CALIFORNIA ENVIRONMENTAL QUALITY ACT
ENVIRONMENTAL INITIAL STUDY CHECKLIST FORM
Covelop
Public Review Period September 11, 2023 to October 10, 2023

1. PROJECT TITLE:	Covelop
Entitlements:	Planned Development PD 22-20, Conditional Use Permit 22-20 and Tentative Parcel Map PR 22-0054
2. LEAD AGENCY:	City of Paso Robles 1000 Spring Street Paso Robles, CA 93446
Contact Person:	Darren Nash, City Planner
Phone Number:	(805) 237-3970
Email:	dnash@prcity.com
3. PROJECT LOCATION:	2930 Union Road, Paso Robles, CA APN: 025-362-043
4. PROJECT PROPONENT:	Covelop/MDF
Contact Person:	Ian McCarville
Phone Number:	(805) 461-5765
Email:	Ian@kirk-consulting.net
5. GENERAL PLAN DESIGNATION:	CS (Commercial Service)
6. ZONING:	C3-PD (Commercial-Light Industrial, Planned Development Overlay)

7. PROJECT DESCRIPTION:

The project consists of subdividing an existing 7.54-acre gross lot (Lot 6), into two parcels totaling 4.15 acres gross (Parcel A) and 3.39 acres gross (Parcel B). The site has a General Plan land use designation of Commercial Service (CS) and is zoned Commercial-Light industrial with a Planned Development Overlay (C3-PD). Site development will consist of six (6) buildings totaling 240,327 square feet of floor area across Lots 6 and 13, site access, circulation, drainage improvements, and the extension of Ardmore Road. Lot 13 will be developed with one large warehouse building consisting of 116,812 sq. ft. of warehouse space and 9,000 sq. ft. of office space. Parcels A and Parcel B will be developed with five (5) smaller buildings totaling 114,515 sq. ft. of building area that will consist of a mix of retail, manufacturing, winemaking, and storage uses. A retention basin is proposed at the northeastern corner of the site to capture surface runoff. The project will result in approximately 14 acres of site disturbance and +/-19,803 CY cut and +/- 43,612 CY fill. The project also includes the construction of 310 vehicle parking spaces, 16 motorcycle parking spaces, and 114,529 sq. ft. of landscaping. (See Site Plan, Attachment 3)

The project is proposed to be implemented in two phases. Phase I will consist of the development of Lot 13, the construction of buildings 2, 3 and 4 and access, circulation, parking, retention basin, and landscaping on Lot 6 ("Parcel A"), and the construction of Ardmore Extension. Phase II will consist of buildings 5 & 6 ("Parcel B") with the adjacent parking and site circulation improvements.

There are eight (8) existing native oak trees onsite, seven (7) of which are in poor or very poor condition and one (1) that is in good condition. The project proposes the removal of six (6) oak trees that are in poor or very poor condition. The two remaining trees are to be protected and preserved during construction. The City has an Oak Tree Preservation Ordinance which requires the City Council to authorize the removal of trees that are not clearly diseased or dying. This project will require the City Council to review the oak trees requested for removal.

8. Surrounding Land Uses and Setting: Briefly describe the project's surroundings:

Existing uses on the project site consist of abandoned agricultural structures and a +/- 12 acres of horse pasture. The site is mostly flat with gently rolling slopes downwards from north to south to a non-jurisdictional swale running across the southern edge of the site. There are eight (8) existing native oak trees onsite, seven (7) of which are in poor or very poor condition and one (1) that is in good condition. Native soils withing the project site are predominantly within the Arbuckle-San Ysidro Complex and the San Ysidro Loam.

Surrounding uses include Commercial/Light Industry zoned parcels to the north (residence, horse pasture), east (residences, animal raising), and west (Daniels Wood Land, Spurr/Case Pacific Construction/outdoor storage yard), and Residential Single Family and Residential Agriculture zoned parcels to the south (vacant, rangeland). The parcels to the south of the project area are within the boundary of the North Chandler Ranch Specific Plan. North Chandler Ranch was approved for 879 dwelling units, however, there are no current plans to start on this development. (See Vicinity Map, Attachment 2)

9. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.):

San Luis Obispo County Air Pollution Control District, Regional Water Quality Control Board

10. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

In accordance with AB 52, the City provided formal notification on April 11th, 2023 to the designated contact or tribal representative of traditionally and culturally affiliated California Native American tribes that have requested notice. At the time of publishing this report no consultation request has been received.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

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

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

DETERMINATION (To be completed by the Lead Agency)

On the basis of this initial Discussion:

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

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

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

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

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

September 8, 2023

Signature *Date*

EVALUATION OF ENVIRONMENTAL IMPACTS

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

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
I. AESTHETICS. Except as provided in Public Resources Code Section 21099, would the project:					
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒	
Discussion: The site is located in an area where there are existing large acreage residential uses in an area of the City that is zoned for commercial and light-industrial uses (C3). In addition to the residential properties, there are existing adjacent industrial uses such as the Case Pacific and Dave Spurr construction office and outdoor storage yards. The Paso Robles School District bus maintenance yard is also located on Ardmore Road, at Golden Hill Road. The other surrounding properties consist of existing residences on C3 zoned land. The project site is not located on a scenic vista and does not include scenic resources, therefore there is no impact.					
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐	
Discussion: The project will not substantially damage any scenic resources within a state scenic highway. The project proposesto remove 6 out of the 8 oak trees on the site as a result of the project Arborist concluding that the trees are in poor health, but none of these trees are located within or visible from a state scenic highway. Moreover, the City's Oak Tree Preservation Ordinance allows for the City Council to approve the removal of oak trees in relation to a development project by making findings. The Arborist reports for the project indicate that the 6 oaks proposed for removal have health issues and need to be removed to prevent future hazard situations with the new proposed buildings. Based on the trees not being located within a scenic highway, and since the oaks would be removed in a manner consistent with the City Ordinance, including the requirement to plant mitigation trees at a rate of 25-percent of the diameter removed, the proposed project would result in a less than significant impact relating to this issue.					
c) Substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐	
Discussion: The project would not conflict with applicable zoning or other regulations governing scenic quality. This site is zoned C3-PD, and since it has PD Overlay Zoning, a development plan is required. In addition to the PD requirement, Section 21.13 of the Zoning Code requires a conditional use permit to be processed. The overlay zoning, along with the special conditions, is required to give the Planning Commission the opportunity to review land use proposals to ensure quality development is approved in this area of the City. The proposed light industrial, warehouse project is the type of development anticipated in the C3-PD zoning district in this Ardmore Road area of the City. The project is designed in a manner that has high aesthetic quality and will not substantially degrade visual character from surrounding public views, therefore this project's impacts to existing visual character and quality of public views is less than significant.					
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐	
Discussion: Standard conditions require that all new lighting be adequately shielded. A condition of approval requires Staff to review light fixtures for proper shielding prior to the issuance of a building permit. As a result, the proposed project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area, and the proposed project's potential impact relating to this issue would be less than significant.					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
II. AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:					
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒	
Discussion: The project site is designated in the General Plan and is zoned on the City's Zoning Map for commercial development. The property is not identified in the City General Plan, Conservation Element (Figure OS-1, Important Farmland) as having either prime or unique farmland of statewide importance. Therefore, the project would not result in impacts on converting prime or other significant soils to urban land uses.					
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒	
Discussion: The project would not conflict with zoning for agricultural use. The Project Site is not zoned for agriculture and is not under a Williamson Act Contract. Therefore, the project would not conflict with existing zoning for agricultural use or a Williamson Act contract and would result in no impact.					
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒	
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒	
Discussion (c-d): The project site is not zoned for forest land or timberland resources and only contains a few scattered Oak trees. Therefore, no impacts associated with forest land or timberland would occur with the implementation of the project. Additionally, the project site is an open field and contains no forest land. The project would not result in the removal or conversion of forest land; therefore, no impacts would occur.					
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒	
Discussion: The proposed project would not cause other changes in the environments that could indirectly result in the conversion of farmland to non-agricultural uses. The project site does not conflict with existing zoning either, as the site is not designated as farmland or forest land, nor is it surrounded by those uses. The development of this project will have no impact on agricultural or forest resources.					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:					
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐	

Discussion (a): The San Luis Obispo County area is a non-attainment area for the State standards for ozone and suspended particulate matter. The SLO County Air Pollution Control District (APCD) administers a permit system to ensure that stationary sources do not collectively create emissions which would cause local and state standards to be exceeded. The CEQA thresholds of significance established by the SLOAPCD are designed to meet the objectives of the Clean Air Plan and in doing so achieve attainment status with state standards.

The potential for future project development to create adverse air quality impacts falls generally into two categories: Short term and Long term impacts. Short term impacts are associated with the grading and development portion of a project where construction generates dust from grading and site preparation, and emissions from construction equipment, but the impacts end when construction is complete. Long term impacts are related to the ongoing operational characteristics of a project and are generally related to mobile sources (e.g., vehicle trips), energy sources (e.g., electricity and natural gas), and area sources (e.g., architectural coatings and the use of landscape maintenance equipment), related to the proposed project.

Short term impacts:
An Air Quality and GHG Analysis was prepared for the project by LSA (Attachment 7). Predicted maximum daily construction emissions for the proposed project are summarized in Table J (below). Construction generated emissions are short term and of temporary duration, lasting only as long as construction activities occur, but would be considered a significant air quality impact if the volume of pollutants exceeds the SLO APCD's thresholds of significance. The emission projections in Table J account for the conventional construction equipment that will be utilized during grading and construction activities. Additional sources of air pollutant emissions include emissions from on-road motor vehicles used to transport materials and personnel.

As identified in the Air Quality and GHG analysis, Table J Air Quality Construction Emissions demonstrate that although the activities would increase the emission of O3 precursor pollutants GOD and NOx, DPM, and fugitive dust, it would not exceed the thresholds of significance establish by the SLO APCD for the purposes of reducing air pollution and its deleterious health effects, and therefore not require mitigation. Based on the project not exceeding the established threshold, criteria pollutant emissions generated during project construction would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.

Table J: Air Quality Construction Emissions

	ROG + NO_x (combined)		Diesel Particulate Matter (DPM)		Fugitive Dust[2] (PM_{10})
	pounds/day	tons/quarter	pounds/day	tons/quarter	tons/quarter
Project Construction Emissions	86.1	1.2	1.1	0.1	<0.1
SLO County APCD's Significance Threshold[1]	137	2.5[3]	7	0.13[3]	2.5[3]
Exceeds Threshold?	No	No	No	No	No

Long term impacts:
Implementation of the project would result in long-term operational emissions of criteria air pollutants such as PM_{10}, $PM_{2.5}$, and CO as well as ozone precursors such as ROG and NOx. Project generated increases in emissions would be predominantly associated with motor vehicle use. Long-term operational emissions attributable to the project are identified in Table K (below) and are compared to the operational significance thresholds established by the SLO APCD. As shown in Table K, the Project's emissions would not exceed any SLO APCD thresholds for any criteria air pollutants, therefore impacts would be less than significant.

Table K: Air Quality Operational Emissions

	ROG + NO_x (combined)		Diesel Particulate Matter (DPM)	Fugitive Dust[2] (PM_{10})	
	pounds/day	tons/year	pounds/day	pounds/day	tons/year
Project Operational Emissions	16.9	3.1	0.1	1.0	0.2
SLO County APCD's Significance Threshold[1]	25[2]	25	1.25[2]	25	25
Exceeds Threshold?	No	No	No	No	No

Based on the analysis presented above, the proposed project would not conflict with the 2001 Clean Air Plan and construction and operation of the proposed project would not result in the generation of criteria air pollutants that would exceed SLO County APCD thresholds of significance. The proposed project is not expected to produce significant emissions that would affect nearby sensitive receptors. The project would also not result in objectionable odors affecting a substantial number of people. GHG emissions released during construction and operation of the project are estimated to be lower than significance thresholds and would not be cumulatively considerable. The proposed project would generally be consistent with the State GHG reduction goals and the City's CAP.

b)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air standard?	☐	☐	☐	☒	

Discussion: As shown in Table K in Discussion A above, the emissions associated with the operations of the project would be well below the significance thresholds set by the SLO County APCD. Therefore, operation of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State AAQS, resulting in no impact.

c)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐	

Discussion: There are no sensitive receptors located within 1,000 feet of the project site. The project site is primarily surrounded by commercial and a few residential land uses. Therefore, it is not anticipated that sensitive receptors would be exposed to airborne particulates and construction equipment pollutants. In addition, project construction pollutant emissions would be below the SLO County APCD significance thresholds. Once the project is constructed, the project would not be a source of substantial pollutant emissions. Therefore, impacts to sensitive receptors are less than significant.

d)	Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐	

Discussion: During construction, the various diesel-powered vehicles and equipment in use on site would result in localized odors. These odors would be temporary and will not be noticeable for extended periods of time beyond the project site. Additionally, the proposed uses that would be developed within the project site are not expected to produce any offensive odors that would result in frequent odor complaints. Therefore, odor impacts from the project will be less than significant.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
IV. BIOLOGICAL RESOURCES. Would the project:					
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐	

Discussion: The proposed project will not have a substantial adverse effect on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or the U.S. Fish and Wildlife Service (USFWS). A Biological Resource Assessment (BRA) was prepared by David Wolff Environmental, LLC, dated July 24, 2023 (See Attachment 4). The BRA studied the 14-acre study area for biological resources. . The BRA concluded that there are no special status plant species within the project site. Additionally, no special status wildlife species or evidence of nesting birds was identified. The BRA did indicate that the project site may provide suitable habitat to support some special-status wildlife species, based on suitable habitat and regional (less than five miles) documented occurrences. These species include the San Joaquin Kit Fox (SJKF) and migratory nesting birds.

Based on the potential impacts to occur to special status biological resources, mitigation measures are included for this project. With incorporation of the following mitigation measures the projects impacts on Biological Resources will be less than significant.

MM BIO-1: Vegetation removal and initial site disturbance shall be conducted between September 1 and January 31 outside of the nesting season for birds. If vegetation and/or tree removal is planned for the bird nesting season (February 1 to August 31), then preconstruction nesting bird surveys shall be conducted by a qualified biologist to determine if any active nests would be impacted by project construction. If no active nests are found, then no further mitigation shall be required.
If any active nests are found that would be impacted by construction, then the nest sites shall be avoided with the establishment of a non-disturbance buffer zone around active nests as determined by a qualified biologist. Nest sites shall be avoided and protected with the non-disturbance buffer zone until the adults and young of the year are no longer reliant on the nest site for survival as determined by a qualified biologist. As such, avoiding disturbance or take of an active nest would reduce potential impacts on nesting birds to a less-than-significant level.

MM BIO-2: To avoid direct take of SJKF during construction in accordance with the CDFW and San Luis Obispo County Guide to SJKF Mitigation Procedures Under CEQA, the project owner shall adopt the Standard Kit Fox CEQA Mitigation Measures and shall be included on development plans. The following measures shall be implemented:

- A maximum 25 mph speed limit shall be required at the project site during construction activities.
- All construction activities shall cease at dusk and not start before dawn.
- A qualified biologist shall be on-site immediately prior to initiation of project activities to inspect for any large burrows (e.g., known and potential dens) and to ensure no wildlife are injured during project activities. If dens are encountered, they should be avoided as discussed below.
- Exclusion zone boundaries shall be established around all known and potential SJKF dens.
- All excavations deeper than 2 feet shall be completely covered at the end of each working day, or fitted with wildlife escape ramps.
- All pipes, culverts, or similar structures shall be inspected for SJKF and other wildlife before burying, capping, or moving.
- All exposed openings of pipes, culverts, or similar structures shall be capped or temporarily sealed prior to the end of each working day.
- All food-related trash shall be removed from the site at the end of each workday.
- Project-related equipment shall be prohibited outside of designated work areas and access routes.
- No firearms shall be allowed in the project area.
- Disturbance to burrows shall be avoided to the greatest extent feasible.
- No rodenticides or herbicides should be applied in the project area.
- Permanent fences between any remaining habitat areas shall allow for SJKF passage through or underneath (i.e., an approximate 4-inch passage gap shall remain at ground level).
- To avoid take of any SJKF and/or active SJKF dens, within 30 days prior to the initiation of site disturbance, implement the SJKF den survey and den closure protocol for unoccupied dens. Any SJKF occupied dens shall be avoided until the SJKF leave the den/site.
- Prior to issuance of grading and/or construction permit and within 30 days prior to initiation of site disturbance and/or construction, all personnel associated with the project shall attend a worker education training program, conducted by a qualified biologist, to avoid or reduce impacts on sensitive biological resources (i.e. San Joaquin kit fox). At a minimum, as the program relates to the kit fox, the training shall include the kit fox's life history, all mitigation measures specified by the City, as well as any related biological report(s) prepared for the project. The applicant shall notify the City shortly prior to this meeting. A kit fox fact sheet shall also be developed prior to the training program, and distributed at the training program to all contractors, employers and other personnel involved with the construction of the project.
- During the site-disturbance and/or construction phase, any contractor or employee that inadvertently kills or injures a San Joaquin kit fox or who finds any such animal either dead, injured, or entrapped shall be required to report the incident immediately to the applicant and City. In the event that any observations are made of injured or dead kit fox, the applicant shall immediately notify the USFWS and CDFW by telephone. In addition, formal notification shall be provided in writing within three working days of the finding of any such animal(s). Notification shall include the date, time, location and circumstances of the incident. Any threatened or endangered species found dead or injured shall be turned over immediately to CDFW for care, analysis, or disposition.

Based on the findings described above establishing the existing conditions of biological resources within the project site, and incorporation of the recommended mitigation measures, implementation of the proposed project would not result in any substantial adverse effects on biological, botanical, or wetland habitat resources. Therefore, with mitigation measures incorporated into the project, direct and indirect project impacts on biological resources would be considered to be less than significant.

b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐	

Discussion: A Biological Resource Assessment (BRA) was prepared for the project dated July 24, 2023. The BRA indicates that field surveys were conducted and concludes that no wetlands, water of the U.S./State or riparian habitat occur on the project site. Additionally, there were not any other sensitive natural communities are located on the site. Therefore, this project's impacts on riparian and sensitive habitats are less than significant.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐	

Discussion: The Biological Study indicates that there are two swale features observed onsite and were determined to not be subject to the Clean Water Act or California Fish and Game Code jurisdiction due to a lack of defined bed and bank structure. In addition, consultation with the RWQCB confirmed that similar to the Case Pacific project and Spurr project sites to the west, they would not regulate the swales as waters of the state pursuant to the Porter Cologne Act due to lack of wetland habitat and low beneficial uses. Therefore, this project's impact on protected wetlands are less than significant.

d) 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?	☐	☐	☒	☐	

Discussion: The project will not substantially interfere with the movement of any native resident or migratory fish or wildlife species, nor will it substantially interfere with established native resident or migratory wildlife corridors. Furthermore, the project will not impede the use of native wildlife nursery sites. According to Figure 4.3-2 San Joaquin Kit Fox Mitigation Area (see Figure 6 of the BRA, Attachment 4), of the City of Paso Robles General Plan EIR, the project site is not located within the Kit Fox Mitigation Area and considered part of the developed portion of the City, therefore, compensatory mitigation is not required.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐	

Discussion: There are eight oak trees on the site. The project proposes the removal of six oak trees, all of which are in poor or very poor condition. The two remaining oak trees (Tree No. 10 & 13) may have additional impacts associated with grading within the critical root zone and trimming for construction purposes. Oak tree removals approved as part of this project would be mitigated in accordance with the City Zoning Code, requiring replacement plantings on an inch for inch basis of 25% of the inches of diameter at breast height of the oak trees removed. Additionally, the project has been designed in a manner to protect the Tree No. 10 and 13 and protection measures such as protection fencing will be required as conditions of approval.

As a result of the trees being removed being in poor condition and mitigation oak trees will be planted on site as outlined in the City's Oak Preservation Ordinance, this project impacts on oak trees will be less than significant.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒	

Discussion: There are no Habitat Conservation Plans or other related plans in the City of Paso Robles; therefore, no impact will occur.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
V. CULTURAL RESOURCES. Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?	☐	☐	☐	☒	
Discussion: The project will not result in a substantial adverse change in the significance of a historical resource; indeed, the project will not impact a historical resource at all. A Phase I Archaeological Study completed for the project did not identify any historic resources within the Project site; moreover, no historic resources were identified within the Project site during the pedestrian survey. Proposed Project impacts will not affect historic resources and no further historic study or monitoring is warranted.					
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐	
Discussion: The Phase I Archaeological Study prepared for the Project did not identify any cultural resources within the project site, and no cultural resources were identified within the project site during the pedestrian survey. Proposed project impacts will not affect cultural resources and no further archaeological study or monitoring is warranted. Although the study did not identify any cultural resources, mitigation measure CUL-1 will require work to stop in the event that cultural materials are encountered during future ground disturbance. With the implementation of this mitigation measure, the project's impacts related to archeological resource is less than significant with mitigation incorporated. **MM CUL-1 In the event that cultural resources including human remains are encountered during ground disturbance activity, the project shall stop all activity within a 100-foot radius of the find and the project archaeologist shall access the situation with the County Coroner to verify the next steps and determine when construction may resume.**					
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐	
Discussion (c): A Phase I archeological survey was conducted by Padre Associates, Inc. of the project site on July 1, 2022. The field investigation identified no prehistoric materials or historic cultural resources within the project site. Located within an area characterized as low to moderate archaeological sensitivity, the existing landform has slightly been altered by an agricultural accessory structure and mainly used as pastureland for horses. The project area has excellent ground surface visibility, ranging from 60 to 95 percent, with discarded construction materials and oak detritus accounting for areas of reduced visibility. Although the study did not identify any cultural resources including human remains, mitigation measure CUL-1 will require work to stop in the event that cultural materials including human remains are encountered during future ground disturbance, Padre recommends stopping all activity within a 100-foot radius of the find and contacting a County-qualified archaeologist, therefore this project impacts on human remain disturbance is less than significant with mitigation incorporated. **MM CUL-1 In the event that cultural resources including human remains are encountered during ground disturbance activity, the project shall stop all activity within a 100-foot radius of the find and the project archaeologist shall access the situation with the County Coroner to verify the next steps and determine when construction may resume.**					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
VI. ENERGY. Would the project:					
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐	**1**
Discussion: The proposed project is a commercial development, consistent with the City's General Plan and does not require rezoning. The existing land use and proposed development will not use or promote the use of non-renewable resources in a wasteful and inefficient manner. Further, the project is subject to air quality and energy efficiency requirements which are often referred to as Green Building Standards or the Building Energy Efficiency Standards, all of which are applicable standards to reduce inefficient, wasteful, or unnecessary consumption of energy. Therefore, impacts to energy resources are less than significant.					
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐	**1, 5**
Discussion: The project would be required to be in full compliance with the California Building Code, including applicable green building standards and building energy efficiency standards. Furthermore, the City's General Plan and Conservation Element ensures the conservation and preservation of energy resources by increasing the energy efficiency of buildings, appliances, and buildings to the use of alternative forms of energy. Additionally, the project would not exceed the Efficiency Threshold for operational emissions or operation emission plus the amortized constriction emissions, the Project would not conflict with the CAP, Updated Strategic Action Plan Update, or the City of Paso Robles Climate Action Plan (PRCAP). Therefore, impacts to this environmental factor are less than significant.					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
VII. GEOLOGY AND SOILS. Would the project:					
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☒	
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒	
Discussion (a-i): The project would not cause potential substantial adverse effects relating to the rupture of a known earthquake fault, as addressed in the General Plan EIR, pg. 4.5-8. There are two known fault zones on either side of the Salinas River valley. The Rinconada Fault system runs on the west side of the valley and grazes the City on its western boundary. The San Andreas Fault is on the east side of the valley and is situated about 30 miles east of Paso Robles. The City of Paso Robles recognizes these geologic influences in the application of the California Building Code (CBC) to all new development within the city. Review of available information and examinations indicate that neither of these faults is active with respect to ground rupture in Paso Robles. Soils and geotechnical reports and structural engineering in accordance with local seismic influences would be applied in conjunction with any new development proposal. Based on standard conditions of approval, the potential for fault rupture and exposure of person or property to seismic hazards is not considered significant. There are no Alquist-Priolo Earthquake Fault Zones within City limits.					
ii) Strong seismic ground shaking?	☐	☐	☒	☐	**1, 2, 3**

Discussion: The proposed project will be constructed to current CBC codes. The General Plan EIR identified impacts resulting from ground shaking as less than significant and provided mitigation measures that will be incorporated into the design of this project including adequate structural design and not constructing overactive or potentially active faults. Therefore, impacts that may result from seismic ground shaking are less than significant.					
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐	**1, 2, 3**
Discussion: Per the General Plan EIR, the project site is located in an area with soil conditions that have a low potential for liquefaction or other type of ground failure due to seismic events and soil conditions. To implement the EIR's mitigation measures to reduce this potential impact, the City has a standard condition to require submittal of soils and geotechnical reports, which include site-specific analysis of liquefaction potential for all building permits for new construction, and incorporation of the recommendations of said reports into the design of the project. The design of any structures on-site would incorporate measures to incorporate design measures into the project; therefore, impacts for seismic-related ground failure are less than significant.					
iv) Landslides?	☐	☐	☒	☐	**1**
Discussion**:** Per the General Plan Safety Element, the project site is in an area that is designated a low-risk area for landslides. Therefore, potential impacts due to landslides are less than significant.					
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒	**1, 2, 3**
Discussion: Per the General Plan EIR the soil condition is not erosive or otherwise unstable. As such, no significant impacts are anticipated. A geotechnical/soils analysis will be required prior to issuance of building permits that will evaluate the site-specific soil stability and suitability of the development proposed. This study will determine the necessary grading techniques that will ensure that potential impacts due to soil stability will not occur; therefore, impacts due to soil erosion or loss of topsoil.					
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒	
Discussion: See response to item VII.a.iii above.					
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒	
Discussion: See response to item VII.a.iii above.					
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒	
Discussion: The project does not propose to use septic tanks or alternative wastewater disposal systems; therefore, no impacts would occur. No further analysis is warranted.					
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐	
Discussion: There are no known paleontological or unique geologic features identified on-site. If resources are found during grading activities, appropriate recommendations will be made regarding their treatment and/or disposition; therefore, this project will result in less than significant impacts on paleontological resources and/or unique geologic features.					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
VIII. GREENHOUSE GAS EMISSIONS. Would the project:					
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐	

Discussion (a):

Short term:

Construction-related activities that would generate GHG emissions include worker commute trips, haul trucks carrying supplies and materials to the project site, and off-road construction equipment. The SLO County APCD does not have an adopted threshold of significance for construction related emissions. It's estimated that the proposed project would generate a total of approximately 1,875.0 metric tons of CO_2E during construction. When amortized over the 30-year life the of project, annual emissions would be 62.5 metric tons of CO_2e. Once construction is complete, the generation of these emissions will cease.

Long Term:

Operation of the project would result in GHG emissions predominantly associated with motor vehicle use Long-term operational GHG emissions attributable to the project as a whole are identified in Table L. Project operations are expected to generate 1,201.6 metric tons of CO_2E emissions annually.

Table L: GHG Emissions (Metric Tons Per Year)

Types of Emissions	Operational Emissions				
	CO_2	CH_4	N_2O	CO_2e	Percentage of Total
Mobile Source Emissions	495.0	<0.1	<0.1	507.0	45
Area Source Emissions	6.4	<0.1	<0.1	6.5	<1
Energy Source Emissions	445.0	0.1	<0.1	448.0	39
Water Source Emissions	44.3	1.8	<0.1	101.0	9
Waste Source Emissions	21.9	2.2	0.0	76.6	7
Total Operational Emissions				1,139.1	100
Amortized Construction Emissions				62.5	—
Total Annual Emissions				1,201.6	—
SLO County APCD Operational Year Numeric Threshold				1,150	—
Exceed?				Yes	—
Service Population Emissions				4.8	
SLO County APCD Scaled 2031 Service Population Threshold				4.9	
Exceeds Threshold?				No	

The project is compared with the SLO APCD efficiency-based threshold of 4.9 metric tons of CO_2E per project service population per year. The SLO APCD's approach is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. The project would emit 4.8 metric tons of CO_2E per service population per year, which is below the SLO APCD threshold of 4.9 metric tons of CO_2E per service population per year. Since the project would not exceed the Efficiency Threshold, the Project for operation emissions or operational emissions plus amortized construction emissions would not conflict with the CAP, Updated Strategic Action Plan, or the City of Paso Robles Climate Action Plan (PRCAP). Therefore, the project's cumulative contribution of GHG emissions would be less than significant and the projects cumulative GHG impacts would be less than cumulatively considerable.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐	

The following analysis evaluates the proposed project's consistency with adopted plans to reduce GHG emissions. As described above, the City adopted a CAP in November 2013. The consistency of the project with the goals of this CAP fulfills the CEQA goal of fully informing local-agency decision-makers of the environmental impact of the project under consideration at a stage early enough to ensure that GHG emissions are addressed. Although the CAP does not include a target for 2030, the measures in the plan will continue to provide reductions after the milestone year and help demonstrate continued progress toward achieving the SB 32 2030 target. The following CAP measures would be applicable to the proposed project:

- Measure E-4: Incentives for Exceeding Title 24 Energy Efficiency Building Standards
- Measure E-5: Energy Efficient Public Realm Lighting Requirements
- Measure E-6: Small-Scale On-Site Solar PV Incentive Program
- Measure TL-5: Transport Demand Management Incentives
- Measure TL-6: Parking Supply Management
- Measure W-1: Exceed the SB X7-7 Water Conservation Target
- Measure S-1: Solid Waste Diversion Rate

Future tenants of the project are unknown at this time, but they would implement transportation measures consistent with the CAP to reduce VMT. The proposed project would also be consistent with the CAP goal of increasing water and energy efficiency in new buildings by complying with the latest California Building Code (Title 24), including the latest CALGreen Code standards. In addition, the proposed project would comply with local and State laws regarding solar energy. Construction of the project would include a diversion of construction waste from landfills to recycling consistent with current local and State standards and CAP goals to increase diversion and reduction of waste. As such, the proposed project would be consistent with applicable CAP measures. Therefore, the proposed project would be consistent with applicable plans and programs designed to reduce GHG emissions. Therefore, the proposed project would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
IX. HAZARDS AND HAZARDOUS MATERIALS. Would the project:					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒	
Discussion: The proposed project does not include the routine transport, use or disposal of hazardous materials. Therefore, the project will not have an impact on this environmental factor.					
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐	
Discussion: The proposed project would not result in impacts from hazards and hazardous materials with respect to creating a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, nor would it result in impacts from accidental release of materials into the environment. During construction, the proposed project would involve the transport of general construction materials. Construction activities would involve the use of fuels and greases for the construction equipment; however, the use, storage, transport, and disposal of these materials will be carried out in accordance with federal, state, and local laws, ordinances and regulations. Therefore, the project would have a less than significant impact on this environmental factor.					
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒	
Discussion: There are no existing or proposed schools located within ¼ mile of the project; therefore, there would be no impact of hazardous materials emission on local schools.					

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒	
Discussion: The project site is not included on a hazardous materials site list; therefore, there is no impact from this project.					
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒	
Discussion: The project is not located within an airport safety zone; therefore, there is no impact.					
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒	
Discussion: The City does not have any adopted emergency response plans. As proposed, the development would not interfere with emergency response, therefore there is not impact.					
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒	
Discussion: The site is not located in an area that is considered wildland, therefore there is no impact from wildland fires.					
X. HYDROLOGY AND WATER QUALITY. Would the project:					
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐	
Discussion: Water use during construction would be limited to dust control measures for grading activities. The project will not result in releasing water or wastewater from the site. The project is subject to several existing regulations and programs, including the City's Storm Water Management Program and State Water Resources Control Board (SWRCB) Regulations. BMPs and PPMs are required to be incorporated into grading and construction plans for the short and long-term management and protection of water quality. The proposed project's Stormwater Control plans include the use of drainage management areas (DMAs) and the use of low impact designs (LIDs). Therefore, considering these factors, the impacts as a result of the development of this project on storm water will be less than significant.					
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐	**7**
Discussion: The project site is within the city limits and is zoned for commercial development. The City's municipal water supply is composed of groundwater from the Paso Robles Groundwater Basin, an allocation of the Salinas River underflow, and a surface water allocation from the Nacimiento Lake pipeline project. According to the 2020 Urban Water Management Plan (UWMP), Citywide, the City of Paso Robles anticipates a water demand of 9,451 acre-feet/year at full buildout, with supply availability projected to be 15,088 acre-feet/year to serve development during normal, dry, and multiple dry years. Based on UWMP indicating that City water resources exceeds the projected demand city wide, this projects water use will have less than significant impact on the City's overall water system Standard conditions applied to all new developments require the payment of development fees for water service expansion to mitigate its proportionate share of related impacts.					
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☐	☒	☐	

Discussion: The proposed new/replaced impervious surface area is approximately 11.52-acres. Post-Construction Stormwater Requirements (PCRs) will be satisfied through a variety of methods. Several different Stormwater Control Measures (SCMs) have been designed for implementation across the site, depending on proposed surface drainage conditions and subsurface retention requirements. In conclusion, the project's drainage system was designed to meet minimum drainage requirements outlined in the City of Paso Robles Standard Specifications and the Regional Water Quality Control Board's PCRs. Based on the stormwater retention plan, the impact will be less than significant.					
i) result in a substantial erosion or siltation on- or off-site;	☐	☐	☒	☐	
Discussion: The proposed project site, as discussed in Section VII. Geology/Soils, is generally flat, and therefore will not result in substantial erosion on or off-site. Additionally, in compliance with State and local regulations, during construction erosion and/or stormwater control measures will be implemented during site disturbance; therefore, the project is not expected to result in substantial erosion or siltation and impacts will be less than significant.					
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐	
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐	
iv) impede or redirect flood flows?	☐	☐	☒	☐	
Discussion (ii-iv): See the discussion in X.a (above) for discussion on the stormwater management approach. Measures and BMPs will be installed and implemented to decrease the amount/rate of surface runoff during storm events. Impacts will be less than significant.					
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒	
Discussion: The proposed project is not in any flood hazard, tsunami, or seiche zones; therefore, there no impact will occur due to this environmental factor.					
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐	
Discussion: See the discussion in X.a for discussion on the stormwater management approach. Measures and BMPs will be installed and implemented to adhere to the City's Stormwater Management Program, therefore impacts would be reduced to less than significant.					

Issues	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**	**Source**
XI. LAND USE AND PLANNING. Would the project:					
a) Physically divide an established community?	☐	☐	☐	☒	**1, 2**
Discussion: The project is a commercial development in a commercial district and is adjacent to other commercial uses. Some residences are located to the east of the site, but no established community would be physically divided as a result of the project.					
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☐	**1, 2**

Discussion: The proposed project is located within the Commercial Service (C3) District, which is defined as, "Areas for highway-related, commercial services, and light industrial uses," in the City of Paso Robles General Plan Land Use Element. The application includes a request to establish a mix of commercial services and light industrial uses; warehouse, retail, manufacturing, and winemaking uses with supporting office and storage space. The proposed uses are consistent with the C3 District land use category, therefore, there is no impact.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
XII. MINERAL RESOURCES. Would the project:					
a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?	☐	☐	☐	☒	**1**
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒	**1**
Discussion (a and b)**:** There are no known mineral resources at this project site. No impacts will occur.					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
XIII. NOISE. Would the project result in:					
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐	**1**

Discussion: An Acoustical Analysis was completed by 45 dB in March of 2023.

The Study concluded that existing daytime hourly noise levels due to road traffic noise, primarily from Highway 46, range up to 43 dBA at the north property line adjacent to an existing residence, as predicted from published traffic counts and the FHWA's Traffic Noise Model implemented into SoundPLAN®. The proposed project was modeled to analyze the potential noise impact on the neighboring land uses. Noise levels associated with the project are anticipated to comprise of the following:

- Traffic noise associated with the increased traffic on Ardmore Road
- Traffic and parking activities of 994 passenger vehicles daily in the surrounding parking lots
- Truck traffic and loading of up to 80 semi-trucks daily at the loading docks on the west side of Building 1
- Truck traffic and loading of up to 60 medium delivery trucks daily at the loading dock and in the service/loading lane along the north side of Building 6
- Truck traffic and loading of up to 60 medium delivery trucks daily in the service/loading lane along the south side of Building 3
- 37 rooftop HVAC units on the six Project buildings, each modeled with a sound power level of 87 dBA rel 10-12 W (i.e., sound pressure level of 76 dBA rel 20µPa at 1-m).
- All site activities were assumed to occur during daytime hours between 7am and 7pm
- No vehicle idling was included for the service/loading lanes near Buildings 3 and 6 or near the loading docks at Building 1
- Refrigerated trucks are not expected at the Project site and were not included as a noise source in the model

With the project in place and the above assumptions about site traffic and rooftop HVAC equipment, the modeled Daytime Hourly LAeq levels along the property lines adjacent to residential land uses ranged up to 55 dBA and Nighttime Hourly LAeq levels ranged up to 45 dBA, both of which comply with the City of Paso Robles Municipal Code Daytime limit of 55 dBA and Nighttime limit of 45 dBA for residential land uses, therefore, this projects impacts to ambient noise levels are less than significant. The analysis concluded that the project would comply with the Paso Robles Municipal Code Daytime, Evening, and Nighttime Hourly limits.

b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐	**1**

Discussion: Based on the proposed light-industrial/commercial type uses, groundborne noise and vibration generated by the project will not be significant. All construction activity will be required to comply with the City's construction time requirements of 7am to 7pm Monday thru Saturday, unless exception is allowed for by the Building Official. Groundborne vibration and noise related to construction activity is anticipated to be low, since noise would only occur during daytime hours of construction and would cease upon completion of the project. Therefore, impacts from groundborne vibrations are considered to be less than significant.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒	

Discussion: The project is not located within the geographic boundaries of the Airport Land Use Plan, therefore there is no impact.

Issues	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**	**Source**
XIV. POPULATION AND HOUSING. Would the project:					
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐	**2**

Discussion: The project site is currently undeveloped land and jobs created can be absorbed by the local and regional employment market and will not create the demand for new housing or population growth. Therefore, impacts to population growth are less than significant.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	

Discussion: There are no residences located on the project site, therefore, there are no impacts related to the displacement of people.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
XV. PUBLIC SERVICES. Would the project:					
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:	☐	☐	☐	☒	**1, 10**
Fire protection?	☐	☐	☐	☒	
Police protection?	☐	☐	☐	☒	
Schools?	☐	☐	☐	☒	
Parks?	☐	☐	☐	☒	
Other public facilities?	☐	☐	☐	☒	

Discussion: The project would be designed and constructed in accordance with Paso Robles Department of Emergency Services (EMS) requirements for access, fire water supply, and vegetation management. With adherence to these requirements, the project poses a low fire hazard and is not expected to impact capacity or service levels. No new or modified government facilities are needed to provide fire protection for the project. Therefore, there would be no impact to EMS.

The project site is located in the City of Paso Robles, which provides police protection and public safety within the city limits. Construction and operation of the project would not generate a material demand on police services. As such, the project is not expected to result in an adverse impact on City of Paso Robles Police Department response times, service ratios, or other performance objectives, nor would the project result in the need for new or modified police facilities to serve the site. No new or modified government facilities are needed to provide police protection for the project, therefore, there would be no impact for Police services.

The project would not generate population growth. Therefore, there would be no impact to schools, parks, or other public facilities.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
XVI. RECREATION.					
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒	**1**
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒	**1**

Discussion (a and b)**:** The project would not encourage new housing demands and use of recreational facilities, therefore the project results in no impacts to recreational facilities.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
XVII. TRANSPORTATION. Would the project:					
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐	
Discussion: This project is consistent with the City's C3 and CS zoning and land use designations. The proposed project would generate approximately 1,194 net new vehicle trips per weekday, including 117 AM peak hour trips and 158 PM peak hour trips. The project would not significantly impact intersection operations and would have a less than significant impact on vehicle miles traveled. As required by all development projects with the approval of a building permit, the applicant shall be required to pay transportation impact fees established by the City Council in affect at the time of occupancy to mitigate future impacts with planned development in the City.					
b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?	☐	☐	☒	☐	
Discussion: A Transportation Analysis was prepared for this project by Central Coast Transportation Consulting, dated December 7, 2022 (Attachment 10), which indicates that the project would generate approximately 1,194 net new vehicle trips per weekday, including 117 AM peak hour trips and 158 PM peak hour trips, which would not significantly impact intersection operations and would have a less than significant impact on vehicle miles traveled, and therefore would not conflict or be inconsistent with CEQA Section 1504.3(b).					
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒	
Discussion: There are no hazardous design features associated with, planned for, or will result from this project. No impact will occur.					
d) Result in inadequate emergency access?	☐	☐	☐	☒	
Discussion: The project has been reviewed by the City's Department of Emergency Services. The project will not impede emergency access and is designed in compliance with all emergency access safety features and City emergency access standards. The project would result in no impact to emergency access.					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
XVIII. TRIBAL CULTURAL RESOURCES.					
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	☐	☐	☒	☐	
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☒	☐	

ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☒	☐	

Discussion: A Phase I archeological survey was conducted by Padre Associates, Inc. of the project site on July 1, 2022. The field investigation identified no prehistoric materials or historic cultural resources within the project site. Located within an area characterized as low to moderate archaeological sensitivity, the existing landform has slightly been altered by an agricultural accessory structure and mainly used as pastureland for horses. The project area has excellent ground surface visibility, ranging from 60 to 95 percent, with discarded construction materials and oak detritus accounting for areas of reduced visibility. No tribal cultural resources were identified within the project area. Therefore, impacts to tribal cultural resources are less than significant.

Letters were sent to the six tribes who requested notification for development plans as outlined in AB 52. As of this time the city has not received any request for further consultation. As mentioned above, based on the location and characteristics, it is unlikely that there are tribal cultural resources.

Issues	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**	**Source**
XIX. UTILITIES AND SERVICE SYSTEMS. Would the project:					
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒	

Discussion: Per the City's General Plan EIR, Urban Water Management Plan, and Sewer System Management Plan, the City's water and wastewater treatment facilities are adequately sized, including planned facility upgrades, to provide water needed for the project and treat effluent resulting from this project. All new storm water resulting from this project will be managed on the project site and will not enter existing storm water drainage facilities or require expansion of new drainage facilities. No new water or wastewater facilities, electric power, natural gas, or telecommunications will need to be constructed or expanded for this project, therefore there are no impacts.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐	

Discussion: The project is permitted is permitted with a Development Plan and a Conditional Use Permit, in the current land use and zoning designations; therefore, the project can be served with existing water resource entitlements available and will not require expansion of new water resource entitlements. This project will have a less than significant impact on the City's water supply.

c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	

Discussion: Per the City's SSMP, the wastewater treatment facility has adequate capacity to serve this project as well as existing commitments; therefore, there is no impact.

d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒	
Discussion: During construction, most debris would consist of recyclable materials such as wood pallets, plastic and paper packaging and scrap metal that can be taken to the nearby waste recycling center and all other non-recyclable construction debris being taken to the nearby landfill. The landfill has a maximum permitted capacity of 6,495,000 cubic yards and a maximum permitted throughput of 450 tons of solid waste per day and 75,000 tons per year, through October 1, 2051. As of December 31, 2017, the landfill had a remaining capacity of 4,216,402 cubic yards or approximately 65% of the maximum permitted. Per the City's Landfill Master Plan, the City's landfill has adequate capacity to accommodate construction related and operational solid waste disposal for this project; therefore, there is no impact to solid waste infrastructure from this project.					
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒	
Discussion: The proposed project will comply with federal, state, and local management and reduction statutes and regulations. No impact will occur.					

Issues	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**	**Source**
XX. WILDFIRE. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:					
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒	
Discussion: The City of Paso Robles does not have an adopted emergency response plan or evacuation plan. Therefore, the project would not impact an emergency response plan.					
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐	
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐	
Discussion (b and c)**:** As previously identified, the site is not considered as being located within the wildland urban interface (WUI) and therefore would not need specific measures for fire-fighting purposes, beyond emergency vehicle access, clearance around structures, and connection to water. The project has been reviewed by the City of Paso Robles Fire Department and designed with Fire Codes in mind. Given these considerations the impacts will be less than significant.					
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒	
Discussion: The project site is relatively flat and not subject to landslide potential or significant drainage changes, therefore there would be no impact.					

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Source
XXI. MANDATORY FINDINGS OF SIGNIFICANCE.					
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐	
Discussion: As noted within the Biological Resources section of this environmental document, there are mitigation measures related to habitat that will reduce impacts on biological resources to less than significant.					
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☐	☐	☒	
Discussion: The project will not have impacts that are individually limited, but cumulatively considerable.					
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒	
Discussion: As noted within this environmental document, the project's potential to cause what may be considered substantial, adverse effects on human beings either directly or indirectly is less than significant. As such, there would be no impact on the effects on human beings as a result of the project.					

EARLIER ANALYSIS AND BACKGROUND MATERIALS.

Earlier analyses may be used where, pursuant to tiering, program EIR, or other CEQA process, one or more effects have been adequately analyzed in an earlier EIR or negative declaration. CEQA Guidelines, Section 15152(b), (f).

Earlier Documents Prepared and Utilized in this Analysis and Background / Explanatory Materials

Reference #	Document Title	Available for Review at:
1	City of Paso Robles General Plan	City of Paso Robles Community Development Department 1000 Spring Street Paso Robles, CA 93446
2	City of Paso Robles Zoning Code	Same as above
3	City of Paso Robles Environmental Impact Report for General Plan Update	Same as above
4	2005 Airport Land Use Plan	Same as above
5	City of Paso Robles Municipal Code	Same as above
6	City of Paso Robles Water Master Plan	Same as above
7	City of Paso Robles Urban Water Management Plan 2020	Same as above
8	City of Paso Robles Sewer Master Plan	Same as above
9	City of Paso Robles Housing Element	Same as above
10	City of Paso Robles Standard Conditions of Approval for New Development	Same as above
11	Uptown/Town Centre Specific Plan	Same as above
12	San Luis Obispo County Air Pollution Control District Guidelines for Impact Thresholds	APCD 3433 Roberto Court San Luis Obispo, CA 93401
13	San Luis Obispo County – Land Use Element	San Luis Obispo County Department of Planning County Government Center San Luis Obispo, CA 93408
14	USDA, Soils Conservation Service, Soil Survey of San Luis Obispo County, Paso Robles Area, 1983	Soil Conservation Offices Paso Robles, Ca 93446
15	City of Paso Robles Climate Action Plan 2013	City of Paso Robles Community Development Department 1000 Spring Street Paso Robles, CA 93446

Attachments:

1. Mitigation Monitoring and Reporting Plan
2. Vicinity Map
3. Project Site Plan
4. Biological Resource Assessment by David Wolff Environmental, LLC (July 2023)
    a. Biological Consistency Letter and SJKF Habitat Evaluation
5. Oak Tree Assessment Report by Heritage Tree (August 2022)
6. Phase I Archaeological Study by Padre Associates, Inc (July 2022)
7. Air Quality and Greenhouse Gas Analysis by LSA (April 2023)
8. Storm Water Control Plan by Wallace Group (February 2023)
9. Drainage Design Report by Wallace Group (February 2023)
10. Transportation Analysis by Central Coast Transportation Consultants (December 2022)
11. Acoustical Analysis by 45dB Acoustics (March 2023)

Mitigation Monitoring and Reporting Plan

Project File No./Name: **Covelop Project – Ardmore Road**
Approving Resolution No.:____ by: ☒ Planning Commission ☐ City Council Date: September 26, 2023

The following environmental mitigation measures were either incorporated into the approved plans or were incorporated into the conditions of approval. Each and every mitigation measure listed below has been found by the approving body indicated above to lessen the level of environmental impact of the project to a level of non-significance. A completed and signed checklist for each mitigation measure indicates that it has been completed.

Explanation of Headings:

Type: .....Project, ongoing, cumulative
Monitoring Department or Agency: .....Department or Agency responsible for monitoring a particular mitigation measure
Shown on Plans: .....When a mitigation measure is shown on the plans, this column will be initialed and dated.
Verified Implementation: .....When a mitigation measure has been implemented, this column will be initialed and dated.
Remarks: .....Area for describing status of ongoing mitigation measure, or for other information.

Mitigation Measure PD 22-20, CUP 22-20, VTPM 22-0054, OTR (Covelop)	Type	Monitoring Department or Agency	Shown on Plans	Verified Implementation	Timing/Remarks
To reduce any potentially significant impact on nesting birds from vegetation removal to a less than significant level, the following mitigation measures are recommended. **MM BIO-1: Vegetation removal and initial site disturbance shall be conducted between** September 1 and January 31 outside of the nesting season for birds. If vegetation and/or tree removal is planned for the bird nesting season (February 1 to August 31), then preconstruction nesting bird surveys shall be conducted by a qualified biologist to determine if any active nests would be impacted by project construction. If no active nests are found, then no further mitigation shall be required.	On-going	CDD			Prior to issuance of grading permit

VICINITY MAP



PROJECT DATA DATA

LOT 13 - BLDG 1

USES:

OFFICE	9,000 SF
WAREHOUSE	116,812 SF
TOTAL AREA:	125,812 SF

TOTAL PARKING REQUIRED 144 SPACES

TOTAL PARKING PROVIDED 154 SPACES*

**INCLUDES 43 COMPACT SPACES & 8 ADA SPACES*

**INCLUDES 10 EVC SPACES PER CGBSC TABLE 5.106.5.3.3*

MOTORCYCLE PARKING REQUIRED

1 SPACE PER 20 VEHICLE SPACES REQUIRED: 8 SPACES

TOTAL MOTORCYCLE PARKING PROVIDED: 8 SPACES

PARCEL A & B - BLDG 2, 3, 4, 5 & 6

USES:

COMMERCIAL/RETAIL	7,392 SF
STORAGE	40,271 SF
MANUFACTURING	25,836 SF
WINEMAKING	41,016 SF
TOTAL AREA:	114,515 SF

TOTAL PARKING REQUIRED 156 SPACES

TOTAL PARKING PROVIDED 156 SPACES**

***INCLUDES 23 COMPACT SPACES AND 8 ADA SPACES*

***INCLUDES 10 EVC SPACES PER CGBCS TABLE 5.106.5.3.3*

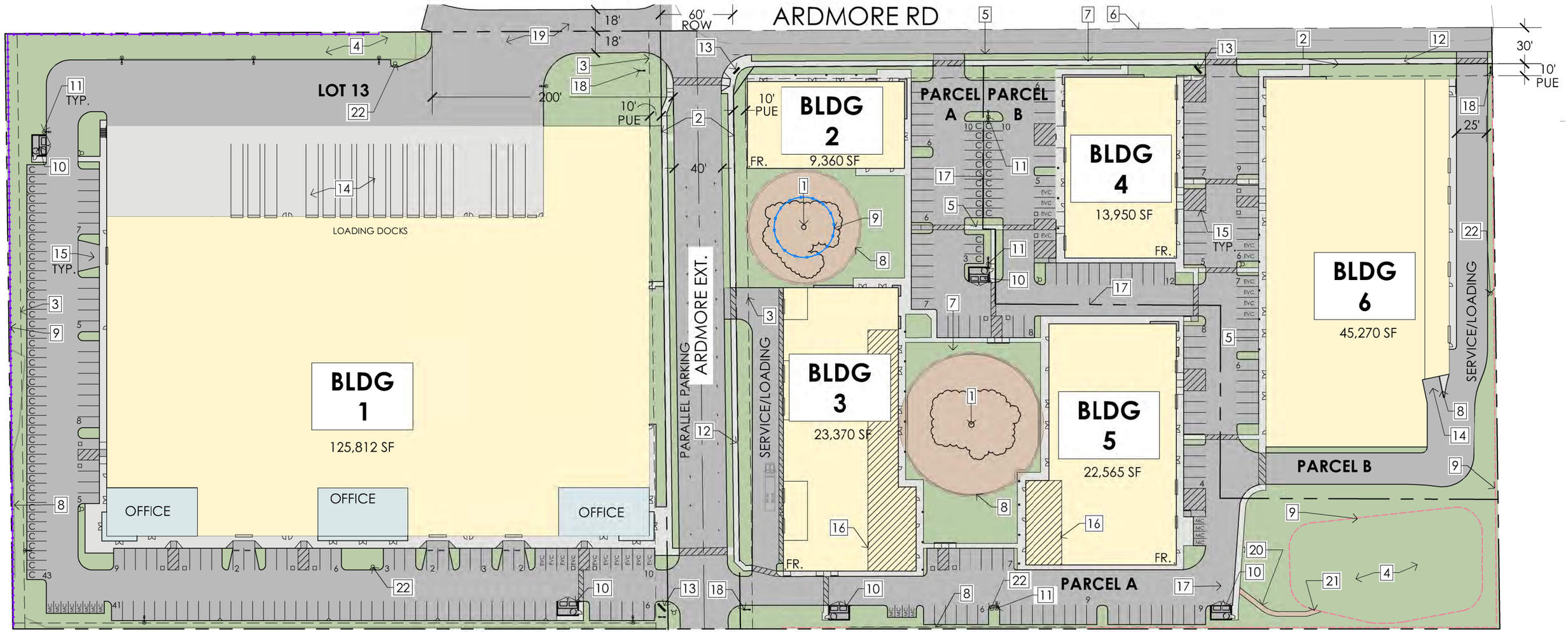
MOTORCYCLE PARKING REQUIRED

1 SPACE PER 20 VEHICLE SPACES REQUIRED: 8 SPACES

MOTORCYCLE PARKING PROVIDED 8 SPACES

REFERENCE NOTES

1: EXISTING OAK TREE TO REMAIN AND BE PROTECTED IN PLACE
2: PROPERTY LINE
3: SETBACK LINE
4: RETENTION BASIN
5: SIDEWALK
6: CENTERLINE OF ARDMORE ROAD
7: LANDSCAPE
8: RETAINING WALL/CURB
9: FENCING, SEE FENCING LEGEND ON LANDSCAPE PLAN
10: TRASH ENCLOSURE
11: SITE LIGHTING
12: STREET TREES. SEE PLANTING PALETTE
13: EXTERNALLY ILLUMINATED MONUMENT SIGN. SEE SITE AMENITIES DETAILS
14: DEPRESSED LOADING DOCK
15: LOADING SPACE
16: AMENITY FACING COMMERCIAL SPACE SHOWN HATCHED
17: PROPOSED PROPERTY LINE
18: FIRE SPRINKLER BACK FLOW DEVICE
19: PRIVATE SHARED ACCESS DRIVEWAY
20: MAINTENANCE PATH
21: 8' WIDE ACCESS GATE
22: FIRE HYDRANT



NORTH

0 20 40 80

CONCEPTUAL OVERALL SITE PLAN

MD3 INVESTMENTS
A real estate investment and development company

COVELOP COLLABORATIVE DEVELOPMENT

WALLACE GROUP®

Kirk Consulting A California Corporation

ARRIS STUDIO ARCHITECTS

ARDMORE INDUSTRIAL
PASO ROBLES, CA

PROPOSED ARCHITECTURAL SITE PLAN

Date: MARCH 10, 2023
Scale: 1" = 80' @ 11x17
1" = 40' @ 24x36
Sheet: A1.0

2930 UNION ROAD DEVELOPMENT PROJECT

CITY OF PASO ROBLES, CA

(LOTS 6 & 13 APN: 025-362-043)

BIOLOGICAL RESOURCES ASSESSMENT

WATERS OF THE U.S./STATE JURISDICTIONAL DETERMINATION

SAN JOAQUIN KIT FOX EXEMPT AREA HABITAT EVALUATION

JULY 24, 2023

Prepared for:

MD3 INVESTMENTS
893 MARSH ST # 13914
SAN LUIS OBISPO, CA 93406

PREPARED BY:

David Wolff Environmental, LLC

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FIGURE 1: REGIONAL LOCATION MAP
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APPENDIX B – TABLES

TABLE B-1: FLORISTIC INVENTORY PLANT SPECIES OBSERVED
TABLE B-2: CNDDB SPECIAL-STATUS SPECIES OCCURRENCES

APPENDIX C – WATERS OF THE U.S./STATE WETLAND DETERMINATION DATA SHEETS

MD3 INVESTMENTS
2930 UNION ROAD DEVELOPMENT PROJECT
CITY OF PASO ROBLES, CA
(LOTS 6 & 13 APN: 025-362-043)
BIOLOGICAL RESOURCES ASSESSMENT

1.0 EXECUTIVE SUMMARY

The 2930 Union Road Development Project (project) proposes an industrial park development on approximately 14 acres of undeveloped land in the City of Paso Robles. The proposed project site is on the edge of commercial, industrial and residential developments to the north, east and west of the site. Open grazing grasslands are to the south of the project site. Field surveys established existing conditions of the site as non-native annual grassland habitat and ruderal barn and paddock area. Eight mature valley oak trees are spread around the site. Based on a formal jurisdictional determination, a non-wetland non-jurisdictional swale runs across the southern end of the site. No wetlands or other waters of the U.S./State or riparian habitat occur on the project site.

The search and review of the CNDDB revealed 17 special-status species composed of 7 special-status plants, 10 special-status wildlife species, and no natural communities of special concern with recorded occurrences within an approximately 5-mile radius of the proposed project site. A floristic inventory and rare plant survey conducted during the spring/summer 2022 confirmed that no special-status plant species occur on the project site. No special-status wildlife species were observed or expected to occur on the project site. The project site is outside of and exempt from the City of Paso Robles (City) San Joaquin kit fox (SJKF) compensatory mitigation area as delineated in the City's General Plan Final Environmental Impact Report. No SJKF have been observed in the Paso Robles area for over 10 years. Implementation of the standard SJKF take avoidance measures would reduce potentially significant direct impacts on the SJKF to a less than significant level.

The conversion of disturbed non-native annual grassland to development and displacement of common local wildlife at the edge of urban development may be considered a less than significant impact. Valley oak tree removal (7 trees in poor or very poor condition; 1 tree in good conditions) would require implementation of the City's replacement policy, therefore, would be considered a less than significant impact. Locally common resident and migratory ground nesting birds that may use the site for breeding, foraging, and roosting could be impacted by project construction. Mitigation to avoid potentially significant impacts on nesting birds is recommended.

Based on the findings described in this biological resources assessment establishing the existing conditions of the proposed project site, and incorporation of the recommended

mitigation measures, implementation of the proposed project would not result in any substantial adverse effects on biological or botanical resources. Therefore, with mitigation measures incorporated into the project, direct and indirect project impacts on biological resources would be considered less than significant.

2.0 INTRODUCTION, PROJECT DESCRIPTION, AND PURPOSE

The 2930 Union Road Development Project (project) proposes industrial park development on approximately 14.0 acres of undeveloped land within the urbanized area in the City of Paso Robles (City). The site supports approximately 12.0 acres of disturbed non-native grassland with evidence of intensive horse pasturing, and approximately 2.0 acres of livestock paddocks, barn, and horse training areas ("arenas"). There are eight mature valley oak trees on the site that have been documented and evaluated by arborists (7 trees in poor or very poor condition; 1 tree in good conditions). The project site is surrounded by industrial and residential development to the north, west, and east. Grassland hills with grazing cattle are to the south and southeast. Figures 1 and 2 in Appendix A provide regional and vicinity context location maps respectively.

David Wolff Environmental (DWE) conducted the review of available background data, biological resources field surveys, a floristic inventory and rare plant survey, and a waters of the U.S./State jurisdictional determination on the project site on May 5 and June 23, 2022. The purpose of the field surveys and this biological resources assessment is to document existing conditions of the proposed project site, determine the suitability and presence or absence of rare, threatened, or endangered plants or wildlife (special-status species), and to evaluate the potential for any direct or indirect significant impacts on biological or waters of the U.S./State resources, or adverse effects on any special-status species.

3.0 EXISTING CONDITIONS – SETTING

The proposed project site has been used as horse pasturing for many years and is surrounded by residential and industrial developments, with active grazing lands to the southeast. The site is mostly flat gently sloping downwards from north to south to a swale running across the southern edge of the site to culverts on and under the recent adjacent development on the western site boundary. The site appears to have been substantially and regularly used as horse pasture over time evidenced by abundant horse droppings all over the site. The northwest two acres show more intense horse use in paddocks, barn, and a rectangular and circular "arena" training areas.

The USDA Natural Resources Conservation Service (NRCS; Soil Conservation Service, 1977/2022) has identified two soil series mapping units within the project site as shown in Appendix A Figure 3. Onsite soils are mapped as Arbuckle-San Ysidro Complex (106), 2 to 9 percent slopes, and San Ysidro Loam (197), 0 to 2 percent slopes. The Arbuckle soil is a very

deep, well drained soil with moderately low permeability formed in alluvium from mixed rocks. Typically, the surface layer is pale brown fine sandy loam to 10 inches thick. The San Ysidro soil is a very deep, moderately well drained soil with very slow permeability formed in alluvium from mixed rocks. Typically, the surface layer is pale brown loam about 20 inches thick. Field observations of surface soils, spoils from ground squirrel burrows, and wetland delineation soil test pits corroborate the loamy and sandy loam soils mapping throughout the project site.

4.0 METHODS

Prior to field surveys, DWE Principal Ecologist David Wolff conducted a review of available background information including aerial photography of the project area over time (Google Earth), the Natural Resources Conservation Service soil survey, arborists' reports, environmental review documentation from the adjacent City of Paso Robles approved Planned Development 17-015, City of Paso Robles General Plan Final Environmental Impact Report, and the query results of an approximately 5-mile search radius of the California Natural Diversity Data Base (CNDDB). The 5-mile radius search is appropriate given project location mostly surrounded by and at the edge of urban development in the City. The CNDDB provided a list and mapped locations of special-status plant and wildlife species that have been recorded in the region of the project site. The CNDDB records help to focus the field survey efforts and evaluation of potential project effects on specific species or habitats. It is noted that the CNDDB does not necessarily include all special-status species potentially occurring onsite or in the region, but rather only those that have been recorded by the CNDDB.

DWE Principal Ecologist David Wolff reviewed the available background data described above and conducted biological resources field surveys and a floristic inventory and rare plant survey on the project site on May 5 and June 23, 2022, to document existing conditions of the onsite biological resources. Surveys were conducted by walking the entirety of the proposed project site recording plant and wildlife species observed and general site characteristics. Conditions for the site survey were conducive to the purpose of documenting plant and wildlife habitat to establish existing conditions. The field surveys included conducting a wetland delineation and jurisdictional determination of swale running across the southern corner of the site. It appears that cattle were brought in to reduce the grassland cover between the two DWE field surveys that provided additional observations of the swale configuration and general site microtopography.

The overall purpose of the field surveys was to document existing conditions in terms of habitat for plant and wildlife species, determination of the presence/absence of special-status plant or wildlife species, and the potential to support wetland habitat and/or other waters of the U.S./State. The study area habitat types were described by the aggregation of plants and wildlife based on the composition and structure of the dominant vegetation observed at the

time the field reconnaissance was conducted and through review of multiple years of aerial photography.

DWE Principal Ecologist David Wolff reviewed the available background information and available aerial photography, conducted the field surveys, and is the primary author and principal in charge of report preparation. The survey data collected on plant and wildlife species and conclusions presented in this biological resources assessment are based on the methods and field reconnaissance conducted over the project site as described above.

5.0 RESULTS

5.1 HABITAT TYPES AND PLANT COMMUNITIES

Plant communities are generally described by the assemblages of plant species that occur together in the same area forming habitat types. The best fit based on observed site conditions for community alliance and alliance codes habitat classifications used in this report follow, *A manual of California vegetation, 2nd edition* (Sawyer et al. 2009) and California Department of Fish and Wildlife *California Natural Community List*. Plant names used in this report follow *The Jepson Manual, Vascular Plants of California, Second Edition Thoroughly Revised and Expanded* (Baldwin et al. 2012) with updated taxonomy referenced through the CalFlora database (2022). The proposed project site supports one plant community, non-native annual grassland over the entire site, with a more disturbed/ruderal area where there are paddocks, evidence of horse "arenas," and a barn. Eight mature valley oak trees are spread across the site. Figure 4 in Appendix A provides a habitat map showing the locations and extent of the habitat types and oak trees on the proposed project site. Figure 7 includes a set of onsite representative photographs from DWE field surveys. Table B-1 in Appendix B provides a complete list of plant species observed during DWE floristic inventory and rare plant field surveys.

5.1.1 ANNUAL BROME GRASSLAND – DISTURBED NON-NATIVE ANNUAL GRASSLAND

The Annual Brome Grassland or *Bromus (diandrus, hordeaceus*), *Semi-Natural Herbaceous Stands* (CDFW: *Bromus hordaceus – Erodium botrys,* 42.026.09), is best described as disturbed non-native annual grassland habitat from what appears to be ongoing horse pasturing. The disturbed non-native annual grassland habitat covers 12 acres of the project site and is dominated by non-native annual grasses and herbaceous broadleaf plant species, with few native forbs. Plant species diversity is generally low on the site given what appears to be long-term horse grazing practices. Dominant plant species in the disturbed annual grassland habitat include soft chess (*Bromus hordeaceus*) and filarees (*Erodium* spp.). Other associated grasses and herbaceous broadleaf species include ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), foxtail barley (*Hordum murinum* ssp. *leporinum*), short podded

mustard (*Hirschfeldia incana*), clustered tarweed (*Deinandra fasciculata*), and fiddleneck (*Amsinckia intermedia*). See Figure 7 Photos 1 through 9.

Eight mature valley oak trees (*Quercus lobata*) are spread across the non-native annual grassland site that were evaluated by arborists. Seven of which are in poor or very poor condition with arborist's recommendation for removal for development, and one in good condition that could be retained with maintenance pruning.

A non-wetland swale running southeast to northwest emanating from the southern edge of site was dominated by squirrel-tail barley (*Hordeum jubatum*) with mayweed (*Anthemis cotula*) transitioning to Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum)* (see Figure 4). A full discussion of the jurisdictional determination of the non-wetland swale is included in Section 5.3 below.

5.1.2 RUDERAL – LIVESTOCK PADDOCKS AND BARN

Approximately two acres on the northwest corner of the site supports a barn, fenced paddocks, and what appears to have been rectangular and circular horse training "arenas" that created a ruderal (disturbed) grassland area. There is no official classification for "ruderal" but is accepted for describing areas subject to human and livestock disturbed areas. The intensive animal use reduces vegetative cover and habitat values for native species with an increase in cover of short-podded mustard in the disturbed areas.

5.2 WILDLIFE

The project site soft chess and filaree dominated non-native grassland with evidence of substantial horse grazing provides minimal quality habitat for locally common wildlife species that have become adapted to the habitat edges along the urban interface. Common wildlife observed were gopher mounds and abundant ground squirrels. Bird species observed included northern mockingbird, mourning dove, European starling, common raven, western meadowlark, with red tailed hawk and turkey vulture fly overs. The large valley oak trees can provide roosting and nesting habitat for birds. No large raptor stick nests were observed in any of the trees. The habitat on the project area does not support a substantial amount habitat in the context of the greater expanse of undeveloped lands abutting urban development to the north and west, and agricultural/grazing lands to the south and west. As such, the site adjacent to developed City of Paso Robles does not represent a migratory or movement corridor for wildlife.

5.3 WATERS OF THE U.S., WETLANDS, AND WATERS OF THE STATE

The project site is upland non-native grassland/pasture with a non-wetland non-jurisdictional swale running southeast to northwest across the southern corner of the project site. In addition to review of aerial photography over time, data on vegetation, soils, and

hydrology were collected at three wetland determination data observation points on May 5, 2022, and reaffirmed on June 23, 2022 (see Figure 4). The swale is evident onsite from Google Earth aerial photographs back to 1994 leading offsite on adjacent properties to the west running towards Union Road where it likely entered storm drains.

Presently, the western end of the swale at the property line is met by culverts on and under the adjacent property. Recent City approved adjacent development placed culverts at the western end of the swale at the property line. There is no surface evidence of the swale remaining on the recent developed areas. The certified mitigated negative declaration (MND) for the adjacent approved project (Planned Development PD 17-001) determined that the swale emanating from and "downstream" of the project site lacked an ordinary high water mark (OHWM; limits of Federal Clean Water Act jurisdiction) and, therefore, was not a wetland or waters of the U.S./State (City of Paso Robles MND, Attachment 4, Kevin Merk Associates, 2017). The onsite broad low gradient swale also lacks any distinct bed, bank, or channel, evidence of flow such as scour or sediment deposits, or basin topography. The lack of any defined OHWM was very evident during the DWE June 23, 2022 field survey after cattle grazing had reduced the grassland cover exposing the microtopography of the site (see Figure 7, Photos 10 through 20). As such, there is no OHWM present and the swale does not represent a waters of the U.S./State.

DWE gathered data at wetland determination data points at two locations in the swale that supported wetland indicator plant species, and one location above the swale representing uplands. The wetland determination data forms corroborating the following findings are included in Appendix C. The following current wetland plant indicators status and 2020 Arid West Wetland Plant List were used.

- OBL – (Obligate) almost always occur in wetlands;
- FACW – (Facultative Wetland) usually occur in wetlands, but may occur in non-wetlands;
- FAC – (Facultative) occur in wetlands and non-wetlands;
- FACU – (Facultative Upland) usually occur in non-wetlands, but may occur in wetlands;
- UPL – (Upland) almost always occur in non-wetlands.

Data Point 1 (DP-1) was taken at the western ("downstream") end of the swale at the property line where there was a dominance of seasonal wetland plants coyote thistle (*Eryngium vaseyi;* FACW), popcorn flower (*Plagiobothrys stipitatus;* FACW), and woolly marbles (*Psilocarphus tenellus;* OBL) within an approximately 470 square foot oval area. However, there were no field indicators of hydric soil (redoxomorphic features from sufficient wetting/drying). While the swale could be considered a drainage pattern (a secondary indicator), two secondary indicators are needed (i.e., water marks, sediment/drift deposits) to be determine a wetland. No other secondary indicators or any primary

indicators (1 required) of wetland hydrology were present. As such, the area does not meet the three-parameter jurisdictional wetland determination criteria and is a non-wetland non-jurisdictional swale.

Data Point 2 (DP-2) was taken above the swale topography to represent an upland point. This data point was dominated by 85% cover of soft chess (*Bromus hordeaceus:* FACU), with red brome (*Bromus rubens;* UPL), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum;* FAC), and a few coyote thistle (FACW) that does not meet the wetland vegetation criteria. There were no field indicators of hydric soil (redoxomorphic features from sufficient wetting/drying). The data point was outside of the swale drainage pattern so no primary or secondary wetland hydrology indicators were present. As such, the area does not meet the three-parameter jurisdictional wetland determination criteria and represents uplands.

Data Point 3 (DP-3) was taken in the swale where there was a predominance of seasonal wetland grasses Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum;* FAC) and squirreltail barley (*Hordum jubatum;* FAC), with filaree (*Erodium cicutarium;* UPL). However, there were no field indicators of hydric soil (redoxomorphic features from sufficient wetting/drying). While the swale could be considered a drainage pattern (a secondary indicator), two secondary indicators are needed (i.e., water marks, sediment/drift deposits) to be determine a wetland. No other secondary indicators or any primary indicators (1 required) of wetland hydrology were present. As such, the area does not meet the three-parameter jurisdictional wetland determination criteria and is a non-wetland non-jurisdictional swale.

The State Water Resources Control Board (Water Board) issued policy, procedures, and wetland definition for the discharge of dredged or fill material into waters of the State (2021 Procedures). In brief, the 2021 Procedures define wetlands as waters of the State to be consistent with the federal three parameter definition requiring the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. As described above and detailed on the wetland determination data sheets in Appendix C, the project site does not support any three parameter wetlands. As such, there are no State wetlands present on the project site. Further, the State determined the swale on the adjacent property to the west (now in culverts) did not represent a waters of the State (City of Paso Robles, 2017).

Based on the above detailed findings, no waters of the U.S./State, wetlands, or riparian habitat under any regulatory jurisdictions or definitions occur on the project site.

5.4 SPECIAL-STATUS SPECIES AND NATURAL COMMUNITIES OF SPECIAL CONCERN

Special-status species are those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the United States Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) under the federal Endangered

Species Act (FESA); those considered "species of concern" by the USFWS; those listed or proposed for listing as rare, threatened, or endangered by the CDFW under the California Endangered Species Act (CESA); animals designated as "Species of Special Concern" by the CDFW; and plants occurring as a rank 1B, 2, and 4 of the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Vascular Plants of California.* Natural Communities of Special Concern are habitat types considered rare and worthy of tracking in the California Natural Diversity Database (CNDDB) by the CNPS and CDFW because of their limited distribution or historic loss over time.

The search and review of the CNDDB revealed 17 special-status species composed of seven special-status plants, 10 special-status wildlife species, and no natural communities of special concern with recorded occurrences within an approximately 5-mile radius of the proposed project site. The 5-mile CNDDB search radius is appropriate to focus the special-status species issues given the project site location at the edge of urban development. The following briefly describes or summarizes the special-status species issues and potential for occurrence on the project site. Figure 5 provides CNDDB mapped locations and Table B-2 in Appendix B provides a list of special-status species recorded in the CNDDB that includes scientific and common name, listing status, habitat requirements, and potential to occur or observations if any on the project site.

5.4.1 Special-Status Botanical Resources

The CNDDB revealed the recorded occurrences of seven special-status plant species within a 5-mile radius of the project site, none of which are formally listed under the Federal or State Endangered Species Acts, only with a CNPS rank suggesting rarity. None of the CNDDB plant occurrences are mapped within the project site. The floristic inventory and rare plant survey conducted on the project site on May 5 and June 23, 2022 resulted in no observations of any special-status plant species. The May 5th field survey was during peak floristic expression for the 2022 growing season.

The special-status plant species occurrences recorded in the CNDDB are herbaceous annuals that are commonly associated with a specific soil type, moisture regime (mesic/moist grasslands, vernal pools). Special-status plants recorded in the CNDDB associated with serpentine or specialized soils that do not occur on the project site include Lemmon's jewelflower *(Caulanthus lemmonii),* woodland wollythreads (*Monolopia gracilens*) and San Luis Obispo owl's-clover (*Castilleja densifllora* var. *obispoensis*). No serpentine or clay soils are mapped or observed within the project area and these species were not observed during the DWE floristic inventory field surveys.

The special-status plant species recorded in the CNDDB known from mesic (moist) habitats occurring in the region are the shining navarretia (*Navarretia nigeliformis* ssp. *radians),* Jared's pepper-grass (*Lepidium jaredii* ssp. *jaredii*), oval-leaved snapdragon (*Antirrhinum*

ovatum), and Santa Lucia dwarf rush (*Juncus luciensis*). The CNDDB has many occurrences of shining navarretia south of the project site (Chandler Ranch occurrences). The non-wetland swale provides mesic conditions but none of these species were observed during the DWE floristic inventory field surveys.

5.4.2 Special-Status Wildlife

The CNDDB search revealed the recorded occurrences of 10 special-status wildlife species within the region of the project site. Special-status wildlife species known from the region evaluated for this study are discussed below by groups based upon habitat preferences, specific habitat use requirements (i.e., terrestrial or aquatic), mobility, and migratory patterns. Table B-2 in Appendix B provides listing status, habitat detail, and potential to occur on the project site for each of the species discussed below.

Aquatic/Riparian Species – The project site does not support habitat for any of the highly aquatic permanent water western pond turtle (*Emys marmorata*), vernal pool species vernal pool fairy shrimp (*Branchinecta lynchi*) or western spadefoot (toad) (*Spea hammondii*). The CNDDB includes occurrences for wide-ranging resident and migratory bird species known from the region of the project site. The tricolored blackbird (*Agelaius tricolor*) is locally nomadic but requires bulrush and cattail marsh or ponds for breeding that are not present on the project site. The least Bell's vireo (*Vireo bellii pusillus*) is a breeding season migrant known from the Salinas River that requires dense riparian habitat that does not occur on the project site. As such, the project site does not support suitable habitat for these bird species.

Reptiles – The northern legless lizard *(Anniela pulchra)* is closely associated with sandy or very friable loamy soils under coastal scrub or woodland vegetation with soil moisture and vegetative cover being essential. The onsite loam and sandy loam soils, lack of shrub cover, and horse pasturing renders the site unsuitable for this species.

Upland Birds – The project site supports potential limited foraging and/or nesting opportunities for the wide ranging locally nomadic golden eagle. No large stick nests were observed in any of the large onsite valley oak trees. Brief forging on the project site has a low probability of occurrence and does not represent a substantial amount of foraging habitat.

Mammals – San Joaquin Kit Fox Habitat Urban Area Exemption – The SJKF occupies open country grassland, open scrubland, and oak savannah where there are friable soils for burrowing and an abundant rodent prey base. This small species of fox is known to use available ground squirrel or other existing burrows for den sites as they typically do not initially excavate their own dens. The open grassland grazing lands to the southeast offers suitable habitat for the San Joaquin kit fox, although not observed in the Paso Robles area for over ten years. The project site in the developed area of the City falls outside of the SJKF compensatory mitigation area defined in the City General Plan Final Environmental Impact Report as shown on Figure 6 in Appendix A.

6.0 IMPACT ASSESSMENT AND RECOMMENDED MITIGATION MEASURES

6.1 SUFFICIENCY OF BIOLOGICAL DATA

The DWE field surveys on May 5 and June 23, 2022 are sufficient to; 1) adequately establish existing conditions of the project site and context in the landscape and land use mosaic in the vicinity; 2) determine that the site does not support any special-status plant or wildlife species; 3) determine the absence of waters of the U.S./State, wetland or riparian habitats onsite, and 4) adequately evaluate proposed project impacts and provide recommended mitigation measures to reduce potential significant impacts to a less than significant level. The data collected as articulated in this report provide sufficient biological resources information to adequately address potential significance of impacts on biological resources.

6.2 IMPACT ASSESSMENT

Botanical Resources – The proposed project would develop the entire 12.0 acres of non-native annual grassland and 2.0 acres of ruderal habitats, including up to eight valley oak trees into industrial park urban uses. Seven valley oaks are in poor or very poor condition with arborist's recommendation for removal for development, and one in good condition that could be retained with maintenance pruning. No natural communities of special concern occur on the project site so none would be impacted. The onsite soil and microhabitat conditions are not suitable for any special-status plant species, and none were observed during the DWE floristic inventory and rare plant survey. Oak tree removals approved as part of the project would be mitigated in accordance with the City ordinance requiring replacement plantings on an inch for inch basis of 25% of the inches of diameter at breast height of oak trees removed. **As such, impacts on botanical resources would be considered a less than significant impact and no mitigation is recommended.**

Wildlife Resources – Construction of the proposed project and conversion of the entire site into industrial park urban uses could result in the mortality and/or displacement of locally common wildlife such as resident and migratory birds, raccoons, opossums, and small mammals. ~~No special-status wildlife species are expected to occur on the project site.~~ **As such, impacts on common wildlife would be considered a less than significant impact and no mitigation is recommended.**

Vegetation and tree removal (clearing and grubbing) during the nesting season for birds could result in the destruction of active bird's nests. Destruction of active nests is prohibited by the Fish and Game Code of California Sections 3503 and 3503.1 (raptors specifically). As such, this could be considered **a potentially significant impact. Mitigation to avoid take or destruction of active nests would reduce this potentially significant impact to a less than significant level.**

The project is within the historic range of the SJKF with no observations in the City limits for over 10 years. Although highly unlikely, the SJKF could occupy a den on the project site and be impacted by project construction. Potential direct impacts on an occupied SJKF den is **a potentially significant impact requiring mitigation to avoid take of the species.**

6.3 RECOMMENDED MITIGATION MEASURES

The following mitigation measure is recommended to avoid, minimize, and mitigate for potentially significant impacts on nesting birds.

To reduce any potentially significant impact on nesting birds from vegetation removal to a less than significant level, the following mitigation measures are recommended.

MM BIO-1: Vegetation removal and initial site disturbance shall be conducted between September 1 and January 31 outside of the nesting season for birds. If vegetation and/or tree removal is planned for the bird nesting season (February 1 to August 31), then preconstruction nesting bird surveys shall be conducted by a qualified biologist to determine if any active nests would be impacted by project construction. If no active nests are found, then no further mitigation shall be required.

If any active nests are found that would be impacted by construction, then the nest sites shall be avoided with the establishment of a non-disturbance buffer zone around active nests as determined by a qualified biologist. Nest sites shall be avoided and protected with the non-disturbance buffer zone until the adults and young of the year are no longer reliant on the nest site for survival as determined by a qualified biologist. As such, avoiding disturbance or take of an active nest would reduce potential impacts on nesting birds to a less-than-significant level.

To reduce any potentially significant impact and avoid take of any SJKF from project construction, the following mitigation measures are recommended.

MM BIO-2: To avoid direct take of SJKF during construction in accordance with the USFWS and San Luis Obispo County Guide to SJKF Mitigation Procedures Under CEQA, the project owner shall adopt the Standard Kit Fox CEQA Mitigation Measures and shall be included on development plans. The following measures shall be implemented:

- A maximum 25 mph speed limit shall be required at the project site during construction activities.
- All construction activities shall cease at dusk and not start before dawn.
- A qualified biologist shall be on-site immediately prior to initiation of project activities to inspect for any large burrows (e.g., known and

potential dens) and to ensure no wildlife are injured during project activities. If dens are encountered, they should be avoided as discussed below.

- Exclusion zone boundaries shall be established around all known and potential SJKF dens.
- All excavations deeper than 2 feet shall be completely covered at the end of each working day, or fitted with wildlife escape ramps.
- All pipes, culverts, or similar structures shall be inspected for SJKF and other wildlife before burying, capping, or moving.
- All exposed openings of pipes, culverts, or similar structures shall be capped or temporarily sealed prior to the end of each working day.
- All food-related trash shall be removed from the site at the end of each workday.
- Project-related equipment shall be prohibited outside of designated work areas and access routes.
- No firearms shall be allowed in the project area.
- Disturbance to burrows shall be avoided to the greatest extent feasible.
- No rodenticides or herbicides should be applied in the project area.
- Permanent fences between any remaining habitat areas shall allow for SJKF passage through or underneath (i.e., an approximate 4-inch passage gap shall remain at ground level).
- To avoid take of any SJKF and/or active SJKF dens, within 30 days prior to the initiation of site disturbance, implement the SJKF den survey and den closure protocol for unoccupied dens. Any SJKF occupied dens shall be avoided until the SJKF leave the den/site.
- Prior to issuance of grading and/or construction permit and within 30 days prior to initiation of site disturbance and/or construction, all personnel associated with the project shall attend a worker education training program, conducted by a qualified biologist, to avoid or reduce impacts on sensitive biological resources (i.e. San Joaquin kit fox). At a minimum, as the program relates to the kit fox, the training shall include the kit fox's life history, all mitigation measures specified by the City, as well as any related biological report(s) prepared for the project. The applicant shall notify the City shortly prior to this meeting. A kit fox fact sheet shall also be developed prior to the training program, and distributed at the training program to all contractors, employers and other personnel involved with the construction of the project.

- During the site-disturbance and/or construction phase, any contractor or employee that inadvertently kills or injures a San Joaquin kit fox or who finds any such animal either dead, injured, or entrapped shall be required to report the incident immediately to the applicant and City. In the event that any observations are made of injured or dead kit fox, the applicant shall immediately notify the USFWS and CDFW by telephone. In addition, formal notification shall be provided in writing within three working days of the finding of any such animal(s). Notification shall include the date, time, location and circumstances of the incident. Any threatened or endangered species found dead or injured shall be turned over immediately to CDFW for care, analysis, or disposition.

7.0 CONCLUSIONS

Based on the findings described above establishing the existing conditions of biological resources within the project site, and incorporation of the recommended mitigation measures, implementation of the proposed project would not result in any substantial adverse effects on biological, botanical, or wetland habitat resources. ***Therefore, with mitigation measures incorporated into the project, direct and indirect project impacts on biological resources would be considered to be less than significant.***

8.0 REFERENCES

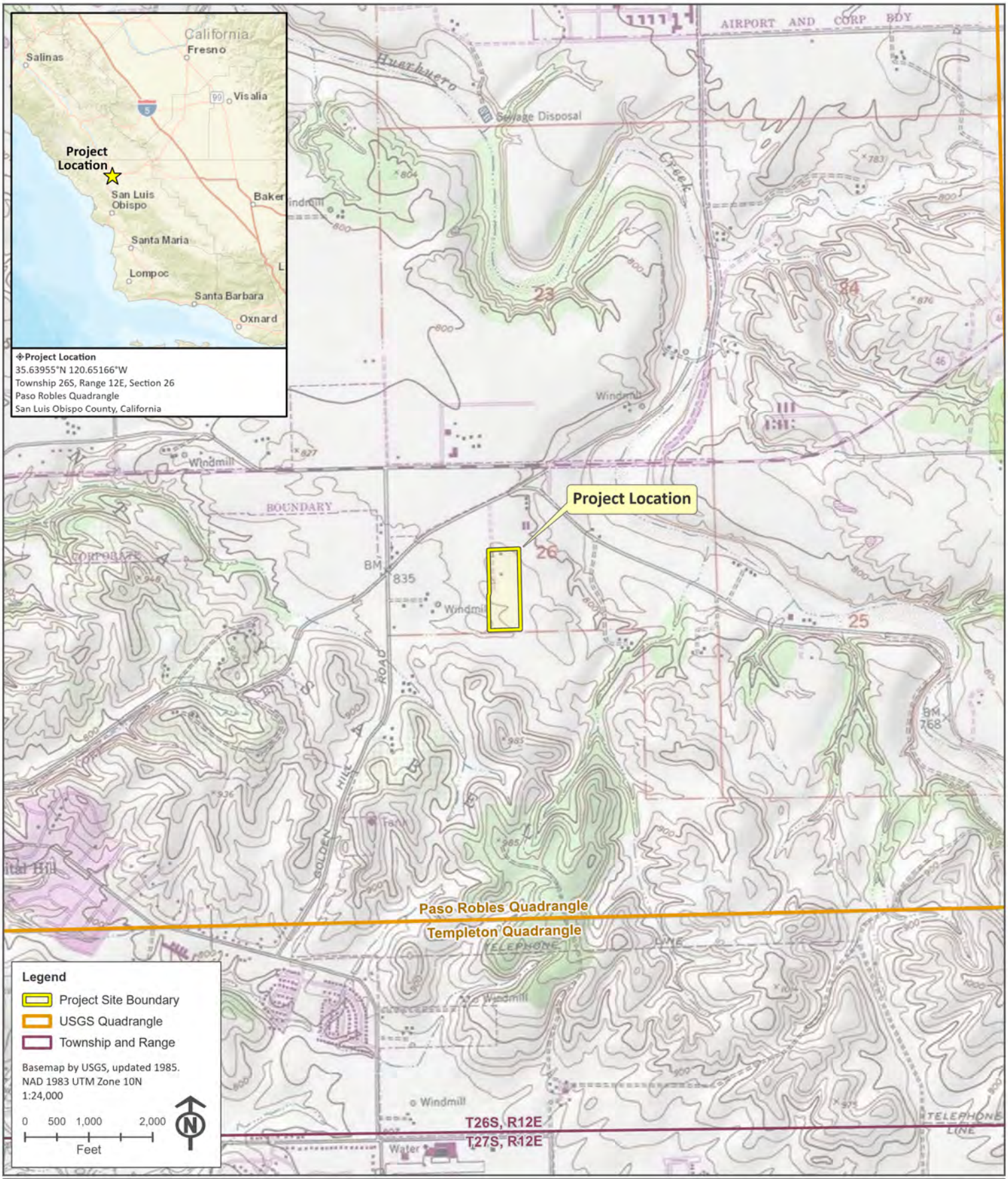
1. Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, Editors. 2012. *The Jepson Manual, Vascular Plants of California, Second Edition Thoroughly Revised and Expanded*. UC Press.
2. California Native Plant Society, Rare Plant Program. 2022. Rare Plant Inventory (online edition, v9-01 1.5). Website https://www.rareplants.cnps.org (accessed March 2022).
3. California Department of Fish and Wildlife (CDFW). 2022. Natural Diversity Data Base (CNDDB) of recorded occurrences of special-status species. Accessed July 2022.
4. CALFLORA. 2022. Online database of native plants of California. 2022.
5. City of Paso Robles. 2003. General Plan Final Environmental Impact Report Figure 4.3-2 delineating the San Joaquin kit fox compensatory mitigation area.
6. City of Paso Robles. 2017. Notice of Determination and Certified Mitigated Negative Declaration for Planned Development 17-001, Tentative Parcel Map PR 16-0245, and Conditional Use Permit 17-01. November 16, 2017.
7. Google Earth. 2022. Online resource for aerial photography over time.
8. Heritage Tree Arboricultural Consulting. 2022. Oak Tree Assessment Report for Ardmore Road Project, 2930 Union Road, Paso Robles, CA 93446. August 10, 2022.
9. Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California.* California Department of Fish and Wildlife Nongame-Heritage Program.

10. Holland, V.L., and D.J. Keil. 1990. *California Vegetation*. Biological Sciences Department, California Polytechnic State University, San Luis Obispo, California.
11. Jameson, E.W. & Hans J. Peeters . 2004. *Mammals of California, Revised Edition.* University of California Press.
12. Jennings, M.R. and M.P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Wildlife Contract # 8023. Inland Fisheries Division, Rancho Cordova, California.
13. Mayer, W. and W. Laudenslayer, Editors. 1988. *A Guide to Wildlife Habitats of California*. California Department of Forestry and Fire Protection.
14. Peterson, R.T. 1990. *A Field Guide to Western Birds*, Houghton Mifflin Company.
15. Stebbins, R.C., and McGinnis, S.M. 2012. *Field Guide to Amphibians and Reptiles of California: Revised Edition* (California Natural History Guides) University of California Press, 2012
16. Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. *A Manual of California Vegetation, Second Edition*. California Native Plant Society Press, Sacramento.
17. Solid Oak Tree Management. 2021. Arborist Report for Ardmore Project, Paso Robles, CA. October 31, 2021.
18. U.S.D.A Soil Conservation Service (Natural Resources Conservation Service). Online mapping and soils data for inland San Luis Obispo County (1977/2022).
19. U.S. Fish and Wildlife Service. 2011. *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance*. January 2011.
20. U.S. Fish and Wildlife Service. 2020*. Species Status Assessment Report for the San Joaquin kit fox* (*Vulpes macrotis mutica*). August 2020.

Appendix A

Figures

Figure 1: Regional Location Map
Figure 2: Vicinity Location Aerial Map
Figure 3: Soils Map
Figure 4: Habitat Map
Figure 5: CNDDB Occurrence Map
Figure 6: San Joaquin Kit Fox Exempt Area Map
Figure 7: Representative Photographs



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Figure 1: Regional Location Map

2930 Union Road – Lots 6 & 13

Biological Resources Assessment

Updated: 7/8/2022

Created by: SierraGIS

Figure 2: Vicinity Location Aerial Map

2930 Union Road
Lots 6 & 13

Biological Resources Assessment

Legend

- Project Site Boundary
- Lot Boundary

Sources: Aerial by Google (2/26/21).
Map Updated: 7/21/2022

GCS | NAD 1983 StatePlane California V FIPS 0405 Feet
Projection | Lambert Conformal Conic
Datum | North American 1983
Scale | 1:5,500

Feet: 0 — 440 — 880
Meters: 0 — 130 — 260

David Wolff
Environmental, LLC

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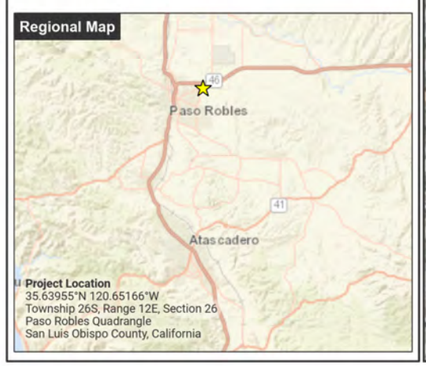




Figure 3: Soils Map

2930 Union Road
Lots 6 & 13

Biological Resources Assessment

Legend

- Project Site Boundary
- Lot Boundary

NRCS Soils

- Arbuckle fine sandy loam, 0 to 2 percent slopes (100)
- Arbuckle-Positas complex, 9 to 15 percent slopes (102)
- Arbuckle-Positas complex, 30 to 50 percent slopes (104)
- Arbuckle-San Ysidro complex, 2 to 9 percent slopes (106)
- Cropley clay, 2 to 9 percent slopes (133)
- Hanford and Greenfield gravelly sandy loams, 0 to 2 percent slopes (149)
- Nacimiento-Ayar complex, 9 to 30 percent slopes (177)
- Nacimiento-Los Osos complex, 9 to 30 percent slopes (179)
- San Ysidro loam, 0 to 2 percent slopes (197)

Sources: Aerial Imagery by Google (2/26/21). NRCS by USDA (2022).
Map Updated: 7/21/2022
Created by: SierraGIS

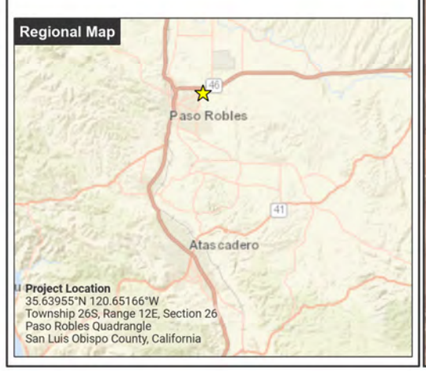
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Datum | North American 1983
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Feet: 0 — 175 — 350
Meters: 0 — 50 — 100

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Regional Map



Project Location
35.63955°N 120.65166°W
Township 26S, Range 12E, Section 26
Paso Robles Quadrangle
San Luis Obispo County, California

Figure 4: Habitat Map

2930 Union Road
Lots 6 & 13

Biological Resources Assessment

Legend

- Project Site Boundary
- Lot Boundary
- Non-Wetland Swale
- Valley Oak Tree
- DP-# | Wetland Delineation Data Point

Habitats

- Disturbed Non-Native Annual Grassland
- Livestock Paddocks and Barn

Sources: Aerial Imagery by Google (2/26/21).
Map Updated: 8/8/2022
Created by: SierraGIS

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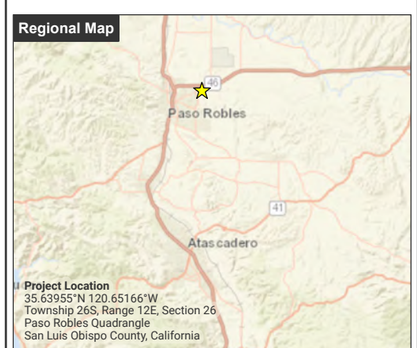
Feet
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Meters
0 30 60

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Environmental, LLC

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Regional Map



Project Location
35.63955°N 120.65166°W
Township 26S, Range 12E, Section 26
Paso Robles Quadrangle
San Luis Obispo County, California



Figure 5: CNDDB Map

2930 Union Road
Lots 6 & 13

Biological Resources Assessment

Legend

- Project Site Boundary
- 5-Mile Buffer

CNDDB Animals

- Atascadero June beetle
- Lompoc grasshopper
- Northern California legless lizard
- San Joaquin kit fox
- golden eagle
- least Bell's vireo
- tricolored blackbird
- vernal pool fairy shrimp
- western pond turtle
- western spadefoot

CNDDB Plants

- Jared's pepper-grass
- Lemmon's jewelflower
- San Luis Obispo owl's-clover
- Santa Lucia dwarf rush
- oval-leaved snapdragon
- shining navarretia
- woodland woollythreads

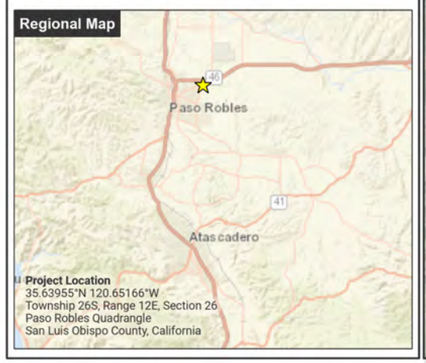
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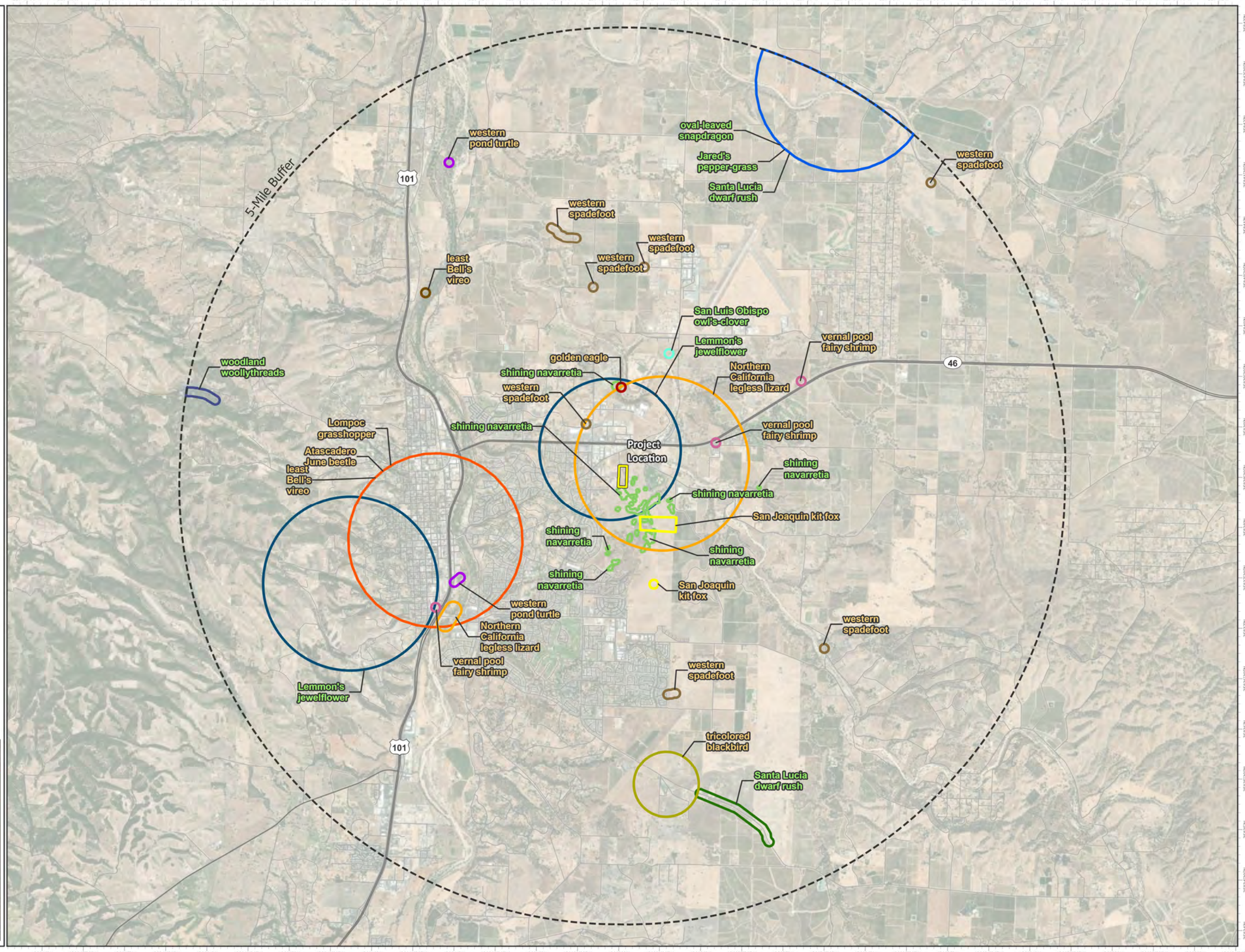
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Miles
0 1 2
Kilometers
0 1.5 3

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Environmental, LLC
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Regional Map





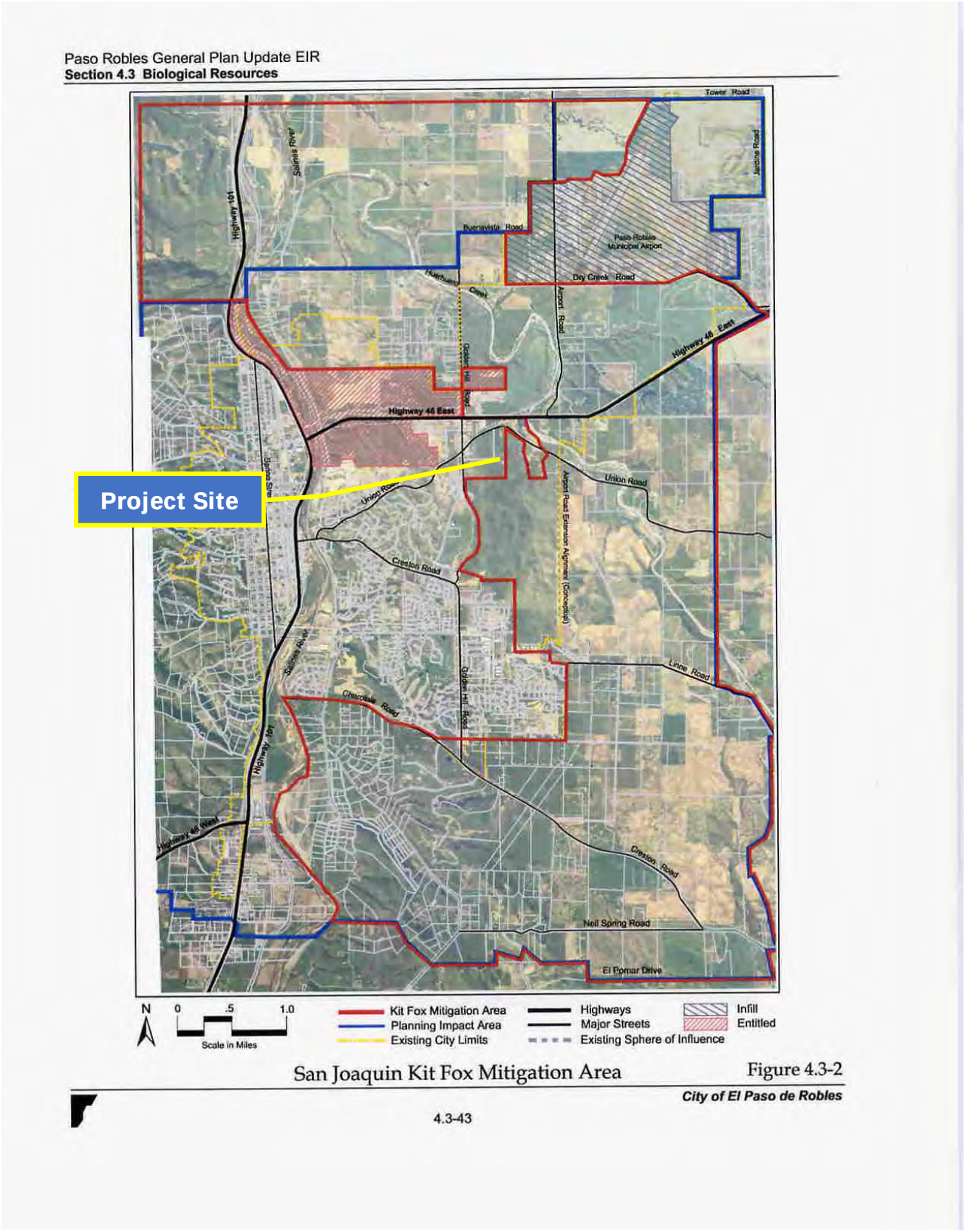


FIGURE 6 – SAN JOAQUIN KIT FOX PROJECT COMPENSATORY MITIGATION EXEMPT AREA MAP



Photo 1: View southeast at ruderal animal paddock area, remnant rectangular "arena" with mustard growth, and barn (arrow). **5/5/2022**



Photo 2: View west at ruderal animal paddock area and remnant circular "arena" along Ardmore Road (truck passing by). **5/5/2022**



Photo 3: View northeast along west edge of lot #6 at non-native annual grassland heavily used as horse pasture. **5/5/2022**



Photo 4: View east along lot #6 edge between pasture and paddock area at non-native annual grassland with scattered valley oak trees. **5/5/2022**

FIGURE 7 – REPRESENTATIVE PHOTOGRAPHS



Photo 5: View north at non-native annual grassland pasture towards north edge of lot #6 (tree line). **5/5/2022**



Photo 6: View west across lot #6 & lot #13 "line" non-native annual grassland & barn/oak at south end of paddock area (arrow). **5/5/2022**



Photo 7: View south along east border of lot #13 non-native annual grassland pasture and scattered valley oak trees. **5/5/2022**



Photo 8: View west at non-native annual grassland pasture & valley oak along north edge of lot #13. Structures are across Ardmore Road. **5/5/2022**

FIGURE 7 – REPRESENTATIVE PHOTOGRAPHS



Photo 9: View west at lot #13 non-native annual grassland pasture. West property boundary along fence in background (arrow). **5/5/2022**



Photo 10: View west along south edge of lot #13 property boundary where non-jurisdictional swale enters property (arrow). **5/5/2022**



Photo 11: View west at non-jurisdictional swale running across southwest corner of lot #13 to culverts on/under adjacent property (arrow). **5/5/2022**



Photo 12. View west at non-jurisdictional swale after grazing showing lack of any ordinary highwater mark (OHWM). **6/23/2022**

FIGURE 7 – REPRESENTATIVE PHOTOGRAPHS



Photo13: View southeast at wetland determination data point DP-1 (arrow) at end of non-jurisdictional swale. **5/5/2022**



Photo 14: View southeast at DP-1 (arrow) at end of non-jurisdictional swale after grazing showing lack of any basin topography. **6/23/2022**



Photo 15: View south at DP-2 (arrow) upland data point and DP-1 (shovel) at end of non-jurisditinal swale. **5/5/2022**



Photo 16. View north after grazing at DP-2 (arrow) upland point and DP-1 (shovel) at end of non-jurisditinal swale. No OHWM. **6/23/2022**

FIGURE 7 – REPRESENTATIVE PHOTOGRAPHS



Photo 17: View west at DP-3 (arrow) in non-jurisdictional swale. **5/5/2022**



Photo 18: View southeast at DP-3 (arrow) after grazing in non-jurisdictional swale. No OHWM. **6/23/2022**



Photo 19: View southeast at non-jurisdictional swale after grazing showing no OHWM. **6/23/2022**



Photo 20. View southeast across adjacent property where non-jurisdictional swale enters the project site. **5/5/2022**

FIGURE 7 – REPRESENTATIVE PHOTOGRAPHS

APPENDIX B

TABLES

TABLE B-1: FLORISTIC INVENTORY PLANT SPECIES OBSERVED

TABLE B-2: CNDDB SPECIAL-STATUS SPECIES

TABLE B-1
FLORISTIC INVENTORY AND RARE PLANT SURVEY SPECIES OBSERVED
DWE SURVEYS: MAY 5, 2022, JUNE 23, 2022

SCIENTIFIC NAME	COMMON NAME
Amsinckia intermedia	Common fiddleneck
Anthemis cotula	Mayweed
Bromus diandrus	Rip gut brome
Bromus hordeaceus	Soft chess
Bromus rubens	Red brome
Deinandra fasciculata	Clustered tarweed
Festuca perennis	Italian rye grass
Erodium botrys	Filaree
Erodium cicutarium	Redstem filaree
Eryngium vaseyi	Coyote thistle
Festuca perennis	Italian rye grass
Hirschfeldia incana	Short podded mustard
Hordeum jubatum	Squirreltail barley
Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
Hordum murinum ssp. *leporinum*	Foxtail barley
Plagiobothrys stipitatus	Stalked popcorn flower
Psilocarphus tenellus	Woolly marbles
Quercus lobata	Valley oak
Rumex crispus	Curly dock

Table B-2
CNDDB Special-Status Species Recorded Occurrences
(5-mile Radius; July 2022)

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	General Habitat Description	Micro Habitat Description	Potential to Occur Onsite
BIRDS							
Agelaius tricolor	tricolored blackbird	None	Threatened	--	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California.	Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	No suitable wetland habitat onsite.
Aquila chrysaetos	golden eagle	None	Fully Protected	--	Rolling foothills, mountain areas, sage-juniper flats, and desert.	Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	low / foraging only
Vireo bellii pusillus	least Bell's vireo	Endangered	Endangered	--	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft.	Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	No suitable riparian habitat onsite.
REPTILES / AMPHIBIANS							
Anniella pulchra	northern California legless lizard	None	Species of Special Concern	--	Sandy or loose loamy soils under sparse vegetation.	Soil moisture is essential. They prefer soils with a high moisture content.	No suitable friable soils onsite.
Emys marmorata	western pond turtle	None	Species of Special Concern	--	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation.	Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	No suitable wetland habitat onsite.
Spea hammondii	western spadefoot	None	Species of Special Concern	--	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands.	Vernal pools are essential for breeding and egg-laying.	No suitable ponded wetland habitat onsite.
MAMMALS							
Vulpes macrotis mutica	San Joaquin kit fox	Endangered	Threatened	--	Annual grasslands or grassy open stages with scattered shrubby vegetation.	Need loose-textured sandy soils for burrowing, and suitable prey base. Often associated with ground squirrel burrows.	Low. Not observed in area for more than 10 years.
INVERTEBRATES							
Branchinecta lynchi	vernal pool fairy shrimp	Threatened	None	--	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools.	Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	No suitable ponded wetland habitat onsite.
Polyphylla nubila	Atascadero June beetle	None	None	--	Known only from inland sand dunes in San Luis Obispo County.		No suitable sandy dune habitat onsite.
Trimerotropis occulens	Lompoc grasshopper	None	None	--	Known only from Santa Barbara and San Luis Obispo counties.	Rocky gravelly habitats	No suitable habitat onsite.
PLANTS							
Antirrhinum ovatum	oval-leaved snapdragon	None	None	4.2	Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland.	From open hillsides to small vernal pools in clay or gypsum soils w/in grassland or woodland. Sites often alkaline. 200-1000 m.	Not observed during DWE rare plant survey.
Castilleja densiflora var. obispoensis	San Luis Obispo owl's-clover	None	None	1B.2	Valley and foothill grassland, meadows and seeps.	Heavy clay soils; sometimes on serpentine. 9-485 m.	Not observed during DWE rare plant survey.
Caulanthus lemmonii	Lemmon's jewelflower	None	None	1B.2	Pinyon and juniper woodland, valley and foothill grassland.	75-1585 m.	Not observed during DWE rare plant survey.
Juncus luciensis	Santa Lucia dwarf rush	None	None	1B.2	Vernal pools, meadows and seeps, lower montane coniferous forest, chaparral, Great Basin scrub.	Vernal pools, ephemeral drainages, wet meadow habitats and streamsides. 280-2035 m.	Not observed during DWE rare plant survey.
Lepidium jaredii ssp. jaredii	Jared's pepper-grass	None	None	1B.2	Valley and foothill grassland.	Alkali flats and sinks. Sandy, alkaline, sometimes adobe soils. 335-1005 m.	Not observed during DWE rare plant survey.
Monolopia gracilens	woodland woollythreads	None	None	1B.2	Chaparral, valley and foothill grassland, cismontane woodland, broadleafed upland forest, North Coast coniferous forest.	Grassy sites, in openings; sandy to rocky soils. Often seen on serpentine after burns, but may have only weak affinity to serpentine. 120-975 m.	Not observed during DWE rare plant survey.
Navarretia nigelliformis ssp. radians	shining navarretia	None	None	1B.2	Cismontane woodland, valley and foothill grassland, vernal pools.	Apparently in grassland, and not necessarily in vernal pools. 60-975 m.	Not observed during DWE rare plant survey.

APPENDIX C

WETLAND DETERMINATION DATA SHEETS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 2930 Union Road Development Project City/County: Paso Robles, San Luis Obispo Sampling Date: May 5, 2022

Applicant/Owner: MD3 Investments State: CA Sampling Point: DP-1

Investigator(s): David Wolff, DWE Principal Ecologist Section, Township, Range: S26 T26S R12E

Landform (hillslope, terrace, etc.): Upland Terrace Local relief (concave, convex, none): Level Slope (%): 0-2%

Subregion (LRR): LRR C Lat: 35.638191 Long: -120.652540 Datum: NAD 1983

Soil Map Unit Name: San Ysidro loam, 0 to 2 percent slopes (197) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes _____ No ✓	

Remarks:

Swale topography evident in field and available aerial photography. Non-wetland non-jurisdictional swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.20 ac.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 470 sq. ft)			
1. Eryngium vaseyi	25%	Yes	FACW
2. Plagiobothrys stipitatus	40%	Yes	FACW
3. Psilocarphus tenellus	40%	Yes	OBL
4. Rumex crispus	3%	No	FAC
5.			
6.			
7.			
8.			
	108% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	100 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

Mesic site at end of swale at property border.

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	100%	NONE				Loam	No redox features
3-6	10YR 4/2	100%	NONE				Loam	No redox features
6-17	10YR 3/2	100%	NONE				Loam	No redox features

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Loam soils with no redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Swale topography. No other secondary indicators and no OHWM.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 2930 Union Road Development Project City/County: Paso Robles, San Luis Obispo Sampling Date: May 5, 2022

Applicant/Owner: MD3 Investments State: CA Sampling Point: DP-2

Investigator(s): David Wolff, DWE Principal Ecologist Section, Township, Range: S26 T26S R12E

Landform (hillslope, terrace, etc.): Upland Terrace Local relief (concave, convex, none): Level Slope (%): 0-2%

Subregion (LRR): LRR C Lat: 35.638104 Long: -120.652409 Datum: NAD 1983

Soil Map Unit Name: San Ysidro loam, 0 to 2 percent slopes (197) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Upland data point above non-wetland non-jurisdictional swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 500 sq. ft)			
1. Bromus hordeaceus	85%	Yes	FACU
2. Hordeum marinum ssp. gussoneanum	25%	Yes	FAC
3. Bromus rubens	5%	No	UPL
4. Eryngium vaseyi	10%	No	FACW
5.			
6.			
7.			
8.			
	125% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Not greater than 50% dominance by wetland indicator species. Upland data point

SOIL

Sampling Point: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100%	NONE				Loam	No redox features
3-10	10YR 3/2	100%	NONE				Loam	No redox features

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Loam soils with no redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Data point above swale topography. No indicators of wetland hydrology

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 2930 Union Road Development Project City/County: Paso Robles, San Luis Obispo Sampling Date: May 5, 2022

Applicant/Owner: MD3 Investments State: CA Sampling Point: DP-3

Investigator(s): David Wolff, DWE Principal Ecologist Section, Township, Range: S26 T26S R12E

Landform (hillslope, terrace, etc.): Upland Terrace Local relief (concave, convex, none): Level Slope (%): 0-2%

Subregion (LRR): LRR C Lat: 35.638003 Long: -120.652354 Datum: NAD 1983

Soil Map Unit Name: San Ysidro loam, 0 to 2 percent slopes (197) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes _____ No ✓	

Remarks:

Swale topography evident in field and available aerial photography. Non-wetland non-jurisdictional swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 500 sq. ft)			
1. Hordeum marinum ssp. gussoneanum	65%	Yes	FAC
2. Hordeum jubatum	35%	Yes	FAC
3. Erodium cicutarium	20%	Yes	OBL
4.			
5.			
6.			
7.			
8.			
	120% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

Swale with dominance of FAC grasses.

SOIL

Sampling Point: DP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100%	NONE				Loam	No redox features
3-10	10YR 3/2	100%	NONE				Loam	No redox features

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Loam soils with no redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Swale topography. No other secondary indicators and no OHWM.

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August 17, 2022

To: Michael Stoltey – MD3 Investments & Damien Mavis – CoVelop

Re: Oak Tree Assessment report for Ardmore Road Project, 2930 Union Rd, Paso Robles, CA 93446

Gentlemen,

In response to your request for an Oak Tree Assessment for trees growing on a lot you intend to purchase and develop at 2930 Union Road, I have produced the following report.

Assignment

- Collect tree data and perform Level 2 inspection on 9 valley oaks *(Quercus lobata)* to determine condition and suitability for retention.
- Perform advanced Level 3 Assessment with Resistograph for 3 valley oaks.
- Provide written summary of condition and suitability for retention for all 9 valley oaks.

Introduction

On August 2, 2022, I visited the site and performed a Level 2, basic assessment on all native oaks 6-inch diameter and greater on lots you intend to develop. As a result, 3 of the trees required a Level 3 advanced inspection with a Resistograph, wood density measuring device. I returned to the site on August 5, 2022, and performed the advanced inspections with a Resistograph to measure wood density. On August 12, 2022, I collected additional data for tree #2 via a climbing inspection. I analyzed data collected during the advanced inspections and have made recommendations regarding tree condition, tree risk and potential for retention. All tree inspections were based on the potential for a tree to fail within the next 5 years from the date of this report. Any tree retained should be re-inspected on an annual basis to determine health and structural integrity status.

Methodology-

My initial level 2 inspection consisted of a ground based, visual inspection and full walk around of the tree. I used a rubber mallet to sound the trunk to detect decay. I tagged each tree with an aluminum tag and assigned it a number. Based on a previous arborist's inspection of the trees, I assigned the same number that was listed in their report so we would have consistency when referencing the trees.

Advanced inspections consisted of Resistograph wood density testing, and in one instance, an aerial inspection that consisted of determining the extent of decay with a tape measure.

Tree Condition Ratings

All trees in the inventory were given a condition rating. The rating was based on the health, structure and presence of disease and insects. See the following definitions:

- **Dead** = Severely declining or no foliage, large dead branches, decay cavities, loss of bark, roots decayed or dead.
- **Very Poor** = Evidence of multiple large past failures, advanced decay, uncontrollable pest infestations or disease infection. Tree in severe decline.
- **Poor** = Tree may be suppressed, drought stressed, or had at least 1 large branch failure. Disease or pest infestations may be present. Can potentially be retained with attention to mitigation pruning, cultural care changes, pest and disease control.
- **Fair** = May have had minor past failures. Some pests or structural defects may be present, small deadwood. Minor to moderate drought stress present. Defects may be mitigated with pruning and pests can be controlled.
- **Good** = A relatively healthy tree with minor to no structural defects with minimal to no pest observed. Defects can be mitigated with pruning and pests can be controlled.
- **Very Good** = Trees that have had professional arboricultural care. No structural defects, disease or pests identified.
- **Excellent** = Specimen tree with superior form, root structure and health. Tree has been regularly cared for by professional arborists over its lifetime, E.g., estate or arboretum tree.

Inspection Levels

Level 1 – Limited Visual Inspection – This is a limited walk-by or drive-by, which does not typically include a complete walk around a tree. The inspection focuses on obvious defects, imminent or probable likelihood of failures. There are generally no tools used at this level. This is the fastest and least thorough assessment.

Level 2 – Basic Assessment – Generally includes a complete walk around inspection. Basic tools such as probes, measuring devices, binoculars, mallet or magnifying glass are used. At this level, an aerial inspection is not included. A Level 2 assessment is usually necessary to establish the need for a Level 3 assessment.

Level 3 – **Advanced Inspection –** Detailed inspection which usually employs the use of special equipment, data collection and analysis. A higher level of training is also required, such as International Society of Arboriculture (ISA) Tree Risk Assessment Qualification. Specialized equipment may include an Air Spade (device that uses compressed air to expose roots or root crown for inspections without causing damage to sensitive plant tissues). Resistograph (drilling devise used to measure and graph wood density) Level 3 inspections may also include sending samples to labs for analysis. A Level 3 inspections will usually take place later because of time needed to perform a Level 2 inspection.

Assessing Tree Structure and Potential to Fail

Estimating the structural integrity of trees is a challenge because, unlike steel I-beams or other construction materials there is no precise engineering standard to help determine the load a tree can withstand.

Arborists must use measurement of decay, experience with previous, similar trees as well as factor in the various stressors on the compromised areas within the tree. Trees with thicker outer shells are going to be stronger. Oval internal decay areas and areas of decay that have broken through the outer shell of the trunk or branch will be weaker due to the inconsistency of the cylinder.

Tree Risk

Tree risk is determined by identifying the targets e.g. (people, buildings, cars or property) that could be injured or damaged by a whole or partial tree failure, the occupancy rate, exposure of the target to the tree hazard, the size of part of the tree that may impact the target if it were to fail, the likelihood of impact on the target, and the consequences of failure on the target.

The part of the tree most likely to fail and cause the largest impact is used to determine the highest overall risk for the tree.

When considering likelihood of failure, the definitions are as follows:

- **Imminent** – Failure has started or most likely to occur in the near future. Even if there is no significant wind or increased load. The imminent category overrides the time frame stated in the scope of work.
- **Probable** – Failure may be expected under normal weather conditions within the specified time frame.
- **Possible** – Failure may be expected in extreme weather conditions, but is unlikely during normal weather conditions during a specified time frame.
- **Improbable** – The tree or part is not likely to fail during normal weather conditions and may not fail in extreme weather conditions within the specified time frame.

Risk Matrices

I used the International Society of Arboriculture's Basic Tree Risk Assessment Form to determine risk. Matrix 1 the "Likelihood Matrix" determines the likelihood of failure and impact. The result is entered into Matrix 2, the "Risk Rating Matrix" which factors in Consequences of Failure to get the overall risk rating. In the example below, Likelihood of failure of a part was Probable. The Likelihood of Impact was High. The result was Likely. In Matrix 2, I entered the result of Likely and entered Severe in the Consequences of Failure which gave me a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

For each tree requiring a level 3 inspection, I have highlighted matrix tables to show how risk was determined for the part or parts of the tree being considered regarding failure potential.

Mitigation

When assessing risk for a tree, it is important to determine if the risk of tree failure can be reduced through mitigation. Mitigation can be made through pruning, installing cabling or bracing support structures. Moving targets out of the strike zone of a tree or restricting access to a tree are also viable mitigation measures. The recommended mitigation should not be so excessive that they compromise the health of the tree.

Tree Assessments

I performed level 2 assessments on trees 1,2,3,4,9,10,11 & 13. See Tree Map Appendix B. From those assessments, I determined that trees 1,2 and 13 required level 3 advanced inspections. Each assessment below includes a condition rating as well as potential for retention and mitigation recommendations. For level 3 inspections, I included a tree risk assessment matrix.

Tree 1 – A 43" diameter valley oak was in Very Poor condition. See Appendix A - Photographs - Photo 1

Basic Level 2 Inspection –

This tree had drought stress which was indicated by dead wood in the canopy. It also had decay throughout its scaffold branches which was indicated by decay cavities and woodpecker nests excavated in dead wood. See Appendix A - Photographs - Photos 1 & 4.

The trunk had an approximate lean to the east of 10 degrees. It also had a horizontal compression bulge on the east side of its trunk approximately 1' above ground. Compression bulges or wrinkles, indicate that wood fibers are being crushed by the weight of the canopy and trunk due to lack of supportive structure in the trunk. Further the tree had a large, decayed, anchor root on its southwest side. The root was on the opposing side of the lean of the tree and is likely to fail as decay advances and stress from the weight of the canopy continues to build. See Appendix A -Photographs - Photos 1-3.

Although this tree had a full canopy it has significant trunk decay. When I sounded the trunk with a rubber mallet, it resounded hollow on all sides. To further confirm the sounding results, I performed an advanced inspection of the decay using a Resistograph.

Advanced Level 3 Inspection -

I took 4 measurements of the wood density of the trunk at 3.5' above ground.

- Sample 1 – west side of tree. Outer shell thickness was 4"
- Sample 2 – south side of tree. Outer shell thickness was 6"
- Sample 3 – east side of tree. Outer shell thickness was 4" with a small 1.25" pocket of sound wood at 8" laterally, then total decay

- Sample 4 – north side of tree. Outer shell thickness was 5.25”

Based on the Resistograph results, it was apparent that interior wood of the trunk is significantly decayed. The evidence of compression bulges showed that the trunk is losing structural integrity and leaning due to lack of supportive wood fibers.

Armillaria mellea, a.k.a. Oak root fungus is a common disease in valley oaks and is likely the cause of the decay in the roots and the trunk. Christopher J. Luley in his guide *Wood Decay Fungi* calls this fungus *Number one of the “Big Three” of the important decay fungi.* Again, according to Mr. Luley, “Armillaria is a root and butt rot fungus that increases the risk of tree failure and is a pathogen capable of killing cambium of roots and lower trunk of stressed trees”. See Appendix A - Photographs - Photos 29 & 30 for example of failed oak due to root and butt rot.

Parts Assessed – Roots and Trunk

I used the International Society of Arboriculture’s Basic Tree Risk Assessment Form to determine risk for this tree. In Matrix 1 the “Likelihood Matrix” I selected Likelihood of Failure of the roots and trunk as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the “Risk Rating Matrix” in the Likelihood of Failure and Impact section. For the Consequences of Failure section of Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Scaffold Branches

In Matrix 1 the “Likelihood Matrix” I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the “Risk Rating Matrix” for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Combined Inspection Results and Risk Assessment

The highest risk rating for this tree was High and was associated with root and trunk failure. I found decay in one anchor root and significant decay was detected in the trunk. Buckling of trunk fibers was evident. Based on shell strength measurements, the likelihood of trunk failure was probable, due to lack of structural integrity. Root failure was Probable due to significant decay in the anchor root on the southwest side of the tree. Scaffold failure was also probable with a high likelihood of failure.

Mitigation:

Scaffolds - Reducing the canopy through end weight reduction and removing decayed branches 2" diameter and larger would relieve some stress on remaining scaffold branches and reduce their risk to Moderate.

