantial evidence demonstrating that the Draft EIR fails to adequately evaluate cumulative impacts for land use, public services, or utilities, or that the Project's incremental contribution to any cumulative condition in these resource areas is cumulatively considerable. The Draft EIR's cumulative impact analysis complies with CEQA Guidelines Section 15130, and no revisions to the Draft EIR are required in response to this comment.

- 5-19 The commenter asserts that the Project is inconsistent with, and in conflict with, the City of Hesperia General Plan, Housing Element, and related land use planning documents based on the Draft EIR's identification of a significant and unavoidable VMT impact. This conclusion is legally incorrect, lacks substantial evidence, and reflects a misunderstanding of both CEQA and the California general plan consistency doctrine. CEQA Guidelines Section 15125(d) requires an EIR to discuss whether a project is consistent with applicable land use plans. The Draft EIR satisfies this requirement by evaluating the Project's consistency with the City of Hesperia General Plan, applicable zoning regulations, and the Main Street Freeway Corridor Specific Plan. The Draft EIR concludes that the Project's proposed land use, intensity, and development characteristics are consistent with the site's designated commercial land use and with the City's adopted planning framework.

As courts have long held, a project is consistent with a general plan "if, considering all its aspects, it will further the objectives and policies of the general plan and not obstruct their attainment" (*Corona-Norco Unified School Dist. v. City of Corona* (1993) 17 Cal. App.4th 985, 994). A given project need not be in perfect conformity with each and every general plan policy (*Clover Valley Foundation v. City of Rocklin* (2011) 197 Cal.App.4th 200, 238). Moreover, a lead agency's determination that a project is consistent with the general plan is entitled to deference (*Ibid*); *Sequoiah Hills Homeowners Assn. v. City of Oakland* (1993) 23 Cal. App.4th 704, 719; *Families Unafraid to Uphold Rural El Dorado County v. El Dorado County Bd. of Supervisors* (1998) 62 Cal.App.4th 1332, 1336). The Draft EIR applies this established legal standard by evaluating the Project as a whole rather than elevating a single policy goal above all others.

The commenter improperly equates the identification of a significant VMT impact under CEQA with a determination that the Project is inconsistent with the General Plan. CEQA Guidelines Section 15064.3 establishes VMT as the metric for determining vehicular transportation impact significance for CEQA purposes; it does not correlate VMT efficiency thresholds into land use consistency standards or policy mandates. CEQA expressly contemplates that a project may be consistent with an adopted general plan and zoning ordinance while still resulting in significant and unavoidable environmental impacts, which are addressed through findings and, where appropriate, a Statement of Overriding Considerations (Public Resources Code §§21081, 21002; CEQA Guidelines §§ 15091, 15093). Courts have repeatedly rejected attempts to conflate CEQA impact significance with land use plan inconsistency. Here, the Draft EIR discloses that the Project's OD VMT per service population exceeds San Bernardino County's adopted significance threshold under both existing and cumulative conditions. That disclosure satisfies CEQA's informational purpose. It does not, however, demonstrate that the Project obstructs or frustrates the General Plan's overall objectives.

The City's General Plan contains multiple objectives that must be balanced, including economic development, job creation, provision of commercial services, efficient use of designated commercial land, and long-term sustainability. The Project advances several of these objectives by activating a vacant site planned for retail use, providing regionally serving retail uses in a planned commercial corridor, and generating employment opportunities consistent with General Plan economic development policies. The commenter's approach improperly elevates generalized sustainability and VMT-reduction goals into absolute prohibitions on otherwise consistent development. California law does not require such an outcome. As recognized in *Families Unafraid* and *Sequoiah Hills*, general plans often include aspirational, sometimes competing policies, and consistency is determined by whether a project, on balance, aligns with the plan's overall framework.

The commenter further asserts that the Project's VMT impact conflicts with CEQA Guidelines Section 15064.3 and regional planning documents such as Connect SoCal. This assertion is misplaced. Section 15064.3 governs how transportation impacts are measured for CEQA purposes; it does not impose substantive land use consistency requirements or prohibit approval of projects with significant VMT impacts. Likewise, regional sustainability strategies do not function as binding land use controls unless adopted as such by the lead agency. The Draft EIR does not give "conflicting signals" regarding the Project. Rather, it transparently discloses that the Project is consistent with applicable land use plans and identifies a significant and unavoidable VMT impact under CEQA. These conclusions are not contradictory; they reflect CEQA's disclosure-based framework and the separation between environmental impact analysis and land use policy determinations. The Draft EIR's land use analysis is complete, internally consistent, and supported by substantial evidence. It does not rely on a deficient general plan, nor does it obscure or mischaracterize the Project's impacts. The identification of a significant and unavoidable VMT impact does not render the Project inconsistent with the City's land use plans and does not undermine the adequacy of the EIR. The commenter has not provided substantial evidence demonstrating that the Project is inconsistent with the City of Hesperia General Plan, Housing Element, or other applicable land use plans. The Draft EIR properly analyzes land use consistency in accordance with CEQA Guidelines Section 15125(d), and the identification of a significant and unavoidable VMT impact does not establish a land use conflict. Accordingly, no revisions to the Draft EIR are required in response to this comment.

- 5-20 The commenter requests that the City direct staff and the Project Applicant to further evaluate the issues raised in the comment letter and to require recirculation of the Draft EIR prior to Project approval. Under CEQA Guidelines Section 15384, argument, speculation, unsubstantiated opinion or narrative does not constitute substantial evidence. (*Pala Band of Mission Indians v. County of San Diego* (1998) 68 Cal.App.4th 556, 580.) This request lacks substantial evidence and is inconsistent with CEQA's recirculation standards. CEQA requires recirculation of a Draft EIR only when significant new information is added to the EIR after public notice that deprives the public of a meaningful opportunity to comment (Public Resources Code §21092.1; CEQA Guidelines § 15088.5). As demonstrated in the responses above, the comment letter does not identify any new environmental impacts, feasible mitigation measures, or project alternatives that were not already evaluated and disclosed in the Draft EIR. Rather, the comments reflect disagreements with the Draft EIR's methodology, significance determinations, and conclusions, none of which

constitute significant new information requiring recirculation under CEQA. The Draft EIR adequately identifies and analyzes the Project's environmental impacts, including its significant and unavoidable transportation (VMT) impacts, evaluates feasible mitigation measures and alternatives, and provides a reasoned, evidence-based analysis consistent with CEQA, the CEQA Guidelines, and applicable case law. The responses to comments clarify and expand upon the Draft EIR's analysis but do not reveal deficiencies in the environmental review or introduce new information that would alter the Draft EIR's conclusions. Accordingly, no further evaluation or revisions to the Draft EIR are required in response to this comment, and recirculation of the Draft EIR is not warranted. The City may proceed with consideration of Project approval based on the Final EIR, Findings of Fact, and Statement of Overriding Considerations, as appropriate, consistent with CEQA.

- 5-21 This commenter included the following attachments: (1) a March 8, 2021, SWAPE letter addressing local hire requirements and greenhouse gas modeling consideration (Exhibit A); and (2) curriculum vitae for two air quality and greenhouse gas experts (Exhibits B and C). The City has reviewed these attachments. Exhibit A is a general policy and advocacy letter prepared in 2021, prior to the completion of the Draft EIR, and not specific to the Project. It does not include project-level technical analysis, modeling, or data related to the Project's design, location, operational characteristics, or environmental setting. The letter does not identify errors or omissions in the Draft EIR's analyses, nor does it present feasible mitigation measures or alternatives applicable to the Project that were not already evaluated. As such, Exhibit A does not constitute substantial evidence requiring revisions to the Draft EIR.

Exhibits B and C consist solely of professional qualifications (curriculum vitae) and do not include technical opinions, analyses, or conclusions related to the Project. While the City acknowledges the professional credentials of the individuals identified, the CVs themselves do not provide evidence relevant to the adequacy or accuracy of the Draft EIR. Accordingly, the attached exhibits do not introduce significant new information under CEQA Guidelines Section 15088.5, do not undermine the conclusions of the Draft EIR, and do not warrant revisions to or recirculation of the Draft EIR.

Comment Letter 6: Department of Water Resources

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

GAVIN NEWSOM, Governor

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791



Edgar Gonzalez
Senior Planner
egonzalez@hesperiaca.gov
City of Hesperia
9700 Seventh Avenue
Hesperia, CA 92345

California Environmental Quality Act, Review of SCH2024110259 Hesperia Big Box Retail Project

Dear Mr. Gonzalez:

- 6-1 The Department of Water Resources (DWR) has received notification regarding a request to construct a 167,664-square-foot (sf) big box retail center with 683 parking spaces on an approximately 16.7-acre parcel north of Amargosa Road. A 14-pump fuel station with an approximately 205-sf office building and an approximately 2,623-sf automated carwash facility. The site of the proposed development is located within the City of Hesperia, near milepost (MP) 395 of the State Water Project's (SWP) California Aqueduct.
- 6-2 DWR has a vested interest in any development of the proposed parcels because of its potential to impact the California Aqueduct. In particular, the MP 394.8 cross drainage structure, north of the proposed site was designed and constructed to handle existing drainage flows that cross over the California Aqueduct. Drainage flows resulting from the proposed development may be directed toward the California Aqueduct cross drainage structure.
- If any portion of the project encroaches into, requires construction access through, or impacts the existing drainage within, including developed runoff discharging into, DWR's right of way, then the project proponents will be required to acquire an encroachment permit (EP) from DWR prior to the start of construction. Information regarding encroachment permits can be found at:
- <https://www.water.ca.gov/Work-With-Us/Real-Estate/Encroachment-Permits>
- Please provide DWR with a copy of any future correspondence related to the proposal. All future correspondence can be sent to swp.encroachments@water.ca.gov.

Sincerely,

Zachary Ramsey

Zachary Ramsey, Manager
State Water Project Right-of-Way Management Section
Division of Operations and Maintenance

BCC: Asal Bardsiri, O&M CMB
Hassan Amin, DOE Civil
Josephine Miyata, DOE REB
Delia Grijalva, DOE REB
William Wang, DOE REB
Luz Dial, SFD
Omer Eljari, SFD

Responses to Comment Letter 6

Zachary Ramsey, Manager
Department of Water Resources
State Water Project Right-of-Way Management Section
January 26, 2026

- 6-1 The comment describes the proposed Project and notes its location within the City of Hesperia near Milepost 395 of the State Water Project California Aqueduct. The comment is noted. This comment provides background and jurisdictional context and does not identify a CEQA issue or require changes to the EIR.
- 6-2 The commenter states that the Department of Water Resources (DWR) has a vested interest in the Project due to its proximity to the State Water Project California Aqueduct and an existing cross-drainage structure north of the site. DWR notes that project-generated drainage could potentially be directed toward this facility and advises that any encroachment into, access through, or discharge to DWR right-of-way would require a DWR encroachment permit. The commenter also requests future coordination and correspondence. The comment is noted. The proposed Project does not anticipate increasing or causing new drainage into DWR facilities. The Project was presented to DWR in March 2025 via email coordination with DWR staff. This comment provides regulatory and jurisdictional guidance regarding DWR facilities and encroachment permitting requirements and does not identify a CEQA issue or require revisions to the EIR. Any future work affecting DWR right-of-way would be subject to separate permitting and review by DWR.

3.0 ERRATA TO THE EIR

3.1 INTRODUCTION TO THE ERRATA

The Draft EIR for the Hesperia Big Box Retail Project is hereby incorporated by reference as part of the Final EIR. Changes to the EIR are further detailed below.

The changes to the EIR do not affect the overall conclusions of the environmental document, and instead provide clarification, amplification, and/or insignificant modifications, as needed, as a result of public comments on the Draft EIR, or due to additional information received during the public review period. These clarifications and corrections do not warrant Draft EIR recirculation pursuant to CEQA Guidelines Section 15088.5.

None of the changes or information provided in the comments reflects a new significant environmental impact, a substantial increase in the severity of an environmental impact for which mitigation is not proposed, or a new feasible alternative or mitigation measure that would clearly lessen significant environmental impacts but is not adopted. In addition, the changes do not render the EIR fundamentally flawed or conclusory.

Changes to the EIR are listed by Section, page, paragraph, etc. to best guide the reader to the revision. Changes are identified as follows:

- Deletions are indicated by ~~strikeout text~~.
- Additions are indicated by underlined text.

3.2 CHANGES TO THE EIR

Table 1.6-1 of **Section 1.6: Summary of Environmental Impacts and Mitigation Measures** has been revised.

Table 1.6-1: Summary of Impacts and Mitigation Program			
Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Section 4.3 Biological Resources			
Impact 4.3-1: Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS?	Potentially Significant Impact	MM BIO-1A: Western Joshua Tree Incidental Take Permit. Prior to the issuance of grading permits, the Pproject P roponent shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW) in accordance with the Western Joshua Tree Conservation Act (WJTCA) Incidental Take Permit (ITP) and . <u>If a Western Joshua Tree Conservation Act (WJTCA) ITP is obtained, the Project Proponent shall pay</u> statutorily prescribed fees defined in the WJTCA to offset proposed impacts on 316 to western Joshua trees as a result of the Pproject, as well as if required by CDFW, the project proponent shall also	Less than Significant Impact with Mitigation

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<p>prepare and implement a <u>Relocation Plan</u>, if required by CDFW. If a CESA ITP is obtained, <u>compensatory habitat mitigation shall be provided through purchase of mitigation credits from an agency-approved mitigation bank or protection of western Joshua tree habitat through acquisition of fee title or conservation easement and funding for long-term management of the habitat.</u></p> <p>MM BIO-1B: Construction Fencing. Prior to initiation of project activities, the entire project site, including any off-site improvements, shall be demarcated with construction fencing to prevent unauthorized impacts on sensitive biological resources beyond the project site, including western Joshua tree. Fencing shall be installed under the supervision of a qualified biologist and shall remain in place and in good condition until completion of construction.</p> <p>MM BIO-1BC: Biological Monitoring. A designated biological monitor, knowledgeable in the biology of western Joshua tree, shall be responsible for monitoring project activities through the end of construction to minimize disturbance to western Joshua tree habitat off-site, prevent unlawful take of the species, and ensure that Project activities are confined to authorized impact areas only. The biological monitor shall have authority to <u>immediately stop any activity that does not comply with the approved Incidental Take Permit (ITP) and/or to implement order any reasonable measure to avoid unauthorized take of western Joshua tree.</u></p> <p>MM BIO-1CD: Construction Access Routes. Project-related personnel shall access the project site using existing routes and shall not cross areas supporting western Joshua tree habitat outside of, or in route to, the project site. If construction of routes is necessary outside of the project site, the biological monitor shall coordinate with CDFW <u>the California Department of Fish and Wildlife</u> to obtain written approval prior to initiating such activity.</p> <p>MM BIO-2A: Burrowing Owl Preconstruction Surveys. No less than 14 days prior to the onset of construction activities, a qualified biologist shall conduct a survey of the project site and a 500-foot</p>	

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<p>buffer to identify the presence of burrowing owls or occupied burrows. A second survey shall be conducted within 24 hours prior to the start of construction. Surveys shall be conducted in accordance with the most current California Department of Fish and Wildlife (CDFW) <i>Staff Report on Burrowing Owl Mitigation</i> (CDFW 2012 or as updated).</p> <p>At least one burrowing owl pre-construction survey report shall be submitted to the City to document compliance with this mitigation measure. For the purposes of this measure, "qualified biologist" is a biologist who meets the criteria outlined in the CDFW BUOW Guidelines (2012).</p> <p>MM BIO-2B: Burrowing Owl Incidental Take Permit. Suitable burrowing owl habitat and burrowing owl presence have been confirmed on the site. Therefore, the Project Applicant shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW) pursuant to the California Endangered Species Act (CESA) prior to the start of any ground disturbance or construction activities.</p> <p>The ITP shall include, at a minimum: a description of project activities and equipment, proposed avoidance and buffer zones, identification of temporary and permanent impacts, monitoring requirements, proposed relocation or translocation protocols, and compensatory mitigation measures. Compensatory mitigation shall be satisfied through one or more of the following mechanisms:</p> <ol style="list-style-type: none"> 1. purchase of credits at a CDFW-approved conservation or mitigation bank (if available); <u>or</u> 2. execution of a Mitigation Credit Agreement; or 2.3. Acquisition and long-term management or permittee responsible mitigation lands <u>Permittee-responsible mitigation land acquisition.</u> <p>If burrowing owl is <u>documented</u> detected within the project site or within the 500-foot buffer during pre-construction surveys or construction-phase biological monitoring, the biological monitor shall notify <u>the</u> CDFW within 48 hours of the observation. All applicable conditions of the ITP</p>	

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<p>shall be fully implemented to avoid unauthorized take.</p> <p>MM BIO-2C: Mohave Ground Squirrel Pre-Construction Surveys. Prior to commencement of ground disturbing Project activities, a visual survey shall be conducted by a qualified biologist during the period of March 15 through April 15 to determine presence of Mohave ground squirrel. The survey shall be conducted on the project site according to the <i>Mohave Ground Squirrel Survey Guidelines</i> (CDFW, October 2023 Revision 4 or most recent version) during daylight hours by the qualified biologist who can visually identify Mohave ground squirrel and white-tailed antelope squirrel and detect vocalization calls. If the survey or monitoring confirms presence, the Project Proponents shall contact CDFW immediately (within 24 hours) and fully avoid all impacts to Mohave ground squirrel or obtain an Incidental Take Permit (ITP).</p> <p>MM BIO-2D: Desert Tortoise Pre-Construction Surveys. A qualified biologist shall conduct a protocol-level presence or absence survey within the project site, and 50-foot buffer zone no more than 48 hours prior to Project activities commencing in accordance with the U.S. Fish and Wildlife Service 2019 <i>Desert Tortoise Survey Methodology</i> (USFWS 2019). The survey shall utilize survey routes that provide 100 percent visual coverage for desert tortoise and their sign. If desert tortoise may be impacted by the Project, Permittee shall fully avoid impacts to desert tortoise or should obtain a CESA ITP if impacts are unavoidable.</p> <p>MM BIO-3A: Crotch's Bumble Bee Preconstruction Nesting Surveys. At a minimum, two pre-construction nesting surveys shall be conducted prior to Project implementation. Surveys shall occur: 1) within one week; and 2) within 24 hours prior to any vegetation removal or ground-disturbing activities scheduled to occur during the Crotch's bumble bee flight season (February through October). Surveys shall follow the guidelines in the California Department of Fish and Wildlife (CDFW) <i>Survey Considerations for CESA</i></p>	

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<p><i>Candidate Bumble Bee Species</i> (CDFW 2024c) and shall occur within the project site and areas adjacent to the project site where suitable habitat exists. Surveys shall be conducted with qualified biologists familiar with Crotch's bumble bee identification and life history.</p> <p>MM BIO-3B: Crotch's Bumble Bee Nest Avoidance and CDFW Coordination. If an active Crotch's bumble bee nest is detected, the California Department of Fish and Wildlife (CDFW) shall be notified, and an appropriate no-disturbance buffer zone shall be established around the nest to reduce the risk of disturbance or accidental take. The buffer shall also include foraging resources and flight corridors essential to the colony. If avoidance is not feasible, or if complete avoidance cannot be achieved, project activities shall be postponed until appropriate authorization (i.e., a finalized Incidental Take Permit under Fish and Game Code §2081) is obtained from CDFW.</p> <p>MM BIO-3C: Crotch's Bumble Bee Construction Monitoring. If no active nests are found but the Crotch's bumble bee is present, a qualified biologist shall conduct full-time monitoring during vegetation removal or ground-disturbing activities occurring during the queen flight period (February through March), colony active period (March through September), and/or gyne flight period (September through October). The monitor shall have authority to halt or redirect activities to avoid impacts.</p> <p>MM BIO-3D: Crotch's Bumble Bee Foraging Habitat Revegetation Plan. If occupied foraging habitat for Crotch's bumble bee is present within Project impact areas, a Revegetation Plan shall be prepared in consultation with a qualified biologist familiar with the species. The plan shall include native shrubs and native seed mixes that contain known nectar sources for Crotch's bumble bee and shall be implemented following Project construction.</p> <p>MM BIO-3E: Crotch's Bumble Bee Incidental Take Permit. If avoidance of Crotch's bumble bee is not feasible, the Project Applicant shall obtain an Incidental Take Permit (ITP) from the California</p>	

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<p>Department of Fish and Wildlife (CDFW) under Fish and Game Code Section 2081 prior to the start of Project activities. If, at the time of construction, Crotch's bumble bee is no longer a listed or candidate species under CESA, then the requirements of Mitigation Measures BIO-3A through BIO-3E shall no longer apply.</p> <p>MM BIO-4A: Avoidance of Nesting Season (If Feasible). To ensure compliance with California Fish and Game Code Sections 3503, 3503.5, and 3513 and to avoid potential impacts to nesting birds, vegetation clearing and ground-disturbing activities shall be conducted outside of the typical bird nesting season (February 15 through August 31), where feasible.</p> <p>MM BIO-4B: Pre-Construction Nesting Bird Surveys. Regardless of the time of year, a qualified biologist shall conduct a pre-construction nesting bird survey within three (3) days prior to the start of vegetation clearing, disking, demolition activities, grading, or other ground disturbance. The survey shall include the entire project site and a biologically appropriate buffer area.</p> <p>MM BIO-4C: Nest Protection, Buffers, and Monitoring. If active nests are detected, the biologist shall establish species-appropriate buffer zones around the nests based on the level of activity within the buffer and species observed. The buffer areas shall be avoided until the nests are no longer occupied, and the juvenile birds can survive independently from the nests. During construction activities, the qualified biologist shall conduct monitoring at a frequency recommended by the qualified biologist using their best professional judgment. If nesting birds are documented and at risk of disturbance, the biologist may modify avoidance and minimization measures, and shall have authority to stop or redirect construction activities as needed using their best professional judgment to avoid take of nesting birds.</p> <p>If no active nests are documented during the pre-construction survey, no further nesting bird measures shall be required.</p> <p>MM BIO-5: Best Management Practices. To avoid impacts to special-status species and prevent</p>	

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<p>inadvertent disturbance to wildlife, the following Best Management Practices (BMPs) shall be implemented throughout construction activities:</p> <ul style="list-style-type: none"> A. A qualified biologist shall flush special-status wildlife species (i.e., avian or other mobile species) from suitable habitat areas within the project development footprint to the maximum extent practicable immediately (e.g., within 24 hours) prior to initial vegetation removal activities. The biologist shall flush wildlife by walking through the habitat to be imminently removed. B. Construction vehicles shall not exceed 15 miles per hour on unpaved roads adjacent to the project site or the right-of-way accessing the site. C. Construction activities shall occur during daytime hours unless otherwise approved by the Lead Agency and biological monitor. D. If trash and debris need to be stored overnight during maintenance activities, fully covered trash receptacles that are animal-proof and weather-proof shall be used by the maintenance contractor to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Alternatively, standard trash receptacles may be used during the day but must be removed each night. E. The operator shall not permit pets on or adjacent to construction sites. F. At the end of each workday during construction, the <u>Project</u> Applicant or its contractors shall cover all excavated, steep-sided holes or trenches more than eight inches deep and that have sidewalls steeper than 1:1 (45 degree) slope with plywood or similar materials, or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than 3:1) constructed of earth fill or wooden planks. The project biologist shall thoroughly inspect holes and trenches for trapped animals during biological monitoring. 	

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<p>G. The Project Applicant, or its contractors, shall screen, cover, or elevate at least one (1) foot above ground, all construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored on site overnight. These pipes, culverts, and similar structures shall be inspected by the project biologist for wildlife before such material is moved, buried, or capped.</p> <p>H. The Project Applicant, or its contractors, shall avoid the use of invasive plant species in the associated landscaping.</p> <p>I. <u>To prevent inadvertent disturbance to areas outside the limits of work, the construction limits shall be clearly demarcated (e.g., installation of flagging or temporary visibility construction fence) prior to ground-disturbance activities, and all construction activities, including equipment staging and maintenance, shall be conducted within the marked disturbance limits. The work limit delineation shall be maintained throughout project construction.</u></p> <p>J. <u>Prior to construction mobilization activities, the implementing entity shall prepare a Storm Water Pollution Prevention Plan in conformance with California Construction Stormwater General Permit Order 2022-0057-DWQ requirements to avoid and minimize impacts associated with erosion, runoff, and storm water contaminants. The Storm Water Pollution Prevention Plan shall include BMPs to avoid and minimize impacts on adjacent potentially jurisdictional aquatic resources, including, but not limited to:</u></p> <ul style="list-style-type: none"> ○ <u>Vehicles and equipment should not be operated in ponded or flowing water.</u> ○ <u>Water containing mud, silt, or other pollutants from grading or other activities should not be allowed to enter jurisdictional waters adjacent to the project or be placed in locations that may be subjected to high storm flows.</u> 	

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		<ul style="list-style-type: none"> ○ <u>Spoil sites should not be located within 30 feet from the boundaries of potentially jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into potentially jurisdictional aquatic resources adjacent to the project.</u> ○ <u>Raw cement/concrete or washings thereof; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project construction, should be prevented from contaminating the soil and/or entering potentially jurisdictional waters adjacent to the project.</u> ○ <u>No equipment maintenance or fueling should be performed within 100 feet of potentially jurisdictional aquatic resources adjacent to the project, where petroleum products or other pollutants from the equipment may enter these areas.</u> ○ <u>Temporary structures, storage of construction materials, and staging/storage of construction equipment should be located outside potentially jurisdictional aquatic resources.</u> 	
Impact 4.3-2: Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS?	Potentially Significant Impact	MM BIO-1A is applicable	Less than Significant Impact with Mitigation

Table 1.6-1: Summary of Impacts and Mitigation Program

Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Impact 4.3-3: Would the Project have a substantial adverse effect on State or federal protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than Significant Impact	None required.	Less than Significant Impact
Impact 4.3-4: Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Potentially Significant Impact	MM BIO-4A, MM BIO-4B, and MM BIO-4C are applicable.	Less than Significant Impact with Mitigation
Impact 4.3-5: Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Potentially Significant Impact	MM BIO-1A, MM BIO-2A, and MM BIO 2B are applicable. MM BIO-6: Desert Native Plants. Prior to the start of ground-disturbing or vegetation-removal activities, the Project Applicant shall coordinate with the City of Hesperia to determine permitting requirements under the City's Desert Native Plant Protection Ordinance for all Desert Native Plant Act (DNPA) species documented within the project site, including silver cholla (<i>Cylindropuntia echinocarpa</i>). The Project Applicant shall comply with all conditions imposed by the City, which may include payment of permit fees and/or salvage of plants for translocation to a suitable recipient site. If salvage or translocation is required, a Desert Native Plant Salvage Plan shall be prepared by a qualified biologist or botanist and submitted to the City for review and approval prior to initiation of ground-disturbing activities. At a minimum, the plan shall identify and map plants to be salvaged, describe salvage and transport methods, and specify the proposed recipient site and final disposition of	Less than Significant Impact with Mitigation

Table 1.6-1: Summary of Impacts and Mitigation Program			
Thresholds	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
		salvaged specimens. Acceptable recipient sites may include conservation areas, botanical preserves, museums, zoological societies, or other conservation organizations that provide suitable habitat and management of desert native plants. Documentation of compliance with City permitting requirements and approval of the Desert Native Plant Salvage Plan shall be provided to the City prior to issuance of grading permits.	

Section 4.3.8: Mitigation Program, starting on page 4.3-12, is revised as follows:

- MM BIO-1A Western Joshua Tree Incidental Take Permit.** Prior to the issuance of grading permits, the Project Proponent shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW). If a Western Joshua Tree Conservation Act (WJTCA) ITP is obtained, the Project Proponent shall pay statutorily prescribed fees defined in the WJTCA to offset proposed impacts to western Joshua trees as a result of the Project, as well as prepare and implement a Relocation Plan, if required by CDFW. If a CESA ITP is obtained, compensatory habitat mitigation shall be provided through purchase of mitigation credits from an agency-approved mitigation bank or protection of western Joshua tree habitat through acquisition of fee title or conservation easement and funding for long-term management of the habitat.
- MM BIO-1CB Biological Monitoring.** A designated biological monitor, knowledgeable in the biology of western Joshua tree, shall be responsible for monitoring project activities through the end of construction to minimize disturbance to western Joshua tree habitat off-site, prevent unlawful take of the species, and ensure that Project activities are confined to authorized impact areas only. The biological monitor shall have authority to immediately stop any activity that does not comply with the anticipated Incidental Take Permit (ITP) and/or to order any reasonable measure to avoid unauthorized take of western Joshua tree.
- MM BIO-1DC Construction Access Routes.** Project-related personnel shall access the project site using existing routes and shall not cross western Joshua tree habitat outside of, or in route to, the project site. If construction of routes is necessary outside of the project site, the biological monitor shall coordinate with the California Department of Fish and Wildlife to obtain written approval prior to initiating such activity.
- MM BIO-2A Burrowing Owl Preconstruction Surveys.** No less than 14 days prior to the onset of construction activities, a qualified biologist shall conduct a survey of the project site and a 500-foot buffer to identify the presence of burrowing owls or occupied burrows. A second survey shall be conducted within 24 hours prior to the start of construction.

Surveys shall be conducted in accordance with the most current California Department of Fish and Wildlife (CDFW) *Staff Report on Burrowing Owl Mitigation* (CDFW 2012 or as updated).

At least one burrowing owl pre-construction survey report shall be submitted to the City to document compliance with this mitigation measure. For the purposes of this measure, "qualified biologist" is a biologist who meets the criteria outlined in the CDFW BUOW Guidelines (2012).

MM BIO-2B Burrowing Owl Incidental Take Permit. Suitable burrowing owl habitat and burrowing owl presence have been confirmed on the site. Therefore, the Project Applicant shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW) pursuant to the California Endangered Species Act (CESA) prior to the start of any ground disturbance or construction activities.

The ITP shall include, at a minimum: a description of project activities and equipment, proposed avoidance and buffer zones, identification of temporary and permanent impacts, monitoring requirements, proposed relocation or translocation protocols, and compensatory mitigation measures. Compensatory mitigation shall be satisfied through one or more of the following mechanisms:

1. purchase of credits at a CDFW-approved conservation or mitigation bank (if available);
or
- ~~2. execution of a Mitigation Credit Agreement; or~~
2. 3. Acquisition and long-term management or permittee responsible mitigation lands
Permittee-responsible mitigation land acquisition.

If burrowing owl is ~~documented~~ detected within the project site or within the 500-foot buffer during pre-construction surveys or construction-phase biological monitoring, the biological monitor shall notify the CDFW within 48 hours of the observation. All applicable conditions of the ITP shall be fully implemented to avoid unauthorized take.

MM BIO-2C Mohave Ground Squirrel Pre-Construction Surveys. Prior to commencement of ground disturbing Project activities, a visual survey shall be conducted by a qualified biologist during the period of March 15 through April 15 to determine presence of Mohave ground squirrel. The survey shall be conducted on the project site according to the Mohave Ground Squirrel Survey Guidelines (CDFW, October 2023 Revision 4 or most recent version) during daylight hours by the qualified biologist who can visually identify Mohave ground squirrel and white-tailed antelope squirrel and detect vocalization calls. If the survey or monitoring confirms presence, the Project Proponents shall contact CDFW immediately (within 24 hours) and fully avoid all impacts to Mohave ground squirrel or obtain an Incidental Take Permit (ITP).

MM BIO-2D Desert Tortoise Pre-Construction Surveys. A qualified biologist shall conduct a protocol-level presence or absence survey within the project site, and 50-foot buffer zone no more than 48 hours prior to Project activities commencing in accordance with the U.S. Fish and

Wildlife Service 2019 Desert Tortoise Survey Methodology (USFWS 2019). The survey shall utilize survey routes that provide 100-percent visual coverage for desert tortoise and their sign. If desert tortoise may be impacted by the Project, Permittee shall fully avoid impacts to desert tortoise or should obtain a CESA ITP if impacts are unavoidable.

Page 4.3-6 of **Section 4.3: Biological Resources** has been revised as follows:

Threatened and Endangered Wildlife Species

One western burrowing owl, a candidate species for listing under the CESA, was observed on the project site during a focused survey on February 24, 2025, and suitable habitat for this species is present on site. ~~Despite negative~~ In addition, although focused surveys results, suitable habitat for Crotch's bumble bee, suitable habitat for this also a candidate species for listing under the CESA, is present on within the project site. As a result, impacts on these species may occur with Project implementation, as discussed further below.

~~The Mohave ground squirrel is currently absent from the site, as evidenced by negative results from~~ was not detected during visual/ and aural surveys, live-trapping, or camera station surveys conducted in 2024, and the species is currently considered absent from the site. Therefore, Project impacts on Mohave ground squirrel are not anticipated. However, consistent with recommendations from CDFW, MM BIO-2C has been incorporated, which requires pre-construction Mohave ground squirrel surveys prior to the commencement of ground-disturbing activities to confirm continued absence of the species.

Similarly, the potential for desert tortoise occurrence on the project site is considered very low. No suitable burrows or habitat were observed during biological surveys, and the project site is largely isolated from surrounding native habitat by existing development. Nevertheless, because the project site is located within the predicted range of desert tortoise, and in accordance with CDFW recommendations, MM BIO-2D has been incorporated. This measure requires protocol-level pre-construction desert tortoise surveys prior to ground-disturbing activities to confirm absence and to ensure compliance with applicable State and federal requirements should the species be detected.

~~The proposed Project would not impact any~~ No additional federally and/or state-listed wildlife species as ~~no additional species were observed during general biological surveys, and no other special-status wildlife species or have moderate to or high potential to occur on the project site based on due to the lack of suitable habitat and the disturbed nature of the site. Accordingly, the proposed Project would not impact any additional federally or state-listed wildlife species.~~

Page 4.14-7 of **Section 4.14 Tribal Cultural Resources** has been revised as follows:

Additionally, the Project would be subject to CEQA Guidelines Section 15064.5, Public Resources Code Sections 21083.2 and 5097.9, and Health and Safety Code Section 7050.5, to properly recover human remains if encountered, as addressed in ~~SC CUL-1~~ MM CUL-1.

4.0 MITIGATION MONITORING AND REPORTING PROGRAM

4.1 PURPOSE OF THE MITIGATION MONITORING AND REPORTING PROGRAM

CEQA requires that all public agencies establish monitoring and/or reporting procedures for mitigation adopted as conditions of approval in order to mitigate or avoid significant environmental impacts. This Mitigation Monitoring and Reporting Program (MMRP) has been developed to provide a vehicle by which to monitor the Mitigation Program outlined in the Hesperia Big Box Retail Project EIR. The MMRP has been prepared in conformance with Section 21081.6 of the Public Resources Code. Specifically, Section 21081.6 states:

- (a) When making findings required by paragraph (1) of subdivision (a) of Section 21081 or when adopting a mitigated negative declaration pursuant to paragraph (2) of subdivision (c) of Section 21080, the following requirements shall apply:
 - (1) The public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation. For those changes which have been required or incorporated into the project at the request of a responsible agency or a public agency having jurisdiction by law over natural resources affected by the project, that agency shall, if so requested by the lead or responsible agency, prepare and submit a proposed reporting or monitoring program.
 - (2) The lead agency shall specify the location and custodian of the documents or other material which constitute the record of proceedings upon which its decision is based.

CEQA Guidelines Section 15097 clarifies mitigation monitoring and reporting requirements and provides guidance to local lead agencies on implementing strategies. The reporting or monitoring program must be designed to ensure compliance during project implementation. The Lead Agency is responsible for ensuring the implementation of the MMRP. The MMRP has been drafted to meet the requirements of Public Resources Code Section 21081.6 as a fully enforceable monitoring program.

4.2 BACKGROUND

The MMRP identifies the mitigation measures and other enforceable project requirements, if any, adopted by the City to avoid or reduce significant environmental effects, and describes the timing, responsible parties, and implementation verification procedures. The ongoing documentation and monitoring of mitigation compliance will be completed by the City of Hesperia. The completed MMRP and supplemental documents will be kept on file at the City of Hesperia Planning Department.

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
MM BIO-1A: Western Joshua Tree Incidental Take Permit. Prior to the issuance of grading permits, the Project Proponent shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW). If a Western Joshua Tree Conservation Act (WJTCA) ITP is obtained, the Project Proponent shall pay statutorily prescribed fees defined in the WJTCA to offset proposed impacts to western Joshua trees as a result of the Project, as well as prepare and implement a Relocation Plan, if required by CDFW. If a CESA ITP is obtained, compensatory habitat mitigation shall be provided through purchase of mitigation credits from an agency-approved mitigation bank or protection of western Joshua tree habitat through acquisition of fee title or conservation easement and funding for long-term management of the habitat.	Prior to the issuance of grading permits.	California Department of Fish and Wildlife (CDFW); Project Applicant		
MM BIO-1B: Biological Monitoring. A designated biological monitor, knowledgeable in the biology of western Joshua tree, shall be responsible for monitoring project activities through the end of construction to minimize disturbance to western Joshua tree habitat off site, prevent unlawful take of the species, and ensure that project activities are confined to authorized impact areas. The biological monitor shall have authority to stop any activity that does not comply with the conditions of the approved Incidental Take Permit (ITP) and/or to implement any reasonable measure to avoid unauthorized take of western Joshua tree.	Prior to initiation of any ground-disturbing activities; continuous during all construction activities through completion of construction.	Project Proponent; City of Hesperia; CDFW		
MM BIO-1C: Construction Access Routes. Project-related personnel shall access the project site using existing routes and shall not cross western Joshua tree habitat outside of, or in route to, the project site. If construction of routes is necessary outside of the project site, the	Prior to commencement of construction and continuously throughout all construction activities; prior to construction of any access routes outside the project site, if required.	Project Proponent; Designated Biological Monitor; City of Hesperia; CDFW		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
biological monitor shall coordinate with the California Department of Fish and Wildlife to obtain written approval prior to initiating such activity.				
MM BIO-2A: Burrowing Owl Preconstruction Surveys. No less than 14 days prior to the onset of construction activities, a qualified biologist shall conduct a survey of the project site and a 500-foot buffer to identify the presence of burrowing owls or occupied burrows. A second survey shall be conducted within 24 hours prior to the start of construction. Surveys shall be conducted in accordance with the most current California Department of Fish and Wildlife (CDFW) <i>Staff Report on Burrowing Owl Mitigation</i> (CDFW 2012 or as updated). At least one burrowing owl pre-construction survey report shall be submitted to the City to document compliance with this mitigation measure. For the purposes of this measure, "qualified biologist" is a biologist who meets the criteria outlined in the CDFW BUOW Guidelines (2012).	No less than 14 days prior to the start of construction activities and within 24 hours prior to commencement of construction.	Project Proponent; Qualified Biologist; City of Hesperia		
MM BIO-2B: Burrowing Owl Incidental Take Permit. Suitable burrowing owl habitat and burrowing owl presence has been confirmed on the site. Therefore, the Project Applicant shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW) pursuant to the California Endangered Species Act (CESA) prior to the start of any ground disturbance or construction activities. The ITP shall include, at a minimum: a description of project activities and equipment, proposed avoidance and buffer zones, identification of temporary and permanent impacts, monitoring requirements, proposed relocation or translocation protocols, and compensatory mitigation	Prior to issuance of grading permits and before commencement of any ground-disturbing or construction activities; notification to CDFW within 48 hours of any burrowing owl detection during pre-construction surveys or construction.	Project Proponent; Designated Biological Monitor		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
<p>measures. Compensatory mitigation shall be satisfied through one or more of the following mechanisms:</p> <ol style="list-style-type: none"> 1. Purchase of credits at a CDFW-approved conservation or mitigation bank (if available); or 2. Permittee-responsible mitigation land acquisition <p>If burrowing owl is documented within the project site or within the 500-foot buffer during pre-construction surveys or construction-phase biological monitoring, the biological monitor shall notify CDFW within 48 hours of the observation. All applicable conditions of the ITP shall be fully implemented to avoid unauthorized take.</p>				
<p>MM BIO-2C: Mohave Ground Squirrel Pre-Construction Surveys. Prior to commencement of ground disturbing Project activities, a visual survey shall be conducted by a qualified biologist during the period of March 15 through April 15 to determine presence of Mohave ground squirrel. The survey shall be conducted on the project site according to the <i>Mohave Ground Squirrel Survey Guidelines</i> (CDFW, October 2023 Revision 4 or most recent version) during daylight hours by the qualified biologist who can visually identify Mohave ground squirrel and white-tailed antelope squirrel and detect vocalization calls. If the survey or monitoring confirms presence, the Project Proponents shall contact CDFW immediately (within 24 hours) and fully avoid all impacts to Mohave ground squirrel or obtain an incidental take permit (ITP).</p>	Prior to commencing ground- or vegetation-disturbing activities	Project Proponent; Qualified Biologist; City of Hesperia		
<p>MM BIO-2D: Desert Tortoise Pre-Construction Surveys. A qualified biologist shall conduct a protocol-level presence or absence survey within the Project Site, and 50-foot buffer zone no more than 48 hours prior to Project activities commencing in accordance with the U.S. Fish</p>	Prior to commencing ground- or vegetation-disturbing activities	Project Proponent; Qualified Biologist; City of Hesperia		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
and Wildlife Service 2019 desert tortoise survey methodology (USFWS 2019). The survey shall utilize survey routes that provide 100 percent visual coverage for desert tortoise and their sign. If desert tortoise may be impacted by the Project, Permittee shall fully avoid impacts to desert tortoise or should obtain a CESA ITP if impacts are unavoidable.				
MM BIO-3A: Crotch's Bumble Bee Preconstruction Nesting Surveys. At a minimum, two pre-construction nesting surveys shall be conducted prior to project implementation. Surveys shall occur: 1) within one week; and 2) within 24 hours prior to any vegetation removal or ground-disturbing activities scheduled to occur during the Crotch's bumble bee flight season (February through October). Surveys shall follow the guidelines in the California Department of Fish and Wildlife (CDFW) <i>Survey Considerations for CESA Candidate Bumble Bee Species</i> (CDFW 2024c) and shall occur within the project site and areas adjacent to the project site where suitable habitat exists. Surveys shall be conducted with qualified biologists familiar with Crotch's bumble bee identification and life history.	Within one week prior to project implementation and within 24 hours prior to any vegetation removal or ground-disturbing activities occurring during the Crotch's bumble bee flight season (February through October).	Project Proponent; Qualified Biologist; City of Hesperia		
MM BIO-3B: Crotch's Bumble Bee Nest Avoidance and CDFW Coordination. If an active Crotch's bumble bee nest is detected, the California Department of Fish and Wildlife (CDFW) shall be notified, and an appropriate no-disturbance buffer zone shall be established around the nest to reduce the risk of disturbance or accidental take. The buffer shall also include foraging resources and flight corridors essential to the colony. If avoidance is not feasible, or if complete avoidance cannot be achieved, project activities shall be postponed until appropriate	Immediately upon detection of an active Crotch's bumble bee nest and prior to continuation of any project activities that could affect the nest.	Project Proponent; Qualified Biologist; City of Hesperia; CDFW		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
authorization (i.e., a finalized Incidental Take Permit under Fish and Game Code §2081) is obtained from CDFW.				
MM BIO-3C: Crotch's Bumble Bee Construction Monitoring. If no active nests are found but the Crotch's bumble bee is present, a qualified biologist shall conduct full-time monitoring during vegetation removal or ground-disturbing activities occurring during the queen flight period (February through March), colony active period (March through September), and/or gyne flight period (September through October). The monitor shall have authority to halt or redirect activities to avoid impacts.	During all vegetation removal or ground-disturbing activities occurring during the Crotch's bumble bee queen flight, colony active, and gyne flight periods, if the species is present and no active nests are detected.	Project Proponent; Qualified Biologist; City of Hesperia		
MM BIO-3D: Crotch's Bumble Bee Foraging Habitat Revegetation Plan. If occupied foraging habitat for Crotch's bumble bee is present within project impact areas, a Revegetation Plan shall be prepared in consultation with a qualified biologist familiar with the species. The plan shall include native shrubs and native seed mixes that contain known nectar sources for Crotch's bumble bee and shall be implemented following project construction.	If occupied foraging habitat is identified, prepare the Revegetation Plan prior to initiation of construction activities affecting the habitat; implement the plan following completion of project construction.	Project Proponent; Qualified Biologist; City of Hesperia		
MM BIO-3E: Crotch's Bumble Bee Incidental Take Permit. If avoidance of Crotch's bumble bee is not feasible, the applicant shall obtain an Incidental Take Permit (ITP) from the California Department of Fish and Wildlife (CDFW) under Fish and Game Code Section 2081 prior to the start of project activities. If, at the time of construction, Crotch's bumble bee is no longer a listed or candidate species under CESA, then the requirements of Mitigation Measures BIO-3A through BIO-3E shall no longer apply.	Prior to commencement of any project activities if avoidance of Crotch's bumble bee is not feasible; mitigation measures BIO-3A through BIO-3E shall not apply if the species is no longer listed or a CESA candidate at the time of construction.	Project Proponent; City of Hesperia; CDFW		
MM BIO-4A: Avoidance of Nesting Season (If Feasible). To ensure compliance with California Fish and Game Code Sections 3503, 3503.5, and 3513 and to avoid potential	Prior to scheduling and during vegetation clearing and ground-disturbing activities; outside of the typical nesting bird season	Project Proponent; City of Hesperia		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
impacts to nesting birds, vegetation clearing and ground-disturbing activities shall be conducted outside of the typical bird nesting season (February 15 through August 31), where feasible.	(February 15 through August 31), where feasible.			
MM BIO-4B. Pre-Construction Nesting Bird Surveys. Regardless of the time of year, a qualified biologist shall conduct a pre-construction nesting bird survey within three days prior to the start of vegetation clearing, disking, demolition activities, grading, or other ground disturbance.	Within three days prior to the start of vegetation clearing, disking, demolition activities, grading, or other ground-disturbing activities.	Project Proponent; Qualified Biologist; City of Hesperia		
MM BIO-4C: Nest Protection, Buffers, and Monitoring. If active nests are detected, the biologist shall establish species-appropriate buffer zones around the nests based on the level of activity within the buffer and species observed. The buffer areas shall be avoided until the nests are no longer occupied, and the juvenile birds can survive independently from the nests. During construction activities, the qualified biologist shall conduct monitoring at a frequency recommended by the qualified biologist using their best professional judgment. If nesting birds are documented and at risk of disturbance, the biologist may modify avoidance and minimization measures, and shall have authority to stop or redirect construction activities as needed using their best professional judgement to avoid take of nesting birds. If no active nests are documented during the pre-construction survey, no further nesting bird measures shall be required.	Immediately upon detection of active nests and throughout construction activities until nests are no longer occupied and juvenile birds are independent; no further measures required if no active nests are identified during pre-construction surveys.	Project Proponent; Qualified Biologist; City of Hesperia		
MM BIO-5. Best Management Practices. To avoid impacts to special-status species and prevent inadvertent disturbance to wildlife, the following Best Management	Prior to initiation of ground-disturbing activities (as applicable to specific BMPs) and continuously throughout all construction activities.	Project Proponent; Construction Contractor; Qualified Biologist; City of Hesperia		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
<p>Practices (BMPs) shall be implemented throughout construction activities:</p> <p>A. A qualified biologist shall flush special-status wildlife species (i.e., avian or other mobile species) from suitable habitat areas within the project development footprint to the maximum extent practicable immediately (e.g., within 24 hours) prior to initial vegetation removal activities. The biologist shall flush wildlife by walking through the habitat to be removed.</p> <p>B. Construction vehicles shall not exceed 15 miles per hour on unpaved roads adjacent to the project site or the right-of-way accessing the site.</p> <p>C. Construction activities shall occur during daytime hours unless otherwise approved by the lead agency and biological monitor.</p> <p>D. If trash and debris need to be stored overnight during maintenance activities, fully covered trash receptacles that are animal-proof and weather-proof shall be used by the maintenance contractor to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Alternatively, standard trash receptacles may be used during the day but must be removed each night.</p> <p>E. The operator shall not permit pets on or adjacent to construction sites.</p> <p>F. At the end of each workday during construction, the Project Applicant or its contractors shall cover all excavated, steep-sided holes or trenches more than</p>				

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
<p>eight inches deep and that have sidewalls steeper than 1:1 (45 degree) slope with plywood or similar materials, or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than 3:1) constructed of earth fill or wooden planks. The project biologist shall thoroughly inspect holes and trenches for trapped animals during biological monitoring.</p> <p>G. The Project Applicant, or its contractors, shall screen, cover, or elevate at least one (1) foot above ground, all construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored on site overnight. These pipes, culverts, and similar structures shall be inspected by the project biologist for wildlife before such material is moved, buried, or capped.</p> <p>H. The Project Applicant, or its contractors, shall avoid the use of invasive plant species in the associated landscaping.</p> <p>I. To prevent inadvertent disturbance to areas outside the limits of work, the construction limits shall be clearly demarcated (e.g., installation of flagging or temporary visibility construction fence) prior to ground-disturbance activities, and all construction activities, including equipment staging and maintenance, shall be conducted within the marked disturbance limits. The work limit delineation shall be maintained throughout project construction.</p> <p>J. Prior to construction mobilization activities, the implementing entity shall prepare a Storm Water</p>				

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
<p>Pollution Prevention Plan in conformance with California Construction Stormwater General Permit Order 2022-0057-DWQ requirements to avoid and minimize impacts associated with erosion, runoff, and storm water contaminants. The Storm Water Pollution Prevention Plan shall include BMPs to avoid and minimize impacts on adjacent potentially jurisdictional aquatic resources, including, but not limited to:</p> <ul style="list-style-type: none"> ○ Vehicles and equipment should not be operated in ponded or flowing water. ○ Water containing mud, silt, or other pollutants from grading or other activities should not be allowed to enter jurisdictional waters adjacent to the project or be placed in locations that may be subjected to high storm flows. ○ Spoil sites should not be located within 30 feet from the boundaries of potentially jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into potentially jurisdictional aquatic resources adjacent to the project. ○ Raw cement/concrete or washings thereof; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project construction, should be 				

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
<p>prevented from contaminating the soil and/or entering potentially jurisdictional waters adjacent to the project.</p> <ul style="list-style-type: none"> No equipment maintenance or fueling should be performed within 100 feet of potentially jurisdictional aquatic resources adjacent to the project, where petroleum products or other pollutants from the equipment may enter these areas. Temporary structures, storage of construction materials, and staging/storage of construction equipment should be located outside potentially jurisdictional aquatic resources. 				
<p>MM BIO-6. Desert Native Plants. Prior to the start of ground-disturbing or vegetation-removal activities, the Project Applicant shall coordinate with the City of Hesperia to determine permitting requirements under the City's Desert Native Plant Protection Ordinance for all Desert Native Plant Act (DNPA) species documented within the project site, including silver cholla (<i>Cylindropuntia echinocarpa</i>). The Project Applicant shall comply with all conditions imposed by the City, which may include payment of permit fees and/or salvage of plants for translocation to a suitable recipient site. If salvage or translocation is required, a Desert Native Plant Salvage Plan shall be prepared by a qualified biologist or botanist and submitted to the City for review and approval prior to initiation of ground-disturbing activities. At a minimum, the plan shall identify and map plants to be salvaged,</p>	<p>Prior to the start of ground-disturbing or vegetation removal activities; prior to the issuance of grading permits if salvage or translocation is required.</p>	<p>Project Applicant; Qualified Biologist or Botanist; City of Hesperia</p>		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
describe salvage and transport methods, and specify the proposed recipient site and final disposition of salvaged specimens. Acceptable recipient sites may include conservation areas, botanical preserves, museums, zoological societies, or other conservation organizations that provide suitable habitat and management of desert native plants. Documentation of compliance with City permitting requirements and approval of the Desert Native Plant Salvage Plan shall be provided to the City prior to issuance of grading permits.				
MM CUL-1: Inadvertent Discoveries of Cultural Resources. In the event that cultural resources are discovered during project activities, all work within 60 feet of the find shall cease, and a qualified archaeologist meeting the Secretary of Interior Professional Standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of the San Manuel Nation Cultural Resources Department (YSMN) shall be contacted, as detailed within MM TCR-1, regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, to provide Tribal input with regards to significance and treatment. If significant pre-contact cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to YSMN for review and comment, as detailed within MM TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly. If human remains or funerary objects are encountered during any activities associated with the	Immediately upon discovery of cultural resources during project activities; throughout construction as required if monitoring or treatment measures are implemented.	Project Proponent; Qualified Archaeologist; Yuhaaviatam of San Manuel Nation Cultural Resources Management Department; County Coroner; City of Hesperia		

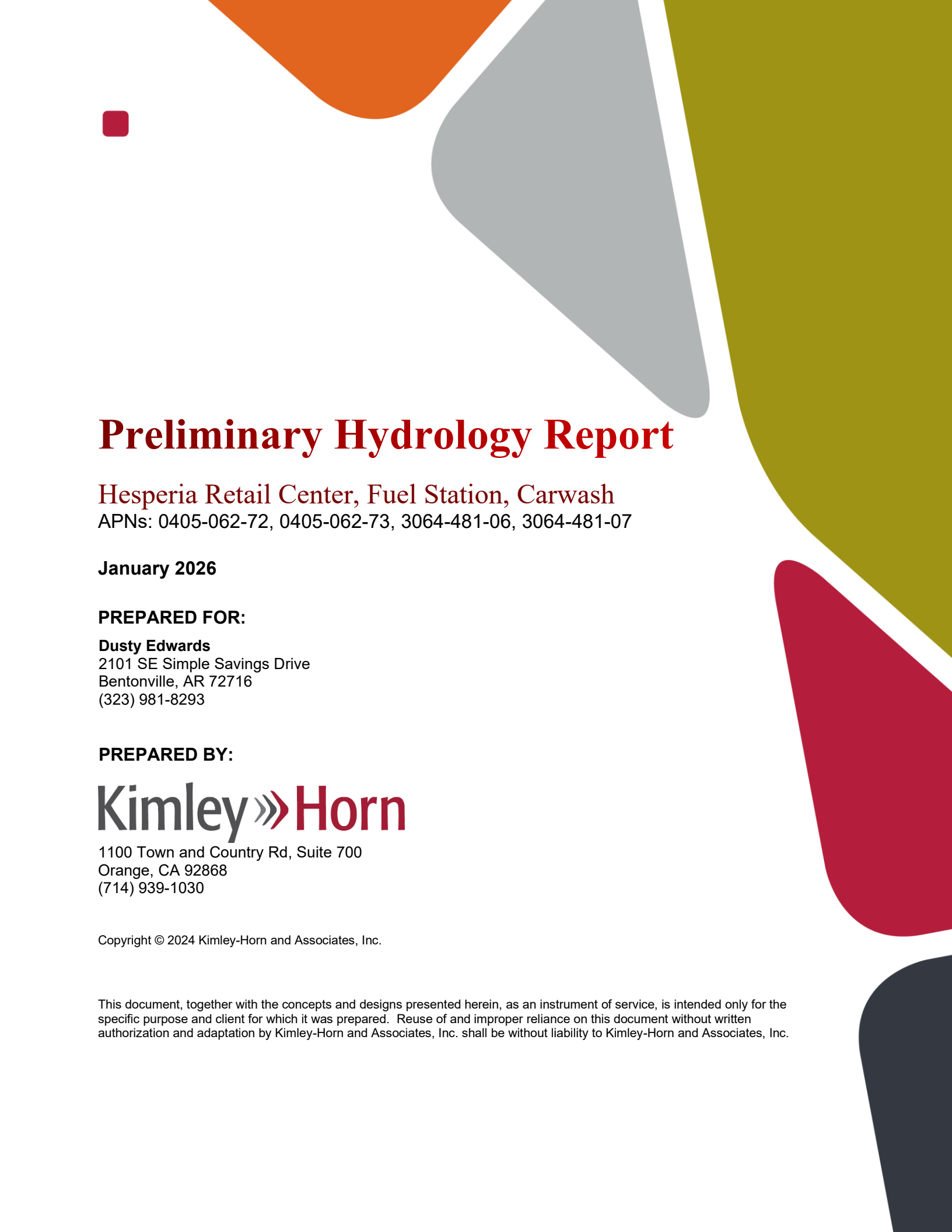
Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease, and the County Coroner shall be contacted pursuant to State Health and Safety Code Section 7050.5 and that code enforced for the duration of the project. If the Coroner determines that the remains are Native American, the Coroner shall notify the Native American Heritage Commission (NAHC), which shall identify the Most Likely Descendant (MLD). The MLD shall be afforded an opportunity to make recommendations regarding treatment and disposition of the remains, consistent with Public Resources Code §5097.98.				
<p>MM GEO-1: Paleontological Monitoring. Prior to the issuance of any grading permits or any permit authorizing ground disturbance, the Project Applicant shall, to the satisfaction of the City of Hesperia Director of Development Services, demonstrate that a qualified paleontologist has been retained to respond on an as-needed basis to address unanticipated paleontological discoveries. A paleontologist is defined as an individual with an M.S./M.A. or Ph.D. in paleontology or geology who is familiar with paleontological procedures and techniques and knowledgeable in geology and paleontology of the area.</p> <p>In the event that fossils or fossil-bearing deposits are inadvertently unearthed during excavation and grading activities, all earth-disturbing activities within a 100-foot radius of the area of discovery shall be temporarily halted or diverted. The qualified paleontologist shall be contacted to evaluate the significance of the finding and determine an appropriate course of action in accordance with Society of Vertebrate Paleontology standards and assess the significance of the find under the criteria set</p>	Prior to the issuance of the grading permits or any permit authorizing ground disturbance; immediately upon discovery of fossils or fossil-bearing deposits during excavation and grading activities.	Project Applicant; Qualified Paleontologist; City of Hesperia Director of Development Services		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
forth in CEQA Guidelines Section 15064.5. The paleontologist shall notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. If, in consultation with the paleontologist, the city staff, and the project applicant, the paleontologist determines that avoidance is not feasible, the paleontologist shall prepare an excavation plan to reduce the project's effect on the qualities that make the resource important. The plan shall be submitted to the City for review and approval, and the project applicant shall implement the approved excavation plan.				
MM NOI-1: Noise Shielding and Muffling. Power construction equipment (including combustion engines), fixed or mobile, will be equipped with noise shielding and muffling devices consistent with manufacturers' standards or the Best Available Control Technology, which achieve a noise reduction of 10 dBA or greater. All equipment will be properly maintained, and the Applicant or Owner will require any construction contractor to keep documentation on-site during any earthwork or construction activities demonstrating that the equipment has been maintained in accordance with manufacturer specifications.	During all earthwork and construction activities.	Project Applicant; Construction Contractor; City of Hesperia		
MM TCR-1: Cultural Resources Monitoring and Treatment Plan. The Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN) shall be contacted, as detailed in MM CUL-1, of any pre-contact cultural resources discovered during Project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be	Immediately upon discovery of pre-contact cultural resources during project implementation; throughout remaining ground-disturbing activities if a Monitoring and Treatment Plan is required.	Project Applicant; Qualified Archaeologist; Yuhaaviatam of San Manuel Nation Cultural Resources Management Department; City of Hesperia		

Mitigation Monitoring and Reporting Program				
Mitigation Measures	Implementation Timing	Responsible Party	Verification	
			Date	Initials
deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with YSMN, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents YSMN for the remainder of the Project's ground-disturbing activities, should YSMN elect to place a monitor on the site.				
MM TCR-2: Cultural Records. Any and all archaeological/cultural documents created as a part of the Project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and the City of Hesperia Planning Department for dissemination to the Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN). The City and/or applicant shall, in good faith, consult with YSMN throughout the life of the Project.	Throughout project construction and upon completion of archaeological or cultural investigations; ongoing consultation throughout the life of the Project.	Project Applicant; Qualified Archaeologist; City of Hesperia Planning Department; Yuhaaviatam of San Manuel Nation Cultural Resources Management Department		

Appendix A

Revised Preliminary Hydrology Report



Preliminary Hydrology Report

Hesperia Retail Center, Fuel Station, Carwash

APNs: 0405-062-72, 0405-062-73, 3064-481-06, 3064-481-07

January 2026

PREPARED FOR:

Dusty Edwards

2101 SE Simple Savings Drive
Bentonville, AR 72716
(323) 981-8293

PREPARED BY:

Kimley»Horn

1100 Town and Country Rd, Suite 700
Orange, CA 92868
(714) 939-1030

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Certification by Engineer

Jacob Glaze, P.E.

Date

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Appendices

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Appendix E – NOAA Rainfall Data
Appendix F – Soils Reports
Appendix G – Hydrology Exhibits
Appendix H – Rational Method Analysis
Appendix I – Synthetic Unit Hydrograph Method Analysis
Appendix J – Basin Routing Analysis
Appendix K – Hydraulic Analysis

References

Hydrology Manual. County of San Bernardino, August 1986.

100.0 Introduction

Kimley-Horn and Associates has been retained to prepare a Preliminary Hydrology Report for the proposed commercial project in Hesperia, California. The purpose of this report is to demonstrate preliminary analysis of the hydrologic and hydraulic conditions associated with the development of the project site. To do so, the following is the scope of this report:

- Discuss potential for hydromodification downstream of the site
- Discuss the pre-development discharge patterns and points
- Discuss the post-development discharge patterns and points
- Determine the pre-development flow rates for the 10-year and 100-year event
- Determine the pre-development volumes for the 10-year and 100-year event
- Determine the post-development unmitigated flow rates for the 10-year and 100-year event
- Determine the post-development volumes for the 10-year and 100-year event
- Analyze the required post-development onsite mitigation for up to the 100-year event
- Determine the design of the infiltration/detention basin to ensure that the volume and flow rate requirements are met

Even though this report discusses stormwater, this report is not a Stormwater Pollution Prevention Plan (SWPPP), a Groundwater Study, a Geotechnical Report, nor a Water Quality Management Plan (WQMP). Each of these reports discuss separate aspects of stormwater. However, portions of the Geotechnical Report are utilized and referenced for the purpose of this report. Similarly, the stormwater mitigation requirements of the WQMP are considered for sizing the BMPs used for this project.

100.1 Project Description

The project site is located on Amargosa Road and is bounded by the California Aqueduct to the north, I-15 to the east, Main Street to the south, and Key Point Avenue to the west. The entire project site measures approximately 25.37 acres and is intended to be developed into a new retail building with associated fuel station and carwash. The existing project site is entirely undeveloped and consists mainly of soil with some vegetation. The soils have a hydrologic soil group classification of "A". The site is relatively flat.

The proposed site is considered a commercial development and intends to develop approximately 25.37 acres into one retail building, one 14-pump fuel station, one carwash, parking areas, loading docks, drive aisles, and landscape areas. Stormwater runoff will be collected by nearby catch basins and conveyed to retention basins within landscape areas where it will infiltrate into the soil. When the required water quality volume is captured within the retention system, excess runoff will be routed offsite onto Amargosa Road and connected to the storm drain system. Stormwater runoff from the fuel area will enter an oil water separator for pretreatment prior to entering the retention basin.

100.2 Methodology

100.2.1 Background

The type of soil and soil conditions are major factors affecting infiltration and storm water runoff as a result. The Natural Resources Conservation Service (NRCS) has classified soil into general hydrologic soil groups for comparing infiltration and runoff rates. Each group is based on properties that influence runoff, such as water infiltration rate, texture, natural discharge, and moisture condition. The runoff potential is based on the amount of runoff at the end of a long duration storm that occurs after wetting and swelling of the soil not protected by vegetation. Using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey online tool, the hydrologic soil group classification for the area was determined to be A. Soil type A is defined as soils having a high infiltration rate (low runoff potential) when thoroughly wet.

In addition, based on the Percolation/Infiltration Testing prepared by Terracon Consultants, Inc. dated August 25, 2023, the site is suitable for infiltration with a measured infiltration rate of 4.38 in/hr at the location of the infiltration system. Using a factor of safety of 3, the design infiltration rate for this project was computed to be 1.46 in/hr.

For the hydrologic analysis, the Rational Method, Unit Hydrograph Method, and Basin Routing Analysis was used to solve for the time of concentration, flow rates, and volumes following methodology described in the San Bernardino County Hydrology Manual, and the AES Engineering Software was used to compute the data. Utilizing precipitation data from NOAA Atlas 14 along with the proposed site characteristics, the rational method was used to compute the time of concentrations and peak flow rates generated from the existing and proposed 2-year, 10-year, 25-year, and 100-year storm events. The time of concentration was then used to solve for the Synthetic Unit Hydrograph of the site which returned the total volume generated for the 24-hour duration of the 2-year, 10-year and 100-year storm events. The Unit Hydrograph is then routed through the basin to perform the Basin Routing Analysis which returns the peak flow out of the proposed underground basin along with the maximum water surface elevation for up to the 100-year storm.

Antecedent moisture conditions (AMCs) II was used to calculate the peak flows and volumes for the 10-year and 25-year storm events, and AMC III was used for the 100-year storm event based on the hydrology manual. In addition, since the project is not located within a location that is HCOC Exempt, hydromodification will be a concern and calculations comparing the pre-development and post-development conditions for a 10-year storm event were performed. Note that for the 10-year storm event, calculations for the pre-development conditions correspond to the natural conditions prior to any development to analyze hydromodification. For the 10-year and 100-year storm events, the pre-development calculations correspond to the existing or current conditions on the project site.

100.2.2 Design Methodology

To prevent potential adverse impacts downstream of the site, the project proposes to retain at minimum the difference in stormwater runoff volume for the 100-year storm between post-development and pre-development conditions. In addition, to meet water quality requirements, the project is required to retain both the Design Capture Volume (DCV) and the hydromodification retention volume onsite. Therefore, the required retention volume for this project is taken to be the greater between the DCV, hydromodification volume, and the difference in runoff between the post-development and pre-development conditions. Refer to the WQMP for more information regarding the water quality retention requirements.

Once the required retention volume is retained onsite, the site is allowed to release stormwater runoff offsite. To prevent adverse impacts downstream of the project site, the project will mitigate peak flows such that it does not exceed existing conditions for up to the 100-year storm event. In addition, for a 100-year storm event, the basins will not be allowed to release more than the existing conditions for a 25-year storm event per the San Bernardino County Detention Basin Design Criteria.

For hydraulic purposes, the storm drain system and inlets are designed to be able to accommodate the design storm of a 100-year storm event.

100.2.3 Calculations Performed

Below is a summary of the calculations that were performed for hydrological and hydraulic analysis. Refer to Appendices H, I, and J for the Rational Method, Unit Hydrograph, and Basin Routing calculations respectively.

1. Rational Method
 - a. 2-year storm event for pre-development and post-development conditions
 - b. 10-year storm event for pre-development and post-development conditions
 - c. 25-year storm event for pre-development conditions
 - i. Used to determine allowable peak flow for the 100-year storm event
 - d. 100-year storm event for pre-development and post-development conditions
 - i. Used to determine peak flows and time of concentration
2. Unit Hydrograph
 - a. 2-year storm event for pre-development and post-development conditions
 - b. 10-year storm event for pre-development and post-development conditions
 - c. 100-year storm event for pre-development and post-development conditions
 - i. Used to determine volume differences and generate inflow hydrograph for the basin analysis
3. Basin Analysis
 - a. 2-year, 10-year, 100-year storm event
 - i. Used to determine peak flows for each storm event
 - ii. Used to determine max water surface elevation within the basin for the 100-year storm
 - iii. Used to show that the basin will return to the dead storage elevation within 24 hours after the basin reaches its peak depth

100.3 Drainage Characteristics

The site is in Zone X per the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Maps (FIRM) map number 06071C6475H, dated August 28, 2008. For reference, see the FIRM Map in Appendix B.

Flood Zone X is defined by FEMA as areas determined to be outside the 0.2% annual chance floodplain.

100.3.1 Pre-development (Existing) Condition

Under the existing conditions, the project site is undeveloped and primarily consists of exposed soil (Classification A) and some vegetation. The project site primarily drains toward the north. Runoff enters the Oro Grande Wash and will eventually discharge into the Mojave River.

Table 1 shows a summary of the predevelopment (existing) flows and volumes for the project site. See the Pre-Development Hydrology Exhibit in Appendix G for more information, Appendix H for the Rational Method Calculations, and Appendix I for the Unit Hydrograph Calculations.

Table 1: Pre-development Flows and Volumes (Refer to Pre-Development Exhibit)

Area Description	Area (acres)	Q₁₀ (cfs)	V₁₀ (cf)	Q₂₅ (cfs)	Q₁₀₀ (cfs)	V₁₀₀ (cf)
A	16.70	13.81	59,655	19.65	33.23	254,826
B	8.67	12.82	35,397	17.30	26.59	155,074
Total	25.37	26.63	95,052	36.95	59.82	409,900

100.3.2 Post-development Condition

Stormwater runoff will be collected by nearby catch basins and conveyed to retention basins within landscape areas where it will infiltrate into the soil. When the required water quality volume is captured within the retention system, excess runoff will be routed offsite onto Amargosa Road and connected to the storm drain system where it will eventually enter Oro Grande Wash and discharge into the Mojave River. Stormwater runoff from the fuel area will enter an oil water separator for pretreatment prior to entering the retention basin.

Table 2 shows a summary of the post-development flows (unmitigated). For more information, refer to the Post Development Hydrology Exhibit in Appendix G, the Rational Method Calculations in Appendix H, and the Unit Hydrograph Calculations in Appendix I.

Table 2: Onsite Post-development Flows (Unmitigated)

Area Description	Area (acres)	Q₁₀ (cfs)	V₁₀ (cf)	Q₁₀₀ (cfs)	V₁₀₀ (cf)
A	9.10	19.59	109,083	33.09	208,696
B	16.27	36.12	158,602	62.49	316,346
Total	25.37	55.71	267,685	95.58	525,042

For retention purposes, the project proposes to retain the greater between the DCV, hydromodification volume, and the difference between the post- and pre- development volume for the 100-year storm event. The project proposes to utilize an above ground retention basin within landscape areas on the site to retain the required volume. See the below table for a summary of the required retention volume.

Table 3: Retention Requirement

Area Description	DCV (CF)	Hydromodification Volume (CF)	Δ100 (CF)	Retention Required (CF)	Retention Provided (CF)
Total	46,606	201,835	115,142	201,835	211,741

100.4 Stormwater Mitigation

Since infiltration is feasible, the proposed development will be required to retain the required water quality volume onsite and excess runoff will be allowed to be discharged offsite. Per hydromodification requirements, the project will be required to attenuate peak runoff for the 10-year storm event such that it does not exceed existing conditions. To prevent adverse impact downstream of the project site, the project will mitigate peak flows such that the 100-year storm event does not exceed the existing conditions for the 25-year storm event.