Roots and Trunk - Reducing the canopy through end weight reduction would relieve some stress on the trunk but not enough to offset the overall stress being exerted on the buckling area on the north side of the tree. No structural support or bracing will help the stability of the tree's trunk or roots. Significant decay has been detected in the roots as well as the trunk. Based on shell strength measurements, lean of the tree and buckling of wood fibers on the east side of the trunk made failure likely due to lack of structural integrity. I recommend removing the tree before commencement of construction.

Tree 2 – A 47" diameter valley oak was in Poor condition. See Appendix A - Photographs - Photo 5.

Basic Level 2 Inspection –

On the south side of the trunk there was a decay cavity originating at the root-crown and extending approximately 5.5' upward. When sounded with a rubber mallet on either side of the cavity, it resounded hollow. Moving around the trunk to the east side, I detected another hollow sounding area with my mallet at approximately 3.5' above ground. See Appendix A - Photographs - Photo 6. Like Tree 1, I suspect *Armillaria mellea* - Oak root fungus, is the cause of the rot.

At approximately 8 feet above ground, on the southwest side of the trunk there was another decay area that was almost closed over with scar tissue. Although almost closed, I suspected a large area of decay behind the scar. See Appendix A - Photographs – Photo 7. There was a large scaffold branch attached to the trunk above the scar. It had a desiccated fungal fruiting body growing on it and cankers had killed strips of bark near the fungus. See Appendix A - Photographs – Photo 8. I identified the fungi genus to be that of *Inonotus*. Jessie A. Glaeser and Kevin T. Smith in the winter 2010 issue of Western Arborist, note this fungus to cause a white-rot of heartwood in the trunk of living oaks and also decays strips or sections of sapwood, forming elongate cankers and killing the cambium. According to Swiecki, T. J.; Bernhardt, E. A. 2006, A Field Guide to Insects and Diseases of California Oaks, "*Inonotus dryophilus* is one of the most serious pathogens of living oaks in California associated with decline, failure, and mortality". In this tree, the combined weakened trunk area at the scar combined with the heavy, decayed scaffold branch make this section of the tree likely to fail.

In the upper canopy at approximately 14' above ground there was another decay cavity in the center of the canopy, where a large scaffold branch had failed many years ago. I suspected advanced decay in the trunk at this location. See Appendix A - Photographs - Photo 9

Advanced Level 3 Inspection -

During the aerial inspection, it was discovered that the opening of the decayed scaffold in the upper canopy was 13" in diameter. The depth of the cavity was 13'2" deep. When the distance to the ground from the outside of the cavity was measured, it was 14'3", which illustrated that the entire trunk of the tree was hollow. See Appendix A - Photographs – Photos 9 -14.

From the cavity opening, the decay continued upward into the scaffold branch growing east. This scaffold is very likely to fail due to weak trunk structure. See Appendix A - Photographs – Photo 12.

Based on the decay detected during mallet sounding, I wanted to investigate the extent of the decay further. I performed an advanced inspection for decay using a Resistograph. I took 6 measurements of the wood density of the trunk at 3.5' above ground unless otherwise indicated.

- Sample 1 – west side of tree. Outer shell thickness was 8"
- Sample 2 – south side of tree, 1' west of decay cavity, outer shell thickness was 8.5"
- Sample 3 – south side of tree at decay cavity seam, outer shell thickness was 3" at 3' above ground.
- Sample 4 – south side of tree, 1' east of decay cavity, outer shell thickness was 7.25"
- Sample 5 – east side of tree, outer shell thickness was 5.5"
- Sample 6 – north side of tree, outer shell thickness was 12"

I have highlighted the tables below to show how risk was determined for the part or parts of the tree that was being considered regarding failure potential.

I used the International Society of Arboriculture's Basic Tree Risk Assessment Form to determine risk for this tree.

Part Assessed - Trunk

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the trunk as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" in the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of the Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Scaffold Branches

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Combined Inspection Results and Risk Assessment-

The highest risk rating for this tree was High and was associated with trunk and scaffold branch failure. Significant decay was detected in the trunk and eastern scaffold branch.

Based on shell strength measurements, and the void caused by decay on the south side of the tree, the trunk is likely to fail due to lack of structural integrity. In regard to the eastern scaffold branch and other decayed branches, they could be removed, and end-weight could be reduced to relieve some stress on remaining scaffold branches. However, the reduction of the canopy would be close to 50% and would compromise the health of the tree. Further, since the trunk is not structurally sound, this negates the mitigation measure.

Mitigation: Remove tree before commencement of construction. No structural support or bracing will help the stability of the tree's trunk.

Tree 3 – A 47" diameter valley oak was in Very Poor condition. When I sounded the trunk with a rubber mallet, it resounded hollow on the southwest side. A large wound left by a scaffold branch failure in the crown of the tree has since decayed and left a 3'x 4' hollow at approximately 14' above ground on the east side of tree. Another decay cavity on the north side of the tree at the same height as the previous, measured approximately 2' in diameter. Remaining scaffold was overextended and attached to the decaying trunk. The remaining parts of this tree have a high likelihood of failure. See Appendix A - Photographs – Photos 15 & 16.

Mitigation: Remove tree before commencing project.

- **Tree 4 –** A 52" diameter valley oak was in Very Poor condition. The tree was growing off-site but had critical root zone (CRZ) and crown encroachments into your proposed construction area. This tree has had several large scaffold branch failures. At the failure points, significant decay was visible. The remaining scaffolds were overextended and potentially had similar internal decay and had a high likelihood of failure. See Appendix A - Photographs – Photo 17.

  Mitigation: I highly recommend removal of this tree due to the advancement of decay in the scaffold branches which is compromising their structural integrity. Crown reduction needed to reduce the risk of scaffold branches failing would take up to 50% of the live canopy and jeopardize the tree's health. Because this tree is off site, you will need to coordinate with the owner regarding removal.

  At minimum this tree should have all overextended branches reduced to help prevent further failures and protect any buildings or other targets you may place on your property within striking distance of the tree. If the owner of the tree chooses to retain it, you will need to design buildings, service and loading zones outside of the CRZ.

- **Tree 9 –** A 51" diameter valley oak was in Very Poor condition. Multiple large scaffold branches had failed. Extensive decay was present at branch failure points. Only 2 overextended scaffold branches remain, and they are connected to a decaying trunk.

  When I sounded the trunk with a rubber mallet, it resounded hollow. A 3' long by 10" wide decay cavity was on the northeast side of trunk. This tree has a high risk of complete failure. See Appendix A - Photographs – Photos 18 & 19.

  Mitigation: Remove tree before commencing project.

- **Tree 10 –** A 51" diameter valley oak was in Good condition. The trunk of the tree resounded solid when sounded with a rubber mallet. Tree form was good, but there was some large dead wood and decaying scaffolds. This tree can be retained, but it should have maintenance pruning performed prior to commencement of your project. See Appendix A - Photographs – Photos 20 & 21.

  Mitigation: Reduce end-weight on overextended branches. Remove dead wood 2" diameter and larger. Remove decayed and structurally unsound scaffold branches.

- **Tree 11 –** A 30" diameter valley oak was in Very Poor condition. The tree was in severe decline due to drought stress and root disease. Many of the smaller branches had died. I detected decay at the root crown on the southwest side of the tree. I found an ant nest at the root-crown decay area indicating ants are excavating and nesting in dead roots and root crown. The dead roots contribute to the decline of the canopy and compromise the stability of the tree. At least five, 12" average diameter scaffolds had extensive decay on the east side of the tree. To reduce scaffold failure risk, up to 50% of the live canopy would need to be removed, which would compromise the health of and already unhealthy tree. See Appendix A - Photographs – Photos 22-24.

  Mitigation: Remove tree prior do commencement of project.

- **Tree 13 –** A 42" diameter valley oak was in Poor condition.

  Basic Level 2 Inspection –

  The tree had a full canopy with a balanced form. On the south side of the tree at the root crown, there was an area of decay in the underside of one of the anchor roots. Like trees 1 and 2, the decay is likely caused by *Armillaria mellea*. I also noted the lower trunk was bulging and larger than normal which may indicate butt-rot caused by A. mellea. Further, I observed that the eastern scaffold branch was decayed, and large dead wood was present throughout the canopy. See Appendix A - Photographs – Photos 25 - 28.

  A previous report, by another arborist, expressed concern that a scar at the base of the tree might indicate decay and structural instability. When I sounded the tree's trunk with a rubber mallet, it resounded solid, except on the north side of the trunk. Due to the difference of opinion regarding the structural integrity of the trunk, I performed an advanced inspection for decay using a Resistograph.

  Advanced Level 3 Inspection -

  I took 5 measurements of the wood density of the trunk at 3.5' above ground.

  - Sample 1 – west side of tree. Outer shell thickness was 7"
  - Sample 2 – south side of tree. Outer shell thickness was 8.5"
  - Sample 3 – east side of tree. Outer shell thickness was 8.5"
  - Sample 4 – east side of tree scarred area on east side of trunk approximately 1' above ground. Outer shell thickness was 12".

- Sample 5 – north side of tree. Outer shell thickness was 5”

Like Tree 1, the trunk of this tree had advanced internal decay, however when comparing outer shell thickness, this specimen had thicker walls and did not have indications of trunk fibers buckling, therefore its structural integrity is likely stronger.

Tree Risk - I used the International Society of Arboriculture’s Basic Tree Risk Assessment Form to determine the risk. I used Matrix 1 the “Likelihood Matrix” on the form and entered the result into Matrix 2, the “Risk Rating Matrix” to get the overall risk rating.

I have highlighted the tables below to show how risk was determined
for the part or parts of the tree that was being considered regarding failure potential.

Part Assessed - Root

In Matrix 1 the “Likelihood Matrix” I selected Likelihood of Failure of the roots as Possible. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Somewhat Likely, which I entered into Matrix 2, the “Risk Rating Matrix” for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of Moderate.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Trunk

In Matrix 1 the “Likelihood Matrix” I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the “Risk Rating Matrix” for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Scaffold Branches

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Combined Inspections Results and Risk Assessment-

The highest risk rating for this tree was High and was associated with scaffold and trunk failure. I found decay in one anchor root and significant decay was detected in the trunk, however no bulging of trunk fibers was evident. Based on shell strength measurements, the likelihood of trunk failure is probable due to lack of structural integrity. Scaffold failure was also probable. Risk of root failure remained moderate.

Mitigation:

Mitigations are meant to reduce risk without compromising the health of the tree. Ultimately, the tree manager, owner or other controlling entity must decide if the residual risk assessed is reasonable.

Scaffolds - Reducing the canopy through end weight reduction and removing decayed and branches 2” diameter and larger will relieve some stress on remaining scaffold branches and reduce their risk to Moderate.

Roots - Reducing the canopy through end weight reduction will relieve some stress on roots, however due to the overall weight of the canopy and stem, the risk rating for root failure will remain Moderate.

Trunk - Canopy reduction will relieve some stress on the trunk of the tree, however it will not likely be enough to lower trunk failure risk to moderate. If this tree is to be retained, and the goal is to reduce the risk rating, the only reasonable way to achieve that goal will be to restrict access by installing a permanent fence around it. The fence shall be a minimum of 4.5’ tall and be set at least to the edge of the canopy dripline. Once access is restricted, the risk rating will be Moderate.

Respectfully Submitted,



Rodney D. Thurman
ISA Board Certified Master Arborist PN-2684BUM
ISA Municipal Specialist
ISA Utility Arborist
ISA Tree Risk Assessor Qualification

Appendices: *Photographs, Tree Map*

Appendix A - Photographs



Photo 1 - View of Tree 1 to south. Note lean to east.

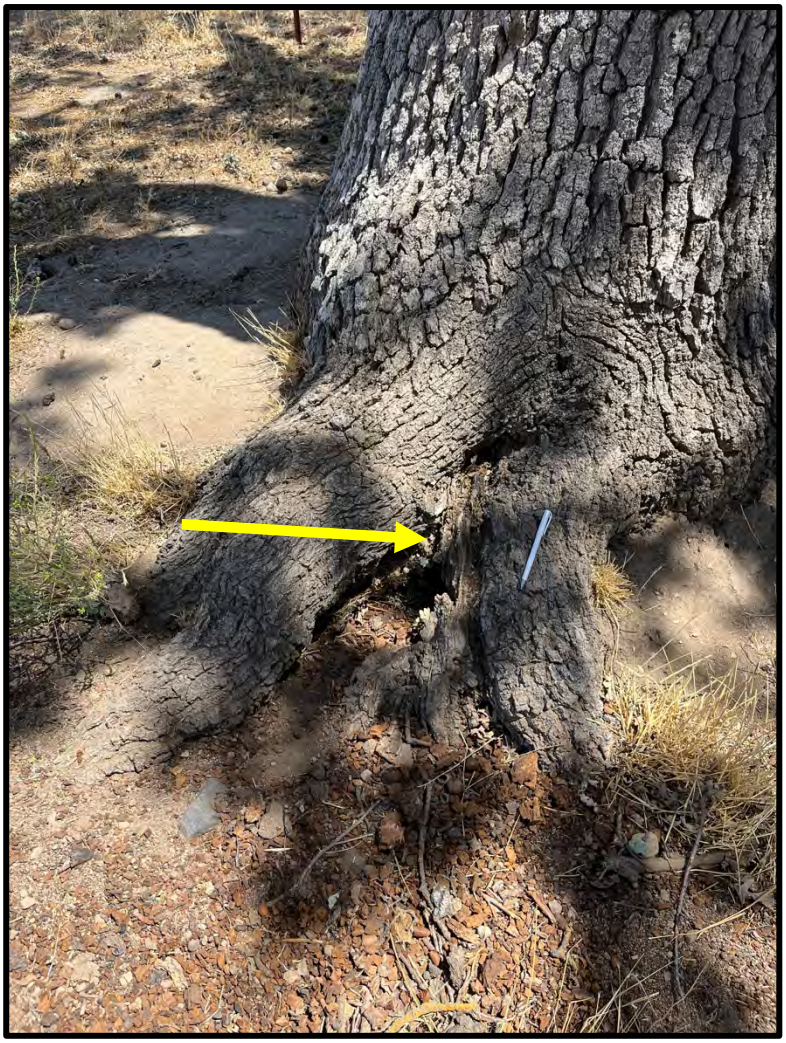


Photo 2 - Tree 1 with decayed anchor root on southwest side, indicated by arrow. Ink pen provided for scale



Photo 3 - Tree 1 with compression bulge east side of trunk indicated by arrow shows lack of structural support.



Photo 4 - Tree 1 with decay in scaffold branches. indicated by arrows.



Photo 5 - View of Tree 2 to north

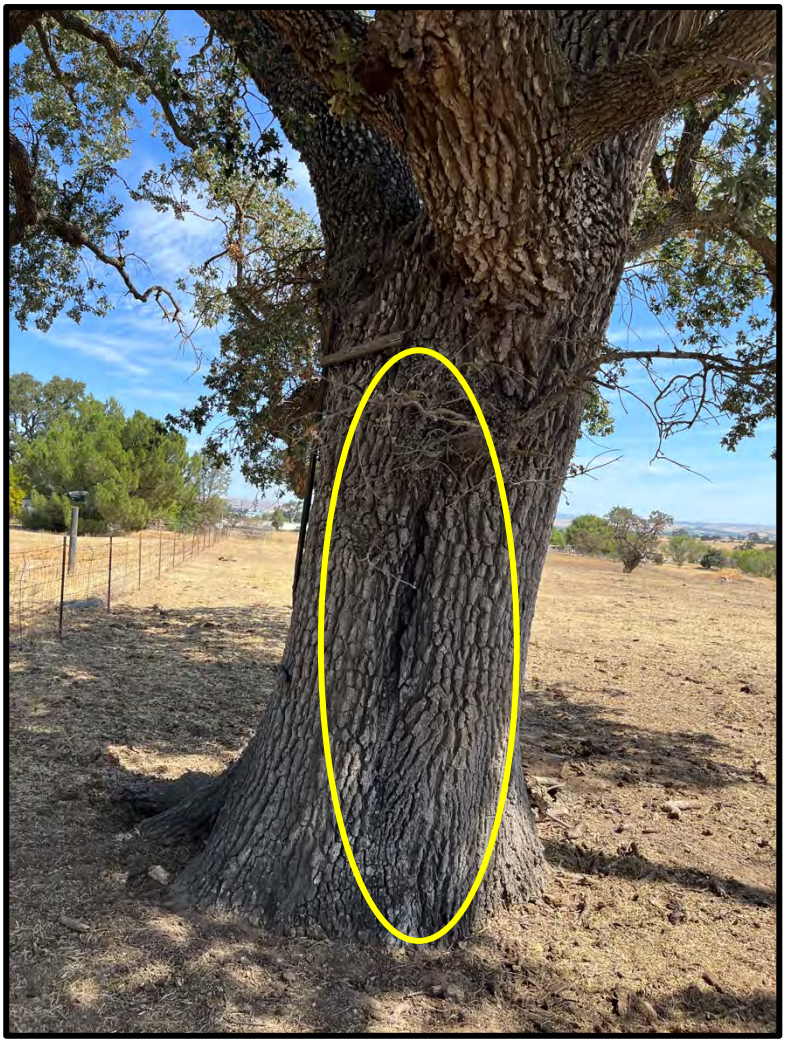


Photo 6 - Tree 2 with decay cavity south side of trunk. Length is approximately 5.5’.



Photo 7 - Tree 2 with decay cavity at scaffold union approx. 8’ above ground on southwest side of tree.



Photo 8 - Tree 2 with fungal fruiting body circled and decay in south scaffold branch indicated by arrow.



Photo 9 - Tree 2 with decay cavity formed by failed scaffold circled at center of tree, approximately 14 feet above ground.



Photo 10 - Tree 2 perspective view of decay cavity formed by failed scaffold circled at center of tree. Cavity is circled. Other decay points below the open cavity are indicated by arrows.



Photo 11 - Tree 2 view of decay cavity formed by failed scaffold. Opening measures 13”

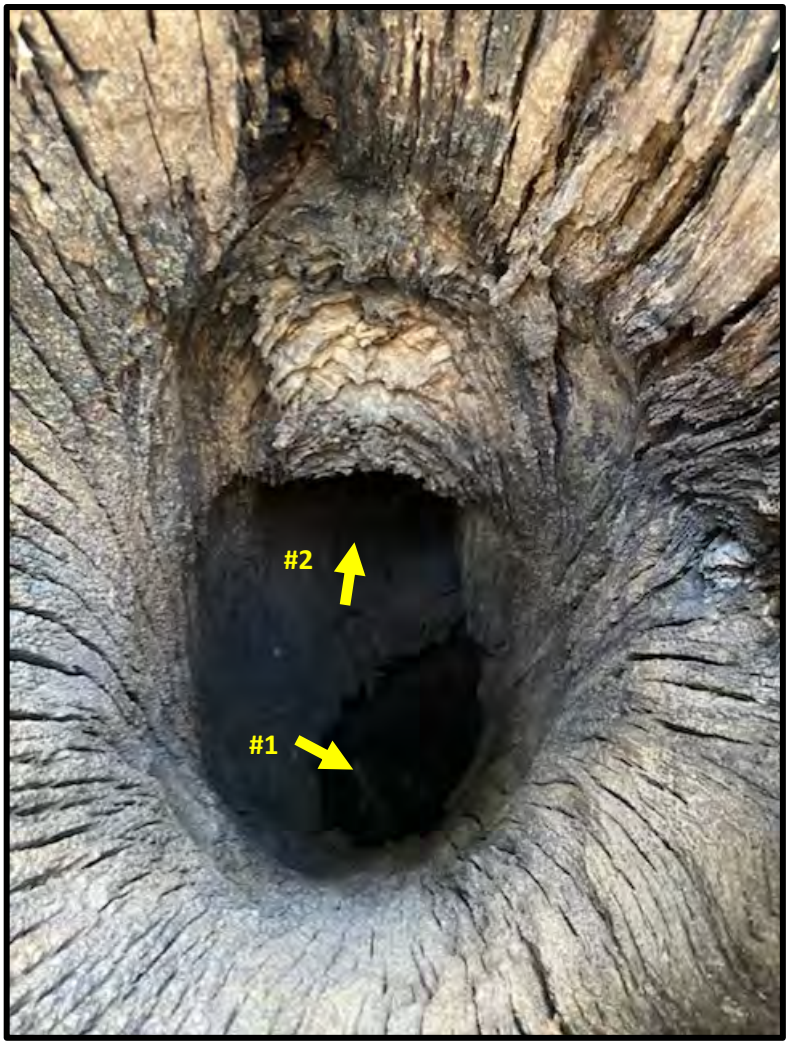


Photo 12 - Tree 2 view of interior decay cavity formed by failed scaffold. Arrow 1 shows depth of cavity down to roots of tree. Arrow 2 shows decay that has advanced into eastern scaffold branch.



Photo 13 - Tree 2 measurement of interior depth of decay cavity formed by failed scaffold. 13’ 2”



Photo 14 - Tree 2 measurement of exterior depth of decay cavity formed by failed scaffold. 14’ 3”



Photo 15 - View of Tree 3 to north. Overextended scaffold to west. Large decay cavity at connection to trunk.



Photo 16 - Tree 3 with large decay cavity at scaffold connection to trunk.



Photo 17 - View of Tree 4 with to northwest. Numerous failed scaffold branches due to overextension and internal decay.



Photo 18 - View of Tree 9 to north. Numerous failed scaffold branches due to overextension and internal decay.

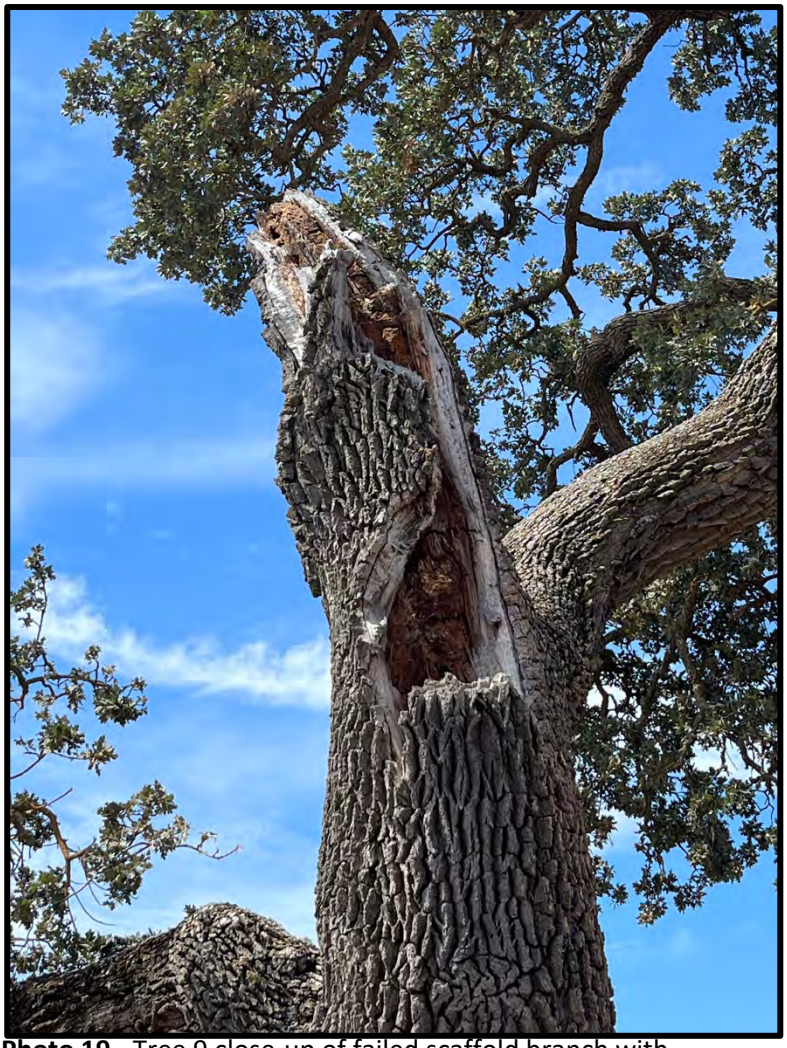


Photo 19 - Tree 9 close-up of failed scaffold branch with internal decay.



Photo 20 - View of Tree 10 to south.

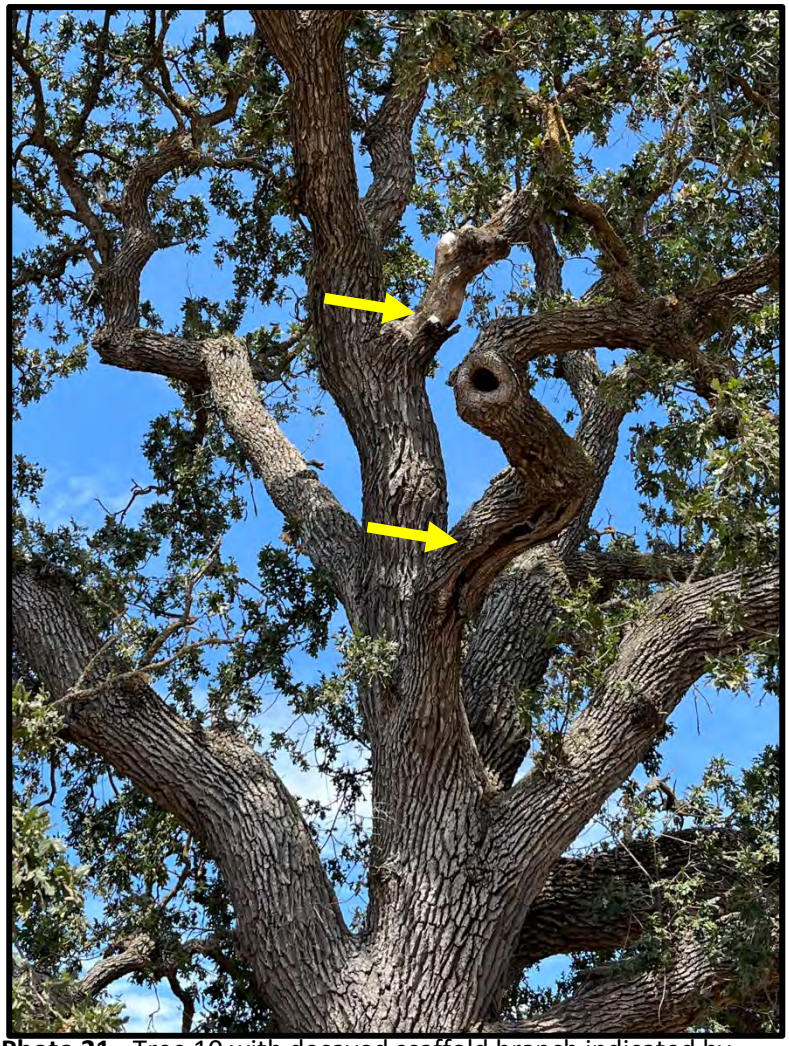


Photo 21 - Tree 10 with decayed scaffold branch indicated by yellow arrows.



Photo 22 - View of Tree 11 to north. At least 5 decayed scaffold branches would be removed which would reduce the tree at least 50%. Arrows indicate branch removal points.



Photo 23 - Tree 11 close up of declining canopy, decayed branches, and dead wood indicated by arrows.



Photo 24 - Tree 11 close up of root crown decay at southwest side of tree indicated by yellow arrow. Ant nest discovered here which indicates dead and rotting wood.

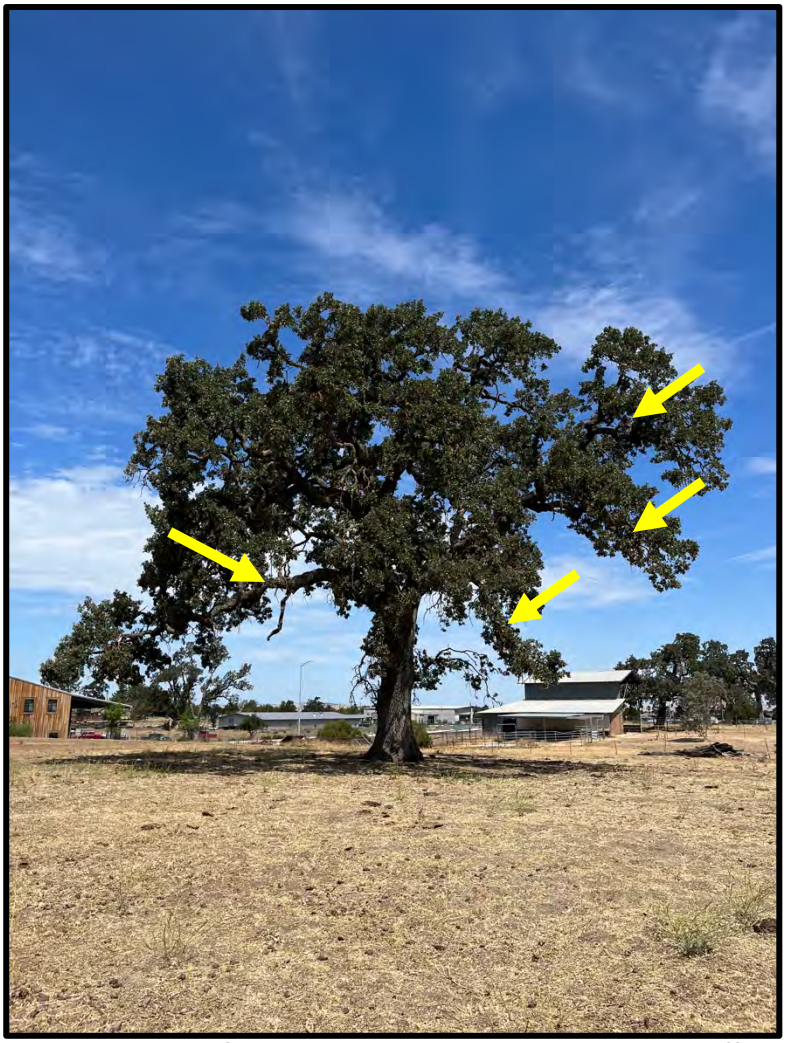


Photo 25 - View of Tree 13 to north. Note overextended scaffold branches indicated by arrows.



Photo 26 - Tree 13 with root decay cavity on south side of tree indicated by arrow.



Photo 27 - Tree 13 with bulging root-crown indicating possible butt-rot.



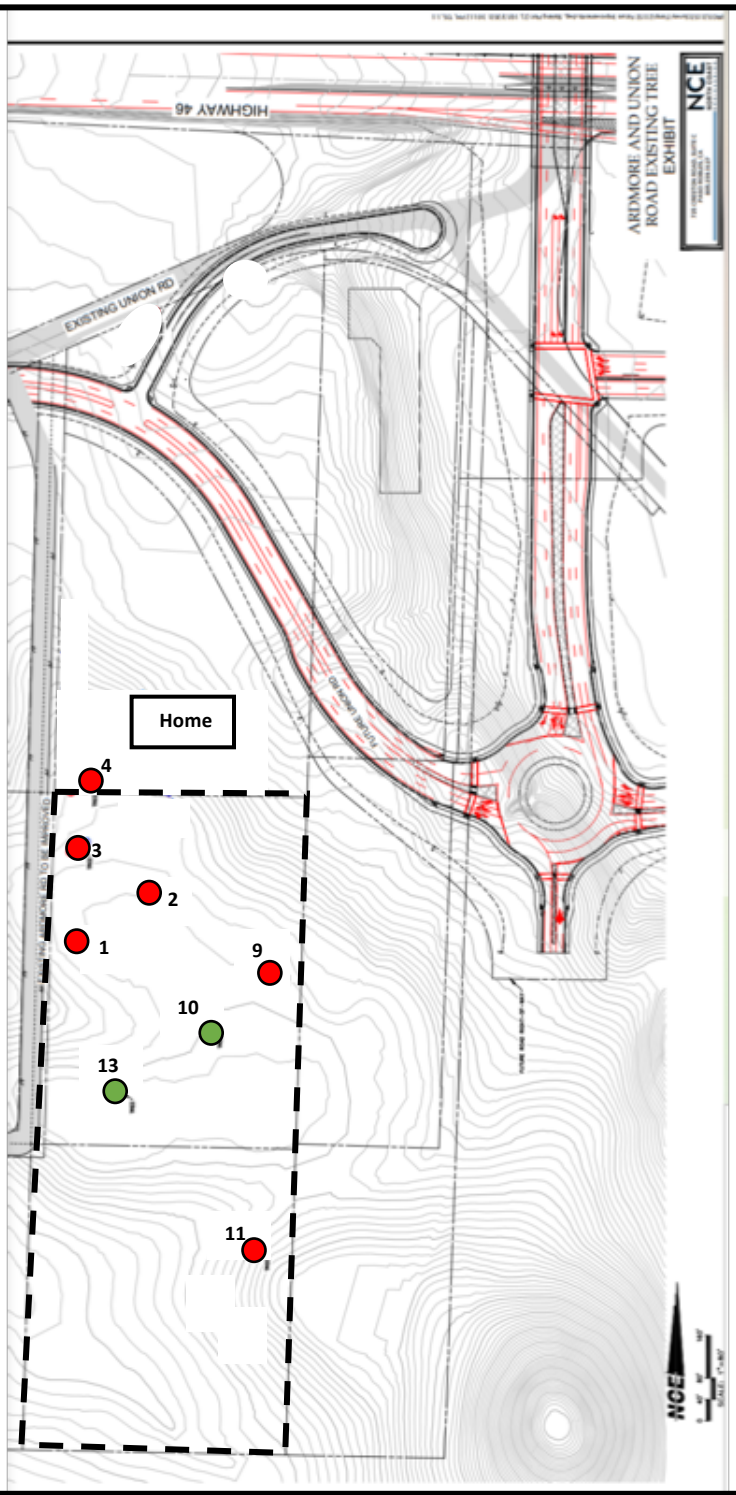
Photo 28- Tree 13 with decaying scaffold branch east side of canopy indicated by arrow. Line indicates locations for removal





Photos 29 & 30 - Example of oak tree that failed due to root and butt-rot. Photo 29 shows failed roots. Photo 30 shows internal decay of trunk.

Appendix B – Tree Map



Tree Locations Map – Red = removals, Green = retain and protect, Dashed line delineates property boundaries.

PHASE I ARCHAEOLOGICAL STUDY, NEW COMMERCIAL DEVELOPMENT, 2930 UNION ROAD (LOTS 6 AND 13, APN 025-362-043)

PASO ROBLES, SAN LUIS OBISPO COUNTY, CALIFORNIA

Project No. 2202-2481

Prepared for:
Covelop, Inc.
P.O. Box 12910
San Luis Obispo, California 93406

Prepared by:
Rachael J. Letter, M.S., RPA and Christopher J. Letter, B.A.

Padre Associates, Inc.
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July 2022

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION

Authors: Rachael J. Letter, M.S., RPA and Christopher J. Letter, B.A.

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Report Date: July 2022

Report Title: Phase I Archaeological Study, New Commercial Development, 2930 Union Road (Lots 6 and 13, APN 025-362-043), Paso Robles, San Luis Obispo County, California

Prepared for: Covelop, Inc.
P.O. 12910
San Luis Obispo, California 93406

Prepared by: Padre Associates, Inc.
369 Pacific Street
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(805) 786-2650

Contract No: 2202-2481

U.S.G.S. Quads: Paso Robles, California

Project Size: 14.5 acres

Key words: San Luis Obispo County, Paso Robles, Phase I Archaeological Study

MANAGEMENT SUMMARY

At the request of Covelop, Inc. (Client), Padre Associates, Inc. (Padre), has completed a Phase I archaeological study in support of a new commercial development (Project) at 2930 Union Road (Lots 6 and 13 of APN 025-362-043), in Paso Robles, San Luis Obispo County, California (Project site). The scope of this document includes an archaeological records search and a Phase I pedestrian survey.

The records search did not reveal any previously recorded resources within the Project site. Padre conducted a pedestrian survey of the Project site on July 1, 2022. No cultural resources were observed within the Project site.

Proposed Project impacts will not affect cultural resources and no further archaeological study or monitoring is warranted. Padre recommends that the Project proceed as planned. In the event cultural resources are encountered during the proposed Project, Padre recommends the County cease construction activities within a 100-foot radius. Work will resume once an archaeologist who meets the U.S. Secretary of the Interior's Historic Preservation Professional Qualification Standards for Archaeology has assessed the find and identified and implemented appropriate mitigation measures.

One copy of this report will be submitted to the Central Coast Information Center (CCIC) at the Santa Barbara Museum of Natural History. A copy of all field notes is on file at Padre's office in San Luis Obispo, California.

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APPENDICES

Appendix A. Confidential Records Search Results

1.0 INTRODUCTION

At the request of Covelop, Inc. (Client), Padre Associates, Inc. (Padre), has completed a Phase I archaeological study in support of a new commercial development (Project) at 2930 Union Road (Lots 6 and 13 of APN 025-362-043) in Paso Robles, San Luis Obispo County, California (Project site).

Padre completed the Phase I Archaeological Study pursuant to the California Environmental Quality Act (CEQA) Guidelines. CEQA requires lead agencies to evaluate proposed projects for their potential to impact archaeological resources (Public Resources Code Section 21082, 21083.2, and 21084.1, and California Code of Regulations 15064.5). According to the CEQA Guidelines, "historical resources" include buildings, structures, objects, districts, or sites that may possess prehistoric or historical archaeological, architectural, cultural, or scientific importance. CEQA states that if a project will have a significant effect on important cultural resources, then alternative plans or mitigation measures need to be developed. However, only important cultural resources need to be considered in the mitigation plans.

Padre Staff Archaeologist Christopher Letter completed the pedestrian survey on July 1, 2022 and was overseen by Padre Senior Archaeologist Rachael J. Letter, M.S., RPA. Ms. Letter exceeds the U.S. Secretary of the Interior's Historic Preservation Professional Qualification Standards as outlined in 36 Code of Federal Regulations (CFR) 61.

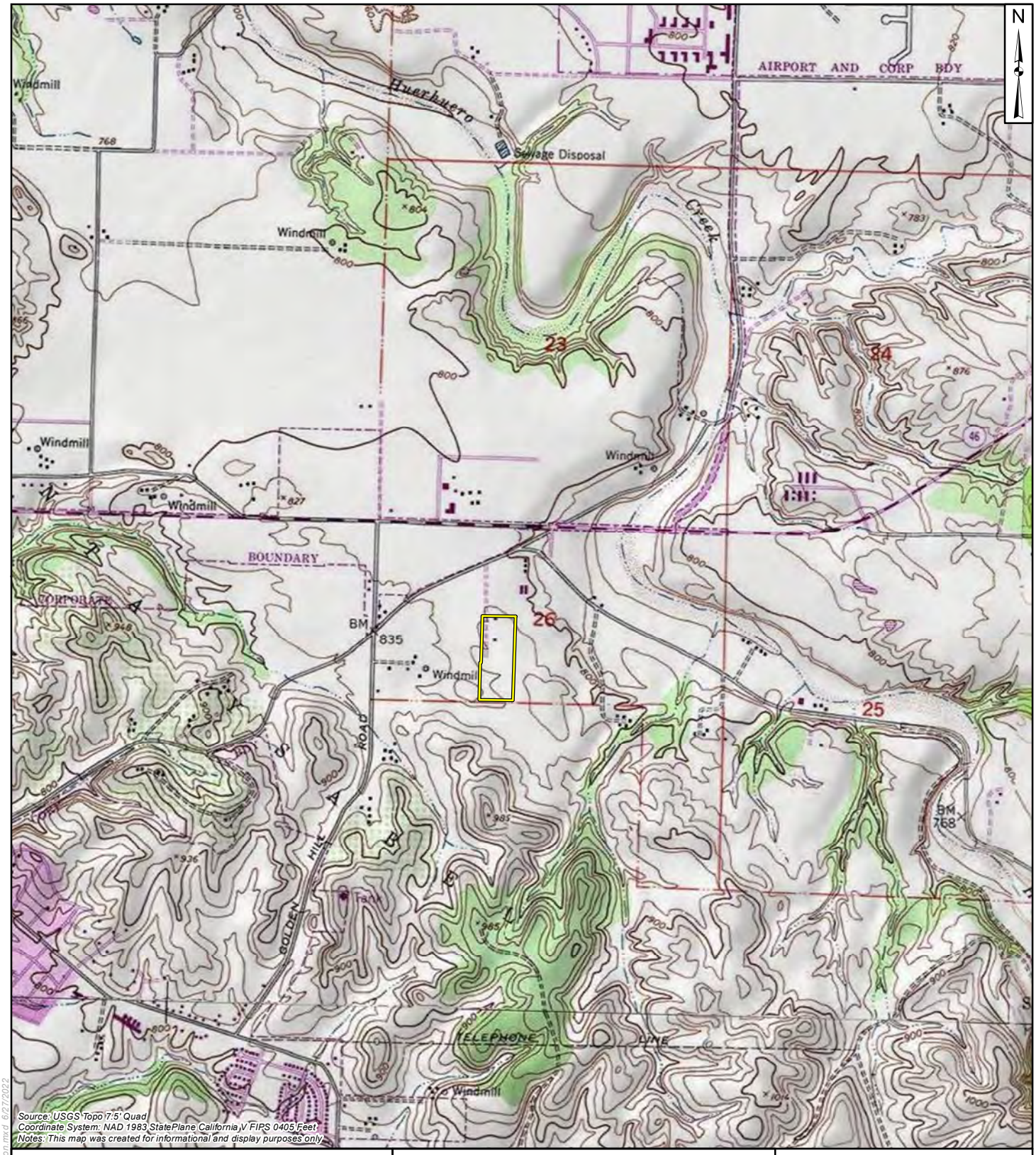
The remainder of this section provides the Project description and location; Section 2.0 discusses the regulatory framework; Section 3.0 provides the environmental, ethnographic and archaeological overviews for the region; Section 4.0 describes the records search results; Section 5.0 presents the field methodology and survey results; Section 6.0 provides a summary and recommendations; and references are listed in Section 7.0. Appendix A provides the confidential records search results.

1.1 PROJECT LOCATION AND DESCRIPTION

The Project site is located within the *Paso Robles, California* United States Geological Survey (USGS) 7.5-Minute Series topographic quadrangle map. Specifically, the Project site is located within Section 26, Township 26 South, Range 12 East in Paso Robles, San Luis Obispo County, California (Figure 1-1). Elevation ranges from 811 to 834 feet above mean sea level, and Huer Huero Creek is located approximately 0.32-mile to the east of the Project site.

The Project site is bordered by Union Road to the north, Ardmore Street to the west, and pastureland/ rural properties to the east and south.

The proposed Project includes the construction of a 125,812 square foot warehouse and office building on lot 13 and four commercial, storage, manufacturing, and winemaking buildings totaling 114,650 square feet on lot 6 as well as associated parking lots.



0 1,000 2,000

FEET

1:24,000

USGS 7.5' Quadrangle: Paso Robles

Legal Description: T26S, R12E Sec.26

LEGEND:

Project Location



padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: 2930 UNION ROAD, PASO ROBLES, SAN LUIS OBISPO COUNTY, CA

PROJECT NUMBER: 2202-2481

DATE: June 2022

PROJECT LOCATION

FIGURE 1-1

Project\Archeology\2930 Union Road\Project Location.mxd 6/27/2022

2.0 REGULATORY FRAMEWORK

The following regulatory framework describes the applicable state and local statutes, ordinances, and policies pertaining to the protection of archaeological resources. These laws must be considered during the planning process for projects that have the potential to affect archaeological resources in San Luis Obispo County.

2.1 STATE REGULATIONS

2.1.1 California Environment Quality Act (CEQA)

CEQA statute and guidelines include procedures for identifying, analyzing, and disclosing potential adverse impacts to historical resources, which include all resources listed in or formally determined eligible for the California Register of Historical Resources (CRHR) or local registers. CEQA further defines a "historical resource" as a resource that meets any of the following criteria:

- A resource listed in, or determined to be eligible for listing in, the CRHR;
- A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code, unless the preponderance of evidence demonstrates that it is not historically or culturally significant;
- A resource identified as significant (i.e., rated 1-5) in a historical resource survey meeting the requirements of Public Resource Code Section 5024.1(g) (Department of Parks and Recreation Form [DPR] 523), unless the preponderance of evidence demonstrates that it is not historically or culturally significant; or
- Any object, building, structure, site, area, place, record or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military or cultural annals of California, provided the determination is supported by substantial evidence in light of the whole record. Generally, a resource is considered "historically significant" if it meets the criteria for listing on the CRHR (CEQA Guidelines Section 15064.5).

2.1.2 California Register of Historical Resources

The CRHR is a listing of California resources that are significant within the context of California's history. The CRHR is a state-wide program of similar scope to the National Register Historic Places (NRHP). In addition, properties designated under municipal or county ordinances are eligible for listing in the CRHR. A historic resource must be significant at the local, state, or national level under one or more of the following criteria that are defined in the California Code of Regulations Title 14, Chapter 11.5, Section 4850:

- It is associated with events or patterns of events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; or
- It is associated with the lives of persons important to local, California, or national history; or

- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values; or
- It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation.

2.2 REGULATIONS CONCERNING DISCOVERY OF HUMAN REMAINS

California Public Resources Code §5097.98 (Notification of Native American human remains, descendants; disposition of human remains and associated grave goods) mandates that the lead agency adhere to the following regulations when a project results in the identification or disturbance of Native American human remains:

(a) Whenever the commission receives notification of a discovery of Native American human remains from a county coroner pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, it shall immediately notify those persons it believes to be most likely descended from the deceased Native American. The descendants may, with the permission of the owner of the land, or his or her authorized representative, inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The descendants shall complete their inspection and make their recommendation within 48 hours of their notification by the Native American Heritage Commission. The recommendation may include the scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

(b) Whenever the commission is unable to identify a descendant, or the descendant identified fails to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendant, and the mediation provided for in subdivision (k) of Section 5097.94 fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance.

(c) Notwithstanding the provisions of Section 5097.9, the provisions of this section (including those actions taken by the landowner or his or her authorized representative to implement this section), and any action taken to implement an agreement developed pursuant to subdivision (l) of Section 5097.94, shall be exempt from the requirements of the California Environmental Quality Act (Division 13, commencing with Section 21000).

(d) Notwithstanding the provisions of Section 30244, the provisions of this section (including those actions taken by the landowner or his or her authorized representative to implement this section), and any action taken to implement an agreement developed pursuant to subdivision (1) of Section 5097.94 shall be exempt from the requirements of the California Coastal Act of 1976 (Division 20, commencing with Section 30000).

3.0 NATURAL AND CULTURAL OVERVIEW

3.1 ENVIRONMENTAL SETTING

The Project site is located on a stream terrace within the southern portion of the Coast Ranges Geological Province within the Salinas Valley. The Project site is underlain by Holocene-aged younger fluvial and alluvial deposits associated with fan deposits associated with highlands immediately west of the Project site and the Salinas River consisting of mixtures of gravel, sand, silt, and clay (Dibblee, 2004). Specifically, the soil types within the Project site are Arbuckle and San Ysidro sandy loam, which are well-drained soils formed in alluvium derived from sedimentary and metamorphic rock. The area receives a mixture of coastal California and Mediterranean climates, but the primary climate is defined by long, hot, dry summers and brief, cool, sometimes rainy winters (Miles and Goudey, 1998).

3.2 ARCHAEOLOGICAL CONTEXT

Archaeologists working in central California have generally recognized six major prehistoric periods of cultural adaptation within the last 10,000 years. Previous research in San Luis Obispo County has tended to assume that the Santa Barbara sequence developed by Chester King (1982) would be largely replicated in this northern extension of ethnographic Chumash territory (Fitzgerald and Jones, 1998). Jones (1993) has suggested that, despite ethnographic affiliations with the Santa Barbara Channel, archaeologists should consider San Luis Obispo County a district within the central California Coastal Region that also includes Santa Cruz and Monterey counties. The presence of major offshore islands and rich Channel fisheries facilitated development of an intensive, populous maritime culture in the Santa Barbara Channel. The absence of this resource base in San Luis Obispo County forced cultural elaborations along different trajectories (Fitzgerald and Jones, 1998).

3.2.1 Paleo-Indian Period (c. 25,000 – c. 9950 B.P.)

The Paleo-Indian period represents the earliest human occupation in North America, beginning no earlier than 40,000 years before present (B.P.) and perhaps as recently as 25,000 to 20,000 B.P. This period coincides with the entry of people into the Americas during the latter part of the Wisconsin glaciation. At the end of this glacial period, the sea level began rising, submerging and eroding the flat coastal terraces at a rate of up to two meters per year (Barter et al., 1995).

Conclusive evidence of human occupation during the Paleo-Indian Period has been found at several coastal sites dating to the early Holocene, prior to 8450 B.P. At Diablo Canyon, Greenwood (1972) reported two multi-component sites with basal dates of 9320 and 8410 BP. The paucity of sites and materials from this time, termed the “Paleocoastal” by Moratto (1984), suggests that population density was low and settlements were impermanent. People used relatively simple technology to procure plant foods, shellfish, and a limited variety of vertebrate species (Greenwood, 1972; Jones and Waugh, 1995; Jones et al., 1994; King, 1982; 1990).

3.2.2 Millingstone Period (c. 9950 – c. 5450 B.P.)

Appropriately named, the Millingstone Period is defined by the predominance of hand stones and milling slabs in the archaeological record, indicating a reliance on hard seeds and

other plant foods. A variety of flaked stone tools including leaf-shaped bifaces, oval bifacial knives, choppers, and scrapers is also present. This period was a time of rising sea levels that created additional lagoons and estuaries (Glassow et al., 2007). Although deer are represented in the archaeological record, hunting and fishing contributed little to the diet, with the faunal diet relying heavily on mussels and Pismo clams. Bone gorges occur and Olivella spp. spire-lopped shell beads appear in burials (Glassow et al., 2007). Residential bases are presumed to have been comprised of extended families during this period.

3.2.3 Early Period (c. 5450 – c. 2550 B.P.)

Cultural changes after 5450 B.P. are thought to be a response to environmental shifts, rising sea levels, and an increase in population. Diagnostic artifacts of the Early Period include large side-notched, square stem, and contracting stem projectile points, as well as *Olivella* spp. beads. Although milling slabs and hand stones continued as the primary plant processing tools, mortars and pestles were added to the tool kit, probably indicating the systematic use of acorns (Glassow et al., 1988). In response to climactic changes, local residential sites appear more settled, but not permanent, with an increase in logistical organization of economic activities (Jones et al., 1994). The greater diversity of site types during this period reflects an increasing number of short-term occupations near labor-intensive resources. Trade and exchange also increased in importance as population mobility decreased, as evidenced by exotic shell beads and obsidian materials in midden deposits (Jones et al., 1994).

3.2.4 Middle Period (c. 2550 – c. 950 B.P.)

Prehistoric technology and economy became markedly more complex after 2550 B.P. The artifact assemblage contains shellfish hooks and other fishing gear, saucer-type *Olivella* spp. beads, and contracting-stemmed projectile points. Subsistence practices emphasized fish and acorns, with a greater use of seasonal resources and the first attempts at food storage (Glassow et al., 1988; King, 1990). Continuation of trade relationships is evident in the increased number and diversity of obsidian items and beads associated with this period. Settlement patterns were similar to those of the prior period. Sites were occupied on an extensive basis, but not as permanent settlements. These residential bases functioned in conjunction with short-term, smaller occupations at specialized resource processing areas (Jones and Ferneau, 2002).

3.2.5 Middle to Late Transition Period (c. 950 – c. 700 B.P.)

Around 950 B.P. the Medieval Climatic Anomaly, a 300-year period of warmer temperatures and drier climate, caused consequential, adverse environmental conditions, particularly intermittent droughts (Rabb et al., 1997). This transition period was a time of emergent political complexity, development of social ranking, and the rapid development of craft specialization. In San Luis Obispo County, settlement appears to have shifted away from the coast, perhaps reflecting adaptations to warmer temperatures and changes in available resources on the coast (Jones et al., 1994). Artifact assemblages contain a mixture of earlier artifact types such as stemmed projectile points, milling slabs, hand stones, bowl mortars, and *Olivella* spp. beads. Moreover, the absence of imported obsidian after 950 B.P. suggests a change in trade relationships, likely associated with the shift in settlement patterns (Jones et al., 1994). The prehistoric population in San Luis Obispo County may have decreased during this time, as villages became temporary hunting camps and native inhabitants increasingly relied on terrestrial mammals for subsistence.

3.2.6 Late Period (c. 700 – c. 181 B.P.)

The Late Period is poorly understood in San Luis Obispo County as prehistoric occupations from this period do not exhibit well-defined cultural stratigraphy (Jones et al., 2007). The few intact Late Period sites have produced artifact assemblages containing small side-notched, triangular, contracting stem, and leaf shaped projectile points, some groundstone, and late prehistoric bead types (Hoover and Sawyer, 1977). The conversion to concave based projectile points led to the abandonment of asphaltum, which had been used for hafting. Shellfish remained the principal protein food. A ranked society with hereditary elite was established. Population growth and socioeconomic complexity transpired along with environmental change (Glassow et al., 2007).

3.3 ETHNOGRAPHIC CONTEXT

The Project site is situated within the prehistoric territory of the Salinan tribe (Heizer and Whipple, 1971). The Salinans occupied a geographical area extending from present day San Luis Obispo in the south to King City in the north, and west to the coast (Breschini et al., 1983). The Salinan people were seasonally migratory and, depending on food resources, would inhabit the coastal beaches to procure marine resources, and the interior Santa Lucia mountain ranges for acorn and land mammal resources. It is probable that the Project APE falls within the regional territory of the Migueleño group, which inhabited the upper course of the Salinas River.

The Salinan language is part of the Hokan language family, which has been in the American Southwest for around 9,000 years (Hoover, 1977). Moratto (1984) suggests the Salinans were descendants of early Hokan settlers in the South Coast Ranges. Salinan may have become a distinct language 6000 to 8000 B.P. or earlier. At the time of contact, there were at least two mutually intelligible Salinan dialects. The northern dialect is referred to as Antoniaño, due to its association with the Mission of San Antonio de Padua, and the southern dialect was associated with the San Miguel Mission, which lends the name Migueleño. A third dialect, Playano, is referred to in mission records but nothing is known of it with any certainty.

There are few details recognized about Salinan culture, and what is known survives because of ethnographic interviews conducted by Mason (1912) and Harrington (1942). Their subsistence largely derived from gathering nuts and seeds, particularly acorns. Acorns were stored in bent twig granaries before processing. Wild oats, fruit, sage seeds and berries were also collected. Both coastal and inland groups hunted wild game, such as deer and rabbit, and they used C-shaped fishhooks to fish (Hester, 1978).

Autonomous villages created the Salinan's main sociopolitical structure. Families constructed domed houses of bent poles covered with tule or rye grass. There were communal structures as well, including dance houses and sweat lodges. Known ethnographic villages sites near the Project sites include *him'-se-en'* between Paso Robles and Templeton on the west side of the Salinas River, and a major village at *isolam* near present-day Cholame (Hester, 1978).

The placement of Chumash and Salinan territorial boundaries is a complex issue. Cultural historic approaches have had limited success in tying ethnographic Salinan settlement with archaeological sites. Notable exceptions include a list of sites recorded in Monterey County that can be associated with recorded Salinan place names collected by Harrington in 1942 (Rivers and Jones, 1993). Early researchers have suggested a boundary at Morro Creek at the north

end of Morro Bay (Kroeber, 1925), with a cultural boundary along the ridge dividing the Morro Valley from Toro Creek Valley. Subsequent studies moved this boundary inland to the San Miguel area and Ragged Point along the coastline (Gibson, 1983). In general, Salinan prehistory is poorly understood because of the limited number of sites excavated and the frequent lack of cultural stratigraphy and chronological control (Hester, 1978).

At the time of Spanish arrival in Central California, a pattern of small, bounded tribelets was observed. The date of contact in this area is usually set around 1650, although the first record of Spanish contact with the natives in the region is not until 1769, when Gaspar de Portola and Father Junipero Serra arrived. Native Americans residing in the region were moved into the missions first by their own will, and later by force (Heizer and Whipple, 1971). Migration to the missions and population decline emptied the land of its original inhabitants by around 1780 (Beck and Haase, 1974).

3.4 HISTORIC PERIOD CONTEXT

3.4.1 Contact Period

Gaspar de Portolá led the first Spanish land expedition in September 1769 through San Luis Obispo County, camping near the present site of the Coast Union High School (Bolton, 1926; Squibb, 1984). Several accounts of this expedition exist, including those of Juan Crespi (Bolton, 1926), Miguel Costansó (Browning, 1992), and Pedro Fages (Priestley, 1937). Costansó's diary contains observations regarding the native inhabitants' houses, settlement patterns, dress, and customs, as well as their attitudes toward the expedition (Browning, 1992).

In 1774, Juan Bautista de Anza passed over the same route as Portolá had five years before him (Hoover et al., 1990). This expedition made two stops in San Luis Obispo County, including one at the present Mission location on April 15, 1774, and a second at the Nacimiento River on April 16, 1774 (Hoover et al., 1990). In 1776, Anza made a second trip through the San Luis Obispo area as leader of the San Francisco colonists.

3.4.2 Mission Period

Fermin Francisco de Lasuen founded *Mission San Miguel Arcángel*, approximately eight miles north of the Project site, on July 25, 1797 (Hoover et al., 1990). The Franciscans chose the location for its proximity to the Salinan village, *Vahca,* and to close the gap between *Mission San Antonio* to the north and *Mission San Luis Obispo* to the south. Newly baptized Salinans provided almost all the labor to construct and maintain the missions, which soon produced surplus amounts of wheat, beans, corn, cattle, and sheep for trade (Barter et al. 1995). Most of the missions were similar in design and consisted of a church and living quarters for the priests, soldiers, and baptized Salinans (Hoover, 1990).

3.4.3 Rancho and Anglo-Mexican Periods

Mexico declared its independence from Spain in 1821 and the Secularization Act of 1833 ended the Catholic Church's control of large estates associated with the missions and presidios in Alta California. The Mexican government granted ranchos to Mexican and foreign settlers, who mainly used the land for grazing sheep and cattle. Following the Bear Flag Revolt in 1846, California gained its independence from Mexico and the United States gained control of the territory. Across California, courts reviewed the legality of each land grant on an individual basis.

While the Treaty of Hidalgo promised all property belonging to the Californios would be respected, the Land Act of 1851 required all land grant owners to prove their title and ownerships rights. Because the Californios relied on vague surveys and land titles, it took an average of 17 years to receive their American land patents (Bean, 1968; Palmer, 1999).

Specifically, the present Project site is adjacent to the former Rancho Paso de Robles land grant. Rancho Paso de Robles was granted by Governor Manuel Micheltorena to Jose Pedro Narvarez in 1844, who sold the rancho to Petronilo Rios a year later in 1845. A claim for Rancho Paso de Robles was filed in 1852, although Rios did not receive the patent until 1886. By the time the patent had been issued, Rios had already sold the rancho to James H. Blackburn, Daniel Drew Blackburn, and Lazard Godchaux.

3.4.4 Americanization Period

During the mid-nineteenth century, the Paso Robles area was known for its mineral hot springs and was a popular rest stop along the Camino Real. The first El Paso de Robles Hotel, built in 1864, featured a bath house and attracted many tourists to the area. European settlers also came to the area to establish cattle ranches, apple and almond orchards, dairy farms, and vineyards (TravelPaso, 2015).

After the introduction of the Southern Pacific Railroad, the town of Paso Robles was laid out in 1886 and incorporated in 1889. Daniel and James Blackburn built the Hotel El Paso de Robles (now the Paso Robles Inn), including an extensive bathhouse in 1891. At this time, Paso Robles became known as “Almond City” because it contained the world’s largest concentration of almond orchards. Growth remained steady until the 1940s when the United States Army established Camp Roberts. The new military installation brought more people and encouraged new development in the city (TravelPaso, 2015).

4.0 RECORDS SEARCH METHODS AND RESULTS

4.1 METHODS

Padre ordered an expedited records search from the Central Coast Information Center of the California Historical Resources Information System (CCIC-CHRIS) at the Santa Barbara Museum of Natural History on June 28, 2022. The records search included a review of all recorded historic-era and prehistoric archaeological sites within a 1/4-mile radius of the Project APE, as well as a review of known cultural resource surveys and technical reports. Padre received the results on June 28, 2022.

During the records search, the following sources were consulted:

- CCIC base maps, USGS 7.5-minute series topographic quadrangles for the Project APE, and other historic maps;
- Pertinent survey reports and archaeological site records were examined to identify recorded archaeological sites and historic-period built-environment resources (such as buildings, structures, and objects) within or immediately adjacent to the Project APE; and
- The California Department of Parks and Recreation's California Inventory of Historic Resources (1991) and the Office of Historic Preservation's Historic Properties Directory (2007), which combines cultural resources listed on the California Historical Landmarks, California Points of Historic Interest, and those that are listed in or determined eligible for listing in the NRHP or the CRHR.

4.2 RESULTS

The records search revealed that no cultural resources have been recorded within the Project site. A single prehistoric artifact (P-40-038008) was recorded approximately ¼ mile southwest of the Project site in 1988 (Singer and Atwood, 1988a).

The records search indicates that the Project site has not been previously examined for cultural resources; however, five cultural resource studies have been completed within a ¼ mile radius of the Project site. These studies included the parcels to the east, south, and northeast, and no cultural resources were observed (Singer and Atwood, 1988b; Conway, 2015).

5.0 FIELD SURVEY METHODS AND RESULTS

Padre Staff Archaeologist Christopher J. Letter conducted a Phase I pedestrian survey of the Project site on July 1, 2022. The archaeologist examined the Project site with parallel transects spaced at 15-meter intervals where not constrained by steep slopes or dense vegetation. The survey areas were documented with color digital photographs. No cultural materials were observed.

The Project site is located on gently rolling terrain with the majority of the property used for pastureland (Figure 5-1 and Figure 5-2). Ground surface visibility was generally excellent, ranging from 60 to 95 percent, with discarded construction materials and accumulations of oak detritus accounting for areas of reduced visibility. Vegetation within the Project site was sparse and consisted of weeds and seasonal grasses. Several mature oak trees (*Quercus spp.*) are located throughout the Project site (Figure 5-3 and Figure 5-4). Soils consisted of a light-yellow brown sandy loam with less than 10 percent subrounded to subangular pebbles. Many small mammal burrows allowed for additional subsurface soil evaluations.



Figure 5-1. Overview of Project site, facing south



Figure 5-2. Overview north end of Project site, facing south



Figure 5-3. Overview of Project site, facing south



Figure 5-4. Overview of south end of Project site, facing south

6.0 CONCLUSIONS AND RECOMMENDATIONS

Padre has completed a Phase I Archaeological Study in support of the construction of a new commercial development at 2930 Union Road (Lots 6 and 13 of APN 025-362-043) in Paso Robles, San Luis Obispo County, California.

The records search did not identify any cultural resources within the Project site, and no cultural resources were identified within the Project site during the pedestrian survey.

Proposed Project impacts will not affect cultural resources and no further archaeological study or monitoring is warranted. Padre recommends that the Project proceed as planned. A change in scope (i.e. increased area of disturbance), will require additional archaeological surveys.

In the event that cultural materials are encountered during future ground disturbance, Padre recommends stopping all activity within a 100-foot radius of the find and contacting a County-qualified archaeologist.

7.0 REFERENCES CITED

Barter, E. R., Farris, G., and Rivers, B. J., 1995. *Coastal Branch, Phase II, State Water Project Cultural Resources Survey, Reach 5A, San Luis Obispo County, California*. Report prepared for State of California, Department of Water Resources, Division of Planning, Sacramento. Report on file, Department of Parks and Recreation, Cultural Heritage Section, Sacramento.

Bean, W., 1968. *California: An Interpretive History*. McGraw Hill Book Company, New York.

Beck, W.A. and Haase, Y.D. 1974. Historical Atlas of California. University of Oklahoma Press, Norman.

Bolton, H. E., 1926. *Captain Portola in San Luis Obispo County 1769.* Tabula Rasa Press, Morro Bay, California.

Breschini, G.S., Haversat, T., and Hampson, R.P., 1983. A Cultural Resources Overview of the Coast and Coast-Valley Study Areas. Unpublished technical report, Bureau of Land Management. On file at the Los Prietos Heritage Resource Center.

Browning, P. (Editor), 1992. The Discovery of San Francisco Bay -- The Portolá Expedition of 1769 – 1770: The Diary of Miguel Costansó. Great West Books, Lafayette, California.

California Office of Historic Preservation, 1991. *Preservation Planning Bulletin 5: Guidelines for Archaeological Resource Management Reports (ARMR) Recommended Contents and Format.* California Office of Historic Preservation, Department of Parks and Recreation, Sacramento, California.

_____, 2007. *Historic Properties Directory.* State of California, Department of Parks and Recreation, Sacramento, California.

Conway, T. 2015. *An Archaeological Surface Survey for the Residence Inn Project, 2940 Union Road, Paso Robles, San Luis Obispo County, California.* Prepared by Heritage Discoveries, Inc. SL-06920.

Dibblee, T. W. Jr., 2004, Geologic Map of the Templeton Quadrangle, Dibblee Geology Center Map #DF-135, Accessed July 2022.

Fitzgerald, R. T., and Jones, T. L., 1998. Interpretive Synthesis of Subsurface Archaeological Investigations for the Coastal Branch, Phase II, State Water Project. Appendix G in Final Report: *Archaeological Data Recovery at CA-SLO-1797, the Cross Creek Site, San Luis Obispo County, California, Coastal Branch Phase II Project.* Garcia and Associates. Prepared for the California Department of Water Resources, Sacramento, California.

Gibson, R. O. 1983. *Ethnogeography of the Salinan People: A Systems Approach*. Master's thesis. California State University, Haywood.

Glassow, M., Wilcoxon, L., and Erlandson, J., 1988. Cultural and Environmental Change during the Early Period of Santa Barbara Channel Prehistory. In *The Archaeology of Hunter-Gatherer Subsistence Economics in Coastal Environments,* edited by G. Parkington and B. Bailey. Cambridge University Press, New York.

Glassow, Michael A., Gamble, Lynn H., Perry, Jennifer E., and Russell, Glenn S., 2007. Prehistory of the Northern California Bight and the Adjacent Transverse Ranges. *California Prehistory.* T. L. Jones and K. A. Klar, eds., AltaMira Press, Lantham, Maryland.

Greenwood, R.S., 1972. 9,000 Years of Prehistory at Diablo Canyon. *San Luis Obispo County Archaeological Society Occasional Papers* 7. Paso Robles, California.

Harrington, J. P. 1942. Cultural Element Distributions: XIX: Central California. *University of California Anthropological Records* 7(1):1-46. Berkeley.

Heizer, R.F., and Whipple, M.A., 1971. The California Indians, a Source Book. University of California Press, Berkeley, Los Angeles, London.

Hester, T. R., 1978. Salinan, in *Handbook of North American Indians*, Vol. 8, California, R. F. Heizer, ed., pp. 500-504. Smithsonian Institution, Washington, D.C.

Hoover, R., 1977. Ethnohistoric Salinan Acculturation. *Ethnohistory,* 24(3):261-268.

_____, 1990. *Archaeological Resources of the Nipomo Dunes Preserve*. Prepared for the Nature Conservancy, San Luis Obispo, California. Contract No. CAFO-0005.

Jones, T. L., 1993. Big Sur: A Keystone in Central California Culture History. *Pacific Coast Archaeological Society Quarterly* 29 (1): 1-77, Costa Mesa.

Jones, T. L. and Ferneau, J. A., 2002. Prehistory at San Simeon Reef: Archaeological Data Recovery at CA-SLO-179 and -267, San Luis Obispo County, California. San Luis Obispo County Archaeological Society Occasional Paper 16.

Jones, T. L. and Waugh, G., 1995. Central California Coastal Prehistory: A View from Little Pico Creek. *Perspectives in California Archaeology* 3, Institute of Archaeology, University of California, Los Angeles.

Jones, T. L., Davis, K., Farris, G., Grantham, S. D., Fung, T. W., and Rivers, B., 1994. *Toward a Prehistory of Morro Bay: Phase II Archaeological Investigations* for the Highway 41 Widening Project, San Luis Obispo County, California. Prepared for the Department of Transportation, District 05, San Luis Obispo, California.

Jones, T. L., Stevens, N. E., Jones, D. A., Fitzgerald, R. T., and Hylkema, M. G., 2007. The Central Coast: A Midlatitude Milieu. In *California Prehistory.* T. L. Jones and K. A. Klar, eds., AltaMira Press, Lantham, Maryland.

King, C., 1982. *The Evolution of Chumash Society.* Unpublished PhD. dissertation, University of California, Davis.

_____, 1990. *The Evolution of Chumash Society: A Comparative Study of Artifacts Used in Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804*. Garland, New York.

Kroeber, A. L., 1925. *Handbook of the Indians of California*. *Bulletin 78* of the Bureau of American Ethnology of the Smithsonian Institution, Government Printing Office, Washington. Republished in 1976 by Dover Publications, Inc., New York.

Mason, J. A., 1912. The Ethnology of the Salinan Indians. *University of California Publications in American Archaeology and Ethnology* 10(4):97-240.

Miles, S. R., and Goudey, C. B., 1998. *Ecological Subregions of California: Section and Subsection Descriptions.* USDA, Forest Service Pacific Southwest Region, San Francisco. Electronic document, http://www.fs.fed.us/r5/projects/ecoregions/.

Moratto, M. J., 1984. *California Archaeology.* Academic Press, Inc., San Diego.

Palmer, K., 1999. *Central Coast Continuum—From Ranchos to Rockets: A Historic Overview for an Inventory and Evaluation of Historic Sites, Buildings, and Structures, Vandenberg Air Force Base, California.* Prepared under contract to BTG, Inc. Submitted to 30 CES/CEVPC, Vandenberg Air Force Base.

Priestley, H. I., 1937. *A Historical, Political, and Natural Description of California by Pedro Fages, Written for the Viceroy in 1775.* Translated by Herbert Ingram Priestley. University of California Press, Berkeley.

Rabb, L. M., and Larson, D. O., 1997. "Medieval Climatic Anomaly and Punctuated Cultural Evolution in Coastal Southern California." *American Antiquity* 62: 319-336.

Rivers, B., and Jones, T. L., 1993. Walking Along Deer Trails: A Contribution to Salinan Ethnogeography Based on the Field Notes of John Peabody Harrington. *Journal of California and Great Basin Anthropology* 15(2):146-175.

Singer, C. A. and Atwood, J. E. 1988a. Archaeological Site Record: P-40-038008. Prepared by Singer and Associates.

_____ 1988b. *Cultural Resources Survey and Impact Assessment for the Chandler Specific Plan Area, Near the City of El Paso de Robles, San Luis Obispo County, California.* Prepared by Singer and Associates. SL-01601.

Squibb, P., 1984. *Captain Portola in San Luis Obispo County in 1769.* Tabula Rasa Press, Morro Bay, California.

TravelPaso, 2015. *History of Paso Robles*. http://www.travelpaso.com/about/history. Accessed on February 1, 2016.

APPENDIX A

CONFIDENTIAL: RECORDS SEARCH RESULTS

AIR QUALITY AND GREENHOUSE GAS ANALYSIS

ARDMORE INDUSTRIAL PROJECT

PASO ROBLES, CALIFORNIA

LSA

April 2023

AIR QUALITY AND GREENHOUSE GAS ANALYSIS

ARDMORE INDUSTRIAL PROJECT

PASO ROBLES, CALIFORNIA

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April 2023

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A: CALEEMOD OUTPUTS

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LIST OF ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AAQS	ambient air quality standards
AB	Assembly Bill
CAA	Federal Clean Air Act
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen Code	California Green Building Standards Code
CAP	Climate Action Plan
CARB	California Air Resources Board
CAT	California Climate Action Team
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CH_4	methane
City	City of Paso Robles
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
County	County of San Luis Obispo
DPM	diesel particulate matter

EIR	Environmental Impact Report
EO	Executive Order
GHG	greenhouse gas
GWP	global warming potential
HFCs	hydrofluorocarbons
I-SIP	California Infrastructure State Implementation Plan
IPCC	Intergovernmental Panel on Climate Change
LCFS	Low Carbon Fuel Standard
mg/m^3	milligrams per cubic meter
MMT	million metric tons
MMT CO_2e	million metric tons of carbon dioxide equivalent
MPO	Metropolitan Planning Organization
MT	metric tons
MT CO_2e	metric tons of carbon dioxide equivalent
N_2O	nitrous oxide
ND	no data available
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
O_3	ozone (or smog)
OPR	Governor's Office of Planning and Research
Pb	lead
PFCs	perfluorocarbons
PM	particulate matter

$PM_{2.5}$	particulate matter less than 2.5 microns in size
PM_{10}	particulate matter less than 10 microns in size
ppb	parts per billion
ppm	parts per million
project	Ardmore Industrial Project
ROGs	reactive organic gases
SB	Senate Bill
SCS	Sustainable Communities Strategy
SF_6	sulfur hexafluoride
SLO County APCD	San Luis Obispo County Air Pollution Control District
SLOCOG	San Luis Obispo Council of Governments
SO_2	sulfur dioxide
SO_X	sulfur oxides
sq ft	square foot/feet
TAC	toxic air contaminant
TIA	Transportation Impact Analysis
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
VOCs	volatile organic compounds
ZEV	zero-emission vehicle

INTRODUCTION

This air quality and greenhouse gas (GHG) impact analysis has been prepared to evaluate the potential air quality and GHG emissions impacts associated with the proposed Ardmore Industrial Project (project) in the City of Paso Robles (City), California. This report provides a project-specific air quality and GHG emissions impact analysis by examining the impacts of the proposed uses on regional air quality and nearby sensitive uses. This air quality and GHG impact analysis has been prepared using methods and assumptions recommended in the air quality impact assessment guidelines of the San Luis Obispo County Air Pollution Control District (SLO County APCD) and by the County of San Luis Obispo (County). This analysis also follows the guidelines within the SLO County APCD's *California Environmental Quality Act* (*CEQA) Air Quality Handbook*[1]*,* including an assessment of criteria pollutant emissions and an assessment of the project's greenhouse gas (GHG) emissions.

PROJECT LOCATION AND DESCRIPTION

The project site is located at 2930 Union Road in the City of Paso Robles, San Luis Obispo County, California. See Figure 1, Project Location and Vicinity, and Figure 2, Project Site Plan, below.

The proposed project would consist of an approximately 125,812 square-foot (sq ft) warehouse and an office building on Lot 13 (Building 1) and four commercial, storage, manufacturing, and winemaking buildings totaling approximately 114,515 sq ft on Lot 6 (Buildings 2–5). Buildings 2 through 5 would include the following uses: 9,000 sq ft of office uses; 116,812 sq ft of warehouse uses; 7,392 sq feet of retail uses; 41,016 sq ft of winemaking uses; 40,271 sq feet of storage uses, and 25,836 sq ft of manufacturing uses. The site would have a total of 310 parking spaces, of which 154 spaces would be for Lot 13 and 156 spaces for Lot 6. The proposed project would not require a change to the General Plan land use designation or the current zoning and would be consistent with the City's General Plan and Zoning Ordinance.

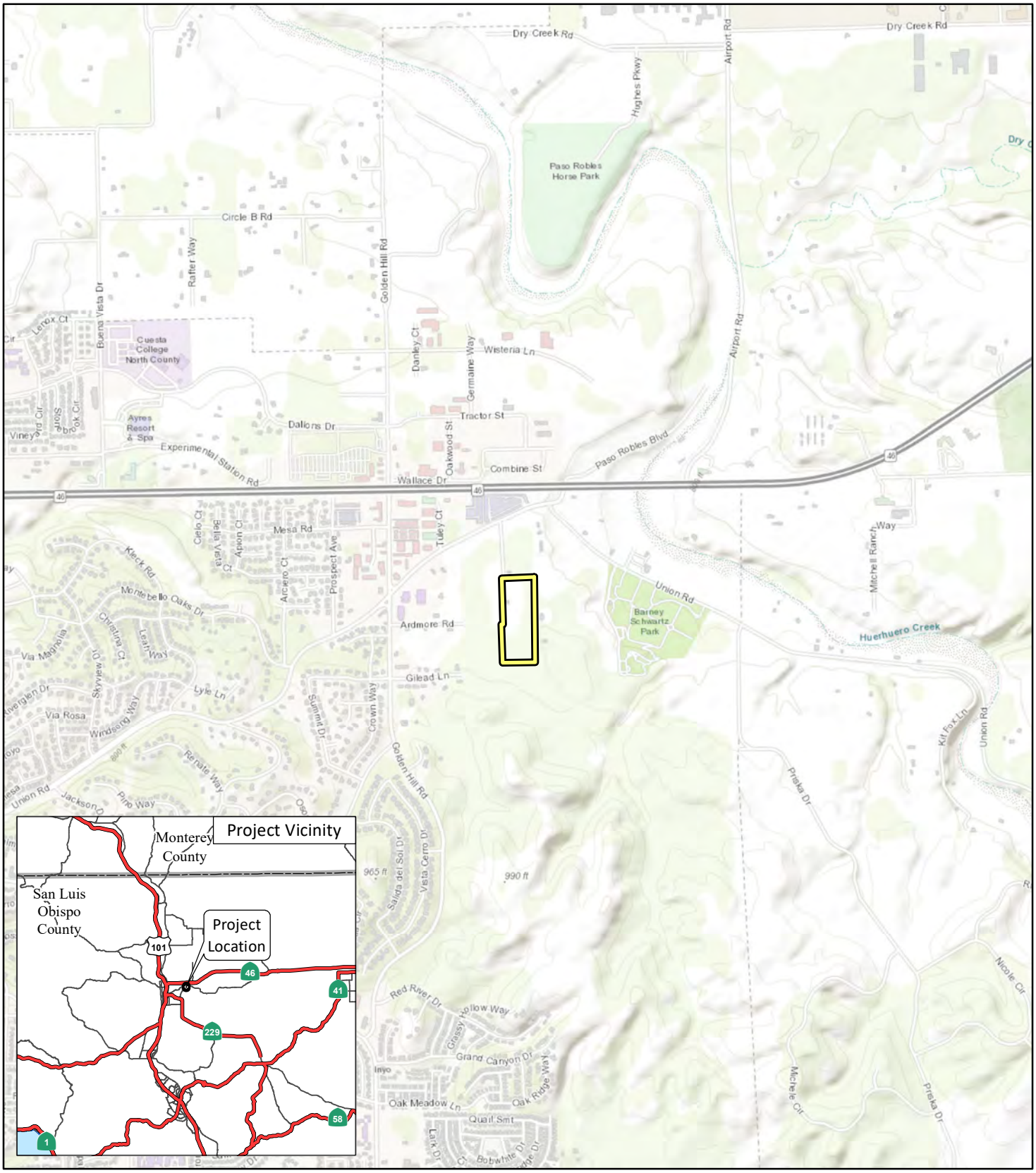
Typical operational characteristics include employees traveling to and from the site, delivery of products to the site, truck loading and unloading, and truck maintenance operations. The project is assumed to operate from 7:00 a.m. to 7:00 p.m., 7 days per week; however, these hours may shift depending on the tenant, as the hours of operation are unknown at this time. The proposed project is expected to generate approximately 250 employees and would generate approximately 1,194 average daily trips[2].

Construction of Buildings 1–4 is anticipated to begin in summer 2024 and occur for 12 to 16 months, and construction of Building 5 would commence in summer 2026 and would occur for 12 to 16 months. Based on the preliminary grading plans, earthwork would be balanced on site and no export or import of soil would be required. Construction would include demolition, excavation, grading, building construction, and installation of landscaping and irrigation, lighting, storm drain facilities, and underground utilities. Grading, and building activities would involve the use of

1 San Luis Obispo County Air Pollution Control District (SLO County APCD). 2012. *CEQA Air Quality Handbook*. April.

2 Central Coast Transportation Consulting (CCTC). 2022. *Transportation Analysis for the Ardmore Industrial Project – Paso Robles.* December 7.

standard earthmoving equipment such as large excavators, cranes, and other related equipment. This analysis also assumes the use of Tier 2 construction equipment.



LSA

LEGEND

Project Location

FIGURE 1

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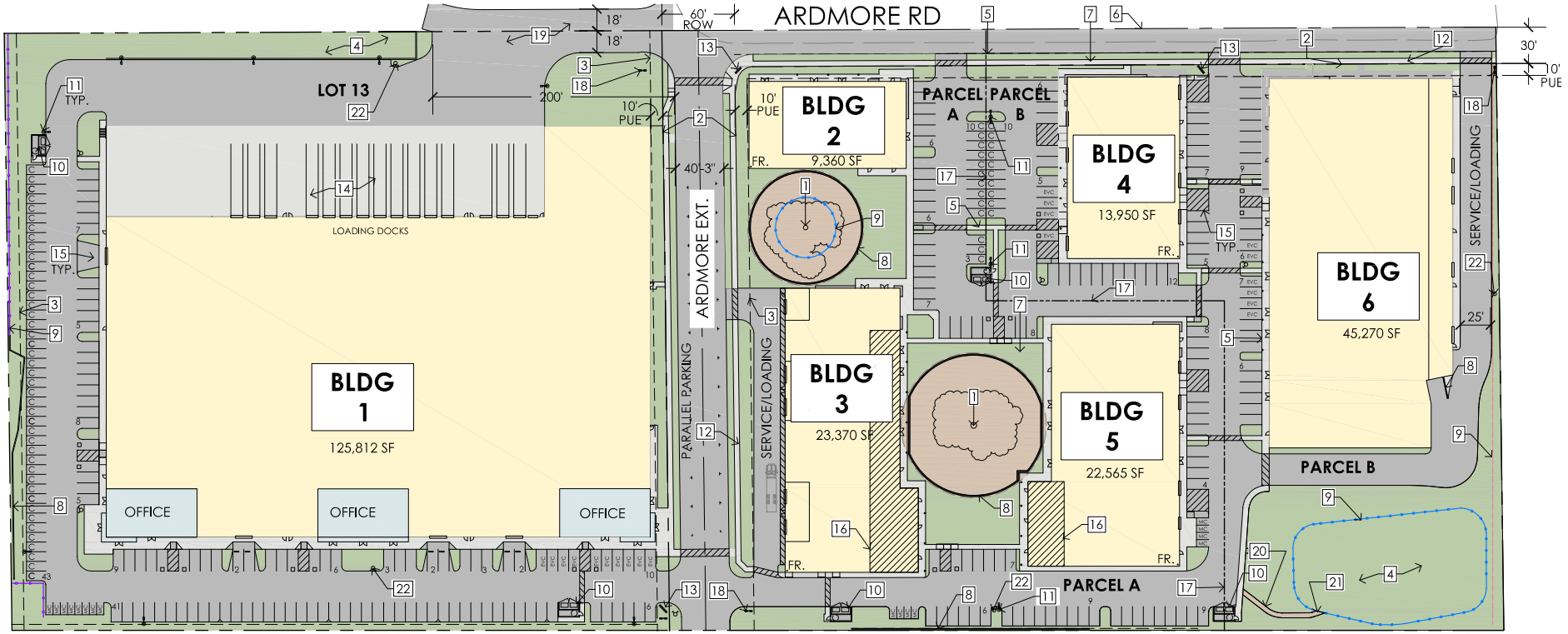
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Ardmore Industrial Project

Project Location and Vicinity

SOURCE: USGS 7.5' Quad - *San Luis Rey* (1975), *Oceanside* (1975), CA

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LSA

FIGURE 2

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SOURCE: Arris Architects

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Ardmore Industrial Project

Site Plan

Existing Sensitive Land Uses in the Project Area

For the purposes of this analysis, sensitive receptors are areas of population that have an increased sensitivity to air pollution or environmental contaminants. Sensitive receptor locations include residences, schools, day care centers, hospitals, parks, and similar uses that are sensitive to air quality. Impacts on sensitive receptors are of particular concern because they are the population most vulnerable to the effects of air pollution. The project site is bounded by open land to the east and south and by commercial uses to the north and the east. There are no nearby sensitive receptors within 1,000 feet of the project area.

BACKGROUND

This section provides background information on air pollutants and their health effects. It also provides regulatory background information, including information from the California Air Resources Board's (CARB) Air Quality and Land Use Handbook[3] (CARB Handbook); a description of the general health risks of toxics, and the significance criteria for project evaluation.

AIR POLLUTANTS AND HEALTH EFFECTS

Both State and federal governments have established health-based Ambient Air Quality Standards for six criteria air pollutants:[4] carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety. Long-term exposure to elevated levels of criteria pollutants may result in adverse health effects. However, emission thresholds established by an air district are used to manage total regional emissions within an air basin based on the air basin's attainment status for criteria pollutants. These emission thresholds were established for individual projects that would contribute to regional emissions and pollutant concentrations and could adversely affect or delay the projected attainment target year for certain criteria pollutants.

Because of the conservative nature of the thresholds and the basin-wide context of individual project emissions, there is no known direct correlation between a single project and localized air quality-related health effects. One individual project that generates emissions exceeding a threshold does not necessarily result in adverse health effects for residents in the project vicinity. This condition is especially true when the criteria pollutants exceeding thresholds are those with regional effects, such as ozone precursors like nitrogen oxides (NO_x) and volatile organic compounds (VOC).

Occupants of facilities such as schools, daycare centers, parks and playgrounds, hospitals, and nursing and convalescent homes are considered to be more sensitive than the general public to air pollutants because these population groups have increased susceptibility to respiratory disease. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. Residential areas are considered more sensitive to air quality conditions, compared to commercial and industrial areas, because people generally spend longer periods of time at their residences, with greater associated exposure to ambient air quality conditions. Recreational uses are also considered sensitive compared to commercial and industrial uses due to greater exposure to ambient air quality conditions associated with exercise.

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3 California Air Resources Board (CARB). 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* May.

4 Criteria pollutants are defined as those pollutants for which the federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

Ozone

Rather than being directly emitted, O_3 (smog) is formed by photochemical reactions between NO_X and VOCs. Ozone is a pungent, colorless gas. Elevated O_3 concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, elderly, and young children. O_3 levels peak during the summer and early fall months.

Carbon Monoxide

CO forms from the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. CO passes through the lungs into the bloodstream, where it interferes with the transfer of oxygen to body tissues.

Particulate Matter

PM is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles are those that are 10 microns or less in diameter, or PM_{10}. Fine, suspended particulate matter with an aerodynamic diameter of 2.5 microns or less, or $PM_{2.5}$, is not readily filtered out by the lungs. Nitrates, sulfates, dust, and combustion particulates are major components of PM_{10} and $PM_{2.5}$. These small particles can be directly emitted into the atmosphere as byproducts of fuel combustion; through abrasion, such as tire or brake lining wear; or through fugitive dust (wind or mechanical erosion of soil). They can also be formed in the atmosphere through chemical reactions. Particulates may transport carcinogens and other toxic compounds that adhere to the particle surfaces and can enter the human body through the lungs.

Nitrogen Dioxide

NO_2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to O_3 formation, NO_2 also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. NO_2 decreases lung function and may reduce resistance to infection.

Sulfur Dioxide

SO_2 is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels in the region. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight.

Lead

Leaded gasoline (phased out in the United States beginning in 1973), paint (on older houses and cars), smelters (metal refineries), and the manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has multiple adverse neurotoxic health effects, and children are at special risk. Some lead-containing chemicals cause cancer in animals.

Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. On October 15, 2008, the United States Environmental Protection Agency (USEPA) strengthened the national ambient air quality standard for lead by lowering it from 1.5 to 0.15 micrograms per cubic meter ($\mu g/m^3$). The USEPA revised the monitoring requirements for lead in December 2010. These requirements focus on airports and large urban areas, resulting in an increase in 76 monitors nationally.

Volatile Organic Compounds

VOCs (also known as reactive organic gases and reactive organic compounds) are formed from the combustion of fuels and the evaporation of organic solvents. VOCs are not defined as criteria pollutants, however, because VOCs accumulate in the atmosphere more quickly during the winter, when sunlight is limited and photochemical reactions are slower, they are a prime component of the photochemical smog reaction. There are no attainment designations for VOCs.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are injurious in small quantities and are regulated by the USEPA and the CARB. Some examples of TACs include benzene, butadiene, formaldehyde, and hydrogen sulfide. The identification, regulation, and monitoring of TACs is relatively recent compared to that for criteria pollutants.

TACs do not have ambient air quality standards, but are regulated by the USEPA, CARB, and the SLO County APCD. In 1998, the CARB identified particulate matter from diesel-fueled engines as a TAC. The CARB has completed a risk management process that identified potential cancer risks for a range of activities using diesel-fueled engines.[5] High-volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic (e.g., distribution centers and truck stops) were identified as posing the highest risk to adjacent receptors. Other facilities associated with increased risk include warehouse distribution centers, large retail or industrial facilities, high-volume transit centers, and schools with a high volume of bus traffic. Health risks from TACs are a function of both concentration and duration of exposure.

Unlike TACs emitted from industrial and other stationary sources noted above, most diesel particulate matter is emitted from mobile sources—primarily "off-road" sources such as construction and mining equipment, agricultural equipment, and truck-mounted refrigeration units, as well as "on-road" sources such as trucks and buses traveling on freeways and local roadways.

Although not specifically monitored, recent studies indicate that exposure to diesel particulate matter may contribute significantly to a cancer risk (a risk of approximately 500 to 700 in 1,000,000) that is greater than all other measured TACs combined.[6] The technology for reducing diesel particulate matter emissions from heavy-duty trucks is well established, and both State and federal

[5] CARB. 2000. Stationary Source Division and Mobile Source Control Division. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles.* October.

[6] Ibid.

agencies are moving aggressively to regulate engines and emission control systems to reduce and remediate diesel emissions. The CARB anticipates that by 2020, average statewide diesel particulate matter concentrations will decrease by 85 percent from levels in 2000 with full implementation of the CARB's Diesel Risk Reduction Plan,[7] meaning that the statewide health risk from diesel particulate matter is expected to decrease from 540 cancer cases in 1,000,000 to 21.5 cancer cases in 1,000,000.

Table A summarizes the sources and health effects of air pollutants discussed in this section. Table B presents a summary of State and federal ambient air quality standards (AAQS).

Table A: Sources and Health Effects of Air Pollutants

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	● Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust ● Natural events, such as decomposition of organic matter	● Reduced tolerance for exercise ● Impairment of mental function ● Impairment of fetal development ● Death at high levels of exposure ● Aggravation of some heart diseases (angina)
Nitrogen Dioxide (NO_2)	● Motor vehicle exhaust ● High temperature stationary combustion ● Atmospheric reactions	● Aggravation of respiratory illness ● Reduced visibility ● Reduced plant growth ● Formation of acid rain
Ozone (O_3)	● Atmospheric reaction of organic gases with nitrogen oxides in sunlight	● Aggravation of respiratory and cardiovascular diseases ● Irritation of eyes ● Impairment of cardiopulmonary function ● Plant leaf injury
Lead (Pb)	● Contaminated soil	● Impairment of blood functions and nerve construction ● Behavioral and hearing problems in children
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	● Stationary combustion of solid fuels ● Construction activities ● Industrial processes ● Atmospheric chemical reactions	● Reduced lung function ● Aggravation of the effects of gaseous pollutants ● Aggravation of respiratory and cardiorespiratory diseases ● Increased cough and chest discomfort ● Soiling ● Reduced visibility
Sulfur Dioxide (SO_2)	● Combustion of sulfur-containing fossil fuels ● Smelting of sulfur-bearing metal ores Industrial processes	● Aggravation of respiratory diseases (asthma, emphysema) ● Reduced lung function ● Irritation of eyes ● Reduced visibility ● Plant injury ● Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board (2016).

[7] CARB. 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October.

Table B: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
Ozone (O_3)[h]	1-Hour	0.09 ppm (180 µg/m³)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m³)		0.070 ppm (137 µg/m³)		
Respirable Particulate Matter (PM_{10})[i]	24-Hour	50 µg/m³	Gravimetric or Beta Attenuation	150 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m³		–		
Fine Particulate Matter ($PM_{2.5}$)[i]	24-Hour	-		35 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m³	Gravimetric or Beta Attenuation	12.0 µg/m³		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m³)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m³)	–	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m³)		35 ppm (40 mg/m³)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m³)		–	–	
Nitrogen Dioxide (NO_2)[j]	Annual Arithmetic Mean	0.03 ppm (57 µg/m³)	Gas Phase Chemi-luminescence	53 ppb (100 µg/m³)	Same as Primary Standard	Gas Phase Chemi-luminescence
	1-Hour	0.18 ppm (339 µg/m³)		100 ppb (188 µg/m³)	-	
Lead (Pb)[l,m]	30-Day Average	1.5 µg/m³	Atomic Absorption	–	–	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m³ (for certain areas)[l]	Same as Primary Standard	
	Rolling 3-Month Average[i]	–		0.15 µg/m³		
Sulfur Dioxide (SO_2)[k]	24-Hour	0.04 ppm (105 µg/m3)	Ultraviolet Fluorescence	0.14 ppm (for certain areas)	–	Ultraviolet Fluorescence; Spectro-photometry (Pararosaniline Method)
	3-Hour	–		–	0.5 ppm (1300 µg/m³)	
	1-Hour	0.25 ppm (655 µg/m³)		75 ppb (196 µg/m³)[k]	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[k]	–	
Visibility-Reducing Particles[l]	8-Hour	See footnote n	Beta Attenuation and Transmittance through Filter Tape.	No Federal Standards		
Sulfates	24-Hour	25 µg/m³	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[j]	24-Hour	0.01 ppm (26 µg/m³)	Gas Chromatography			

Source: California Air Resources Board (2016).

Table notes are provided on the following page.

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact USEPA for further clarification and current national policies.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Any equivalent measurement method which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Reference method as described by the USEPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the USEPA.

[h] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[i] On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24- hour PM2.5 standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[j] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[k] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[l] The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[m] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[n] In 1989, the CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

°C = degrees Celsius
µg/m^3 = micrograms per cubic meter
CARB = California Air Resources Board
mg/m^3 = milligrams per cubic meter
ppb = parts per billion
ppm = parts per million
USEPA = United States Environmental Protection Agency

GREENHOUSE GASES AND GLOBAL CLIMATE CHANGE

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. The Earth's average near-surface atmospheric temperature rose 0.6 ± 0.2° Celsius or 1.1 ± 0.4° Fahrenheit (°F) in the 20th century. The prevailing scientific opinion on climate change is that most of the warming observed over the last 50 years is attributable to human activities. The increased amounts of carbon dioxide (CO_2) and other GHGs are the primary causes of the human-induced component of warming. GHGs are released by the burning of fossil fuels, land clearing, agriculture, and other activities, and lead to an increase in the greenhouse effect.[8]

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:

- CO_2
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFC)
- Perfluorocarbons (PFC)
- Sulfur hexafluoride (SF_6)

Over the last 200 years, humans have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While manmade GHGs include naturally occurring GHGs such as CO_2, CH_4, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this air quality analysis, the term "GHGs" will refer collectively to the six gases listed above only.

These gases vary considerably in terms of global warming potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere

[8] The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduces the heat escaping, greenhouse gases like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the naturally occurring greenhouse effect is necessary to keep our planet at a comfortable temperature.

("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG; the definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO_2 equivalents" (CO_2e). Table C shows the GWP for each type of GHG. For example, SF_6 is 23,900 times more potent at contributing to global warming than carbon dioxide.

Table C: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-Year Time Horizon)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	114	310
HFC-23	270	11,700
HFC-134a	14	140
HFC-152a	1.4	140
PFC: Tetrafluoromethane (CF_4)	50,000	6,500
PFC: Hexafluoromethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900

Source: Intergovernmental Panel on Climate Change (2007).

The following discussion summarizes the characteristics of the six GHGs and black carbon.

Carbon Dioxide

In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals, and plants, volcanic out gassing, decomposition of organic matter and evaporation from the oceans. Human caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. Natural sources release approximately 150 billion tons of CO_2 each year, far outweighing the 7 billion tons of manmade emissions of CO_2 each year. Nevertheless, natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of manmade CO_2, and consequently, the gas is building up in the atmosphere.

In 2020, total annual CO_2 accounted for approximately 80.2 percent of California's overall GHG emissions.[9] Transportation is the single largest source of CO_2 in California, which is primarily comprised of on-road travel. Electricity production, industrial and residential sources also make important contributions to CO_2 emissions in California.

Methane

CH_4 is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Decomposition in landfills accounts for the

[9] CARB. 2021. GHGs Descriptions & Sources in California. Website: ww2.arb.ca.gov/ghg-descriptions-sources (accessed December 2022).

majority of human-generated CH_4 emissions in California and in the United States as a whole. Agricultural processes such as intestinal fermentation, manure management, and rice cultivation are also significant sources of CH_4 in California. Total annual emissions of CH_4 accounted for approximately 10.5 percent of GHG emissions in California in 2020.[10]

Nitrous Oxide

N_2O is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. Nitrous oxide is a product of the reaction between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California. Nitrous oxide emissions accounted for approximately 3.5 percent of GHG emissions in California in 2020.[11]

Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride

HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.[12] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry leads to greater use of PFCs. HFCs, PFCs, and SF_6 accounted for about 5.5 percent of GHG emissions in California in 2020.[13]

Black Carbon

Black carbon is the most strongly light-absorbing component of PM formed by burning fossil fuels such as coal, diesel, and biomass. Black carbon is emitted directly into the atmosphere in the form of $PM_{2.5}$ and is the most effective form of PM, by mass, at absorbing solar energy. Per unit of mass in the atmosphere, black carbon can absorb 1 million times more energy than CO_2.[14] Black carbon contributes to climate change both directly, such as absorbing sunlight, and indirectly, such as affecting cloud formation. However, because black carbon is short-lived in the atmosphere, it can be difficult to quantify its effect on global-warming.

Most United States emissions of black carbon come from mobile sources (52 percent), particularly from diesel-fueled vehicles. The other major source of black carbon is open biomass burning,

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10 CARB. 2021. GHGs Descriptions & Sources in California. Website: ww2.arb.ca.gov/ghg-descriptions-sources (accessed December 2022).

11 Ibid.

12 The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

13 CARB. 2021. op. cit.

14 United States Environmental Protection Agency (USEPA). 2015. Black Carbon, Basic Information. Last updated February 14, 2017. Website: 19january2017snapshot.epa.gov/www3/airquality/blackcarbon/basic.html (accessed December 2022).

including wildfires, although residential heating and industry also contribute. Black carbon emissions in the U.S. are projected to decline substantially by 2030, largely due to controls on new mobile diesel emissions.[15]

[15] USEPA. 2017. Black Carbon, Basic Information. February 14, 2017. Website: 19january2017snapshot.epa.gov/www3/airquality/blackcarbon/basic.html (accessed December 2022).

REGULATORY SETTING

This section provides regulatory background information for air quality and GHG.

AIR QUALITY REGULATORY SETTING

Federal Regulations

Federal Clean Air Act

The 1970 federal Clean Air Act authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The federal Clean Air Act Amendments of 1990 changed deadlines for attaining national standards as well as the remedial actions required of areas of the nation that exceed the standards. Under the Clean Air Act, State and local agencies in areas that exceed the national standards are required to develop State Implementation Plans to demonstrate how they will achieve the national standards by specified dates.

State Regulations

California Clean Air Act

In 1988, the California Clean Air Act (CCAA) required that all air districts in the State endeavor to achieve and maintain California ambient air quality standards (AAQS) for CO_2, O_3, SO_2, and NO_2 by the earliest practical date. The California Clean Air Act provides districts with authority to regulate indirect sources and mandates that air quality districts focus particular attention on reducing emissions from transportation and area-wide emission sources. Each nonattainment district is required to adopt a plan to achieve a 5 percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. A Clean Air Plan shows how a district would reduce emissions to achieve air quality standards. Generally, the State standards for these pollutants are more stringent than the national standards.

California Air Resources Board

The CARB is the State's "clean air agency." The CARB's goals are to attain and maintain healthy air quality, protect the public from exposure to toxic air contaminants, and oversee compliance with air pollution rules and regulations.

Assembly Bill 2588 Air Toxics "Hot Spots" Information and Assessment Act Under Assembly Bill (AB) 2588, stationary sources of air pollutants are required to report the types and quantities of certain substances their facilities routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, identify facilities having localized impacts, determine health risks, and notify nearby residents of significant risks.

The California Air Resources Board Handbook The CARB has developed an Air Quality and Land Use Handbook[16] intended to serve as a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process.

[16] CARB. 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* April.

According to the CARB Handbook, recent air pollution studies have shown an association between respiratory and other non-cancer health effects and proximity to high traffic roadways. Other studies have shown that diesel exhaust and other cancer-causing chemicals emitted from cars and trucks are responsible for much of the overall cancer risk from airborne toxics in California. The CARB Handbook recommends that county and city planning agencies strongly consider proximity to these sources when finding new locations for "sensitive" land uses such as homes, medical facilities, daycare centers, schools, and playgrounds.

Land use designations with air pollution sources of concern include freeways, rail yards, ports, refineries, distribution centers, chrome plating facilities, dry cleaners, and large gasoline service stations. Key recommendations in the CARB Handbook include taking steps to avoid siting new, sensitive land uses:

- Within 500 feet of a freeway, urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day.
- Within 1,000 feet of a major service and maintenance rail yard.
- Immediately downwind of ports (in the most heavily impacted zones) and petroleum refineries.
- Within 300 feet of any dry cleaning operation (for operations with two or more machines, provide 500 feet).
- Within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater).

The CARB Handbook specifically states that its recommendations are advisory and acknowledges land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues.

The recommendations are generalized and do not consider site-specific meteorology, freeway truck percentages, or other factors that influence risk for a particular project site. The purpose of this guidance is to further examine project sites for actual health risk associated with the location of new sensitive land uses.

Regional Regulations

The SLO County APCD has specific air quality-related planning documents, rules, and regulations. This section summarizes the local planning documents and regulations that may be applicable to the proposed project as administered by the SLO County APCD with CARB oversight.

CEQA Air Quality Handbook

The SLO County APCD 2012 *CEQA Air Quality Handbook* defines the criteria used by the SLO County APCD when evaluating new development to determine when an air quality analysis is necessary, the type of analysis that should be performed, the significance of the impacts predicted by the analysis, and the mitigation measures to reduce overall air quality impacts. The 2017 Clarification Memo for

the 2012 *CEQA Air Quality Handbook* provides administrative clarity on certain sections of the Handbook. In addition, in 2021, the SLO County APCD created a drop-down information guide and a CEQA Training Guided Question document to help answer the air quality and GHG questions from the Appendix G: Environmental Checklist Form.

Clean Air Plan

As part of the CCAA, the SLO County APCD is required to develop a plan to achieve and maintain the state ozone standard by the earliest practicable date. The 2001 Clean Air Plan, adopted on March 26, 2002, outlines SLO County APCD's strategies to reduce ozone precursor emissions from a wide variety of stationary and mobile sources.

Ozone Emergency Episode Plan

The San Luis Obispo County Ozone Emergency Episode Plan provides the basis for taking actions when ambient ozone concentrations reach a level that could endanger public health in San Luis Obispo County. It identifies criteria for the four levels of emergency episodes and related components for public announcements whenever an episode has been identified. This document will be incorporated into the California Infrastructure State Implementation Plan (I-SIP).

PM Report

In 2003, the California Legislature enacted Senate Bill (SB) 656, to reduce public exposure to particulate matter. SB 656 required CARB in consultation with local air pollution control districts, to develop and adopt a list of PM reduction strategies. SLO County APCD adopted the PM Report and associated control measures in July 2005.

Local Regulations

City of Paso Robles General Plan

The City of Paso Robles adopted the Conservation Element of the General Plan in November 2014, which addresses air quality.[17] The Conservation Element contains goals and policies that seek to maintain air quality by taking actions to reduce traffic congestion, vehicle miles traveled, and air pollutant emissions. The following policies are applicable to the proposed project

- Policy C-2A: Traffic Congestion Reduction. Implement circulation systems improvements to reduce congestion and associated air contaminant emissions.

- Policy C-2B: VMT Reduction. Implement programs to reduce the number of vehicle miles traveled (VMT), especially by single occupant vehicles, including providing opportunities for mixed-use projects.

[17] City of Paso Robles. 2014. *City of Paso Robles General Plan, Conservation Element.* November 19. Website: https://www.prcity.com/DocumentCenter/View/25852/20141119-Conservation-Element (accessed December 2022).

- Provide bikeways, pedestrian paths, and transit turn-outs/stops as requirements of development applications.
- Encourage the development of transit facilities.
- Strive to recruit new industry as part of on-going efforts to create a balanced community where the majority of residents can live, work, shop, and play, thereby reducing the commute lengths for some city residents.

- Policy C-2C: Emissions Reduction. Take steps to reduce creation of air contaminant emissions.

GREENHOUSE GAS REGULATORY SETTING

This section describes regulations related to global climate change at the federal, State, and local level.

Federal Regulations

The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the USEPA has the authority to regulate CO_2 emissions under the federal Clean Air Act. While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the USEPA commenced several actions in 2009 to implement a regulatory approach to global climate change.

This includes the 2009 USEPA final rule for mandatory reporting of GHGs from large GHG emission sources in the United States. Additionally, the USEPA Administrator signed an endangerment finding action in 2009 under the Clean Air Act, finding that six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change, leading to national GHG emission standards.

In October 2012, the USEPA and the National Highway Traffic Safety Administration (NHTSA), on behalf of the United States Department of Transportation, issued final rules to further reduce GHG emissions and improve Corporate Average Fuel Economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 *Federal Register* 62624). The NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon, limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 *Federal Register* 62630).

On March 31, 2022, the NHTSA finalized the CAFE standards for Model Years 2024–2026 Passenger Cars and Light Trucks. The amended CAFE standards would require an industry wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks in model year 2026, by increasing fuel efficiency by 8 percent annually for model years 2024–2025, and 10 percent annually for model year 2026. The final standards are estimated to save about 234 billion gallons of gas between model years 2030 to 2050.

State Regulations

The CARB is the lead agency for implementing climate change regulations in the State. Since its formation, the CARB has worked with the public, the business sector, and local governments to find solutions to California's air pollution problems. Key efforts by the State are described below.

Assembly Bill 1493 (2002)

In a response to the transportation sector's significant contribution to California's CO_2 emissions, AB 1493 was enacted on July 22, 2002. AB 1493 requires the CARB to set GHG emission standards for passenger vehicles and light duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. These standards (starting in model years 2009 to 2016) were approved by the CARB in 2004, but the needed waiver of CAA Preemption was not granted by the USEPA until June 30, 2009. The CARB responded by amending its original regulation, now referred to as Low Emission Vehicle III, to take effect for model years starting in 2017 to 2025. The Trump administration revoked California's waiver in 2019, but the Biden administration restored California's waiver in 2021

Executive Order S-3-05 (2005)

Governor Arnold Schwarzenegger signed Executive Order (EO) S-3-05 on June 1, 2005, which proclaimed that California is vulnerable to the impacts of climate change. To combat those concerns, this executive order established California's GHG emissions reduction targets, which established the following goals.

- GHG emissions should be reduced to 2000 levels by 2010.
- GHG emissions should be reduced to 1990 levels by 2020.
- GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

The Secretary of the California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various State agencies in order to collectively and efficiently reduce GHGs. A biannual progress report must be submitted to the Governor and State Legislature disclosing the progress made toward greenhouse emission reduction targets. In addition, another biannual report must be submitted illustrating the impacts of global warming on California's water supply, public health, agriculture, the coastline, and forestry, and report possible mitigation and adaptation plans to address these impacts.

The Secretary of CalEPA leads this CAT made up of representatives from State agencies as well as numerous other boards and departments. The CAT members work to coordinate statewide efforts to implement global warming emission reduction programs and the State's Climate Adaptation Strategy. The CAT is also responsible for reporting on the progress made toward meeting the statewide GHG targets that were established in the executive order and further defined under AB 32, the "Global Warming Solutions Act of 2006." The first CAT Report to the Governor and the Legislature was released in March 2006, which laid out 46 specific emission reduction strategies for reducing GHG emissions and reaching the targets established in the executive order. The most recent report was released in December 2020.

Assembly Bill 32 (2006), California Global Warming Solutions Act

California's major initiative for reducing GHG emissions is AB 32, passed by the State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The CARB has established the level of GHG emissions in 1990 at 427 million metric tons (MMT) of CO_2e. The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 requires the CARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The Scoping Plan was approved by the CARB on December 11, 2008, and contains the main strategies California will implement to achieve the reduction of approximately 169 MMT of CO_2e, or approximately 30 percent, from the State's projected 2020 emissions level of 596 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT CO_2e, or almost 10 percent from 2002–2004 average emissions). The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of the State's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards.

- Improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e);
- The Low-Carbon Fuel Standard (15.0 MMT CO_2e)
- Energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e)
- A renewable portfolio standard for electricity production (21.3 MMT CO_2e)

The Scoping Plan identifies 18 emission reduction measures that address cap-and-trade programs, vehicle gas standards, energy efficiency, low carbon fuel standards (LCFS), renewable energy, regional transportation-related GHG targets, vehicle efficiency measures, goods movement, solar roof programs, industrial emissions, high-speed rail, green building strategies, recycling, sustainable forests, water, and air. The measures would result in a total reduction of 174 MMT CO_2e by 2020.

On August 24, 2011, the CARB unanimously approved both the new supplemental assessment and reapproved its Scoping Plan, which provides the overall roadmap and rule measures to carry out AB 32. The CARB also approved a more robust CEQA equivalent document supporting the supplemental analysis of the cap-and-trade program. The cap-and-trade took effect on January 1, 2012, with an enforceable compliance obligation that began January 1, 2013.

CARB has not yet determined what amount of GHG reductions it recommends from local government operations and local land use decisions; however, the Scoping Plan states that land use planning and urban growth decisions will play an important role in the State's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions (meanwhile, CARB is also developing an additional protocol for community emissions). CARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and

natural gas emission sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is to be determined. With regard to land use planning, the Scoping Plan expects an approximately 5.0 MMT CO_2e reduction due to implementation of SB 375.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed the CARB and the CAT to identify a list of "discrete early action GHG reduction measures" that could be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed EO S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard (LCFS). This executive order sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs the CARB to consider the LCFS as a discrete early action measure. In 2011, United States District Court Judge Lawrence O'Neil issued an injunction preventing implementation of the LCFS, ruling that it is unconstitutional. In 2012, the Ninth Circuit Court of Appeal stayed the District Court's injunction, allowing implementation of the LCFS. The Ninth Circuit decided to uphold the LCFS.

In June 2007, the CARB approved a list of 37 early action measures, including three discrete early action measures (LCFS, Restrictions on GWP Refrigerants, and Landfill CH_4 Capture).[18] Discrete early action measures are measures that were required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code Section 38560.5. The CARB adopted additional early action measures in October 2007 that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of PFCs from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and SF_6 reductions from the non-electricity sector. The combination of early action measures is estimated to reduce statewide GHG emissions by nearly 16 MMT.[19]

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The CARB approved the First Update to the Climate Change Scoping Plan on May 22, 2014. The First Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The First Update defines CARB climate change priorities until 2020, and also sets the groundwork to reach long-term

18 California Air Resources Board (CARB). 2007a. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

19 CARB. 2007b. "ARB approves tripling of early action measures required under AB 32." News Release 07-46. October 25.

20 CARB. 2007a. op cit.

21 CARB. 2007b. op cit.

goals set forth in EOs S-3-05 and B-16-2012. The Update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals as defined in the initial Scoping Plan. It also evaluates how to align the State's "longer-term" GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use. CARB released a second update to the Scoping Plan, the 2017 Scoping Plan,[22] to reflect the 2030 target set by EO B-30-15 and codified by SB 32.

The 2022 Scoping Plan[23] assesses progress toward the statutory 2030 target, while laying out a path to achieving carbon neutrality no later than 2045. The 2022 Scoping Plan Update focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology, energy deployment, natural and working lands, and others, and is designed to meet the State's long-term climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities.

Senate Bill 97 (2007)

SB 97, signed by the Governor in August 2007 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research to prepare, develop, and transmit to the California Resources Agency guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA.

The California Natural Resources Agency adopted the amendments to the *State CEQA Guidelines* in November 2018, which went into effect in December 2018. The amendments do not identify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. The amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion granted by CEQA to lead agencies in making their own determinations based on substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs when they perform individual project analyses.

Senate Bill 375 (2008)

SB 375, the Sustainable Communities and Climate Protection Act, which establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions, was adopted by the State on September 30, 2008. On September 23, 2010, the CARB adopted the vehicular GHG emissions reduction targets that had been developed in consultation with the MPO; the targets require a 6 to 15 percent reduction by 2020 and between 13 to 19 percent reduction by 2035 for each MPO. SB 375 recognizes the importance of achieving significant GHG reductions by working with cities and counties to change land use patterns and improve transportation alternatives. Through the SB 375 process, MPOs such as the SCAG will work with local jurisdictions in the development of Sustainable Communities Strategy (SCS) designed to integrate development patterns and the transportation network in a way that reduces GHG emissions while meeting housing needs and other regional planning objectives. Pursuant to SB 375, the Los Angeles/Southern

22 CARB. 2017. *California's 2017 Climate Change Scoping Plan*. November.

23 CARB. 2021. op. cit.

California reduction targets for per capita vehicular emissions are 8 percent by 2020 and 19 percent by 2035, as shown in Table D.

Table D: Senate Bill 375 Regional Greenhouse Gas Emissions Reduction Targets

Metropolitan Planning Organization	By 2020 (percentage)	By 2035 (percentage)
San Francisco Bay Area	10	19
San Diego	15	19
Sacramento	7	19
Central Valley/San Joaquin	6-13	13-16
Los Angeles/Southern California	8	19

Source: California Air Resources Board (2018).

Executive Order B-30-15 (2015)

Governor Jerry Brown signed EO B-30-15 on April 29, 2015, which added the immediate target of:

- GHG emissions should be reduced to 40 percent below 1990 levels by 2030.

All State agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. CARB was directed to update the AB 32 Scoping Plan to reflect the 2030 target, and therefore, is moving forward with the update process. The mid-term target is critical to help frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue reducing emissions.

Senate Bill 350 (2015) Clean Energy and Pollution Reduction Act

SB 350, signed by Governor Jerry Brown on October 7, 2015, updates and enhances AB 32 by introducing the following set of objectives in clean energy, clean air, and pollution reduction for 2030.

- Raise California's renewable portfolio standard from 33 percent to 50 percent.
- Increasing energy efficiency in buildings by 50 percent by the year 2030.

The 50 percent renewable energy standard will be implemented by the California Public Utilities Commission for the private utilities and by the California Energy Commission for municipal utilities. Each utility must submit a procurement plan showing it will purchase clean energy to displace other non-renewable resources. The 50 percent increase in energy efficiency in buildings must be achieved through the use of existing energy efficiency retrofit funding and regulatory tools already available to State energy agencies under existing law. The addition made by this legislation requires state energy agencies to plan for and implement those programs in a manner that achieves the energy efficiency target.

Senate Bill 32, California Global Warming Solutions Act of 2016, and Assembly Bill 197

In summer 2016, the Legislature passed, and the Governor signed, SB 32 and AB 197. SB 32 affirms the importance of addressing climate change by codifying into statute the GHG emissions reductions target of at least 40 percent below 1990 levels by 2030 contained in Governor Jerry Brown's April 2015 EO B-30-15. SB 32 builds on AB 32 and keeps California on the path toward achieving the State's 2050 objective of reducing emissions to 80 percent below 1990 levels, consistent with an IPCC analysis of the emissions trajectory that would stabilize atmospheric GHG concentrations at 450 parts per million (ppm) CO_2e and reduce the likelihood of catastrophic impacts from climate change.

The companion bill to SB 32, AB 197, provides additional direction to CARB related to the adoption of strategies to reduce GHG emissions. Additional direction in AB 197 meant to provide easier public access to air emissions data that are collected by CARB was posted in December 2016.

Senate Bill 100

On September 10, 2018, Governor Jerry Brown signed SB 100, which raises California's renewables portfolio standard requirements to 60 percent by 2030, with interim targets, and 100 percent by 2045. The bill also establishes a State policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all State agencies by December 31, 2045. Under the bill, the State cannot increase carbon emissions elsewhere in the Western grid or allow resource shuffling to achieve the 100 percent carbon-free electricity target.

Executive Order B-55-18

EO B-55-18, signed September 10, 2018, sets a goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." EO B-55-18 directs CARB to work with relevant State agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The goal of carbon neutrality by 2045 is in addition to other statewide goals, meaning not only should emissions be reduced to 80 percent below 1990 levels by 2050, but that, by no later than 2045, the remaining emissions be offset by equivalent net removals of CO_2e from the atmosphere, including through sequestration in forests, soils, and other natural landscapes.

Title 24, Building Standards Code and CALGreen Code

In November 2008, the California Building Standards Commission established the California Green Building Standards (CALGreen) Code, which sets performance standards for residential and nonresidential development to reduce environmental impacts and encourage sustainable construction practices. The CALGreen Code addresses energy efficiency, water conservation, material conservation, planning and design, and overall environmental quality. The CALGreen Code is updated every 3 years and was most recently updated in 2022 to include new mandatory measures for residential as well as non-residential uses; the new measures will apply to projects seeking building permits on or after January 1, 2023.

Cap and Trade

The development of a cap-and-trade program was included as a key reduction measure of the CARB AB 32 Climate Change Scoping Plan. The cap-and-trade program will help put California on the path to meet its goal of reducing GHG emissions to 1990 levels by 2020 and ultimately achieving an 80 percent reduction from 1990 levels by 2050. The cap-and-trade emissions trading program developed by the CARB took effect on January 1, 2012, with enforceable compliance obligations beginning January 1, 2013. The cap-and-trade program aims to regulate GHG emissions from the largest producers in the State by setting a statewide firm limit, or cap, on allowable annual GHG emissions. The cap was set in 2013 at approximately 2 percent below the emissions forecast for 2020. In 2014, the cap declined approximately 2 percent. Beginning in 2015 and continuing through 2020, the cap has been declining approximately 3 percent annually. The CARB administered the first auction on November 14, 2012, with many of the qualified bidders representing corporations or organizations that produce large amounts of GHG emissions, including energy companies, agriculture and food industries, steel mills, cement companies, and universities. On January 1, 2015, compliance obligation began for distributors of transportation fuels, natural gas, and other fuels. The cap-and-trade program was initially slated to sunset in 2020, but the passage of SB 398 in 2017 extended the program through 2030.

Executive Order N-79-20

EO N-79-20, signed by Governor Gavin Newsom on September 23, 2020, sets the following goals for the State: 100 percent of in-state sales of new passenger cars and trucks shall be zero-emission by 2035; 100 percent of medium- and heavy-duty vehicles in the State shall be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks; and 100 percent of off-road vehicles and equipment in the State shall be zero-emission by 2035, where feasible.

Low Carbon Fuel Standard

In January 2007, EO S-01-07 established a low carbon fuel standard (LCFS). This executive order calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and that an LCFS for transportation fuels be established for California. The LCFS applies to all refiners, blenders, producers, or importers ("Providers") of transportation fuels in California, including fuels used by off-road construction equipment. In June 2007, CARB adopted the LCFS under AB 32 pursuant to Health and Safety Code Section 38560.5, and, in April 2009, CARB approved the new rules and carbon intensity reference values with new regulatory requirements taking effect in January 2011. The standards require providers of transportation fuels to report on the mix of fuels they provide and demonstrate they meet the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a lower carbon intensity than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher intensity fuels. In response to certain court rulings, CARB re-adopted the LCFS regulation in September 2015, and the LCFS went into effect on January 1, 2016. In 2018, CARB approved amendments to the regulation to readjust carbon intensity benchmarks to meet California's 2030 GHG reductions targets under SB 32. These amendments include opportunities to promote zero-emission vehicle (ZEV) adoption, carbon capture and sequestration, and advanced technologies for decarbonization of the transportation sector.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program, which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of ZEVs, into a single package of regulatory standards for vehicle model years 2017 through 2025. The new regulations strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's ZEVs regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the State. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 40 percent fewer GHGs and 75 percent fewer smog-forming emissions than 2012 model year vehicles.

Executive Order B-48-18

In January 2018, Governor Jerry Brown signed EO B-48-18 requiring all State entities to work with the private sector to have at least 5 million ZEVs on the road by 2030 and install 200 hydrogen fueling stations and 250,000 electric vehicle charging stations by 2025. It specifies that 10,000 of the electric vehicle charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a Plug-in Charging Station Design Guidebook and update the 2015 Hydrogen Station Permitting Guidebook to aid in these efforts. All State entities are required to participate in updating the 2016 Zero-Emissions Vehicle Action Plan to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities. Additionally, all State entities are to support and recommend policies and actions to expand ZEV infrastructure at residential land uses, through the LCFS Program, and recommend how to ensure affordability and accessibility for all drivers.

Local Regulations

The County adopted the EnergyWise Plan in November 2011 to demonstrate the County's continued commitment to addressing the challenges of climate change by reducing local GHG emissions and preparing the County to adapt to a changing climate.[24] The EnergyWise Plan outlines the County's approach to reducing GHG emissions through a number of goals, measures, and actions that provide a road map to achieving the County's GHG reduction target of 15 percent below baseline levels by 2020. In addition, the EnergyWise Plan 2016 Update summarizes the progress toward implementing measures in the EnergyWise Plan and outlines the overall trends in energy use and emissions since the baseline year of the EnergyWise Plan.

[24] San Luis Obispo, County of, 2011. *County of San Luis Obispo EnergyWise Plan*. November.

City of Paso Robles Climate Action Plan

The City adopted a comprehensive Climate Action Plan (CAP)[25] in November 2013, which provides goals and policies for reducing GHG emissions. The CAP is a comprehensive planning document outlining the City's proposed approach both to address climate impacts on Paso Robles and to reduce the City's impact on the climate by reducing GHG emissions. The CAP provides a framework to reduce the City's GHG footprint (climate action) and ensure the community and physical assets are better protected from the impacts of climate change (climate adaptation). The vision of the CAP is to create a more sustainable, resilient, and equitable city by addressing climate change in a way that remedies existing environmental health disparities while also improving health, quality of life, and enhancing economic vitality throughout Paso Robles. The CAP includes a roadmap for implementing new polices, programs, incentives, requirements, projects, and initiatives in the immediate future, as well as longer-term actions that will need to be studied further while monitoring how the climate continues to change and evaluating the effectiveness of actions taken. The following implementing actions from the CAP are applicable to the proposed project:

- **C-4.1:** Develop a program to meet City employee commute trip VMT reduction targets by offering one or more services from a menu of options, including: encourage the use of carpools; provide ride matching services and assistance; allow flexible work schedules and telecommuting; provide end of trip facilities (parking, showers, lockers); provide subsidized transit passes; hire a transportation coordination to manage TDM programs; or others at the employer's discretion.

- **W-1.3:** Adopt CALGreen Tier 1 or Tier 2 standards for water efficiency and conservation in new development. To meet Tier 1 or Tier 2, designers, builders, or property owners must increase the number of green building measures and further reduce percentages of water use in order to meet the threshold levels for each tier.

- **S-1.1:** Adopt a solid waste diversion rate that exceeds the state-mandated rate by 25 percent (e.g., California's AB 341 identifies a 75 percent diversion goal for 2020).

- **S-1.5**: Adopt an ordinance requiring that 65 percent of construction and demolition debris from development project be diverted from landfills.

[25] City of Paso Robles. 2013. City of Paso Robles Climate Action Plan. November 19. Website: https://www.prcity.com/DocumentCenter/View/14729/Climate-Action-Plan-PDF?bidId= (accessed December 2022)

SETTING

ATTAINMENT STATUS

The CARB is required to designate areas of the state as attainment, nonattainment, or unclassified for all State standards. An *attainment* designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A *nonattainment* designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. An *unclassified* designation signifies that data do not support either an attainment or nonattainment status. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The USEPA designates areas for O_3, CO, and NO_2 as either does not meet the primary standards, cannot be classified, or better than national standards. For SO_2, areas are designated as does not meet the primary standards, does not meet the secondary standards, cannot be classified, or better than national standards.

Table E provides a summary of the attainment status for the South Central Coast Air Basin (SCC Air Basin) with respect to federal and State AAQS.

Table E: San Luis Obispo County Attainment Status

Pollutant	State	Federal
O_3 1-hour	Nonattainment	Nonattainment - Eastern San Luis Obispo County/ Attainment - Western San Luis Obispo County[2]
O_3 8-hour	Nonattainment	
PM_{10}	Nonattainment	Unclassified[1]/ Attainment
$PM_{2.5}$	Attainment	Unclassified[1]/ Attainment
CO	Attainment	Unclassified[1]
NO_2	Attainment	Unclassified[1]
SO_2	Attainment	Unclassified[1]
Lead	Attainment	No Attainment Information
Visibility Reducing Particles	Attainment	No Federal Standards
Sulfates	Attainment	
Hydrogen Sulfide	Attainment	
Vinyl Chloride[1]	No Attainment Information	

Source: SLO County APCD (2019). Website: https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/AttainmentStatus29January2019.pdf

Notes:

[1] Unclassified (USEPA/Federal definition): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for that pollutant.

[2] San Luis Obispo County has been designated non-attainment east of the -120.4 degree Longitude line, in areas of San Luis Obispo County that are south of latitude 35.45 degrees, and east of the -120.3 degree Longitude line, in areas of San Luis Obispo County that are north of latitude 35.45 degrees. Map of non-attainment area is available upon request from the SLO County APCD.

EXISTING CLIMATE AND AIR QUALITY

Air quality in the planning area is not only affected by various emission sources (e.g., mobile and industry), but also by atmospheric conditions (e.g., wind speed, wind direction, temperature, and rainfall).