The below tables show a summary of the required retention and peak flow mitigation, and a summary of the retention basins. Refer to Appendix J for more information on the proposed BMP.

Table 4: Stormwater Mitigation Requirements

Area Description	Retention Requirement (CF)	10-Year Allowable Outflow (cfs)	100-Year Allowable Outflow (cfs)
Total	201,835	26.63	36.95 (25-Year Existing Peak Flow)

Table 5: Basin Volume Summary

Area Description	BMP	Retention Requirement (CF)	Provided Retention (CF)
A	Above Ground Infiltration Basin #1	-	79,489
B	Above Ground Infiltration Basin #2	-	132,252
Total	-	201,835	211,741

Table 6: Basin Routing Analysis

Area Description	BMP	10-Year Peak Flow Rate (cfs)	100-Year Peak Flow Rate (cfs)
A	Above Ground Infiltration Basin #1	4.56	7.89
B	Above Ground Infiltration Basin #2	13.60	26.04
Total	-	18.16	33.93

To capture the required volume and the outlet peak flows, the outlet structure of Basin #1 will have an 18" diameter orifice placed 4.0' above the bottom of the basin. The outlet structure of Basin #2 will have a 5' weir placed 4.5' above the bottom of the basin. The orifice and weir serve to discharge excess runoff and placing the openings 4.0' and 4.5', respectively, above the bottom of the basins it will prevent runoff volumes below the required retention volume from leaving the site. Refer to the chamber section in the Post Development Exhibit for more information.

100.5 Hydraulic Analysis

Hydraulic calculations for 10-year and 100-year storm conditions to be prepared for final engineering analysis.

100.6 Conclusion

In conclusion, the following was covered in this report:

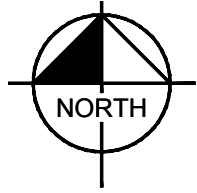
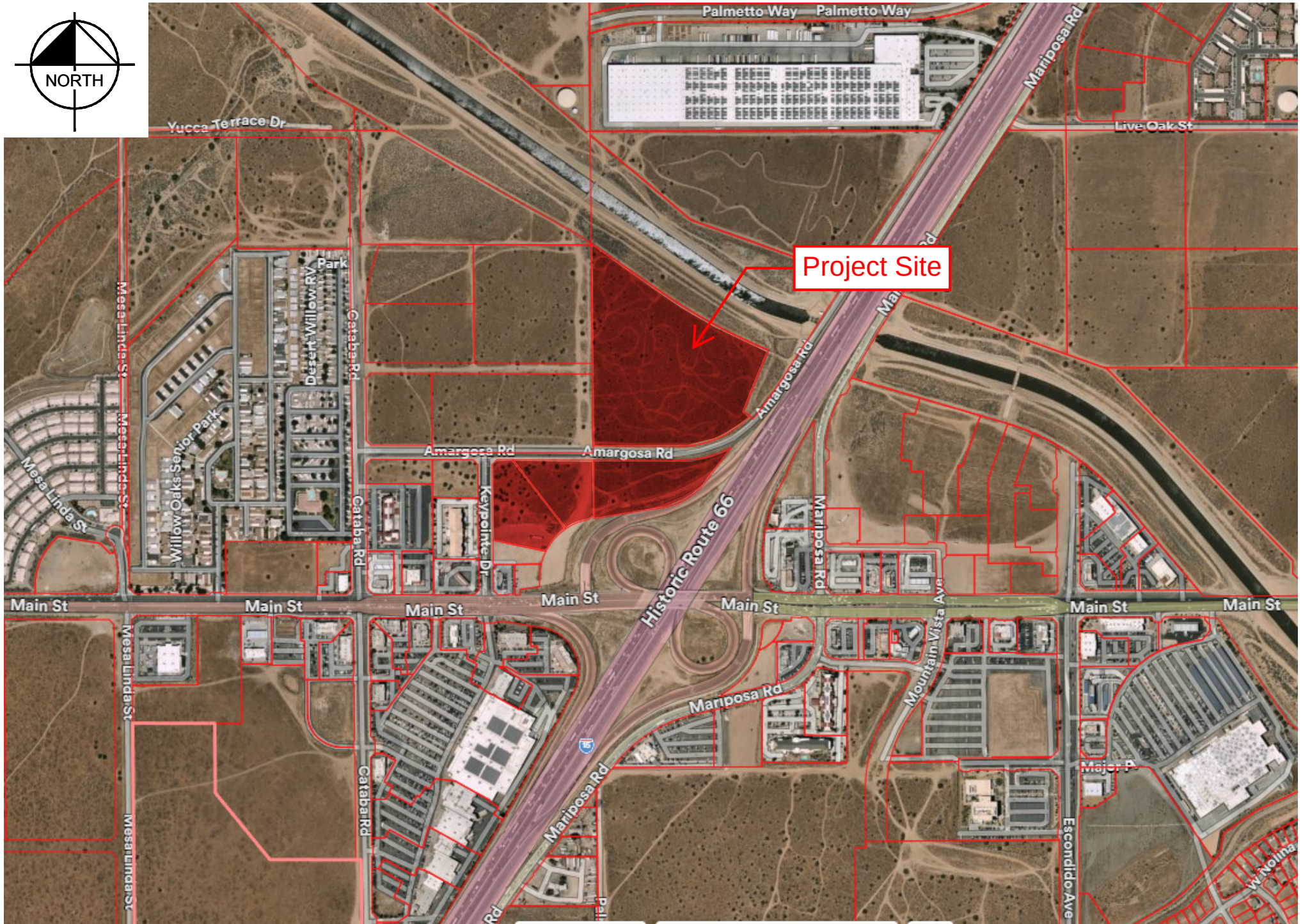
- The potential for hydromodification downstream of the site was discussed
- The pre-development discharge patterns and points were analyzed
- The post-development discharge patterns and points were analyzed
- The pre-development flow rates for the 10-year, 25-year, and 100-year events were determined
- The pre-development volumes for the 10-year and 100-year events were determined
- The post-development unmitigated flows for the 10-year and 100-year events were determined
- The post-development volumes for the 10-year and 100-year events were determined
- The required stormwater mitigation was analyzed
- The infiltration/detention basin was designed to ensure that the volume and flow mitigation requirements are met

As discussed in the contents of this report, the development is not expected to cause a significant impact to downstream systems for storms up to the 100-year storm.

Appendix A

Vicinity Map

VICINITY MAP



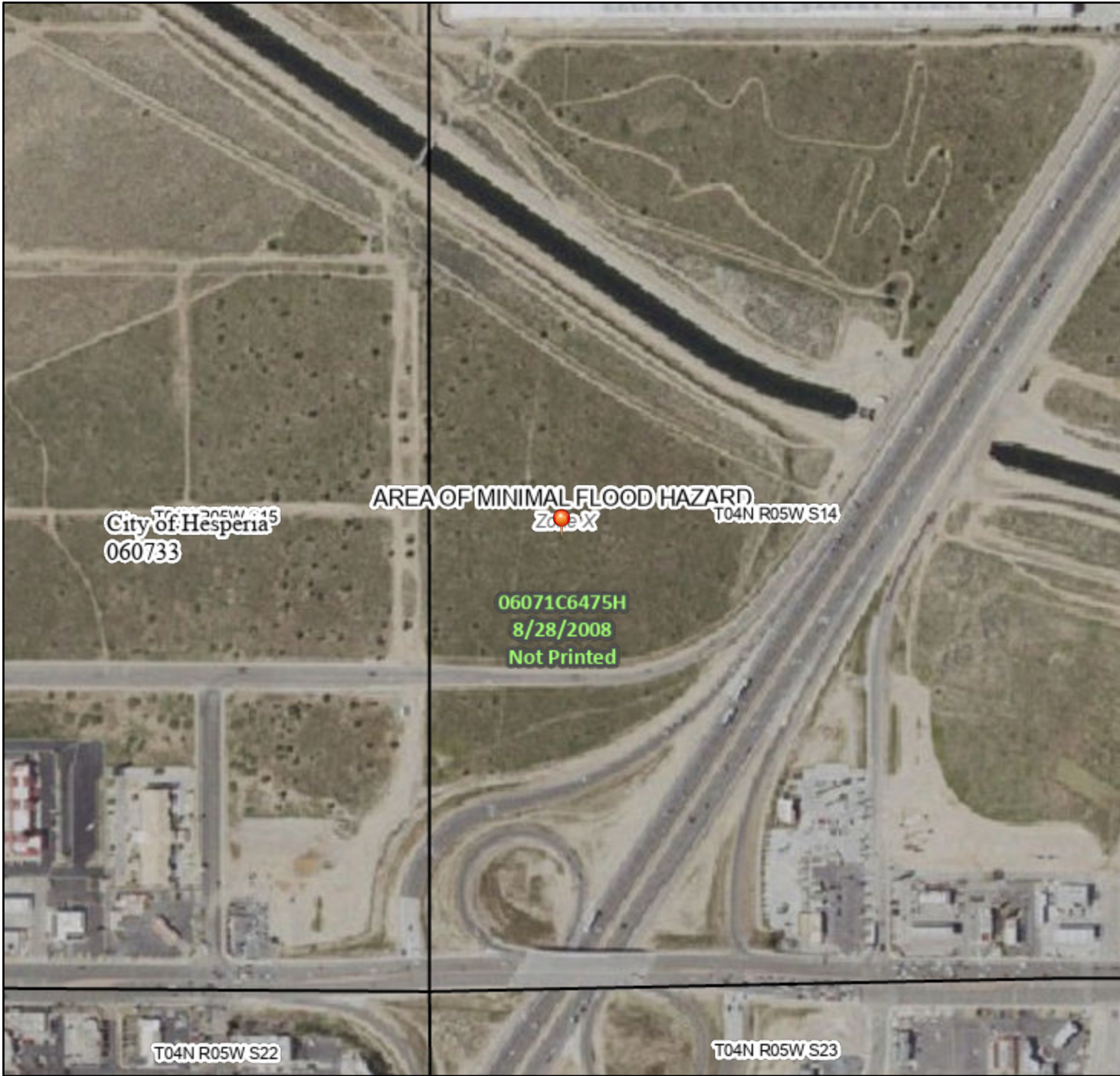
Appendix B

FIRM Map

National Flood Hazard Layer FIRMMette



117°23'9"W 34°26'3"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

117°22'31"W 34°25'33"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/3/2024 at 1:43 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmapped areas cannot be used for regulatory purposes.

Appendix C
Construction Plans

Appendix D

Hydrology Manual and Other Reference Material

Curve (I) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>NATURAL COVERS -</u>					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent.)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	25	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
<u>URBAN COVERS -</u>					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
<u>AGRICULTURAL COVERS -</u>					
Fallow (Land plowed but not tilled or seeded)		77	86	91	94

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

**CURVE NUMBERS
FOR
PERVIOUS AREAS**

Curve (I) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>AGRICULTURAL COVERS</u> (Continued)					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87

Notes:

- All curve numbers are for Antecedent Moisture Condition (AMC) II.
- Quality of cover definitions:

 Poor-Heavily grazed, regularly burned areas, or areas of high burn potential. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.

 Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.

 Good-Heavy or dense cover with more than 75 percent of the ground surface protected.
- See Figure C-2 for definition of cover types.

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

**CURVE NUMBERS
FOR
PERVIOUS AREAS**

Appendix E
NOAA Rainfall Data

NOAA Atlas 14, Volume 6, Version 2 BALDY MESA

COUNTY YARD #1

Station ID: 79-6383

Location name: Victorville, California, USA*

Latitude: 34.4683°, Longitude: -117.3932°

Elevation:

Elevation (station metadata): 3320 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 & aerals](#)

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	0.078 (0.064-0.095)	0.113 (0.093-0.138)	0.159 (0.131-0.195)	0.196 (0.160-0.243)	0.247 (0.195-0.316)	0.285 (0.221-0.373)	0.324 (0.245-0.434)	0.365 (0.268-0.502)	0.418 (0.295-0.600)	0.460 (0.313-0.683)
10-min	0.111 (0.092-0.136)	0.162 (0.134-0.198)	0.228 (0.188-0.280)	0.281 (0.230-0.348)	0.354 (0.280-0.452)	0.409 (0.317-0.534)	0.465 (0.351-0.622)	0.523 (0.384-0.719)	0.600 (0.422-0.860)	0.660 (0.449-0.979)
15-min	0.135 (0.111-0.165)	0.196 (0.162-0.240)	0.276 (0.227-0.338)	0.340 (0.278-0.421)	0.428 (0.338-0.547)	0.495 (0.383-0.646)	0.562 (0.425-0.752)	0.632 (0.464-0.869)	0.725 (0.511-1.04)	0.798 (0.543-1.18)
30-min	0.206 (0.171-0.252)	0.300 (0.248-0.367)	0.422 (0.348-0.518)	0.521 (0.426-0.644)	0.655 (0.517-0.837)	0.757 (0.586-0.988)	0.861 (0.650-1.15)	0.967 (0.710-1.33)	1.11 (0.782-1.59)	1.22 (0.831-1.81)
60-min	0.283 (0.234-0.345)	0.411 (0.339-0.503)	0.578 (0.476-0.709)	0.714 (0.583-0.882)	0.897 (0.709-1.15)	1.04 (0.803-1.35)	1.18 (0.890-1.58)	1.32 (0.973-1.82)	1.52 (1.07-2.18)	1.67 (1.14-2.48)
2-hr	0.398 (0.329-0.487)	0.543 (0.448-0.664)	0.739 (0.608-0.906)	0.903 (0.738-1.12)	1.14 (0.897-1.45)	1.32 (1.02-1.72)	1.51 (1.14-2.02)	1.72 (1.26-2.36)	2.00 (1.41-2.87)	2.23 (1.52-3.31)
3-hr	0.503 (0.416-0.614)	0.672 (0.555-0.822)	0.906 (0.746-1.11)	1.10 (0.903-1.37)	1.39 (1.10-1.78)	1.62 (1.26-2.12)	1.87 (1.41-2.50)	2.14 (1.57-2.94)	2.51 (1.77-3.60)	2.82 (1.92-4.19)
6-hr	0.691 (0.571-0.844)	0.914 (0.755-1.12)	1.23 (1.01-1.51)	1.51 (1.23-1.86)	1.91 (1.51-2.45)	2.25 (1.74-2.94)	2.61 (1.97-3.50)	3.01 (2.21-4.15)	3.60 (2.53-5.16)	4.09 (2.78-6.07)
12-hr	0.861 (0.712-1.05)	1.19 (0.982-1.45)	1.66 (1.36-2.03)	2.06 (1.68-2.55)	2.66 (2.10-3.40)	3.16 (2.44-4.12)	3.70 (2.79-4.95)	4.30 (3.16-5.91)	5.17 (3.64-7.41)	5.90 (4.02-8.76)
24-hr	1.18 (1.05-1.36)	1.71 (1.51-1.97)	2.45 (2.16-2.83)	3.10 (2.72-3.62)	4.06 (3.44-4.89)	4.85 (4.03-5.96)	5.71 (4.62-7.19)	6.65 (5.24-8.62)	8.03 (6.07-10.8)	9.18 (6.71-12.8)
2-day	1.27 (1.13-1.46)	1.82 (1.61-2.10)	2.60 (2.30-3.01)	3.30 (2.89-3.84)	4.32 (3.66-5.20)	5.18 (4.30-6.36)	6.11 (4.95-7.70)	7.15 (5.63-9.26)	8.68 (6.56-11.7)	9.97 (7.28-13.9)
3-day	1.36 (1.20-1.56)	1.92 (1.70-2.22)	2.73 (2.41-3.16)	3.45 (3.02-4.02)	4.52 (3.83-5.44)	5.42 (4.49-6.66)	6.40 (5.18-8.06)	7.49 (5.90-9.70)	9.11 (6.89-12.3)	10.5 (7.66-14.6)
4-day	1.46 (1.30-1.69)	2.06 (1.83-2.38)	2.92 (2.58-3.38)	3.68 (3.22-4.29)	4.81 (4.08-5.79)	5.76 (4.78-7.08)	6.80 (5.51-8.57)	7.96 (6.27-10.3)	9.67 (7.31-13.1)	11.1 (8.12-15.5)
7-day	1.60 (1.42-1.84)	2.22 (1.97-2.56)	3.12 (2.75-3.60)	3.90 (3.42-4.55)	5.06 (4.29-6.10)	6.03 (5.01-7.42)	7.09 (5.74-8.93)	8.26 (6.50-10.7)	9.97 (7.54-13.5)	11.4 (8.34-15.9)
10-day	1.72 (1.52-1.98)	2.37 (2.10-2.73)	3.30 (2.92-3.82)	4.12 (3.61-4.80)	5.32 (4.51-6.41)	6.32 (5.24-7.77)	7.40 (5.99-9.32)	8.59 (6.77-11.1)	10.3 (7.81-13.9)	11.8 (8.61-16.5)
20-day	2.10 (1.86-2.42)	2.87 (2.54-3.31)	3.96 (3.50-4.58)	4.91 (4.30-5.72)	6.29 (5.33-7.58)	7.44 (6.17-9.14)	8.67 (7.02-10.9)	10.0 (7.89-13.0)	12.0 (9.06-16.2)	13.6 (9.94-19.0)
30-day	2.48 (2.20-2.85)	3.35 (2.97-3.86)	4.58 (4.04-5.29)	5.65 (4.95-6.58)	7.21 (6.11-8.68)	8.50 (7.05-10.4)	9.88 (8.00-12.4)	11.4 (8.97-14.8)	13.6 (10.3-18.3)	15.4 (11.2-21.5)
45-day	2.92 (2.59-3.36)	3.89 (3.44-4.48)	5.25 (4.64-6.07)	6.43 (5.64-7.50)	8.16 (6.91-9.82)	9.58 (7.95-11.8)	11.1 (8.99-14.0)	12.8 (10.0-16.5)	15.1 (11.4-20.4)	17.1 (12.5-23.9)
60-day	3.30 (2.92-3.80)	4.33 (3.83-4.99)	5.78 (5.10-6.67)	7.03 (6.16-8.19)	8.86 (7.51-10.7)	10.4 (8.60-12.7)	12.0 (9.70-15.1)	13.7 (10.8-17.8)	16.2 (12.3-21.9)	18.3 (13.4-25.6)

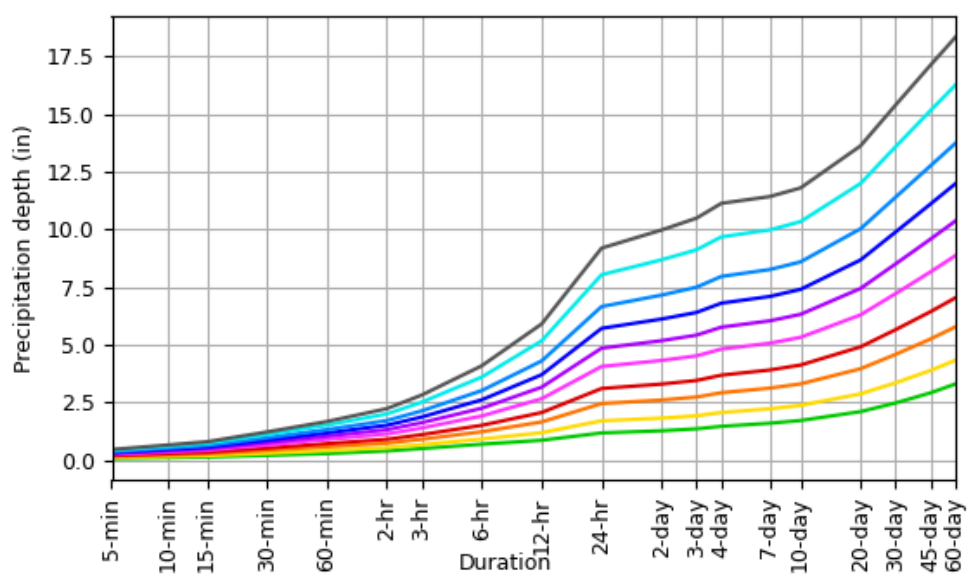
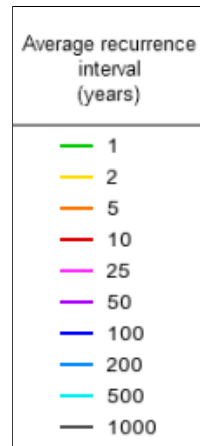
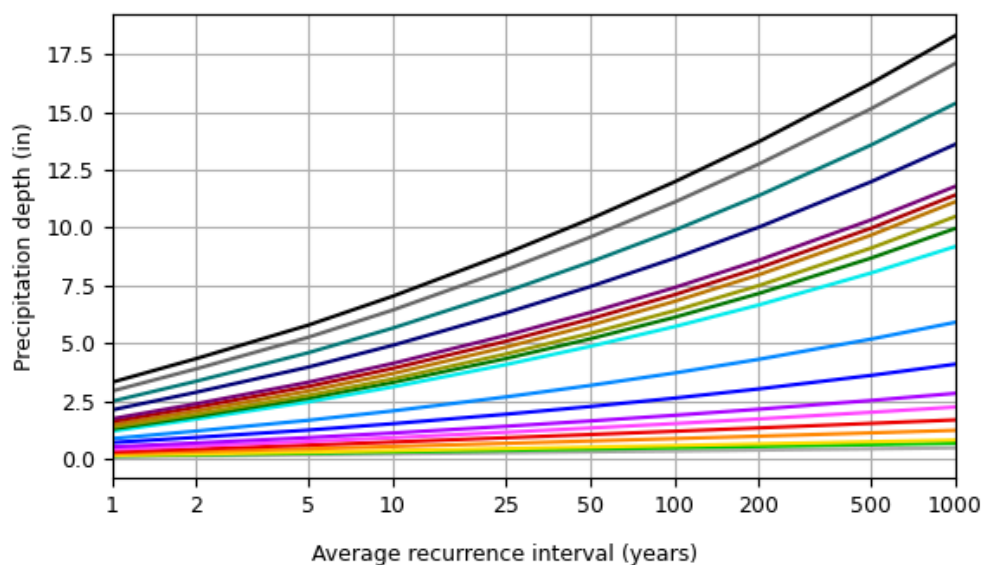
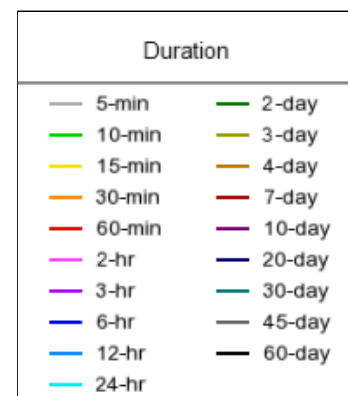
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average 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.

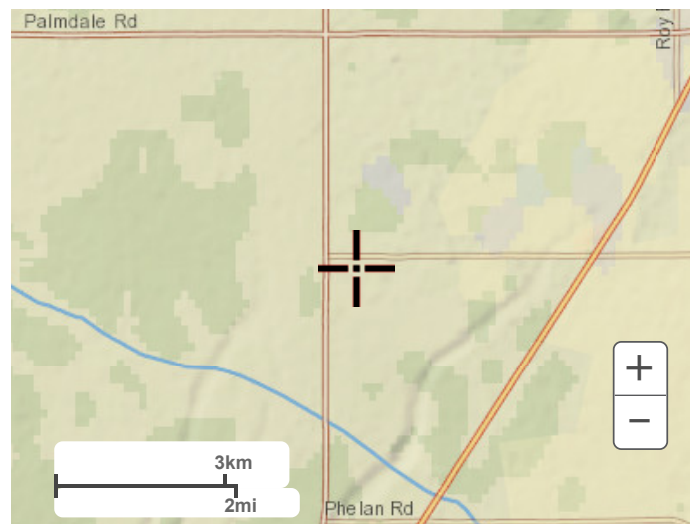
[Back to Top](#)

PF graphical

PDS-based depth-duration-frequency (DDF) curves

Latitude: 34.4683°, Longitude: -117.3932°

[Back to Top](#)**Maps & aerals****Small scale terrain**



Large scale terrain



Large scale map



Large scale aerial



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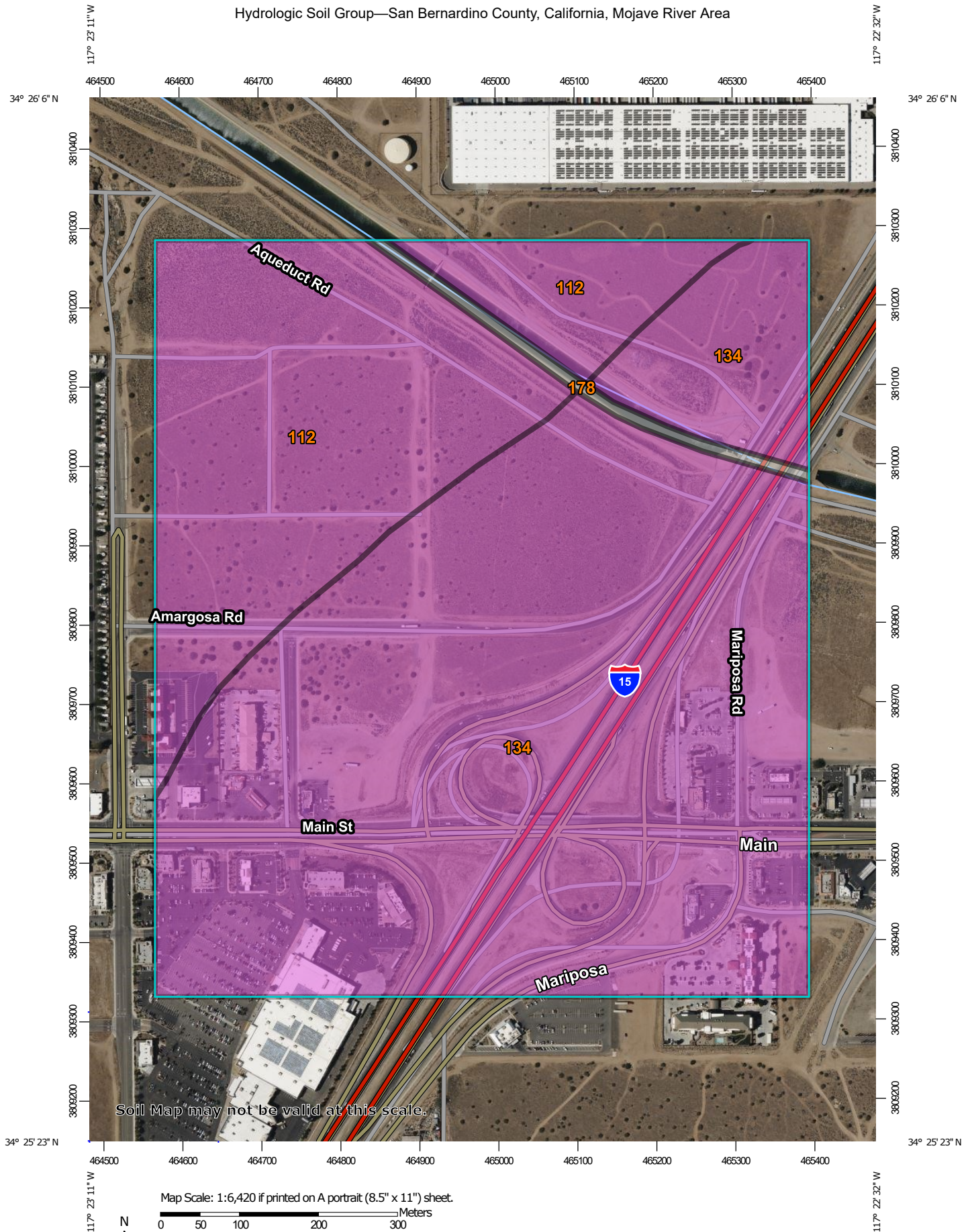
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

Appendix F

Soils Reports

Hydrologic Soil Group—San Bernardino County, California, Mojave River Area



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

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: San Bernardino County, California, Mojave River Area
 Survey Area Data: Version 15, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
112	CAJON SAND, 0 TO 2 PERCENT SLOPES	A	57.7	29.4%
134	HESPERIA LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	A	136.0	69.4%
178	WATER		2.2	1.1%
Totals for Area of Interest			195.9	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

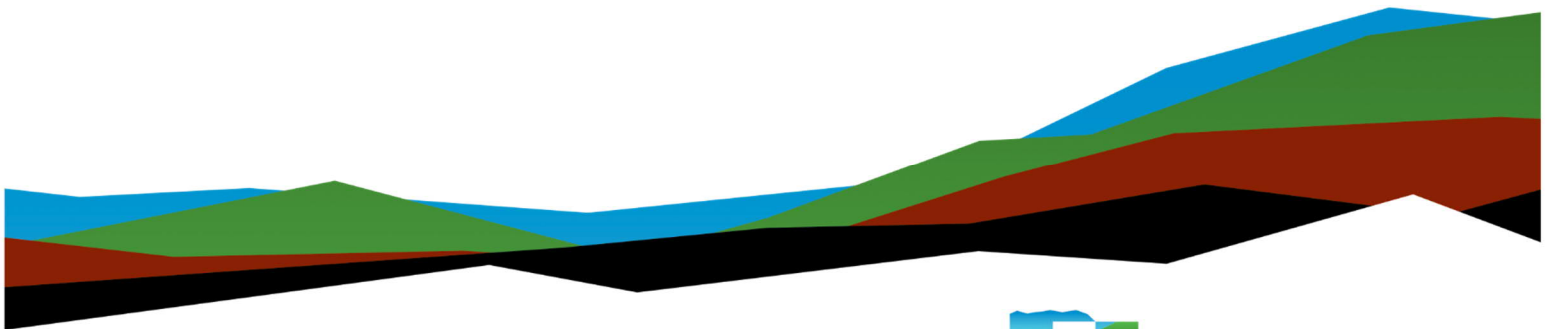
Sam's Club – Hesperia

Geotechnical Engineering Report

August 25, 2023 | Terracon Project No. CB235111

Prepared for:

Sam's Club and Kimley-Horn and Associates Inc.
1100 W Town and County Road, Suite 700
Orange, California



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1355 E. Cooley Drive
Colton, CA 92324
P (909) 824-7311
Terracon.com

August 25, 2023

Sam's Club and Kimley-Horn and Associates Inc.
1100 W Town and County Road, Suite 700
Orange, California

Attn: Mr. Ryan Alvarez
P: (714) 786-6322
E: ryan.alvarez@kimley-horn.com

Re: Geotechnical Engineering Report
Sam's Club – Hesperia
North of Amargosa Road and West of Highway I-15
Hesperia, San Bernardino County, California
Terracon Project No. CB235111

Dear Mr. Alvarez:

We have completed the scope of Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PCB235111 dated June 8, 2023. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and floor slabs for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon



Ali Tabatabaei, Ph.D., G.E.

Geotechnical Project Engineer



Keith P. Askew, P.E., G.E.

Department Manager

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Attachments

Exploration and Testing Procedures
Site Location and Exploration Plans
Exploration and Laboratory Results
Supporting Information

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed Sam's Club to be located North of Amargosa Road and West of Highway I-15 in Hesperia, San Bernardino County, California. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions and historic high groundwater
- 2022 California Building Code (CBC) seismic design parameters
- Subgrade preparation/earthwork recommendations
- Foundation design and construction
- Floor slab design and construction
- Preliminary pavement section design
- Infiltration and drainage

The geotechnical engineering Scope of Services for this project included the advancement of forty-six test borings to depths ranging from approximately 5 to 51½ feet below existing site grades (bgs), laboratory testing, engineering analysis, and preparation of this report. Our scope also includes conducting four percolation tests at depths of 5 and 10 feet bgs.

Drawings showing the site and boring locations are shown on the [Site Location](#) and [Exploration Plan](#), respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and/or as separate graphs in the [Exploration Results](#) section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	An email request for proposal was provided by Kimley Horn on June 1, 2023. The request included conceptual plan drawings of the layout of the planned development.

Item	Description
Project Description	The project will consist of a new single-story Sam's Club store, paved parking and driveway, and a new fuel station with drive-thru canopies and a single-story service building.
Proposed Structure	<p>The project generally consists of the construction of Sam's Club building with footprint area of approximately 167,050 square feet (sf). The project will also include car parking, driveways, and utilities. Fuel station with canopies and service building will be constructed. Buried fuel tanks will also be installed.</p> <p>We assume that stormwater diversion structures such as culverts, open channels, and storm drains will also be constructed on the site. The development will also include on-site Low Impact Development (LID) infiltration system.</p>
Building Construction	<p>We anticipate the Sam's Club building will be a combination of concrete masonry shear walls and steel columns, with a slab-on-grade floor.</p> <p>We anticipate the fuel station service building will be a combination of light gauge steel shear walls and steel columns, with a monolithic interior floor slab.</p> <p>We anticipate the fuel station canopy will be steel columns with a steel canopy roof.</p>
Finished Floor Elevation	Anticipated to be within 3 feet of existing grade
Maximum Loads (assumed)	<p>Structural loads were not provided at the time of this report. We assume that the proposed structures will have the following loads:</p> <p>Sam's Club Building:</p> <ul style="list-style-type: none"> ■ Columns: 150 kips ■ Walls: 3 kips per linear foot (klf) ■ Slabs: 250 pounds per square foot (psf) <p>Fuel Station Service Building:</p> <ul style="list-style-type: none"> ■ Columns: 25 kips ■ Walls: 1 kip per linear foot (klf) ■ Slabs: 150 pounds per square foot (psf) <p>Fuel Station Canopy:</p> <ul style="list-style-type: none"> ■ Columns: 40 kips compression, 25 kips uplift

Item	Description
Grading / Slopes	A preliminary grading plan was not available for review at the time this report was prepared. Proposed finished grade elevation for the building pad is expected to be within 2 feet or less of existing grades, excluding remedial grading requirements. Slopes are not planned.
Below-Grade Structures	We have assumed the proposed fuel tanks will have a maximum depth on the order of 12 feet bgs.
Free-Standing Retaining Walls	None
Pavements	<p>Paved driveway and parking will be constructed on approximately 16.7 acres of the parcel.</p> <p>A preferred pavement surfacing has not been identified to us as part of the preliminary information. Asphalt and concrete surfacing are common in the area for projects of this nature and is the assumed preference.</p> <p>Unless information is provided prior to the report, the anticipated ACI traffic categories and daily truck traffic will be assumed to consist of:</p> <ul style="list-style-type: none"> ■ Category A: Car parking areas and access lanes, 10 truck per day ■ Category B: Entrance and truck service lanes, 25 trucks per day ■ Category C: Buses ■ Category D: Heavy duty trucks, 10 trucks per day ■ Category E: Garbage or fire truck lanes <p>We assume the following traffic indices (TIs) will be used:</p> <ul style="list-style-type: none"> ■ Auto Parking Areas: TI = 5.0: ■ Auto Road: TI = 5.5 ■ Truck Parking Areas: TI = 6.0 ■ Truck Ramps and Roads: TI = 8.0 ■ The pavement design period is 20 years.
Infiltration Systems	Based on review of the preliminary site plan, a shallow infiltration system consisting of a retention pond is planned on site.
Building Code	California Building Code 2022

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at North of Amargosa Road and West of Highway I-15 in Hesperia, San Bernardino County, California. The approximate size of the project area is approximately 20 acres. Approximate coordinates of the center of the site: Latitude: 34.4302°, Longitude: -117.3804° See Site Location
Existing Improvements	Currently consists of an undeveloped tract of land.
Current Ground Cover	Exposed soils with a light growth of grass and vegetation.
Existing Topography	Site is relatively flat.

Geotechnical Characterization

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. The following table provides our geotechnical characterization. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the [Exploration Results](#). The table below summarizes our geotechnical characterization.

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency / Density
---------	---	----------------------	-----------------------

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency / Density
Stratum I	51 ½	Interbedded layers of silty sand, silty sand with gravel and poorly graded sand with silt and gravel	medium dense to very dense

Groundwater

The borings were advanced using a hollow-stem-auger drilling technique that allows short term groundwater observations to be made while drilling. Groundwater seepage was not encountered within the maximum drilled depth of 51½ feet below ground surface (bgs) at the time of our field exploration. Our review of historical information regarding groundwater levels indicates that historical high groundwater levels are deeper than 50 feet bgs. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed.

Lab Results

Laboratory tests were conducted on selected soil samples and the test results are presented in the [Exploration Results](#) section and on the boring logs. An Expansion Index (EI) test conducted on a near-surface sample from boring B-7 resulted in an EI value of 0 (characterized as “very low” potential).

To evaluate the potential deformation that may be caused by the addition of water to subsurface soils, hydroconsolidation testing was performed on selected, representative relatively undisturbed samples. The result is shown in Exploration Results section. The test result indicates collapse potentials of 1.8% (B-6 at 2.5 feet) and 4% (B-9 at 10 feet), boring number and sample depths summarized in parentheses. All samples were saturated under an axial pressure of 2,000 psf. The risk of hydro collapse can be mitigated by removal and replacement of the top 4 feet of on-site soil with engineered fill.

The soil sample with collapse potential of 4% was retrieved at a depth of 10 feet bgs (B-9). Based on the laboratory density and field blow counts, it is our opinion that sample disturbance may have contributed to the measured hydro-collapse laboratory results. Furthermore, effective stresses at such depths will be lower than 2,000 psf, which is the axial pressure the sample was tested for at.

Seismic Site Class

The 2022 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16, and 2022 CBC. 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_s value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that “In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites.” Based on our understanding of the proposed structures, it is our assumption that the exception in Section 11.4.8 applies to the proposed structure. However, the structural engineer should verify the applicability of this exception.

Based on this exception, the spectral response accelerations presented below were determined using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2022 CBC.

Description	Value
2019 California Building Code Site Classification (CBC) ¹	D ²
Site Latitude (°N)	34.4302
Site Longitude (°W)	117.3804
S_s Spectral Acceleration for a 0.2-Second Period	1.5
S_1 Spectral Acceleration for a 1-Second Period	0.584
F_a Site Coefficient for a 0.2-Second Period	1.0
F_v Site Coefficient for a 1-Second Period	1.72
Site Modified Peak Ground Acceleration (PGA_M)	0.55g
De-aggregated Modal Magnitude ³	8.09

Description	Value
<ol style="list-style-type: none"> 1. Seismic site classification in general accordance with the <i>2022 California Building Code</i>. 2. The 2022 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the 100-foot soil profile determination. Borings were extended to a maximum depth of 51½ feet, and this seismic site class definition considers that similar or denser soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration. 3. These values were obtained using on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years accessed 	

In some cases, a site-specific ground motion study may generate less conservative coefficients and acceleration values which may reduce construction costs. We recommend consulting with a structural engineer to evaluate the need for such study and its potential impact on construction costs. Terracon should be contacted if a site-specific ground motion study is desired.

Faulting and Estimated Ground Motions

The site is located in southern California, which is a seismically active area. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. As calculated using the USGS Unified Hazard Tool, the San Andreas (San Bernardino N segment), which is considered to have the most significant effect at the site from a design standpoint, has a maximum magnitude of 7.92 and is located approximately 18.6 kilometers from the site. Furthermore, the site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.

Liquefaction

Liquefaction is a mode of ground failure that results from the generation of high pore-water pressures during earthquake ground shaking, causing loss of shear strength, and is typically a hazard where loose sandy soils exist below groundwater. San Bernardino County has designated certain areas as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table.

According to the County of San Bernardino Geologic Hazard Maps, the site is located within an area having low liquefaction potential. Moreover, historic groundwater levels are deeper than 50 feet. Based on the County mapping and encountered subsurface

conditions, it is our opinion that liquefaction potential/seismic settlement is low for this site.

Geotechnical Overview

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

On-site soils generally consisted of interbedded layers of silty sand with gravel, poorly graded sand and poorly graded sand with silt and gravel extending to the maximum boring termination depth of about 51½ feet below ground surface (bgs).

Based on the conditions encountered, the proposed buildings can be supported on shallow foundations, such as spread footings, provided the recommendations outlined herein are followed.

Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling. Groundwater is not expected to affect shallow foundation construction on this site.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the [Exploration Results](#)), engineering analyses, and our current understanding of the proposed project. The [General Comments](#) section provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include clearing and grubbing, excavations, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Site Preparation

Strip and remove existing vegetation, debris, pavements, and other deleterious materials from proposed building and pavement areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill and provide for a relatively uniform thickness of fill beneath proposed building structures.

Although no evidence of underground facilities such as septic tanks, cesspools, or basements were observed during the site reconnaissance, such features could be encountered during construction. If unexpected fills, utilities, or underground facilities are encountered, such features should be removed, and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

We recommend that the proposed structures be supported on engineered fill extending to a minimum depth of 2 feet below the bottom of foundations, or 4 feet below existing grades, whichever is greater. Engineered fill placed beneath the entire footprint of the structures should extend horizontally a minimum distance of 3 feet beyond the outside edge of perimeter footings.

Subgrade soils beneath exterior slabs and pavements should be removed and replaced with engineered compacted fill to a depth of 1 foot below existing grade, or proposed pavement sections, whichever is greater.

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned, and compacted per the compaction requirements in this report. Compacted fill soils should then be placed to the design elevations per the recommendations of this report. The moisture content and compaction of subgrade soils should be maintained until foundation, slab, or pavement construction.

Based upon the subsurface conditions observed from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable. However, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Excavation

Due to very dense soil encountered near the surface in some areas, excavation may require the use of specialized heavy-duty equipment. Consideration should be given to obtaining a unit price for difficult excavation in the contract documents for the project.

Individual contractors are responsible for designing and constructing stable, temporary excavations. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

Fill Material Types

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than 3 inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean on-site soils or approved imported materials may be used as fill material for the following:

- general site grading
- foundation areas
- interior floor slab areas
- foundation backfill
- pavement areas
- exterior slab areas

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris.

	Percent Finer by Weight
<u>Gradation</u>	<u>(ASTM C 136)</u>
3"	100
No. 4 Sieve	50-100
No. 200 Sieve	10-40
■ Liquid Limit	30 (max)
■ Plasticity Index	15 (max)
■ Maximum expansion index*	20 (max)

*ASTM D 4829

The contractor shall notify the Geotechnical Engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor shall also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the job.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness.

Fill Placement and Compaction Requirements

Engineered fill should meet the following compaction requirements.

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
On-site soils and/or low volume change imported fill:			
Beneath foundations:	90	-2%	+3%
Beneath interior slabs:	90	-2%	+3%
Fill greater than 5 feet in depth:	95	-2%	+3%
Miscellaneous backfill:	90	-2%	+3%
Beneath pavements:	95	-2%	+3%
Utility trenches: ¹	90	-2%	+3%
Bottom of excavation receiving fill:	90	-2%	+3%
Aggregate base (beneath pavements)	95	-2%	+3%

1. Upper 12 inches should be compacted to 95% within pavement and structural areas.

Utility Trench Backfill

Any soft or unsuitable materials encountered at the bottom of utility trench excavations should be removed and replaced with structural fill or bedding material in accordance with public works specifications for the utility to be supported. This recommendation is particularly applicable to utility work requiring grade control and/or in areas where subsequent grade raising could cause settlement in the subgrade supporting the utility. Trench excavation should not be conducted below a downward 1:1 projection from existing foundations or existing utilities without engineering review of shoring requirements and geotechnical observation during construction.

A non-expansive granular material with a sand equivalent greater than 30 should be used for bedding and shading of utilities, unless allowed or specified otherwise by the utility manufacturer. On-site materials are considered suitable for backfill of utility and pipe trenches from 1 foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Exterior Slab Design and Construction

Compacted subgrade composed of on-site clayey or silty soils may expand with increasing moisture content; therefore, exterior concrete slabs may heave, resulting in cracking or vertical offsets. The potential for damage would be greatest where exterior slabs are constructed adjacent to the building or other structural elements. To reduce the potential for damage caused by movement, we recommend:

- exterior slabs should be supported directly on subgrade fill (not ABC) with no, or very low expansion potential;
- strict moisture-density control during placement of subgrade fills;
- maintain proper subgrade moisture until placement of slabs;
- placement of effective control joints on relatively close centers and isolation joints between slabs and other structural elements;
- provision for adequate drainage in areas adjoining the slabs;
- use of designs which allow vertical movement between the exterior slabs and adjoining structural elements.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance

program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade-supported improvements such as floor slabs and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining properties and structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent or near property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season (typically November through April) it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork operations may require additional mitigative measures beyond that which would be expected during the drier summer and fall months. This could include diversion of surface runoff around exposed soils and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances

shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. Where not specified by local ordinance, one density and water content test should be performed for every 50 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill. This testing frequency criteria may be adjusted during construction as specified by the geotechnical engineer of record.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are observed, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

Shallow Foundations

If the site has been prepared in accordance with the requirements noted in [Earthwork](#), the following design parameters are applicable for mat foundation.

Design Parameters

Item	Description
Foundation Type	Shallow Spread Footings
Net Allowable Bearing Pressure ^{1, 2}	3,000 psf

Foundation Support ³	Engineered fill extending 2 feet below the bottom of foundations, or 4 feet below existing grades, whichever is greater.
Minimum Foundation Dimensions	Continuous: 18 inches wide Columns: 24 inches wide
Minimum Embedment below Finished Grade ⁴	18 inches
Ultimate Passive Resistance ⁵ (Equivalent fluid pressures)	375 pcf
Ultimate Coefficient of Sliding Friction ⁶	0.36
Estimated Static Settlement from Structural Loads ²	About 1 inch
Estimated Differential Settlement ^{2, 7}	About ½ of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation.
2. Values provided are for maximum loads noted in [Project Description](#). Additional geotechnical consultation will be necessary if higher loads are anticipated. Does not include seismically induced settlement.
3. Unsuitable or soft soils should be over excavated and replaced per the recommendations presented in [Earthwork](#).
4. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
5. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed, and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
6. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance for granular materials is dependent on the bearing pressure which may vary due to load combinations.
7. Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Shallow Foundations Designed for Uplift Conditions

Reinforced concrete footings or dead-man foundations, cast against undisturbed subsoils, are recommended for resistance to uplift. Footings may be designed using the cone method. The equation for determining the ultimate uplift capacity as a function of footing dimension, foundation depth, and soil weight is:

$$T_u = 0.8 \cdot \gamma \cdot D^2 \cdot (B + L) + W$$

Where:

Variable	Description	Unit
T_u	Ultimate uplift capacity	pounds
γ	Unit weight of soil ¹	pcf
D	Depth to base of footing/dead-man foundation below final grade	feet
B	Width of footing/dead-man foundation	feet
L	Length of footing/dead-man foundation	feet
W	Weight of footing/dead-man + weight of soil directly over the top of the footing/block	pounds

Notes: ¹A unit weight (γ) of 120 pounds per cubic foot (pcf) is recommended for soil (either undisturbed or compacted backfill) at this site.

The design uplift resistance should be calculated by dividing the ultimate resistance obtained from the equation above by an appropriate factor of safety. A factor of safety of at least 2 is recommended for live uplift loads in the analysis.

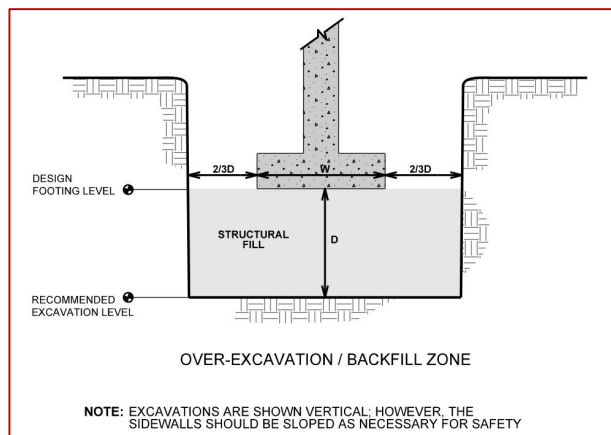
Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in masonry walls is recommended.

Foundation excavations should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Foundation Construction Considerations

As noted in [Earthwork](#), the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Over excavation for engineered fill placement below footings should be conducted as shown below. The over excavation should be backfilled up to the footing base elevation, with low volume change engineered fill placed, as recommended in the [Earthwork](#) section.



Floor Slabs

Design parameters for floor slabs assume the requirements for [Earthwork](#) have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support ¹	Engineered fill extending 2 feet below the bottom of foundations, or 4 feet below existing grades, whichever is greater.
Subbase	Minimum 4 inches of Aggregate Base
Estimated Modulus of Subgrade Reaction ²	200 pounds per square inch per inch (psi/in) for point loads. (The modulus was obtained based on estimates obtained from NAVFAC 7.1 design charts). This value is for a small loaded area (1 Sq. ft or less) such as for forklift wheel loads or point loads and should be adjusted for larger loaded areas.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible

compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

Lateral Earth Pressures

Design Parameters

Lateral earth pressures are provided for below grade structures such as loading docks, and retaining walls with a height of less than 6 feet. For engineered fill comprised of on-site soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are:

ITEM	VALUE ^{a, b}
Active Case	40 psf/ft
Passive Case	375 psf/ft
At-Rest Case	60 psf/ft

Coefficient of Friction	0.36
^a Note: The values are based on on-site soils used as backfill. ^b Note: Uniform, horizontal backfill, compacted to at least 90% of the ASTM D 1557 maximum dry density, rendering a maximum unit weight of 125 pcf.	

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

Fill against foundation and retaining walls should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors.

Pavements

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in [Project Description](#) and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the [Earthwork](#) section.

Pavement Design Parameters

Design of asphalt concrete (AC) pavements is based on the procedures outlined in the Caltrans "Highway Design Manual" (Caltrans, 2018). Design of Portland cement concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330R-08; "Guide for Design and Construction of Concrete Parking Lots."

During the field investigation at the site, two samples of the near surface soil taken from our borings were tested in our laboratory to determine the Hveem Stabilometer Value (R-value). The tests produced R-values of 39 and 58. A design R-Value of 35 was used to calculate the AC pavement thickness sections. A modulus of subgrade reaction of 120 pci and a modulus of rupture of 600 psi were used for the PCC pavement designs.

The structural sections are predicated upon proper compaction of the utility trench backfills and the subgrade soils as prescribed by in [Earthwork](#), with the upper 12 inches of subgrade soils and all aggregate base material brought to a minimum relative compaction of 95 percent in accordance with ASTM D 1557 prior to paving. The aggregate base should meet Caltrans requirements for Class 2 base.

The pavement designs were based upon the results of preliminary sampling and testing and should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed.

Pavement Section Thicknesses

The following tables provides our opinion of minimum thickness for AC and PCC sections:

Asphalt Concrete Design		
Usage	Assumed Traffic Index	Recommended Structural Section
Auto Parking Areas	5.0	3" HMA ¹ /5" Class 2 AB ²
Auto Roads	5.5	3" HMA ¹ /6" Class 2 AB ²
Truck Parking Areas	6.0	3.5" HMA ¹ /7" Class 2 AB ²
Truck Ramps and Roads	8.0	4" HMA ¹ /11" Class 2 AB ²
^{1.} HMA = hot mix asphalt ^{2.} AB = aggregate base		

Portland Cement Concrete Design			
Layer	Thickness (inches)		
	Light Duty ¹	Medium Duty ²	Dumpster Pad ³
PCC	5.0	6.0	7.5
Aggregate Base	4.0	4.0	4.0
^{1.} Car Parking and Access Lanes, Average Daily Truck Traffic (ADTT) = 1 (Category A). ^{2.} Truck Parking Areas, Multiple Units, ADTT = 25 (Category B) ^{3.} In areas of anticipated heavy traffic, fire trucks, delivery trucks, or concentrated loads (e.g., dumpster pads), and areas with repeated turning or maneuvering of heavy vehicles, ADTT = 700 (Category C).			

Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles.

Although not required for structural support, a minimum 4-inch thick base course layer is recommended to help reduce potential for slab curl, shrinkage cracking, and subgrade pumping through joints. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign

material and doweled where necessary for load transfer. PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with ACI 330 and ACI 325.

Where practical, we recommend early-entry cutting of crack-control joints in PCC pavements. Cutting of the concrete in its “green” state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. Islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils are particular areas of concern. The civil design for the pavements with these conditions should include features to restrict or collect and discharge excess water from the islands. Examples of features are edge drains connected to the stormwater collection system, longitudinal subdrains, or other suitable outlets and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic upkeep should be anticipated. Preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Pavement care consists of both localized (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Additional engineering consultation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

Storm Water Management

Four in-situ percolation tests (falling head borehole permeability) were performed at approximate depths of 5 and 10 feet bgs within boreholes drilled with an 8-inch diameter auger. The objective of the testing is to provide infiltration rates for designing the proposed infiltration system. A 2-inch thick, 3/4-inch gravel layer was placed in the bottom of each boring after the borings were drilled to investigate the soil profile. Three-inch diameter perforated pipes were installed on top of the gravel layer and gravel was used to backfill between the perforated pipes and the boring sidewall. The borings were then filled with water for a pre-soak period.

At the beginning of each test, the pipes were refilled with water and readings were taken at periodic time intervals as the water level dropped. The soil at the percolation test locations was classified in the field using a visual/manual procedure. The infiltration velocity is presented as the infiltration rate and is summarized in the following table. The infiltration rates provided do not include safety factors.

Test Location	Boring Depth (ft.) ¹	Test Depth Range (ft.) ¹	Soil Type	Water Head (ft)	Percolation Rate Average (in./hr.)	Infiltration Rate Average (in./hr.) ²
Perc-1	5	0 to 5	SM	5	49.5	1.7

Perc-2	10	5 to 10	SM	5	171.0	6.8
Perc-3	5	0 to 5	SM	5	84.5	3.5
Perc-4	10	5 to 10	SM	5	101.5	5.5
<ol style="list-style-type: none"> 1. Below existing ground surface. 2. If proposed infiltration system will mainly rely on vertical downward seepage, the correlated infiltration rates should be used. The correlation rate is based on the Porchet Method. 						

The above infiltration rates determined by the percolation test method are based on field test results utilizing clear water. Infiltration rates can be affected by silt buildup, debris, degree of soil saturation, site variability and other factors. The rate obtained at specific location and depth is representative of the location and depth tested and may not be representative of the entire site. Application of an appropriate safety factor is prudent to account for subsoil inconsistencies, possible compaction related to site grading, and potential silting of the percolating soils, depending on the application.

The design engineer should also check with the local agency for the limitation of the infiltration rate allowed in the design. If the maximum allowable design infiltration rate is lower than the above recommended rate, the maximum allowable design infiltration rate should be used. The designer of the basins should also consider other possible site variability in the design.

The percolation tests were performed with clear water, whereas the storm water will likely not be clear, but may contain organics, fines, and grease/oil. The presence of these deleterious materials will tend to decrease the rate that water percolates from the infiltration systems. Design of the storm water infiltration systems should account for the presence of these materials and should incorporate structures/devices to remove these deleterious materials.

Based on the soils encountered in our borings, we expect the percolation rates of the soils could be different than measured in the field due to variations in fines and gravel content. The design elevation and size of the proposed infiltration system should account for this expected variability in infiltration rates.

Infiltration testing should be performed after construction of the infiltration system to verify the design infiltration rates. It should be noted that siltation and vegetation growth along with other factors may affect the infiltration rates of the infiltration areas. The actual infiltration rate may vary from the values reported here. Infiltration systems should be located at least 10 feet from any existing or proposed foundation system.

Corrosivity

The results of laboratory sulfides, soluble sulfate, chlorides, electrical resistivity, redox

potential, total salts, and pH testing are presented in our appendix within the [Exploration Results](#) section. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Results of soluble sulfate testing indicate samples of the on-site soils tested possess negligible sulfate concentrations when classified in accordance with Table 19.3.1.1 of the ACI Design Manual. Concrete should be designed in accordance with the exposure class S0 provisions of the ACI Design Manual, Section 318, Chapter 19.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. The findings and recommendations presented in this report were prepared in a manner consistent with the standards of care and skill ordinarily exercised by members of its profession completing similar studies and practicing under similar conditions in the geographic vicinity and at the time these services have been performed. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth or Refusal (feet) ^{1,2}	Location
10(B-1 to B-6 & B-9 to B-12)	21 ½	Building area
2 (B-7 & B-8)	51 ½	Building area
3 (B-13 to B-15)	16 ½	Fuel Station (Canopy and Tank)
27 (P-1 to P-27)	5 to 11 ½	Parking/Driveway area
4 (Perc-1 to Perc-4)	5 to 10	Percolation Testing

1. Below ground surface.

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±10 feet) and referencing existing site features. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted drill rig using continuous flight hollow stem augers. Four samples were generally obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring lined sampler was also used for sampling soils at the project site. Ring-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation

of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Dry Unit Weight
- Particle-size Distribution (Gradation) of Soils Using Sieve Analysis
- Maximum Dry Density/Optimum Moisture Content
- Expansion Index
- Corrosion Suite
- Consolidation
- R-Value

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

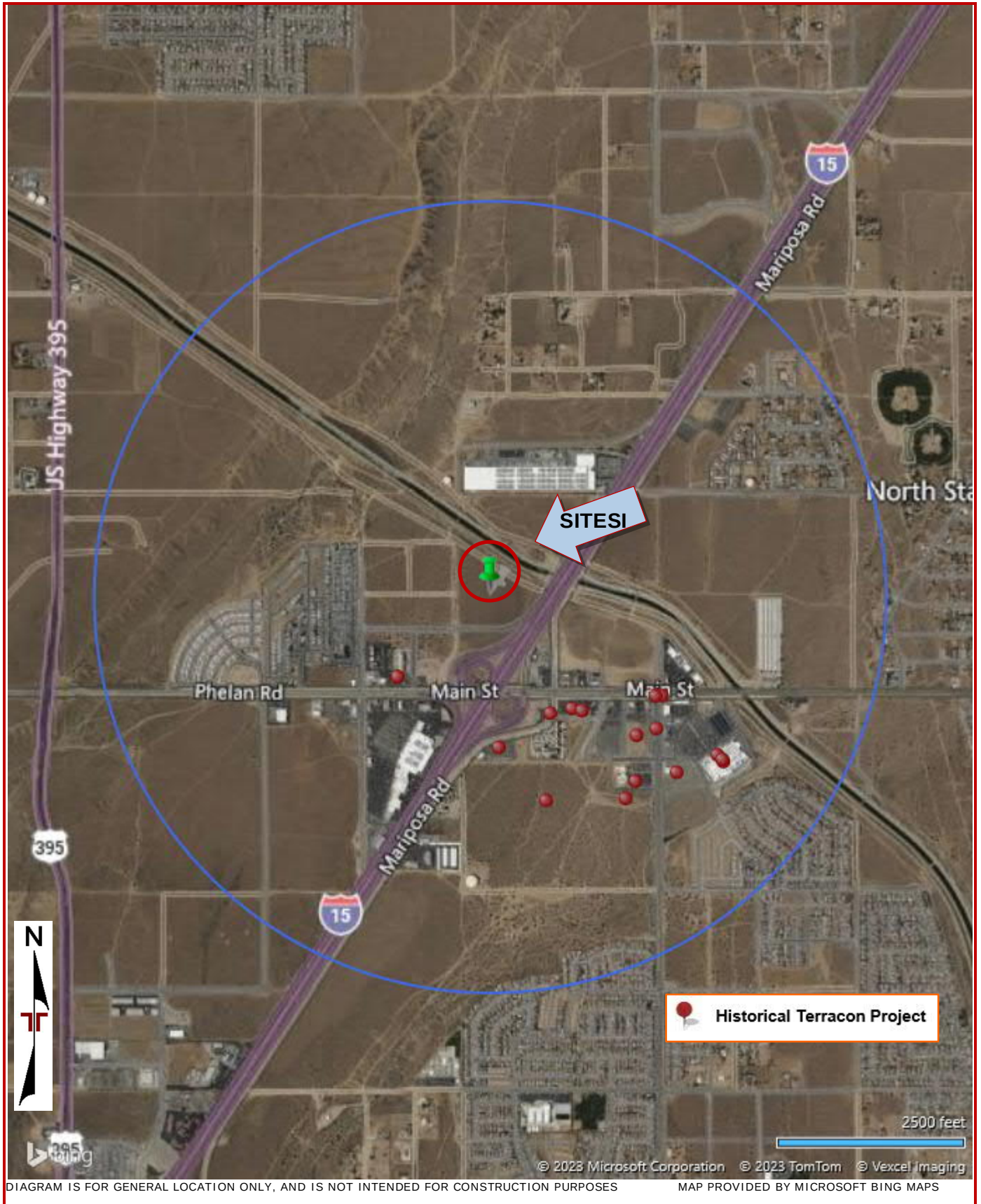
Site Location and Exploration Plans

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location



Exploration Plan (11x17 Portrait)

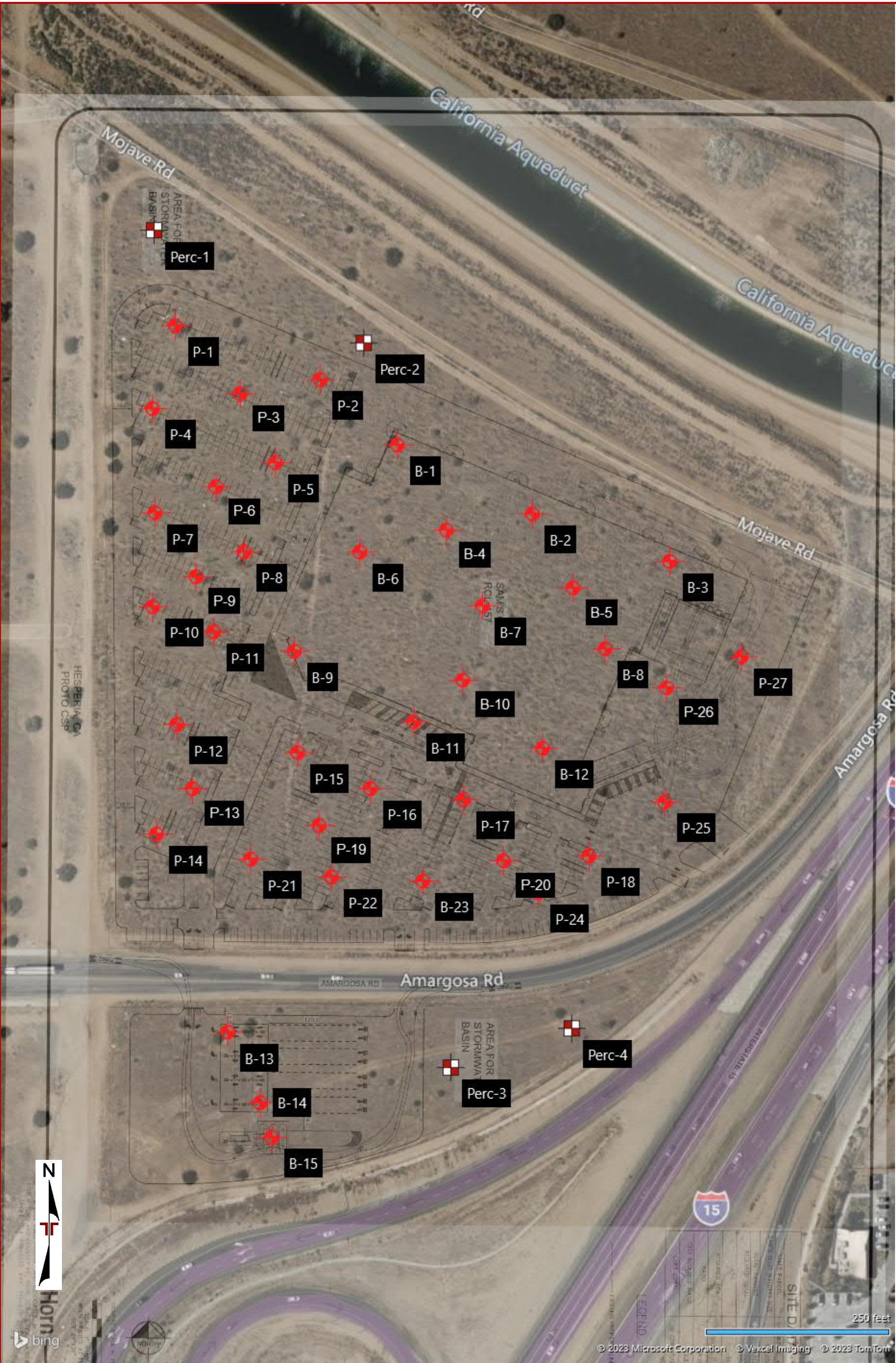


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Exploration and Laboratory Results

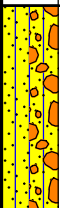
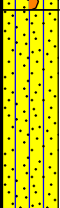
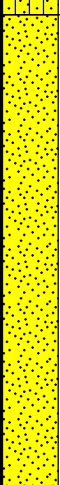
BORING LOG NO. B-1

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4310° Longitude: -117.3805°							
DEPTH								
	SILTY SAND WITH GRAVEL (SM) , brown, very dense	5			22-50/6"	2.7	122	30
	SILTY SAND (SM) , brown, very dense	10			26-50/6"	2.6	127	
	POORLY GRADED SAND (SP) , reddish brown, very dense	15			26-50/6"	1.7	117	16
	POORLY GRADED SAND (SP) , reddish brown, very dense	20			30-50/6"			
	POORLY GRADED SAND (SP) , reddish brown, very dense	21.5			6-12-13 N=25			5
	POORLY GRADED SAND (SP) , reddish brown, very dense	21.5			17-19-23 N=42			
Boring Terminated at 21.5 Feet								
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS		 1355 E Cooley Dr, Ste C Colton, CA		Boring Started: 07-14-2023		Boring Completed: 07-14-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-1		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

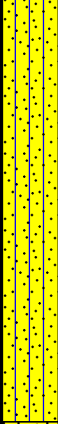
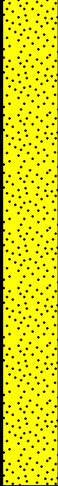
BORING LOG NO. B-2

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4308° Longitude: -117.3799°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (GM) , light brown, very dense, with trace of gravel							
		5			50/6"			23
					50/6"			
	dense				30-37-50			16
		10			31-38-50			
	POORLY GRADED SAND (SP) , dense							
		15			8-12-17 N=29			5
	medium dense	20			15-18-20 N=38			
	Boring Terminated at 21.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.								
WATER LEVEL OBSERVATIONS Groundwater not encountered				Boring Started: 07-10-2023 Drill Rig: CME 75 Project No.: CB235111		Boring Completed: 07-10-2023 Driller: 2R Exhibit: A-2		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

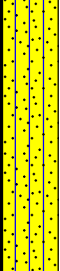
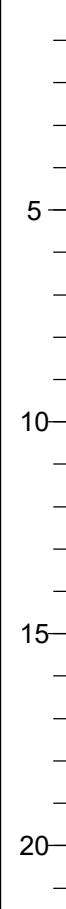
BORING LOG NO. B-3

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES	
	Latitude: 34.4306° Longitude: -117.3792°								
DEPTH									
	SILTY SAND (SM) , brown, very dense, with trace of gravel								
					45-50/6"				
	5				25-50/6"				16
					25-38-50				
	10				30-50/6"				6
		15	11-15-19 N=34						
		20	12-19-31 N=50						
21.5	Boring Terminated at 21.5 Feet								
Stratification lines are approximate. In-situ, the transition may be gradual.									
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:					
		See Appendix B for description of laboratory procedures and additional data (if any).							
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix C for explanation of symbols and abbreviations.							
WATER LEVEL OBSERVATIONS		 1355 E Cooley Dr, Ste C Colton, CA		Boring Started: 07-10-2023		Boring Completed: 07-10-2023			
<i>Groundwater not encountered</i>				Drill Rig: CME 75		Driller: 2R			
				Project No.: CB235111		Exhibit: A-3			

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

BORING LOG NO. B-4

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4307° Longitude: -117.3802°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , brown, medium dense							
		5			15-19-20	2.0	120	21
					20-16-17	1.4	116	
7.5	POORLY GRADED SAND (SP) , brown, dense				24-34-42	2.9	122	
		10			34-43-48			7
	medium dense	15			10-10-15 N=25			7
		20			12-19-21 N=40			
21.5	Boring Terminated at 21.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS		 <p>1355 E Cooley Dr, Ste C Colton, CA</p>		Boring Started: 07-13-2023		Boring Completed: 07-13-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-4		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

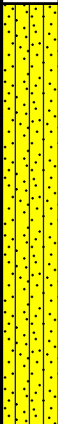
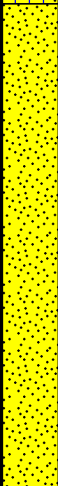
BORING LOG NO. B-5

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4305° Longitude: -117.3797°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES	
DEPTH									
 <p>SILTY SAND (SM), brown, very dense, with trace of gravel</p> <p>dense</p>									
					36-55/6"			28	
		5			45-50/5"				
					21-35-52			13	
	10.0				22-26-28				
	 <p>POORLY GRADED SAND (SM), medium dense, with trace of gravel</p> <p>dense</p>								
			15			12-22-24 N=46			7
			20			13-13-18 N=31			
		21.5							
	Boring Terminated at 21.5 Feet								
Stratification lines are approximate. In-situ, the transition may be gradual.									
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:					
Abandonment Method: Boring backfilled with auger cuttings upon completion.									
WATER LEVEL OBSERVATIONS Groundwater not encountered					Boring Started: 07-10-2023 Drill Rig: CME 75 Project No.: CB235111		Boring Completed: 07-10-2023 Driller: 2R Exhibit: A-5		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

Page 1 of 1

**CLIENT: Kimley-Horn and Associates Inc
Orange, CA**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4306° Longitude: -117.3806°							
	DEPTH							

SILTY SAND (SM) , brown, medium dense, with trace of gravel					
	</				

<p>Advancement Method: Hollow Stem Auger</p>	<p>See Exhibit A-3 for description of field procedures.</p>	<p>Notes:</p>		
<p>Abandonment Method: Boring backfilled with auger cuttings upon completion.</p>	<p>See Appendix B for description of laboratory procedures and additional data (if any).</p> <p>See Appendix C for explanation of symbols and abbreviations.</p>			
<p>WATER LEVEL OBSERVATIONS</p>		 <p>1355 E Cooley Dr, Ste C Colton, CA</p>	Boring Started: 07-13-2023	Boring Completed: 07-13-2023
<p><i>Groundwater not encountered</i></p>			Drill Rig: CME 75	Driller: 2R
			Project No.: CB235111	Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