The annual average temperature varies little throughout the SCC Air Basin, ranging from the low to middle 60s°F. With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site is the Paso Robles Station.[26] The monthly average maximum temperature recorded at this station ranged from 59.6°F in January to 93.8°F in July, with an annual average maximum of 76.1°F. The monthly average minimum temperature recorded at this station ranged from 33.3°F in December to 53.7°F in July, with an annual average minimum of 43.3°F. These levels are still representative of the project area.

The majority of annual rainfall in the SCC Air Basin occurs between November and March. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the SCC Air Basin and along the coastal side of the mountains. Average monthly rainfall at the Paso Robles station varied from 2.46 inches in February to 0.02 inch in June and July, with an annual total of 12.53 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

The SCC Air Basin experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed in mid-afternoon to late afternoon on hot summer days when the air appears to clear up suddenly. Winter inversions frequently break by midmorning.

Winds in the project area blow predominantly from the south-southwest, with relatively low velocities. Wind speeds in the project area average about 5 miles per hour. Summer wind speeds average slightly higher than winter wind speeds. Low average wind speeds, together with a persistent temperature inversion, limit the vertical dispersion of air pollutants throughout the SCC Air Basin. Strong, dry, north, or northeasterly winds occur during the fall and winter months, dispersing air contaminants. The Santa Ana conditions tend to last for several days at a time.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are the lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly on shore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are CO and NO_x because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer

[26] Western Regional Climate Center. n.d. Recent Climate in the West. Website: http://www.wrcc.dri.edu, (accessed December 2022).

daylight hours and brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog. Smog is a general term that is naturally occurring fog that has become mixed with smoke or pollution. In this context it is better described as a form of air pollution produced by the photochemical reaction of sunlight with pollutants that have been released into the atmosphere, especially by automotive emissions.

AIR QUALITY MONITORING RESULTS

Air quality monitoring stations are located throughout the nation and are maintained by the local air pollution control district and State air quality regulating agencies. The SCC Air Basin, together with the CARB, maintains ambient air quality monitoring stations in the basin. The air quality monitoring stations closest to the project site are at 235 Santa Fe Avenue in Paso Robles, 5599 Traffic Way in Atascadero, and 1300 Guadalupe Road in Nipomo, California

Pollutant monitoring results for years 2019 to 2021 at the Paso Robles, Atascadero, and Nipomo air quality monitoring stations, shown in Table F, indicate that air quality in the area has generally been good. As indicated in the monitoring results, the federal PM_{10} standard was exceeded four times in 2020 only, with no exceedances for the years 2019 and 2021. The State PM_{10} standard was exceeded nine times in 2019, 35 times in 2020, and an unknown number of times in 2021. The federal $PM_{2.5}$ levels had 11 exceedances in 2020 only, with no exceedances for the years 2019 and 2021. The State 1-hour ozone standards were exceeded during the 3-year period. The 8-hour ozone State standards were exceeded three times in 2020 only, with no exceedances in 2019 and 2020. Similarly, the 8-hour federal Standards were exceeded two times in 2020 only, with no exceedances in the years 2019 and 2021. The SO_2 and NO_2 standards were not exceeded in this area during the 3-year period. Lastly, there was no available data for either the State or federal standards for CO in the county of San Luis Obispo.

GREENHOUSE GAS EMISSIONS INVENTORY

An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, United States, and California GHG emission inventories.

Global Emissions

Worldwide emissions of GHGs in 2020 totaled 22.9 billion metric tons (MT) of CO_2e. Global estimates are based on country inventories developed as part of the programs of the United Nations Framework Convention on Climate Change.[27]

[27] United Nations Framework Convention on Climate Change (UNFCCC). 2021. GHG Data from UNFCCC. Website: unfccc.int/process-and-meetings/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc/ghg-data-from-unfccc (accessed December 2022).

Table F: Ambient Air Quality at Nearby Monitoring Stations

Pollutant	Standard	2019	2020	2021
Carbon Monoxide (CO)[1]				
Maximum 1-hour concentration (ppm)		ND	ND	ND
Number of days exceeded:	State: > 20 ppm	ND	ND	ND
	Federal: > 35 ppm	ND	ND	ND
Maximum 8-hour concentration (ppm)		ND	ND	ND
Number of days exceeded:	State: > 9 ppm	ND	ND	ND
	Federal: > 9 ppm	ND	ND	ND
Ozone (O_3)[2]				
Maximum 1-hour concentration (ppm)		0.077	0.092	0.07
Number of days exceeded:	State: > 0.09 ppm	0	0	0
Maximum 8-hour concentration (ppm)		0.065	0.073	0.064
Number of days exceeded:	State: > 0.07 ppm	0	3	0
	Federal: > 0.07 ppm	0	2	0
Coarse Particulates (PM_{10})[2]				
Maximum 24-hour concentration (µg/m^3)		138.0	357.2	74
Number of days exceeded:	State: > 50 µg/m^3	9	35	ND
	Federal: > 150 µg/m^3	0	4	0
Annual arithmetic average concentration (µg/m^3)		ND	24.4	ND
Exceeded for the year:	State: > 20 µg/m^3	ND	Yes	ND
	Federal: > 50 µg/m^3	ND	No	ND
Fine Particulates ($PM_{2.5}$)[3]				
Maximum 24-hour concentration (µg/m^3)		17.3	242.1	19.1
Number of days exceeded:	Federal: > 35 µg/m^3	0	11	0
Annual arithmetic average concentration (µg/m^3)		ND	ND	6.7
Exceeded for the year:	State: > 12 µg/m^3	ND	No	No
	Federal: > 15 µg/m^3	ND	No	No
Nitrogen Dioxide (NO_2)[3]				
Maximum 1-hour concentration (ppm)		34	33	44
Number of days exceeded:	State: > 250 ppb	0	0	0
Annual arithmetic average concentration (ppm)		4	4	3.9
Exceeded for the year:	Federal: > 53 ppb	No	No	No
Sulfur Dioxide (SO_2)[4]				
Maximum 1-hour concentration (ppm)		0.002	0.002	0.004
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Maximum 24-hour concentration (ppm)		0.0007	0.0012	0.0015
Number of days exceeded:	State: > 0.04 ppm	0	0	0
	Federal: > 0.14 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.00002	0.00026	0.00051
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No

Sources: CARB (2022) and USEPA (2022).
[1] There were no available stations for CO_2.
[2] Data were taken from the 235 Santa Fe Avenue, Paso Robles Monitoring Station.
[3] Data were taken from the 5599 Traffic Way, Atascadero Monitoring Station.
[4] Data were taken from 1300 Guadalupe Road, Nipomo Monitoring Station.
µg/m^3 = micrograms per cubic meter
CARB = California Air Resources Board
ND = No data. There were insufficient (or no) data to determine the value.
ppb = parts per billion
ppm = parts per million
USEPA = United States Environmental Protection Agency

United States Emissions

In 2020, the year for which the most recent data are available, the United States emitted about 5,222 million metric tons of CO_2e (MMT CO_2e). Overall, emissions in 2020 decreased by 11 percent since 2019 and were 21 percent lower than 2005 levels. The primary driver for the decrease was an 11 percent decrease in CO_2 emissions from fossil fuel combustion. This decrease was primarily due to a 13 percent decrease in transportation emissions driven by decreased demand due to the ongoing COVID-19 pandemic. Electric power sector emissions also decreased 10 percent, reflecting both a slight decrease in demand from the COVID-19 pandemic and a continued shift from coal to less carbon intensive natural gas and renewables. Of the five major sectors – residential and commercial, agricultural, industry, transportation, and electricity generation – transportation accounted for the highest amount of GHG emissions in 2020 (approximately 27 percent), with electricity generation second at 27 percent and emissions from industry third at 24 percent.[28]

State of California Emissions

The State emitted approximately 369.2 MMT CO_2e emissions in 2020, 35.3 MMT CO_2e lower than 2019 levels and 61.8 MMT CO_2e below the 2020 GHG limit of 431 MMT CO_2e.[29] The California Air Resources Board (CARB) estimates that transportation was the source of approximately 37 percent of the State's GHG emissions in 2020, which is a smaller share than recent years, as the transportation sector saw a significant decrease of 26.6 MMT CO_2e in 2020, likely due in large part to the impact of the COVID-19 pandemic. The next largest sources included industrial sources at approximately 20 percent and electricity generation at 16 percent. The remaining sources of GHG emissions were commercial and residential activities at 10 percent, agriculture at 9 percent, high GWP at 6 percent, and waste at 2 percent.[30]

City of Paso Robles Emissions

The City of Paso Robles 2005 greenhouse gas emissions inventory update was prepared to identify the major sources and quantities of GHG emissions produced in Paso Robles in 2005 and forecast how these emissions may change over time. Paso Robles' GHG emissions are projected to grow approximately 20 percent above 2005 GHG emissions levels by the year 2020. Table G shows the GHG emissions by sector for 2005 and the forecasted emissions for 2020.

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28 USEPA. 2022. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020. Website: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks (accessed December 2022).

29 CARB. 2022. *California Greenhouse Gas Emissions for 2000 to 2020, Trends of Emissions and Other Indicators Report*. Website: https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf (accessed December 2022).

30 Ibid.

Table G: City of Paso Robles GHG Emissions

Sector	MT CO_2e	Percent	Percent Change
Residential	40,188	46,828	17
Commercial/ Industrial	33,536	30,551	-9
Transportation	67,801	92,913	37
Off-Road	13,205	15,878	20
Solid Waste	13,433	15,653	17
Wastewater	70	82	17
Aircraft	1,324	1,543	17
Total	**169,557**	**203,448**	**20**

Source: City of Paso Robles Climate Action Plan (City of Paso Robles 2013).
GHG = greenhouse gas
MT CO_2e = metric tons carbon dioxide equivalent

METHODOLOGY

The methodology used to estimate air quality and GHG impacts is described below.

CONSTRUCTION EMISSIONS

Construction activities can generate a substantial amount of air pollution. Construction activities are considered temporary; however, short term impacts can contribute to exceedances of air quality standards. Construction activities include site preparation, earthmoving, and general construction. The emissions generated from these common construction activities include fugitive dust from soil disturbance, fuel combustion from mobile heavy-duty diesel and gasoline powered equipment, portable auxiliary equipment, and worker commute trips.

The California Emission Estimator Model version 2022.1 (CalEEMod) computer program was used to calculate emissions from on-site construction equipment and emissions from worker and vehicle trips to the site (provided as Appendix A). Construction of Buildings 1–4 is anticipated to begin in summer 2024 and occur for 12 to 16 months, and construction of Building 5 would commence in summer 2026 and would occur for 12 to 16 months.[31] This analysis also assumes the use of Tier 2 construction equipment. All other construction details are not yet known; therefore, default assumptions (e.g., construction worker and truck trips and fleet activities) from CalEEMod were used.

OPERATIONAL EMISSIONS

The air quality analysis includes estimating emissions associated with long-term operation of the proposed project. Indirect emissions of criteria pollutants with regional impacts would be emitted by project-generated vehicle trips. In addition, localized air quality impacts (i.e., higher carbon monoxide concentrations or "hot-spots") near intersections or roadway segments in the project vicinity would also potentially occur due to project-generated vehicle trips.

Consistent with the SCCAB guidance for estimating emissions associated with land use development projects, the CalEEMod computer program was used to calculate the long-term operational emissions associated with the project. This analysis was conducted using the land use codes *Unrefrigerated Warehouse No-Rail, Manufacturing, Regional Shopping Center, and Parking Lot*. In addition, this analysis assumes the proposed project would generate new vehicle trips, consistent with the project's trip generation, which estimates the proposed project would result in approximately 1,194 average daily trips[32]. In addition, the proposed project would not include any woodburning hearths and only natural gas would be used, which was assumed in CalEEMod. When

31 The CalEEMod analysis evaluated project construction emissions with a start date of August 2023. The proposed project's construction schedule has since been modified that project construction would begin summer 2024 and would still occur over the same duration. This modification to the project construction start date was reviewed by LSA and it was determined that it would not result in any new or more severe air quality or GHG impacts than what is described within.

32 Central Coast Transportation Consulting (CCTC). 2022. Ardmore Industrial, Paso Robles- Transportation Analysis. December 7.

project-specific data were not available, default assumptions from CalEEMod were used to estimate project emissions.

GREENHOUSE GAS ANALYSIS

GHG emissions associated with the project would occur over the short-term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term GHG emissions associated with project-related vehicular trips. Recognizing that the field of global climate change analysis is rapidly evolving, the approaches advocated most recently indicate that for determining a project's contribution to GHG emissions, lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, construction activities, and any other significant source of emissions within the project area. The CalEEMod results were used to quantify GHG emissions generated by the project.

THRESHOLDS OF SIGNIFICANCE

The *State CEQA Guidelines* indicate that a project would normally have a significant adverse air quality impact if project-generated pollutant emissions would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project is nonattainment under applicable federal or state ambient air quality standards;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in other emissions (such as those leading to odors) affecting a substantial number of people.

The *State CEQA Guidelines* indicate that a project would normally have a significant adverse greenhouse gas emission impact if the project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reduction the emissions of greenhouse gases.

Certain air districts (e.g., SLO County APCD) have created guidelines and requirements to conduct air quality analysis. SLO County APCD's current guidelines, the *CEQA Air Quality Handbook* with associated updates, were followed in this assessment of air quality and GHG impacts for the proposed project.

REGIONAL EMISSIONS THRESHOLDS

The SLO County APCD sets emissions thresholds in its *CEQA Air Quality Handbook*, which were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety, these emission thresholds are regarded as conservative and would overstate an individual project's contribution to health risks. The thresholds of significance for emissions from construction activities are shown in Table H and the thresholds of significance for operational emissions impacts are presented in Table I.

Table H: Air Quality Thresholds of Significance for Construction Emissions

Pollutant	Threshold[1]		
	Daily	Quarterly Tier 1	Quarterly Tier 2
ROG + NO_x (combined)	137 lbs	2.5 tons	6.3 tons
Diesel Particulate Matter (DPM)	7 lbs	0.13 tons	0.32 tons
Fugitive Particulate Matter (PM_{10}), Dust[2]		2.5 tons	
Greenhouse Gases (CO_2e)	1,150 tons per year Amortized and Combined with Operational Emissions[3]		

Source: *CEQA Air Quality Handbook*. (SLO County APCD, April 2012).
[1] Daily and quarterly emission thresholds are based on the California Health & Safety Code and the CARB Carl Moyer Guidelines.
[2] Any project with a grading area greater than 4.0 acres of worked area can exceed the 2.5 ton PM_{10} quarterly threshold.
[3] The amortization of GHG emissions over the life of the project is based on the total greenhouse gas emissions for construction activities divided by the project life (i.e., 50 years for residential projects and 25 years for commercial projects) then add that number to the annual operational phase GHG emissions.
CARB = California Air Resources Board
CO_2e = carbon dioxide equivalent
DPM = diesel particulate matter
GHG = greenhouse gas
Lbs = pounds
NO_x = nitrogen oxides
PM_{10}= particulate matter less than 10 microns in size
SLO County APCD = San Luis Obispo County Air Pollution Control District

Table I: Air Quality Thresholds of Significance for Operational Emissions

Pollutant	Threshold[1]	
	Daily	Annual
ROG + NO_x (combined)[1]	25 lbs	25 tons
Diesel Particulate Matter (DPM)[1]	1.25 lbs	
Fugitive Particulate Matter (PM_{10}), Dust	25 lbs	25 tons
CO	550 lbs	

Source: *CEQA Air Quality Handbook*. (SLO County APCD, April 2012).
[1] Daily and annual emission thresholds are based on the California Health & Safety Code Division 26, Part 3, Chapter 10, Section 40918 and the CARB Carl Moyer Guidelines for DPM.
[2] CalEEMod – use winter operational emissions data to compare to operational thresholds.
CalEEMod = California Emissions Estimator Model
CARB = California Air Resources Board
CO = carbon monoxide
DPM = diesel particulate matter
lbs = pounds
NO_x = nitrogen oxides
PM_{10}= particulate matter less than 10 microns in size
ROG = reactive organic gases
SLO County APCD = San Luis Obispo County Air Pollution Control District

LOCAL MICROSCALE CONCENTRATION STANDARDS

The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. Because ambient CO levels are below the standards throughout the SCC Air Basin, a project would be considered to have a significant CO impact if project emissions result in an exceedance of one or more of the 1-hour or 8-hour standards. The following are applicable local emission concentration standards for CO:

- California State 1-hour CO standard of 20 ppm
- California State 8-hour CO standard of 9 ppm

GREENHOUSE GAS EMISSIONS

The significance of GHG emissions may be evaluated based on locally adopted quantitative thresholds or consistency with a regional GHG reduction plan (such as a Climate Action Plan). The SLO County APCD's bright-line threshold of 1,150 metric tons of CO_2e per year and the efficiency threshold of 4.9 metric tons of CO_2e per year service population were applicable to residential and commercial projects. These thresholds were based on a gap analysis and were used in CEQA evaluations for projects to demonstrate their consistency with the State's 2020 GHG emission reduction goal from AB 32 and CARB's 2008 Climate Change Scoping Plan. In 2015, the California Supreme Court issued an opinion in the *Center for Biological Diversity vs. California Department of Fish and Wildlife* (Newhall Ranch) which determined that AB 32 based thresholds derived from a gap analysis are invalid for projects with a planning horizon beyond 2020. As such, the SLO County APCD does not recommend the use of these thresholds in CEQA Evaluations.[33] However, since the SLO County APCD has yet to publish a quantified GHG efficiency threshold for the 2030 target, for informational purposes, the proposed project is compared to the numerical screening threshold of 1,150 metric tons of CO_2e per year and the efficiency target of 4.9 metric tons of CO_2e per year per service population. In addition, the proposed project was analyzed for consistency with the City's CAP and the 2022 Scoping Plan.

[33] SLO County APCD, 2021. Interim GHG Guidance for APCD CEQA Air Quality Handbook 2012. January 28.

IMPACT ANALYSIS

This section identifies the air quality and GHG emissions impacts associated with implementation of the proposed project. The results of the impact analyses are then compared to applicable thresholds of significance. As noted below, no thresholds were met or exceeded, therefore no mitigation measures are required for the proposed project.

AIR QUALITY IMPACTS

Air pollutant emissions associated with the project would occur over the short term from construction activities and over the long term from operational activities associated with the proposed land uses

Consistency with Applicable Air Quality Plans

The air quality plan applicable to the project area is the SLO County APCD's 2001 Clean Air Plan, which was adopted on March 26, 2002.[34] The CAP outlines the SLO County APCD's strategies to reduce ozone precursor emissions from a wide variety of stationary and mobile sources.

According to the SLO County APCD, a Clean Air Plan consistency analysis is generally required for a Program Level Environmental Impact Report (EIR), and may be necessary for a Project Level EIR, depending on the project being considered. Examples of projects and programs requiring a consistency analysis include: General Plan Updates and Amendments, Specific Plans, Area Plans, large residential developments and large commercial or industrial developments.

Consistency with the Clean Air Plan can be determined if: (1) the population projections for the project are less than or equal to those identified in the 2050 Regional Growth Forecast population data; (2) the rate of increase in vehicle trips and vehicle miles traveled (VMT) are less than or equal to the rate of population growth; and (3) all applicable Transportation and Land Use Control Measures from the Clean Air Plan have been included in the project to the maximum extent feasible. The following is an evaluation of the proposed project's consistency with each of these criteria.

Population Projections

According to the 2050 Regional Growth Forecast for San Luis Obispo County, the forecasted population in Paso Robles in 2020 was 32,755 residents and in 2050 is anticipated to have a population of 38,858 residents.[35] Therefore, the forecasted population for Paso Robles will grow by approximately 6,103 residents between 2020 and 2050. The proposed project would consist of an approximately 125,812 sq ft warehouse and an office building on Lot 13 (Building 1) and four commercial, storage, manufacturing, and winemaking buildings totaling approximately 114,515 sq ft

[34] SLO County APCD. 2001. *2001 Clean Air Plan San Luis Obispo County.* December.

[35] San Luis Obispo Council of Governments (SLOCOG). 2017. *2050 Regional Growth Forecast for San Luis Obispo County.* Website: https://www.dropbox.com/s/rkukq86qtmtmgjz/2050RegionalGrowthForecast_June2017.pdf?dl=0 (accessed December 2022).

on Lot 6 (Buildings 2–5). Therefore, the proposed project would not include new residences and would not increase population growth.

Vehicle Trips and Vehicle Miles Traveled

Based on the project's Transportation Analysis[36], the proposed project's VMT were analyzed consistent with the Governor's Office of Planning and Research (OPR) guidance. The City's 2022 Transportation Impact Analysis (TIA) Guidelines Supplement provide VMT and safety thresholds consistent with OPR guidance. Office and industrial projects may have a significant impact if the work VMT per employee exceeds 85 percent of the regional average. Work VMT captures home-based-work attractions (trips from homes to workplaces). In addition, projects may have a significant impact if they exacerbate an existing high-priority or similar safety location, introduces a design feature that substantially increases hazards, or propose features that do not meet City design standards. As demonstrated in the project's Transportation Analysis, the addition of the project would reduce regional work VMT due to the provision of jobs in a housing-rich area. Therefore, the project would have a less-than-significant impact to VMT.

Transportation and Land Use Control Measures

The SLO County APCD identifies Transportation Control Measures as part of the Clean Air Plan to decrease emissions of criteria pollutants by reducing demand for motor vehicle travel and commuting, improving the local and regional transit system, enhancing bicycle and bikeway facilities, and improving traffic flow. In addition, the SLO County APCD identifies Land Use Control Measures that are designed to reduce emissions of criteria air pollutants by planning compact communities, providing for mixed land uses, balancing jobs and housing, and circulation management. As discussed above, the addition of the project would reduce regional work VMT due to the provision of jobs in a housing-rich area. As such, the proposed project would not conflict with the Transportation and Land Use Control Measures.

Summary

As discussed above, the proposed project would not conflict with the Clean Air Plan. Furthermore, as demonstrated below, the proposed project would result in short-term construction and long-term operational pollutant emissions that are all less than the CEQA significance emissions thresholds established by the SLO County APCD. Therefore, the project would not result in an increase in the frequency or severity of an air quality standards violation or cause a new air quality standards violation. Therefore, the proposed project would not conflict with or obstruct implementation of the Clean Air Plan.

Criteria Pollutant Analysis

The SCCAB is currently designated as nonattainment for the federal and State standards for O_3. In addition, the SCCAB is in nonattainment for the State PM_{10} standard. The SCCAB's nonattainment status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very

[36] Central Coast Transportation Consulting (CCTC). 2022. Ardmore Industrial, Paso Robles- Transportation Analysis. December 7.

nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of an ambient air quality standard. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

In developing thresholds of significance for air pollutants, SLO County APCD considered the emissions levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is not necessary. The following analysis assesses the potential project-level air quality impacts associated with construction and operation of the proposed project.

Construction Emissions

During construction, short-term degradation of air quality may occur due to the release of particulate matter emissions (i.e., fugitive dust) generated by site preparation, grading, construction, paving, and other activities. Emissions from construction equipment are also anticipated and would include CO, NO_x, reactive organic gases (ROGs), directly emitted $PM_{2.5}$ or PM_{10}, and TACs such as diesel exhaust particulate matter.

Project construction activities would include site preparation, grading, construction, architectural coating, and paving activities. Construction-related effects on air quality from the proposed project would be greatest during the site preparation and grading phases due to the disturbance of soils. If not properly controlled, these activities would temporarily generate particulate emissions. Sources of fugitive dust would include disturbed soils at the construction site. Unless properly controlled, vehicles leaving the site would deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and amount of operating equipment. Larger dust particles would settle near the source, whereas fine particles would be dispersed over greater distances from the construction site. Water or other soil stabilizers can be used to control fugitive dust, resulting in emission reductions of 50 percent or more.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, sulfur oxides (SO_x), NO_x, ROGs and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles idle in traffic. These emissions would be temporary in nature and limited to the immediate area surrounding the construction site.

Construction emissions were estimated for the project using CalEEMod and summarized in Table J. Attachment A provides CalEEMod output sheets.

Table J: Air Quality Construction Emissions

	ROG + NO_x (combined)		Diesel Particulate Matter (DPM)		Fugitive Dust[2] (PM_{10})
	pounds/day	tons/quarter	pounds/day	tons/quarter	tons/quarter
Project Construction Emissions	86.1	1.2	1.1	0.1	<0.1
SLO County APCD's Significance Threshold[1]	**137**	**2.5[3]**	**7**	**0.13[3]**	**2.5[3]**
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**

Source: LSA (December 2022).
[1] Daily and quarterly emission thresholds are based on the California Health & Safety Code and the CARB Carl Moyer Guidelines.
[2] Per SLO County APCD, any project with a grading area greater than 4.0 acres of worked area can exceed the 2.5-ton PM_{10} quarterly threshold.
[3] Quarterly Tier 1 thresholds.
CARB = California Air Resources Board
DPM = diesel particulate matter
NOx = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic gases
SLO County APCD = San Luis Obispo County Air Pollution Control District

As shown in Table J, construction emissions associated with the project would be below the significance thresholds set by the SLO County APCD. Therefore, construction of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State AAQS.

Operational Emissions

Long-term air pollutant emission impacts are those associated with mobile sources (e.g., vehicle trips), energy sources (e.g., electricity and natural gas), and area sources (e.g., architectural coatings and the use of landscape maintenance equipment), related to the proposed project.

PM_{10} emissions result from running exhaust, tire and brake wear, and the entrainment of dust into the atmosphere from vehicles traveling on paved roadways. Entrainment of PM_{10} occurs when vehicle tires pulverize small rocks and pavement and the vehicle wakes generate airborne dust. Gasoline-powered engines have small rates of particulate matter emissions compared with diesel-powered vehicles. Since much of the project traffic fleet would be made up of light-duty gasoline-powered vehicles, a majority of the PM_{10} emissions would result from entrainment of roadway dust from vehicle travel.

Energy source emissions result from activities in buildings for which natural gas is used. The quantity of emissions is the product of usage intensity (i.e., the amount of natural gas) and the emission factor of the fuel source.

Area source emissions associated with the project would include emissions from water heating and the use of landscaping equipment.

Long-term operation emissions associated with the proposed project were calculated using CalEEMod. Table K provides the proposed project's estimated operational emissions. Attachment A provides CalEEMod output sheets.

Table K: Air Quality Operational Emissions

	ROG + NO_x (combined)		Diesel Particulate Matter (DPM)	Fugitive Dust[2] (PM_{10})	
	pounds/day	**tons/year**	**pounds/day**	**pounds/day**	**tons/year**
Project Operational Emissions	16.9	3.1	0.1	1.0	0.2
SLO County APCD's Significance Threshold[1]	**25[2]**	**25**	**1.25[2]**	**25**	**25**
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**

Source: LSA (December 2022).
[1] Daily and annual emission thresholds are based on the California Health & Safety Code Division 26, Part 3, Chapter 10, Section 40918
[2] CalEEMod winter report should be used to compare with these thresholds.
CalEEMod = California Emissions Estimator Model
DPM = diesel particulate matter
NOx = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic gases
SLO County APCD = San Luis Obispo County Air Pollution Control District

As shown in Table K, the emissions associated with the operations of the project would be well below the significance thresholds set by the SLO County APCD. Therefore, operation of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State AAQS.

Health Risk on Nearby Sensitive Receptors

Sensitive receptors are defined as people that have an increased sensitivity to air pollution or environmental contaminants. Sensitive receptor locations include schools, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential dwelling units. The project site is surrounded primarily by commercial and residential land uses. As discussed, there are no sensitive receptors located within 1,000 feet of the project site. Therefore, it is not anticipated that sensitive receptors would be exposed to airborne particulates and construction equipment pollutants (i.e., usually diesel-fueled vehicles and equipment). In addition, as shown in Table J above, project construction pollutant emissions would be below the SLO County APCD significance thresholds.

Once the project is constructed, the project would not be a source of substantial pollutant emissions. Therefore, sensitive receptors are not expected to be exposed to substantial pollutant concentrations during project construction and operation.

Odors

During construction, the various diesel-powered vehicles and equipment in use on site would create localized odors. These odors would be temporary and are not likely to be noticeable for extended

periods of time beyond the project site. Additionally, the proposed uses that would be developed within the project site are not expected to produce any offensive odors that would result in frequent odor complaints. The proposed project would not include sensitive receptors; therefore, odor impacts on the project do not require further evaluation.

GREENHOUSE GAS EMISSION IMPACTS

This section identifies the GHG impacts associated with implementation of the proposed project.

Generation of Greenhouse Gas Emissions

The following sections describe the proposed project's construction- and operation-related GHG impacts and consistency with applicable GHG reduction plans.

Construction Greenhouse Gas Emissions

Construction activities associated with the proposed project would produce combustion emissions from various sources. During construction, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically use fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

The SLO County APCD does not have an adopted threshold of significance for construction-related GHG emissions. However, lead agencies are encouraged to quantify and disclose GHG emissions that would occur during construction. Using CalEEMod, it is estimated that construction of the proposed project would generate a total of approximately 1,875.0 MT CO_2e during construction of the proposed project. When amortized over the 30-year life of the project, annual emissions would be 62.5 MT CO_2e.

Operational Greenhouse Gas Emissions

Long-term operation of the project would generate GHG emissions from mobile, area, waste, and water sources and indirect emissions from sources associated with energy consumption. Mobile-source GHG emissions would include project-generated vehicle trips to and from the project. Area-source emissions would be associated with activities such as landscaping and maintenance on the project site. Energy source emissions would be generated at off-site utility providers as a result of increased electricity demand generated by the project. Waste source emissions generated by the proposed project include energy generated by land filling and other methods of disposal related to transporting and managing project generated waste. In addition, water source emissions associated with the proposed project are generated by water supply and conveyance, water treatment, water distribution, and wastewater treatment.

Following guidance from the SLO County APCD, GHG emissions were estimated using CalEEMod. As shown in Table L, mobile source emissions are the largest source of emissions, at approximately 45 percent of total CO_2e emissions, followed by energy source emissions at approximately 39 percent of the total. In addition, water source emissions are approximately 9 percent, and waste source

emissions are approximately 7 percent. Area source emissions account for less than 1 percent of the total emissions.

Table L: GHG Emissions (Metric Tons Per Year)

Types of Emissions	Operational Emissions				
	CO_2	CH_4	N_2O	CO_2e	Percentage of Total
Mobile Source Emissions	495.0	<0.1	<0.1	507.0	45
Area Source Emissions	6.4	<0.1	<0.1	6.5	<1
Energy Source Emissions	445.0	0.1	<0.1	448.0	39
Water Source Emissions	44.3	1.8	<0.1	101.0	9
Waste Source Emissions	21.9	2.2	0.0	76.6	7
Total Operational Emissions				**1,139.1**	**100**
Amortized Construction Emissions				62.5	—
Total Annual Emissions				**1,201.6**	**—**
SLO County APCD Operational Year Numeric Threshold				**1,150**	—
Exceed?				**Yes**	**—**
Service Population Emissions				**4.8**	
SLO County APCD Scaled 2031 Service Population Threshold				**4.9**	
Exceeds Threshold?				**No**	

Source: LSA (March 2023).
Note = Some values may appear to be incorrect due to rounding.
CH_4 = methane
CO_2 = carbon monoxide
CO_2e = CO_2 equivalents
N_2O = nitrous oxide
SLO County APCD = San Luis Obispo County Air Pollution Control District

As discussed above and based on the project-specific thresholds developed for this analysis, GHG emissions generated by the proposed project would be less than significant if one or more of the following criteria are met: (1) the proposed project result in operational-related GHG emissions of less than 1,150 MT CO_2e per year, or (2) the proposed project would result in operational-related GHG emissions of less than 4.9 MT CO_2e per year per service population (residents plus employees). As shown in Table L, the proposed project would generate approximately 1,176.1 MT CO_2e per year, which would be exceed the numeric threshold of 1,150 MT CO_2e. Therefore, the following discussion evaluates the proposed project to the 4.9 MT CO_2e per year per service population threshold.

As discussed above, the proposed project would consist of an approximately 125,812 square-foot warehouse and an office building on Lot 13 (Building 1) and four commercial, storage, manufacturing, and winemaking buildings totaling approximately 114,515 sq ft on Lot 6 (Buildings 2–5). Therefore, the proposed project would not include new residences and would not increase population growth. The proposed project would employ approximately 250 workers. As such, the proposed project would result in a per service population emission of 4.8 MT CO_2e per year per service population, which would be below the SLO County APCD efficiency threshold of 4.9 MT CO_2e per year per service population.

In addition, since the SLO County APCD has yet to publish a quantified GHG efficiency threshold for the 2030 target, the proposed project was also analyzed for consistency with the goals of the 2022 Scoping Plan, EO B-30-15, SB 32, and AB 197.

EO B-30-15 added the immediate target of reducing GHG emissions to 40 percent below 1990 levels by 2030. Additionally, SB 32 affirms the importance of addressing climate change by codifying into statute the GHG emissions reduction target of at least 40 percent below 1990 levels by 2030 contained in EO B-30-15. SB 32 builds on AB 32 and keeps us on the path toward achieving the State's 2050 objective of reducing emissions to 80 percent below 1990 levels. The companion bill to SB 32, AB 197, provides additional direction to CARB related to the adoption of strategies to reduce GHG emissions. Additional direction in AB 197 that is intended to provide easier public access to air emission data collected by the CARB was posted in December 2016.

In addition, the 2022 Scoping Plan assesses progress toward the statutory 2030 target, while laying out a path to achieving carbon neutrality no later than 2045. The 2022 Scoping Plan focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology, energy deployment, natural and working lands, and others, and is designed to meet the State's long-term climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities.

The 2022 Scoping Plan focuses on building clean energy production and distribution infrastructure for a carbon-neutral future, including transitioning existing energy production and transmission infrastructure to produce zero-carbon electricity and hydrogen, and utilizing biogas resulting from wildfire management or landfill and dairy operations, among other substitutes. The 2022 Scoping Plan states that in almost all sectors, electrification will play an important role. The 2022 Scoping Plan evaluates clean energy and technology options and the transition away from fossil fuels, including adding four times the solar and wind capacity by 2045 and about 1,700 times the amount of current hydrogen supply. As discussed in the 2022 Scoping Plan, EO N-79-20 requires that all new passenger vehicles sold in California will be zero-emission by 2035, and all other fleets will have transitioned to zero-emission as fully possible by 2045, which will reduce the percentage of fossil fuel combustion vehicles.

Energy-efficient measures are intended to maximize energy-efficiency building and appliance standards, pursue additional efficiency efforts including new technologies and new policy and implementation mechanisms, and pursue comparable investment in energy efficiency from all retail providers of electricity in California. In addition, these measures are designed to expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings. As identified above, the proposed project would comply with the latest CALGreen Code standards, regarding energy conservation and green building standards. Therefore, the proposed project would comply with applicable energy measures.

Water conservation and efficiency measures are intended to continue efficiency programs and use cleaner energy sources to move and treat water. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions. As noted above, the project would be required to comply with the latest CALGreen Code standards, which include a variety of different measures, including reduction of wastewater and water use. In addition, the proposed project would be

required to comply with the California Model Water Efficient Landscape Ordinance. Therefore, the proposed project would not conflict with any water conservation and efficiency measures.

The goal of transportation and motor vehicle measures is to develop regional GHG emission reduction targets for passenger vehicles. Specific regional emissions targets for transportation emissions would not directly apply to the proposed project. The second phase of Pavley standards will reduce GHG emissions from new cars by 34 percent from 2016 levels by 2025, resulting in a 3 percent decrease in average vehicle emissions for all vehicles by 2020. Vehicles traveling to the project site would comply with the Pavley II (LEV III) Advanced Clean Cars Program. In addition, as discussed above, the addition of the project would reduce regional work VMT due to the provision of jobs in a housing-rich area. Therefore, the proposed project would not conflict with the identified transportation and motor vehicle measures.

Therefore, the proposed project would comply with existing State regulations adopted to achieve the overall GHG emissions reduction goals identified in AB 32, the AB 32 Scoping Plan, EO B-30-15, SB 32, and AB 197. As such, the proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Consistency with Greenhouse Gas Reduction Plans

The following analysis evaluates the proposed project's consistency with adopted plans to reduce GHG emissions.

As described above, the City adopted a CAP in November 2013. The consistency of the project with the goals of this CAP fulfills the CEQA goal of fully informing local-agency decision-makers of the environmental impact of the project under consideration at a stage early enough to ensure that GHG emissions are addressed. Although the CAP does not include a target for 2030, the measures in the plan will continue to provide reductions after the milestone year and help demonstrate continued progress toward achieving the SB 32 2030 target. The following CAP measures would be applicable to the proposed project:

- Measure E-4: Incentives for Exceeding Title 24 Energy Efficiency Building Standards
- Measure E-5: Energy Efficient Public Realm Lighting Requirements
- Measure E-6: Small-Scale On-Site Solar PV Incentive Program
- Measure TL-5: Transport Demand Management Incentives
- Measure TL-6: Parking Supply Management
- Measure W-1: Exceed the SB X7-7 Water Conservation Target
- Measure S-1: Solid Waste Diversion Rate

Future tenants of the project are unknown at this time, but they would implement transportation measures consistent with the CAP to reduce VMT. The proposed project would also be consistent with the CAP goal of increasing water and energy efficiency in new buildings by complying with the latest California Building Code (Title 24), including the latest CALGreen Code standards. In addition, the proposed project would comply with local and State laws regarding solar energy. Construction of the project would include a diversion of construction waste from landfills to recycling consistent

with current local and State standards and CAP goals to increase diversion and reduction of waste. As such, the proposed project would be consistent with applicable CAP measures.

Therefore, the proposed project would be consistent with applicable plans and programs designed to reduce GHG emissions. Therefore, the proposed project would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions.

CONCLUSION

Based on the analysis presented above, the proposed project would not conflict with the 2001 Clean Air Plan and construction and operation of the proposed project would not result in the generation of criteria air pollutants that would exceed SLO County APCD thresholds of significance. The proposed project is not expected to produce significant emissions that would affect nearby sensitive receptors. The project would also not result in objectionable odors affecting a substantial number of people. GHG emissions released during construction and operation of the project are estimated to be lower than significance thresholds and would not be cumulatively considerable. The proposed project would generally be consistent with the State GHG reduction goals and the City's CAP.

APPENDIX A

CALEEMOD OUTPUTS

Ardmore Industrial Project Custom Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Ardmore Industrial Project
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.00
Precipitation (days)	24.6
Location	35.6421954541768, -120.65084092570058
County	San Luis Obispo
City	Paso Robles
Air District	San Luis Obispo County APCD
Air Basin	South Central Coast
TAZ	3307
EDFZ	6
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Southern California Gas

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Unrefrigerated Warehouse-No Rail	166	1000sqft	3.81	166,083	0.00	—	—	—
Manufacturing	66.0	1000sqft	1.52	66,852	0.00	—	—	—

Regional Shopping Center	7.00	1000sqft	0.16	7,392	0.00	—	—	—
Parking Lot	310	Space	2.79	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-10-A	Water Exposed Surfaces
Construction	C-11	Limit Vehicle Speeds on Unpaved Roads

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	46.2	39.9	1.12	19.8	20.9	1.02	10.1	11.1	5,406	0.22	0.19	5,426
Mit.	46.2	39.9	1.12	7.77	8.88	1.02	3.96	4.98	5,406	0.22	0.19	5,426
% Reduced	—	—	—	61%	57%	—	61%	55%	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	46.2	23.2	0.77	7.17	7.92	0.71	3.44	4.14	4,205	0.17	0.19	4,264
Mit.	46.2	23.2	0.77	2.85	3.60	0.71	1.36	2.05	4,205	0.17	0.19	4,264
% Reduced	—	—	—	60%	55%	—	61%	50%	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	11.5	14.5	0.49	1.07	1.29	0.46	0.50	0.71	2,784	0.11	0.13	2,827

Mit.	11.5	14.5	0.49	0.61	1.10	0.46	0.21	0.61	2,784	0.11	0.13	2,827
% Reduced	—	—	—	43%	14%	—	57%	14%	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.10	2.64	0.09	0.19	0.24	0.08	0.09	0.13	461	0.02	0.02	468
Mit.	2.10	2.64	0.09	0.11	0.20	0.08	0.04	0.11	461	0.02	0.02	468
% Reduced	—	—	—	43%	14%	—	57%	14%	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
2023	1.15	39.9	1.12	19.8	20.9	1.02	10.1	11.1	5,406	0.22	0.05	5,426
2024	1.08	20.5	0.70	0.80	1.50	0.65	0.20	0.85	3,920	0.17	0.18	3,983
2025	46.2	20.5	0.70	1.03	1.73	0.65	0.25	0.90	4,138	0.18	0.19	4,204
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
2023	1.11	23.2	0.75	7.17	7.92	0.69	3.44	4.14	3,918	0.17	0.18	3,976
2024	1.07	20.6	0.70	0.80	1.50	0.65	0.20	0.85	3,895	0.17	0.18	3,953
2025	46.2	20.6	0.70	1.03	1.73	0.65	0.25	0.90	4,103	0.16	0.19	4,163
2026	46.2	21.6	0.77	1.03	1.80	0.71	0.25	0.97	4,205	0.17	0.18	4,264
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.29	6.98	0.22	1.07	1.29	0.21	0.50	0.71	1,124	0.05	0.03	1,136
2024	0.72	13.8	0.47	0.53	1.00	0.44	0.13	0.57	2,617	0.11	0.12	2,657
2025	11.5	14.5	0.49	0.61	1.10	0.46	0.15	0.61	2,784	0.11	0.13	2,827
2026	4.57	1.03	0.04	0.04	0.08	0.04	0.01	0.05	170	0.01	< 0.005	171
Annual	—	—	—	—	—	—	—	—	—	—	—	—

2023	0.05	1.27	0.04	0.19	0.24	0.04	0.09	0.13	186	0.01	0.01	188
2024	0.13	2.52	0.09	0.10	0.18	0.08	0.02	0.10	433	0.02	0.02	440
2025	2.10	2.64	0.09	0.11	0.20	0.08	0.03	0.11	461	0.02	0.02	468
2026	0.83	0.19	0.01	0.01	0.02	0.01	< 0.005	0.01	28.1	< 0.005	< 0.005	28.4

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
2023	1.15	39.9	1.12	7.77	8.88	1.02	3.96	4.98	5,406	0.22	0.05	5,426
2024	1.08	20.5	0.70	0.80	1.50	0.65	0.20	0.85	3,920	0.17	0.18	3,983
2025	46.2	20.5	0.70	1.03	1.73	0.65	0.25	0.90	4,138	0.18	0.19	4,204
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
2023	1.11	23.2	0.75	2.85	3.60	0.69	1.36	2.05	3,918	0.17	0.18	3,976
2024	1.07	20.6	0.70	0.80	1.50	0.65	0.20	0.85	3,895	0.17	0.18	3,953
2025	46.2	20.6	0.70	1.03	1.73	0.65	0.25	0.90	4,103	0.16	0.19	4,163
2026	46.2	21.6	0.77	1.03	1.80	0.71	0.25	0.97	4,205	0.17	0.18	4,264
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.29	6.98	0.22	0.50	0.72	0.21	0.21	0.42	1,124	0.05	0.03	1,136
2024	0.72	13.8	0.47	0.53	1.00	0.44	0.13	0.57	2,617	0.11	0.12	2,657
2025	11.5	14.5	0.49	0.61	1.10	0.46	0.15	0.61	2,784	0.11	0.13	2,827
2026	4.57	1.03	0.04	0.04	0.08	0.04	0.01	0.05	170	0.01	< 0.005	171
Annual	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.05	1.27	0.04	0.09	0.13	0.04	0.04	0.08	186	0.01	0.01	188
2024	0.13	2.52	0.09	0.10	0.18	0.08	0.02	0.10	433	0.02	0.02	440

2025	2.10	2.64	0.09	0.11	0.20	0.08	0.03	0.11	461	0.02	0.02	468
2026	0.83	0.19	0.01	0.01	0.02	0.01	< 0.005	0.01	28.1	< 0.005	< 0.005	28.4

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	13.4	3.51	0.13	0.98	1.11	0.13	0.17	0.30	6,243	24.5	0.48	11,454
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	11.6	3.64	0.11	0.98	1.09	0.11	0.17	0.28	6,114	24.5	0.50	11,318
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	13.1	3.65	0.12	0.96	1.09	0.13	0.17	0.30	6,116	24.5	0.49	11,324
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.39	0.67	0.02	0.18	0.20	0.02	0.03	0.05	1,013	4.06	0.08	1,875

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	4.98	2.38	0.03	0.98	1.01	0.03	0.17	0.21	3,112	0.26	0.20	3,188
Area	8.41	0.09	0.01	—	0.01	0.02	—	0.02	43.0	< 0.005	< 0.005	43.1
Energy	0.06	1.03	0.08	—	0.08	0.08	—	0.08	2,689	0.34	0.03	2,706
Water	—	—	—	—	—	—	—	—	268	10.7	0.26	611

Waste	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Refrig.	—	—	—	—	—	—	—	—	—	—	—	4,444
Total	13.4	3.51	0.13	0.98	1.11	0.13	0.17	0.30	6,243	24.5	0.48	11,454
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	4.85	2.60	0.03	0.98	1.01	0.03	0.17	0.21	3,025	0.30	0.21	3,095
Area	6.69	—	—	—	—	—	—	—	—	—	—	—
Energy	0.06	1.03	0.08	—	0.08	0.08	—	0.08	2,689	0.34	0.03	2,706
Water	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Waste	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Refrig.	—	—	—	—	—	—	—	—	—	—	—	4,444
Total	11.6	3.64	0.11	0.98	1.09	0.11	0.17	0.28	6,114	24.5	0.50	11,318
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	4.81	2.53	0.03	0.96	1.00	0.03	0.17	0.20	2,989	0.29	0.20	3,062
Area	8.24	0.08	0.01	—	0.01	0.02	—	0.02	38.9	< 0.005	< 0.005	39.0
Energy	0.06	1.03	0.08	—	0.08	0.08	—	0.08	2,689	0.34	0.03	2,706
Water	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Waste	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Refrig.	—	—	—	—	—	—	—	—	—	—	—	4,444
Total	13.1	3.65	0.12	0.96	1.09	0.13	0.17	0.30	6,116	24.5	0.49	11,324
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.88	0.46	0.01	0.18	0.18	0.01	0.03	0.04	495	0.05	0.03	507
Area	1.50	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.43	< 0.005	< 0.005	6.46
Energy	0.01	0.19	0.01	—	0.01	0.01	—	0.01	445	0.06	0.01	448
Water	—	—	—	—	—	—	—	—	44.3	1.77	0.04	101
Waste	—	—	—	—	—	—	—	—	21.9	2.19	0.00	76.6
Refrig.	—	—	—	—	—	—	—	—	—	—	—	736
Total	2.39	0.67	0.02	0.18	0.20	0.02	0.03	0.05	1,013	4.06	0.08	1,875

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	4.98	2.38	0.03	0.98	1.01	0.03	0.17	0.21	3,112	0.26	0.20	3,188
Area	8.41	0.09	0.01	—	0.01	0.02	—	0.02	43.0	< 0.005	< 0.005	43.1
Energy	0.06	1.03	0.08	—	0.08	0.08	—	0.08	2,689	0.34	0.03	2,706
Water	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Waste	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Refrig.	—	—	—	—	—	—	—	—	—	—	—	4,444
Total	13.4	3.51	0.13	0.98	1.11	0.13	0.17	0.30	6,243	24.5	0.48	11,454
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	4.85	2.60	0.03	0.98	1.01	0.03	0.17	0.21	3,025	0.30	0.21	3,095
Area	6.69	—	—	—	—	—	—	—	—	—	—	—
Energy	0.06	1.03	0.08	—	0.08	0.08	—	0.08	2,689	0.34	0.03	2,706
Water	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Waste	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Refrig.	—	—	—	—	—	—	—	—	—	—	—	4,444
Total	11.6	3.64	0.11	0.98	1.09	0.11	0.17	0.28	6,114	24.5	0.50	11,318
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	4.81	2.53	0.03	0.96	1.00	0.03	0.17	0.20	2,989	0.29	0.20	3,062
Area	8.24	0.08	0.01	—	0.01	0.02	—	0.02	38.9	< 0.005	< 0.005	39.0
Energy	0.06	1.03	0.08	—	0.08	0.08	—	0.08	2,689	0.34	0.03	2,706
Water	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Waste	—	—	—	—	—	—	—	—	132	13.2	0.00	462

Refrig.	—	—	—	—	—	—	—	—	—	—	—	4,444
Total	13.1	3.65	0.12	0.96	1.09	0.13	0.17	0.30	6,116	24.5	0.49	11,324
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.88	0.46	0.01	0.18	0.18	0.01	0.03	0.04	495	0.05	0.03	507
Area	1.50	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.43	< 0.005	< 0.005	6.46
Energy	0.01	0.19	0.01	—	0.01	0.01	—	0.01	445	0.06	0.01	448
Water	—	—	—	—	—	—	—	—	44.3	1.77	0.04	101
Waste	—	—	—	—	—	—	—	—	21.9	2.19	0.00	76.6
Refrig.	—	—	—	—	—	—	—	—	—	—	—	736
Total	2.39	0.67	0.02	0.18	0.20	0.02	0.03	0.05	1,013	4.06	0.08	1,875

3. Construction Emissions Details

3.1. Demolition (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.72	24.9	0.79	—	0.79	0.71	—	0.71	3,425	0.14	0.03	3,437
Demolition	—	—	—	0.05	0.05	—	0.01	0.01	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	1.37	0.04	—	0.04	0.04	—	0.04	188	0.01	< 0.005	188

Demolition	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.25	0.01	—	0.01	0.01	—	0.01	31.1	< 0.005	< 0.005	31.2
Demolition	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	94.8	0.01	< 0.005	96.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.07	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	45.4	< 0.005	0.01	47.7
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	5.02	< 0.005	< 0.005	5.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.49	< 0.005	< 0.005	2.61
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.83	< 0.005	< 0.005	0.84
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.41	< 0.005	< 0.005	0.43

3.2. Demolition (2023) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.72	24.9	0.79	—	0.79	0.71	—	0.71	3,425	0.14	0.03	3,437
Demolition	—	—	—	0.05	0.05	—	0.01	0.01	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	1.37	0.04	—	0.04	0.04	—	0.04	188	0.01	< 0.005	188
Demolition	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.25	0.01	—	0.01	0.01	—	0.01	31.1	< 0.005	< 0.005	31.2
Demolition	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	94.8	0.01	< 0.005	96.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.07	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	45.4	< 0.005	0.01	47.7
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	5.02	< 0.005	< 0.005	5.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.49	< 0.005	< 0.005	2.61
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.83	< 0.005	< 0.005	0.84
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.41	< 0.005	< 0.005	0.43

3.3. Site Preparation (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	39.9	1.12	—	1.12	1.02	—	1.02	5,295	0.21	0.04	5,314
Dust From Material Movement	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	1.09	0.03	—	0.03	0.03	—	0.03	145	0.01	< 0.005	146
Dust From Material Movement	—	—	—	0.54	0.54	—	0.28	0.28	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.20	0.01	—	0.01	0.01	—	0.01	24.0	< 0.005	< 0.005	24.1

Dust From Material Movement	—	—	—	0.10	0.10	—	0.05	0.05	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.05	0.00	0.10	0.10	0.00	0.02	0.02	111	0.01	< 0.005	113
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.93	< 0.005	< 0.005	2.97
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.48	< 0.005	< 0.005	0.49
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.4. Site Preparation (2023) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.07	39.9	1.12	—	1.12	1.02	—	1.02	5,295	0.21	0.04	5,314
Dust From Material Movement	—	—	—	7.67	7.67	—	3.94	3.94	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	1.09	0.03	—	0.03	0.03	—	0.03	145	0.01	< 0.005	146
Dust From Material Movement	—	—	—	0.21	0.21	—	0.11	0.11	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.20	0.01	—	0.01	0.01	—	0.01	24.0	< 0.005	< 0.005	24.1
Dust From Material Movement	—	—	—	0.04	0.04	—	0.02	0.02	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.05	0.00	0.10	0.10	0.00	0.02	0.02	111	0.01	< 0.005	113
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.93	< 0.005	< 0.005	2.97
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.48	< 0.005	< 0.005	0.49
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.73	23.2	0.75	—	0.75	0.69	—	0.69	2,958	0.12	0.02	2,968
Dust From Material Movement	—	—	—	7.08	7.08	—	3.42	3.42	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.73	23.2	0.75	—	0.75	0.69	—	0.69	2,958	0.12	0.02	2,968
Dust From Material Movement	—	—	—	7.08	7.08	—	3.42	3.42	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.04	1.27	0.04	—	0.04	0.04	—	0.04	162	0.01	< 0.005	163
Dust From Material Movement	—	—	—	0.39	0.39	—	0.19	0.19	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.23	0.01	—	0.01	0.01	—	0.01	26.8	< 0.005	< 0.005	26.9
Dust From Material Movement	—	—	—	0.07	0.07	—	0.03	0.03	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	94.8	0.01	< 0.005	96.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	90.9	0.01	< 0.005	92.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	5.02	< 0.005	< 0.005	5.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.83	< 0.005	< 0.005	0.84

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.6. Grading (2023) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.73	23.2	0.75	—	0.75	0.69	—	0.69	2,958	0.12	0.02	2,968
Dust From Material Movement	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.73	23.2	0.75	—	0.75	0.69	—	0.69	2,958	0.12	0.02	2,968
Dust From Material Movement	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	1.27	0.04	—	0.04	0.04	—	0.04	162	0.01	< 0.005	163
Dust From Material Movement	—	—	—	0.15	0.15	—	0.07	0.07	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.01	0.23	0.01	—	0.01	0.01	—	0.01	26.8	< 0.005	< 0.005	26.9
Dust From Material Movement	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	94.8	0.01	< 0.005	96.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	90.9	0.01	< 0.005	92.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	5.02	< 0.005	< 0.005	5.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.83	< 0.005	< 0.005	0.84
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,397	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	2.95	0.11	—	0.11	0.10	—	0.10	375	0.02	< 0.005	377
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.54	0.02	—	0.02	0.02	—	0.02	62.1	< 0.005	< 0.005	62.4
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.45	0.35	0.00	0.57	0.57	0.00	0.13	0.13	607	0.04	0.03	616
Vendor	0.04	1.47	0.01	0.23	0.24	0.01	0.06	0.07	914	0.03	0.13	954
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	95.7	0.01	< 0.005	97.3
Vendor	0.01	0.23	< 0.005	0.04	0.04	< 0.005	0.01	0.01	143	< 0.005	0.02	149
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.00	0.02	0.02	0.00	< 0.005	< 0.005	15.8	< 0.005	< 0.005	16.1
Vendor	< 0.005	0.04	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	23.7	< 0.005	< 0.005	24.7
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2023) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,397	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	2.95	0.11	—	0.11	0.10	—	0.10	375	0.02	< 0.005	377
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.54	0.02	—	0.02	0.02	—	0.02	62.1	< 0.005	< 0.005	62.4
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.45	0.35	0.00	0.57	0.57	0.00	0.13	0.13	607	0.04	0.03	616
Vendor	0.04	1.47	0.01	0.23	0.24	0.01	0.06	0.07	914	0.03	0.13	954
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.00	0.09	0.09	0.00	0.02	0.02	95.7	0.01	< 0.005	97.3
Vendor	0.01	0.23	< 0.005	0.04	0.04	< 0.005	0.01	0.01	143	< 0.005	0.02	149
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.00	0.02	0.02	0.00	< 0.005	< 0.005	15.8	< 0.005	< 0.005	16.1
Vendor	< 0.005	0.04	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	23.7	< 0.005	< 0.005	24.7
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.42	12.7	0.46	—	0.46	0.43	—	0.43	1,609	0.07	0.01	1,615
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	2.31	0.08	—	0.08	0.08	—	0.08	266	0.01	< 0.005	267
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.28	0.00	0.57	0.57	0.00	0.13	0.13	622	0.04	0.03	634
Vendor	0.04	1.36	0.01	0.23	0.24	0.01	0.06	0.07	901	0.03	0.13	943
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.31	0.00	0.57	0.57	0.00	0.13	0.13	596	0.04	0.03	606
Vendor	0.04	1.41	0.01	0.23	0.24	0.01	0.06	0.07	901	0.03	0.13	941
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.20	0.00	0.38	0.38	0.00	0.09	0.09	403	0.03	0.02	410
Vendor	0.02	0.94	0.01	0.15	0.16	0.01	0.04	0.05	605	0.02	0.09	632
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.00	0.07	0.07	0.00	0.02	0.02	66.7	< 0.005	< 0.005	67.9
Vendor	< 0.005	0.17	< 0.005	0.03	0.03	< 0.005	0.01	0.01	100	< 0.005	0.01	105
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.42	12.7	0.46	—	0.46	0.43	—	0.43	1,609	0.07	0.01	1,615
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	2.31	0.08	—	0.08	0.08	—	0.08	266	0.01	< 0.005	267
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.28	0.00	0.57	0.57	0.00	0.13	0.13	622	0.04	0.03	634
Vendor	0.04	1.36	0.01	0.23	0.24	0.01	0.06	0.07	901	0.03	0.13	943
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.31	0.00	0.57	0.57	0.00	0.13	0.13	596	0.04	0.03	606
Vendor	0.04	1.41	0.01	0.23	0.24	0.01	0.06	0.07	901	0.03	0.13	941
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.20	0.00	0.38	0.38	0.00	0.09	0.09	403	0.03	0.02	410
Vendor	0.02	0.94	0.01	0.15	0.16	0.01	0.04	0.05	605	0.02	0.09	632
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.00	0.07	0.07	0.00	0.02	0.02	66.7	< 0.005	< 0.005	67.9
Vendor	< 0.005	0.17	< 0.005	0.03	0.03	< 0.005	0.01	0.01	100	< 0.005	0.01	105
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.44	13.3	0.48	—	0.48	0.45	—	0.45	1,689	0.07	0.01	1,695
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	2.43	0.09	—	0.09	0.08	—	0.08	280	0.01	< 0.005	281
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.26	0.00	0.57	0.57	0.00	0.13	0.13	611	0.04	0.03	622
Vendor	0.04	1.30	0.01	0.23	0.24	0.01	0.06	0.07	885	0.03	0.13	927
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.40	0.29	0.00	0.57	0.57	0.00	0.13	0.13	585	0.02	0.03	594
Vendor	0.04	1.33	0.01	0.23	0.24	0.01	0.06	0.07	885	0.03	0.13	926
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.20	0.00	0.40	0.40	0.00	0.09	0.09	415	0.02	0.02	422
Vendor	0.03	0.94	0.01	0.16	0.17	0.01	0.04	0.05	624	0.02	0.09	652
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.00	0.07	0.07	0.00	0.02	0.02	68.8	< 0.005	< 0.005	69.9
Vendor	< 0.005	0.17	< 0.005	0.03	0.03	< 0.005	0.01	0.01	103	< 0.005	0.02	108
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,398	0.10	0.02	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.44	13.3	0.48	—	0.48	0.45	—	0.45	1,689	0.07	0.01	1,695
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	2.43	0.09	—	0.09	0.08	—	0.08	280	0.01	< 0.005	281
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.26	0.00	0.57	0.57	0.00	0.13	0.13	611	0.04	0.03	622
Vendor	0.04	1.30	0.01	0.23	0.24	0.01	0.06	0.07	885	0.03	0.13	927
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.40	0.29	0.00	0.57	0.57	0.00	0.13	0.13	585	0.02	0.03	594
Vendor	0.04	1.33	0.01	0.23	0.24	0.01	0.06	0.07	885	0.03	0.13	926
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.20	0.00	0.40	0.40	0.00	0.09	0.09	415	0.02	0.02	422
Vendor	0.03	0.94	0.01	0.16	0.17	0.01	0.04	0.05	624	0.02	0.09	652
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.00	0.07	0.07	0.00	0.02	0.02	68.8	< 0.005	< 0.005	69.9
Vendor	< 0.005	0.17	< 0.005	0.03	0.03	< 0.005	0.01	0.01	103	< 0.005	0.02	108
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,397	0.10	0.02	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.33	0.01	—	0.01	0.01	—	0.01	42.2	< 0.005	< 0.005	42.4

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.06	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.99	< 0.005	< 0.005	7.01
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.38	0.27	0.00	0.57	0.57	0.00	0.13	0.13	575	0.02	0.03	583
Vendor	0.03	1.27	0.01	0.23	0.24	0.01	0.06	0.07	869	0.03	0.13	907
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.00	0.01	0.01	0.00	< 0.005	< 0.005	10.2	< 0.005	< 0.005	10.4
Vendor	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	15.3	< 0.005	< 0.005	16.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	1.69	< 0.005	< 0.005	1.72
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.53	< 0.005	< 0.005	2.65
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Building Construction (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.62	18.9	0.69	—	0.69	0.64	—	0.64	2,397	0.10	0.02	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.33	0.01	—	0.01	0.01	—	0.01	42.2	< 0.005	< 0.005	42.4
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.06	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.99	< 0.005	< 0.005	7.01
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.38	0.27	0.00	0.57	0.57	0.00	0.13	0.13	575	0.02	0.03	583
Vendor	0.03	1.27	0.01	0.23	0.24	0.01	0.06	0.07	869	0.03	0.13	907
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.00	0.01	0.01	0.00	< 0.005	< 0.005	10.2	< 0.005	< 0.005	10.4
Vendor	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	15.3	< 0.005	< 0.005	16.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	1.69	< 0.005	< 0.005	1.72

Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.53	< 0.005	< 0.005	2.65
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	13.3	0.58	—	0.58	0.54	—	0.54	1,511	0.06	0.01	1,516
Paving	0.49	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.55	0.02	—	0.02	0.02	—	0.02	62.1	< 0.005	< 0.005	62.3
Paving	0.02	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.10	< 0.005	—	< 0.005	< 0.005	—	< 0.005	10.3	< 0.005	< 0.005	10.3
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.04	0.00	0.09	0.09	0.00	0.02	0.02	86.1	< 0.005	< 0.005	87.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.56	< 0.005	< 0.005	3.62
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.59	< 0.005	< 0.005	0.60
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Paving (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	13.3	0.58	—	0.58	0.54	—	0.54	1,511	0.06	0.01	1,516
Paving	0.49	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.02	0.55	0.02	—	0.02	0.02	—	0.02	62.1	< 0.005	< 0.005	62.3
Paving	0.02	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.10	< 0.005	—	< 0.005	< 0.005	—	< 0.005	10.3	< 0.005	< 0.005	10.3
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.04	0.00	0.09	0.09	0.00	0.02	0.02	86.1	< 0.005	< 0.005	87.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.56	< 0.005	< 0.005	3.62
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.59	< 0.005	< 0.005	0.60
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	45.0	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	45.0	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	10.7	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.96	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.10	0.00	0.23	0.23	0.00	0.05	0.05	244	0.02	0.01	249
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.11	0.00	0.23	0.23	0.00	0.05	0.05	234	0.01	0.01	238

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.00	0.05	0.05	0.00	0.01	0.01	56.3	< 0.005	< 0.005	57.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.00	0.01	0.01	0.00	< 0.005	< 0.005	9.32	< 0.005	< 0.005	9.47
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.18. Architectural Coating (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	45.0	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	45.0	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	10.7	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.96	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.10	0.00	0.23	0.23	0.00	0.05	0.05	244	0.02	0.01	249
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.11	0.00	0.23	0.23	0.00	0.05	0.05	234	0.01	0.01	238
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.00	0.05	0.05	0.00	0.01	0.01	56.3	< 0.005	< 0.005	57.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.00	0.01	0.01	0.00	< 0.005	< 0.005	9.32	< 0.005	< 0.005	9.47
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	1.09	0.07	—	0.07	0.06	—	0.06	134	0.01	< 0.005	134
Architectural Coatings	45.0	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.11	0.01	—	0.01	0.01	—	0.01	13.3	< 0.005	< 0.005	13.4
Architectural Coatings	4.49	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.02	< 0.005	—	< 0.005	< 0.005	—	< 0.005	2.21	< 0.005	< 0.005	2.21
Architectural Coatings	0.82	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.11	0.00	0.23	0.23	0.00	0.05	0.05	230	0.01	0.01	233
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.00	0.02	0.02	0.00	0.01	0.01	23.1	< 0.005	< 0.005	23.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.83	< 0.005	< 0.005	3.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.20. Architectural Coating (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	1.09	0.07	—	0.07	0.06	—	0.06	134	0.01	< 0.005	134
Architectural Coatings	45.0	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.11	0.01	—	0.01	0.01	—	0.01	13.3	< 0.005	< 0.005	13.4
Architectural Coatings	4.49	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	< 0.005	0.02	< 0.005	—	< 0.005	< 0.005	—	< 0.005	2.21	< 0.005	< 0.005	2.21
Architectural Coatings	0.82	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.11	0.00	0.23	0.23	0.00	0.05	0.05	230	0.01	0.01	233
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.00	0.02	0.02	0.00	0.01	0.01	23.1	< 0.005	< 0.005	23.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.83	< 0.005	< 0.005	3.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	1.27	0.65	0.01	0.28	0.29	0.01	0.05	0.06	893	0.07	0.05	914
Manufacturing	2.07	1.07	0.02	0.46	0.48	0.01	0.08	0.10	1,455	0.11	0.09	1,489
Regional Shopping Center	1.63	0.66	0.01	0.23	0.24	0.01	0.04	0.05	765	0.08	0.06	786
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.98	2.38	0.03	0.98	1.01	0.03	0.17	0.21	3,112	0.26	0.20	3,188
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	1.24	0.71	0.01	0.28	0.29	0.01	0.05	0.06	867	0.08	0.06	886
Manufacturing	2.02	1.16	0.02	0.46	0.48	0.01	0.08	0.10	1,414	0.13	0.09	1,445
Regional Shopping Center	1.58	0.72	0.01	0.23	0.24	0.01	0.04	0.05	744	0.09	0.06	764
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.85	2.60	0.03	0.98	1.01	0.03	0.17	0.21	3,025	0.30	0.21	3,095
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	0.22	0.13	< 0.005	0.05	0.05	< 0.005	0.01	0.01	144	0.01	0.01	148
Manufacturing	0.37	0.21	< 0.005	0.08	0.09	< 0.005	0.01	0.02	235	0.02	0.02	241
Regional Shopping Center	0.29	0.12	< 0.005	0.04	0.04	< 0.005	0.01	0.01	116	0.01	0.01	119
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total	0.88	0.46	0.01	0.18	0.18	0.01	0.03	0.04	495	0.05	0.03	507

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	1.27	0.65	0.01	0.28	0.29	0.01	0.05	0.06	893	0.07	0.05	914
Manufacturing	2.07	1.07	0.02	0.46	0.48	0.01	0.08	0.10	1,455	0.11	0.09	1,489
Regional Shopping Center	1.63	0.66	0.01	0.23	0.24	0.01	0.04	0.05	765	0.08	0.06	786
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.98	2.38	0.03	0.98	1.01	0.03	0.17	0.21	3,112	0.26	0.20	3,188
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	1.24	0.71	0.01	0.28	0.29	0.01	0.05	0.06	867	0.08	0.06	886
Manufacturing	2.02	1.16	0.02	0.46	0.48	0.01	0.08	0.10	1,414	0.13	0.09	1,445
Regional Shopping Center	1.58	0.72	0.01	0.23	0.24	0.01	0.04	0.05	744	0.09	0.06	764
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.85	2.60	0.03	0.98	1.01	0.03	0.17	0.21	3,025	0.30	0.21	3,095
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	0.22	0.13	< 0.005	0.05	0.05	< 0.005	0.01	0.01	144	0.01	0.01	148

Manufacturing	0.37	0.21	< 0.005	0.08	0.09	< 0.005	0.01	0.02	235	0.02	0.02	241
Regional Shopping Center	0.29	0.12	< 0.005	0.04	0.04	< 0.005	0.01	0.01	116	0.01	0.01	119
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.88	0.46	0.01	0.18	0.18	0.01	0.03	0.04	495	0.05	0.03	507

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	983	0.16	0.02	993
Manufacturing	—	—	—	—	—	—	—	—	377	0.06	0.01	381
Regional Shopping Center	—	—	—	—	—	—	—	—	34.2	0.01	< 0.005	34.5
Parking Lot	—	—	—	—	—	—	—	—	59.5	0.01	< 0.005	60.1
Total	—	—	—	—	—	—	—	—	1,454	0.24	0.03	1,468
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	983	0.16	0.02	993
Manufacturing	—	—	—	—	—	—	—	—	377	0.06	0.01	381

Regional Shopping Center	—	—	—	—	—	—	—	—	34.2	0.01	< 0.005	34.5
Parking Lot	—	—	—	—	—	—	—	—	59.5	0.01	< 0.005	60.1
Total	—	—	—	—	—	—	—	—	1,454	0.24	0.03	1,468
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	163	0.03	< 0.005	164
Manufacturing	—	—	—	—	—	—	—	—	62.4	0.01	< 0.005	63.0
Regional Shopping Center	—	—	—	—	—	—	—	—	5.66	< 0.005	< 0.005	5.72
Parking Lot	—	—	—	—	—	—	—	—	9.85	< 0.005	< 0.005	9.95
Total	—	—	—	—	—	—	—	—	241	0.04	< 0.005	243

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	983	0.16	0.02	993
Manufacturing	—	—	—	—	—	—	—	—	377	0.06	0.01	381
Regional Shopping Center	—	—	—	—	—	—	—	—	34.2	0.01	< 0.005	34.5
Parking Lot	—	—	—	—	—	—	—	—	59.5	0.01	< 0.005	60.1
Total	—	—	—	—	—	—	—	—	1,454	0.24	0.03	1,468

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	983	0.16	0.02	993
Manufacturing	—	—	—	—	—	—	—	—	377	0.06	0.01	381
Regional Shopping Center	—	—	—	—	—	—	—	—	34.2	0.01	< 0.005	34.5
Parking Lot	—	—	—	—	—	—	—	—	59.5	0.01	< 0.005	60.1
Total	—	—	—	—	—	—	—	—	1,454	0.24	0.03	1,468
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	163	0.03	< 0.005	164
Manufacturing	—	—	—	—	—	—	—	—	62.4	0.01	< 0.005	63.0
Regional Shopping Center	—	—	—	—	—	—	—	—	5.66	< 0.005	< 0.005	5.72
Parking Lot	—	—	—	—	—	—	—	—	9.85	< 0.005	< 0.005	9.95
Total	—	—	—	—	—	—	—	—	241	0.04	< 0.005	243

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	0.01	0.27	0.02	—	0.02	0.02	—	0.02	316	0.03	< 0.005	317
Manufacturing	0.04	0.76	0.06	—	0.06	0.06	—	0.06	904	0.08	< 0.005	907

Regional Shopping Center	< 0.005	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	14.1	< 0.005	< 0.005	14.2
Parking Lot	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.06	1.03	0.08	—	0.08	0.08	—	0.08	1,235	0.11	< 0.005	1,238
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	0.01	0.27	0.02	—	0.02	0.02	—	0.02	316	0.03	< 0.005	317
Manufacturing	0.04	0.76	0.06	—	0.06	0.06	—	0.06	904	0.08	< 0.005	907
Regional Shopping Center	< 0.005	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	14.1	< 0.005	< 0.005	14.2
Parking Lot	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.06	1.03	0.08	—	0.08	0.08	—	0.08	1,235	0.11	< 0.005	1,238
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	< 0.005	0.05	< 0.005	—	< 0.005	< 0.005	—	< 0.005	52.4	< 0.005	< 0.005	52.5
Manufacturing	0.01	0.14	0.01	—	0.01	0.01	—	0.01	150	0.01	< 0.005	150
Regional Shopping Center	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	2.34	< 0.005	< 0.005	2.35
Parking Lot	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.19	0.01	—	0.01	0.01	—	0.01	204	0.02	< 0.005	205

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	0.01	0.27	0.02	—	0.02	0.02	—	0.02	316	0.03	< 0.005	317
Manufacturing	0.04	0.76	0.06	—	0.06	0.06	—	0.06	904	0.08	< 0.005	907
Regional Shopping Center	< 0.005	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	14.1	< 0.005	< 0.005	14.2
Parking Lot	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.06	1.03	0.08	—	0.08	0.08	—	0.08	1,235	0.11	< 0.005	1,238
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	0.01	0.27	0.02	—	0.02	0.02	—	0.02	316	0.03	< 0.005	317
Manufacturing	0.04	0.76	0.06	—	0.06	0.06	—	0.06	904	0.08	< 0.005	907
Regional Shopping Center	< 0.005	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	14.1	< 0.005	< 0.005	14.2
Parking Lot	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.06	1.03	0.08	—	0.08	0.08	—	0.08	1,235	0.11	< 0.005	1,238
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	< 0.005	0.05	< 0.005	—	< 0.005	< 0.005	—	< 0.005	52.4	< 0.005	< 0.005	52.5
Manufacturing	0.01	0.14	0.01	—	0.01	0.01	—	0.01	150	0.01	< 0.005	150
Regional Shopping Center	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	2.34	< 0.005	< 0.005	2.35
Parking Lot	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.19	0.01	—	0.01	0.01	—	0.01	204	0.02	< 0.005	205

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	5.15	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.54	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.72	0.09	0.01	—	0.01	0.02	—	0.02	43.0	< 0.005	< 0.005	43.1
Total	8.41	0.09	0.01	—	0.01	0.02	—	0.02	43.0	< 0.005	< 0.005	43.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	5.15	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.54	—	—	—	—	—	—	—	—	—	—	—
Total	6.69	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.94	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.28	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.28	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.43	< 0.005	< 0.005	6.46
Total	1.50	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.43	< 0.005	< 0.005	6.46

4.3.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	5.15	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.54	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.72	0.09	0.01	—	0.01	0.02	—	0.02	43.0	< 0.005	< 0.005	43.1
Total	8.41	0.09	0.01	—	0.01	0.02	—	0.02	43.0	< 0.005	< 0.005	43.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	5.15	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.54	—	—	—	—	—	—	—	—	—	—	—
Total	6.69	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.94	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.28	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.28	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.43	< 0.005	< 0.005	6.46
Total	1.50	0.01	< 0.005	—	< 0.005	< 0.005	—	< 0.005	6.43	< 0.005	< 0.005	6.46

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	190	7.56	0.18	433
Manufacturing	—	—	—	—	—	—	—	—	75.4	3.01	0.07	172
Regional Shopping Center	—	—	—	—	—	—	—	—	2.56	0.10	< 0.005	5.85
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	190	7.56	0.18	433
Manufacturing	—	—	—	—	—	—	—	—	75.4	3.01	0.07	172
Regional Shopping Center	—	—	—	—	—	—	—	—	2.56	0.10	< 0.005	5.85
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	31.4	1.25	0.03	71.6
Manufacturing	—	—	—	—	—	—	—	—	12.5	0.50	0.01	28.5

Regional Shopping Center	—	—	—	—	—	—	—	—	0.42	0.02	< 0.005	0.97
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	44.3	1.77	0.04	101

4.4.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	190	7.56	0.18	433
Manufacturing	—	—	—	—	—	—	—	—	75.4	3.01	0.07	172
Regional Shopping Center	—	—	—	—	—	—	—	—	2.56	0.10	< 0.005	5.85
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	268	10.7	0.26	611
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	190	7.56	0.18	433
Manufacturing	—	—	—	—	—	—	—	—	75.4	3.01	0.07	172
Regional Shopping Center	—	—	—	—	—	—	—	—	2.56	0.10	< 0.005	5.85
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	268	10.7	0.26	611

Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	31.4	1.25	0.03	71.6
Manufacturing	—	—	—	—	—	—	—	—	12.5	0.50	0.01	28.5
Regional Shopping Center	—	—	—	—	—	—	—	—	0.42	0.02	< 0.005	0.97
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	44.3	1.77	0.04	101

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	84.1	8.41	0.00	294
Manufacturing	—	—	—	—	—	—	—	—	44.1	4.41	0.00	154
Regional Shopping Center	—	—	—	—	—	—	—	—	3.96	0.40	0.00	13.9
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—

Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	84.1	8.41	0.00	294
Manufacturing	—	—	—	—	—	—	—	—	44.1	4.41	0.00	154
Regional Shopping Center	—	—	—	—	—	—	—	—	3.96	0.40	0.00	13.9
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	13.9	1.39	0.00	48.7
Manufacturing	—	—	—	—	—	—	—	—	7.30	0.73	0.00	25.5
Regional Shopping Center	—	—	—	—	—	—	—	—	0.66	0.07	0.00	2.29
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	21.9	2.19	0.00	76.6

4.5.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	84.1	8.41	0.00	294
Manufacturing	—	—	—	—	—	—	—	—	44.1	4.41	0.00	154

Regional Shopping Center	—	—	—	—	—	—	—	—	3.96	0.40	0.00	13.9
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	84.1	8.41	0.00	294
Manufacturing	—	—	—	—	—	—	—	—	44.1	4.41	0.00	154
Regional Shopping Center	—	—	—	—	—	—	—	—	3.96	0.40	0.00	13.9
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	132	13.2	0.00	462
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	13.9	1.39	0.00	48.7
Manufacturing	—	—	—	—	—	—	—	—	7.30	0.73	0.00	25.5
Regional Shopping Center	—	—	—	—	—	—	—	—	0.66	0.07	0.00	2.29
Parking Lot	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	21.9	2.19	0.00	76.6

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	—	—	—	4,426
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	17.4
Regional Shopping Center	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	4,444
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	—	—	—	4,426
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	17.4
Regional Shopping Center	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	4,444
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	—	—	—	733
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	2.88
Regional Shopping Center	—	—	—	—	—	—	—	—	—	—	—	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	736

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	—	—	—	4,426
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	17.4
Regional Shopping Center	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	4,444
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	—	—	—	4,426
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	17.4
Regional Shopping Center	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	4,444
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Unrefrigerated Warehouse-No Rail	—	—	—	—	—	—	—	—	—	—	—	733
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	2.88
Regional Shopping Center	—	—	—	—	—	—	—	—	—	—	—	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	736

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	8/1/2023	8/29/2023	5.00	20.0	—
Site Preparation	Site Preparation	8/30/2023	9/13/2023	5.00	10.0	—
Grading	Grading	9/14/2023	10/12/2023	5.00	20.0	—
Building 1-4	Building Construction	10/13/2023	12/8/2024	5.00	301	—
Building 5	Building Construction	1/6/2025	1/9/2026	5.00	265	—
Paving	Paving	1/12/2026	1/30/2026	5.00	15.0	—
Architectural Coating	Architectural Coating	9/1/2025	2/20/2026	5.00	125	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Tier 2	1.00	8.00	33.0	0.73
Demolition	Rubber Tired Dozers	Diesel	Tier 2	2.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 2	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Tier 2	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 2	3.00	8.00	84.0	0.37
Building 1-4	Cranes	Diesel	Tier 2	1.00	7.00	367	0.29
Building 1-4	Forklifts	Diesel	Tier 2	3.00	8.00	82.0	0.20

Building 1-4	Tractors/Loaders/Backhoes	Diesel	Tier 2	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Tier 2	2.00	8.00	81.0	0.42
Paving	Rollers	Diesel	Tier 2	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Tier 2	1.00	6.00	37.0	0.48
Demolition	Excavators	Diesel	Tier 2	3.00	8.00	36.0	0.38
Site Preparation	Rubber Tired Dozers	Diesel	Tier 2	3.00	8.00	367	0.40
Grading	Excavators	Diesel	Tier 2	1.00	8.00	36.0	0.38
Building 1-4	Generator Sets	Diesel	Tier 2	1.00	8.00	14.0	0.74
Building 1-4	Welders	Diesel	Tier 2	1.00	8.00	46.0	0.45
Paving	Paving Equipment	Diesel	Tier 2	2.00	8.00	89.0	0.36
Building 5	Forklifts	Diesel	Tier 2	3.00	8.00	82.0	0.20
Building 5	Generator Sets	Diesel	Tier 2	1.00	8.00	14.0	0.74
Building 5	Cranes	Diesel	Tier 2	1.00	7.00	367	0.29
Building 5	Welders	Diesel	Tier 2	1.00	8.00	46.0	0.45
Building 5	Tractors/Loaders/Backhoes	Diesel	Tier 2	3.00	7.00	84.0	0.37

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Tier 2	1.00	8.00	33.0	0.73
Demolition	Rubber Tired Dozers	Diesel	Tier 2	2.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 2	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Tier 2	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 2	3.00	8.00	84.0	0.37

Building 1-4	Cranes	Diesel	Tier 2	1.00	7.00	367	0.29
Building 1-4	Forklifts	Diesel	Tier 2	3.00	8.00	82.0	0.20
Building 1-4	Tractors/Loaders/Backhoes	Diesel	Tier 2	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Tier 2	2.00	8.00	81.0	0.42
Paving	Rollers	Diesel	Tier 2	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Tier 2	1.00	6.00	37.0	0.48
Demolition	Excavators	Diesel	Tier 2	3.00	8.00	36.0	0.38
Site Preparation	Rubber Tired Dozers	Diesel	Tier 2	3.00	8.00	367	0.40
Grading	Excavators	Diesel	Tier 2	1.00	8.00	36.0	0.38
Building 1-4	Generator Sets	Diesel	Tier 2	1.00	8.00	14.0	0.74
Building 1-4	Welders	Diesel	Tier 2	1.00	8.00	46.0	0.45
Paving	Paving Equipment	Diesel	Tier 2	2.00	8.00	89.0	0.36
Building 5	Forklifts	Diesel	Tier 2	3.00	8.00	82.0	0.20
Building 5	Generator Sets	Diesel	Tier 2	1.00	8.00	14.0	0.74
Building 5	Cranes	Diesel	Tier 2	1.00	7.00	367	0.29
Building 5	Welders	Diesel	Tier 2	1.00	8.00	46.0	0.45
Building 5	Tractors/Loaders/Backhoes	Diesel	Tier 2	3.00	7.00	84.0	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	8.10	LDA,LDT1,LDT2
Demolition	Vendor	—	6.90	HHDT,MHDT
Demolition	Hauling	0.60	20.0	HHDT

Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	8.10	LDA,LDT1,LDT2
Site Preparation	Vendor	—	6.90	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	15.0	8.10	LDA,LDT1,LDT2
Grading	Vendor	—	6.90	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building 1-4	—	—	—	—
Building 1-4	Worker	100	8.10	LDA,LDT1,LDT2
Building 1-4	Vendor	39.4	6.90	HHDT,MHDT
Building 1-4	Hauling	0.00	20.0	HHDT
Building 1-4	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	8.10	LDA,LDT1,LDT2
Paving	Vendor	—	6.90	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	40.1	8.10	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	6.90	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT
Building 5	—	—	—	—

Building 5	Worker	100	8.10	LDA,LDT1,LDT2
Building 5	Vendor	39.4	6.90	HHDT,MHDT
Building 5	Hauling	0.00	20.0	HHDT
Building 5	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	8.10	LDA,LDT1,LDT2
Demolition	Vendor	—	6.90	HHDT,MHDT
Demolition	Hauling	0.60	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	8.10	LDA,LDT1,LDT2
Site Preparation	Vendor	—	6.90	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	15.0	8.10	LDA,LDT1,LDT2
Grading	Vendor	—	6.90	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building 1-4	—	—	—	—
Building 1-4	Worker	100	8.10	LDA,LDT1,LDT2
Building 1-4	Vendor	39.4	6.90	HHDT,MHDT
Building 1-4	Hauling	0.00	20.0	HHDT
Building 1-4	Onsite truck	—	—	HHDT

Paving	—	—	—	—
Paving	Worker	15.0	8.10	LDA,LDT1,LDT2
Paving	Vendor	—	6.90	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	40.1	8.10	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	6.90	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT
Building 5	—	—	—	—
Building 5	Worker	100	8.10	LDA,LDT1,LDT2
Building 5	Vendor	39.4	6.90	HHDT,MHDT
Building 5	Hauling	0.00	20.0	HHDT
Building 5	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	360,491	120,164	7,292

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	960	—
Site Preparation	0.00	0.00	15.0	0.00	—
Grading	0.00	0.00	20.0	0.00	—
Paving	0.00	0.00	0.00	0.00	2.79

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Unrefrigerated Warehouse-No Rail	0.00	0%
Manufacturing	0.00	0%
Regional Shopping Center	0.00	0%
Parking Lot	2.79	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2023	0.00	204	0.03	< 0.005
2024	0.00	204	0.03	< 0.005
2025	0.00	204	0.03	< 0.005
2026	0.00	204	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Unrefrigerated Warehouse-No Rail	301	301	301	109,971	1,020	1,020	1,020	372,211
Manufacturing	491	491	491	179,230	1,662	1,662	1,662	606,626
Regional Shopping Center	402	402	402	146,912	756	843	843	285,104
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Unrefrigerated Warehouse-No Rail	301	301	301	109,971	1,020	1,020	1,020	372,211
Manufacturing	491	491	491	179,230	1,662	1,662	1,662	606,626
Regional Shopping Center	402	402	402	146,912	756	843	843	285,104
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

0	0.00	360,491	120,164	7,292

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	330

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	330

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Unrefrigerated Warehouse-No Rail	1,759,825	204	0.0330	0.0040	987,051
Manufacturing	674,280	204	0.0330	0.0040	2,820,772
Regional Shopping Center	61,185	204	0.0330	0.0040	44,152
Parking Lot	106,462	204	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)

Unrefrigerated Warehouse-No Rail	1,759,825	204	0.0330	0.0040	987,051
Manufacturing	674,280	204	0.0330	0.0040	2,820,772
Regional Shopping Center	61,185	204	0.0330	0.0040	44,152
Parking Lot	106,462	204	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Unrefrigerated Warehouse-No Rail	38,387,500	0.00
Manufacturing	15,262,500	0.00
Regional Shopping Center	518,508	0.00
Parking Lot	0.00	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Unrefrigerated Warehouse-No Rail	38,387,500	0.00
Manufacturing	15,262,500	0.00
Regional Shopping Center	518,508	0.00
Parking Lot	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Unrefrigerated Warehouse-No Rail	156	0.00

Manufacturing	81.8	0.00
Regional Shopping Center	7.35	0.00
Parking Lot	0.00	0.00

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Unrefrigerated Warehouse-No Rail	156	0.00
Manufacturing	81.8	0.00
Regional Shopping Center	7.35	0.00
Parking Lot	0.00	0.00

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Unrefrigerated Warehouse-No Rail	Cold storage	R-404A	3,922	7.50	7.50	7.50	25.0
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0
Regional Shopping Center	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Regional Shopping Center	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Unrefrigerated Warehouse-No Rail	Cold storage	R-404A	3,922	7.50	7.50	7.50	25.0

Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0
Regional Shopping Center	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Regional Shopping Center	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

8. User Changes to Default Data

Screen	Justification
Land Use	The proposed project would include 5 buildings consisting of a warehouse, commercial, storage, manufacturing, and winemaking uses. To be consistent with the Transportation analyses, the following land uses were used to best represent the 5 buildings.
Construction: Construction Phases	Construction of buildings 1-4 would begin in August 2023 and occur for 12-16 months. Construction of building 5 would begin in January 2025 and occur for 12-16 months. Assuming overlap of building construction and Architectural Coating
Construction: Off-Road Equipment	Default construction equipment with Tier 2 engines
Operations: Vehicle Data	Based on project trip generation, approximately 301 ADT for warehouse, 491 ADT for manufacturing, and 402 ADT for retail.

Preliminary Stormwater Control Plan

For

Ardmore Industrial

Ardmore Road, Paso Robles, California

February 2023

Damien Mavis, Covelop
PO Box 12910
San Luis Obispo, CA 93406

Prepared by:

Tom Zehnder, PE C72702
Principal, Wallace Group

DRAFT – FOR REVIEW ONLY



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- Site Infiltration data and Porchet Method conversion calculations
- Pages from City of Paso Robles public work standards
- Time of Concentration - County of San Luis Obispo Public Improvement Standards
- Rainfall data – NOAA Atlas 14, Volume 6, Version 2 excerpt (for Paso Robles, CA)

Appendix C – Preliminary Drainage Design Calculations
- Existing and Proposed Hydrologic Calculations
- Existing and Proposed Land Use Data
- Time of Concentration Calculations
- HydroCAD Drainage Results – Proposed Site
    - 95th Percentile, 2-Year, and 10-Year Design Storms

I. Project Data

Table 1: Project Data

Project Name/Number	Ardmore Industrial
Application Submittal Date	TBD
Project Location	Ardmore Road, Paso Robles, CA 93446
Project Phase No.	Preliminary Planning and Design Phase
Project Type and Description	Six commercial buildings, associated parking areas, interior courtyards, and a new city-maintained road segment.
Total Project Site Area (acres)	14.06 acres
Total New Impervious Surface Area	11.45 acres
Total Replaced Impervious Surface Area	0.00 acres
Total Pre-Project Impervious Surface Area	0.07 acres
Total Post-Project Impervious Surface Area	11.52 acres
Net Impervious Area	11.45 acres
Watershed Management Zone(s)	WMZ 1
Design Storm Frequency and Depth	95th = 1.45 inches 2-year = 2.14 inches 10-year = 3.74 inches

II. Setting

a. Project Location and Description

The Ardmore project is a planned commercial development to be located in the City of Paso Robles, off of Ardmore Road just south of Union Road. The existing property is 14.06 acres of primarily undeveloped rural grassland with two agricultural structures. The southern portion of the site slopes gently to the west while the northern portion of the site gently slopes to the northeast corner. The current site plan design includes six commercial buildings, associated parking areas, interior courtyards and a new city-maintained road segment extending from Ardmore Road through the project to the eastern boundary of the site. Proposed storm drain facilities for this project include five separate storm drain pipe networks, three underground infiltration and detention chambers, and one surface infiltration and detention basin.

As a project located within the city limits of Paso Robles, this report is intended to support issuance of entitlement by the City of Paso Robles. A project map is shown below in **Figure 1** and the Offsite Properties Exhibit is shown in **Figure 2**, for reference.



Figure 1: Project Location Map

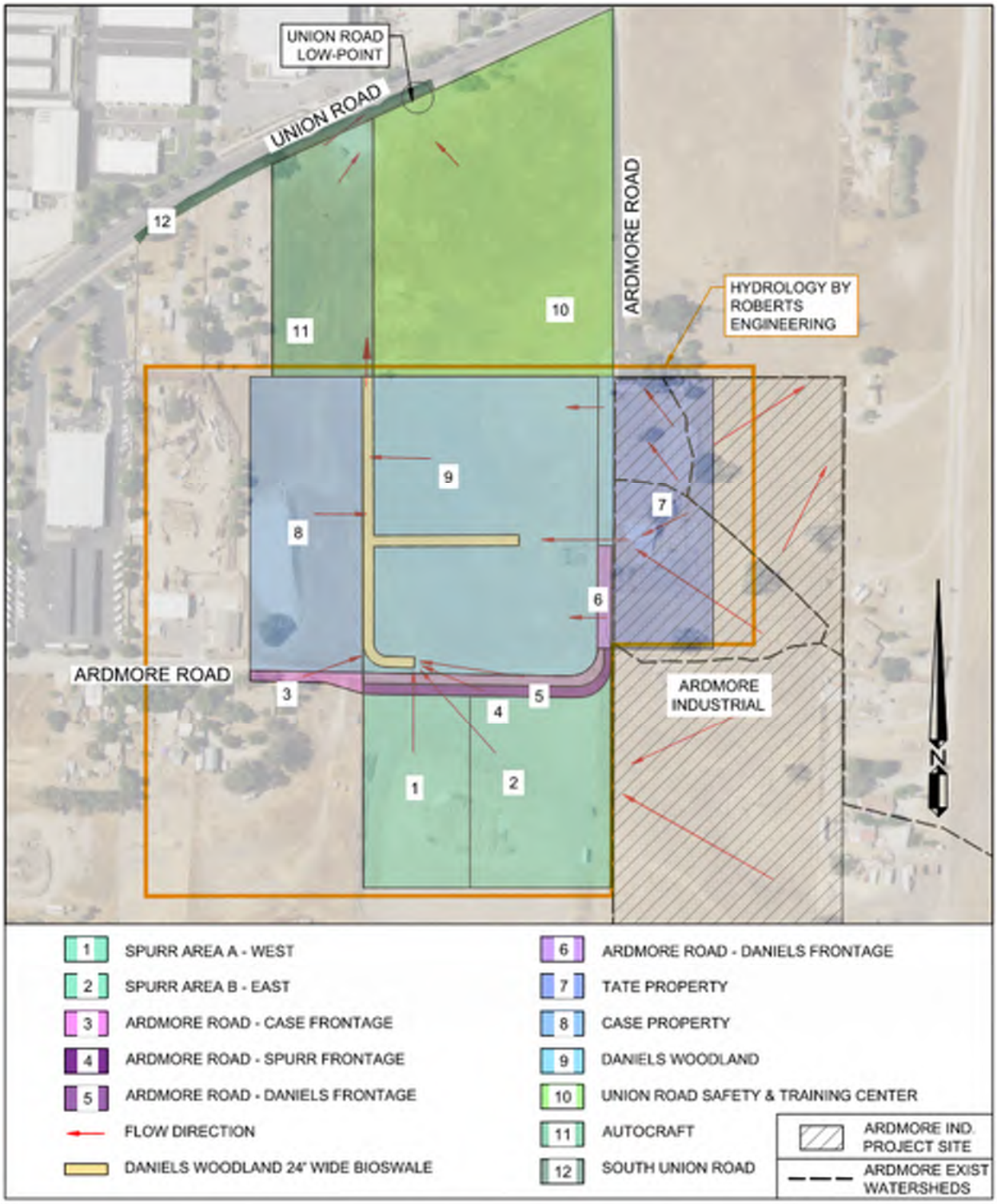


Figure 2: Offsite Properties Exhibit - Ardmore Industrial

b. Existing Site Features and Conditions

Land Use and Drainage

The Ardmore project site is part of an existing 106-acre watershed that drains north towards Union Road where it is collected by the City of Paso Robles' storm drain system. This project is located at the upstream end of this greater existing watershed encompassing approximately 69 acres of the project drainage area. The northwest corner of the site, which is about 3.27 acres of the project area, drains offsite to the northeast towards Union Road and Huer Huero Creek.

The project drainage area consists of four existing major watersheds that each drain to different discharge locations (See **Appendix A** for the Existing Watershed Exhibit). Existing watershed #1 (EX1 offsite) includes approximately 57 acres of undeveloped, rural grassland that flows onto the site. Existing watershed #1 (EX1 onsite) includes 7.20 acres of undeveloped onsite area. Stormwater from this drainage area flows through shallow, natural drainage paths to two existing 24" storm drain pipe inlets along the west project boundary located on the adjacent Spurr property (Outlet A). Existing Watershed #2 (EX2) drains to an existing culvert inlet, conveying it beneath Ardmore Road to the adjacent Daniels Woodlands property (Outlet B). Existing Watershed #3 (EX3) consists of the northeast corner of the site with stormwater flowing offsite through shallow, natural drainage paths towards Union Road and Huer Huero Creek (Outlet D). Existing Watershed #4 (EX4) is the smallest existing project watershed. Stormwater from this area flows northwest towards Ardmore Road where it is collected in a natural roadside swale and conveyed north towards Union Road (Onsite Runoff (C)).

Soil Characteristics

A geotechnical engineering soils report for Ardmore Industrial has been prepared by Beacon Geotechnical, Inc (dated October 12, 2022).

Based on this geotechnical report, soils across the site are comprised of mostly very silty clayey sands overlain by layers of multiple silty clayey sands with gravel. Soil expansion capabilities were determined to be low, and groundwater was not encountered in any of the site borings to a depth of 20 feet. Twelve different infiltration borings and tests were completed across the site with infiltration rates recorded range from 1.50 in/hr. to 5.00 in/hr. and are directly applicable to the design of infiltration trenches and similar deep facilities. For shallow facilities with more bottom area than sidewall area, the Porchet conversion is applied to the test data to determine the applicable infiltration rate. Using the Porchet conversion method, infiltration rates ranged from 0.07 to 0.70 in/hr.

NRCS web soil data identifies the soils as primarily Hydrologic Soil Group C (mostly clay and loams), which is associated with generally moderate-to-low infiltration rates and is usually due to the existence of clays within the soil complexes.

Refer to the *Preliminary Drainage Design Report for Ardmore Industrial* (dated February 2023) for excerpts of the geotechnical engineering report, NRCS web soil survey, and additional data related to onsite infiltration.

c. Opportunities and Constraints for Stormwater Control

The proposed site plan consists primarily of impervious surfaces which limits space for stormwater facilities. Impervious areas include large commercial buildings, associated parking areas, a new city-maintained road extension of Ardmore Road east through the project site, and frontage improvements along the east side of the existing Ardmore Road.

With limited pervious surface areas and low- to moderate- soil infiltration capabilities, the current site design will utilize surface bioretention swales along roadsides, underground gravel facilities, a vegetated detention and infiltration basin, and ADS StormTech chamber systems beneath paved areas to meet post-construction stormwater requirements (PCRs) and peak flow management requirements.

III. Low Impact Development Design Strategies

a. Optimization of Site Layout

III.A.1. Limitation of development envelope

The project minimizes excessive land disturbance and site improvements given the required project conditions

III.A.2. Preservation of natural drainage features

See Preliminary Drainage Design Report for Ardmore Industrial, prepared by Wallace Group, dated February 16, 2023, for specific details on routing of existing drainage discharge locations

III.A.3. Setbacks from creeks, wetlands, and riparian habitats

This project does not contain or involve any setbacks from creeks, wetlands, and riparian habitats

III.A.4. Minimization of imperviousness

The nature of the development requires significant impervious areas to accommodate six commercial buildings, associated parking areas, a new city-maintained road extension of Ardmore Road east through the project site, and frontage improvements along the east side of the existing Ardmore Road.

III.A.5. Use of drainage as a design element

Drainage facilities and Low Impact Development (LID) elements have been considered during the entire design process

b. Use of Permeable Pavements

Permeable pavements were not considered for this project due to low- to moderate- soil infiltration conditions across site, anticipated vehicle loads, increased costs, and maintenance requirements.

c. Dispersal of Runoff to Pervious Areas

Impervious surfaces with drain first to landscaped areas, when possible. Where designed (within DMA's A, B1, B2 and C), roads and driveways will be designed to drain into strategically placed LID facilities (vegetated roadside bioswales). The northeastern drainage management area (DMA D) will drain to a vegetated detention basin that will have bioretention and infiltration capabilities. Proposed ADS StormTech chamber systems beneath paved areas will provide retention and infiltration capabilities in DMA A, DMA B1 and DMA B2.

d. Stormwater Control Measures (SCMs)

Several different SCMs have been designed for implementation across the site, depending on proposed surface drainage conditions and subsurface retention requirements. Surface bioretention swales along roadsides, underground gravel facilities, a vegetated detention and infiltration basin, and ADS StormTech chamber systems beneath paved areas will all be utilized.

IV. Documentation of Drainage Design

a. Applicable Stormwater Performance Requirements (PR)

The following list outlines the PRs that apply to this project:

- PR #1 Site Design and Runoff Reduction
- PR #2 Water Quality Treatment
- PR #3 Runoff Retention
- PR #4 Peak Management

Performance requirements that do not apply to the project are:

- PR #5 Special Circumstances

b. Drainage Management Areas (DMA)

The DMA numbers in the following tables correspond with the DMA numbers of the "Proposed Drainage Management Areas" exhibit. A summary of each DMA is provided below.

Table 2: Table of Drainage Management Areas

DMA ID	Surface Type & Description	Area (sf)	Drains to	SCM Type	Outlet Location	SCM Area (sf)
A1	Pervious	37,042	SCM 1	StormTech Chambers (detention & infiltration)	Outlet A	13,196
	Impervious	227,546				
A2	Pervious	6,844	SCM 2	Roadside Bioretention Swales		3,565
	Impervious	42,041				
B1a	Pervious	15,178	SCM 3	StormTech Chambers (detention & infiltration)	Outlet B	6,753
	Impervious	44,042				
B1b	Pervious	1,256	SCM 4	Roadside Bioretention Swales		1,256
	Impervious	9,109				
B2a	Pervious	4,163	SCM 5	StormTech Chambers (detention & infiltration)	Outlet B	4,045
	Impervious	48,124				
C1	Pervious	2,633	SCM 6	Roadside Bioretention Swales	Onsite Runoff (C)	1,256
	Impervious	7,087				
C2	Pervious	-	--	Onsite run-off to the north, following historic patterns		---
	Impervious	2,221				
D1	Pervious	43,517	SCM 7	Vegeated Basin with Bioretention	Outlet D	4,775
	Impervious	121,559				

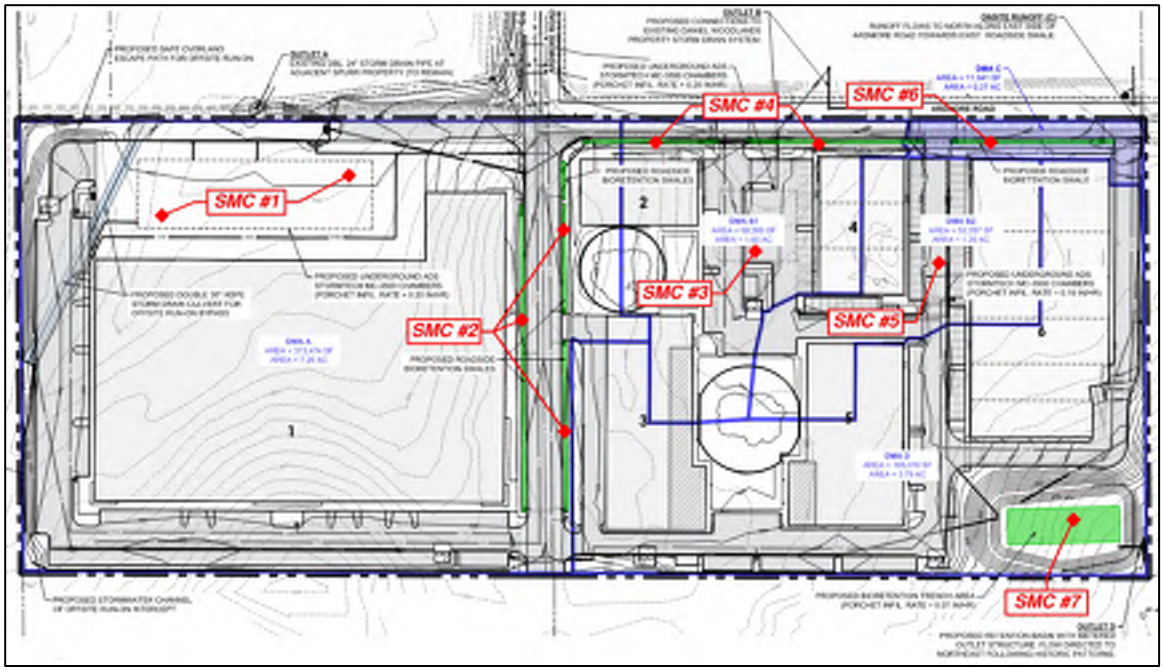


Figure 3: Proposed Drainage Management Areas Exhibit

c. Hydrologic Analysis

The hydrograph method was used to calculate the runoff for each DMA and to size the SCM's, using the HyrdoCAD software. The following criteria was used in the hydraulic stormwater model:

95th percentile design storm:	1.45 inches
Hydrograph Analysis Method:	Santa Barbara Unit Hydrograph, SBUH
Pond Routing Method:	Dynamic-storage-indication
Infiltration Rate (in/hr):	On-site infiltration tests and Porchet Method conversions
Rainfall Distribution:	NRCS Type I, NOAA Atlas 14, Vol. 6, Version 2
Time of Concentration	Minimum of 6 minutes
Time Increment	0.01 hrs.

d. Summary of Calculations

PR #1 Site Design and Runoff Reduction –

As outlined in Section III, stormwater management has been incorporated into the design of the project. Low impact development strategies such as bioretention swales, underground detention and retention chambers, and a vegetated detention and infiltration basin have been implemented to meet this requirement.

PR #2 Water Quality Treatment –

Retention of the 95th percentile storm event (PR #3) meets the treatment objectives of this requirement (see **Table 3**). Several different LID and SCM treatment systems across the

site are proposed, complying with the PCR #2 requirement to reduce pollutant loads and concentrations in captured runoff using physical and biological removal.

PR #3 Runoff Retention –

Retention of the 95th percentile storm event from impervious surfaces is achieved through the combined performance of surface bioretention swales, underground gravel facilities, a vegetated detention and infiltration basin, and underground ADS StormTech chamber systems (see **Table 3**).

Table 3: Runoff Retention Summary

DMA ID	DMA 95th Runoff Volume (cf)	Drains to	SCM Available Retention Volume (cf)
A1	16,945	SCM 1	45,302
A2	3,136	SCM 2	5,348
B1a	3,267	SCM 3	23,000
B1b	697	SCM 4	1,884
B2a	3,572	SCM 5	13,721
C1	523	SCM 6	1,884
C2	174	--	Onsite Runoff. Over-detention in DMA C1
D1	9,060	SCM 7	35,708

PR #4 Peak Management –

The proposed project will increase the impervious area on the property by more than 22,500 SF. To satisfy PCR #4, detention facilities will be strategically implemented to manage post-developed peak flows for 2- through 100-year storm events before discharge from the project site to historic outlet locations. It is expected that the combined performance of these proposed detention facilities across the project will decrease stormwater runoff from the site compared to pre-development drainage conditions (see **Table 4**).

Further information on Peak Flow Management can be reviewed in the *Preliminary Drainage Design Report for Ardmore Industrial,* prepared by Wallace Group, dated February 2023.

Table 4: Peak Flow Management Summary

Outlet Location	DMAs	Design Storm	Total Pre-Developed Peak Flow (cfs)	Total Post-Developed Peak Flow (cfs)
Outlet A	A1, A2	2 YR	1.24	0.48
		10 YR	6.44	4.58
Outlet B	B1a, B1b, B2a	2 YR	1.02	0.04
		10 YR	2.11	0.59
Onsite Runoff C	C1, C2	2 YR	0.15	0.07
		10 YR	0.74	0.12
Outlet D	D1	2 YR	0.56	-
		10 YR	2.94	0.54

Table 5 lists each project outlet location for Ardmore industrial, for reference. For more information on the project outlet locations and drainage conditions, refer to the *Preliminary Drainage Design Report for Ardmore Industrial,* prepared by Wallace Group, dated February 2023.

Table 5: Ardmore Industrial Outlets Summary

Outlet Location	Description and Notes
Outlet A	Existing double 24" storm drain pipes on adjacent Spurr property.
Outlet B	Existing Ardmore Road 12" storm drain culvert connection.
Onsite Runoff C	Onsite runoff (sheet flow) to north along Ardmore Road, following historic conditions
Outlet D	Proposed discharge from basin outlet (metered) to northwest, following historic conditions

Source Control Measures

Hydrocarbons, trash, debris from trees/ landscaping, sediment and fertilizers will be the most apparent sources of pollutants on the project site.

Table 6: Source Control Table

	Pollutants Associated with Activity						
Potential Pollutant Source	Sediment/ Litter/ Debris	Nutrients/ Organic Matter	Bacteria	Hydro-carbons	Toxics/ Chemicals/ Paint	Other	Source Control BMP Proposed
Parking Lots, Driveways	X			X			Vehicle Maintenance, Fueling and Storage, street sweeping
Fertilizers, Pesticides	X	X			X		Effective irrigation and planting
Roof runoff		X			X		Bioretention, landscape maintenance for healthy plants.

V. Stormwater Facility Maintenance

a. Ownership and Responsibility for Maintenance in Perpetuity

This project is required to record an Agreement with the City accepting responsibility for inspection, operation, and maintenance of facilities.

This project will utilize an Agreement to meet this requirement, and the responsible parties will be the City of Paso Robles for improvements within the Ardmore Road right-of-way and Covelop for onsite improvements of the Ardmore Industrial project. An Operations and Maintenance Plan and Draft Agreement will be provided after preliminary approvals.

VI. Construction Checklist

The Construction Checklist Table will be provided after preliminary approvals.

Table 7: Construction Checklist Table

STRUCTURAL CONTROL MEASURE SCMs	PLAN SHEET NUMBER	SCM DETAIL NUMBER

VII. Certifications

The preliminary design of stormwater treatment facilities and other stormwater pollution control measures in this plan are in accordance with the Post-Construction Stormwater Management Requirements, Resolution R3-2013-0032, Attachment 1.

Appendices

Appendix A – Supporting Exhibits

- Existing Watersheds and Proposed Drainage Management Areas (DMA) Exhibits
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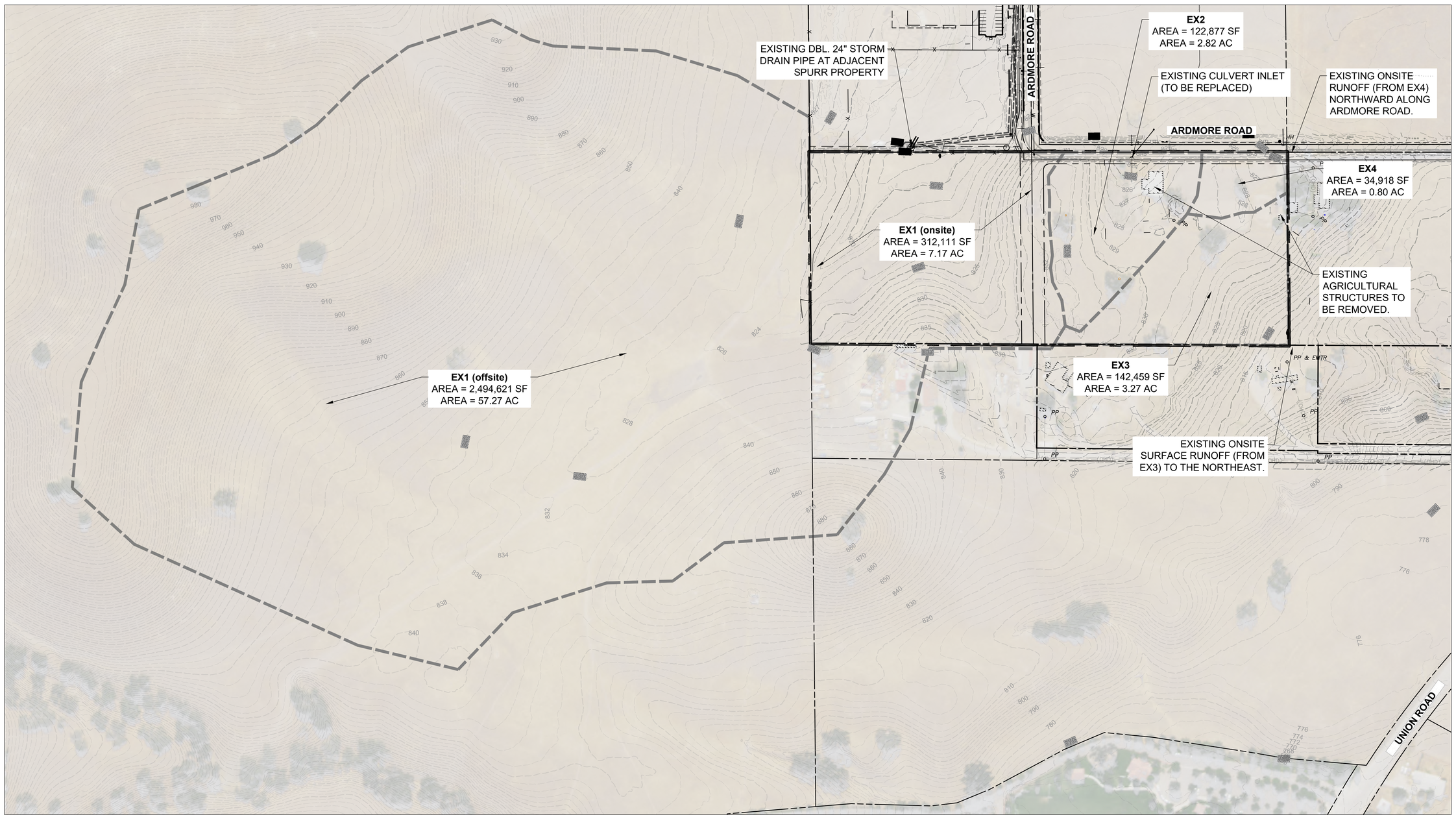
Appendix C – Preliminary Drainage Design Calculations

- HydroCAD Drainage Results – Proposed Site
    - o 95th Percentile, 2-Year, and 10-Year Design Storms

APPENDIX A
Supporting Exhibits

FILE NAME: 2022_ARDMORE_DRAINAGE MANAGEMENT AREAS.DWG

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3



LEGEND:

- **ARDMORE PROJECT BOUNDARY**
- **EXISTING WATERSHED BOUNDARY**

GRAPHIC SCALE
0 60 120 240
(IN FEET)
1 IN = 120 FT

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WATER RESOURCES

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REGISTERED PROFESSIONAL ENGINEER
THOMAS K. ZEPHNDER
No. 72702
FOR PLAN REVIEW ONLY
NOT FOR CONSTRUCTION
CIVIL
STATE OF CALIFORNIA

SIGNATURE

DATE SIGNED

These plans and specifications, and the ideas and designs incorporated herein, are instruments of service prepared for the construction of work shown hereon and shall not be used in whole or in part for any other project without written authority of Wallace Group, a California Corporation.

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COVELOP
ARDMORE PROJECT DEVELOPMENT
EXISTING WATERSHED EXHIBIT

JOB #: 751-005
DESIGNERS: CD/ ZKP
DRAWN BY: ZKP
DATE: 12/06/2022

DRAWING NO.
1
OF 1 SHEET

FILE NAME: 2022_ARDMORE_DRAINAGE MANAGEMENT AREAS.DWG

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES
0 1 2 3
5

PROPOSED SAFE OVERLAND
ESCAPE PATH FOR OFFSITE RUN-ON

OUTLET A
EXISTING DBL. 24" STORM DRAIN PIPE AT
ADJACENT SPURR PROPERTY (TO REMAIN)

ARDMORE ROAD

OUTLET B
PROPOSED CONNECTIONS TO
EXISTING DANIEL WOODLANDS
PROPERTY STORM DRAIN SYSTEM.

ONSITE RUNOFF (C)
RUNOFF FLOWS TO NORTH ALONG EAST SIDE OF
ARDMORE ROAD TOWARDS EXIST. ROADSIDE SWALE.

PROPOSED UNDERGROUND ADS
STORMTECH MC-3500 CHAMBERS
(PORCHET INFIL. RATE = 0.20 IN/HR)

DMA C
AREA = 11,941 SF
AREA = 0.27 AC

SCM #4

SCM #6

ARDMORE ROAD

PROPOSED ROADSIDE
BIORETENTION SWALES

PROPOSED ROADSIDE
BIORETENTION SWALE

SCM #1

DMA B1
AREA = 69,586 SF
AREA = 1.60 AC

DMA B2
AREA = 52,287 SF
AREA = 1.20 AC

SCM #3

PROPOSED UNDERGROUND ADS
STORMTECH MC-3500 CHAMBERS
(PORCHET INFIL. RATE = 0.19 IN/HR)

SCM #5

PROPOSED UNDERGROUND ADS
STORMTECH MC-3500 CHAMBERS
(PORCHET INFIL. RATE = 0.20 IN/HR)

PROPOSED DOUBLE 30" HDPE
STORM DRAIN CULVERT FOR
OFFSITE RUN-ON BYPASS

DMA A
AREA = 313,474 SF
AREA = 7.20 AC

SCM #2

PROPOSED ROADSIDE
BIORETENTION SWALES

DMA D
AREA = 165,076 SF
AREA = 3.79 AC

PROPOSED STORMWATER CHANNEL
OF OFFSITE RUN-ON INTERCEPT

PROPOSED BIORETENTION TRENCH AREA
(PORCHET INFIL. RATE = 0.07 IN/HR)

SCM #7

OUTLET D
PROPOSED RETENTION BASIN WITH METERED
OUTLET STRUCTURE. FLOW DIRECTED TO
NORTHEAST FOLLOWING HISTORIC PATTERNS.

LEGEND:

- **ARDMORE PROJECT BOUNDARY**
- **PROPOSED DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY**
- **PROPOSED DRAINAGE MANAGEMENT AREA (DMA)** *(DRAINS OFFSITE OVER SURFACE)*
- **BIORETENTION WITH UNDERGROUND GRAVEL TRENCH**

GRAPHIC SCALE
0 20 40 80
(IN FEET)
1 IN = 40 FT

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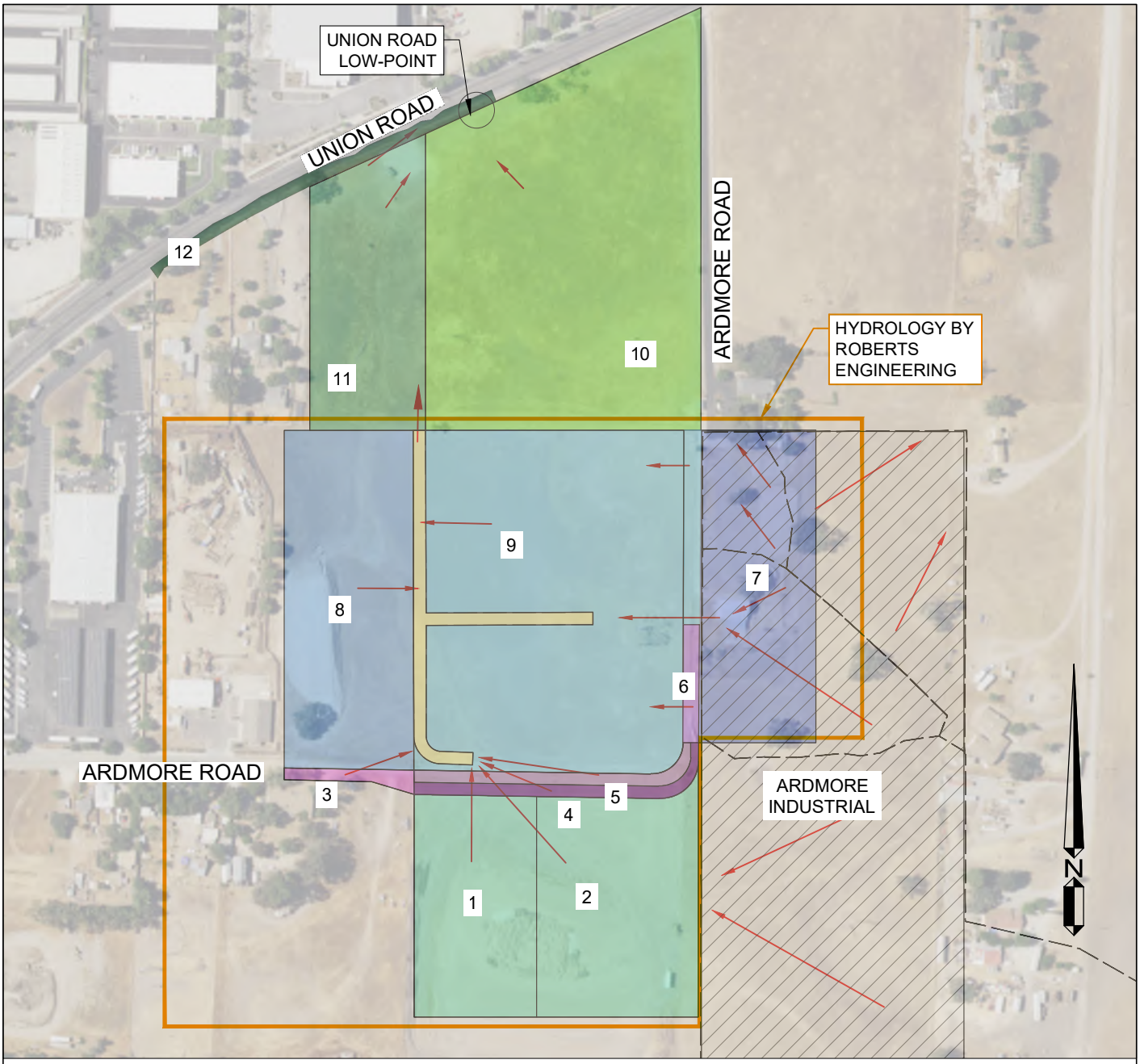
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COVELOP
ARDMORE PROJECT DEVELOPMENT
PROPOSED DRAINAGE MANAGEMENT AREAS

JOB #:	751-005
DESIGNERS:	CD/ ZKP
DRAWN BY:	ZKP
DATE:	2/14/2023

DRAWING NO.
1
OF 1 SHEET



1	SPURR AREA A - WEST	6	ARDMORE ROAD - DANIELS FRONTAGE
2	SPURR AREA B - EAST	7	TATE PROPERTY
3	ARDMORE ROAD - CASE FRONTAGE	8	CASE PROPERTY
4	ARDMORE ROAD - SPURR FRONTAGE	9	DANIELS WOODLAND
5	ARDMORE ROAD - DANIELS FRONTAGE	10	UNION ROAD SAFETY & TRAINING CENTER
	FLOW DIRECTION	11	AUTOCRAFT
	DANIELS WOODLAND 24' WIDE BIOSWALE	12	SOUTH UNION ROAD

ARDMORE IND. PROJECT SITE

ARDMORE EXIST WATERSHEDS

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EXHIBIT
OFFSITE PROPERTIES
ARDMORE PROJECT SITE
PASO ROBLES, CA

JOB No. :	751-005
DRAWING :	OFFSITE PROPS
DRAWN BY:	ZKP
DATE :	DEC 6, 2022
SCALE :	1" = 300'

APPENDIX B
Excerpts from Design Standards and References

Geotechnical Engineering Report

For

Proposed Commercial Buildings and Street Improvements

2930 Union Road Lots 6 and 13

Paso Robles, California

October 12, 2022

F-103116

Prepared For

MD3 Investments

By

Beacon Geotechnical, Inc.
P.O. Box 4814
Paso Robles, California 93447

BEACON
GEOTECHNICAL, INC

October 12, 2022 F-103116

MD3 Investments
P.O. Box 13174
San Luis Obispo, CA 93406

Project: Proposed Commercial Buildings and Street Improvements
2930 Union Roads Lots 6 and 13
Paso Robles, California

Subject: Geotechnical Engineering and Infiltration Report

As authorized, we have performed a Geotechnical Study for the above referenced project. The accompanying Geotechnical Engineering Report presents the results of our subsurface exploration, laboratory-testing program and conclusions and recommendations for geotechnical engineering aspects of project design. Our services were performed using the standard of care ordinarily exercised in this locality at the time this report was prepared.

Based on our study, it is our opinion that the site is suitable for the proposed developments from a geotechnical engineering standpoint provided the recommendations of this report are successfully implemented.

We have appreciated this opportunity to be of service to you on this project. Please call if you have any questions, or if we can be of further service.

Respectfully submitted,
Beacon Geotechnical, Inc.

Greg McKay
Project Manager

Copies: 3-MD3 Investments
1-File



Nicholas A. McClure
Geotechnical Engineer

P.O. Box 4814 • Paso Robles, CA 93447
Phone: (805) 239-9457 • Fax: (805) 237-9098• Email: beacongeotechnical@gmail.com

1. INTRODUCTION

This report presents results of a Geotechnical Engineering Study performed for the proposed commercial buildings and street improvements to be located in Paso Robles, California.

1.1 Description

1.1.1. It should be noted that grading and foundation plans were not provided for the purpose of this report. Prior to any construction, this firm should review the grading and foundation plans to verify or modify the recommendations offered herein. We anticipate that the sites will be developed by cutting and filling to create level building pads.

1.1.2. The proposed structures are assumed to be one (1) or two (2) stories of wood or metal framed construction.

1.1.3. Structural considerations for maximum wall load of 1.75 kips per square foot and maximum point loads of 25.0 kips were used as a basis for the recommendations of this report. If actual loads vary significantly from these assumed loads, Beacon Geotechnical, Inc. should be notified as re-evaluation of the recommendations contained herein may be required.

2 SCOPE OF WORK

2.1 The purpose of the geotechnical investigation that led to this report was to evaluate the soil conditions of the site with respect to the proposed developments. These conditions include surface and subsurface soil types, expansion potential, settlement potential, bearing capacity, and presence or absence of subsurface water. The scope of our work included:

- Reconnaissance of the site.
- Drilling, sampling, and logging of eighteen (18) borings to investigate soils and groundwater conditions.
- Laboratory testing of soil samples obtained from subsurface exploration to determine their physical and engineering properties.
- Geotechnical analysis of the data obtained.
- Consultation with owner representatives and design professionals.
- Preparation of this report.

2.2 Contained in the report are:

- Discussions on local soil and groundwater conditions.
- Results of laboratory and field tests.
- Conclusions and recommendations pertaining to site grading and structural design.

3 SITE SETTING

3.1 The site of the proposed development is located in Paso Robles, California, with the approximate geographical coordinates 35°38'25.55" N and 120°39'05.92" W. See the Vicinity Map in Appendix A.

3.2 The proposed building sites are relatively level to slightly sloping with weeds up to one (1) foot high and a few existing structures to be removed prior to preparation of the new building pads.

4 SITE CONDITIONS

4.1 Soil Conditions

4.1.1 Evaluation of the subsurface indicates that soils are generally light brown very silty clayey sand overlain by light brown silty clayey sand with gravel, brown silty very clayey sand, and brown silty clayey sand with gravel.

4.1.2 Soils encountered at approximate bearing depths should be designed as Site Classification D in accordance with the local building code.