BORING LOG NO. B-7

Page 1 of 2

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4304° Longitude: -117.3801°							
DEPTH								
	SILTY SAND WITH GRAVEL (SM) , very dense							
					50/5"			28
		5			50			
	7.5				19-22-25	0.7		7
		10			15-23-36			
		15			10-12-23 N=35			5
		20			23-18-26 N=44			
		25			14-18-21 N=39			
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
		See Appendix B for description of laboratory procedures and additional data (if any).						
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS				Boring Started: 07-10-2023		Boring Completed: 07-10-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-7		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. B-7

Page 2 of 2

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4304° Longitude: -117.3801°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	DEPTH							
	POORLY GRADED SAND WITH GRAVEL (SP) , reddish brown, medium dense (continued)	30		X	14-16-16 N=32			
		35		X	9-17-16 N=33			
	very dense 40' to 51.5'	40		X	17-23-30 N=53			
		45		X	20-32-32 N=64			
		50		X	18-31-23 N=54			
	51.5 Boring Terminated at 51.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.								
WATER LEVEL OBSERVATIONS Groundwater not encountered					Boring Started: 07-10-2023		Boring Completed: 07-10-2023	
					Drill Rig: CME 75		Driller: 2R	
					Project No.: CB235111		Exhibit: A-7	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. B-8

Page 1 of 2

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4303° Longitude: -117.3795°							
DEPTH								
	SILTY SAND (SM) , very dense, with trace of gravel							
					50/6"			20
	brown, dense	5			23-25-48	1.9	123	14
					26-23-23			
		10			22-27-40			
		15			12-16-18 N=34			
		20			13-16-20 N=36			5
		25			12-18-13 N=31			
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
		See Appendix B for description of laboratory procedures and additional data (if any).						
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS		 1355 E Cooley Dr, Ste C Colton, CA		Boring Started: 07-10-2023		Boring Completed: 07-10-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-8		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. B-8

Page 2 of 2

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4303° Longitude: -117.3795°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	DEPTH							
	SILTY SAND WITH GRAVEL (SM) , light brown, dense <i>(continued)</i>							
	30.0	30						
	POORLY GRADED SAND WITH GRAVEL (SP) , dense		X		10-15-25 N=40			5
	35.0	35						
	SILTY SAND WITH GRAVEL (SM) , dense		X		17-20-15 N=35			
		40						
			X		12-18-27 N=45			
		45						
			X		17-22-27 N=49			
		50						
	very dense		X		19-23-28 N=51			
	51.5							
	Boring Terminated at 51.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-10-2023

Boring Completed: 07-10-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

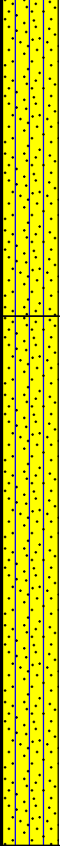
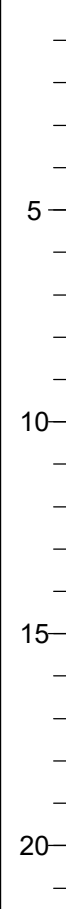
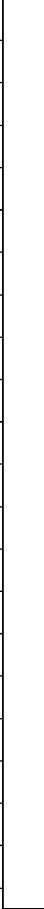
BORING LOG NO. B-9

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4303° Longitude: -117.3809°							
DEPTH								
	SILTY SAND (SM) , medium dense, with trace of gravel							
					13-16-16	1.6	121	16
					11-16-20	1.6	119	
					34-40-50/5"			
					23-50/5"			13
7.5	SILTY SAND (SM) , reddish brown, very dense							
	dense	15			19-23-24 N=47			
20.0	POORLY GRADED SAND (SP) , brown, dense	20			15-15-17 N=32			
21.5	Boring Terminated at 21.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS		 1355 E Cooley Dr, Ste C Colton, CA		Boring Started: 07-13-2023		Boring Completed: 07-13-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-9		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

BORING LOG NO. B-10

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4301° Longitude: -117.3802°							
DEPTH								
	SILTY SAND (SM) , dark brown, medium dense, with trace of gravel							
5.0		5			12-16-20	2.4		22
	SILTY SAND (SM) , reddish brown, very dense				50/5"			
7.5								
	POORLY GRADED SAND (SP) , reddish brown, dense				30-44-45	1.5	117	
		10			30-42-50			
		15			12-14-18 N=32			4
		20			12-13-17 N=30			
21.5	Boring Terminated at 21.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS		 1355 E Cooley Dr, Ste C Colton, CA		Boring Started: 07-13-2023		Boring Completed: 07-13-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-10		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

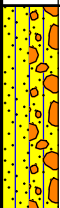
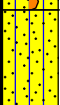
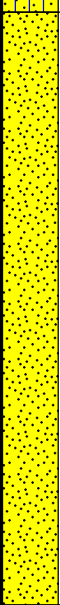
BORING LOG NO. B-11

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4300° Longitude: -117.3804°							
DEPTH								
	SILTY SAND WITH GRAVEL (SM) , dark brown, very dense	5			15-50/4"	2.1	118	28
	SILTY SAND (SM) , reddish brown, very dense				50/4"			
	POORLY GRADED SAND (SP) , reddish brown, dense				20-40-50			
	very dense	10			30-50/6"			
	medium dense	15			11-14-14 N=28			
	light brown, dense	20			19-19-24 N=43			
	Boring Terminated at 21.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS		 1355 E Cooley Dr, Ste C Colton, CA		Boring Started: 07-13-2023		Boring Completed: 07-13-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-11		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

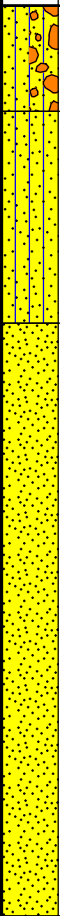
BORING LOG NO. B-12

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4299° Longitude: -117.3798°							
DEPTH								
	SILTY SAND WITH GRAVEL (SM) , dark brown							
	2.5							
	SILTY SAND (SM) , dark brown, very dense				32-50/6"			24
	reddish brown	5			28-50/6"			22
	7.5							
	POORLY GRADED SAND (SP) , reddish brown, dense				22-39-50	1.7	115	
			10			35-40-48	1.2	118
	brown	15			15-14-19 N=33			
		20			11-15-20 N=35			
	21.5							
	Boring Terminated at 21.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS				Boring Started: 07-13-2023		Boring Completed: 07-13-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-12		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

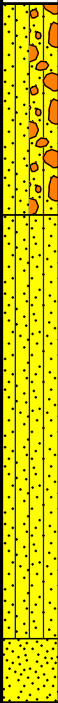
BORING LOG NO. B-14

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4286° Longitude: -117.3811°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND WITH GRAVEL (SM) , dark brown, dense							
5.0		5			26-37-47			30
	SILTY SAND (SM) , dark brown, very dense				26-50/6"			27
					50/6"			
	dense	10			26-37-50			
15.0		15			11-15-17 N=32			
16.5	POORLY GRADED SAND (SP) , dark brown, dense							
	Boring Terminated at 16.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-14-2023

Boring Completed: 07-14-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPER.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

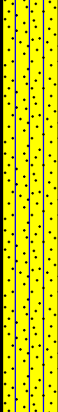
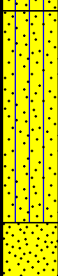
BORING LOG NO. B-15

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4284° Longitude: -117.3810°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown, very dense							
		5			27-50/6"			30
					17-27-36/0"			14
					50/6"			30
		10			35-50/6"			
	SILTY SAND (SM) , trace gravel, dark brown, very dense							
	POORLY GRADED SAND (SP) , trace gravel, dark brown, medium dense	15			8-8-12 N=20			
	Boring Terminated at 16.5 Feet	16.5						
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: 8" Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.								
WATER LEVEL OBSERVATIONS Groundwater not encountered					Boring Started: 07-14-2023 Drill Rig: CME 75 Project No.: CB235111		Boring Completed: 07-14-2023 Driller: 2R Exhibit: A-15	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-1

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4294° Longitude: -117.3804°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							15
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-101

BORING LOG NO. P-2

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4315° Longitude: -117.3815°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-102

BORING LOG NO. P-3

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4313° Longitude: -117.3808°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							22
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).
See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-103

BORING LOG NO. P-4

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4312° Longitude: -117.3812°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-104

BORING LOG NO. P-5

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4312° Longitude: -117.3816°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							18
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-105

BORING LOG NO. P-6

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4310° Longitude: -117.3810°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							27
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-106

BORING LOG NO. P-7

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4309° Longitude: -117.3813°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-107

BORING LOG NO. P-8

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4308° Longitude: -117.3816°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							24
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-108

BORING LOG NO. P-9

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4306° Longitude: -117.3812°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							25
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-109

BORING LOG NO. P-10

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4305° Longitude: -117.3814°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).
See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-110

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-11

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4304° Longitude: -117.3816°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							30
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-111

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-12

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4303° Longitude: -117.3813°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM) , trace gravel, brown to reddish brown, very dense							
		5		X	29-34-40 N=74			7
				X	29-27-34 N=61			8
		10		X	24-40-47 N=87			
				X	39-50/6"			
	11.5	Boring Terminated at 11.5 Feet						
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: 8" Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.								
WATER LEVEL OBSERVATIONS Groundwater not encountered				Boring Started: 07-13-2023 Drill Rig: CME 75 Project No.: CB235111		Boring Completed: 07-13-2023 Driller: 2R Exhibit: A-112		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-13		Page 1 of 1	
PROJECT: Sam's Club Hesperia		CLIENT: Kimley-Horn and Associates Inc	
SITE: North of Amargosa Road & West of Highway I-15 Hesperia, CA			
LOCATION See Exhibit A-2 Latitude: 34.4300° Longitude: -117.3815°			
GRAPHIC LOG			
DEPTH		SILTY SAND WITH GRAVEL (SM), dark brown, very dense	
		medium dense	
		SILTY SAND (SM), trace gravel, reddish brown, dense	
		POORLY GRADED SAND WITH GRAVEL (SP), reddish brown, dense	
		Boring Terminated at 11.5 Feet	
		Stratification lines are approximate. In-situ, the transition may be gradual.	
Notes:		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.	
Advancement Method: 8" Hollow Stem Auger		Abandonment Method: Boring backfilled with auger cuttings upon completion.	
WATER LEVEL OBSERVATIONS		Groundwater not encountered	
Project No.: CB235111		1355 E Cooley Dr, Ste C Colton, CA Terracon	
Boring Started: 07-13-2023		Drill Rtg: CME 75	
Boring Completed: 07-13-2023		Driller: 2R	
Exhibit: A-112			
DEPTH (FL)		10	
WATER LEVEL OBSERVATIONS		16-15-13 N=28	
SAMPLE TYPE		17-30-38 N=68	
FIELD TEST RESULTS		18-18-21 N=39	
WATER CONTENT (%)			
DRY UNIT WEIGHT (pcf)			
PERCENT FINES		30	

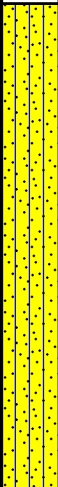
BORING LOG NO. P-16

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4299° Longitude: -117.3809°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown, dense							
	medium dense	5		X	13-20-23 N=43			
				X	9-11-14 N=25			
	very dense			X	32-50/6"			
		10		X	15-24-19 N=43			
	Boring Terminated at 11.5 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: 8" Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.								
WATER LEVEL OBSERVATIONS Groundwater not encountered					Boring Started: 07-13-2023 Drill Rig: CME 75 Project No.: CB235111		Boring Completed: 07-13-2023 Driller: 2R Exhibit: A-116	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

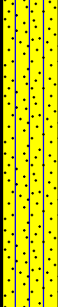
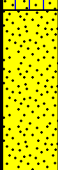
BORING LOG NO. P-17

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PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4297° Longitude: -117.3806°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , dark brown, dense							
				X	28-23-26 N=49			18
	very dense	5		X	30-50/5"			29
	7.5							
	POORLY GRADED SAND (SP) , trace gravel, reddish brown, dense			X	13-17-18 N=35			
		10		X	17-17-18 N=35			
	11.5							
Boring Terminated at 11.5 Feet								
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: 8" Hollow Stem Auger Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
WATER LEVEL OBSERVATIONS Groundwater not encountered		 <p>1355 E Cooley Dr, Ste C Colton, CA</p>		Boring Started: 07-13-2023		Boring Completed: 07-13-2023		
				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-117		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

Page 1 of 1

**CLIENT: Kimley-Horn and Associates Inc
Orange, CA**

LOCATION See Exhibit A-2		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
GRAPHIC LOG	DEPTH							
	SILTY SAND (SM) , trace gravel, dark brown, very dense							
	medium dense	5			30-37-42 N=79			25
					7-11-13 N=24			
	POORLY GRADED SAND (SP) , trace silt, dark brown, medium dense							
		10			11-13-15 N=28			
					8-9-7 N=16			
Boring Terminated at 11.5 Feet								

Exhibit: A-118

BORING LOG NO. P-19

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PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4295° Longitude: -117.3796°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, brown							
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-119

BORING LOG NO. P-20

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4296° Longitude: -117.3808°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, brown							29
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-120

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-21

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PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4295° Longitude: -117.3800°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).
See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-121

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-22

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PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4295° Longitude: -117.3811°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, brown							26
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method: 8" Hollow Stem Auger	See Exhibit A-3 for description of field procedures.	Notes:	
Abandonment Method: Boring backfilled with auger cuttings upon completion.	See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		
WATER LEVEL OBSERVATIONS	 1355 E Cooley Dr, Ste C Colton, CA	Boring Started: 07-13-2023	Boring Completed: 07-13-2023
Groundwater not encountered		Drill Rig: CME 75	Driller: 2R
		Project No.: CB235111	Exhibit: A-122

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-23

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4294° Longitude: -117.3808°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).
See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-123

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. P-24

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PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4293° Longitude: -117.3798°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							28
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-13-2023

Boring Completed: 07-13-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-124

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

Page 1 of 1

**CLIENT: Kimley-Horn and Associates Inc
Orange, CA**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4297° Longitude: -117.3793°							
	DEPTH							

dense

Figure 1: A schematic diagram of a 1D lattice with 10 sites. The lattice is represented by a horizontal line with 10 vertical segments. The sites are numbered 1 to 10 from left to right. A thick vertical line is drawn between sites 4 and 5, representing a bipartition. The sites are grouped into four sets: sites 1-4 are labeled '17-24-28 N=52', sites 5-6 are labeled '17-20-25 N=45', sites 7-8 are labeled '17-21-26 N=46', and sites 9-10 are labeled '17-22-27 N=46'. The labels are placed in the middle of each group of sites.

Advancement Method: 8" Hollow Stem Auger	See Exhibit A-3 for description of field procedures.	Notes:	
	See Appendix B for description of laboratory procedures and additional data (if any).		
Abandonment Method: Boring backfilled with auger cuttings upon completion.	See Appendix C for explanation of symbols and abbreviations.		
WATER LEVEL OBSERVATIONS	 1355 E Cooley Dr, Ste C Colton, CA	Boring Started: 07-13-2023	Boring Completed: 07-13-2023
<i>Groundwater not encountered</i>		Drill Rig: CME 75	Driller: 2R
		Project No.: CB235111	Exhibit: A-125

Page 1 of 1

**CLIENT: Kimley-Horn and Associates Inc
Orange, CA**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	Latitude: 34.4301° Longitude: -117.3792°							
	DEPTH							

5-5-5
N=10

Stratification lines are approximate. In-situ, the transition may be gradual.

Exhibit: A-126

BORING LOG NO. P-27

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4302° Longitude: -117.3789°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, reddish brown to brown, very dense							
		5			23-30-30 N=60			8
					26-35-45 N=80			
		10						
	Boring Terminated at 10 Feet							
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: 8" Hollow Stem Auger		See Exhibit A-3 for description of field procedures.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.		See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.						
WATER LEVEL OBSERVATIONS		 <p>1355 E Cooley Dr, Ste C Colton, CA</p>		Boring Started: 07-13-2023		Boring Completed: 07-13-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-127		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

BORING LOG NO. Perc-1

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4318° Longitude: -117.3816°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							29
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 07-14-2023

Boring Completed: 07-14-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-201

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON_DATATEMPLATE.GDT 8/24/23

BORING LOG NO. Perc-2

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4314° Longitude: -117.3806°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown	5						
10.0	Boring Terminated at 10 Feet	10						
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: 8" Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.								
WATER LEVEL OBSERVATIONS		 <p>1355 E Cooley Dr, Ste C Colton, CA</p>		Boring Started: 07-14-2023		Boring Completed: 07-14-2023		
Groundwater not encountered				Drill Rig: CME 75		Driller: 2R		
				Project No.: CB235111		Exhibit: A-202		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

BORING LOG NO. Perc-3

Page 1 of 1

PROJECT: Sam's Club Hesperia

CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4287° Longitude: -117.3802°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown							18
5.0		5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
8" Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix B for description of laboratory
procedures and additional data (if any).

See Appendix C for explanation of symbols and
abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-14-2023

Boring Completed: 07-14-2023

Drill Rig: CME 75

Driller: 2R

Project No.: CB235111

Exhibit: A-203

BORING LOG NO. Perc-4

Page 1 of 1

PROJECT: Sam's Club Hesperia

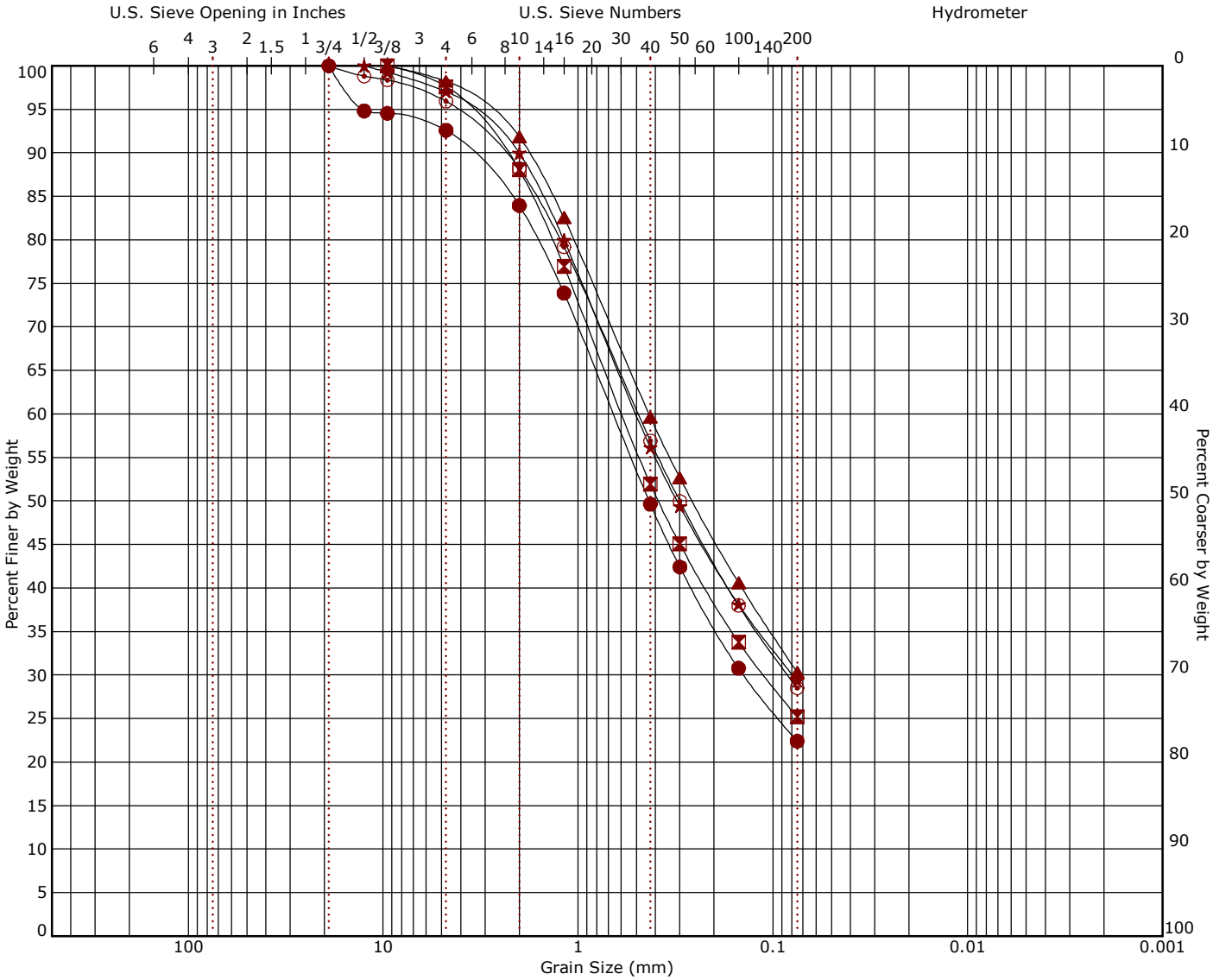
CLIENT: Kimley-Horn and Associates Inc
Orange, CA

SITE: North of Amargosa Road & West of Highway I-15
Hesperia, CA

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.4288° Longitude: -117.3797°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
DEPTH								
	SILTY SAND (SM) , trace gravel, dark brown	5						
10.0	Boring Terminated at 10 Feet	10						
Stratification lines are approximate. In-situ, the transition may be gradual.								
Advancement Method: 8" Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:				
Abandonment Method: Boring backfilled with auger cuttings upon completion.								
WATER LEVEL OBSERVATIONS <i>Groundwater not encountered</i>				Boring Started: 07-14-2023 Drill Rig: CME 75 Project No.: CB235111		Boring Completed: 07-14-2023 Driller: 2R Exhibit: A-204		

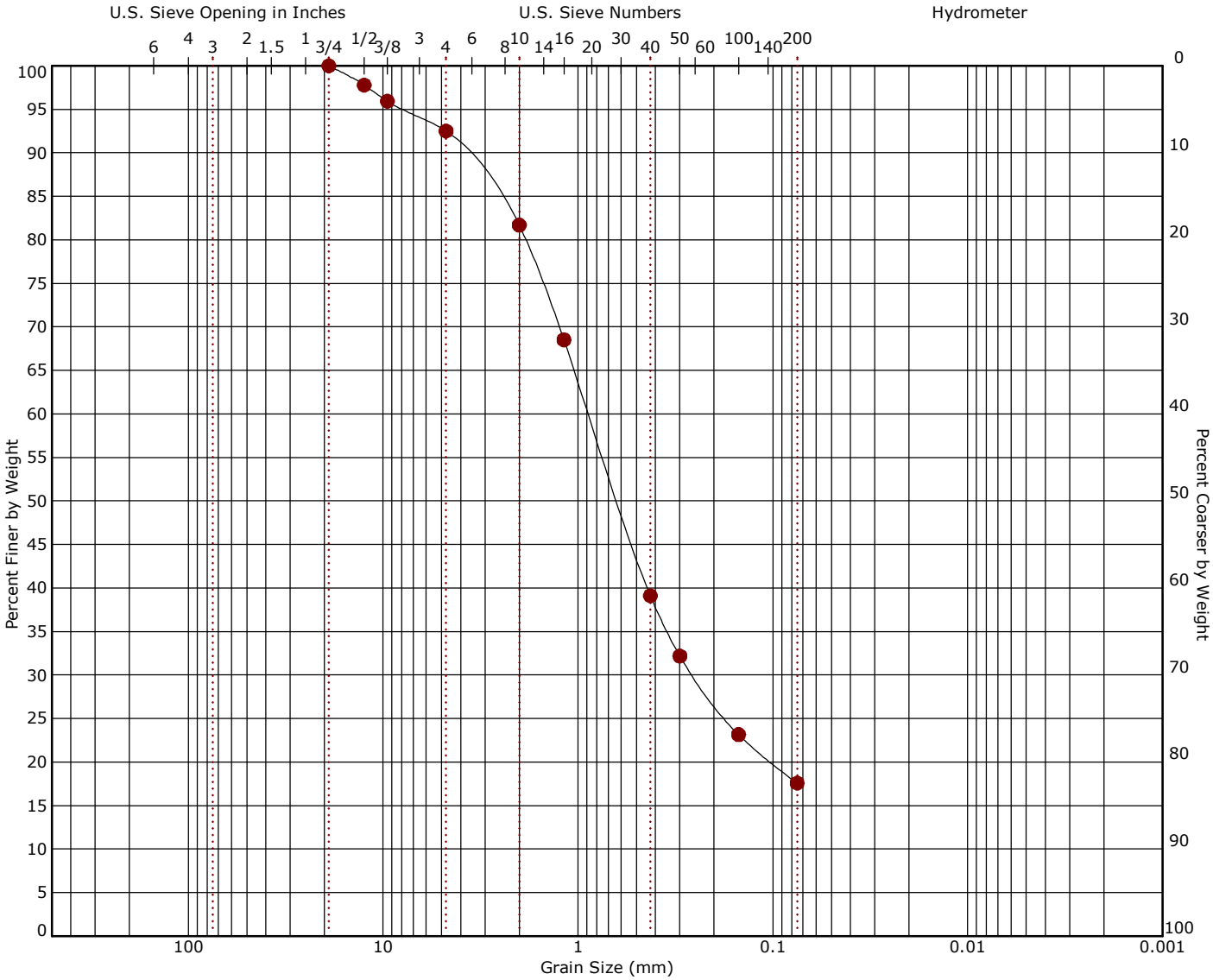
THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB235111 SAM'S CLUB HESPERIA.GPJ TERRACON DATATEMPLATE.GDT 8/24/23

Grain Size Distribution
ASTM D422 / ASTM C136



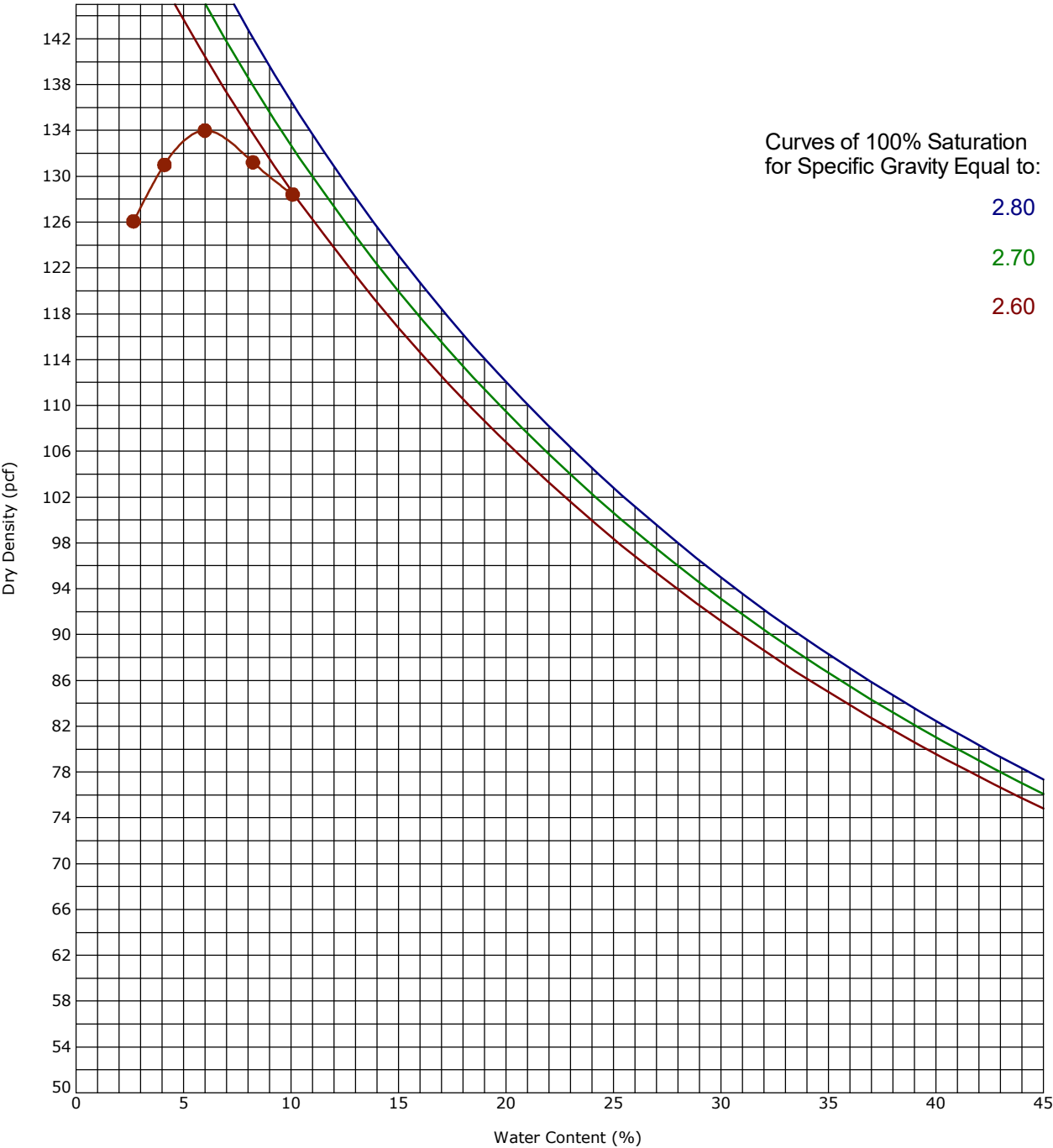
		Cobbles		Gravel		Sand			Silt or Clay		
				coarse	fine	coarse	medium	fine			
Boring ID	Depth (Ft)	USCS Classification			USCS	AASHTO	LL	PL	PI	Cc	Cu
● P-3	0 - 5										
⊠ P-9	0 - 5										
▲ P-13	0 - 5										
★ P-20	0 - 5										
⊙ Perc-1	0 - 5										
Boring ID	Depth (Ft)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
● P-3	0 - 5	19	0.658	0.141		0.0	7.4	70.2	22.4		
⊠ P-9	0 - 5	9.5	0.591	0.11		0.0	2.4	72.4	25.2		
▲ P-13	0 - 5	9.5	0.432			0.0	1.8	67.9	30.3		
★ P-20	0 - 5	12.5	0.501	0.079		0.0	2.9	67.7	29.4		
⊙ Perc-1	0 - 5	19	0.49	0.084		0.0	4.1	67.4	28.5		

Grain Size Distribution
ASTM D422 / ASTM C136



Cobbles		Gravel		Sand			Silt or Clay					
		coarse	fine	coarse	medium	fine						
Boring ID	Depth (Ft)	USCS Classification				USCS	AASHTO	LL	PL	PI	Cc	Cu
<div></div> Perc-3	0 - 5											
Boring ID	Depth (Ft)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay	
<div></div> Perc-3	0 - 5	19	0.878	0.254		0.0	7.5	74.9	17.6			

Moisture-Density Relationship
ASTM D1557-Method D



Boring ID		Depth (Ft)		Description of Materials			
B-5		0 - 5					
Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
	0.0				ASTM D1557-Method D	134.0	6.0

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393



Client

Project

Sam's Club Hesperia

Sample Submitted By: Terracon (CB)

Date Received: 7/28/2023

Lab No.: 23-0427

Results of Corrosion Analysis

Sample Number	--
Sample Location	B-7
Sample Depth (ft.)	0.0-5.0
pH Analysis, ASTM G51	7.62
Water Soluble Sulfate (SO ₄), ASTM C 1580 (mg/kg)	23
Sulfides, AWWA 4500-S D, (mg/Kg)	Nil
Chlorides, ASTM D512, (mg/kg)	45
Red-Ox, ASTM G200, (mV)	+736
Total Salts, AWWA 2540, (mg/Kg)	47
As-Received Resistivity, ASTM G-57, (ohm-cm)	271600
Saturated Minimum Resistivity, ASTM G-57, (ohm-cm)	4850

A handwritten signature in black ink, appearing to read 'N. Campo'.

Analyzed By

Nathan Campo
Engineering Technician III

The tests were performed in general accordance with applicable ASTM and AWWA test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

Job No. CB235111
Date. 8/16/2023

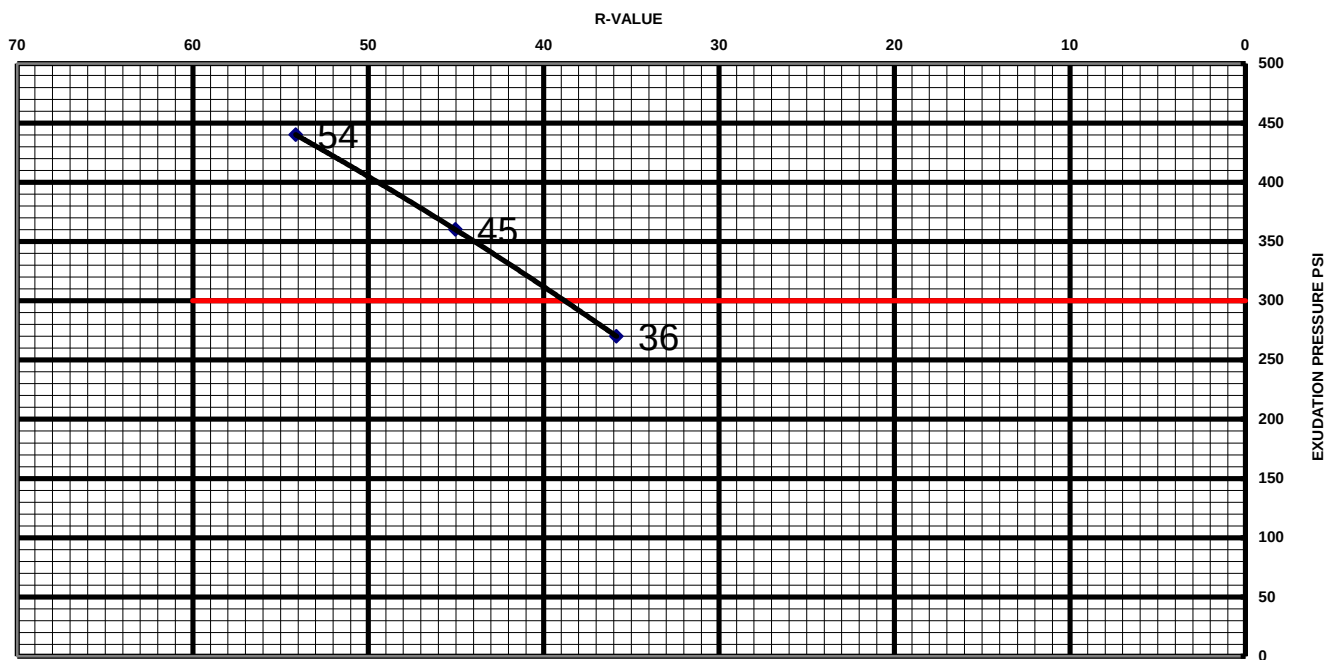
**LABORATORY RECORD OF TESTS MADE ON
BASE, SUBBASE, AND BASEMENT SOILS**

CLIENT: Kimley-Horn and Associate
PROJECT Sam's Club-Hesperia
LOCATION: Hesperia, CA
R-VALUE # : P-25
T.I. :

COMPACTOR AIR PRESSURE P.S.I.
INITIAL MOISTURE %
WATER ADDED, ML
WATER ADDED %
MOISTURE AT COMPACTION %
HEIGHT OF BRIQUETTE
WET WEIGHT OF BRIQUETTE
DENSITY LB. PER CU.FT.
STABILOMETER PH AT 1000 LBS.
2000 LBS.
DISPLACEMENT
R-VALUE
EXUDATION PRESSURE
THICK. INDICATED BY STAB.
EXPANSION PRESSURE
THICK. INDICATED BY E.P.

A	B	C	D
350	350	350	
2.2	2.2	2.2	
75	70	65	
6.5	6.1	5.7	
8.7	8.3	7.9	
2.53	2.49	2.45	
1177	1177	1157	
129.7	132.3	132.6	
38	32	28	
74	63	52	
5.20	4.70	4.40	
36	45	54	
270	360	440	
0.00	0.00	0.00	
0	0	4	
0.00	0.00	0.13	

EXUDATION CHART



R-Value: 39

Job No. CB235111
Date. 8/16/2023

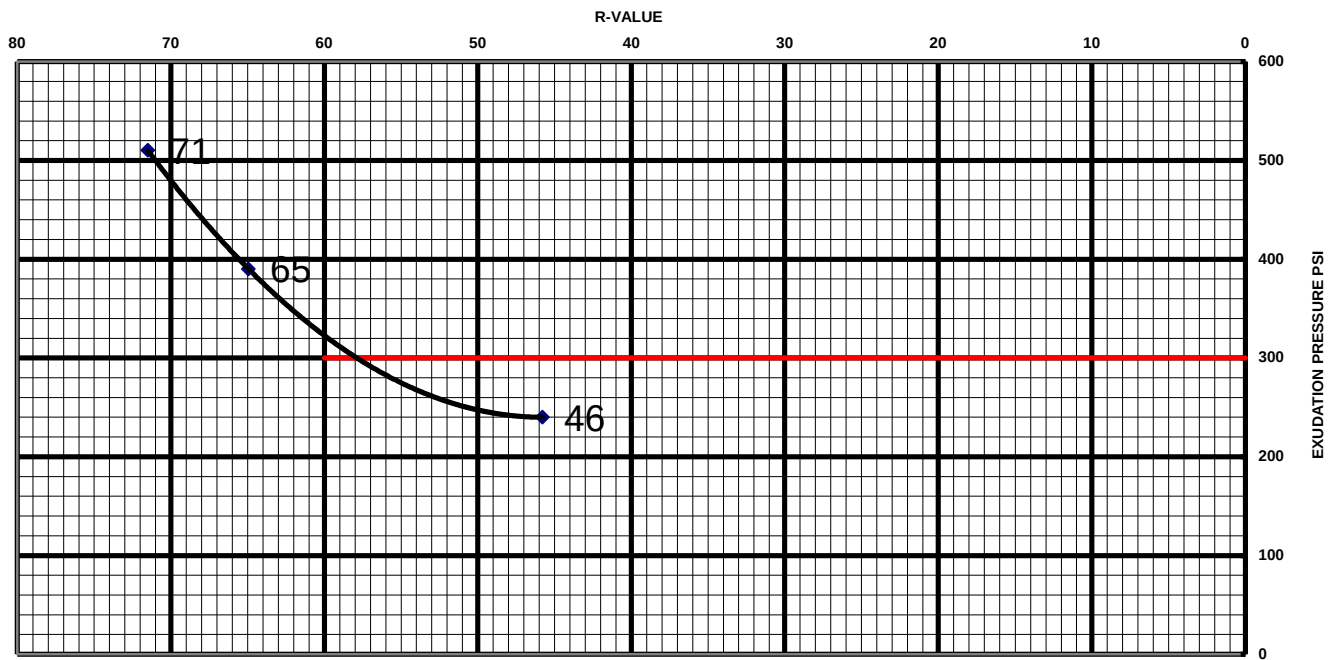
**LABORATORY RECORD OF TESTS MADE ON
BASE, SUBBASE, AND BASEMENT SOILS**

CLIENT: Kimley-Horn and Associate
PROJECT Sam's Club-Hesperia
LOCATION: Hesperia, CA
R-VALUE # : P-6
T.I. :

COMPACTOR AIR PRESSURE P.S.I.
INITIAL MOISTURE %
WATER ADDED, ML
WATER ADDED %
MOISTURE AT COMPACTION %
HEIGHT OF BRIQUETTE
WET WEIGHT OF BRIQUETTE
DENSITY LB. PER CU.FT.
STABILOMETER PH AT 1000 LBS.
2000 LBS.
DISPLACEMENT
R-VALUE
EXUDATION PRESSURE
THICK. INDICATED BY STAB.
EXPANSION PRESSURE
THICK. INDICATED BY E.P.

A	B	C	D
350	350	350	
1.5	1.5	1.5	
85	75	70	
7.4	6.5	6.1	
8.9	8.0	7.6	
2.52	2.54	2.52	
1169	1174	1167	
129.1	129.7	130.4	
34	20	17	
56	32	28	
5.50	5.40	4.70	
46	65	71	
240	390	510	
0.00	0.00	0.00	
0	0	0	
0.00	0.00	0.00	

EXUDATION CHART

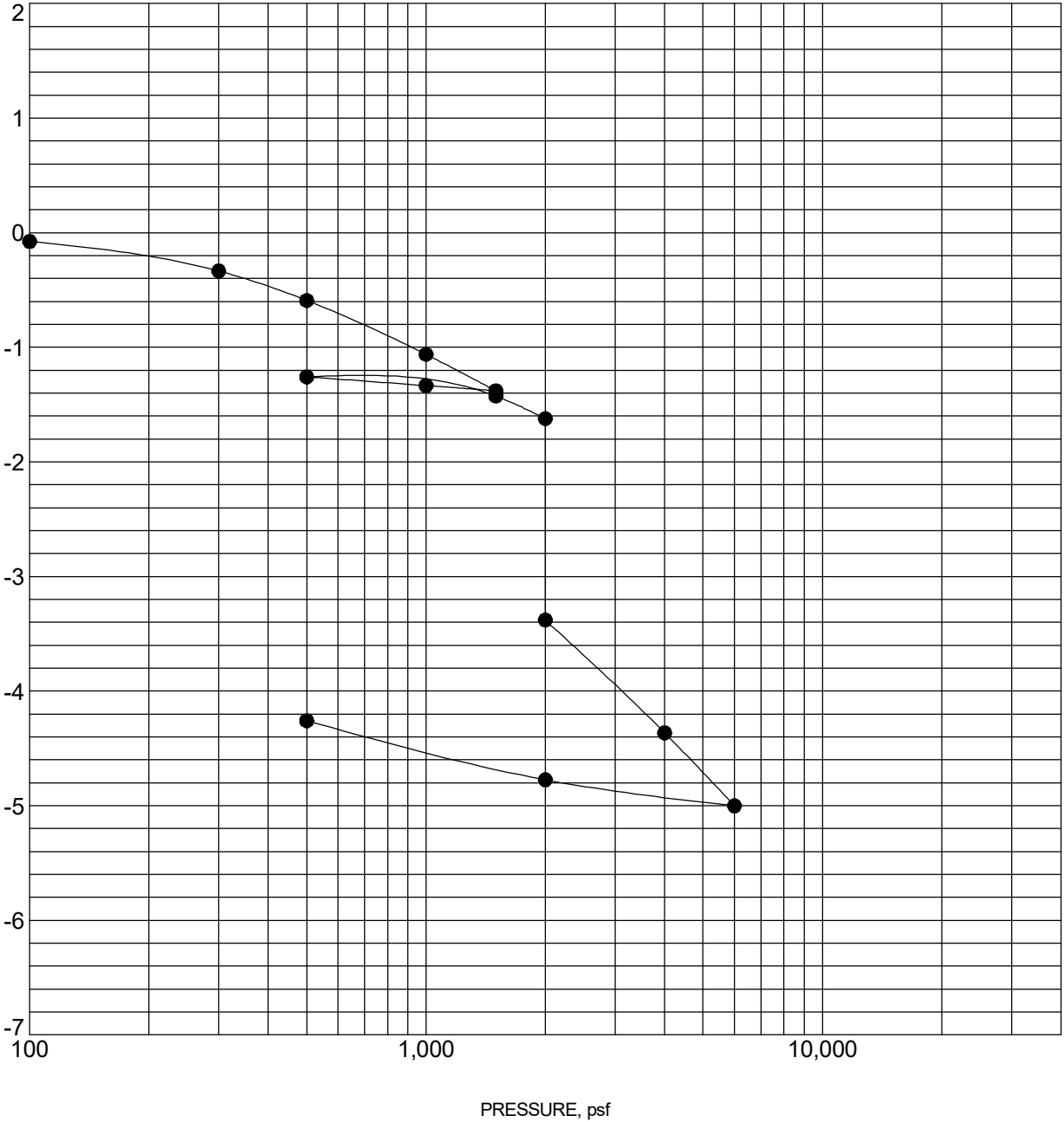


R-Value: 58

SWELL CONSOLIDATION TEST
ASTM D2435

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS CB235111 SAM'S CLUB HESPER.GPJ TERRACON_DATATEMPLATE.GDT 8/23/23

AXIAL STRAIN, %



Specimen Identification			Classification	γ_d , pcf	WC, %
●	B-6	2.5 - 4 ft			

NOTES: sample was saturated at axial pressure of 2,000 psf

PROJECT: Sam's Club Hesperia

SITE: North of Amargosa Road &
West of Highway I-15
Hesperia, CA



PROJECT NUMBER: CB235111

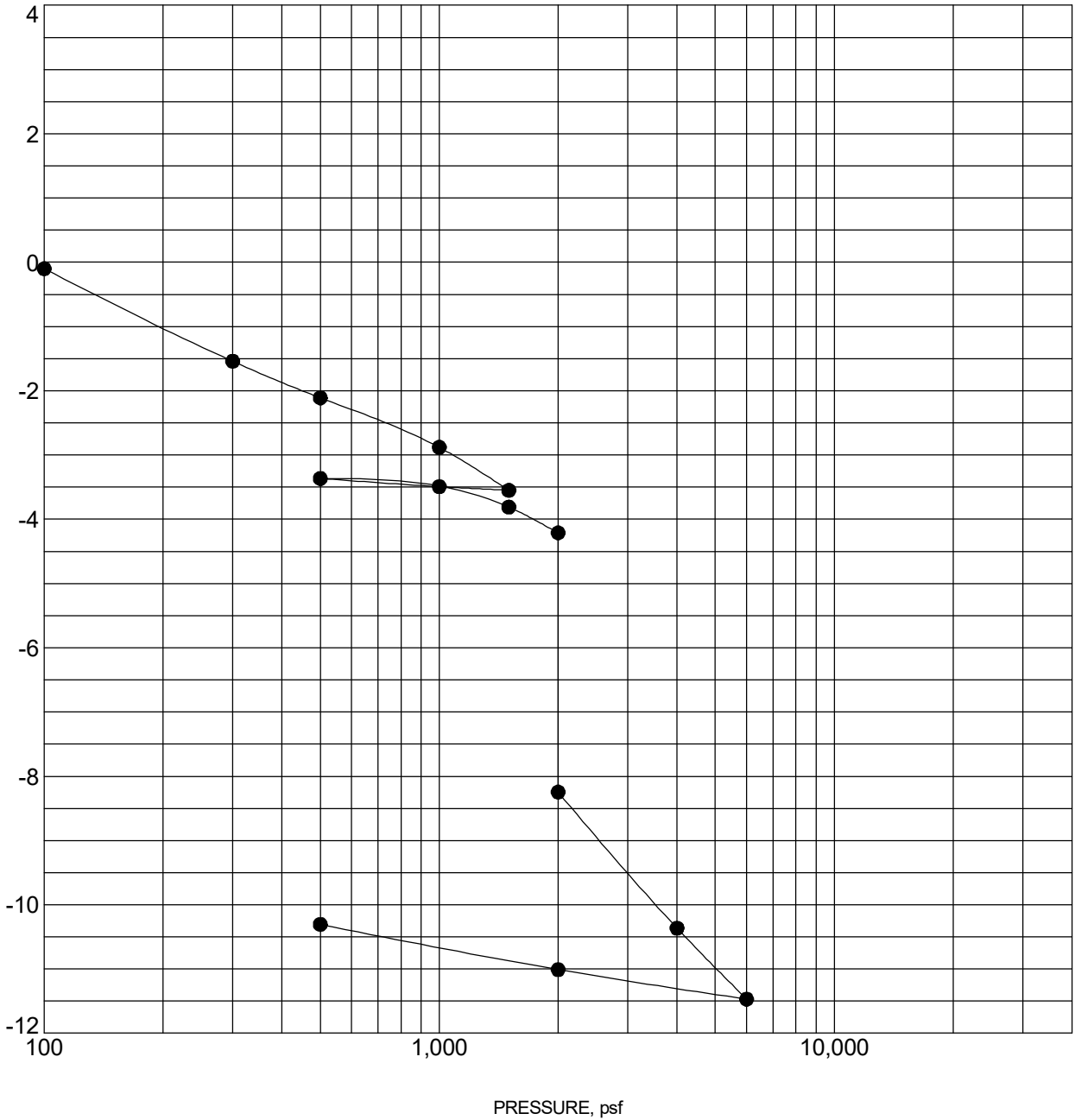
CLIENT: Kimley-Horn and Associates
Inc
Orange, CA

EXHIBIT: B-1

SWELL CONSOLIDATION TEST
ASTM D2435

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS CB235111 SAM'S CLUB HESPER.GPJ TERRACON_DATATEMPLATE.GDT 8/23/23

AXIAL STRAIN, %



Specimen Identification			Classification	γ_d , pcf	WC, %
●	B-9	10 - 11.4 ft			

NOTES: sample was saturated at axial pressure of 2,000 psf

PROJECT: Sam's Club Hesperia

SITE: North of Amargosa Road &
West of Highway I-15
Hesperia, CA



PROJECT NUMBER: CB235111

CLIENT: Kimley-Horn and Associates
Inc
Orange, CA

EXHIBIT: B-1

Job No.: CB235111

PERCOLATION TEST DATA

BORING NUMBER: P-1
LOT No: N/A
TRACT No: N/A

CLIENT: Sams Club
PROJECT: Sams Club Hesperia

DATE OF DRILLING:
DATE OF PRESOAK:
DATE OF TEST: July 19, 2023
TESTED BY:

DEPTH BEFORE (ft.): 5.0
DEPTH AFTER (ft.): 5.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
25	25	19.0	36.0	17.0	60.0	60.0	40.8	2.37
25	50	11.0	27.0	16.0	60.0	60.0	38.4	1.79
10	60	7.0	21.5	14.5	60.0	60.0	87.0	3.64
10	70	8.0	27.5	19.5	60.0	60.0	117.0	5.29
10	80	6.5	17.0	10.5	60.0	60.0	63.0	2.51
10	90	3.0	11.0	8.0	60.0	60.0	48.0	1.75
10	100	2.0	10.5	8.5	60.0	60.0	51.0	1.83
10	110	2.0	9.0	7.0	60.0	60.0	42.0	1.49

Final reading: 49.50 1.79

Job No.: CB235111

PERCOLATION TEST DATA

BORING NUMBER:	P-2
LOT No:	N/A
TRACT No:	N/A

CLIENT:	Sams Club
PROJECT:	Sams Club Hesperia

DATE OF DRILLING:	
DATE OF PRESOAK:	
DATE OF TEST:	July 19, 2023
TESTED BY:	

DEPTH BEFORE (ft.):	10.0
DEPTH AFTER (ft.):	10.0
PVC PIPE DIA. (in.):	3.0
PERC HOLE DIA. (in.):	8.0

[illegible]

Job No.: CB235111

PERCOLATION TEST DATA

BORING NUMBER: P-3
LOT No: N/A
TRACT No: N/A

CLIENT: Sams Club
PROJECT: Sams Club- Hesperia

DATE OF DRILLING:
DATE OF PRESOAK:
DATE OF TEST: July 19, 2023
TESTED BY:

DEPTH BEFORE (ft.): 5.0
DEPTH AFTER (ft.): 5.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
25	25	25.0	60.0	35.0	60.0	60.0	84.0	8.62
25	50	21.5	60.0	38.5	60.0	60.0	92.4	8.70
10	60	18.8	38.5	19.8	60.0	60.0	118.5	7.10
10	70	11.0	30.0	19.0	60.0	60.0	114.0	5.49
10	80	10.5	26.3	15.8	60.0	60.0	94.5	4.33
10	90	8.5	23.0	14.5	60.0	60.0	87.0	3.76
10	100	7.0	21.3	14.3	60.0	60.0	85.5	3.57
10	110	7.0	20.5	13.5	60.0	60.0	81.0	3.36

Final reading: 84.50 3.56

Job No.: CB235111

PERCOLATION TEST DATA

BORING NUMBER: P-4
LOT No: N/A
TRACT No: N/A

CLIENT: Sams Club
PROJECT: Sams Club- Hesperia

DATE OF DRILLING:
DATE OF PRESOAK:
DATE OF TEST: July 19, 2023
TESTED BY:
DEPTH BEFORE (ft.): 10.0
DEPTH AFTER (ft.): 10.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
25	25	88.0	120.0	32.0	120.0	120.0	76.8	8.53
25	50	85.0	120.0	35.0	120.0	120.0	84.0	8.62
10	60	84.0	108.5	24.5	120.0	120.0	147.0	11.42
10	70	79.3	102.8	23.5	120.0	120.0	141.0	9.10
10	80	80.0	100.5	20.5	120.0	120.0	123.0	7.75
10	90	77.5	95.3	17.8	120.0	120.0	106.5	5.98
10	100	77.0	94.0	17.0	120.0	120.0	102.0	5.59
10	110	75.0	91.0	16.0	120.0	120.0	96.0	4.92

Final reading: 101.50 5.50

Supporting Information

Contents:

General Notes
Unified Soil Classification System

Note: All attachments are one page unless noted above.

General Notes

Sampling	Water Level	Field Tests
 Auger Cuttings  Modified Dames & Moore Ring Sampler  Split Spoon	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time  Cave In Encountered <p>Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.</p>	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Relative Density	Standard Penetration or N-Value (Blows/Ft.)	Ring Sampler (Blows/Ft.)	Consistency	Unconfined Compressive Strength Qu (tsf)	Standard Penetration or N-Value (Blows/Ft.)	Ring Sampler (Blows/Ft.)
Very Loose	0 - 3	0 - 5	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	6 - 14	Soft	0.25 to 0.50	2 - 4	3 - 5
Medium Dense	10 - 29	15 - 46	Medium Stiff	0.50 to 1.00	4 - 8	6 - 10
Dense	30 - 50	47 - 79	Stiff	1.00 to 2.00	8 - 15	11 - 18
Very Dense	> 50	> 80	Very Stiff	2.00 to 4.00	15 - 30	19 - 36
			Hard	> 4.00	> 30	> 36

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification	
				Group Symbol	Group Name ^B
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F
			$Cu < 4$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E	GP	Poorly graded gravel ^F
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}
			Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E	SW	Well-graded sand ^I
			$Cu < 6$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E	SP	Poorly graded sand ^I
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}
			Fines classify as CL or CH	SC	Clayey sand ^{G, H, I}
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots above "A" line ^J	CL	Lean clay ^{K, L, M}
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K, L, M}
		Organic:	$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OL	Organic clay ^{K, L, M, N} Organic silt ^{K, L, M, O}
			Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line
	PI plots below "A" line	MH			Elastic silt ^{K, L, M}
	Organic:	$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$		OH	Organic clay ^{K, L, M, P} Organic silt ^{K, L, M, Q}
		Highly organic soils:		Primarily organic matter, dark in color, and organic odor	

^A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

^E $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

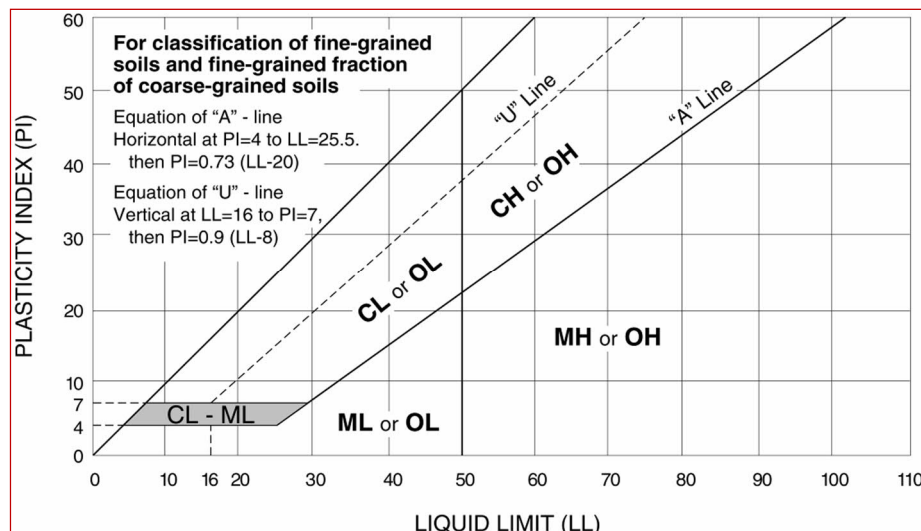
^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



Appendix G
Hydrology Exhibits

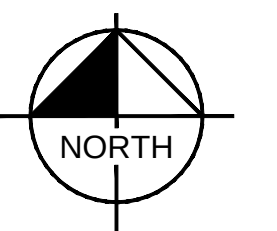
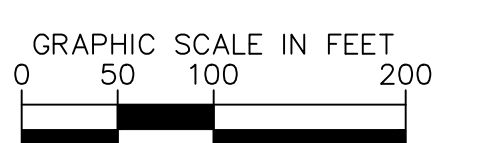
[illegible]

SITE AREA:	25.37 ACRES	
SOIL TYPE:	A	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	0%	(PER CALCULATIONS)
ISOHYETALS:	0.411 INCH	(2-YEAR, 1-HR)
	1.18 INCH	(100-YEAR, 1-HR)
CURVE NUMBER	67	(SOIL GROUP A)
FREQUENCY:	2-YEAR	(FOR STORMWATER QUALITY)
	100-YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	SAN BERNARDINO COUNTY HYDROLOGY MANUAL	

Diagram illustrating the symbols for a drainage area boundary, flow path, existing flow direction arrow, drainage area designation, area (AC), and node.

- DRAINAGE AREA BOUNDARY:** Represented by a dashed purple line.
- FLOW PATH:** Represented by a red line with arrows pointing right.
- EXISTING FLOW DIRECTION ARROW:** Represented by a thick black arrow pointing right.
- DRAINAGE AREA DESIGNATION:** Represented by a circle containing an 'X'.
- AREA (AC):** Represented by a circle containing 'X.XX'.
- NODE:** Represented by a hexagon containing '1.1'.

HYDROLOGY SUMMARY						
DRAINAGE AREA NO.	TRIBUTARY AREA (SF)	TRIBUTARY AREA (AC)	IMPERVIOUS RATIO	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)	V ₁₀₀ (CF)
A	727,385	16.70	0.00	19.65	33.23	254,826
B	377,722	8.67	0.00	17.30	26.59	155,074
TOTAL	1,105,107	25.37	0.00	36.95	59.82	409,900



Kimley»Horn

PRE-DEVELOPMENT HYDROLOGY EXHIBIT

CITY OF HESPERIA

1

1

CITY OF HESPERIA
POST-DEVELOPMENT HYDROLOGY EXHIBIT

HYDROLOGY INFORMATION

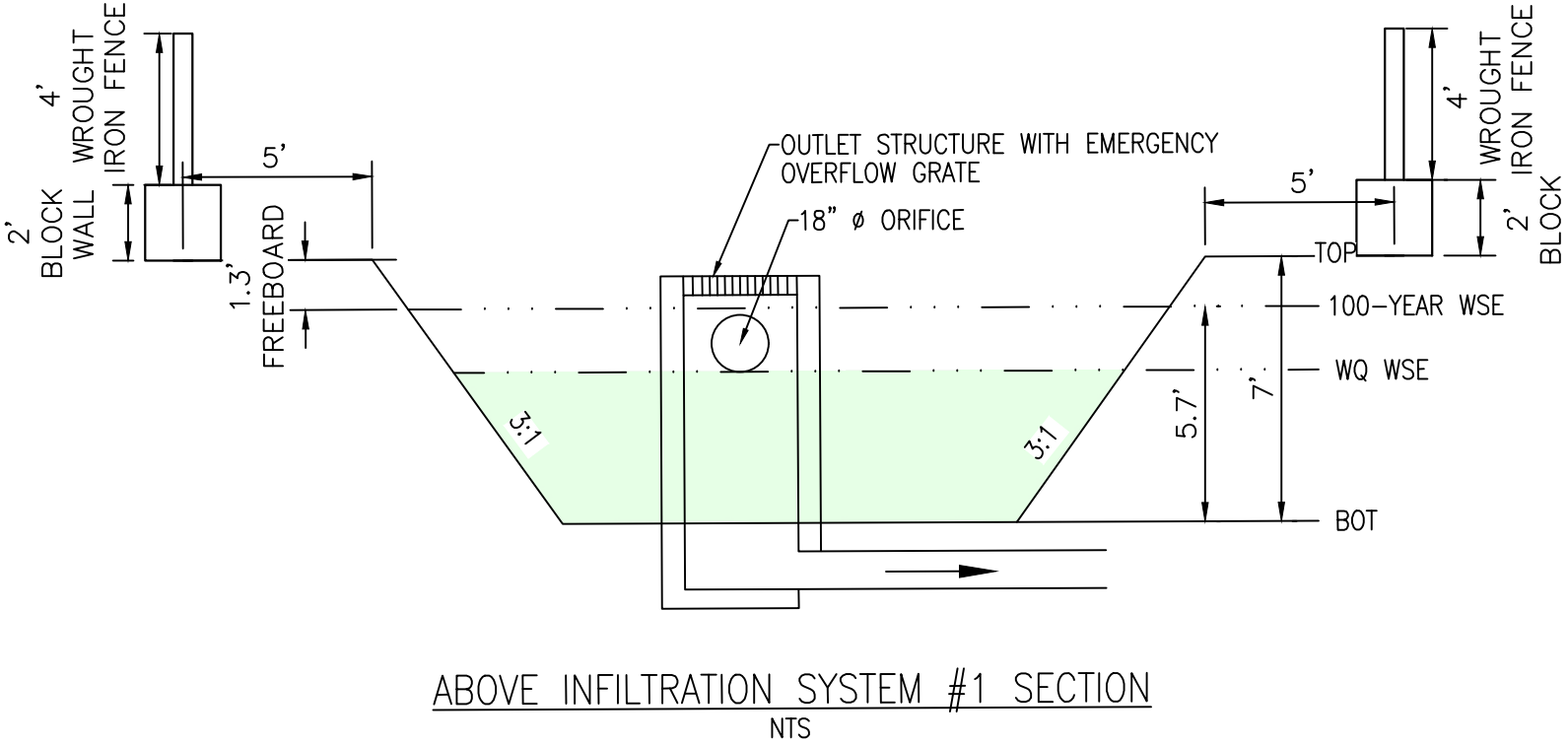
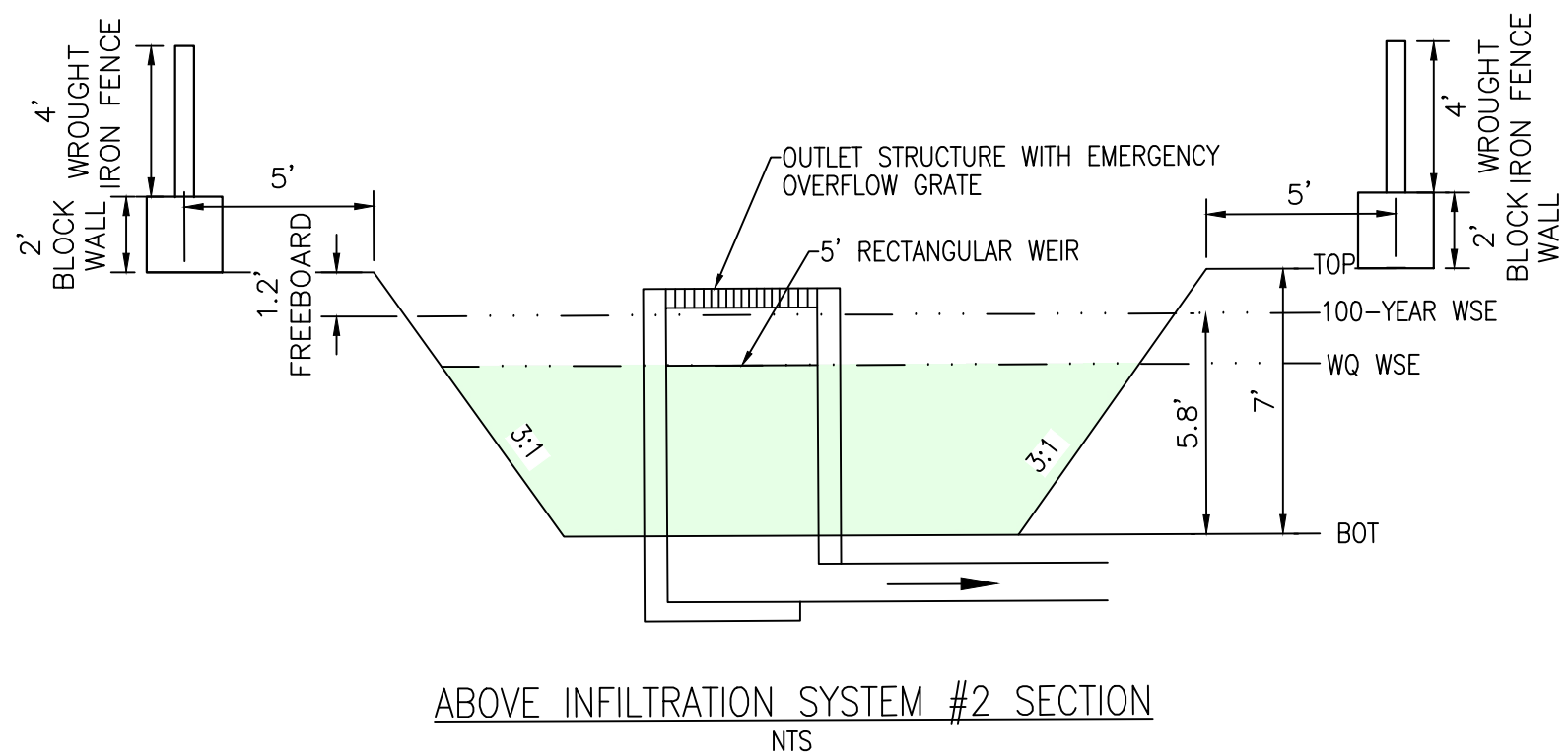
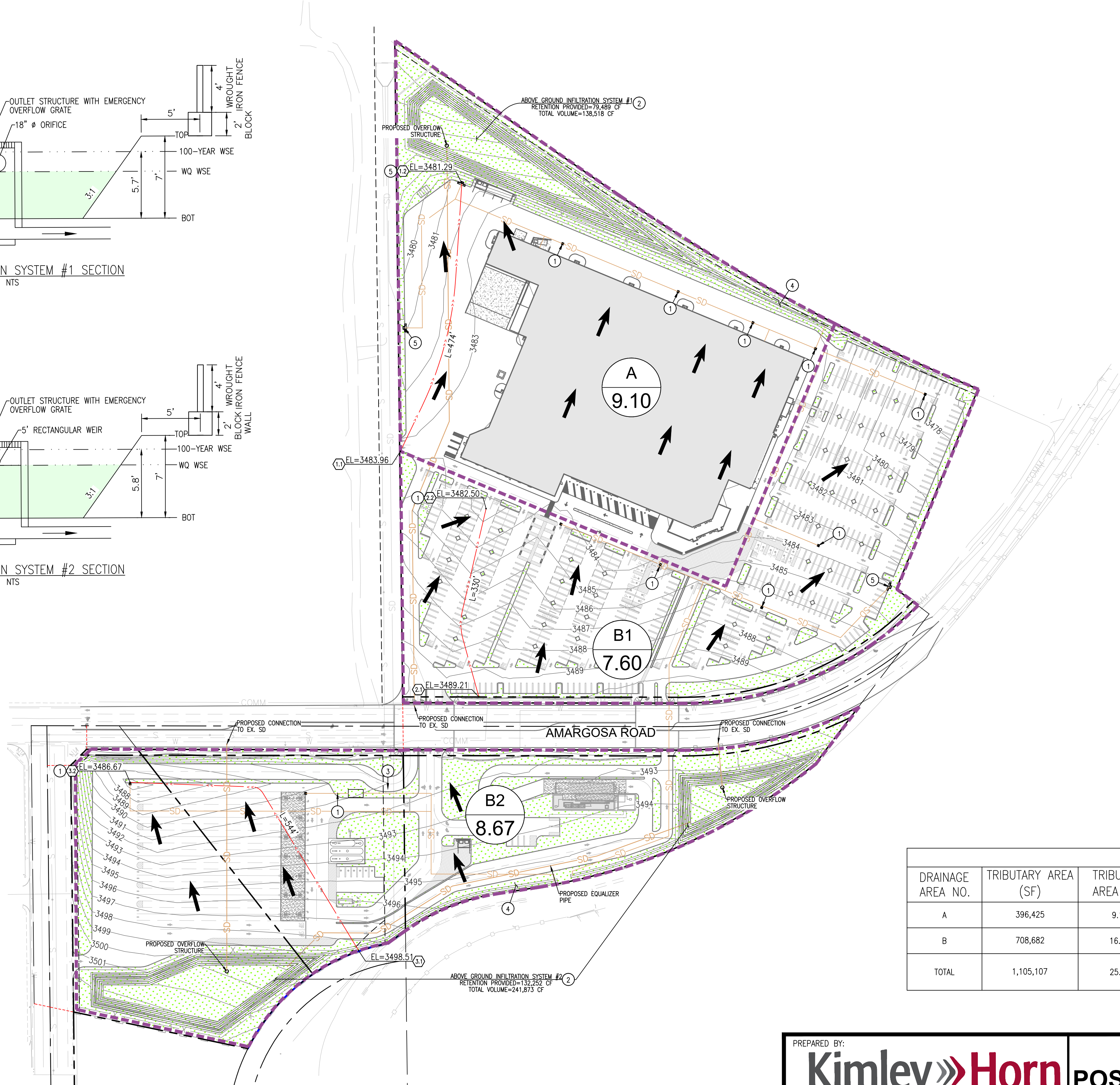
SITE AREA:	25.37 ACRES
SOIL TYPE:	A (NRCS WEB SOIL SURVEY)
IMPERVIOUS:	71% (PER CALCULATIONS)
ISOHYETALS:	0.411 INCH (2-YEAR, 1-HR)
	1.18 INCH (100-YEAR, 1-HR)
CURVE NUMBER	32 (SOIL GROUP A)
FREQUENCY:	10-YEAR (FOR STORMWATER QUALITY)
	100-YEAR (FOR STORM DRAIN DESIGN)
METHOD:	SAN BERNARDINO COUNTY HYDROLOGY MANUAL

DRAINAGE NOTES:

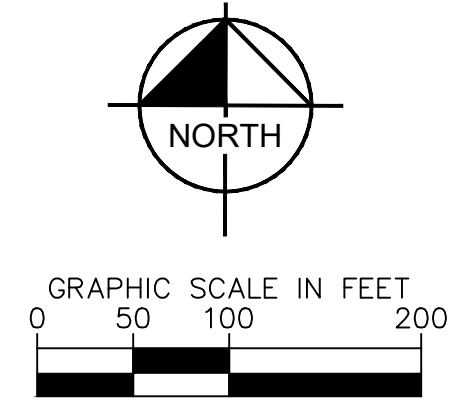
- ① PROPOSED CATCH BASIN WITH FILTER INSERT
- ② PROPOSED BMP - RETENTION BASIN
- ③ PROPOSED OIL AND WATER SEPARATOR
- ④ PROPOSED SWALE
- ⑤ PROPOSED CURB OPENING CATCH BASIN

LEGEND:

- DRAINAGE AREA BOUNDARY
- FLOW PATH
- SD STORM DRAIN
- PROPOSED FLOW DIRECTION ARROW
- X DRAINAGE AREA DESIGNATION
- X.XX AREA (AC)
- (1-1) NODE



HYDROLOGY SUMMARY							
DRAINAGE AREA NO.	TRIBUTARY AREA (SF)	TRIBUTARY AREA (AC)	IMPERVIOUS RATIO	Q ₁₀₀ (CFS)	V ₁₀₀ (CF)	RETENTION PROVIDED (CF)	STORAGE PROVIDED (CF)
A	396,425	9.10	0.81	33.09	208,696	79,489 (ABOVE GROUND INFILTRATION SYSTEM #1)	138,518 (ABOVE GROUND INFILTRATION SYSTEM #1)
B	708,682	16.27	0.65	62.49	316,346	132,252 (ABOVE GROUND INFILTRATION SYSTEM #2)	241,873 (ABOVE GROUND INFILTRATION SYSTEM #2)
TOTAL	1,105,107	25.37	0.71	95.58	525,042	211,741 (ABOVE GROUND INFILTRATION SYSTEM #1 AND #2)	380,391 (ABOVE GROUND INFILTRATION SYSTEM #1 AND #2)



PREPARED BY:

Kimley»Horn

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1100 W TOWN AND COUNTRY ROAD, SUITE 700,
ORANGE, CA 92668
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

POST-DEVELOPMENT HYDROLOGY EXHIBIT

CITY OF HESPERIA

DATE: JAN 2026
SHEET

1

OF 1

Appendix H

Rational Method Analysis

Appendix H.I

Rational Method Analysis Pre-Development Conditions 2-Year Storm

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* SAMS FUEL HESPERIA *
* RATIONAL METHOD *
* 2-YEAR PRE CONDITIONS *

FILE NAME: RATPRE.DAT
TIME/DATE OF STUDY: 13:33 01/29/2026

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:									

--*TIME-OF-CONCENTRATION MODEL*--									

=====

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.4110

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB GUTTER-GEOMETRIES: MANNING HEIGHT WIDTH LIP HIKE FACTOR (FT) (FT) (FT) (FT) (n)
	WIDTH (FT)	CROSSFALL (FT)		
1	30.0	20.0	0.018/0.018/0.020	0.67 2.00 0.0312 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.10 TO NODE 1.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1173.00
ELEVATION DATA: UPSTREAM(FEET) = 3491.00 DOWNSTREAM(FEET) = 3473.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.450
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.873
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL POOR COVER "GRASS"	A	16.70	0.84	1.000	47	20.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.84
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 0.56
 TOTAL AREA(ACRES) = 16.70 PEAK FLOW RATE(CFS) = 0.56

FLOW PROCESS FROM NODE 2.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 351.00
 ELEVATION DATA: UPSTREAM(FEET) = 3498.84 DOWNSTREAM(FEET) = 3491.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION\ CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.708

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.290

SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------	--------------

NATURAL POOR COVER

"GRASS"	A	8.67	0.84	1.000	47	11.71
---------	---	------	------	-------	----	-------

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.84

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 3.54

TOTAL AREA(ACRES) = 8.67 PEAK FLOW RATE(CFS) = 3.54

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 8.7 TC(MIN.) = 11.71

EFFECTIVE AREA(ACRES) = 8.67 AREA-AVERAGED Fm(INCH/HR) = 0.84

AREA-AVERAGED Fp(INCH/HR) = 0.84 AREA-AVERAGED Ap = 1.000

PEAK FLOW RATE(CFS) = 3.54

=====

=====

END OF RATIONAL METHOD ANALYSIS

▲

Appendix H.II

Rational Method Analysis Pre-Development Conditions 10-Year Storm

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* HESPERIA PRE DEVELOPMENT RATIONAL METHOD *
* *
* *

FILE NAME: RATPRE.DAT
TIME/DATE OF STUDY: 19:00 05/13/2024

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.7140

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.10 TO NODE 1.20 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1173.00
ELEVATION DATA: UPSTREAM(FEET) = 3491.00 DOWNSTREAM(FEET) = 3473.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 20.450
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517
SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL POOR COVER						
"GRASS"	A	16.70	0.60	1.000	67	20.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000
SUBAREA RUNOFF(CFS) = 13.81
TOTAL AREA(ACRES) = 16.70 PEAK FLOW RATE(CFS) = 13.81

FLOW PROCESS FROM NODE 2.10 TO NODE 2.20 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 351.00
ELEVATION DATA: UPSTREAM(FEET) = 3498.84 DOWNSTREAM(FEET) = 3491.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 11.708
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.241
SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL POOR COVER						
"GRASS"	A	8.67	0.60	1.000	67	11.71

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000
SUBAREA RUNOFF(CFS) = 12.82
TOTAL AREA(ACRES) = 8.67 PEAK FLOW RATE(CFS) = 12.82

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 8.7 T_c (MIN.) = 11.71
EFFECTIVE AREA(ACRES) = 8.67 AREA-AVERAGED F_m (INCH/HR) = 0.60
AREA-AVERAGED F_p (INCH/HR) = 0.60 AREA-AVERAGED A_p = 1.000

PEAK FLOW RATE(CFS) = 12.82

=====

END OF RATIONAL METHOD ANALYSIS



Appendix H.III

Rational Method Analysis Pre-Development Conditions 25-Year Storm

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* HESPERIA PRE DEVELOPMENT RATIONAL METHOD *
* *
* *

FILE NAME: RATPRE.DAT
TIME/DATE OF STUDY: 18:47 05/13/2024

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8970

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.10 TO NODE 1.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1173.00
ELEVATION DATA: UPSTREAM(FEET) = 3491.00 DOWNSTREAM(FEET) = 3473.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 20.450
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.906
SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL POOR COVER						
"GRASS"	A	16.70	0.60	1.000	67	20.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000
SUBAREA RUNOFF(CFS) = 19.65
TOTAL AREA(ACRES) = 16.70 PEAK FLOW RATE(CFS) = 19.65

FLOW PROCESS FROM NODE 2.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 351.00
ELEVATION DATA: UPSTREAM(FEET) = 3498.84 DOWNSTREAM(FEET) = 3491.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 11.708
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.816
SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL POOR COVER						
"GRASS"	A	8.67	0.60	1.000	67	11.71

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000
SUBAREA RUNOFF(CFS) = 17.30
TOTAL AREA(ACRES) = 8.67 PEAK FLOW RATE(CFS) = 17.30

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 8.7 T_c (MIN.) = 11.71
EFFECTIVE AREA(ACRES) = 8.67 AREA-AVERAGED F_m (INCH/HR) = 0.60
AREA-AVERAGED F_p (INCH/HR) = 0.60 AREA-AVERAGED A_p = 1.000

PEAK FLOW RATE(CFS) = 17.30

=====

END OF RATIONAL METHOD ANALYSIS



Appendix H.IV

Rational Method Analysis Pre-Development Conditions 100-Year Storm

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* BIG BOX RETAIL - HESPERIA *
* RATIONAL METHOD *
* 100-YEAR PRE CONDITIONS *

FILE NAME: ARATPRE.DAT
TIME/DATE OF STUDY: 19:09 05/13/2024

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1800

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

	HALF- WIDTH	CROWN TO CROSSFALL	STREET-/PARK- SIDE / SIDE/ WAY	STREET-CROSSFALL: IN- / OUT-/PARK- HEIGHT	CURB (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE	MANNING FACTOR (n)
NO.	(FT)	(FT)		(FT)	(FT)	(FT)	(n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.10 TO NODE 1.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1173.00
ELEVATION DATA: UPSTREAM(FEET) = 3491.00 DOWNSTREAM(FEET) = 3473.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.450
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.507
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL POOR COVER "GRASS"	A	16.70	0.30	1.000	85	20.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000
SUBAREA RUNOFF(CFS) = 33.23
TOTAL AREA(ACRES) = 16.70 PEAK FLOW RATE(CFS) = 33.23

FLOW PROCESS FROM NODE 2.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 351.00
ELEVATION DATA: UPSTREAM(FEET) = 3498.84 DOWNSTREAM(FEET) = 3491.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 11.708

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.704

SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL POOR COVER						
"GRASS"	A	8.67	0.30	1.000	85	11.71

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF(CFS) = 26.59

TOTAL AREA(ACRES) = 8.67 PEAK FLOW RATE(CFS) = 26.59

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 8.7 T_c (MIN.) = 11.71

EFFECTIVE AREA(ACRES) = 8.67 AREA-AVERAGED F_m (INCH/HR) = 0.30

AREA-AVERAGED F_p (INCH/HR) = 0.30 AREA-AVERAGED A_p = 1.000

PEAK FLOW RATE(CFS) = 26.59

=====

=====

END OF RATIONAL METHOD ANALYSIS

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Appendix H.V

Rational Method Analysis Post-Development Conditions 2-year Storm

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* SAM'S CLUB HESPERIA *
* RATIONAL METHOD *
* 2-YEAR, POST-CONDITIONS, DA A *

FILE NAME: SCH2A.DAT
TIME/DATE OF STUDY: 18:47 01/28/2026

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.4110

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

	HALF- WIDTH	CROWN TO CROSSFALL	STREET- SIDE / SIDE/	CROSSFALL WAY	CURB HEIGHT	GUTTER- WIDTH	GEOMETRIES: LIP	MANNING HIKE	FACTOR (n)
NO.	(FT)	(FT)			(FT)	(FT)	(FT)	(FT)	
1	30.0	20.0	0.018/0.018/0.020		0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.10 TO NODE 1.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 474.30
ELEVATION DATA: UPSTREAM(FEET) = 3483.96 DOWNSTREAM(FEET) = 3481.29

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.074
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.433
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.10	1.33	0.100	17	10.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
SUBAREA RUNOFF(CFS) = 10.65
TOTAL AREA(ACRES) = 9.10 PEAK FLOW RATE(CFS) = 10.65

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 9.1 TC(MIN.) = 10.07
EFFECTIVE AREA(ACRES) = 9.10 AREA-AVERAGED F_m (INCH/HR)= 0.13
AREA-AVERAGED F_p (INCH/HR) = 1.33 AREA-AVERAGED $A_p = 0.100$
PEAK FLOW RATE(CFS) = 10.65

=====

END OF RATIONAL METHOD ANALYSIS



RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2016 Advanced Engineering Software (aes)
Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* SAM'S CLUB HESPERIA *
* RATIONAL METHOD *
* 2-YEAR, POST-CONDITONS, DA B *

FILE NAME: SCH2B.DAT
TIME/DATE OF STUDY: 19:12 01/28/2026

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.4110

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

	HALF- WIDTH	CROWN TO CROSSFALL	STREET- SIDE / SIDE/	CROSSFALL WAY	CURB HEIGHT	GUTTER- WIDTH	GEOMETRIES: LIP	MANNING HIKE	FACTOR (n)
NO.	(FT)	(FT)			(FT)	(FT)	(FT)	(FT)	
1	30.0	20.0	0.018/0.018/0.020		0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 2.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.09
ELEVATION DATA: UPSTREAM(FEET) = 3489.21 DOWNSTREAM(FEET) = 3482.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.741
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.899
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.60	1.33	0.100	17	6.74

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 12.08
TOTAL AREA(ACRES) = 7.60 PEAK FLOW RATE(CFS) = 12.08

FLOW PROCESS FROM NODE 2.20 TO NODE 2.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 6.74
RAINFALL INTENSITY(INCH/HR) = 1.90
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 7.60
TOTAL STREAM AREA(ACRES) = 7.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.08

FLOW PROCESS FROM NODE 3.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 544.30
ELEVATION DATA: UPSTREAM(FEET) = 3498.51 DOWNSTREAM(FEET) = 3486.67

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.394

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.402

SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------	--------------

RESIDENTIAL

"5-7 DWELLINGS/ACRE"	A	8.67	1.33	0.500	17	10.39
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500

SUBAREA RUNOFF(CFS) = 5.76

TOTAL AREA(ACRES) = 8.67 PEAK FLOW RATE(CFS) = 5.76

FLOW PROCESS FROM NODE 2.20 TO NODE 2.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.39
RAINFALL INTENSITY(INCH/HR) = 1.40
AREA-AVERAGED Fm(INCH/HR) = 0.66
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.50
EFFECTIVE STREAM AREA(ACRES) = 8.67
TOTAL STREAM AREA(ACRES) = 8.67
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.76

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	12.08	6.74	1.899	1.33(0.13)	0.10	7.6	2.10
2	5.76	10.39	1.402	1.33(0.66)	0.50	8.7	3.10

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	17.84	6.74	1.899	1.33(0.36)	0.27	13.2	2.10
2	14.44	10.39	1.402	1.33(0.42)	0.31	16.3	3.10

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 17.84 Tc(MIN.) = 6.74
 EFFECTIVE AREA(ACRES) = 13.22 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.27
 TOTAL AREA(ACRES) = 16.3
 LONGEST FLOWPATH FROM NODE 3.10 TO NODE 2.20 = 544.30 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 16.3 TC(MIN.) = 6.74
 EFFECTIVE AREA(ACRES) = 13.22 AREA-AVERAGED Fm(INCH/HR)= 0.36
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.270
 PEAK FLOW RATE(CFS) = 17.84

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	17.84	6.74	1.899	1.33(0.36)	0.27	13.2	2.10
2	14.44	10.39	1.402	1.33(0.42)	0.31	16.3	3.10

END OF RATIONAL METHOD ANALYSIS

↑

Appendix H.VI

Rational Method Analysis Post-Development Conditions 10-Year Storm

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2016 Advanced Engineering Software (aes)
Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* SAM'S CLUB HESPERIA *
* RATIONAL METHOD *
* 10-YEAR, POST-CONDITIONS, DA A *

FILE NAME: SCH10A.DAT
TIME/DATE OF STUDY: 18:44 01/28/2026

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:									
--*TIME-OF-CONCENTRATION MODEL*--									

=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.7140

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL:	CURB	GUTTER-GEOMETRIES:				MANNING
	WIDTH	CROSSFALL			IN-	OUT-/PARK-	HEIGHT	WIDTH	
	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.10 TO NODE 1.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 474.30
ELEVATION DATA: UPSTREAM(FEET) = 3483.96 DOWNSTREAM(FEET) = 3481.29

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.074
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.490
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.10	0.98	0.100	32	10.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
SUBAREA RUNOFF(CFS) = 19.59
TOTAL AREA(ACRES) = 9.10 PEAK FLOW RATE(CFS) = 19.59

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 9.1 TC(MIN.) = 10.07
EFFECTIVE AREA(ACRES) = 9.10 AREA-AVERAGED F_m (INCH/HR) = 0.10
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED $A_p = 0.100$
PEAK FLOW RATE(CFS) = 19.59

=====

END OF RATIONAL METHOD ANALYSIS



RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2016 Advanced Engineering Software (aes)
Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* SAM'S CLUB HESPERIA *
* RATIONAL METHOD *
* 10-YEAR, POST-CONDITIONS, DA B *

FILE NAME: SCH10B.DAT
TIME/DATE OF STUDY: 19:09 01/28/2026

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:									
--*TIME-OF-CONCENTRATION MODEL*--									

=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.7140

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL:	CURB	GUTTER-GEOMETRIES:				MANNING
	WIDTH	CROSSFALL			IN-	OUT-/PARK-	HEIGHT	WIDTH	
	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 2.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.09
ELEVATION DATA: UPSTREAM(FEET) = 3489.21 DOWNSTREAM(FEET) = 3482.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.741
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.298
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.60	0.98	0.100	32	6.74

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 21.89
 TOTAL AREA(ACRES) = 7.60 PEAK FLOW RATE(CFS) = 21.89

FLOW PROCESS FROM NODE 2.20 TO NODE 2.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 6.74
 RAINFALL INTENSITY(INCH/HR) = 3.30
 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 7.60
 TOTAL STREAM AREA(ACRES) = 7.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.89

FLOW PROCESS FROM NODE 3.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 544.30
 ELEVATION DATA: UPSTREAM(FEET) = 3498.51 DOWNSTREAM(FEET) = 3486.67

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.394
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.67	0.98	0.500	32	10.39

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA RUNOFF(CFS) = 15.20
 TOTAL AREA(ACRES) = 8.67 PEAK FLOW RATE(CFS) = 15.20

FLOW PROCESS FROM NODE 2.20 TO NODE 2.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.39
 RAINFALL INTENSITY(INCH/HR) = 2.44
 AREA-AVERAGED Fm(INCH/HR) = 0.49
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.50
 EFFECTIVE STREAM AREA(ACRES) = 8.67
 TOTAL STREAM AREA(ACRES) = 8.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 15.20

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	21.89	6.74	3.298	0.98(0.10)	0.10	7.6	2.10
2	15.20	10.39	2.436	0.97(0.49)	0.50	8.7	3.10

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.12	6.74	3.298	0.97(0.26)	0.27	13.2	2.10
2	31.20	10.39	2.436	0.97(0.31)	0.31	16.3	3.10

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 36.12 TC(MIN.) = 6.74
EFFECTIVE AREA(ACRES) = 13.22 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.27
TOTAL AREA(ACRES) = 16.3
LONGEST FLOWPATH FROM NODE 3.10 TO NODE 2.20 = 544.30 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 16.3 TC(MIN.) = 6.74
EFFECTIVE AREA(ACRES) = 13.22 AREA-AVERAGED Fm(INCH/HR)= 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.270
PEAK FLOW RATE(CFS) = 36.12

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.12	6.74	3.298	0.97(0.26)	0.27	13.2	2.10
2	31.20	10.39	2.436	0.97(0.31)	0.31	16.3	3.10

END OF RATIONAL METHOD ANALYSIS

↑

Appendix H.VII

Rational Method Analysis Post-Development Conditions 100-Year Storm

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* SAM'S CLUB HESPERIA *
* RATIONAL METHOD *
* 100-YEAR, POST-CONDITIONS, DA A *

FILE NAME: SCH100A.DAT
TIME/DATE OF STUDY: 18:19 01/28/2026

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1800

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

	HALF- WIDTH	CROWN TO CROSSFALL	STREET- SIDE / SIDE/ WAY	CURB HEIGHT	GUTTER- WIDTH	GEOMETRIES: LIP	MANNING HIKE	
NO.	(FT)	(FT)		(FT)	(FT)	(FT)	(FT)	(n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 1.10 TO NODE 1.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 474.30
ELEVATION DATA: UPSTREAM(FEET) = 3483.96 DOWNSTREAM(FEET) = 3481.29

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.074
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.115
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.10	0.74	0.100	52	10.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.74

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
SUBAREA RUNOFF(CFS) = 33.09
TOTAL AREA(ACRES) = 9.10 PEAK FLOW RATE(CFS) = 33.09

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 9.1 TC(MIN.) = 10.07
EFFECTIVE AREA(ACRES) = 9.10 AREA-AVERAGED F_m (INCH/HR)= 0.07
AREA-AVERAGED F_p (INCH/HR) = 0.74 AREA-AVERAGED $A_p = 0.100$
PEAK FLOW RATE(CFS) = 33.09

=====

END OF RATIONAL METHOD ANALYSIS



RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2016 Advanced Engineering Software (aes)
Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* SAM'S CLUB HESPERIA *
* RATIONAL METHOD *
* 100-YEAR, POST-CONDITIONS, DA B *

FILE NAME: SCH100B.DAT
TIME/DATE OF STUDY: 19:06 01/28/2026

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1800

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

	HALF- WIDTH	CROWN TO CROSSFALL	STREET- SIDE / SIDE/	CROSSFALL WAY	CURB HEIGHT	GUTTER- WIDTH	GEOMETRIES: LIP	MANNING HIKE	FACTOR (n)
NO.	(FT)	(FT)			(FT)	(FT)	(FT)	(FT)	
1	30.0	20.0	0.018/0.018/0.020		0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 2.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.09
ELEVATION DATA: UPSTREAM(FEET) = 3489.21 DOWNSTREAM(FEET) = 3482.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.741
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.451
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.60	0.74	0.100	52	6.74

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.74

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 36.78
 TOTAL AREA(ACRES) = 7.60 PEAK FLOW RATE(CFS) = 36.78

FLOW PROCESS FROM NODE 2.20 TO NODE 2.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 6.74
 RAINFALL INTENSITY(INCH/HR) = 5.45
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.74
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 7.60
 TOTAL STREAM AREA(ACRES) = 7.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 36.78

FLOW PROCESS FROM NODE 3.10 TO NODE 2.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 544.30
 ELEVATION DATA: UPSTREAM(FEET) = 3498.51 DOWNSTREAM(FEET) = 3486.67

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.394
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.026
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	8.67	0.74	0.500	52	10.39

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.74
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA RUNOFF(CFS) = 28.52
 TOTAL AREA(ACRES) = 8.67 PEAK FLOW RATE(CFS) = 28.52

FLOW PROCESS FROM NODE 2.20 TO NODE 2.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.39
 RAINFALL INTENSITY(INCH/HR) = 4.03
 AREA-AVERAGED Fm(INCH/HR) = 0.37
 AREA-AVERAGED Fp(INCH/HR) = 0.74
 AREA-AVERAGED Ap = 0.50
 EFFECTIVE STREAM AREA(ACRES) = 8.67
 TOTAL STREAM AREA(ACRES) = 8.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 28.52

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	36.78	6.74	5.451	0.74(0.07)	0.10	7.6	2.10
2	28.52	10.39	4.026	0.74(0.37)	0.50	8.7	3.10

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.49	6.74	5.451	0.74(0.20)	0.27	13.2	2.10
2	55.55	10.39	4.026	0.74(0.23)	0.31	16.3	3.10

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 62.49 Tc(MIN.) = 6.74
 EFFECTIVE AREA(ACRES) = 13.22 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.74 AREA-AVERAGED Ap = 0.27
 TOTAL AREA(ACRES) = 16.3
 LONGEST FLOWPATH FROM NODE 3.10 TO NODE 2.20 = 544.30 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 16.3 TC(MIN.) = 6.74
 EFFECTIVE AREA(ACRES) = 13.22 AREA-AVERAGED Fm(INCH/HR)= 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.74 AREA-AVERAGED Ap = 0.270
 PEAK FLOW RATE(CFS) = 62.49

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.49	6.74	5.451	0.74(0.20)	0.27	13.2	2.10
2	55.55	10.39	4.026	0.74(0.23)	0.31	16.3	3.10

END OF RATIONAL METHOD ANALYSIS

↑

Appendix I

Synthetic Unit Hydrograph Method Analysis

Appendix I.I

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 2-Year Storm

 NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS
 =====

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 2-YEAR, PRE-CONDITIONS, DA A

 *** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 1.71 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	16.70	100.00	67.(AMC II)	0.836	0.000

TOTAL AREA (Acres) = 16.70

AREA-AVERAGED LOSS RATE, $\bar{F}_m$ (in./hr.) = 0.836

AREA-AVERAGED LOW LOSS FRACTION, $\bar{Y} = 1.000$

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 2-YEAR, PRE-CONDITIONS, DA A

 RATIONAL METHOD CALIBRATION COEFFICIENT = 2.00
 TOTAL CATCHMENT AREA(ACRES) = 16.70
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.836
 LOW LOSS FRACTION = 1.000
 TIME OF CONCENTRATION(MIN.) = 20.45
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 2
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.11
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.30
 1-HOUR POINT RAINFALL VALUE(INCHES) = 0.41
 3-HOUR POINT RAINFALL VALUE(INCHES) = 0.67
 6-HOUR POINT RAINFALL VALUE(INCHES) = 0.91
 24-HOUR POINT RAINFALL VALUE(INCHES) = 1.71

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.00
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 2.38

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
-----------------	----------------	------------	----	-----	-----	-----	------

0.32	0.0000	0.00	Q	.	.	.	.
0.66	0.0000	0.00	Q	.	.	.	.
1.00	0.0000	0.00	Q	.	.	.	.
1.34	0.0000	0.00	Q	.	.	.	.
1.68	0.0000	0.00	Q	.	.	.	.
2.03	0.0000	0.00	Q	.	.	.	.
2.37	0.0000	0.00	Q	.	.	.	.
2.71	0.0000	0.00	Q	.	.	.	.
3.05	0.0000	0.00	Q	.	.	.	.
3.39	0.0000	0.00	Q	.	.	.	.
3.73	0.0000	0.00	Q	.	.	.	.
4.07	0.0000	0.00	Q	.	.	.	.
4.41	0.0000	0.00	Q	.	.	.	.
4.75	0.0000	0.00	Q	.	.	.	.
5.09	0.0000	0.00	Q	.	.	.	.
5.43	0.0000	0.00	Q	.	.	.	.
5.77	0.0000	0.00	Q	.	.	.	.
6.12	0.0000	0.00	Q	.	.	.	.
6.46	0.0000	0.00	Q	.	.	.	.
6.80	0.0000	0.00	Q	.	.	.	.
7.14	0.0000	0.00	Q	.	.	.	.
7.48	0.0000	0.00	Q	.	.	.	.
7.82	0.0000	0.00	Q	.	.	.	.
8.16	0.0000	0.00	Q	.	.	.	.
8.50	0.0000	0.00	Q	.	.	.	.
8.84	0.0000	0.00	Q	.	.	.	.
9.18	0.0000	0.00	Q	.	.	.	.
9.52	0.0000	0.00	Q	.	.	.	.
9.86	0.0000	0.00	Q	.	.	.	.
10.21	0.0000	0.00	Q	.	.	.	.
10.55	0.0000	0.00	Q	.	.	.	.
10.89	0.0000	0.00	Q	.	.	.	.
11.23	0.0000	0.00	Q	.	.	.	.
11.57	0.0000	0.00	Q	.	.	.	.
11.91	0.0000	0.00	Q	.	.	.	.
12.25	0.0000	0.00	Q	.	.	.	.
12.59	0.0000	0.00	Q	.	.	.	.
12.93	0.0000	0.00	Q	.	.	.	.
13.27	0.0000	0.00	Q	.	.	.	.
13.61	0.0000	0.00	Q	.	.	.	.
13.95	0.0000	0.00	Q	.	.	.	.
14.30	0.0000	0.00	Q	.	.	.	.
14.64	0.0000	0.00	Q	.	.	.	.
14.98	0.0000	0.00	Q	.	.	.	.
15.32	0.0000	0.00	Q	.	.	.	.
15.66	0.0000	0.00	Q	.	.	.	.
16.00	0.0000	0.00	Q	.	.	.	.
16.34	0.0000	0.00	Q	.	.	.	.
16.68	0.0000	0.00	Q	.	.	.	.
17.02	0.0000	0.00	Q	.	.	.	.
17.36	0.0000	0.00	Q	.	.	.	.
17.70	0.0000	0.00	Q	.	.	.	.
18.05	0.0000	0.00	Q	.	.	.	.
18.39	0.0000	0.00	Q	.	.	.	.
18.73	0.0000	0.00	Q	.	.	.	.
19.07	0.0000	0.00	Q	.	.	.	.
19.41	0.0000	0.00	Q	.	.	.	.
19.75	0.0000	0.00	Q	.	.	.	.
20.09	0.0000	0.00	Q	.	.	.	.
20.43	0.0000	0.00	Q	.	.	.	.
20.77	0.0000	0.00	Q	.	.	.	.
21.11	0.0000	0.00	Q	.	.	.	.
21.45	0.0000	0.00	Q	.	.	.	.
21.79	0.0000	0.00	Q	.	.	.	.
22.14	0.0000	0.00	Q	.	.	.	.
22.48	0.0000	0.00	Q	.	.	.	.
22.82	0.0000	0.00	Q	.	.	.	.
23.16	0.0000	0.00	Q	.	.	.	.

23.50	0.0000	0.00	Q	.	.	.	.
23.84	0.0000	0.00	Q	.	.	.	.
24.18	0.0000	0.00	Q	.	.	.	.
24.52	0.0000	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	0.0
10%	0.0
20%	0.0
30%	0.0
40%	0.0
50%	0.0
60%	0.0
70%	0.0
80%	0.0
90%	0.0

SMALL AREA UNIT HYDROGRAPH MODEL

=====

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
UNIT HYDROGRAPH
2-YEAR, PRE-CONDITIONS, DA B

RATIONAL METHOD CALIBRATION COEFFICIENT = 2.00
TOTAL CATCHMENT AREA(ACRES) = 8.67
SOIL-LOSS RATE, F_m (INCH/HR) = 0.836
LOW LOSS FRACTION = 1.000
TIME OF CONCENTRATION(MIN.) = 11.71
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 2
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.11
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.30
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.41
3-HOUR POINT RAINFALL VALUE(INCHES) = 0.67
6-HOUR POINT RAINFALL VALUE(INCHES) = 0.91
24-HOUR POINT RAINFALL VALUE(INCHES) = 1.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.02
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 1.21

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.19	0.0000	0.00	Q	.	.	.	.
0.39	0.0000	0.00	Q	.	.	.	.
0.58	0.0000	0.00	Q	.	.	.	.
0.78	0.0000	0.00	Q	.	.	.	.
0.97	0.0000	0.00	Q	.	.	.	.
1.17	0.0000	0.00	Q	.	.	.	.
1.36	0.0000	0.00	Q	.	.	.	.
1.56	0.0000	0.00	Q	.	.	.	.
1.75	0.0000	0.00	Q	.	.	.	.
1.95	0.0000	0.00	Q	.	.	.	.
2.14	0.0000	0.00	Q	.	.	.	.
2.34	0.0000	0.00	Q	.	.	.	.
2.53	0.0000	0.00	Q	.	.	.	.
2.73	0.0000	0.00	Q	.	.	.	.
2.92	0.0000	0.00	Q	.	.	.	.
3.12	0.0000	0.00	Q	.	.	.	.
3.31	0.0000	0.00	Q	.	.	.	.
3.51	0.0000	0.00	Q	.	.	.	.
3.70	0.0000	0.00	Q	.	.	.	.
3.90	0.0000	0.00	Q	.	.	.	.
4.09	0.0000	0.00	Q	.	.	.	.

4.29	0.0000	0.00	Q	.	.	.	.
4.49	0.0000	0.00	Q	.	.	.	.
4.68	0.0000	0.00	Q	.	.	.	.
4.88	0.0000	0.00	Q	.	.	.	.
5.07	0.0000	0.00	Q	.	.	.	.
5.27	0.0000	0.00	Q	.	.	.	.
5.46	0.0000	0.00	Q	.	.	.	.
5.66	0.0000	0.00	Q	.	.	.	.
5.85	0.0000	0.00	Q	.	.	.	.
6.05	0.0000	0.00	Q	.	.	.	.
6.24	0.0000	0.00	Q	.	.	.	.
6.44	0.0000	0.00	Q	.	.	.	.
6.63	0.0000	0.00	Q	.	.	.	.
6.83	0.0000	0.00	Q	.	.	.	.
7.02	0.0000	0.00	Q	.	.	.	.
7.22	0.0000	0.00	Q	.	.	.	.
7.41	0.0000	0.00	Q	.	.	.	.
7.61	0.0000	0.00	Q	.	.	.	.
7.80	0.0000	0.00	Q	.	.	.	.
8.00	0.0000	0.00	Q	.	.	.	.
8.19	0.0000	0.00	Q	.	.	.	.
8.39	0.0000	0.00	Q	.	.	.	.
8.58	0.0000	0.00	Q	.	.	.	.
8.78	0.0000	0.00	Q	.	.	.	.
8.97	0.0000	0.00	Q	.	.	.	.
9.17	0.0000	0.00	Q	.	.	.	.
9.36	0.0000	0.00	Q	.	.	.	.
9.56	0.0000	0.00	Q	.	.	.	.
9.75	0.0000	0.00	Q	.	.	.	.
9.95	0.0000	0.00	Q	.	.	.	.
10.15	0.0000	0.00	Q	.	.	.	.
10.34	0.0000	0.00	Q	.	.	.	.
10.54	0.0000	0.00	Q	.	.	.	.
10.73	0.0000	0.00	Q	.	.	.	.
10.93	0.0000	0.00	Q	.	.	.	.
11.12	0.0000	0.00	Q	.	.	.	.
11.32	0.0000	0.00	Q	.	.	.	.
11.51	0.0000	0.00	Q	.	.	.	.
11.71	0.0000	0.00	Q	.	.	.	.
11.90	0.0000	0.00	Q	.	.	.	.
12.10	0.0000	0.00	Q	.	.	.	.
12.29	0.0000	0.00	Q	.	.	.	.
12.49	0.0000	0.00	Q	.	.	.	.
12.68	0.0000	0.00	Q	.	.	.	.
12.88	0.0000	0.00	Q	.	.	.	.
13.07	0.0000	0.00	Q	.	.	.	.
13.27	0.0000	0.00	Q	.	.	.	.
13.46	0.0000	0.00	Q	.	.	.	.
13.66	0.0000	0.00	Q	.	.	.	.
13.85	0.0000	0.00	Q	.	.	.	.
14.05	0.0000	0.00	Q	.	.	.	.
14.24	0.0000	0.00	Q	.	.	.	.
14.44	0.0000	0.00	Q	.	.	.	.
14.63	0.0000	0.00	Q	.	.	.	.
14.83	0.0000	0.00	Q	.	.	.	.
15.02	0.0000	0.00	Q	.	.	.	.
15.22	0.0000	0.00	Q	.	.	.	.
15.41	0.0000	0.00	Q	.	.	.	.
15.61	0.0000	0.00	Q	.	.	.	.
15.80	0.0000	0.00	Q	.	.	.	.
16.00	0.0000	0.00	Q	.	.	.	.
16.20	0.0118	1.47	.	Q	.	.	.
16.39	0.0237	0.00	Q	.	.	.	.
16.59	0.0237	0.00	Q	.	.	.	.
16.78	0.0237	0.00	Q	.	.	.	.
16.98	0.0237	0.00	Q	.	.	.	.
17.17	0.0237	0.00	Q	.	.	.	.
17.37	0.0237	0.00	Q	.	.	.	.
17.56	0.0237	0.00	Q	.	.	.	.

17.76	0.0237	0.00	Q	.	.	.	.
17.95	0.0237	0.00	Q	.	.	.	.
18.15	0.0237	0.00	Q	.	.	.	.
18.34	0.0237	0.00	Q	.	.	.	.
18.54	0.0237	0.00	Q	.	.	.	.
18.73	0.0237	0.00	Q	.	.	.	.
18.93	0.0237	0.00	Q	.	.	.	.
19.12	0.0237	0.00	Q	.	.	.	.
19.32	0.0237	0.00	Q	.	.	.	.
19.51	0.0237	0.00	Q	.	.	.	.
19.71	0.0237	0.00	Q	.	.	.	.
19.90	0.0237	0.00	Q	.	.	.	.
20.10	0.0237	0.00	Q	.	.	.	.
20.29	0.0237	0.00	Q	.	.	.	.
20.49	0.0237	0.00	Q	.	.	.	.
20.68	0.0237	0.00	Q	.	.	.	.
20.88	0.0237	0.00	Q	.	.	.	.
21.07	0.0237	0.00	Q	.	.	.	.
21.27	0.0237	0.00	Q	.	.	.	.
21.46	0.0237	0.00	Q	.	.	.	.
21.66	0.0237	0.00	Q	.	.	.	.
21.86	0.0237	0.00	Q	.	.	.	.
22.05	0.0237	0.00	Q	.	.	.	.
22.25	0.0237	0.00	Q	.	.	.	.
22.44	0.0237	0.00	Q	.	.	.	.
22.64	0.0237	0.00	Q	.	.	.	.
22.83	0.0237	0.00	Q	.	.	.	.
23.03	0.0237	0.00	Q	.	.	.	.
23.22	0.0237	0.00	Q	.	.	.	.
23.42	0.0237	0.00	Q	.	.	.	.
23.61	0.0237	0.00	Q	.	.	.	.
23.81	0.0237	0.00	Q	.	.	.	.
24.00	0.0237	0.00	Q	.	.	.	.
24.20	0.0237	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	11.7
10%	11.7
20%	11.7
30%	11.7
40%	11.7
50%	11.7
60%	11.7
70%	11.7
80%	11.7
90%	11.7

Appendix I.II

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 10-Year Storm

SMALL AREA UNIT HYDROGRAPH MODEL

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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:

BIG BOX RETAIL - HESPERIA
UNIT HYDROGRAPH
10-YEAR PRE CONDITIONS, DA A

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.29
TOTAL CATCHMENT AREA(ACRES) = 16.70
SOIL-LOSS RATE, F_m , (INCH/HR) = 0.598
LOW LOSS FRACTION = 0.795
TIME OF CONCENTRATION(MIN.) = 20.45
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 10
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.20
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.71
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.10
6-HOUR POINT RAINFALL VALUE(INCHES) = 1.51
24-HOUR POINT RAINFALL VALUE(INCHES) = 3.10

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.37
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 2.94

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
-----------------	----------------	------------	----	-----	------	------	------

0.32	0.0042	0.30	Q	.	.	.	.
0.66	0.0126	0.30	Q	.	.	.	.

1.00	0.0210	0.30	Q	.	.	.	.
1.34	0.0296	0.31	Q	.	.	.	.
1.68	0.0382	0.31	Q	.	.	.	.
2.03	0.0470	0.31	Q	.	.	.	.
2.37	0.0558	0.32	Q	.	.	.	.
2.71	0.0648	0.32	Q	.	.	.	.
3.05	0.0738	0.32	Q	.	.	.	.
3.39	0.0830	0.33	Q	.	.	.	.
3.73	0.0923	0.33	Q	.	.	.	.
4.07	0.1017	0.34	Q	.	.	.	.
4.41	0.1113	0.34	Q	.	.	.	.
4.75	0.1209	0.35	Q	.	.	.	.
5.09	0.1308	0.35	Q	.	.	.	.
5.43	0.1407	0.36	Q	.	.	.	.
5.77	0.1508	0.36	Q	.	.	.	.
6.12	0.1611	0.37	Q	.	.	.	.
6.46	0.1715	0.37	Q	.	.	.	.
6.80	0.1822	0.38	Q	.	.	.	.
7.14	0.1930	0.39	Q	.	.	.	.
7.48	0.2040	0.40	Q	.	.	.	.
7.82	0.2152	0.40	Q	.	.	.	.
8.16	0.2266	0.41	Q	.	.	.	.
8.50	0.2382	0.42	Q	.	.	.	.
8.84	0.2501	0.43	Q	.	.	.	.
9.18	0.2623	0.44	Q	.	.	.	.
9.52	0.2748	0.45	Q	.	.	.	.
9.86	0.2875	0.46	Q	.	.	.	.
10.21	0.3006	0.47	Q	.	.	.	.
10.55	0.3140	0.48	Q	.	.	.	.
10.89	0.3279	0.50	.Q	.	.	.	.
11.23	0.3422	0.51	.Q	.	.	.	.
11.57	0.3569	0.54	.Q	.	.	.	.
11.91	0.3722	0.55	.Q	.	.	.	.
12.25	0.3874	0.54	.Q	.	.	.	.
12.59	0.4024	0.53	.Q	.	.	.	.
12.93	0.4177	0.56	.Q	.	.	.	.
13.27	0.4339	0.59	.Q	.	.	.	.
13.61	0.4511	0.64	.Q	.	.	.	.
13.95	0.4696	0.67	.Q	.	.	.	.
14.30	0.4885	0.67	.Q	.	.	.	.
14.64	0.5078	0.70	.Q	.	.	.	.
14.98	0.5296	0.85	.Q	.	.	.	.
15.32	0.5550	0.96	.Q	.	.	.	.
15.66	0.5905	1.56	. Q	.	.	.	.
16.00	0.6447	2.29	. Q	.	.	.	.
16.34	0.8715	13.81	.	.	.	Q	.
16.68	1.0818	1.12	. Q	.	.	.	.
17.02	1.1083	0.77	.Q	.	.	.	.
17.36	1.1290	0.71	.Q	.	.	.	.
17.70	1.1476	0.61	.Q	.	.	.	.

18.05	1.1639	0.54	.Q	.	.	.	.
18.39	1.1794	0.56	.Q	.	.	.	.
18.73	1.1947	0.52	.Q	.	.	.	.
19.07	1.2090	0.49	Q	.	.	.	.
19.41	1.2225	0.46	Q	.	.	.	.
19.75	1.2352	0.44	Q	.	.	.	.
20.09	1.2474	0.42	Q	.	.	.	.
20.43	1.2591	0.41	Q	.	.	.	.
20.77	1.2703	0.39	Q	.	.	.	.
21.11	1.2811	0.38	Q	.	.	.	.
21.45	1.2915	0.36	Q	.	.	.	.
21.79	1.3016	0.35	Q	.	.	.	.
22.14	1.3115	0.34	Q	.	.	.	.
22.48	1.3210	0.33	Q	.	.	.	.
22.82	1.3303	0.33	Q	.	.	.	.
23.16	1.3394	0.32	Q	.	.	.	.
23.50	1.3482	0.31	Q	.	.	.	.
23.84	1.3569	0.30	Q	.	.	.	.
24.18	1.3653	0.30	Q	.	.	.	.
24.52	1.3695	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1452.0
10%	61.4
20%	20.5
30%	20.5
40%	20.5
50%	20.5
60%	20.5
70%	20.5
80%	20.5
90%	20.5

SMALL AREA UNIT HYDROGRAPH MODEL

=====

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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:

BIG BOX RETAIL - HESPERIA
UNIT HYDROGRAPH
10-YEAR PRE CONDITIONS, DA B

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.48
TOTAL CATCHMENT AREA(ACRES) = 8.67
SOIL-LOSS RATE, F_m , (INCH/HR) = 0.598
LOW LOSS FRACTION = 0.795
TIME OF CONCENTRATION(MIN.) = 11.71
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 10
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.20
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.71
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.10
6-HOUR POINT RAINFALL VALUE(INCHES) = 1.51
24-HOUR POINT RAINFALL VALUE(INCHES) = 3.10

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.81
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 1.43

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
-----------------	----------------	------------	----	-----	------	------	------

0.19	0.0014	0.18	Q	.	.	.	.
0.39	0.0043	0.18	Q	.	.	.	.

0.58	0.0071	0.18	Q	.	.	.	.
0.78	0.0100	0.18	Q	.	.	.	.
0.97	0.0129	0.18	Q	.	.	.	.
1.17	0.0159	0.18	Q	.	.	.	.
1.36	0.0188	0.18	Q	.	.	.	.
1.56	0.0218	0.18	Q	.	.	.	.
1.76	0.0247	0.19	Q	.	.	.	.
1.95	0.0277	0.19	Q	.	.	.	.
2.15	0.0308	0.19	Q	.	.	.	.
2.34	0.0338	0.19	Q	.	.	.	.
2.54	0.0368	0.19	Q	.	.	.	.
2.73	0.0399	0.19	Q	.	.	.	.
2.93	0.0430	0.19	Q	.	.	.	.
3.12	0.0462	0.19	Q	.	.	.	.
3.32	0.0493	0.20	Q	.	.	.	.
3.51	0.0525	0.20	Q	.	.	.	.
3.71	0.0557	0.20	Q	.	.	.	.
3.90	0.0589	0.20	Q	.	.	.	.
4.10	0.0621	0.20	Q	.	.	.	.
4.29	0.0654	0.20	Q	.	.	.	.
4.49	0.0687	0.21	Q	.	.	.	.
4.68	0.0720	0.21	Q	.	.	.	.
4.88	0.0754	0.21	Q	.	.	.	.
5.07	0.0787	0.21	Q	.	.	.	.
5.27	0.0821	0.21	Q	.	.	.	.
5.46	0.0856	0.21	Q	.	.	.	.
5.66	0.0890	0.22	Q	.	.	.	.
5.85	0.0925	0.22	Q	.	.	.	.
6.05	0.0961	0.22	Q	.	.	.	.
6.24	0.0996	0.22	Q	.	.	.	.
6.44	0.1032	0.22	Q	.	.	.	.
6.63	0.1068	0.23	Q	.	.	.	.
6.83	0.1105	0.23	Q	.	.	.	.
7.02	0.1142	0.23	Q	.	.	.	.
7.22	0.1179	0.23	Q	.	.	.	.
7.41	0.1217	0.24	Q	.	.	.	.
7.61	0.1255	0.24	Q	.	.	.	.
7.80	0.1294	0.24	Q	.	.	.	.
8.00	0.1333	0.24	Q	.	.	.	.
8.19	0.1373	0.25	Q	.	.	.	.
8.39	0.1413	0.25	Q	.	.	.	.
8.58	0.1453	0.25	Q	.	.	.	.
8.78	0.1494	0.26	Q	.	.	.	.
8.98	0.1536	0.26	Q	.	.	.	.
9.17	0.1578	0.26	Q	.	.	.	.
9.37	0.1620	0.27	Q	.	.	.	.
9.56	0.1663	0.27	Q	.	.	.	.
9.76	0.1707	0.27	Q	.	.	.	.
9.95	0.1752	0.28	Q	.	.	.	.
10.15	0.1797	0.28	Q	.	.	.	.

10.34	0.1843	0.29	Q	.	.	.	.
10.54	0.1889	0.29	Q	.	.	.	.
10.73	0.1937	0.30	Q	.	.	.	.
10.93	0.1985	0.30	Q	.	.	.	.
11.12	0.2034	0.31	Q	.	.	.	.
11.32	0.2084	0.31	Q	.	.	.	.
11.51	0.2135	0.32	Q	.	.	.	.
11.71	0.2187	0.32	Q	.	.	.	.
11.90	0.2240	0.33	Q	.	.	.	.
12.10	0.2294	0.34	Q	.	.	.	.
12.29	0.2347	0.31	Q	.	.	.	.
12.49	0.2397	0.32	Q	.	.	.	.
12.68	0.2449	0.33	Q	.	.	.	.
12.88	0.2502	0.33	Q	.	.	.	.
13.07	0.2558	0.35	Q	.	.	.	.
13.27	0.2615	0.36	Q	.	.	.	.
13.46	0.2674	0.38	Q	.	.	.	.
13.66	0.2736	0.39	Q	.	.	.	.
13.85	0.2800	0.41	Q	.	.	.	.
14.05	0.2867	0.42	Q	.	.	.	.
14.24	0.2933	0.39	Q	.	.	.	.
14.44	0.2998	0.41	Q	.	.	.	.
14.63	0.3067	0.45	Q	.	.	.	.
14.83	0.3143	0.48	Q	.	.	.	.
15.02	0.3225	0.54	.Q	.	.	.	.
15.22	0.3316	0.59	.Q	.	.	.	.
15.41	0.3422	0.72	.Q	.	.	.	.
15.61	0.3554	0.92	.Q	.	.	.	.
15.80	0.3742	1.41	. Q	.	.	.	.
16.00	0.4011	1.93	. Q	.	.	.	.
16.20	0.5201	12.82	.	.	Q	.	.
16.39	0.6320	1.05	. Q	.	.	.	.
16.59	0.6456	0.64	.Q	.	.	.	.
16.78	0.6549	0.51	.Q	.	.	.	.
16.98	0.6624	0.43	Q	.	.	.	.
17.17	0.6692	0.42	Q	.	.	.	.
17.37	0.6758	0.40	Q	.	.	.	.
17.56	0.6820	0.37	Q	.	.	.	.
17.76	0.6877	0.34	Q	.	.	.	.
17.95	0.6931	0.32	Q	.	.	.	.
18.15	0.6982	0.31	Q	.	.	.	.
18.34	0.7034	0.33	Q	.	.	.	.
18.54	0.7086	0.32	Q	.	.	.	.
18.73	0.7136	0.30	Q	.	.	.	.
18.93	0.7184	0.29	Q	.	.	.	.
19.12	0.7231	0.28	Q	.	.	.	.
19.32	0.7276	0.28	Q	.	.	.	.
19.51	0.7320	0.27	Q	.	.	.	.
19.71	0.7362	0.26	Q	.	.	.	.
19.90	0.7404	0.25	Q	.	.	.	.

20.10	0.7444	0.25	Q	.	.	.	.
20.29	0.7484	0.24	Q	.	.	.	.
20.49	0.7522	0.24	Q	.	.	.	.
20.68	0.7560	0.23	Q	.	.	.	.
20.88	0.7597	0.23	Q	.	.	.	.
21.07	0.7633	0.22	Q	.	.	.	.
21.27	0.7669	0.22	Q	.	.	.	.
21.46	0.7704	0.21	Q	.	.	.	.
21.66	0.7738	0.21	Q	.	.	.	.
21.85	0.7772	0.21	Q	.	.	.	.
22.05	0.7805	0.20	Q	.	.	.	.
22.24	0.7838	0.20	Q	.	.	.	.
22.44	0.7870	0.20	Q	.	.	.	.
22.63	0.7902	0.20	Q	.	.	.	.
22.83	0.7933	0.19	Q	.	.	.	.
23.02	0.7964	0.19	Q	.	.	.	.
23.22	0.7994	0.19	Q	.	.	.	.
23.42	0.8024	0.18	Q	.	.	.	.
23.61	0.8054	0.18	Q	.	.	.	.
23.81	0.8083	0.18	Q	.	.	.	.
24.00	0.8112	0.18	Q	.	.	.	.
24.20	0.8126	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.1
10%	35.1
20%	11.7
30%	11.7
40%	11.7
50%	11.7
60%	11.7
70%	11.7
80%	11.7
90%	11.7

Appendix I.III

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 100-Year Storm

SMALL AREA UNIT HYDROGRAPH MODEL

=====

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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:
pre dev UH

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.02
TOTAL CATCHMENT AREA(ACRES) = 16.70
SOIL-LOSS RATE, F_m , (INCH/HR) = 0.296
LOW LOSS FRACTION = 0.294
TIME OF CONCENTRATION(MIN.) = 20.45
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 100
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.32
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.18
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.87
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.61
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 5.85
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 2.10

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	7.5	15.0	22.5	30.0
-----------------	----------------	------------	----	-----	------	------	------

0.32	0.0228	1.62	. Q	.	.	.	.
0.66	0.0686	1.64	. Q	.	.	.	.

1.00	0.1148	1.65	.	Q	.	.	.	.
1.34	0.1615	1.67	.	Q	.	.	.	.
1.68	0.2086	1.68	.	Q	.	.	.	.
2.03	0.2562	1.70	.	Q	.	.	.	.
2.37	0.3043	1.71	.	Q	.	.	.	.
2.71	0.3529	1.74	.	Q	.	.	.	.
3.05	0.4021	1.75	.	Q	.	.	.	.
3.39	0.4518	1.78	.	Q	.	.	.	.
3.73	0.5021	1.79	.	Q	.	.	.	.
4.07	0.5530	1.82	.	Q	.	.	.	.
4.41	0.6045	1.84	.	Q	.	.	.	.
4.75	0.6567	1.87	.	Q	.	.	.	.
5.09	0.7095	1.88	.	Q	.	.	.	.
5.43	0.7630	1.92	.	Q	.	.	.	.
5.77	0.8173	1.94	.	Q	.	.	.	.
6.12	0.8724	1.97	.	Q	.	.	.	.
6.46	0.9282	1.99	.	Q	.	.	.	.
6.80	0.9849	2.03	.	Q	.	.	.	.
7.14	1.0425	2.06	.	Q	.	.	.	.
7.48	1.1011	2.10	.	Q	.	.	.	.
7.82	1.1606	2.13	.	Q	.	.	.	.
8.16	1.2212	2.18	.	Q	.	.	.	.
8.50	1.2829	2.20	.	Q	.	.	.	.
8.84	1.3458	2.26	.	Q	.	.	.	.
9.18	1.4100	2.29	.	Q	.	.	.	.
9.52	1.4755	2.36	.	Q	.	.	.	.
9.86	1.5425	2.40	.	Q	.	.	.	.
10.21	1.6110	2.47	.	Q	.	.	.	.
10.55	1.6813	2.51	.	Q	.	.	.	.
10.89	1.7534	2.61	.	Q	.	.	.	.
11.23	1.8275	2.66	.	Q	.	.	.	.
11.57	1.9038	2.76	.	Q	.	.	.	.
11.91	1.9825	2.83	.	Q	.	.	.	.
12.25	2.0603	2.70	.	Q	.	.	.	.
12.59	2.1350	2.60	.	Q	.	.	.	.
12.93	2.2108	2.78	.	Q	.	.	.	.
13.27	2.2907	2.89	.	Q	.	.	.	.
13.61	2.3756	3.14	.	Q	.	.	.	.
13.95	2.4662	3.29	.	Q	.	.	.	.
14.30	2.5590	3.30	.	Q	.	.	.	.
14.64	2.6541	3.45	.	Q	.	.	.	.
14.98	2.7609	4.13	.	Q	.	.	.	.
15.32	2.8846	4.65	.	Q	.	.	.	.
15.66	3.0493	7.05	.	Q.	.	.	.	.
16.00	3.2940	10.33	.	Q	.	.	.	.
16.34	3.8602	29.87	.	.	.	.	Q.	.
16.68	4.3567	5.38	.	Q	.	.	.	.
17.02	4.4854	3.75	.	Q	.	.	.	.
17.36	4.5870	3.47	.	Q	.	.	.	.
17.70	4.6782	3.01	.	Q	.	.	.	.

18.05	4.7584	2.69	. Q	.	.	.	.
18.39	4.8370	2.89	. Q	.	.	.	.
18.73	4.9159	2.71	. Q	.	.	.	.
19.07	4.9900	2.56	. Q	.	.	.	.
19.41	5.0603	2.43	. Q	.	.	.	.
19.75	5.1274	2.33	. Q	.	.	.	.
20.09	5.1916	2.23	. Q	.	.	.	.
20.43	5.2533	2.15	. Q	.	.	.	.
20.77	5.3129	2.08	. Q	.	.	.	.
21.11	5.3705	2.01	. Q	.	.	.	.
21.45	5.4264	1.95	. Q	.	.	.	.
21.79	5.4806	1.90	. Q	.	.	.	.
22.14	5.5335	1.85	. Q	.	.	.	.
22.48	5.5850	1.81	. Q	.	.	.	.
22.82	5.6353	1.76	. Q	.	.	.	.
23.16	5.6845	1.73	. Q	.	.	.	.
23.50	5.7326	1.69	. Q	.	.	.	.
23.84	5.7797	1.66	. Q	.	.	.	.
24.18	5.8259	1.63	. Q	.	.	.	.
24.52	5.8488	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1452.0
10%	265.9
20%	61.4
30%	40.9
40%	20.5
50%	20.5
60%	20.5
70%	20.5
80%	20.5
90%	20.5

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.20
 TOTAL CATCHMENT AREA(ACRES) = 8.67
 SOIL-LOSS RATE, F_m , (INCH/HR) = 0.296
 LOW LOSS FRACTION = 0.294
 TIME OF CONCENTRATION(MIN.) = 11.71
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.32
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.18
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.87
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.61
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 3.56
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.57

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	7.5	15.0	22.5	30.0
0.19	0.0078	0.99	.Q	.	.	.	.
0.39	0.0238	0.99	.Q	.	.	.	.
0.58	0.0399	1.00	.Q	.	.	.	.
0.78	0.0560	1.00	.Q	.	.	.	.
0.97	0.0722	1.01	.Q	.	.	.	.
1.17	0.0886	1.01	.Q	.	.	.	.
1.36	0.1050	1.02	.Q	.	.	.	.
1.56	0.1215	1.03	.Q	.	.	.	.
1.75	0.1381	1.03	.Q	.	.	.	.
1.95	0.1548	1.04	.Q	.	.	.	.
2.14	0.1716	1.05	.Q	.	.	.	.
2.34	0.1885	1.05	.Q	.	.	.	.
2.53	0.2056	1.06	.Q	.	.	.	.
2.73	0.2227	1.06	.Q	.	.	.	.
2.92	0.2399	1.07	.Q	.	.	.	.
3.12	0.2573	1.08	.Q	.	.	.	.
3.31	0.2747	1.09	.Q	.	.	.	.
3.51	0.2923	1.09	.Q	.	.	.	.
3.70	0.3100	1.10	.Q	.	.	.	.
3.90	0.3278	1.11	.Q	.	.	.	.
4.09	0.3457	1.12	.Q	.	.	.	.
4.29	0.3638	1.12	.Q	.	.	.	.
4.49	0.3820	1.13	.Q	.	.	.	.

4.68	0.4003	1.14	.Q	.	.	.	.
4.88	0.4188	1.15	.Q	.	.	.	.
5.07	0.4374	1.16	.Q	.	.	.	.
5.27	0.4561	1.17	.Q	.	.	.	.
5.46	0.4750	1.17	.Q	.	.	.	.
5.66	0.4940	1.19	.Q	.	.	.	.
5.85	0.5132	1.19	.Q	.	.	.	.
6.05	0.5326	1.21	.Q	.	.	.	.
6.24	0.5521	1.21	.Q	.	.	.	.
6.44	0.5718	1.23	.Q	.	.	.	.
6.63	0.5916	1.23	.Q	.	.	.	.
6.83	0.6117	1.25	.Q	.	.	.	.
7.02	0.6319	1.26	.Q	.	.	.	.
7.22	0.6523	1.27	.Q	.	.	.	.
7.41	0.6729	1.28	.Q	.	.	.	.
7.61	0.6937	1.30	.Q	.	.	.	.
7.80	0.7147	1.31	.Q	.	.	.	.
8.00	0.7359	1.32	.Q	.	.	.	.
8.19	0.7574	1.33	.Q	.	.	.	.
8.39	0.7790	1.35	.Q	.	.	.	.
8.58	0.8010	1.36	.Q	.	.	.	.
8.78	0.8231	1.38	.Q	.	.	.	.
8.97	0.8455	1.40	.Q	.	.	.	.
9.17	0.8682	1.42	.Q	.	.	.	.
9.36	0.8912	1.43	.Q	.	.	.	.
9.56	0.9144	1.45	.Q	.	.	.	.
9.75	0.9380	1.47	.Q	.	.	.	.
9.95	0.9619	1.49	.Q	.	.	.	.
10.15	0.9861	1.51	. Q	.	.	.	.
10.34	1.0106	1.54	. Q	.	.	.	.
10.54	1.0355	1.55	. Q	.	.	.	.
10.73	1.0608	1.58	. Q	.	.	.	.
10.93	1.0865	1.60	. Q	.	.	.	.
11.12	1.1126	1.64	. Q	.	.	.	.
11.32	1.1391	1.65	. Q	.	.	.	.
11.51	1.1661	1.69	. Q	.	.	.	.
11.71	1.1936	1.72	. Q	.	.	.	.
11.90	1.2217	1.76	. Q	.	.	.	.
12.10	1.2503	1.79	. Q	.	.	.	.
12.29	1.2773	1.57	. Q	.	.	.	.
12.49	1.3029	1.60	. Q	.	.	.	.
12.68	1.3292	1.66	. Q	.	.	.	.
12.88	1.3562	1.69	. Q	.	.	.	.
13.07	1.3841	1.77	. Q	.	.	.	.
13.27	1.4130	1.81	. Q	.	.	.	.
13.46	1.4428	1.90	. Q	.	.	.	.
13.66	1.4738	1.95	. Q	.	.	.	.
13.85	1.5061	2.06	. Q	.	.	.	.
14.05	1.5399	2.12	. Q	.	.	.	.
14.24	1.5730	1.99	. Q	.	.	.	.

14.44	1.6057	2.07	. Q	.	.	.	.
14.63	1.6407	2.27	. Q	.	.	.	.
14.83	1.6783	2.40	. Q	.	.	.	.
15.02	1.7195	2.71	. Q	.	.	.	.
15.22	1.7648	2.91	. Q	.	.	.	.
15.41	1.8168	3.53	. Q	.	.	.	.
15.61	1.8794	4.24	. Q	.	.	.	.
15.80	1.9661	6.51	. Q	.	.	.	.
16.00	2.0955	9.55	. Q	.	.	.	.
16.20	2.3692	24.40	.	.	.	. Q	.
16.39	2.6052	4.87	. Q	.	.	.	.
16.59	2.6700	3.17	. Q	.	.	.	.
16.78	2.7160	2.54	. Q	.	.	.	.
16.98	2.7539	2.16	. Q	.	.	.	.
17.17	2.7882	2.09	. Q	.	.	.	.
17.37	2.8212	2.00	. Q	.	.	.	.
17.56	2.8523	1.85	. Q	.	.	.	.
17.76	2.8811	1.73	. Q	.	.	.	.
17.95	2.9082	1.63	. Q	.	.	.	.
18.15	2.9343	1.61	. Q	.	.	.	.
18.34	2.9614	1.74	. Q	.	.	.	.
18.54	2.9889	1.67	. Q	.	.	.	.
18.73	3.0154	1.62	. Q	.	.	.	.
18.93	3.0411	1.57	. Q	.	.	.	.
19.12	3.0660	1.52	. Q	.	.	.	.
19.32	3.0902	1.48	.Q	.	.	.	.
19.51	3.1138	1.44	.Q	.	.	.	.
19.71	3.1368	1.41	.Q	.	.	.	.
19.90	3.1592	1.37	.Q	.	.	.	.
20.10	3.1811	1.34	.Q	.	.	.	.
20.29	3.2025	1.32	.Q	.	.	.	.
20.49	3.2236	1.29	.Q	.	.	.	.
20.68	3.2442	1.27	.Q	.	.	.	.
20.88	3.2644	1.24	.Q	.	.	.	.
21.07	3.2842	1.22	.Q	.	.	.	.
21.27	3.3038	1.20	.Q	.	.	.	.
21.46	3.3230	1.18	.Q	.	.	.	.
21.66	3.3418	1.16	.Q	.	.	.	.
21.86	3.3604	1.14	.Q	.	.	.	.
22.05	3.3788	1.13	.Q	.	.	.	.
22.25	3.3968	1.11	.Q	.	.	.	.
22.44	3.4146	1.10	.Q	.	.	.	.
22.64	3.4322	1.08	.Q	.	.	.	.
22.83	3.4496	1.07	.Q	.	.	.	.
23.03	3.4667	1.05	.Q	.	.	.	.
23.22	3.4836	1.04	.Q	.	.	.	.
23.42	3.5003	1.03	.Q	.	.	.	.
23.61	3.5168	1.02	.Q	.	.	.	.
23.81	3.5332	1.01	.Q	.	.	.	.
24.00	3.5493	1.00	.Q	.	.	.	.

24.20 3.5573 0.00 Q

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.3
10%	117.1
20%	35.1
30%	23.4
40%	11.7
50%	11.7
60%	11.7
70%	11.7
80%	11.7
90%	11.7

Appendix I.IV

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 2-Year Storm

SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA

UNIT HYDROGRAPH

2-YEAR, POST-CONDITIONS, DA A

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.51

TOTAL CATCHMENT AREA(ACRES) = 9.10

SOIL-LOSS RATE, F_m (INCH/HR) = 0.210

LOW LOSS FRACTION = 0.307

TIME OF CONCENTRATION(MIN.) = 10.07

SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA

USER SPECIFIED RAINFALL VALUES ARE USED

RETURN FREQUENCY(YEARS) = 2

5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.11

30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.30

1-HOUR POINT RAINFALL VALUE(INCHES) = 0.41

3-HOUR POINT RAINFALL VALUE(INCHES) = 0.67

6-HOUR POINT RAINFALL VALUE(INCHES) = 0.91

24-HOUR POINT RAINFALL VALUE(INCHES) = 1.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.36

TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = -0.07

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
-----------------	----------------	------------	----	-----	------	------	------

0.06	0.0000	0.00	Q	.	.	.	.
0.22	0.0021	0.31	Q	.	.	.	.
0.39	0.0064	0.31	Q	.	.	.	.
0.56	0.0107	0.31	Q	.	.	.	.
0.73	0.0150	0.31	Q	.	.	.	.
0.90	0.0194	0.31	Q	.	.	.	.
1.06	0.0238	0.32	Q	.	.	.	.
1.23	0.0282	0.32	Q	.	.	.	.
1.40	0.0326	0.32	Q	.	.	.	.
1.57	0.0371	0.32	Q	.	.	.	.
1.73	0.0416	0.33	Q	.	.	.	.
1.90	0.0461	0.33	Q	.	.	.	.
2.07	0.0506	0.33	Q	.	.	.	.
2.24	0.0552	0.33	Q	.	.	.	.
2.41	0.0598	0.33	Q	.	.	.	.
2.57	0.0645	0.34	Q	.	.	.	.
2.74	0.0691	0.34	Q	.	.	.	.
2.91	0.0738	0.34	Q	.	.	.	.
3.08	0.0786	0.34	Q	.	.	.	.
3.24	0.0833	0.34	Q	.	.	.	.
3.41	0.0881	0.35	Q	.	.	.	.

3.58	0.0930	0.35	Q	.	.	.	.
3.75	0.0979	0.35	Q	.	.	.	.
3.92	0.1028	0.35	Q	.	.	.	.
4.08	0.1077	0.36	Q	.	.	.	.
4.25	0.1127	0.36	Q	.	.	.	.
4.42	0.1177	0.36	Q	.	.	.	.
4.59	0.1228	0.37	Q	.	.	.	.
4.76	0.1279	0.37	Q	.	.	.	.
4.92	0.1330	0.37	Q	.	.	.	.
5.09	0.1382	0.38	Q	.	.	.	.
5.26	0.1434	0.38	Q	.	.	.	.
5.43	0.1487	0.38	Q	.	.	.	.
5.59	0.1540	0.38	Q	.	.	.	.
5.76	0.1594	0.39	Q	.	.	.	.
5.93	0.1648	0.39	Q	.	.	.	.
6.10	0.1703	0.40	Q	.	.	.	.
6.27	0.1758	0.40	Q	.	.	.	.
6.43	0.1814	0.40	Q	.	.	.	.
6.60	0.1870	0.41	Q	.	.	.	.
6.77	0.1927	0.41	Q	.	.	.	.
6.94	0.1984	0.41	Q	.	.	.	.
7.10	0.2042	0.42	Q	.	.	.	.
7.27	0.2100	0.42	Q	.	.	.	.
7.44	0.2159	0.43	Q	.	.	.	.
7.61	0.2219	0.43	Q	.	.	.	.
7.78	0.2279	0.44	Q	.	.	.	.
7.94	0.2341	0.44	Q	.	.	.	.
8.11	0.2402	0.45	Q	.	.	.	.
8.28	0.2465	0.45	Q	.	.	.	.
8.45	0.2528	0.46	Q	.	.	.	.
8.62	0.2592	0.46	Q	.	.	.	.
8.78	0.2656	0.47	Q	.	.	.	.
8.95	0.2722	0.47	Q	.	.	.	.
9.12	0.2788	0.48	Q	.	.	.	.
9.29	0.2856	0.49	Q	.	.	.	.
9.45	0.2924	0.50	Q	.	.	.	.
9.62	0.2993	0.50	.Q	.	.	.	.
9.79	0.3063	0.51	.Q	.	.	.	.
9.96	0.3134	0.52	.Q	.	.	.	.
10.13	0.3206	0.53	.Q	.	.	.	.
10.29	0.3279	0.53	.Q	.	.	.	.
10.46	0.3354	0.54	.Q	.	.	.	.
10.63	0.3429	0.55	.Q	.	.	.	.
10.80	0.3506	0.56	.Q	.	.	.	.
10.97	0.3585	0.57	.Q	.	.	.	.
11.13	0.3664	0.58	.Q	.	.	.	.
11.30	0.3745	0.59	.Q	.	.	.	.
11.47	0.3828	0.60	.Q	.	.	.	.
11.64	0.3913	0.61	.Q	.	.	.	.
11.80	0.3999	0.63	.Q	.	.	.	.
11.97	0.4087	0.64	.Q	.	.	.	.
12.14	0.4176	0.65	.Q	.	.	.	.
12.31	0.4266	0.66	.Q	.	.	.	.
12.48	0.4359	0.68	.Q	.	.	.	.
12.64	0.4454	0.69	.Q	.	.	.	.
12.81	0.4552	0.72	.Q	.	.	.	.
12.98	0.4652	0.73	.Q	.	.	.	.
13.15	0.4755	0.76	.Q	.	.	.	.
13.31	0.4862	0.78	.Q	.	.	.	.
13.48	0.4972	0.81	.Q	.	.	.	.
13.65	0.5086	0.83	.Q	.	.	.	.
13.82	0.5205	0.88	.Q	.	.	.	.
13.99	0.5328	0.90	.Q	.	.	.	.
14.15	0.5458	0.96	.Q	.	.	.	.
14.32	0.5594	1.00	.Q	.	.	.	.
14.49	0.5737	1.07	. Q	.	.	.	.
14.66	0.5889	1.11	. Q	.	.	.	.
14.83	0.6051	1.22	. Q	.	.	.	.
14.99	0.6224	1.28	. Q	.	.	.	.