4.1.3 Expansion determination indicates that the bearing soils lie in the "Low" range.

4.2 Groundwater

4.2.1 Groundwater was not encountered to a depth of twenty (20) feet.

4.3 Infiltration Testing

4.3.1 Infiltration testing was done on the site in accordance with the Central Coast Low Impact Development Initiative standard. Twelve (12) infiltration borings were drilled with their locations shown on the Site Map in Appendix A. The borings were presaturated and subsequently tested. The resulting infiltration rates are as follows:

Test No.	Depth (Ft.)	Rate (Inch/Hour)
A	5.0'	2.25
B	5.0'	3.00
C	5.0'	2.00
D	5.0'	1.50
E	5.0'	3.25
F	5.0'	4.00
G	5.0'	2.00
H	5.0'	4.25
I	5.0'	5.00
J	5.0'	2.50
K	5.0'	3.00
L	5.0'	3.25

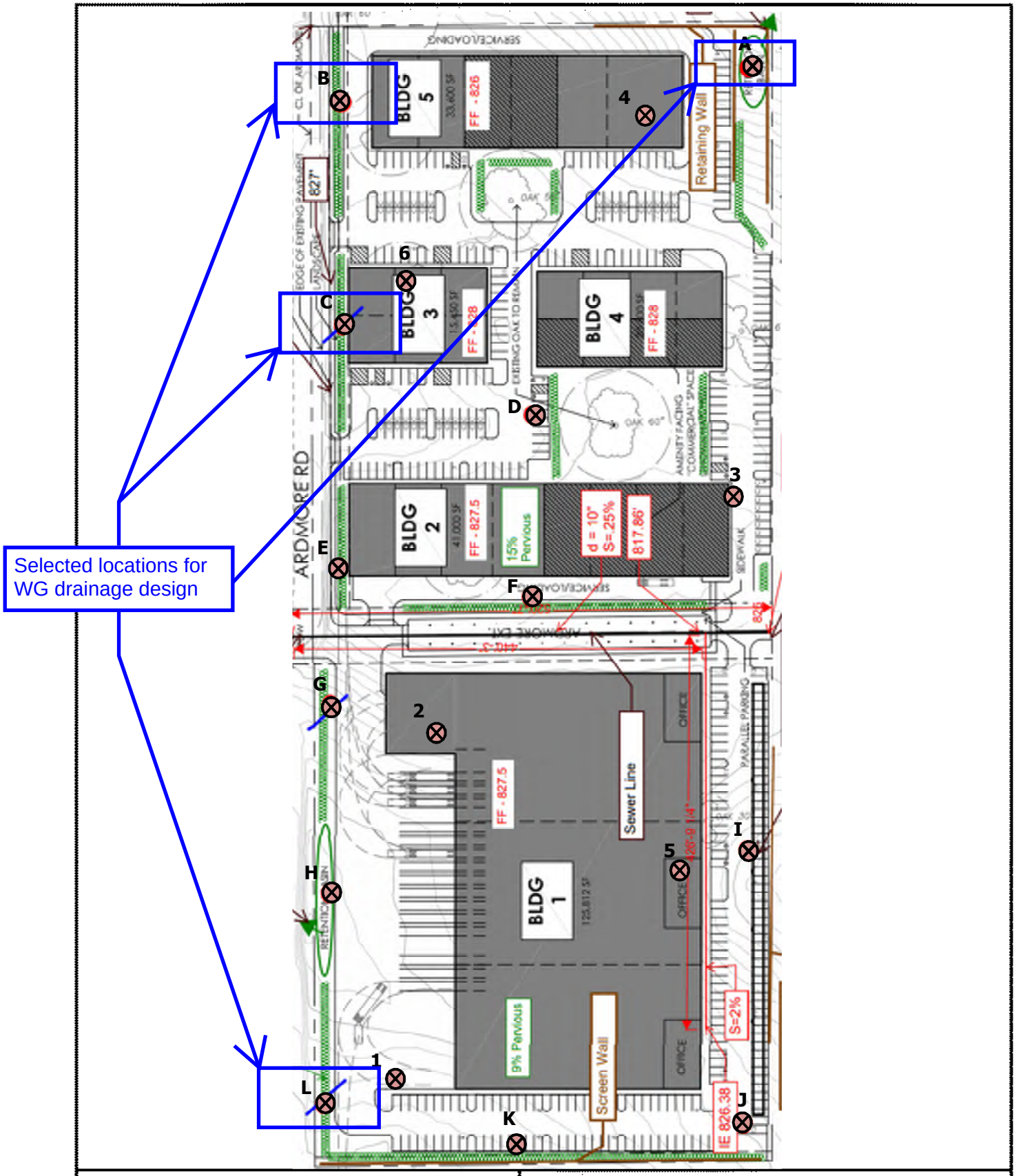
Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 12/05/2022
By: ZKP

Porchet Method Summary - Infiltration Calculations

Geotech Boring ID Referenced*	Proposed DMA Selection for design	Tested Infiltration Rate (in/hr)*	Porchett Infiltration Rate (in/hr) **
A	---	2.25	0.07
B	DMA B2	3.00	0.19
C	DMA B1	2.00	0.10
D	---	1.50	0.08
E	---	3.25	0.13
F	---	4.00	0.36
G	---	2.00	0.13
H	---	4.25	Data Not Included
I	---	5.00	0.70
J	---	2.50	0.10
K	---	3.00	0.17
L	DMA A	3.25	0.20
* See Geotechnical Engineering Report (page 3) by Beacon Geotechnical, dated 10/12/2022			
** See Infiltration Test Field Mesaurements by Beacon Geotechnical, dated 09/28/2022			

Site Map from Geotechnical Engineering Report, by Beacon Geotechnical Inc, dated 10/12/2022



PROJECT #: F-103116	SITE MAP
BEACON GEOTECHNICAL, INC.	

Infiltration Test Field Measurements

2930 Union Road

BORING NO. A

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 61 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	24.25	----	----
30 minutes	26.50	2.25	4.50
30 minutes	29.00	2.50	5.00
30 minutes	31.00	2.00	4.00
30 minutes	32.75	1.75	3.50
30 minutes	34.50	1.75	3.50
30 minutes	35.75	1.25	2.50
30 minutes	36.875	1.125	2.25
30 minutes	38.00	1.125	2.25

Range used for Porchet conversion

Test - Boring No. A

delta H	1.125	inches	First Reading	3.07	ft		User Input
delta T	60	minutes	Last Reading	3.17	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.08	ft		
H start	24.13	inches	Riser Height	0			
H end	23.00	inches					
H ave	23.5625	inches					
I_t	0.07	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r^* = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. B

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 58 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	25.00	----	----
30 minutes	30.25	5.25	10.50
30 minutes	33.00	2.75	5.50
30 minutes	35.00	2.00	4.00
30 minutes	37.50	2.50	5.00
30 minutes	39.50	2.00	4.00
30 minutes	41.00	1.50	3.00
30 minutes	42.75	1.75	3.50
30 minutes	44.25	1.50	3.00

Range used for Porchet conversion

Test - Boring No. B						
delta H	3.25	inches	First Reading	3.42	ft	User Input
delta T	90	minutes	Last Reading	3.69	ft	Calculated Values
effective radius	3	inches	Hole Depth	4.83	ft	
H start	17.00	inches	Riser Height	0		
H end	13.75	inches				
H ave	15.375	inches				
I_t	0.19	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. C

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 60 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	24.50	----	----
30 minutes	27.00	2.50	5.00
30 minutes	28.50	1.50	3.00
30 minutes	30.25	1.75	3.50
30 minutes	31.50	1.25	2.50
30 minutes	32.50	1.00	2.00
30 minutes	33.75	1.25	2.50
30 minutes	35.00	1.25	2.50
30 minutes	36.00	1.00	2.00

Range used for Porchet conversion

Test - Boring No. C						
delta H	3.5	inches	First Reading	2.71	ft	User Input
delta T	120	minutes	Last Reading	3.00	ft	Calculated Values
effective radius	3	inches	Hole Depth	5.00	ft	
H start	27.50	inches	Riser Height	0		
H end	24.00	inches				
H ave	25.75	inches				
I_t	0.10	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. D

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 57 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	26.00	----	----
30 minutes	27.25	1.25	2.50
30 minutes	28.50	1.25	2.50
30 minutes	30.00	1.50	3.00
30 minutes	31.00	1.00	2.00
30 minutes	31.75	0.75	1.50
30 minutes	32.75	1.00	2.00
30 minutes	33.75	1.00	2.00
30 minutes	34.50	0.75	1.50

Range used for Porchet conversion

Test - Boring No. D

delta H	2.75	inches	First Reading	2.65	ft		User Input
delta T	120	minutes	Last Reading	2.88	ft		Calculated Values
effective radius	3	inches	Hole Depth	4.75	ft		
H start	25.25	inches	Riser Height	0			
H end	22.50	inches					
H ave	23.875	inches					
I_t	0.08	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. E

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 59 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	26.75	----	----
30 minutes	29.75	3.00	6.00
30 minutes	32.00	2.25	4.50
30 minutes	34.50	2.50	5.00
30 minutes	36.50	2.00	4.00
30 minutes	38.25	1.75	3.50
30 minutes	40.00	1.75	3.50
30 minutes	41.625	1.625	3.25
30 minutes	43.25	1.625	3.25

Range used for Porchet conversion

Test - Boring No. E

delta H	1.625	inches	First Reading	3.47	ft	User Input
delta T	60	minutes	Last Reading	3.60	ft	Calculated Values
effective radius	3	inches	Hole Depth	4.92	ft	
H start	17.38	inches	Riser Height	0		
H end	15.75	inches				
H ave	16.5625	inches				
I_t	0.13	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. F

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 62 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	33.25	----	----
30 minutes	37.50	4.25	8.50
30 minutes	39.75	2.25	4.50
30 minutes	42.50	2.75	5.50
30 minutes	44.75	2.25	4.50
30 minutes	46.75	2.00	4.00
30 minutes	49.00	2.25	4.50
30 minutes	51.00	2.00	4.00
30 minutes	53.25	2.25	4.50

Range used for Porchet conversion

Test - Boring No. F

delta H	6.5	inches	First Reading	3.90	ft		User Input
delta T	120	minutes	Last Reading	4.44	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.17	ft		
H start	15.25	inches	Riser Height	0			
H end	8.75	inches					
H ave	12	inches					
I_t	0.36	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. G

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 61 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	30.25	----	----
30 minutes	33.00	2.75	5.50
30 minutes	36.00	3.00	6.00
30 minutes	37.50	1.50	3.00
30 minutes	39.00	1.50	3.00
30 minutes	40.00	1.00	2.00
30 minutes	41.25	1.25	2.50
30 minutes	42.50	1.25	2.50
30 minutes	43.50	1.00	2.00

Range used for Porchet conversion

Test - Boring No. G

delta H	3.5	inches	First Reading	3.33	ft		User Input
delta T	120	minutes	Last Reading	3.63	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.08	ft		
H start	21.00	inches	Riser Height	0			
H end	17.50	inches					
H ave	19.25	inches					
I_t	0.13	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. H

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: inches **No Available Data**

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----		----	----
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			

Test - Boring No. H

delta H	0	inches	First Reading	0.00	ft		User Input
delta T	0	minutes	Last Reading	0.00	ft		Calculated Values
effective radius	3	inches	Hole Depth	0.00	ft		
H start	0.00	inches	Riser Height	0			
H end	0.00	inches					
H ave	0	inches					
I_t	#DIV/0!	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. I

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 60 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	32.50	----	----
30 minutes	38.25	5.75	11.50
30 minutes	41.75	3.50	7.00
30 minutes	44.75	3.00	6.00
30 minutes	47.25	2.50	5.00
30 minutes	49.75	2.50	5.00
30 minutes	52.50	2.75	5.50
30 minutes	55.25	2.75	5.50
30 minutes	57.75	2.50	5.00

Range used for Porchet conversion

Test - Boring No. I

delta H	10.5	inches	First Reading	3.94	ft		User Input
delta T	150	minutes	Last Reading	4.81	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.00	ft		
H start	12.75	inches	Riser Height	0			
H end	2.25	inches					
H ave	7.5	inches					
I_t	0.70	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. J

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 62 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	30.75	----	----
30 minutes	32.75	2.00	4.00
30 minutes	34.75	2.00	4.00
30 minutes	37.00	2.25	4.50
30 minutes	38.50	1.50	3.00
30 minutes	40.00	1.50	3.00
30 minutes	42.00	2.00	4.00
30 minutes	43.25	1.25	2.50
30 minutes	44.50	1.25	2.50

Range used for Porchet conversion

Test - Boring No. J

delta H	1.25	inches	First Reading	3.60	ft	User Input
delta T	60	minutes	Last Reading	3.71	ft	Calculated Values
effective radius	3	inches	Hole Depth	5.17	ft	
H start	18.75	inches	Riser Height	0		
H end	17.50	inches				
H ave	18.125	inches				
I_t	0.10	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. K

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 56 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	28.50	----	----
30 minutes	31.25	2.75	5.50
30 minutes	34.25	3.00	6.00
30 minutes	37.25	3.00	6.00
30 minutes	39.25	2.00	4.00
30 minutes	41.50	2.25	4.50
30 minutes	43.00	1.50	3.00
30 minutes	44.75	1.75	3.50
30 minutes	46.25	1.50	3.00

Range used for Porchet conversion

Test - Boring No. K

delta H	3.25	inches	First Reading	3.58	ft		User Input
delta T	90	minutes	Last Reading	3.85	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.17	ft		
H start	19.00	inches	Riser Height	0			
H end	15.75	inches					
H ave	17.375	inches					
I_t	0.17	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. L

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 63 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	33.00	----	----
30 minutes	35.75	2.75	5.50
30 minutes	38.25	2.50	5.00
30 minutes	40.50	2.25	4.50
30 minutes	42.75	2.25	4.50
30 minutes	44.375	1.625	3.25
30 minutes	46.125	1.75	3.50
30 minutes	47.75	1.625	3.25
30 minutes	49.50	1.75	3.50

Range used for Porchet conversion

Test - Boring No. L						
delta H	3.375	inches	First Reading	3.84	ft	User Input
delta T	90	minutes	Last Reading	4.13	ft	Calculated Values
effective radius	3	inches	Hole Depth	5.25	ft	
H start	16.88	inches	Riser Height	0		
H end	13.50	inches				
H ave	15.1875	inches				
I_t	0.20	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

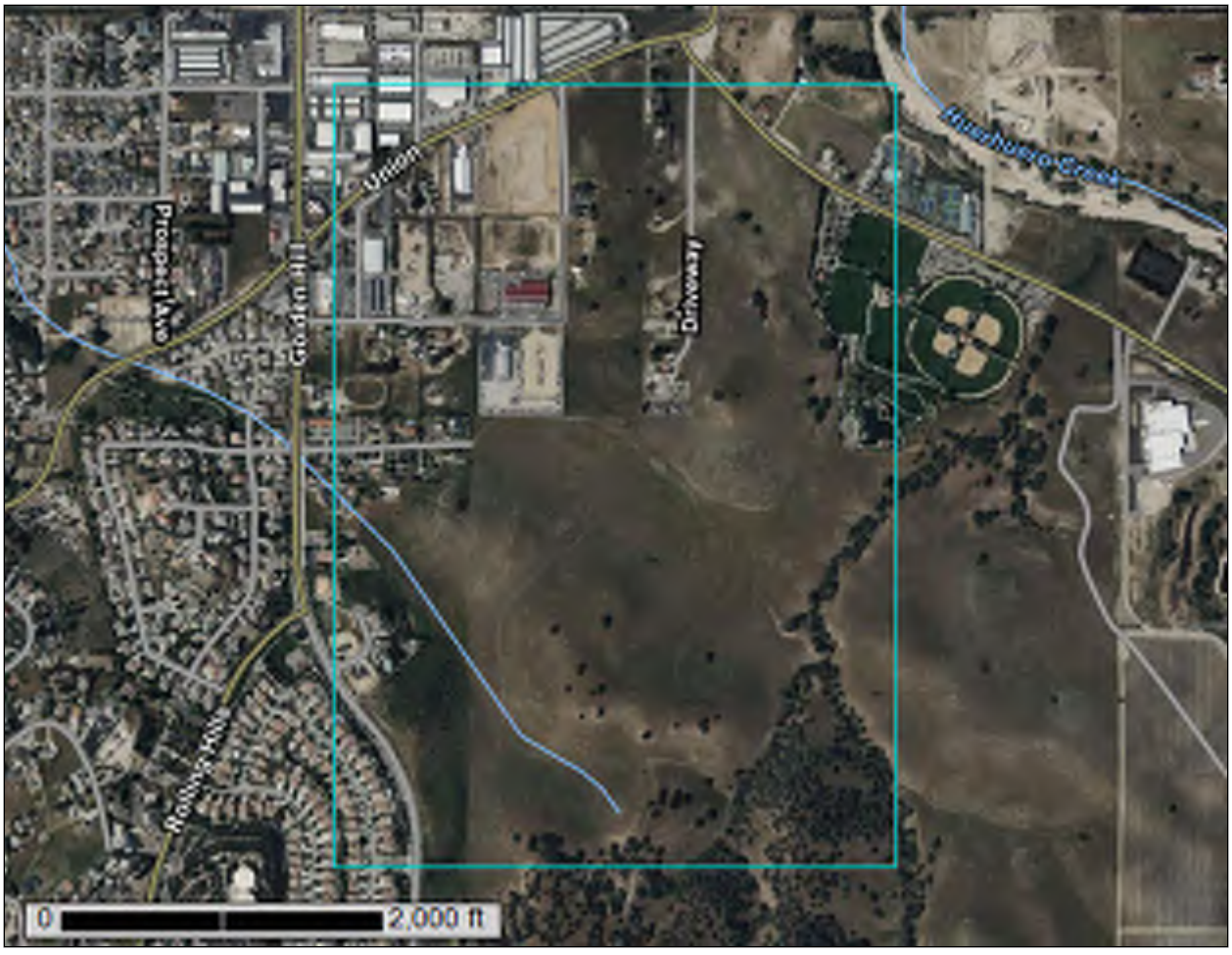
United States Department of Agriculture

NRCS

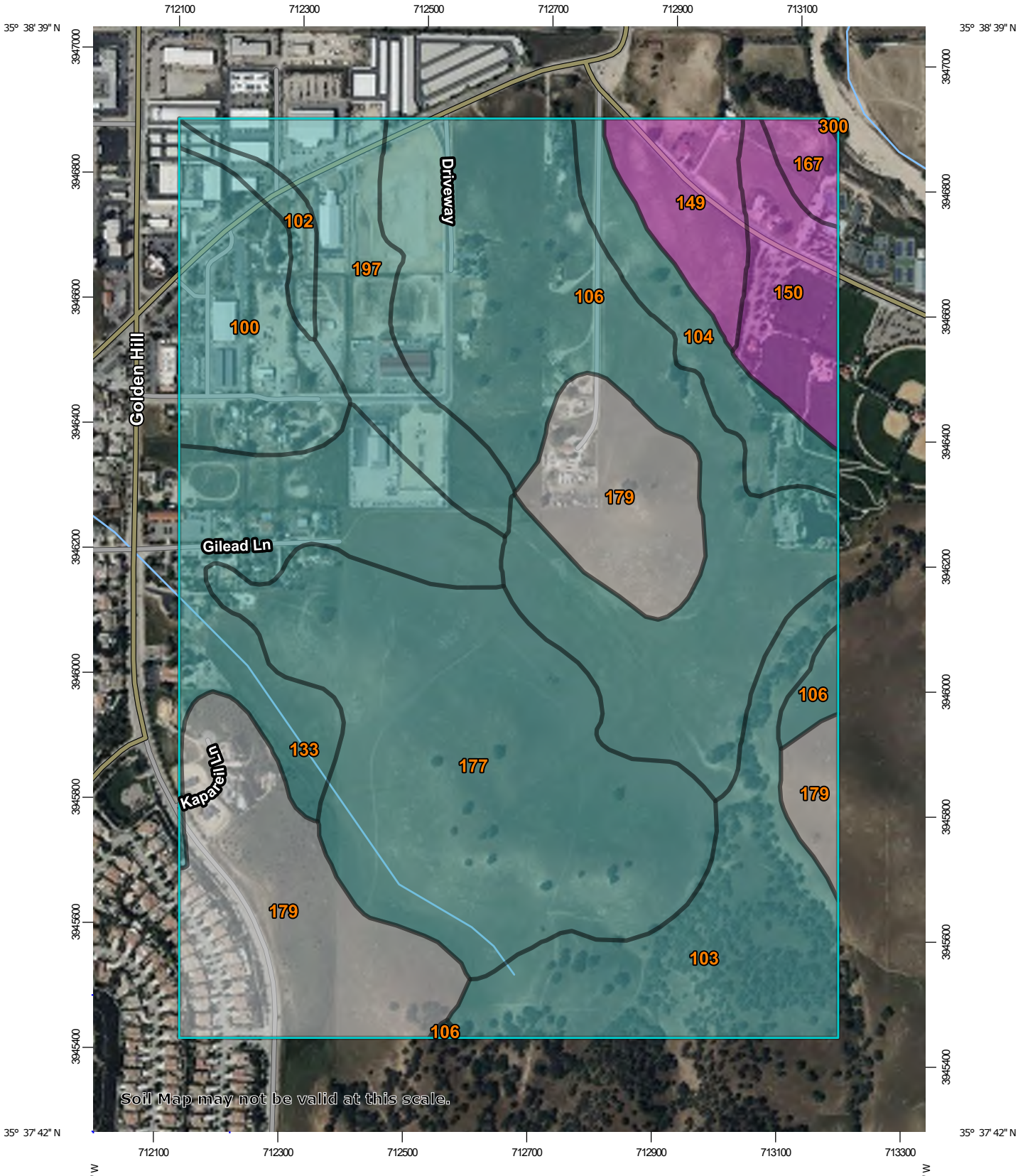
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Luis Obispo County, California, Paso Robles Area



October 17, 2022



Map Scale: 1:8,620 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil 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 Luis Obispo County, California, Paso Robles Area
Survey Area Data: Version 16, Sep 14, 2022

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

Date(s) aerial images were photographed: Mar 12, 2022—Apr 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
100	Arbuckle fine sandy loam, 0 to 2 percent slopes	C	22.6	5.9%
102	Arbuckle-Positas complex, 9 to 15 percent slopes	C	4.2	1.1%
103	Arbuckle-Positas complex, 15 to 30 percent slopes	C	39.1	10.1%
104	Arbuckle-Positas complex, 30 to 50 percent slopes	C	14.3	3.7%
106	Arbuckle-San Ysidro complex, 2 to 9 percent slopes	C	82.1	21.3%
133	Cropley clay, 2 to 9 percent slopes, MLRA 14	C	33.8	8.8%
149	Hanford and Greenfield gravelly sandy loams, 0 to 2 percent slopes	A	12.5	3.2%
150	Hanford and Greenfield gravelly sandy loams, 2 to 9 percent slopes	A	14.2	3.7%
167	Metz-Tujunga complex, occasionally flooded, 0 to 5 percent slopes	A	3.5	0.9%
177	Nacimiento-Ayar complex, 9 to 30 percent slopes	C	76.2	19.7%
179	Nacimiento-Los Osos complex, 9 to 30 percent slopes		60.4	15.6%
197	San Ysidro loam, 0 to 2 percent slopes, MLRA 14	C	23.0	6.0%
300	Corducci and Typic Xerofluvents, 0 to 5 percent slopes, occasionally flooded, MLRA 14	A	0.1	0.0%
Totals for Area of Interest			**386.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of ASTM C33 and compost (30%-40%) may be used. An alternative planting medium may be utilized if it is demonstrated to be equal or more effective at attenuating pollutants than the specified planting medium mixture.

- Proper plant selection as provided by the Central Coast LID Initiative.
- Subsurface drainage/storage (gravel) layer with an area equal to the biofiltration treatment system surface area and having a minimum depth of 12 inches.
- Underdrain with discharge elevation at top of gravel layer.
- No compaction of soils beneath the biofiltration facility.
- No liners or other barriers interfering with infiltration (excepting conditions were lateral infiltration is not feasible).

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Non-Retention Based Treatment Systems:
Stormwater Control Measures that collectively achieve at least one of the following hydraulic sizing criteria for non-retention based treatment systems:

- Volume Design Basis: Treat stormwater runoff equal to the volume of runoff generated by the 85th percentile 24-hour storm event (0.80 inches).
- Flow Design Basis: Treat the flow of runoff produced by a rain event equal to at least 0.2 inches per hour intensity.

(5) Performance Requirement No. 3: Runoff Retention

Projects that create and/or replace greater than or equal to 15,000 square feet of impervious surface are required to meet runoff retention performance requirements using Low Impact Development Standards. See Stormwater Technical Guide.

Prevent off-site discharge from events up to the 95th percentile 24-hour rainfall event (1.45 inches). Retention is to be achieved by optimizing infiltration. Project design shall be founded in Low Impact Development principles. Site opportunities and constraints shall be identified and a site assessment shall include:

- Topography, structures, utilities, easements
- Hydrologic features including natural areas, wetlands, watercourses, seeps, or springs.
- Depth to seasonal high groundwater
- Locations of wells
- Depth to impervious bedrock
- Presence of unique geology

- Geotechnical hazards
- Soil and/or groundwater contamination
- Soil types and hydrologic soil groups
- Vegetative cover/trees
- Run-on characteristics (estimate off-site runoff discharging to the project area)
- Existing drainage infrastructure
- Zoning, setbacks and open space requirements
- Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.
- Conserve natural areas including existing trees, vegetation and soils
- Limit the overall impervious footprint of the project
- Set back development from creeks, wetlands and riparian habitats
- When runoff reduction measures and natural landscape areas have been maximized to the extent feasible storm water control measures shall be used to comply with performance requirements. Storm water control measures associated with small-scale, decentralized facilities designed to infiltrate, evapotranspirate, filter, or capture storm water shall be optimized. Refer to the City's technical guidelines for sizing of storm water retention facilities.

(6) Performance Requirement No. 4: Peak Management

All projects that create and/or replace greater than or equal to 22,500 square feet of impervious surface in Watershed Management Zone 1 shall manage peak stormwater runoff as required below as well as meeting Water Quality and Runoff Retention requirements.

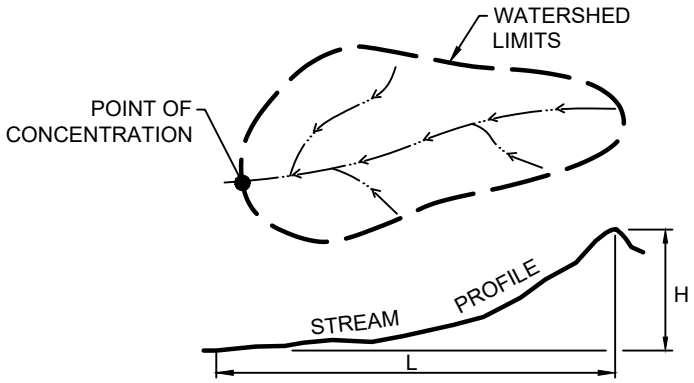
Post-development peak flows, discharged from the site, shall not exceed pre-project peak flows for the 2 through 10-year storm events.

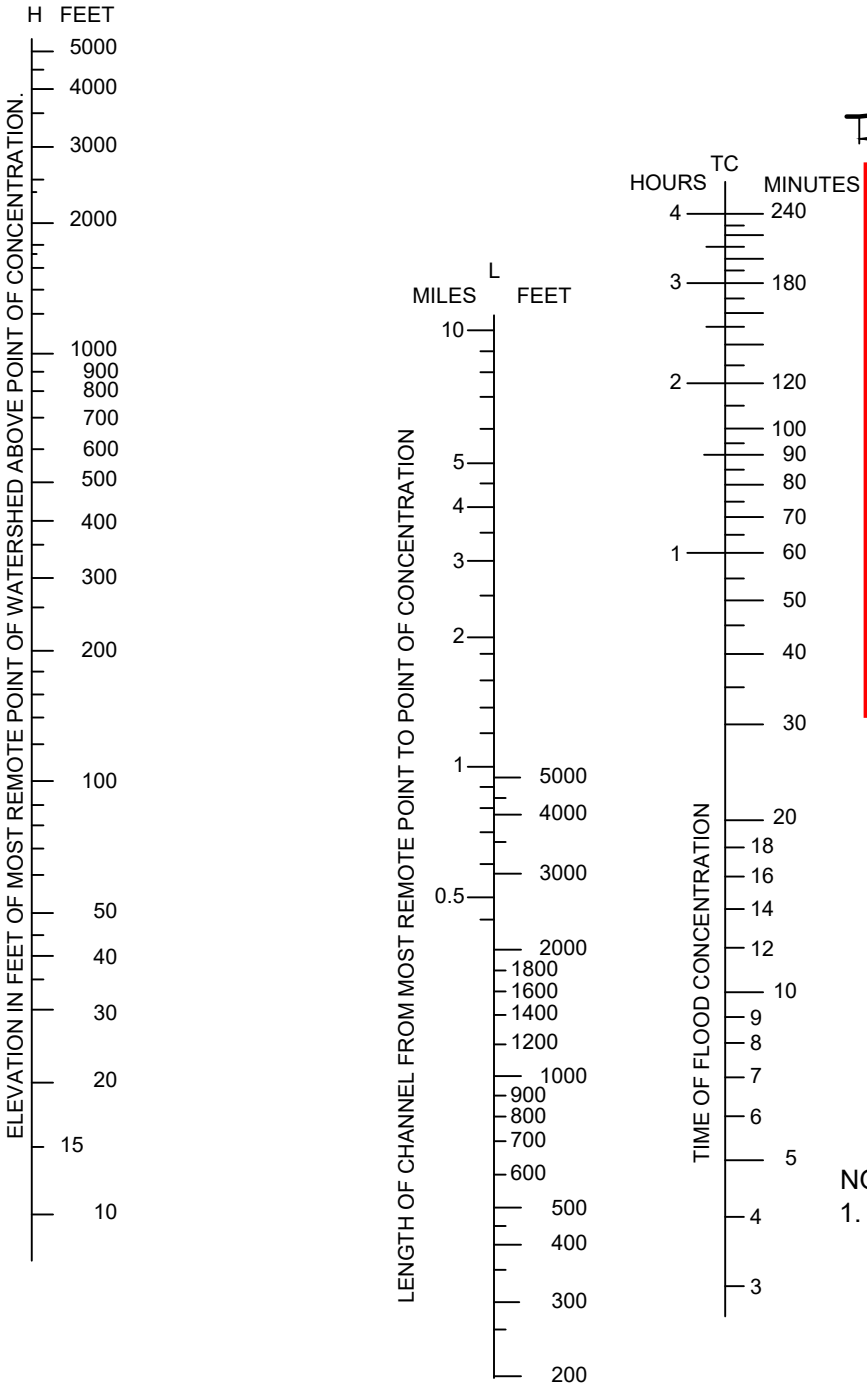
A Stormwater Control shall be provided in conformance with the Stormwater Technical Guide on File with the Stormwater Control Manager in the Department of Public Works.

(7) Operation and Maintenance for Structural Stormwater Control Measures

The design of all structural stormwater control measures must be accompanied by an operation and maintenance (O and M) plan. Minimum requirements for the O and M plan are described in the City's Technical Guide.

Prior to project acceptance or occupancy, verification of on-going maintenance of structural stormwater control measures must be established by legal binding agreements.





EQUATIONS FOR ESTIMATED "TIME OF CONCENTRATION"

$$Tc = \left(\frac{11.9L^3}{H}\right)^{0.385}$$

LEGEND:
Tc = TIME OF CONCENTRATION IN HOURS.
L = LENGTH OF CHANNEL IN MILES.
H = DIFFERENCE IN ELEVATION BETWEEN MOST REMOTE POINT AND THE POINT OF CONCENTRATION IN FEET.

NOTES:
1. THIS NOMOGRAPH IS LIMITED TO WATERSHED AREAS OF 200 ACRES OR LESS. FOR LARGER WATERSHEDS REFER TO THE DESIGN STANDARDS.

REF: P.Z. KIRPICH, CIVIL ENGINEERING, Vol. 10, No. 6, JUNE 1940, p. 362
FOR WATERSHEDS LESS THAN 200 ACRES

DEPARTMENT OF PUBLIC WORKS - STANDARD DRAWINGS

HYDROLOGY
TIME OF CONCENTRATION

Issued: August 2022	Scale: NTS
Revised:	Revision No:
Drawing No: H-2	

NOAA Atlas 14, Volume 6, Version 2
Location name: Paso Robles, California, USA*
Latitude: 35.6395°, Longitude: -120.6521°
Elevation: 825.91 ft**
* source: ESRI Maps
** source: USGS

FROM
NOAA ATLAS 14,
VOLUME 6, VERSION 2
FOR PASO ROBLES, CA

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.108 (0.092-0.129)	0.142 (0.120-0.169)	0.187 (0.158-0.224)	0.226 (0.189-0.272)	0.280 (0.225-0.350)	0.323 (0.254-0.414)	0.368 (0.282-0.485)	0.416 (0.309-0.566)	0.484 (0.343-0.689)	0.538 (0.367-0.797)
10-min	0.155 (0.132-0.184)	0.203 (0.172-0.242)	0.269 (0.227-0.321)	0.323 (0.271-0.390)	0.401 (0.323-0.502)	0.462 (0.364-0.593)	0.527 (0.404-0.695)	0.596 (0.442-0.811)	0.693 (0.491-0.988)	0.771 (0.526-1.14)
15-min	0.187 (0.159-0.223)	0.246 (0.208-0.293)	0.325 (0.274-0.388)	0.391 (0.327-0.472)	0.485 (0.391-0.607)	0.559 (0.440-0.718)	0.638 (0.488-0.841)	0.721 (0.535-0.981)	0.838 (0.594-1.20)	0.933 (0.636-1.38)
30-min	0.262 (0.223-0.312)	0.344 (0.292-0.410)	0.454 (0.384-0.543)	0.547 (0.458-0.660)	0.678 (0.547-0.850)	0.783 (0.616-1.00)	0.892 (0.684-1.18)	1.01 (0.749-1.37)	1.17 (0.831-1.67)	1.31 (0.890-1.93)
60-min	0.384 (0.326-0.457)	0.504 (0.427-0.600)	0.666 (0.563-0.796)	0.802 (0.672-0.968)	0.994 (0.801-1.24)	1.15 (0.903-1.47)	1.31 (1.00-1.72)	1.48 (1.10-2.01)	1.72 (1.22-2.45)	1.91 (1.30-2.83)
2-hr	0.570 (0.484-0.678)	0.727 (0.616-0.866)	0.942 (0.796-1.13)	1.13 (0.942-1.36)	1.39 (1.12-1.74)	1.60 (1.26-2.05)	1.82 (1.40-2.40)	2.06 (1.53-2.80)	2.40 (1.70-3.42)	2.68 (1.83-3.96)
3-hr	0.705 (0.598-0.839)	0.897 (0.760-1.07)	1.16 (0.980-1.39)	1.38 (1.16-1.67)	1.70 (1.37-2.13)	1.96 (1.54-2.52)	2.24 (1.71-2.95)	2.53 (1.88-3.44)	2.95 (2.09-4.20)	3.29 (2.24-4.87)
6-hr	0.985 (0.836-1.17)	1.27 (1.08-1.51)	1.66 (1.40-1.98)	1.98 (1.66-2.39)	2.45 (1.97-3.07)	2.82 (2.22-3.62)	3.21 (2.46-4.23)	3.63 (2.69-4.94)	4.22 (2.99-6.01)	4.69 (3.20-6.95)
12-hr	1.22 (1.04-1.45)	1.68 (1.43-2.00)	2.29 (1.94-2.74)	2.79 (2.34-3.36)	3.47 (2.80-4.35)	4.00 (3.15-5.13)	4.54 (3.48-5.99)	5.10 (3.79-6.94)	5.86 (4.16-8.36)	6.46 (4.41-9.57)
24-hr	1.46 (1.32-1.65)	2.14 (1.93-2.42)	3.03 (2.72-3.43)	3.74 (3.34-4.28)	4.70 (4.05-5.56)	5.42 (4.58-6.56)	6.16 (5.06-7.63)	6.90 (5.52-8.80)	7.90 (6.06-10.5)	8.67 (6.41-12.0)
2-day	1.85 (1.67-2.09)	2.66 (2.40-3.01)	3.74 (3.37-4.24)	4.63 (4.13-5.30)	5.85 (5.05-6.93)	6.80 (5.74-8.23)	7.78 (6.40-9.65)	8.80 (7.04-11.2)	10.2 (7.81-13.6)	11.3 (8.35-15.6)
3-day	2.11 (1.91-2.39)	2.98 (2.69-3.37)	4.16 (3.75-4.72)	5.15 (4.60-5.89)	6.54 (5.63-7.73)	7.63 (6.44-9.23)	8.77 (7.22-10.9)	9.98 (7.98-12.7)	11.7 (8.94-15.5)	13.0 (9.63-18.0)
4-day	2.31 (2.09-2.61)	3.22 (2.91-3.64)	4.47 (4.02-5.07)	5.53 (4.93-6.32)	7.02 (6.05-8.30)	8.21 (6.93-9.93)	9.46 (7.79-11.7)	10.8 (8.64-13.8)	12.7 (9.72-16.9)	14.2 (10.5-19.6)
7-day	2.78 (2.51-3.14)	3.78 (3.42-4.28)	5.17 (4.65-5.86)	6.35 (5.67-7.26)	8.04 (6.93-9.51)	9.40 (7.93-11.4)	10.8 (8.92-13.4)	12.4 (9.91-15.8)	14.6 (11.2-19.4)	16.4 (12.1-22.6)
10-day	3.14 (2.84-3.55)	4.22 (3.81-4.77)	5.72 (5.14-6.48)	7.00 (6.24-8.00)	8.84 (7.62-10.5)	10.3 (8.72-12.5)	11.9 (9.80-14.8)	13.6 (10.9-17.4)	16.1 (12.3-21.4)	18.1 (13.4-24.9)
20-day	3.90 (3.52-4.40)	5.20 (4.69-5.88)	7.02 (6.32-7.96)	8.59 (7.67-9.83)	10.9 (9.36-12.8)	12.7 (10.7-15.4)	14.7 (12.1-18.2)	16.8 (13.4-21.4)	19.8 (15.2-26.4)	22.3 (16.5-30.8)
30-day	4.63 (4.19-5.23)	6.20 (5.59-7.01)	8.38 (7.54-9.51)	10.3 (9.16-11.7)	13.0 (11.2-15.4)	15.2 (12.8-18.3)	17.5 (14.4-21.7)	20.1 (16.0-25.6)	23.7 (18.1-31.5)	26.6 (19.7-36.7)
45-day	5.54 (5.00-6.25)	7.43 (6.71-8.41)	10.1 (9.06-11.4)	12.3 (11.0-14.1)	15.6 (13.4-18.4)	18.2 (15.4-22.0)	21.0 (17.3-26.1)	24.0 (19.2-30.6)	28.3 (21.7-37.7)	31.8 (23.5-43.8)
60-day	6.46 (5.84-7.30)	8.70 (7.85-9.83)	11.8 (10.6-13.4)	14.4 (12.9-16.5)	18.2 (15.7-21.5)	21.2 (17.9-25.7)	24.5 (20.1-30.3)	27.9 (22.3-35.6)	32.8 (25.1-43.7)	36.8 (27.2-50.7)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

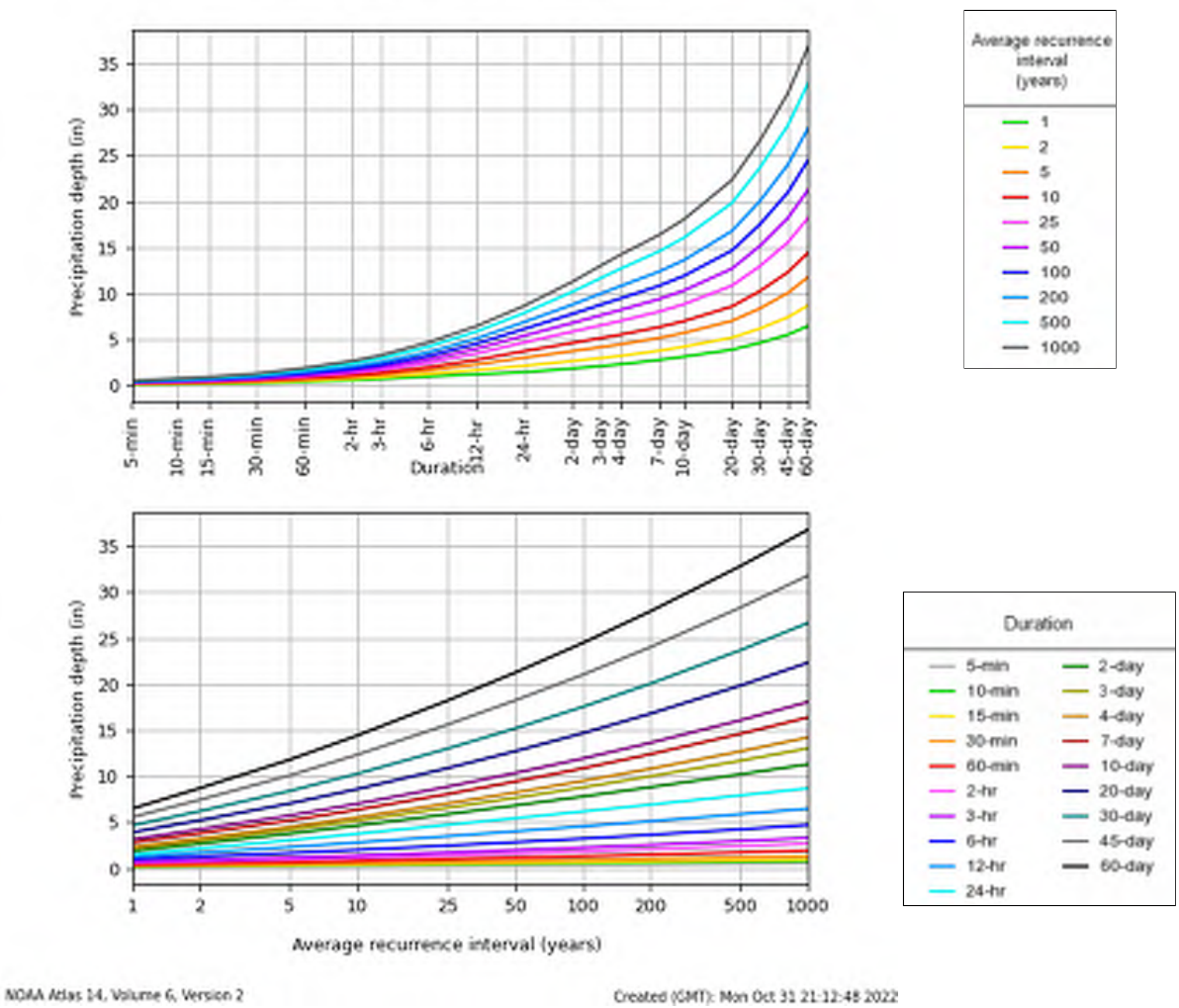
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

FROM
NOAA ATLAS 14, VOLUME 6,
VERSION 2 FOR PASO ROBLES, CA

PDS-based depth-duration-frequency (DDF) curves
Latitude: 35.6395°, Longitude: -120.6521°



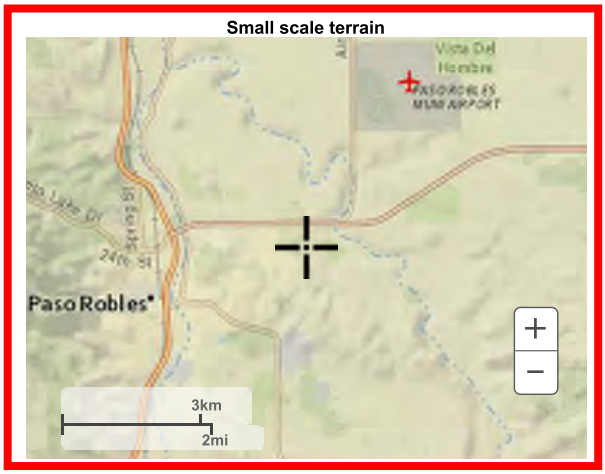
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Maps & aerials

Small scale terrain

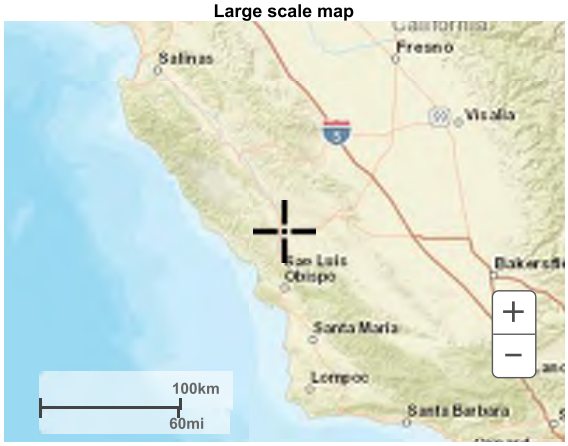


Large scale terrain

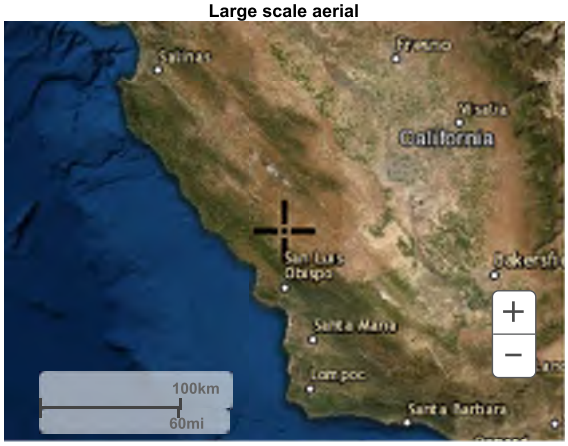
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Large scale map



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 C
Preliminary Drainage Design Calculations

Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 2/16/2022
By: ZKP
Overall Hydrologic Calculations - SBUH method in HydroCAD

Rainfall Event Data			Antecedent Moisture Condition
95th	1.45	inches	1
2 YR	2.14	inches	2
10 YR	3.74	inches	2
25 YR	4.70	inches	2
50 YR	5.42	inches	2
100 YR	6.16	inches	2
** See NOAA Atlas 14 Rainfall data (24-hr storm duration)*			*Antecedent Moisture Condition (AMC) utilized in HydroCAD.*

Pre- vs. Post-Development Peak Flow Summary - OUTLETS

Outlet Location	Pre-Dev. Total Area (ac)	Post-Dev. Total Area (ac)	Storm	Pre-Developed Flow, Q (cfs)	Post-Developed Flow, Q (cfs)	Drainage Notes	Proposed Structural Control Measures (SCM)
Outlet A	64.43	64.46	95th	-	-	A bypass culvert is proposed to intercept offsite run-on from the south (**EX1 offsite**) and convey it to Outlet A following historic drainage patterns.	Roadside bioretention swales, StormTech Chamber: (A =257' x 52')
			2 YR	32.51	31.75		
			10 YR	61.76	59.90		
			25 YR	72.83	71.33		
			50 YR	85.55	83.41		
			100 YR	93.67	90.48		
Outlet B	2.82	2.80	95th	Data Unknown	-	Pre-developed data referenced from Daniels Commercial drainage report by Roberts Eng. (2019, 2020)	Roadside bioretention swales, StormTech Chamber: (B1 = 78' x 88') (B2 = 178' x 23')
			2 YR	1.02	0.04		
			10 YR	2.11	0.59		
			25 YR	2.46	1.65		
			50 YR	2.97	2.53		
			100 YR	3.54	3.42		
Onsite Runoff (C)	0.80	0.27	95th	0.01	0.03	Designed onsite runoff to north along Ardmore Road following historic drainage patterns	Roadside bioretention swale
			2 YR	0.15	0.07		
			10 YR	0.74	0.12		
			25 YR	1.17	0.15		
			50 YR	1.52	0.18		
			100 YR	1.89	0.20		
Outlet D	3.27	3.79	95th	-	-		Detention Basin with metered SD outlet. Underground bioretention trench along basin bottom
			2 YR	0.56	-		
			10 YR	2.94	0.54		
			25 YR	4.70	1.37		
			50 YR	6.11	3.36		
			100 YR	7.62	6.81		
Drainage Area Subtotal	71.33	71.33					

Pre- vs. Post-Development Peak Flow Summary - OVERALL PROJECT SITE

Project Site	Pre-Dev. Total Area (ac)	Post-Dev. Total Area (ac)	Storm	Pre-Developed Flow, Q (cfs)	Post-Developed Flow, Q (cfs)
Ardmore Industrial	14.06	14.06	95th	0.01	0.03
			2 YR	2.97	0.59
			10 YR	12.23	5.83
			25 YR	18.62	11.96
			50 YR	23.99	17.32
			100 YR	29.75	23.94

Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 2/16/2022
By: ZKP
Overall Hydrologic Calculations - SBUH method in HydroCAD

Existing/ Pre-developed Hydrology - Land Use Data & Peak Flow								
WSHD	Outlet Location	Total Area (sf)	Total Area (ac)	Weighted CN	Land Type Description	Time of Conc. (min)	Storm	Flow, Q (cfs)
EX1 (offsite)	**Outlet A** (Exist. double 24" SD pipes)	2,494,621	57.27	See Offsite Hydrology Calculations (Rational Method)	*OFFSITE RUN-ON* Undeveloped. Rural grassland/ open space, few trees	11.04	2 YR	31.27
							10 YR	55.32
							25 YR	62.54
							50 YR	72.16
							100 YR	76.97
EX1 (onsite)		312,111	7.17	74	*ONSITE* Undeveloped. Rural grassland/ open space with few trees	6.00	95th	-
							2 YR	1.24
							10 YR	6.44
							25 YR	10.29
							50 YR	13.39
							100 YR	16.70
EX2	**Outlet B** (Exist 12" culvert)	122,877	2.82	(Data referenced from 2019 Daniels Commercial drainage report by Roberts Engineering - see "Tate Property/ Offsite flow from east" calculations)			95th	Data Unknown
							2 YR	1.02
							10 YR	2.11
							25 YR	2.46
							50 YR	2.97
							100 YR	3.54
EX3	**Outlet D** (Surface runoff/ sheet flow to northwest)	142,459	3.27	74	Undeveloped. Rural grassland/ agricultural with few trees	6.00	95th	-
							2 YR	0.56
							10 YR	2.94
							25 YR	4.70
							50 YR	6.11
							100 YR	7.62
EX4	**Onsite Runoff (C)** (Sheet flow runoff to north along Ardmore Rd)	34,918	0.80	74	Mostly undeveloped (single ag structure). Rural grassland/ agricultural, few	6.00	95th	0.01
							2 YR	0.15
							10 YR	0.74
							25 YR	1.17
							50 YR	1.52
							100 YR	1.89
Subtotal		3,106,984	71.33					
** Calculated time of concentrations values were found to be less than the minimum 6-minute standard set by the City of Paso Robles Standards.*								

Proposed/ Post-developed Hydrology - Land Use Data & Peak Flow								
DMA	Outlet Location	Total Area (sf)	Total Area (ac)	Weighted CN	Land Type Description	Time of Conc. (min)	Storm	Flow, Q (cfs)
A	**Outlet A** (Exist. double 24" SD pipes)	313,474	7.20	95	Developed	6.00	95th	-
							2 YR	0.48
							10 YR	4.58
							25 YR	8.79
							50 YR	11.25
							100 YR	13.51
B1 + B2	**Outlet B** (Prop. curb inlet at exist 12" culvert)	121,873	2.80	95	Developed	6.00	95th	-
							2 YR	0.04
							10 YR	0.59
							25 YR	1.65
							50 YR	2.53
							100 YR	3.42
C	**Onsite Runoff (C)** (Sheet flow runoff to north along Ardmore Rd)	11,941	0.27	98	Developed	6.00	95th	0.03
							2 YR	0.07
							10 YR	0.12
							25 YR	0.15
							50 YR	0.18
							100 YR	0.20
D	**Outlet D** (Prop. basin outlet with metered flow to northwest)	165,076	3.79	95	Developed	6.00	95th	-
							2 YR	-
							10 YR	0.54
							25 YR	1.37
							50 YR	3.36
							100 YR	6.81
Subtotal		612,363	14.06					
** Calculated time of concentrations values were found to be less than the minimum 6-minute standard set by the City of Paso Robles Standards.*								
*** DMA C storm drain system has been designed to over-retain and detain stormwater to account for DMA E onsite stormwater runoff.*								

Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 2/16/2022
By: ZKP
Offsite Hydrologic Calculations - Rational method

Rainfall Event Data		
2 YR	1.30	in/ hr
10 YR	2.30	in/ hr
25 YR	2.60	in/ hr
50 YR	3.00	in/ hr
100 YR	3.20	in/ hr
** See 2022 County of San Luis Obispo Public Improvement Standards H-4, Table 2*		

Existing/ Pre-developed Offsite Hydrology Conditions									
DMA	Outlet Location	Total Area (sf)	Total Area (ac)	C	Land Type Description	Time of Conc. (min)	Storm	Intensity, I (in/hr)	Flow, Q (cfs)
EX1 (offsite)	**Outlet A** (Exist. double 24" SD pipes)	2,494,621	57.27	0.42	*OFFSITE RUN-ON* Undeveloped. Rural grassland/ open space, few trees	11.04			
							2 YR	1.30	31.27
							10 YR	2.30	55.32
							25 YR	2.60	62.54
							50 YR	3.00	72.16
							100 YR	3.20	76.97
Subtotal		2,494,621	57.27						
** Calculated time of concentrations values were found to be less than the minimum 10-minute standard set by the 2022 County of San Luis Obispo Public Improvements Standards*									

EX1 (offsite)					
Land Type	**Area**		**C-Value**		
Rural grass/ ag	2,494,621	SF	0.42	Undeveloped	
		ΣCA	1,047,741		
		Total DMA Area	2,494,621	57.27	ac
		Weighted C-Value	0.42		

Undeveloped Area C-Value (SLO County detail H-3a)			
	Description	**C-value**	
Rural/ Ag Land	Relief	0.20	Relatively flat land, with average slopes 0-5%
	Soil Infiltration	0.08	Slow to take up water, clay or shallow loam soils
	Vegetal Cover	0.06	Good to excellent - 90% or more area is good grassland or equiv. cover
	Surface Storage	0.08	Low - well defined system of small drainage ways with no ponds or marshes
	Total	0.42	

Project: 751-005 Ardmore
Date: 2/14/2022
By: ZKP
Existing/ Pre-developed Watershed Land Use
(For HydroCAD model use)

Existing/ Pre-developed Site Summary (excludes EX1 offsite)			
Land Type	**Total Area (sf)**	**Total Area (ac)**	**% of Total Area**
Impervious (Imp)	3,223	0.07	0.5%
Pervious (P)	609,141	13.98	99.5%
Total Area	612,364	14.06	100.0%

SF to Acre
43,560

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX1 (offsite)	2,494,621	P	100%	2,494,621	57.27	
		Imp	0%	-	-	
Subtotal	2,494,621	P	100%	2,494,621	57.27	Exist Outlet A
		Imp	0%	-	-	
		✓	100%	2,494,621	57.27	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX1 (onsite)	312,111	P	100%	312,111	7.17	
		Imp	0%	-	-	
Subtotal	312,111	P	100%	312,111	7.17	Exist Outlet A
		Imp	0%	-	-	
		✓	100%	312,111	7.17	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX2	122,877	P	98%	120,160	2.76	
		Imp	2%	2,717	0.06	
Subtotal	122,877	P	98%	120,160	2.76	Exist Outlet B
		Imp	2%	2,717	0.06	
		✓	100%	122,877	2.82	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX3	142,459	P	100%	142,459	3.27	
		Imp	0%	-	-	
Subtotal	142,459	P	100%	142,459	3.27	Surface runoff to northeast
		Imp	0%	-	-	
		✓	100%	142,459	3.27	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX4	34,918	P	99%	34,412	0.79	
		Imp	1%	506	0.01	
Subtotal	34,918	P	99%	34,412	0.79	Exist Outlet B
		Imp	1%	506	0.01	
		✓	100%	34,918	0.80	

Existing Watershed Area	**3,106,984**	**71.33**

Project: 751-005 Ardmore
Date: 2/14/2022
By: ZKP
Proposed/ Post-developed DMA Land Use
(For HydroCAD model use)

Proposed/ Post-developed Site Summary			
Land Type	**Total Area (sf)**	**Total Area (ac)**	**% of Total Area**
Impervious (Imp)	501,730	11.52	81.9%
Pervious (P)	110,633	2.54	18.1%
Total Area	612,363	14.06	100.0%

SF to Acre
43,560

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
A1	264,589	P	14%	37,042	0.85	StormTech Chambers,
		Imp	86%	227,546	5.22	Outlet A
A2	48,885	P	14%	6,844	0.16	Roadside Bioswale,
		Imp	86%	42,041	0.97	Outlet A
Subtotal (A)	313,474	P	14%	43,886	1.01	
		Imp	86%	269,587	6.19	
		✓	100%	313,474	7.20	
B1a	59,221	P	24%	15,178	0.35	StormTech Chambers,
		Imp	76%	44,042	1.01	Outlet B
B1b	10,365	P	24%	1,256	0.03	Roadside Bioswale,
		Imp	76%	9,109	0.21	Outlet B
Subtotal (B)	69,586	P	24%	16,434	0.38	
		Imp	76%	53,151	1.22	
		✓	100%	69,586	1.60	
B2a	52,287	P	24%	4,163	0.10	StormTech Chambers,
		Imp	76%	48,124	1.10	Outlet B
Subtotal (B)	52,287	P	24%	4,163	0.10	
		Imp	76%	48,124	1.10	
		✓	100%	52,287	1.20	
C1	9,720	P	10%	2,633	0.06	Roadside Bioswale,
		Imp	90%	7,087	0.16	Run-off to the north
C2	2,221	P	10%	-	-	Onsite run-off to the
		Imp	90%	2,221	0.05	north
Subtotal (C)	11,941	P	10%	2,633	0.06	
		Imp	90%	9,308	0.21	
		✓	100%	11,941	0.27	
D1	165,076	P	26%	43,517	1.00	Basin w/ Bioretention,
		Imp	74%	121,559	2.79	Outlet D
Subtotal (D)	165,076	P	26%	43,517	1.00	
		Imp	74%	121,559	2.79	
		✓	100%	165,076	3.79	

Total Project Area	**612,363**	**14.06**

Project: 751-005 Ardmore
Date: 2/16/2022
By: ZKP
Time of Concentration calculations

References:
2022 County of San Luis Obispo Public Improvement Standard H-2

		Existing Conditions				City of Paso Robles min. tc (min)
Watershed	**Outlet**	L (Mile)	H (ft)	tc (hr)	tc (min)	
EX1 (offsite)	Outlet A (Exist. double 24" SD pipes)	0.54	152	0.18	11.04	6.00
EX1 (onsite)		0.11	19	0.07	4.06	6.00
EX2	Outlet B (Exist 12" culvert)	(Data referenced from 2019 Daniels Commercial drainage report by Roberts Engineering)				
EX3	Outlet D (Surface runoff/ sheet flow to northwest)	0.11	19	0.06	3.89	6.00
EX4	Onsite Runoff (C) (Sheet flow runoff to north along Ardmore Rd)	0.05	6	0.05	2.74	6.00

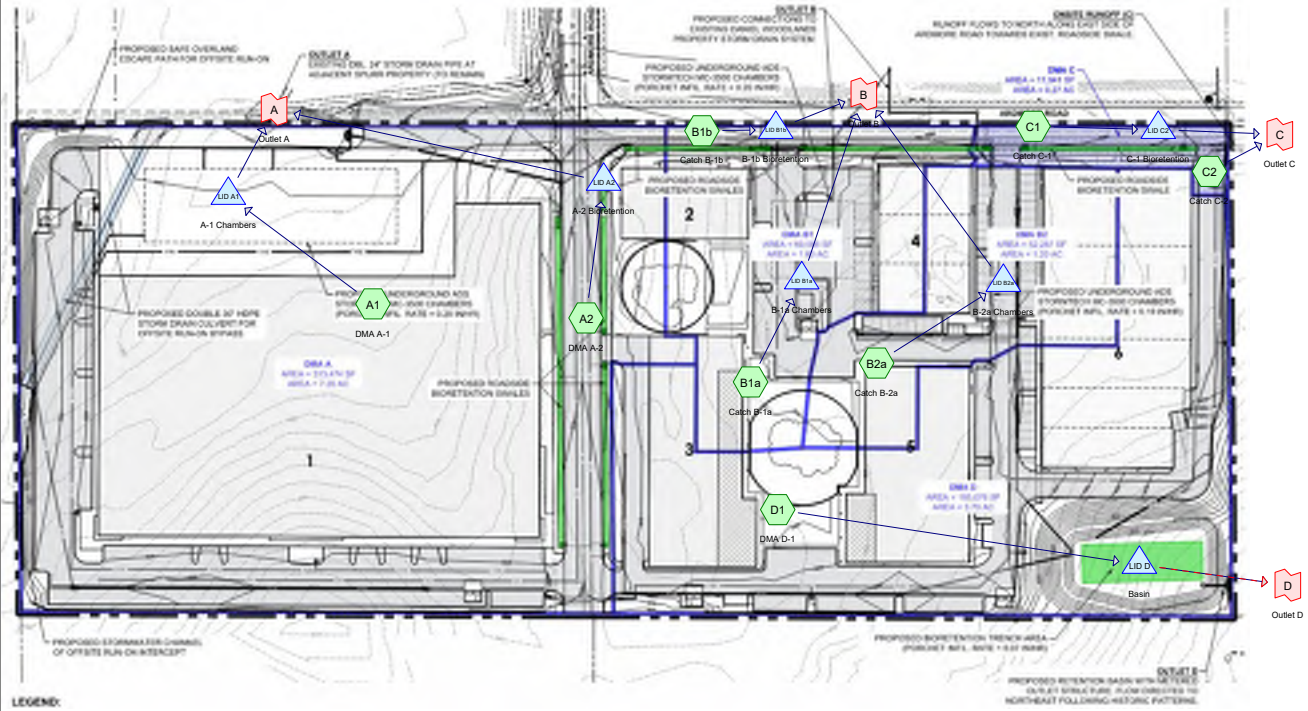
		Proposed Conditions				City of Paso Robles min. tc (min)
DMA	**Outlet**	L (MI)	H	tc (hr)	tc (min)	
A	Exist. Dbl. 24" SD pipes	0.11	13.0	0.08	4.77	6.00
B	Proposed Curb Inlet	0.06	3.9	0.06	3.77	6.00
C	Onsite Runoff	0.09	4.7	0.09	5.49	6.00
D	Basin Outlet	0.13	15.0	0.08	4.97	6.00

EQUATIONS FOR ESTIMATED "TIME OF CONCENTRATION"

$$Tc = \left(\frac{11.9L^3}{H}\right)^{0.385}$$

LEGEND:
Tc = TIME OF CONCENTRATION IN HOURS.
L = LENGTH OF CHANNEL IN MILES.
H = DIFFERENCE IN ELEVATION BETWEEN MOST REMOTE POINT AND THE POINT OF CONCENTRATION IN FEET.

PROPOSED ROUTING DIAGRAM



Subcat Reach Pond Link

Routing Diagram for 2022_Ardmore
Prepared by Wallace Group, Printed 2/17/2023
HydroCAD® 10.20-2f s/n 05444 © 2022 HydroCAD Software Solutions LLC

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58 Pond LID B2a: B-2a Chambers
61 Pond LID C2: C-1 Bioretention

63 Pond LID D: Basin
65 Link A: Outlet A
66 Link B: Outlet B
67 Link C: Outlet C
68 Link D: Outlet D

95th Event
69 Node Listing
71 Subcat A1: DMA A-1
72 Subcat A2: DMA A-2
73 Subcat B1a: Catch B-1a
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89 Pond LID B2a: B-2a Chambers
92 Pond LID C2: C-1 Bioretention
94 Pond LID D: Basin
96 Link A: Outlet A
97 Link B: Outlet B
98 Link C: Outlet C
99 Link D: Outlet D

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type I 24-hr		Default	24.00	1	2.14	2
2	10-YR	Type I 24-hr		Default	24.00	1	3.74	2
3	_95th	Type I 24-hr		Default	24.00	1	1.45	1

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.728	98	Impervious, HSG C (A1, A2, B1a, B1b, B2a, C1, C2)
2.540	79	Landscaped, 50-75% Grass cover, Fair, HSG C (A1, A2, B1a, B1b, B2a, C1, D1)
2.791	98	Paved parking, HSG C (D1)
14.058	**95**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
14.058	HSG C	A1, A2, B1a, B1b, B2a, C1, C2, D1
0.000	HSG D	
0.000	Other	
14.058		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatc Numbe
0.000	0.000	8.728	0.000	0.000	8.728	Impervious	
0.000	0.000	2.540	0.000	0.000	2.540	Landscaped, 50-75% Grass cover, Fair	
0.000	0.000	2.791	0.000	0.000	2.791	Paved parking	
0.000	**0.000**	**14.058**	**0.000**	**0.000**	**14.058**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	LID A1	819.00	818.50	35.0	0.0143	0.012	0.0	18.0	0.0
2	LID B1a	822.63	822.50	50.0	0.0026	0.012	0.0	18.0	0.0
3	LID B2a	822.19	821.89	30.0	0.0100	0.012	0.0	18.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A1: DMA A-1 Runoff Area=264,589 sf 86.00% Impervious Runoff Depth=1.73"
Tc=6.0 min CN=79/98 Runoff=7.21 cfs 0.876 af

Subcatchment A2: DMA A-2 Runoff Area=48,885 sf 86.00% Impervious Runoff Depth=1.73"
Tc=6.0 min CN=79/98 Runoff=1.33 cfs 0.162 af

Subcatchment B1a: Catch B-1a Runoff Area=59,221 sf 74.37% Impervious Runoff Depth=1.58"
Tc=6.0 min CN=79/98 Runoff=1.46 cfs 0.179 af

Subcatchment B1b: Catch B-1b Runoff Area=10,365 sf 87.88% Impervious Runoff Depth=1.75"
Tc=6.0 min CN=79/98 Runoff=0.29 cfs 0.035 af

Subcatchment B2a: Catch B-2a Runoff Area=52,287 sf 92.04% Impervious Runoff Depth=1.81"
Tc=6.0 min CN=79/98 Runoff=1.50 cfs 0.181 af

Subcatchment C1: Catch C-1 Runoff Area=9,720 sf 72.91% Impervious Runoff Depth=1.56"
Tc=6.0 min CN=79/98 Runoff=0.24 cfs 0.029 af

Subcatchment C2: Catch C-2 Runoff Area=2,221 sf 100.00% Impervious Runoff Depth=1.91"
Tc=6.0 min CN=0/98 Runoff=0.07 cfs 0.008 af

Subcatchment D1: DMA D-1 Runoff Area=165,076 sf 73.64% Impervious Runoff Depth=1.57"
Tc=6.0 min CN=79/98 Runoff=4.03 cfs 0.495 af

Pond LID A1: A-1 Chambers Peak Elev=819.30' Storage=0.487 af Inflow=7.21 cfs 0.876 af
Discarded=0.06 cfs 0.350 af Primary=0.48 cfs 0.330 af Outflow=0.54 cfs 0.680 af

Pond LID A2: A-2 Bioretention Peak Elev=824.08' Storage=1,618 cf Inflow=1.33 cfs 0.162 af
Discarded=0.27 cfs 0.162 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.162 af

Pond LID B1a: B-1a Chambers Peak Elev=821.36' Storage=0.153 af Inflow=1.46 cfs 0.179 af
Discarded=0.02 cfs 0.088 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.088 af

Pond LID B1b: B-1b Bioretention Peak Elev=822.64' Storage=389 cf Inflow=0.29 cfs 0.035 af
Discarded=0.05 cfs 0.035 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.035 af

Pond LID B2a: B-2a Chambers Peak Elev=822.28' Storage=0.131 af Inflow=1.50 cfs 0.181 af
Discarded=0.02 cfs 0.101 af Primary=0.04 cfs 0.022 af Outflow=0.06 cfs 0.123 af

Pond LID C2: C-1 Bioretention Peak Elev=821.65' Storage=245 cf Inflow=0.24 cfs 0.029 af
Discarded=0.06 cfs 0.029 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.029 af

Pond LID D: Basin Peak Elev=815.66' Storage=20,544 cf Inflow=4.03 cfs 0.495 af
Discarded=0.02 cfs 0.090 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.090 af

Link A: Outlet A Inflow=0.48 cfs 0.330 af
Primary=0.48 cfs 0.330 af

Link B: Outlet B Inflow=0.04 cfs 0.022 af
Primary=0.04 cfs 0.022 af

Link C: Outlet C Inflow=0.07 cfs 0.008 af
Primary=0.07 cfs 0.008 af

Link D: Outlet D Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 14.058 ac Runoff Volume = 1.965 af Average Runoff Depth = 1.68"
18.07% Pervious = 2.540 ac 81.93% Impervious = 11.518 ac

Summary for Subcatchment A1: DMA A-1

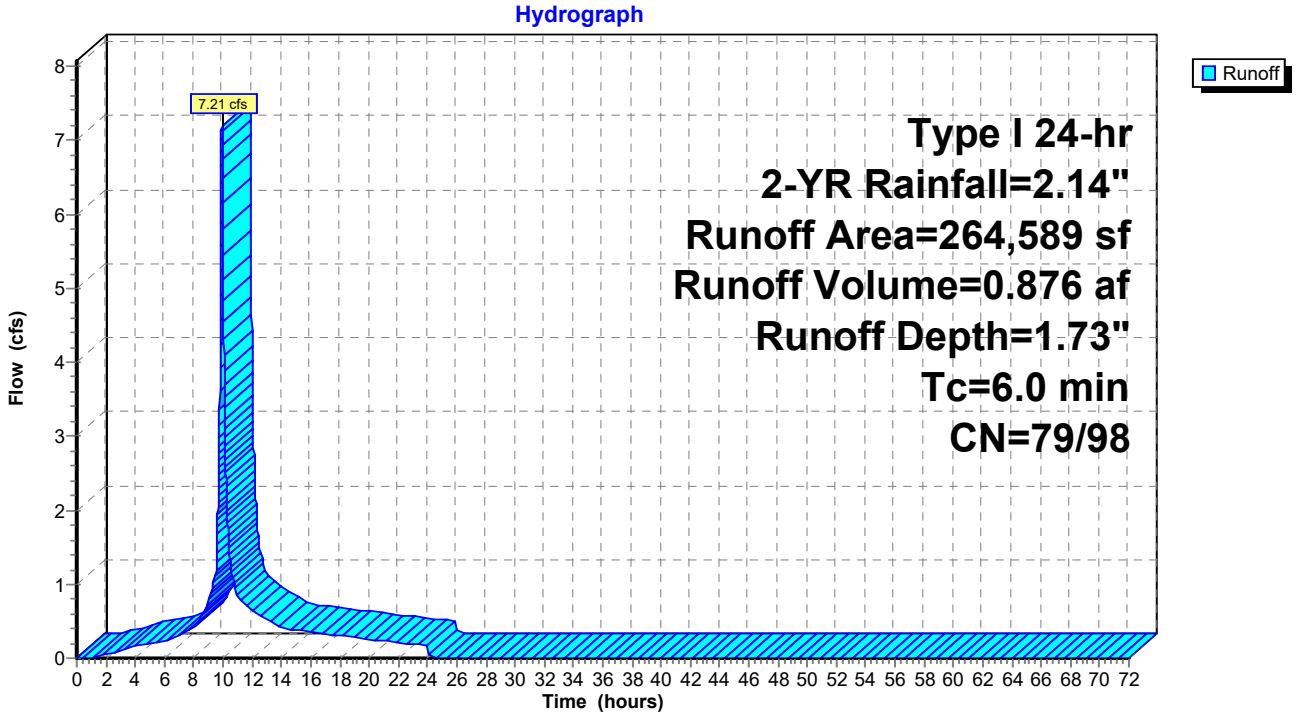
Runoff = 7.21 cfs @ 9.94 hrs, Volume= 0.876 af, Depth= 1.73"
Routed to Pond LID A1 : A-1 Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

	Area (sf)	CN	Description
*	227,546	98	Impervious, HSG C
*	37,043	79	Landscaped, 50-75% Grass cover, Fair, HSG C
	264,589	95	Weighted Average
	37,043	79	14.00% Pervious Area
	227,546	98	86.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment A1: DMA A-1



Summary for Subcatchment A2: DMA A-2

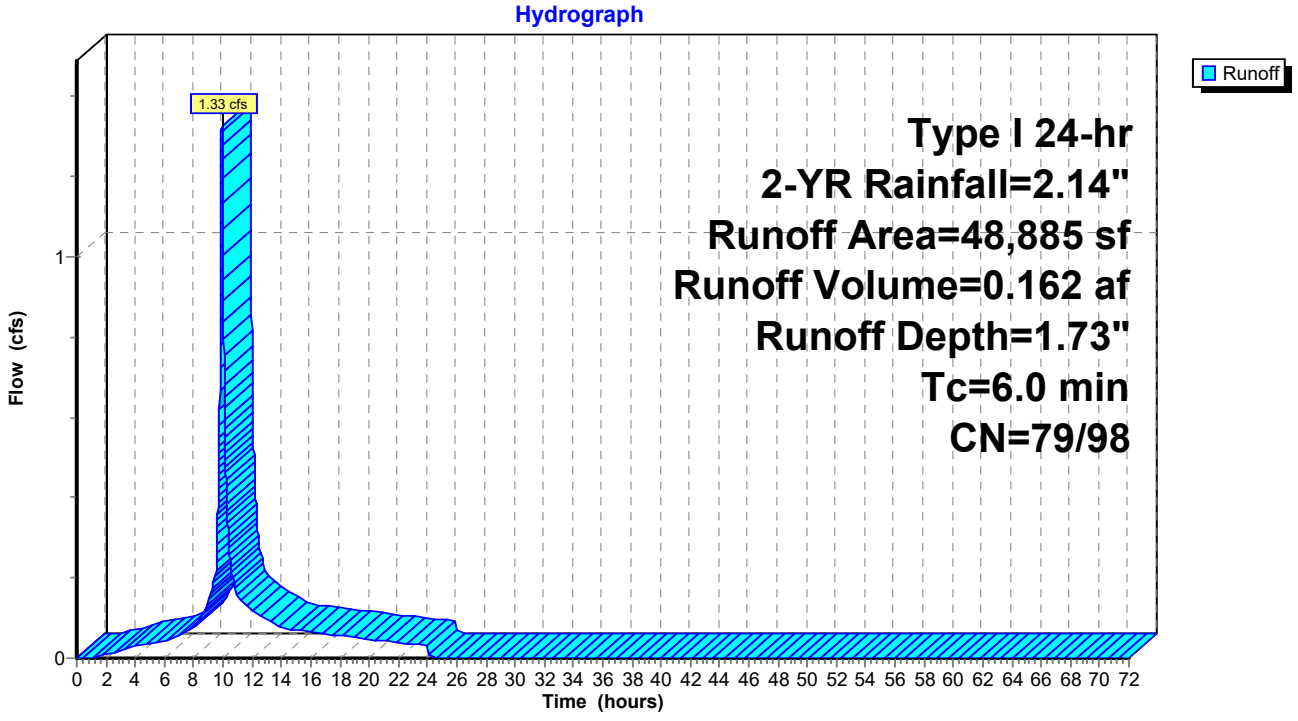
Runoff = 1.33 cfs @ 9.94 hrs, Volume= 0.162 af, Depth= 1.73"
Routed to Pond LID A2 : A-2 Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

Area (sf)	CN	Description
42,041	98	Impervious, HSG C
6,844	79	Landscaped, 50-75% Grass cover, Fair, HSG C
48,885	95	Weighted Average
6,844	79	14.00% Pervious Area
42,041	98	86.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment A2: DMA A-2



Summary for Subcatchment B1a: Catch B-1a

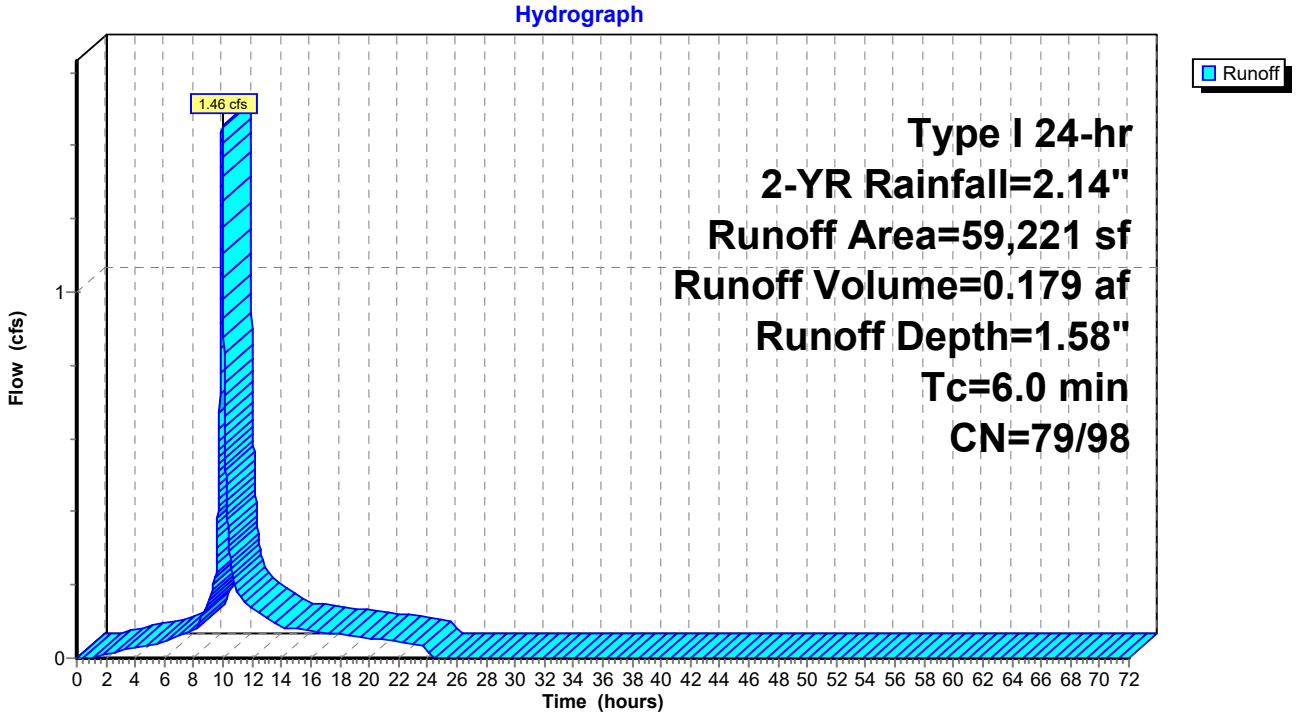
Runoff = 1.46 cfs @ 9.94 hrs, Volume= 0.179 af, Depth= 1.58"
Routed to Pond LID B1a : B-1a Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

Area (sf)	CN	Description
44,043	98	Impervious, HSG C
15,178	79	Landscaped, 50-75% Grass cover, Fair, HSG C
59,221	93	Weighted Average
15,178	79	25.63% Pervious Area
44,043	98	74.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B1a: Catch B-1a



Summary for Subcatchment B1b: Catch B-1b

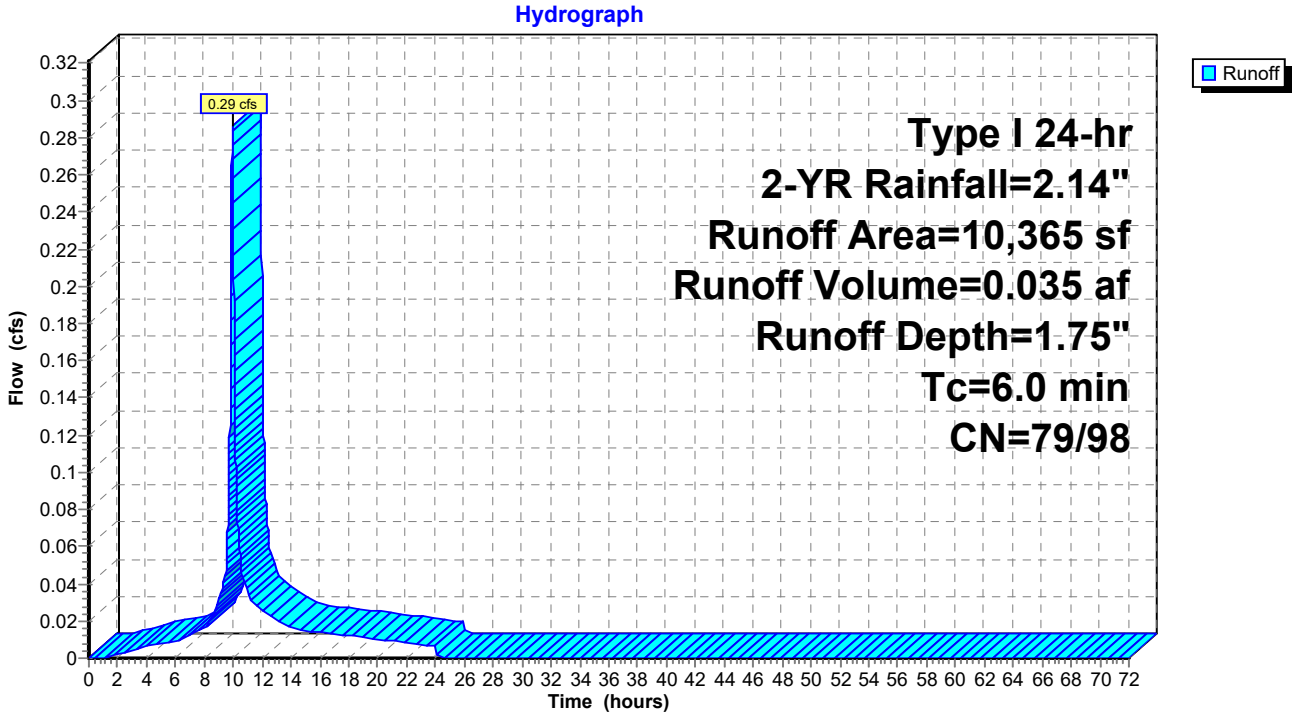
Runoff = 0.29 cfs @ 9.94 hrs, Volume= 0.035 af, Depth= 1.75"
Routed to Pond LID B1b : B-1b Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

Area (sf)	CN	Description
9,109	98	Impervious, HSG C
1,256	79	Landscaped, 50-75% Grass cover, Fair, HSG C
10,365	96	Weighted Average
1,256	79	12.12% Pervious Area
9,109	98	87.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B1b: Catch B-1b



Summary for Subcatchment B2a: Catch B-2a

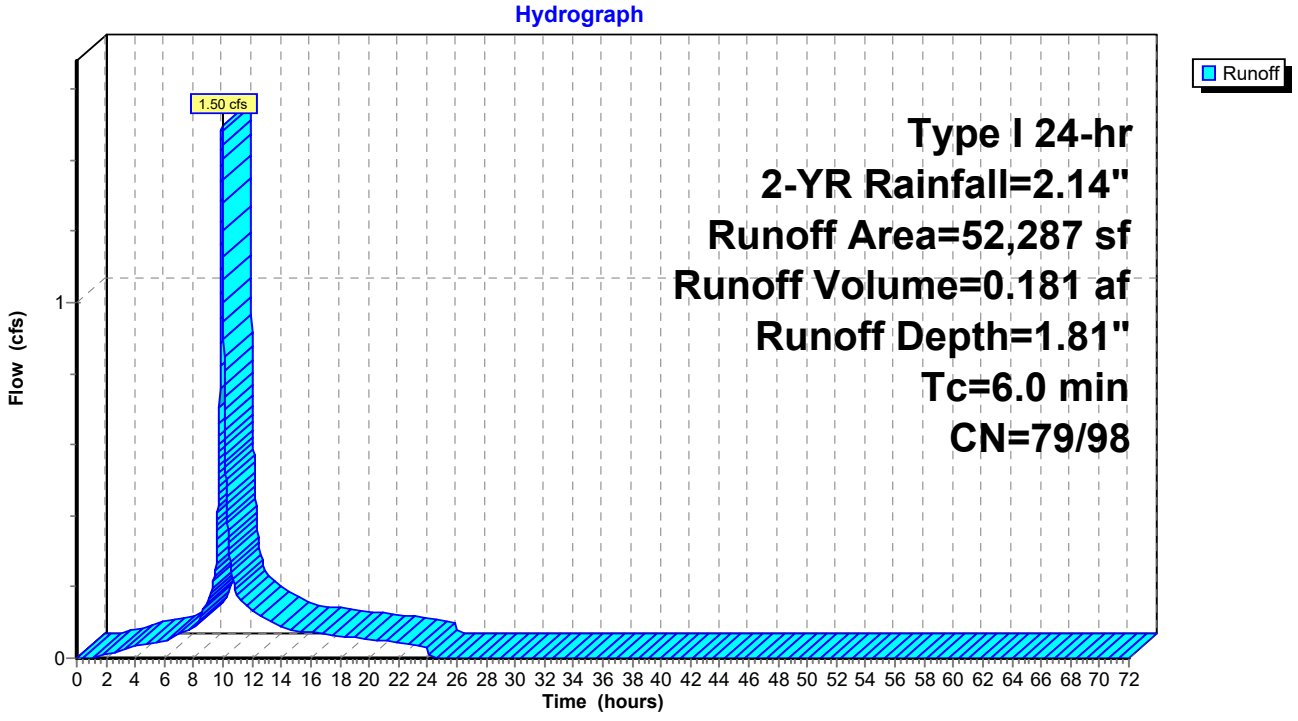
Runoff = 1.50 cfs @ 9.94 hrs, Volume= 0.181 af, Depth= 1.81"
Routed to Pond LID B2a : B-2a Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

Area (sf)	CN	Description
48,124	98	Impervious, HSG C
4,163	79	Landscaped, 50-75% Grass cover, Fair, HSG C
52,287	96	Weighted Average
4,163	79	7.96% Pervious Area
48,124	98	92.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B2a: Catch B-2a



Summary for Subcatchment C1: Catch C-1

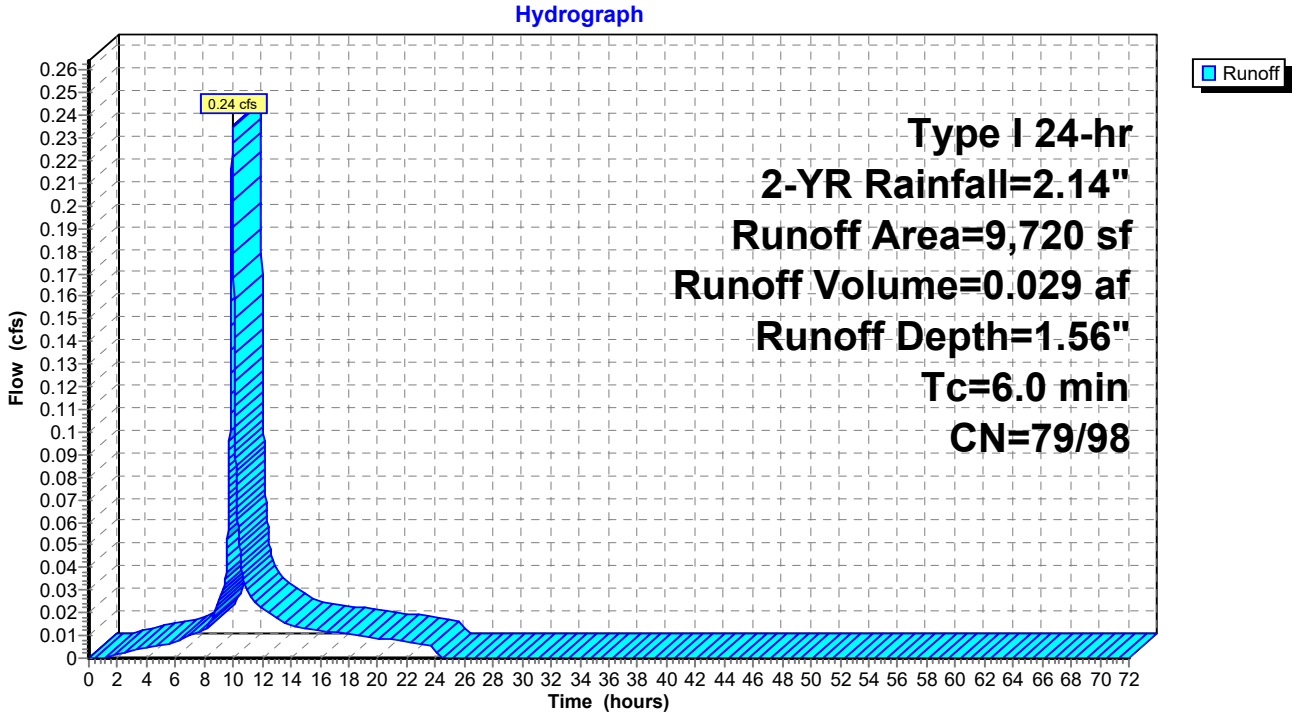
Runoff = 0.24 cfs @ 9.94 hrs, Volume= 0.029 af, Depth= 1.56"
Routed to Pond LID C2 : C-1 Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

Area (sf)	CN	Description
7,087	98	Impervious, HSG C
2,633	79	Landscaped, 50-75% Grass cover, Fair, HSG C
9,720	93	Weighted Average
2,633	79	27.09% Pervious Area
7,087	98	72.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment C1: Catch C-1



Summary for Subcatchment C2: Catch C-2

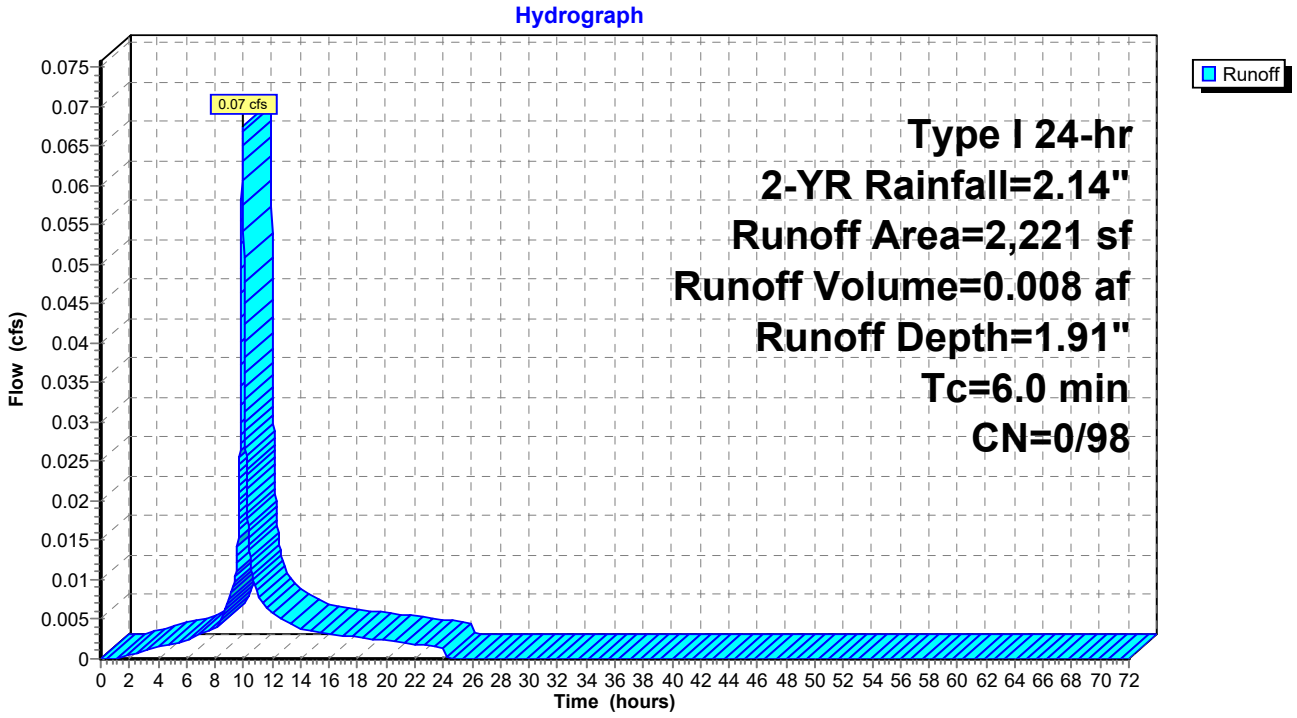
Runoff = 0.07 cfs @ 9.94 hrs, Volume= 0.008 af, Depth= 1.91"
Routed to Link C : Outlet C

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

Area (sf)	CN	Description
2,221	98	Impervious, HSG C
2,221	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment C2: Catch C-2



Summary for Subcatchment D1: DMA D-1

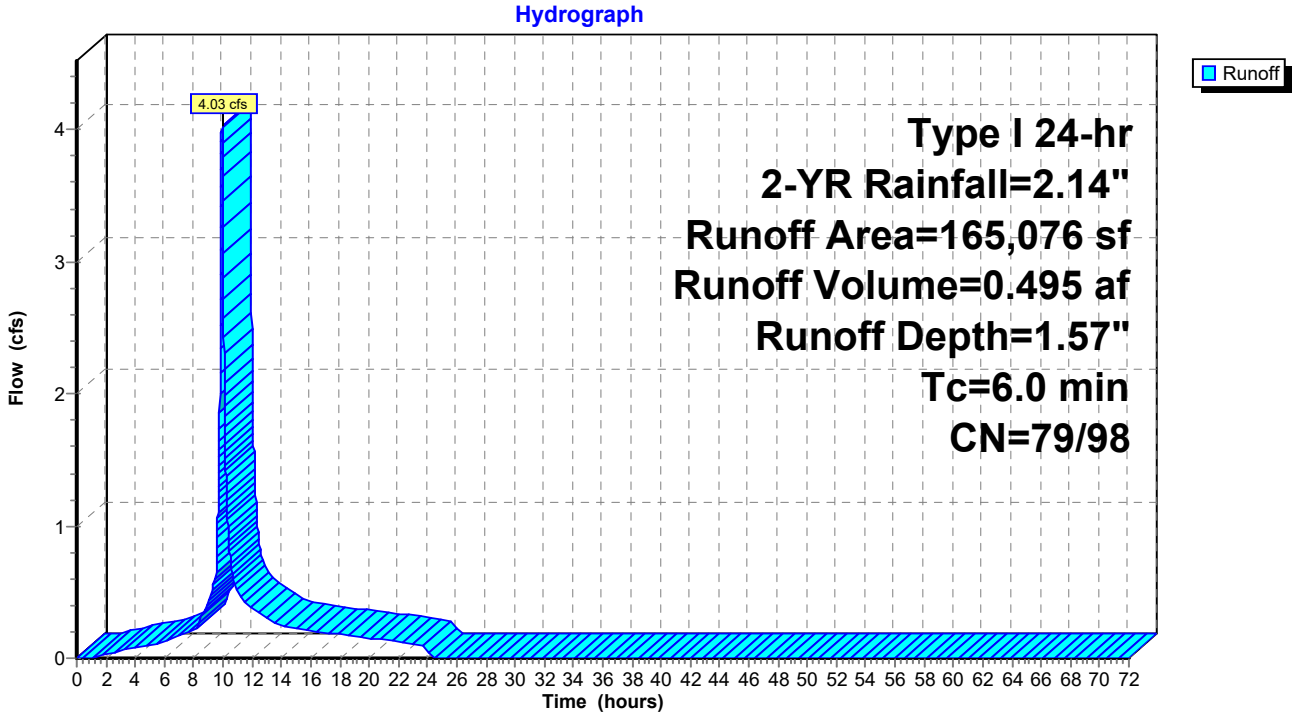
Runoff = 4.03 cfs @ 9.94 hrs, Volume= 0.495 af, Depth= 1.57"
Routed to Pond LID D : Basin

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 2-YR Rainfall=2.14"

	Area (sf)	CN	Description
	121,559	98	Paved parking, HSG C
*	43,517	79	Landscaped, 50-75% Grass cover, Fair, HSG C
	165,076	93	Weighted Average
	43,517	79	26.36% Pervious Area
	121,559	98	73.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment D1: DMA D-1



Summary for Pond LID A1: A-1 Chambers

Inflow Area = 6.074 ac, 86.00% Impervious, Inflow Depth = 1.73" for 2-YR event
Inflow = 7.21 cfs @ 9.94 hrs, Volume= 0.876 af
Outflow = 0.54 cfs @ 12.88 hrs, Volume= 0.680 af, Atten= 92%, Lag= 176.2 min
Discarded = 0.06 cfs @ 12.88 hrs, Volume= 0.350 af
Primary = 0.48 cfs @ 12.88 hrs, Volume= 0.330 af
Routed to Link A : Outlet A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 819.30' @ 12.88 hrs Surf.Area= 0.303 ac Storage= 0.487 af

Plug-Flow detention time= 1,042.4 min calculated for 0.680 af (78% of inflow)
Center-of-Mass det. time= 921.0 min (1,644.3 - 723.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	817.00'	0.417 af	**51.42'W x 256.65'L x 5.50'H Field A** 1.666 af Overall - 0.623 af Embedded = 1.043 af x 40.0% Voids
#2A	817.75'	0.623 af	**ADS_StormTech MC-3500 d +Cap**x 245 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 245 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		1.040 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	819.00'	**18.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 819.00' / 818.50' S= 0.0143 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	817.00'	**0.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.10' Phase-In= 0.10'

Discarded OutFlow Max=0.06 cfs @ 12.88 hrs HW=819.30' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.48 cfs @ 12.88 hrs HW=819.30' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.48 cfs @ 1.88 fps)

Pond LID A1: A-1 Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

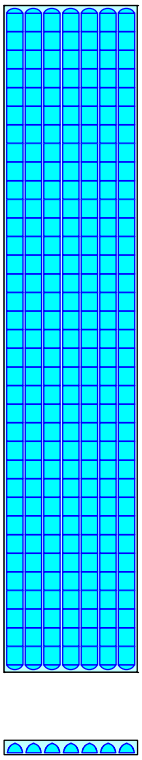
35 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 254.65' Row Length +12.0" End Stone x 2 = 256.65' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

245 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 27,146.8 cf Chamber Storage

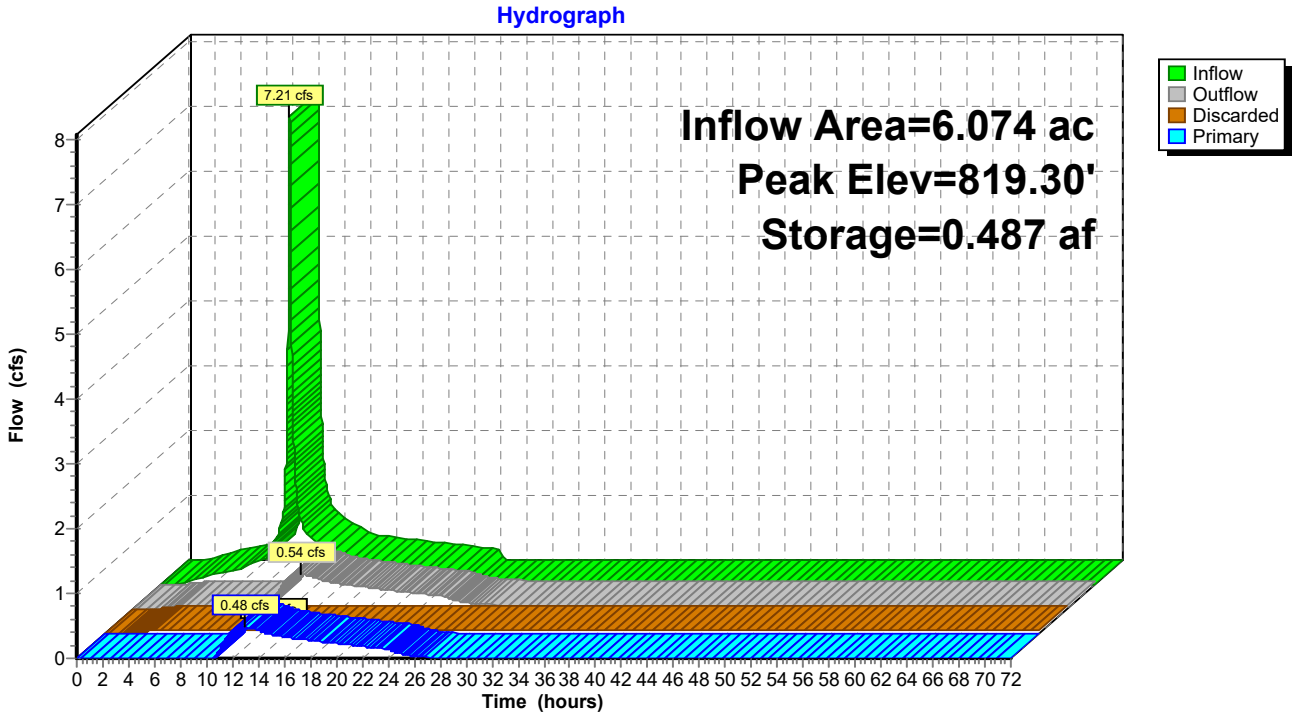
72,578.5 cf Field - 27,146.8 cf Chambers = 45,431.7 cf Stone x 40.0% Voids = 18,172.7 cf Stone Storage

Chamber Storage + Stone Storage = 45,319.5 cf = 1.040 af
Overall Storage Efficiency = 62.4%
Overall System Size = 256.65' x 51.42' x 5.50'

245 Chambers
2,688.1 cy Field
1,682.7 cy Stone



Pond LID A1: A-1 Chambers



Summary for Pond LID A2: A-2 Bioretention

Inflow Area = 1.122 ac, 86.00% Impervious, Inflow Depth = 1.73" for 2-YR event
Inflow = 1.33 cfs @ 9.94 hrs, Volume= 0.162 af
Outflow = 0.27 cfs @ 10.44 hrs, Volume= 0.162 af, Atten= 80%, Lag= 30.2 min
Discarded = 0.27 cfs @ 10.44 hrs, Volume= 0.162 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link A : Outlet A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 824.08' @ 10.44 hrs Surf.Area= 3,565 sf Storage= 1,618 cf

Plug-Flow detention time= 50.0 min calculated for 0.162 af (100% of inflow)
Center-of-Mass det. time= 49.9 min (773.3 - 723.3)

Volume	Invert	Avail.Storage	Storage Description
#1	821.90'	5,348 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

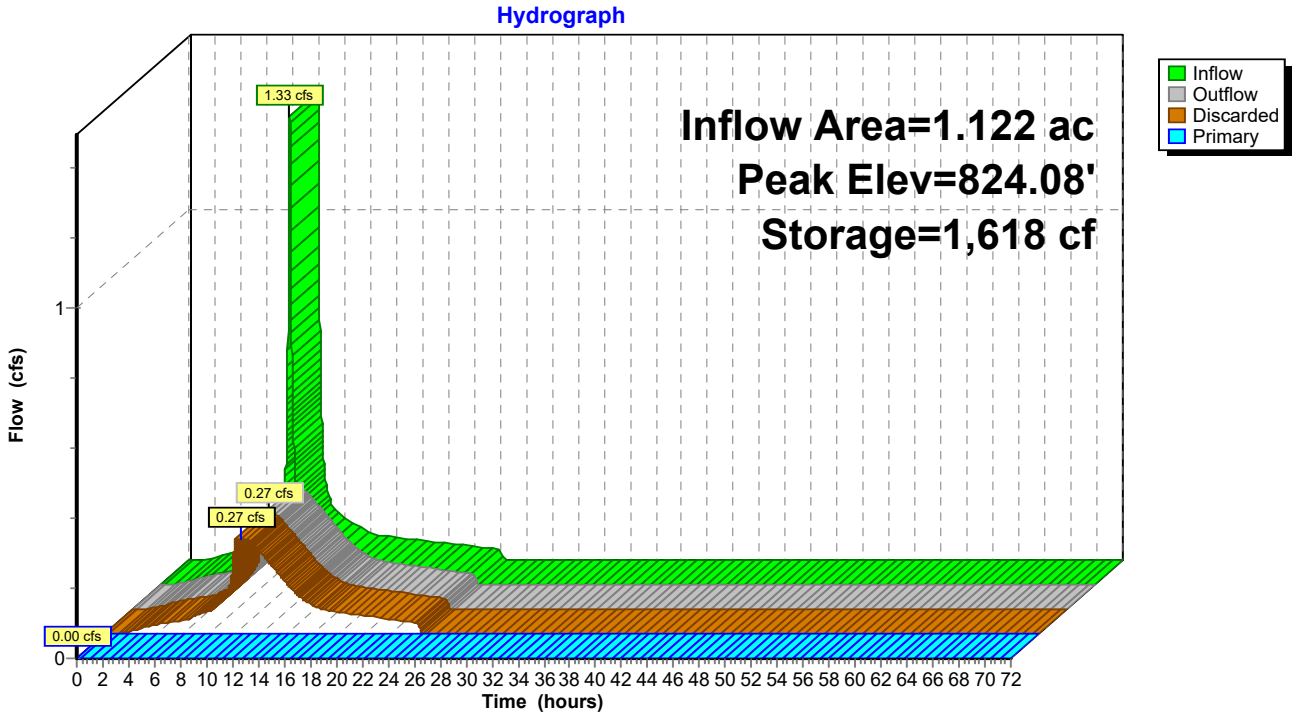
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
821.90	0	0.0	0	0
823.90	3,565	40.0	1,426	1,426
825.90	3,565	30.0	2,139	3,565
826.40	3,565	100.0	1,783	5,348

Device	Routing	Invert	Outlet Devices
#1	Primary	825.90'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	821.90'	**3.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00'

Discarded OutFlow Max=0.27 cfs @ 10.44 hrs HW=824.08' (Free Discharge)
↑**2=Exfiltration** (Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=821.90' TW=0.00' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID A2: A-2 Bioretention



Summary for Pond LID B1a: B-1a Chambers

Inflow Area = 1.360 ac, 74.37% Impervious, Inflow Depth = 1.58" for 2-YR event
Inflow = 1.46 cfs @ 9.94 hrs, Volume= 0.179 af
Outflow = 0.02 cfs @ 24.08 hrs, Volume= 0.088 af, Atten= 99%, Lag= 848.7 min
Discarded = 0.02 cfs @ 24.08 hrs, Volume= 0.088 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 821.36' @ 24.08 hrs Surf.Area= 0.155 ac Storage= 0.153 af

Plug-Flow detention time= 1,749.5 min calculated for 0.088 af (49% of inflow)
Center-of-Mass det. time= 1,547.2 min (2,278.3 - 731.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	819.80'	0.217 af	**87.25'W x 77.40'L x 5.50'H Field A** 0.853 af Overall - 0.311 af Embedded = 0.542 af x 40.0% Voids
#2A	820.55'	0.311 af	**ADS_StormTech MC-3500 d +Cap**x 120 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 120 Chambers in 12 Rows Cap Storage= 14.9 cf x 2 x 12 rows = 357.6 cf
		0.528 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	822.63'	**18.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 822.63' / 822.50' S= 0.0026 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	819.80'	**0.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 98.80' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 24.08 hrs HW=821.36' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=819.80' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond LID B1a: B-1a Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 12 rows = 357.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

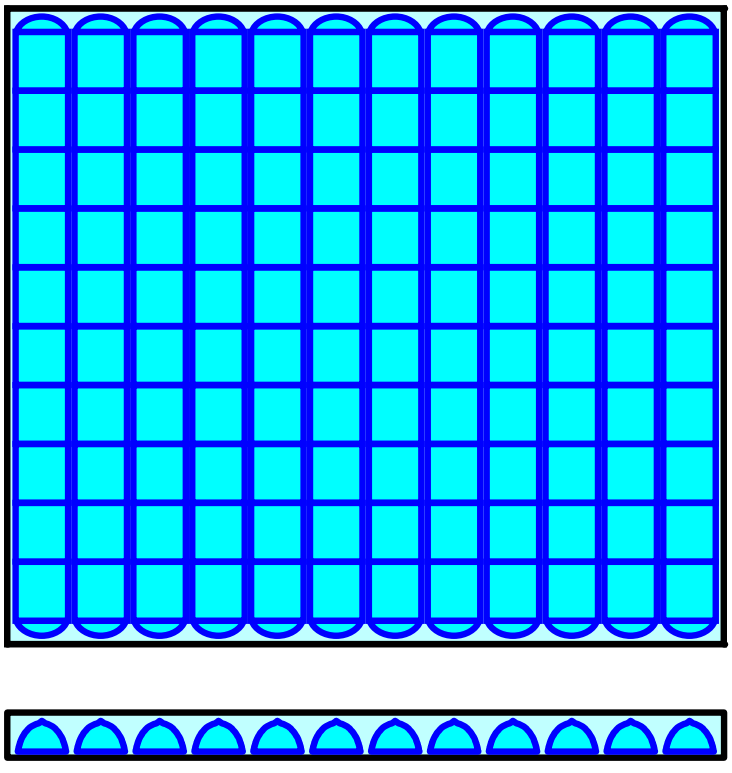
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
12 Rows x 77.0" Wide + 9.0" Spacing x 11 + 12.0" Side Stone x 2 = 87.25' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

120 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 12 Rows = 13,551.8 cf Chamber Storage

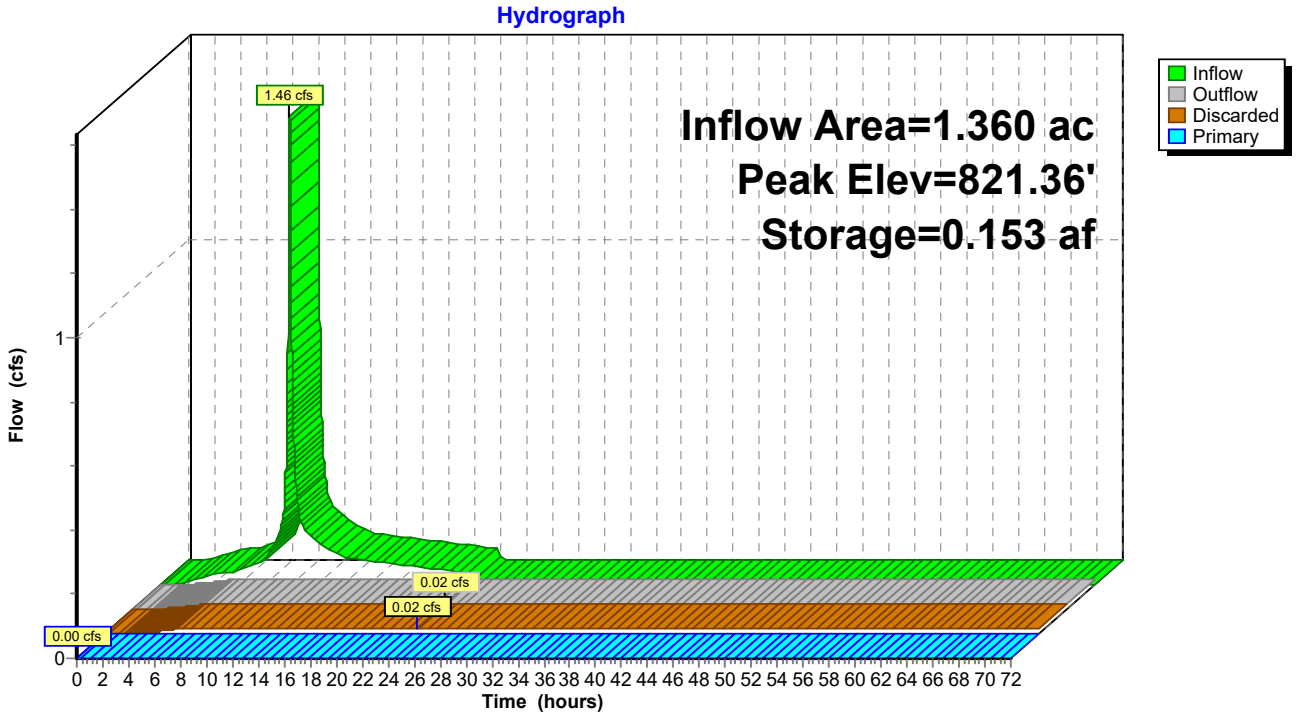
37,142.3 cf Field - 13,551.8 cf Chambers = 23,590.5 cf Stone x 40.0% Voids = 9,436.2 cf Stone Storage

Chamber Storage + Stone Storage = 22,988.0 cf = 0.528 af
Overall Storage Efficiency = 61.9%
Overall System Size = 77.40' x 87.25' x 5.50'

120 Chambers
1,375.6 cy Field
873.7 cy Stone



Pond LID B1a: B-1a Chambers



Summary for Pond LID B1b: B-1b Bioretention

Inflow Area = 0.238 ac, 87.88% Impervious, Inflow Depth = 1.75" for 2-YR event
Inflow = 0.29 cfs @ 9.94 hrs, Volume= 0.035 af
Outflow = 0.05 cfs @ 10.51 hrs, Volume= 0.035 af, Atten= 82%, Lag= 34.2 min
Discarded = 0.05 cfs @ 10.51 hrs, Volume= 0.035 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 822.64' @ 10.51 hrs Surf.Area= 1,106 sf Storage= 389 cf

Plug-Flow detention time= 72.4 min calculated for 0.035 af (100% of inflow)
Center-of-Mass det. time= 72.4 min (794.6 - 722.2)

Volume	Invert	Avail.Storage	Storage Description
#1	820.88'	1,884 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

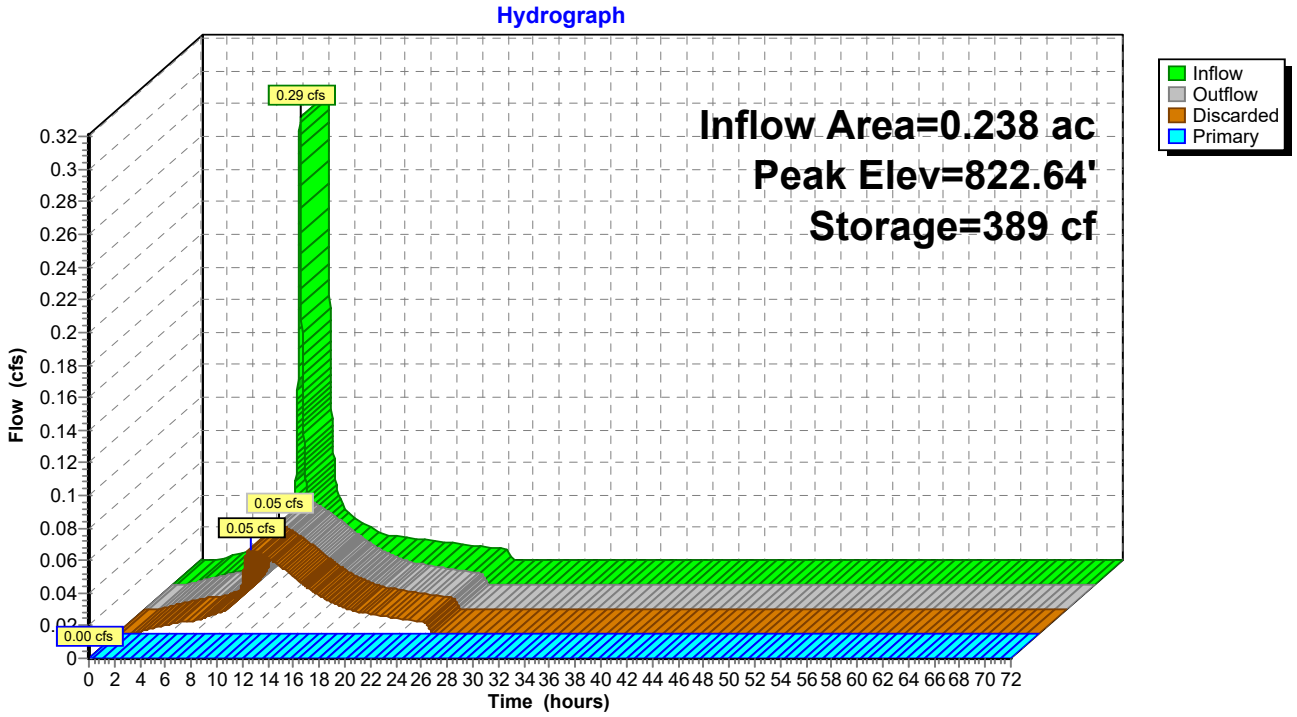
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
820.88	0	0.0	0	0
822.88	1,256	40.0	502	502
824.88	1,256	30.0	754	1,256
825.38	1,256	100.0	628	1,884

Device	Routing	Invert	Outlet Devices
#1	Primary	824.88'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	820.88'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'

Discarded OutFlow Max=0.05 cfs @ 10.51 hrs HW=822.64' (Free Discharge)
↑**2=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=820.88' TW=0.00' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID B1b: B-1b Bioretention



Summary for Pond LID B2a: B-2a Chambers

Inflow Area = 1.200 ac, 92.04% Impervious, Inflow Depth = 1.81" for 2-YR event
Inflow = 1.50 cfs @ 9.94 hrs, Volume= 0.181 af
Outflow = 0.06 cfs @ 18.70 hrs, Volume= 0.123 af, Atten= 96%, Lag= 525.7 min
Discarded = 0.02 cfs @ 18.70 hrs, Volume= 0.101 af
Primary = 0.04 cfs @ 18.70 hrs, Volume= 0.022 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 822.28' @ 18.70 hrs Surf.Area= 0.093 ac Storage= 0.131 af

Plug-Flow detention time= 1,504.4 min calculated for 0.123 af (68% of inflow)
Center-of-Mass det. time= 1,350.8 min (2,070.6 - 719.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	820.19'	0.131 af	**22.75'W x 177.78'L x 5.50'H Field A** 0.511 af Overall - 0.184 af Embedded = 0.327 af x 40.0% Voids
#2A	820.94'	0.184 af	**ADS_StormTech MC-3500 d +Cap**x 72 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 72 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		0.315 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	822.19'	**18.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 822.19' / 821.89' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	820.19'	**0.190 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 98.79' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 18.70 hrs HW=822.28' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.04 cfs @ 18.70 hrs HW=822.28' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.04 cfs @ 1.47 fps)

Pond LID B2a: B-2a Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

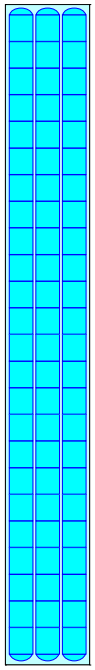
24 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 175.78' Row Length +12.0" End Stone x 2 = 177.78' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

72 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 8,005.9 cf Chamber Storage

22,244.7 cf Field - 8,005.9 cf Chambers = 14,238.8 cf Stone x 40.0% Voids = 5,695.5 cf Stone Storage

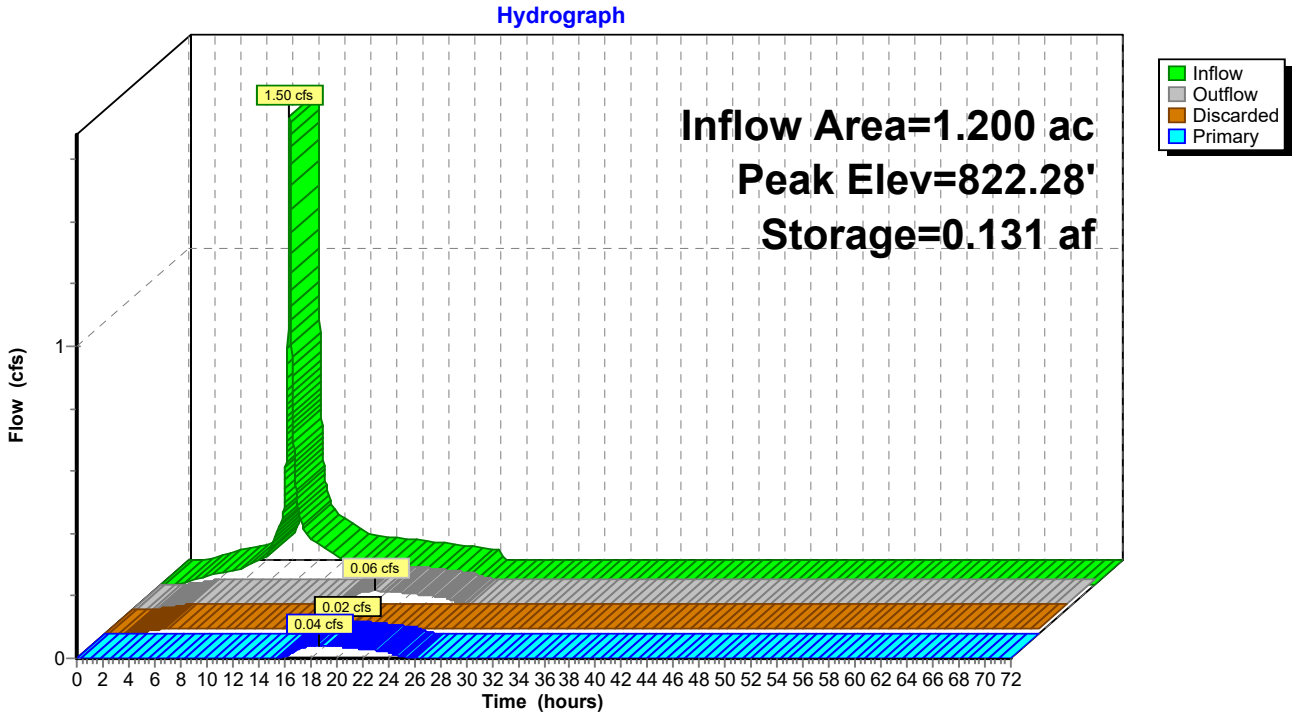
Chamber Storage + Stone Storage = 13,701.5 cf = 0.315 af
Overall Storage Efficiency = 61.6%
Overall System Size = 177.78' x 22.75' x 5.50'

72 Chambers
823.9 cy Field
527.4 cy Stone





Pond LID B2a: B-2a Chambers



Summary for Pond LID C2: C-1 Bioretention

Inflow Area = 0.223 ac, 72.91% Impervious, Inflow Depth = 1.56" for 2-YR event
Inflow = 0.24 cfs @ 9.94 hrs, Volume= 0.029 af
Outflow = 0.06 cfs @ 10.32 hrs, Volume= 0.029 af, Atten= 74%, Lag= 22.5 min
Discarded = 0.06 cfs @ 10.32 hrs, Volume= 0.029 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link C : Outlet C

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 821.65' @ 10.32 hrs Surf.Area= 877 sf Storage= 245 cf

Plug-Flow detention time= 32.0 min calculated for 0.029 af (100% of inflow)
Center-of-Mass det. time= 32.0 min (764.1 - 732.1)

Volume	Invert	Avail.Storage	Storage Description
#1	820.25'	1,884 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

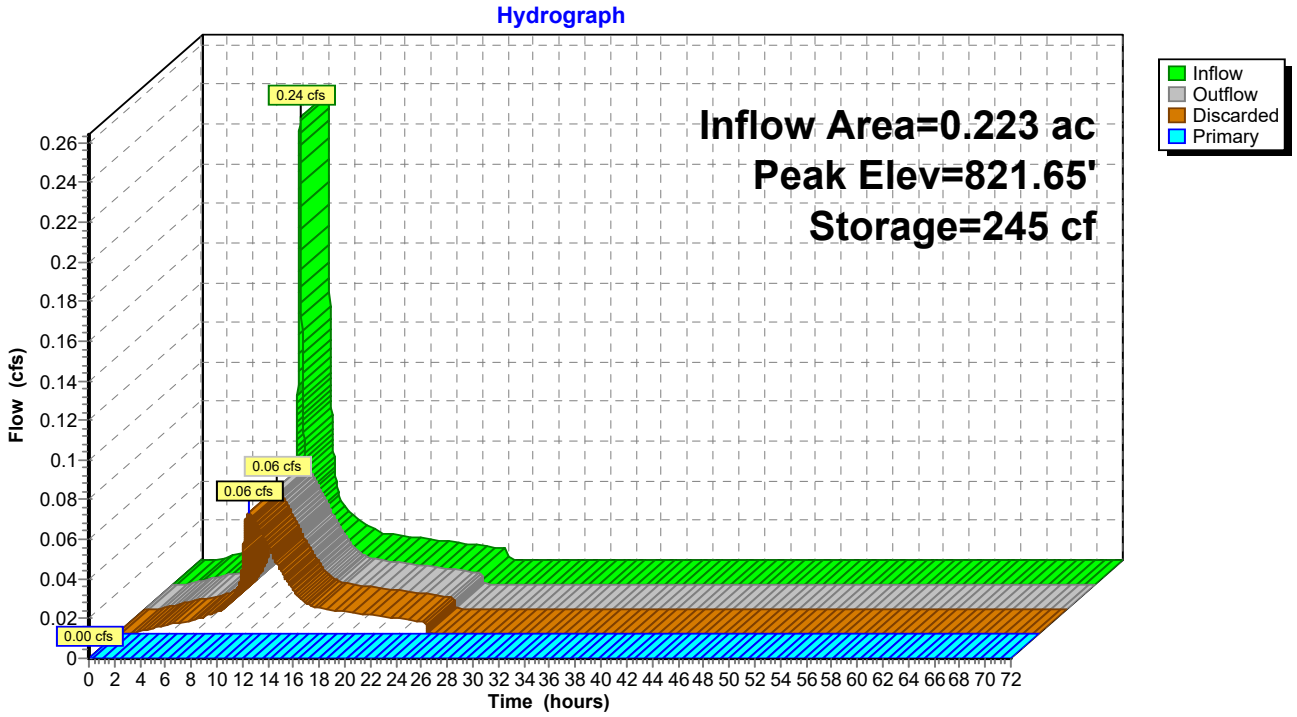
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
820.25	0	0.0	0	0
822.25	1,256	40.0	502	502
824.25	1,256	30.0	754	1,256
824.75	1,256	100.0	628	1,884