15.16	0.6413	1.44	. Q	.	.	.	.
15.33	0.6620	1.54	. Q	.	.	.	.
15.50	0.6856	1.86	. Q	.	.	.	.
15.66	0.7129	2.08	. Q	.	.	.	.
15.83	0.7507	3.38	. Q	.	.	.	.
16.00	0.8040	4.31	. Q	.	.	.	.
16.17	0.9078	10.66	.	.	.Q	.	.
16.34	0.9983	2.38	. Q	.	.	.	.
16.50	1.0264	1.67	. Q	.	.	.	.
16.67	1.0474	1.35	. Q	.	.	.	.
16.84	1.0648	1.16	. Q	.	.	.	.
17.01	1.0801	1.03	. Q	.	.	.	.
17.17	1.0937	0.93	.Q	.	.	.	.
17.34	1.1061	0.85	.Q	.	.	.	.
17.51	1.1175	0.79	.Q	.	.	.	.
17.68	1.1282	0.74	.Q	.	.	.	.
17.85	1.1382	0.70	.Q	.	.	.	.
18.01	1.1477	0.67	.Q	.	.	.	.
18.18	1.1568	0.65	.Q	.	.	.	.
18.35	1.1656	0.62	.Q	.	.	.	.
18.52	1.1741	0.60	.Q	.	.	.	.
18.69	1.1822	0.57	.Q	.	.	.	.
18.85	1.1900	0.55	.Q	.	.	.	.
19.02	1.1976	0.54	.Q	.	.	.	.
19.19	1.2049	0.52	.Q	.	.	.	.
19.36	1.2120	0.51	.Q	.	.	.	.
19.52	1.2189	0.49	Q	.	.	.	.
19.69	1.2257	0.48	Q	.	.	.	.
19.86	1.2322	0.47	Q	.	.	.	.
20.03	1.2386	0.46	Q	.	.	.	.
20.20	1.2448	0.44	Q	.	.	.	.
20.36	1.2509	0.44	Q	.	.	.	.
20.53	1.2569	0.43	Q	.	.	.	.
20.70	1.2628	0.42	Q	.	.	.	.
20.87	1.2685	0.41	Q	.	.	.	.
21.03	1.2741	0.40	Q	.	.	.	.
21.20	1.2796	0.39	Q	.	.	.	.
21.37	1.2850	0.39	Q	.	.	.	.
21.54	1.2904	0.38	Q	.	.	.	.
21.71	1.2956	0.37	Q	.	.	.	.
21.87	1.3007	0.37	Q	.	.	.	.
22.04	1.3058	0.36	Q	.	.	.	.
22.21	1.3108	0.36	Q	.	.	.	.
22.38	1.3157	0.35	Q	.	.	.	.
22.55	1.3205	0.35	Q	.	.	.	.
22.71	1.3253	0.34	Q	.	.	.	.
22.88	1.3300	0.34	Q	.	.	.	.
23.05	1.3347	0.33	Q	.	.	.	.
23.22	1.3392	0.33	Q	.	.	.	.
23.38	1.3438	0.32	Q	.	.	.	.
23.55	1.3482	0.32	Q	.	.	.	.
23.72	1.3526	0.32	Q	.	.	.	.
23.89	1.3570	0.31	Q	.	.	.	.
24.06	1.3613	0.31	Q	.	.	.	.
24.22	1.3634	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:

(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.0
10%	151.0
20%	40.3
30%	30.2
40%	20.1

50%	10.1
60%	10.1
70%	10.1
80%	10.1
90%	10.1

 NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS
 =====

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 2-YEAR, POST-CONDITIONS, DA B

 *** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 1.71 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	16.27	25.00	32.(AMC II)	1.033	0.652

TOTAL AREA (Acres) = 16.27

AREA-AVERAGED LOSS RATE, $\bar{F}_m$ (in./hr.) = 0.258

AREA-AVERAGED LOW LOSS FRACTION, $\bar{Y}$ = 0.348
 =====

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 2-YEAR, POST-CONDITIONS, DA B

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.19
 TOTAL CATCHMENT AREA(ACRES) = 16.27
 SOIL-LOSS RATE, F_m , (INCH/HR) = 0.258
 LOW LOSS FRACTION = 0.348
 TIME OF CONCENTRATION(MIN.) = 6.74
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 2
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.11
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.30
 1-HOUR POINT RAINFALL VALUE(INCHES) = 0.41
 3-HOUR POINT RAINFALL VALUE(INCHES) = 0.67
 6-HOUR POINT RAINFALL VALUE(INCHES) = 0.91
 24-HOUR POINT RAINFALL VALUE(INCHES) = 1.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.81
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.51

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
-----------------	----------------	------------	----	-----	------	------	------

0.05	0.0000	0.00	Q	.	.	.	.
0.16	0.0019	0.41	Q	.	.	.	.
0.27	0.0057	0.41	Q	.	.	.	.
0.39	0.0095	0.41	Q	.	.	.	.
0.50	0.0133	0.41	Q	.	.	.	.
0.61	0.0171	0.41	Q	.	.	.	.
0.72	0.0210	0.42	Q	.	.	.	.
0.84	0.0249	0.42	Q	.	.	.	.
0.95	0.0287	0.42	Q	.	.	.	.
1.06	0.0326	0.42	Q	.	.	.	.
1.17	0.0365	0.42	Q	.	.	.	.
1.28	0.0405	0.42	Q	.	.	.	.
1.40	0.0444	0.43	Q	.	.	.	.
1.51	0.0484	0.43	Q	.	.	.	.
1.62	0.0524	0.43	Q	.	.	.	.
1.73	0.0563	0.43	Q	.	.	.	.
1.85	0.0604	0.43	Q	.	.	.	.
1.96	0.0644	0.44	Q	.	.	.	.
2.07	0.0684	0.44	Q	.	.	.	.
2.18	0.0725	0.44	Q	.	.	.	.
2.30	0.0766	0.44	Q	.	.	.	.
2.41	0.0807	0.44	Q	.	.	.	.
2.52	0.0848	0.44	Q	.	.	.	.
2.63	0.0889	0.45	Q	.	.	.	.
2.74	0.0931	0.45	Q	.	.	.	.
2.86	0.0973	0.45	Q	.	.	.	.
2.97	0.1015	0.45	Q	.	.	.	.
3.08	0.1057	0.46	Q	.	.	.	.
3.19	0.1099	0.46	Q	.	.	.	.
3.31	0.1142	0.46	Q	.	.	.	.
3.42	0.1185	0.46	Q	.	.	.	.
3.53	0.1228	0.46	Q	.	.	.	.
3.64	0.1271	0.47	Q	.	.	.	.
3.76	0.1314	0.47	Q	.	.	.	.
3.87	0.1358	0.47	Q	.	.	.	.
3.98	0.1402	0.47	Q	.	.	.	.
4.09	0.1446	0.48	Q	.	.	.	.
4.21	0.1490	0.48	Q	.	.	.	.
4.32	0.1534	0.48	Q	.	.	.	.
4.43	0.1579	0.48	Q	.	.	.	.
4.54	0.1624	0.49	Q	.	.	.	.
4.65	0.1669	0.49	Q	.	.	.	.
4.77	0.1715	0.49	Q	.	.	.	.
4.88	0.1761	0.49	Q	.	.	.	.
4.99	0.1807	0.50	Q	.	.	.	.
5.10	0.1853	0.50	Q	.	.	.	.
5.22	0.1899	0.50	.Q	.	.	.	.
5.33	0.1946	0.51	.Q	.	.	.	.
5.44	0.1993	0.51	.Q	.	.	.	.
5.55	0.2040	0.51	.Q	.	.	.	.
5.67	0.2088	0.51	.Q	.	.	.	.
5.78	0.2136	0.52	.Q	.	.	.	.
5.89	0.2184	0.52	.Q	.	.	.	.
6.00	0.2232	0.52	.Q	.	.	.	.
6.11	0.2281	0.53	.Q	.	.	.	.
6.23	0.2330	0.53	.Q	.	.	.	.
6.34	0.2379	0.53	.Q	.	.	.	.
6.45	0.2429	0.54	.Q	.	.	.	.
6.56	0.2479	0.54	.Q	.	.	.	.
6.68	0.2529	0.54	.Q	.	.	.	.
6.79	0.2580	0.55	.Q	.	.	.	.
6.90	0.2631	0.55	.Q	.	.	.	.
7.01	0.2682	0.55	.Q	.	.	.	.
7.13	0.2734	0.56	.Q	.	.	.	.
7.24	0.2786	0.56	.Q	.	.	.	.
7.35	0.2838	0.57	.Q	.	.	.	.
7.46	0.2891	0.57	.Q	.	.	.	.
7.58	0.2944	0.57	.Q	.	.	.	.

7.69	0.2998	0.58	.Q	.	.	.	.
7.80	0.3051	0.58	.Q	.	.	.	.
7.91	0.3106	0.59	.Q	.	.	.	.
8.02	0.3160	0.59	.Q	.	.	.	.
8.14	0.3216	0.60	.Q	.	.	.	.
8.25	0.3271	0.60	.Q	.	.	.	.
8.36	0.3327	0.60	.Q	.	.	.	.
8.47	0.3384	0.61	.Q	.	.	.	.
8.59	0.3440	0.61	.Q	.	.	.	.
8.70	0.3498	0.62	.Q	.	.	.	.
8.81	0.3556	0.62	.Q	.	.	.	.
8.92	0.3614	0.63	.Q	.	.	.	.
9.04	0.3673	0.64	.Q	.	.	.	.
9.15	0.3732	0.64	.Q	.	.	.	.
9.26	0.3792	0.65	.Q	.	.	.	.
9.37	0.3853	0.65	.Q	.	.	.	.
9.48	0.3913	0.66	.Q	.	.	.	.
9.60	0.3975	0.67	.Q	.	.	.	.
9.71	0.4037	0.67	.Q	.	.	.	.
9.82	0.4100	0.68	.Q	.	.	.	.
9.93	0.4163	0.68	.Q	.	.	.	.
10.05	0.4227	0.69	.Q	.	.	.	.
10.16	0.4292	0.70	.Q	.	.	.	.
10.27	0.4357	0.71	.Q	.	.	.	.
10.38	0.4423	0.71	.Q	.	.	.	.
10.50	0.4490	0.72	.Q	.	.	.	.
10.61	0.4557	0.73	.Q	.	.	.	.
10.72	0.4626	0.74	.Q	.	.	.	.
10.83	0.4695	0.75	.Q	.	.	.	.
10.95	0.4765	0.76	.Q	.	.	.	.
11.06	0.4835	0.76	.Q	.	.	.	.
11.17	0.4907	0.78	.Q	.	.	.	.
11.28	0.4979	0.78	.Q	.	.	.	.
11.39	0.5053	0.80	.Q	.	.	.	.
11.51	0.5127	0.80	.Q	.	.	.	.
11.62	0.5202	0.82	.Q	.	.	.	.
11.73	0.5279	0.83	.Q	.	.	.	.
11.84	0.5356	0.84	.Q	.	.	.	.
11.96	0.5435	0.85	.Q	.	.	.	.
12.07	0.5514	0.86	.Q	.	.	.	.
12.18	0.5594	0.86	.Q	.	.	.	.
12.29	0.5675	0.88	.Q	.	.	.	.
12.41	0.5757	0.89	.Q	.	.	.	.
12.52	0.5841	0.91	.Q	.	.	.	.
12.63	0.5926	0.92	.Q	.	.	.	.
12.74	0.6013	0.94	.Q	.	.	.	.
12.85	0.6101	0.96	.Q	.	.	.	.
12.97	0.6191	0.98	.Q	.	.	.	.
13.08	0.6283	1.00	.Q	.	.	.	.
13.19	0.6376	1.02	. Q	.	.	.	.
13.30	0.6472	1.04	. Q	.	.	.	.
13.42	0.6570	1.07	. Q	.	.	.	.
13.53	0.6670	1.09	. Q	.	.	.	.
13.64	0.6773	1.12	. Q	.	.	.	.
13.75	0.6878	1.14	. Q	.	.	.	.
13.87	0.6987	1.19	. Q	.	.	.	.
13.98	0.7098	1.21	. Q	.	.	.	.
14.09	0.7213	1.27	. Q	.	.	.	.
14.20	0.7332	1.30	. Q	.	.	.	.
14.32	0.7455	1.36	. Q	.	.	.	.
14.43	0.7583	1.39	. Q	.	.	.	.
14.54	0.7715	1.46	. Q	.	.	.	.
14.65	0.7853	1.51	. Q	.	.	.	.
14.76	0.7997	1.60	. Q	.	.	.	.
14.88	0.8148	1.65	. Q	.	.	.	.
14.99	0.8307	1.77	. Q	.	.	.	.
15.10	0.8475	1.85	. Q	.	.	.	.
15.21	0.8655	2.02	. Q	.	.	.	.
15.33	0.8847	2.12	. Q	.	.	.	.

15.44	0.9057	2.41	.	Q	.	.	.	.
15.55	0.9289	2.59	.	Q	.	.	.	.
15.66	0.9552	3.07	.	Q	.	.	.	.
15.78	0.9868	3.74	.	Q	.	.	.	.
15.89	1.0291	5.39	.	Q	.	.	.	.
16.00	1.0860	6.86	.	.	Q	.	.	.
16.11	1.2010	17.92	.	.	.	.	Q	.
16.22	1.3056	4.61	.	Q.	.	.	.	.
16.34	1.3401	2.80	.	Q	.	.	.	.
16.45	1.3635	2.24	.	Q	.	.	.	.
16.56	1.3828	1.93	.	Q	.	.	.	.
16.67	1.3997	1.71	.	Q	.	.	.	.
16.79	1.4148	1.55	.	Q	.	.	.	.
16.90	1.4286	1.43	.	Q	.	.	.	.
17.01	1.4414	1.33	.	Q	.	.	.	.
17.12	1.4533	1.23	.	Q	.	.	.	.
17.24	1.4644	1.17	.	Q	.	.	.	.
17.35	1.4750	1.11	.	Q	.	.	.	.
17.46	1.4850	1.05	.	Q	.	.	.	.
17.57	1.4946	1.01	.	Q	.	.	.	.
17.68	1.5038	0.97	.Q	.	.	.	.	.
17.80	1.5126	0.93	.Q	.	.	.	.	.
17.91	1.5211	0.90	.Q	.	.	.	.	.
18.02	1.5293	0.87	.Q	.	.	.	.	.
18.13	1.5374	0.86	.Q	.	.	.	.	.
18.25	1.5452	0.83	.Q	.	.	.	.	.
18.36	1.5529	0.81	.Q	.	.	.	.	.
18.47	1.5603	0.79	.Q	.	.	.	.	.
18.58	1.5675	0.77	.Q	.	.	.	.	.
18.70	1.5746	0.75	.Q	.	.	.	.	.
18.81	1.5815	0.73	.Q	.	.	.	.	.
18.92	1.5883	0.72	.Q	.	.	.	.	.
19.03	1.5949	0.70	.Q	.	.	.	.	.
19.15	1.6013	0.69	.Q	.	.	.	.	.
19.26	1.6077	0.68	.Q	.	.	.	.	.
19.37	1.6139	0.66	.Q	.	.	.	.	.
19.48	1.6200	0.65	.Q	.	.	.	.	.
19.59	1.6260	0.64	.Q	.	.	.	.	.
19.71	1.6319	0.63	.Q	.	.	.	.	.
19.82	1.6376	0.62	.Q	.	.	.	.	.
19.93	1.6433	0.61	.Q	.	.	.	.	.
20.04	1.6489	0.60	.Q	.	.	.	.	.
20.16	1.6544	0.59	.Q	.	.	.	.	.
20.27	1.6599	0.58	.Q	.	.	.	.	.
20.38	1.6652	0.57	.Q	.	.	.	.	.
20.49	1.6705	0.56	.Q	.	.	.	.	.
20.61	1.6757	0.56	.Q	.	.	.	.	.
20.72	1.6808	0.55	.Q	.	.	.	.	.
20.83	1.6859	0.54	.Q	.	.	.	.	.
20.94	1.6909	0.53	.Q	.	.	.	.	.
21.06	1.6958	0.53	.Q	.	.	.	.	.
21.17	1.7007	0.52	.Q	.	.	.	.	.
21.28	1.7055	0.52	.Q	.	.	.	.	.
21.39	1.7103	0.51	.Q	.	.	.	.	.
21.50	1.7150	0.50	.Q	.	.	.	.	.
21.62	1.7196	0.50	Q	.	.	.	.	.
21.73	1.7242	0.49	Q	.	.	.	.	.
21.84	1.7288	0.49	Q	.	.	.	.	.
21.95	1.7333	0.48	Q	.	.	.	.	.
22.07	1.7377	0.48	Q	.	.	.	.	.
22.18	1.7421	0.47	Q	.	.	.	.	.
22.29	1.7465	0.47	Q	.	.	.	.	.
22.40	1.7508	0.46	Q	.	.	.	.	.
22.52	1.7551	0.46	Q	.	.	.	.	.
22.63	1.7593	0.45	Q	.	.	.	.	.
22.74	1.7635	0.45	Q	.	.	.	.	.
22.85	1.7677	0.45	Q	.	.	.	.	.
22.96	1.7718	0.44	Q	.	.	.	.	.
23.08	1.7759	0.44	Q	.	.	.	.	.

23.19	1.7799	0.43	Q	.	.	.	.
23.30	1.7839	0.43	Q	.	.	.	.
23.41	1.7879	0.43	Q	.	.	.	.
23.53	1.7918	0.42	Q	.	.	.	.
23.64	1.7958	0.42	Q	.	.	.	.
23.75	1.7996	0.42	Q	.	.	.	.
23.86	1.8035	0.41	Q	.	.	.	.
23.98	1.8073	0.41	Q	.	.	.	.
24.09	1.8111	0.41	Q	.	.	.	.
24.20	1.8130	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1442.4
10%	94.4
20%	33.7
30%	20.2
40%	6.7
50%	6.7
60%	6.7
70%	6.7
80%	6.7
90%	6.7

Appendix I.V

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 10-Year Storm

 NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS
 =====

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 10-YEAR, POST-CONDITIONS, DA A

 *** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 3.10 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	9.10	20.30	32.	0.975	0.737

TOTAL AREA (Acres) = 9.10

AREA-AVERAGED LOSS RATE, $\bar{F}_m$ (in./hr.) = 0.198

AREA-AVERAGED LOW LOSS FRACTION, $\bar{Y} = 0.263$

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 10-YEAR, POST-CONDITIONS, DA A

 RATIONAL METHOD CALIBRATION COEFFICIENT = 1.43
 TOTAL CATCHMENT AREA(ACRES) = 9.10
 SOIL-LOSS RATE, F_m , (INCH/HR) = 0.198
 LOW LOSS FRACTION = 0.263
 TIME OF CONCENTRATION(MIN.) = 10.07
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 10
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.20
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
 1-HOUR POINT RAINFALL VALUE(INCHES) = 0.71
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.10
 6-HOUR POINT RAINFALL VALUE(INCHES) = 1.51
 24-HOUR POINT RAINFALL VALUE(INCHES) = 3.10

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 2.50
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = -0.15

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
-----------------	----------------	------------	----	-----	------	------	------

0.06	0.0000	0.00	Q	.	.	.	.
0.22	0.0045	0.64	.Q	.	.	.	.
0.39	0.0134	0.65	.Q	.	.	.	.
0.56	0.0224	0.65	.Q	.	.	.	.
0.73	0.0315	0.66	.Q	.	.	.	.
0.90	0.0406	0.66	.Q	.	.	.	.
1.06	0.0497	0.66	.Q	.	.	.	.
1.23	0.0589	0.66	.Q	.	.	.	.
1.40	0.0682	0.67	.Q	.	.	.	.
1.57	0.0775	0.67	.Q	.	.	.	.
1.73	0.0868	0.68	.Q	.	.	.	.
1.90	0.0962	0.68	.Q	.	.	.	.
2.07	0.1057	0.68	.Q	.	.	.	.
2.24	0.1152	0.69	.Q	.	.	.	.
2.41	0.1248	0.69	.Q	.	.	.	.
2.57	0.1344	0.70	.Q	.	.	.	.
2.74	0.1441	0.70	.Q	.	.	.	.
2.91	0.1538	0.70	.Q	.	.	.	.
3.08	0.1636	0.71	.Q	.	.	.	.
3.24	0.1735	0.71	.Q	.	.	.	.
3.41	0.1834	0.72	.Q	.	.	.	.
3.58	0.1934	0.72	.Q	.	.	.	.
3.75	0.2034	0.73	.Q	.	.	.	.
3.92	0.2135	0.73	.Q	.	.	.	.
4.08	0.2237	0.74	.Q	.	.	.	.
4.25	0.2340	0.74	.Q	.	.	.	.
4.42	0.2443	0.75	.Q	.	.	.	.
4.59	0.2547	0.75	.Q	.	.	.	.
4.76	0.2652	0.76	.Q	.	.	.	.
4.92	0.2757	0.76	.Q	.	.	.	.
5.09	0.2863	0.77	.Q	.	.	.	.
5.26	0.2970	0.77	.Q	.	.	.	.
5.43	0.3078	0.78	.Q	.	.	.	.
5.59	0.3186	0.78	.Q	.	.	.	.
5.76	0.3296	0.79	.Q	.	.	.	.
5.93	0.3406	0.80	.Q	.	.	.	.
6.10	0.3517	0.81	.Q	.	.	.	.
6.27	0.3629	0.81	.Q	.	.	.	.
6.43	0.3742	0.82	.Q	.	.	.	.
6.60	0.3856	0.82	.Q	.	.	.	.
6.77	0.3971	0.83	.Q	.	.	.	.
6.94	0.4087	0.84	.Q	.	.	.	.
7.10	0.4203	0.85	.Q	.	.	.	.
7.27	0.4321	0.85	.Q	.	.	.	.
7.44	0.4440	0.86	.Q	.	.	.	.
7.61	0.4560	0.87	.Q	.	.	.	.
7.78	0.4682	0.88	.Q	.	.	.	.
7.94	0.4804	0.89	.Q	.	.	.	.
8.11	0.4928	0.90	.Q	.	.	.	.
8.28	0.5052	0.90	.Q	.	.	.	.
8.45	0.5179	0.92	.Q	.	.	.	.
8.62	0.5306	0.92	.Q	.	.	.	.
8.78	0.5435	0.94	.Q	.	.	.	.
8.95	0.5565	0.94	.Q	.	.	.	.
9.12	0.5697	0.96	.Q	.	.	.	.
9.29	0.5830	0.96	.Q	.	.	.	.
9.45	0.5965	0.98	.Q	.	.	.	.
9.62	0.6102	0.99	.Q	.	.	.	.
9.79	0.6240	1.00	. Q	.	.	.	.
9.96	0.6380	1.01	. Q	.	.	.	.
10.13	0.6522	1.03	. Q	.	.	.	.
10.29	0.6665	1.04	. Q	.	.	.	.
10.46	0.6811	1.06	. Q	.	.	.	.
10.63	0.6959	1.07	. Q	.	.	.	.
10.80	0.7109	1.09	. Q	.	.	.	.
10.97	0.7261	1.10	. Q	.	.	.	.
11.13	0.7416	1.13	. Q	.	.	.	.
11.30	0.7573	1.14	. Q	.	.	.	.

11.47	0.7733	1.17	. Q	.	.	.	.
11.64	0.7896	1.18	. Q	.	.	.	.
11.80	0.8061	1.21	. Q	.	.	.	.
11.97	0.8230	1.22	. Q	.	.	.	.
12.14	0.8394	1.14	. Q	.	.	.	.
12.31	0.8552	1.12	. Q	.	.	.	.
12.48	0.8710	1.16	. Q	.	.	.	.
12.64	0.8873	1.18	. Q	.	.	.	.
12.81	0.9040	1.22	. Q	.	.	.	.
12.98	0.9211	1.25	. Q	.	.	.	.
13.15	0.9388	1.30	. Q	.	.	.	.
13.31	0.9570	1.33	. Q	.	.	.	.
13.48	0.9758	1.39	. Q	.	.	.	.
13.65	0.9952	1.42	. Q	.	.	.	.
13.82	1.0154	1.49	. Q	.	.	.	.
13.99	1.0364	1.53	. Q	.	.	.	.
14.15	1.0569	1.43	. Q	.	.	.	.
14.32	1.0769	1.45	. Q	.	.	.	.
14.49	1.0979	1.57	. Q	.	.	.	.
14.66	1.1201	1.64	. Q	.	.	.	.
14.83	1.1441	1.81	. Q	.	.	.	.
14.99	1.1699	1.91	. Q	.	.	.	.
15.16	1.1982	2.17	. Q	.	.	.	.
15.33	1.2295	2.34	. Q	.	.	.	.
15.50	1.2682	3.24	. Q	.	.	.	.
15.66	1.3159	3.63	. Q	.	.	.	.
15.83	1.3821	5.91	. Q	.	.	.	.
16.00	1.4762	7.66	.	. Q	.	.	.
16.17	1.6659	19.69	.	.	.	.	Q.
16.34	1.8314	4.17	. Q	.	.	.	.
16.50	1.8781	2.56	. Q	.	.	.	.
16.67	1.9099	2.03	. Q	.	.	.	.
16.84	1.9359	1.72	. Q	.	.	.	.
17.01	1.9583	1.51	. Q	.	.	.	.
17.17	1.9797	1.58	. Q	.	.	.	.
17.34	2.0007	1.45	. Q	.	.	.	.
17.51	2.0202	1.35	. Q	.	.	.	.
17.68	2.0384	1.27	. Q	.	.	.	.
17.85	2.0556	1.20	. Q	.	.	.	.
18.01	2.0718	1.14	. Q	.	.	.	.
18.18	2.0884	1.24	. Q	.	.	.	.
18.35	2.1052	1.19	. Q	.	.	.	.
18.52	2.1215	1.15	. Q	.	.	.	.
18.69	2.1372	1.12	. Q	.	.	.	.
18.85	2.1525	1.08	. Q	.	.	.	.
19.02	2.1673	1.05	. Q	.	.	.	.
19.19	2.1816	1.02	. Q	.	.	.	.
19.36	2.1956	1.00	. Q	.	.	.	.
19.52	2.2093	0.97	. Q	.	.	.	.
19.69	2.2226	0.95	. Q	.	.	.	.
19.86	2.2356	0.93	. Q	.	.	.	.
20.03	2.2484	0.91	. Q	.	.	.	.
20.20	2.2609	0.89	. Q	.	.	.	.
20.36	2.2731	0.87	. Q	.	.	.	.
20.53	2.2851	0.86	. Q	.	.	.	.
20.70	2.2969	0.84	. Q	.	.	.	.
20.87	2.3085	0.83	. Q	.	.	.	.
21.03	2.3199	0.81	. Q	.	.	.	.
21.20	2.3311	0.80	. Q	.	.	.	.
21.37	2.3421	0.79	. Q	.	.	.	.
21.54	2.3530	0.78	. Q	.	.	.	.
21.71	2.3637	0.77	. Q	.	.	.	.
21.87	2.3742	0.75	. Q	.	.	.	.
22.04	2.3846	0.74	. Q	.	.	.	.
22.21	2.3949	0.73	. Q	.	.	.	.
22.38	2.4050	0.72	. Q	.	.	.	.
22.55	2.4150	0.72	. Q	.	.	.	.
22.71	2.4248	0.71	. Q	.	.	.	.
22.88	2.4346	0.70	. Q	.	.	.	.

23.05	2.4442	0.69	.Q	.	.	.	.
23.22	2.4537	0.68	.Q	.	.	.	.
23.38	2.4631	0.67	.Q	.	.	.	.
23.55	2.4724	0.67	.Q	.	.	.	.
23.72	2.4816	0.66	.Q	.	.	.	.
23.89	2.4907	0.65	.Q	.	.	.	.
24.06	2.4997	0.65	.Q	.	.	.	.
24.22	2.5042	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.0
10%	100.7
20%	40.3
30%	30.2
40%	10.1
50%	10.1
60%	10.1
70%	10.1
80%	10.1
90%	10.1

 NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS
 =====

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 10-YEAR, POST-CONDITIONS, DA B

 *** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 3.10 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	16.27	25.00	32.	0.975	0.694

TOTAL AREA (Acres) = 16.27

AREA-AVERAGED LOSS RATE, $\bar{F}_m$ (in./hr.) = 0.244

AREA-AVERAGED LOW LOSS FRACTION, $\bar{Y}$ = 0.306
 =====

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 10-YEAR, POST-CONDITIONS, DA B

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.23
 TOTAL CATCHMENT AREA(ACRES) = 16.27
 SOIL-LOSS RATE, F_m , (INCH/HR) = 0.244
 LOW LOSS FRACTION = 0.306
 TIME OF CONCENTRATION(MIN.) = 6.74
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 10
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.20
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
 1-HOUR POINT RAINFALL VALUE(INCHES) = 0.71
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.10
 6-HOUR POINT RAINFALL VALUE(INCHES) = 1.51
 24-HOUR POINT RAINFALL VALUE(INCHES) = 3.10

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 3.64
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.56

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	10.0	20.0	30.0	40.0
-----------------	----------------	------------	----	------	------	------	------

0.05	0.0000	0.00	Q	.	.	.	.
0.16	0.0043	0.93	Q	.	.	.	.
0.27	0.0130	0.94	Q	.	.	.	.
0.39	0.0217	0.94	Q	.	.	.	.
0.50	0.0304	0.94	Q	.	.	.	.
0.61	0.0392	0.95	Q	.	.	.	.
0.72	0.0480	0.95	Q	.	.	.	.
0.84	0.0568	0.95	Q	.	.	.	.
0.95	0.0657	0.96	Q	.	.	.	.
1.06	0.0746	0.96	Q	.	.	.	.
1.17	0.0835	0.96	Q	.	.	.	.
1.28	0.0924	0.97	Q	.	.	.	.
1.40	0.1014	0.97	Q	.	.	.	.
1.51	0.1104	0.97	Q	.	.	.	.
1.62	0.1195	0.98	Q	.	.	.	.
1.73	0.1286	0.98	Q	.	.	.	.
1.85	0.1377	0.98	Q	.	.	.	.
1.96	0.1469	0.99	Q	.	.	.	.
2.07	0.1560	0.99	Q	.	.	.	.
2.18	0.1653	1.00	Q	.	.	.	.
2.30	0.1745	1.00	Q	.	.	.	.
2.41	0.1838	1.00	.Q	.	.	.	.
2.52	0.1932	1.01	.Q	.	.	.	.
2.63	0.2025	1.01	.Q	.	.	.	.
2.74	0.2119	1.01	.Q	.	.	.	.
2.86	0.2214	1.02	.Q	.	.	.	.
2.97	0.2309	1.02	.Q	.	.	.	.
3.08	0.2404	1.03	.Q	.	.	.	.
3.19	0.2500	1.03	.Q	.	.	.	.
3.31	0.2596	1.04	.Q	.	.	.	.
3.42	0.2692	1.04	.Q	.	.	.	.
3.53	0.2789	1.05	.Q	.	.	.	.
3.64	0.2886	1.05	.Q	.	.	.	.
3.76	0.2984	1.06	.Q	.	.	.	.
3.87	0.3082	1.06	.Q	.	.	.	.
3.98	0.3181	1.06	.Q	.	.	.	.
4.09	0.3280	1.07	.Q	.	.	.	.
4.21	0.3379	1.07	.Q	.	.	.	.
4.32	0.3479	1.08	.Q	.	.	.	.
4.43	0.3580	1.08	.Q	.	.	.	.
4.54	0.3680	1.09	.Q	.	.	.	.
4.65	0.3782	1.09	.Q	.	.	.	.
4.77	0.3883	1.10	.Q	.	.	.	.
4.88	0.3986	1.11	.Q	.	.	.	.
4.99	0.4089	1.11	.Q	.	.	.	.
5.10	0.4192	1.12	.Q	.	.	.	.
5.22	0.4296	1.12	.Q	.	.	.	.
5.33	0.4400	1.13	.Q	.	.	.	.
5.44	0.4505	1.13	.Q	.	.	.	.
5.55	0.4610	1.14	.Q	.	.	.	.
5.67	0.4716	1.14	.Q	.	.	.	.
5.78	0.4822	1.15	.Q	.	.	.	.
5.89	0.4929	1.15	.Q	.	.	.	.
6.00	0.5037	1.16	.Q	.	.	.	.
6.11	0.5145	1.17	.Q	.	.	.	.
6.23	0.5254	1.18	.Q	.	.	.	.
6.34	0.5363	1.18	.Q	.	.	.	.
6.45	0.5473	1.19	.Q	.	.	.	.
6.56	0.5584	1.19	.Q	.	.	.	.
6.68	0.5695	1.20	.Q	.	.	.	.
6.79	0.5807	1.21	.Q	.	.	.	.
6.90	0.5919	1.22	.Q	.	.	.	.
7.01	0.6032	1.22	.Q	.	.	.	.
7.13	0.6146	1.23	.Q	.	.	.	.
7.24	0.6261	1.24	.Q	.	.	.	.
7.35	0.6376	1.25	.Q	.	.	.	.
7.46	0.6492	1.25	.Q	.	.	.	.
7.58	0.6609	1.26	.Q	.	.	.	.

7.69	0.6726	1.27	.Q	.	.	.	.
7.80	0.6844	1.28	.Q	.	.	.	.
7.91	0.6963	1.28	.Q	.	.	.	.
8.02	0.7083	1.30	.Q	.	.	.	.
8.14	0.7203	1.30	.Q	.	.	.	.
8.25	0.7325	1.31	.Q	.	.	.	.
8.36	0.7447	1.32	.Q	.	.	.	.
8.47	0.7570	1.33	.Q	.	.	.	.
8.59	0.7694	1.34	.Q	.	.	.	.
8.70	0.7819	1.35	.Q	.	.	.	.
8.81	0.7944	1.36	.Q	.	.	.	.
8.92	0.8071	1.37	.Q	.	.	.	.
9.04	0.8199	1.38	.Q	.	.	.	.
9.15	0.8327	1.39	.Q	.	.	.	.
9.26	0.8457	1.40	.Q	.	.	.	.
9.37	0.8588	1.41	.Q	.	.	.	.
9.48	0.8719	1.42	.Q	.	.	.	.
9.60	0.8852	1.44	.Q	.	.	.	.
9.71	0.8986	1.45	.Q	.	.	.	.
9.82	0.9121	1.46	.Q	.	.	.	.
9.93	0.9257	1.47	.Q	.	.	.	.
10.05	0.9395	1.49	.Q	.	.	.	.
10.16	0.9533	1.50	.Q	.	.	.	.
10.27	0.9673	1.52	.Q	.	.	.	.
10.38	0.9814	1.53	.Q	.	.	.	.
10.50	0.9957	1.55	.Q	.	.	.	.
10.61	1.0101	1.56	.Q	.	.	.	.
10.72	1.0246	1.58	.Q	.	.	.	.
10.83	1.0393	1.59	.Q	.	.	.	.
10.95	1.0541	1.61	.Q	.	.	.	.
11.06	1.0691	1.62	.Q	.	.	.	.
11.17	1.0843	1.64	.Q	.	.	.	.
11.28	1.0996	1.66	.Q	.	.	.	.
11.39	1.1151	1.68	.Q	.	.	.	.
11.51	1.1308	1.69	.Q	.	.	.	.
11.62	1.1466	1.72	.Q	.	.	.	.
11.73	1.1627	1.74	.Q	.	.	.	.
11.84	1.1789	1.77	.Q	.	.	.	.
11.96	1.1954	1.78	.Q	.	.	.	.
12.07	1.2116	1.72	.Q	.	.	.	.
12.18	1.2271	1.61	.Q	.	.	.	.
12.29	1.2422	1.65	.Q	.	.	.	.
12.41	1.2576	1.66	.Q	.	.	.	.
12.52	1.2733	1.70	.Q	.	.	.	.
12.63	1.2892	1.72	.Q	.	.	.	.
12.74	1.3053	1.76	.Q	.	.	.	.
12.85	1.3218	1.79	.Q	.	.	.	.
12.97	1.3386	1.83	.Q	.	.	.	.
13.08	1.3557	1.86	.Q	.	.	.	.
13.19	1.3732	1.91	.Q	.	.	.	.
13.30	1.3910	1.94	.Q	.	.	.	.
13.42	1.4093	1.99	.Q	.	.	.	.
13.53	1.4279	2.03	. Q	.	.	.	.
13.64	1.4471	2.09	. Q	.	.	.	.
13.75	1.4667	2.13	. Q	.	.	.	.
13.87	1.4868	2.21	. Q	.	.	.	.
13.98	1.5074	2.25	. Q	.	.	.	.
14.09	1.5276	2.11	. Q	.	.	.	.
14.20	1.5470	2.06	. Q	.	.	.	.
14.32	1.5666	2.17	. Q	.	.	.	.
14.43	1.5870	2.22	. Q	.	.	.	.
14.54	1.6082	2.35	. Q	.	.	.	.
14.65	1.6304	2.42	. Q	.	.	.	.
14.76	1.6537	2.59	. Q	.	.	.	.
14.88	1.6781	2.68	. Q	.	.	.	.
14.99	1.7041	2.90	. Q	.	.	.	.
15.10	1.7316	3.03	. Q	.	.	.	.
15.21	1.7612	3.34	. Q	.	.	.	.
15.33	1.7931	3.53	. Q	.	.	.	.

15.44	1.8307	4.57	.	Q	.	.	.	.
15.55	1.8748	4.95	.	Q	.	.	.	.
15.66	1.9251	5.87	.	Q	.	.	.	.
15.78	1.9855	7.15	.	Q	.	.	.	.
15.89	2.0665	10.31	.	Q	.	.	.	.
16.00	2.1794	14.01	.	.	Q	.	.	.
16.11	2.4125	36.21	.	.	.	.	Q	.
16.22	2.6216	8.83	.	Q	.	.	.	.
16.34	2.6874	5.36	.	Q	.	.	.	.
16.45	2.7297	3.75	.	Q	.	.	.	.
16.56	2.7618	3.18	.	Q	.	.	.	.
16.67	2.7895	2.79	.	Q	.	.	.	.
16.79	2.8141	2.50	.	Q	.	.	.	.
16.90	2.8363	2.29	.	Q	.	.	.	.
17.01	2.8567	2.11	.	Q	.	.	.	.
17.12	2.8772	2.29	.	Q	.	.	.	.
17.24	2.8978	2.17	.	Q	.	.	.	.
17.35	2.9174	2.06	.	Q	.	.	.	.
17.46	2.9361	1.96	.	Q	.	.	.	.
17.57	2.9540	1.88	.	Q	.	.	.	.
17.68	2.9711	1.81	.	Q	.	.	.	.
17.80	2.9876	1.74	.	Q	.	.	.	.
17.91	3.0035	1.68	.	Q	.	.	.	.
18.02	3.0189	1.63	.	Q	.	.	.	.
18.13	3.0348	1.80	.	Q	.	.	.	.
18.25	3.0512	1.75	.	Q	.	.	.	.
18.36	3.0673	1.71	.	Q	.	.	.	.
18.47	3.0830	1.67	.	Q	.	.	.	.
18.58	3.0983	1.63	.	Q	.	.	.	.
18.70	3.1133	1.60	.	Q	.	.	.	.
18.81	3.1280	1.57	.	Q	.	.	.	.
18.92	3.1424	1.54	.	Q	.	.	.	.
19.03	3.1565	1.51	.	Q	.	.	.	.
19.15	3.1703	1.48	.	Q	.	.	.	.
19.26	3.1840	1.45	.	Q	.	.	.	.
19.37	3.1973	1.43	.	Q	.	.	.	.
19.48	3.2105	1.41	.	Q	.	.	.	.
19.59	3.2235	1.39	.	Q	.	.	.	.
19.71	3.2362	1.36	.	Q	.	.	.	.
19.82	3.2488	1.34	.	Q	.	.	.	.
19.93	3.2612	1.33	.	Q	.	.	.	.
20.04	3.2734	1.31	.	Q	.	.	.	.
20.16	3.2855	1.29	.	Q	.	.	.	.
20.27	3.2974	1.27	.	Q	.	.	.	.
20.38	3.3091	1.26	.	Q	.	.	.	.
20.49	3.3207	1.24	.	Q	.	.	.	.
20.61	3.3322	1.23	.	Q	.	.	.	.
20.72	3.3435	1.21	.	Q	.	.	.	.
20.83	3.3547	1.20	.	Q	.	.	.	.
20.94	3.3657	1.18	.	Q	.	.	.	.
21.06	3.3767	1.17	.	Q	.	.	.	.
21.17	3.3875	1.16	.	Q	.	.	.	.
21.28	3.3982	1.15	.	Q	.	.	.	.
21.39	3.4088	1.13	.	Q	.	.	.	.
21.50	3.4192	1.12	.	Q	.	.	.	.
21.62	3.4296	1.11	.	Q	.	.	.	.
21.73	3.4399	1.10	.	Q	.	.	.	.
21.84	3.4501	1.09	.	Q	.	.	.	.
21.95	3.4602	1.08	.	Q	.	.	.	.
22.07	3.4702	1.07	.	Q	.	.	.	.
22.18	3.4801	1.06	.	Q	.	.	.	.
22.29	3.4899	1.05	.	Q	.	.	.	.
22.40	3.4996	1.04	.	Q	.	.	.	.
22.52	3.5092	1.03	.	Q	.	.	.	.
22.63	3.5188	1.03	.	Q	.	.	.	.
22.74	3.5283	1.02	.	Q	.	.	.	.
22.85	3.5377	1.01	.	Q	.	.	.	.
22.96	3.5470	1.00	.	Q	.	.	.	.
23.08	3.5563	0.99	Q	.	.	.	.	.

23.19	3.5655	0.99	Q	.	.	.	.
23.30	3.5746	0.98	Q	.	.	.	.
23.41	3.5837	0.97	Q	.	.	.	.
23.53	3.5927	0.96	Q	.	.	.	.
23.64	3.6016	0.96	Q	.	.	.	.
23.75	3.6104	0.95	Q	.	.	.	.
23.86	3.6192	0.94	Q	.	.	.	.
23.98	3.6280	0.94	Q	.	.	.	.
24.09	3.6366	0.93	Q	.	.	.	.
24.20	3.6410	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1442.4
10%	67.4
20%	27.0
30%	13.5
40%	6.7
50%	6.7
60%	6.7
70%	6.7
80%	6.7
90%	6.7

Appendix I.VI

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 100-Year Storm

SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
UNIT HYDROGRAPH
100-YEAR, POST-CONDITIONS, DA A

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.36
TOTAL CATCHMENT AREA(ACRES) = 9.10
SOIL-LOSS RATE, F_m (INCH/HR) = 0.151
LOW LOSS FRACTION = 0.196
TIME OF CONCENTRATION(MIN.) = 10.07
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 100
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.32
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.18
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.87
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.61
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 4.79
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = -0.46

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	10.0	20.0	30.0	40.0
0.06	0.0000	0.00	Q	.	.	.	.
0.22	0.0093	1.34	.Q	.	.	.	.
0.39	0.0279	1.35	.Q	.	.	.	.
0.56	0.0466	1.35	.Q	.	.	.	.
0.73	0.0654	1.36	.Q	.	.	.	.
0.90	0.0843	1.36	.Q	.	.	.	.
1.06	0.1033	1.37	.Q	.	.	.	.
1.23	0.1224	1.38	.Q	.	.	.	.
1.40	0.1416	1.39	.Q	.	.	.	.
1.57	0.1608	1.39	.Q	.	.	.	.
1.73	0.1802	1.40	.Q	.	.	.	.
1.90	0.1996	1.41	.Q	.	.	.	.
2.07	0.2192	1.42	.Q	.	.	.	.
2.24	0.2389	1.42	.Q	.	.	.	.
2.41	0.2586	1.43	.Q	.	.	.	.
2.57	0.2785	1.44	.Q	.	.	.	.
2.74	0.2985	1.45	.Q	.	.	.	.
2.91	0.3186	1.45	.Q	.	.	.	.
3.08	0.3388	1.46	.Q	.	.	.	.
3.24	0.3591	1.47	.Q	.	.	.	.
3.41	0.3795	1.48	.Q	.	.	.	.

3.58	0.4000	1.48	.Q	.	.	.	.
3.75	0.4207	1.50	.Q	.	.	.	.
3.92	0.4415	1.50	.Q	.	.	.	.
4.08	0.4624	1.51	.Q	.	.	.	.
4.25	0.4834	1.52	.Q	.	.	.	.
4.42	0.5046	1.53	.Q	.	.	.	.
4.59	0.5259	1.54	.Q	.	.	.	.
4.76	0.5474	1.55	.Q	.	.	.	.
4.92	0.5689	1.56	.Q	.	.	.	.
5.09	0.5906	1.57	.Q	.	.	.	.
5.26	0.6125	1.58	.Q	.	.	.	.
5.43	0.6345	1.59	.Q	.	.	.	.
5.59	0.6567	1.60	.Q	.	.	.	.
5.76	0.6790	1.62	.Q	.	.	.	.
5.93	0.7014	1.62	.Q	.	.	.	.
6.10	0.7241	1.64	.Q	.	.	.	.
6.27	0.7469	1.65	.Q	.	.	.	.
6.43	0.7698	1.66	.Q	.	.	.	.
6.60	0.7930	1.67	.Q	.	.	.	.
6.77	0.8163	1.69	.Q	.	.	.	.
6.94	0.8398	1.70	.Q	.	.	.	.
7.10	0.8635	1.72	.Q	.	.	.	.
7.27	0.8873	1.73	.Q	.	.	.	.
7.44	0.9114	1.75	.Q	.	.	.	.
7.61	0.9357	1.76	.Q	.	.	.	.
7.78	0.9602	1.78	.Q	.	.	.	.
7.94	0.9849	1.79	.Q	.	.	.	.
8.11	1.0098	1.81	.Q	.	.	.	.
8.28	1.0350	1.82	.Q	.	.	.	.
8.45	1.0604	1.84	.Q	.	.	.	.
8.62	1.0860	1.85	.Q	.	.	.	.
8.78	1.1119	1.88	.Q	.	.	.	.
8.95	1.1380	1.89	.Q	.	.	.	.
9.12	1.1644	1.92	.Q	.	.	.	.
9.29	1.1911	1.93	.Q	.	.	.	.
9.45	1.2180	1.96	.Q	.	.	.	.
9.62	1.2453	1.97	.Q	.	.	.	.
9.79	1.2729	2.00	. Q	.	.	.	.
9.96	1.3008	2.02	. Q	.	.	.	.
10.13	1.3290	2.05	. Q	.	.	.	.
10.29	1.3576	2.07	. Q	.	.	.	.
10.46	1.3865	2.10	. Q	.	.	.	.
10.63	1.4158	2.12	. Q	.	.	.	.
10.80	1.4455	2.16	. Q	.	.	.	.
10.97	1.4756	2.18	. Q	.	.	.	.
11.13	1.5061	2.22	. Q	.	.	.	.
11.30	1.5371	2.24	. Q	.	.	.	.
11.47	1.5685	2.29	. Q	.	.	.	.
11.64	1.6005	2.32	. Q	.	.	.	.
11.80	1.6329	2.37	. Q	.	.	.	.
11.97	1.6660	2.39	. Q	.	.	.	.
12.14	1.6977	2.18	. Q	.	.	.	.
12.31	1.7275	2.12	. Q	.	.	.	.
12.48	1.7574	2.19	. Q	.	.	.	.
12.64	1.7880	2.22	. Q	.	.	.	.
12.81	1.8194	2.30	. Q	.	.	.	.
12.98	1.8516	2.34	. Q	.	.	.	.
13.15	1.8847	2.43	. Q	.	.	.	.
13.31	1.9187	2.48	. Q	.	.	.	.
13.48	1.9539	2.59	. Q	.	.	.	.
13.65	1.9902	2.65	. Q	.	.	.	.
13.82	2.0279	2.78	. Q	.	.	.	.
13.99	2.0669	2.85	. Q	.	.	.	.
14.15	2.1053	2.68	. Q	.	.	.	.
14.32	2.1427	2.72	. Q	.	.	.	.
14.49	2.1820	2.94	. Q	.	.	.	.
14.66	2.2236	3.06	. Q	.	.	.	.
14.83	2.2681	3.36	. Q	.	.	.	.
14.99	2.3160	3.54	. Q	.	.	.	.

15.16	2.3683	4.01	.	Q	.	.	.	.
15.33	2.4260	4.31	.	Q	.	.	.	.
15.50	2.4944	5.57	.	Q	.	.	.	.
15.66	2.5763	6.23	.	Q	.	.	.	.
15.83	2.6940	10.74	.	Q	.	.	.	.
16.00	2.8670	14.21	.	.	Q	.	.	.
16.17	3.1954	33.13	.	.	.	.	Q	.
16.34	3.4748	7.16	.	Q	.	.	.	.
16.50	3.5569	4.68	.	Q	.	.	.	.
16.67	3.6154	3.75	.	Q	.	.	.	.
16.84	3.6637	3.20	.	Q	.	.	.	.
17.01	3.7054	2.82	.	Q	.	.	.	.
17.17	3.7453	2.93	.	Q	.	.	.	.
17.34	3.7845	2.71	.	Q	.	.	.	.
17.51	3.8208	2.53	.	Q	.	.	.	.
17.68	3.8550	2.39	.	Q	.	.	.	.
17.85	3.8872	2.26	.	Q	.	.	.	.
18.01	3.9178	2.15	.	Q	.	.	.	.
18.18	3.9495	2.42	.	Q	.	.	.	.
18.35	3.9826	2.34	.	Q	.	.	.	.
18.52	4.0145	2.27	.	Q	.	.	.	.
18.69	4.0455	2.20	.	Q	.	.	.	.
18.85	4.0756	2.14	.	Q	.	.	.	.
19.02	4.1049	2.09	.	Q	.	.	.	.
19.19	4.1335	2.03	.	Q	.	.	.	.
19.36	4.1614	1.99	.	Q	.	.	.	.
19.52	4.1887	1.94	.	Q	.	.	.	.
19.69	4.2153	1.90	.	Q	.	.	.	.
19.86	4.2415	1.87	.	Q	.	.	.	.
20.03	4.2671	1.83	.	Q	.	.	.	.
20.20	4.2923	1.80	.	Q	.	.	.	.
20.36	4.3170	1.77	.	Q	.	.	.	.
20.53	4.3412	1.74	.	Q	.	.	.	.
20.70	4.3651	1.71	.	Q	.	.	.	.
20.87	4.3886	1.68	.	Q	.	.	.	.
21.03	4.4118	1.66	.	Q	.	.	.	.
21.20	4.4346	1.63	.	Q	.	.	.	.
21.37	4.4570	1.61	.	Q	.	.	.	.
21.54	4.4792	1.59	.	Q	.	.	.	.
21.71	4.5011	1.57	.	Q	.	.	.	.
21.87	4.5226	1.55	.	Q	.	.	.	.
22.04	4.5439	1.53	.	Q	.	.	.	.
22.21	4.5650	1.51	.	Q	.	.	.	.
22.38	4.5858	1.49	.	Q	.	.	.	.
22.55	4.6063	1.47	.	Q	.	.	.	.
22.71	4.6266	1.46	.	Q	.	.	.	.
22.88	4.6467	1.44	.	Q	.	.	.	.
23.05	4.6666	1.42	.	Q	.	.	.	.
23.22	4.6862	1.41	.	Q	.	.	.	.
23.38	4.7057	1.40	.	Q	.	.	.	.
23.55	4.7250	1.38	.	Q	.	.	.	.
23.72	4.7440	1.37	.	Q	.	.	.	.
23.89	4.7629	1.36	.	Q	.	.	.	.
24.06	4.7816	1.34	.	Q	.	.	.	.
24.22	4.7910	0.00	Q	.	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:

(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.0
10%	120.8
20%	40.3
30%	30.2
40%	20.1

50%	10.1
60%	10.1
70%	10.1
80%	10.1
90%	10.1

 NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS
 =====

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
 UNIT HYDROGRAPH
 100-YEAR, POST-CONDITIONS, DA B

 *** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 5.71 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	16.27	25.00	32.(AMC II)	0.742	0.769

TOTAL AREA (Acres) = 16.27

AREA-AVERAGED LOSS RATE, $\bar{F}_m$ (in./hr.) = 0.185

AREA-AVERAGED LOW LOSS FRACTION, $\bar{Y}$ = 0.231

Problem Descriptions:

SAM'S CLUB HESPERIA
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 RATIONAL METHOD CALIBRATION COEFFICIENT = 1.20
 TOTAL CATCHMENT AREA(ACRES) = 16.27
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.185
 LOW LOSS FRACTION = 0.231
 TIME OF CONCENTRATION(MIN.) = 6.74
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.32
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.18
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.87
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.61
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.71

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 7.26
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.48

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	17.5	35.0	52.5	70.0
-----------------	----------------	------------	----	------	------	------	------

0.05	0.0000	0.00	Q	.	.	.	.
0.16	0.0094	2.02	.Q	.	.	.	.
0.27	0.0282	2.03	.Q	.	.	.	.
0.39	0.0470	2.03	.Q	.	.	.	.
0.50	0.0659	2.04	.Q	.	.	.	.
0.61	0.0849	2.05	.Q	.	.	.	.
0.72	0.1039	2.05	.Q	.	.	.	.
0.84	0.1230	2.06	.Q	.	.	.	.
0.95	0.1422	2.06	.Q	.	.	.	.
1.06	0.1614	2.07	.Q	.	.	.	.
1.17	0.1806	2.08	.Q	.	.	.	.
1.28	0.2000	2.09	.Q	.	.	.	.
1.40	0.2194	2.09	.Q	.	.	.	.
1.51	0.2389	2.10	.Q	.	.	.	.
1.62	0.2584	2.11	.Q	.	.	.	.
1.73	0.2780	2.12	.Q	.	.	.	.
1.85	0.2976	2.12	.Q	.	.	.	.
1.96	0.3174	2.13	.Q	.	.	.	.
2.07	0.3372	2.14	.Q	.	.	.	.
2.18	0.3570	2.15	.Q	.	.	.	.
2.30	0.3770	2.15	.Q	.	.	.	.
2.41	0.3970	2.16	.Q	.	.	.	.
2.52	0.4171	2.17	.Q	.	.	.	.
2.63	0.4372	2.18	.Q	.	.	.	.
2.74	0.4575	2.18	.Q	.	.	.	.
2.86	0.4778	2.19	.Q	.	.	.	.
2.97	0.4981	2.20	.Q	.	.	.	.
3.08	0.5186	2.21	.Q	.	.	.	.
3.19	0.5391	2.21	.Q	.	.	.	.
3.31	0.5597	2.23	.Q	.	.	.	.
3.42	0.5804	2.23	.Q	.	.	.	.
3.53	0.6012	2.24	.Q	.	.	.	.
3.64	0.6220	2.25	.Q	.	.	.	.
3.76	0.6429	2.26	.Q	.	.	.	.
3.87	0.6640	2.27	.Q	.	.	.	.
3.98	0.6851	2.28	.Q	.	.	.	.
4.09	0.7062	2.28	.Q	.	.	.	.
4.21	0.7275	2.30	.Q	.	.	.	.
4.32	0.7489	2.30	.Q	.	.	.	.
4.43	0.7703	2.32	.Q	.	.	.	.
4.54	0.7918	2.32	.Q	.	.	.	.
4.65	0.8135	2.34	.Q	.	.	.	.
4.77	0.8352	2.34	.Q	.	.	.	.
4.88	0.8570	2.36	.Q	.	.	.	.
4.99	0.8789	2.36	.Q	.	.	.	.
5.10	0.9009	2.38	.Q	.	.	.	.
5.22	0.9230	2.38	.Q	.	.	.	.
5.33	0.9452	2.40	.Q	.	.	.	.
5.44	0.9675	2.41	.Q	.	.	.	.
5.55	0.9899	2.42	.Q	.	.	.	.
5.67	1.0124	2.43	.Q	.	.	.	.
5.78	1.0351	2.44	.Q	.	.	.	.
5.89	1.0578	2.45	.Q	.	.	.	.
6.00	1.0806	2.47	.Q	.	.	.	.
6.11	1.1036	2.48	.Q	.	.	.	.
6.23	1.1266	2.49	.Q	.	.	.	.
6.34	1.1498	2.50	.Q	.	.	.	.
6.45	1.1731	2.52	.Q	.	.	.	.
6.56	1.1965	2.53	.Q	.	.	.	.
6.68	1.2200	2.54	.Q	.	.	.	.
6.79	1.2437	2.55	.Q	.	.	.	.
6.90	1.2674	2.57	.Q	.	.	.	.
7.01	1.2913	2.58	.Q	.	.	.	.
7.13	1.3154	2.60	.Q	.	.	.	.
7.24	1.3395	2.61	.Q	.	.	.	.
7.35	1.3638	2.63	.Q	.	.	.	.
7.46	1.3882	2.64	.Q	.	.	.	.
7.58	1.4128	2.66	.Q	.	.	.	.

7.69	1.4375	2.67	.Q	.	.	.	.
7.80	1.4624	2.69	.Q	.	.	.	.
7.91	1.4874	2.70	.Q	.	.	.	.
8.02	1.5125	2.72	.Q	.	.	.	.
8.14	1.5378	2.73	.Q	.	.	.	.
8.25	1.5633	2.75	.Q	.	.	.	.
8.36	1.5889	2.77	.Q	.	.	.	.
8.47	1.6147	2.79	.Q	.	.	.	.
8.59	1.6407	2.80	.Q	.	.	.	.
8.70	1.6668	2.83	.Q	.	.	.	.
8.81	1.6931	2.84	.Q	.	.	.	.
8.92	1.7195	2.86	.Q	.	.	.	.
9.04	1.7462	2.88	.Q	.	.	.	.
9.15	1.7730	2.90	.Q	.	.	.	.
9.26	1.8000	2.92	.Q	.	.	.	.
9.37	1.8273	2.95	.Q	.	.	.	.
9.48	1.8547	2.96	.Q	.	.	.	.
9.60	1.8823	2.99	.Q	.	.	.	.
9.71	1.9101	3.01	.Q	.	.	.	.
9.82	1.9382	3.04	.Q	.	.	.	.
9.93	1.9664	3.05	.Q	.	.	.	.
10.05	1.9949	3.09	.Q	.	.	.	.
10.16	2.0236	3.10	.Q	.	.	.	.
10.27	2.0526	3.14	.Q	.	.	.	.
10.38	2.0818	3.15	.Q	.	.	.	.
10.50	2.1113	3.19	.Q	.	.	.	.
10.61	2.1410	3.21	.Q	.	.	.	.
10.72	2.1709	3.25	.Q	.	.	.	.
10.83	2.2012	3.27	.Q	.	.	.	.
10.95	2.2317	3.31	.Q	.	.	.	.
11.06	2.2626	3.33	.Q	.	.	.	.
11.17	2.2937	3.37	.Q	.	.	.	.
11.28	2.3251	3.40	.Q	.	.	.	.
11.39	2.3569	3.44	.Q	.	.	.	.
11.51	2.3890	3.47	.Q	.	.	.	.
11.62	2.4214	3.52	. Q	.	.	.	.
11.73	2.4542	3.55	. Q	.	.	.	.
11.84	2.4874	3.60	. Q	.	.	.	.
11.96	2.5209	3.63	. Q	.	.	.	.
12.07	2.5538	3.46	.Q	.	.	.	.
12.18	2.5846	3.17	.Q	.	.	.	.
12.29	2.6143	3.23	.Q	.	.	.	.
12.41	2.6445	3.27	.Q	.	.	.	.
12.52	2.6752	3.34	.Q	.	.	.	.
12.63	2.7063	3.38	.Q	.	.	.	.
12.74	2.7380	3.45	.Q	.	.	.	.
12.85	2.7703	3.49	.Q	.	.	.	.
12.97	2.8031	3.58	. Q	.	.	.	.
13.08	2.8366	3.63	. Q	.	.	.	.
13.19	2.8707	3.72	. Q	.	.	.	.
13.30	2.9055	3.77	. Q	.	.	.	.
13.42	2.9411	3.88	. Q	.	.	.	.
13.53	2.9774	3.94	. Q	.	.	.	.
13.64	3.0146	4.07	. Q	.	.	.	.
13.75	3.0526	4.13	. Q	.	.	.	.
13.87	3.0916	4.28	. Q	.	.	.	.
13.98	3.1317	4.35	. Q	.	.	.	.
14.09	3.1710	4.11	. Q	.	.	.	.
14.20	3.2087	4.03	. Q	.	.	.	.
14.32	3.2471	4.22	. Q	.	.	.	.
14.43	3.2868	4.33	. Q	.	.	.	.
14.54	3.3281	4.57	. Q	.	.	.	.
14.65	3.3712	4.71	. Q	.	.	.	.
14.76	3.4164	5.01	. Q	.	.	.	.
14.88	3.4637	5.19	. Q	.	.	.	.
14.99	3.5138	5.59	. Q	.	.	.	.
15.10	3.5668	5.83	. Q	.	.	.	.
15.21	3.6236	6.40	. Q	.	.	.	.
15.33	3.6846	6.75	. Q	.	.	.	.

15.44	3.7540	8.20	.	Q	.	.	.	.
15.55	3.8332	8.85	.	Q	.	.	.	.
15.66	3.9229	10.49	.	Q	.	.	.	.
15.78	4.0319	12.99	.	Q	.	.	.	.
15.89	4.1866	20.33	.	.	.Q	.	.	.
16.00	4.4055	26.84	.	.	Q	.	.	.
16.11	4.8210	62.66	.	.	.	.	Q	.
16.22	5.1903	16.89	.	Q.	.	.	.	.
16.34	5.3131	9.57	.	Q	.	.	.	.
16.45	5.3907	7.15	.	Q	.	.	.	.
16.56	5.4522	6.10	.	Q	.	.	.	.
16.67	5.5055	5.38	.	Q	.	.	.	.
16.79	5.5530	4.86	.	Q	.	.	.	.
16.90	5.5962	4.45	.	Q	.	.	.	.
17.01	5.6360	4.12	.	Q	.	.	.	.
17.12	5.6757	4.43	.	Q	.	.	.	.
17.24	5.7158	4.20	.	Q	.	.	.	.
17.35	5.7539	4.00	.	Q	.	.	.	.
17.46	5.7902	3.83	.	Q	.	.	.	.
17.57	5.8251	3.67	.	Q	.	.	.	.
17.68	5.8585	3.54	.	Q	.	.	.	.
17.80	5.8908	3.41	.	.Q	.	.	.	.
17.91	5.9220	3.30	.	.Q	.	.	.	.
18.02	5.9522	3.20	.	.Q	.	.	.	.
18.13	5.9840	3.66	.	Q	.	.	.	.
18.25	6.0176	3.57	.	Q	.	.	.	.
18.36	6.0504	3.49	.	.Q	.	.	.	.
18.47	6.0825	3.42	.	.Q	.	.	.	.
18.58	6.1139	3.35	.	.Q	.	.	.	.
18.70	6.1447	3.29	.	.Q	.	.	.	.
18.81	6.1750	3.23	.	.Q	.	.	.	.
18.92	6.2047	3.17	.	.Q	.	.	.	.
19.03	6.2339	3.12	.	.Q	.	.	.	.
19.15	6.2626	3.07	.	.Q	.	.	.	.
19.26	6.2909	3.02	.	.Q	.	.	.	.
19.37	6.3187	2.98	.	.Q	.	.	.	.
19.48	6.3461	2.93	.	.Q	.	.	.	.
19.59	6.3732	2.89	.	.Q	.	.	.	.
19.71	6.3998	2.85	.	.Q	.	.	.	.
19.82	6.4261	2.81	.	.Q	.	.	.	.
19.93	6.4521	2.78	.	.Q	.	.	.	.
20.04	6.4777	2.74	.	.Q	.	.	.	.
20.16	6.5030	2.71	.	.Q	.	.	.	.
20.27	6.5280	2.68	.	.Q	.	.	.	.
20.38	6.5527	2.65	.	.Q	.	.	.	.
20.49	6.5771	2.62	.	.Q	.	.	.	.
20.61	6.6013	2.59	.	.Q	.	.	.	.
20.72	6.6252	2.56	.	.Q	.	.	.	.
20.83	6.6488	2.53	.	.Q	.	.	.	.
20.94	6.6723	2.51	.	.Q	.	.	.	.
21.06	6.6954	2.48	.	.Q	.	.	.	.
21.17	6.7184	2.46	.	.Q	.	.	.	.
21.28	6.7411	2.44	.	.Q	.	.	.	.
21.39	6.7636	2.41	.	.Q	.	.	.	.
21.50	6.7859	2.39	.	.Q	.	.	.	.
21.62	6.8080	2.37	.	.Q	.	.	.	.
21.73	6.8299	2.35	.	.Q	.	.	.	.
21.84	6.8516	2.33	.	.Q	.	.	.	.
21.95	6.8732	2.31	.	.Q	.	.	.	.
22.07	6.8945	2.29	.	.Q	.	.	.	.
22.18	6.9157	2.27	.	.Q	.	.	.	.
22.29	6.9367	2.25	.	.Q	.	.	.	.
22.40	6.9576	2.24	.	.Q	.	.	.	.
22.52	6.9783	2.22	.	.Q	.	.	.	.
22.63	6.9988	2.20	.	.Q	.	.	.	.
22.74	7.0192	2.19	.	.Q	.	.	.	.
22.85	7.0394	2.17	.	.Q	.	.	.	.
22.96	7.0595	2.16	.	.Q	.	.	.	.
23.08	7.0794	2.14	.	.Q	.	.	.	.

23.19	7.0992	2.13	.Q	.	.	.	.
23.30	7.1189	2.11	.Q	.	.	.	.
23.41	7.1384	2.10	.Q	.	.	.	.
23.53	7.1578	2.08	.Q	.	.	.	.
23.64	7.1771	2.07	.Q	.	.	.	.
23.75	7.1962	2.06	.Q	.	.	.	.
23.86	7.2153	2.04	.Q	.	.	.	.
23.98	7.2342	2.03	.Q	.	.	.	.
24.09	7.2530	2.02	.Q	.	.	.	.
24.20	7.2623	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1442.4
10%	80.9
20%	33.7
30%	20.2
40%	13.5
50%	6.7
60%	6.7
70%	6.7
80%	6.7
90%	6.7

Appendix J
BMP Analysis

Appendix J.I

BMP Analysis BMP Details and Outlet Structure Summary

Wednesday, 09 / 4 / 2024

[illegible]

Pond Report

Pond No. 2 - BASIN #2 - DA B

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
1.00	101.00	n/a	23,264	23,264
2.00	102.00	n/a	26,825	50,089
3.00	103.00	n/a	30,618	80,707
4.00	104.00	n/a	34,646	115,353
4.50	104.50	n/a	18,909	134,262
5.00	105.00	n/a	20,001	154,263
6.00	106.00	n/a	43,379	197,642
7.00	107.00	n/a	48,055	245,697

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 104.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	23,264	101.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	50,089	102.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	80,707	103.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.00	115,353	104.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.50	134,262	104.50	---	---	---	---	0.00	---	---	---	---	---	0.000
5.00	154,263	105.00	---	---	---	---	5.89	---	---	---	---	---	5.887
6.00	197,642	106.00	---	---	---	---	30.59	---	---	---	---	---	30.59
7.00	245,697	107.00	---	---	---	---	65.81	---	---	---	---	---	65.81

Appendix J.II
BMP Analysis
2-Year Storm Event

SMALL AREA UNIT HYDROGRAPH MODEL

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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
BASIN ROUTING
2-YEAR, POST-CONDITIONS, DA A

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.51
TOTAL CATCHMENT AREA(ACRES) = 9.10
SOIL-LOSS RATE, F_m (INCH/HR) = 0.210
LOW LOSS FRACTION = 0.307
TIME OF CONCENTRATION(MIN.) = 10.07
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 2
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.11
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.30
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.41
3-HOUR POINT RAINFALL VALUE(INCHES) = 0.67
6-HOUR POINT RAINFALL VALUE(INCHES) = 0.91
24-HOUR POINT RAINFALL VALUE(INCHES) = 1.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.36
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = -0.07

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
0.06	0.0000	0.00	Q	.	.	.	.
0.22	0.0021	0.31	Q	.	.	.	.
0.39	0.0064	0.31	Q	.	.	.	.
0.56	0.0107	0.31	Q	.	.	.	.
0.73	0.0150	0.31	Q	.	.	.	.
0.90	0.0194	0.31	Q	.	.	.	.
1.06	0.0238	0.32	Q	.	.	.	.
1.23	0.0282	0.32	Q	.	.	.	.
1.40	0.0326	0.32	Q	.	.	.	.
1.57	0.0371	0.32	Q	.	.	.	.
1.73	0.0416	0.33	Q	.	.	.	.
1.90	0.0461	0.33	Q	.	.	.	.
2.07	0.0506	0.33	Q	.	.	.	.
2.24	0.0552	0.33	Q	.	.	.	.
2.41	0.0598	0.33	Q	.	.	.	.
2.57	0.0645	0.34	Q	.	.	.	.
2.74	0.0691	0.34	Q	.	.	.	.
2.91	0.0738	0.34	Q	.	.	.	.
3.08	0.0786	0.34	Q	.	.	.	.
3.24	0.0833	0.34	Q	.	.	.	.
3.41	0.0881	0.35	Q	.	.	.	.

3.58	0.0930	0.35	Q	.	.	.	.
3.75	0.0979	0.35	Q	.	.	.	.
3.92	0.1028	0.35	Q	.	.	.	.
4.08	0.1077	0.36	Q	.	.	.	.
4.25	0.1127	0.36	Q	.	.	.	.
4.42	0.1177	0.36	Q	.	.	.	.
4.59	0.1228	0.37	Q	.	.	.	.
4.76	0.1279	0.37	Q	.	.	.	.
4.92	0.1330	0.37	Q	.	.	.	.
5.09	0.1382	0.38	Q	.	.	.	.
5.26	0.1434	0.38	Q	.	.	.	.
5.43	0.1487	0.38	Q	.	.	.	.
5.59	0.1540	0.38	Q	.	.	.	.
5.76	0.1594	0.39	Q	.	.	.	.
5.93	0.1648	0.39	Q	.	.	.	.
6.10	0.1703	0.40	Q	.	.	.	.
6.27	0.1758	0.40	Q	.	.	.	.
6.43	0.1814	0.40	Q	.	.	.	.
6.60	0.1870	0.41	Q	.	.	.	.
6.77	0.1927	0.41	Q	.	.	.	.
6.94	0.1984	0.41	Q	.	.	.	.
7.10	0.2042	0.42	Q	.	.	.	.
7.27	0.2100	0.42	Q	.	.	.	.
7.44	0.2159	0.43	Q	.	.	.	.
7.61	0.2219	0.43	Q	.	.	.	.
7.78	0.2279	0.44	Q	.	.	.	.
7.94	0.2341	0.44	Q	.	.	.	.
8.11	0.2402	0.45	Q	.	.	.	.
8.28	0.2465	0.45	Q	.	.	.	.
8.45	0.2528	0.46	Q	.	.	.	.
8.62	0.2592	0.46	Q	.	.	.	.
8.78	0.2656	0.47	Q	.	.	.	.
8.95	0.2722	0.47	Q	.	.	.	.
9.12	0.2788	0.48	Q	.	.	.	.
9.29	0.2856	0.49	Q	.	.	.	.
9.45	0.2924	0.50	Q	.	.	.	.
9.62	0.2993	0.50	.Q	.	.	.	.
9.79	0.3063	0.51	.Q	.	.	.	.
9.96	0.3134	0.52	.Q	.	.	.	.
10.13	0.3206	0.53	.Q	.	.	.	.
10.29	0.3279	0.53	.Q	.	.	.	.
10.46	0.3354	0.54	.Q	.	.	.	.
10.63	0.3429	0.55	.Q	.	.	.	.
10.80	0.3506	0.56	.Q	.	.	.	.
10.97	0.3585	0.57	.Q	.	.	.	.
11.13	0.3664	0.58	.Q	.	.	.	.
11.30	0.3745	0.59	.Q	.	.	.	.
11.47	0.3828	0.60	.Q	.	.	.	.
11.64	0.3913	0.61	.Q	.	.	.	.
11.80	0.3999	0.63	.Q	.	.	.	.
11.97	0.4087	0.64	.Q	.	.	.	.
12.14	0.4176	0.65	.Q	.	.	.	.
12.31	0.4266	0.66	.Q	.	.	.	.
12.48	0.4359	0.68	.Q	.	.	.	.
12.64	0.4454	0.69	.Q	.	.	.	.
12.81	0.4552	0.72	.Q	.	.	.	.
12.98	0.4652	0.73	.Q	.	.	.	.
13.15	0.4755	0.76	.Q	.	.	.	.
13.31	0.4862	0.78	.Q	.	.	.	.
13.48	0.4972	0.81	.Q	.	.	.	.
13.65	0.5086	0.83	.Q	.	.	.	.
13.82	0.5205	0.88	.Q	.	.	.	.
13.99	0.5328	0.90	.Q	.	.	.	.
14.15	0.5458	0.96	.Q	.	.	.	.
14.32	0.5594	1.00	.Q	.	.	.	.
14.49	0.5737	1.07	. Q	.	.	.	.
14.66	0.5889	1.11	. Q	.	.	.	.
14.83	0.6051	1.22	. Q	.	.	.	.
14.99	0.6224	1.28	. Q	.	.	.	.

15.16	0.6413	1.44	. Q	.	.	.	.
15.33	0.6620	1.54	. Q	.	.	.	.
15.50	0.6856	1.86	. Q	.	.	.	.
15.66	0.7129	2.08	. Q	.	.	.	.
15.83	0.7507	3.38	. Q	.	.	.	.
16.00	0.8040	4.31	. Q	.	.	.	.
16.17	0.9078	10.66	.	.	.Q	.	.
16.34	0.9983	2.38	. Q	.	.	.	.
16.50	1.0264	1.67	. Q	.	.	.	.
16.67	1.0474	1.35	. Q	.	.	.	.
16.84	1.0648	1.16	. Q	.	.	.	.
17.01	1.0801	1.03	. Q	.	.	.	.
17.17	1.0937	0.93	.Q	.	.	.	.
17.34	1.1061	0.85	.Q	.	.	.	.
17.51	1.1175	0.79	.Q	.	.	.	.
17.68	1.1282	0.74	.Q	.	.	.	.
17.85	1.1382	0.70	.Q	.	.	.	.
18.01	1.1477	0.67	.Q	.	.	.	.
18.18	1.1568	0.65	.Q	.	.	.	.
18.35	1.1656	0.62	.Q	.	.	.	.
18.52	1.1741	0.60	.Q	.	.	.	.
18.69	1.1822	0.57	.Q	.	.	.	.
18.85	1.1900	0.55	.Q	.	.	.	.
19.02	1.1976	0.54	.Q	.	.	.	.
19.19	1.2049	0.52	.Q	.	.	.	.
19.36	1.2120	0.51	.Q	.	.	.	.
19.52	1.2189	0.49	Q	.	.	.	.
19.69	1.2257	0.48	Q	.	.	.	.
19.86	1.2322	0.47	Q	.	.	.	.
20.03	1.2386	0.46	Q	.	.	.	.
20.20	1.2448	0.44	Q	.	.	.	.
20.36	1.2509	0.44	Q	.	.	.	.
20.53	1.2569	0.43	Q	.	.	.	.
20.70	1.2628	0.42	Q	.	.	.	.
20.87	1.2685	0.41	Q	.	.	.	.
21.03	1.2741	0.40	Q	.	.	.	.
21.20	1.2796	0.39	Q	.	.	.	.
21.37	1.2850	0.39	Q	.	.	.	.
21.54	1.2904	0.38	Q	.	.	.	.
21.71	1.2956	0.37	Q	.	.	.	.
21.87	1.3007	0.37	Q	.	.	.	.
22.04	1.3058	0.36	Q	.	.	.	.
22.21	1.3108	0.36	Q	.	.	.	.
22.38	1.3157	0.35	Q	.	.	.	.
22.55	1.3205	0.35	Q	.	.	.	.
22.71	1.3253	0.34	Q	.	.	.	.
22.88	1.3300	0.34	Q	.	.	.	.
23.05	1.3347	0.33	Q	.	.	.	.
23.22	1.3392	0.33	Q	.	.	.	.
23.38	1.3438	0.32	Q	.	.	.	.
23.55	1.3482	0.32	Q	.	.	.	.
23.72	1.3526	0.32	Q	.	.	.	.
23.89	1.3570	0.31	Q	.	.	.	.
24.06	1.3613	0.31	Q	.	.	.	.
24.22	1.3634	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:

(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.0
10%	151.0
20%	40.3
30%	30.2
40%	20.1

50%	10.1
60%	10.1
70%	10.1
80%	10.1
90%	10.1

Problem Descriptions:

SAM'S CLUB HESPERIA

BASIN ROUTING

2-YEAR, POST-CONDITIONS, DA A

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FLOW-THROUGH DETENTION BASIN MODEL

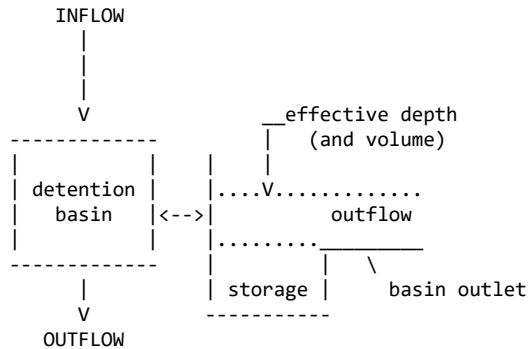
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 10.070

DEAD STORAGE(AF) = 0.00

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00

ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 5

* BASIN-DEPTH	STORAGE	OUTFLOW	** BASIN-DEPTH	STORAGE	OUTFLOW
*(FEET)	(ACRE-FEET)	(CFS)	*(FEET)	(ACRE-FEET)	(CFS)
* 0.000	0.000	0.000**	4.000	0.000	0.000*
* 5.000	0.637	4.625**	6.000	1.355	9.512*
* 7.000	2.161	12.760**			

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	4.00	0.00000	0.00000
3	5.00	0.60444	0.66860
4	6.00	1.28915	1.42109
5	7.00	2.07230	2.24928

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.056	0.000	0.00	4.00	0.00	0.000
0.224	0.000	0.31	4.01	0.01	0.004
0.392	0.000	0.31	4.01	0.04	0.008
0.559	0.000	0.31	4.02	0.07	0.011

0.727	0.000	0.31	4.02	0.09	0.014
0.895	0.000	0.31	4.03	0.11	0.017
1.063	0.000	0.32	4.03	0.13	0.020
1.231	0.000	0.32	4.03	0.15	0.022
1.399	0.000	0.32	4.04	0.17	0.024
1.566	0.000	0.32	4.04	0.18	0.026
1.734	0.000	0.33	4.04	0.20	0.028
1.902	0.000	0.33	4.05	0.21	0.029
2.070	0.000	0.33	4.05	0.22	0.031
2.238	0.000	0.33	4.05	0.23	0.032
2.406	0.000	0.33	4.05	0.24	0.034
2.573	0.000	0.34	4.05	0.25	0.035
2.741	0.000	0.34	4.06	0.26	0.036
2.909	0.000	0.34	4.06	0.27	0.037
3.077	0.000	0.34	4.06	0.27	0.038
3.245	0.000	0.34	4.06	0.28	0.039
3.413	0.000	0.35	4.06	0.29	0.040
3.580	0.000	0.35	4.06	0.29	0.041
3.748	0.000	0.35	4.06	0.30	0.041
3.916	0.000	0.35	4.07	0.30	0.042
4.084	0.000	0.36	4.07	0.31	0.043
4.252	0.000	0.36	4.07	0.31	0.043
4.420	0.000	0.36	4.07	0.32	0.044
4.587	0.000	0.37	4.07	0.32	0.045
4.755	0.000	0.37	4.07	0.33	0.045
4.923	0.000	0.37	4.07	0.33	0.046
5.091	0.000	0.38	4.07	0.34	0.046
5.259	0.000	0.38	4.07	0.34	0.047
5.427	0.000	0.38	4.07	0.34	0.047
5.594	0.000	0.38	4.08	0.35	0.048
5.762	0.000	0.39	4.08	0.35	0.049
5.930	0.000	0.39	4.08	0.35	0.049
6.098	0.000	0.40	4.08	0.36	0.050
6.266	0.000	0.40	4.08	0.36	0.050
6.434	0.000	0.40	4.08	0.37	0.051
6.601	0.000	0.41	4.08	0.37	0.051
6.769	0.000	0.41	4.08	0.37	0.052
6.937	0.000	0.41	4.08	0.38	0.052
7.105	0.000	0.42	4.08	0.38	0.053
7.273	0.000	0.42	4.08	0.38	0.053
7.441	0.000	0.43	4.08	0.39	0.054
7.608	0.000	0.43	4.09	0.39	0.054
7.776	0.000	0.44	4.09	0.40	0.055
7.944	0.000	0.44	4.09	0.40	0.055
8.112	0.000	0.45	4.09	0.41	0.056
8.280	0.000	0.45	4.09	0.41	0.057
8.448	0.000	0.46	4.09	0.41	0.057
8.615	0.000	0.46	4.09	0.42	0.058
8.783	0.000	0.47	4.09	0.42	0.059
8.951	0.000	0.47	4.09	0.43	0.059
9.119	0.000	0.48	4.09	0.43	0.060
9.287	0.000	0.49	4.10	0.44	0.061
9.455	0.000	0.50	4.10	0.44	0.061
9.622	0.000	0.50	4.10	0.45	0.062
9.790	0.000	0.51	4.10	0.45	0.063
9.958	0.000	0.52	4.10	0.46	0.064
10.126	0.000	0.53	4.10	0.47	0.064
10.294	0.000	0.53	4.10	0.47	0.065
10.462	0.000	0.54	4.10	0.48	0.066
10.629	0.000	0.55	4.11	0.48	0.067
10.797	0.000	0.56	4.11	0.49	0.068
10.965	0.000	0.57	4.11	0.50	0.069
11.133	0.000	0.58	4.11	0.51	0.070
11.301	0.000	0.59	4.11	0.51	0.071
11.469	0.000	0.60	4.11	0.52	0.072
11.636	0.000	0.61	4.12	0.53	0.073
11.804	0.000	0.63	4.12	0.54	0.075
11.972	0.000	0.64	4.12	0.55	0.076
12.140	0.000	0.65	4.12	0.56	0.077

12.308	0.000	0.66	4.12	0.57	0.078
12.476	0.000	0.68	4.13	0.58	0.080
12.643	0.000	0.69	4.13	0.59	0.081
12.811	0.000	0.72	4.13	0.60	0.083
12.979	0.000	0.73	4.13	0.61	0.085
13.147	0.000	0.76	4.14	0.62	0.087
13.315	0.000	0.78	4.14	0.64	0.089
13.483	0.000	0.81	4.14	0.65	0.091
13.650	0.000	0.83	4.15	0.67	0.093
13.818	0.000	0.88	4.15	0.69	0.096
13.986	0.000	0.90	4.15	0.71	0.098
14.154	0.000	0.96	4.16	0.73	0.102
14.322	0.000	1.00	4.17	0.75	0.105
14.490	0.000	1.07	4.17	0.78	0.109
14.657	0.000	1.11	4.18	0.81	0.113
14.825	0.000	1.22	4.19	0.84	0.119
14.993	0.000	1.28	4.20	0.88	0.124
15.161	0.000	1.44	4.21	0.93	0.131
15.329	0.000	1.54	4.22	0.98	0.139
15.497	0.000	1.86	4.24	1.05	0.150
15.664	0.000	2.08	4.26	1.14	0.163
15.832	0.000	3.38	4.30	1.29	0.192
16.000	0.000	4.31	4.36	1.54	0.231
16.168	0.000	10.66	4.55	2.11	0.349
16.336	0.000	2.38	4.55	2.53	0.347
16.503	0.000	1.67	4.53	2.48	0.336
16.671	0.000	1.35	4.51	2.39	0.322
16.839	0.000	1.16	4.48	2.28	0.306
17.007	0.000	1.03	4.46	2.17	0.290
17.175	0.000	0.93	4.43	2.05	0.275
17.343	0.000	0.85	4.41	1.94	0.260
17.510	0.000	0.79	4.39	1.83	0.245
17.678	0.000	0.74	4.36	1.73	0.232
17.846	0.000	0.70	4.34	1.64	0.219
18.014	0.000	0.67	4.32	1.54	0.206
18.182	0.000	0.65	4.31	1.46	0.195
18.350	0.000	0.62	4.29	1.38	0.185
18.517	0.000	0.60	4.27	1.31	0.175
18.685	0.000	0.57	4.26	1.24	0.166
18.853	0.000	0.55	4.25	1.17	0.157
19.021	0.000	0.54	4.23	1.11	0.149
19.189	0.000	0.52	4.22	1.06	0.142
19.357	0.000	0.51	4.21	1.00	0.135
19.524	0.000	0.49	4.20	0.96	0.128
19.692	0.000	0.48	4.19	0.91	0.122
19.860	0.000	0.47	4.18	0.87	0.117
20.028	0.000	0.46	4.18	0.83	0.112
20.196	0.000	0.44	4.17	0.79	0.107
20.364	0.000	0.44	4.16	0.76	0.102
20.531	0.000	0.43	4.15	0.73	0.098
20.699	0.000	0.42	4.15	0.70	0.094
20.867	0.000	0.41	4.14	0.67	0.091
21.035	0.000	0.40	4.14	0.65	0.087
21.203	0.000	0.39	4.13	0.62	0.084
21.371	0.000	0.39	4.13	0.60	0.081
21.538	0.000	0.38	4.12	0.58	0.078
21.706	0.000	0.37	4.12	0.56	0.076
21.874	0.000	0.37	4.12	0.54	0.073
22.042	0.000	0.36	4.11	0.52	0.071
22.210	0.000	0.36	4.11	0.51	0.069
22.378	0.000	0.35	4.11	0.49	0.067
22.545	0.000	0.35	4.10	0.48	0.065
22.713	0.000	0.34	4.10	0.47	0.063
22.881	0.000	0.34	4.10	0.45	0.062
23.049	0.000	0.33	4.09	0.44	0.060
23.217	0.000	0.33	4.09	0.43	0.059
23.385	0.000	0.32	4.09	0.42	0.057
23.552	0.000	0.32	4.09	0.41	0.056
23.720	0.000	0.32	4.09	0.40	0.055

23.888	0.000	0.31	4.08	0.39	0.054
24.056	0.000	0.31	4.08	0.39	0.053
24.224	0.000	0.00	4.07	0.36	0.048
24.392	0.000	0.00	4.07	0.33	0.043
24.559	0.000	0.00	4.06	0.30	0.039
24.727	0.000	0.00	4.06	0.27	0.035
24.895	0.000	0.00	4.05	0.24	0.032
25.063	0.000	0.00	4.05	0.22	0.029
25.231	0.000	0.00	4.04	0.20	0.026
25.399	0.000	0.00	4.04	0.18	0.023
25.566	0.000	0.00	4.03	0.16	0.021
25.734	0.000	0.00	4.03	0.15	0.019
25.902	0.000	0.00	4.03	0.13	0.017
26.070	0.000	0.00	4.02	0.12	0.016
26.238	0.000	0.00	4.02	0.11	0.014
26.406	0.000	0.00	4.02	0.10	0.013
26.573	0.000	0.00	4.02	0.09	0.012
26.741	0.000	0.00	4.02	0.08	0.010
26.909	0.000	0.00	4.01	0.07	0.009
27.077	0.000	0.00	4.01	0.07	0.009
27.245	0.000	0.00	4.01	0.06	0.008
27.413	0.000	0.00	4.01	0.05	0.007
27.580	0.000	0.00	4.01	0.05	0.006
27.748	0.000	0.00	4.01	0.04	0.006
27.916	0.000	0.00	4.01	0.04	0.005
28.084	0.000	0.00	4.01	0.04	0.005
28.252	0.000	0.00	4.01	0.03	0.004
28.420	0.000	0.00	4.01	0.03	0.004
28.587	0.000	0.00	4.01	0.03	0.003
28.755	0.000	0.00	4.00	0.02	0.003
28.923	0.000	0.00	4.00	0.02	0.003
29.091	0.000	0.00	4.00	0.02	0.003
29.259	0.000	0.00	4.00	0.02	0.002
29.427	0.000	0.00	4.00	0.02	0.002
29.594	0.000	0.00	4.00	0.01	0.002
29.762	0.000	0.00	4.00	0.01	0.002
29.930	0.000	0.00	4.00	0.01	0.002
30.098	0.000	0.00	4.00	0.01	0.001
30.266	0.000	0.00	4.00	0.01	0.001
30.434	0.000	0.00	4.00	0.01	0.001
30.601	0.000	0.00	4.00	0.01	0.001

SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
BASIN ROUTING
2-YEAR, POST-CONDITIONS, DA B

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.19
TOTAL CATCHMENT AREA(ACRES) = 16.27
SOIL-LOSS RATE, F_m (INCH/HR) = 0.258
LOW LOSS FRACTION = 0.348
TIME OF CONCENTRATION(MIN.) = 6.74
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 2
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.11
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.30
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.41
3-HOUR POINT RAINFALL VALUE(INCHES) = 0.67
6-HOUR POINT RAINFALL VALUE(INCHES) = 0.91
24-HOUR POINT RAINFALL VALUE(INCHES) = 1.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.81
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.51

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
0.05	0.0000	0.00	Q	.	.	.	.
0.16	0.0019	0.41	Q	.	.	.	.
0.27	0.0057	0.41	Q	.	.	.	.
0.39	0.0095	0.41	Q	.	.	.	.
0.50	0.0133	0.41	Q	.	.	.	.
0.61	0.0171	0.41	Q	.	.	.	.
0.72	0.0210	0.42	Q	.	.	.	.
0.84	0.0249	0.42	Q	.	.	.	.
0.95	0.0287	0.42	Q	.	.	.	.
1.06	0.0326	0.42	Q	.	.	.	.
1.17	0.0365	0.42	Q	.	.	.	.
1.28	0.0405	0.42	Q	.	.	.	.
1.40	0.0444	0.43	Q	.	.	.	.
1.51	0.0484	0.43	Q	.	.	.	.
1.62	0.0524	0.43	Q	.	.	.	.
1.73	0.0563	0.43	Q	.	.	.	.
1.85	0.0604	0.43	Q	.	.	.	.
1.96	0.0644	0.44	Q	.	.	.	.
2.07	0.0684	0.44	Q	.	.	.	.
2.18	0.0725	0.44	Q	.	.	.	.
2.30	0.0766	0.44	Q	.	.	.	.

2.41	0.0807	0.44	Q	.	.	.	.
2.52	0.0848	0.44	Q	.	.	.	.
2.63	0.0889	0.45	Q	.	.	.	.
2.74	0.0931	0.45	Q	.	.	.	.
2.86	0.0973	0.45	Q	.	.	.	.
2.97	0.1015	0.45	Q	.	.	.	.
3.08	0.1057	0.46	Q	.	.	.	.
3.19	0.1099	0.46	Q	.	.	.	.
3.31	0.1142	0.46	Q	.	.	.	.
3.42	0.1185	0.46	Q	.	.	.	.
3.53	0.1228	0.46	Q	.	.	.	.
3.64	0.1271	0.47	Q	.	.	.	.
3.76	0.1314	0.47	Q	.	.	.	.
3.87	0.1358	0.47	Q	.	.	.	.
3.98	0.1402	0.47	Q	.	.	.	.
4.09	0.1446	0.48	Q	.	.	.	.
4.21	0.1490	0.48	Q	.	.	.	.
4.32	0.1534	0.48	Q	.	.	.	.
4.43	0.1579	0.48	Q	.	.	.	.
4.54	0.1624	0.49	Q	.	.	.	.
4.65	0.1669	0.49	Q	.	.	.	.
4.77	0.1715	0.49	Q	.	.	.	.
4.88	0.1761	0.49	Q	.	.	.	.
4.99	0.1807	0.50	Q	.	.	.	.
5.10	0.1853	0.50	Q	.	.	.	.
5.22	0.1899	0.50	.Q	.	.	.	.
5.33	0.1946	0.51	.Q	.	.	.	.
5.44	0.1993	0.51	.Q	.	.	.	.
5.55	0.2040	0.51	.Q	.	.	.	.
5.67	0.2088	0.51	.Q	.	.	.	.
5.78	0.2136	0.52	.Q	.	.	.	.
5.89	0.2184	0.52	.Q	.	.	.	.
6.00	0.2232	0.52	.Q	.	.	.	.
6.11	0.2281	0.53	.Q	.	.	.	.
6.23	0.2330	0.53	.Q	.	.	.	.
6.34	0.2379	0.53	.Q	.	.	.	.
6.45	0.2429	0.54	.Q	.	.	.	.
6.56	0.2479	0.54	.Q	.	.	.	.
6.68	0.2529	0.54	.Q	.	.	.	.
6.79	0.2580	0.55	.Q	.	.	.	.
6.90	0.2631	0.55	.Q	.	.	.	.
7.01	0.2682	0.55	.Q	.	.	.	.
7.13	0.2734	0.56	.Q	.	.	.	.
7.24	0.2786	0.56	.Q	.	.	.	.
7.35	0.2838	0.57	.Q	.	.	.	.
7.46	0.2891	0.57	.Q	.	.	.	.
7.58	0.2944	0.57	.Q	.	.	.	.
7.69	0.2998	0.58	.Q	.	.	.	.
7.80	0.3051	0.58	.Q	.	.	.	.
7.91	0.3106	0.59	.Q	.	.	.	.
8.02	0.3160	0.59	.Q	.	.	.	.
8.14	0.3216	0.60	.Q	.	.	.	.
8.25	0.3271	0.60	.Q	.	.	.	.
8.36	0.3327	0.60	.Q	.	.	.	.
8.47	0.3384	0.61	.Q	.	.	.	.
8.59	0.3440	0.61	.Q	.	.	.	.
8.70	0.3498	0.62	.Q	.	.	.	.
8.81	0.3556	0.62	.Q	.	.	.	.
8.92	0.3614	0.63	.Q	.	.	.	.
9.04	0.3673	0.64	.Q	.	.	.	.
9.15	0.3732	0.64	.Q	.	.	.	.
9.26	0.3792	0.65	.Q	.	.	.	.
9.37	0.3853	0.65	.Q	.	.	.	.
9.48	0.3913	0.66	.Q	.	.	.	.
9.60	0.3975	0.67	.Q	.	.	.	.
9.71	0.4037	0.67	.Q	.	.	.	.
9.82	0.4100	0.68	.Q	.	.	.	.
9.93	0.4163	0.68	.Q	.	.	.	.
10.05	0.4227	0.69	.Q	.	.	.	.

10.16	0.4292	0.70	.Q	.	.	.	.
10.27	0.4357	0.71	.Q	.	.	.	.
10.38	0.4423	0.71	.Q	.	.	.	.
10.50	0.4490	0.72	.Q	.	.	.	.
10.61	0.4557	0.73	.Q	.	.	.	.
10.72	0.4626	0.74	.Q	.	.	.	.
10.83	0.4695	0.75	.Q	.	.	.	.
10.95	0.4765	0.76	.Q	.	.	.	.
11.06	0.4835	0.76	.Q	.	.	.	.
11.17	0.4907	0.78	.Q	.	.	.	.
11.28	0.4979	0.78	.Q	.	.	.	.
11.39	0.5053	0.80	.Q	.	.	.	.
11.51	0.5127	0.80	.Q	.	.	.	.
11.62	0.5202	0.82	.Q	.	.	.	.
11.73	0.5279	0.83	.Q	.	.	.	.
11.84	0.5356	0.84	.Q	.	.	.	.
11.96	0.5435	0.85	.Q	.	.	.	.
12.07	0.5514	0.86	.Q	.	.	.	.
12.18	0.5594	0.86	.Q	.	.	.	.
12.29	0.5675	0.88	.Q	.	.	.	.
12.41	0.5757	0.89	.Q	.	.	.	.
12.52	0.5841	0.91	.Q	.	.	.	.
12.63	0.5926	0.92	.Q	.	.	.	.
12.74	0.6013	0.94	.Q	.	.	.	.
12.85	0.6101	0.96	.Q	.	.	.	.
12.97	0.6191	0.98	.Q	.	.	.	.
13.08	0.6283	1.00	.Q	.	.	.	.
13.19	0.6376	1.02	. Q	.	.	.	.
13.30	0.6472	1.04	. Q	.	.	.	.
13.42	0.6570	1.07	. Q	.	.	.	.
13.53	0.6670	1.09	. Q	.	.	.	.
13.64	0.6773	1.12	. Q	.	.	.	.
13.75	0.6878	1.14	. Q	.	.	.	.
13.87	0.6987	1.19	. Q	.	.	.	.
13.98	0.7098	1.21	. Q	.	.	.	.
14.09	0.7213	1.27	. Q	.	.	.	.
14.20	0.7332	1.30	. Q	.	.	.	.
14.32	0.7455	1.36	. Q	.	.	.	.
14.43	0.7583	1.39	. Q	.	.	.	.
14.54	0.7715	1.46	. Q	.	.	.	.
14.65	0.7853	1.51	. Q	.	.	.	.
14.76	0.7997	1.60	. Q	.	.	.	.
14.88	0.8148	1.65	. Q	.	.	.	.
14.99	0.8307	1.77	. Q	.	.	.	.
15.10	0.8475	1.85	. Q	.	.	.	.
15.21	0.8655	2.02	. Q	.	.	.	.
15.33	0.8847	2.12	. Q	.	.	.	.
15.44	0.9057	2.41	. Q	.	.	.	.
15.55	0.9289	2.59	. Q	.	.	.	.
15.66	0.9552	3.07	. Q	.	.	.	.
15.78	0.9868	3.74	. Q	.	.	.	.
15.89	1.0291	5.39	. Q	.	.	.	.
16.00	1.0860	6.86	. Q	.	.	.	.
16.11	1.2010	17.92	. Q	.	.	.	.
16.22	1.3056	4.61	. Q.	.	.	.	.
16.34	1.3401	2.80	. Q	.	.	.	.
16.45	1.3635	2.24	. Q	.	.	.	.
16.56	1.3828	1.93	. Q	.	.	.	.
16.67	1.3997	1.71	. Q	.	.	.	.
16.79	1.4148	1.55	. Q	.	.	.	.
16.90	1.4286	1.43	. Q	.	.	.	.
17.01	1.4414	1.33	. Q	.	.	.	.
17.12	1.4533	1.23	. Q	.	.	.	.
17.24	1.4644	1.17	. Q	.	.	.	.
17.35	1.4750	1.11	. Q	.	.	.	.
17.46	1.4850	1.05	. Q	.	.	.	.
17.57	1.4946	1.01	. Q	.	.	.	.
17.68	1.5038	0.97	.Q	.	.	.	.
17.80	1.5126	0.93	.Q	.	.	.	.

17.91	1.5211	0.90	.Q	.	.	.	.
18.02	1.5293	0.87	.Q	.	.	.	.
18.13	1.5374	0.86	.Q	.	.	.	.
18.25	1.5452	0.83	.Q	.	.	.	.
18.36	1.5529	0.81	.Q	.	.	.	.
18.47	1.5603	0.79	.Q	.	.	.	.
18.58	1.5675	0.77	.Q	.	.	.	.
18.70	1.5746	0.75	.Q	.	.	.	.
18.81	1.5815	0.73	.Q	.	.	.	.
18.92	1.5883	0.72	.Q	.	.	.	.
19.03	1.5949	0.70	.Q	.	.	.	.
19.15	1.6013	0.69	.Q	.	.	.	.
19.26	1.6077	0.68	.Q	.	.	.	.
19.37	1.6139	0.66	.Q	.	.	.	.
19.48	1.6200	0.65	.Q	.	.	.	.
19.59	1.6260	0.64	.Q	.	.	.	.
19.71	1.6319	0.63	.Q	.	.	.	.
19.82	1.6376	0.62	.Q	.	.	.	.
19.93	1.6433	0.61	.Q	.	.	.	.
20.04	1.6489	0.60	.Q	.	.	.	.
20.16	1.6544	0.59	.Q	.	.	.	.
20.27	1.6599	0.58	.Q	.	.	.	.
20.38	1.6652	0.57	.Q	.	.	.	.
20.49	1.6705	0.56	.Q	.	.	.	.
20.61	1.6757	0.56	.Q	.	.	.	.
20.72	1.6808	0.55	.Q	.	.	.	.
20.83	1.6859	0.54	.Q	.	.	.	.
20.94	1.6909	0.53	.Q	.	.	.	.
21.06	1.6958	0.53	.Q	.	.	.	.
21.17	1.7007	0.52	.Q	.	.	.	.
21.28	1.7055	0.52	.Q	.	.	.	.
21.39	1.7103	0.51	.Q	.	.	.	.
21.50	1.7150	0.50	.Q	.	.	.	.
21.62	1.7196	0.50	Q	.	.	.	.
21.73	1.7242	0.49	Q	.	.	.	.
21.84	1.7288	0.49	Q	.	.	.	.
21.95	1.7333	0.48	Q	.	.	.	.
22.07	1.7377	0.48	Q	.	.	.	.
22.18	1.7421	0.47	Q	.	.	.	.
22.29	1.7465	0.47	Q	.	.	.	.
22.40	1.7508	0.46	Q	.	.	.	.
22.52	1.7551	0.46	Q	.	.	.	.
22.63	1.7593	0.45	Q	.	.	.	.
22.74	1.7635	0.45	Q	.	.	.	.
22.85	1.7677	0.45	Q	.	.	.	.
22.96	1.7718	0.44	Q	.	.	.	.
23.08	1.7759	0.44	Q	.	.	.	.
23.19	1.7799	0.43	Q	.	.	.	.
23.30	1.7839	0.43	Q	.	.	.	.
23.41	1.7879	0.43	Q	.	.	.	.
23.53	1.7918	0.42	Q	.	.	.	.
23.64	1.7958	0.42	Q	.	.	.	.
23.75	1.7996	0.42	Q	.	.	.	.
23.86	1.8035	0.41	Q	.	.	.	.
23.98	1.8073	0.41	Q	.	.	.	.
24.09	1.8111	0.41	Q	.	.	.	.
24.20	1.8130	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1442.4
10%	94.4
20%	33.7

30%	20.2
40%	6.7
50%	6.7
60%	6.7
70%	6.7
80%	6.7
90%	6.7

Problem Descriptions:

SAM'S CLUB HESPERIA

BASIN ROUTING

2-YEAR, POST-CONDITIONS, DA B

=====

FLOW-THROUGH DETENTION BASIN MODEL

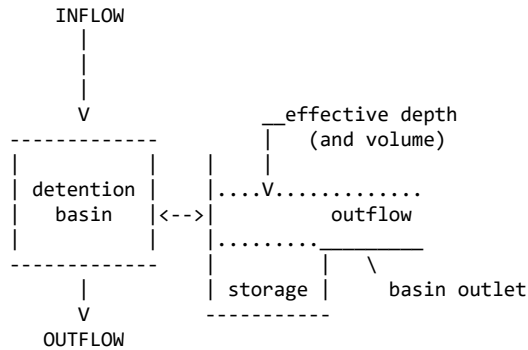
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 6.740

DEAD STORAGE(AF) = 0.00

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00

ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 6

* BASIN-DEPTH	STORAGE	OUTFLOW	** BASIN-DEPTH	STORAGE	OUTFLOW
*(FEET)	(ACRE-FEET)	(CFS)	*(FEET)	(ACRE-FEET)	(CFS)
* 0.000	0.000	0.000**	4.000	0.000	0.000*
* 4.500	0.427	0.730**	5.000	0.879	6.610*
* 6.000	1.859	31.320**	7.000	2.944	66.540*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	4.00	0.00000	0.00000
3	4.50	0.42371	0.43049
4	5.00	0.84822	0.90958
5	6.00	1.71312	2.00388
6	7.00	2.63483	3.25257

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.049	0.000	0.00	4.00	0.00	0.000

0.161	0.000	0.41	4.00	0.00	0.004
0.273	0.000	0.41	4.01	0.01	0.007
0.386	0.000	0.41	4.01	0.02	0.011
0.498	0.000	0.41	4.02	0.02	0.015
0.610	0.000	0.41	4.02	0.03	0.018
0.723	0.000	0.42	4.03	0.03	0.022
0.835	0.000	0.42	4.03	0.04	0.025
0.947	0.000	0.42	4.03	0.05	0.029
1.060	0.000	0.42	4.04	0.05	0.032
1.172	0.000	0.42	4.04	0.06	0.036
1.284	0.000	0.42	4.05	0.06	0.039
1.397	0.000	0.43	4.05	0.07	0.042
1.509	0.000	0.43	4.05	0.08	0.046
1.621	0.000	0.43	4.06	0.08	0.049
1.734	0.000	0.43	4.06	0.09	0.052
1.846	0.000	0.43	4.06	0.09	0.055
1.958	0.000	0.44	4.07	0.10	0.058
2.071	0.000	0.44	4.07	0.10	0.061
2.183	0.000	0.44	4.08	0.11	0.064
2.295	0.000	0.44	4.08	0.11	0.068
2.408	0.000	0.44	4.08	0.12	0.071
2.520	0.000	0.44	4.09	0.12	0.074
2.632	0.000	0.45	4.09	0.13	0.076
2.745	0.000	0.45	4.09	0.13	0.079
2.857	0.000	0.45	4.10	0.14	0.082
2.969	0.000	0.45	4.10	0.14	0.085
3.082	0.000	0.46	4.10	0.15	0.088
3.194	0.000	0.46	4.11	0.15	0.091
3.306	0.000	0.46	4.11	0.16	0.094
3.419	0.000	0.46	4.11	0.16	0.096
3.531	0.000	0.46	4.12	0.17	0.099
3.643	0.000	0.47	4.12	0.17	0.102
3.756	0.000	0.47	4.12	0.18	0.105
3.868	0.000	0.47	4.13	0.18	0.107
3.980	0.000	0.47	4.13	0.19	0.110
4.093	0.000	0.48	4.13	0.19	0.113
4.205	0.000	0.48	4.13	0.19	0.115
4.317	0.000	0.48	4.14	0.20	0.118
4.430	0.000	0.48	4.14	0.20	0.121
4.542	0.000	0.49	4.14	0.21	0.123
4.654	0.000	0.49	4.15	0.21	0.126
4.767	0.000	0.49	4.15	0.22	0.128
4.879	0.000	0.49	4.15	0.22	0.131
4.991	0.000	0.50	4.16	0.23	0.133
5.104	0.000	0.50	4.16	0.23	0.136
5.216	0.000	0.50	4.16	0.23	0.138
5.328	0.000	0.51	4.16	0.24	0.141
5.441	0.000	0.51	4.17	0.24	0.143
5.553	0.000	0.51	4.17	0.25	0.146
5.665	0.000	0.51	4.17	0.25	0.148
5.778	0.000	0.52	4.18	0.26	0.150
5.890	0.000	0.52	4.18	0.26	0.153
6.002	0.000	0.52	4.18	0.26	0.155
6.115	0.000	0.53	4.18	0.27	0.158
6.227	0.000	0.53	4.19	0.27	0.160
6.339	0.000	0.53	4.19	0.28	0.163
6.452	0.000	0.54	4.19	0.28	0.165
6.564	0.000	0.54	4.20	0.28	0.167
6.676	0.000	0.54	4.20	0.29	0.170
6.789	0.000	0.55	4.20	0.29	0.172
6.901	0.000	0.55	4.20	0.30	0.174
7.013	0.000	0.55	4.21	0.30	0.177
7.126	0.000	0.56	4.21	0.30	0.179
7.238	0.000	0.56	4.21	0.31	0.181
7.350	0.000	0.57	4.22	0.31	0.184
7.463	0.000	0.57	4.22	0.32	0.186
7.575	0.000	0.57	4.22	0.32	0.189
7.687	0.000	0.58	4.22	0.32	0.191
7.800	0.000	0.58	4.23	0.33	0.193

7.912	0.000	0.59	4.23	0.33	0.196
8.024	0.000	0.59	4.23	0.34	0.198
8.137	0.000	0.60	4.23	0.34	0.200
8.249	0.000	0.60	4.24	0.34	0.203
8.361	0.000	0.60	4.24	0.35	0.205
8.474	0.000	0.61	4.24	0.35	0.208
8.586	0.000	0.61	4.25	0.36	0.210
8.698	0.000	0.62	4.25	0.36	0.212
8.811	0.000	0.62	4.25	0.36	0.215
8.923	0.000	0.63	4.25	0.37	0.217
9.035	0.000	0.64	4.26	0.37	0.220
9.148	0.000	0.64	4.26	0.38	0.222
9.260	0.000	0.65	4.26	0.38	0.225
9.372	0.000	0.65	4.27	0.39	0.227
9.485	0.000	0.66	4.27	0.39	0.230
9.597	0.000	0.67	4.27	0.39	0.232
9.709	0.000	0.67	4.27	0.40	0.235
9.822	0.000	0.68	4.28	0.40	0.237
9.934	0.000	0.68	4.28	0.41	0.240
10.046	0.000	0.69	4.28	0.41	0.242
10.159	0.000	0.70	4.29	0.42	0.245
10.271	0.000	0.71	4.29	0.42	0.248
10.383	0.000	0.71	4.29	0.43	0.250
10.496	0.000	0.72	4.30	0.43	0.253
10.608	0.000	0.73	4.30	0.43	0.256
10.720	0.000	0.74	4.30	0.44	0.259
10.833	0.000	0.75	4.31	0.44	0.261
10.945	0.000	0.76	4.31	0.45	0.264
11.057	0.000	0.76	4.31	0.45	0.267
11.170	0.000	0.78	4.32	0.46	0.270
11.282	0.000	0.78	4.32	0.46	0.273
11.394	0.000	0.80	4.32	0.47	0.276
11.507	0.000	0.80	4.33	0.47	0.279
11.619	0.000	0.82	4.33	0.48	0.282
11.731	0.000	0.83	4.33	0.49	0.285
11.844	0.000	0.84	4.34	0.49	0.289
11.956	0.000	0.85	4.34	0.50	0.292
12.068	0.000	0.86	4.35	0.50	0.295
12.181	0.000	0.86	4.35	0.51	0.299
12.293	0.000	0.88	4.35	0.51	0.302
12.405	0.000	0.89	4.36	0.52	0.306
12.518	0.000	0.91	4.36	0.53	0.309
12.630	0.000	0.92	4.37	0.53	0.313
12.742	0.000	0.94	4.37	0.54	0.316
12.855	0.000	0.96	4.37	0.54	0.320
12.967	0.000	0.98	4.38	0.55	0.324
13.079	0.000	1.00	4.38	0.56	0.328
13.192	0.000	1.02	4.39	0.56	0.333
13.304	0.000	1.04	4.39	0.57	0.337
13.416	0.000	1.07	4.40	0.58	0.342
13.529	0.000	1.09	4.41	0.59	0.346
13.641	0.000	1.12	4.41	0.60	0.351
13.753	0.000	1.14	4.42	0.60	0.356
13.866	0.000	1.19	4.42	0.61	0.361
13.978	0.000	1.21	4.43	0.62	0.367
14.090	0.000	1.27	4.44	0.63	0.373
14.203	0.000	1.30	4.44	0.64	0.379
14.315	0.000	1.36	4.45	0.65	0.385
14.427	0.000	1.39	4.46	0.66	0.392
14.540	0.000	1.46	4.47	0.68	0.399
14.652	0.000	1.51	4.48	0.69	0.407
14.764	0.000	1.60	4.49	0.70	0.415
14.877	0.000	1.65	4.50	0.72	0.424
14.989	0.000	1.77	4.51	0.77	0.433
15.101	0.000	1.85	4.52	0.87	0.442
15.214	0.000	2.02	4.53	0.99	0.452
15.326	0.000	2.12	4.54	1.11	0.461
15.438	0.000	2.41	4.55	1.25	0.472
15.551	0.000	2.59	4.56	1.39	0.483

15.663	0.000	3.07	4.58	1.55	0.497
15.775	0.000	3.74	4.60	1.76	0.516
15.888	0.000	5.39	4.63	2.08	0.546
16.000	0.000	6.86	4.68	2.54	0.586
16.112	0.000	17.92	4.82	3.66	0.719
16.225	0.000	4.61	4.82	4.53	0.720
16.337	0.000	2.80	4.81	4.44	0.704
16.449	0.000	2.24	4.79	4.22	0.686
16.562	0.000	1.93	4.77	3.98	0.667
16.674	0.000	1.71	4.74	3.73	0.648
16.786	0.000	1.55	4.72	3.49	0.630
16.899	0.000	1.43	4.71	3.26	0.613
17.011	0.000	1.33	4.69	3.05	0.597
17.123	0.000	1.23	4.67	2.85	0.582
17.236	0.000	1.17	4.66	2.66	0.568
17.348	0.000	1.11	4.64	2.49	0.556
17.460	0.000	1.05	4.63	2.33	0.544
17.573	0.000	1.01	4.62	2.18	0.533
17.685	0.000	0.97	4.61	2.04	0.523
17.797	0.000	0.93	4.60	1.92	0.514
17.910	0.000	0.90	4.59	1.80	0.505
18.022	0.000	0.87	4.58	1.70	0.498
18.134	0.000	0.86	4.57	1.60	0.491
18.247	0.000	0.83	4.56	1.52	0.484
18.359	0.000	0.81	4.56	1.44	0.479
18.471	0.000	0.79	4.55	1.37	0.473
18.584	0.000	0.77	4.55	1.30	0.468
18.696	0.000	0.75	4.54	1.24	0.464
18.808	0.000	0.73	4.54	1.18	0.460
18.921	0.000	0.72	4.53	1.13	0.456
19.033	0.000	0.70	4.53	1.08	0.452
19.145	0.000	0.69	4.52	1.04	0.449
19.258	0.000	0.68	4.52	1.00	0.446
19.370	0.000	0.66	4.52	0.96	0.443
19.482	0.000	0.65	4.52	0.93	0.441
19.595	0.000	0.64	4.51	0.89	0.438
19.707	0.000	0.63	4.51	0.86	0.436
19.819	0.000	0.62	4.51	0.84	0.434
19.932	0.000	0.61	4.51	0.81	0.432
20.044	0.000	0.60	4.50	0.79	0.431
20.156	0.000	0.59	4.50	0.77	0.429
20.269	0.000	0.58	4.50	0.74	0.427
20.381	0.000	0.57	4.50	0.73	0.426
20.493	0.000	0.56	4.50	0.73	0.424
20.606	0.000	0.56	4.50	0.72	0.423
20.718	0.000	0.55	4.49	0.72	0.421
20.830	0.000	0.54	4.49	0.72	0.420
20.943	0.000	0.53	4.49	0.72	0.418
21.055	0.000	0.53	4.49	0.71	0.416
21.167	0.000	0.52	4.49	0.71	0.415
21.280	0.000	0.52	4.48	0.71	0.413
21.392	0.000	0.51	4.48	0.70	0.411
21.504	0.000	0.50	4.48	0.70	0.409
21.617	0.000	0.50	4.48	0.70	0.407
21.729	0.000	0.49	4.47	0.69	0.405
21.841	0.000	0.49	4.47	0.69	0.403
21.954	0.000	0.48	4.47	0.69	0.402
22.066	0.000	0.48	4.47	0.68	0.400
22.178	0.000	0.47	4.47	0.68	0.398
22.291	0.000	0.47	4.46	0.68	0.396
22.403	0.000	0.46	4.46	0.67	0.394
22.515	0.000	0.46	4.46	0.67	0.392
22.628	0.000	0.45	4.46	0.67	0.390
22.740	0.000	0.45	4.45	0.66	0.388
22.852	0.000	0.45	4.45	0.66	0.386
22.965	0.000	0.44	4.45	0.66	0.384
23.077	0.000	0.44	4.45	0.65	0.382
23.189	0.000	0.43	4.44	0.65	0.380
23.302	0.000	0.43	4.44	0.65	0.378

23.414	0.000	0.43	4.44	0.64	0.376
23.526	0.000	0.42	4.44	0.64	0.374
23.639	0.000	0.42	4.44	0.64	0.372
23.751	0.000	0.42	4.43	0.63	0.370
23.863	0.000	0.41	4.43	0.63	0.368
23.976	0.000	0.41	4.43	0.63	0.366
24.088	0.000	0.41	4.43	0.62	0.364
24.200	0.000	0.00	4.42	0.62	0.358
24.313	0.000	0.00	4.41	0.61	0.352
24.425	0.000	0.00	4.41	0.60	0.347
24.537	0.000	0.00	4.40	0.59	0.341
24.650	0.000	0.00	4.39	0.58	0.336
24.762	0.000	0.00	4.39	0.57	0.331
24.874	0.000	0.00	4.38	0.56	0.325
24.987	0.000	0.00	4.37	0.55	0.320
25.099	0.000	0.00	4.37	0.54	0.315
25.211	0.000	0.00	4.36	0.53	0.310
25.324	0.000	0.00	4.36	0.53	0.305
25.436	0.000	0.00	4.35	0.52	0.301
25.548	0.000	0.00	4.35	0.51	0.296
25.661	0.000	0.00	4.34	0.50	0.291
25.773	0.000	0.00	4.34	0.49	0.287
25.885	0.000	0.00	4.33	0.49	0.282
25.998	0.000	0.00	4.33	0.48	0.278
26.110	0.000	0.00	4.32	0.47	0.273
26.222	0.000	0.00	4.31	0.46	0.269
26.335	0.000	0.00	4.31	0.46	0.265
26.447	0.000	0.00	4.31	0.45	0.261
26.559	0.000	0.00	4.30	0.44	0.257
26.672	0.000	0.00	4.30	0.43	0.252
26.784	0.000	0.00	4.29	0.43	0.248
26.896	0.000	0.00	4.29	0.42	0.245
27.009	0.000	0.00	4.28	0.41	0.241
27.121	0.000	0.00	4.28	0.41	0.237
27.233	0.000	0.00	4.27	0.40	0.233
27.346	0.000	0.00	4.27	0.40	0.230
27.458	0.000	0.00	4.26	0.39	0.226
27.570	0.000	0.00	4.26	0.38	0.222
27.683	0.000	0.00	4.26	0.38	0.219
27.795	0.000	0.00	4.25	0.37	0.215
27.907	0.000	0.00	4.25	0.37	0.212
28.020	0.000	0.00	4.24	0.36	0.209
28.132	0.000	0.00	4.24	0.35	0.205
28.244	0.000	0.00	4.24	0.35	0.202
28.357	0.000	0.00	4.23	0.34	0.199
28.469	0.000	0.00	4.23	0.34	0.196
28.581	0.000	0.00	4.23	0.33	0.193
28.694	0.000	0.00	4.22	0.33	0.190
28.806	0.000	0.00	4.22	0.32	0.187
28.918	0.000	0.00	4.22	0.32	0.184
29.031	0.000	0.00	4.21	0.31	0.181
29.143	0.000	0.00	4.21	0.31	0.178
29.255	0.000	0.00	4.21	0.30	0.175
29.368	0.000	0.00	4.20	0.30	0.173
29.480	0.000	0.00	4.20	0.29	0.170
29.592	0.000	0.00	4.20	0.29	0.167
29.705	0.000	0.00	4.19	0.28	0.164
29.817	0.000	0.00	4.19	0.28	0.162
29.929	0.000	0.00	4.19	0.27	0.159
30.042	0.000	0.00	4.18	0.27	0.157
30.154	0.000	0.00	4.18	0.27	0.154
30.266	0.000	0.00	4.18	0.26	0.152
30.379	0.000	0.00	4.18	0.26	0.150
30.491	0.000	0.00	4.17	0.25	0.147
30.603	0.000	0.00	4.17	0.25	0.145
30.716	0.000	0.00	4.17	0.25	0.143
30.828	0.000	0.00	4.16	0.24	0.140
30.940	0.000	0.00	4.16	0.24	0.138
31.053	0.000	0.00	4.16	0.23	0.136

31.165	0.000	0.00	4.16	0.23	0.134
31.277	0.000	0.00	4.15	0.23	0.132
31.390	0.000	0.00	4.15	0.22	0.130
31.502	0.000	0.00	4.15	0.22	0.128
31.614	0.000	0.00	4.15	0.22	0.126
31.727	0.000	0.00	4.14	0.21	0.124
31.839	0.000	0.00	4.14	0.21	0.122
31.951	0.000	0.00	4.14	0.21	0.120
32.064	0.000	0.00	4.14	0.20	0.118
32.176	0.000	0.00	4.14	0.20	0.116
32.288	0.000	0.00	4.13	0.20	0.114
32.401	0.000	0.00	4.13	0.19	0.112
32.513	0.000	0.00	4.13	0.19	0.111
32.625	0.000	0.00	4.13	0.19	0.109
32.738	0.000	0.00	4.13	0.18	0.107
32.850	0.000	0.00	4.12	0.18	0.105
32.962	0.000	0.00	4.12	0.18	0.104
33.075	0.000	0.00	4.12	0.18	0.102
33.187	0.000	0.00	4.12	0.17	0.101
33.299	0.000	0.00	4.12	0.17	0.099
33.412	0.000	0.00	4.11	0.17	0.097
33.524	0.000	0.00	4.11	0.17	0.096
33.636	0.000	0.00	4.11	0.16	0.094
33.749	0.000	0.00	4.11	0.16	0.093
33.861	0.000	0.00	4.11	0.16	0.091
33.973	0.000	0.00	4.11	0.16	0.090
34.086	0.000	0.00	4.10	0.15	0.089
34.198	0.000	0.00	4.10	0.15	0.087
34.310	0.000	0.00	4.10	0.15	0.086
34.423	0.000	0.00	4.10	0.15	0.084
34.535	0.000	0.00	4.10	0.14	0.083
34.647	0.000	0.00	4.10	0.14	0.082
34.760	0.000	0.00	4.09	0.14	0.081
34.872	0.000	0.00	4.09	0.14	0.079
34.984	0.000	0.00	4.09	0.13	0.078
35.097	0.000	0.00	4.09	0.13	0.077
35.209	0.000	0.00	4.09	0.13	0.076
35.321	0.000	0.00	4.09	0.13	0.074
35.434	0.000	0.00	4.09	0.13	0.073
35.546	0.000	0.00	4.08	0.12	0.072
35.658	0.000	0.00	4.08	0.12	0.071
35.771	0.000	0.00	4.08	0.12	0.070
35.883	0.000	0.00	4.08	0.12	0.069
35.995	0.000	0.00	4.08	0.12	0.068
36.108	0.000	0.00	4.08	0.11	0.067
36.220	0.000	0.00	4.08	0.11	0.066
36.332	0.000	0.00	4.08	0.11	0.064
36.445	0.000	0.00	4.07	0.11	0.063
36.557	0.000	0.00	4.07	0.11	0.062
36.669	0.000	0.00	4.07	0.11	0.061
36.782	0.000	0.00	4.07	0.10	0.061
36.894	0.000	0.00	4.07	0.10	0.060
37.006	0.000	0.00	4.07	0.10	0.059
37.119	0.000	0.00	4.07	0.10	0.058
37.231	0.000	0.00	4.07	0.10	0.057
37.343	0.000	0.00	4.07	0.10	0.056
37.456	0.000	0.00	4.06	0.09	0.055
37.568	0.000	0.00	4.06	0.09	0.054
37.680	0.000	0.00	4.06	0.09	0.053
37.793	0.000	0.00	4.06	0.09	0.052
37.905	0.000	0.00	4.06	0.09	0.052
38.017	0.000	0.00	4.06	0.09	0.051
38.130	0.000	0.00	4.06	0.09	0.050
38.242	0.000	0.00	4.06	0.08	0.049
38.354	0.000	0.00	4.06	0.08	0.048
38.467	0.000	0.00	4.06	0.08	0.048
38.579	0.000	0.00	4.05	0.08	0.047
38.691	0.000	0.00	4.05	0.08	0.046
38.804	0.000	0.00	4.05	0.08	0.045

38.916	0.000	0.00	4.05	0.08	0.045
39.028	0.000	0.00	4.05	0.08	0.044
39.141	0.000	0.00	4.05	0.07	0.043
39.253	0.000	0.00	4.05	0.07	0.043
39.365	0.000	0.00	4.05	0.07	0.042
39.478	0.000	0.00	4.05	0.07	0.041
39.590	0.000	0.00	4.05	0.07	0.041
39.702	0.000	0.00	4.05	0.07	0.040
39.815	0.000	0.00	4.05	0.07	0.039
39.927	0.000	0.00	4.05	0.07	0.039
40.039	0.000	0.00	4.04	0.07	0.038
40.152	0.000	0.00	4.04	0.06	0.038
40.264	0.000	0.00	4.04	0.06	0.037
40.376	0.000	0.00	4.04	0.06	0.036
40.489	0.000	0.00	4.04	0.06	0.036
40.601	0.000	0.00	4.04	0.06	0.035
40.713	0.000	0.00	4.04	0.06	0.035
40.826	0.000	0.00	4.04	0.06	0.034
40.938	0.000	0.00	4.04	0.06	0.034
41.050	0.000	0.00	4.04	0.06	0.033
41.163	0.000	0.00	4.04	0.06	0.033
41.275	0.000	0.00	4.04	0.06	0.032
41.387	0.000	0.00	4.04	0.05	0.032
41.500	0.000	0.00	4.04	0.05	0.031
41.612	0.000	0.00	4.04	0.05	0.031
41.724	0.000	0.00	4.04	0.05	0.030
41.837	0.000	0.00	4.03	0.05	0.030
41.949	0.000	0.00	4.03	0.05	0.029
42.062	0.000	0.00	4.03	0.05	0.029
42.174	0.000	0.00	4.03	0.05	0.028
42.286	0.000	0.00	4.03	0.05	0.028
42.399	0.000	0.00	4.03	0.05	0.027
42.511	0.000	0.00	4.03	0.05	0.027
42.623	0.000	0.00	4.03	0.05	0.027
42.736	0.000	0.00	4.03	0.04	0.026
42.848	0.000	0.00	4.03	0.04	0.026
42.960	0.000	0.00	4.03	0.04	0.025
43.073	0.000	0.00	4.03	0.04	0.025
43.185	0.000	0.00	4.03	0.04	0.024
43.297	0.000	0.00	4.03	0.04	0.024
43.410	0.000	0.00	4.03	0.04	0.024
43.522	0.000	0.00	4.03	0.04	0.023
43.634	0.000	0.00	4.03	0.04	0.023
43.747	0.000	0.00	4.03	0.04	0.023
43.859	0.000	0.00	4.03	0.04	0.022
43.971	0.000	0.00	4.03	0.04	0.022
44.084	0.000	0.00	4.03	0.04	0.022
44.196	0.000	0.00	4.02	0.04	0.021
44.308	0.000	0.00	4.02	0.04	0.021
44.421	0.000	0.00	4.02	0.04	0.021
44.533	0.000	0.00	4.02	0.03	0.020
44.645	0.000	0.00	4.02	0.03	0.020
44.758	0.000	0.00	4.02	0.03	0.020
44.870	0.000	0.00	4.02	0.03	0.019
44.982	0.000	0.00	4.02	0.03	0.019
45.095	0.000	0.00	4.02	0.03	0.019
45.207	0.000	0.00	4.02	0.03	0.018
45.319	0.000	0.00	4.02	0.03	0.018
45.432	0.000	0.00	4.02	0.03	0.018
45.544	0.000	0.00	4.02	0.03	0.018
45.656	0.000	0.00	4.02	0.03	0.017
45.769	0.000	0.00	4.02	0.03	0.017
45.881	0.000	0.00	4.02	0.03	0.017
45.993	0.000	0.00	4.02	0.03	0.016
46.106	0.000	0.00	4.02	0.03	0.016
46.218	0.000	0.00	4.02	0.03	0.016
46.330	0.000	0.00	4.02	0.03	0.016
46.443	0.000	0.00	4.02	0.03	0.015
46.555	0.000	0.00	4.02	0.03	0.015

46.667	0.000	0.00	4.02	0.03	0.015
46.780	0.000	0.00	4.02	0.03	0.015
46.892	0.000	0.00	4.02	0.03	0.015
47.004	0.000	0.00	4.02	0.02	0.014
47.117	0.000	0.00	4.02	0.02	0.014
47.229	0.000	0.00	4.02	0.02	0.014
47.341	0.000	0.00	4.02	0.02	0.014
47.454	0.000	0.00	4.02	0.02	0.013
47.566	0.000	0.00	4.02	0.02	0.013
47.678	0.000	0.00	4.02	0.02	0.013
47.791	0.000	0.00	4.01	0.02	0.013
47.903	0.000	0.00	4.01	0.02	0.013
48.015	0.000	0.00	4.01	0.02	0.012
48.128	0.000	0.00	4.01	0.02	0.012
48.240	0.000	0.00	4.01	0.02	0.012
48.352	0.000	0.00	4.01	0.02	0.012
48.465	0.000	0.00	4.01	0.02	0.012
48.577	0.000	0.00	4.01	0.02	0.011
48.689	0.000	0.00	4.01	0.02	0.011
48.802	0.000	0.00	4.01	0.02	0.011
48.914	0.000	0.00	4.01	0.02	0.011
49.026	0.000	0.00	4.01	0.02	0.011
49.139	0.000	0.00	4.01	0.02	0.011
49.251	0.000	0.00	4.01	0.02	0.010
49.363	0.000	0.00	4.01	0.02	0.010
49.476	0.000	0.00	4.01	0.02	0.010
49.588	0.000	0.00	4.01	0.02	0.010
49.700	0.000	0.00	4.01	0.02	0.010
49.813	0.000	0.00	4.01	0.02	0.010
49.925	0.000	0.00	4.01	0.02	0.009
50.037	0.000	0.00	4.01	0.02	0.009
50.150	0.000	0.00	4.01	0.02	0.009
50.262	0.000	0.00	4.01	0.02	0.009
50.374	0.000	0.00	4.01	0.02	0.009
50.487	0.000	0.00	4.01	0.02	0.009
50.599	0.000	0.00	4.01	0.01	0.009
50.711	0.000	0.00	4.01	0.01	0.008
50.824	0.000	0.00	4.01	0.01	0.008
50.936	0.000	0.00	4.01	0.01	0.008
51.048	0.000	0.00	4.01	0.01	0.008
51.161	0.000	0.00	4.01	0.01	0.008
51.273	0.000	0.00	4.01	0.01	0.008
51.385	0.000	0.00	4.01	0.01	0.008
51.498	0.000	0.00	4.01	0.01	0.008
51.610	0.000	0.00	4.01	0.01	0.007
51.722	0.000	0.00	4.01	0.01	0.007
51.835	0.000	0.00	4.01	0.01	0.007
51.947	0.000	0.00	4.01	0.01	0.007
52.059	0.000	0.00	4.01	0.01	0.007
52.172	0.000	0.00	4.01	0.01	0.007
52.284	0.000	0.00	4.01	0.01	0.007
52.396	0.000	0.00	4.01	0.01	0.007
52.509	0.000	0.00	4.01	0.01	0.007
52.621	0.000	0.00	4.01	0.01	0.006
52.733	0.000	0.00	4.01	0.01	0.006
52.846	0.000	0.00	4.01	0.01	0.006
52.958	0.000	0.00	4.01	0.01	0.006
53.070	0.000	0.00	4.01	0.01	0.006
53.183	0.000	0.00	4.01	0.01	0.006
53.295	0.000	0.00	4.01	0.01	0.006
53.407	0.000	0.00	4.01	0.01	0.006
53.520	0.000	0.00	4.01	0.01	0.006
53.632	0.000	0.00	4.01	0.01	0.006
53.744	0.000	0.00	4.01	0.01	0.006
53.857	0.000	0.00	4.01	0.01	0.005
53.969	0.000	0.00	4.01	0.01	0.005
54.081	0.000	0.00	4.01	0.01	0.005
54.194	0.000	0.00	4.01	0.01	0.005
54.306	0.000	0.00	4.01	0.01	0.005

54.418	0.000	0.00	4.01	0.01	0.005
54.531	0.000	0.00	4.01	0.01	0.005
54.643	0.000	0.00	4.01	0.01	0.005
54.755	0.000	0.00	4.01	0.01	0.005
54.868	0.000	0.00	4.01	0.01	0.005
54.980	0.000	0.00	4.01	0.01	0.005
55.092	0.000	0.00	4.01	0.01	0.005
55.205	0.000	0.00	4.01	0.01	0.004
55.317	0.000	0.00	4.01	0.01	0.004
55.429	0.000	0.00	4.01	0.01	0.004
55.542	0.000	0.00	4.01	0.01	0.004
55.654	0.000	0.00	4.00	0.01	0.004
55.766	0.000	0.00	4.00	0.01	0.004
55.879	0.000	0.00	4.00	0.01	0.004
55.991	0.000	0.00	4.00	0.01	0.004
56.103	0.000	0.00	4.00	0.01	0.004
56.216	0.000	0.00	4.00	0.01	0.004
56.328	0.000	0.00	4.00	0.01	0.004
56.440	0.000	0.00	4.00	0.01	0.004
56.553	0.000	0.00	4.00	0.01	0.004
56.665	0.000	0.00	4.00	0.01	0.004
56.777	0.000	0.00	4.00	0.01	0.004
56.890	0.000	0.00	4.00	0.01	0.004
57.002	0.000	0.00	4.00	0.01	0.003
57.114	0.000	0.00	4.00	0.01	0.003
57.227	0.000	0.00	4.00	0.01	0.003
57.339	0.000	0.00	4.00	0.01	0.003
57.451	0.000	0.00	4.00	0.01	0.003
57.564	0.000	0.00	4.00	0.01	0.003
57.676	0.000	0.00	4.00	0.01	0.003
57.788	0.000	0.00	4.00	0.01	0.003
57.901	0.000	0.00	4.00	0.01	0.003
58.013	0.000	0.00	4.00	0.01	0.003
58.125	0.000	0.00	4.00	0.01	0.003
58.238	0.000	0.00	4.00	0.01	0.003
58.350	0.000	0.00	4.00	0.00	0.003
58.462	0.000	0.00	4.00	0.00	0.003
58.575	0.000	0.00	4.00	0.00	0.003
58.687	0.000	0.00	4.00	0.00	0.003
58.799	0.000	0.00	4.00	0.00	0.003
58.912	0.000	0.00	4.00	0.00	0.003
59.024	0.000	0.00	4.00	0.00	0.003
59.136	0.000	0.00	4.00	0.00	0.003
59.249	0.000	0.00	4.00	0.00	0.003
59.361	0.000	0.00	4.00	0.00	0.002
59.473	0.000	0.00	4.00	0.00	0.002
59.586	0.000	0.00	4.00	0.00	0.002
59.698	0.000	0.00	4.00	0.00	0.002
59.810	0.000	0.00	4.00	0.00	0.002
59.923	0.000	0.00	4.00	0.00	0.002
60.035	0.000	0.00	4.00	0.00	0.002
60.147	0.000	0.00	4.00	0.00	0.002
60.260	0.000	0.00	4.00	0.00	0.002
60.372	0.000	0.00	4.00	0.00	0.002
60.484	0.000	0.00	4.00	0.00	0.002
60.597	0.000	0.00	4.00	0.00	0.002
60.709	0.000	0.00	4.00	0.00	0.002
60.821	0.000	0.00	4.00	0.00	0.002
60.934	0.000	0.00	4.00	0.00	0.002
61.046	0.000	0.00	4.00	0.00	0.002
61.158	0.000	0.00	4.00	0.00	0.002
61.271	0.000	0.00	4.00	0.00	0.002
61.383	0.000	0.00	4.00	0.00	0.002
61.495	0.000	0.00	4.00	0.00	0.002
61.608	0.000	0.00	4.00	0.00	0.002
61.720	0.000	0.00	4.00	0.00	0.002
61.832	0.000	0.00	4.00	0.00	0.002
61.945	0.000	0.00	4.00	0.00	0.002
62.057	0.000	0.00	4.00	0.00	0.002

62.170	0.000	0.00	4.00	0.00	0.002
62.282	0.000	0.00	4.00	0.00	0.002
62.394	0.000	0.00	4.00	0.00	0.002
62.507	0.000	0.00	4.00	0.00	0.002
62.619	0.000	0.00	4.00	0.00	0.002
62.731	0.000	0.00	4.00	0.00	0.002
62.844	0.000	0.00	4.00	0.00	0.002
62.956	0.000	0.00	4.00	0.00	0.002
63.068	0.000	0.00	4.00	0.00	0.001
63.181	0.000	0.00	4.00	0.00	0.001
63.293	0.000	0.00	4.00	0.00	0.001
63.405	0.000	0.00	4.00	0.00	0.001
63.518	0.000	0.00	4.00	0.00	0.001
63.630	0.000	0.00	4.00	0.00	0.001
63.742	0.000	0.00	4.00	0.00	0.001
63.855	0.000	0.00	4.00	0.00	0.001
63.967	0.000	0.00	4.00	0.00	0.001
64.079	0.000	0.00	4.00	0.00	0.001
64.192	0.000	0.00	4.00	0.00	0.001
64.304	0.000	0.00	4.00	0.00	0.001
64.416	0.000	0.00	4.00	0.00	0.001
64.529	0.000	0.00	4.00	0.00	0.001
64.641	0.000	0.00	4.00	0.00	0.001
64.753	0.000	0.00	4.00	0.00	0.001
64.866	0.000	0.00	4.00	0.00	0.001
64.978	0.000	0.00	4.00	0.00	0.001
65.090	0.000	0.00	4.00	0.00	0.001
65.203	0.000	0.00	4.00	0.00	0.001
65.315	0.000	0.00	4.00	0.00	0.001
65.427	0.000	0.00	4.00	0.00	0.001
65.540	0.000	0.00	4.00	0.00	0.001
65.652	0.000	0.00	4.00	0.00	0.001
65.764	0.000	0.00	4.00	0.00	0.001
65.877	0.000	0.00	4.00	0.00	0.001

Appendix J.III

BMP Analysis 10-Year Storm Event

SMALL AREA UNIT HYDROGRAPH MODEL

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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
BASIN ROUTING
10-YEAR, POST-CONDITIONS, DA A

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.43
TOTAL CATCHMENT AREA(ACRES) = 9.10
SOIL-LOSS RATE, F_m (INCH/HR) = 0.198
LOW LOSS FRACTION = 0.263
TIME OF CONCENTRATION(MIN.) = 10.07
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 10
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.20
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.71
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.10
6-HOUR POINT RAINFALL VALUE(INCHES) = 1.51
24-HOUR POINT RAINFALL VALUE(INCHES) = 3.10

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 2.50
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = -0.15

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
0.06	0.0000	0.00	Q	.	.	.	.
0.22	0.0045	0.64	.Q	.	.	.	.
0.39	0.0134	0.65	.Q	.	.	.	.
0.56	0.0224	0.65	.Q	.	.	.	.
0.73	0.0315	0.66	.Q	.	.	.	.
0.90	0.0406	0.66	.Q	.	.	.	.
1.06	0.0497	0.66	.Q	.	.	.	.
1.23	0.0589	0.66	.Q	.	.	.	.
1.40	0.0682	0.67	.Q	.	.	.	.
1.57	0.0775	0.67	.Q	.	.	.	.
1.73	0.0868	0.68	.Q	.	.	.	.
1.90	0.0962	0.68	.Q	.	.	.	.
2.07	0.1057	0.68	.Q	.	.	.	.
2.24	0.1152	0.69	.Q	.	.	.	.
2.41	0.1248	0.69	.Q	.	.	.	.
2.57	0.1344	0.70	.Q	.	.	.	.
2.74	0.1441	0.70	.Q	.	.	.	.
2.91	0.1538	0.70	.Q	.	.	.	.
3.08	0.1636	0.71	.Q	.	.	.	.
3.24	0.1735	0.71	.Q	.	.	.	.
3.41	0.1834	0.72	.Q	.	.	.	.

3.58	0.1934	0.72	.Q	.	.	.	.
3.75	0.2034	0.73	.Q	.	.	.	.
3.92	0.2135	0.73	.Q	.	.	.	.
4.08	0.2237	0.74	.Q	.	.	.	.
4.25	0.2340	0.74	.Q	.	.	.	.
4.42	0.2443	0.75	.Q	.	.	.	.
4.59	0.2547	0.75	.Q	.	.	.	.
4.76	0.2652	0.76	.Q	.	.	.	.
4.92	0.2757	0.76	.Q	.	.	.	.
5.09	0.2863	0.77	.Q	.	.	.	.
5.26	0.2970	0.77	.Q	.	.	.	.
5.43	0.3078	0.78	.Q	.	.	.	.
5.59	0.3186	0.78	.Q	.	.	.	.
5.76	0.3296	0.79	.Q	.	.	.	.
5.93	0.3406	0.80	.Q	.	.	.	.
6.10	0.3517	0.81	.Q	.	.	.	.
6.27	0.3629	0.81	.Q	.	.	.	.
6.43	0.3742	0.82	.Q	.	.	.	.
6.60	0.3856	0.82	.Q	.	.	.	.
6.77	0.3971	0.83	.Q	.	.	.	.
6.94	0.4087	0.84	.Q	.	.	.	.
7.10	0.4203	0.85	.Q	.	.	.	.
7.27	0.4321	0.85	.Q	.	.	.	.
7.44	0.4440	0.86	.Q	.	.	.	.
7.61	0.4560	0.87	.Q	.	.	.	.
7.78	0.4682	0.88	.Q	.	.	.	.
7.94	0.4804	0.89	.Q	.	.	.	.
8.11	0.4928	0.90	.Q	.	.	.	.
8.28	0.5052	0.90	.Q	.	.	.	.
8.45	0.5179	0.92	.Q	.	.	.	.
8.62	0.5306	0.92	.Q	.	.	.	.
8.78	0.5435	0.94	.Q	.	.	.	.
8.95	0.5565	0.94	.Q	.	.	.	.
9.12	0.5697	0.96	.Q	.	.	.	.
9.29	0.5830	0.96	.Q	.	.	.	.
9.45	0.5965	0.98	.Q	.	.	.	.
9.62	0.6102	0.99	.Q	.	.	.	.
9.79	0.6240	1.00	. Q	.	.	.	.
9.96	0.6380	1.01	. Q	.	.	.	.
10.13	0.6522	1.03	. Q	.	.	.	.
10.29	0.6665	1.04	. Q	.	.	.	.
10.46	0.6811	1.06	. Q	.	.	.	.
10.63	0.6959	1.07	. Q	.	.	.	.
10.80	0.7109	1.09	. Q	.	.	.	.
10.97	0.7261	1.10	. Q	.	.	.	.
11.13	0.7416	1.13	. Q	.	.	.	.
11.30	0.7573	1.14	. Q	.	.	.	.
11.47	0.7733	1.17	. Q	.	.	.	.
11.64	0.7896	1.18	. Q	.	.	.	.
11.80	0.8061	1.21	. Q	.	.	.	.
11.97	0.8230	1.22	. Q	.	.	.	.
12.14	0.8394	1.14	. Q	.	.	.	.
12.31	0.8552	1.12	. Q	.	.	.	.
12.48	0.8710	1.16	. Q	.	.	.	.
12.64	0.8873	1.18	. Q	.	.	.	.
12.81	0.9040	1.22	. Q	.	.	.	.
12.98	0.9211	1.25	. Q	.	.	.	.
13.15	0.9388	1.30	. Q	.	.	.	.
13.31	0.9570	1.33	. Q	.	.	.	.
13.48	0.9758	1.39	. Q	.	.	.	.
13.65	0.9952	1.42	. Q	.	.	.	.
13.82	1.0154	1.49	. Q	.	.	.	.
13.99	1.0364	1.53	. Q	.	.	.	.
14.15	1.0569	1.43	. Q	.	.	.	.
14.32	1.0769	1.45	. Q	.	.	.	.
14.49	1.0979	1.57	. Q	.	.	.	.
14.66	1.1201	1.64	. Q	.	.	.	.
14.83	1.1441	1.81	. Q	.	.	.	.
14.99	1.1699	1.91	. Q	.	.	.	.