Device	Routing	Invert	Outlet Devices
#1	Primary	824.25'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	820.25'	**3.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'

Discarded OutFlow Max=0.06 cfs @ 10.32 hrs HW=821.65' (Free Discharge)
↑**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=820.25' TW=0.00' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID C2: C-1 Bioretention



Summary for Pond LID D: Basin

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 1.57" for 2-YR event
Inflow = 4.03 cfs @ 9.94 hrs, Volume= 0.495 af
Outflow = 0.02 cfs @ 24.18 hrs, Volume= 0.090 af, Atten= 100%, Lag= 854.3 min
Discarded = 0.02 cfs @ 24.18 hrs, Volume= 0.090 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link D : Outlet D
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link D : Outlet D

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 815.66' @ 24.18 hrs Surf.Area= 10,472 sf Storage= 20,544 cf

Plug-Flow detention time= 1,944.2 min calculated for 0.090 af (18% of inflow)
Center-of-Mass det. time= 1,627.5 min (2,359.1 - 731.6)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	35,708 cf	**DMA D Basin (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
810.00	4,775	0.0	0	0
812.00	4,775	40.0	3,820	3,820
814.00	4,775	30.0	2,865	6,685
815.00	9,674	100.0	7,225	13,910
816.00	10,885	100.0	10,280	24,189
817.00	12,153	100.0	11,519	35,708

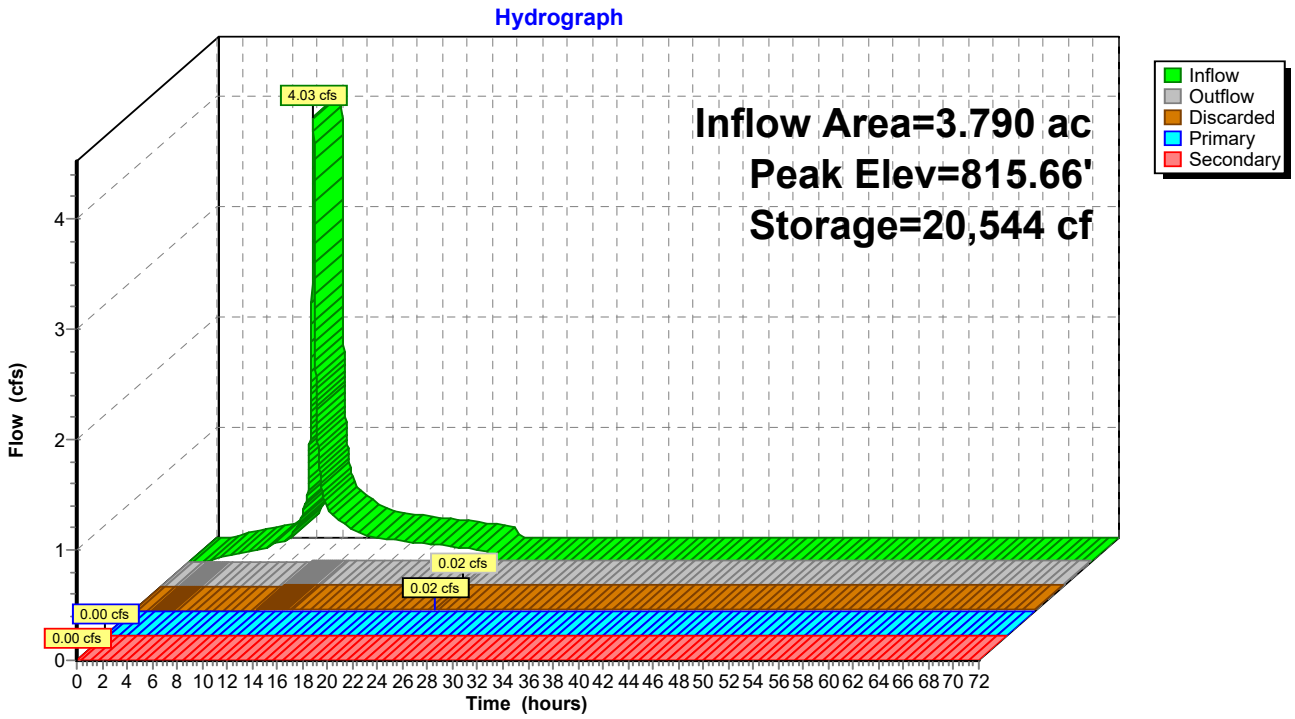
Device	Routing	Invert	Outlet Devices
#1	Primary	816.25'	**3.6" x 1.0" Horiz. Orifice/Grate X 310.00** C= 0.600 in 36.0" x 36.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	810.00'	**0.070 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'
#3	Secondary	816.75'	**30.0' long x 2.0' breadth Spillway_Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.02 cfs @ 24.18 hrs HW=815.66' (Free Discharge)
2=Exfiltration (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=810.00' TW=0.00' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=810.00' TW=0.00' (Dynamic Tailwater)
3=Spillway_Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond LID D: Basin

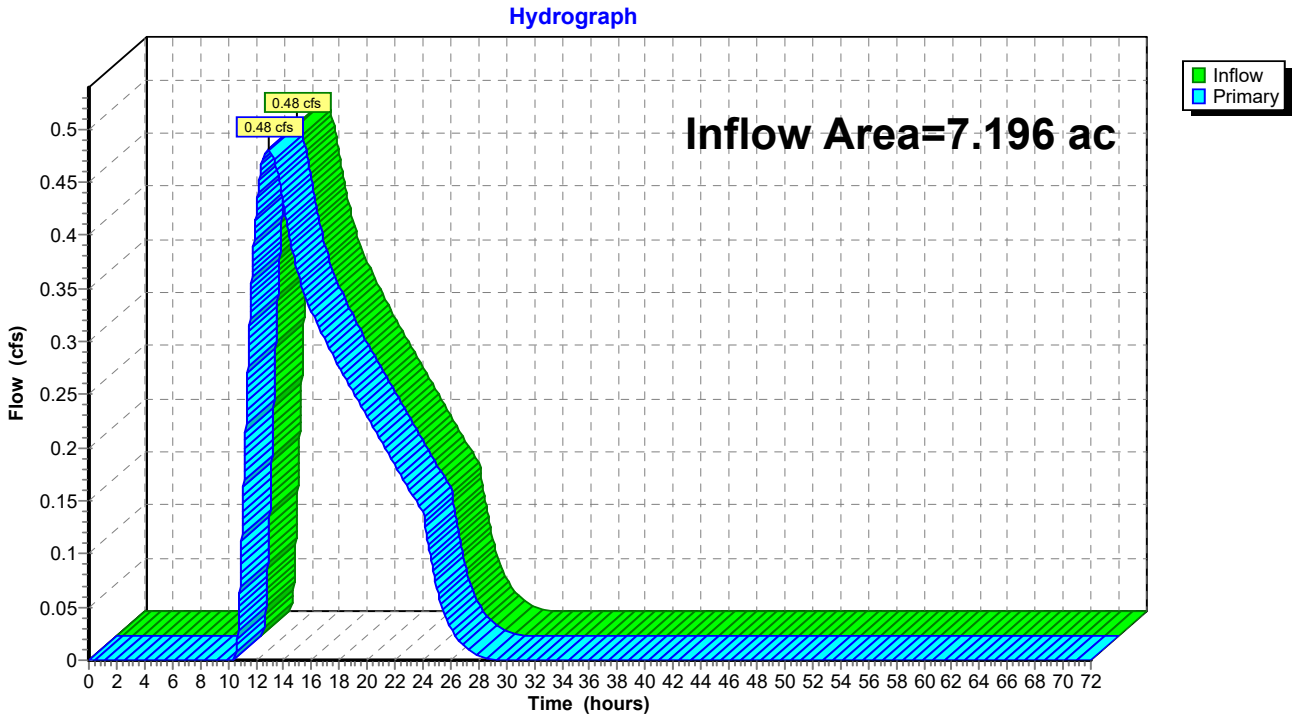


Summary for Link A: Outlet A

Inflow Area = 7.196 ac, 86.00% Impervious, Inflow Depth = 0.55" for 2-YR event
Inflow = 0.48 cfs @ 12.88 hrs, Volume= 0.330 af
Primary = 0.48 cfs @ 12.88 hrs, Volume= 0.330 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: Outlet A

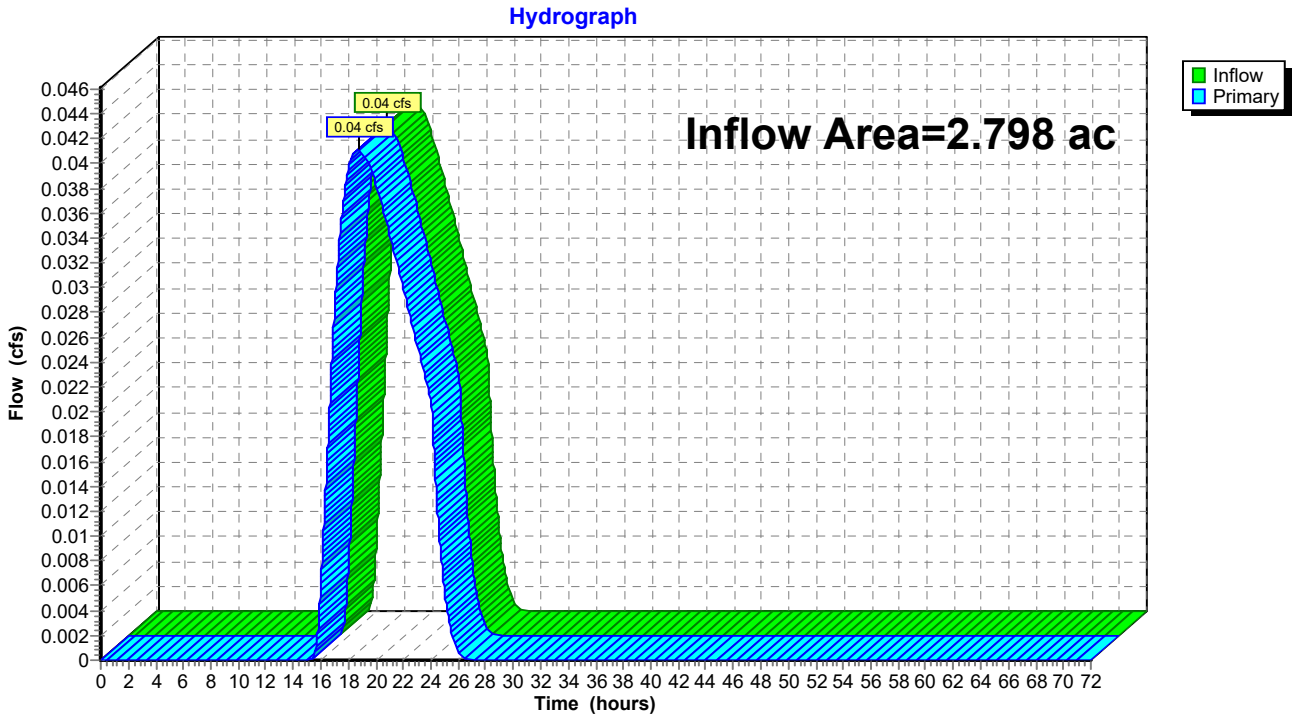


Summary for Link B: Outlet B

Inflow Area = 2.798 ac, 83.10% Impervious, Inflow Depth = 0.10" for 2-YR event
Inflow = 0.04 cfs @ 18.70 hrs, Volume= 0.022 af
Primary = 0.04 cfs @ 18.70 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: Outlet B

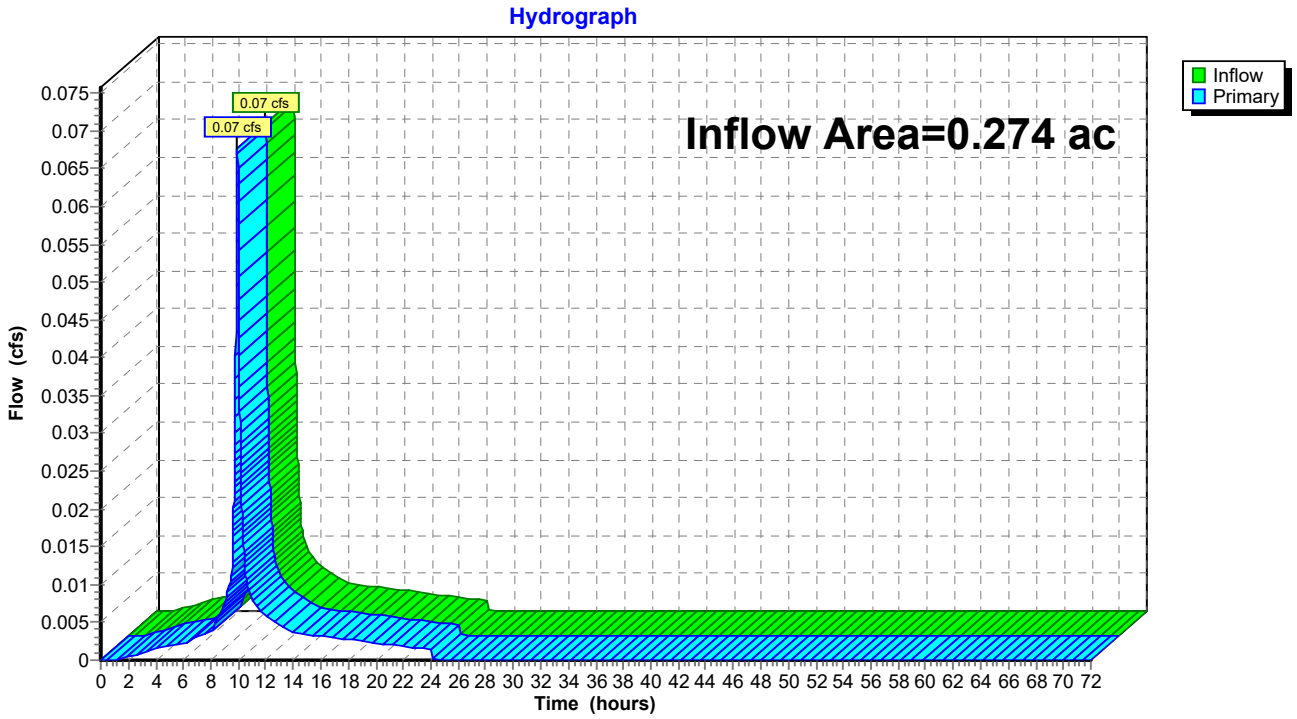


Summary for Link C: Outlet C

Inflow Area = 0.274 ac, 77.95% Impervious, Inflow Depth = 0.36" for 2-YR event
Inflow = 0.07 cfs @ 9.94 hrs, Volume= 0.008 af
Primary = 0.07 cfs @ 9.94 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link C: Outlet C

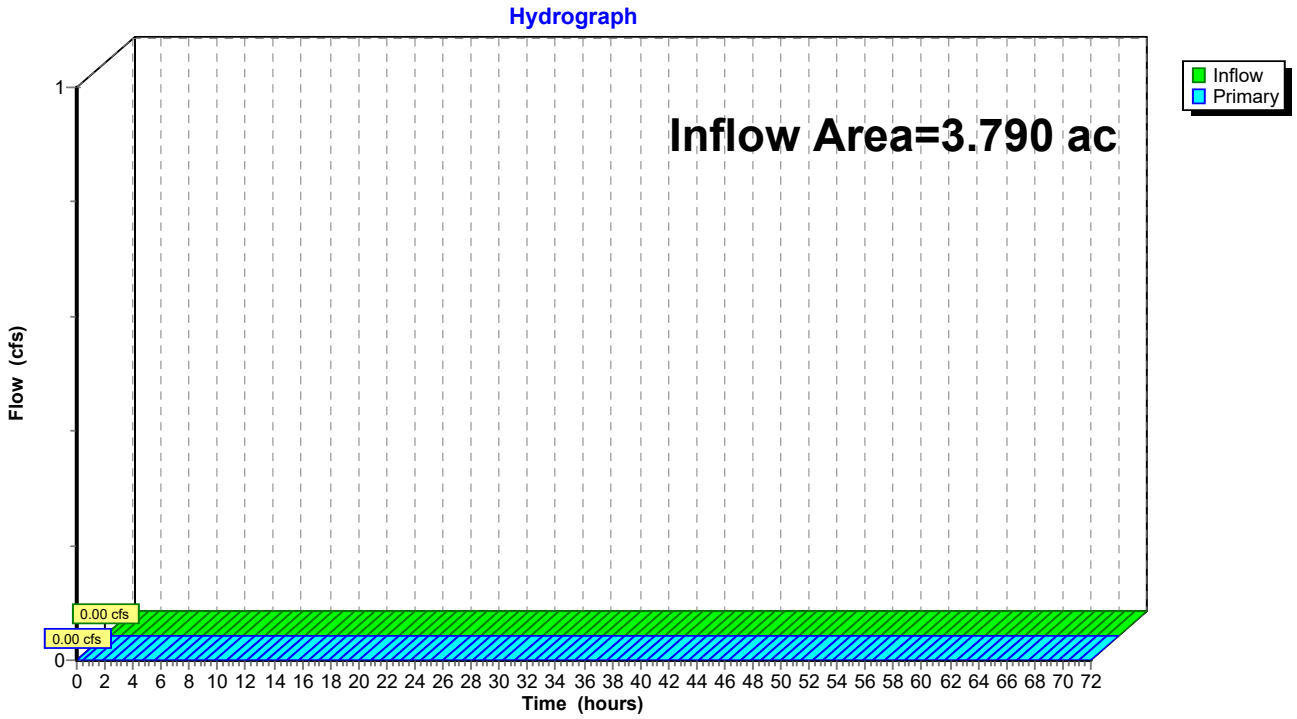


Summary for Link D: Outlet D

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link D: Outlet D



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A1: DMA A-1 Runoff Area=264,589 sf 86.00% Impervious Runoff Depth=3.26"
Tc=6.0 min CN=79/98 Runoff=13.40 cfs 1.650 af

Subcatchment A2: DMA A-2 Runoff Area=48,885 sf 86.00% Impervious Runoff Depth=3.26"
Tc=6.0 min CN=79/98 Runoff=2.48 cfs 0.305 af

Subcatchment B1a: Catch B-1a Runoff Area=59,221 sf 74.37% Impervious Runoff Depth=3.06"
Tc=6.0 min CN=79/98 Runoff=2.81 cfs 0.346 af

Subcatchment B1b: Catch B-1b Runoff Area=10,365 sf 87.88% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=79/98 Runoff=0.53 cfs 0.065 af

Subcatchment B2a: Catch B-2a Runoff Area=52,287 sf 92.04% Impervious Runoff Depth=3.37"
Tc=6.0 min CN=79/98 Runoff=2.73 cfs 0.337 af

Subcatchment C1: Catch C-1 Runoff Area=9,720 sf 72.91% Impervious Runoff Depth=3.03"
Tc=6.0 min CN=79/98 Runoff=0.46 cfs 0.056 af

Subcatchment C2: Catch C-2 Runoff Area=2,221 sf 100.00% Impervious Runoff Depth=3.51"
Tc=6.0 min CN=0/98 Runoff=0.12 cfs 0.015 af

Subcatchment D1: DMA D-1 Runoff Area=165,076 sf 73.64% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=79/98 Runoff=7.81 cfs 0.961 af

Pond LID A1: A-1 Chambers Peak Elev=820.05' Storage=0.660 af Inflow=13.40 cfs 1.650 af
Discarded=0.06 cfs 0.356 af Primary=4.58 cfs 1.095 af Outflow=4.64 cfs 1.451 af

Pond LID A2: A-2 Bioretention Peak Elev=825.94' Storage=3,706 cf Inflow=2.48 cfs 0.305 af
Discarded=0.27 cfs 0.297 af Primary=0.15 cfs 0.008 af Outflow=0.42 cfs 0.305 af

Pond LID B1a: B-1a Chambers Peak Elev=822.70' Storage=0.317 af Inflow=2.81 cfs 0.346 af
Discarded=0.02 cfs 0.090 af Primary=0.01 cfs 0.002 af Outflow=0.03 cfs 0.093 af

Pond LID B1b: B-1b Bioretention Peak Elev=823.90' Storage=887 cf Inflow=0.53 cfs 0.065 af
Discarded=0.06 cfs 0.065 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.065 af

Pond LID B2a: B-2a Chambers Peak Elev=822.54' Storage=0.150 af Inflow=2.73 cfs 0.337 af
Discarded=0.02 cfs 0.103 af Primary=0.59 cfs 0.175 af Outflow=0.61 cfs 0.278 af

Pond LID C2: C-1 Bioretention Peak Elev=822.44' Storage=574 cf Inflow=0.46 cfs 0.056 af
Discarded=0.09 cfs 0.056 af Primary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.056 af

Pond LID D: Basin Peak Elev=816.31' Storage=27,593 cf Inflow=7.81 cfs 0.961 af
Discarded=0.02 cfs 0.098 af Primary=0.54 cfs 0.313 af Secondary=0.00 cfs 0.000 af Outflow=0.56 cfs 0.411 af

Link A: Outlet A Inflow=4.58 cfs 1.103 af
Primary=4.58 cfs 1.103 af

Link B: Outlet B Inflow=0.59 cfs 0.177 af
Primary=0.59 cfs 0.177 af

Link C: Outlet C Inflow=0.12 cfs 0.015 af
Primary=0.12 cfs 0.015 af

Link D: Outlet D Inflow=0.54 cfs 0.313 af
Primary=0.54 cfs 0.313 af

Total Runoff Area = 14.058 ac Runoff Volume = 3.736 af Average Runoff Depth = 3.19"
18.07% Pervious = 2.540 ac 81.93% Impervious = 11.518 ac

Summary for Subcatchment A1: DMA A-1

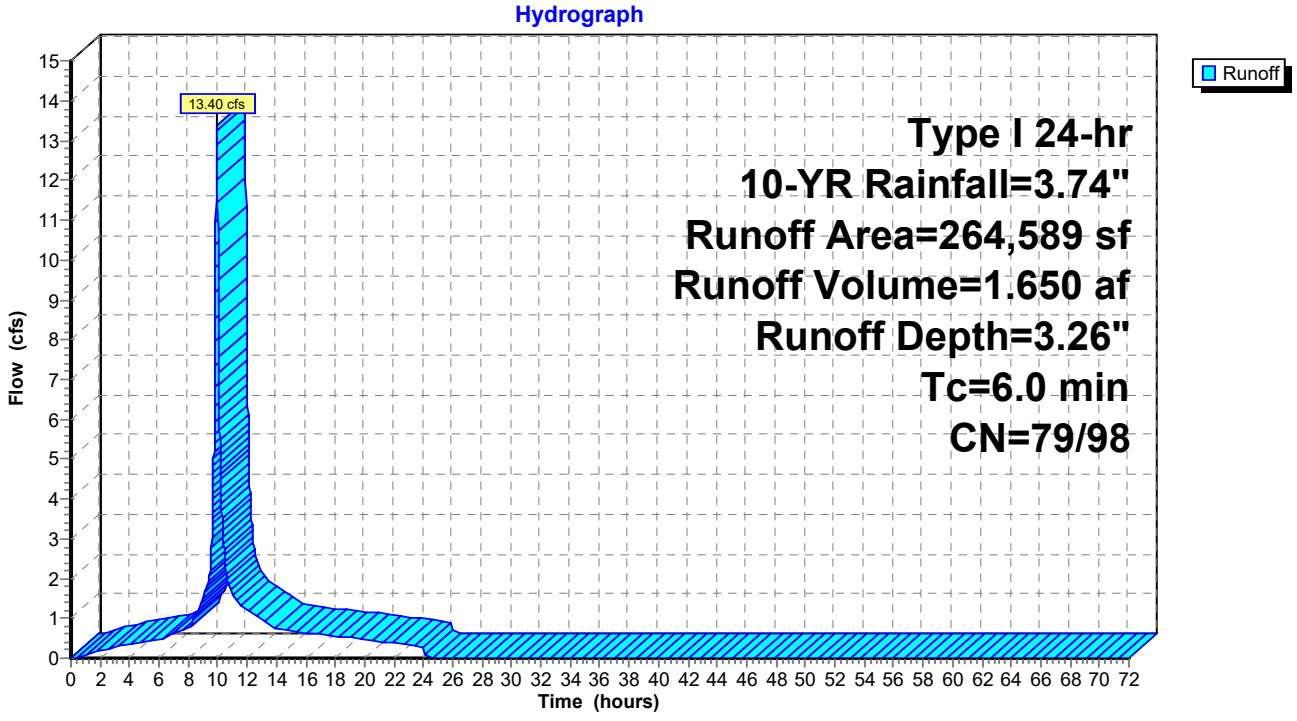
Runoff = 13.40 cfs @ 9.94 hrs, Volume= 1.650 af, Depth= 3.26"
Routed to Pond LID A1 : A-1 Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

	Area (sf)	CN	Description
*	227,546	98	Impervious, HSG C
*	37,043	79	Landscaped, 50-75% Grass cover, Fair, HSG C
	264,589	95	Weighted Average
	37,043	79	14.00% Pervious Area
	227,546	98	86.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment A1: DMA A-1



Summary for Subcatchment A2: DMA A-2

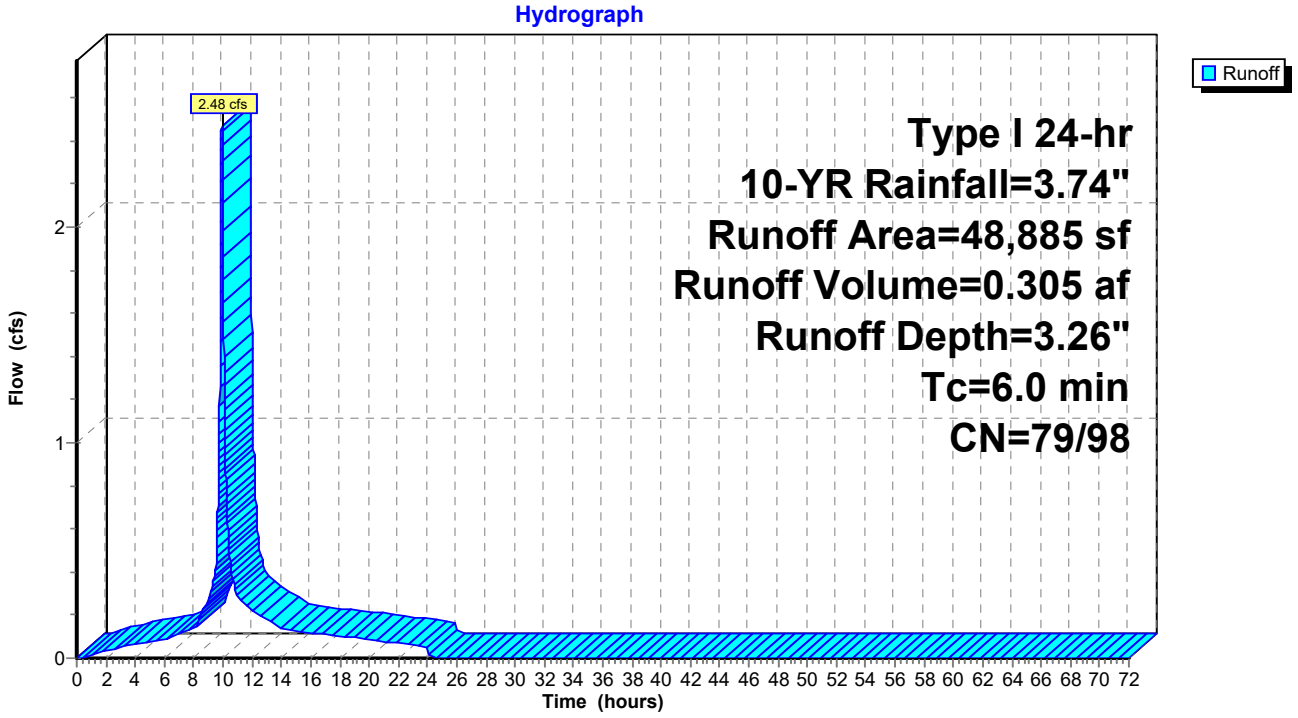
Runoff = 2.48 cfs @ 9.94 hrs, Volume= 0.305 af, Depth= 3.26"
Routed to Pond LID A2 : A-2 Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

Area (sf)	CN	Description
42,041	98	Impervious, HSG C
6,844	79	Landscaped, 50-75% Grass cover, Fair, HSG C
48,885	95	Weighted Average
6,844	79	14.00% Pervious Area
42,041	98	86.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment A2: DMA A-2



Summary for Subcatchment B1a: Catch B-1a

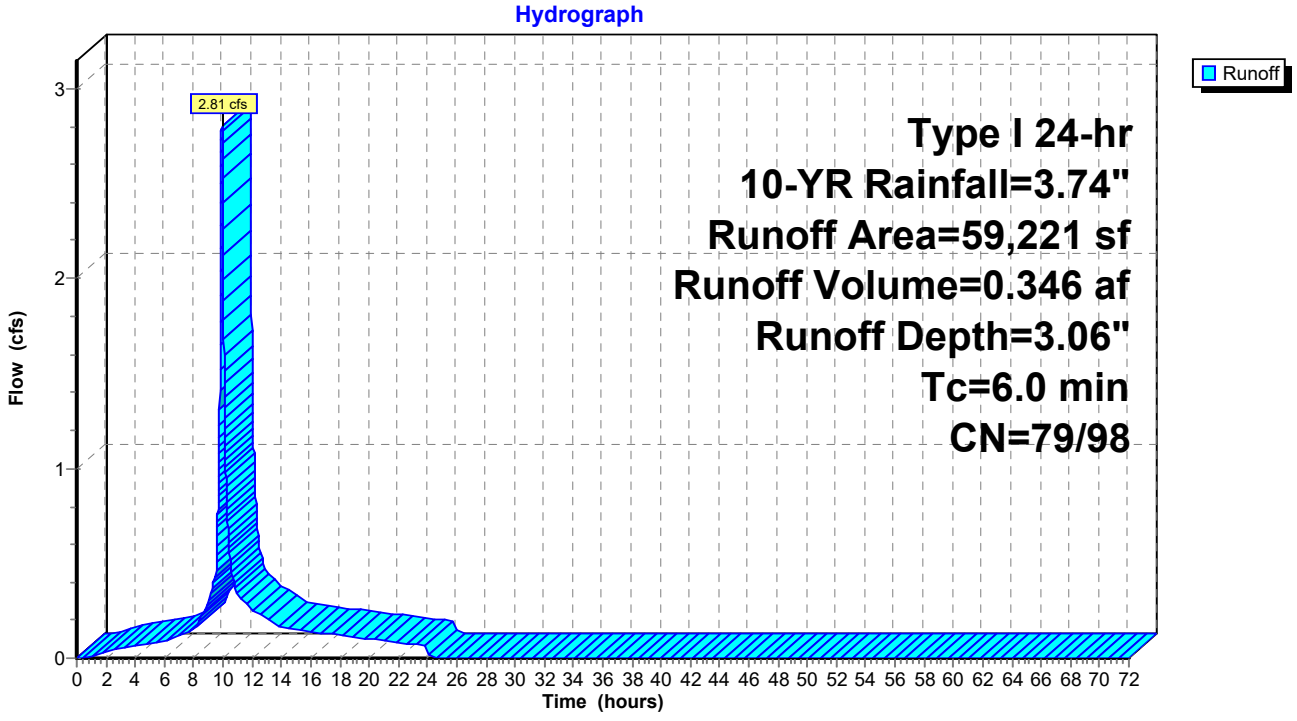
Runoff = 2.81 cfs @ 9.94 hrs, Volume= 0.346 af, Depth= 3.06"
Routed to Pond LID B1a : B-1a Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

Area (sf)	CN	Description
44,043	98	Impervious, HSG C
15,178	79	Landscaped, 50-75% Grass cover, Fair, HSG C
59,221	93	Weighted Average
15,178	79	25.63% Pervious Area
44,043	98	74.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B1a: Catch B-1a



Summary for Subcatchment B1b: Catch B-1b

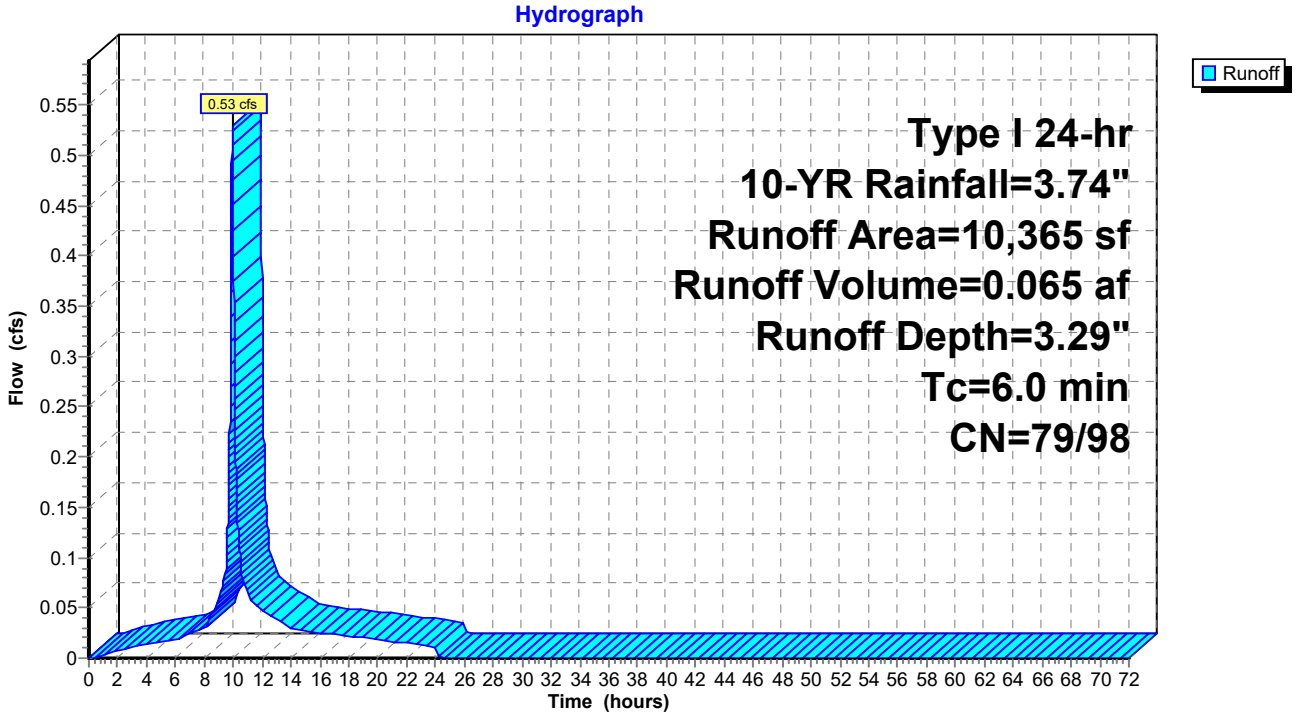
Runoff = 0.53 cfs @ 9.94 hrs, Volume= 0.065 af, Depth= 3.29"
Routed to Pond LID B1b : B-1b Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

Area (sf)	CN	Description
9,109	98	Impervious, HSG C
1,256	79	Landscaped, 50-75% Grass cover, Fair, HSG C
10,365	96	Weighted Average
1,256	79	12.12% Pervious Area
9,109	98	87.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B1b: Catch B-1b



Summary for Subcatchment B2a: Catch B-2a

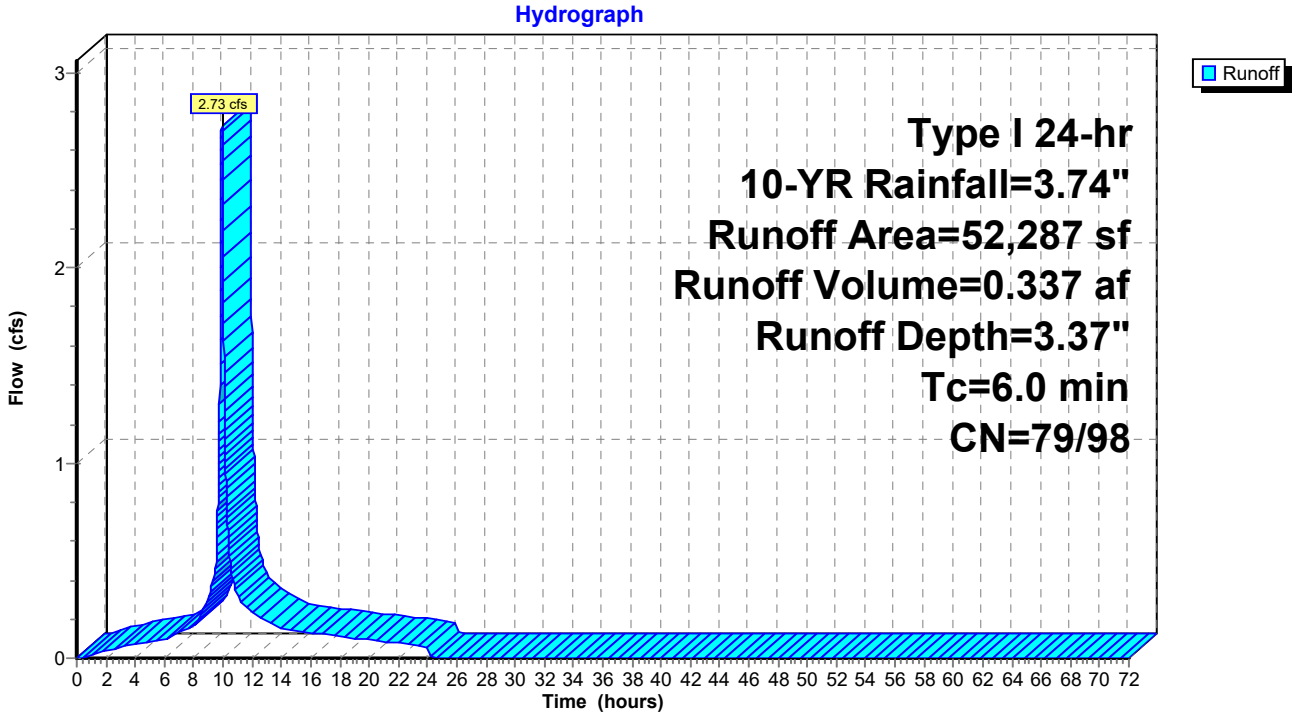
Runoff = 2.73 cfs @ 9.94 hrs, Volume= 0.337 af, Depth= 3.37"
Routed to Pond LID B2a : B-2a Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

Area (sf)	CN	Description
48,124	98	Impervious, HSG C
4,163	79	Landscaped, 50-75% Grass cover, Fair, HSG C
52,287	96	Weighted Average
4,163	79	7.96% Pervious Area
48,124	98	92.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B2a: Catch B-2a



Summary for Subcatchment C1: Catch C-1

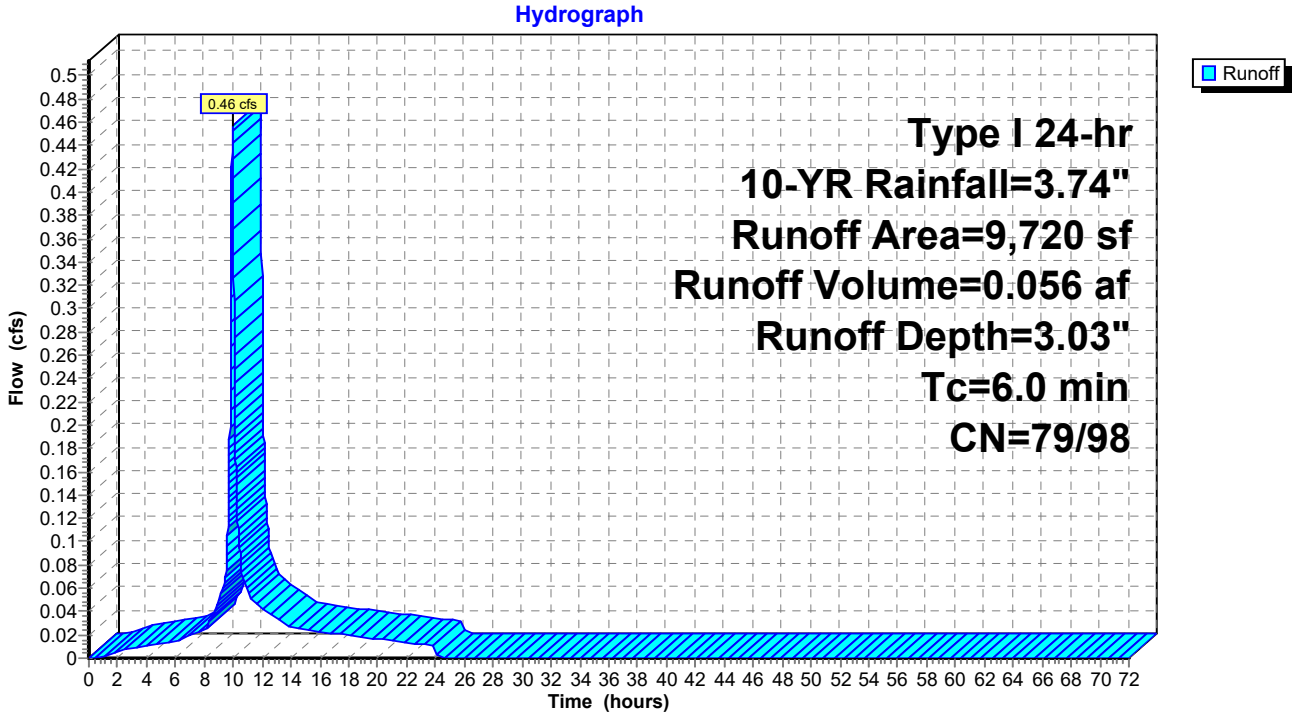
Runoff = 0.46 cfs @ 9.94 hrs, Volume= 0.056 af, Depth= 3.03"
Routed to Pond LID C2 : C-1 Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

Area (sf)	CN	Description
7,087	98	Impervious, HSG C
2,633	79	Landscaped, 50-75% Grass cover, Fair, HSG C
9,720	93	Weighted Average
2,633	79	27.09% Pervious Area
7,087	98	72.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment C1: Catch C-1



Summary for Subcatchment C2: Catch C-2

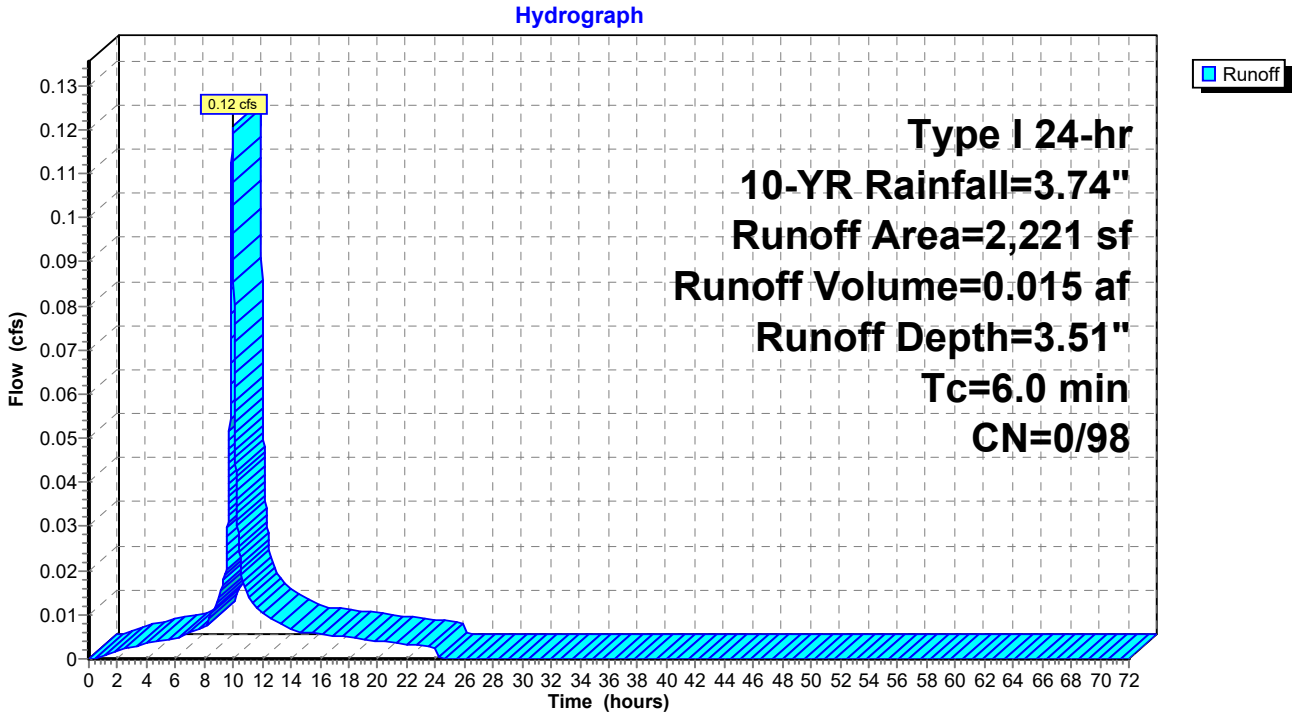
Runoff = 0.12 cfs @ 9.94 hrs, Volume= 0.015 af, Depth= 3.51"
Routed to Link C : Outlet C

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

Area (sf)	CN	Description
2,221	98	Impervious, HSG C
2,221	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment C2: Catch C-2



Summary for Subcatchment D1: DMA D-1

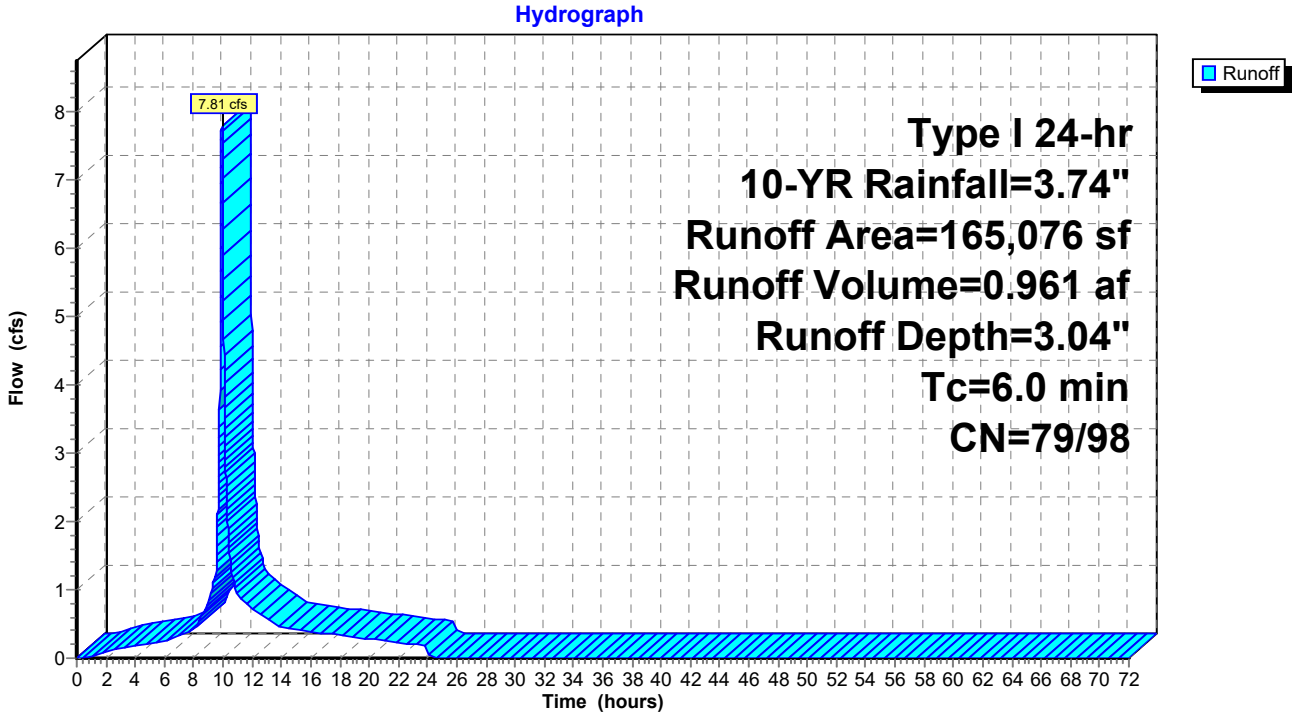
Runoff = 7.81 cfs @ 9.94 hrs, Volume= 0.961 af, Depth= 3.04"
Routed to Pond LID D : Basin

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 10-YR Rainfall=3.74"

	Area (sf)	CN	Description
	121,559	98	Paved parking, HSG C
*	43,517	79	Landscaped, 50-75% Grass cover, Fair, HSG C
	165,076	93	Weighted Average
	43,517	79	26.36% Pervious Area
	121,559	98	73.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment D1: DMA D-1



Summary for Pond LID A1: A-1 Chambers

Inflow Area = 6.074 ac, 86.00% Impervious, Inflow Depth = 3.26" for 10-YR event
Inflow = 13.40 cfs @ 9.94 hrs, Volume= 1.650 af
Outflow = 4.64 cfs @ 10.19 hrs, Volume= 1.451 af, Atten= 65%, Lag= 15.0 min
Discarded = 0.06 cfs @ 10.19 hrs, Volume= 0.356 af
Primary = 4.58 cfs @ 10.19 hrs, Volume= 1.095 af
Routed to Link A : Outlet A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 820.05' @ 10.19 hrs Surf.Area= 0.303 ac Storage= 0.660 af

Plug-Flow detention time= 555.6 min calculated for 1.450 af (88% of inflow)
Center-of-Mass det. time= 480.9 min (1,190.5 - 709.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	817.00'	0.417 af	**51.42'W x 256.65'L x 5.50'H Field A** 1.666 af Overall - 0.623 af Embedded = 1.043 af x 40.0% Voids
#2A	817.75'	0.623 af	**ADS_StormTech MC-3500 d +Cap**x 245 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 245 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		1.040 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	819.00'	**18.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 819.00' / 818.50' S= 0.0143 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	817.00'	**0.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.10' Phase-In= 0.10'

Discarded OutFlow Max=0.06 cfs @ 10.19 hrs HW=820.05' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=4.58 cfs @ 10.19 hrs HW=820.05' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.58 cfs @ 3.48 fps)

Pond LID A1: A-1 Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

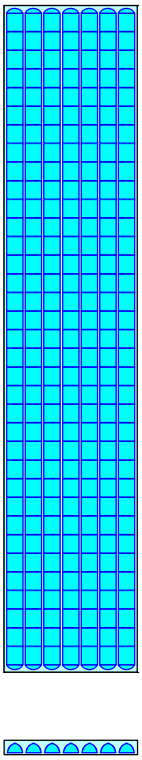
35 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 254.65' Row Length +12.0" End Stone x 2 = 256.65' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

245 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 27,146.8 cf Chamber Storage

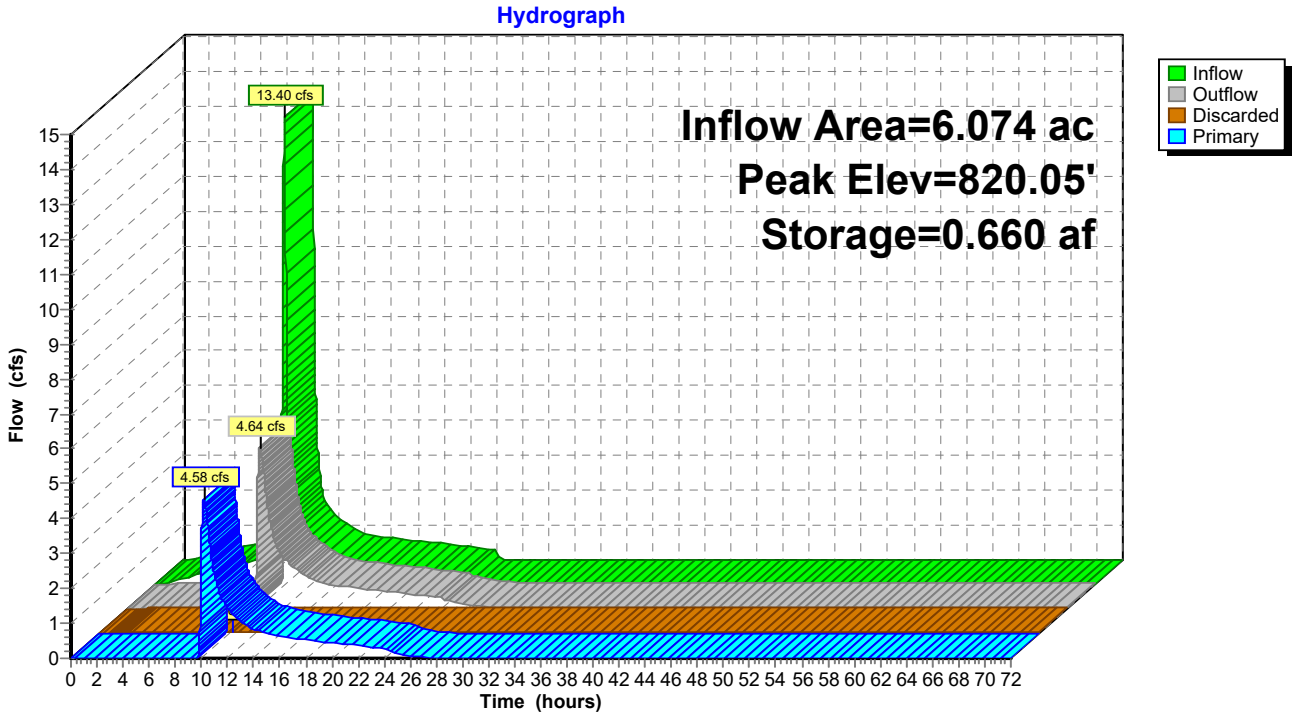
72,578.5 cf Field - 27,146.8 cf Chambers = 45,431.7 cf Stone x 40.0% Voids = 18,172.7 cf Stone Storage

Chamber Storage + Stone Storage = 45,319.5 cf = 1.040 af
Overall Storage Efficiency = 62.4%
Overall System Size = 256.65' x 51.42' x 5.50'

245 Chambers
2,688.1 cy Field
1,682.7 cy Stone



Pond LID A1: A-1 Chambers



Summary for Pond LID A2: A-2 Bioretention

Inflow Area = 1.122 ac, 86.00% Impervious, Inflow Depth = 3.26" for 10-YR event
Inflow = 2.48 cfs @ 9.94 hrs, Volume= 0.305 af
Outflow = 0.42 cfs @ 10.53 hrs, Volume= 0.305 af, Atten= 83%, Lag= 35.5 min
Discarded = 0.27 cfs @ 10.53 hrs, Volume= 0.297 af
Primary = 0.15 cfs @ 10.53 hrs, Volume= 0.008 af
Routed to Link A : Outlet A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 825.94' @ 10.53 hrs Surf.Area= 3,565 sf Storage= 3,706 cf

Plug-Flow detention time= 111.7 min calculated for 0.305 af (100% of inflow)
Center-of-Mass det. time= 111.7 min (821.3 - 709.6)

Volume	Invert	Avail.Storage	Storage Description
#1	821.90'	5,348 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

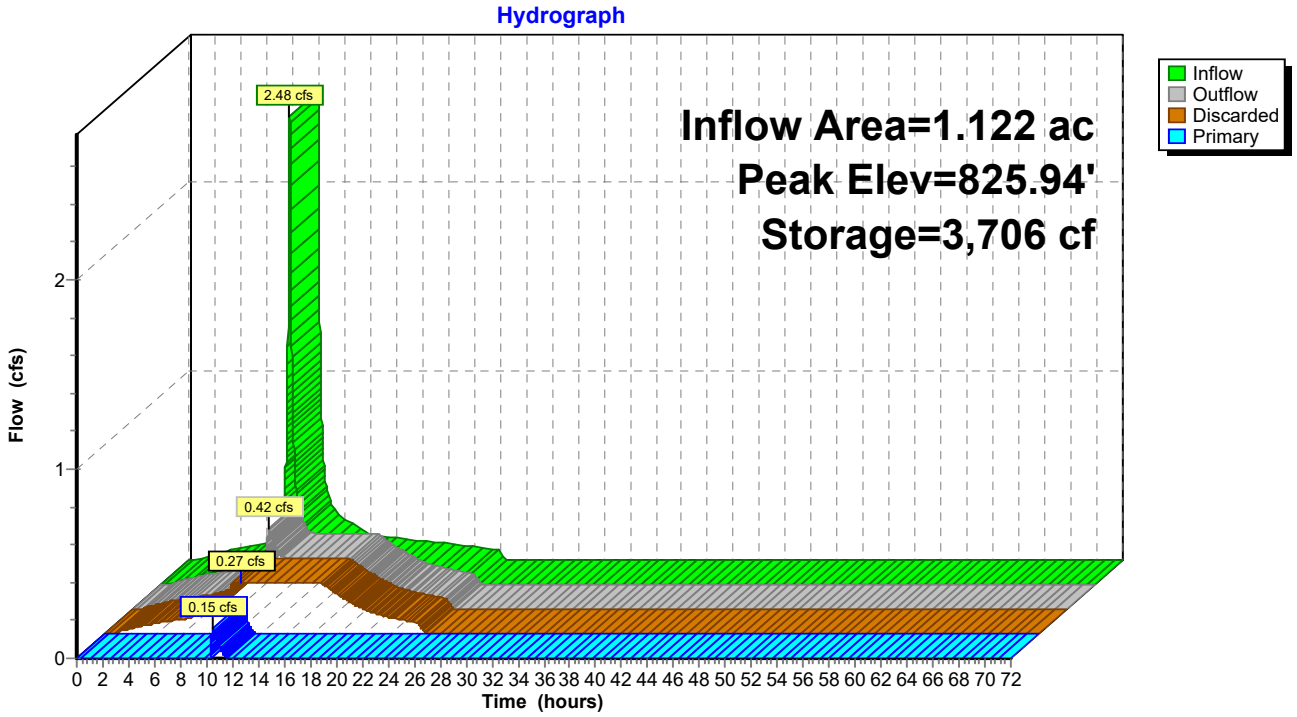
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
821.90	0	0.0	0	0
823.90	3,565	40.0	1,426	1,426
825.90	3,565	30.0	2,139	3,565
826.40	3,565	100.0	1,783	5,348

Device	Routing	Invert	Outlet Devices
#1	Primary	825.90'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	821.90'	**3.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00'

Discarded OutFlow Max=0.27 cfs @ 10.53 hrs HW=825.94' (Free Discharge)
↑**2=Exfiltration** (Controls 0.27 cfs)

Primary OutFlow Max=0.15 cfs @ 10.53 hrs HW=825.94' TW=0.00' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Weir Controls 0.15 cfs @ 0.65 fps)

Pond LID A2: A-2 Bioretention



Summary for Pond LID B1a: B-1a Chambers

Inflow Area = 1.360 ac, 74.37% Impervious, Inflow Depth = 3.06" for 10-YR event
Inflow = 2.81 cfs @ 9.94 hrs, Volume= 0.346 af
Outflow = 0.03 cfs @ 24.09 hrs, Volume= 0.093 af, Atten= 99%, Lag= 848.8 min
Discarded = 0.02 cfs @ 24.09 hrs, Volume= 0.090 af
Primary = 0.01 cfs @ 24.09 hrs, Volume= 0.002 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 822.70' @ 24.09 hrs Surf.Area= 0.155 ac Storage= 0.317 af

Plug-Flow detention time= 1,770.0 min calculated for 0.093 af (27% of inflow)
Center-of-Mass det. time= 1,495.5 min (2,213.6 - 718.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	819.80'	0.217 af	**87.25'W x 77.40'L x 5.50'H Field A** 0.853 af Overall - 0.311 af Embedded = 0.542 af x 40.0% Voids
#2A	820.55'	0.311 af	**ADS_StormTech MC-3500 d +Cap**x 120 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 120 Chambers in 12 Rows Cap Storage= 14.9 cf x 2 x 12 rows = 357.6 cf
		0.528 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	822.63'	**18.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 822.63' / 822.50' S= 0.0026 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	819.80'	**0.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 98.80' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 24.09 hrs HW=822.70' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.01 cfs @ 24.09 hrs HW=822.70' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.01 cfs @ 0.68 fps)

Pond LID B1a: B-1a Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 12 rows = 357.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

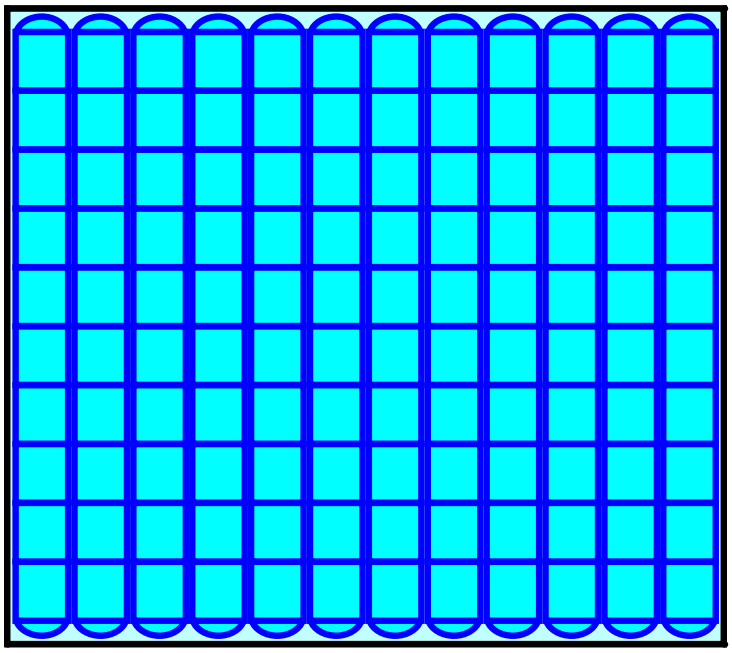
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
12 Rows x 77.0" Wide + 9.0" Spacing x 11 + 12.0" Side Stone x 2 = 87.25' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

120 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 12 Rows = 13,551.8 cf Chamber Storage

37,142.3 cf Field - 13,551.8 cf Chambers = 23,590.5 cf Stone x 40.0% Voids = 9,436.2 cf Stone Storage

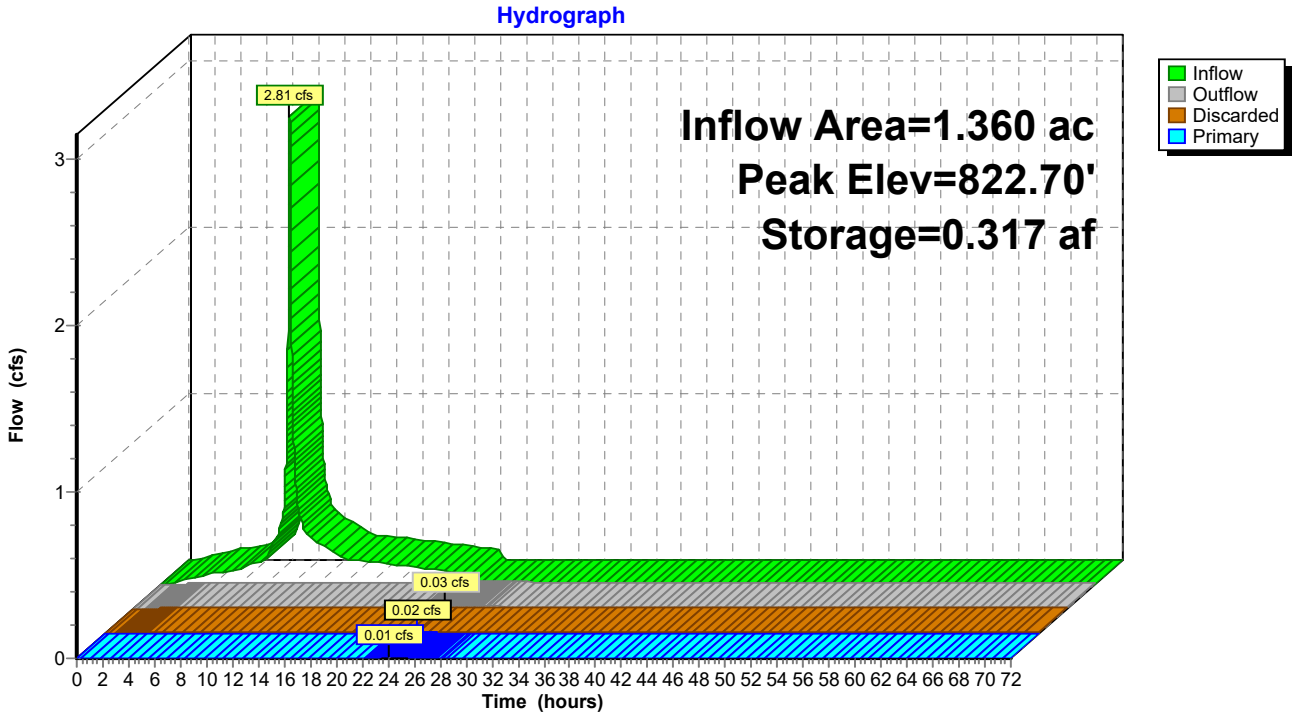
Chamber Storage + Stone Storage = 22,988.0 cf = 0.528 af
Overall Storage Efficiency = 61.9%
Overall System Size = 77.40' x 87.25' x 5.50'

120 Chambers
1,375.6 cy Field
873.7 cy Stone





Pond LID B1a: B-1a Chambers



Summary for Pond LID B1b: B-1b Bioretention

Inflow Area = 0.238 ac, 87.88% Impervious, Inflow Depth = 3.29" for 10-YR event
Inflow = 0.53 cfs @ 9.94 hrs, Volume= 0.065 af
Outflow = 0.06 cfs @ 11.18 hrs, Volume= 0.065 af, Atten= 89%, Lag= 74.5 min
Discarded = 0.06 cfs @ 11.18 hrs, Volume= 0.065 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 823.90' @ 11.18 hrs Surf.Area= 1,256 sf Storage= 887 cf

Plug-Flow detention time= 141.6 min calculated for 0.065 af (100% of inflow)
Center-of-Mass det. time= 141.6 min (849.8 - 708.3)

Volume	Invert	Avail.Storage	Storage Description
#1	820.88'	1,884 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

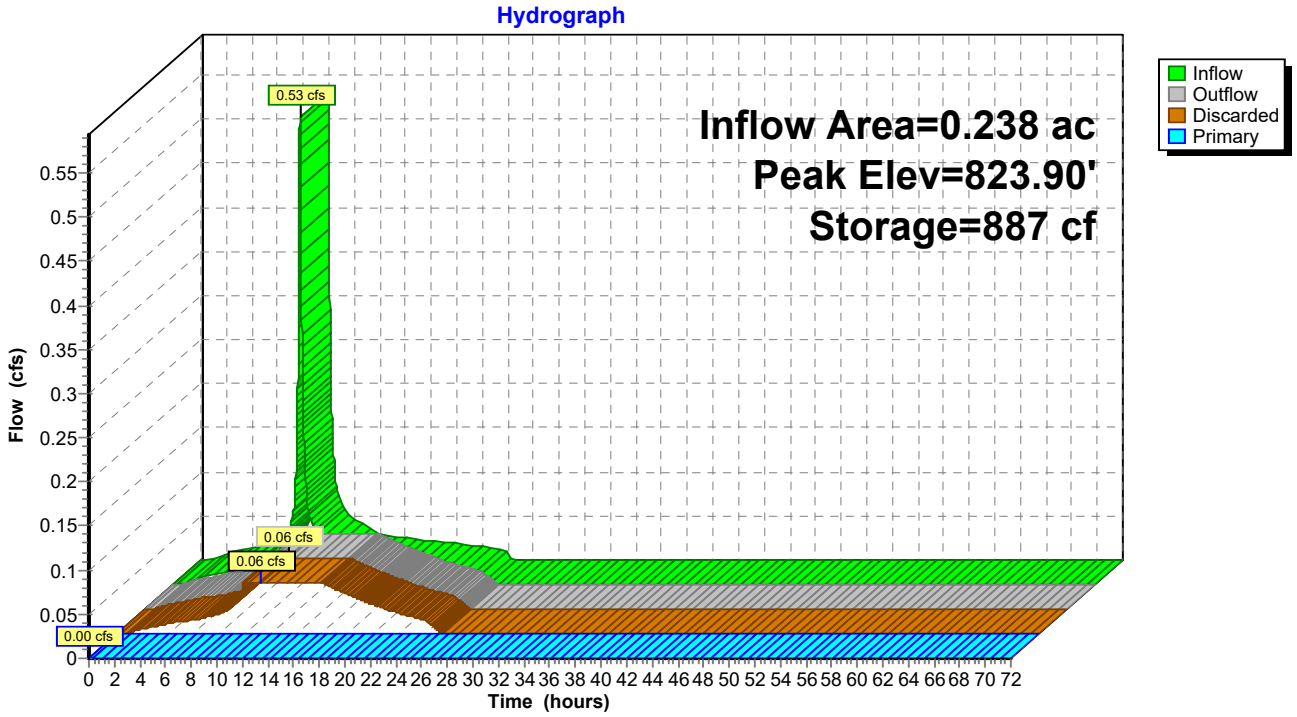
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
820.88	0	0.0	0	0
822.88	1,256	40.0	502	502
824.88	1,256	30.0	754	1,256
825.38	1,256	100.0	628	1,884

Device	Routing	Invert	Outlet Devices
#1	Primary	824.88'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	820.88'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'

Discarded OutFlow Max=0.06 cfs @ 11.18 hrs HW=823.90' (Free Discharge)
↑**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=820.88' TW=0.00' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID B1b: B-1b Bioretention



Summary for Pond LID B2a: B-2a Chambers

Inflow Area = 1.200 ac, 92.04% Impervious, Inflow Depth = 3.37" for 10-YR event
Inflow = 2.73 cfs @ 9.94 hrs, Volume= 0.337 af
Outflow = 0.61 cfs @ 10.38 hrs, Volume= 0.278 af, Atten= 78%, Lag= 26.3 min
Discarded = 0.02 cfs @ 10.38 hrs, Volume= 0.103 af
Primary = 0.59 cfs @ 10.38 hrs, Volume= 0.175 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 822.54' @ 10.38 hrs Surf.Area= 0.093 ac Storage= 0.150 af

Plug-Flow detention time= 770.9 min calculated for 0.278 af (83% of inflow)
Center-of-Mass det. time= 670.3 min (1,375.9 - 705.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	820.19'	0.131 af	**22.75'W x 177.78'L x 5.50'H Field A** 0.511 af Overall - 0.184 af Embedded = 0.327 af x 40.0% Voids
#2A	820.94'	0.184 af	**ADS_StormTech MC-3500 d +Cap**x 72 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 72 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		0.315 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	822.19'	**18.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 822.19' / 821.89' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	820.19'	**0.190 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 98.79' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 10.38 hrs HW=822.54' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.59 cfs @ 10.38 hrs HW=822.54' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.59 cfs @ 2.89 fps)

Pond LID B2a: B-2a Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

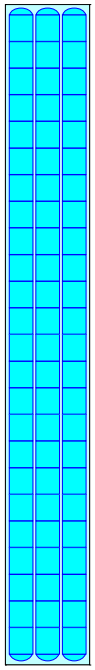
24 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 175.78' Row Length +12.0" End Stone x 2 = 177.78' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

72 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 8,005.9 cf Chamber Storage

22,244.7 cf Field - 8,005.9 cf Chambers = 14,238.8 cf Stone x 40.0% Voids = 5,695.5 cf Stone Storage

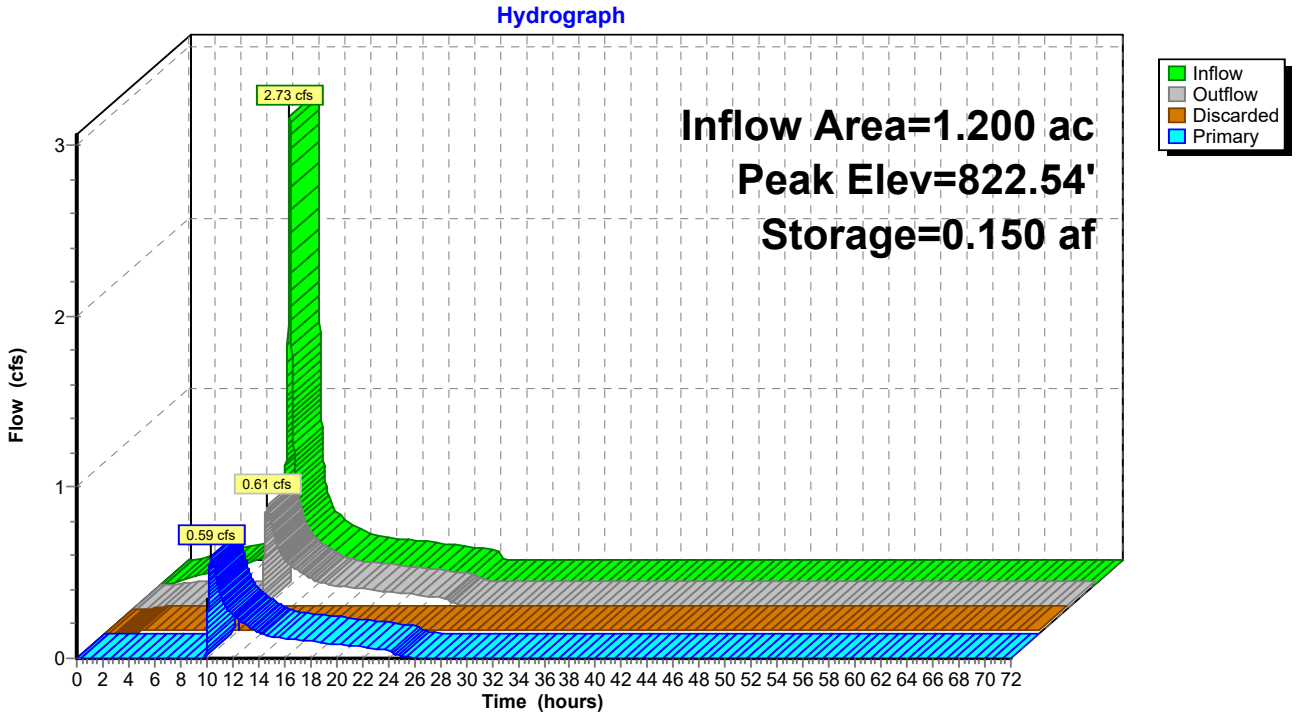
Chamber Storage + Stone Storage = 13,701.5 cf = 0.315 af
Overall Storage Efficiency = 61.6%
Overall System Size = 177.78' x 22.75' x 5.50'

72 Chambers
823.9 cy Field
527.4 cy Stone





Pond LID B2a: B-2a Chambers



Summary for Pond LID C2: C-1 Bioretention

Inflow Area = 0.223 ac, 72.91% Impervious, Inflow Depth = 3.03" for 10-YR event
Inflow = 0.46 cfs @ 9.94 hrs, Volume= 0.056 af
Outflow = 0.09 cfs @ 10.48 hrs, Volume= 0.056 af, Atten= 81%, Lag= 32.2 min
Discarded = 0.09 cfs @ 10.48 hrs, Volume= 0.056 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link C : Outlet C

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 822.44' @ 10.48 hrs Surf.Area= 1,256 sf Storage= 574 cf

Plug-Flow detention time= 55.4 min calculated for 0.056 af (100% of inflow)
Center-of-Mass det. time= 55.4 min (774.7 - 719.3)

Volume	Invert	Avail.Storage	Storage Description
#1	820.25'	1,884 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

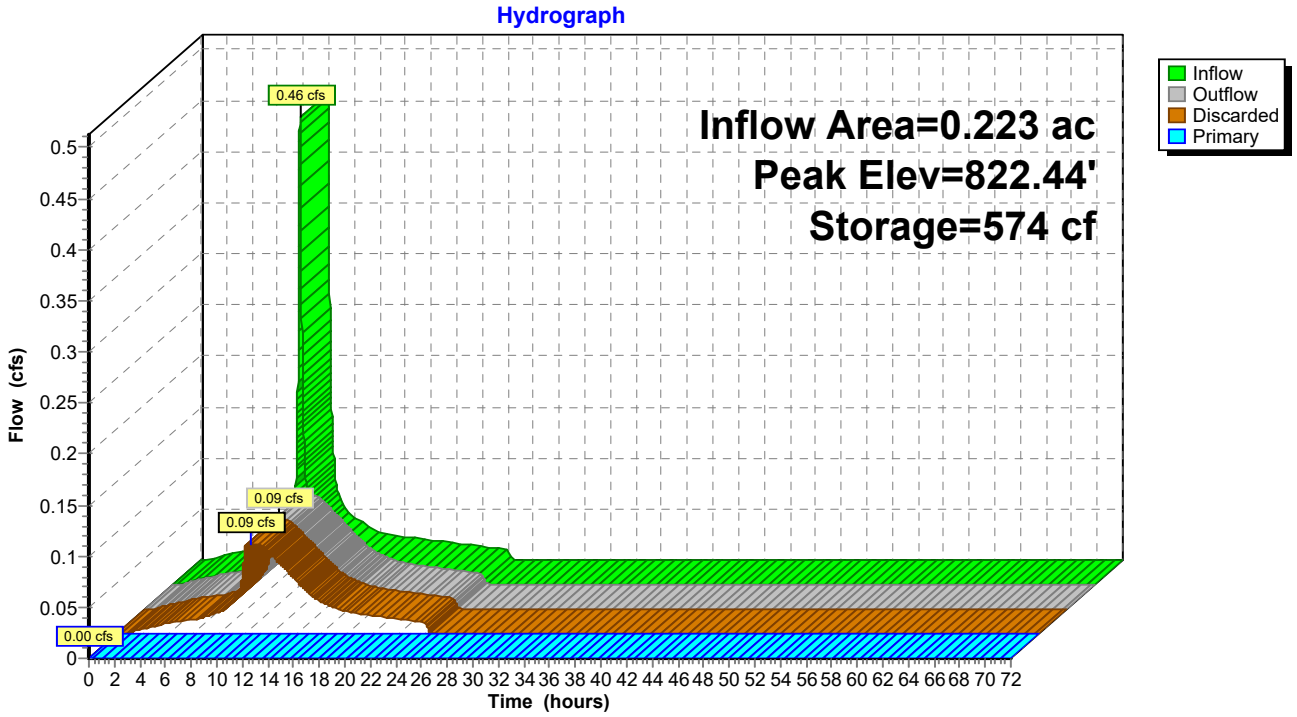
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
820.25	0	0.0	0	0
822.25	1,256	40.0	502	502
824.25	1,256	30.0	754	1,256
824.75	1,256	100.0	628	1,884

Device	Routing	Invert	Outlet Devices
#1	Primary	824.25'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	820.25'	**3.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'

Discarded OutFlow Max=0.09 cfs @ 10.48 hrs HW=822.44' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=820.25' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID C2: C-1 Bioretention



Summary for Pond LID D: Basin

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 3.04" for 10-YR event
Inflow = 7.81 cfs @ 9.94 hrs, Volume= 0.961 af
Outflow = 0.56 cfs @ 13.17 hrs, Volume= 0.411 af, Atten= 93%, Lag= 193.7 min
Discarded = 0.02 cfs @ 13.17 hrs, Volume= 0.098 af
Primary = 0.54 cfs @ 13.17 hrs, Volume= 0.313 af
Routed to Link D : Outlet D
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link D : Outlet D

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 816.31' @ 13.17 hrs Surf.Area= 11,275 sf Storage= 27,593 cf

Plug-Flow detention time= 850.0 min calculated for 0.411 af (43% of inflow)
Center-of-Mass det. time= 632.4 min (1,351.1 - 718.7)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	35,708 cf	**DMA D Basin (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
810.00	4,775	0.0	0	0
812.00	4,775	40.0	3,820	3,820
814.00	4,775	30.0	2,865	6,685
815.00	9,674	100.0	7,225	13,910
816.00	10,885	100.0	10,280	24,189
817.00	12,153	100.0	11,519	35,708

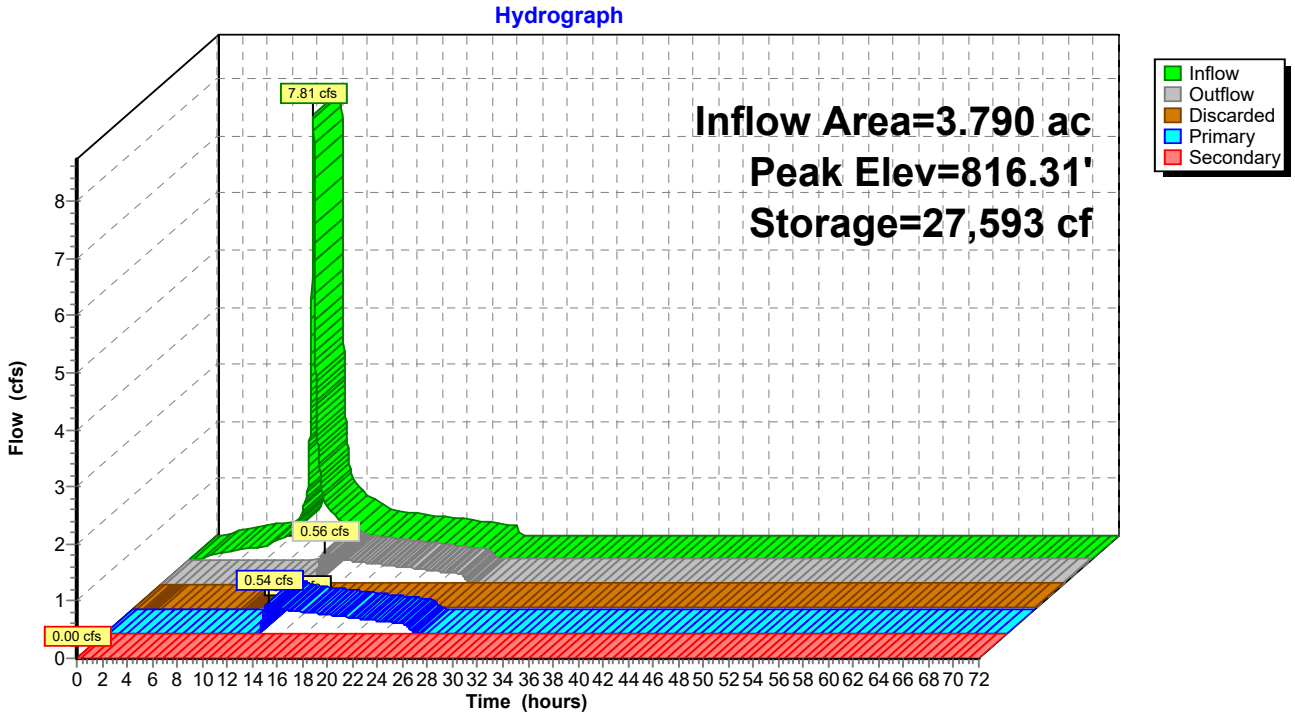
Device	Routing	Invert	Outlet Devices
#1	Primary	816.25'	**3.6" x 1.0" Horiz. Orifice/Grate X 310.00** C= 0.600 in 36.0" x 36.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	810.00'	**0.070 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'
#3	Secondary	816.75'	**30.0' long x 2.0' breadth Spillway_Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.02 cfs @ 13.17 hrs HW=816.31' (Free Discharge)
2=Exfiltration (Controls 0.02 cfs)

Primary OutFlow Max=0.54 cfs @ 13.17 hrs HW=816.31' TW=0.00' (Dynamic Tailwater)
1=Orifice/Grate (Weir Controls 0.54 cfs @ 0.78 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=810.00' TW=0.00' (Dynamic Tailwater)
3=Spillway_Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond LID D: Basin

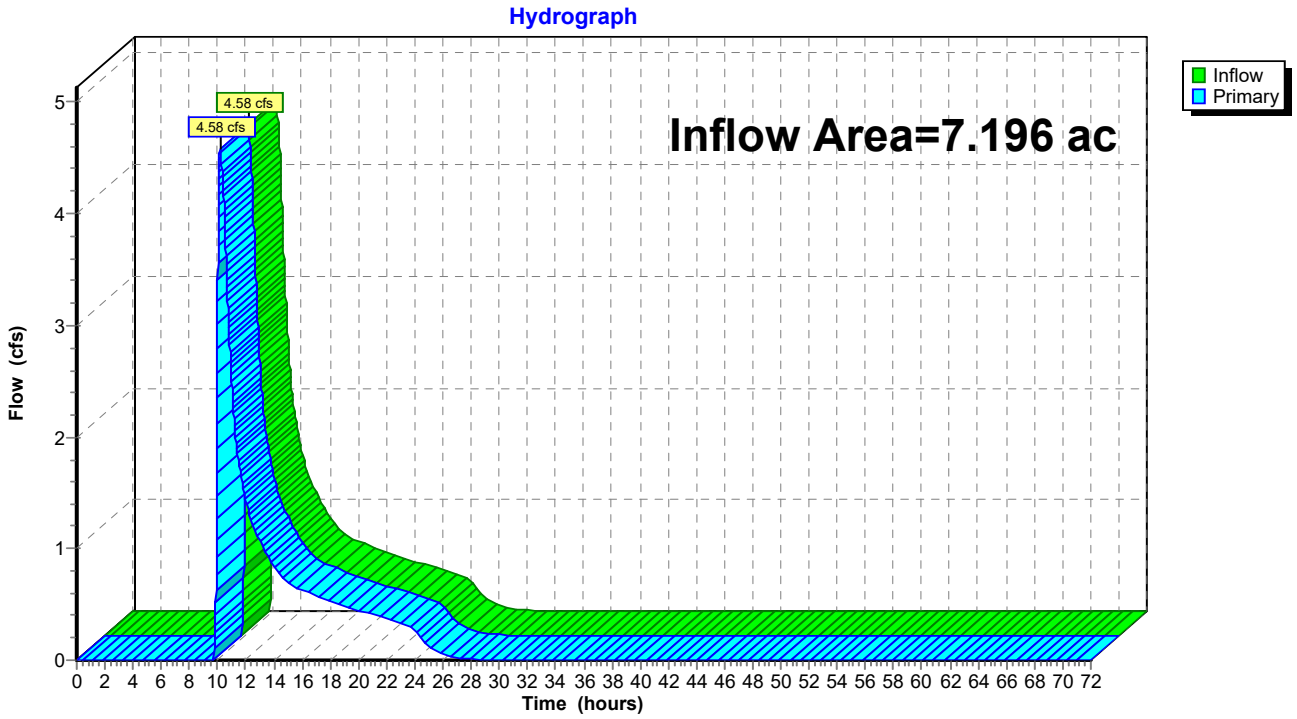


Summary for Link A: Outlet A

Inflow Area = 7.196 ac, 86.00% Impervious, Inflow Depth = 1.84" for 10-YR event
Inflow = 4.58 cfs @ 10.19 hrs, Volume= 1.103 af
Primary = 4.58 cfs @ 10.19 hrs, Volume= 1.103 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: Outlet A

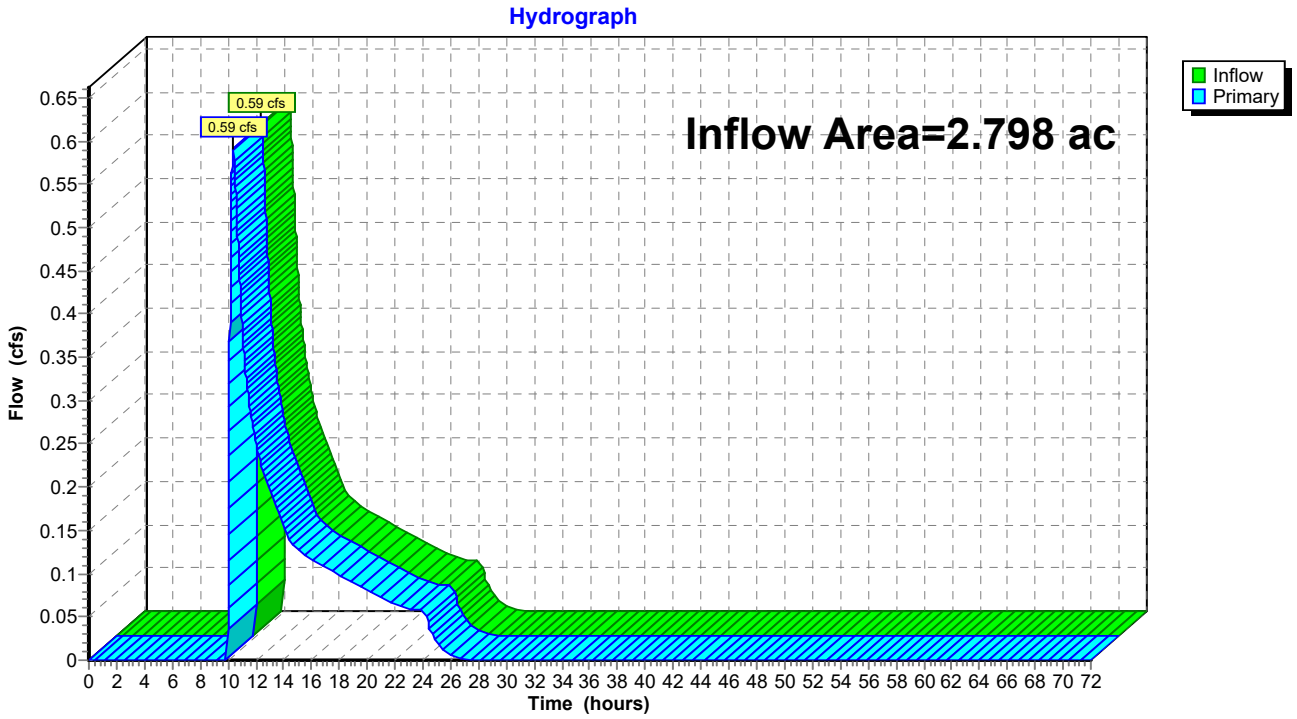


Summary for Link B: Outlet B

Inflow Area = 2.798 ac, 83.10% Impervious, Inflow Depth = 0.76" for 10-YR event
Inflow = 0.59 cfs @ 10.38 hrs, Volume= 0.177 af
Primary = 0.59 cfs @ 10.38 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: Outlet B

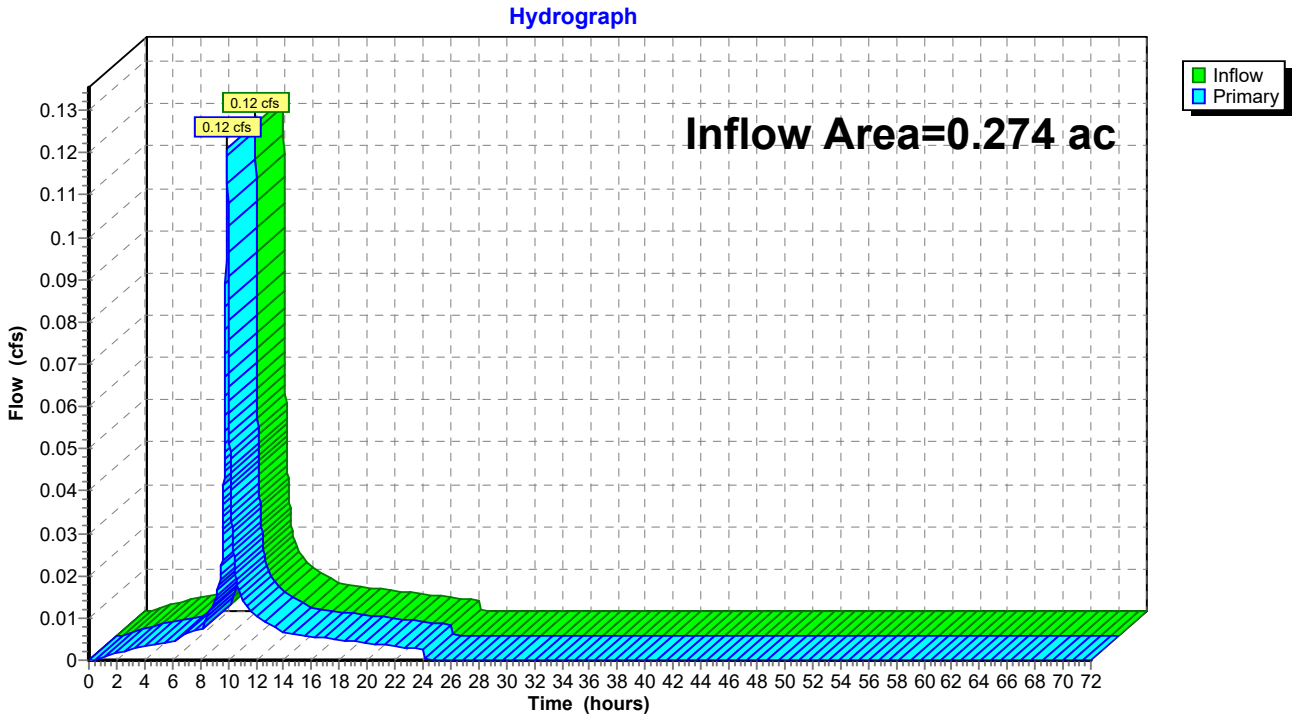


Summary for Link C: Outlet C

Inflow Area = 0.274 ac, 77.95% Impervious, Inflow Depth = 0.65" for 10-YR event
Inflow = 0.12 cfs @ 9.94 hrs, Volume= 0.015 af
Primary = 0.12 cfs @ 9.94 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link C: Outlet C

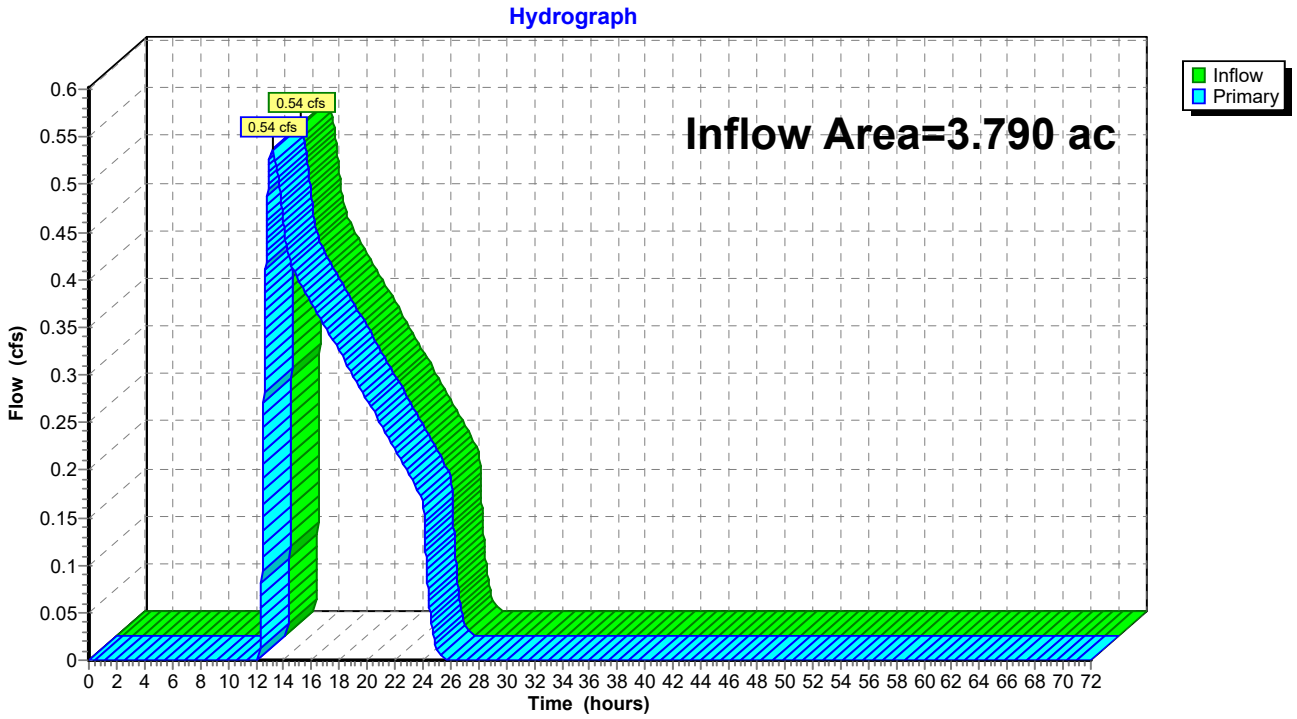


Summary for Link D: Outlet D

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 0.99" for 10-YR event
Inflow = 0.54 cfs @ 13.17 hrs, Volume= 0.313 af
Primary = 0.54 cfs @ 13.17 hrs, Volume= 0.313 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link D: Outlet D



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: DMA A-1 Runoff Area=264,589 sf 86.00% Impervious Runoff Depth=0.77"
Tc=6.0 min AMC Adjusted CN=62/94 Runoff=3.33 cfs 0.389 af

SubcatchmentA2: DMA A-2 Runoff Area=48,885 sf 86.00% Impervious Runoff Depth=0.77"
Tc=6.0 min AMC Adjusted CN=62/94 Runoff=0.62 cfs 0.072 af

SubcatchmentB1a: Catch B-1a Runoff Area=59,221 sf 74.37% Impervious Runoff Depth=0.67"
Tc=6.0 min AMC Adjusted CN=62/94 Runoff=0.65 cfs 0.075 af

SubcatchmentB1b: Catch B-1b Runoff Area=10,365 sf 87.88% Impervious Runoff Depth=0.78"
Tc=6.0 min AMC Adjusted CN=62/94 Runoff=0.13 cfs 0.016 af

SubcatchmentB2a: Catch B-2a Runoff Area=52,287 sf 92.04% Impervious Runoff Depth=0.82"
Tc=6.0 min AMC Adjusted CN=62/94 Runoff=0.71 cfs 0.082 af

SubcatchmentC1: Catch C-1 Runoff Area=9,720 sf 72.91% Impervious Runoff Depth=0.65"
Tc=6.0 min AMC Adjusted CN=62/94 Runoff=0.10 cfs 0.012 af

SubcatchmentC2: Catch C-2 Runoff Area=2,221 sf 100.00% Impervious Runoff Depth=0.89"
Tc=6.0 min AMC Adjusted CN=0/94 Runoff=0.03 cfs 0.004 af

SubcatchmentD1: DMA D-1 Runoff Area=165,076 sf 73.64% Impervious Runoff Depth=0.66"
Tc=6.0 min AMC Adjusted CN=62/94 Runoff=1.78 cfs 0.208 af

Pond LID A1: A-1 Chambers Peak Elev=818.57' Storage=0.304 af Inflow=3.33 cfs 0.389 af
Discarded=0.06 cfs 0.327 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.327 af

Pond LID A2: A-2 Bioretention Peak Elev=823.17' Storage=576 cf Inflow=0.62 cfs 0.072 af
Discarded=0.17 cfs 0.072 af Primary=0.00 cfs 0.000 af Outflow=0.17 cfs 0.072 af

Pond LID B1a: B-1a Chambers Peak Elev=820.61' Storage=0.055 af Inflow=0.65 cfs 0.075 af
Discarded=0.02 cfs 0.075 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.075 af

Pond LID B1b: B-1b Bioretention Peak Elev=821.94' Storage=142 cf Inflow=0.13 cfs 0.016 af
Discarded=0.03 cfs 0.016 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.016 af

Pond LID B2a: B-2a Chambers Peak Elev=821.32' Storage=0.058 af Inflow=0.71 cfs 0.082 af
Discarded=0.02 cfs 0.082 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.082 af

Pond LID C2: C-1 Bioretention Peak Elev=821.06' Storage=82 cf Inflow=0.10 cfs 0.012 af
Discarded=0.04 cfs 0.012 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.012 af

Pond LID D: Basin Peak Elev=814.33' Storage=8,527 cf Inflow=1.78 cfs 0.208 af
Discarded=0.01 cfs 0.049 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.049 af

Link A: Outlet A Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link B: Outlet B Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link C: Outlet C Inflow=0.03 cfs 0.004 af
Primary=0.03 cfs 0.004 af

Link D: Outlet D Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 14.058 ac Runoff Volume = 0.858 af Average Runoff Depth = 0.73"
18.07% Pervious = 2.540 ac 81.93% Impervious = 11.518 ac

Summary for Subcatchment A1: DMA A-1

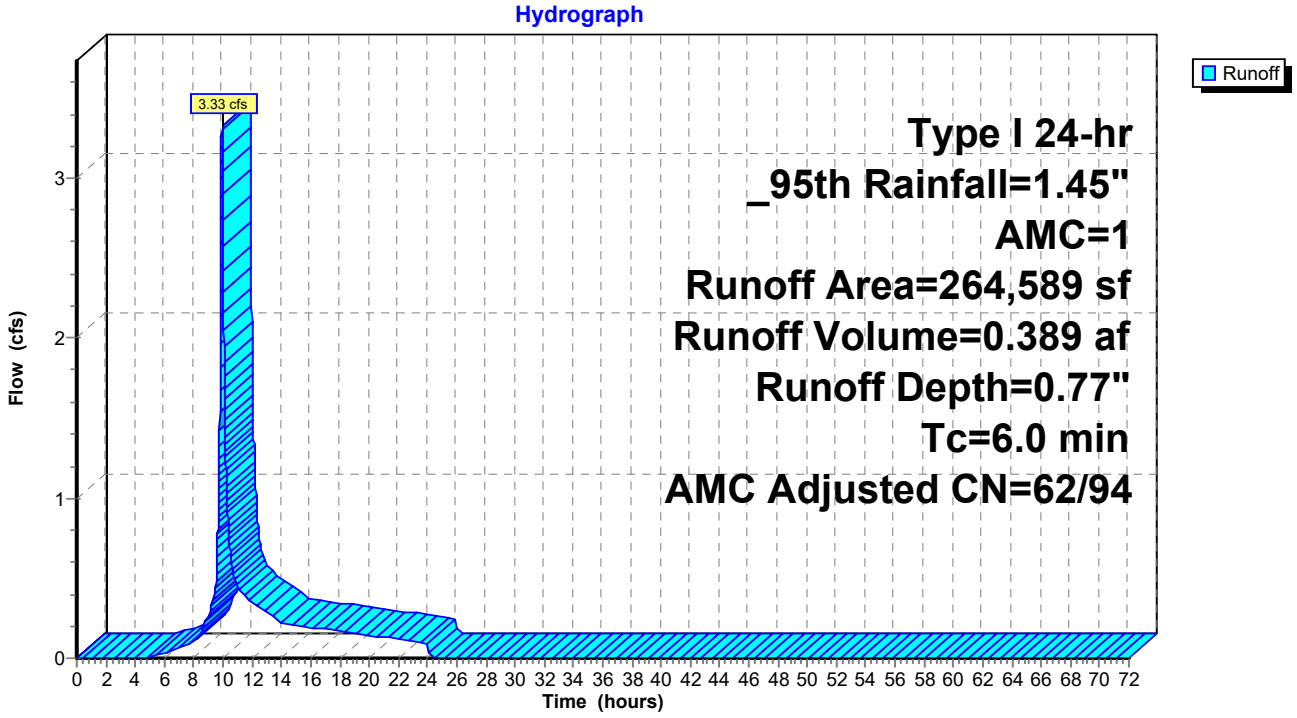
Runoff = 3.33 cfs @ 9.94 hrs, Volume= 0.389 af, Depth= 0.77"
Routed to Pond LID A1 : A-1 Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

	Area (sf)	CN	Adj	Description
*	227,546	98		Impervious, HSG C
*	37,043	79		Landscaped, 50-75% Grass cover, Fair, HSG C
	264,589	95	87	Weighted Average, AMC Adjusted
	37,043	79	62	14.00% Pervious Area, AMC Adjusted
	227,546	98	94	86.00% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment A1: DMA A-1



Summary for Subcatchment A2: DMA A-2

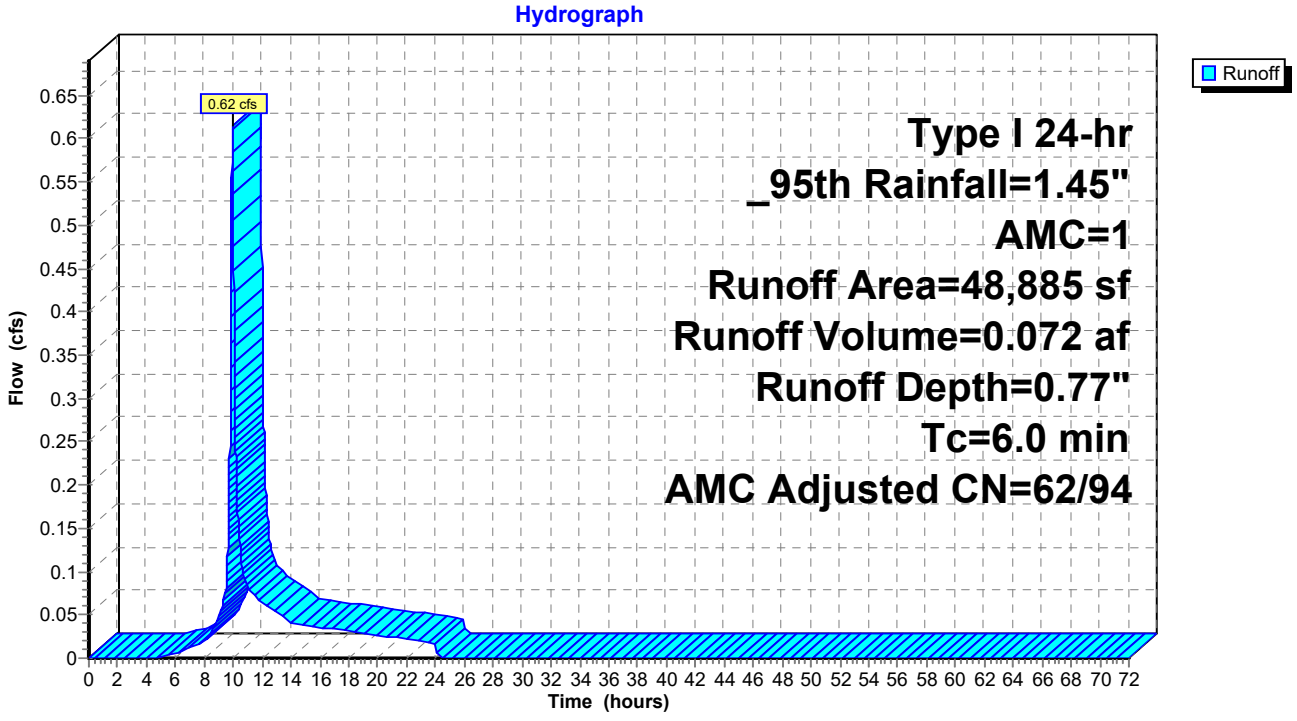
Runoff = 0.62 cfs @ 9.94 hrs, Volume= 0.072 af, Depth= 0.77"
Routed to Pond LID A2 : A-2 Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

Area (sf)	CN	Adj	Description
42,041	98		Impervious, HSG C
6,844	79		Landscaped, 50-75% Grass cover, Fair, HSG C
48,885	95	87	Weighted Average, AMC Adjusted
6,844	79	62	14.00% Pervious Area, AMC Adjusted
42,041	98	94	86.00% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment A2: DMA A-2



Summary for Subcatchment B1a: Catch B-1a

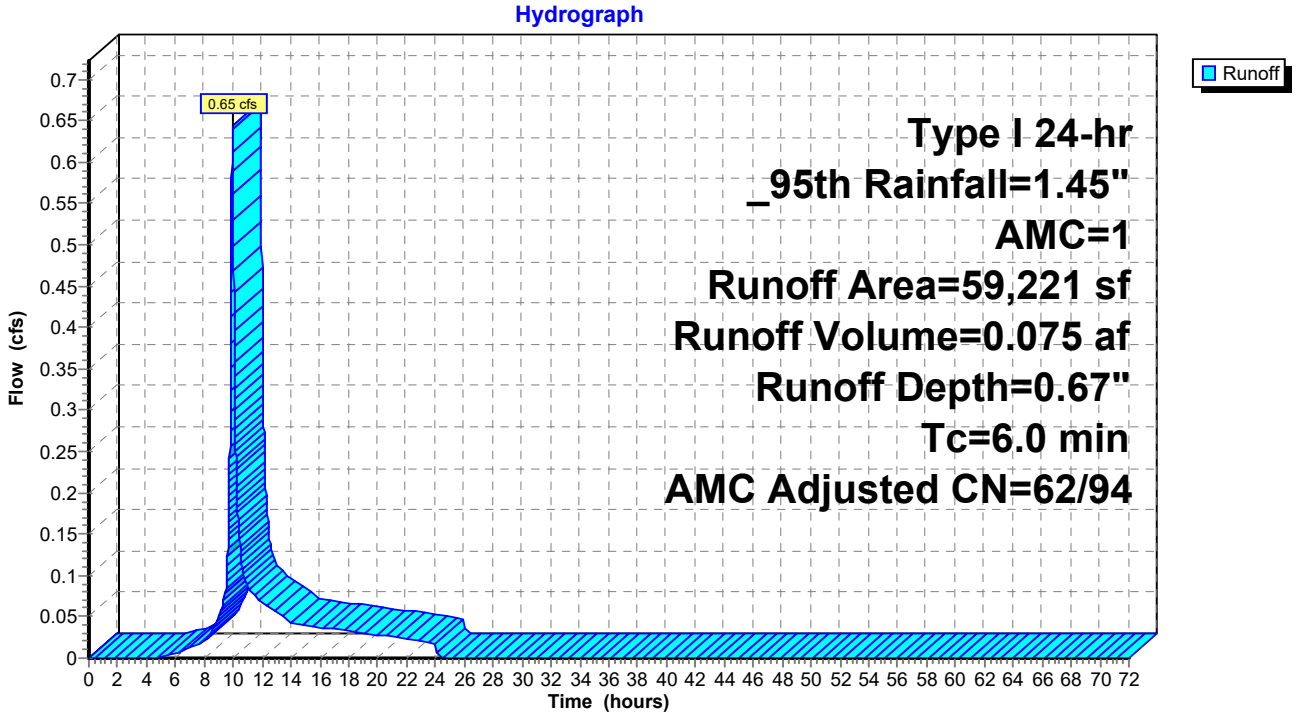
Runoff = 0.65 cfs @ 9.94 hrs, Volume= 0.075 af, Depth= 0.67"
Routed to Pond LID B1a : B-1a Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

Area (sf)	CN	Adj	Description
44,043	98		Impervious, HSG C
15,178	79		Landscaped, 50-75% Grass cover, Fair, HSG C
59,221	93	83	Weighted Average, AMC Adjusted
15,178	79	62	25.63% Pervious Area, AMC Adjusted
44,043	98	94	74.37% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B1a: Catch B-1a



Summary for Subcatchment B1b: Catch B-1b

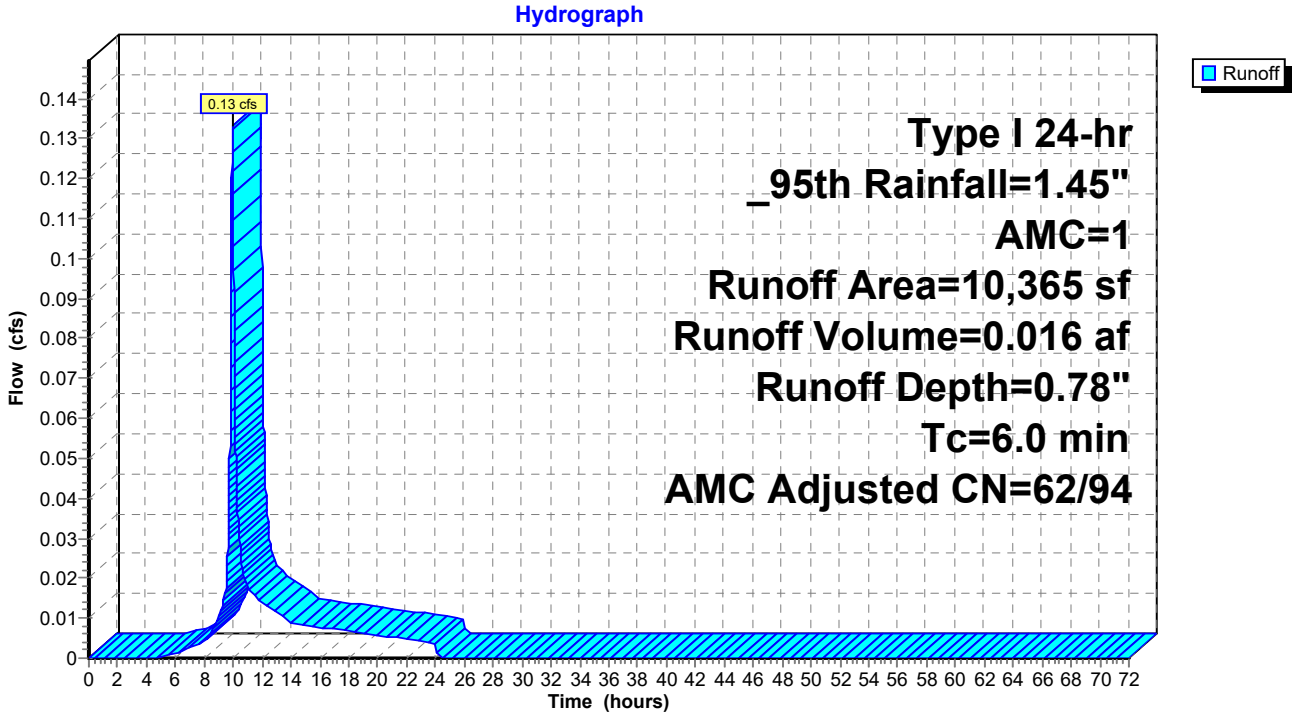
Runoff = 0.13 cfs @ 9.94 hrs, Volume= 0.016 af, Depth= 0.78"
Routed to Pond LID B1b : B-1b Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

Area (sf)	CN	Adj	Description
9,109	98		Impervious, HSG C
1,256	79		Landscaped, 50-75% Grass cover, Fair, HSG C
10,365	96	89	Weighted Average, AMC Adjusted
1,256	79	62	12.12% Pervious Area, AMC Adjusted
9,109	98	94	87.88% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B1b: Catch B-1b



Summary for Subcatchment B2a: Catch B-2a

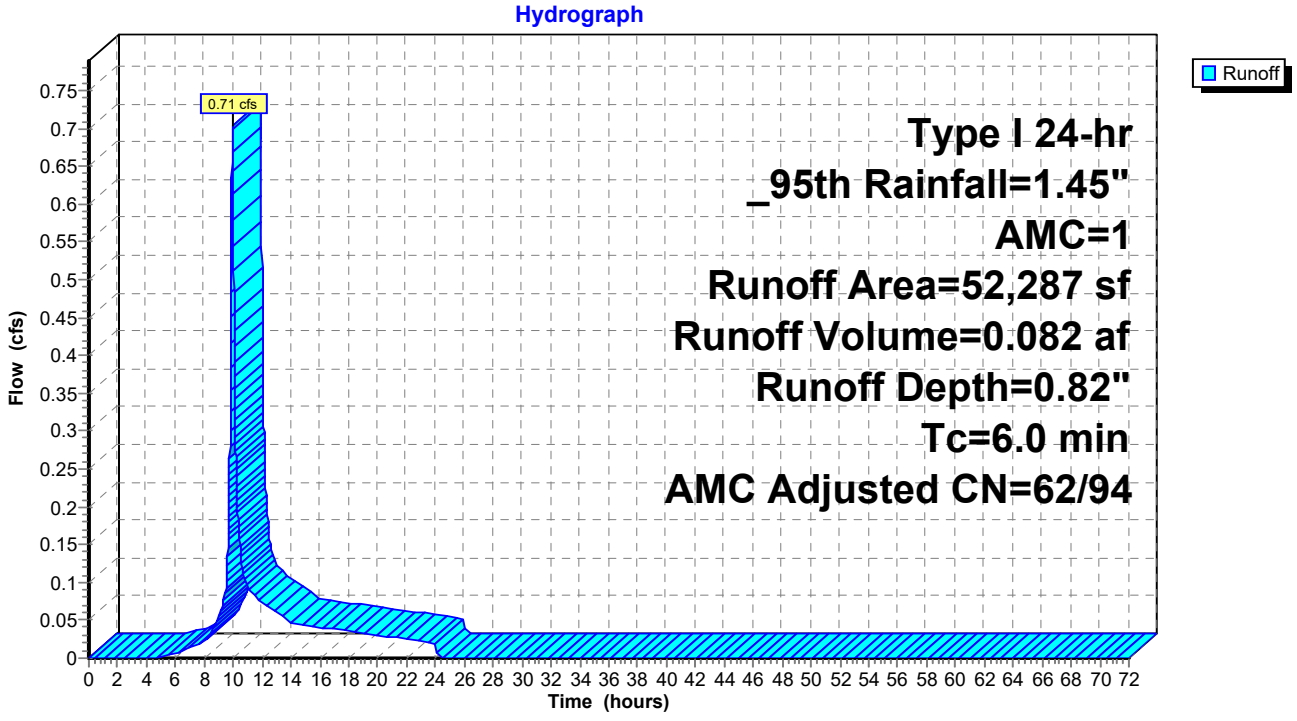
Runoff = 0.71 cfs @ 9.94 hrs, Volume= 0.082 af, Depth= 0.82"
Routed to Pond LID B2a : B-2a Chambers

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

Area (sf)	CN	Adj	Description
48,124	98		Impervious, HSG C
4,163	79		Landscaped, 50-75% Grass cover, Fair, HSG C
52,287	96	89	Weighted Average, AMC Adjusted
4,163	79	62	7.96% Pervious Area, AMC Adjusted
48,124	98	94	92.04% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment B2a: Catch B-2a



Summary for Subcatchment C1: Catch C-1

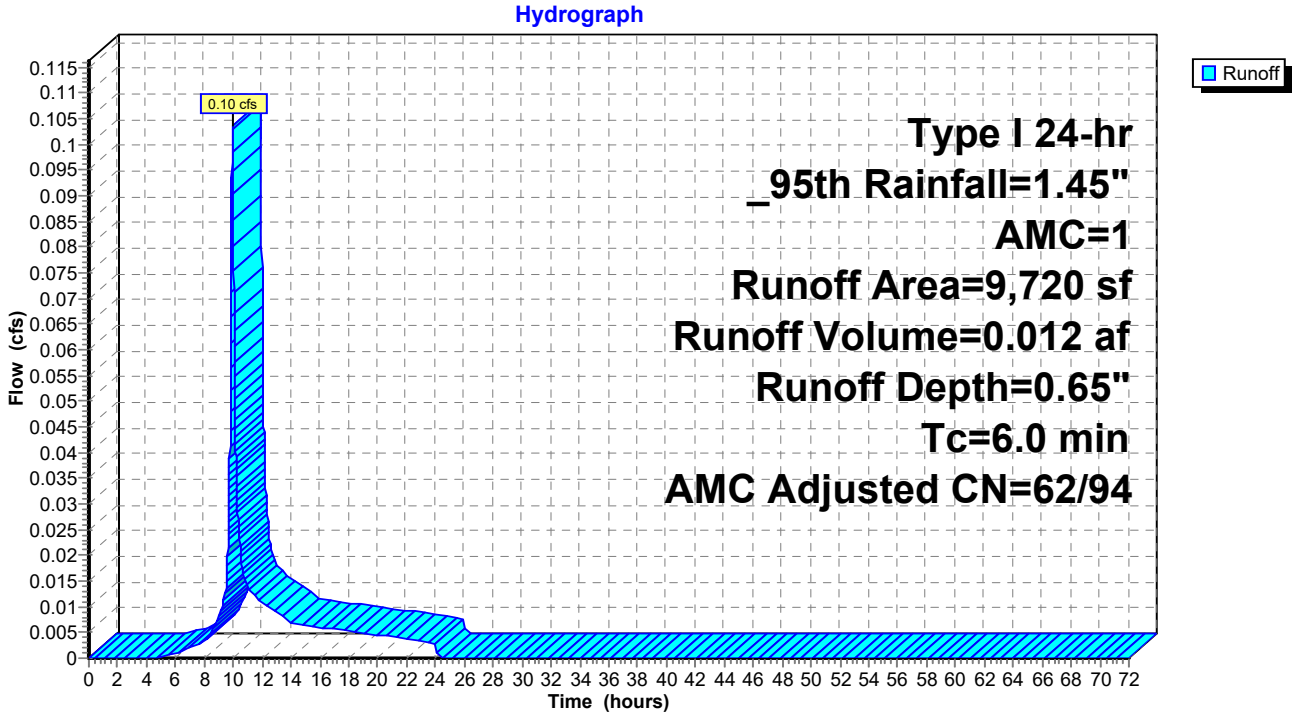
Runoff = 0.10 cfs @ 9.94 hrs, Volume= 0.012 af, Depth= 0.65"
Routed to Pond LID C2 : C-1 Bioretention

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

Area (sf)	CN	Adj	Description
7,087	98		Impervious, HSG C
2,633	79		Landscaped, 50-75% Grass cover, Fair, HSG C
9,720	93	83	Weighted Average, AMC Adjusted
2,633	79	62	27.09% Pervious Area, AMC Adjusted
7,087	98	94	72.91% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment C1: Catch C-1



Summary for Subcatchment C2: Catch C-2

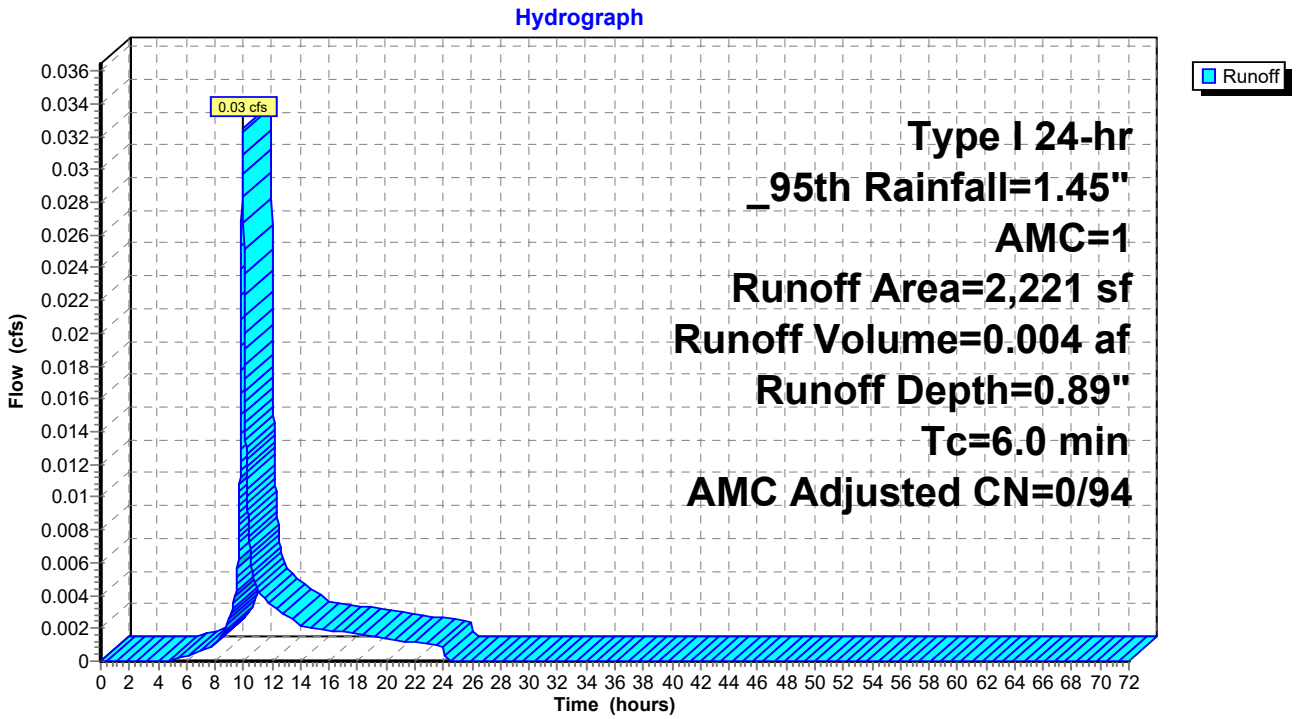
Runoff = 0.03 cfs @ 9.94 hrs, Volume= 0.004 af, Depth= 0.89"
Routed to Link C : Outlet C

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

Area (sf)	CN	Adj	Description
2,221	98		Impervious, HSG C
2,221	98	94	Weighted Average, AMC Adjusted
2,221	98	94	100.00% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment C2: Catch C-2