15.16	1.1982	2.17	.	Q	.	.	.	.
15.33	1.2295	2.34	.	Q	.	.	.	.
15.50	1.2682	3.24	.	Q	.	.	.	.
15.66	1.3159	3.63	.	Q	.	.	.	.
15.83	1.3821	5.91	.	.	.Q	.	.	.
16.00	1.4762	7.66	.	.	Q	.	.	.
16.17	1.6659	19.69	.	.	.	.	.	Q.
16.34	1.8314	4.17	.	Q	.	.	.	.
16.50	1.8781	2.56	.	Q	.	.	.	.
16.67	1.9099	2.03	.	Q	.	.	.	.
16.84	1.9359	1.72	.	Q	.	.	.	.
17.01	1.9583	1.51	.	Q	.	.	.	.
17.17	1.9797	1.58	.	Q	.	.	.	.
17.34	2.0007	1.45	.	Q	.	.	.	.
17.51	2.0202	1.35	.	Q	.	.	.	.
17.68	2.0384	1.27	.	Q	.	.	.	.
17.85	2.0556	1.20	.	Q	.	.	.	.
18.01	2.0718	1.14	.	Q	.	.	.	.
18.18	2.0884	1.24	.	Q	.	.	.	.
18.35	2.1052	1.19	.	Q	.	.	.	.
18.52	2.1215	1.15	.	Q	.	.	.	.
18.69	2.1372	1.12	.	Q	.	.	.	.
18.85	2.1525	1.08	.	Q	.	.	.	.
19.02	2.1673	1.05	.	Q	.	.	.	.
19.19	2.1816	1.02	.	Q	.	.	.	.
19.36	2.1956	1.00	.	.Q	.	.	.	.
19.52	2.2093	0.97	.	.Q	.	.	.	.
19.69	2.2226	0.95	.	.Q	.	.	.	.
19.86	2.2356	0.93	.	.Q	.	.	.	.
20.03	2.2484	0.91	.	.Q	.	.	.	.
20.20	2.2609	0.89	.	.Q	.	.	.	.
20.36	2.2731	0.87	.	.Q	.	.	.	.
20.53	2.2851	0.86	.	.Q	.	.	.	.
20.70	2.2969	0.84	.	.Q	.	.	.	.
20.87	2.3085	0.83	.	.Q	.	.	.	.
21.03	2.3199	0.81	.	.Q	.	.	.	.
21.20	2.3311	0.80	.	.Q	.	.	.	.
21.37	2.3421	0.79	.	.Q	.	.	.	.
21.54	2.3530	0.78	.	.Q	.	.	.	.
21.71	2.3637	0.77	.	.Q	.	.	.	.
21.87	2.3742	0.75	.	.Q	.	.	.	.
22.04	2.3846	0.74	.	.Q	.	.	.	.
22.21	2.3949	0.73	.	.Q	.	.	.	.
22.38	2.4050	0.72	.	.Q	.	.	.	.
22.55	2.4150	0.72	.	.Q	.	.	.	.
22.71	2.4248	0.71	.	.Q	.	.	.	.
22.88	2.4346	0.70	.	.Q	.	.	.	.
23.05	2.4442	0.69	.	.Q	.	.	.	.
23.22	2.4537	0.68	.	.Q	.	.	.	.
23.38	2.4631	0.67	.	.Q	.	.	.	.
23.55	2.4724	0.67	.	.Q	.	.	.	.
23.72	2.4816	0.66	.	.Q	.	.	.	.
23.89	2.4907	0.65	.	.Q	.	.	.	.
24.06	2.4997	0.65	.	.Q	.	.	.	.
24.22	2.5042	0.00	Q	.	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:

(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.0
10%	100.7
20%	40.3
30%	30.2
40%	10.1

50%	10.1
60%	10.1
70%	10.1
80%	10.1
90%	10.1

Problem Descriptions:

SAM'S CLUB HESPERIA

BASIN ROUTING

10-YEAR, POST-CONDITIONS, DA A

FLOW-THROUGH DETENTION BASIN MODEL

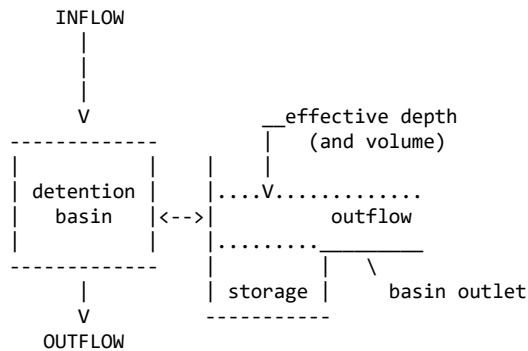
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 10.070

DEAD STORAGE(AF) = 0.00

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00

ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 5

* BASIN-DEPTH	STORAGE	OUTFLOW	** BASIN-DEPTH	STORAGE	OUTFLOW
*(FEET)	(ACRE- FEET)	(CFS)	*(FEET)	(ACRE- FEET)	(CFS)
* 0.000	0.000	0.000**	4.000	0.000	0.000*
* 5.000	0.637	4.625**	6.000	1.355	9.512*
* 7.000	2.161	12.760**			

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE- FEET)	(ACRE- FEET)
1	0.00	0.00000	0.00000
2	4.00	0.00000	0.00000
3	5.00	0.60444	0.66860
4	6.00	1.28915	1.42109
5	7.00	2.07230	2.24928

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.056	0.000	0.00	4.00	0.00	0.000
0.224	0.000	0.64	4.01	0.03	0.009
0.392	0.000	0.65	4.03	0.09	0.016
0.559	0.000	0.65	4.04	0.14	0.023

0.727	0.000	0.66	4.05	0.19	0.030
0.895	0.000	0.66	4.06	0.24	0.036
1.063	0.000	0.66	4.06	0.28	0.041
1.231	0.000	0.66	4.07	0.31	0.046
1.399	0.000	0.67	4.08	0.35	0.050
1.566	0.000	0.67	4.09	0.38	0.054
1.734	0.000	0.68	4.09	0.41	0.058
1.902	0.000	0.68	4.10	0.43	0.061
2.070	0.000	0.68	4.10	0.46	0.065
2.238	0.000	0.69	4.11	0.48	0.067
2.406	0.000	0.69	4.11	0.50	0.070
2.573	0.000	0.70	4.11	0.52	0.073
2.741	0.000	0.70	4.12	0.54	0.075
2.909	0.000	0.70	4.12	0.55	0.077
3.077	0.000	0.71	4.12	0.57	0.079
3.245	0.000	0.71	4.13	0.58	0.081
3.413	0.000	0.72	4.13	0.59	0.082
3.580	0.000	0.72	4.13	0.61	0.084
3.748	0.000	0.73	4.13	0.62	0.086
3.916	0.000	0.73	4.14	0.63	0.087
4.084	0.000	0.74	4.14	0.64	0.088
4.252	0.000	0.74	4.14	0.65	0.090
4.420	0.000	0.75	4.14	0.66	0.091
4.587	0.000	0.75	4.14	0.67	0.092
4.755	0.000	0.76	4.15	0.67	0.093
4.923	0.000	0.76	4.15	0.68	0.094
5.091	0.000	0.77	4.15	0.69	0.096
5.259	0.000	0.77	4.15	0.70	0.097
5.427	0.000	0.78	4.15	0.71	0.098
5.594	0.000	0.78	4.15	0.71	0.099
5.762	0.000	0.79	4.16	0.72	0.100
5.930	0.000	0.80	4.16	0.73	0.101
6.098	0.000	0.81	4.16	0.73	0.102
6.266	0.000	0.81	4.16	0.74	0.103
6.434	0.000	0.82	4.16	0.75	0.103
6.601	0.000	0.82	4.16	0.76	0.104
6.769	0.000	0.83	4.17	0.76	0.105
6.937	0.000	0.84	4.17	0.77	0.106
7.105	0.000	0.85	4.17	0.78	0.107
7.273	0.000	0.85	4.17	0.78	0.108
7.441	0.000	0.86	4.17	0.79	0.109
7.608	0.000	0.87	4.17	0.80	0.110
7.776	0.000	0.88	4.17	0.81	0.111
7.944	0.000	0.89	4.18	0.81	0.112
8.112	0.000	0.90	4.18	0.82	0.113
8.280	0.000	0.90	4.18	0.83	0.114
8.448	0.000	0.92	4.18	0.84	0.116
8.615	0.000	0.92	4.18	0.84	0.117
8.783	0.000	0.94	4.19	0.85	0.118
8.951	0.000	0.94	4.19	0.86	0.119
9.119	0.000	0.96	4.19	0.87	0.120
9.287	0.000	0.96	4.19	0.88	0.121
9.455	0.000	0.98	4.19	0.89	0.123
9.622	0.000	0.99	4.19	0.90	0.124
9.790	0.000	1.00	4.20	0.91	0.125
9.958	0.000	1.01	4.20	0.92	0.127
10.126	0.000	1.03	4.20	0.93	0.128
10.294	0.000	1.04	4.20	0.94	0.130
10.462	0.000	1.06	4.21	0.95	0.131
10.629	0.000	1.07	4.21	0.96	0.133
10.797	0.000	1.09	4.21	0.97	0.134
10.965	0.000	1.10	4.21	0.98	0.136
11.133	0.000	1.13	4.22	1.00	0.138
11.301	0.000	1.14	4.22	1.01	0.140
11.469	0.000	1.17	4.22	1.02	0.142
11.636	0.000	1.18	4.23	1.04	0.144
11.804	0.000	1.21	4.23	1.05	0.146
11.972	0.000	1.22	4.23	1.07	0.148
12.140	0.000	1.14	4.23	1.08	0.149

12.308	0.000	1.12	4.23	1.08	0.150
12.476	0.000	1.16	4.24	1.09	0.151
12.643	0.000	1.18	4.24	1.10	0.152
12.811	0.000	1.22	4.24	1.11	0.153
12.979	0.000	1.25	4.24	1.12	0.155
13.147	0.000	1.30	4.25	1.13	0.157
13.315	0.000	1.33	4.25	1.15	0.160
13.483	0.000	1.39	4.26	1.17	0.163
13.650	0.000	1.42	4.26	1.19	0.166
13.818	0.000	1.49	4.27	1.22	0.170
13.986	0.000	1.53	4.27	1.25	0.174
14.154	0.000	1.43	4.28	1.27	0.176
14.322	0.000	1.45	4.28	1.29	0.178
14.490	0.000	1.57	4.29	1.31	0.182
14.657	0.000	1.64	4.29	1.34	0.186
14.825	0.000	1.81	4.30	1.37	0.192
14.993	0.000	1.91	4.31	1.42	0.199
15.161	0.000	2.17	4.33	1.48	0.208
15.329	0.000	2.34	4.34	1.55	0.219
15.497	0.000	3.24	4.38	1.67	0.241
15.664	0.000	3.63	4.42	1.84	0.266
15.832	0.000	5.91	4.50	2.12	0.319
16.000	0.000	7.66	4.61	2.57	0.389
16.168	0.000	19.69	4.96	3.64	0.612
16.336	0.000	4.17	4.96	4.43	0.608
16.503	0.000	2.56	4.92	4.33	0.584
16.671	0.000	2.03	4.87	4.13	0.554
16.839	0.000	1.72	4.82	3.92	0.524
17.007	0.000	1.51	4.78	3.70	0.494
17.175	0.000	1.58	4.73	3.49	0.467
17.343	0.000	1.45	4.69	3.30	0.441
17.510	0.000	1.35	4.66	3.12	0.417
17.678	0.000	1.27	4.62	2.95	0.394
17.846	0.000	1.20	4.58	2.78	0.372
18.014	0.000	1.14	4.55	2.63	0.351
18.182	0.000	1.24	4.52	2.49	0.334
18.350	0.000	1.19	4.50	2.37	0.318
18.517	0.000	1.15	4.48	2.25	0.302
18.685	0.000	1.12	4.45	2.15	0.288
18.853	0.000	1.08	4.43	2.04	0.275
19.021	0.000	1.05	4.41	1.95	0.262
19.189	0.000	1.02	4.39	1.86	0.251
19.357	0.000	1.00	4.38	1.78	0.240
19.524	0.000	0.97	4.36	1.70	0.230
19.692	0.000	0.95	4.35	1.63	0.220
19.860	0.000	0.93	4.33	1.57	0.211
20.028	0.000	0.91	4.32	1.50	0.203
20.196	0.000	0.89	4.31	1.45	0.195
20.364	0.000	0.87	4.30	1.39	0.188
20.531	0.000	0.86	4.28	1.34	0.181
20.699	0.000	0.84	4.28	1.29	0.175
20.867	0.000	0.83	4.27	1.25	0.169
21.035	0.000	0.81	4.26	1.21	0.164
21.203	0.000	0.80	4.25	1.17	0.159
21.371	0.000	0.79	4.24	1.13	0.154
21.538	0.000	0.78	4.23	1.10	0.149
21.706	0.000	0.77	4.23	1.07	0.145
21.874	0.000	0.75	4.22	1.04	0.141
22.042	0.000	0.74	4.22	1.01	0.137
22.210	0.000	0.73	4.21	0.99	0.134
22.378	0.000	0.72	4.21	0.96	0.131
22.545	0.000	0.72	4.20	0.94	0.128
22.713	0.000	0.71	4.20	0.92	0.125
22.881	0.000	0.70	4.19	0.90	0.122
23.049	0.000	0.69	4.19	0.88	0.119
23.217	0.000	0.68	4.18	0.86	0.117
23.385	0.000	0.67	4.18	0.84	0.115
23.552	0.000	0.67	4.18	0.82	0.112
23.720	0.000	0.66	4.17	0.81	0.110

23.888	0.000	0.65	4.17	0.79	0.108
24.056	0.000	0.65	4.17	0.78	0.106
24.224	0.000	0.00	4.15	0.74	0.096
24.392	0.000	0.00	4.14	0.67	0.087
24.559	0.000	0.00	4.12	0.60	0.079
24.727	0.000	0.00	4.11	0.54	0.071
24.895	0.000	0.00	4.10	0.49	0.064
25.063	0.000	0.00	4.09	0.44	0.058
25.231	0.000	0.00	4.08	0.40	0.053
25.399	0.000	0.00	4.07	0.36	0.048
25.566	0.000	0.00	4.07	0.33	0.043
25.734	0.000	0.00	4.06	0.30	0.039
25.902	0.000	0.00	4.06	0.27	0.035
26.070	0.000	0.00	4.05	0.24	0.032
26.238	0.000	0.00	4.05	0.22	0.029
26.406	0.000	0.00	4.04	0.20	0.026
26.573	0.000	0.00	4.04	0.18	0.023
26.741	0.000	0.00	4.03	0.16	0.021
26.909	0.000	0.00	4.03	0.15	0.019
27.077	0.000	0.00	4.03	0.13	0.017
27.245	0.000	0.00	4.02	0.12	0.016
27.413	0.000	0.00	4.02	0.11	0.014
27.580	0.000	0.00	4.02	0.10	0.013
27.748	0.000	0.00	4.02	0.09	0.012
27.916	0.000	0.00	4.02	0.08	0.010
28.084	0.000	0.00	4.01	0.07	0.009
28.252	0.000	0.00	4.01	0.07	0.009
28.420	0.000	0.00	4.01	0.06	0.008
28.587	0.000	0.00	4.01	0.05	0.007
28.755	0.000	0.00	4.01	0.05	0.006
28.923	0.000	0.00	4.01	0.04	0.006
29.091	0.000	0.00	4.01	0.04	0.005
29.259	0.000	0.00	4.01	0.04	0.005
29.427	0.000	0.00	4.01	0.03	0.004
29.594	0.000	0.00	4.01	0.03	0.004
29.762	0.000	0.00	4.01	0.03	0.003
29.930	0.000	0.00	4.00	0.02	0.003
30.098	0.000	0.00	4.00	0.02	0.003
30.266	0.000	0.00	4.00	0.02	0.003
30.434	0.000	0.00	4.00	0.02	0.002
30.601	0.000	0.00	4.00	0.02	0.002
30.769	0.000	0.00	4.00	0.01	0.002
30.937	0.000	0.00	4.00	0.01	0.002
31.105	0.000	0.00	4.00	0.01	0.002
31.273	0.000	0.00	4.00	0.01	0.001
31.441	0.000	0.00	4.00	0.01	0.001
31.608	0.000	0.00	4.00	0.01	0.001
31.776	0.000	0.00	4.00	0.01	0.001

SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
BASIN ROUTING
10-YEAR, POST-CONDITIONS, DA B

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.23
TOTAL CATCHMENT AREA(ACRES) = 16.27
SOIL-LOSS RATE, F_m (INCH/HR) = 0.244
LOW LOSS FRACTION = 0.306
TIME OF CONCENTRATION(MIN.) = 6.74
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 10
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.20
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.71
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.10
6-HOUR POINT RAINFALL VALUE(INCHES) = 1.51
24-HOUR POINT RAINFALL VALUE(INCHES) = 3.10

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 3.64
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.56

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	10.0	20.0	30.0	40.0
0.05	0.0000	0.00	Q	.	.	.	.
0.16	0.0043	0.93	Q	.	.	.	.
0.27	0.0130	0.94	Q	.	.	.	.
0.39	0.0217	0.94	Q	.	.	.	.
0.50	0.0304	0.94	Q	.	.	.	.
0.61	0.0392	0.95	Q	.	.	.	.
0.72	0.0480	0.95	Q	.	.	.	.
0.84	0.0568	0.95	Q	.	.	.	.
0.95	0.0657	0.96	Q	.	.	.	.
1.06	0.0746	0.96	Q	.	.	.	.
1.17	0.0835	0.96	Q	.	.	.	.
1.28	0.0924	0.97	Q	.	.	.	.
1.40	0.1014	0.97	Q	.	.	.	.
1.51	0.1104	0.97	Q	.	.	.	.
1.62	0.1195	0.98	Q	.	.	.	.
1.73	0.1286	0.98	Q	.	.	.	.
1.85	0.1377	0.98	Q	.	.	.	.
1.96	0.1469	0.99	Q	.	.	.	.
2.07	0.1560	0.99	Q	.	.	.	.
2.18	0.1653	1.00	Q	.	.	.	.
2.30	0.1745	1.00	Q	.	.	.	.

2.41	0.1838	1.00	.Q	.	.	.	.
2.52	0.1932	1.01	.Q	.	.	.	.
2.63	0.2025	1.01	.Q	.	.	.	.
2.74	0.2119	1.01	.Q	.	.	.	.
2.86	0.2214	1.02	.Q	.	.	.	.
2.97	0.2309	1.02	.Q	.	.	.	.
3.08	0.2404	1.03	.Q	.	.	.	.
3.19	0.2500	1.03	.Q	.	.	.	.
3.31	0.2596	1.04	.Q	.	.	.	.
3.42	0.2692	1.04	.Q	.	.	.	.
3.53	0.2789	1.05	.Q	.	.	.	.
3.64	0.2886	1.05	.Q	.	.	.	.
3.76	0.2984	1.06	.Q	.	.	.	.
3.87	0.3082	1.06	.Q	.	.	.	.
3.98	0.3181	1.06	.Q	.	.	.	.
4.09	0.3280	1.07	.Q	.	.	.	.
4.21	0.3379	1.07	.Q	.	.	.	.
4.32	0.3479	1.08	.Q	.	.	.	.
4.43	0.3580	1.08	.Q	.	.	.	.
4.54	0.3680	1.09	.Q	.	.	.	.
4.65	0.3782	1.09	.Q	.	.	.	.
4.77	0.3883	1.10	.Q	.	.	.	.
4.88	0.3986	1.11	.Q	.	.	.	.
4.99	0.4089	1.11	.Q	.	.	.	.
5.10	0.4192	1.12	.Q	.	.	.	.
5.22	0.4296	1.12	.Q	.	.	.	.
5.33	0.4400	1.13	.Q	.	.	.	.
5.44	0.4505	1.13	.Q	.	.	.	.
5.55	0.4610	1.14	.Q	.	.	.	.
5.67	0.4716	1.14	.Q	.	.	.	.
5.78	0.4822	1.15	.Q	.	.	.	.
5.89	0.4929	1.15	.Q	.	.	.	.
6.00	0.5037	1.16	.Q	.	.	.	.
6.11	0.5145	1.17	.Q	.	.	.	.
6.23	0.5254	1.18	.Q	.	.	.	.
6.34	0.5363	1.18	.Q	.	.	.	.
6.45	0.5473	1.19	.Q	.	.	.	.
6.56	0.5584	1.19	.Q	.	.	.	.
6.68	0.5695	1.20	.Q	.	.	.	.
6.79	0.5807	1.21	.Q	.	.	.	.
6.90	0.5919	1.22	.Q	.	.	.	.
7.01	0.6032	1.22	.Q	.	.	.	.
7.13	0.6146	1.23	.Q	.	.	.	.
7.24	0.6261	1.24	.Q	.	.	.	.
7.35	0.6376	1.25	.Q	.	.	.	.
7.46	0.6492	1.25	.Q	.	.	.	.
7.58	0.6609	1.26	.Q	.	.	.	.
7.69	0.6726	1.27	.Q	.	.	.	.
7.80	0.6844	1.28	.Q	.	.	.	.
7.91	0.6963	1.28	.Q	.	.	.	.
8.02	0.7083	1.30	.Q	.	.	.	.
8.14	0.7203	1.30	.Q	.	.	.	.
8.25	0.7325	1.31	.Q	.	.	.	.
8.36	0.7447	1.32	.Q	.	.	.	.
8.47	0.7570	1.33	.Q	.	.	.	.
8.59	0.7694	1.34	.Q	.	.	.	.
8.70	0.7819	1.35	.Q	.	.	.	.
8.81	0.7944	1.36	.Q	.	.	.	.
8.92	0.8071	1.37	.Q	.	.	.	.
9.04	0.8199	1.38	.Q	.	.	.	.
9.15	0.8327	1.39	.Q	.	.	.	.
9.26	0.8457	1.40	.Q	.	.	.	.
9.37	0.8588	1.41	.Q	.	.	.	.
9.48	0.8719	1.42	.Q	.	.	.	.
9.60	0.8852	1.44	.Q	.	.	.	.
9.71	0.8986	1.45	.Q	.	.	.	.
9.82	0.9121	1.46	.Q	.	.	.	.
9.93	0.9257	1.47	.Q	.	.	.	.
10.05	0.9395	1.49	.Q	.	.	.	.

10.16	0.9533	1.50	.Q	.	.	.	.
10.27	0.9673	1.52	.Q	.	.	.	.
10.38	0.9814	1.53	.Q	.	.	.	.
10.50	0.9957	1.55	.Q	.	.	.	.
10.61	1.0101	1.56	.Q	.	.	.	.
10.72	1.0246	1.58	.Q	.	.	.	.
10.83	1.0393	1.59	.Q	.	.	.	.
10.95	1.0541	1.61	.Q	.	.	.	.
11.06	1.0691	1.62	.Q	.	.	.	.
11.17	1.0843	1.64	.Q	.	.	.	.
11.28	1.0996	1.66	.Q	.	.	.	.
11.39	1.1151	1.68	.Q	.	.	.	.
11.51	1.1308	1.69	.Q	.	.	.	.
11.62	1.1466	1.72	.Q	.	.	.	.
11.73	1.1627	1.74	.Q	.	.	.	.
11.84	1.1789	1.77	.Q	.	.	.	.
11.96	1.1954	1.78	.Q	.	.	.	.
12.07	1.2116	1.72	.Q	.	.	.	.
12.18	1.2271	1.61	.Q	.	.	.	.
12.29	1.2422	1.65	.Q	.	.	.	.
12.41	1.2576	1.66	.Q	.	.	.	.
12.52	1.2733	1.70	.Q	.	.	.	.
12.63	1.2892	1.72	.Q	.	.	.	.
12.74	1.3053	1.76	.Q	.	.	.	.
12.85	1.3218	1.79	.Q	.	.	.	.
12.97	1.3386	1.83	.Q	.	.	.	.
13.08	1.3557	1.86	.Q	.	.	.	.
13.19	1.3732	1.91	.Q	.	.	.	.
13.30	1.3910	1.94	.Q	.	.	.	.
13.42	1.4093	1.99	.Q	.	.	.	.
13.53	1.4279	2.03	. Q	.	.	.	.
13.64	1.4471	2.09	. Q	.	.	.	.
13.75	1.4667	2.13	. Q	.	.	.	.
13.87	1.4868	2.21	. Q	.	.	.	.
13.98	1.5074	2.25	. Q	.	.	.	.
14.09	1.5276	2.11	. Q	.	.	.	.
14.20	1.5470	2.06	. Q	.	.	.	.
14.32	1.5666	2.17	. Q	.	.	.	.
14.43	1.5870	2.22	. Q	.	.	.	.
14.54	1.6082	2.35	. Q	.	.	.	.
14.65	1.6304	2.42	. Q	.	.	.	.
14.76	1.6537	2.59	. Q	.	.	.	.
14.88	1.6781	2.68	. Q	.	.	.	.
14.99	1.7041	2.90	. Q	.	.	.	.
15.10	1.7316	3.03	. Q	.	.	.	.
15.21	1.7612	3.34	. Q	.	.	.	.
15.33	1.7931	3.53	. Q	.	.	.	.
15.44	1.8307	4.57	. Q	.	.	.	.
15.55	1.8748	4.95	. Q	.	.	.	.
15.66	1.9251	5.87	. Q	.	.	.	.
15.78	1.9855	7.15	. Q	.	.	.	.
15.89	2.0665	10.31	. Q	.	.	.	.
16.00	2.1794	14.01	. Q	.	.	.	.
16.11	2.4125	36.21	. Q	.	.	.	.
16.22	2.6216	8.83	. Q	.	.	.	.
16.34	2.6874	5.36	. Q	.	.	.	.
16.45	2.7297	3.75	. Q	.	.	.	.
16.56	2.7618	3.18	. Q	.	.	.	.
16.67	2.7895	2.79	. Q	.	.	.	.
16.79	2.8141	2.50	. Q	.	.	.	.
16.90	2.8363	2.29	. Q	.	.	.	.
17.01	2.8567	2.11	. Q	.	.	.	.
17.12	2.8772	2.29	. Q	.	.	.	.
17.24	2.8978	2.17	. Q	.	.	.	.
17.35	2.9174	2.06	. Q	.	.	.	.
17.46	2.9361	1.96	.Q	.	.	.	.
17.57	2.9540	1.88	.Q	.	.	.	.
17.68	2.9711	1.81	.Q	.	.	.	.
17.80	2.9876	1.74	.Q	.	.	.	.

17.91	3.0035	1.68	.Q	.	.	.	.
18.02	3.0189	1.63	.Q	.	.	.	.
18.13	3.0348	1.80	.Q	.	.	.	.
18.25	3.0512	1.75	.Q	.	.	.	.
18.36	3.0673	1.71	.Q	.	.	.	.
18.47	3.0830	1.67	.Q	.	.	.	.
18.58	3.0983	1.63	.Q	.	.	.	.
18.70	3.1133	1.60	.Q	.	.	.	.
18.81	3.1280	1.57	.Q	.	.	.	.
18.92	3.1424	1.54	.Q	.	.	.	.
19.03	3.1565	1.51	.Q	.	.	.	.
19.15	3.1703	1.48	.Q	.	.	.	.
19.26	3.1840	1.45	.Q	.	.	.	.
19.37	3.1973	1.43	.Q	.	.	.	.
19.48	3.2105	1.41	.Q	.	.	.	.
19.59	3.2235	1.39	.Q	.	.	.	.
19.71	3.2362	1.36	.Q	.	.	.	.
19.82	3.2488	1.34	.Q	.	.	.	.
19.93	3.2612	1.33	.Q	.	.	.	.
20.04	3.2734	1.31	.Q	.	.	.	.
20.16	3.2855	1.29	.Q	.	.	.	.
20.27	3.2974	1.27	.Q	.	.	.	.
20.38	3.3091	1.26	.Q	.	.	.	.
20.49	3.3207	1.24	.Q	.	.	.	.
20.61	3.3322	1.23	.Q	.	.	.	.
20.72	3.3435	1.21	.Q	.	.	.	.
20.83	3.3547	1.20	.Q	.	.	.	.
20.94	3.3657	1.18	.Q	.	.	.	.
21.06	3.3767	1.17	.Q	.	.	.	.
21.17	3.3875	1.16	.Q	.	.	.	.
21.28	3.3982	1.15	.Q	.	.	.	.
21.39	3.4088	1.13	.Q	.	.	.	.
21.50	3.4192	1.12	.Q	.	.	.	.
21.62	3.4296	1.11	.Q	.	.	.	.
21.73	3.4399	1.10	.Q	.	.	.	.
21.84	3.4501	1.09	.Q	.	.	.	.
21.95	3.4602	1.08	.Q	.	.	.	.
22.07	3.4702	1.07	.Q	.	.	.	.
22.18	3.4801	1.06	.Q	.	.	.	.
22.29	3.4899	1.05	.Q	.	.	.	.
22.40	3.4996	1.04	.Q	.	.	.	.
22.52	3.5092	1.03	.Q	.	.	.	.
22.63	3.5188	1.03	.Q	.	.	.	.
22.74	3.5283	1.02	.Q	.	.	.	.
22.85	3.5377	1.01	.Q	.	.	.	.
22.96	3.5470	1.00	.Q	.	.	.	.
23.08	3.5563	0.99	Q	.	.	.	.
23.19	3.5655	0.99	Q	.	.	.	.
23.30	3.5746	0.98	Q	.	.	.	.
23.41	3.5837	0.97	Q	.	.	.	.
23.53	3.5927	0.96	Q	.	.	.	.
23.64	3.6016	0.96	Q	.	.	.	.
23.75	3.6104	0.95	Q	.	.	.	.
23.86	3.6192	0.94	Q	.	.	.	.
23.98	3.6280	0.94	Q	.	.	.	.
24.09	3.6366	0.93	Q	.	.	.	.
24.20	3.6410	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1442.4
10%	67.4
20%	27.0

30%	13.5
40%	6.7
50%	6.7
60%	6.7
70%	6.7
80%	6.7
90%	6.7

Problem Descriptions:

SAM'S CLUB HESPERIA

BASIN ROUTING

10-YEAR, POST-CONDITIONS, DA B

=====

FLOW-THROUGH DETENTION BASIN MODEL

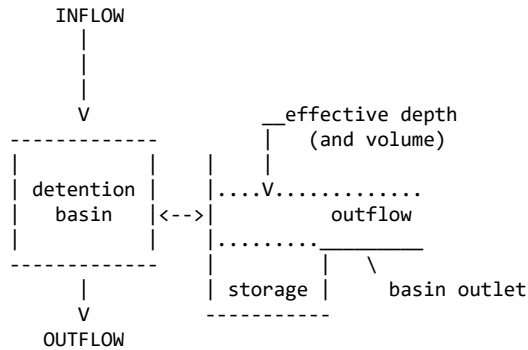
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 6.740

DEAD STORAGE(AF) = 0.00

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00

ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 6

* BASIN-DEPTH	STORAGE	OUTFLOW	** BASIN-DEPTH	STORAGE	OUTFLOW
(FEET)	(ACRE-FEET)	(CFS)	(FEET)	(ACRE-FEET)	(CFS)
* 0.000	0.000	0.000**	4.000	0.000	0.000*
* 4.500	0.427	0.730**	5.000	0.879	6.610*
* 6.000	1.859	31.320**	7.000	2.944	66.540*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	4.00	0.00000	0.00000
3	4.50	0.42371	0.43049
4	5.00	0.84822	0.90958
5	6.00	1.71312	2.00388
6	7.00	2.63483	3.25257

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.049	0.000	0.00	4.00	0.00	0.000

0.161	0.000	0.93	4.01	0.01	0.009
0.273	0.000	0.94	4.02	0.02	0.017
0.386	0.000	0.94	4.03	0.04	0.025
0.498	0.000	0.94	4.04	0.05	0.034
0.610	0.000	0.95	4.05	0.06	0.042
0.723	0.000	0.95	4.06	0.08	0.050
0.835	0.000	0.95	4.07	0.09	0.058
0.947	0.000	0.96	4.08	0.11	0.066
1.060	0.000	0.96	4.09	0.12	0.074
1.172	0.000	0.96	4.10	0.13	0.081
1.284	0.000	0.97	4.10	0.15	0.089
1.397	0.000	0.97	4.11	0.16	0.097
1.509	0.000	0.97	4.12	0.17	0.104
1.621	0.000	0.98	4.13	0.18	0.111
1.734	0.000	0.98	4.14	0.20	0.119
1.846	0.000	0.98	4.15	0.21	0.126
1.958	0.000	0.99	4.16	0.22	0.133
2.071	0.000	0.99	4.16	0.23	0.140
2.183	0.000	1.00	4.17	0.25	0.147
2.295	0.000	1.00	4.18	0.26	0.154
2.408	0.000	1.00	4.19	0.27	0.161
2.520	0.000	1.01	4.20	0.28	0.167
2.632	0.000	1.01	4.20	0.29	0.174
2.745	0.000	1.01	4.21	0.30	0.181
2.857	0.000	1.02	4.22	0.31	0.187
2.969	0.000	1.02	4.23	0.33	0.194
3.082	0.000	1.03	4.23	0.34	0.200
3.194	0.000	1.03	4.24	0.35	0.206
3.306	0.000	1.04	4.25	0.36	0.213
3.419	0.000	1.04	4.26	0.37	0.219
3.531	0.000	1.05	4.26	0.38	0.225
3.643	0.000	1.05	4.27	0.39	0.231
3.756	0.000	1.06	4.28	0.40	0.237
3.868	0.000	1.06	4.28	0.41	0.243
3.980	0.000	1.06	4.29	0.42	0.249
4.093	0.000	1.07	4.30	0.43	0.255
4.205	0.000	1.07	4.31	0.44	0.261
4.317	0.000	1.08	4.31	0.45	0.267
4.430	0.000	1.08	4.32	0.46	0.273
4.542	0.000	1.09	4.33	0.47	0.279
4.654	0.000	1.09	4.33	0.48	0.284
4.767	0.000	1.10	4.34	0.49	0.290
4.879	0.000	1.11	4.35	0.50	0.295
4.991	0.000	1.11	4.35	0.51	0.301
5.104	0.000	1.12	4.36	0.52	0.307
5.216	0.000	1.12	4.37	0.53	0.312
5.328	0.000	1.13	4.37	0.54	0.318
5.441	0.000	1.13	4.38	0.55	0.323
5.553	0.000	1.14	4.38	0.56	0.328
5.665	0.000	1.14	4.39	0.57	0.334
5.778	0.000	1.15	4.40	0.57	0.339
5.890	0.000	1.15	4.40	0.58	0.344
6.002	0.000	1.16	4.41	0.59	0.350
6.115	0.000	1.17	4.42	0.60	0.355
6.227	0.000	1.18	4.42	0.61	0.360
6.339	0.000	1.18	4.43	0.62	0.365
6.452	0.000	1.19	4.43	0.63	0.371
6.564	0.000	1.19	4.44	0.64	0.376
6.676	0.000	1.20	4.45	0.65	0.381
6.789	0.000	1.21	4.45	0.66	0.386
6.901	0.000	1.22	4.46	0.66	0.391
7.013	0.000	1.22	4.46	0.67	0.396
7.126	0.000	1.23	4.47	0.68	0.401
7.238	0.000	1.24	4.48	0.69	0.406
7.350	0.000	1.25	4.48	0.70	0.411
7.463	0.000	1.25	4.49	0.71	0.416
7.575	0.000	1.26	4.49	0.72	0.422
7.687	0.000	1.27	4.50	0.72	0.427
7.800	0.000	1.28	4.50	0.76	0.431

7.912	0.000	1.28	4.51	0.81	0.436
8.024	0.000	1.30	4.51	0.87	0.440
8.137	0.000	1.30	4.52	0.92	0.443
8.249	0.000	1.31	4.52	0.96	0.447
8.361	0.000	1.32	4.52	1.00	0.450
8.474	0.000	1.33	4.53	1.04	0.452
8.586	0.000	1.34	4.53	1.07	0.455
8.698	0.000	1.35	4.53	1.10	0.457
8.811	0.000	1.36	4.54	1.13	0.459
8.923	0.000	1.37	4.54	1.16	0.461
9.035	0.000	1.38	4.54	1.18	0.463
9.148	0.000	1.39	4.54	1.21	0.465
9.260	0.000	1.40	4.54	1.23	0.466
9.372	0.000	1.41	4.54	1.25	0.468
9.485	0.000	1.42	4.55	1.27	0.469
9.597	0.000	1.44	4.55	1.29	0.471
9.709	0.000	1.45	4.55	1.30	0.472
9.822	0.000	1.46	4.55	1.32	0.473
9.934	0.000	1.47	4.55	1.34	0.474
10.046	0.000	1.49	4.55	1.35	0.476
10.159	0.000	1.50	4.56	1.37	0.477
10.271	0.000	1.52	4.56	1.39	0.478
10.383	0.000	1.53	4.56	1.40	0.479
10.496	0.000	1.55	4.56	1.42	0.480
10.608	0.000	1.56	4.56	1.43	0.482
10.720	0.000	1.58	4.56	1.45	0.483
10.833	0.000	1.59	4.56	1.46	0.484
10.945	0.000	1.61	4.56	1.48	0.485
11.057	0.000	1.62	4.57	1.49	0.486
11.170	0.000	1.64	4.57	1.51	0.488
11.282	0.000	1.66	4.57	1.53	0.489
11.394	0.000	1.68	4.57	1.54	0.490
11.507	0.000	1.69	4.57	1.56	0.491
11.619	0.000	1.72	4.57	1.58	0.493
11.731	0.000	1.74	4.57	1.59	0.494
11.844	0.000	1.77	4.58	1.61	0.495
11.956	0.000	1.78	4.58	1.63	0.497
12.068	0.000	1.72	4.58	1.64	0.498
12.181	0.000	1.61	4.58	1.65	0.497
12.293	0.000	1.65	4.58	1.64	0.497
12.405	0.000	1.66	4.58	1.65	0.498
12.518	0.000	1.70	4.58	1.65	0.498
12.630	0.000	1.72	4.58	1.66	0.499
12.742	0.000	1.76	4.58	1.67	0.500
12.855	0.000	1.79	4.58	1.68	0.501
12.967	0.000	1.83	4.58	1.69	0.502
13.079	0.000	1.86	4.58	1.71	0.503
13.192	0.000	1.91	4.59	1.73	0.505
13.304	0.000	1.94	4.59	1.75	0.507
13.416	0.000	1.99	4.59	1.78	0.509
13.529	0.000	2.03	4.59	1.80	0.511
13.641	0.000	2.09	4.60	1.83	0.513
13.753	0.000	2.13	4.60	1.86	0.515
13.866	0.000	2.21	4.60	1.90	0.518
13.978	0.000	2.25	4.60	1.94	0.521
14.090	0.000	2.11	4.61	1.96	0.523
14.203	0.000	2.06	4.61	1.98	0.523
14.315	0.000	2.17	4.61	1.99	0.525
14.427	0.000	2.22	4.61	2.02	0.527
14.540	0.000	2.35	4.61	2.05	0.530
14.652	0.000	2.42	4.62	2.09	0.533
14.764	0.000	2.59	4.62	2.13	0.537
14.877	0.000	2.68	4.63	2.19	0.542
14.989	0.000	2.90	4.63	2.26	0.548
15.101	0.000	3.03	4.64	2.34	0.554
15.214	0.000	3.34	4.65	2.44	0.562
15.326	0.000	3.53	4.66	2.55	0.572
15.438	0.000	4.57	4.68	2.72	0.589
15.551	0.000	4.95	4.70	2.95	0.607

15.663	0.000	5.87	4.73	3.23	0.632
15.775	0.000	7.15	4.76	3.61	0.665
15.888	0.000	10.31	4.83	4.19	0.721
16.000	0.000	14.01	4.92	5.10	0.804
16.112	0.000	36.21	5.19	8.43	1.062
16.225	0.000	8.83	5.17	10.98	1.042
16.337	0.000	5.36	5.12	10.16	0.997
16.449	0.000	3.75	5.07	8.99	0.949
16.562	0.000	3.18	5.03	7.83	0.906
16.674	0.000	2.79	4.99	6.87	0.868
16.786	0.000	2.50	4.95	6.24	0.833
16.899	0.000	2.29	4.91	5.80	0.800
17.011	0.000	2.11	4.88	5.39	0.770
17.123	0.000	2.29	4.85	5.03	0.745
17.236	0.000	2.17	4.83	4.71	0.721
17.348	0.000	2.06	4.80	4.41	0.699
17.460	0.000	1.96	4.78	4.14	0.679
17.573	0.000	1.88	4.76	3.89	0.660
17.685	0.000	1.81	4.74	3.65	0.643
17.797	0.000	1.74	4.72	3.44	0.627
17.910	0.000	1.68	4.71	3.24	0.613
18.022	0.000	1.63	4.69	3.06	0.600
18.134	0.000	1.80	4.68	2.91	0.589
18.247	0.000	1.75	4.67	2.78	0.580
18.359	0.000	1.71	4.66	2.66	0.571
18.471	0.000	1.67	4.65	2.55	0.563
18.584	0.000	1.63	4.64	2.45	0.555
18.696	0.000	1.60	4.63	2.35	0.548
18.808	0.000	1.57	4.63	2.26	0.542
18.921	0.000	1.54	4.62	2.18	0.536
19.033	0.000	1.51	4.61	2.11	0.530
19.145	0.000	1.48	4.61	2.04	0.525
19.258	0.000	1.45	4.60	1.97	0.520
19.370	0.000	1.43	4.60	1.91	0.516
19.482	0.000	1.41	4.59	1.86	0.512
19.595	0.000	1.39	4.59	1.80	0.508
19.707	0.000	1.36	4.59	1.75	0.504
19.819	0.000	1.34	4.58	1.71	0.501
19.932	0.000	1.33	4.58	1.67	0.497
20.044	0.000	1.31	4.57	1.63	0.494
20.156	0.000	1.29	4.57	1.59	0.492
20.269	0.000	1.27	4.57	1.55	0.489
20.381	0.000	1.26	4.57	1.52	0.487
20.493	0.000	1.24	4.56	1.49	0.484
20.606	0.000	1.23	4.56	1.46	0.482
20.718	0.000	1.21	4.56	1.43	0.480
20.830	0.000	1.20	4.56	1.41	0.478
20.943	0.000	1.18	4.55	1.38	0.476
21.055	0.000	1.17	4.55	1.36	0.475
21.167	0.000	1.16	4.55	1.34	0.473
21.280	0.000	1.15	4.55	1.32	0.471
21.392	0.000	1.13	4.55	1.30	0.470
21.504	0.000	1.12	4.55	1.28	0.468
21.617	0.000	1.11	4.54	1.26	0.467
21.729	0.000	1.10	4.54	1.24	0.466
21.841	0.000	1.09	4.54	1.23	0.465
21.954	0.000	1.08	4.54	1.21	0.463
22.066	0.000	1.07	4.54	1.19	0.462
22.178	0.000	1.06	4.54	1.18	0.461
22.291	0.000	1.05	4.54	1.17	0.460
22.403	0.000	1.04	4.54	1.15	0.459
22.515	0.000	1.03	4.53	1.14	0.458
22.628	0.000	1.03	4.53	1.13	0.457
22.740	0.000	1.02	4.53	1.11	0.456
22.852	0.000	1.01	4.53	1.10	0.455
22.965	0.000	1.00	4.53	1.09	0.455
23.077	0.000	0.99	4.53	1.08	0.454
23.189	0.000	0.99	4.53	1.07	0.453
23.302	0.000	0.98	4.53	1.06	0.452

23.414	0.000	0.97	4.53	1.05	0.451
23.526	0.000	0.96	4.53	1.04	0.451
23.639	0.000	0.96	4.53	1.03	0.450
23.751	0.000	0.95	4.52	1.02	0.449
23.863	0.000	0.94	4.52	1.01	0.449
23.976	0.000	0.94	4.52	1.01	0.448
24.088	0.000	0.93	4.52	1.00	0.447
24.200	0.000	0.00	4.51	0.94	0.439
24.313	0.000	0.00	4.50	0.83	0.431
24.425	0.000	0.00	4.50	0.75	0.424
24.537	0.000	0.00	4.49	0.72	0.417
24.650	0.000	0.00	4.48	0.71	0.411
24.762	0.000	0.00	4.47	0.70	0.404
24.874	0.000	0.00	4.47	0.69	0.398
24.987	0.000	0.00	4.46	0.67	0.392
25.099	0.000	0.00	4.45	0.66	0.385
25.211	0.000	0.00	4.44	0.65	0.379
25.324	0.000	0.00	4.44	0.64	0.373
25.436	0.000	0.00	4.43	0.63	0.368
25.548	0.000	0.00	4.42	0.62	0.362
25.661	0.000	0.00	4.42	0.61	0.356
25.773	0.000	0.00	4.41	0.60	0.350
25.885	0.000	0.00	4.40	0.59	0.345
25.998	0.000	0.00	4.40	0.58	0.340
26.110	0.000	0.00	4.39	0.58	0.334
26.222	0.000	0.00	4.39	0.57	0.329
26.335	0.000	0.00	4.38	0.56	0.324
26.447	0.000	0.00	4.37	0.55	0.319
26.559	0.000	0.00	4.37	0.54	0.314
26.672	0.000	0.00	4.36	0.53	0.309
26.784	0.000	0.00	4.36	0.52	0.304
26.896	0.000	0.00	4.35	0.52	0.299
27.009	0.000	0.00	4.34	0.51	0.294
27.121	0.000	0.00	4.34	0.50	0.290
27.233	0.000	0.00	4.33	0.49	0.285
27.346	0.000	0.00	4.33	0.48	0.281
27.458	0.000	0.00	4.32	0.48	0.276
27.570	0.000	0.00	4.32	0.47	0.272
27.683	0.000	0.00	4.31	0.46	0.268
27.795	0.000	0.00	4.31	0.45	0.263
27.907	0.000	0.00	4.30	0.45	0.259
28.020	0.000	0.00	4.30	0.44	0.255
28.132	0.000	0.00	4.29	0.43	0.251
28.244	0.000	0.00	4.29	0.43	0.247
28.357	0.000	0.00	4.28	0.42	0.243
28.469	0.000	0.00	4.28	0.41	0.239
28.581	0.000	0.00	4.28	0.41	0.236
28.694	0.000	0.00	4.27	0.40	0.232
28.806	0.000	0.00	4.27	0.39	0.228
28.918	0.000	0.00	4.26	0.39	0.225
29.031	0.000	0.00	4.26	0.38	0.221
29.143	0.000	0.00	4.25	0.38	0.218
29.255	0.000	0.00	4.25	0.37	0.214
29.368	0.000	0.00	4.25	0.36	0.211
29.480	0.000	0.00	4.24	0.36	0.208
29.592	0.000	0.00	4.24	0.35	0.204
29.705	0.000	0.00	4.24	0.35	0.201
29.817	0.000	0.00	4.23	0.34	0.198
29.929	0.000	0.00	4.23	0.34	0.195
30.042	0.000	0.00	4.22	0.33	0.192
30.154	0.000	0.00	4.22	0.33	0.189
30.266	0.000	0.00	4.22	0.32	0.186
30.379	0.000	0.00	4.21	0.32	0.183
30.491	0.000	0.00	4.21	0.31	0.180
30.603	0.000	0.00	4.21	0.31	0.177
30.716	0.000	0.00	4.20	0.30	0.174
30.828	0.000	0.00	4.20	0.30	0.172
30.940	0.000	0.00	4.20	0.29	0.169
31.053	0.000	0.00	4.19	0.29	0.166

31.165	0.000	0.00	4.19	0.28	0.164
31.277	0.000	0.00	4.19	0.28	0.161
31.390	0.000	0.00	4.19	0.27	0.159
31.502	0.000	0.00	4.18	0.27	0.156
31.614	0.000	0.00	4.18	0.26	0.154
31.727	0.000	0.00	4.18	0.26	0.151
31.839	0.000	0.00	4.17	0.26	0.149
31.951	0.000	0.00	4.17	0.25	0.146
32.064	0.000	0.00	4.17	0.25	0.144
32.176	0.000	0.00	4.17	0.24	0.142
32.288	0.000	0.00	4.16	0.24	0.140
32.401	0.000	0.00	4.16	0.24	0.137
32.513	0.000	0.00	4.16	0.23	0.135
32.625	0.000	0.00	4.16	0.23	0.133
32.738	0.000	0.00	4.15	0.23	0.131
32.850	0.000	0.00	4.15	0.22	0.129
32.962	0.000	0.00	4.15	0.22	0.127
33.075	0.000	0.00	4.15	0.22	0.125
33.187	0.000	0.00	4.14	0.21	0.123
33.299	0.000	0.00	4.14	0.21	0.121
33.412	0.000	0.00	4.14	0.21	0.119
33.524	0.000	0.00	4.14	0.20	0.117
33.636	0.000	0.00	4.14	0.20	0.115
33.749	0.000	0.00	4.13	0.20	0.114
33.861	0.000	0.00	4.13	0.19	0.112
33.973	0.000	0.00	4.13	0.19	0.110
34.086	0.000	0.00	4.13	0.19	0.108
34.198	0.000	0.00	4.12	0.18	0.107
34.310	0.000	0.00	4.12	0.18	0.105
34.423	0.000	0.00	4.12	0.18	0.103
34.535	0.000	0.00	4.12	0.18	0.102
34.647	0.000	0.00	4.12	0.17	0.100
34.760	0.000	0.00	4.12	0.17	0.098
34.872	0.000	0.00	4.11	0.17	0.097
34.984	0.000	0.00	4.11	0.16	0.095
35.097	0.000	0.00	4.11	0.16	0.094
35.209	0.000	0.00	4.11	0.16	0.092
35.321	0.000	0.00	4.11	0.16	0.091
35.434	0.000	0.00	4.10	0.15	0.090
35.546	0.000	0.00	4.10	0.15	0.088
35.658	0.000	0.00	4.10	0.15	0.087
35.771	0.000	0.00	4.10	0.15	0.085
35.883	0.000	0.00	4.10	0.14	0.084
35.995	0.000	0.00	4.10	0.14	0.083
36.108	0.000	0.00	4.10	0.14	0.081
36.220	0.000	0.00	4.09	0.14	0.080
36.332	0.000	0.00	4.09	0.14	0.079
36.445	0.000	0.00	4.09	0.13	0.078
36.557	0.000	0.00	4.09	0.13	0.076
36.669	0.000	0.00	4.09	0.13	0.075
36.782	0.000	0.00	4.09	0.13	0.074
36.894	0.000	0.00	4.09	0.13	0.073
37.006	0.000	0.00	4.08	0.12	0.072
37.119	0.000	0.00	4.08	0.12	0.071
37.231	0.000	0.00	4.08	0.12	0.069
37.343	0.000	0.00	4.08	0.12	0.068
37.456	0.000	0.00	4.08	0.12	0.067
37.568	0.000	0.00	4.08	0.11	0.066
37.680	0.000	0.00	4.08	0.11	0.065
37.793	0.000	0.00	4.08	0.11	0.064
37.905	0.000	0.00	4.07	0.11	0.063
38.017	0.000	0.00	4.07	0.11	0.062
38.130	0.000	0.00	4.07	0.11	0.061
38.242	0.000	0.00	4.07	0.10	0.060
38.354	0.000	0.00	4.07	0.10	0.059
38.467	0.000	0.00	4.07	0.10	0.058
38.579	0.000	0.00	4.07	0.10	0.057
38.691	0.000	0.00	4.07	0.10	0.057
38.804	0.000	0.00	4.07	0.10	0.056

38.916	0.000	0.00	4.06	0.09	0.055
39.028	0.000	0.00	4.06	0.09	0.054
39.141	0.000	0.00	4.06	0.09	0.053
39.253	0.000	0.00	4.06	0.09	0.052
39.365	0.000	0.00	4.06	0.09	0.051
39.478	0.000	0.00	4.06	0.09	0.051
39.590	0.000	0.00	4.06	0.09	0.050
39.702	0.000	0.00	4.06	0.08	0.049
39.815	0.000	0.00	4.06	0.08	0.048
39.927	0.000	0.00	4.06	0.08	0.047
40.039	0.000	0.00	4.05	0.08	0.047
40.152	0.000	0.00	4.05	0.08	0.046
40.264	0.000	0.00	4.05	0.08	0.045
40.376	0.000	0.00	4.05	0.08	0.045
40.489	0.000	0.00	4.05	0.08	0.044
40.601	0.000	0.00	4.05	0.07	0.043
40.713	0.000	0.00	4.05	0.07	0.042
40.826	0.000	0.00	4.05	0.07	0.042
40.938	0.000	0.00	4.05	0.07	0.041
41.050	0.000	0.00	4.05	0.07	0.040
41.163	0.000	0.00	4.05	0.07	0.040
41.275	0.000	0.00	4.05	0.07	0.039
41.387	0.000	0.00	4.05	0.07	0.039
41.500	0.000	0.00	4.04	0.07	0.038
41.612	0.000	0.00	4.04	0.06	0.037
41.724	0.000	0.00	4.04	0.06	0.037
41.837	0.000	0.00	4.04	0.06	0.036
41.949	0.000	0.00	4.04	0.06	0.036
42.062	0.000	0.00	4.04	0.06	0.035
42.174	0.000	0.00	4.04	0.06	0.035
42.286	0.000	0.00	4.04	0.06	0.034
42.399	0.000	0.00	4.04	0.06	0.033
42.511	0.000	0.00	4.04	0.06	0.033
42.623	0.000	0.00	4.04	0.06	0.032
42.736	0.000	0.00	4.04	0.05	0.032
42.848	0.000	0.00	4.04	0.05	0.031
42.960	0.000	0.00	4.04	0.05	0.031
43.073	0.000	0.00	4.04	0.05	0.030
43.185	0.000	0.00	4.04	0.05	0.030
43.297	0.000	0.00	4.03	0.05	0.029
43.410	0.000	0.00	4.03	0.05	0.029
43.522	0.000	0.00	4.03	0.05	0.029
43.634	0.000	0.00	4.03	0.05	0.028
43.747	0.000	0.00	4.03	0.05	0.028
43.859	0.000	0.00	4.03	0.05	0.027
43.971	0.000	0.00	4.03	0.05	0.027
44.084	0.000	0.00	4.03	0.05	0.026
44.196	0.000	0.00	4.03	0.04	0.026
44.308	0.000	0.00	4.03	0.04	0.026
44.421	0.000	0.00	4.03	0.04	0.025
44.533	0.000	0.00	4.03	0.04	0.025
44.645	0.000	0.00	4.03	0.04	0.024
44.758	0.000	0.00	4.03	0.04	0.024
44.870	0.000	0.00	4.03	0.04	0.024
44.982	0.000	0.00	4.03	0.04	0.023
45.095	0.000	0.00	4.03	0.04	0.023
45.207	0.000	0.00	4.03	0.04	0.023
45.319	0.000	0.00	4.03	0.04	0.022
45.432	0.000	0.00	4.03	0.04	0.022
45.544	0.000	0.00	4.03	0.04	0.021
45.656	0.000	0.00	4.02	0.04	0.021
45.769	0.000	0.00	4.02	0.04	0.021
45.881	0.000	0.00	4.02	0.04	0.020
45.993	0.000	0.00	4.02	0.03	0.020
46.106	0.000	0.00	4.02	0.03	0.020
46.218	0.000	0.00	4.02	0.03	0.020
46.330	0.000	0.00	4.02	0.03	0.019
46.443	0.000	0.00	4.02	0.03	0.019
46.555	0.000	0.00	4.02	0.03	0.019

46.667	0.000	0.00	4.02	0.03	0.018
46.780	0.000	0.00	4.02	0.03	0.018
46.892	0.000	0.00	4.02	0.03	0.018
47.004	0.000	0.00	4.02	0.03	0.017
47.117	0.000	0.00	4.02	0.03	0.017
47.229	0.000	0.00	4.02	0.03	0.017
47.341	0.000	0.00	4.02	0.03	0.017
47.454	0.000	0.00	4.02	0.03	0.016
47.566	0.000	0.00	4.02	0.03	0.016
47.678	0.000	0.00	4.02	0.03	0.016
47.791	0.000	0.00	4.02	0.03	0.016
47.903	0.000	0.00	4.02	0.03	0.015
48.015	0.000	0.00	4.02	0.03	0.015
48.128	0.000	0.00	4.02	0.03	0.015
48.240	0.000	0.00	4.02	0.03	0.015
48.352	0.000	0.00	4.02	0.02	0.014
48.465	0.000	0.00	4.02	0.02	0.014
48.577	0.000	0.00	4.02	0.02	0.014
48.689	0.000	0.00	4.02	0.02	0.014
48.802	0.000	0.00	4.02	0.02	0.014
48.914	0.000	0.00	4.02	0.02	0.013
49.026	0.000	0.00	4.02	0.02	0.013
49.139	0.000	0.00	4.02	0.02	0.013
49.251	0.000	0.00	4.01	0.02	0.013
49.363	0.000	0.00	4.01	0.02	0.013
49.476	0.000	0.00	4.01	0.02	0.012
49.588	0.000	0.00	4.01	0.02	0.012
49.700	0.000	0.00	4.01	0.02	0.012
49.813	0.000	0.00	4.01	0.02	0.012
49.925	0.000	0.00	4.01	0.02	0.012
50.037	0.000	0.00	4.01	0.02	0.011
50.150	0.000	0.00	4.01	0.02	0.011
50.262	0.000	0.00	4.01	0.02	0.011
50.374	0.000	0.00	4.01	0.02	0.011
50.487	0.000	0.00	4.01	0.02	0.011
50.599	0.000	0.00	4.01	0.02	0.011
50.711	0.000	0.00	4.01	0.02	0.010
50.824	0.000	0.00	4.01	0.02	0.010
50.936	0.000	0.00	4.01	0.02	0.010
51.048	0.000	0.00	4.01	0.02	0.010
51.161	0.000	0.00	4.01	0.02	0.010
51.273	0.000	0.00	4.01	0.02	0.010
51.385	0.000	0.00	4.01	0.02	0.009
51.498	0.000	0.00	4.01	0.02	0.009
51.610	0.000	0.00	4.01	0.02	0.009
51.722	0.000	0.00	4.01	0.02	0.009
51.835	0.000	0.00	4.01	0.02	0.009
51.947	0.000	0.00	4.01	0.01	0.009
52.059	0.000	0.00	4.01	0.01	0.009
52.172	0.000	0.00	4.01	0.01	0.008
52.284	0.000	0.00	4.01	0.01	0.008
52.396	0.000	0.00	4.01	0.01	0.008
52.509	0.000	0.00	4.01	0.01	0.008
52.621	0.000	0.00	4.01	0.01	0.008
52.733	0.000	0.00	4.01	0.01	0.008
52.846	0.000	0.00	4.01	0.01	0.008
52.958	0.000	0.00	4.01	0.01	0.008
53.070	0.000	0.00	4.01	0.01	0.007
53.183	0.000	0.00	4.01	0.01	0.007
53.295	0.000	0.00	4.01	0.01	0.007
53.407	0.000	0.00	4.01	0.01	0.007
53.520	0.000	0.00	4.01	0.01	0.007
53.632	0.000	0.00	4.01	0.01	0.007
53.744	0.000	0.00	4.01	0.01	0.007
53.857	0.000	0.00	4.01	0.01	0.007
53.969	0.000	0.00	4.01	0.01	0.007
54.081	0.000	0.00	4.01	0.01	0.006
54.194	0.000	0.00	4.01	0.01	0.006
54.306	0.000	0.00	4.01	0.01	0.006

54.418	0.000	0.00	4.01	0.01	0.006
54.531	0.000	0.00	4.01	0.01	0.006
54.643	0.000	0.00	4.01	0.01	0.006
54.755	0.000	0.00	4.01	0.01	0.006
54.868	0.000	0.00	4.01	0.01	0.006
54.980	0.000	0.00	4.01	0.01	0.006
55.092	0.000	0.00	4.01	0.01	0.006
55.205	0.000	0.00	4.01	0.01	0.005
55.317	0.000	0.00	4.01	0.01	0.005
55.429	0.000	0.00	4.01	0.01	0.005
55.542	0.000	0.00	4.01	0.01	0.005
55.654	0.000	0.00	4.01	0.01	0.005
55.766	0.000	0.00	4.01	0.01	0.005
55.879	0.000	0.00	4.01	0.01	0.005
55.991	0.000	0.00	4.01	0.01	0.005
56.103	0.000	0.00	4.01	0.01	0.005
56.216	0.000	0.00	4.01	0.01	0.005
56.328	0.000	0.00	4.01	0.01	0.005
56.440	0.000	0.00	4.01	0.01	0.005
56.553	0.000	0.00	4.01	0.01	0.005
56.665	0.000	0.00	4.01	0.01	0.004
56.777	0.000	0.00	4.01	0.01	0.004
56.890	0.000	0.00	4.01	0.01	0.004
57.002	0.000	0.00	4.00	0.01	0.004
57.114	0.000	0.00	4.00	0.01	0.004
57.227	0.000	0.00	4.00	0.01	0.004
57.339	0.000	0.00	4.00	0.01	0.004
57.451	0.000	0.00	4.00	0.01	0.004
57.564	0.000	0.00	4.00	0.01	0.004
57.676	0.000	0.00	4.00	0.01	0.004
57.788	0.000	0.00	4.00	0.01	0.004
57.901	0.000	0.00	4.00	0.01	0.004
58.013	0.000	0.00	4.00	0.01	0.004
58.125	0.000	0.00	4.00	0.01	0.004
58.238	0.000	0.00	4.00	0.01	0.004
58.350	0.000	0.00	4.00	0.01	0.004
58.462	0.000	0.00	4.00	0.01	0.003
58.575	0.000	0.00	4.00	0.01	0.003
58.687	0.000	0.00	4.00	0.01	0.003
58.799	0.000	0.00	4.00	0.01	0.003
58.912	0.000	0.00	4.00	0.01	0.003
59.024	0.000	0.00	4.00	0.01	0.003
59.136	0.000	0.00	4.00	0.01	0.003
59.249	0.000	0.00	4.00	0.01	0.003
59.361	0.000	0.00	4.00	0.01	0.003
59.473	0.000	0.00	4.00	0.01	0.003
59.586	0.000	0.00	4.00	0.01	0.003
59.698	0.000	0.00	4.00	0.01	0.003
59.810	0.000	0.00	4.00	0.00	0.003
59.923	0.000	0.00	4.00	0.00	0.003
60.035	0.000	0.00	4.00	0.00	0.003
60.147	0.000	0.00	4.00	0.00	0.003
60.260	0.000	0.00	4.00	0.00	0.003
60.372	0.000	0.00	4.00	0.00	0.003
60.484	0.000	0.00	4.00	0.00	0.003
60.597	0.000	0.00	4.00	0.00	0.003
60.709	0.000	0.00	4.00	0.00	0.003
60.821	0.000	0.00	4.00	0.00	0.002
60.934	0.000	0.00	4.00	0.00	0.002
61.046	0.000	0.00	4.00	0.00	0.002
61.158	0.000	0.00	4.00	0.00	0.002
61.271	0.000	0.00	4.00	0.00	0.002
61.383	0.000	0.00	4.00	0.00	0.002
61.495	0.000	0.00	4.00	0.00	0.002
61.608	0.000	0.00	4.00	0.00	0.002
61.720	0.000	0.00	4.00	0.00	0.002
61.832	0.000	0.00	4.00	0.00	0.002
61.945	0.000	0.00	4.00	0.00	0.002
62.057	0.000	0.00	4.00	0.00	0.002

62.170	0.000	0.00	4.00	0.00	0.002
62.282	0.000	0.00	4.00	0.00	0.002
62.394	0.000	0.00	4.00	0.00	0.002
62.507	0.000	0.00	4.00	0.00	0.002
62.619	0.000	0.00	4.00	0.00	0.002
62.731	0.000	0.00	4.00	0.00	0.002
62.844	0.000	0.00	4.00	0.00	0.002
62.956	0.000	0.00	4.00	0.00	0.002
63.068	0.000	0.00	4.00	0.00	0.002
63.181	0.000	0.00	4.00	0.00	0.002
63.293	0.000	0.00	4.00	0.00	0.002
63.405	0.000	0.00	4.00	0.00	0.002
63.518	0.000	0.00	4.00	0.00	0.002
63.630	0.000	0.00	4.00	0.00	0.002
63.742	0.000	0.00	4.00	0.00	0.002
63.855	0.000	0.00	4.00	0.00	0.002
63.967	0.000	0.00	4.00	0.00	0.002
64.079	0.000	0.00	4.00	0.00	0.002
64.192	0.000	0.00	4.00	0.00	0.002
64.304	0.000	0.00	4.00	0.00	0.002
64.416	0.000	0.00	4.00	0.00	0.001
64.529	0.000	0.00	4.00	0.00	0.001
64.641	0.000	0.00	4.00	0.00	0.001
64.753	0.000	0.00	4.00	0.00	0.001
64.866	0.000	0.00	4.00	0.00	0.001
64.978	0.000	0.00	4.00	0.00	0.001
65.090	0.000	0.00	4.00	0.00	0.001
65.203	0.000	0.00	4.00	0.00	0.001
65.315	0.000	0.00	4.00	0.00	0.001
65.427	0.000	0.00	4.00	0.00	0.001
65.540	0.000	0.00	4.00	0.00	0.001
65.652	0.000	0.00	4.00	0.00	0.001
65.764	0.000	0.00	4.00	0.00	0.001
65.877	0.000	0.00	4.00	0.00	0.001
65.989	0.000	0.00	4.00	0.00	0.001
66.101	0.000	0.00	4.00	0.00	0.001
66.214	0.000	0.00	4.00	0.00	0.001
66.326	0.000	0.00	4.00	0.00	0.001
66.438	0.000	0.00	4.00	0.00	0.001
66.551	0.000	0.00	4.00	0.00	0.001
66.663	0.000	0.00	4.00	0.00	0.001
66.775	0.000	0.00	4.00	0.00	0.001
66.888	0.000	0.00	4.00	0.00	0.001
67.000	0.000	0.00	4.00	0.00	0.001
67.112	0.000	0.00	4.00	0.00	0.001
67.225	0.000	0.00	4.00	0.00	0.001

Appendix J.IV

BMP Analysis 100-Year Storm Event

SMALL AREA UNIT HYDROGRAPH MODEL

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Ver. 23.0 Release Date: 07/01/2016 License ID 1499

Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
BASIN ROUTING
100-YEAR, POST-CONDITIONS, DA A

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.36
TOTAL CATCHMENT AREA(ACRES) = 9.10
SOIL-LOSS RATE, F_m (INCH/HR) = 0.151
LOW LOSS FRACTION = 0.196
TIME OF CONCENTRATION(MIN.) = 10.07
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 100
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.32
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.18
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.87
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.61
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 4.79
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = -0.46

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	10.0	20.0	30.0	40.0
0.06	0.0000	0.00	Q	.	.	.	.
0.22	0.0093	1.34	.Q	.	.	.	.
0.39	0.0279	1.35	.Q	.	.	.	.
0.56	0.0466	1.35	.Q	.	.	.	.
0.73	0.0654	1.36	.Q	.	.	.	.
0.90	0.0843	1.36	.Q	.	.	.	.
1.06	0.1033	1.37	.Q	.	.	.	.
1.23	0.1224	1.38	.Q	.	.	.	.
1.40	0.1416	1.39	.Q	.	.	.	.
1.57	0.1608	1.39	.Q	.	.	.	.
1.73	0.1802	1.40	.Q	.	.	.	.
1.90	0.1996	1.41	.Q	.	.	.	.
2.07	0.2192	1.42	.Q	.	.	.	.
2.24	0.2389	1.42	.Q	.	.	.	.
2.41	0.2586	1.43	.Q	.	.	.	.
2.57	0.2785	1.44	.Q	.	.	.	.
2.74	0.2985	1.45	.Q	.	.	.	.
2.91	0.3186	1.45	.Q	.	.	.	.
3.08	0.3388	1.46	.Q	.	.	.	.
3.24	0.3591	1.47	.Q	.	.	.	.
3.41	0.3795	1.48	.Q	.	.	.	.