Summary for Subcatchment D1: DMA D-1

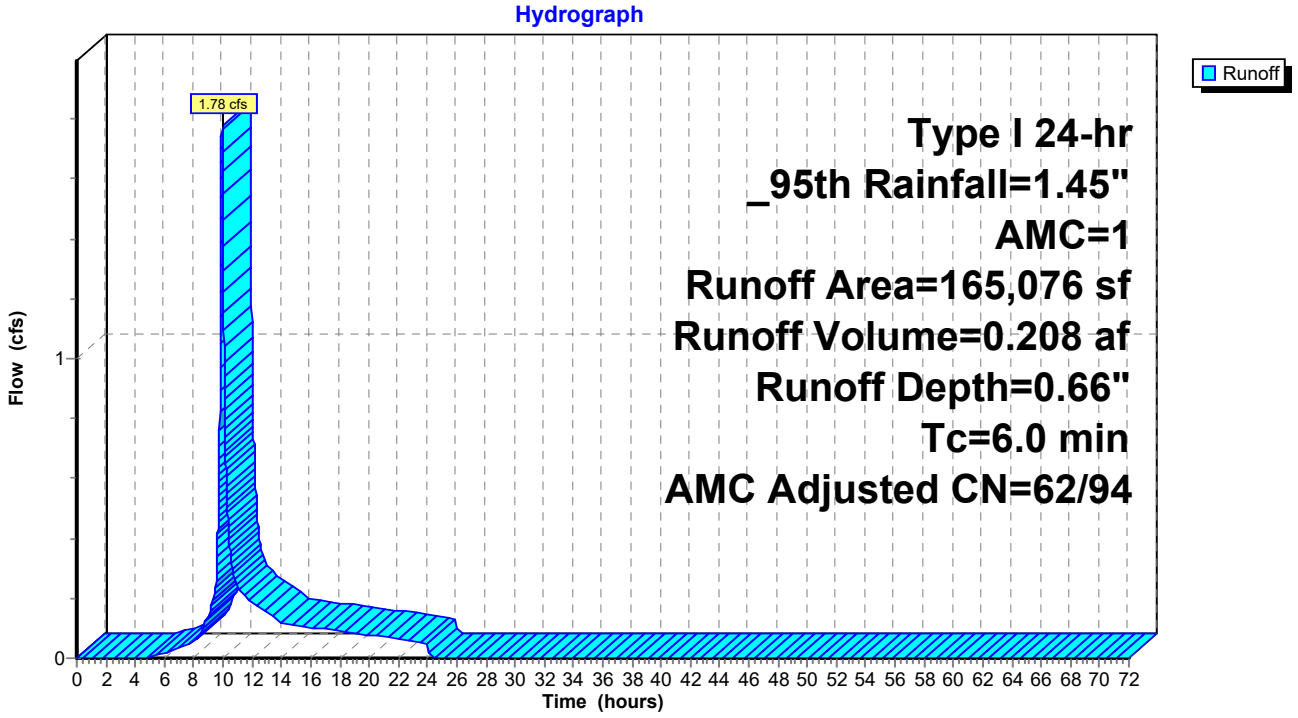
Runoff = 1.78 cfs @ 9.94 hrs, Volume= 0.208 af, Depth= 0.66"
Routed to Pond LID D : Basin

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr _95th Rainfall=1.45", AMC=1

	Area (sf)	CN	Adj	Description
	121,559	98		Paved parking, HSG C
*	43,517	79		Landscaped, 50-75% Grass cover, Fair, HSG C
	165,076	93	83	Weighted Average, AMC Adjusted
	43,517	79	62	26.36% Pervious Area, AMC Adjusted
	121,559	98	94	73.64% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment D1: DMA D-1



Summary for Pond LID A1: A-1 Chambers

Inflow Area = 6.074 ac, 86.00% Impervious, Inflow Depth = 0.77" for _95th event
Inflow = 3.33 cfs @ 9.94 hrs, Volume= 0.389 af
Outflow = 0.06 cfs @ 24.05 hrs, Volume= 0.327 af, Atten= 98%, Lag= 846.0 min
Discarded = 0.06 cfs @ 24.05 hrs, Volume= 0.327 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link A : Outlet A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 818.57' @ 24.05 hrs Surf.Area= 0.303 ac Storage= 0.304 af

Plug-Flow detention time= 1,681.4 min calculated for 0.327 af (84% of inflow)
Center-of-Mass det. time= 1,593.0 min (2,380.0 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	817.00'	0.417 af	**51.42'W x 256.65'L x 5.50'H Field A** 1.666 af Overall - 0.623 af Embedded = 1.043 af x 40.0% Voids
#2A	817.75'	0.623 af	**ADS_StormTech MC-3500 d +Cap**x 245 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 245 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		1.040 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	819.00'	**18.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 819.00' / 818.50' S= 0.0143 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	817.00'	**0.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.10' Phase-In= 0.10'

Discarded OutFlow Max=0.06 cfs @ 24.05 hrs HW=818.57' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=817.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond LID A1: A-1 Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

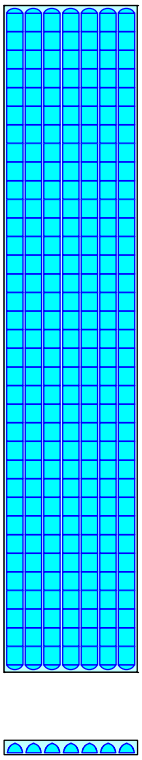
35 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 254.65' Row Length +12.0" End Stone x 2 = 256.65' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

245 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 27,146.8 cf Chamber Storage

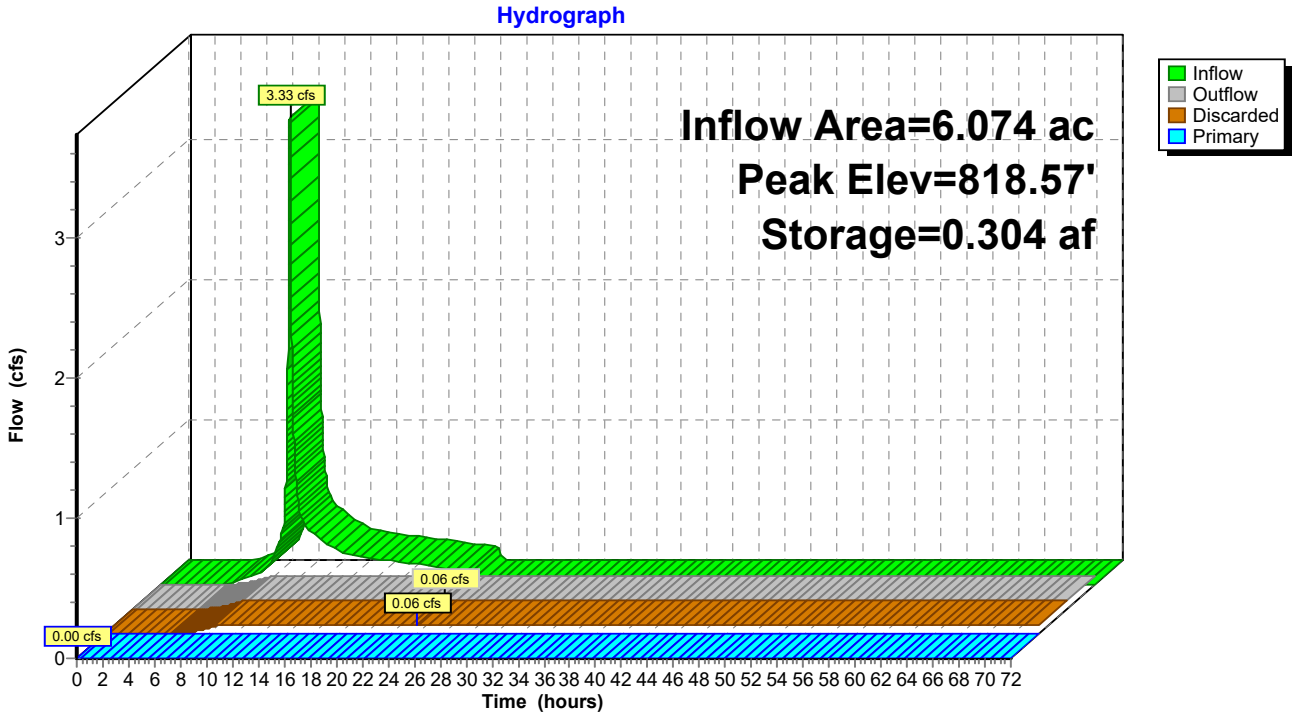
72,578.5 cf Field - 27,146.8 cf Chambers = 45,431.7 cf Stone x 40.0% Voids = 18,172.7 cf Stone Storage

Chamber Storage + Stone Storage = 45,319.5 cf = 1.040 af
Overall Storage Efficiency = 62.4%
Overall System Size = 256.65' x 51.42' x 5.50'

245 Chambers
2,688.1 cy Field
1,682.7 cy Stone



Pond LID A1: A-1 Chambers



Summary for Pond LID A2: A-2 Bioretention

Inflow Area = 1.122 ac, 86.00% Impervious, Inflow Depth = 0.77" for _95th event
Inflow = 0.62 cfs @ 9.94 hrs, Volume= 0.072 af
Outflow = 0.17 cfs @ 10.31 hrs, Volume= 0.072 af, Atten= 72%, Lag= 21.7 min
Discarded = 0.17 cfs @ 10.31 hrs, Volume= 0.072 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link A : Outlet A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 823.17' @ 10.31 hrs Surf.Area= 2,267 sf Storage= 576 cf

Plug-Flow detention time= 27.4 min calculated for 0.072 af (100% of inflow)
Center-of-Mass det. time= 27.4 min (814.4 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1	821.90'	5,348 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

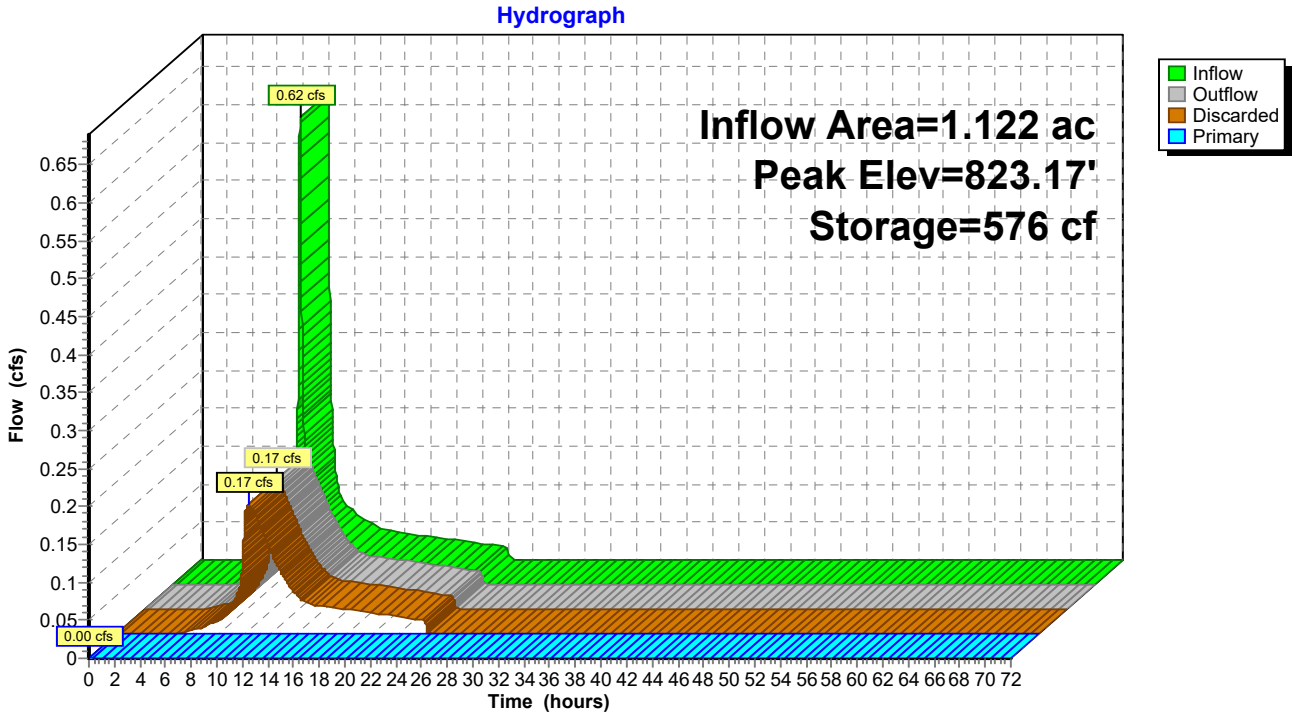
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
821.90	0	0.0	0	0
823.90	3,565	40.0	1,426	1,426
825.90	3,565	30.0	2,139	3,565
826.40	3,565	100.0	1,783	5,348

Device	Routing	Invert	Outlet Devices
#1	Primary	825.90'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	821.90'	**3.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00'

Discarded OutFlow Max=0.17 cfs @ 10.31 hrs HW=823.17' (Free Discharge)
↑**2=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=821.90' TW=0.00' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID A2: A-2 Bioretention



Summary for Pond LID B1a: B-1a Chambers

Inflow Area = 1.360 ac, 74.37% Impervious, Inflow Depth = 0.67" for _95th event
Inflow = 0.65 cfs @ 9.94 hrs, Volume= 0.075 af
Outflow = 0.02 cfs @ 24.02 hrs, Volume= 0.075 af, Atten= 98%, Lag= 844.5 min
Discarded = 0.02 cfs @ 24.02 hrs, Volume= 0.075 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 820.61' @ 24.02 hrs Surf.Area= 0.155 ac Storage= 0.055 af

Plug-Flow detention time= 1,453.6 min calculated for 0.075 af (99% of inflow)
Center-of-Mass det. time= 1,447.4 min (2,235.2 - 787.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	819.80'	0.217 af	**87.25'W x 77.40'L x 5.50'H Field A** 0.853 af Overall - 0.311 af Embedded = 0.542 af x 40.0% Voids
#2A	820.55'	0.311 af	**ADS_StormTech MC-3500 d +Cap**x 120 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 120 Chambers in 12 Rows Cap Storage= 14.9 cf x 2 x 12 rows = 357.6 cf
		0.528 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	822.63'	**18.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 822.63' / 822.50' S= 0.0026 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	819.80'	**0.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 98.80' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 24.02 hrs HW=820.61' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=819.80' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond LID B1a: B-1a Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 12 rows = 357.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

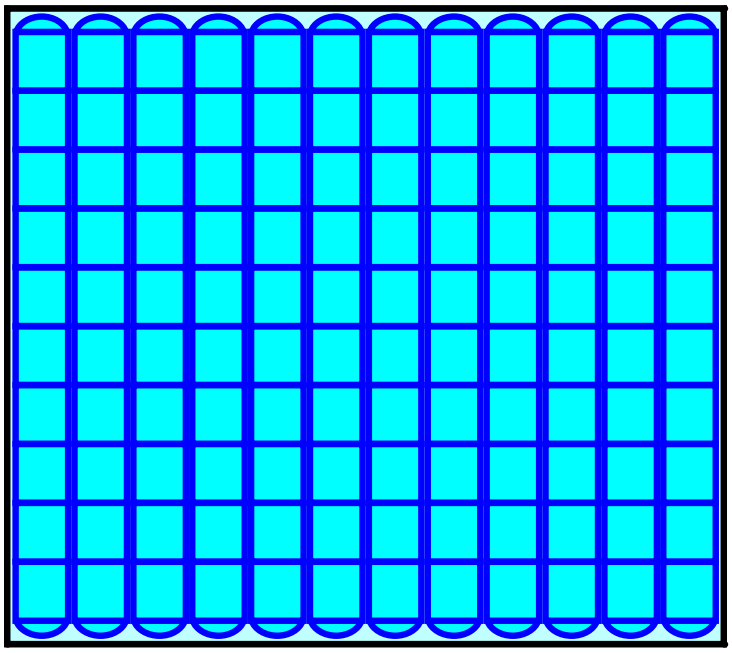
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
12 Rows x 77.0" Wide + 9.0" Spacing x 11 + 12.0" Side Stone x 2 = 87.25' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

120 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 12 Rows = 13,551.8 cf Chamber Storage

37,142.3 cf Field - 13,551.8 cf Chambers = 23,590.5 cf Stone x 40.0% Voids = 9,436.2 cf Stone Storage

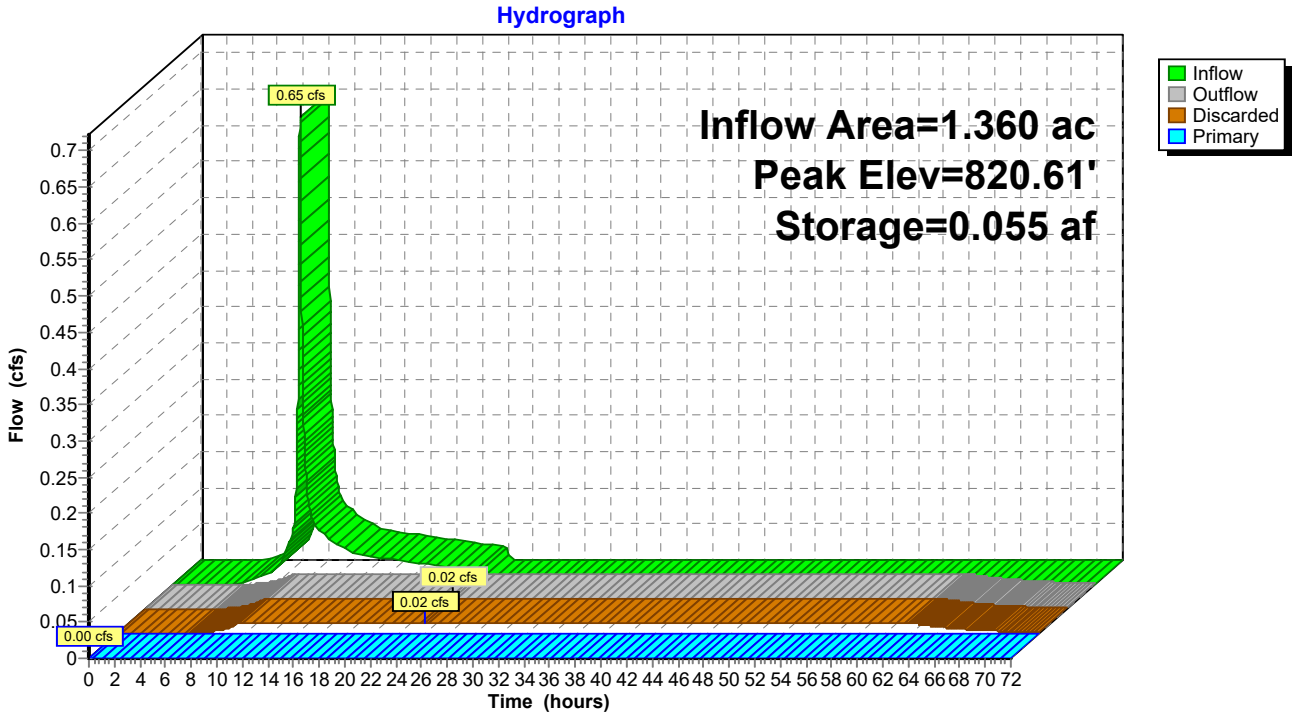
Chamber Storage + Stone Storage = 22,988.0 cf = 0.528 af
Overall Storage Efficiency = 61.9%
Overall System Size = 77.40' x 87.25' x 5.50'

120 Chambers
1,375.6 cy Field
873.7 cy Stone





Pond LID B1a: B-1a Chambers



Summary for Pond LID B1b: B-1b Bioretention

Inflow Area = 0.238 ac, 87.88% Impervious, Inflow Depth = 0.78" for _95th event
Inflow = 0.13 cfs @ 9.94 hrs, Volume= 0.016 af
Outflow = 0.03 cfs @ 10.41 hrs, Volume= 0.016 af, Atten= 77%, Lag= 27.7 min
Discarded = 0.03 cfs @ 10.41 hrs, Volume= 0.016 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 821.94' @ 10.41 hrs Surf.Area= 667 sf Storage= 142 cf

Plug-Flow detention time= 40.9 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 40.9 min (827.8 - 786.9)

Volume	Invert	Avail.Storage	Storage Description
#1	820.88'	1,884 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

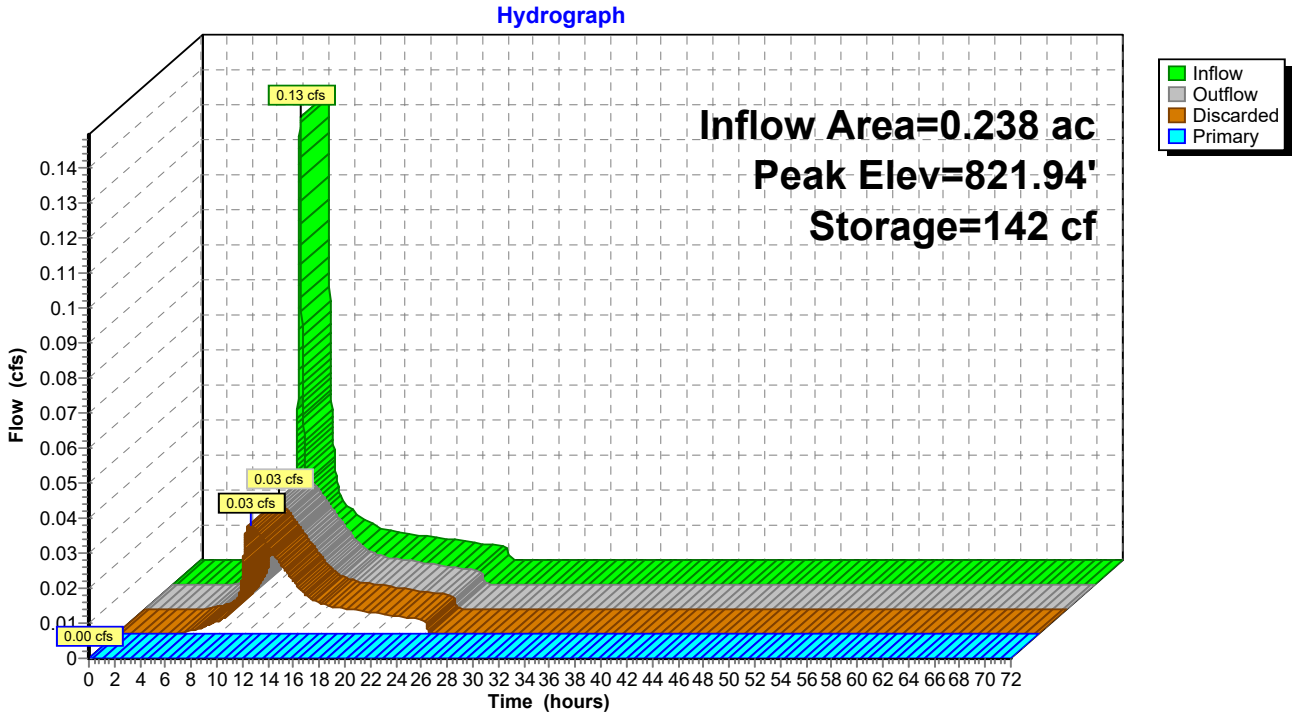
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
820.88	0	0.0	0	0
822.88	1,256	40.0	502	502
824.88	1,256	30.0	754	1,256
825.38	1,256	100.0	628	1,884

Device	Routing	Invert	Outlet Devices
#1	Primary	824.88'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	820.88'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'

Discarded OutFlow Max=0.03 cfs @ 10.41 hrs HW=821.94' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=820.88' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID B1b: B-1b Bioretention



Summary for Pond LID B2a: B-2a Chambers

Inflow Area = 1.200 ac, 92.04% Impervious, Inflow Depth = 0.82" for _95th event
Inflow = 0.71 cfs @ 9.94 hrs, Volume= 0.082 af
Outflow = 0.02 cfs @ 24.01 hrs, Volume= 0.082 af, Atten= 97%, Lag= 844.0 min
Discarded = 0.02 cfs @ 24.01 hrs, Volume= 0.082 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link B : Outlet B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 821.32' @ 24.01 hrs Surf.Area= 0.093 ac Storage= 0.058 af

Plug-Flow detention time= 1,356.6 min calculated for 0.082 af (100% of inflow)
Center-of-Mass det. time= 1,356.2 min (2,142.8 - 786.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	820.19'	0.131 af	**22.75'W x 177.78'L x 5.50'H Field A** 0.511 af Overall - 0.184 af Embedded = 0.327 af x 40.0% Voids
#2A	820.94'	0.184 af	**ADS_StormTech MC-3500 d +Cap**x 72 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 72 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		0.315 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	822.19'	**18.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 822.19' / 821.89' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Discarded	820.19'	**0.190 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 98.79' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 24.01 hrs HW=821.32' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=820.19' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond LID B2a: B-2a Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

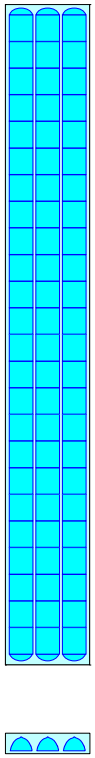
24 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 175.78' Row Length +12.0" End Stone x 2 = 177.78' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

72 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 8,005.9 cf Chamber Storage

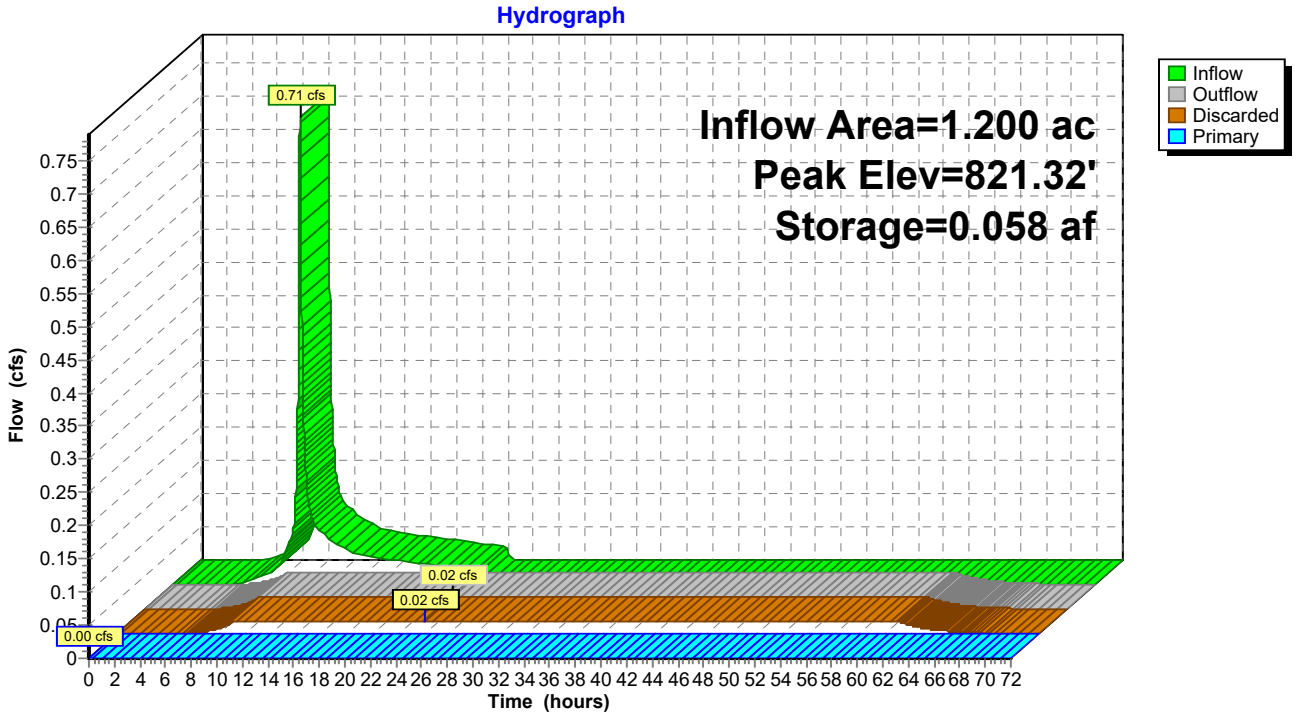
22,244.7 cf Field - 8,005.9 cf Chambers = 14,238.8 cf Stone x 40.0% Voids = 5,695.5 cf Stone Storage

Chamber Storage + Stone Storage = 13,701.5 cf = 0.315 af
Overall Storage Efficiency = 61.6%
Overall System Size = 177.78' x 22.75' x 5.50'

72 Chambers
823.9 cy Field
527.4 cy Stone



Pond LID B2a: B-2a Chambers



Summary for Pond LID C2: C-1 Bioretention

Inflow Area = 0.223 ac, 72.91% Impervious, Inflow Depth = 0.65" for _95th event
Inflow = 0.10 cfs @ 9.94 hrs, Volume= 0.012 af
Outflow = 0.04 cfs @ 10.21 hrs, Volume= 0.012 af, Atten= 66%, Lag= 16.2 min
Discarded = 0.04 cfs @ 10.21 hrs, Volume= 0.012 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link C : Outlet C

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 821.06' @ 10.21 hrs Surf.Area= 509 sf Storage= 82 cf

Plug-Flow detention time= 17.1 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 17.1 min (804.9 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1	820.25'	1,884 cf	**Roadside Bioretention (Prismatic)** Listed below (Recalc)

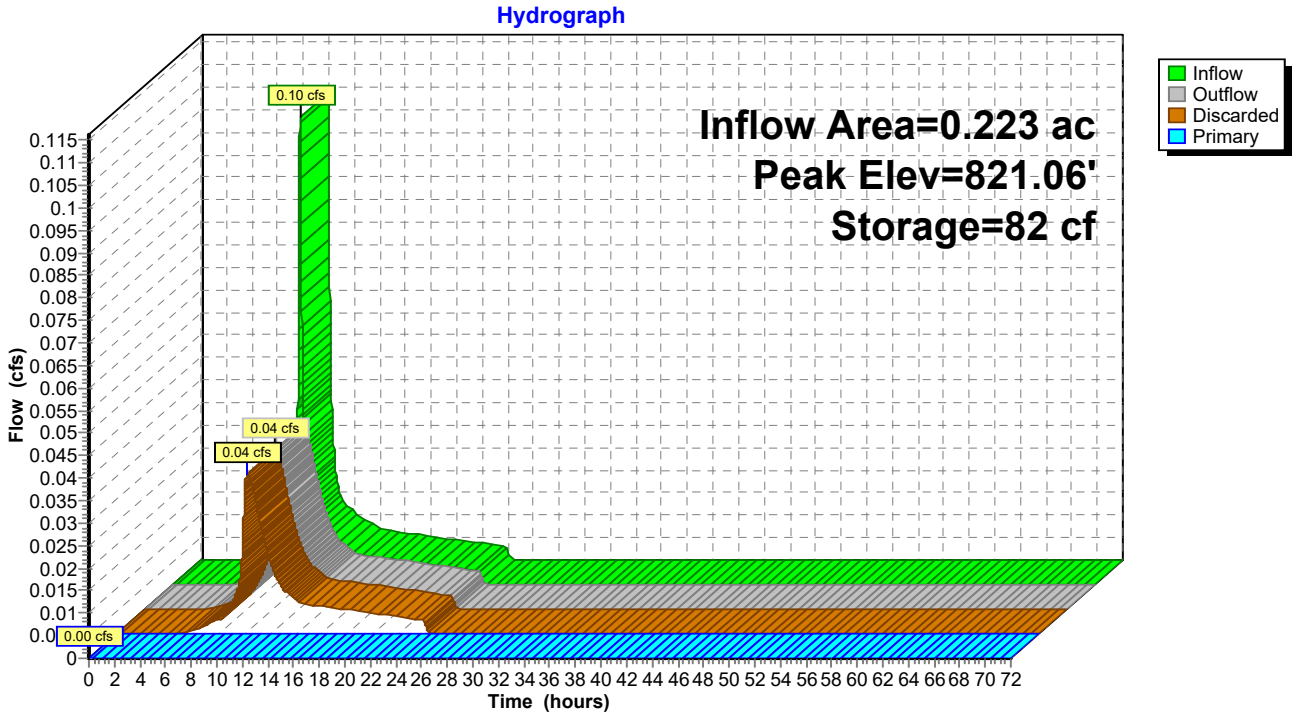
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
820.25	0	0.0	0	0
822.25	1,256	40.0	502	502
824.25	1,256	30.0	754	1,256
824.75	1,256	100.0	628	1,884

Device	Routing	Invert	Outlet Devices
#1	Primary	824.25'	**3.6" x 1.0" Horiz. Orifice/Grate X 77.00** C= 0.600 in 18.0" x 18.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	820.25'	**3.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'

Discarded OutFlow Max=0.04 cfs @ 10.21 hrs HW=821.06' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=820.25' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond LID C2: C-1 Bioretention



Summary for Pond LID D: Basin

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 0.66" for _95th event
Inflow = 1.78 cfs @ 9.94 hrs, Volume= 0.208 af
Outflow = 0.01 cfs @ 24.16 hrs, Volume= 0.049 af, Atten= 99%, Lag= 853.0 min
Discarded = 0.01 cfs @ 24.16 hrs, Volume= 0.049 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link D : Outlet D
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link D : Outlet D

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 814.33' @ 24.16 hrs Surf.Area= 6,392 sf Storage= 8,527 cf

Plug-Flow detention time= 1,811.0 min calculated for 0.049 af (24% of inflow)
Center-of-Mass det. time= 1,572.8 min (2,360.6 - 787.8)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	35,708 cf	**DMA D Basin (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
810.00	4,775	0.0	0	0
812.00	4,775	40.0	3,820	3,820
814.00	4,775	30.0	2,865	6,685
815.00	9,674	100.0	7,225	13,910
816.00	10,885	100.0	10,280	24,189
817.00	12,153	100.0	11,519	35,708

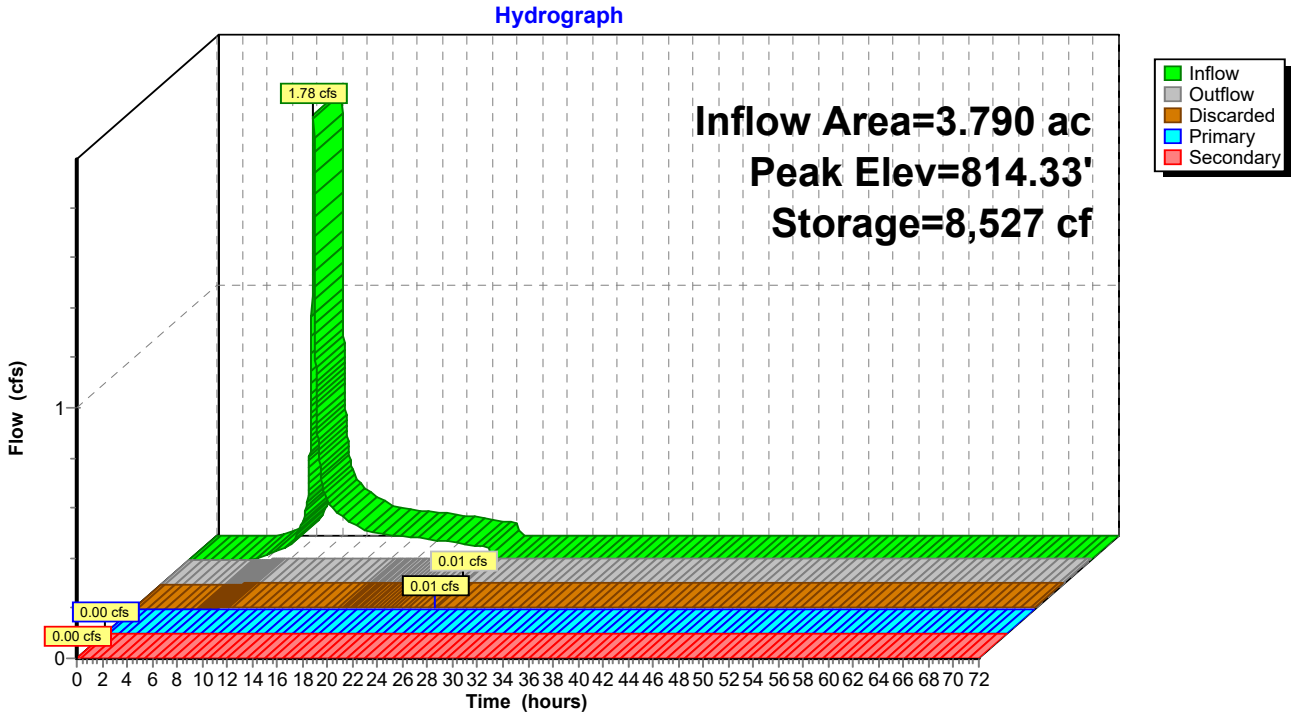
Device	Routing	Invert	Outlet Devices
#1	Primary	816.25'	**3.6" x 1.0" Horiz. Orifice/Grate X 310.00** C= 0.600 in 36.0" x 36.0" Grate (86% open area) Limited to weir flow at low heads
#2	Discarded	810.00'	**0.070 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 100.00' Phase-In= 0.10'
#3	Secondary	816.75'	**30.0' long x 2.0' breadth Spillway_Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.01 cfs @ 24.16 hrs HW=814.33' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=810.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=810.00' TW=0.00' (Dynamic Tailwater)
↑—**3=Spillway_Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond LID D: Basin

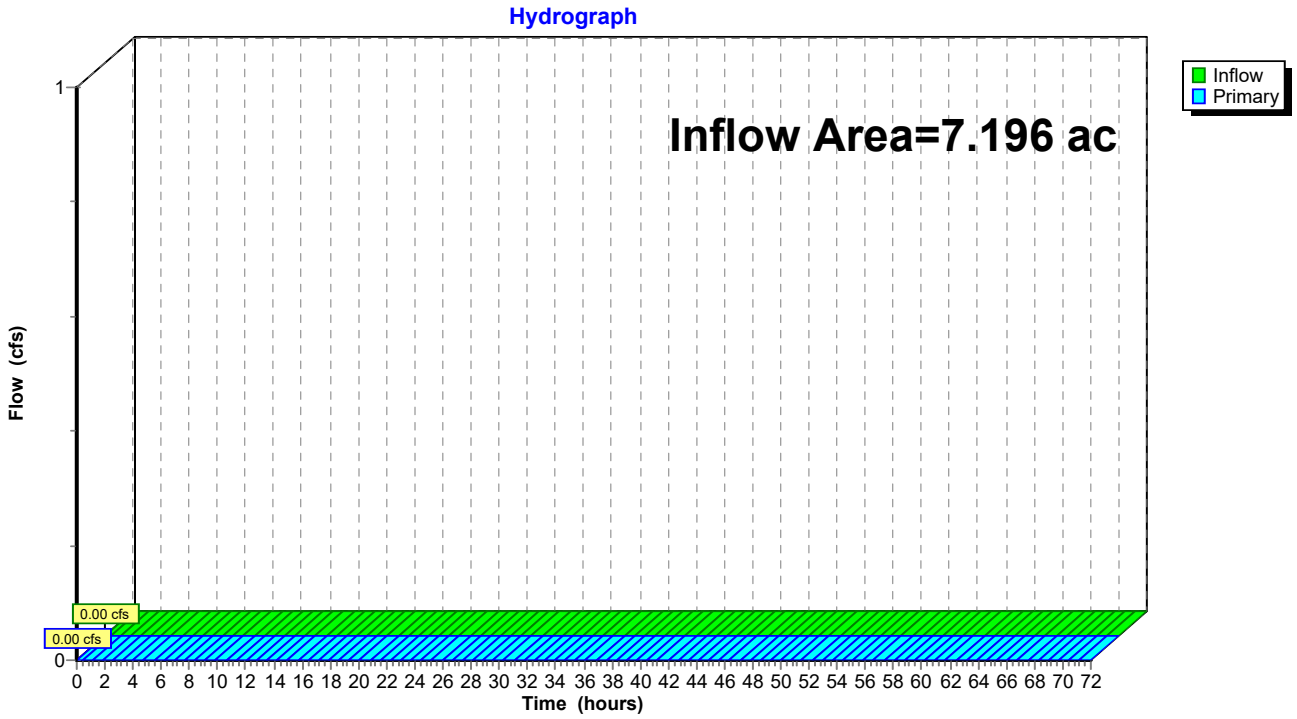


Summary for Link A: Outlet A

Inflow Area = 7.196 ac, 86.00% Impervious, Inflow Depth = 0.00" for _95th event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: Outlet A

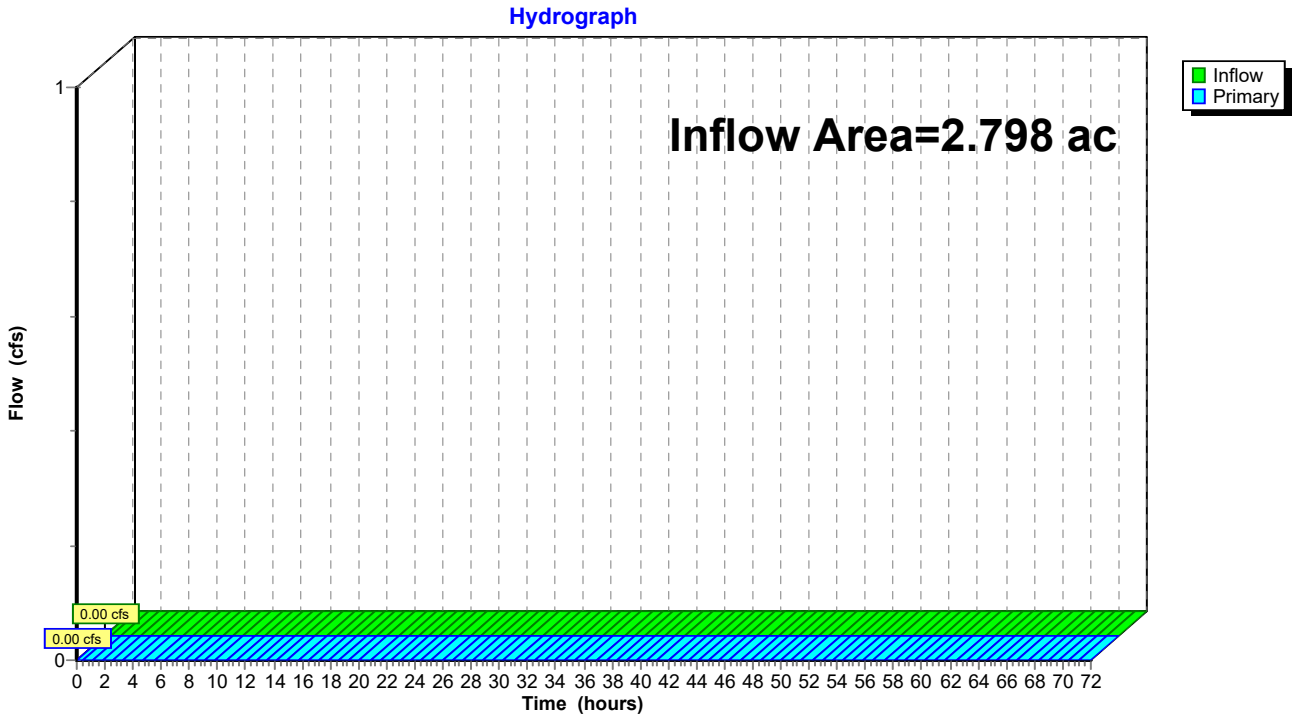


Summary for Link B: Outlet B

Inflow Area = 2.798 ac, 83.10% Impervious, Inflow Depth = 0.00" for _95th event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: Outlet B

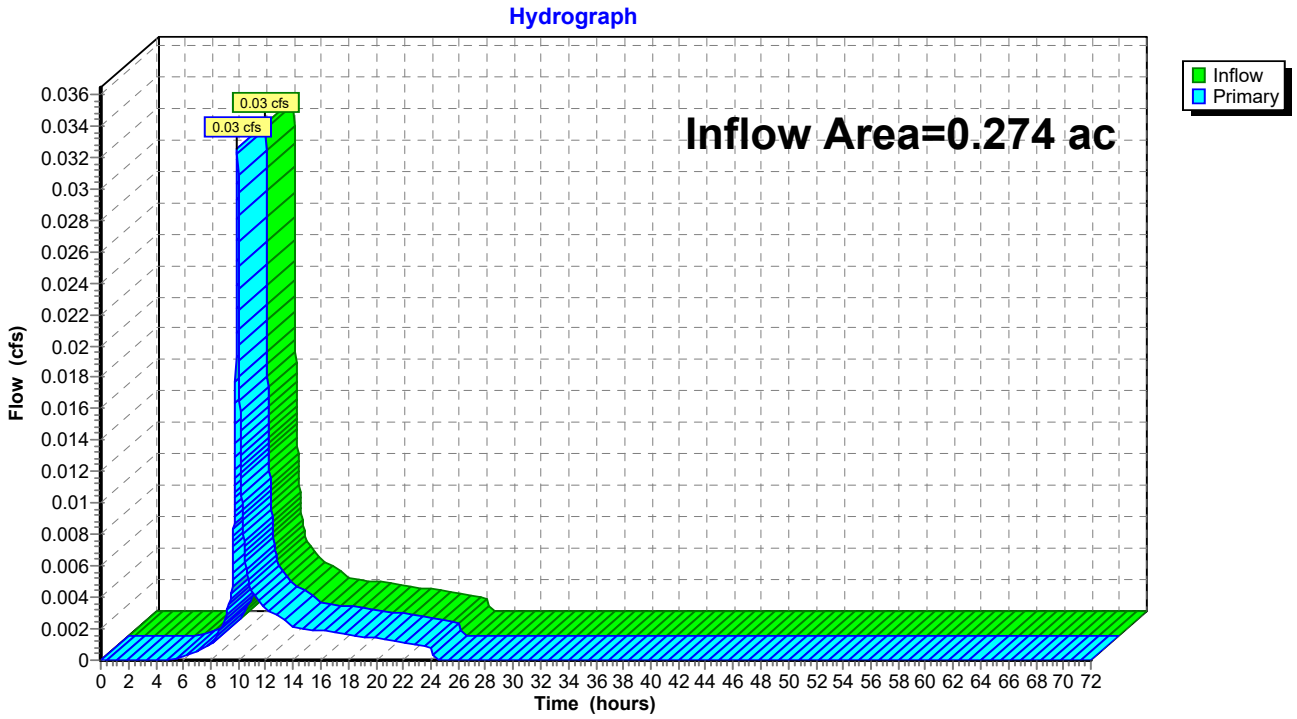


Summary for Link C: Outlet C

Inflow Area = 0.274 ac, 77.95% Impervious, Inflow Depth = 0.17" for _95th event
Inflow = 0.03 cfs @ 9.94 hrs, Volume= 0.004 af
Primary = 0.03 cfs @ 9.94 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link C: Outlet C

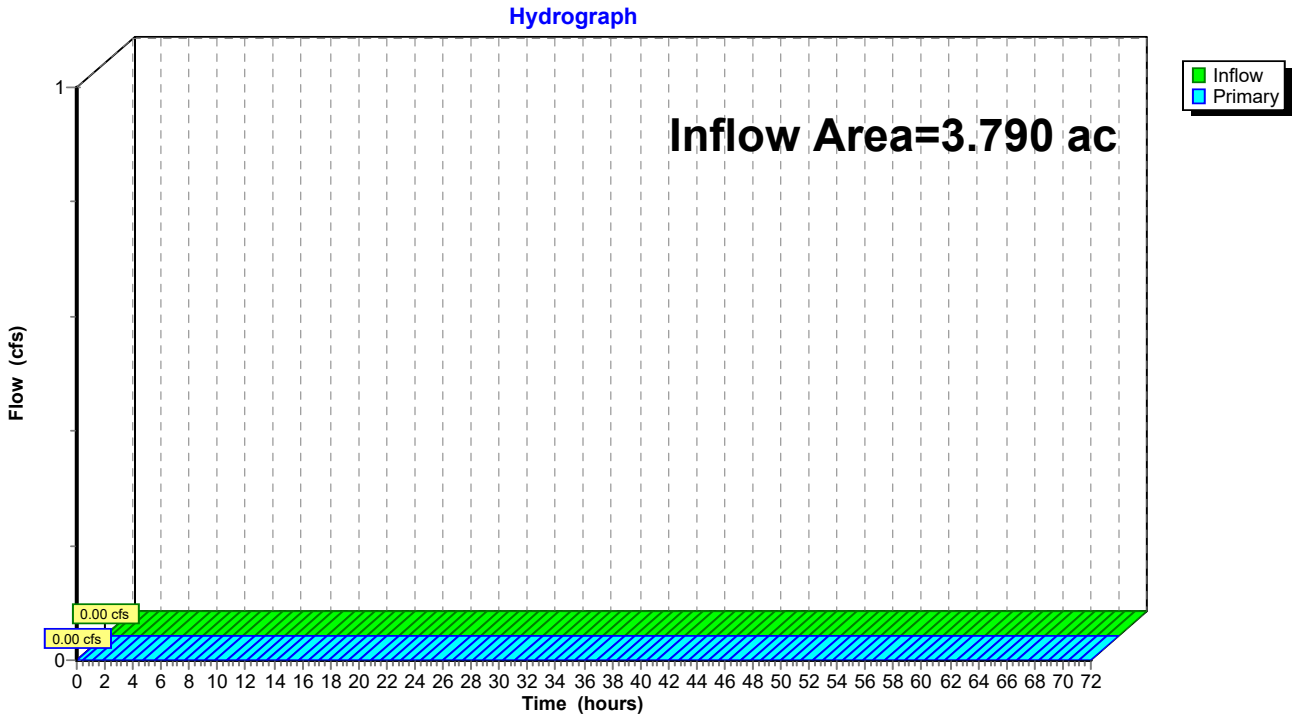


Summary for Link D: Outlet D

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 0.00" for _95th event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link D: Outlet D



PRELIMINARY DRAINAGE DESIGN REPORT

For

ARDMORE INDUSTRIAL

Ardmore Road, Paso Robles, California

WG Project Number:

0751-0005 Ardmore

February 21, 2023

Prepared by:

Wallace Group
612 Clarion Court
San Luis Obispo, CA 93401
805 544-4011
Job Number: 1493-0007

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Certification

Professional Engineer

This report was prepared by, or under the direction of the following Professional Engineer's in accordance with the provisions of Section 6700 of the Business and Professions Code of the State of California.



DRAFT – FOR REVIEW ONLY

_____

Tom Zehnder, PE C72702
Principal, Wallace Group

I. Project Background

I.A. Project Description

The Ardmore project is a planned commercial development to be located in the City of Paso Robles, off of Ardmore Road just south of Union Road. The existing property is 14.06 acres of primarily undeveloped rural grassland with two agricultural structures. The southern portion of the site slopes gently to the west while the northern portion of the site gently slopes to the northeast corner. The current site plan design includes six commercial buildings, associated parking areas, interior courtyards and a new city-maintained road segment extending from Ardmore Road through the project to the eastern boundary of the site. Proposed storm drain facilities for this project include five separate storm drain pipe networks, three underground infiltration and detention chambers, and one surface infiltration and detention basin.
As a project located within the city limits of Paso Robles, this report is intended to support issuance of entitlement by the City of Paso Robles. A project map is shown below in **Figure 1** and the Offsite Properties Exhibit is shown in **Figure 2**, for reference.



Figure 1. Project Location within the City of Paso Robles

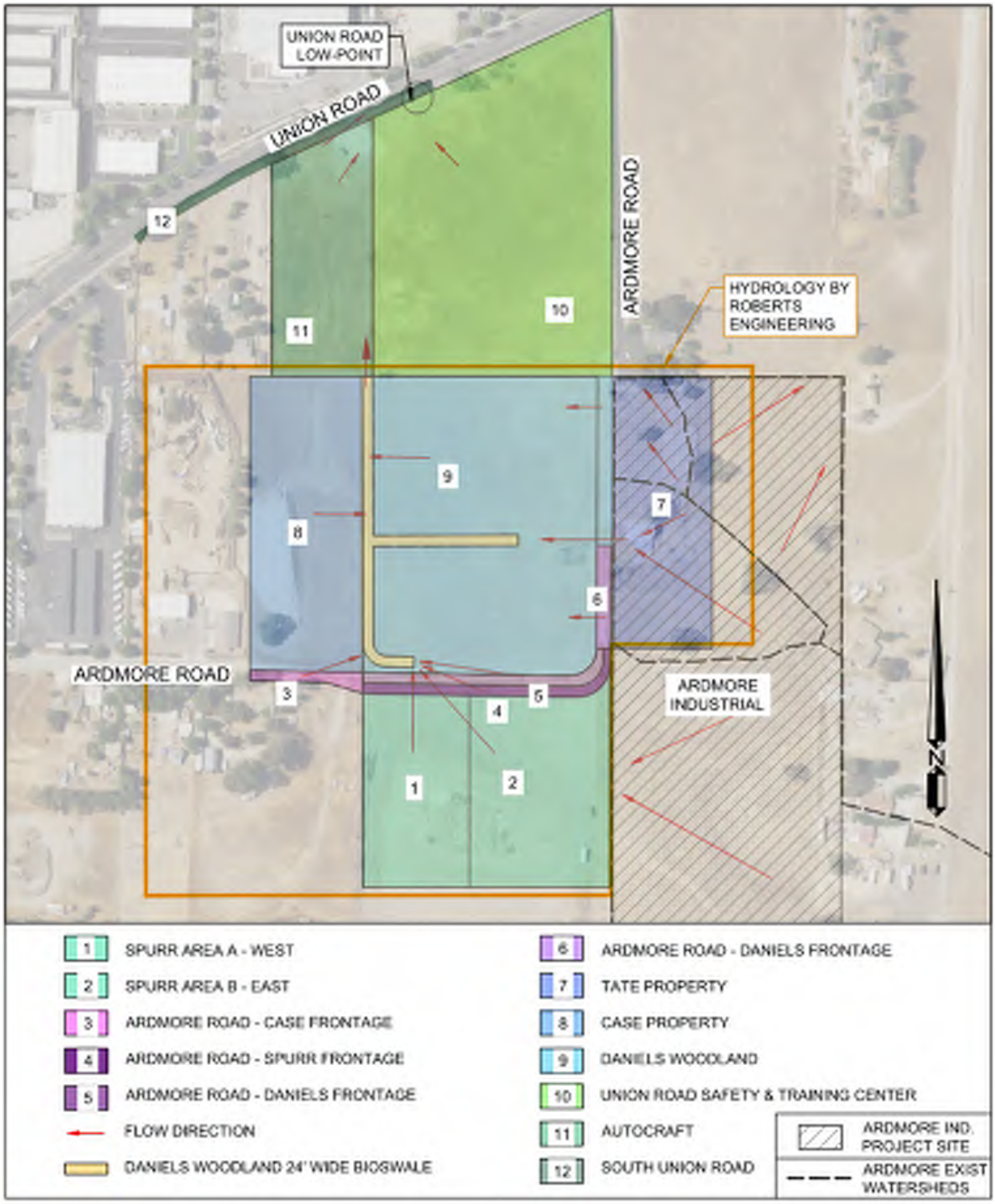


Figure 2: Offsite Properties Exhibit – Ardmore Industrial

I.B. Existing Site Conditions

The Ardmore Project is part of an existing 106-acre watershed that drains north towards Union Road where it is collected by the City of Paso Robles' storm drain system. This project is located at the upstream end of this greater existing watershed encompassing approximately 69 acres of the project drainage area. The northwest corner of the site, which is about 3.27 acres of the project area, drains offsite to the northeast towards Union Road and Huer Huero Creek.

The project drainage area consists of four existing major watersheds that each drain to different discharge locations (See **Appendix A** for the *Existing Watershed Exhibit*). Existing watershed #1 (EX1 offsite) includes approximately 57 acres of undeveloped, rural grassland that flows onto the site. Existing watershed #1 (EX1 onsite) includes 7.20 acres of undeveloped onsite area. Stormwater from this drainage area flows through shallow, natural drainage paths to two existing 24" storm drain pipe inlets along the west project boundary located on the adjacent Spurr property (Outlet A). Existing Watershed #2 (EX2) drains to an existing culvert inlet, conveying it beneath Ardmore Road to the adjacent Daniels Woodlands property (Outlet B). Existing Watershed #3 (EX3) consists of the northeast corner of the site with stormwater flowing offsite through shallow, natural drainage paths towards Union Road and Huer Huero Creek (Outlet D). Existing Watershed #4 (EX4) is the smallest existing project watershed. Stormwater from this area flows northwest towards Ardmore Road where it is collected in a natural roadside swale and conveyed north towards Union Road (Onsite Runoff (C)).

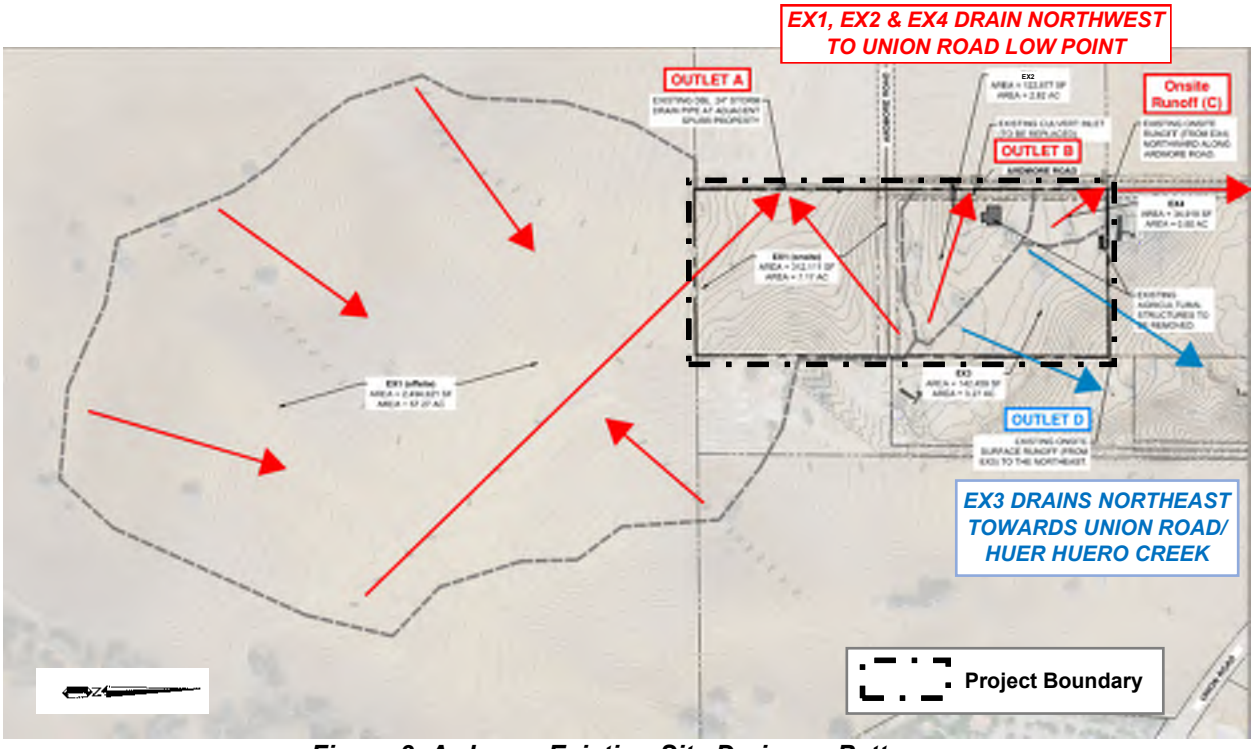


Figure 3. Ardmore Existing Site Drainage Patterns

I.C. Existing Drainage Studies

Several existing drainage studies have been completed for the surrounding offsite properties adjacent to the Ardmore Industrial site. These studies are listed in Section I.F. of this report as additional references.

During the Ardmore preliminary drainage design, the existing offsite hydrology was analyzed and compared to the drainage studies of the surrounding properties (Spurr and Daniels Woodland), both prepared by Roberts Engineering. This was to review the offsite run-on to the Ardmore site and identify the pre-developed drainage condition for the "EX1 offsite" watershed – also called "Spurr (Area B)" within the Roberts Engineering reports. This existing watershed, after crossing the Ardmore site, discharges to an existing storm drain inlet (Outlet A in this report) that is located on the adjacent Spurr property, to the west. This existing inlet will remain and serve as the proposed discharge location for DMA A of Ardmore Industrial, following historic drainage patterns.

Table 1 shows the comparison of 100-year peak flows for this existing, offsite watershed. This preliminary drainage report has been prepared using the assumption that the offsite run-on from "EX1 offsite" in the 100-yr storm event is 76.97 cfs – which is more conservative than previous studies. We also believe that the County of San Luis Obispo standard time of concentration equation (see detail H-2) is more representative of this watershed.

Table 1: Comparison of Ardmore Industrial offsite watershed run-on

Offsite Area *	Report	Total Area in Report (ac)	Calculated tc (min)	tc Method	Hydrology Calculation Method	100-yr Flow (cfs)
Spurr (Area B)	Roberts, Spurr/ Daniels Wood Reports (9/8/2020)	59.00	35.00	FAA method	Rational	44.00
EX1 offsite	Wallace Group, Ardmore Industrial Prelim Report (2/2023)	57.27	11.04	SLO County Equation	Rational	76.97

** These two areas represent the same drainage watershed but have different names in different drainage reports*

I.D. Soil Characteristics

A geotechnical engineering soils report for the Ardmore Project has been prepared by Beacon Geotechnical, Inc (dated October 12, 2022).

Based on this geotechnical report, soils across the site are comprised of mostly very silty clayey sands overlain by layers of multiple silty clayey sands with gravel. Soil expansion capabilities were determined to be low, and groundwater was not encountered in any of the site borings to a depth of 20 feet. Twelve different infiltration borings and tests were completed across the site with infiltration rates recorded range from 1.50 in/hr. to 5.00 in/hr. and are directly applicable to the design of infiltration trenches and similar deep facilities. For shallow facilities with more bottom area than sidewall area, the Porchet conversion is applied to the test data to determine the applicable infiltration rate. Using the Porchet conversion method, infiltration rates ranged from 0.07 to 0.70 in/hr.

NRCS web soil data identifies the soils as primarily Hydrologic Soil Group C (mostly clay and loams), which is associated with generally moderate-to-low infiltration rates and is usually due to the existence of clays within the soil complexes.

See **Appendix B** for excerpts from the geotechnical engineering report, NRCS web soil survey, and additional data related to onsite infiltration.

I.E. Proposed Site Drainage

The proposed site plan will be divided into five drainage management areas (DMAs) while following historic drainage patterns and discharge locations for stormwater runoff. See **Figure 4** below, and **Appendix A** for the Proposed Drainage Management Areas Exhibit.

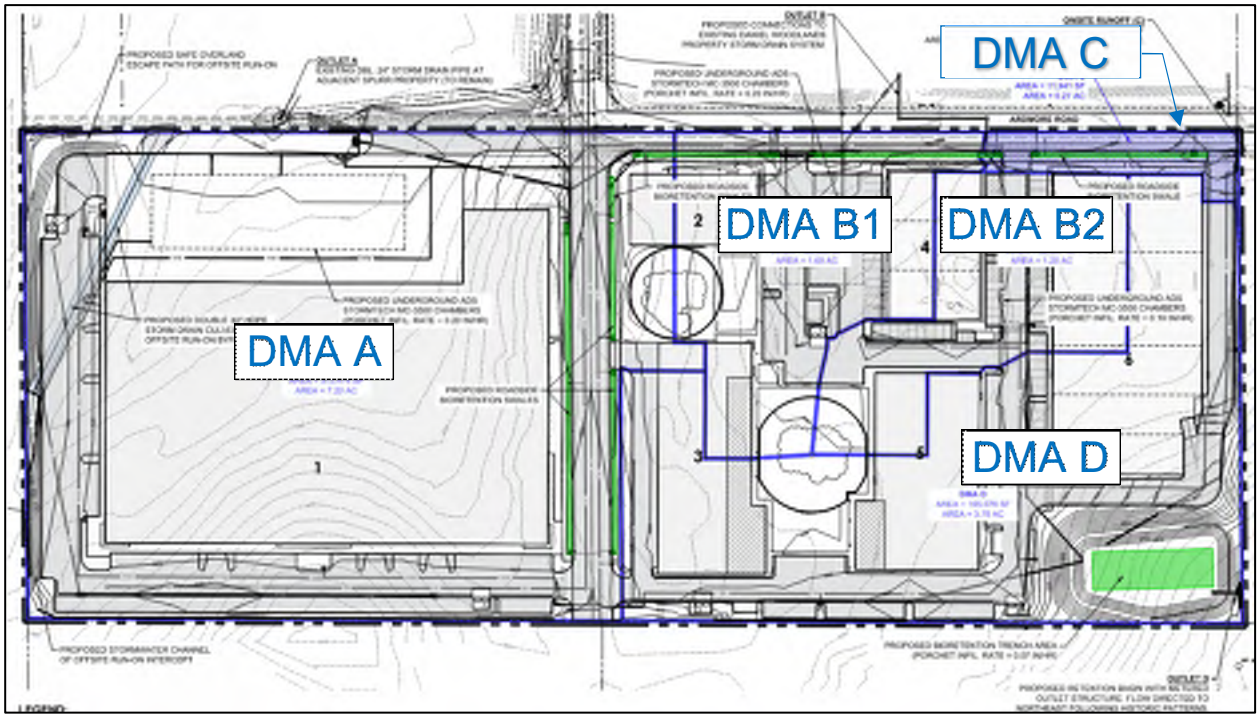


Figure 4: Proposed Drainage Management Areas

The proposed site plan consists primarily of impervious surface areas such as large commercial buildings, associated parking areas, a new city-maintained road extension of Ardmore Road east through the project site, and frontage improvements along the east side of the existing Ardmore Road. **Tables 2 and 3** show the pre-development vs. post-development values for land use types associated with the proposed site plans.

Table 2: Pre-development Site Conditions

Land Type	Total Area (sf)	Total Area (ac)	% of Total Area
Impervious (Imp)	3,223	0.07	0.5%
Pervious (P)	609,141	13.98	99.5%
Total Area	612,364	14.06	100.0%

Table 3: Post-development Site Conditions

Land Type	Total Area (sf)	Total Area (ac)	% of Total Area
Impervious (Imp)	501,730	11.52	81.9%
Pervious (P)	110,633	2.54	18.1%
Total Area	612,363	14.06	100.0%

With limited surface area available for pervious land uses, the current drainage design will utilize surface bioretention swales, underground gravel facilities, and underground ADS StormTech chamber systems to meet post-construction stormwater requirements (PCRs) and peak flow management requirements. Further information on design calculations can be found in Section III of this report. See **Appendix D** for conceptual details of these proposed drainage systems.

DMA A is designed to drain runoff from 7.20 acres of mixed commercial land and new roadway area towards existing Outlet A along the west project boundary. Stormwater from the mixed commercial area will be directed to an underground StormTech chamber system via a storm drain network. This StormTech chamber system is designed to retain and infiltrate smaller storm events while detaining larger events to meter project runoff to Outlet A following historic patterns. The new right-of-way extension of Ardmore Road will drain to roadside bioretention facilities with underground gravel chambers. Runoff from larger storm events, not exceeding historic peak flow patterns will be directed to the existing Outlet A.

Existing Outlet A will also receive offsite run-on from approximately 57 acres of undeveloped, rural grassland that flows onto the site from the south and then is routed via two proposed 36” HDPE storm drain culverts, following historic drainage patterns.

DMA B1 is designed to drain runoff from 1.60 acres of mixed commercial land and the east side of Ardmore Road towards existing Outlet B along the west project boundary. The existing storm drain pipe will be maintained while the existing inlet will be replaced with a standard curb inlet connected to the proposed storm drain system associated with DMA B1. Roadside bioretention swales with underground gravel chambers will manage stormwater runoff from Ardmore Road while onsite runoff will be conveyed to an underground StormTech chamber system where historic peak flow patterns will be directed to Outlet B. See **Figure 5** below for a detailed diagram of Outlet B.

DMA B2 is designed to drain runoff from 1.20 acres of mixed commercial land towards Outlet B along the west project boundary. Onsite runoff will be conveyed to an underground StormTech chamber system where historic peak flow volumes will be directed to Outlet B via a new storm drain pipe that crosses Ardmore Road. This new connection will tie in to an existing storm drain manhole just east of Ardmore Road on the Daniels Woodlands property driveway entrance. The combined stormwater runoff of DMA B1 and DMA B2 has been designed to be less than the existing drainage design volume of the Daniels Woodlands storm drain network, by Roberts Engineering. For more information of these calculations and references to the Roberts Engineering report, see **Appendix C**.

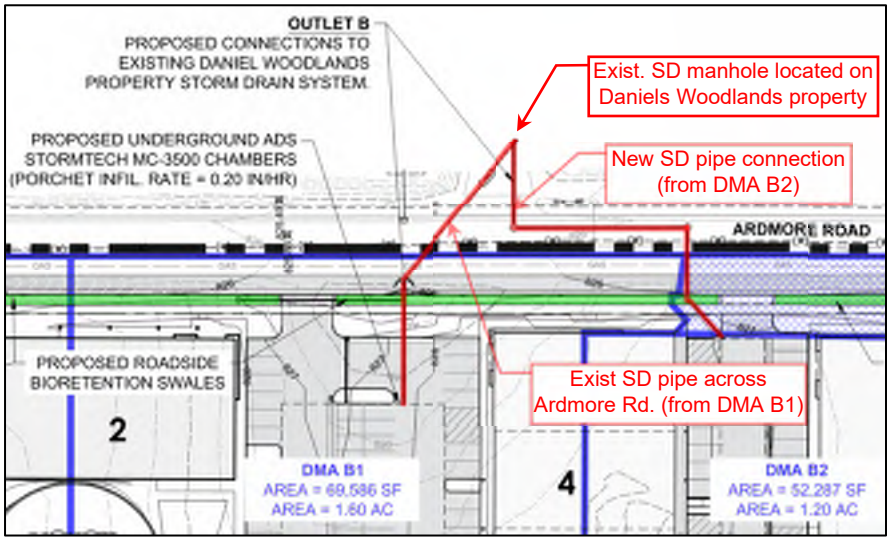


Figure 5: Outlet B for DMA B1 and DMA B2

DMA C is designed to drain runoff from 0.27 acres of onsite mixed commercial land and the east side of Ardmore Road towards the northwest corner of the project. A majority of stormwater runoff from DMA C will be directed into a proposed roadside bioretention swale with underground gravel storage. Following historic drainage patterns and runoff volumes, excess flow from DMA C will be directed offsite along the east side of Ardmore Road (see **Figure 6**). This designed onsite runoff with be flow northward towards Union Road via an existing roadside swale. See **Appendix C** for stormwater calculations of DMA C and the Onsite Runoff (C) location.

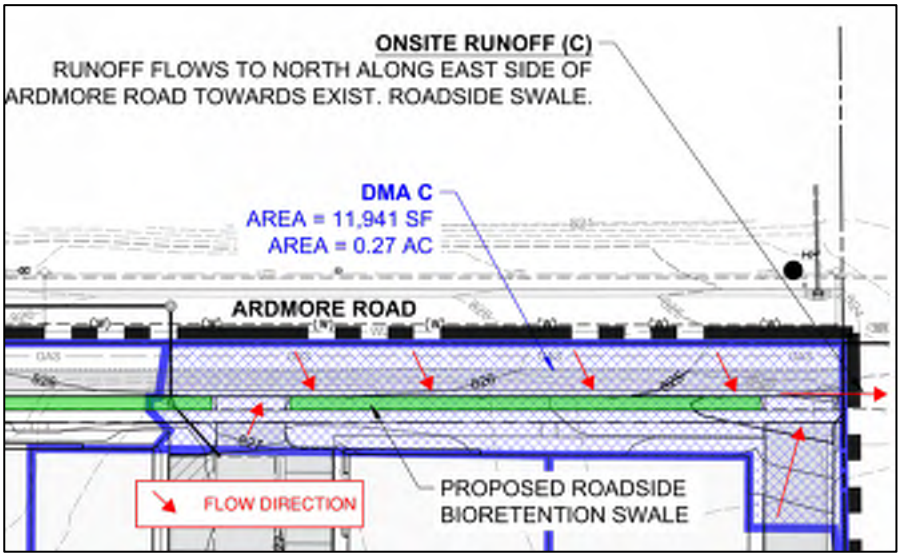


Figure 6: Onsite Runoff (C) for DMA C

The northeast portion of the project site consists of DMA D which drains 3.79 acres of mixed commercial land towards the northeast and Union Road. This drainage area is connected to a separate offsite watershed that flows directly towards Huer Huero Creek, unlike the previously discussed project DMAs A, B1, B2, and C which drain to a separate low point along Union Road. Stormwater runoff from DMA D will be directed to a surface detention basin at the northeast corner of the project site. This basin will also have retention and infiltration capabilities to manage smaller storm events while onsite runoff from larger events will be metered offsite by a proposed box inlet (Outlet D) and concrete spillway towards the northeast, following historic drainage patterns.

Overall, it is expected that the combined performance of these proposed storm drain detention systems across the project will decrease stormwater run-off from the site compared to pre-development drainage conditions. Historic discharge locations will also be maintained, and it expected that appropriate erosion control measures will be implemented to minimize downstream stormwater runoff impacts.

I.F. Purpose of Report

The purpose of this preliminary report is to assess the onsite drainage conditions and document the preliminary drainage design for the Ardmore Industrial project in support of the preliminary grading plans. This report provides relevant data and calculations to meet the requirements set out by the City of Paso Robles and County of San Luis Obispo Public Improvement Standards.

This preliminary report will address the following subjects related to Ardmore project:

- Drainage design standards
- Existing drainage patterns and proposed drainage management areas
- Hydrologic methodology and hydraulic calculations
- Peak flow management and flood control
- Safe overland conveyance paths

The following future reports are anticipated:

- Final Drainage Design Report
- Final Stormwater Control Plan

Additional references :

- Daniels Woodland Commercial Facility drainage report, by Roberts Engineering Inc, dated 3/15/19 and revised 9/8/20.
- Stormwater Control Plan for Daniels Woodland Commercial Complex, by Roberts Engineering Inc, dated 3/13/19.
- Stormwater Quality Control Plan for Spurrco Commercial Development Project, by Roberts Engineering Inc, dated 5/14/18.
- Ardmore Road Public Improvement Plans (Parcel Map PR 18-0067), by Roberts Engineering Inc, record drawings dated 2/12/20.

I.G. Regional Regulations

The Admore project is primarily subject to the City of Paso Robles Standard Specification and Details as it lies within the City of Paso Robles jurisdiction. Where any guidance is not found within the City of Paso Robles standards, designs for this project will then follow County of San Luis Obispo Public Improvement Standards.

This project is also subject to the Stormwater Post Construction Requirements #1 - # 4 (PCRs). A separate preliminary stormwater control plan will be prepared to review and assess the current site plan as it relates to PCR compliance.

This project does not include any impacts that would involve other governing jurisdictions such as the California Department of Fish and Wildlife (CDFW), and the Federal Emergency Management Agency (FEMA). This project does not impact waters within the jurisdiction of the US Army Corps of Engineers.

I.H. Design Criteria

The design standards used for the Ardmore drainage facilities are summarized below.

1. Peak Flow Management and Flood Control (City of Paso Robles and County of SLO)
    a. No significant flow increase from the existing condition for the 2-year through 100-year storms. Historic stormwater drainage patterns will be maintained.
2. Swales and open channels (City of Paso Robles)
    a. 25-year storm event volume with 1-ft of freeboard
    b. 100-year storm event volume shall be contained within the banks or within channel easement.
3. Closed Conduits (City of Paso Robles)
    a. 25-year design storm event.
    b. 100-year storm event volume shall be contained within the banks or within channel easement of secondary, safe overland escape path.
4. Overland Conveyance (City of Paso Robles)
    a. Sump conditions must have safe overflow path for 100-year flow.
5. Stormwater Quality (City of Paso Robles, County of SLO and PCRs)
    a. Comply with Central Coast Regional Water Quality Control Board Post-Construction Stormwater Requirements #1 - #4.

II. Topographic Survey and Data Sources

The following data sources were utilized for the analysis presented in this report:

- Topographic survey prepared by North Coast Engineering, dated 11-09-2022 and 2-2-2023.
- Site visits and field observations

III. Hydrologic and Hydraulic Analysis

III.A. Hydrologic Analysis

A hydrologic analysis was performed as described in the City of Paso Robles Standard Specifications and Details, evaluating peak stormwater flows from each existing watershed and DMA (see **Table 4**). The primary analytical method used for most project drainage areas was the Santa Barbara Urban Hydrograph (SBUH) Method in the HydroCAD software. A separate Rational Method calculation was used for peak flow analysis of the “EX1 (offsite)" existing watershed due to the offsite location and undeveloped land use. It is our opinion that the Rational Method produced more consistent and realistic peak flow values compared to the SBUH Method. Section I.C of this report provides more information on the hydrologic results of “EX1 (offsite)” compared to previous drainage studies.

Table 4: Hydrologic analysis methods by project drainage area

Existing/ Pre-developed Hydrology		Proposed/ Post-developed Hydrology	
EX1 (offsite) *	Rational Method	DMA A	SBUH in HydroCAD
EX1 (onsite)	SBUH in HydroCAD	DMA B1	SBUH in HydroCAD
EX2 **	Peak flow data referenced from 2019 Daniels Comm. drainage report by Roberts Eng. -- these values were more conservative (less than) the peak flows calculated by Wallace Group.	DMA B2	SBUH in HydroCAD
EX3	SBUH in HydroCAD	DMA C	SBUH in HydroCAD
EX4	SBUH in HydroCAD	DMA D	SBUH in HydroCAD

The preliminary drainage design of Ardmore Industrial utilizes the combined performance of surface bioretention swales with underground gravel retention, underground retention and detention (StormTech) chamber systems, and a surface basin with retention and detention capabilities. Each DMA will be connected to an existing drainage discharge location preserving historic drainage patterns with minimal stormwater diversion. Post-developed project peak flows for 2-year through 100-year storm events will be less than or equal to pre-developed peak flow conditions. Offsite run-on to the project from the south will be conveyed through a bypass culvert to an existing discharge location (Outlet A), following historic drainage patterns.

A summary of the existing vs. proposed hydrologic conditions is presented in **Table 5**. For further information on the overall hydrologic analysis see **Appendix C**.

Table 5. Pre-Development vs. Post-Development Hydrologic Analysis

Outlet Location	Pre-Dev. Total Area (ac)	Post-Dev. Total Area (ac)	Storm	Pre-Developed Flow, Q (cfs)	Post-Developed Flow, Q (cfs)
Outlet A	64.43	64.46	95th	-	-
			2 YR	32.51	31.75
			10 YR	61.76	59.90
			25 YR	72.83	71.33
			50 YR	85.55	83.41
			100 YR	93.67	90.48
Outlet B	2.82	2.80	95th	Data Unknown	-
			2 YR	1.02	0.04
			10 YR	2.11	0.59
			25 YR	2.46	1.65
			50 YR	2.97	2.53
			100 YR	3.54	3.42
Onsite Runoff (C)	0.80	0.27	95th	0.01	0.03
			2 YR	0.15	0.07
			10 YR	0.74	0.12
			25 YR	1.17	0.15
			50 YR	1.52	0.18
			100 YR	1.89	0.20
Outlet D	3.27	3.79	95th	-	-
			2 YR	0.56	-
			10 YR	2.94	0.54
			25 YR	4.70	1.37
			50 YR	6.11	3.36
			100 YR	7.62	6.81
Drainage Area Subtotal	71.33	71.33			

Land Use

Project land uses were delineated into pervious and impervious areas. Existing land uses consist of undeveloped rural grassland with good vegetation cover and two agricultural structures across 71.33 acres of drainage area. The proposed project area of 14.06 acres will consist of a mixed commercial development, with impervious surfaces planned for approximately 85% of the site. The project minimizes excessive land disturbance and site improvements given the required project conditions, with pervious/ landscaped areas resulting in 18% of the proposed site (See **Table 3**).

For project calculations within the HydroCAD software, impervious areas were assigned a runoff curve number (CN) of 98, and pervious/ landscaped areas were assigned a CN of 79 (landscaped, 50-75% Grass cover, Fair, Hydrologic Soil Group C) following the standard US Natural Resources Conservation Service (NRCS) runoff curve number method.

Rainfall Depth and Distribution

Average annual rainfall data used in SBUH calculations was derived from the NOAA Atlas 14, Volume 6, Version 2 for the project location within Paso Robles, California (**Table 6**, below).

Table 6: Design Storm Event Data - SBUH

Rainfall Event Data		
95th	1.45	inches
2 YR	2.14	inches
10 YR	3.74	inches
25 YR	4.70	inches
50 YR	5.42	inches
100 YR	6.16	inches
** See NOAA Atlas 14 Rainfall data (24-hr storm duration)*		

Average annual rainfall data used in Rational Method calculations was derived from County of San Luis Obispo standard details H-1 through H-4 (2022) for the project location within Paso Robles, California (**Table 7**, below).

Table 7: Design Storm Event Data - Rational Method

Rainfall Event Data		
2 YR	1.30	in/ hr
10 YR	2.30	in/ hr
25 YR	2.60	in/ hr
50 YR	3.00	in/ hr
100 YR	3.20	in/ hr
** See 2022 County of San Luis Obispo Public Improvement Standards H-4, Table 2*		

See **Appendix B** for selected pages of rainfall data from each respective jurisdictional agency.

Drainage Management Areas

As described earlier in the Proposed Site Drainage section, five drainage management areas (or DMAs) were delineated based upon the preliminary grading design for the Ardmore project. **Appendix A** shows the delineation of the existing and proposed Ardmore DMAs.

Time of Concentration

The time of concentration (Tc) for each existing watershed and drainage management area was calculated using the County of San Luis Obispo standard detail H-2 (2022) time of concentration equation. A minimum time of concentration of 6 minutes was used in the calculations of this report, as standardized by the City of Paso Robles Section V-1.B rainfall chart.

Detailed time of concentration calculations for each existing watershed and drainage management are shown in **Appendix C**.

Peak Flow Analysis and Flood Control

Peak flows were calculated primarily using the Santa Barbara Urban Hydrograph (SBUH) Method analysis through the HydroCAD software for each existing watershed and proposed DMA. See **Table 4** for exceptional cases related to this project. Summaries of the hydrologic analyses and corresponding results are included in **Appendix C**.

The proposed underground retention facilities, surface detention basin, and underground detention chambers will combine to meet all peak flow management requirements for the 2-year through 100-year storm events, as required by the City of Paso Robles and Central Coast Regional Water Quality Control Board Post-Construction Stormwater Requirements #3 and #4.

III.B. Hydraulic Analysis

Bypass Culvert

A bypass culvert consisting of two 36” HDPE storm drain pipes is proposed along the south and southwestern side of the project to collect and convey offsite run-on to existing Outlet A (see **Table 8**), following historic drainage patterns. These parallel culvert pipes will combine to have the capacity to convey the 2-year through 100-year storm events but will be outlet-controlled due to the limited inlet capacity of existing Outlet A. See Section I.F of this report for the additional references containing the calculations for existing Outlet A, completed by Roberts Engineering.

It is expected that stormwater will pond at existing Outlet A to a maximum elevation of 823.35’ in events larger than the 2-year storm due to limited inlet capacity, following historic drainage conditions. Due to this drainage condition at Outlet A, a constant tailwater elevation of 823.35’ has been included in the analysis of the Ardmore bypass culvert. Stormwater ponding above 823.35’ at Outlet A will escape overland to the west and flow towards Ardmore Road. See Section III.C of this report for more information on safe overland escape paths. This water surface elevation will also likely cause variable ponding to occur at the bypass culvert inlet along the southern project boundary.

A safe overland escape path for stormwater upstream of the bypass culvert is proposed along the southern property boundary (see **Figure 7**). As onsite grading will conform to existing offsite topography at the property line, the proposed safe overland drainage path will have a crest elevation of 823.5’. Due to the combined effects of the bypass culvert tailwater condition and the safe overland escape path crest, further ponding of stormwater onto the adjacent southern property can be expected up to an elevation of 824.5’ in the 100-year storm event.

Permanent erosion control and energy dissipation is planned to be designed at the downstream end of the bypass culvert near existing Outlet A. These calculations will be included in the final drainage design report, to be completed at a later date.

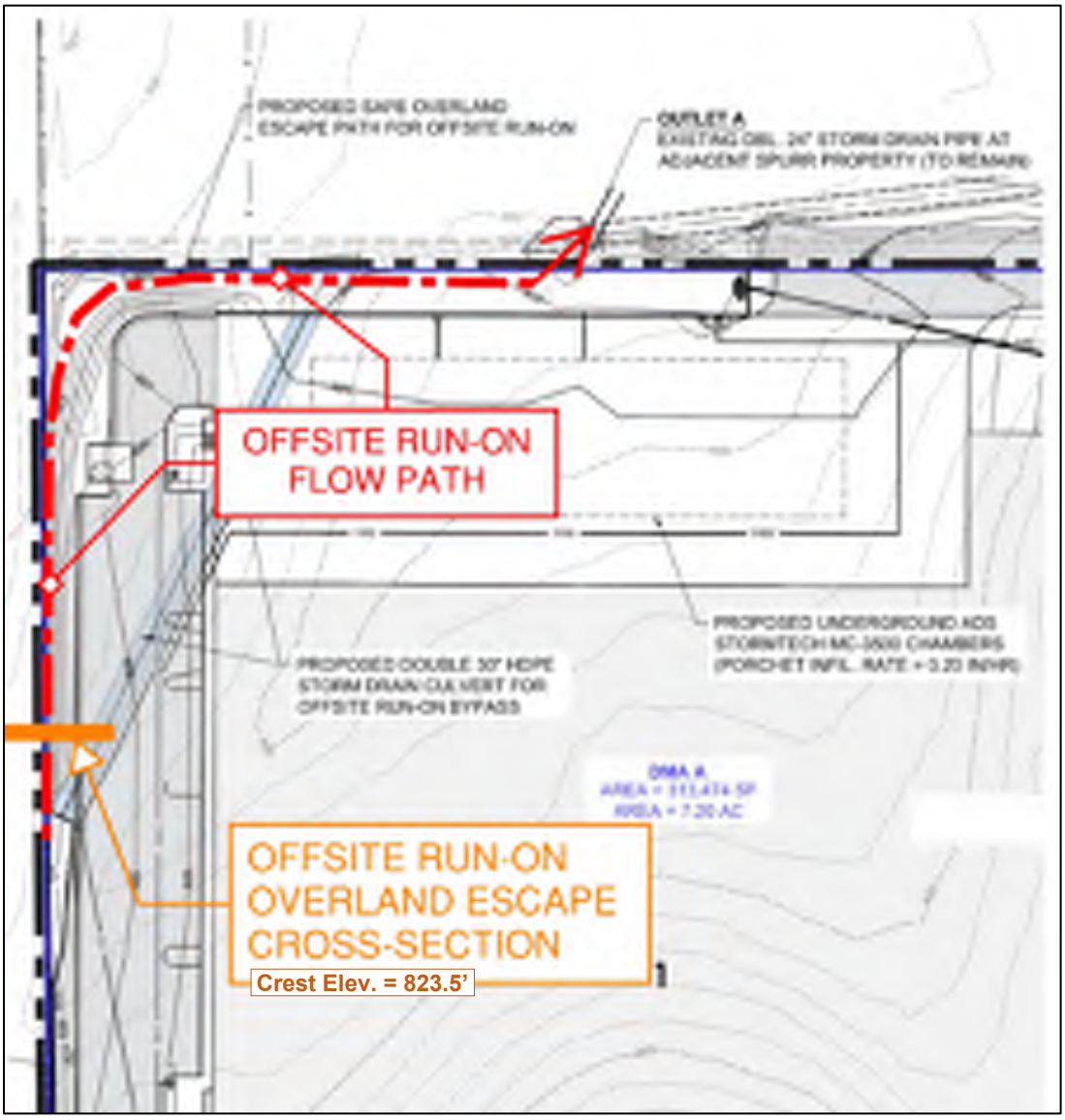


Figure 7: Safe overland escape path for offsite run-on from the south

Table 8: Offsite Run-on Peak Flow Summary

DMA	Outlet Location	Total Area (sf)	Total Area (ac)	C	Land Type Description	Storm	Intensity, I (in/hr)	Flow, Q (cfs)
EX1 (offsite)	**Outlet A** (Exist. double 24" SD pipes)	2,494,621	57.27	0.42	*OFFSITE RUN-ON* Undeveloped. Rural grassland/ open space, few trees			
						2 YR	1.30	31.27
						10 YR	2.30	55.32
						25 YR	2.60	62.54
						50 YR	3.00	72.16
						100 YR	3.20	76.97

A hydraulic analysis of the bypass culvert was performed using the HY-8 software. Summary images of the hydraulic analysis are presented in **Figures 8 and 9**. See **Appendix C** for detailed, hydraulic calculations for the bypass culvert.

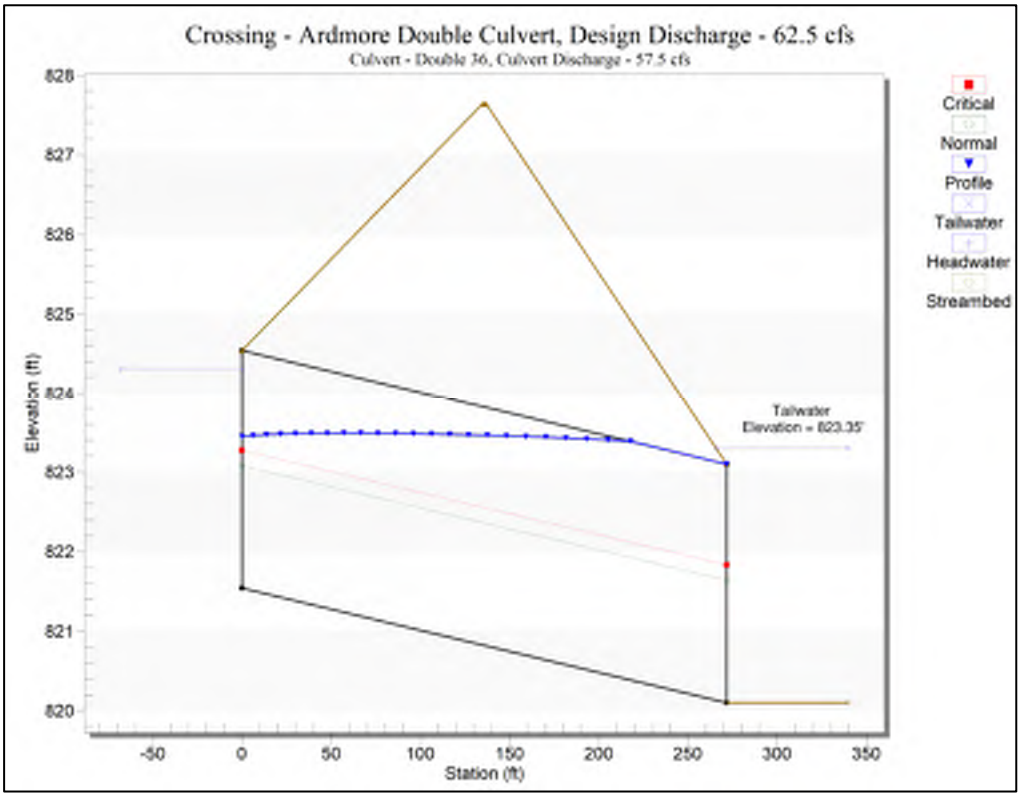


Figure 8: 25-year Hydraulic Analysis for Bypass Culvert - Profile

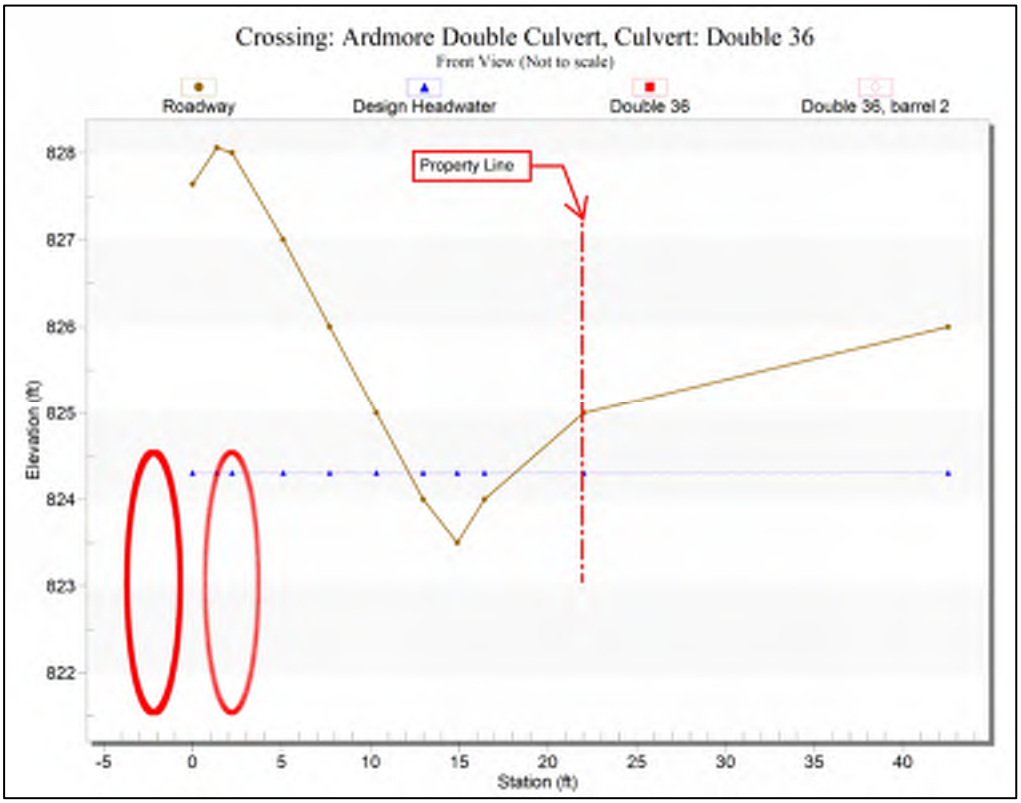


Figure 9: 25-year Hydraulic Analysis for Bypass Culvert – Front View

III.C Safe Overland Conveyance Paths

The proposed, preliminary Ardmore grading has been designed to safely direct overland conveyance of 100-year storm events away from proposed structures and downstream following historic drainage patterns. Below is a summary of each Ardmore project discharge location. **Figure 10** shows the different overland conveyance paths for each of project discharge location.

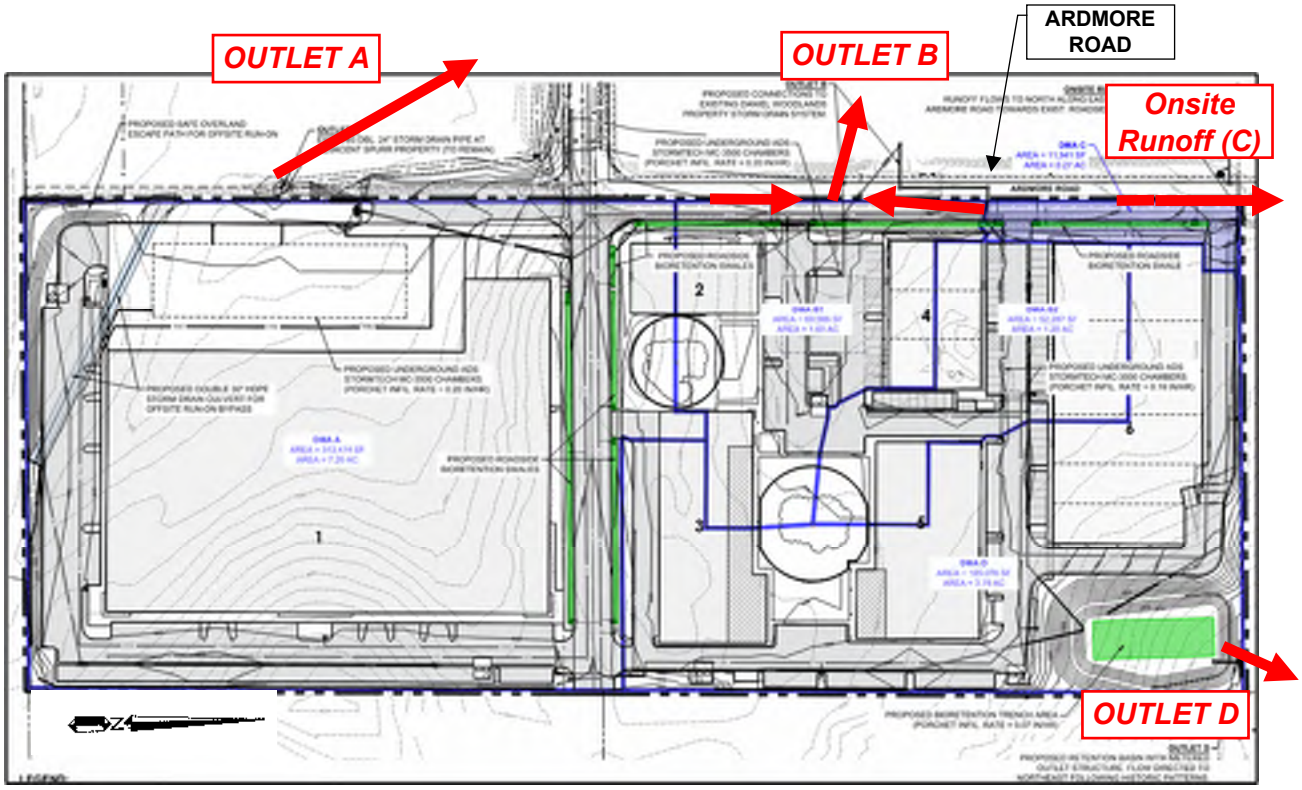


Figure 10: Safe Overland Escape Paths

Outlet A

Outlet A is comprised of two existing 24" storm drain pipes. This outlet is expected to receive stormwater flows from three contributing sources: undeveloped offsite run-on from the south via the proposed bypass culvert, onsite runoff from StormTech chambers in DMA A, and a second storm drain network in DMA A. These flows converge at a low point where the existing Outlet A is located. The existing condition and as-built construction status of this existing storm drain inlet is not completely known at the time of this report. Wallace Group was provided a design invert elevation of 816.84' for existing Outlet A by MBS Land Surveys. Further review of Outlet A will likely be necessary to fully analyze the actual, existing storm drain infrastructure.

In large storm events, or where the two existing 24" storm drain pipes do not perform as designed by Roberts Engineering, it is expected that this area will flood to an elevation of 823.35'. The overland escape path will be northwest across the Spurr property towards Ardmore Road where three stormwater basins will capture and convey flow westward into the downstream storm drain system. This overland escape path aligns with existing, historic drainage patterns.

Outlet B

Outlet B is an existing storm drain manhole just east of Ardmore Road designed as a part of the Daniels Woodlands project (see **Figure 5**, above). Outlet B is proposed to receive stormwater from an existing 12” storm drain pipe (from DMA B1) and a new storm drain pipe connection (from DMA B2). This existing storm drain network conveys stormwater westward through the Daniels Woodlands property where it discharges into a perimeter bypass swale. Stormwater will then be conveyed around the north side of the Daniels Woodlands property towards the downstream drainage channel that flows north to Union Road.

The proposed DMAs B1 and B2 have been designed to maintain this overland escape path following historic conditions and in accordance with the existing drainage design of the Daniels Woodlands project by Roberts Engineering.

Onsite Runoff (C)

Historic drainage patterns of the northwest corner of the Ardmore Industrial site show topography that directs stormwater northwest towards Ardmore Road. Once collected along the east side of Ardmore Road, stormwater continues to flow north and discharges into an existing roadside swale. DMA C has been designed to follow this historic drainage pattern, directing excess stormwater away from developed areas of Ardmore Industrial and onto Ardmore Road.

Outlet D

Proposed Outlet D consists of a box inlet with riser within the DMA D stormwater basin. This outlet has been designed to direct stormwater runoff from the area to the northeast, following historic drainage patterns and volumes. For excess stormwater runoff from DMA D into the proposed basin, a spillway has been proposed above the designed 100-year water surface elevation. Energy dissipation and permanent erosion control measures will be necessary to minimize downstream impacts of the concentrated flow from the proposed pipe outlet and the basin spillway.

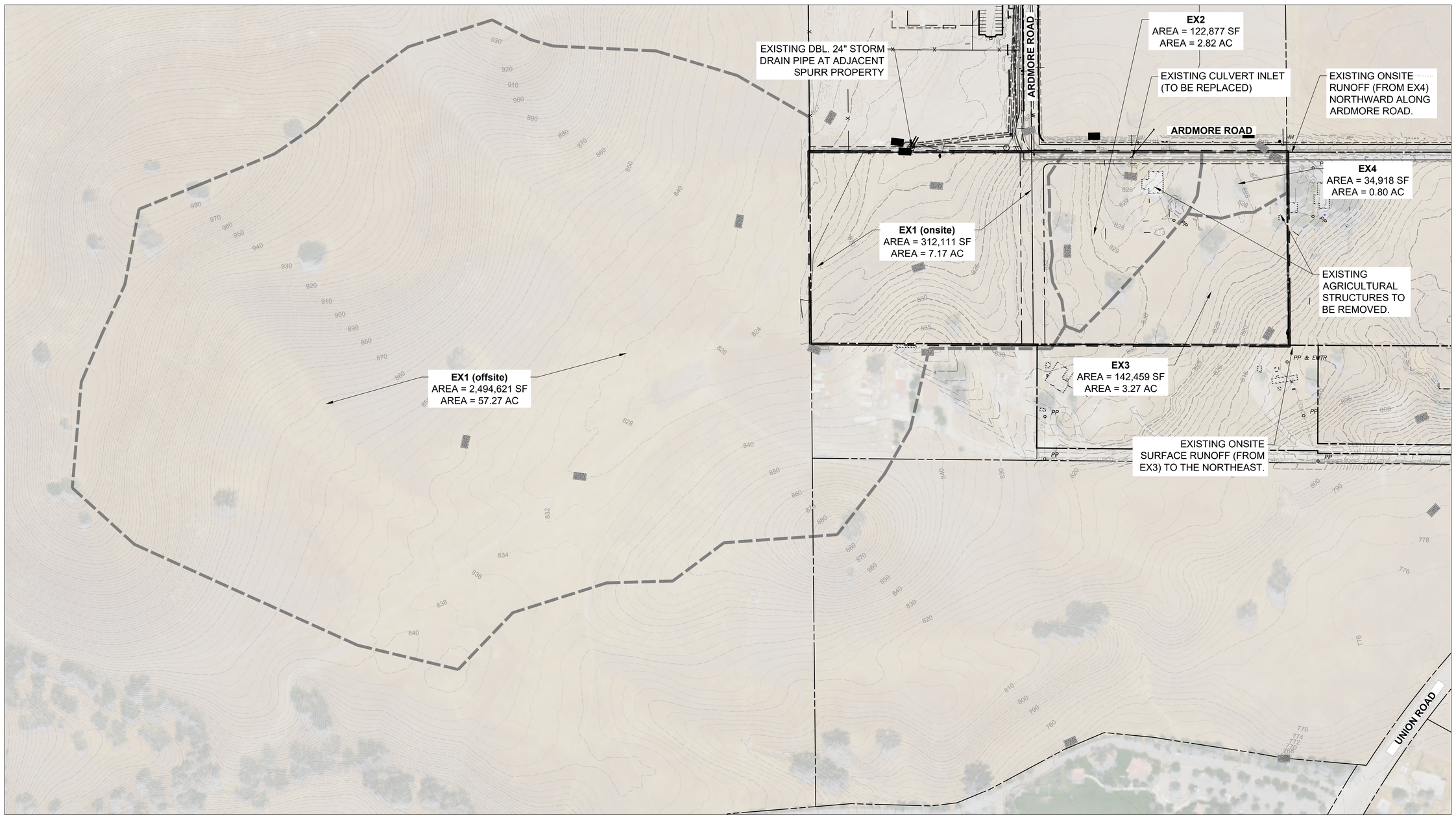
APPENDIX A

Appendix A – Supporting Exhibits

- Existing Watersheds and Proposed Drainage Management Areas (DMA) Exhibits
- Offsite Properties Exhibit

FILE NAME: 2022_ARDMORE_DRAINAGE MANAGEMENT AREAS.DWG

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3



LEGEND:

- **ARDMORE PROJECT BOUNDARY**
- **EXISTING WATERSHED BOUNDARY**

GRAPHIC SCALE
0 60 120 240
(IN FEET)
1 IN = 120 FT

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SIGNATURE

DATE SIGNED

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COVELOP
ARDMORE PROJECT DEVELOPMENT
EXISTING WATERSHED EXHIBIT

JOB #: 751-005
DESIGNERS: CD/ ZKP
DRAWN BY: ZKP
DATE: 12/06/2022

DRAWING NO.
1
OF 1 SHEET

FILE NAME: 2022_ARDMORE_DRAINAGE MANAGEMENT AREAS.DWG

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES
0 1 2 3

PROPOSED SAFE OVERLAND ESCAPE PATH FOR OFFSITE RUN-ON

OUTLET A
EXISTING DBL. 24" STORM DRAIN PIPE AT ADJACENT SPURR PROPERTY (TO REMAIN)

ARDMORE ROAD

OUTLET B
PROPOSED CONNECTIONS TO EXISTING DANIEL WOODLANDS PROPERTY STORM DRAIN SYSTEM.

ONSITE RUNOFF (C)
RUNOFF FLOWS TO NORTH ALONG EAST SIDE OF ARDMORE ROAD TOWARDS EXIST. ROADSIDE SWALE.

PROPOSED UNDERGROUND ADS STORMTECH MC-3500 CHAMBERS (PORCHET INFIL. RATE = 0.20 IN/HR)

DMA C
AREA = 11,941 SF
AREA = 0.27 AC

ARDMORE ROAD

PROPOSED ROADSIDE BIORETENTION SWALES

PROPOSED ROADSIDE BIORETENTION SWALE

DMA B1
AREA = 69,586 SF
AREA = 1.60 AC

DMA B2
AREA = 52,287 SF
AREA = 1.20 AC

PROPOSED DOUBLE 30" HDPE STORM DRAIN CULVERT FOR OFFSITE RUN-ON BYPASS

PROPOSED UNDERGROUND ADS STORMTECH MC-3500 CHAMBERS (PORCHET INFIL. RATE = 0.20 IN/HR)

PROPOSED UNDERGROUND ADS STORMTECH MC-3500 CHAMBERS (PORCHET INFIL. RATE = 0.19 IN/HR)

DMA A
AREA = 313,474 SF
AREA = 7.20 AC

PROPOSED ROADSIDE BIORETENTION SWALES

DMA D
AREA = 165,076 SF
AREA = 3.79 AC

PROPOSED STORMWATER CHANNEL OF OFFSITE RUN-ON INTERCEPT

PROPOSED BIORETENTION TRENCH AREA (PORCHET INFIL. RATE = 0.07 IN/HR)

OUTLET D
PROPOSED RETENTION BASIN WITH METERED OUTLET STRUCTURE. FLOW DIRECTED TO NORTHEAST FOLLOWING HISTORIC PATTERNS.

LEGEND:

- **ARDMORE PROJECT BOUNDARY**
- **PROPOSED DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY**
- **PROPOSED DRAINAGE MANAGEMENT AREA (DMA)** *(DRAINS OFFSITE OVER SURFACE)*
- **BIORETENTION WITH UNDERGROUND GRAVEL TRENCH**

GRAPHIC SCALE
0 20 40 80
(IN FEET)
1 IN = 40 FT

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STATE OF CALIFORNIA

SIGNATURE

DATE SIGNED

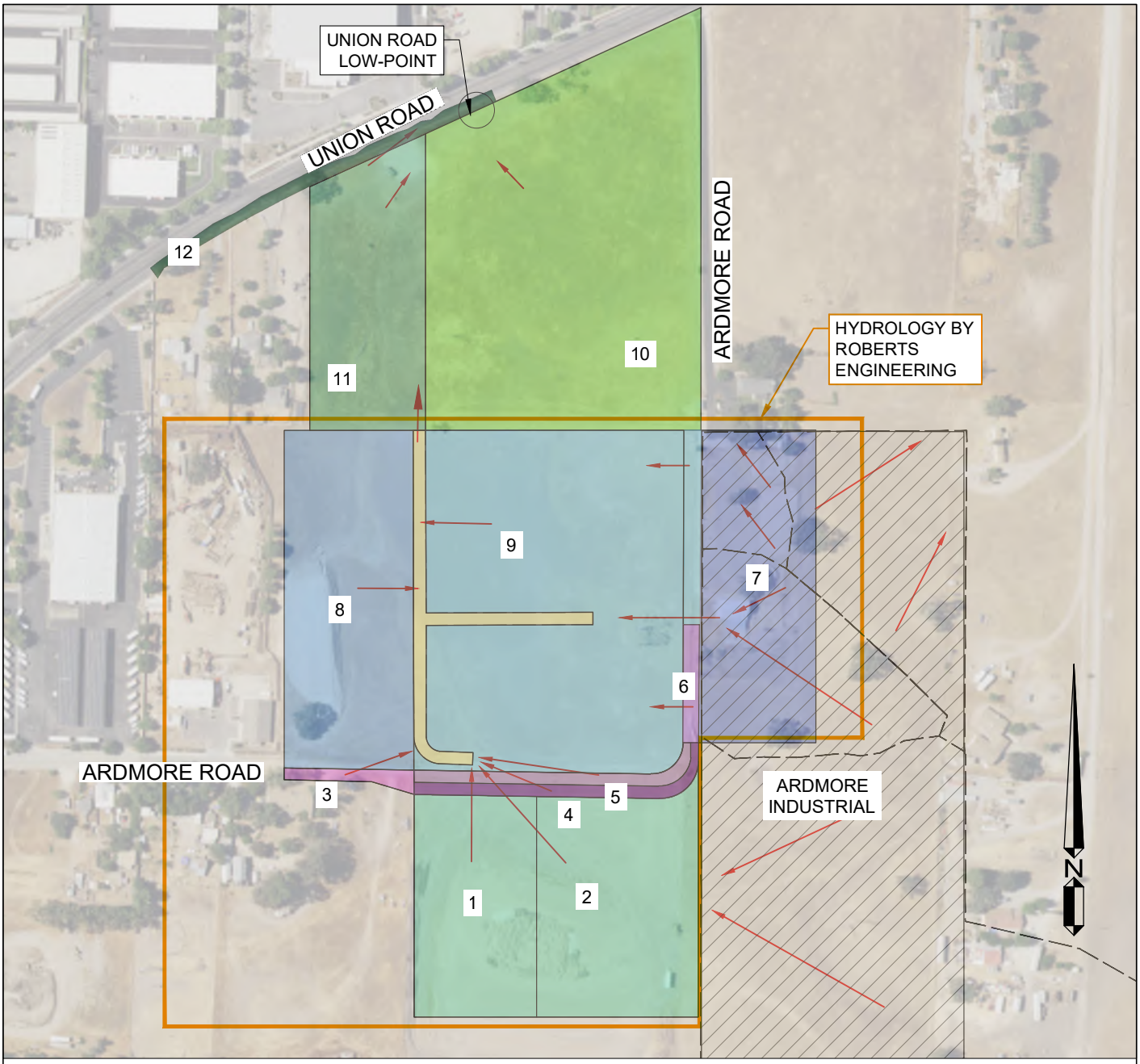
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COVELOP
ARDMORE PROJECT DEVELOPMENT
PROPOSED DRAINAGE MANAGEMENT AREAS

JOB #:	751-005
DESIGNERS:	CD/ ZKP
DRAWN BY:	ZKP
DATE:	2/14/2023

DRAWING NO.
1
OF 1 SHEET



1	SPURR AREA A - WEST	6	ARDMORE ROAD - DANIELS FRONTAGE
2	SPURR AREA B - EAST	7	TATE PROPERTY
3	ARDMORE ROAD - CASE FRONTAGE	8	CASE PROPERTY
4	ARDMORE ROAD - SPURR FRONTAGE	9	DANIELS WOODLAND
5	ARDMORE ROAD - DANIELS FRONTAGE	10	UNION ROAD SAFETY & TRAINING CENTER
	FLOW DIRECTION	11	AUTOCRAFT
	DANIELS WOODLAND 24' WIDE BIOSWALE	12	SOUTH UNION ROAD

ARDMORE IND. PROJECT SITE

ARDMORE EXIST WATERSHEDS

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EXHIBIT
OFFSITE PROPERTIES
ARDMORE PROJECT SITE
PASO ROBLES, CA

JOB No. :	751-005
DRAWING :	OFFSITE PROPS
DRAWN BY:	ZKP
DATE :	DEC 6, 2022
SCALE :	1" = 300'

APPENDIX B

Appendix B – Excerpts from Design Standards and References

- Geotechnical and soils documentation
- Site Infiltration data and Porchet Method conversion calculations
- Pages from City of Paso Robles public work standards
- Time of Concentration & Rainfall data - County of San Luis Obispo Public Improvement Standards
- Rainfall data – NOAA Atlas 14, Volume 6, Version 2 excerpt (for Paso Robles, CA)

Geotechnical Engineering Report

For

Proposed Commercial Buildings and Street Improvements

2930 Union Road Lots 6 and 13

Paso Robles, California

October 12, 2022

F-103116

Prepared For

MD3 Investments

By

Beacon Geotechnical, Inc.
P.O. Box 4814
Paso Robles, California 93447

BEACON
GEOTECHNICAL, INC

October 12, 2022 F-103116

MD3 Investments
P.O. Box 13174
San Luis Obispo, CA 93406

Project: Proposed Commercial Buildings and Street Improvements
2930 Union Roads Lots 6 and 13
Paso Robles, California

Subject: Geotechnical Engineering and Infiltration Report

As authorized, we have performed a Geotechnical Study for the above referenced project. The accompanying Geotechnical Engineering Report presents the results of our subsurface exploration, laboratory-testing program and conclusions and recommendations for geotechnical engineering aspects of project design. Our services were performed using the standard of care ordinarily exercised in this locality at the time this report was prepared.

Based on our study, it is our opinion that the site is suitable for the proposed developments from a geotechnical engineering standpoint provided the recommendations of this report are successfully implemented.

We have appreciated this opportunity to be of service to you on this project. Please call if you have any questions, or if we can be of further service.

Respectfully submitted,
Beacon Geotechnical, Inc.

Greg McKay
Project Manager

Copies: 3-MD3 Investments
1-File



Nicholas A. McClure
Geotechnical Engineer

P.O. Box 4814 • Paso Robles, CA 93447
Phone: (805) 239-9457 • Fax: (805) 237-9098• Email: beacongeotechnical@gmail.com

1. INTRODUCTION

This report presents results of a Geotechnical Engineering Study performed for the proposed commercial buildings and street improvements to be located in Paso Robles, California.

1.1 Description

1.1.1. It should be noted that grading and foundation plans were not provided for the purpose of this report. Prior to any construction, this firm should review the grading and foundation plans to verify or modify the recommendations offered herein. We anticipate that the sites will be developed by cutting and filling to create level building pads.

1.1.2. The proposed structures are assumed to be one (1) or two (2) stories of wood or metal framed construction.

1.1.3. Structural considerations for maximum wall load of 1.75 kips per square foot and maximum point loads of 25.0 kips were used as a basis for the recommendations of this report. If actual loads vary significantly from these assumed loads, Beacon Geotechnical, Inc. should be notified as re-evaluation of the recommendations contained herein may be required.

2 SCOPE OF WORK

2.1 The purpose of the geotechnical investigation that led to this report was to evaluate the soil conditions of the site with respect to the proposed developments. These conditions include surface and subsurface soil types, expansion potential, settlement potential, bearing capacity, and presence or absence of subsurface water. The scope of our work included:

- Reconnaissance of the site.
- Drilling, sampling, and logging of eighteen (18) borings to investigate soils and groundwater conditions.
- Laboratory testing of soil samples obtained from subsurface exploration to determine their physical and engineering properties.
- Geotechnical analysis of the data obtained.
- Consultation with owner representatives and design professionals.
- Preparation of this report.

2.2 Contained in the report are:

- Discussions on local soil and groundwater conditions.
- Results of laboratory and field tests.
- Conclusions and recommendations pertaining to site grading and structural design.

3 SITE SETTING

3.1 The site of the proposed development is located in Paso Robles, California, with the approximate geographical coordinates 35°38'25.55" N and 120°39'05.92" W. See the Vicinity Map in Appendix A.

3.2 The proposed building sites are relatively level to slightly sloping with weeds up to one (1) foot high and a few existing structures to be removed prior to preparation of the new building pads.

4 SITE CONDITIONS

4.1 Soil Conditions

4.1.1 Evaluation of the subsurface indicates that soils are generally light brown very silty clayey sand overlain by light brown silty clayey sand with gravel, brown silty very clayey sand, and brown silty clayey sand with gravel.

4.1.2 Soils encountered at approximate bearing depths should be designed as Site Classification D in accordance with the local building code.

4.1.3 Expansion determination indicates that the bearing soils lie in the "Low" range.

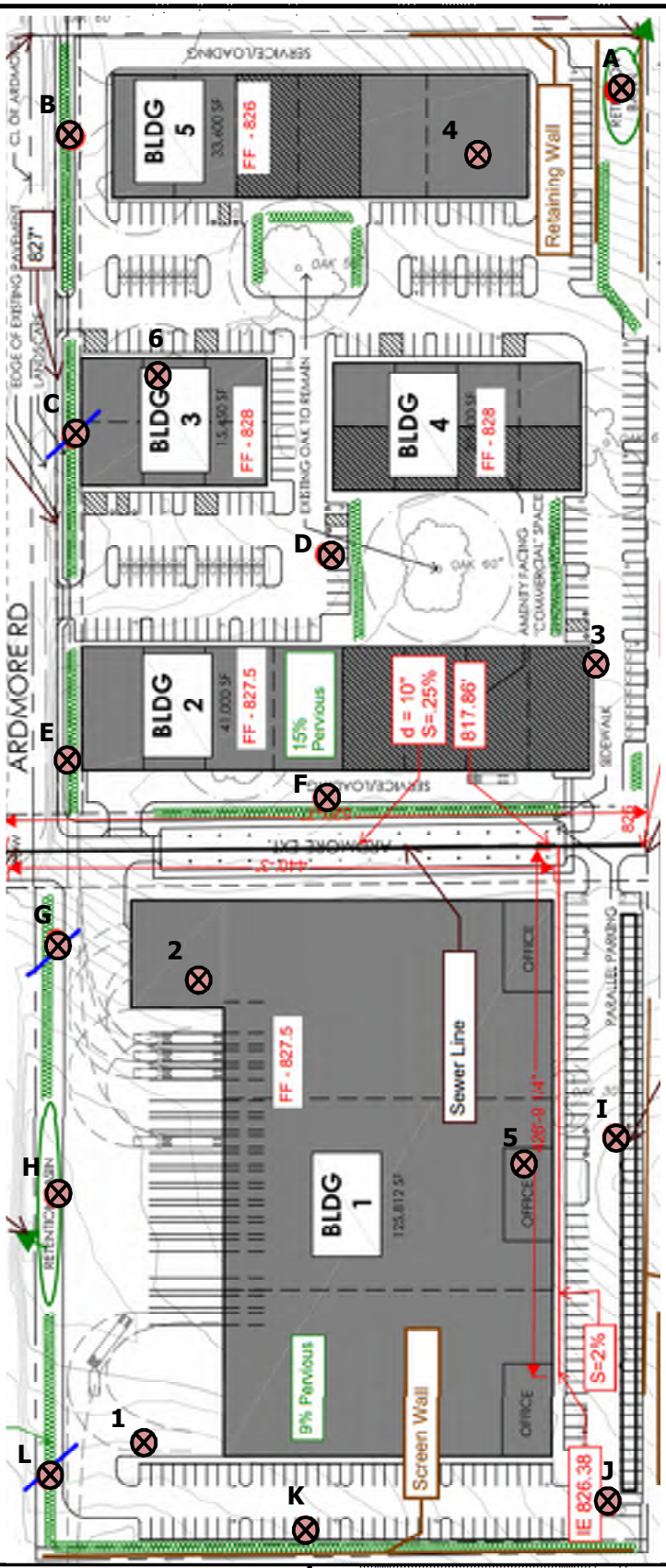
4.2 Groundwater

4.2.1 Groundwater was not encountered to a depth of twenty (20) feet.

4.3 Infiltration Testing

4.3.1 Infiltration testing was done on the site in accordance with the Central Coast Low Impact Development Initiative standard. Twelve (12) infiltration borings were drilled with their locations shown on the Site Map in Appendix A. The borings were presaturated and subsequently tested. The resulting infiltration rates are as follows:

Test No.	Depth (Ft.)	Rate (Inch/Hour)
A	5.0'	2.25
B	5.0'	3.00
C	5.0'	2.00
D	5.0'	1.50
E	5.0'	3.25
F	5.0'	4.00
G	5.0'	2.00
H	5.0'	4.25
I	5.0'	5.00
J	5.0'	2.50
K	5.0'	3.00
L	5.0'	3.25



PROJECT #: F-103116	SITE MAP
BEACON GEOTECHNICAL, INC.	

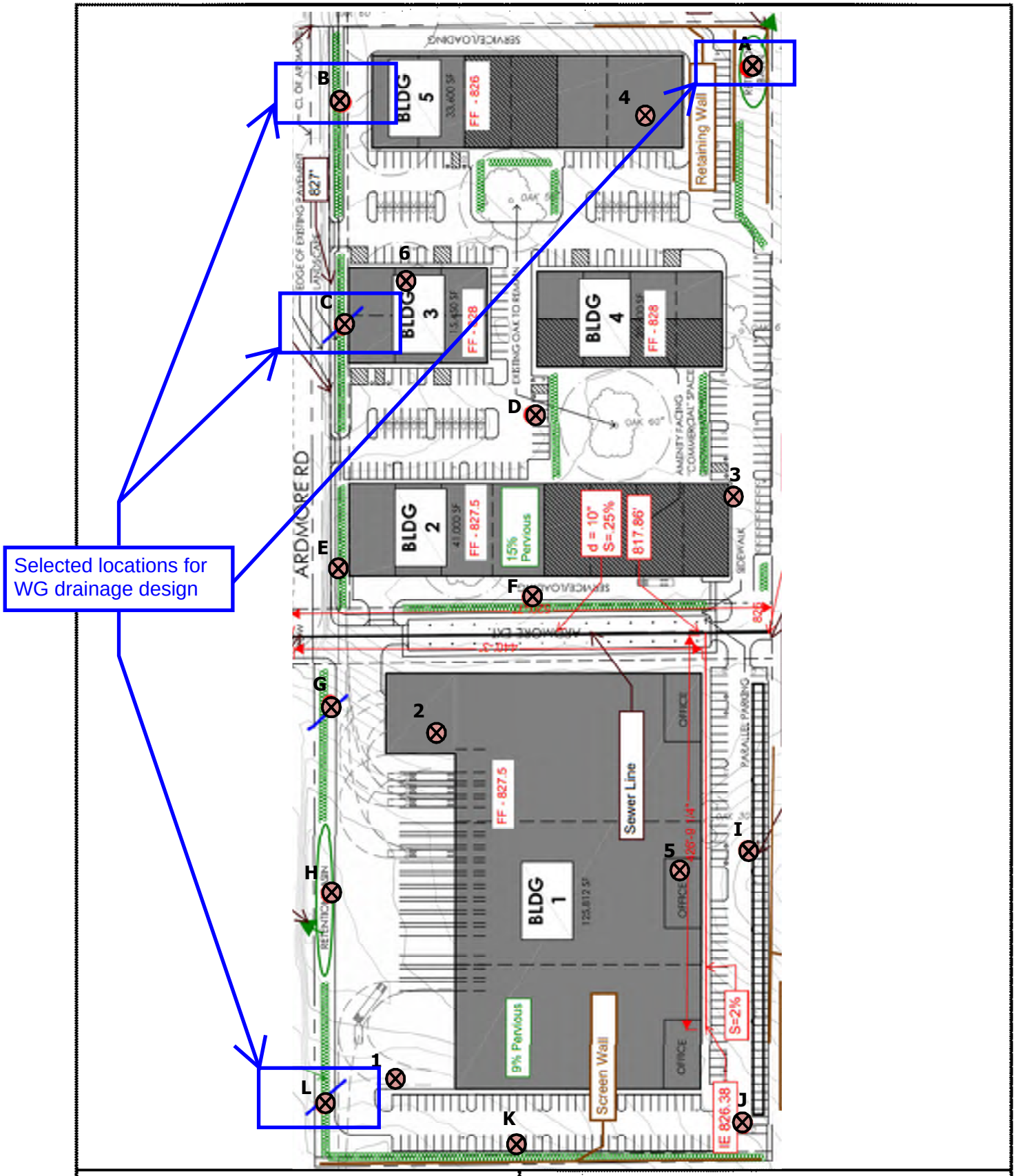
Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 12/05/2022
By: ZKP

Porchet Method Summary - Infiltration Calculations

Geotech Boring ID Referenced*	Proposed DMA Selection for design	Tested Infiltration Rate (in/hr)*	Porchett Infiltration Rate (in/hr) **
A	---	2.25	0.07
B	DMA B2	3.00	0.19
C	DMA B1	2.00	0.10
D	---	1.50	0.08
E	---	3.25	0.13
F	---	4.00	0.36
G	---	2.00	0.13
H	---	4.25	Data Not Included
I	---	5.00	0.70
J	---	2.50	0.10
K	---	3.00	0.17
L	DMA A	3.25	0.20
* See Geotechnical Engineering Report (page 3) by Beacon Geotechnical, dated 10/12/2022			
** See Infiltration Test Field Mesaurements by Beacon Geotechnical, dated 09/28/2022			

Site Map from Geotechnical Engineering Report, by Beacon Geotechnical Inc, dated 10/12/2022



PROJECT #: F-103116	SITE MAP
BEACON GEOTECHNICAL, INC.	