3.58	0.4000	1.48	.Q	.	.	.	.
3.75	0.4207	1.50	.Q	.	.	.	.
3.92	0.4415	1.50	.Q	.	.	.	.
4.08	0.4624	1.51	.Q	.	.	.	.
4.25	0.4834	1.52	.Q	.	.	.	.
4.42	0.5046	1.53	.Q	.	.	.	.
4.59	0.5259	1.54	.Q	.	.	.	.
4.76	0.5474	1.55	.Q	.	.	.	.
4.92	0.5689	1.56	.Q	.	.	.	.
5.09	0.5906	1.57	.Q	.	.	.	.
5.26	0.6125	1.58	.Q	.	.	.	.
5.43	0.6345	1.59	.Q	.	.	.	.
5.59	0.6567	1.60	.Q	.	.	.	.
5.76	0.6790	1.62	.Q	.	.	.	.
5.93	0.7014	1.62	.Q	.	.	.	.
6.10	0.7241	1.64	.Q	.	.	.	.
6.27	0.7469	1.65	.Q	.	.	.	.
6.43	0.7698	1.66	.Q	.	.	.	.
6.60	0.7930	1.67	.Q	.	.	.	.
6.77	0.8163	1.69	.Q	.	.	.	.
6.94	0.8398	1.70	.Q	.	.	.	.
7.10	0.8635	1.72	.Q	.	.	.	.
7.27	0.8873	1.73	.Q	.	.	.	.
7.44	0.9114	1.75	.Q	.	.	.	.
7.61	0.9357	1.76	.Q	.	.	.	.
7.78	0.9602	1.78	.Q	.	.	.	.
7.94	0.9849	1.79	.Q	.	.	.	.
8.11	1.0098	1.81	.Q	.	.	.	.
8.28	1.0350	1.82	.Q	.	.	.	.
8.45	1.0604	1.84	.Q	.	.	.	.
8.62	1.0860	1.85	.Q	.	.	.	.
8.78	1.1119	1.88	.Q	.	.	.	.
8.95	1.1380	1.89	.Q	.	.	.	.
9.12	1.1644	1.92	.Q	.	.	.	.
9.29	1.1911	1.93	.Q	.	.	.	.
9.45	1.2180	1.96	.Q	.	.	.	.
9.62	1.2453	1.97	.Q	.	.	.	.
9.79	1.2729	2.00	. Q	.	.	.	.
9.96	1.3008	2.02	. Q	.	.	.	.
10.13	1.3290	2.05	. Q	.	.	.	.
10.29	1.3576	2.07	. Q	.	.	.	.
10.46	1.3865	2.10	. Q	.	.	.	.
10.63	1.4158	2.12	. Q	.	.	.	.
10.80	1.4455	2.16	. Q	.	.	.	.
10.97	1.4756	2.18	. Q	.	.	.	.
11.13	1.5061	2.22	. Q	.	.	.	.
11.30	1.5371	2.24	. Q	.	.	.	.
11.47	1.5685	2.29	. Q	.	.	.	.
11.64	1.6005	2.32	. Q	.	.	.	.
11.80	1.6329	2.37	. Q	.	.	.	.
11.97	1.6660	2.39	. Q	.	.	.	.
12.14	1.6977	2.18	. Q	.	.	.	.
12.31	1.7275	2.12	. Q	.	.	.	.
12.48	1.7574	2.19	. Q	.	.	.	.
12.64	1.7880	2.22	. Q	.	.	.	.
12.81	1.8194	2.30	. Q	.	.	.	.
12.98	1.8516	2.34	. Q	.	.	.	.
13.15	1.8847	2.43	. Q	.	.	.	.
13.31	1.9187	2.48	. Q	.	.	.	.
13.48	1.9539	2.59	. Q	.	.	.	.
13.65	1.9902	2.65	. Q	.	.	.	.
13.82	2.0279	2.78	. Q	.	.	.	.
13.99	2.0669	2.85	. Q	.	.	.	.
14.15	2.1053	2.68	. Q	.	.	.	.
14.32	2.1427	2.72	. Q	.	.	.	.
14.49	2.1820	2.94	. Q	.	.	.	.
14.66	2.2236	3.06	. Q	.	.	.	.
14.83	2.2681	3.36	. Q	.	.	.	.
14.99	2.3160	3.54	. Q	.	.	.	.

15.16	2.3683	4.01	.	Q	.	.	.	.
15.33	2.4260	4.31	.	Q	.	.	.	.
15.50	2.4944	5.57	.	Q	.	.	.	.
15.66	2.5763	6.23	.	Q	.	.	.	.
15.83	2.6940	10.74	.	Q	.	.	.	.
16.00	2.8670	14.21	.	.	Q	.	.	.
16.17	3.1954	33.13	.	.	.	.	Q	.
16.34	3.4748	7.16	.	Q	.	.	.	.
16.50	3.5569	4.68	.	Q	.	.	.	.
16.67	3.6154	3.75	.	Q	.	.	.	.
16.84	3.6637	3.20	.	Q	.	.	.	.
17.01	3.7054	2.82	.	Q	.	.	.	.
17.17	3.7453	2.93	.	Q	.	.	.	.
17.34	3.7845	2.71	.	Q	.	.	.	.
17.51	3.8208	2.53	.	Q	.	.	.	.
17.68	3.8550	2.39	.	Q	.	.	.	.
17.85	3.8872	2.26	.	Q	.	.	.	.
18.01	3.9178	2.15	.	Q	.	.	.	.
18.18	3.9495	2.42	.	Q	.	.	.	.
18.35	3.9826	2.34	.	Q	.	.	.	.
18.52	4.0145	2.27	.	Q	.	.	.	.
18.69	4.0455	2.20	.	Q	.	.	.	.
18.85	4.0756	2.14	.	Q	.	.	.	.
19.02	4.1049	2.09	.	Q	.	.	.	.
19.19	4.1335	2.03	.	Q	.	.	.	.
19.36	4.1614	1.99	.	Q	.	.	.	.
19.52	4.1887	1.94	.	Q	.	.	.	.
19.69	4.2153	1.90	.	Q	.	.	.	.
19.86	4.2415	1.87	.	Q	.	.	.	.
20.03	4.2671	1.83	.	Q	.	.	.	.
20.20	4.2923	1.80	.	Q	.	.	.	.
20.36	4.3170	1.77	.	Q	.	.	.	.
20.53	4.3412	1.74	.	Q	.	.	.	.
20.70	4.3651	1.71	.	Q	.	.	.	.
20.87	4.3886	1.68	.	Q	.	.	.	.
21.03	4.4118	1.66	.	Q	.	.	.	.
21.20	4.4346	1.63	.	Q	.	.	.	.
21.37	4.4570	1.61	.	Q	.	.	.	.
21.54	4.4792	1.59	.	Q	.	.	.	.
21.71	4.5011	1.57	.	Q	.	.	.	.
21.87	4.5226	1.55	.	Q	.	.	.	.
22.04	4.5439	1.53	.	Q	.	.	.	.
22.21	4.5650	1.51	.	Q	.	.	.	.
22.38	4.5858	1.49	.	Q	.	.	.	.
22.55	4.6063	1.47	.	Q	.	.	.	.
22.71	4.6266	1.46	.	Q	.	.	.	.
22.88	4.6467	1.44	.	Q	.	.	.	.
23.05	4.6666	1.42	.	Q	.	.	.	.
23.22	4.6862	1.41	.	Q	.	.	.	.
23.38	4.7057	1.40	.	Q	.	.	.	.
23.55	4.7250	1.38	.	Q	.	.	.	.
23.72	4.7440	1.37	.	Q	.	.	.	.
23.89	4.7629	1.36	.	Q	.	.	.	.
24.06	4.7816	1.34	.	Q	.	.	.	.
24.22	4.7910	0.00	Q	.	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:

(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.0
10%	120.8
20%	40.3
30%	30.2
40%	20.1

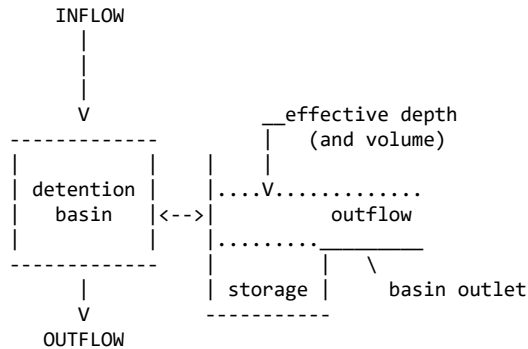
50%	10.1
60%	10.1
70%	10.1
80%	10.1
90%	10.1

Problem Descriptions:
 SAM'S CLUB HESPERIA
 BASIN ROUTING
 100-YEAR, POST-CONDITIONS, DA A

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FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 10.070
 DEAD STORAGE(AF) = 0.00
 SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
 ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
 TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 5

* BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	** BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)
* 0.000	0.000	0.000**	4.000	0.000	0.000*
* 5.000	0.637	4.625**	6.000	1.355	9.512*
* 7.000	2.161	12.760**			

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	4.00	0.00000	0.00000
3	5.00	0.60444	0.66860
4	6.00	1.28915	1.42109
5	7.00	2.07230	2.24928

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
 OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
 AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.056	0.000	0.00	4.00	0.00	0.000
0.224	0.000	1.34	4.03	0.06	0.018
0.392	0.000	1.35	4.05	0.19	0.034
0.559	0.000	1.35	4.08	0.30	0.048

0.727	0.000	1.36	4.10	0.40	0.062
0.895	0.000	1.36	4.12	0.49	0.074
1.063	0.000	1.37	4.13	0.58	0.085
1.231	0.000	1.38	4.15	0.65	0.095
1.399	0.000	1.39	4.16	0.72	0.104
1.566	0.000	1.39	4.18	0.79	0.112
1.734	0.000	1.40	4.19	0.85	0.120
1.902	0.000	1.41	4.20	0.90	0.127
2.070	0.000	1.42	4.21	0.95	0.134
2.238	0.000	1.42	4.22	0.99	0.140
2.406	0.000	1.43	4.23	1.03	0.145
2.573	0.000	1.44	4.24	1.07	0.150
2.741	0.000	1.45	4.24	1.11	0.155
2.909	0.000	1.45	4.25	1.14	0.159
3.077	0.000	1.46	4.26	1.17	0.163
3.245	0.000	1.47	4.26	1.20	0.167
3.413	0.000	1.48	4.27	1.23	0.170
3.580	0.000	1.48	4.27	1.25	0.174
3.748	0.000	1.50	4.28	1.27	0.177
3.916	0.000	1.50	4.28	1.29	0.180
4.084	0.000	1.51	4.29	1.31	0.182
4.252	0.000	1.52	4.29	1.33	0.185
4.420	0.000	1.53	4.29	1.35	0.187
4.587	0.000	1.54	4.30	1.37	0.190
4.755	0.000	1.55	4.30	1.39	0.192
4.923	0.000	1.56	4.31	1.40	0.194
5.091	0.000	1.57	4.31	1.42	0.196
5.259	0.000	1.58	4.31	1.43	0.198
5.427	0.000	1.59	4.31	1.45	0.200
5.594	0.000	1.60	4.32	1.46	0.202
5.762	0.000	1.62	4.32	1.48	0.204
5.930	0.000	1.62	4.32	1.49	0.206
6.098	0.000	1.64	4.33	1.50	0.208
6.266	0.000	1.65	4.33	1.52	0.210
6.434	0.000	1.66	4.33	1.53	0.212
6.601	0.000	1.67	4.34	1.54	0.213
6.769	0.000	1.69	4.34	1.56	0.215
6.937	0.000	1.70	4.34	1.57	0.217
7.105	0.000	1.72	4.34	1.58	0.219
7.273	0.000	1.73	4.35	1.60	0.221
7.441	0.000	1.75	4.35	1.61	0.223
7.608	0.000	1.76	4.35	1.62	0.224
7.776	0.000	1.78	4.36	1.64	0.226
7.944	0.000	1.79	4.36	1.65	0.228
8.112	0.000	1.81	4.36	1.66	0.230
8.280	0.000	1.82	4.36	1.68	0.232
8.448	0.000	1.84	4.37	1.69	0.234
8.615	0.000	1.85	4.37	1.71	0.236
8.783	0.000	1.88	4.37	1.72	0.238
8.951	0.000	1.89	4.38	1.74	0.240
9.119	0.000	1.92	4.38	1.75	0.243
9.287	0.000	1.93	4.38	1.77	0.245
9.455	0.000	1.96	4.39	1.79	0.247
9.622	0.000	1.97	4.39	1.80	0.250
9.790	0.000	2.00	4.40	1.82	0.252
9.958	0.000	2.02	4.40	1.84	0.255
10.126	0.000	2.05	4.40	1.86	0.257
10.294	0.000	2.07	4.41	1.88	0.260
10.462	0.000	2.10	4.41	1.90	0.263
10.629	0.000	2.12	4.42	1.92	0.265
10.797	0.000	2.16	4.42	1.94	0.269
10.965	0.000	2.18	4.43	1.96	0.272
11.133	0.000	2.22	4.43	1.98	0.275
11.301	0.000	2.24	4.44	2.01	0.278
11.469	0.000	2.29	4.44	2.03	0.282
11.636	0.000	2.32	4.45	2.06	0.285
11.804	0.000	2.37	4.45	2.09	0.289
11.972	0.000	2.39	4.46	2.11	0.293
12.140	0.000	2.18	4.46	2.13	0.294

12.308	0.000	2.12	4.46	2.13	0.293
12.476	0.000	2.19	4.46	2.14	0.294
12.643	0.000	2.22	4.46	2.14	0.295
12.811	0.000	2.30	4.47	2.15	0.297
12.979	0.000	2.34	4.47	2.17	0.300
13.147	0.000	2.43	4.48	2.19	0.303
13.315	0.000	2.48	4.48	2.22	0.307
13.483	0.000	2.59	4.49	2.25	0.312
13.650	0.000	2.65	4.50	2.28	0.317
13.818	0.000	2.78	4.51	2.32	0.323
13.986	0.000	2.85	4.52	2.37	0.330
14.154	0.000	2.68	4.52	2.41	0.333
14.322	0.000	2.72	4.53	2.44	0.337
14.490	0.000	2.94	4.54	2.47	0.344
14.657	0.000	3.06	4.55	2.52	0.351
14.825	0.000	3.36	4.57	2.59	0.362
14.993	0.000	3.54	4.59	2.67	0.374
15.161	0.000	4.01	4.61	2.78	0.391
15.329	0.000	4.31	4.64	2.91	0.410
15.497	0.000	5.57	4.70	3.11	0.444
15.664	0.000	6.23	4.76	3.37	0.484
15.832	0.000	10.74	4.91	3.86	0.579
16.000	0.000	14.21	5.10	4.67	0.712
16.168	0.000	33.13	5.62	6.40	1.083
16.336	0.000	7.16	5.61	7.64	1.076
16.503	0.000	4.68	5.56	7.48	1.037
16.671	0.000	3.75	5.49	7.19	0.990
16.839	0.000	3.20	5.42	6.85	0.939
17.007	0.000	2.82	5.35	6.51	0.888
17.175	0.000	2.93	5.29	6.18	0.843
17.343	0.000	2.71	5.23	5.88	0.799
17.510	0.000	2.53	5.17	5.58	0.756
17.678	0.000	2.39	5.11	5.30	0.716
17.846	0.000	2.26	5.06	5.03	0.678
18.014	0.000	2.15	5.01	4.78	0.641
18.182	0.000	2.42	4.96	4.55	0.612
18.350	0.000	2.34	4.92	4.34	0.584
18.517	0.000	2.27	4.88	4.15	0.558
18.685	0.000	2.20	4.84	3.96	0.533
18.853	0.000	2.14	4.80	3.79	0.510
19.021	0.000	2.09	4.77	3.63	0.489
19.189	0.000	2.03	4.74	3.48	0.469
19.357	0.000	1.99	4.71	3.34	0.450
19.524	0.000	1.94	4.68	3.21	0.433
19.692	0.000	1.90	4.65	3.08	0.416
19.860	0.000	1.87	4.63	2.97	0.401
20.028	0.000	1.83	4.61	2.86	0.387
20.196	0.000	1.80	4.59	2.76	0.373
20.364	0.000	1.77	4.57	2.67	0.361
20.531	0.000	1.74	4.55	2.58	0.349
20.699	0.000	1.71	4.53	2.50	0.338
20.867	0.000	1.68	4.52	2.42	0.328
21.035	0.000	1.66	4.50	2.35	0.318
21.203	0.000	1.63	4.49	2.28	0.309
21.371	0.000	1.61	4.47	2.22	0.301
21.538	0.000	1.59	4.46	2.16	0.293
21.706	0.000	1.57	4.45	2.10	0.286
21.874	0.000	1.55	4.44	2.05	0.279
22.042	0.000	1.53	4.43	2.00	0.272
22.210	0.000	1.51	4.42	1.95	0.266
22.378	0.000	1.49	4.41	1.91	0.260
22.545	0.000	1.47	4.40	1.87	0.254
22.713	0.000	1.46	4.39	1.83	0.249
22.881	0.000	1.44	4.38	1.79	0.244
23.049	0.000	1.42	4.38	1.76	0.240
23.217	0.000	1.41	4.37	1.73	0.235
23.385	0.000	1.40	4.36	1.69	0.231
23.552	0.000	1.38	4.36	1.67	0.227
23.720	0.000	1.37	4.35	1.64	0.224

23.888	0.000	1.36	4.35	1.61	0.220
24.056	0.000	1.34	4.34	1.59	0.217
24.224	0.000	0.00	4.31	1.50	0.196
24.392	0.000	0.00	4.28	1.35	0.177
24.559	0.000	0.00	4.25	1.22	0.160
24.727	0.000	0.00	4.23	1.11	0.145
24.895	0.000	0.00	4.21	1.00	0.131
25.063	0.000	0.00	4.19	0.90	0.118
25.231	0.000	0.00	4.17	0.82	0.107
25.399	0.000	0.00	4.15	0.74	0.097
25.566	0.000	0.00	4.14	0.67	0.087
25.734	0.000	0.00	4.12	0.60	0.079
25.902	0.000	0.00	4.11	0.55	0.071
26.070	0.000	0.00	4.10	0.49	0.065
26.238	0.000	0.00	4.09	0.45	0.058
26.406	0.000	0.00	4.08	0.40	0.053
26.573	0.000	0.00	4.07	0.37	0.048
26.741	0.000	0.00	4.07	0.33	0.043
26.909	0.000	0.00	4.06	0.30	0.039
27.077	0.000	0.00	4.06	0.27	0.035
27.245	0.000	0.00	4.05	0.24	0.032
27.413	0.000	0.00	4.05	0.22	0.029
27.580	0.000	0.00	4.04	0.20	0.026
27.748	0.000	0.00	4.04	0.18	0.024
27.916	0.000	0.00	4.03	0.16	0.021
28.084	0.000	0.00	4.03	0.15	0.019
28.252	0.000	0.00	4.03	0.13	0.017
28.420	0.000	0.00	4.02	0.12	0.016
28.587	0.000	0.00	4.02	0.11	0.014
28.755	0.000	0.00	4.02	0.10	0.013
28.923	0.000	0.00	4.02	0.09	0.012
29.091	0.000	0.00	4.02	0.08	0.011
29.259	0.000	0.00	4.01	0.07	0.009
29.427	0.000	0.00	4.01	0.07	0.009
29.594	0.000	0.00	4.01	0.06	0.008
29.762	0.000	0.00	4.01	0.05	0.007
29.930	0.000	0.00	4.01	0.05	0.006
30.098	0.000	0.00	4.01	0.04	0.006
30.266	0.000	0.00	4.01	0.04	0.005
30.434	0.000	0.00	4.01	0.04	0.005
30.601	0.000	0.00	4.01	0.03	0.004
30.769	0.000	0.00	4.01	0.03	0.004
30.937	0.000	0.00	4.01	0.03	0.003
31.105	0.000	0.00	4.00	0.02	0.003
31.273	0.000	0.00	4.00	0.02	0.003
31.441	0.000	0.00	4.00	0.02	0.003
31.608	0.000	0.00	4.00	0.02	0.002
31.776	0.000	0.00	4.00	0.02	0.002
31.944	0.000	0.00	4.00	0.01	0.002
32.112	0.000	0.00	4.00	0.01	0.002
32.280	0.000	0.00	4.00	0.01	0.002
32.448	0.000	0.00	4.00	0.01	0.001
32.615	0.000	0.00	4.00	0.01	0.001
32.783	0.000	0.00	4.00	0.01	0.001
32.951	0.000	0.00	4.00	0.01	0.001

SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

Problem Descriptions:

SAM'S CLUB HESPERIA
BASIN ROUTING
100-YEAR, POST-CONDITIONS, DA B

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.20
TOTAL CATCHMENT AREA(ACRES) = 16.27
SOIL-LOSS RATE, F_m (INCH/HR) = 0.185
LOW LOSS FRACTION = 0.231
TIME OF CONCENTRATION(MIN.) = 6.74
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 100
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.32
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.18
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.87
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.61
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.71

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 7.26
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.48

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	17.5	35.0	52.5	70.0
0.05	0.0000	0.00	Q	.	.	.	.
0.16	0.0094	2.02	.Q	.	.	.	.
0.27	0.0282	2.03	.Q	.	.	.	.
0.39	0.0470	2.03	.Q	.	.	.	.
0.50	0.0659	2.04	.Q	.	.	.	.
0.61	0.0849	2.05	.Q	.	.	.	.
0.72	0.1039	2.05	.Q	.	.	.	.
0.84	0.1230	2.06	.Q	.	.	.	.
0.95	0.1422	2.06	.Q	.	.	.	.
1.06	0.1614	2.07	.Q	.	.	.	.
1.17	0.1806	2.08	.Q	.	.	.	.
1.28	0.2000	2.09	.Q	.	.	.	.
1.40	0.2194	2.09	.Q	.	.	.	.
1.51	0.2389	2.10	.Q	.	.	.	.
1.62	0.2584	2.11	.Q	.	.	.	.
1.73	0.2780	2.12	.Q	.	.	.	.
1.85	0.2976	2.12	.Q	.	.	.	.
1.96	0.3174	2.13	.Q	.	.	.	.
2.07	0.3372	2.14	.Q	.	.	.	.
2.18	0.3570	2.15	.Q	.	.	.	.
2.30	0.3770	2.15	.Q	.	.	.	.

2.41	0.3970	2.16	.Q	.	.	.	.
2.52	0.4171	2.17	.Q	.	.	.	.
2.63	0.4372	2.18	.Q	.	.	.	.
2.74	0.4575	2.18	.Q	.	.	.	.
2.86	0.4778	2.19	.Q	.	.	.	.
2.97	0.4981	2.20	.Q	.	.	.	.
3.08	0.5186	2.21	.Q	.	.	.	.
3.19	0.5391	2.21	.Q	.	.	.	.
3.31	0.5597	2.23	.Q	.	.	.	.
3.42	0.5804	2.23	.Q	.	.	.	.
3.53	0.6012	2.24	.Q	.	.	.	.
3.64	0.6220	2.25	.Q	.	.	.	.
3.76	0.6429	2.26	.Q	.	.	.	.
3.87	0.6640	2.27	.Q	.	.	.	.
3.98	0.6851	2.28	.Q	.	.	.	.
4.09	0.7062	2.28	.Q	.	.	.	.
4.21	0.7275	2.30	.Q	.	.	.	.
4.32	0.7489	2.30	.Q	.	.	.	.
4.43	0.7703	2.32	.Q	.	.	.	.
4.54	0.7918	2.32	.Q	.	.	.	.
4.65	0.8135	2.34	.Q	.	.	.	.
4.77	0.8352	2.34	.Q	.	.	.	.
4.88	0.8570	2.36	.Q	.	.	.	.
4.99	0.8789	2.36	.Q	.	.	.	.
5.10	0.9009	2.38	.Q	.	.	.	.
5.22	0.9230	2.38	.Q	.	.	.	.
5.33	0.9452	2.40	.Q	.	.	.	.
5.44	0.9675	2.41	.Q	.	.	.	.
5.55	0.9899	2.42	.Q	.	.	.	.
5.67	1.0124	2.43	.Q	.	.	.	.
5.78	1.0351	2.44	.Q	.	.	.	.
5.89	1.0578	2.45	.Q	.	.	.	.
6.00	1.0806	2.47	.Q	.	.	.	.
6.11	1.1036	2.48	.Q	.	.	.	.
6.23	1.1266	2.49	.Q	.	.	.	.
6.34	1.1498	2.50	.Q	.	.	.	.
6.45	1.1731	2.52	.Q	.	.	.	.
6.56	1.1965	2.53	.Q	.	.	.	.
6.68	1.2200	2.54	.Q	.	.	.	.
6.79	1.2437	2.55	.Q	.	.	.	.
6.90	1.2674	2.57	.Q	.	.	.	.
7.01	1.2913	2.58	.Q	.	.	.	.
7.13	1.3154	2.60	.Q	.	.	.	.
7.24	1.3395	2.61	.Q	.	.	.	.
7.35	1.3638	2.63	.Q	.	.	.	.
7.46	1.3882	2.64	.Q	.	.	.	.
7.58	1.4128	2.66	.Q	.	.	.	.
7.69	1.4375	2.67	.Q	.	.	.	.
7.80	1.4624	2.69	.Q	.	.	.	.
7.91	1.4874	2.70	.Q	.	.	.	.
8.02	1.5125	2.72	.Q	.	.	.	.
8.14	1.5378	2.73	.Q	.	.	.	.
8.25	1.5633	2.75	.Q	.	.	.	.
8.36	1.5889	2.77	.Q	.	.	.	.
8.47	1.6147	2.79	.Q	.	.	.	.
8.59	1.6407	2.80	.Q	.	.	.	.
8.70	1.6668	2.83	.Q	.	.	.	.
8.81	1.6931	2.84	.Q	.	.	.	.
8.92	1.7195	2.86	.Q	.	.	.	.
9.04	1.7462	2.88	.Q	.	.	.	.
9.15	1.7730	2.90	.Q	.	.	.	.
9.26	1.8000	2.92	.Q	.	.	.	.
9.37	1.8273	2.95	.Q	.	.	.	.
9.48	1.8547	2.96	.Q	.	.	.	.
9.60	1.8823	2.99	.Q	.	.	.	.
9.71	1.9101	3.01	.Q	.	.	.	.
9.82	1.9382	3.04	.Q	.	.	.	.
9.93	1.9664	3.05	.Q	.	.	.	.
10.05	1.9949	3.09	.Q	.	.	.	.

10.16	2.0236	3.10	.Q	.	.	.	.
10.27	2.0526	3.14	.Q	.	.	.	.
10.38	2.0818	3.15	.Q	.	.	.	.
10.50	2.1113	3.19	.Q	.	.	.	.
10.61	2.1410	3.21	.Q	.	.	.	.
10.72	2.1709	3.25	.Q	.	.	.	.
10.83	2.2012	3.27	.Q	.	.	.	.
10.95	2.2317	3.31	.Q	.	.	.	.
11.06	2.2626	3.33	.Q	.	.	.	.
11.17	2.2937	3.37	.Q	.	.	.	.
11.28	2.3251	3.40	.Q	.	.	.	.
11.39	2.3569	3.44	.Q	.	.	.	.
11.51	2.3890	3.47	.Q	.	.	.	.
11.62	2.4214	3.52	. Q	.	.	.	.
11.73	2.4542	3.55	. Q	.	.	.	.
11.84	2.4874	3.60	. Q	.	.	.	.
11.96	2.5209	3.63	. Q	.	.	.	.
12.07	2.5538	3.46	.Q	.	.	.	.
12.18	2.5846	3.17	.Q	.	.	.	.
12.29	2.6143	3.23	.Q	.	.	.	.
12.41	2.6445	3.27	.Q	.	.	.	.
12.52	2.6752	3.34	.Q	.	.	.	.
12.63	2.7063	3.38	.Q	.	.	.	.
12.74	2.7380	3.45	.Q	.	.	.	.
12.85	2.7703	3.49	.Q	.	.	.	.
12.97	2.8031	3.58	. Q	.	.	.	.
13.08	2.8366	3.63	. Q	.	.	.	.
13.19	2.8707	3.72	. Q	.	.	.	.
13.30	2.9055	3.77	. Q	.	.	.	.
13.42	2.9411	3.88	. Q	.	.	.	.
13.53	2.9774	3.94	. Q	.	.	.	.
13.64	3.0146	4.07	. Q	.	.	.	.
13.75	3.0526	4.13	. Q	.	.	.	.
13.87	3.0916	4.28	. Q	.	.	.	.
13.98	3.1317	4.35	. Q	.	.	.	.
14.09	3.1710	4.11	. Q	.	.	.	.
14.20	3.2087	4.03	. Q	.	.	.	.
14.32	3.2471	4.22	. Q	.	.	.	.
14.43	3.2868	4.33	. Q	.	.	.	.
14.54	3.3281	4.57	. Q	.	.	.	.
14.65	3.3712	4.71	. Q	.	.	.	.
14.76	3.4164	5.01	. Q	.	.	.	.
14.88	3.4637	5.19	. Q	.	.	.	.
14.99	3.5138	5.59	. Q	.	.	.	.
15.10	3.5668	5.83	. Q	.	.	.	.
15.21	3.6236	6.40	. Q	.	.	.	.
15.33	3.6846	6.75	. Q	.	.	.	.
15.44	3.7540	8.20	. Q	.	.	.	.
15.55	3.8332	8.85	. Q	.	.	.	.
15.66	3.9229	10.49	. Q	.	.	.	.
15.78	4.0319	12.99	. Q	.	.	.	.
15.89	4.1866	20.33	. Q	.	.	.	.
16.00	4.4055	26.84	.	Q	.	.	.
16.11	4.8210	62.66	.	.	.	Q	.
16.22	5.1903	16.89	. Q.	.	.	.	.
16.34	5.3131	9.57	. Q	.	.	.	.
16.45	5.3907	7.15	. Q	.	.	.	.
16.56	5.4522	6.10	. Q	.	.	.	.
16.67	5.5055	5.38	. Q	.	.	.	.
16.79	5.5530	4.86	. Q	.	.	.	.
16.90	5.5962	4.45	. Q	.	.	.	.
17.01	5.6360	4.12	. Q	.	.	.	.
17.12	5.6757	4.43	. Q	.	.	.	.
17.24	5.7158	4.20	. Q	.	.	.	.
17.35	5.7539	4.00	. Q	.	.	.	.
17.46	5.7902	3.83	. Q	.	.	.	.
17.57	5.8251	3.67	. Q	.	.	.	.
17.68	5.8585	3.54	. Q	.	.	.	.
17.80	5.8908	3.41	.Q	.	.	.	.

17.91	5.9220	3.30	.Q	.	.	.	.
18.02	5.9522	3.20	.Q	.	.	.	.
18.13	5.9840	3.66	. Q	.	.	.	.
18.25	6.0176	3.57	. Q	.	.	.	.
18.36	6.0504	3.49	.Q	.	.	.	.
18.47	6.0825	3.42	.Q	.	.	.	.
18.58	6.1139	3.35	.Q	.	.	.	.
18.70	6.1447	3.29	.Q	.	.	.	.
18.81	6.1750	3.23	.Q	.	.	.	.
18.92	6.2047	3.17	.Q	.	.	.	.
19.03	6.2339	3.12	.Q	.	.	.	.
19.15	6.2626	3.07	.Q	.	.	.	.
19.26	6.2909	3.02	.Q	.	.	.	.
19.37	6.3187	2.98	.Q	.	.	.	.
19.48	6.3461	2.93	.Q	.	.	.	.
19.59	6.3732	2.89	.Q	.	.	.	.
19.71	6.3998	2.85	.Q	.	.	.	.
19.82	6.4261	2.81	.Q	.	.	.	.
19.93	6.4521	2.78	.Q	.	.	.	.
20.04	6.4777	2.74	.Q	.	.	.	.
20.16	6.5030	2.71	.Q	.	.	.	.
20.27	6.5280	2.68	.Q	.	.	.	.
20.38	6.5527	2.65	.Q	.	.	.	.
20.49	6.5771	2.62	.Q	.	.	.	.
20.61	6.6013	2.59	.Q	.	.	.	.
20.72	6.6252	2.56	.Q	.	.	.	.
20.83	6.6488	2.53	.Q	.	.	.	.
20.94	6.6723	2.51	.Q	.	.	.	.
21.06	6.6954	2.48	.Q	.	.	.	.
21.17	6.7184	2.46	.Q	.	.	.	.
21.28	6.7411	2.44	.Q	.	.	.	.
21.39	6.7636	2.41	.Q	.	.	.	.
21.50	6.7859	2.39	.Q	.	.	.	.
21.62	6.8080	2.37	.Q	.	.	.	.
21.73	6.8299	2.35	.Q	.	.	.	.
21.84	6.8516	2.33	.Q	.	.	.	.
21.95	6.8732	2.31	.Q	.	.	.	.
22.07	6.8945	2.29	.Q	.	.	.	.
22.18	6.9157	2.27	.Q	.	.	.	.
22.29	6.9367	2.25	.Q	.	.	.	.
22.40	6.9576	2.24	.Q	.	.	.	.
22.52	6.9783	2.22	.Q	.	.	.	.
22.63	6.9988	2.20	.Q	.	.	.	.
22.74	7.0192	2.19	.Q	.	.	.	.
22.85	7.0394	2.17	.Q	.	.	.	.
22.96	7.0595	2.16	.Q	.	.	.	.
23.08	7.0794	2.14	.Q	.	.	.	.
23.19	7.0992	2.13	.Q	.	.	.	.
23.30	7.1189	2.11	.Q	.	.	.	.
23.41	7.1384	2.10	.Q	.	.	.	.
23.53	7.1578	2.08	.Q	.	.	.	.
23.64	7.1771	2.07	.Q	.	.	.	.
23.75	7.1962	2.06	.Q	.	.	.	.
23.86	7.2153	2.04	.Q	.	.	.	.
23.98	7.2342	2.03	.Q	.	.	.	.
24.09	7.2530	2.02	.Q	.	.	.	.
24.20	7.2623	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1442.4
10%	80.9
20%	33.7

30%	20.2
40%	13.5
50%	6.7
60%	6.7
70%	6.7
80%	6.7
90%	6.7

Problem Descriptions:

SAM'S CLUB HESPERIA

BASIN ROUTING

100-YEAR, POST-CONDITIONS, DA B

=====

FLOW-THROUGH DETENTION BASIN MODEL

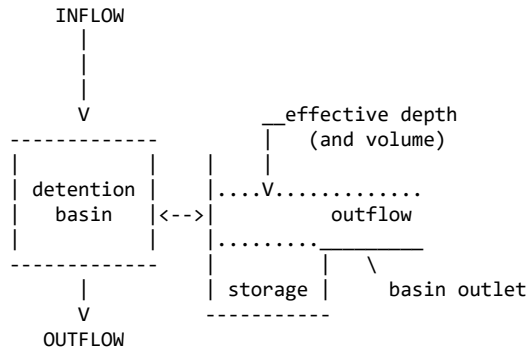
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 6.740

DEAD STORAGE(AF) = 0.00

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00

ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 6

* BASIN-DEPTH	STORAGE	OUTFLOW	** BASIN-DEPTH	STORAGE	OUTFLOW
*(FEET)	(ACRE-FEET)	(CFS)	*(FEET)	(ACRE-FEET)	(CFS)
* 0.000	0.000	0.000	** 4.000	0.000	0.000
* 4.500	0.427	0.730	** 5.000	0.879	6.610
* 6.000	1.859	31.320	** 7.000	2.944	66.540

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	4.00	0.00000	0.00000
3	4.50	0.42371	0.43049
4	5.00	0.84822	0.90958
5	6.00	1.71312	2.00388
6	7.00	2.63483	3.25257

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.049	0.000	0.00	4.00	0.00	0.000

0.161	0.000	2.02	4.02	0.02	0.019
0.273	0.000	2.03	4.04	0.05	0.037
0.386	0.000	2.03	4.06	0.08	0.055
0.498	0.000	2.04	4.09	0.11	0.073
0.610	0.000	2.05	4.11	0.14	0.091
0.723	0.000	2.05	4.13	0.17	0.108
0.835	0.000	2.06	4.15	0.20	0.126
0.947	0.000	2.06	4.17	0.23	0.143
1.060	0.000	2.07	4.19	0.26	0.159
1.172	0.000	2.08	4.21	0.29	0.176
1.284	0.000	2.09	4.23	0.31	0.192
1.397	0.000	2.09	4.24	0.34	0.209
1.509	0.000	2.10	4.26	0.37	0.225
1.621	0.000	2.11	4.28	0.40	0.241
1.734	0.000	2.12	4.30	0.42	0.256
1.846	0.000	2.12	4.32	0.45	0.272
1.958	0.000	2.13	4.34	0.48	0.287
2.071	0.000	2.14	4.35	0.50	0.302
2.183	0.000	2.15	4.37	0.53	0.317
2.295	0.000	2.15	4.39	0.56	0.332
2.408	0.000	2.16	4.41	0.58	0.347
2.520	0.000	2.17	4.42	0.61	0.361
2.632	0.000	2.18	4.44	0.63	0.376
2.745	0.000	2.18	4.46	0.65	0.390
2.857	0.000	2.19	4.47	0.68	0.404
2.969	0.000	2.20	4.49	0.70	0.418
3.082	0.000	2.21	4.50	0.75	0.431
3.194	0.000	2.21	4.52	0.87	0.444
3.306	0.000	2.23	4.53	1.02	0.455
3.419	0.000	2.23	4.54	1.16	0.465
3.531	0.000	2.24	4.55	1.28	0.474
3.643	0.000	2.25	4.56	1.39	0.482
3.756	0.000	2.26	4.57	1.49	0.489
3.868	0.000	2.27	4.58	1.58	0.495
3.980	0.000	2.28	4.58	1.66	0.501
4.093	0.000	2.28	4.59	1.73	0.506
4.205	0.000	2.30	4.59	1.79	0.511
4.317	0.000	2.30	4.60	1.85	0.515
4.430	0.000	2.32	4.60	1.90	0.519
4.542	0.000	2.32	4.61	1.95	0.523
4.654	0.000	2.34	4.61	1.99	0.526
4.767	0.000	2.34	4.61	2.03	0.529
4.879	0.000	2.36	4.62	2.07	0.531
4.991	0.000	2.36	4.62	2.10	0.534
5.104	0.000	2.38	4.62	2.13	0.536
5.216	0.000	2.38	4.62	2.16	0.538
5.328	0.000	2.40	4.62	2.19	0.540
5.441	0.000	2.41	4.63	2.21	0.542
5.553	0.000	2.42	4.63	2.23	0.544
5.665	0.000	2.43	4.63	2.26	0.545
5.778	0.000	2.44	4.63	2.28	0.547
5.890	0.000	2.45	4.63	2.30	0.548
6.002	0.000	2.47	4.64	2.31	0.550
6.115	0.000	2.48	4.64	2.33	0.551
6.227	0.000	2.49	4.64	2.35	0.552
6.339	0.000	2.50	4.64	2.37	0.553
6.452	0.000	2.52	4.64	2.38	0.555
6.564	0.000	2.53	4.64	2.40	0.556
6.676	0.000	2.54	4.64	2.41	0.557
6.789	0.000	2.55	4.65	2.43	0.558
6.901	0.000	2.57	4.65	2.44	0.559
7.013	0.000	2.58	4.65	2.46	0.561
7.126	0.000	2.60	4.65	2.47	0.562
7.238	0.000	2.61	4.65	2.49	0.563
7.350	0.000	2.63	4.65	2.50	0.564
7.463	0.000	2.64	4.65	2.52	0.565
7.575	0.000	2.66	4.65	2.53	0.566
7.687	0.000	2.67	4.66	2.55	0.567
7.800	0.000	2.69	4.66	2.56	0.568

7.912	0.000	2.70	4.66	2.58	0.570
8.024	0.000	2.72	4.66	2.59	0.571
8.137	0.000	2.73	4.66	2.61	0.572
8.249	0.000	2.75	4.66	2.62	0.573
8.361	0.000	2.77	4.66	2.64	0.574
8.474	0.000	2.79	4.66	2.65	0.576
8.586	0.000	2.80	4.67	2.67	0.577
8.698	0.000	2.83	4.67	2.69	0.578
8.811	0.000	2.84	4.67	2.70	0.579
8.923	0.000	2.86	4.67	2.72	0.581
9.035	0.000	2.88	4.67	2.74	0.582
9.148	0.000	2.90	4.67	2.75	0.583
9.260	0.000	2.92	4.67	2.77	0.585
9.372	0.000	2.95	4.68	2.79	0.586
9.485	0.000	2.96	4.68	2.81	0.588
9.597	0.000	2.99	4.68	2.83	0.589
9.709	0.000	3.01	4.68	2.85	0.591
9.822	0.000	3.04	4.68	2.87	0.592
9.934	0.000	3.05	4.68	2.89	0.594
10.046	0.000	3.09	4.69	2.91	0.595
10.159	0.000	3.10	4.69	2.93	0.597
10.271	0.000	3.14	4.69	2.95	0.599
10.383	0.000	3.15	4.69	2.97	0.600
10.496	0.000	3.19	4.69	3.00	0.602
10.608	0.000	3.21	4.70	3.02	0.604
10.720	0.000	3.25	4.70	3.04	0.606
10.833	0.000	3.27	4.70	3.07	0.608
10.945	0.000	3.31	4.70	3.09	0.610
11.057	0.000	3.33	4.70	3.12	0.612
11.170	0.000	3.37	4.71	3.15	0.614
11.282	0.000	3.40	4.71	3.17	0.616
11.394	0.000	3.44	4.71	3.20	0.618
11.507	0.000	3.47	4.71	3.23	0.620
11.619	0.000	3.52	4.72	3.26	0.623
11.731	0.000	3.55	4.72	3.29	0.625
11.844	0.000	3.60	4.72	3.32	0.628
11.956	0.000	3.63	4.72	3.36	0.630
12.068	0.000	3.46	4.73	3.38	0.631
12.181	0.000	3.17	4.72	3.37	0.629
12.293	0.000	3.23	4.72	3.35	0.628
12.405	0.000	3.27	4.72	3.34	0.627
12.518	0.000	3.34	4.72	3.34	0.627
12.630	0.000	3.38	4.72	3.34	0.628
12.742	0.000	3.45	4.72	3.35	0.629
12.855	0.000	3.49	4.72	3.36	0.630
12.967	0.000	3.58	4.73	3.38	0.632
13.079	0.000	3.63	4.73	3.41	0.634
13.192	0.000	3.72	4.73	3.44	0.636
13.304	0.000	3.77	4.73	3.47	0.639
13.416	0.000	3.88	4.74	3.51	0.643
13.529	0.000	3.94	4.74	3.56	0.646
13.641	0.000	4.07	4.75	3.61	0.650
13.753	0.000	4.13	4.75	3.67	0.655
13.866	0.000	4.28	4.76	3.73	0.660
13.978	0.000	4.35	4.76	3.79	0.665
14.090	0.000	4.11	4.77	3.84	0.668
14.203	0.000	4.03	4.77	3.87	0.669
14.315	0.000	4.22	4.77	3.90	0.672
14.427	0.000	4.33	4.78	3.94	0.676
14.540	0.000	4.57	4.78	4.00	0.681
14.652	0.000	4.71	4.79	4.07	0.687
14.764	0.000	5.01	4.80	4.16	0.695
14.877	0.000	5.19	4.81	4.27	0.703
14.989	0.000	5.59	4.82	4.40	0.714
15.101	0.000	5.83	4.83	4.55	0.726
15.214	0.000	6.40	4.85	4.73	0.742
15.326	0.000	6.75	4.87	4.94	0.759
15.438	0.000	8.20	4.90	5.23	0.786
15.551	0.000	8.85	4.93	5.60	0.817

15.663	0.000	10.49	4.98	6.07	0.858
15.775	0.000	12.99	5.04	6.91	0.914
15.888	0.000	20.33	5.14	8.84	1.021
16.000	0.000	26.84	5.29	11.93	1.159
16.112	0.000	62.66	5.70	18.81	1.566
16.225	0.000	16.89	5.64	23.21	1.508
16.337	0.000	9.57	5.53	21.12	1.400
16.449	0.000	7.15	5.43	18.44	1.296
16.562	0.000	6.10	5.33	15.96	1.204
16.674	0.000	5.38	5.25	13.82	1.126
16.786	0.000	4.86	5.18	12.00	1.059
16.899	0.000	4.45	5.13	10.46	1.004
17.011	0.000	4.12	5.08	9.16	0.957
17.123	0.000	4.43	5.04	8.14	0.922
17.236	0.000	4.20	5.01	7.34	0.893
17.348	0.000	4.00	4.99	6.72	0.868
17.460	0.000	3.83	4.96	6.32	0.845
17.573	0.000	3.67	4.94	6.03	0.823
17.685	0.000	3.54	4.92	5.75	0.803
17.797	0.000	3.41	4.89	5.49	0.783
17.910	0.000	3.30	4.87	5.25	0.765
18.022	0.000	3.20	4.86	5.02	0.748
18.134	0.000	3.66	4.84	4.84	0.737
18.247	0.000	3.57	4.83	4.70	0.727
18.359	0.000	3.49	4.82	4.57	0.717
18.471	0.000	3.42	4.81	4.44	0.707
18.584	0.000	3.35	4.80	4.32	0.698
18.696	0.000	3.29	4.79	4.21	0.690
18.808	0.000	3.23	4.78	4.10	0.682
18.921	0.000	3.17	4.77	4.00	0.674
19.033	0.000	3.12	4.77	3.90	0.667
19.145	0.000	3.07	4.76	3.81	0.660
19.258	0.000	3.02	4.75	3.72	0.654
19.370	0.000	2.98	4.74	3.64	0.647
19.482	0.000	2.93	4.74	3.56	0.642
19.595	0.000	2.89	4.73	3.49	0.636
19.707	0.000	2.85	4.73	3.42	0.631
19.819	0.000	2.81	4.72	3.35	0.626
19.932	0.000	2.78	4.71	3.29	0.621
20.044	0.000	2.74	4.71	3.23	0.617
20.156	0.000	2.71	4.71	3.17	0.612
20.269	0.000	2.68	4.70	3.12	0.608
20.381	0.000	2.65	4.70	3.06	0.604
20.493	0.000	2.62	4.69	3.01	0.601
20.606	0.000	2.59	4.69	2.97	0.597
20.718	0.000	2.56	4.68	2.92	0.594
20.830	0.000	2.53	4.68	2.88	0.591
20.943	0.000	2.51	4.68	2.84	0.588
21.055	0.000	2.48	4.67	2.80	0.585
21.167	0.000	2.46	4.67	2.76	0.582
21.280	0.000	2.44	4.67	2.73	0.579
21.392	0.000	2.41	4.67	2.69	0.577
21.504	0.000	2.39	4.66	2.66	0.574
21.617	0.000	2.37	4.66	2.63	0.572
21.729	0.000	2.35	4.66	2.60	0.569
21.841	0.000	2.33	4.66	2.57	0.567
21.954	0.000	2.31	4.65	2.54	0.565
22.066	0.000	2.29	4.65	2.51	0.563
22.178	0.000	2.27	4.65	2.49	0.561
22.291	0.000	2.25	4.65	2.46	0.559
22.403	0.000	2.24	4.64	2.44	0.557
22.515	0.000	2.22	4.64	2.41	0.555
22.628	0.000	2.20	4.64	2.39	0.554
22.740	0.000	2.19	4.64	2.37	0.552
22.852	0.000	2.17	4.64	2.35	0.550
22.965	0.000	2.16	4.63	2.33	0.549
23.077	0.000	2.14	4.63	2.30	0.547
23.189	0.000	2.13	4.63	2.29	0.546
23.302	0.000	2.11	4.63	2.27	0.544

23.414	0.000	2.10	4.63	2.25	0.543
23.526	0.000	2.08	4.63	2.23	0.542
23.639	0.000	2.07	4.63	2.21	0.540
23.751	0.000	2.06	4.62	2.20	0.539
23.863	0.000	2.04	4.62	2.18	0.538
23.976	0.000	2.03	4.62	2.16	0.537
24.088	0.000	2.02	4.62	2.15	0.535
24.200	0.000	0.00	4.60	2.02	0.517
24.313	0.000	0.00	4.58	1.79	0.500
24.425	0.000	0.00	4.56	1.58	0.485
24.537	0.000	0.00	4.55	1.40	0.472
24.650	0.000	0.00	4.54	1.24	0.461
24.762	0.000	0.00	4.53	1.10	0.451
24.874	0.000	0.00	4.52	0.98	0.441
24.987	0.000	0.00	4.51	0.86	0.433
25.099	0.000	0.00	4.50	0.77	0.426
25.211	0.000	0.00	4.49	0.72	0.420
25.324	0.000	0.00	4.48	0.71	0.413
25.436	0.000	0.00	4.48	0.70	0.406
25.548	0.000	0.00	4.47	0.69	0.400
25.661	0.000	0.00	4.46	0.68	0.394
25.773	0.000	0.00	4.45	0.67	0.388
25.885	0.000	0.00	4.45	0.66	0.381
25.998	0.000	0.00	4.44	0.65	0.375
26.110	0.000	0.00	4.43	0.64	0.370
26.222	0.000	0.00	4.43	0.63	0.364
26.335	0.000	0.00	4.42	0.62	0.358
26.447	0.000	0.00	4.41	0.61	0.352
26.559	0.000	0.00	4.41	0.60	0.347
26.672	0.000	0.00	4.40	0.59	0.341
26.784	0.000	0.00	4.39	0.58	0.336
26.896	0.000	0.00	4.39	0.57	0.331
27.009	0.000	0.00	4.38	0.56	0.326
27.121	0.000	0.00	4.38	0.55	0.320
27.233	0.000	0.00	4.37	0.54	0.315
27.346	0.000	0.00	4.36	0.53	0.310
27.458	0.000	0.00	4.36	0.53	0.305
27.570	0.000	0.00	4.35	0.52	0.301
27.683	0.000	0.00	4.35	0.51	0.296
27.795	0.000	0.00	4.34	0.50	0.291
27.907	0.000	0.00	4.34	0.49	0.287
28.020	0.000	0.00	4.33	0.49	0.282
28.132	0.000	0.00	4.33	0.48	0.278
28.244	0.000	0.00	4.32	0.47	0.273
28.357	0.000	0.00	4.31	0.46	0.269
28.469	0.000	0.00	4.31	0.46	0.265
28.581	0.000	0.00	4.31	0.45	0.261
28.694	0.000	0.00	4.30	0.44	0.257
28.806	0.000	0.00	4.30	0.44	0.253
28.918	0.000	0.00	4.29	0.43	0.249
29.031	0.000	0.00	4.29	0.42	0.245
29.143	0.000	0.00	4.28	0.41	0.241
29.255	0.000	0.00	4.28	0.41	0.237
29.368	0.000	0.00	4.27	0.40	0.233
29.480	0.000	0.00	4.27	0.40	0.230
29.592	0.000	0.00	4.26	0.39	0.226
29.705	0.000	0.00	4.26	0.38	0.222
29.817	0.000	0.00	4.26	0.38	0.219
29.929	0.000	0.00	4.25	0.37	0.215
30.042	0.000	0.00	4.25	0.37	0.212
30.154	0.000	0.00	4.24	0.36	0.209
30.266	0.000	0.00	4.24	0.35	0.205
30.379	0.000	0.00	4.24	0.35	0.202
30.491	0.000	0.00	4.23	0.34	0.199
30.603	0.000	0.00	4.23	0.34	0.196
30.716	0.000	0.00	4.23	0.33	0.193
30.828	0.000	0.00	4.22	0.33	0.190
30.940	0.000	0.00	4.22	0.32	0.187
31.053	0.000	0.00	4.22	0.32	0.184

31.165	0.000	0.00	4.21	0.31	0.181
31.277	0.000	0.00	4.21	0.31	0.178
31.390	0.000	0.00	4.21	0.30	0.175
31.502	0.000	0.00	4.20	0.30	0.173
31.614	0.000	0.00	4.20	0.29	0.170
31.727	0.000	0.00	4.20	0.29	0.167
31.839	0.000	0.00	4.19	0.28	0.165
31.951	0.000	0.00	4.19	0.28	0.162
32.064	0.000	0.00	4.19	0.27	0.159
32.176	0.000	0.00	4.18	0.27	0.157
32.288	0.000	0.00	4.18	0.27	0.154
32.401	0.000	0.00	4.18	0.26	0.152
32.513	0.000	0.00	4.18	0.26	0.150
32.625	0.000	0.00	4.17	0.25	0.147
32.738	0.000	0.00	4.17	0.25	0.145
32.850	0.000	0.00	4.17	0.25	0.143
32.962	0.000	0.00	4.16	0.24	0.140
33.075	0.000	0.00	4.16	0.24	0.138
33.187	0.000	0.00	4.16	0.23	0.136
33.299	0.000	0.00	4.16	0.23	0.134
33.412	0.000	0.00	4.15	0.23	0.132
33.524	0.000	0.00	4.15	0.22	0.130
33.636	0.000	0.00	4.15	0.22	0.128
33.749	0.000	0.00	4.15	0.22	0.126
33.861	0.000	0.00	4.14	0.21	0.124
33.973	0.000	0.00	4.14	0.21	0.122
34.086	0.000	0.00	4.14	0.21	0.120
34.198	0.000	0.00	4.14	0.20	0.118
34.310	0.000	0.00	4.14	0.20	0.116
34.423	0.000	0.00	4.13	0.20	0.114
34.535	0.000	0.00	4.13	0.19	0.112
34.647	0.000	0.00	4.13	0.19	0.111
34.760	0.000	0.00	4.13	0.19	0.109
34.872	0.000	0.00	4.13	0.18	0.107
34.984	0.000	0.00	4.12	0.18	0.106
35.097	0.000	0.00	4.12	0.18	0.104
35.209	0.000	0.00	4.12	0.18	0.102
35.321	0.000	0.00	4.12	0.17	0.101
35.434	0.000	0.00	4.12	0.17	0.099
35.546	0.000	0.00	4.11	0.17	0.097
35.658	0.000	0.00	4.11	0.17	0.096
35.771	0.000	0.00	4.11	0.16	0.094
35.883	0.000	0.00	4.11	0.16	0.093
35.995	0.000	0.00	4.11	0.16	0.091
36.108	0.000	0.00	4.11	0.16	0.090
36.220	0.000	0.00	4.10	0.15	0.089
36.332	0.000	0.00	4.10	0.15	0.087
36.445	0.000	0.00	4.10	0.15	0.086
36.557	0.000	0.00	4.10	0.15	0.084
36.669	0.000	0.00	4.10	0.14	0.083
36.782	0.000	0.00	4.10	0.14	0.082
36.894	0.000	0.00	4.09	0.14	0.081
37.006	0.000	0.00	4.09	0.14	0.079
37.119	0.000	0.00	4.09	0.13	0.078
37.231	0.000	0.00	4.09	0.13	0.077
37.343	0.000	0.00	4.09	0.13	0.076
37.456	0.000	0.00	4.09	0.13	0.074
37.568	0.000	0.00	4.09	0.13	0.073
37.680	0.000	0.00	4.08	0.12	0.072
37.793	0.000	0.00	4.08	0.12	0.071
37.905	0.000	0.00	4.08	0.12	0.070
38.017	0.000	0.00	4.08	0.12	0.069
38.130	0.000	0.00	4.08	0.12	0.068
38.242	0.000	0.00	4.08	0.11	0.067
38.354	0.000	0.00	4.08	0.11	0.066
38.467	0.000	0.00	4.08	0.11	0.065
38.579	0.000	0.00	4.07	0.11	0.063
38.691	0.000	0.00	4.07	0.11	0.062
38.804	0.000	0.00	4.07	0.11	0.062

38.916	0.000	0.00	4.07	0.10	0.061
39.028	0.000	0.00	4.07	0.10	0.060
39.141	0.000	0.00	4.07	0.10	0.059
39.253	0.000	0.00	4.07	0.10	0.058
39.365	0.000	0.00	4.07	0.10	0.057
39.478	0.000	0.00	4.07	0.10	0.056
39.590	0.000	0.00	4.06	0.09	0.055
39.702	0.000	0.00	4.06	0.09	0.054
39.815	0.000	0.00	4.06	0.09	0.053
39.927	0.000	0.00	4.06	0.09	0.052
40.039	0.000	0.00	4.06	0.09	0.052
40.152	0.000	0.00	4.06	0.09	0.051
40.264	0.000	0.00	4.06	0.09	0.050
40.376	0.000	0.00	4.06	0.08	0.049
40.489	0.000	0.00	4.06	0.08	0.048
40.601	0.000	0.00	4.06	0.08	0.048
40.713	0.000	0.00	4.05	0.08	0.047
40.826	0.000	0.00	4.05	0.08	0.046
40.938	0.000	0.00	4.05	0.08	0.046
41.050	0.000	0.00	4.05	0.08	0.045
41.163	0.000	0.00	4.05	0.08	0.044
41.275	0.000	0.00	4.05	0.07	0.043
41.387	0.000	0.00	4.05	0.07	0.043
41.500	0.000	0.00	4.05	0.07	0.042
41.612	0.000	0.00	4.05	0.07	0.041
41.724	0.000	0.00	4.05	0.07	0.041
41.837	0.000	0.00	4.05	0.07	0.040
41.949	0.000	0.00	4.05	0.07	0.039
42.062	0.000	0.00	4.05	0.07	0.039
42.174	0.000	0.00	4.04	0.07	0.038
42.286	0.000	0.00	4.04	0.06	0.038
42.399	0.000	0.00	4.04	0.06	0.037
42.511	0.000	0.00	4.04	0.06	0.036
42.623	0.000	0.00	4.04	0.06	0.036
42.736	0.000	0.00	4.04	0.06	0.035
42.848	0.000	0.00	4.04	0.06	0.035
42.960	0.000	0.00	4.04	0.06	0.034
43.073	0.000	0.00	4.04	0.06	0.034
43.185	0.000	0.00	4.04	0.06	0.033
43.297	0.000	0.00	4.04	0.06	0.033
43.410	0.000	0.00	4.04	0.06	0.032
43.522	0.000	0.00	4.04	0.05	0.032
43.634	0.000	0.00	4.04	0.05	0.031
43.747	0.000	0.00	4.04	0.05	0.031
43.859	0.000	0.00	4.04	0.05	0.030
43.971	0.000	0.00	4.03	0.05	0.030
44.084	0.000	0.00	4.03	0.05	0.029
44.196	0.000	0.00	4.03	0.05	0.029
44.308	0.000	0.00	4.03	0.05	0.028
44.421	0.000	0.00	4.03	0.05	0.028
44.533	0.000	0.00	4.03	0.05	0.027
44.645	0.000	0.00	4.03	0.05	0.027
44.758	0.000	0.00	4.03	0.05	0.027
44.870	0.000	0.00	4.03	0.04	0.026
44.982	0.000	0.00	4.03	0.04	0.026
45.095	0.000	0.00	4.03	0.04	0.025
45.207	0.000	0.00	4.03	0.04	0.025
45.319	0.000	0.00	4.03	0.04	0.025
45.432	0.000	0.00	4.03	0.04	0.024
45.544	0.000	0.00	4.03	0.04	0.024
45.656	0.000	0.00	4.03	0.04	0.023
45.769	0.000	0.00	4.03	0.04	0.023
45.881	0.000	0.00	4.03	0.04	0.023
45.993	0.000	0.00	4.03	0.04	0.022
46.106	0.000	0.00	4.03	0.04	0.022
46.218	0.000	0.00	4.03	0.04	0.022
46.330	0.000	0.00	4.02	0.04	0.021
46.443	0.000	0.00	4.02	0.04	0.021
46.555	0.000	0.00	4.02	0.04	0.021

46.667	0.000	0.00	4.02	0.03	0.020
46.780	0.000	0.00	4.02	0.03	0.020
46.892	0.000	0.00	4.02	0.03	0.020
47.004	0.000	0.00	4.02	0.03	0.019
47.117	0.000	0.00	4.02	0.03	0.019
47.229	0.000	0.00	4.02	0.03	0.019
47.341	0.000	0.00	4.02	0.03	0.018
47.454	0.000	0.00	4.02	0.03	0.018
47.566	0.000	0.00	4.02	0.03	0.018
47.678	0.000	0.00	4.02	0.03	0.018
47.791	0.000	0.00	4.02	0.03	0.017
47.903	0.000	0.00	4.02	0.03	0.017
48.015	0.000	0.00	4.02	0.03	0.017
48.128	0.000	0.00	4.02	0.03	0.016
48.240	0.000	0.00	4.02	0.03	0.016
48.352	0.000	0.00	4.02	0.03	0.016
48.465	0.000	0.00	4.02	0.03	0.016
48.577	0.000	0.00	4.02	0.03	0.015
48.689	0.000	0.00	4.02	0.03	0.015
48.802	0.000	0.00	4.02	0.03	0.015
48.914	0.000	0.00	4.02	0.03	0.015
49.026	0.000	0.00	4.02	0.03	0.015
49.139	0.000	0.00	4.02	0.02	0.014
49.251	0.000	0.00	4.02	0.02	0.014
49.363	0.000	0.00	4.02	0.02	0.014
49.476	0.000	0.00	4.02	0.02	0.014
49.588	0.000	0.00	4.02	0.02	0.013
49.700	0.000	0.00	4.02	0.02	0.013
49.813	0.000	0.00	4.02	0.02	0.013
49.925	0.000	0.00	4.01	0.02	0.013
50.037	0.000	0.00	4.01	0.02	0.013
50.150	0.000	0.00	4.01	0.02	0.012
50.262	0.000	0.00	4.01	0.02	0.012
50.374	0.000	0.00	4.01	0.02	0.012
50.487	0.000	0.00	4.01	0.02	0.012
50.599	0.000	0.00	4.01	0.02	0.012
50.711	0.000	0.00	4.01	0.02	0.011
50.824	0.000	0.00	4.01	0.02	0.011
50.936	0.000	0.00	4.01	0.02	0.011
51.048	0.000	0.00	4.01	0.02	0.011
51.161	0.000	0.00	4.01	0.02	0.011
51.273	0.000	0.00	4.01	0.02	0.011
51.385	0.000	0.00	4.01	0.02	0.010
51.498	0.000	0.00	4.01	0.02	0.010
51.610	0.000	0.00	4.01	0.02	0.010
51.722	0.000	0.00	4.01	0.02	0.010
51.835	0.000	0.00	4.01	0.02	0.010
51.947	0.000	0.00	4.01	0.02	0.010
52.059	0.000	0.00	4.01	0.02	0.009
52.172	0.000	0.00	4.01	0.02	0.009
52.284	0.000	0.00	4.01	0.02	0.009
52.396	0.000	0.00	4.01	0.02	0.009
52.509	0.000	0.00	4.01	0.02	0.009
52.621	0.000	0.00	4.01	0.02	0.009
52.733	0.000	0.00	4.01	0.01	0.009
52.846	0.000	0.00	4.01	0.01	0.008
52.958	0.000	0.00	4.01	0.01	0.008
53.070	0.000	0.00	4.01	0.01	0.008
53.183	0.000	0.00	4.01	0.01	0.008
53.295	0.000	0.00	4.01	0.01	0.008
53.407	0.000	0.00	4.01	0.01	0.008
53.520	0.000	0.00	4.01	0.01	0.008
53.632	0.000	0.00	4.01	0.01	0.008
53.744	0.000	0.00	4.01	0.01	0.007
53.857	0.000	0.00	4.01	0.01	0.007
53.969	0.000	0.00	4.01	0.01	0.007
54.081	0.000	0.00	4.01	0.01	0.007
54.194	0.000	0.00	4.01	0.01	0.007
54.306	0.000	0.00	4.01	0.01	0.007

54.418	0.000	0.00	4.01	0.01	0.007
54.531	0.000	0.00	4.01	0.01	0.007
54.643	0.000	0.00	4.01	0.01	0.007
54.755	0.000	0.00	4.01	0.01	0.006
54.868	0.000	0.00	4.01	0.01	0.006
54.980	0.000	0.00	4.01	0.01	0.006
55.092	0.000	0.00	4.01	0.01	0.006
55.205	0.000	0.00	4.01	0.01	0.006
55.317	0.000	0.00	4.01	0.01	0.006
55.429	0.000	0.00	4.01	0.01	0.006
55.542	0.000	0.00	4.01	0.01	0.006
55.654	0.000	0.00	4.01	0.01	0.006
55.766	0.000	0.00	4.01	0.01	0.006
55.879	0.000	0.00	4.01	0.01	0.006
55.991	0.000	0.00	4.01	0.01	0.005
56.103	0.000	0.00	4.01	0.01	0.005
56.216	0.000	0.00	4.01	0.01	0.005
56.328	0.000	0.00	4.01	0.01	0.005
56.440	0.000	0.00	4.01	0.01	0.005
56.553	0.000	0.00	4.01	0.01	0.005
56.665	0.000	0.00	4.01	0.01	0.005
56.777	0.000	0.00	4.01	0.01	0.005
56.890	0.000	0.00	4.01	0.01	0.005
57.002	0.000	0.00	4.01	0.01	0.005
57.114	0.000	0.00	4.01	0.01	0.005
57.227	0.000	0.00	4.01	0.01	0.005
57.339	0.000	0.00	4.01	0.01	0.004
57.451	0.000	0.00	4.01	0.01	0.004
57.564	0.000	0.00	4.01	0.01	0.004
57.676	0.000	0.00	4.01	0.01	0.004
57.788	0.000	0.00	4.00	0.01	0.004
57.901	0.000	0.00	4.00	0.01	0.004
58.013	0.000	0.00	4.00	0.01	0.004
58.125	0.000	0.00	4.00	0.01	0.004
58.238	0.000	0.00	4.00	0.01	0.004
58.350	0.000	0.00	4.00	0.01	0.004
58.462	0.000	0.00	4.00	0.01	0.004
58.575	0.000	0.00	4.00	0.01	0.004
58.687	0.000	0.00	4.00	0.01	0.004
58.799	0.000	0.00	4.00	0.01	0.004
58.912	0.000	0.00	4.00	0.01	0.004
59.024	0.000	0.00	4.00	0.01	0.004
59.136	0.000	0.00	4.00	0.01	0.003
59.249	0.000	0.00	4.00	0.01	0.003
59.361	0.000	0.00	4.00	0.01	0.003
59.473	0.000	0.00	4.00	0.01	0.003
59.586	0.000	0.00	4.00	0.01	0.003
59.698	0.000	0.00	4.00	0.01	0.003
59.810	0.000	0.00	4.00	0.01	0.003
59.923	0.000	0.00	4.00	0.01	0.003
60.035	0.000	0.00	4.00	0.01	0.003
60.147	0.000	0.00	4.00	0.01	0.003
60.260	0.000	0.00	4.00	0.01	0.003
60.372	0.000	0.00	4.00	0.01	0.003
60.484	0.000	0.00	4.00	0.00	0.003
60.597	0.000	0.00	4.00	0.00	0.003
60.709	0.000	0.00	4.00	0.00	0.003
60.821	0.000	0.00	4.00	0.00	0.003
60.934	0.000	0.00	4.00	0.00	0.003
61.046	0.000	0.00	4.00	0.00	0.003
61.158	0.000	0.00	4.00	0.00	0.003
61.271	0.000	0.00	4.00	0.00	0.003
61.383	0.000	0.00	4.00	0.00	0.003
61.495	0.000	0.00	4.00	0.00	0.002
61.608	0.000	0.00	4.00	0.00	0.002
61.720	0.000	0.00	4.00	0.00	0.002
61.832	0.000	0.00	4.00	0.00	0.002
61.945	0.000	0.00	4.00	0.00	0.002
62.057	0.000	0.00	4.00	0.00	0.002

62.170	0.000	0.00	4.00	0.00	0.002
62.282	0.000	0.00	4.00	0.00	0.002
62.394	0.000	0.00	4.00	0.00	0.002
62.507	0.000	0.00	4.00	0.00	0.002
62.619	0.000	0.00	4.00	0.00	0.002
62.731	0.000	0.00	4.00	0.00	0.002
62.844	0.000	0.00	4.00	0.00	0.002
62.956	0.000	0.00	4.00	0.00	0.002
63.068	0.000	0.00	4.00	0.00	0.002
63.181	0.000	0.00	4.00	0.00	0.002
63.293	0.000	0.00	4.00	0.00	0.002
63.405	0.000	0.00	4.00	0.00	0.002
63.518	0.000	0.00	4.00	0.00	0.002
63.630	0.000	0.00	4.00	0.00	0.002
63.742	0.000	0.00	4.00	0.00	0.002
63.855	0.000	0.00	4.00	0.00	0.002
63.967	0.000	0.00	4.00	0.00	0.002
64.079	0.000	0.00	4.00	0.00	0.002
64.192	0.000	0.00	4.00	0.00	0.002
64.304	0.000	0.00	4.00	0.00	0.002
64.416	0.000	0.00	4.00	0.00	0.002
64.529	0.000	0.00	4.00	0.00	0.002
64.641	0.000	0.00	4.00	0.00	0.002
64.753	0.000	0.00	4.00	0.00	0.002
64.866	0.000	0.00	4.00	0.00	0.002
64.978	0.000	0.00	4.00	0.00	0.002
65.090	0.000	0.00	4.00	0.00	0.002
65.203	0.000	0.00	4.00	0.00	0.001
65.315	0.000	0.00	4.00	0.00	0.001
65.427	0.000	0.00	4.00	0.00	0.001
65.540	0.000	0.00	4.00	0.00	0.001
65.652	0.000	0.00	4.00	0.00	0.001
65.764	0.000	0.00	4.00	0.00	0.001
65.877	0.000	0.00	4.00	0.00	0.001
65.989	0.000	0.00	4.00	0.00	0.001
66.101	0.000	0.00	4.00	0.00	0.001
66.214	0.000	0.00	4.00	0.00	0.001
66.326	0.000	0.00	4.00	0.00	0.001
66.438	0.000	0.00	4.00	0.00	0.001
66.551	0.000	0.00	4.00	0.00	0.001
66.663	0.000	0.00	4.00	0.00	0.001
66.775	0.000	0.00	4.00	0.00	0.001
66.888	0.000	0.00	4.00	0.00	0.001
67.000	0.000	0.00	4.00	0.00	0.001
67.112	0.000	0.00	4.00	0.00	0.001
67.225	0.000	0.00	4.00	0.00	0.001
67.337	0.000	0.00	4.00	0.00	0.001
67.449	0.000	0.00	4.00	0.00	0.001
67.562	0.000	0.00	4.00	0.00	0.001
67.674	0.000	0.00	4.00	0.00	0.001
67.786	0.000	0.00	4.00	0.00	0.001
67.899	0.000	0.00	4.00	0.00	0.001
68.011	0.000	0.00	4.00	0.00	0.001

Appendix K

Hydraulic Analysis

(To be prepared in final engineering analysis)