Infiltration Test Field Measurements

2930 Union Road

BORING NO. A

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 61 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	24.25	----	----
30 minutes	26.50	2.25	4.50
30 minutes	29.00	2.50	5.00
30 minutes	31.00	2.00	4.00
30 minutes	32.75	1.75	3.50
30 minutes	34.50	1.75	3.50
30 minutes	35.75	1.25	2.50
30 minutes	36.875	1.125	2.25
30 minutes	38.00	1.125	2.25

Range used for Porchet conversion

Test - Boring No. A

delta H	1.125	inches	First Reading	3.07	ft		User Input
delta T	60	minutes	Last Reading	3.17	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.08	ft		
H start	24.13	inches	Riser Height	0			
H end	23.00	inches					
H ave	23.5625	inches					
I_t	0.07	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r^* = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. B

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 58 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	25.00	----	----
30 minutes	30.25	5.25	10.50
30 minutes	33.00	2.75	5.50
30 minutes	35.00	2.00	4.00
30 minutes	37.50	2.50	5.00
30 minutes	39.50	2.00	4.00
30 minutes	41.00	1.50	3.00
30 minutes	42.75	1.75	3.50
30 minutes	44.25	1.50	3.00

Range used for Porchet conversion

Test - Boring No. B						
delta H	3.25	inches	First Reading	3.42	ft	User Input
delta T	90	minutes	Last Reading	3.69	ft	Calculated Values
effective radius	3	inches	Hole Depth	4.83	ft	
H start	17.00	inches	Riser Height	0		
H end	13.75	inches				
H ave	15.375	inches				
I_t	0.19	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. C

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 60 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	24.50	----	----
30 minutes	27.00	2.50	5.00
30 minutes	28.50	1.50	3.00
30 minutes	30.25	1.75	3.50
30 minutes	31.50	1.25	2.50
30 minutes	32.50	1.00	2.00
30 minutes	33.75	1.25	2.50
30 minutes	35.00	1.25	2.50
30 minutes	36.00	1.00	2.00

Range used for Porchet conversion

Test - Boring No. C						
delta H	3.5	inches	First Reading	2.71	ft	User Input
delta T	120	minutes	Last Reading	3.00	ft	Calculated Values
effective radius	3	inches	Hole Depth	5.00	ft	
H start	27.50	inches	Riser Height	0		
H end	24.00	inches				
H ave	25.75	inches				
I_t	0.10	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. D

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 57 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	26.00	----	----
30 minutes	27.25	1.25	2.50
30 minutes	28.50	1.25	2.50
30 minutes	30.00	1.50	3.00
30 minutes	31.00	1.00	2.00
30 minutes	31.75	0.75	1.50
30 minutes	32.75	1.00	2.00
30 minutes	33.75	1.00	2.00
30 minutes	34.50	0.75	1.50

Range used for Porchet conversion

Test - Boring No. D

delta H	2.75	inches	First Reading	2.65	ft		User Input
delta T	120	minutes	Last Reading	2.88	ft		Calculated Values
effective radius	3	inches	Hole Depth	4.75	ft		
H start	25.25	inches	Riser Height	0			
H end	22.50	inches					
H ave	23.875	inches					
I_t	0.08	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. E

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 59 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	26.75	----	----
30 minutes	29.75	3.00	6.00
30 minutes	32.00	2.25	4.50
30 minutes	34.50	2.50	5.00
30 minutes	36.50	2.00	4.00
30 minutes	38.25	1.75	3.50
30 minutes	40.00	1.75	3.50
30 minutes	41.625	1.625	3.25
30 minutes	43.25	1.625	3.25

Range used for Porchet conversion

Test - Boring No. E

delta H	1.625	inches	First Reading	3.47	ft	User Input
delta T	60	minutes	Last Reading	3.60	ft	Calculated Values
effective radius	3	inches	Hole Depth	4.92	ft	
H start	17.38	inches	Riser Height	0		
H end	15.75	inches				
H ave	16.5625	inches				
I_t	0.13	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. F

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 62 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	33.25	----	----
30 minutes	37.50	4.25	8.50
30 minutes	39.75	2.25	4.50
30 minutes	42.50	2.75	5.50
30 minutes	44.75	2.25	4.50
30 minutes	46.75	2.00	4.00
30 minutes	49.00	2.25	4.50
30 minutes	51.00	2.00	4.00
30 minutes	53.25	2.25	4.50

Range used for Porchet conversion

Test - Boring No. F

delta H	6.5	inches	First Reading	3.90	ft		User Input
delta T	120	minutes	Last Reading	4.44	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.17	ft		
H start	15.25	inches	Riser Height	0			
H end	8.75	inches					
H ave	12	inches					
I_t	0.36	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. G

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 61 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	30.25	----	----
30 minutes	33.00	2.75	5.50
30 minutes	36.00	3.00	6.00
30 minutes	37.50	1.50	3.00
30 minutes	39.00	1.50	3.00
30 minutes	40.00	1.00	2.00
30 minutes	41.25	1.25	2.50
30 minutes	42.50	1.25	2.50
30 minutes	43.50	1.00	2.00

Range used for Porchet conversion

Test - Boring No. G

delta H	3.5	inches	First Reading	3.33	ft		User Input
delta T	120	minutes	Last Reading	3.63	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.08	ft		
H start	21.00	inches	Riser Height	0			
H end	17.50	inches					
H ave	19.25	inches					
I_t	0.13	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. H

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: inches **No Available Data**

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----		----	----
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			
30 minutes			

Test - Boring No. H

delta H	0	inches	First Reading	0.00	ft		User Input
delta T	0	minutes	Last Reading	0.00	ft		Calculated Values
effective radius	3	inches	Hole Depth	0.00	ft		
H start	0.00	inches	Riser Height	0			
H end	0.00	inches					
H ave	0	inches					
I_t	#DIV/0!	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. I

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 60 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	32.50	----	----
30 minutes	38.25	5.75	11.50
30 minutes	41.75	3.50	7.00
30 minutes	44.75	3.00	6.00
30 minutes	47.25	2.50	5.00
30 minutes	49.75	2.50	5.00
30 minutes	52.50	2.75	5.50
30 minutes	55.25	2.75	5.50
30 minutes	57.75	2.50	5.00

Range used for Porchet conversion

Test - Boring No. I

delta H	10.5	inches	First Reading	3.94	ft		User Input
delta T	150	minutes	Last Reading	4.81	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.00	ft		
H start	12.75	inches	Riser Height	0			
H end	2.25	inches					
H ave	7.5	inches					
I_t	0.70	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. J

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 62 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	30.75	----	----
30 minutes	32.75	2.00	4.00
30 minutes	34.75	2.00	4.00
30 minutes	37.00	2.25	4.50
30 minutes	38.50	1.50	3.00
30 minutes	40.00	1.50	3.00
30 minutes	42.00	2.00	4.00
30 minutes	43.25	1.25	2.50
30 minutes	44.50	1.25	2.50

Range used for Porchet conversion

Test - Boring No. J

delta H	1.25	inches	First Reading	3.60	ft	User Input
delta T	60	minutes	Last Reading	3.71	ft	Calculated Values
effective radius	3	inches	Hole Depth	5.17	ft	
H start	18.75	inches	Riser Height	0		
H end	17.50	inches				
H ave	18.125	inches				
I_t	0.10	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. K

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 56 inches

Date: September 29, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	28.50	----	----
30 minutes	31.25	2.75	5.50
30 minutes	34.25	3.00	6.00
30 minutes	37.25	3.00	6.00
30 minutes	39.25	2.00	4.00
30 minutes	41.50	2.25	4.50
30 minutes	43.00	1.50	3.00
30 minutes	44.75	1.75	3.50
30 minutes	46.25	1.50	3.00

Range used for Porchet conversion

Test - Boring No. K

delta H	3.25	inches	First Reading	3.58	ft		User Input
delta T	90	minutes	Last Reading	3.85	ft		Calculated Values
effective radius	3	inches	Hole Depth	5.17	ft		
H start	19.00	inches	Riser Height	0			
H end	15.75	inches					
H ave	17.375	inches					
I_t	0.17	inches/hour					

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

Infiltration Test Field Measurements

2930 Union Road

BORING NO. L

Site Location: Paso Robles, CA F-103116

Auger Diameter: 6”

Depth: 63 inches

Date: September 28, 2022

Time (Minutes)	Depth (inches)	Change in Depth (Inches)	Rate (Inches/Hour)
----	33.00	----	----
30 minutes	35.75	2.75	5.50
30 minutes	38.25	2.50	5.00
30 minutes	40.50	2.25	4.50
30 minutes	42.75	2.25	4.50
30 minutes	44.375	1.625	3.25
30 minutes	46.125	1.75	3.50
30 minutes	47.75	1.625	3.25
30 minutes	49.50	1.75	3.50

Range used for Porchet conversion

Test - Boring No. L						
delta H	3.375	inches	First Reading	3.84	ft	User Input
delta T	90	minutes	Last Reading	4.13	ft	Calculated Values
effective radius	3	inches	Hole Depth	5.25	ft	
H start	16.88	inches	Riser Height	0		
H end	13.50	inches				
H ave	15.1875	inches				
I_t	0.20	inches/hour				

"Porchet Method"

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Source: Riverside County Low Impact Development BMP Design Handbook, 2011

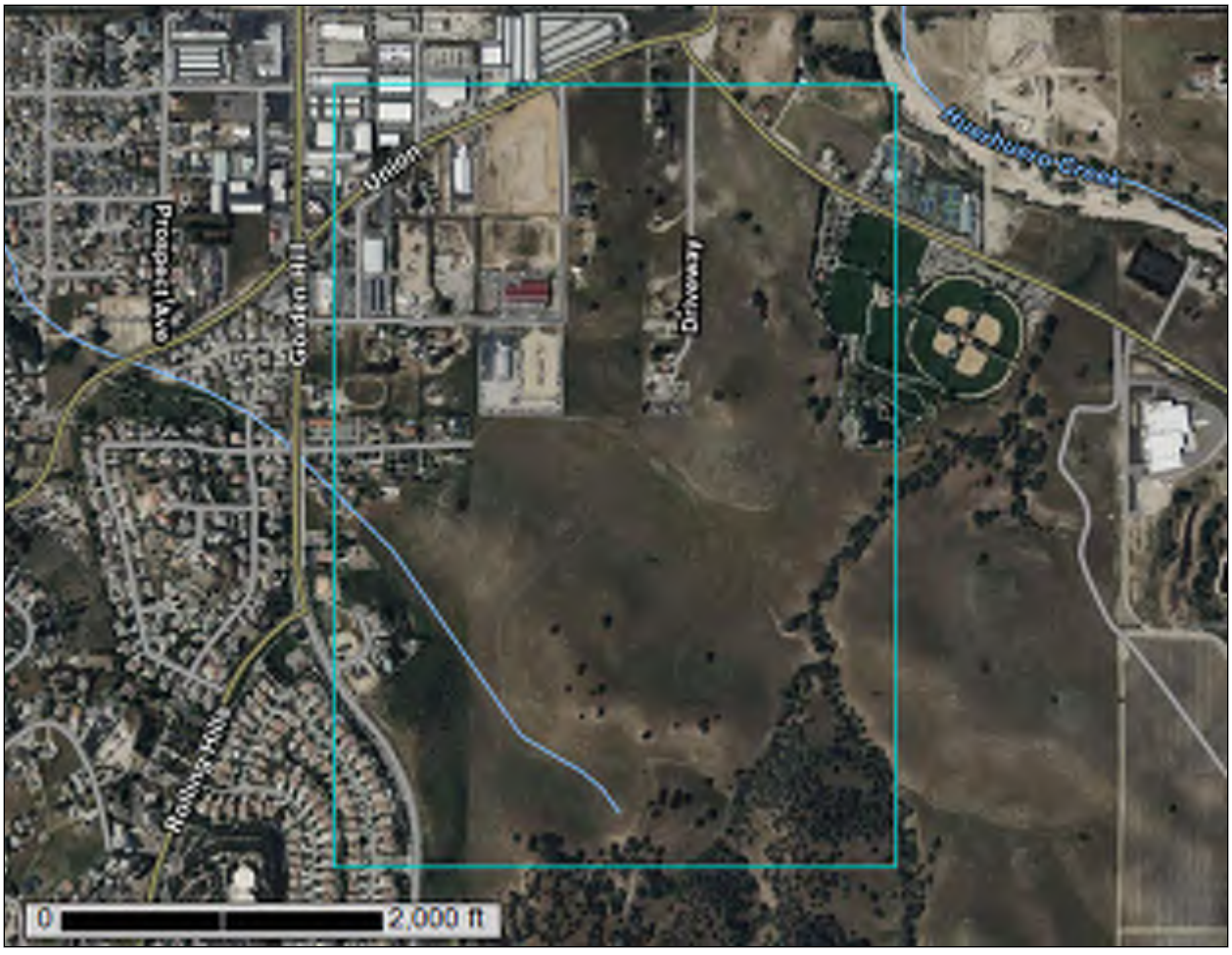
United States Department of Agriculture

NRCS

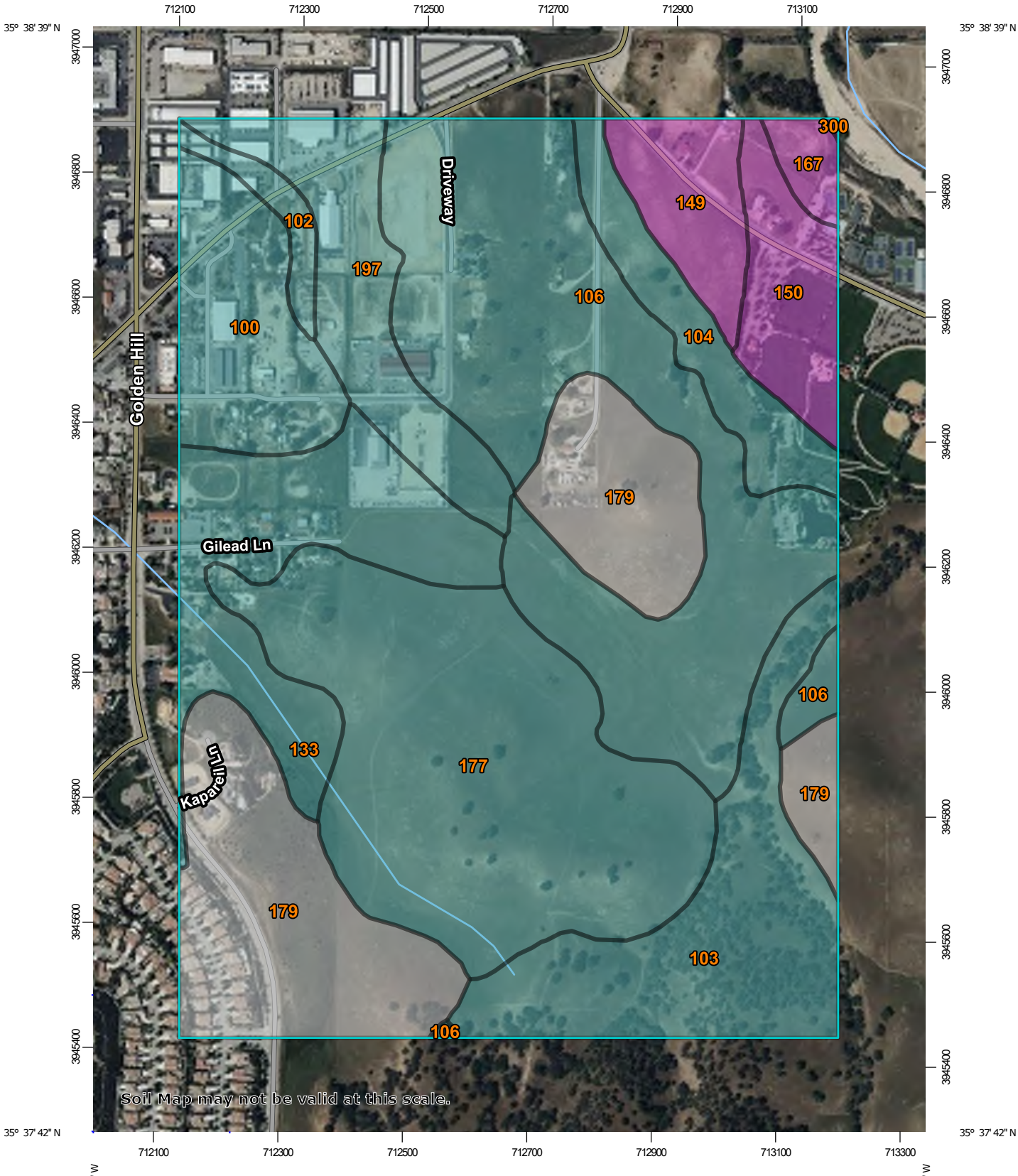
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Luis Obispo County, California, Paso Robles Area



October 17, 2022



Map Scale: 1:8,620 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil 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 Luis Obispo County, California, Paso Robles Area
Survey Area Data: Version 16, Sep 14, 2022

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

Date(s) aerial images were photographed: Mar 12, 2022—Apr 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
100	Arbuckle fine sandy loam, 0 to 2 percent slopes	C	22.6	5.9%
102	Arbuckle-Positas complex, 9 to 15 percent slopes	C	4.2	1.1%
103	Arbuckle-Positas complex, 15 to 30 percent slopes	C	39.1	10.1%
104	Arbuckle-Positas complex, 30 to 50 percent slopes	C	14.3	3.7%
106	Arbuckle-San Ysidro complex, 2 to 9 percent slopes	C	82.1	21.3%
133	Cropley clay, 2 to 9 percent slopes, MLRA 14	C	33.8	8.8%
149	Hanford and Greenfield gravelly sandy loams, 0 to 2 percent slopes	A	12.5	3.2%
150	Hanford and Greenfield gravelly sandy loams, 2 to 9 percent slopes	A	14.2	3.7%
167	Metz-Tujunga complex, occasionally flooded, 0 to 5 percent slopes	A	3.5	0.9%
177	Nacimiento-Ayar complex, 9 to 30 percent slopes	C	76.2	19.7%
179	Nacimiento-Los Osos complex, 9 to 30 percent slopes		60.4	15.6%
197	San Ysidro loam, 0 to 2 percent slopes, MLRA 14	C	23.0	6.0%
300	Corducci and Typic Xerofluvents, 0 to 5 percent slopes, occasionally flooded, MLRA 14	A	0.1	0.0%
Totals for Area of Interest			**386.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

SECTION V

STORM DRAINS, STORM WATER QUALITY, AND WATERSHED PROTECTION

V-1. GENERAL

It is the general purpose of these standards that storm water be contained and treated on the area to be developed. Adjacent improvements, existing or planned, will be free from flood hazard and will not receive a greater volume and intensity of storm water runoff than pre-existing conditions. Flood hazard is defined as potential damage by water having sufficient depth or velocity to damage improvements or to deposit or scour soil.

These specifications are intended to meet the requirements of the National Flood Insurance Program, the City's Flood Plain Ordinance, and the City's Storm Water Management Plan. These specifications reflect numeric storm water control criteria adopted by the Water Board on July 13, 2013 (including subsequent revisions) and modified as specifically applicable to the City of Paso Robles.

The lowest floor of any project that is located within a Special Flood Hazard Area and shown as an A, AE, AH or AO Zone shall be elevated above the highest adjacent grade to a height equal to or exceeding the depth number specified in feet on the Flood Insurance Rate Map (FIRM) by at least one foot, or elevated at least three feet above the highest adjacent grade if no depth number is specified.

Upon completion of a structure in a Special Flood Hazard Area, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or land surveyor, and verified by the city building inspector to be properly elevated. Such certification or verification shall be provided to the City Engineer.

Modification of a flood-plain shall be accomplished in accordance with Federal Management Emergency Management (FEMA) regulations and the City's Floodplain Ordinance. The design engineer shall provide all data necessary for a Conditional Letter of Map Amendment (CLOMA) and a final Letter of Map Amendment (LOMA).

These standards are intended to provide general design criteria. Most design details are left to the responsibility of the consultant. The design standards contained herein are minimal and alternates may be approved, provided such alternates are to a higher standard than those set forth. Exceptions to these standards may be allowed by the City Engineer when it can be determined that such exceptions are in the best interest of the City.

sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of ASTM C33 and compost (30%-40%) may be used. An alternative planting medium may be utilized if it is demonstrated to be equal or more effective at attenuating pollutants than the specified planting medium mixture.

- Proper plant selection as provided by the Central Coast LID Initiative.
- Subsurface drainage/storage (gravel) layer with an area equal to the biofiltration treatment system surface area and having a minimum depth of 12 inches.
- Underdrain with discharge elevation at top of gravel layer.
- No compaction of soils beneath the biofiltration facility.
- No liners or other barriers interfering with infiltration (excepting conditions were lateral infiltration is not feasible).

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Non-Retention Based Treatment Systems:
Stormwater Control Measures that collectively achieve at least one of the following hydraulic sizing criteria for non-retention based treatment systems:

- Volume Design Basis: Treat stormwater runoff equal to the volume of runoff generated by the 85th percentile 24-hour storm event (0.80 inches).
- Flow Design Basis: Treat the flow of runoff produced by a rain event equal to at least 0.2 inches per hour intensity.

(5) Performance Requirement No. 3: Runoff Retention

Projects that create and/or replace greater than or equal to 15,000 square feet of impervious surface are required to meet runoff retention performance requirements using Low Impact Development Standards. See Stormwater Technical Guide.

Prevent off-site discharge from events up to the 95th percentile 24-hour rainfall event (1.45 inches). Retention is to be achieved by optimizing infiltration. Project design shall be founded in Low Impact Development principles. Site opportunities and constraints shall be identified and a site assessment shall include:

- Topography, structures, utilities, easements
- Hydrologic features including natural areas, wetlands, watercourses, seeps, or springs.
- Depth to seasonal high groundwater
- Locations of wells
- Depth to impervious bedrock
- Presence of unique geology

- Geotechnical hazards
- Soil and/or groundwater contamination
- Soil types and hydrologic soil groups
- Vegetative cover/trees
- Run-on characteristics (estimate off-site runoff discharging to the project area)
- Existing drainage infrastructure
- Zoning, setbacks and open space requirements
- Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.
- Conserve natural areas including existing trees, vegetation and soils
- Limit the overall impervious footprint of the project
- Set back development from creeks, wetlands and riparian habitats
- When runoff reduction measures and natural landscape areas have been maximized to the extent feasible storm water control measures shall be used to comply with performance requirements. Storm water control measures associated with small-scale, decentralized facilities designed to infiltrate, evapotranspirate, filter, or capture storm water shall be optimized. Refer to the City's technical guidelines for sizing of storm water retention facilities.

(6) Performance Requirement No. 4: Peak Management

All projects that create and/or replace greater than or equal to 22,500 square feet of impervious surface in Watershed Management Zone 1 shall manage peak stormwater runoff as required below as well as meeting Water Quality and Runoff Retention requirements.

Post-development peak flows, discharged from the site, shall not exceed pre-project peak flows for the 2 through 10-year storm events.

A Stormwater Control shall be provided in conformance with the Stormwater Technical Guide on File with the Stormwater Control Manager in the Department of Public Works.

(7) Operation and Maintenance for Structural Stormwater Control Measures

The design of all structural stormwater control measures must be accompanied by an operation and maintenance (O and M) plan. Minimum requirements for the O and M plan are described in the City's Technical Guide.

Prior to project acceptance or occupancy, verification of on-going maintenance of structural stormwater control measures must be established by legal binding agreements.

B. Off-Site Hydrology, Cross-Culverts, Open Channels

1. Hydrology Calculations

The Rational Method shall be used to compute the total volume of runoff from a development with an area less than 200 acres. For drainage areas in excess of 200 acres, or where the design engineer determines that the Rational Method is not practical or appropriate, the design engineer shall provide all documents necessary to confirm computations.

All calculations shall be prepared by a registered professional engineer with a current license to practice in the State of California. The rainfall intensity curve included herein is available for use as part of the hydrology calculations. In computing runoff in a partial development, adequate provisions must be made for the drainage of the overall improvements and/or drainage tributary. Hydrology calculations shall be based upon ultimate land use designations in accordance with the adopted General Plan.

2. Closed Conduits

Design considerations for closed conduits are as follows:

- Pipe friction losses determined by Manning's equation.
- Entrance and exit losses.
- Tail-water impacts.
- Entrance control headwater.

For each length of pipe, the hydraulic grade line (hgl) at the pipe entrance and exit shall be determined assuming both inlet control and outlet control. The more restrictive shall control. The storm drain system shall be designed to meet the following conditions:

1. The hydraulic grade line shall be a minimum of 0.50 feet below the elevation of inlet grates and manhole covers of all structures for a design storm of 25 years. Said gradient shall be shown on the profile for storm drain systems.
2. Minimum pipe diameter allowable on any public storm drain shall be 18 inches.
3. Storm drain systems shall be designed for the 25-year storm. In a sump condition a secondary overland flow shall be included such that during the 100-year storm, all buildings or first floor elevations shall be at least one foot (1') above the 100-year storm.
4. Street capacity shall be defined as the 10-year storm confined between the crown of the street and the top of curb. Where the street capacity is exceeded at either the curb or the crown, a storm drain or other approved facility shall be provided to convey the excess flows. In all cases, the 100-year storm shall be contained within the right-of-way.

Cross culvert design shall be determined on the basis of a twenty-five year storm with no head. The hydraulic entrance condition shall be such that the 25-year discharge will have the specified freeboard in the upstream channel or waterway and that the 100-year discharge will be contained within the banks of the upstream waterway or drainage easement. The entrance to the closed conduit minor waterway may be submerged provided that the above criteria are satisfied. The invert elevation of the closed conduit entrance shall not be set lower than the natural flowline of the waterway or open channel flowing into it.

3. Open Channels

Open channels shall be designed based on Manning's equation. The impacts of culverts, bridges or other structures affecting the hydraulic performance of the channel shall be considered as appropriate.

The City Engineer may require more complete analysis if he/she determines conditions merit a more thorough study. This additional analysis may include determination of the water surface profile, analysis of critical sections, and analysis of erosion and/or sedimentation.

Maximum velocity for channels flowing full shall be limited to preclude erosion. Freeboard of at least one foot based on 25-year volumes shall be provided for all channels. Lining treatments shall extend to the full height of freeboard. The 100-year discharge shall be contained within the banks or within the easement established for the channel. For natural waterways, the design flow may be allowed in the natural overflow area.

4. Retention Basins

Storm water retention for flood control purposes shall be applied as determined by the design engineer; typically where downstream conditions are constrained and properties are threatened or have been flooded in conditions existing prior to upstream development. Criteria for the design of retention basins may be reviewed on a case by case basis. Typically, the volume of storage for flood control purposes is based upon the post-development 100-year, 24-hour storm event.

5. Detention Basins

A detention basin is defined as a holding facility where the rate of flow from the basin is limited to that rate historically occurring prior to development. The volume of storage of a detention basin shall be determined by theoretically matching the historical hydrograph of flows leaving the previously undeveloped land under consideration.

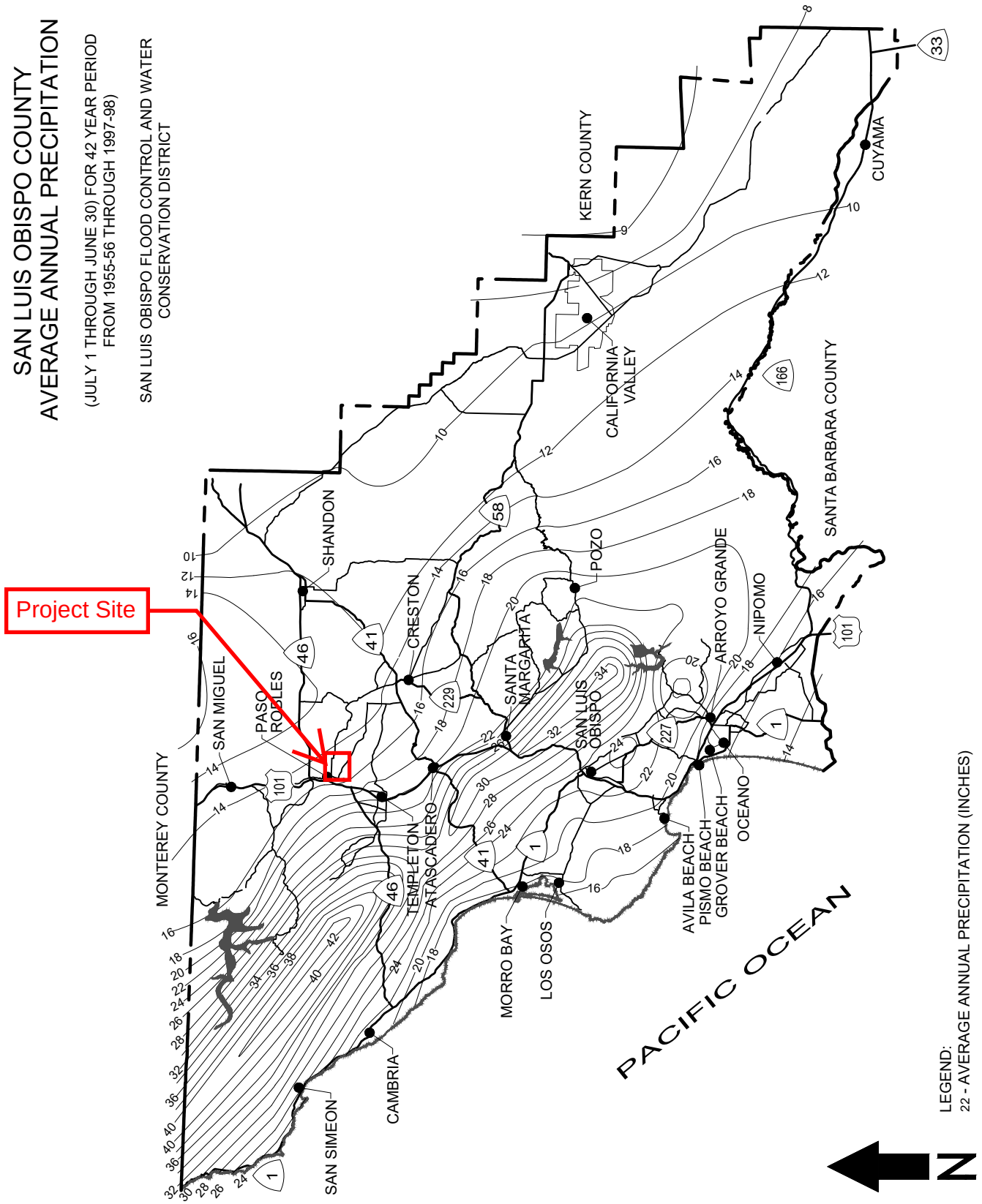
6. Storm Drain Alignment Criteria

Storm drain lines shall be parallel with street centerlines to the extent practical and typically twelve feet southerly or easterly of the centerline **(Standard Detail U-1)**.

SAN LUIS OBISPO COUNTY
AVERAGE ANNUAL PRECIPITATION

(JULY 1 THROUGH JUNE 30) FOR 42 YEAR PERIOD
FROM 1955-56 THROUGH 1997-98)

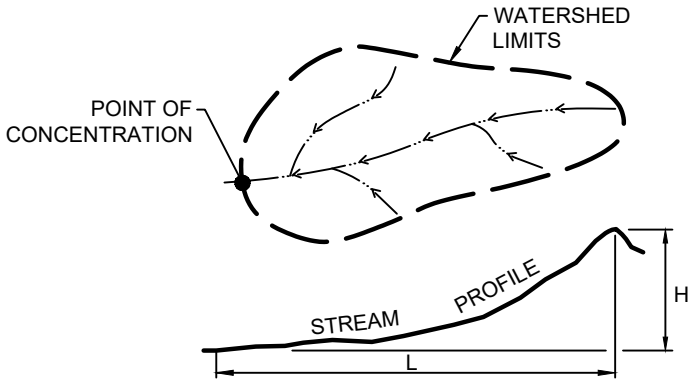
SAN LUIS OBISPO FLOOD CONTROL AND WATER
CONSERVATION DISTRICT

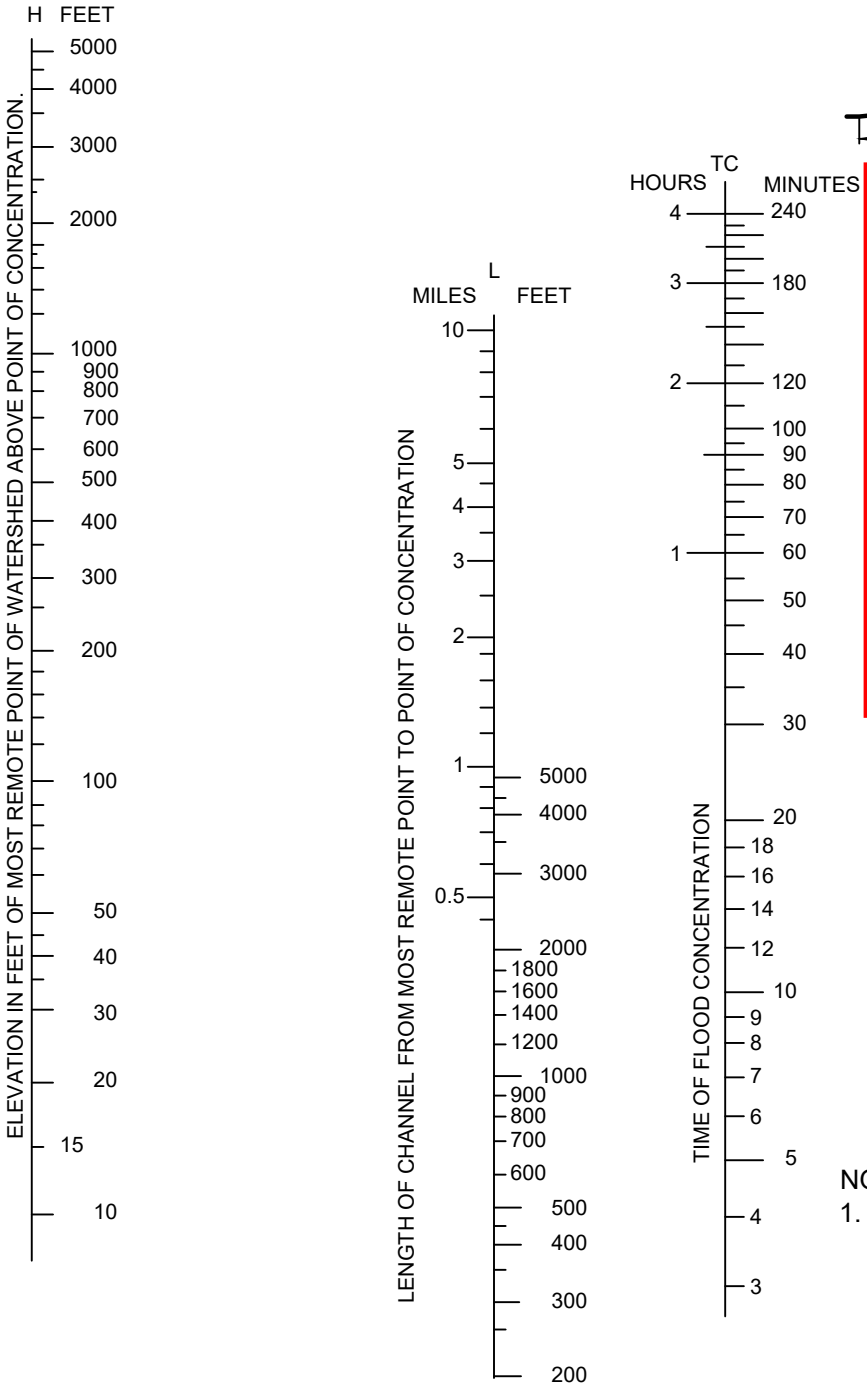


DEPARTMENT OF PUBLIC WORKS - STANDARD DRAWINGS

HYDROLOGY
AVERAGE ANNUAL RAINFALL

Issued: August 2022	Scale: NTS
Revised:	Revision No:
Drawing No:	H-1





EQUATIONS FOR ESTIMATED "TIME OF CONCENTRATION"

$$Tc = \left(\frac{11.9L^3}{H}\right)^{0.385}$$

LEGEND:
Tc = TIME OF CONCENTRATION IN HOURS.
L = LENGTH OF CHANNEL IN MILES.
H = DIFFERENCE IN ELEVATION BETWEEN MOST REMOTE POINT AND THE POINT OF CONCENTRATION IN FEET.

NOTES:
1. THIS NOMOGRAPH IS LIMITED TO WATERSHED AREAS OF 200 ACRES OR LESS. FOR LARGER WATERSHEDS REFER TO THE DESIGN STANDARDS.

REF: P.Z. KIRPICH, CIVIL ENGINEERING, Vol. 10, No. 6, JUNE 1940, p. 362
FOR WATERSHEDS LESS THAN 200 ACRES

DEPARTMENT OF PUBLIC WORKS - STANDARD DRAWINGS

HYDROLOGY
TIME OF CONCENTRATION

Issued: August 2022	Scale: NTS
Revised:	Revision No:
Drawing No: H-2	

TABLE 1: RATIONAL METHOD STANDARD RUNOFF COEFFICIENTS FOR DEVELOPED AREAS

TYPE OF DEVELOPMENT	SOIL TYPE	SLOPE <2%	SLOPE 2% to 10%	SLOPE >10%	FOOT NOTE
RESIDENTIAL LOTS > 20,000 SF	C	0.35	0.40	0.50	1,2
	S	0.25	0.35	0.40	1,2
RESIDENTIAL LOTS 10,000 SF TO 19,999 SF	C	0.40	0.45	0.55	1,2
"	S	0.30	0.40	0.45	1,2
RESIDENTIAL LOTS 6,000 SF TO 9,999 SF	C	0.45	0.55	0.65	1,2
"	S	0.35	0.40	0.50	1,2
PLANNED DEVELOPMENTS (PUD)	C	0.65	0.70	0.75	1,2
"	S	0.60	0.65	0.70	1,2
APARTMENTS	C	0.50	0.60	0.70	2
"	S	0.40	0.50	0.60	2
INDUSTRIAL	C	0.55	0.65	0.75	2
"	S	0.45	0.55	0.65	2
COMMERCIAL	C	0.75	0.80	0.85	2
"	S	0.70	0.75	0.80	2

FOOT NOTES:
1. ESTIMATION OF COMPOSITE "C" VALUE USING ESTIMATED IMPERVIOUS AREAS AND STD. DWG. H-3a (TABLE 2) MAY BE REQUIRED BY THE DEPARTMENT. IMPERVIOUS AND PAVED AREAS SHALL USE C=0.95.
2, ALL VALUES SHOWN ARE INTENDED TO BE MINIMUMS. HIGHER VALUES MAY BE REQUIRED BY THE DEPARTMENT.

LEGEND:
C - CLAY, ADOBE, ROCK, OR IMPERVIOUS MATERIAL
S - SAND, GRAVEL, LOAM, OR PERVIOUS MATERIAL

NOTES:
1. COEFFICIENTS FOR RESIDENTIAL LOTS ASSUME TYPICAL SINGLE FAMILY RESIDENCE WITH ASSOCIATED GARAGE, DRIVEWAY, FLATWORK, AND LANDSCAPING. HIGHER DENSITY RESIDENTIAL DEVELOPMENTS MAY REQUIRE USING COMPOSITE COEFFICIENT EVALUATED BY THE DESIGN ENGINEER AND BASED ON PROPOSED DEVELOPMENT IMPERVIOUS AREAS.
2. FOR ALL TYPES OF DEVELOPMENT, COEFFICIENTS ARE INCLUSIVE OF ONLY THE LOT AREA OUTSIDE THE RIGHT-OF-WAY (NET LOT AREA). PAVED SURFACES BETWEEN ROAD CENTERLINE AND RIGHT-OF-WAY SHALL BE EVALUATED SEPARATELY AND INCLUDED TO DETERMINE A COMPOSITE "C" FACTOR.
3. ALL IMPERVIOUS AREAS AND PAVED AREAS SHALL USE C = 0.95.

TABLE 2: RATIONAL METHOD STANDARD RUNOFF COEFFICIENTS FOR UNDEVELOPED AREAS

	EXTREME	HIGH	NORMAL	LOW
RELIEF 0.20	0.28 TO 0.35 STEEP, RUGGED TERRAIN WITH AVERAGE SLOPES ABOVE 30%	0.20 TO 0.28 HILLY, WITH AVERAGE SLOPES OF 10% TO 30%	0.14 TO 0.20 ROLLING, WITH AVERAGE SLOPE OF 5% TO 10%	0.08 TO 0.14 RELATIVELY FLAT LAND, WITH AVERAGE SLOPES OF 0% TO 5%
SOIL INFILTRATION 0.08	0.12 TO 0.16 NO EFFECTIVE SOIL COVER, EITHER ROCK OR THIN MANTLE OF NEGLIGIBLE INFILTRATION CAPACITY	0.08 TO 0.12 SLOW TO TAKE UP WATER, CLAY OR SHALLOW LOAM SOILS OF LOW INFILTRATION CAPACITY, IMPERFECTLY OR POORLY DRAINED	0.06 TO 0.08 NORMAL; WELL DRAINED LIGHT OR MEDIUM TEXTURED SOILS, SANDY LOAMS, SILT AND SILT LOAMS	0.04 TO 0.06 HIGH; DEEP SAND OR OTHER SOILS THAT TAKES UP WATER READILY, VERY LIGHT WELL DRAINED SOILS
VEGETAL COVER 0.06	0.12 TO 0.16 NO EFFECTIVE PLANT COVER, BARE OR VERY SPARSE COVER	0.08 TO 0.12 POOR TO FAIR; CULTIVATION CROPS, OR POOR NATURAL COVER, LESS THAN 20% OF DRAINAGE AREA OVER GOOD COVER	0.06 TO 0.08 FAIR TO GOOD; ABOUT 50% OF AREA IN GOOD GRASSLAND OR WOODLAND, NOT MORE THAN 50% OF AREA IN CULTIVATED CROPS	0.04 TO 0.06 GOOD TO EXCELLENT; ABOUT 90% OF DRAINAGE AREA IN GOOD GRASSLAND, WOODLAND, OR EQUIVALENT COVER
SURFACE STORAGE 0.08	0.10 TO 0.12 NEGLIGIBLE SURFACE DEPRESSIONS FEW AND SHALLOW; DRAINAGE WAYS STEEP AND SMALL, NO MARSHES	0.08 TO 0.10 LOW; WELL DEFINED SYSTEM OF SMALL DRAINAGE WAYS, NO PONDS OR MARSHES	0.06 TO 0.08 NORMAL; CONSIDERABLE SURFACE STORAGE, LAKES AND POND MARSHES	0.04 TO 0.06 HIGH; SURFACE STORAGE, HIGH; DRAINAGE SYSTEM NOT SHARPLY DEFINED; LARGE FLOOD PLAIN STORAGE OR LARGE NUMBER OF PONDS OR MARSHES

0.42 Subtotal

(REFERENCES FIGURE 819.2A OF HIGHWAY DESIGN MANUAL)

EXAMPLE:

GIVEN: AN UNDEVELOPED WATERSHED CONSISTING OF:
1. ROLLING TERRAIN WITH AVERAGE SLOPES OF 5%
2. CLAY SOILS
3. GOOD GRASSLAND AREA
4. NORMAL SURFACE DEPRESSIONS

FIND: THE RUNOFF COEFFICIENT FOR THE ABOVE WATERSHED

SOLUTION:
1. RELIEF = 0.14
2. SOIL INFILTRATION = 0.08
3. VEGETAL COVER = 0.04
4. SURFACE STORAGE = 0.06

ANSWER: THE RUNOFF COEFFICIENT, C = 0.14 + 0.08 + 0.04 + 0.06 = 0.32

TABLE 1: ANNUAL RAINFALL < 14"

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.00	0.90	0.60	0.40	0.26	0.22	0.18	0.14
5	1.40	1.20	0.80	0.50	0.37	0.32	0.25	0.20
10	1.70	1.40	1.00	0.60	0.44	0.38	0.30	0.23
25	2.00	1.70	1.10	0.70	0.54	0.47	0.37	0.28
50	2.20	1.90	1.30	0.80	0.60	0.53	0.44	0.34
100	2.40	2.10	1.40	0.90	0.65	0.59	0.48	0.36

Intensity (inches/hour)

TABLE 2: ANNUAL RAINFALL 14" TO 17"

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.30	1.10	0.80	0.50	0.35	0.30	0.23	0.18
5	1.90	1.60	1.10	0.70	0.49	0.42	0.33	0.26
10	2.30	1.90	1.30	0.80	0.60	0.51	0.40	0.30
25	2.60	2.20	1.50	1.00	0.71	0.63	0.50	0.38
50	3.00	2.50	1.70	1.10	0.81	0.74	0.60	0.47
100	3.20	2.70	1.90	1.20	0.90	0.80	0.65	0.49

Intensity (inches/hour)

TABLE 3: ANNUAL RAINFALL 18" TO 21"

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.70	1.40	1.00	0.65	0.44	0.37	0.29	0.22
5	2.30	1.90	1.30	0.85	0.60	0.52	0.41	0.33
10	2.80	2.40	1.60	1.03	0.74	0.64	0.50	0.38
25	3.20	2.70	1.90	1.20	0.92	0.80	0.64	0.50
50	3.70	3.10	2.10	1.40	1.05	0.92	0.74	0.58
100	4.00	3.40	2.30	1.50	1.13	1.00	0.80	0.62

Intensity (inches/hour)

TABLE 4: ANNUAL RAINFALL 22" TO 28"

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	2.10	1.80	1.20	0.77	0.55	0.47	0.36	0.28
5	2.80	2.50	1.70	1.05	0.76	0.64	0.52	0.42
10	3.60	3.00	2.10	1.30	0.92	0.81	0.64	0.48
25	3.90	3.50	2.40	1.50	1.10	0.98	0.78	0.60
50	4.50	3.90	2.60	1.70	1.28	1.15	0.94	0.72
100	5.00	4.30	2.90	1.85	1.40	1.25	0.98	0.76

Intensity (inches/hour)

NOAA Atlas 14, Volume 6, Version 2
Location name: Paso Robles, California, USA*
Latitude: 35.6395°, Longitude: -120.6521°
Elevation: 825.91 ft**
* source: ESRI Maps
** source: USGS

FROM
NOAA ATLAS 14,
VOLUME 6, VERSION 2
FOR PASO ROBLES, CA

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.108 (0.092-0.129)	0.142 (0.120-0.169)	0.187 (0.158-0.224)	0.226 (0.189-0.272)	0.280 (0.225-0.350)	0.323 (0.254-0.414)	0.368 (0.282-0.485)	0.416 (0.309-0.566)	0.484 (0.343-0.689)	0.538 (0.367-0.797)
10-min	0.155 (0.132-0.184)	0.203 (0.172-0.242)	0.269 (0.227-0.321)	0.323 (0.271-0.390)	0.401 (0.323-0.502)	0.462 (0.364-0.593)	0.527 (0.404-0.695)	0.596 (0.442-0.811)	0.693 (0.491-0.988)	0.771 (0.526-1.14)
15-min	0.187 (0.159-0.223)	0.246 (0.208-0.293)	0.325 (0.274-0.388)	0.391 (0.327-0.472)	0.485 (0.391-0.607)	0.559 (0.440-0.718)	0.638 (0.488-0.841)	0.721 (0.535-0.981)	0.838 (0.594-1.20)	0.933 (0.636-1.38)
30-min	0.262 (0.223-0.312)	0.344 (0.292-0.410)	0.454 (0.384-0.543)	0.547 (0.458-0.660)	0.678 (0.547-0.850)	0.783 (0.616-1.00)	0.892 (0.684-1.18)	1.01 (0.749-1.37)	1.17 (0.831-1.67)	1.31 (0.890-1.93)
60-min	0.384 (0.326-0.457)	0.504 (0.427-0.600)	0.666 (0.563-0.796)	0.802 (0.672-0.968)	0.994 (0.801-1.24)	1.15 (0.903-1.47)	1.31 (1.00-1.72)	1.48 (1.10-2.01)	1.72 (1.22-2.45)	1.91 (1.30-2.83)
2-hr	0.570 (0.484-0.678)	0.727 (0.616-0.866)	0.942 (0.796-1.13)	1.13 (0.942-1.36)	1.39 (1.12-1.74)	1.60 (1.26-2.05)	1.82 (1.40-2.40)	2.06 (1.53-2.80)	2.40 (1.70-3.42)	2.68 (1.83-3.96)
3-hr	0.705 (0.598-0.839)	0.897 (0.760-1.07)	1.16 (0.980-1.39)	1.38 (1.16-1.67)	1.70 (1.37-2.13)	1.96 (1.54-2.52)	2.24 (1.71-2.95)	2.53 (1.88-3.44)	2.95 (2.09-4.20)	3.29 (2.24-4.87)
6-hr	0.985 (0.836-1.17)	1.27 (1.08-1.51)	1.66 (1.40-1.98)	1.98 (1.66-2.39)	2.45 (1.97-3.07)	2.82 (2.22-3.62)	3.21 (2.46-4.23)	3.63 (2.69-4.94)	4.22 (2.99-6.01)	4.69 (3.20-6.95)
12-hr	1.22 (1.04-1.45)	1.68 (1.43-2.00)	2.29 (1.94-2.74)	2.79 (2.34-3.36)	3.47 (2.80-4.35)	4.00 (3.15-5.13)	4.54 (3.48-5.99)	5.10 (3.79-6.94)	5.86 (4.16-8.36)	6.46 (4.41-9.57)
24-hr	1.46 (1.32-1.65)	2.14 (1.93-2.42)	3.03 (2.72-3.43)	3.74 (3.34-4.28)	4.70 (4.05-5.56)	5.42 (4.58-6.56)	6.16 (5.06-7.63)	6.90 (5.52-8.80)	7.90 (6.06-10.5)	8.67 (6.41-12.0)
2-day	1.85 (1.67-2.09)	2.66 (2.40-3.01)	3.74 (3.37-4.24)	4.63 (4.13-5.30)	5.85 (5.05-6.93)	6.80 (5.74-8.23)	7.78 (6.40-9.65)	8.80 (7.04-11.2)	10.2 (7.81-13.6)	11.3 (8.35-15.6)
3-day	2.11 (1.91-2.39)	2.98 (2.69-3.37)	4.16 (3.75-4.72)	5.15 (4.60-5.89)	6.54 (5.63-7.73)	7.63 (6.44-9.23)	8.77 (7.22-10.9)	9.98 (7.98-12.7)	11.7 (8.94-15.5)	13.0 (9.63-18.0)
4-day	2.31 (2.09-2.61)	3.22 (2.91-3.64)	4.47 (4.02-5.07)	5.53 (4.93-6.32)	7.02 (6.05-8.30)	8.21 (6.93-9.93)	9.46 (7.79-11.7)	10.8 (8.64-13.8)	12.7 (9.72-16.9)	14.2 (10.5-19.6)
7-day	2.78 (2.51-3.14)	3.78 (3.42-4.28)	5.17 (4.65-5.86)	6.35 (5.67-7.26)	8.04 (6.93-9.51)	9.40 (7.93-11.4)	10.8 (8.92-13.4)	12.4 (9.91-15.8)	14.6 (11.2-19.4)	16.4 (12.1-22.6)
10-day	3.14 (2.84-3.55)	4.22 (3.81-4.77)	5.72 (5.14-6.48)	7.00 (6.24-8.00)	8.84 (7.62-10.5)	10.3 (8.72-12.5)	11.9 (9.80-14.8)	13.6 (10.9-17.4)	16.1 (12.3-21.4)	18.1 (13.4-24.9)
20-day	3.90 (3.52-4.40)	5.20 (4.69-5.88)	7.02 (6.32-7.96)	8.59 (7.67-9.83)	10.9 (9.36-12.8)	12.7 (10.7-15.4)	14.7 (12.1-18.2)	16.8 (13.4-21.4)	19.8 (15.2-26.4)	22.3 (16.5-30.8)
30-day	4.63 (4.19-5.23)	6.20 (5.59-7.01)	8.38 (7.54-9.51)	10.3 (9.16-11.7)	13.0 (11.2-15.4)	15.2 (12.8-18.3)	17.5 (14.4-21.7)	20.1 (16.0-25.6)	23.7 (18.1-31.5)	26.6 (19.7-36.7)
45-day	5.54 (5.00-6.25)	7.43 (6.71-8.41)	10.1 (9.06-11.4)	12.3 (11.0-14.1)	15.6 (13.4-18.4)	18.2 (15.4-22.0)	21.0 (17.3-26.1)	24.0 (19.2-30.6)	28.3 (21.7-37.7)	31.8 (23.5-43.8)
60-day	6.46 (5.84-7.30)	8.70 (7.85-9.83)	11.8 (10.6-13.4)	14.4 (12.9-16.5)	18.2 (15.7-21.5)	21.2 (17.9-25.7)	24.5 (20.1-30.3)	27.9 (22.3-35.6)	32.8 (25.1-43.7)	36.8 (27.2-50.7)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

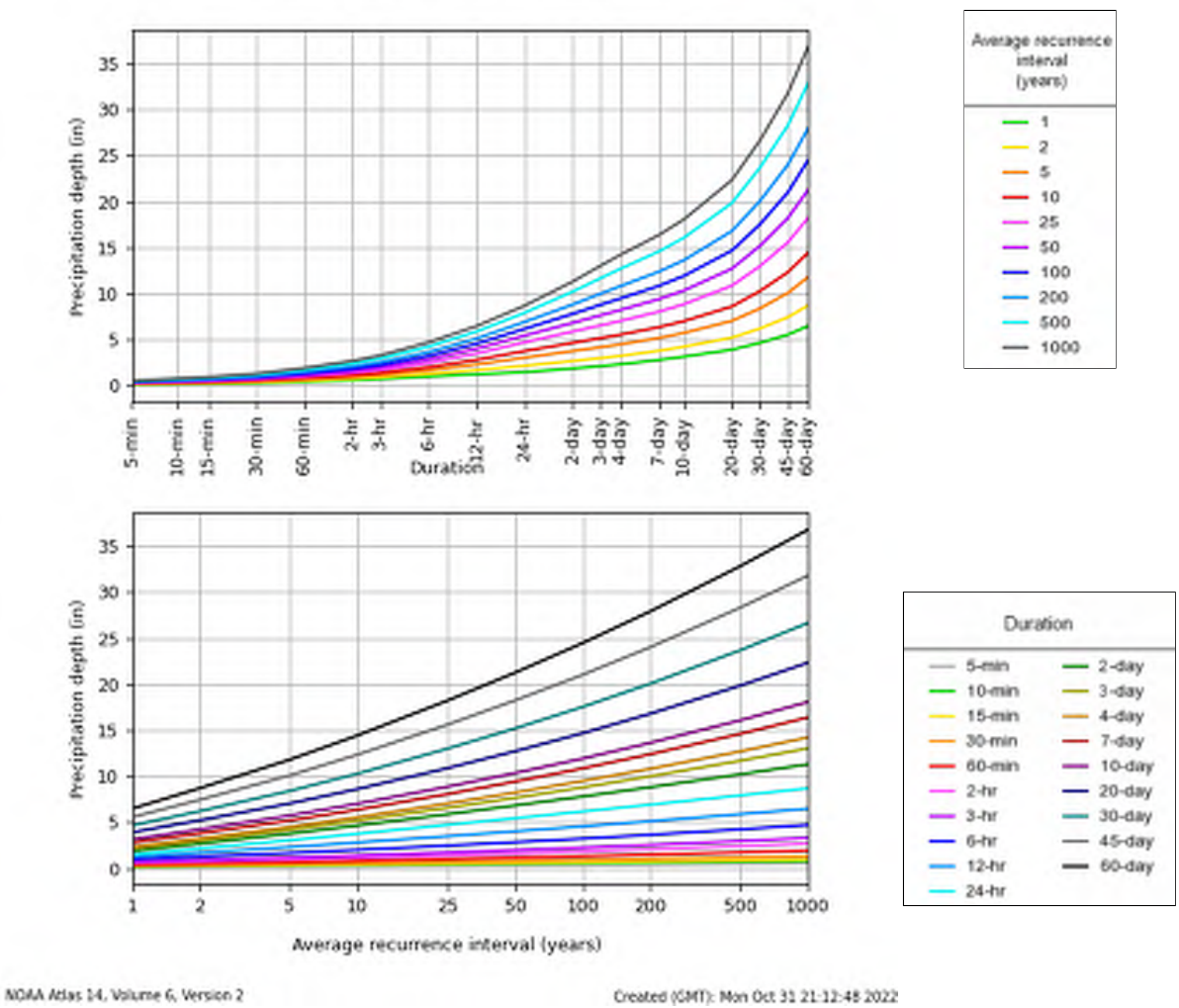
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

FROM
NOAA ATLAS 14, VOLUME 6,
VERSION 2 FOR PASO ROBLES, CA

PDS-based depth-duration-frequency (DDF) curves
Latitude: 35.6395°, Longitude: -120.6521°



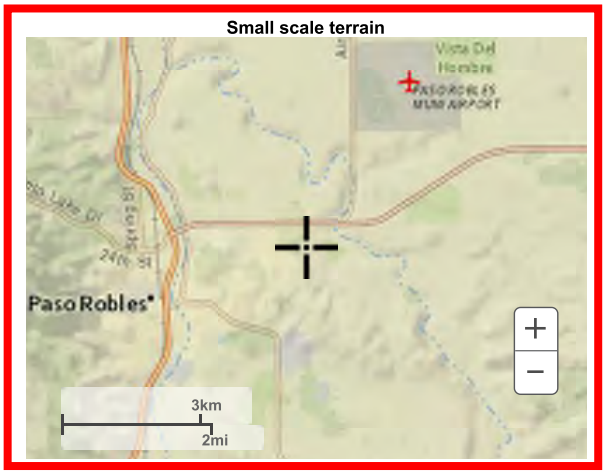
NOAA Atlas 14, Volume 6, Version 2

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Maps & aerials

Small scale terrain

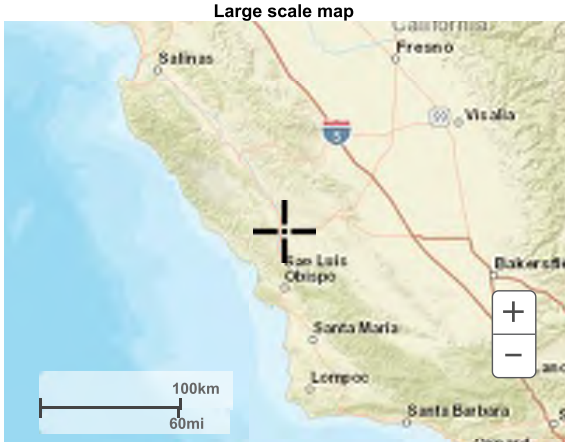


Large scale terrain

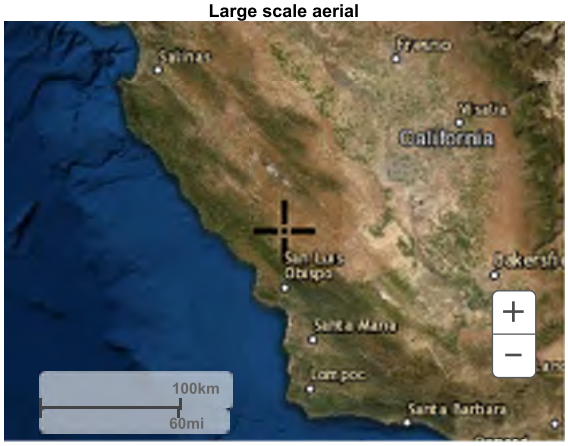
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Large scale map



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 C

Appendix C – Preliminary Drainage Design Calculations

- Existing and Proposed Hydrologic Calculations
- Existing and Proposed Land Use Data
- Time of Concentration Calculations
- HydroCAD Drainage Results – Existing Site
    - 25-Year, 50-Year, and 100-Year Design Storms
- HydroCAD Drainage Results – Proposed Site
    - 25-Year, 50-Year, and 100-Year Design Storms
- Ardmore Bypass Culvert analysis – 25-year and 100-year storm event

Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 2/16/2022
By: ZKP
Overall Hydrologic Calculations - SBUH method in HydroCAD

Rainfall Event Data			Antecedent Moisture Condition
95th	1.45	inches	1
2 YR	2.14	inches	2
10 YR	3.74	inches	2
25 YR	4.70	inches	2
50 YR	5.42	inches	2
100 YR	6.16	inches	2
** See NOAA Atlas 14 Rainfall data (24-hr storm duration)*			*Antecedent Moisture Condition (AMC) utilized in HydroCAD.*

Pre- vs. Post-Development Peak Flow Summary - OUTLETS

Outlet Location	Pre-Dev. Total Area (ac)	Post-Dev. Total Area (ac)	Storm	Pre-Developed Flow, Q (cfs)	Post-Developed Flow, Q (cfs)	Drainage Notes	Proposed Structural Control Measures (SCM)
Outlet A	64.43	64.46	95th	-	-	A bypass culvert is proposed to intercept offsite run-on from the south (**EX1 offsite**) and convey it to Outlet A following historic drainage patterns.	Roadside bioretention swales, StormTech Chamber: (A =257' x 52')
			2 YR	32.51	31.75		
			10 YR	61.76	59.90		
			25 YR	72.83	71.33		
			50 YR	85.55	83.41		
			100 YR	93.67	90.48		
Outlet B	2.82	2.80	95th	Data Unknown	-	Pre-developed data referenced from Daniels Commercial drainage report by Roberts Eng. (2019, 2020)	Roadside bioretention swales, StormTech Chamber: (B1 = 78' x 88') (B2 = 178' x 23')
			2 YR	1.02	0.04		
			10 YR	2.11	0.59		
			25 YR	2.46	1.65		
			50 YR	2.97	2.53		
			100 YR	3.54	3.42		
Onsite Runoff (C)	0.80	0.27	95th	0.01	0.03	Designed onsite runoff to north along Ardmore Road following historic drainage patterns	Roadside bioretention swale
			2 YR	0.15	0.07		
			10 YR	0.74	0.12		
			25 YR	1.17	0.15		
			50 YR	1.52	0.18		
			100 YR	1.89	0.20		
Outlet D	3.27	3.79	95th	-	-		Detention Basin with metered SD outlet. Underground bioretention trench along basin bottom
			2 YR	0.56	-		
			10 YR	2.94	0.54		
			25 YR	4.70	1.37		
			50 YR	6.11	3.36		
			100 YR	7.62	6.81		
Drainage Area Subtotal	71.33	71.33					

Pre- vs. Post-Development Peak Flow Summary - OVERALL PROJECT SITE

Project Site	Pre-Dev. Total Area (ac)	Post-Dev. Total Area (ac)	Storm	Pre-Developed Flow, Q (cfs)	Post-Developed Flow, Q (cfs)
Ardmore Industrial	14.06	14.06	95th	0.01	0.03
			2 YR	2.97	0.59
			10 YR	12.23	5.83
			25 YR	18.62	11.96
			50 YR	23.99	17.32
			100 YR	29.75	23.94

Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 2/16/2022
By: ZKP
Overall Hydrologic Calculations - SBUH method in HydroCAD

Existing/ Pre-developed Hydrology - Land Use Data & Peak Flow								
WSHD	Outlet Location	Total Area (sf)	Total Area (ac)	Weighted CN	Land Type Description	Time of Conc. (min)	Storm	Flow, Q (cfs)
EX1 (offsite)	**Outlet A** (Exist. double 24" SD pipes)	2,494,621	57.27	See Offsite Hydrology Calculations (Rational Method)	*OFFSITE RUN-ON* Undeveloped. Rural grassland/ open space, few trees	11.04	2 YR	31.27
							10 YR	55.32
							25 YR	62.54
							50 YR	72.16
							100 YR	76.97
EX1 (onsite)		312,111	7.17	74	*ONSITE* Undeveloped. Rural grassland/ open space with few trees	6.00	95th	-
							2 YR	1.24
							10 YR	6.44
							25 YR	10.29
							50 YR	13.39
							100 YR	16.70
EX2	**Outlet B** (Exist 12" culvert)	122,877	2.82	(Data referenced from 2019 Daniels Commercial drainage report by Roberts Engineering - see "Tate Property/ Offsite flow from east" calculations)			95th	Data Unknown
							2 YR	1.02
							10 YR	2.11
							25 YR	2.46
							50 YR	2.97
							100 YR	3.54
EX3	**Outlet D** (Surface runoff/ sheet flow to northwest)	142,459	3.27	74	Undeveloped. Rural grassland/ agricultural with few trees	6.00	95th	-
							2 YR	0.56
							10 YR	2.94
							25 YR	4.70
							50 YR	6.11
							100 YR	7.62
EX4	**Onsite Runoff (C)** (Sheet flow runoff to north along Ardmore Rd)	34,918	0.80	74	Mostly undeveloped (single ag structure). Rural grassland/ agricultural, few	6.00	95th	0.01
							2 YR	0.15
							10 YR	0.74
							25 YR	1.17
							50 YR	1.52
							100 YR	1.89
Subtotal		3,106,984	71.33					
** Calculated time of concentrations values were found to be less than the minimum 6-minute standard set by the City of Paso Robles Standards.*								

Proposed/ Post-developed Hydrology - Land Use Data & Peak Flow								
DMA	Outlet Location	Total Area (sf)	Total Area (ac)	Weighted CN	Land Type Description	Time of Conc. (min)	Storm	Flow, Q (cfs)
A	**Outlet A** (Exist. double 24" SD pipes)	313,474	7.20	95	Developed	6.00	95th	-
							2 YR	0.48
							10 YR	4.58
							25 YR	8.79
							50 YR	11.25
							100 YR	13.51
B1 + B2	**Outlet B** (Prop. curb inlet at exist 12" culvert)	121,873	2.80	95	Developed	6.00	95th	-
							2 YR	0.04
							10 YR	0.59
							25 YR	1.65
							50 YR	2.53
							100 YR	3.42
C	**Onsite Runoff (C)** (Sheet flow runoff to north along Ardmore Rd)	11,941	0.27	98	Developed	6.00	95th	0.03
							2 YR	0.07
							10 YR	0.12
							25 YR	0.15
							50 YR	0.18
							100 YR	0.20
D	**Outlet D** (Prop. basin outlet with metered flow to northwest)	165,076	3.79	95	Developed	6.00	95th	-
							2 YR	-
							10 YR	0.54
							25 YR	1.37
							50 YR	3.36
							100 YR	6.81
Subtotal		612,363	14.06					
** Calculated time of concentrations values were found to be less than the minimum 6-minute standard set by the City of Paso Robles Standards.*								
*** DMA C storm drain system has been designed to over-retain and detain stormwater to account for DMA E onsite stormwater runoff.*								

Ardmore Project
Location: Paso Robles, CA

Project: 0751-0005 Ardmore
Date: 2/16/2022
By: ZKP
Offsite Hydrologic Calculations - Rational method

Rainfall Event Data		
2 YR	1.30	in/ hr
10 YR	2.30	in/ hr
25 YR	2.60	in/ hr
50 YR	3.00	in/ hr
100 YR	3.20	in/ hr
** See 2022 County of San Luis Obispo Public Improvement Standards H-4, Table 2*		

Existing/ Pre-developed Offsite Hydrology Conditions									
DMA	Outlet Location	Total Area (sf)	Total Area (ac)	C	Land Type Description	Time of Conc. (min)	Storm	Intensity, I (in/hr)	Flow, Q (cfs)
EX1 (offsite)	**Outlet A** (Exist. double 24" SD pipes)	2,494,621	57.27	0.42	*OFFSITE RUN-ON* Undeveloped. Rural grassland/ open space, few trees	11.04			
							2 YR	1.30	31.27
							10 YR	2.30	55.32
							25 YR	2.60	62.54
							50 YR	3.00	72.16
							100 YR	3.20	76.97
Subtotal		2,494,621	57.27						
** Calculated time of concentrations values were found to be less than the minimum 10-minute standard set by the 2022 County of San Luis Obispo Public Improvements Standards*									

EX1 (offsite)					
Land Type	**Area**		**C-Value**		
Rural grass/ ag	2,494,621	SF	0.42	Undeveloped	
		ΣCA	1,047,741		
		Total DMA Area	2,494,621	57.27	ac
		Weighted C-Value	0.42		

Undeveloped Area C-Value (SLO County detail H-3a)			
	Description	**C-value**	
Rural/ Ag Land	Relief	0.20	Relatively flat land, with average slopes 0-5%
	Soil Infiltration	0.08	Slow to take up water, clay or shallow loam soils
	Vegetal Cover	0.06	Good to excellent - 90% or more area is good grassland or equiv. cover
	Surface Storage	0.08	Low - well defined system of small drainage ways with no ponds or marshes
	Total	0.42	

Project: 751-005 Ardmore
Date: 2/14/2022
By: ZKP
Existing/ Pre-developed Watershed Land Use
(For HydroCAD model use)

Existing/ Pre-developed Site Summary (excludes EX1 offsite)			
Land Type	**Total Area (sf)**	**Total Area (ac)**	**% of Total Area**
Impervious (Imp)	3,223	0.07	0.5%
Pervious (P)	609,141	13.98	99.5%
Total Area	612,364	14.06	100.0%

SF to Acre
43,560

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX1 (offsite)	2,494,621	P	100%	2,494,621	57.27	
		Imp	0%	-	-	
Subtotal	2,494,621	P	100%	2,494,621	57.27	Exist Outlet A
		Imp	0%	-	-	
		✓	100%	2,494,621	57.27	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX1 (onsite)	312,111	P	100%	312,111	7.17	
		Imp	0%	-	-	
Subtotal	312,111	P	100%	312,111	7.17	Exist Outlet A
		Imp	0%	-	-	
		✓	100%	312,111	7.17	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX2	122,877	P	98%	120,160	2.76	
		Imp	2%	2,717	0.06	
Subtotal	122,877	P	98%	120,160	2.76	Exist Outlet B
		Imp	2%	2,717	0.06	
		✓	100%	122,877	2.82	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX3	142,459	P	100%	142,459	3.27	
		Imp	0%	-	-	
Subtotal	142,459	P	100%	142,459	3.27	Surface runoff to northeast
		Imp	0%	-	-	
		✓	100%	142,459	3.27	

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
EX4	34,918	P	99%	34,412	0.79	
		Imp	1%	506	0.01	
Subtotal	34,918	P	99%	34,412	0.79	Exist Outlet B
		Imp	1%	506	0.01	
		✓	100%	34,918	0.80	

Existing Watershed Area	**3,106,984**	**71.33**

Project: 751-005 Ardmore
Date: 2/14/2022
By: ZKP
Proposed/ Post-developed DMA Land Use
(For HydroCAD model use)

Proposed/ Post-developed Site Summary			
Land Type	**Total Area (sf)**	**Total Area (ac)**	**% of Total Area**
Impervious (Imp)	501,730	11.52	81.9%
Pervious (P)	110,633	2.54	18.1%
Total Area	612,363	14.06	100.0%

SF to Acre
43,560

Catchment	Catchment Area (sf)	P/I	% of Catchment	Breakdown Area (sf)	Breakdown Area (acre)	Notes
A1	264,589	P	14%	37,042	0.85	StormTech Chambers,
		Imp	86%	227,546	5.22	Outlet A
A2	48,885	P	14%	6,844	0.16	Roadside Bioswale,
		Imp	86%	42,041	0.97	Outlet A
Subtotal (A)	313,474	P	14%	43,886	1.01	
		Imp	86%	269,587	6.19	
		✓	100%	313,474	7.20	
B1a	59,221	P	24%	15,178	0.35	StormTech Chambers,
		Imp	76%	44,042	1.01	Outlet B
B1b	10,365	P	24%	1,256	0.03	Roadside Bioswale,
		Imp	76%	9,109	0.21	Outlet B
Subtotal (B)	69,586	P	24%	16,434	0.38	
		Imp	76%	53,151	1.22	
		✓	100%	69,586	1.60	
B2a	52,287	P	24%	4,163	0.10	StormTech Chambers,
		Imp	76%	48,124	1.10	Outlet B
Subtotal (B)	52,287	P	24%	4,163	0.10	
		Imp	76%	48,124	1.10	
		✓	100%	52,287	1.20	
C1	9,720	P	10%	2,633	0.06	Roadside Bioswale,
		Imp	90%	7,087	0.16	Run-off to the north
C2	2,221	P	10%	-	-	Onsite run-off to the
		Imp	90%	2,221	0.05	north
Subtotal (C)	11,941	P	10%	2,633	0.06	
		Imp	90%	9,308	0.21	
		✓	100%	11,941	0.27	
D1	165,076	P	26%	43,517	1.00	Basin w/ Bioretention,
		Imp	74%	121,559	2.79	Outlet D
Subtotal (D)	165,076	P	26%	43,517	1.00	
		Imp	74%	121,559	2.79	
		✓	100%	165,076	3.79	

Total Project Area	**612,363**	**14.06**

Project: 751-005 Ardmore
Date: 2/16/2022
By: ZKP
Time of Concentration calculations

References:
2022 County of San Luis Obispo Public Improvement Standard H-2

		Existing Conditions				City of Paso Robles min. tc (min)
Watershed	**Outlet**	L (Mile)	H (ft)	tc (hr)	tc (min)	
EX1 (offsite)	Outlet A (Exist. double 24" SD pipes)	0.54	152	0.18	11.04	6.00
EX1 (onsite)		0.11	19	0.07	4.06	6.00
EX2	Outlet B (Exist 12" culvert)	(Data referenced from 2019 Daniels Commercial drainage report by Roberts Engineering)				
EX3	Outlet D (Surface runoff/ sheet flow to northwest)	0.11	19	0.06	3.89	6.00
EX4	Onsite Runoff (C) (Sheet flow runoff to north along Ardmore Rd)	0.05	6	0.05	2.74	6.00

		Proposed Conditions				City of Paso Robles min. tc (min)
DMA	**Outlet**	L (MI)	H	tc (hr)	tc (min)	
A	Exist. Dbl. 24" SD pipes	0.11	13.0	0.08	4.77	6.00
B	Proposed Curb Inlet	0.06	3.9	0.06	3.77	6.00
C	Onsite Runoff	0.09	4.7	0.09	5.49	6.00
D	Basin Outlet	0.13	15.0	0.08	4.97	6.00

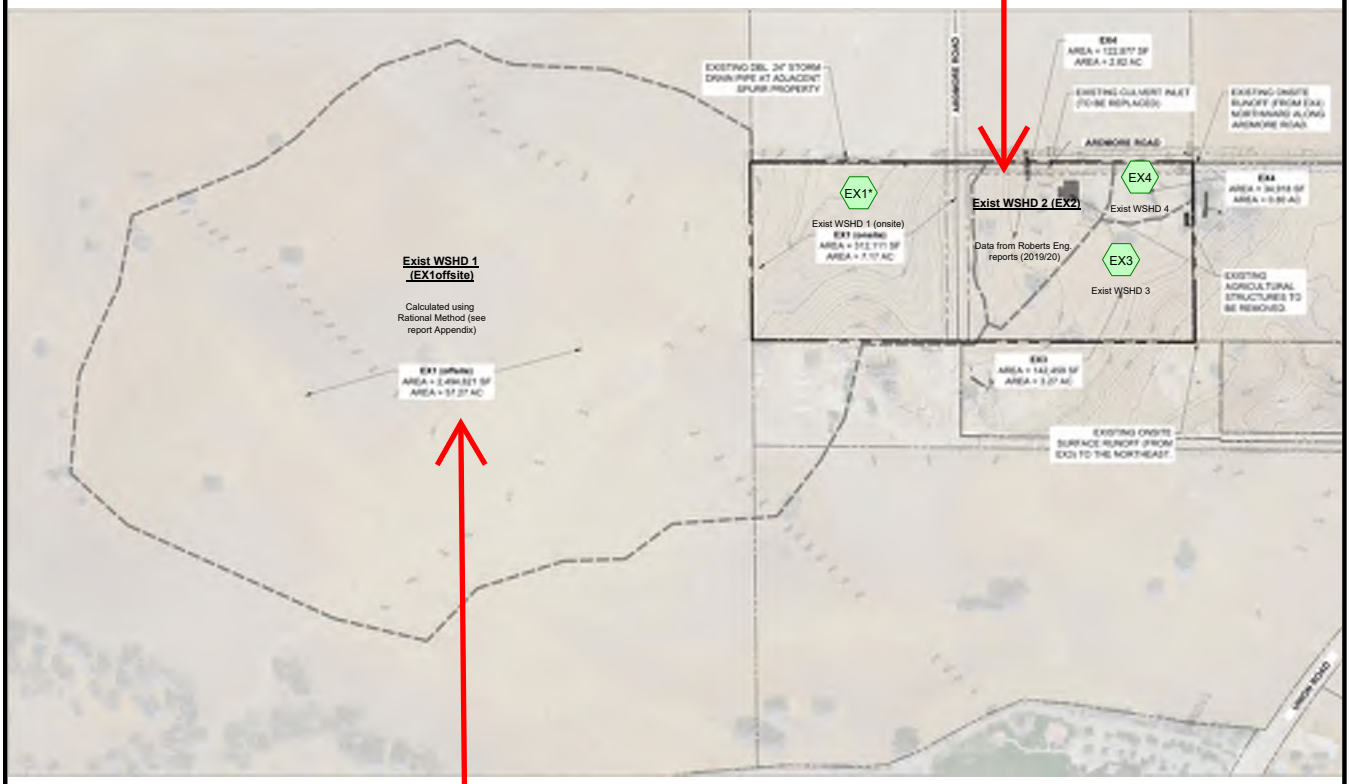
EQUATIONS FOR ESTIMATED "TIME OF CONCENTRATION"

$$Tc = \left(\frac{11.9L^3}{H}\right)^{0.385}$$

LEGEND:
Tc = TIME OF CONCENTRATION IN HOURS.
L = LENGTH OF CHANNEL IN MILES.
H = DIFFERENCE IN ELEVATION BETWEEN MOST REMOTE POINT AND THE POINT OF CONCENTRATION IN FEET.

EXISTING ROUTING DIAGRAM

EX2 not included in this HyrdoCAD report
(See data from 2019/2020 Daniels Woodlands drainage reports by Roberts Engineering, referenced in "Overall Hydrology Calculations" by Wallace Group in Appendix C)



EX1 (offsite) not included in this HyrdoCAD report
(See "Offsite Hydrology Calcs - Rational Method" by Wallace Group in Appendix C)

Subcat Reach Pond Link

Routing Diagram for 2022_Ardmore_Exist
Prepared by Wallace Group, Printed 12/8/2022
HydroCAD® 10.20-2f s/n 05444 © 2022 HydroCAD Software Solutions LLC

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50-YR Event
10 Node Listing
11 Subcat EX1*: Exist WSHD 1 (onsite)
12 Subcat EX3: Exist WSHD 3
13 Subcat EX4: Exist WSHD 4

100-YR Event
14 Node Listing
15 Subcat EX1*: Exist WSHD 1 (onsite)
16 Subcat EX3: Exist WSHD 3
17 Subcat EX4: Exist WSHD 4

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25-YR	Type I 24-hr		Default	24.00	1	4.70	2
2	50-YR	Type I 24-hr		Default	24.00	1	5.42	2
3	100-YR	Type I 24-hr		Default	24.00	1	6.16	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.012	98	Ag Building, HSG C (EX4)
11.225	74	Pasture/grassland/range, Good, HSG C (EX1*, EX3, EX4)
11.237	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
11.237	HSG C	EX1*, EX3, EX4
0.000	HSG D	
0.000	Other	
11.237		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.012	0.000	0.000	0.012	Ag Building	EX 4
0.000	0.000	11.225	0.000	0.000	11.225	Pasture/grassland/range, Good	EX 1*, EX 3, EX 4
0.000	**0.000**	**11.237**	**0.000**	**0.000**	**11.237**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1*: Exist WSHD 1 (onsite) Runoff Area=312,111 sf 0.00% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=74/0 Runoff=10.29 cfs 1.270 af

Subcatchment EX3: Exist WSHD 3 Runoff Area=142,459 sf 0.00% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=74/0 Runoff=4.70 cfs 0.580 af

Subcatchment EX4: Exist WSHD 4 Runoff Area=34,918 sf 1.45% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=74/98 Runoff=1.17 cfs 0.144 af

Total Runoff Area = 11.237 ac Runoff Volume = 1.994 af Average Runoff Depth = 2.13"
99.90% Pervious = 11.225 ac 0.10% Impervious = 0.012 ac

Summary for Subcatchment EX1*: Exist WSHD 1 (onsite)

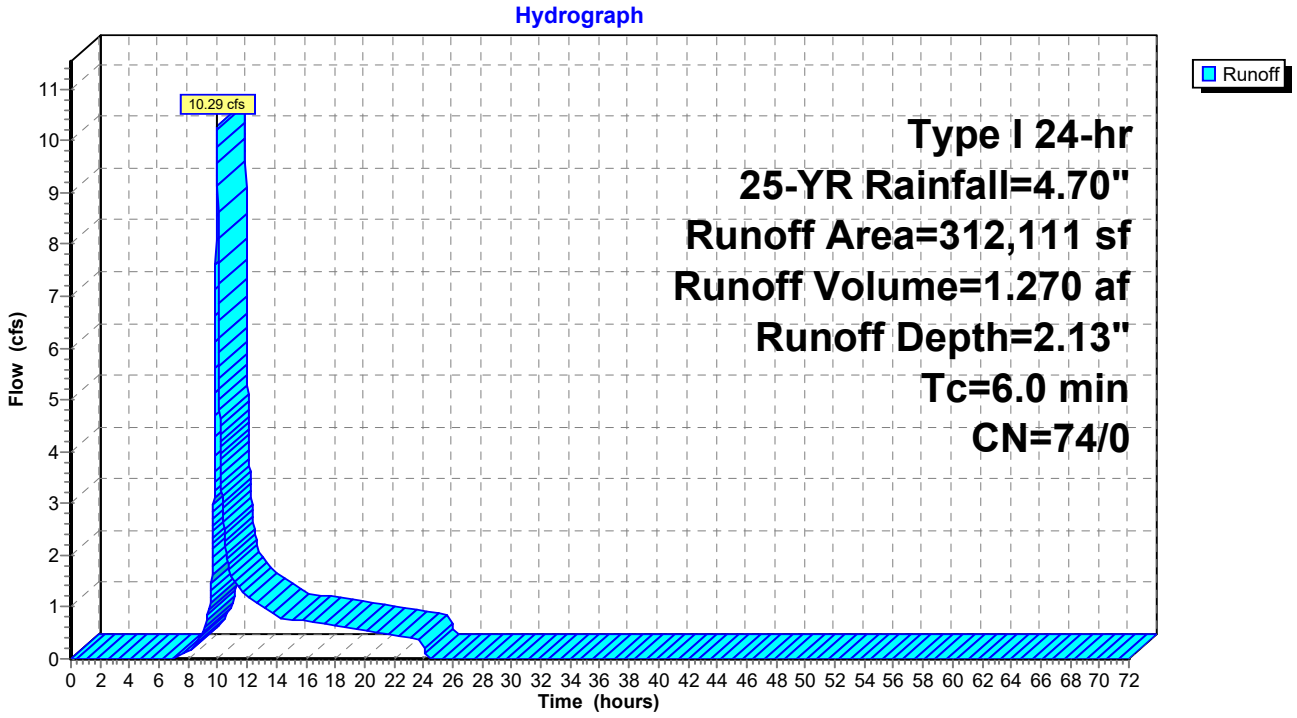
Runoff = 10.29 cfs @ 9.95 hrs, Volume= 1.270 af, Depth= 2.13"
Routed to nonexistent node A

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 25-YR Rainfall=4.70"

Area (sf)	CN	Description
312,111	74	Pasture/grassland/range, Good, HSG C
312,111	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calculated**

Subcatchment EX1*: Exist WSHD 1 (onsite)



Summary for Subcatchment EX3: Exist WSHD 3

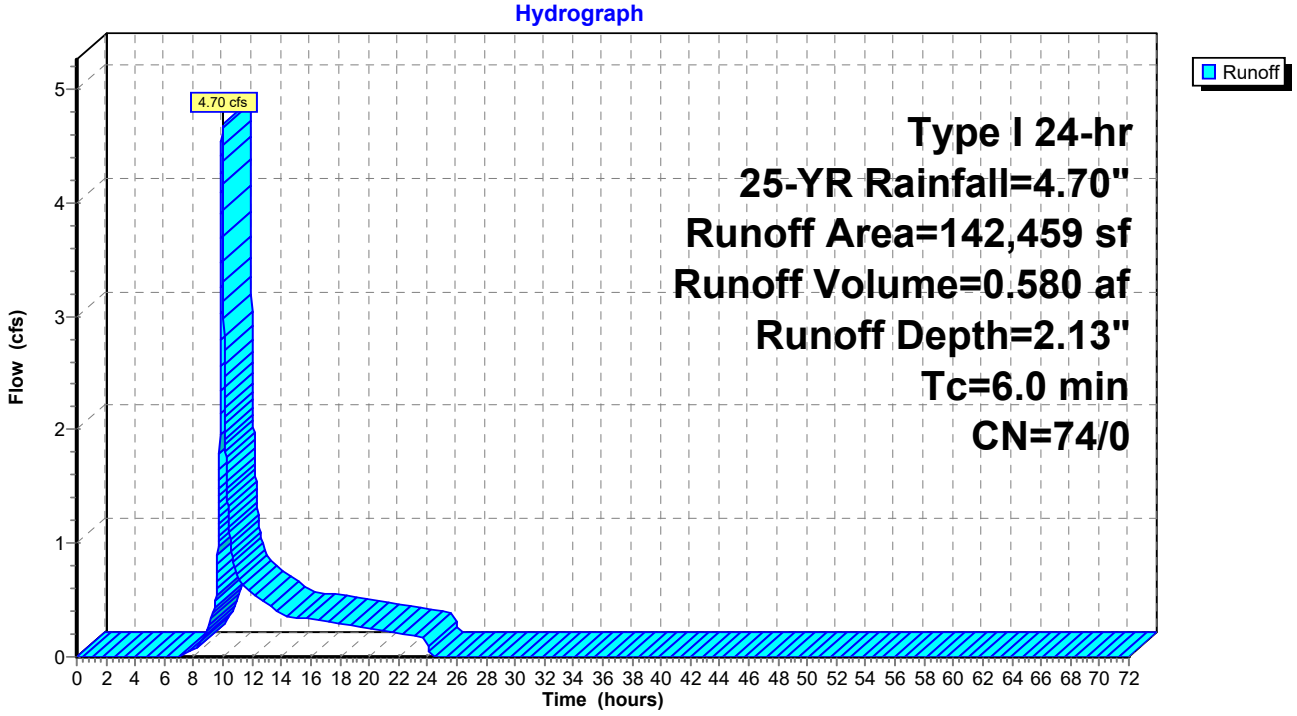
Runoff = 4.70 cfs @ 9.95 hrs, Volume= 0.580 af, Depth= 2.13"
Routed to nonexistent node D

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 25-YR Rainfall=4.70"

Area (sf)	CN	Description
142,459	74	Pasture/grassland/range, Good, HSG C
142,459	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment EX3: Exist WSHD 3



Summary for Subcatchment EX4: Exist WSHD 4

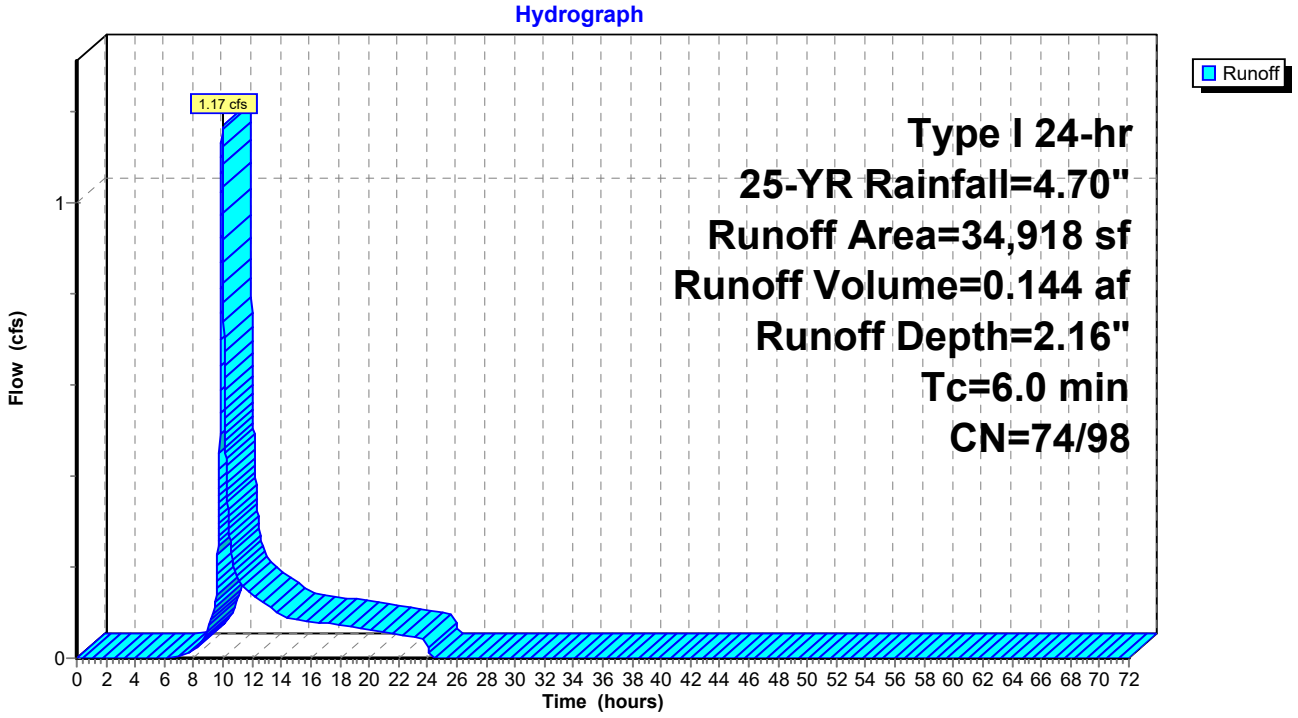
Runoff = 1.17 cfs @ 9.95 hrs, Volume= 0.144 af, Depth= 2.16"
Routed to nonexistent node C

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 25-YR Rainfall=4.70"

	Area (sf)	CN	Description
	34,412	74	Pasture/grassland/range, Good, HSG C
*	506	98	Ag Building, HSG C
	34,918	74	Weighted Average
	34,412	74	98.55% Pervious Area
	506	98	1.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment EX4: Exist WSHD 4



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1*: Exist WSHD 1 (onsite) Runoff Area=312,111 sf 0.00% Impervious Runoff Depth=2.70"
Tc=6.0 min CN=74/0 Runoff=13.39 cfs 1.614 af

Subcatchment EX3: Exist WSHD 3 Runoff Area=142,459 sf 0.00% Impervious Runoff Depth=2.70"
Tc=6.0 min CN=74/0 Runoff=6.11 cfs 0.737 af

Subcatchment EX4: Exist WSHD 4 Runoff Area=34,918 sf 1.45% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=74/98 Runoff=1.52 cfs 0.183 af

Total Runoff Area = 11.237 ac Runoff Volume = 2.534 af Average Runoff Depth = 2.71"
99.90% Pervious = 11.225 ac 0.10% Impervious = 0.012 ac

Summary for Subcatchment EX1*: Exist WSHD 1 (onsite)

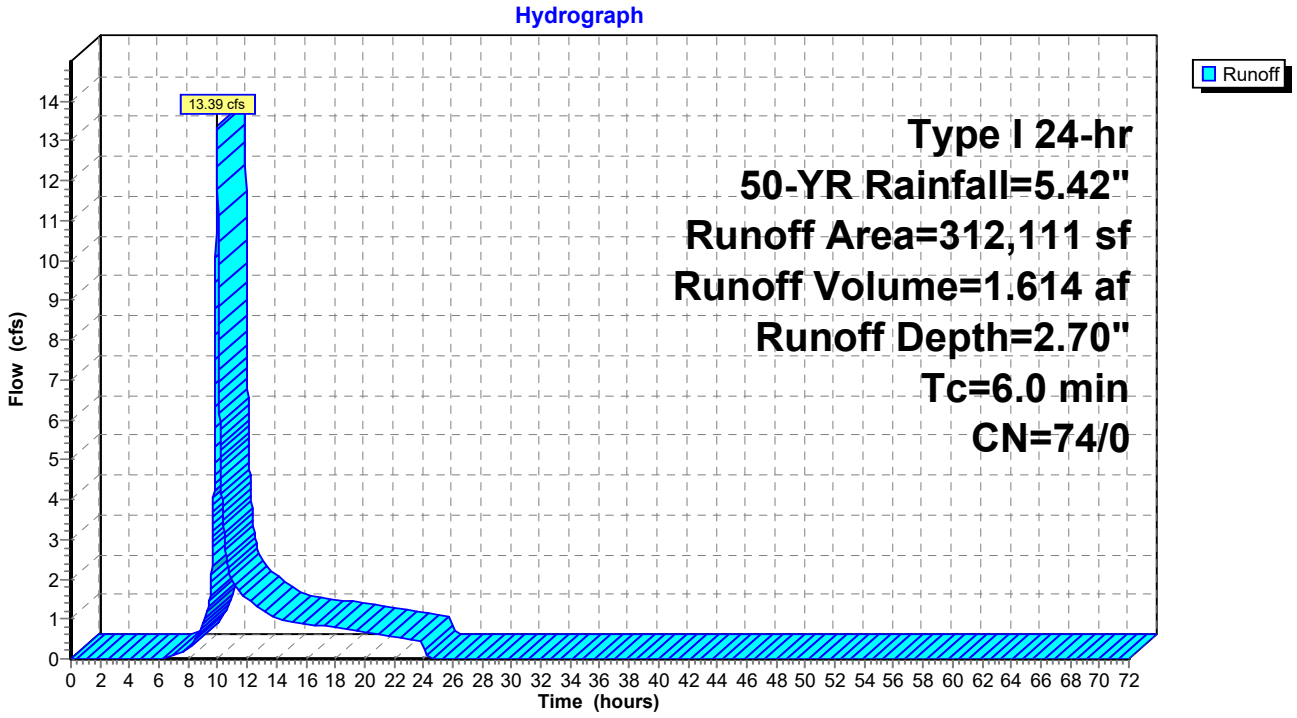
Runoff = 13.39 cfs @ 9.95 hrs, Volume= 1.614 af, Depth= 2.70"
Routed to nonexistent node A

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 50-YR Rainfall=5.42"

Area (sf)	CN	Description
312,111	74	Pasture/grassland/range, Good, HSG C
312,111	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calculated**

Subcatchment EX1*: Exist WSHD 1 (onsite)



Summary for Subcatchment EX3: Exist WSHD 3

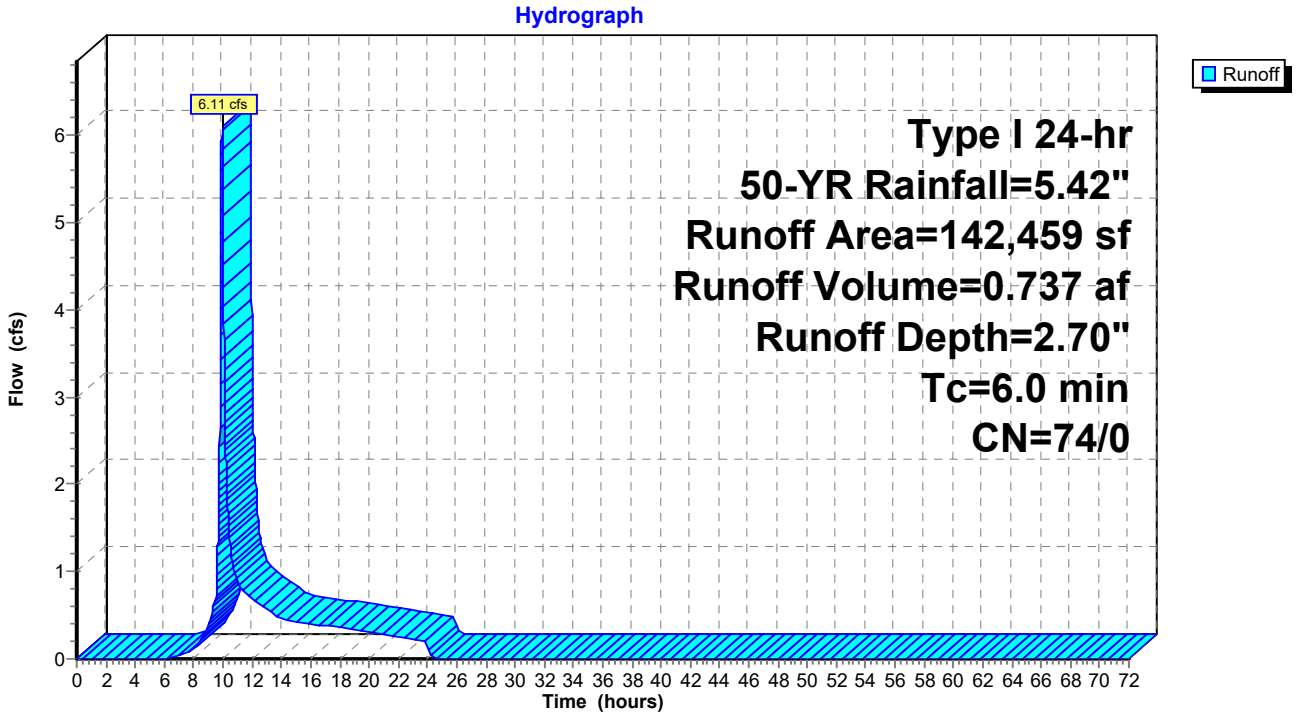
Runoff = 6.11 cfs @ 9.95 hrs, Volume= 0.737 af, Depth= 2.70"
Routed to nonexistent node D

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 50-YR Rainfall=5.42"

Area (sf)	CN	Description
142,459	74	Pasture/grassland/range, Good, HSG C
142,459	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment EX3: Exist WSHD 3



Summary for Subcatchment EX4: Exist WSHD 4

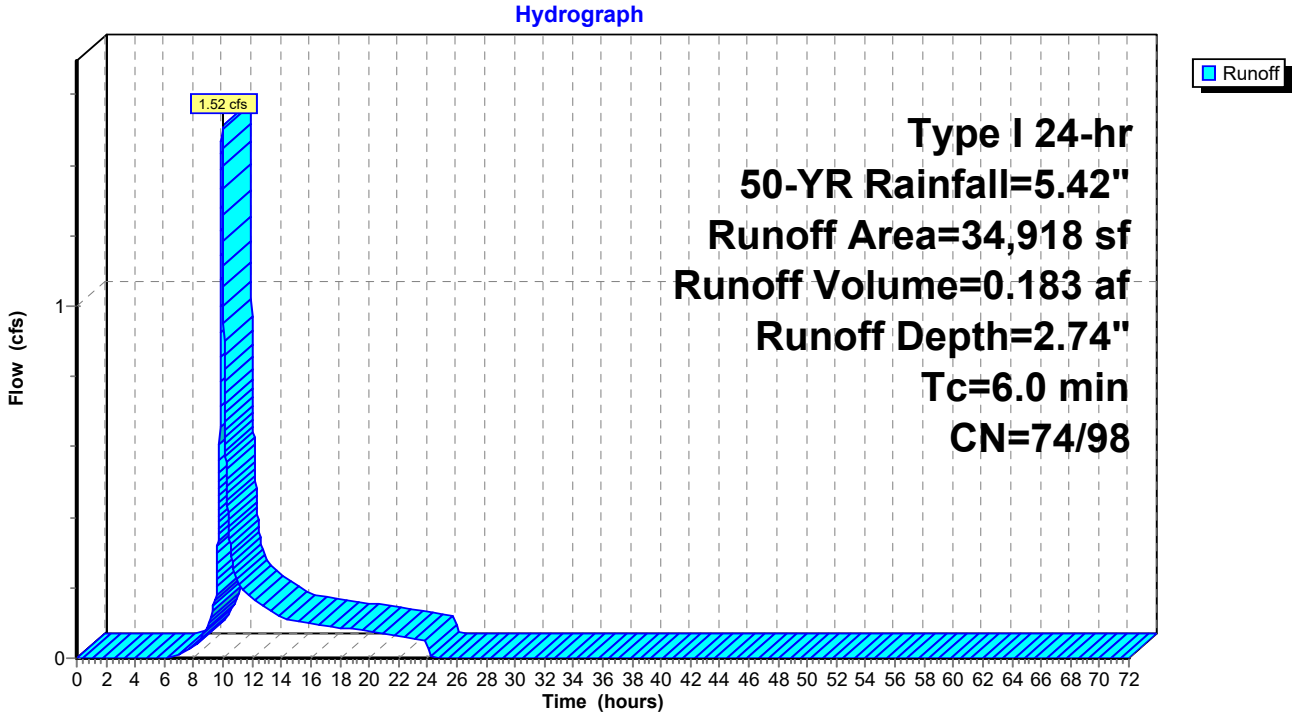
Runoff = 1.52 cfs @ 9.95 hrs, Volume= 0.183 af, Depth= 2.74"
Routed to nonexistent node C

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 50-YR Rainfall=5.42"

	Area (sf)	CN	Description
	34,412	74	Pasture/grassland/range, Good, HSG C
*	506	98	Ag Building, HSG C
	34,918	74	Weighted Average
	34,412	74	98.55% Pervious Area
	506	98	1.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment EX4: Exist WSHD 4



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1*: Exist WSHD 1 (onsite) Runoff Area=312,111 sf 0.00% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=74/0 Runoff=16.70 cfs 1.982 af

Subcatchment EX3: Exist WSHD 3 Runoff Area=142,459 sf 0.00% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=74/0 Runoff=7.62 cfs 0.905 af

Subcatchment EX4: Exist WSHD 4 Runoff Area=34,918 sf 1.45% Impervious Runoff Depth=3.36"
Tc=6.0 min CN=74/98 Runoff=1.89 cfs 0.224 af

Total Runoff Area = 11.237 ac Runoff Volume = 3.111 af Average Runoff Depth = 3.32"
99.90% Pervious = 11.225 ac 0.10% Impervious = 0.012 ac

Summary for Subcatchment EX1*: Exist WSHD 1 (onsite)

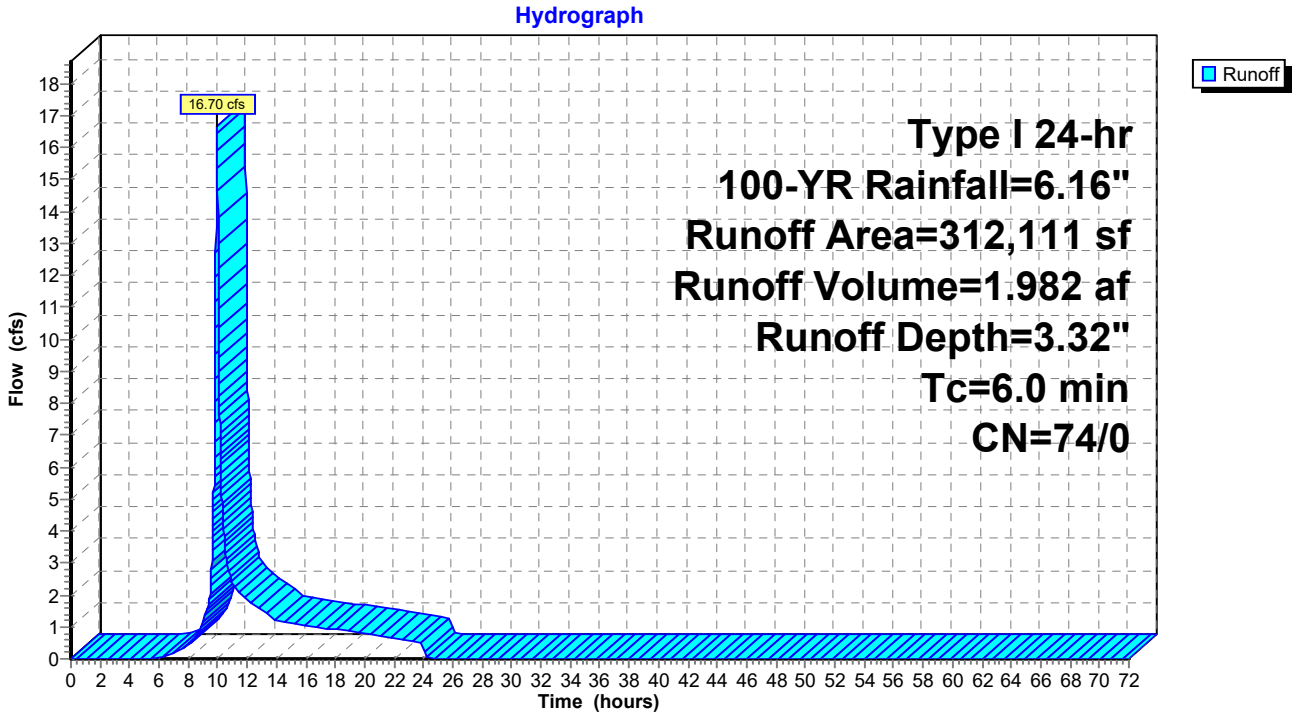
Runoff = 16.70 cfs @ 9.95 hrs, Volume= 1.982 af, Depth= 3.32"
Routed to nonexistent node A

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 100-YR Rainfall=6.16"

Area (sf)	CN	Description
312,111	74	Pasture/grassland/range, Good, HSG C
312,111	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calculated**

Subcatchment EX1*: Exist WSHD 1 (onsite)



Summary for Subcatchment EX3: Exist WSHD 3

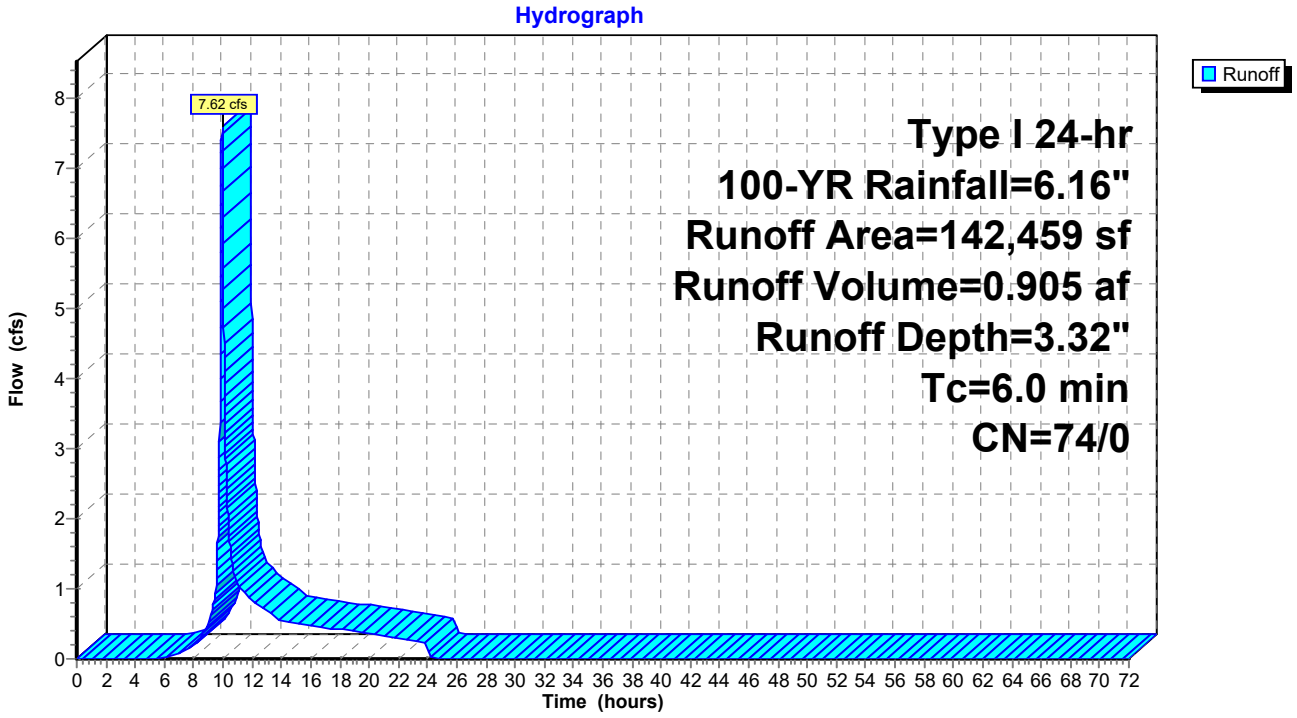
Runoff = 7.62 cfs @ 9.95 hrs, Volume= 0.905 af, Depth= 3.32"
Routed to nonexistent node D

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 100-YR Rainfall=6.16"

Area (sf)	CN	Description
142,459	74	Pasture/grassland/range, Good, HSG C
142,459	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment EX3: Exist WSHD 3



Summary for Subcatchment EX4: Exist WSHD 4

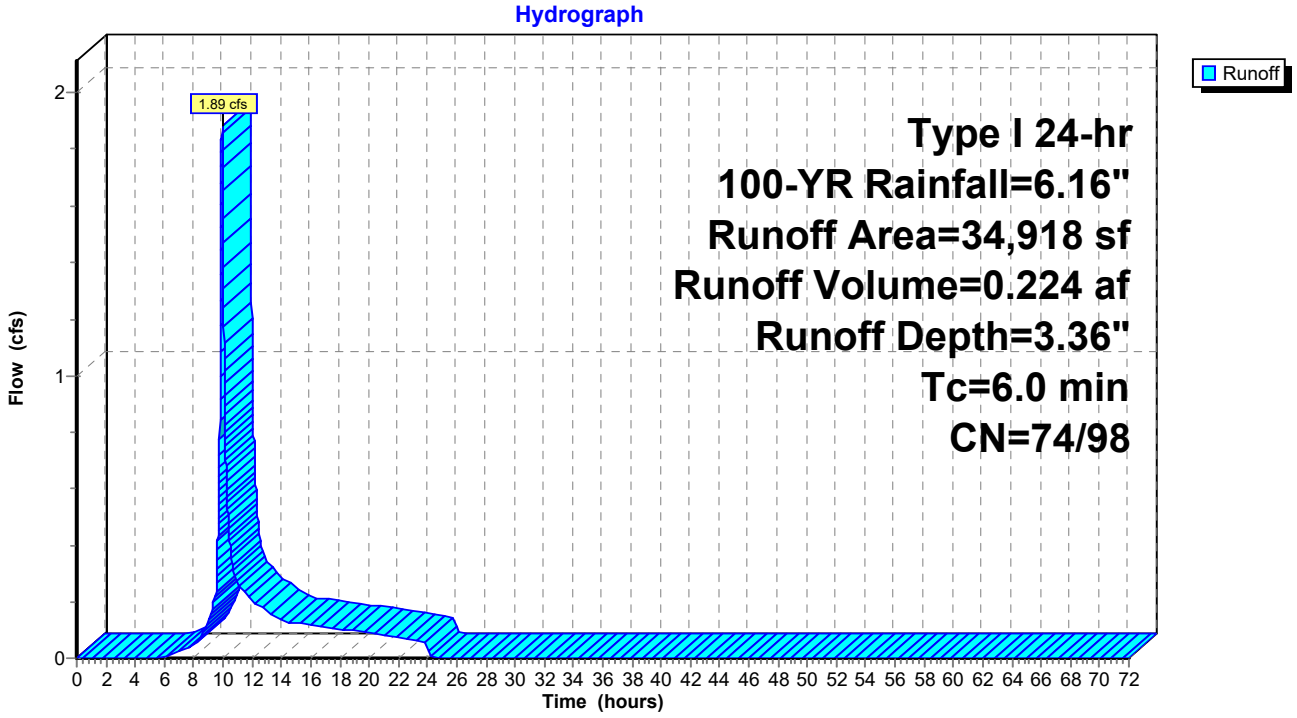
Runoff = 1.89 cfs @ 9.95 hrs, Volume= 0.224 af, Depth= 3.36"
Routed to nonexistent node C

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type I 24-hr 100-YR Rainfall=6.16"

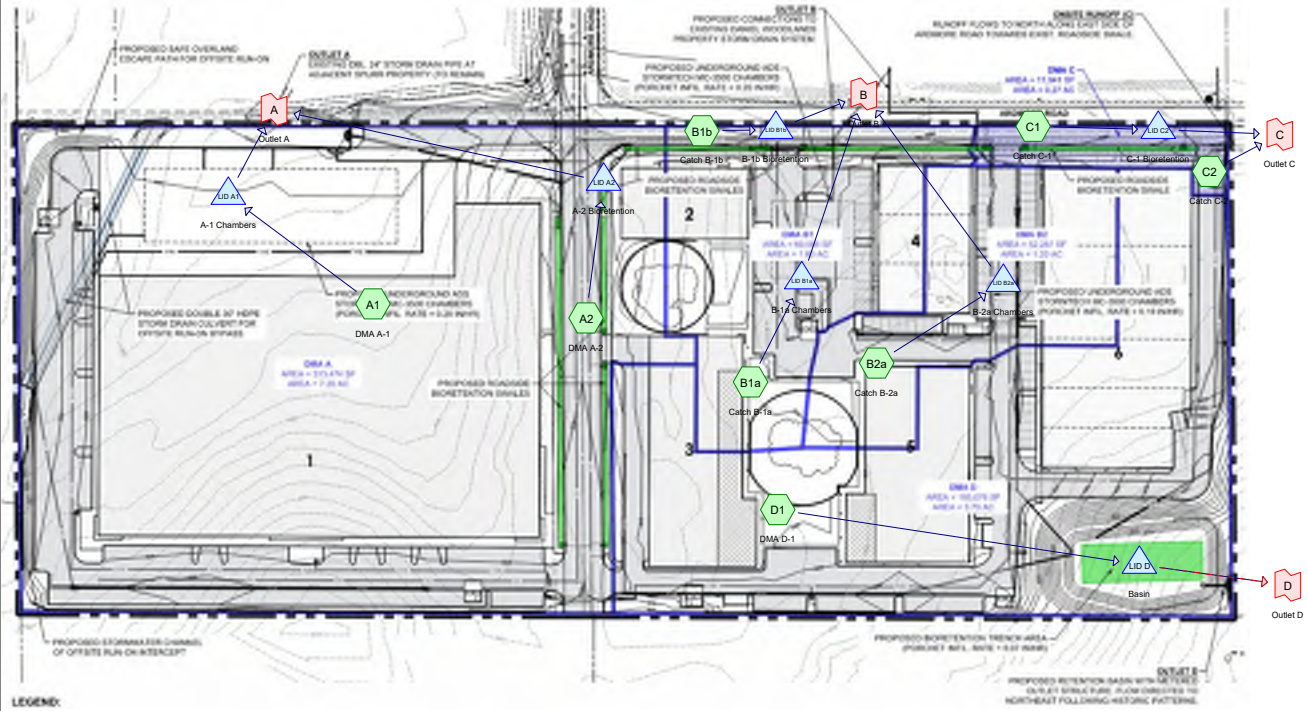
	Area (sf)	CN	Description
	34,412	74	Pasture/grassland/range, Good, HSG C
*	506	98	Ag Building, HSG C
	34,918	74	Weighted Average
	34,412	74	98.55% Pervious Area
	506	98	1.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, City of Paso Robles minimum**

Subcatchment EX4: Exist WSHD 4



PROPOSED ROUTING DIAGRAM



Subcat Reach Pond Link

Routing Diagram for 2022_Ardmore
Prepared by Wallace Group, Printed 2/14/2023
HydroCAD® 10.20-2f s/n 05444 © 2022 HydroCAD Software Solutions LLC

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25-YR	Type I 24-hr		Default	24.00	1	4.70	2
2	50-YR	Type I 24-hr		Default	24.00	1	5.42	2
3	100-YR	Type I 24-hr		Default	24.00	1	6.16	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.728	98	Impervious, HSG C (A1, A2, B1a, B1b, B2a, C1, C2)
2.540	79	Landscaped, 50-75% Grass cover, Fair, HSG C (A1, A2, B1a, B1b, B2a, C1, D1)
2.791	98	Paved parking, HSG C (D1)
14.058	**95**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
14.058	HSG C	A1, A2, B1a, B1b, B2a, C1, C2, D1
0.000	HSG D	
0.000	Other	
14.058		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatc Numbe
0.000	0.000	8.728	0.000	0.000	8.728	Impervious	
0.000	0.000	2.540	0.000	0.000	2.540	Landscaped, 50-75% Grass cover, Fair	
0.000	0.000	2.791	0.000	0.000	2.791	Paved parking	
0.000	**0.000**	**14.058**	**0.000**	**0.000**	**14.058**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	LID A1	819.00	818.50	35.0	0.0143	0.012	0.0	18.0	0.0
2	LID B1a	822.63	822.50	50.0	0.0026	0.012	0.0	18.0	0.0
3	LID B2a	822.19	821.89	30.0	0.0100	0.012	0.0	18.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Link A: Outlet A Inflow=8.79 cfs 1.613 af
Primary=8.79 cfs 1.613 af

Link B: Outlet B Inflow=1.65 cfs 0.371 af
Primary=1.65 cfs 0.371 af

Link C: Outlet C Inflow=0.15 cfs 0.019 af
Primary=0.15 cfs 0.019 af

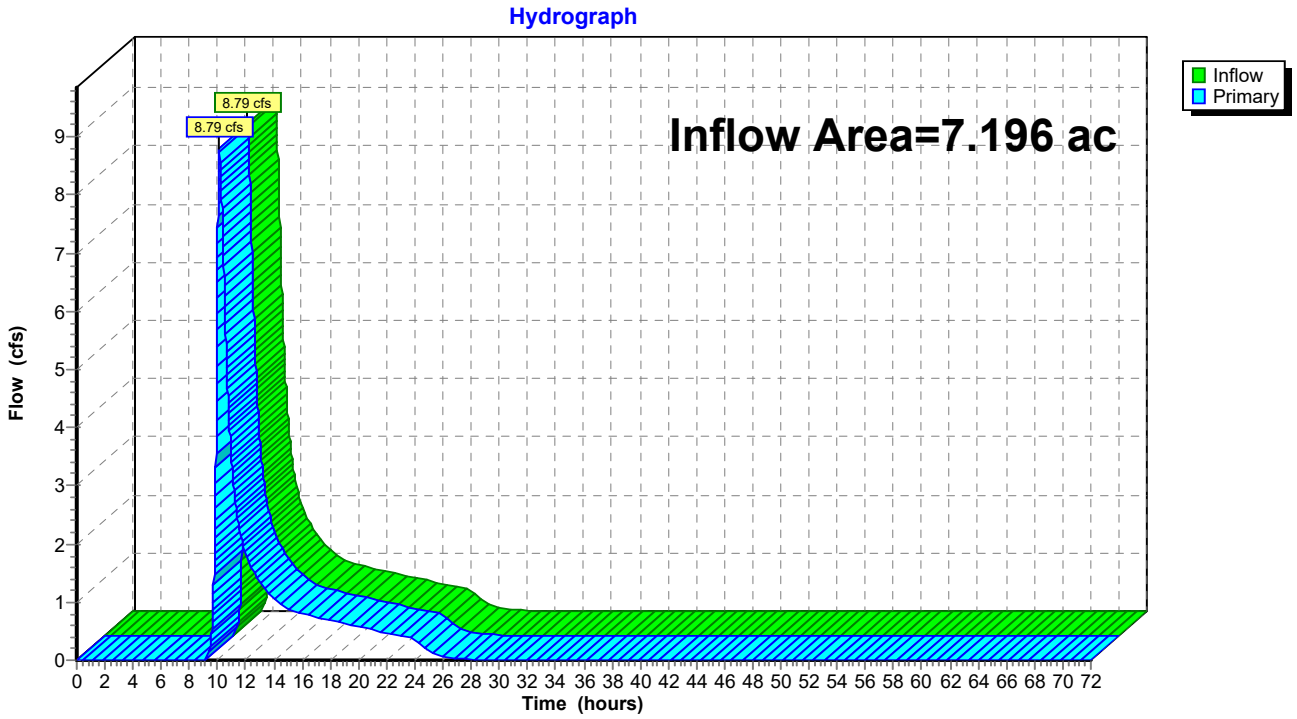
Link D: Outlet D Inflow=1.37 cfs 0.601 af
Primary=1.37 cfs 0.601 af

Summary for Link A: Outlet A

Inflow Area = 7.196 ac, 86.00% Impervious, Inflow Depth = 2.69" for 25-YR event
Inflow = 8.79 cfs @ 10.13 hrs, Volume= 1.613 af
Primary = 8.79 cfs @ 10.13 hrs, Volume= 1.613 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: Outlet A

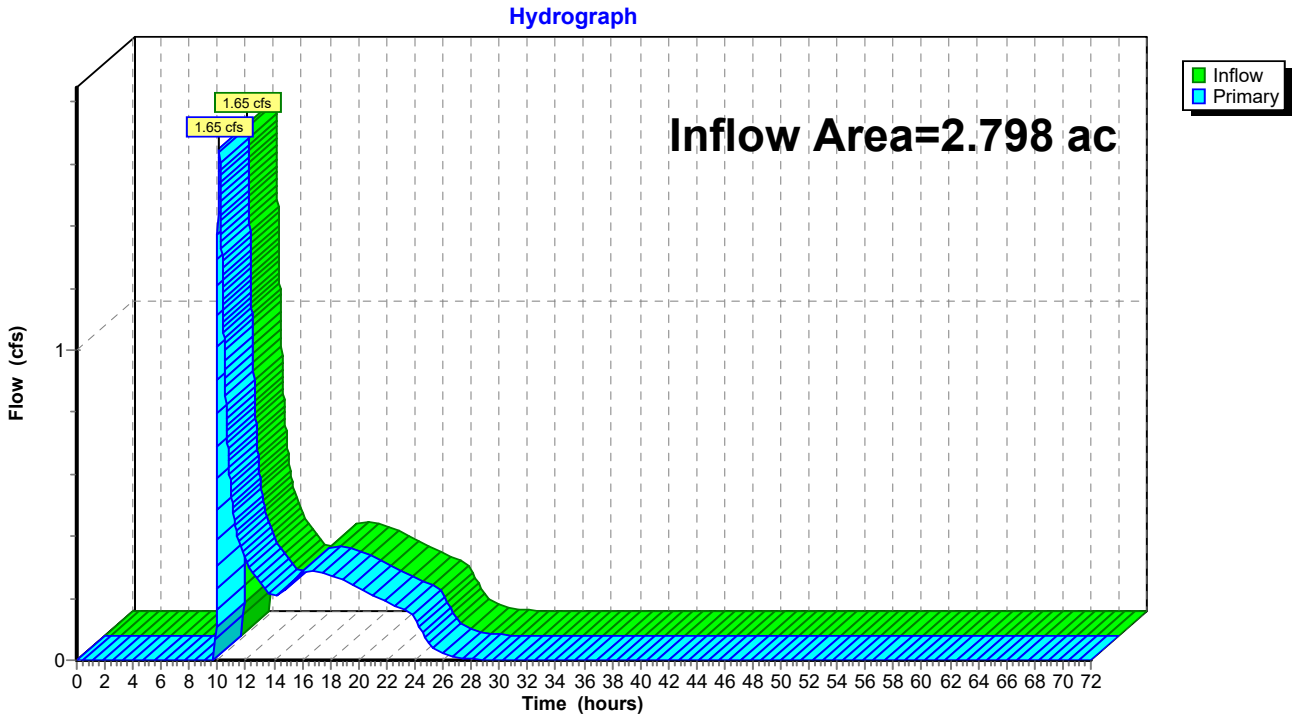


Summary for Link B: Outlet B

Inflow Area = 2.798 ac, 83.10% Impervious, Inflow Depth = 1.59" for 25-YR event
Inflow = 1.65 cfs @ 10.10 hrs, Volume= 0.371 af
Primary = 1.65 cfs @ 10.10 hrs, Volume= 0.371 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: Outlet B

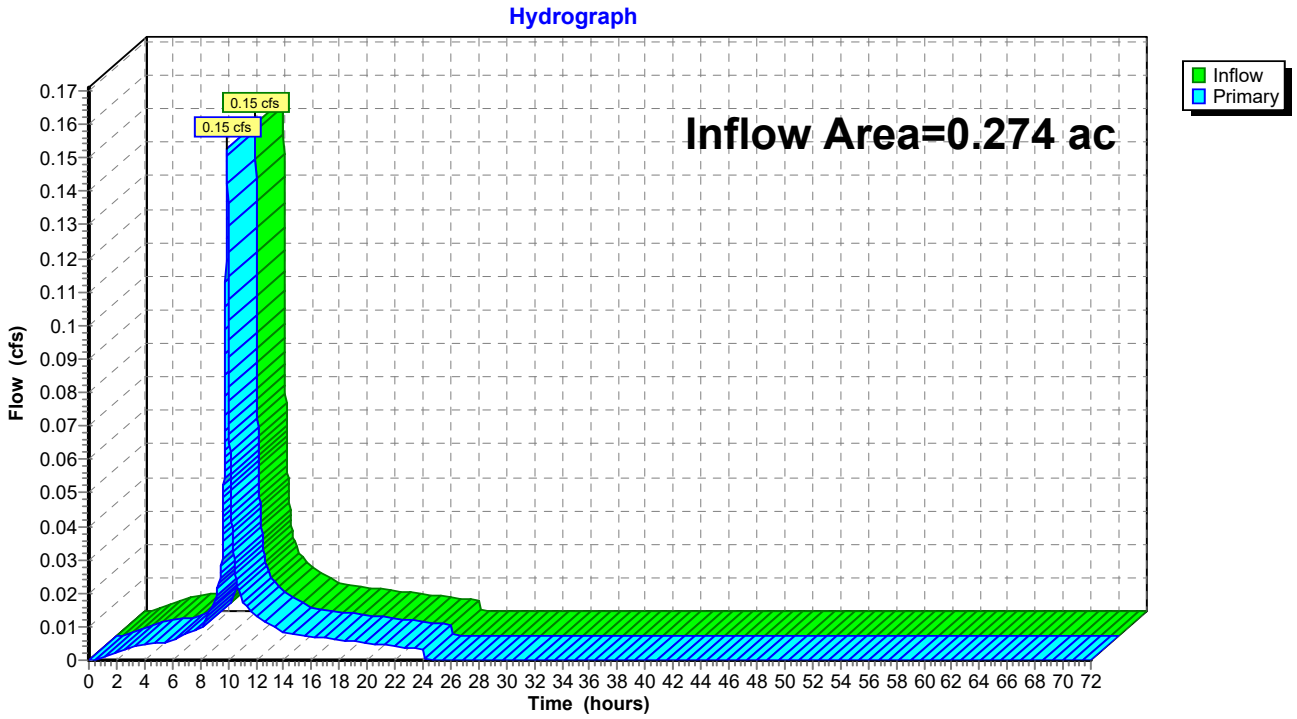


Summary for Link C: Outlet C

Inflow Area = 0.274 ac, 77.95% Impervious, Inflow Depth = 0.83" for 25-YR event
Inflow = 0.15 cfs @ 9.94 hrs, Volume= 0.019 af
Primary = 0.15 cfs @ 9.94 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link C: Outlet C

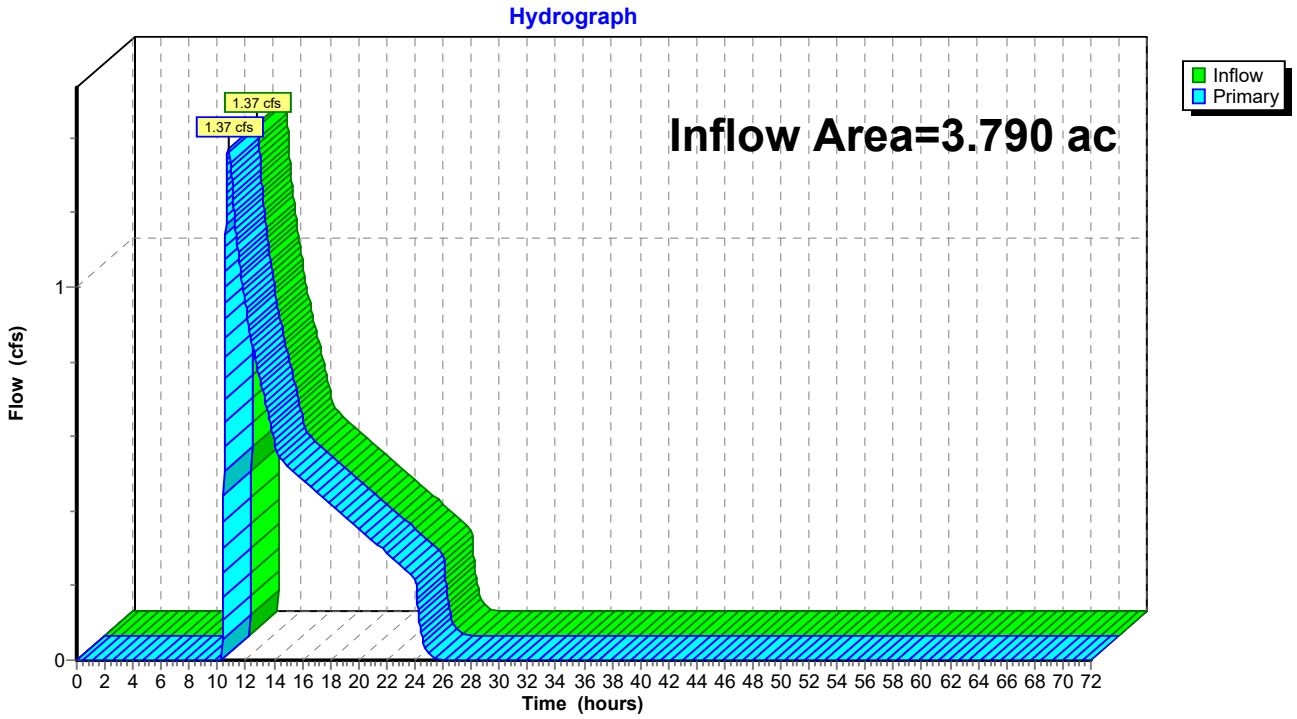


Summary for Link D: Outlet D

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 1.90" for 25-YR event
Inflow = 1.37 cfs @ 10.79 hrs, Volume= 0.601 af
Primary = 1.37 cfs @ 10.79 hrs, Volume= 0.601 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link D: Outlet D



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Link A: Outlet A Inflow=11.25 cfs 2.003 af
Primary=11.25 cfs 2.003 af

Link B: Outlet B Inflow=2.53 cfs 0.527 af
Primary=2.53 cfs 0.527 af

Link C: Outlet C Inflow=0.18 cfs 0.022 af
Primary=0.18 cfs 0.022 af

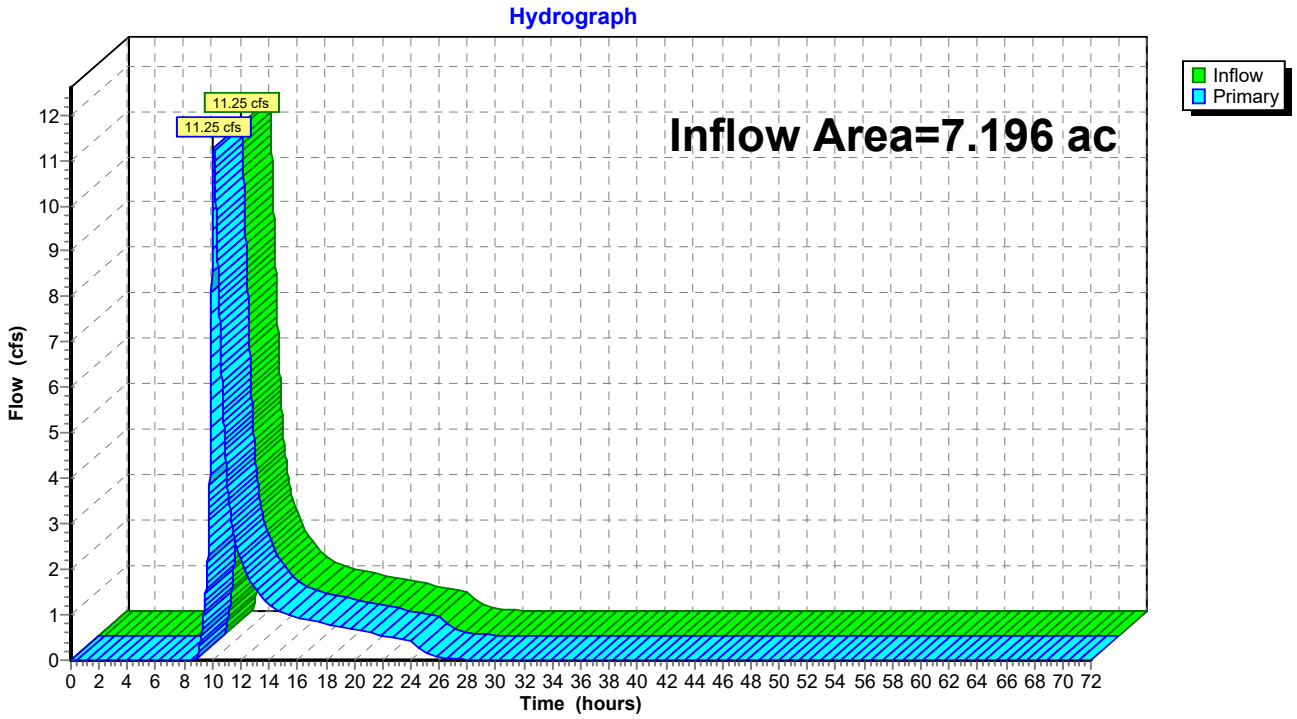
Link D: Outlet D Inflow=3.36 cfs 0.819 af
Primary=3.36 cfs 0.819 af

Summary for Link A: Outlet A

Inflow Area = 7.196 ac, 86.00% Impervious, Inflow Depth = 3.34" for 50-YR event
Inflow = 11.25 cfs @ 10.08 hrs, Volume= 2.003 af
Primary = 11.25 cfs @ 10.08 hrs, Volume= 2.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: Outlet A

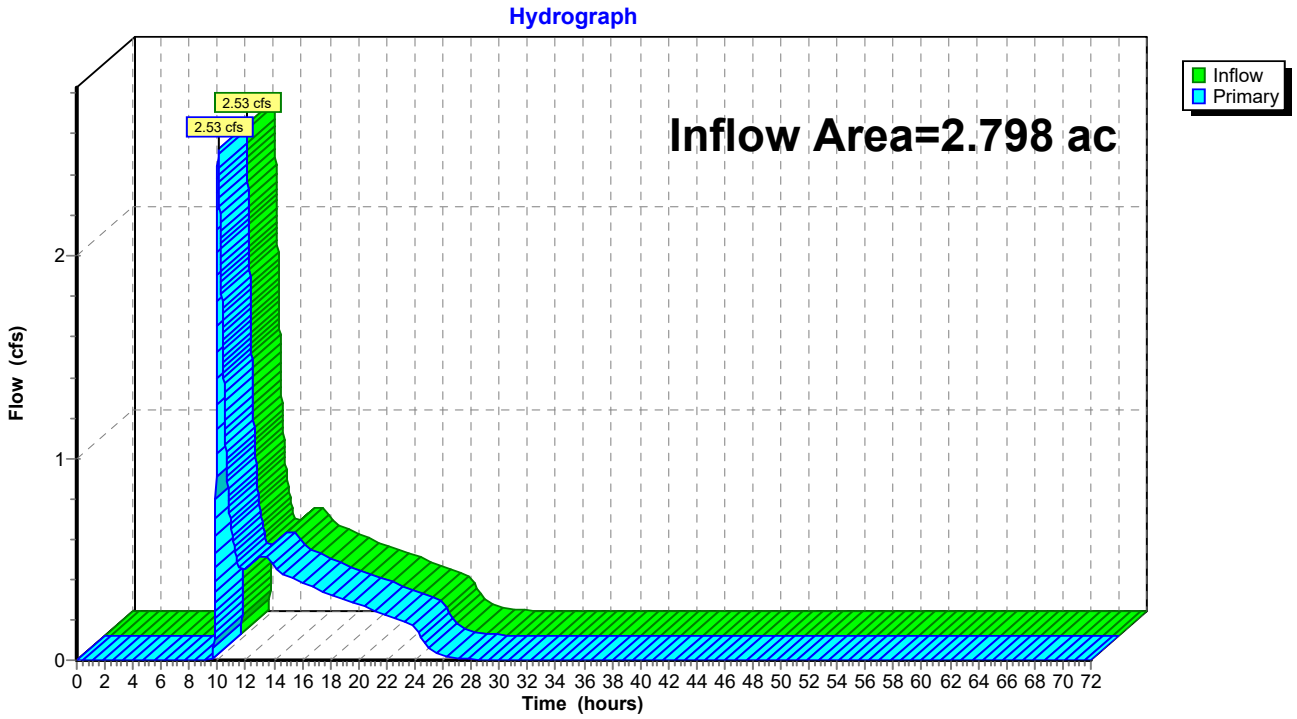


Summary for Link B: Outlet B

Inflow Area = 2.798 ac, 83.10% Impervious, Inflow Depth = 2.26" for 50-YR event
Inflow = 2.53 cfs @ 10.05 hrs, Volume= 0.527 af
Primary = 2.53 cfs @ 10.05 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: Outlet B

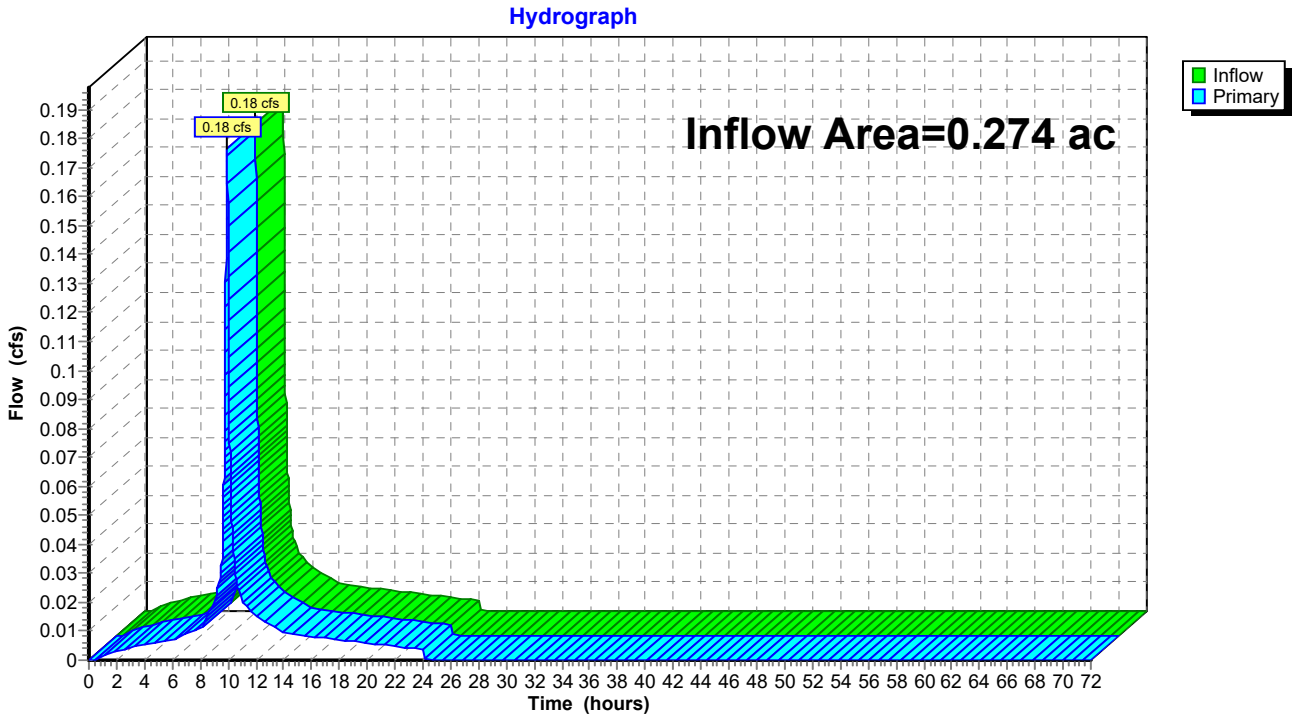


Summary for Link C: Outlet C

Inflow Area = 0.274 ac, 77.95% Impervious, Inflow Depth = 0.96" for 50-YR event
Inflow = 0.18 cfs @ 9.94 hrs, Volume= 0.022 af
Primary = 0.18 cfs @ 9.94 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link C: Outlet C

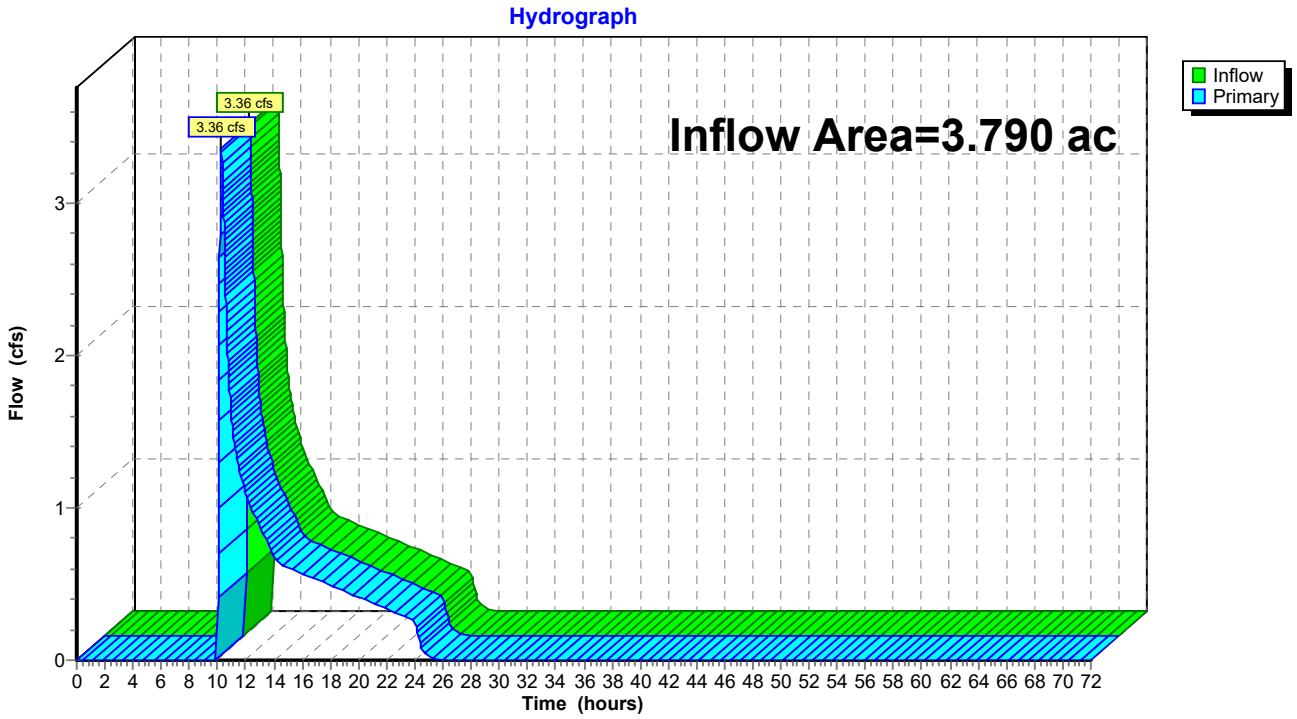


Summary for Link D: Outlet D

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 2.59" for 50-YR event
Inflow = 3.36 cfs @ 10.26 hrs, Volume= 0.819 af
Primary = 3.36 cfs @ 10.26 hrs, Volume= 0.819 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link D: Outlet D



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Link A: Outlet A Inflow=13.51 cfs 2.409 af
Primary=13.51 cfs 2.409 af

Link B: Outlet B Inflow=3.42 cfs 0.690 af
Primary=3.42 cfs 0.690 af

Link C: Outlet C Inflow=0.20 cfs 0.026 af
Primary=0.20 cfs 0.026 af

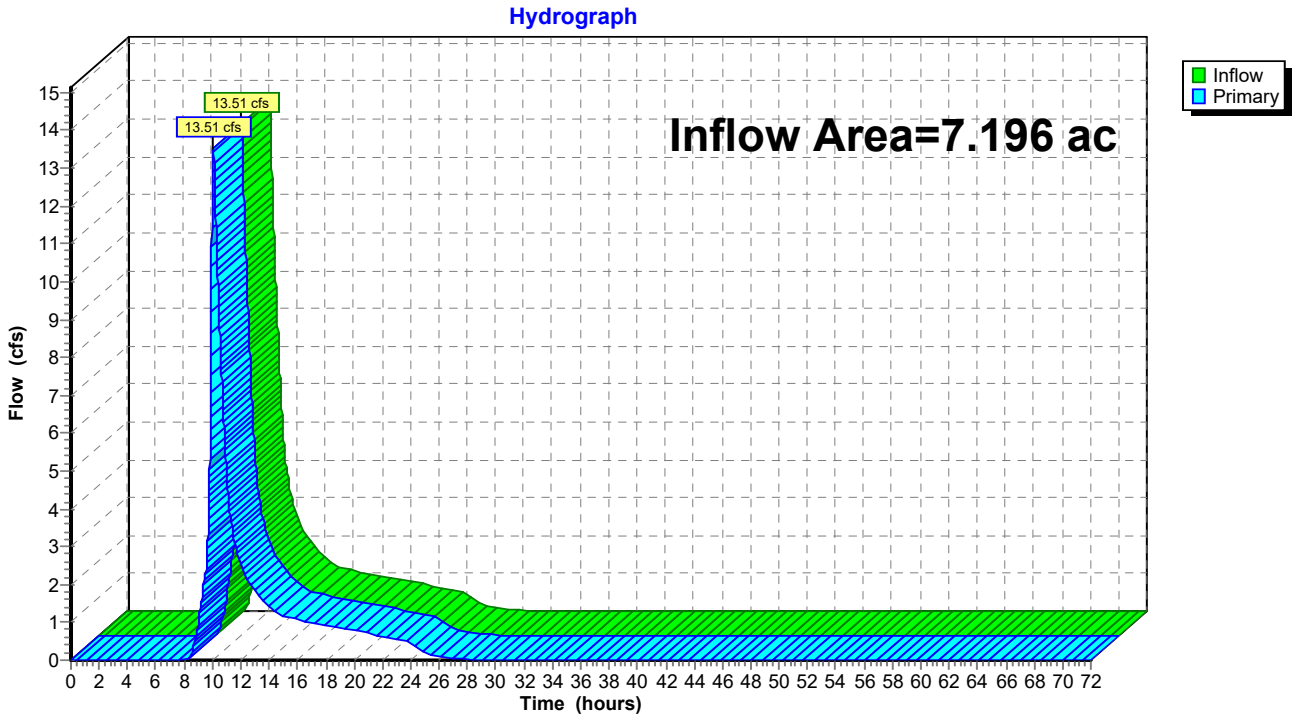
Link D: Outlet D Inflow=6.81 cfs 1.045 af
Primary=6.81 cfs 1.045 af

Summary for Link A: Outlet A

Inflow Area = 7.196 ac, 86.00% Impervious, Inflow Depth = 4.02" for 100-YR event
Inflow = 13.51 cfs @ 10.05 hrs, Volume= 2.409 af
Primary = 13.51 cfs @ 10.05 hrs, Volume= 2.409 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: Outlet A

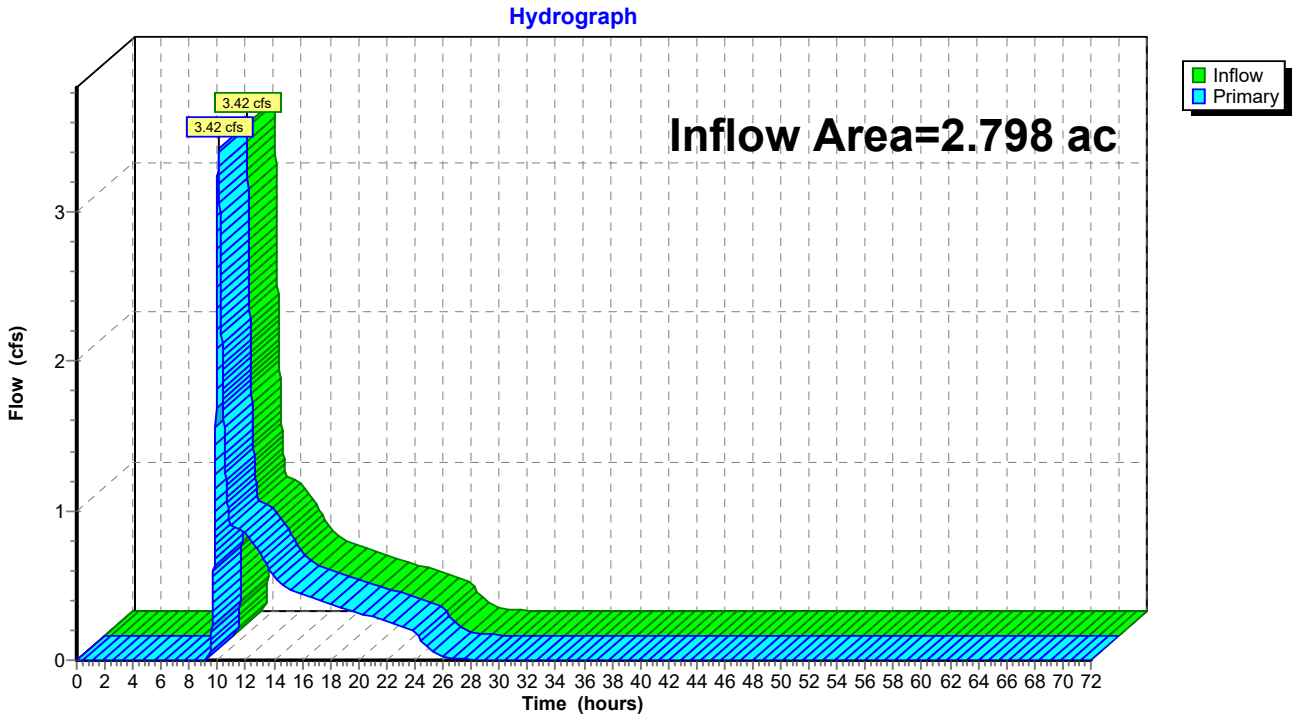


Summary for Link B: Outlet B

Inflow Area = 2.798 ac, 83.10% Impervious, Inflow Depth = 2.96" for 100-YR event
Inflow = 3.42 cfs @ 10.07 hrs, Volume= 0.690 af
Primary = 3.42 cfs @ 10.07 hrs, Volume= 0.690 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: Outlet B

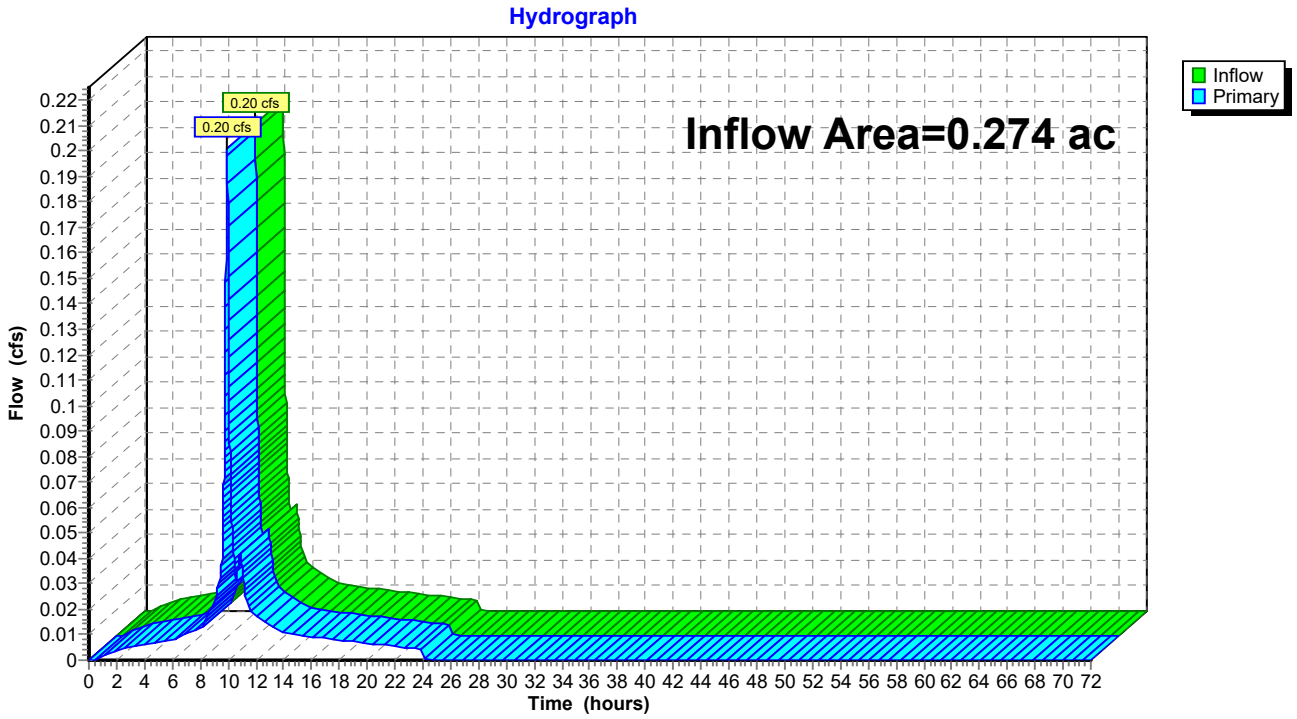


Summary for Link C: Outlet C

Inflow Area = 0.274 ac, 77.95% Impervious, Inflow Depth = 1.13" for 100-YR event
Inflow = 0.20 cfs @ 9.94 hrs, Volume= 0.026 af
Primary = 0.20 cfs @ 9.94 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link C: Outlet C

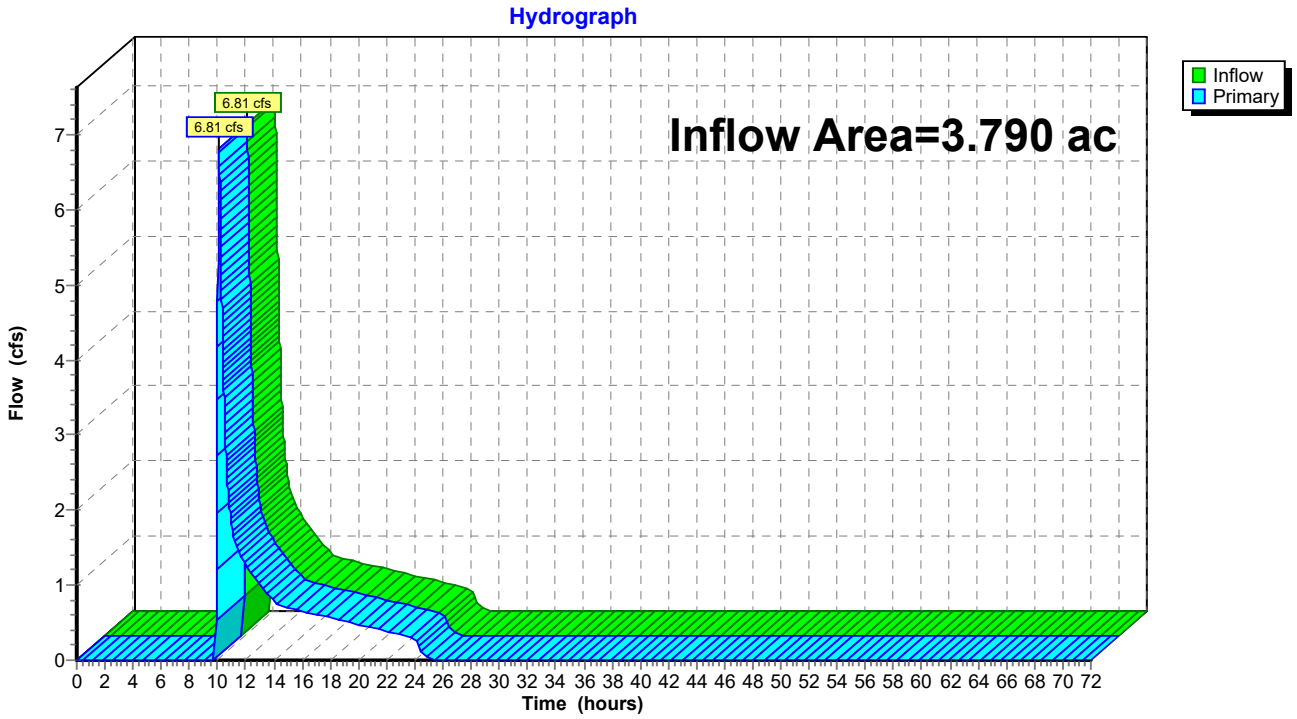


Summary for Link D: Outlet D

Inflow Area = 3.790 ac, 73.64% Impervious, Inflow Depth = 3.31" for 100-YR event
Inflow = 6.81 cfs @ 10.10 hrs, Volume= 1.045 af
Primary = 6.81 cfs @ 10.10 hrs, Volume= 1.045 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link D: Outlet D



BYPASS CULVERT

HY-8 Culvert Analysis Report

Crossing Discharge Data

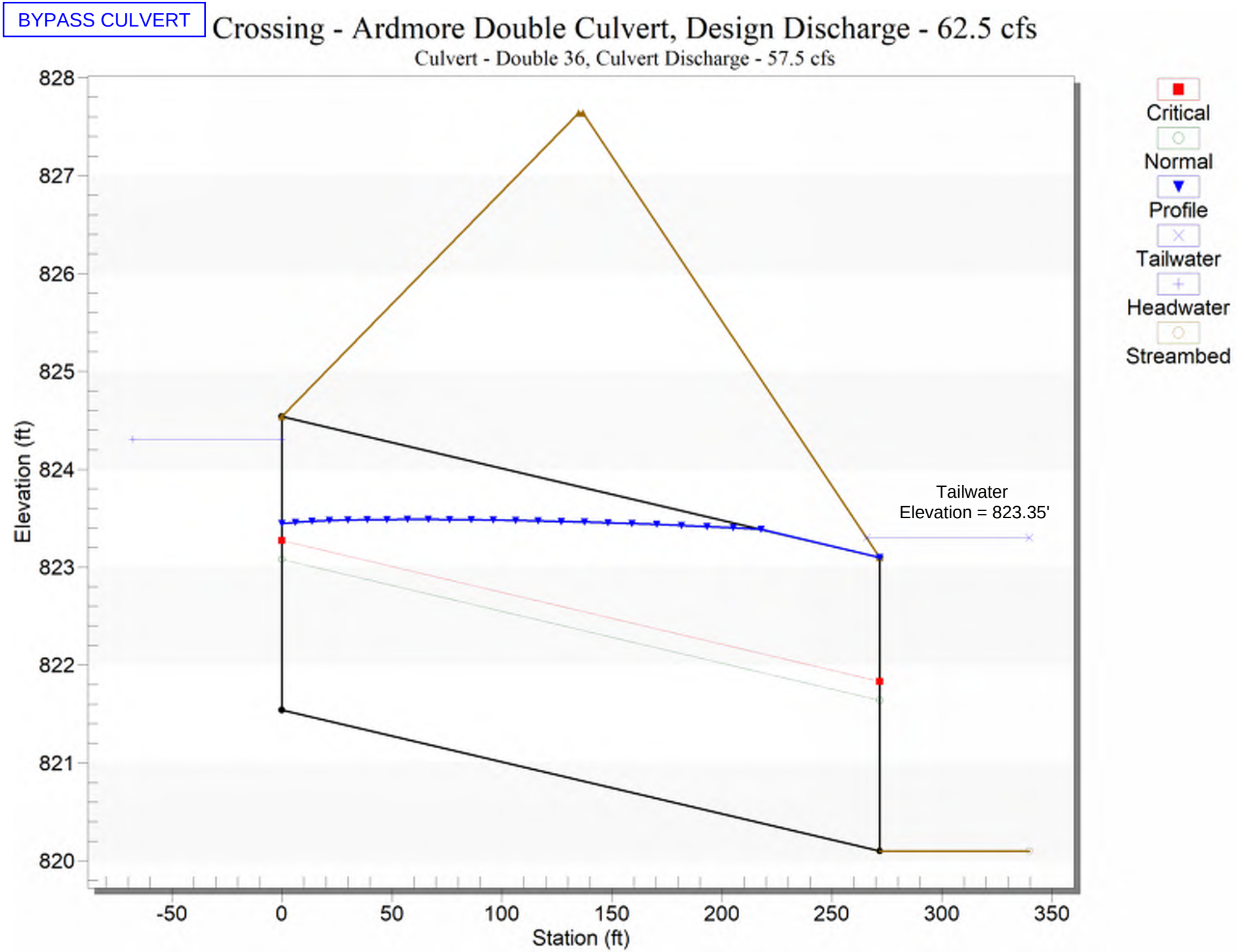
Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 1 cfs

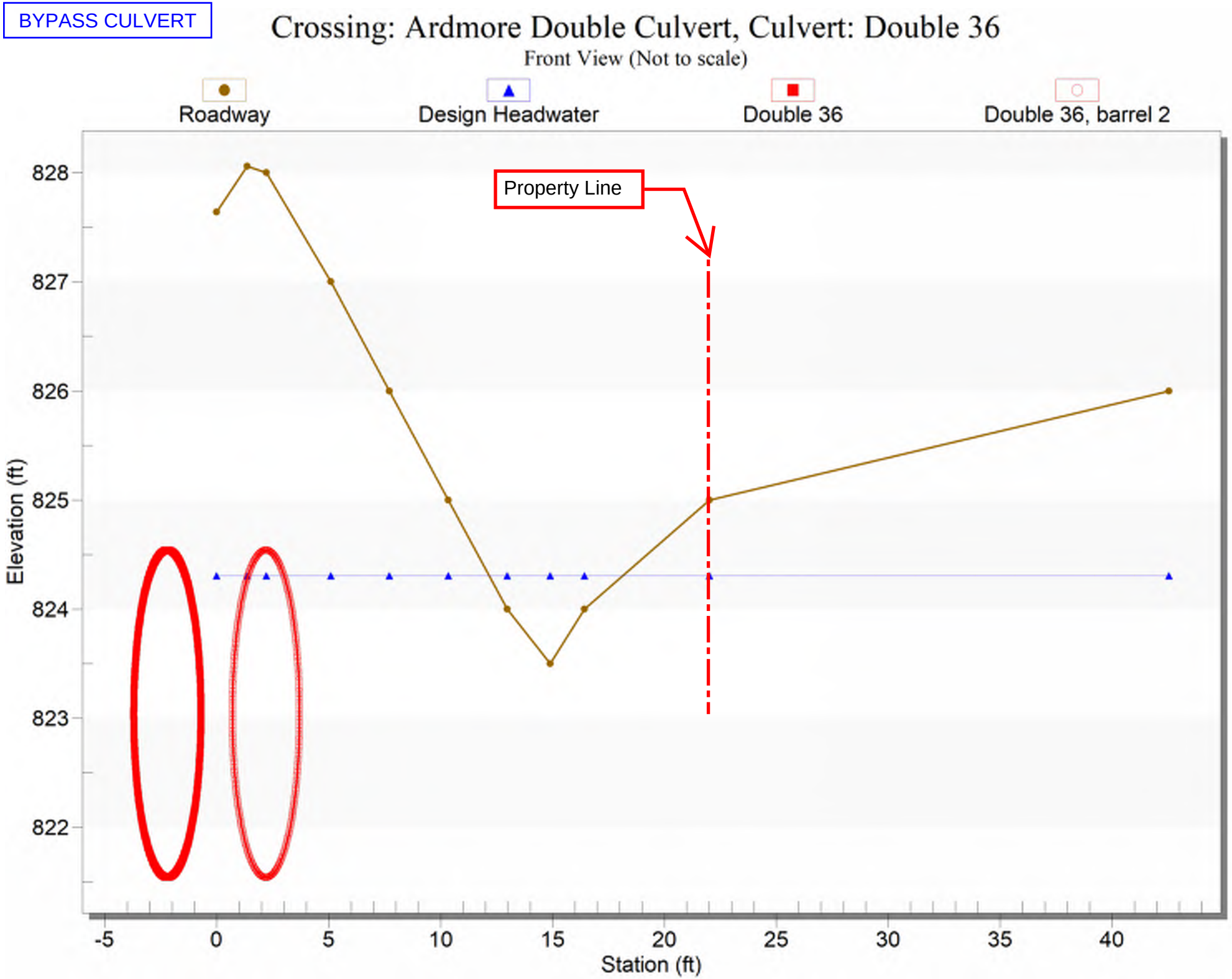
Design Flow: 62.54 cfs

Maximum Flow: 76.97 cfs

BYPASS CULVERT



BYPASS CULVERT



BYPASS CULVERT

Table 1 - Summary of Culvert Flows at Crossing: Ardmore Double Culvert

Headwater Elevation (ft)	Total Discharge (cfs)	Double 36 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
823.30	1.00	1.00	0.00	1
823.33	8.60	8.60	0.00	1
823.39	16.19	16.19	0.00	1
823.49	23.79	23.79	0.00	1
823.63	31.39	31.37	0.04	4
823.79	38.98	38.69	0.29	4
823.96	46.58	45.60	0.97	5
824.13	54.18	51.58	2.58	5
824.29	61.78	57.02	4.72	5
824.31	62.54	57.52	4.96	3
824.57	76.97	66.72	10.21	5
823.50	24.45	24.45	0.00	Overtopping

BYPASS CULVERT

Table 2 - Culvert Summary Table: Double 36

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
1.00	1.00	823.30	0.292	1.760	1-S1f	0.197	0.214	3.000	3.200	0.071	0.000
8.60	8.60	823.33	0.882	1.785	1-S1f	0.563	0.644	3.000	3.200	0.608	0.000
16.19	16.19	823.39	1.230	1.848	1-S1f	0.774	0.892	3.000	3.200	1.145	0.000
23.79	23.79	823.49	1.512	1.949	1-S1f	0.944	1.090	3.000	3.200	1.683	0.000
31.39	31.37	823.63	1.802	2.085	1-S1f	1.093	1.261	3.000	3.200	2.219	0.000
38.98	38.69	823.79	2.052	2.248	1-S1f	1.225	1.411	3.000	3.200	2.737	0.000
46.58	45.60	823.96	2.270	2.424	1-S1f	1.344	1.536	3.000	3.200	3.225	0.000
54.18	51.58	824.13	2.448	2.592	1-S1f	1.443	1.635	3.000	3.200	3.649	0.000
61.78	57.02	824.29	2.607	2.751	1-S1f	1.532	1.724	3.000	3.200	4.034	0.000
62.54	57.52	824.31	2.621	2.765	1-S1f	1.540	1.732	3.000	3.200	4.068	0.000
76.97	66.72	824.57	2.889	3.032	1-S1f	1.688	1.872	3.000	3.200	4.719	0.000

BYPASS CULVERT

****

Straight Culvert

Inlet Elevation (invert): 821.54 ft, Outlet Elevation (invert): 820.10 ft

Culvert Length: 271.67 ft, Culvert Slope: 0.0053

****

Site Data - Double 36

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 821.54 ft

Outlet Station: 271.67 ft

Outlet Elevation: 820.10 ft

Number of Barrels: 2

Culvert Data Summary - Double 36

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Smooth HDPE

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

BYPASS CULVERT

Table 3 - Downstream Channel Rating Curve (Crossing: Ardmore Double Culvert)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
1.00	823.30	3.20
8.60	823.30	3.20
16.19	823.30	3.20
23.79	823.30	3.20
31.39	823.30	3.20
38.98	823.30	3.20
46.58	823.30	3.20
54.18	823.30	3.20
61.78	823.30	3.20
62.54	823.30	3.20
76.97	823.30	3.20

BYPASS CULVERT

Tailwater Channel Data - Ardmore Double Culvert

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 823.30 ft

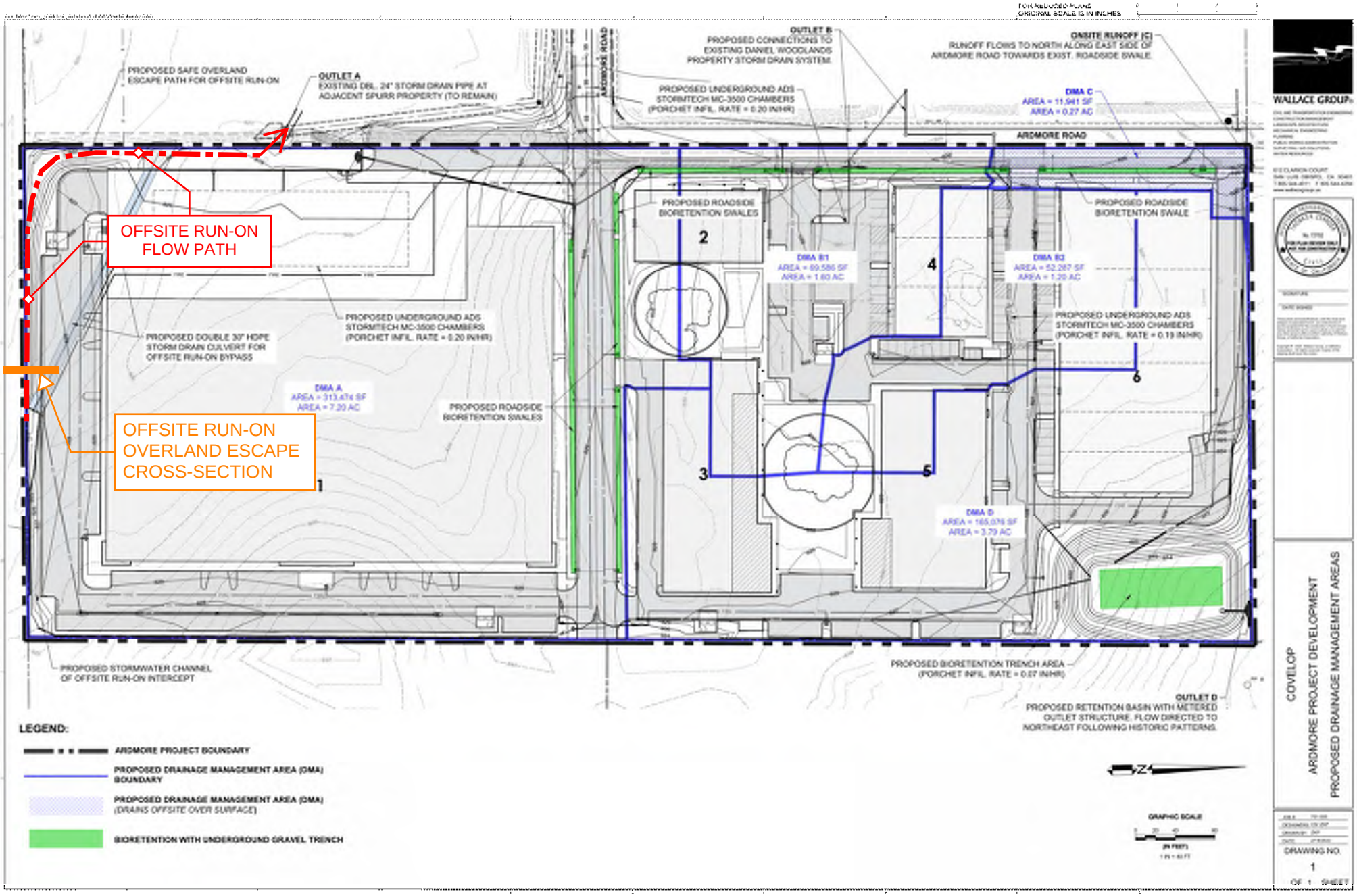
Roadway Data for Crossing: Ardmore Double Culvert

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Roadway Surface: Gravel

Roadway Top Width: 2.00 ft

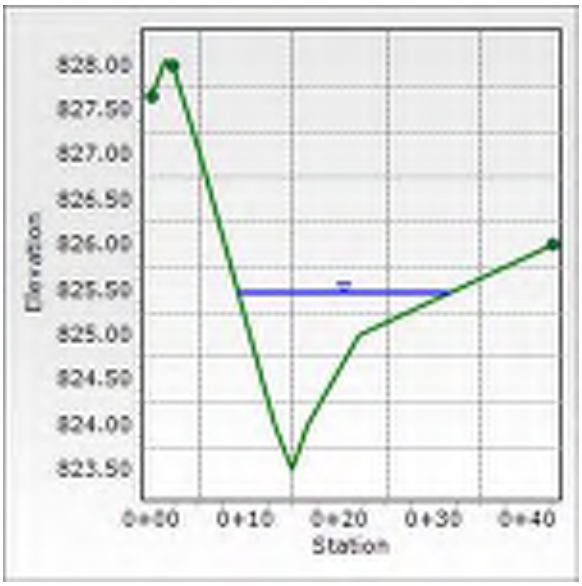
SAFE OVERLAND ESCAPE PATH ANALYSIS FOR BYPASS CULVERT


PROPOSED SAFE OVERLAND ESCAPE PATH FOR OFFSITE RUN-ON
OUTLET A
EXISTING DBL. 24" STORM DRAIN PIPE AT ADJACENT SPURR PROPERTY (TO REMAIN)
ARDMORE ROAD
OUTLET B
PROPOSED CONNECTIONS TO EXISTING DANIEL WOODLANDS PROPERTY STORM DRAIN SYSTEM.
ONSITE RUNOFF (C)
RUNOFF FLOWS TO NORTH ALONG EAST SIDE OF ARDMORE ROAD TOWARDS EXIST. ROADSIDE SWALE
PROPOSED UNDERGROUND ADS STORMTECH MC-3500 CHAMBERS (PORCHET INFIL. RATE = 0.20 IN/HR)
DMA C
AREA = 11,941 SF
AREA = 0.27 AC
ARDMORE ROAD
OFFSITE RUN-ON FLOW PATH
PROPOSED ROADSIDE BIORETENTION SWALES
2
DMA B1
AREA = 69,586 SF
AREA = 1.60 AC
4
DMA B2
AREA = 52,287 SF
AREA = 1.20 AC
PROPOSED ROADSIDE BIORETENTION SWALE
PROPOSED UNDERGROUND ADS STORMTECH MC-3500 CHAMBERS (PORCHET INFIL. RATE = 0.20 IN/HR)
PROPOSED DOUBLE 30" HDPE STORM DRAIN CULVERT FOR OFFSITE RUN-ON BYPASS
PROPOSED UNDERGROUND ADS STORMTECH MC-3500 CHAMBERS (PORCHET INFIL. RATE = 0.19 IN/HR)
6
DMA A
AREA = 313,474 SF
AREA = 7.20 AC
PROPOSED ROADSIDE BIORETENTION SWALES
OFFSITE RUN-ON OVERLAND ESCAPE CROSS-SECTION
1
3
5
DMA D
AREA = 165,076 SF
AREA = 3.79 AC
PROPOSED STORMWATER CHANNEL OF OFFSITE RUN-ON INTERCEPT
PROPOSED BIORETENTION TRENCH AREA (PORCHET INFIL. RATE = 0.07 IN/HR)
OUTLET D
PROPOSED RETENTION BASIN WITH METERED OUTLET STRUCTURE. FLOW DIRECTED TO NORTHEAST FOLLOWING HISTORIC PATTERNS.
LEGEND:
ARDMORE PROJECT BOUNDARY
PROPOSED DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
PROPOSED DRAINAGE MANAGEMENT AREA (DMA) (DRAINS OFFSITE OVER SURFACE)
BIORETENTION WITH UNDERGROUND GRAVEL TRENCH
GRAPHIC SCALE
(IN FEET)
WALLACE GROUP
COVELOP
ARDMORE PROJECT DEVELOPMENT
PROPOSED DRAINAGE MANAGEMENT AREAS
DRAWING NO.
1

100-Year Storm -- Cross Section for Offsite Run-on OVE (crest)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.00 %
Normal Depth	1.96 ft
Discharge	76.97 cfs



100-Year Storm -- Offsite Run-on OVE (crest)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.00 %
Discharge	76.97 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	827.64
0+01	828.06
0+02	828.00
0+05	827.00
0+08	826.00
0+10	825.00
0+13	824.00
0+15	823.50
0+16	824.00
0+22	825.00
0+43	826.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 827.64)	(0+02, 828.00)	0.013
(0+02, 828.00)	(0+43, 826.00)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	1.96 ft
Roughness Coefficient	0.025
Elevation	825.46 ft
Elevation Range	823.50 to 828.06 ft
Flow Area	16.3 ft²
Wetted Perimeter	22.86 ft
Hydraulic Radius	0.71 ft
Top Width	22.34 ft
Normal Depth	1.96 ft

100-Year Storm -- Offsite Run-on OVE (crest)

Results	
Critical Depth	1.95 ft
Critical Slope	1.05 %
Velocity	4.73 ft/s
Velocity Head	0.35 ft
Specific Energy	2.31 ft
Froude Number	0.979
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

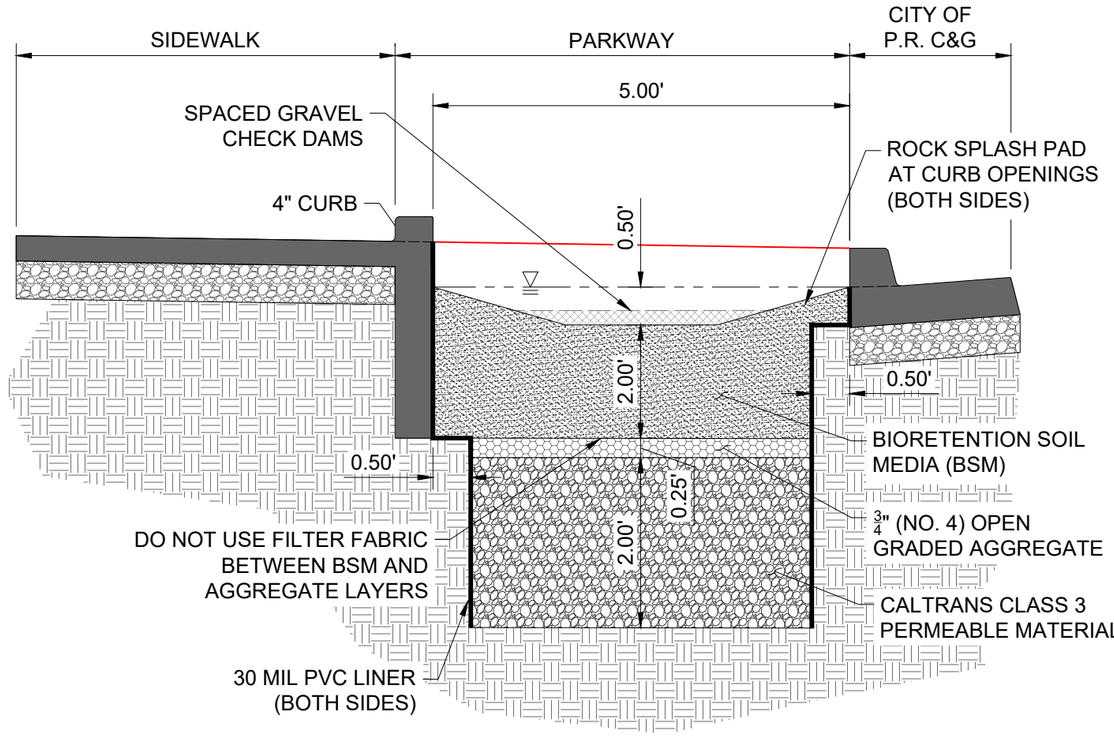
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.96 ft
Critical Depth	1.95 ft
Channel Slope	1.00 %
Critical Slope	1.05 %

APPENDIX D

Appendix D – Preliminary Storm Drain Facility Concepts

- ADS StormTech MC-3500 Chamber overview
- Roadside Bioretention concept

ROADSIDE BIOSWALE WITH UNDERGROUND GRAVEL TRENCH



LEGEND:

DESIGN FINISHED GRADE

MAX. PONDING ELEVATION

ARDMORE - L.I.D. CONCEPT

TYPICAL ROADSIDE BIOSWALES WITH GRAVEL TRENCH

0751-0005

NOT TO SCALE

DATE: 11/08/2022

FOR PLAN REVIEW ONLY.
NOT FOR CONSTRUCTION

WALLACE GROUP®

StormTech MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

MC-3500 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	90” x 77” x 45” (2286 x 1956 x 1143 mm)
Chamber Storage	109.9 ft³ (3.11 m³)
Min. Installed Storage*	175.0 ft³ (4.96 m³)
Weight	134 lbs (60.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 6” (150 mm) of stone between chambers/end caps and 40% stone porosity.

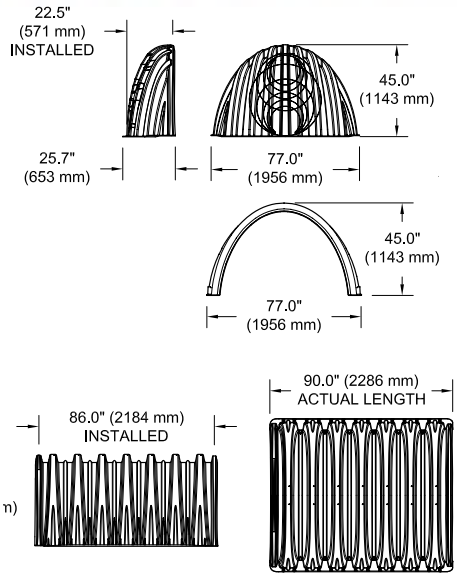


MC-3500 Chamber (not to scale)

Nominal Specifications

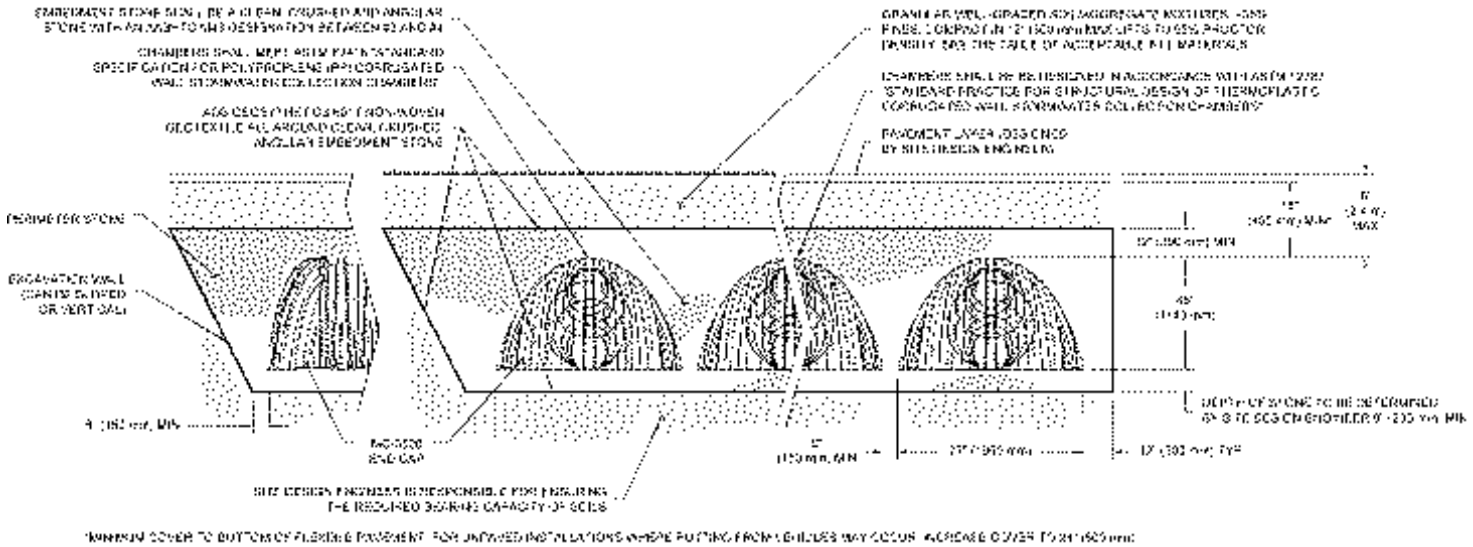
Size (LxWxH)	26.5” x 71” x 45.1” (673 x 1803 x 1145 mm)
End Cap Storage	14.9 ft³ (0.42 m³)
Min. Installed Storage*	45.1 ft³ (1.28 m³)
Weight	49 lbs (22.2 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 6” (150 mm) of stone between chambers/end caps and 40% stone porosity.



Shipping

15 chambers/pallet
7 end caps/pallet
7 pallets/truck



Central Coast Transportation Consulting
Traffic Engineering & Transportation Planning

MEMORANDUM

Date: December 7, 2022

To: David Athey and Darren Nash, City of Paso Robles

From: Michelle Matson and Joe Fernandez, CCTC

Subject: Ardmore Industrial, Paso Robles –Transportation Analysis

This memorandum summarizes the transportation impact analysis for the proposed Ardmore Industrial development at 2930 Union Road in the City of Paso Robles. The proposed project would construct 250,082 square feet of potential warehouse, office, winemaking, storage, and retail uses. The project site plan is included as **Figure 1**.

TRANSPORTATION ANALYSIS SUMMARY

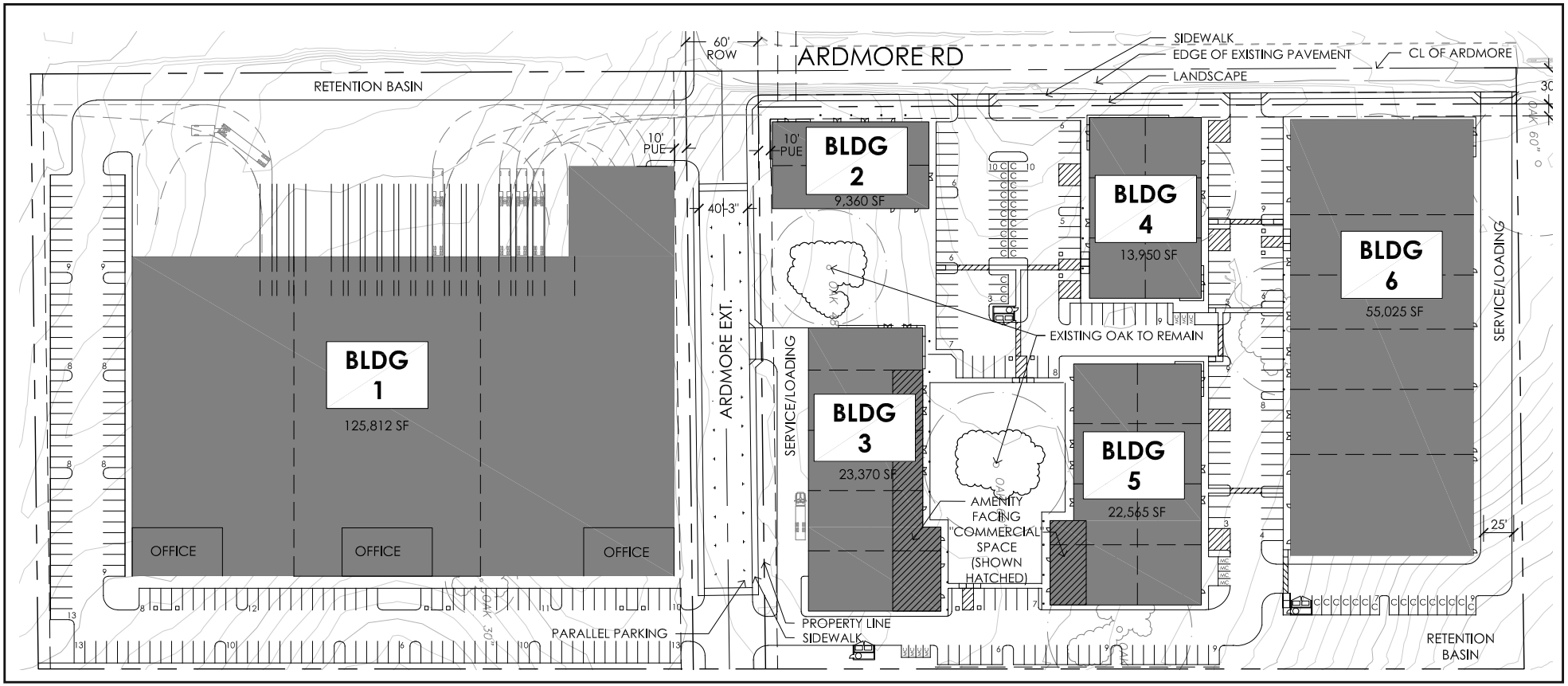
The proposed project would generate approximately 1,194 net new vehicle trips per weekday, including 117 AM peak hour trips and 158 PM peak hour trips. The project would not significantly impact intersection operations and would have a less than significant impact on vehicle miles traveled (VMT).

The Golden Hill Road/Union Road roundabout project could consider restriping the left turn lane just south of Ardmore Road to a two-way left turn lane. We also recommend the following:

- Install all-way stop control at the Ardmore Road/Ardmore Road Extension t-intersection.
- Consider consolidating the two central driveways on the existing Ardmore Road and placing the new driveway opposite the existing driveway location on the west side. Alternatively, remove the second northernmost driveway which has potential left turn conflicts with the existing driveway location on the west side.
- The Building 1 western driveway does not meet City standards. Relocate the proposed truck access for Building 1 so it is at least 200 feet away from the Ardmore Road/Ardmore Extension intersection. Alternatively, this driveway could be one-way inbound forcing trucks to circulate through the parking lot and exit at the easternmost driveway.
- Add ADA parking spaces on the Ardmore Road extension and consider replacing parking tees with edge line striping.
- Install edge line striping on Ardmore Road along the project frontage.
- Install no parking within the Ardmore Road intersection and 25 feet from each curb return and install no parking 6 feet from the curb return on either side of driveways.

Regional improvements are included in the City's Development Impact Fees.

Figure 1: Site Plan



N
Not to Scale

Source : Arris Studio Architects

Central Coast Transportation Consulting
Traffic Engineering & Transportation Planning

CEQA ANALYSIS

Vehicle miles traveled (VMT) were analyzed consistent with recently mandated changes to the California Environmental Quality Act (CEQA) and state Office of Planning and Research (OPR) guidance. The City's 2022 Transportation Impact Analysis (TIA) Guidelines Supplement provide VMT and safety thresholds consistent with OPR guidance. Office and industrial projects may have a significant impact if the work VMT per employee exceeds 85 percent of the regional average. Work VMT captures home-based-work attractions (trips from homes to workplaces). In addition, projects may have a significant impact if they exacerbate an existing high-priority or similar safety location, introduces a design feature that substantially increases hazards, or propose features that do not meet City design standards. Caltrans relies on VMT and safety to evaluate transportation impacts and published a VMT Focused TIS Guide in May 2020, which replaced the prior guide reliant on LOS. The TIS Guide notes that lead agencies have the discretion to choose VMT thresholds and methods, and generally conforms to OPR guidance.

The SLOCOG Travel Demand Model was applied to estimate VMT. Project employees were estimated using typical square footage per employee from industry standard sources, then were added to the model. **Table 1** summarizes the VMT results.

Table 1: Regional VMT Analysis

Regional VMT Analysis		
Scenario	**Regional Employees**	**Regional Work VMT**
2020 No Project	117,332	1,595,867
2020 With Project	117,537	1,593,552
Change from No Project	*205*	*-2,315*

1. Work VMT is attracted to workplaces (sum of home-based-work attractions).
Source: SLOCOG TDM, CCTC, 2022

The addition of the project would reduce regional work VMT due to the provision of jobs in a housing-rich area. Therefore, the project would have a less-than-significant impact to VMT.

PROJECT TRIP GENERATION

The Institute of Transportation Engineers' (ITE) *Trip Generation Manual* 11th Edition was used to estimate project trip generation. **Table 2** summarizes the project trip generation.

Table 2: Project Trip Generation

Ardmore Industrial Trip Generation									
			Daily	AM Peak Hour			PM Peak Hour		
Land Use	**Size**	**Unit**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Warehouse[1]	166.083	KSF	301	34	10	44	13	33	46
Manufacturing[2]	76.607	KSF	491	42	14	56	15	34	49
Retail[3]	7.392	KSF	402	10	7	17	31	32	63
Total Project Trips			**1,194**	**86**	**31**	**117**	**59**	**99**	**158**

KSF = Thousand Square Feet; ITE = Institute of Transportation Engineers.

1. ITE Land Use Code #150, Warehouse. Fitted curve equations used.
2. ITE Land Use Code #140, Manufacturing. Fitted curve equations used.
3. ITE Land Use Code #822, Strip Retail Plaza. Average rates used for Daily and AM. Fitted curve equation used for PM.

The proposed project would generate 1,194 net new vehicle trips per weekday, including 117 AM peak hour trips and 158 PM peak hour trips.

TRANSPORTATION ANALYSIS

The following section summarizes the existing conditions, existing Ardmore Road trip generation, intersection operations, and site access and circulation.

Existing Conditions

Ardmore Road is a two-lane minor road with a 30 miles per hour (MPH) posted speed limit and intermittent sidewalks on either side of the roadway. Streetside parking is allowed intermittently along either side of the roadway.

Traffic collision data was obtained from the Statewide Integrated Traffic Records System (SWITRS). Between 2017 and 2021, no collisions occurred on Ardmore Road. One property damage only collision occurred just south of the Golden Hill Road/Ardmore Road intersection when a northbound driver sideswiped another vehicle and ran off the road due to unsafe speed. No other collisions occurred at the Golden Hill Road/Ardmore Road intersection. There are no collision patterns and no recommendations.

Currently, the Golden Hill Road/Union Road intersection is closed for the construction of a single lane roundabout through 2023. Traffic counts at the Golden Hill Road/Union Road intersection were collected in June and July of 2021 and are attached. No traffic counts are available on Ardmore Drive and new data was not collected due to the current detour on Ardmore Road.

Existing Ardmore Road Trip Generation

There is approximately 100,000 square feet of industrial uses and seven single family homes currently on Ardmore Road. The Institute of Transportation Engineers' (ITE) *Trip Generation Manual* 11th Edition was also

used to estimate the existing trip generation on Ardmore Road. **Table 3** summarizes the trip generation estimate for the existing uses on Ardmore Road.

Table 3: Existing Ardmore Road Trip Generation

Existing Ardmore Road Trip Generation									
			Daily	AM Peak Hour			PM Peak Hour		
Land Use	**Size**	**Unit**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
General Light Industrial	100.000	KSF	426	63	9	72	5	35	40
Single Family Home	7.000	DU	87	2	5	7	5	3	8
Total Gross Vehicle Trips			**513**	**65**	**14**	**79**	**10**	**38**	**48**

KSF = Thousand Square Feet; ITE = Institute of Transportation Engineers, DU = Dwelling Unit

1. ITE Land Use Code #110, General Light Industrial. Fitted curve equations used.

2. ITE Land Use Code #210, Single Family Detached Housing. Fitted curve equations used.

The existing uses would generate 513 net new vehicle trips per weekday, including 79 AM peak hour trips and 48 PM peak hour trips. Following completion of the Golden Hill Road/Union Road roundabout, Ardmore Road will not be the fastest route and cut through traffic is not anticipated.

Intersection Operations

The 2021 traffic counts at Golden Hill/Union Road were used to develop through volumes on Golden Hill Road north of Ardmore Road and the existing Ardmore Road trip generation was used to estimate the turning movement volumes at Ardmore Road without the detour. Project trips were then added to develop Existing Plus Project Conditions. The Existing Plus Project volumes are shown on **Figure 2** and the intersection operations are shown on **Table 4.** Detailed calculation sheets are attached.

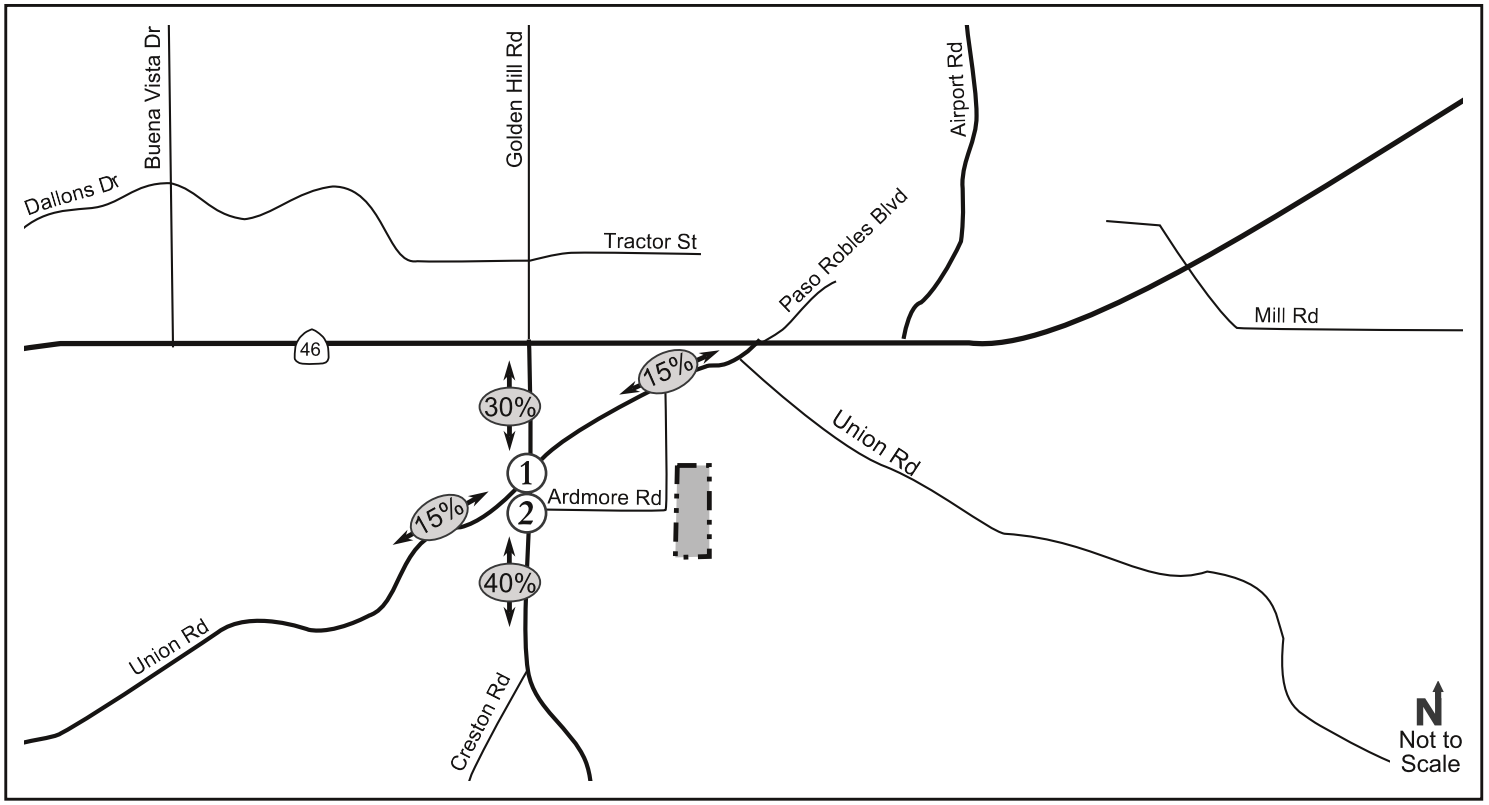
Table 4: Existing Plus Project Intersection Operations

Existing Plus Project Intersection Operations			
Intersection	**Weekday Peak Hour**	**Delay[1]**	**LOS**
1. Golden Hill Rd/Union Rd	AM	10.0	A
	PM	10.9	B
2. Golden Hill Rd/Ardmore Rd	AM	1.6 (18.6)	- (C)
	PM	2.7 (23.4)	- (C)

1. HCM 6th average control delay in seconds per vehicle. For two-way stop controlled (TWSC) intersections the worst approach's delay is reported in parentheses next to the overall delay.

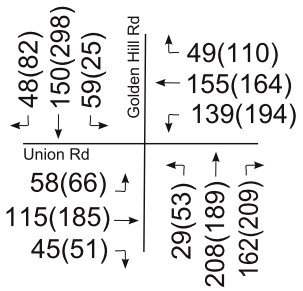
Both the Golden Hill Road/Union Road (#1) and Golden Hill/Ardmore Road (#2) intersections would operate at LOS C or better with the addition of project traffic and the completion of the Golden Hill Road/Union Road (#1) roundabout. No queues exceed the available storage.

Figure 2: Lane Configurations, Existing and Existing Plus Project Volumes

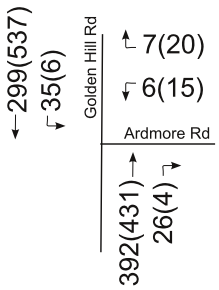


Existing Volumes

1.

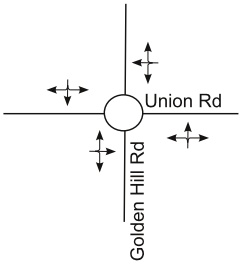


2.

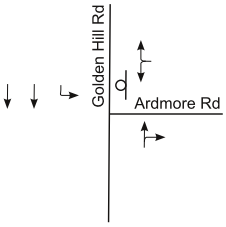


Existing Plus Project Lane Configuration

1.

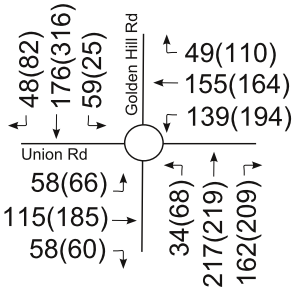


2.

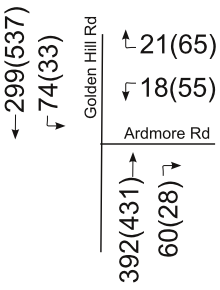


Existing Plus Project Volumes

1.



2.



Legend:

- Stop Sign
- Project Site
- (x) Study Intersection
- xx(yy) - AM(PM) Peak Hour Traffic Volumes
- x% - Project Trip Distribution

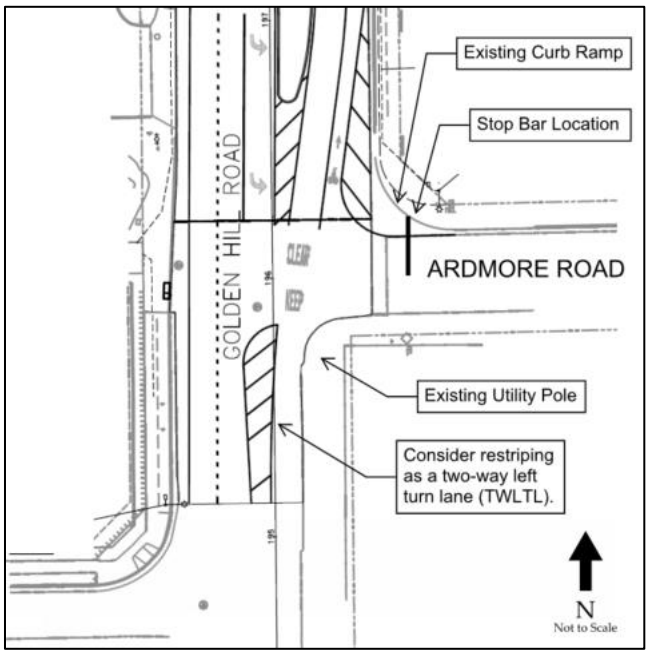
Central Coast Transportation Consulting
Traffic Engineering & Transportation Planning

December 2022

Ardmore Industrial

Exhibit 1 below shows the proposed intersection striping at Golden Hill Road/Ardmore Road (#2) following completion of the roundabout.

Exhibit 1: Golden Hill Road/Ardmore Road Intersection Striping



The Ardmore Road stop bar is located east of the existing curb ramp to allow for pedestrian travel. Therefore, drivers on Ardmore Road need to stop at the stop bar and then creep toward Golden Hill Road prior to making a turning movement. The intersection analysis did not include two-stage gap acceptance; however, the Golden Hill Road/Union Road roundabout project could consider restriping the left turn lane just south of Ardmore Road to a two-way left turn lane to allow for two-stage gap acceptance, which would improve operations.

Site Access and On-Site Circulation

The current site is vacant. The project proposes four driveways on Ardmore Road. The project proposes a main driveway extending Ardmore Road to the east, creating a t-intersection. The project also proposes three additional driveways along Ardmore Road north of the extension, a minimum of 200 feet apart. However, there is an existing intersection on the west side of the road approximately 300 feet north of Ardmore Road.

We recommend the project install all-way stop control at the Ardmore Road/Ardmore Road Extension t-intersection to control left turn conflicts. We also recommend consolidating the two central driveways on the existing Ardmore Road and placing the new driveway opposite the existing driveway location on the west side. Alternatively, remove the second northernmost driveway which has potential left turn conflicts with the existing driveway location on the west side.

The primary truck access point for Building 1 is proposed on the Ardmore Road extension just east of the existing Ardmore Road. The driveway does not meet City Standard Drawing C-10 and the truck turning movements as shown on the site plan are not recommended in this location. 200-foot minimum driveway spacing is recommended. We recommend the project relocate the proposed truck access or convert to one-way inbound.

Americans with Disabilities Act (ADA) parking spaces are recommended on the Ardmore Road extension. Edge line striping could also be considered as an alternative to the parking tees.

Street features including landscaping, utility poles, street furniture, signs, and parked vehicles can inhibit sight distance in urban areas. Per California Manual on Uniform Traffic Control Devices (CAMUTCD) guidance, "At all intersections, one stall length on each side measured from the crosswalk or end of curb return should have parking prohibited. A clearance of 6 feet measured from the curb return should be provided at alleys and driveways." We recommend parking restriction consistent with the CAMUTCD.

ATTACHMENTS

Traffic Count

Synchro Worksheets

REFERENCES

California Department of Transportation. May 2020. Vehicle Miles Traveled-Focused Transportation Impact Study Guide.

_____. 2012, 2018. Highway Design Manual.

_____. 2014, Revision 6. California Manual on Uniform Traffic Control Devices.

City of El Paso De Robles. 2017. Bicycle & Pedestrian Master Plan.

_____. 2018. General Plan Circulation Element.

_____. 2013. Transportation Impact Analysis Guidelines.

_____. 2022. Transportation Impact Analysis Guidelines Supplement.

Institute of Transportation Engineers (ITE). 2021. Trip Generation Manual, 11th Edition.

_____. 2017. Trip Generation Handbook, 3rd Edition. '

The Natelson Company, Inc. 2001. Employment Density Study Summary Report.

Transportation Research Board. 2017. Highway Capacity Manual, 6th Edition.

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March 8, 2023
45dB Project # 23002

Acoustical Analysis:	**Requested by:**	**Client/Owner:**
Commercial/Light Industry Development 2930 Union Rd. Paso Robles, CA 93446	Kirk Consulting Attn: Ian McCarville 8830 Morro Rd. Atascadero, CA 93422	Covelop 1135 Santa Rosa St., Ste #210 San Luis Obispo, CA 93401

Summary

45dB Acoustics (“**45dB”)** has reviewed the applicable noise-related regulations for the commercial and light industrial 6-building planned development at the above address in the City of Paso Robles. Residences exist to the immediate north and east of the project, and a residential development is planned for the vacant site located directly south of the project. Properties to the west are industrial/commercial land uses. All neighboring properties exist within the City of Paso Robles.

Existing daytime hourly noise levels due to road traffic noise, primarily from Highway 46, range up to 43 dBA at the north property line adjacent to an existing residence, as predicted from published traffic counts and the FHWA’s Traffic Noise Model implemented into SoundPLAN®, a 3D noise propagation software package.

The proposed project was modeled to analyze the potential noise impact on the neighboring land uses. Noise levels associated with the project are anticipated to comprise of the following: traffic noise associated with the increased traffic on Ardmore Road; traffic and parking activities of 994 passenger vehicles daily in the surrounding parking lots; truck traffic and loading of up to 80 semi-trucks daily at the loading docks on the west side of Building 1; truck traffic and loading of up to 60 medium delivery trucks daily at the loading dock and in the service/loading lane along the north side of Building 6; truck traffic and loading of up to 60 medium delivery trucks daily in the service/loading lane along the south side of Building 3; a total of 37 rooftop HVAC units on the six Project buildings, each modeled with a sound power level of 87 dBA rel 10^{-12} W (i.e., sound pressure level of 76 dBA rel 20µPa at 1-m). All site activities were assumed to occur during daytime hours between 7am and 7pm. No vehicle idling was included in the service/loading lanes near Buildings 3 and 6 or near the loading docks at Building 1. Refrigerated trucks are not expected at the Project site and were not included as a noise source in the model.

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With the project in place and the above assumptions about site traffic and rooftop HVAC equipment, the modeled Daytime Hourly LA_{eq} levels along the property lines adjacent to residential land uses ranged up to 55 dBA and Nighttime Hourly LAeq levels ranged up to 45 dBA, both of which comply with the Municipal Code Daytime limit of 55 dBA and Nighttime limit of 45 dBA for residential land uses.

for 45dB Acoustics, LLC:



Sarah Taubitz, Mem.INCE, ASA

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1 Introduction

This sound level assessment and analysis was carried out to determine the noise impacts associated with the proposed mixed-use development at 2930 Union Rd in Paso Robles, CA. **45dB Acoustics, LLC** ("**45dB**") has predicted sound levels across the site and evaluated the project's suitability in reference to local regulations. Neighboring properties—particularly the existing residence to the immediate north and future residential developments to the immediate south—have been considered. The following factors are also considered:

- The topographical relationship of potential noise sources and applicable noise ordinances/laws
- Identification of noise sources and their characteristics, including predicted noise levels at representative neighboring receiver location(s), considering present and future land usage
- Basis for the sound level prediction (i.e., engineering inputs and assumptions)
- Noise attenuation measures (mitigation) to be applied, if needed
- Information on fundamentals of noise and vibration to aid in interpreting the report (Section 8, Appendix)

The project would consist of six new commercial/light industrial buildings located in the City of Paso Robles. Anticipated uses included warehousing / storage, wine processing and tasting, light /craft manufacturing, office, and limited retail. Residences and farmland are located immediately north and east of the project's property lines (Figure 1). A residential development is planned to the immediate south. Commercial and industrial properties are located to the west of the project.

The project is planned to include 330 vehicle parking spaces and 17 motorcycle parking spaces. A Transportation Impact Study was completed and is referenced herein for the increased traffic due to the project.

For the purposes of an acoustic study, with trucks in the loading areas as the dominant noise sources on site, the operating hours of 7am to 7pm (i.e. daytime hours) on weekdays were utilized for a conservative analysis. Most days and times of the year may have less traffic, and hence noise, emitting from the proposed project.

2 Regulatory Setting

Throughout this document, noise levels and limits are assumed to be A-weighted decibel levels.

2.1 Local Regulation – City of Paso Robles Noise Ordinance

The project and all surrounding properties are located within Paso Robles. The City of Paso de Robles, CA Municipal Code Noise Ordinance[1] provides regulation and guidelines regarding noise. The Interior and Exterior Noise Standards (Table 1) define the limits due to locally regulated (non-transportation) noise sources at residential, industrial, and commercial receiving land uses.

2.1.1 Residential Exterior Ambient Noise Levels

The nearest potentially sensitive noise receptors evaluated in this study are the residential homes/dwellings—including those on agriculturally zoned land—at the locations indicated on Figure 1.

For residential uses, the limits are 55 dBA LA_{eq} and 75 LA_{max} during daytime hours, 50 dBA LA_{eq} and 70 LA_{max} during evening hours, and 45 dBA LA_{eq} and 65 dBA LA_{max} during nighttime hours. Daytime hours are defined as 7am to 7pm, evening hours are 7pm to 10pm, and nighttime hours are 10pm – 7am. These limits are to be evaluated at the receiving land use property line.

2.1.2 Commercial/Industrial Exterior Ambient Noise Levels

The nearest commercial/industrial properties are located directly west of the project, across Ardmore Rd. These land uses are highlighted in Figure 1.

For commercial and industrial land uses, The City of Paso Robles' exterior noise standards for locally regulated noise sources are 60 dBA LA_{eq} and 80 LA_{max} during daytime hours, and 55 dBA LA_{eq} and 75 LA_{max} during evening hours (Table 1). Daytime hours are defined as 7am to 7pm and evening hours are 7pm to 10pm. Nighttime limits are not defined for these land uses because commercial and industrial properties are assumed to be unoccupied at night.

[1] El Paso de Robles, California Municipal Code, Section 21.60.060, Interior and Exterior Noise Standards, 2019. https://library.municode.com/ca/el_paso_de_robles/codes/code_of_ordinances?nodeId=TIT21ZO_ARTVNO_CH21.60NO_21.60.060EXINNOST

Table 1: City of Paso Robles Noise Ordinance Standards for Non-Transportation Noise Sources (reprint)

Table 1
Noise Standards for Locally Regulated (non-transportation) Noise Sources
Paso Robles Noise Element

Receiving Land Use	Period[3]	Exterior Areas[1]		Interior Spaces[2]	
		Lmax[4]	Leq[5]	Lmax[4]	Leq[5]
Residential	Day	75	55	60	45
	Evening	70	50	55	40
	Night	65	45	45	35
Mixed Use Residential	Day	---	---	60	45
	Evening	---	---	55	40
	Night	---	---	45	35
Hotels, Hospitals[6] & Nursing Homes	Day	75	60	60	45
	Evening	75	55	55	40
	Night	70	50	45	35
Uptown Town Center S.P. Area (UTCSP) Residential	Day	80	60	60	45
	Evening	75	55	55	40
	Night	70	50	45	35
Theaters & Auditoriums	Day	75	55	40	35
	Evening	70	50	40	35
	Night			40	35
Churches, Meeting Halls, Libraries	Day	75	55	55	45
	Evening	70	50	55	40
Schools[7]	Day	---	---	55	40
	Evening	---	---	55	40
Office/Professional	Day	80	60	60	45
	Evening	75	55	60	45
Commercial/Retail Buildings	Day	80	60	60	50
	Evening	75	55	60	50
Playgrounds, Parks, etc.	Day	75	55	---	---
	Evening	75	55	---	---
Industrial	Day	80	60	60	50
	Evening	75	55	60	50

Specific Notes:

1. Noise sensitive areas are defined within the acoustic terminology section.
2. Interior noise level standards are applied within noise-sensitive areas of the various land uses, as defined in the acoustic terminology section, with windows and doors closed.
3. Daytime hours = 7 am – 7 pm, Evening hours = 7 pm – 10 pm, Nighttime hours = 10 pm – 7 am.
4. Lmax = Highest measured sound level occurring during a given interval of time (Typically 1 hour).
5. Leq = Average or "Equivalent" noise level during the worst-case hour in which the building is in use.
6. Hospitals are often noise-generating uses. The exterior noise level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.
7. Exterior areas of school uses are not typically noise-sensitive. As a result, the standards for schools are focused on the interior office and classroom spaces.

General Notes Applicable to All Noise Standards and Land Uses:

a. Where the noise source in question consists of speech or music, or is impulsive in nature, or contains a pure tone, the noise standards of this table are reduced by 5 dB.
b. Where ambient noise levels exceed the noise level standards shown above, the noise standards shall be increased in 5 dBA increments to encompass the ambient.
c. Reductions in the noise standards for noise sources identified in general note "A" above shall be applied after any increases warranted by elevated ambient conditions prescribed in general note "B", subject to verification through a noise study.

3 Noise Propagation Model

SoundPLAN® is a state-of-the-art sound propagation modeling software package that calculates sound levels while taking into account the air and ground attenuation factors, terrain variation and the built environment, road pavement types, and other relevant factors. This software has incorporated many noise propagation standards, including the ISO 9613-2 and the FHWA's Traffic Noise Model (TNM) calculation standards. More details about SoundPLAN®, TNM, and ISO 9613-2 can be found in Section 8.3.

Traffic counts for nearby roads are input to the model to establish an ambient existing noise environment. All sound pressure levels in this report are in units of A-weighted decibels (dBA) for direct comparison to the Code.

3.1 Local Transportation Noise

AADT (Annual Average Daily Traffic) counts are taken from the CalTrans traffic database[2] and the County of San Luis Obispo Traffic Engineering online database[3] and input directly into SoundPLAN®, which then distributes them across the day, evening, and nighttime periods to predict outdoor noise levels. Traffic counts are adjusted upward 1% per year to 2023.

Current traffic counts for Ardmore, Golden Hill, and Union Roads and their projected increases due to the Project were detailed in the transportation impact analysis[4] provided by the Client. The study provided peak AM and PM hourly counts which were used to estimate the current and projected AADT numbers used in the model. Of particular note, the average daily traffic on Ardmore is anticipated to increase by 1194, which includes passenger vehicles as well as the semi-trucks and medium delivery trucks that are anticipated to arrive daily at the Project site. 226 daily passenger and semi-truck trips are expected for Building 1 and 968 daily passenger and medium delivery truck trips are expected for Buildings 2-6.

Table 2: Traffic Count Data, 2023 Estimates, and Projections due to Project

Road	AADT	Year	Years to Project	2023 AADT Projections	Projected AADT Increase due to Project
Hwy 46[2]	26500	2020	3	27303	--
Union Rd (E of Paso Robles)[3]	2985	2002	21	3679	--
Union Rd (Golden Hill to Paso Robles)[4]	--	--	--	8029	--
Union Rd (W of Golden Hill)[4]	--	--	--	5389	215

[2] CalTrans Traffic Census Program, 2020. https://dot.ca.gov/programs/traffic-operations/census
[3] County of San Luis Obispo, Department of Public Works, Traffic Count Data, 2021. https://www.slocounty.ca.gov/Departments/Public-Works/Forms-Documents/Transportation/Traffic-Count-Data.pdf
[4] Ardmore Industrial, Paso Robles –Transportation Analysis, Central Coast Transportation Consulting, December 2022.

Road	AADT	Year	Years to Project	2023 AADT Projections	Projected AADT Increase due to Project
Golden Hill (N of Union)[4]	--	--	--	5785	358
Golden Hill (S of Union)[4]	--	--	--	7445	539
Golden Hill (S of Ardmore)[4]	--	--	--	7242	603
Ardmore (E of Golden Hill)[4]	--	--	--	513	1194

All traffic was assumed to travel at a speed of 15 mph. All passenger, semi-truck, and delivery truck traffic was modeled for the hours between 7am and 7pm.

3.2 Warehouse Shipping Activity

The loading dock area on the west side of Building 1 (Figure 2) is expected to handle 80 semi-trucks daily. These are input into the model with the following details:

- 80 heavy trucks per day, traveling at 10 mph between the hours of 7am and 7pm through the loading area and around Building 1
- Backup alarms for each semi-truck with an average sound power level (LWA) of 100 dBA and maximum sound power level (LWA_{max}) of 103 dBA, emitted for no longer than 15 seconds per vehicle in the loading area
- Air brakes for each semi-truck having a maximum sound power level (LWA_{max}) of 110 dBA, which would be emitted for no more than 2 seconds per vehicle in the loading area
- We assumed that all vehicles would not idle for any significant amount of time
- We assumed that no refrigerated trucks would be expected at this site. (Refrigerated semi-trailer trucks can be problematic for noise, as the refrigerator units for the containers tend to be high level, low-frequency tonal, may operate even when the truck is parked, and are located at a higher height toward the top of the truck containers.)

3.3 Service and Loading Lanes

Two service/loading areas are included on the project site, on the south side of Building 3 and on the north side of Building 6. These are input into the model with the following details:

- Each service lane would have no more than 60 cars and medium-sized delivery trucks, traveling at speeds of 10 mph or less between the hours of 7am and 7pm
- A loading area on the northeast corner of Building 6, which includes a loading dock where delivery trucks may have a backup alarm. The backup alarms have an average sound power level (LA_{eq}) of 100 dBA and maximum sound power level (LWA_{max}) of 103 dBA, which would be emitted for no longer than 10 seconds per vehicle at the loading dock
- We assumed that no medium truck or delivery vehicles would use air brakes
- We assumed that all vehicles would not idle for any significant amount of time

For reference, a medium-duty truck typically has noise emission levels 5-7 dB lower than heavy-duty semi-trucks.

3.4 Parking Areas

Parking areas surround the six Project site buildings. Modeled parking lot noise includes door slams and vehicle ignitions – and conservatively assumes all vehicles have internal-combustion engines. Per the Client, 186 daily vehicle trips are expected for Building 1 and 968 daily vehicle trips are expected for Buildings 2-6. With expected semi- and delivery truck traffic excluded, we modeled the parking area around Building 1 with parking activities for 146 passenger vehicles and the parking areas around Buildings 2-6 with activities for 848 passenger vehicles. All parking activities were assumed to only occur during daytime hours, between 7am and 7pm.

3.5 HVAC Equipment

Placement of the 37 rooftop HVAC units was provided by the architect on March 2, 2023. Nine (9) rooftop units (RTUs) were included for Building 1, two (2) RTUs on Building 2, six (6) RTUs on Building 3, six (6) RTUs on Building 4, eight (8) RTUs on Building 5, and 6 (6) RTUs on Building 6.

Although the models have not yet been selected, based upon our experience with this equipment and calculated sound levels that would comply with the Municipal Code at the property lines, we assumed each unit has a sound power level ("LWA") of no more than 87 dBA rel 10^{-12} W, corresponding to a sound pressure level of 76 dBA rel 20µPa at a distance of 1 meter.

All HVAC equipment was assumed to be operating continuously, 24 hours per day, since although not typical, the project has the potential for all units to be running simultaneously.

4 Existing Site Ambient Noise Environment

A 3D geometric model of the situation is created within the SoundPLAN® noise modeling software. Buildings and main roads are modeled on the terrain to create a realistic model of the outdoor noise propagation for the area.

All sound contour plots, in plan view, are presented at a height of 1.5 m / 5 feet (AGL) within this report, and all are in units of A-weighted dB rel 20µPa for direct comparison with the applicable regulations.

The Federal Highway Administration's Traffic Noise Model (TNM) calculation method is utilized to predict outdoor noise propagation from the existing road traffic. Resulting daytime ("$L_{eq,d}$") sound level contours for the existing site are shown in Figure 3. Because these sound levels are calculated based only on road traffic, they are very low levels, particularly during evening and nighttime hours when traffic counts are lower. In reality, other sounds such as wind through vegetation, and other community sounds may contribute to and create levels higher than those shown here. In general, the areas further away from the roads are relatively quiet rural environments. For the residential use areas north of the project site on Ardmore Rd, daytime noise levels are approximately 42 dBA.

5 Predicted Future Noise Environment with Project

The 3D model with the project in place is shown in Figure 4. The resulting daytime sound level contours (at a 5-ft height) from the proposed Project and associated traffic, loading dock, and HVAC noise in place (as described in Section 3) are illustrated in Figure 5. The red asterisks (*) on each of the buildings represent the rooftop HVAC unit locations.

The daytime hourly levels at the residential property lines to the north, east, and south of the project site are not expected to exceed the Municipal Code residential L_{eq} limit of 55 dBA. Maximum daytime levels are also not expected to exceed the associated L_{max} limit of 75 dBA. Levels at the western commercial/industrial property lines are also not expected to exceed the Municipal Code limits.

Table 3 shows the existing ambient levels due to road traffic alone at selected property line receiver locations (shown in Figure 3 and Figure 5) as well as the anticipated effect the proposed Project would have at each location.

Table 3: Sound Levels at Receivers of Interest

	Existing Ambient (Road Traffic Only)				With Project				
Receiver	CNEL /L_{dn} (dBA)	Daytime Hourly $L_{eq,d}$ (dBA)	Evening Hourly $L_{eq,e}$ (dBA)	Nighttime Hourly $L_{eq,n}$ (dBA)	CNEL /L_{dn} (dBA)	Daytime Hourly $L_{eq,d}$ (dBA)	Evening Hourly† $L_{eq,e}$ (dBA)	Nighttime Hourly $L_{eq,n}$ (dBA)	Daytime L_{max} (dBA)
E1	42	41	36	34	52	51	45	44	44
E2	37	36	31	28	53	52	46	45	30
E3	38	37	32	29	49	47	41	41	32
N1	43	42	37	35	51	53	40	39	66
N2	42	41	36	34	53	55	39	38	71
NE	43	42	37	35	49	48	41	41	58
NW	43	43	37	34	53	54	44	42	52
S1	35	34	29	27	51	53	36	36	65
S2	34	33	28	26	45	46	36	35	52
SE	32	31	25	23	44	42	36	36	34
SW	36	35	30	27	51	53	37	36	64
W1*	35	35	29	26	57	60	40	39	66
W2*	35	34	29	26	57	60	39	38	76

** Receivers W1 & W2 are located on a property line shared with industrial/commercial land uses*

All locations are expected to comply with the Municipal Code, assuming all site activities operate as described within this report and between 7am and 7pm. Although vehicle noise is not present at night, the HVAC units are often still running, which is responsible for a sizable increase during nighttime hours as shown. HVAC units typically run a fraction of any hour, so the increase shown is conservatively high and may be approximately 10dB lower on an hourly L_{eq} basis. Rooftop units also can be screened to provide mitigation (not included here), and parapet walls may further redirect noise due to rooftop equipment.

5.1 Assumptions and Limitations

The sound level contours are provided for visualization purposes showing resulting sound levels during daytime hours. Daytime hourly sound levels are the primary metric used for evaluation since all Project site activities are expected to occur during daytime hours.

5.1.1 Loading Areas

The related maximum ("L_{max}" or "LA_{max}") limits within the regulations also apply while evaluating any proposed project. Maximum short-duration noises for this project include mainly the braking from semi-trucks and backup alarms from semi-trucks and medium delivery trucks in the loading areas outside Buildings 1 and 6. We anticipate that backup noises are within 20dB above the hourly LA_{eq} levels from the trucking activities, such that if the hourly LA_{eq} levels for the site comply, then the maximum levels for the site will also comply with the applicable regulations.

We assume trucks will not idle for long periods of time while parked. We recommend that any semi-trucks wishing to continuously idle do so near the north side of the Building 1 loading area, away from the property lines. If trucks run idle for the majority of a given hour, it can become a nuisance and potential code exceedance. The most effective mitigation is limiting/minimizing truck idling, which we presume is already the case. This is also true for backup beeping and truck air brakes usage.

Noise levels at the property lines are primarily limited by the number of semi-trucks and medium delivery trucks in the loading areas around Buildings 1 and 6. If more than 80 semi-trucks per day are expected in the loading area of Building 1, mitigation will be required at the south and west property lines due to the additional truck traffic noise in the loading area. Similarly, if more than 60 medium delivery trucks are anticipated to use the service/loading lane and dock north of Building 1, mitigation will be required.

5.1.2 Parking Lots

Parking areas surrounding the Project buildings were conservatively modeled with 994 passenger vehicles per day between the hours of 7am and 7pm. Further analysis would be required if parking activities were expected during evening or nighttime hours to ensure compliance with the Municipal Code.

5.1.3 Rooftop HVAC Equipment

Using the preliminary HVAC rooftop unit (RTU) layout provided by the architect, we included a maximum sound power level "LWA" of 87 dBA for each unit on the buildings as constant 24/7 noise sources in our model that would allow the Project to comply with the Municipal Code. This HVAC noise can be considered "worst-case" for the project, and it contributes a significant portion of the total noise increase calculated.

Sound levels at the property lines can increase or decrease depending on the proximity of the RTUs. Nighttime levels along the east property line will not comply if the RTUs on Buildings 3 and 5 are placed closer than 100 feet from the east property line.

These units typically run less frequently at night and perhaps 25 to 50% of the daytime hours, so projected levels may be higher than typical during day and night hours. However, if the RTUs are louder than the sound power level "LWA" of 87 dBA, are located in significantly different locations than shown in the model, are placed closer to the property lines than indicated above, or if there will be more units on-site than included in this analysis, a revised analysis would be required to verify compliance. RTUs can also be screened/mitigated to reduce potential impact.

6 Conclusion

Existing daytime hourly noise levels due to road traffic noise, primarily from Highway 46, range up to 43 dBA at the north property line adjacent to an existing residence, as predicted from published traffic counts and the FHWA's Traffic Noise Model implemented into SoundPLAN®.

The proposed project was modeled to analyze the potential noise impact on the neighboring land uses. Noise levels associated with the project are anticipated to comprise of the following:

- Traffic noise associated with the increased traffic on Ardmore Road
- Traffic and parking activities of 994 passenger vehicles daily in the surrounding parking lots
- Truck traffic and loading of up to 80 semi-trucks daily at the loading docks on the west side of Building 1
- Truck traffic and loading of up to 60 medium delivery trucks daily at the loading dock and in the service/loading lane along the north side of Building 6
- Truck traffic and loading of up to 60 medium delivery trucks daily in the service/loading lane along the south side of Building 3
- 37 rooftop HVAC units on the six Project buildings, each modeled with a sound power level of 87 dBA rel 10^{-12} W (i.e., sound pressure level of 76 dBA rel 20µPa at 1-m).
- All site activities were assumed to occur during daytime hours between 7am and 7pm
- No vehicle idling was included for the service/loading lanes near Buildings 3 and 6 or near the loading docks at Building 1
- Refrigerated trucks are not expected at the Project site and were not included as a noise source in the model

With the project in place and the above assumptions about site traffic and rooftop HVAC equipment, the modeled Daytime Hourly LA_{eq} levels along the property lines adjacent to residential land uses ranged up to 55 dBA and Nighttime Hourly LAeq levels ranged up to 45 dBA, both of which comply with the Municipal Code Daytime limit of 55 dBA and Nighttime limit of 45 dBA for residential land uses.

The conclusions and recommendations of this acoustical analysis are based upon the information known to 45dB Acoustics, LLC ("**45dB**") at the time the analysis was prepared concerning the proposed site plans, traffic volumes, and proposed project activities. Any significant changes to these factors will require a reevaluation of the findings of this report. Additionally, any significant future changes in site plan, noise regulations, or other factors beyond **45dB**'s control may result in long-term noise results that differ from those described by this analysis.

7 Figures

Figure 1: Aerial Map of Proposed Project Site and Surrounding Properties (GoogleMaps)



Figure 2: Project Site Plan (Dated 2-13-2023)

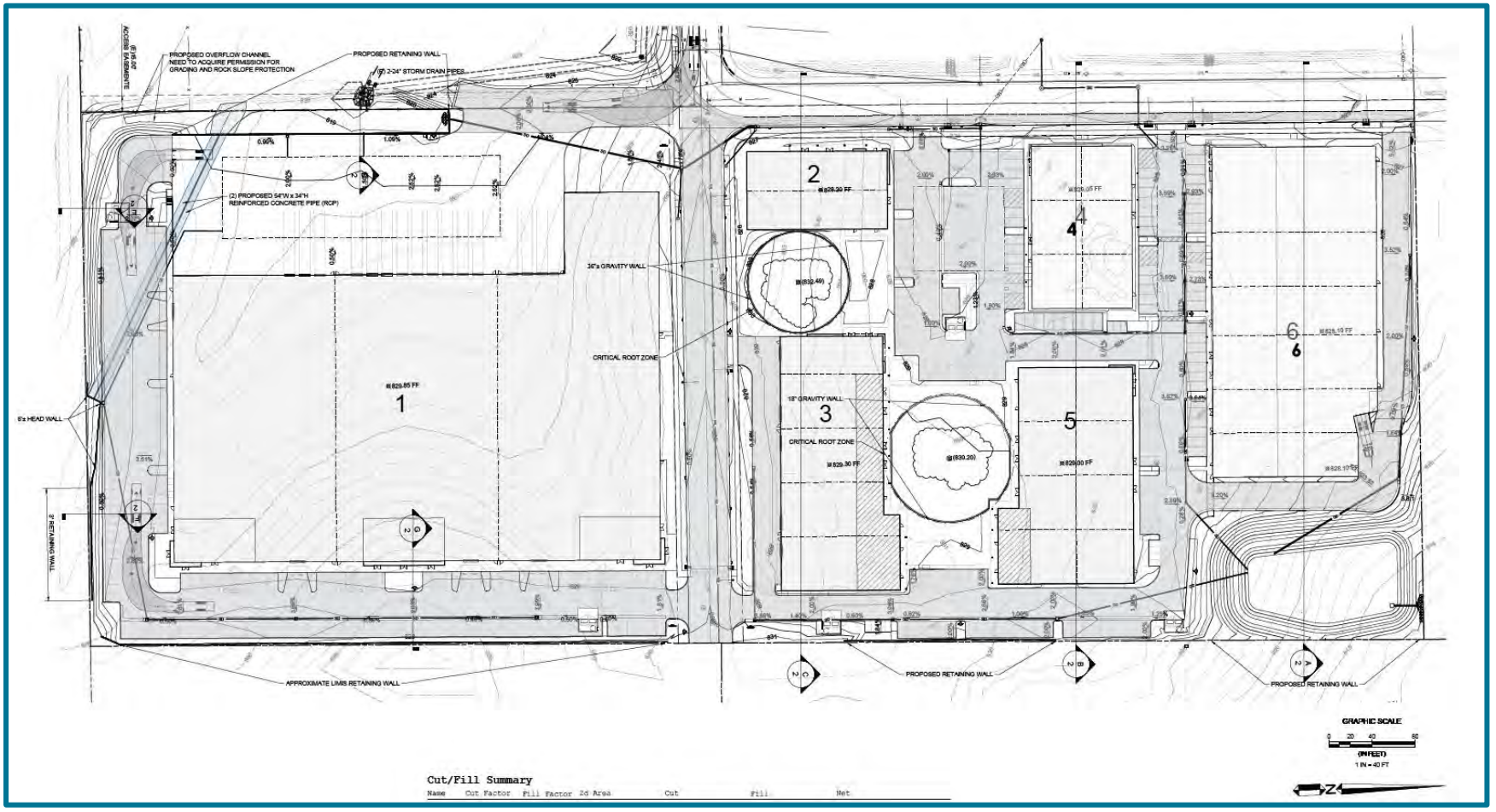


Figure 3: Daytime ("$L_{eq,d}$") Sound Level Contours, Existing Site

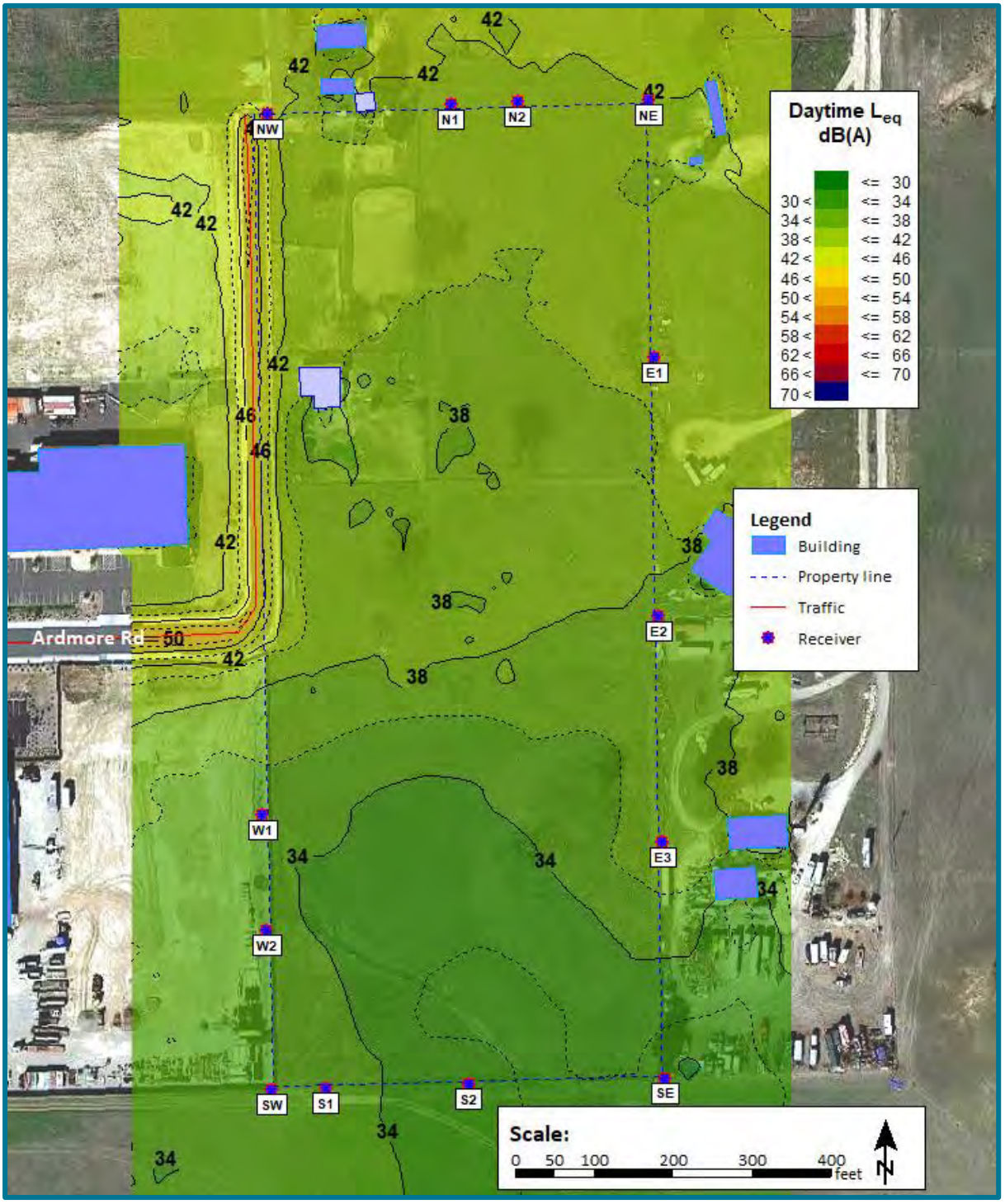
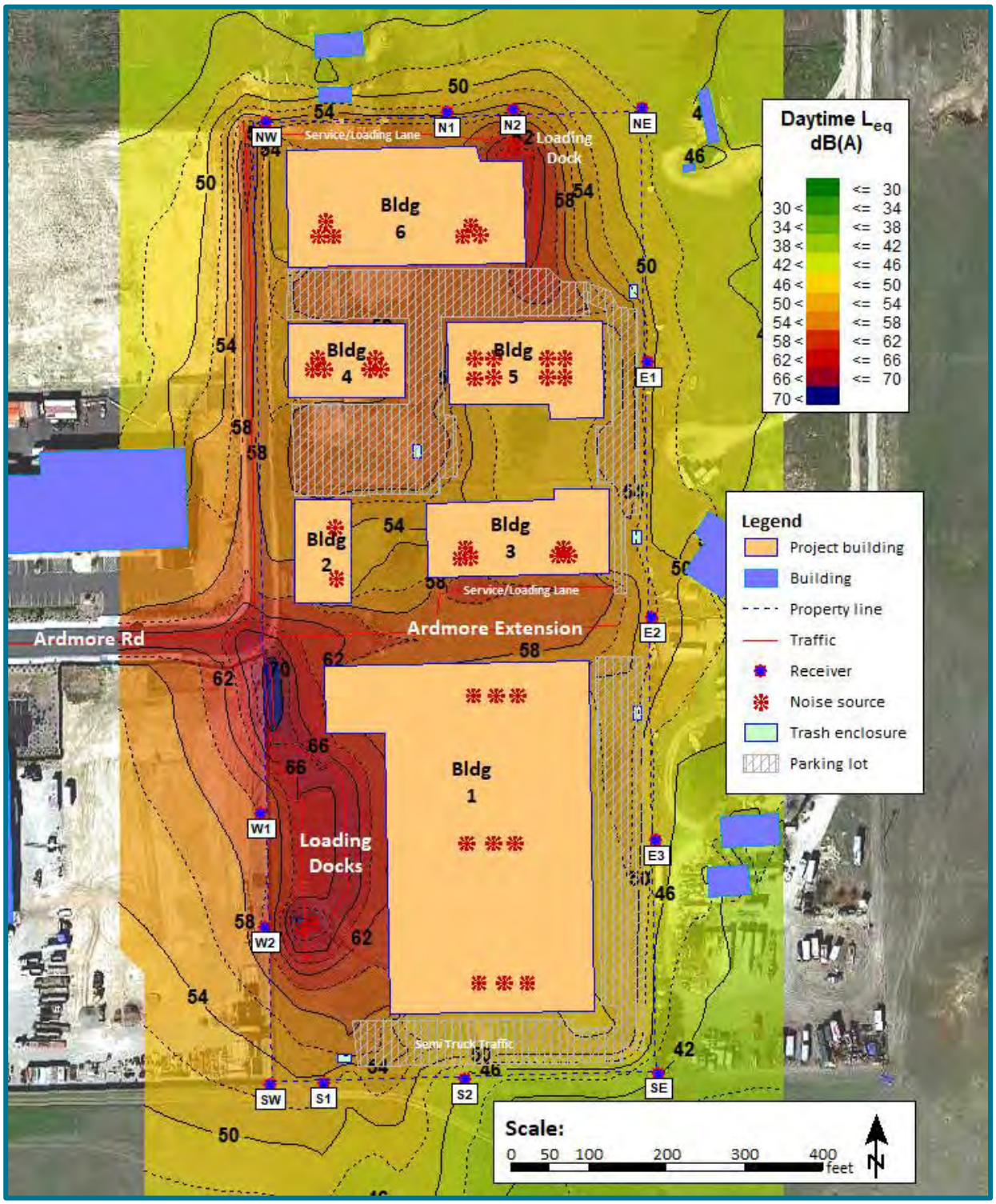


Figure 4: 3D View of Site Geometry, with Proposed Project



Figure 5: Daytime ("$L_{eq,d}$") Sound Level Contours, with Proposed Project



8 Appendix

8.1 Characteristics of Sound

When an object vibrates, it radiates part of its energy as acoustical pressure in the form of a sound wave. Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate this human, frequency-dependent response, the A-weighted filter system is used to adjust measured sound levels. The normal range of human hearing extends from approximately 0 to 140 dBA. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. Because of the physical characteristics of noise transmission and of noise perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 4 below presents the subjective effect of changes in sound pressure levels.

Table 4: Sound Level Change Relative Loudness/Acoustic Energy Loss[5]

0 dBA	Reference 0%
-3 dBA	Barely Perceptible Change 50%
-5 dBA	Readily Perceptible Change 67%
-10 dBA	Half as Loud 90%
-20 dBA	1/4 as Loud 99%
-30 dBA	1/8 as Loud 99.9%

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as spreading loss. Generally, sound levels from a point source will decrease by 6 dBA for each doubling of distance. Sound levels for a highway line source vary differently with distance because sound pressure waves propagate along the line and overlap at the point of measurement. A closely spaced, continuous line of vehicles along a roadway becomes a line source and produces a 3 dBA decrease in sound level for each doubling of distance. However, experimental evidence has shown that where sound from a highway propagates close to “soft” ground (e.g., plowed farmland, grass, crops, etc.), a more suitable drop-off rate to use is not 3.0 dBA but rather 4.5 dBA per distance doubling (FHWA 2010).

When sound is measured for distinct time intervals, the statistical distribution of the overall sound level during that period can be obtained. The L_{eq} is the most common parameter associated with such measurements. The L_{eq} metric is a single-number noise descriptor that represents the average sound level over a given period of time. For example, the L50 noise level is the level that is exceeded 50 percent of the time. This level is also the level that is exceeded 30 minutes in an hour. Similarly, the L02, L08 and L25 values are the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour. Other values typically noted during a

[5] Highway Traffic Noise Analysis and Abatement Policy and Guidance, U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch, June 1995.

noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet-time noise levels in a 24-hour noise descriptor called the CNEL or L_{dn}. This increment is incorporated in the calculation of CNEL or L_{dn}, described earlier.

8.2 Terminology/Glossary

A-Weighted Sound Level (dBA)
The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made. A-weighting de-emphasizes the low and very high frequency components of the sound in a manner similar to the response of the average human ear. A-weighted sound levels correlate well with subjective reactions of people to noise and are universally used for community noise evaluations.

Air-borne Sound
Sound that travels through the air, differentiated from structure-borne sound.

Ambient Sound Level
The prevailing general sound level existing at a location or in a space, which usually consists of a composite of sounds from many sources near and far. The ambient level is typically defined by the L_{eq} level.

Background Sound Level
The underlying, ever-present lower level noise that remains in the absence of intrusive or intermittent sounds. Distant sources, such as Traffic, typically make up the background. The background level is generally defined by the L90 percentile noise level.

Community Noise Equivalent Level (CNEL)
The L_{eq} of the A-weighted noise level over a 24-hour period with a 5-dB penalty applied to noise levels between 7 p.m. and 10 p.m. and a 10-dB penalty applied to noise levels between 10 p.m. and 7 a.m. CNEL is similar to L_{dn}.

Day-Night Sound Level (L_{dn})
The L_{eq} of the A-weighted noise level over a 24-hour period with a 10-dB penalty applied to noise levels between 10 p.m. and 7 a.m. L_{dn} is similar to CNEL.

Decibel (dB)
The decibel is a measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

DBA or dB(A)
A-weighted sound level. The ear does not respond equally to all frequencies and is less sensitive at low and high frequencies than it is at medium or speech range frequencies. Thus, to obtain a single number representing the sound level of a noise containing a wide range of frequencies in a manner representative of the ear's response, it is necessary to reduce the effects of the low and

high frequencies with respect to the medium frequencies. The resultant sound level is said to be A-weighted, and the units are dBA. The A-weighted sound level is also called the noise level.

Energy Equivalent Level (L_{eq})
Because sound levels can vary markedly in intensity over a short period of time, some method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, one describes ambient sounds in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. In this report, an hourly period is used.

Field Sound Transmission Class (FSTC)
A single number rating similar to STC, except that the transmission loss values used to derive the FSTC are measured in the field. All sound transmitted from the source room to the receiving room is assumed to be through the separating wall or floor-ceiling assembly.

Noise Reduction (NR)
Noise reduction is the difference between outdoor sound level and indoor sound level. It is not identical to Sound Transmission Class.

Outdoor-Indoor Transmission Class (OITC)
A single number classification, specified by the American Society for Testing and Materials (ASTM E1332 issued 1994), that establishes the A-weighted sound level reduction provided by building facade components (walls, doors, windows, and combinations thereof), based upon a reference sound spectrum that is an average of typical air, road, and rail transportation sources. The OITC is the preferred rating when exterior façade components are exposed to a noise environment dominated by transportation sources. Once built, as much as a 5-point reduction in Apparent Outside-Inside Transmission Class (OITC) from the original, as-designed OITC may be expected.

Percentile Sound Level, Ln
The noise level exceeded during *n* percent of the measurement period, where *n* is a number between 0 and 100 (e.g., L10 or L90)

Sound Transmission Class (STC)
STC is a single number rating, specified by the American Society for Testing and Materials, which can be used to measure the sound insulation properties for comparing the sound transmission capability, in decibels, of interior building partitions for noise sources such as speech, radio, and television. It is used extensively for rating sound insulation characteristics of building materials and products.

Structure-Borne Sound
Sound propagating through building structure. Rapidly fluctuating elastic waves in gypsum board, joists, studs, etc.

Subjective Loudness Level
In addition to precision measurement of sound level changes, there is a subjective characteristic which describes how most people respond to sound:

- A change in sound level of 3 dBA is *barely perceptible* by most listeners.
- A change in level of 6 dBA is *clearly perceptible*.

- A change of 10 dBA is perceived by most people as being *twice* (or *half*) as loud.

8.3 SoundPLAN Acoustics Software

SoundPLAN®, the software used for this acoustic analysis, is an acoustic ray-tracing program dedicated to the prediction of noise in the environment. Noise emitted by various sources propagates and disperses over a given terrain in accordance with the laws of physics. The software calculates sound attenuation of environmental noise, even over complex terrain, uneven ground conditions, and with complex obstacles. Up to three reflections for each noise source are taken into account to closely and accurately predict real-world acoustics. Worldwide, governments and engineering associations have created algorithms to calculate acoustical phenomena to standardize the assessment of physical scenarios. Accuracy has been validated in published studies to be + / - 2.7 dBA with an 85% confidence level.

8.3.1 ISO 9613-2

For industrial and other noise sources besides road traffic, SoundPLAN calculates the sound field in accordance with ISO 9613-2 "Acoustics - Attenuation of sound during propagation outdoors, Part 2: General Method of Calculation." The standard states that "this part of ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors, in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level under meteorological conditions favorable to propagation from sources of known sound emissions. These conditions are for downwind propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night." Uncertainty of calculations with this method are +/-1 dB for sources less than 10m in height and within 1000m of the receiver.

8.3.2 Traffic Noise Model

The Federal Highway Administration Traffic Noise Model (TNM), implemented into the SoundPLAN® software, was used for the road traffic sound level modeling in this study. TNM contains the following components:

1. Modeling of five standard vehicle types, including automobiles, medium trucks, heavy trucks, buses, and motorcycles, as well as user-defined vehicles.
2. Modeling both constant- and interrupted-flow traffic using a field-measured data base.
3. Modeling effects of different pavement types, as well as the effects of graded roadways.
4. Sound level computations based on a one-third octave-band data base and algorithms.
5. Graphically-interactive noise barrier design and optimization.
6. Attenuation over/through rows of buildings and dense vegetation.
7. Multiple diffraction analysis.
8. Parallel barrier analysis.
9. Contour analysis, including sound level contours, barrier insertion loss contours, and sound-level difference contours.

These components are supported by a scientifically founded and experimentally calibrated acoustic computation methodology, as well as a flexible data base, made up of over 6000 individual pass-by events measured at forty sites across the country.

1343 Bishop Street, San Luis Obispo, CA 93401
Tel: 805 234 8760 Email: rodney@heritagetreeconsulting.com

October 21, 2022

To: Michael Stoltey – MD3 Investments & Damien Mavis – CoVelop

Re: Oak Tree Impact and Protection report for Ardmore Road Project, 2930 Union Rd, Paso Robles, CA 93446

Gentlemen,

In response to your request for an Oak Assessment, Impact and Protection plan for native oaks growing on a lot you intend to purchase and develop at 2930 Union Road, I have produced the following report.

Assignment

- Collect tree data and perform Level 2 inspections on 8 valley oaks *(Quercus lobata)* to determine condition and suitability for retention.
- Perform advanced Level 3 Assessment with Resistograph for 3 valley oaks.
- Provide written summary of condition and suitability for retention for all 8 valley oaks.
- Determine Tree Protection Zones (TPZs) for all trees proposed for retention that will potentially have construction impacts occurring in the Critical Root Zone (CRZ) or within 5 feet of the CRZ per City of Paso Robles requirements.
- Produce written oak tree impact and tree protection report based on the International Society of Arboriculture's (ISA) best management practices for tree protection during construction and City of Paso Robles tree protection requirements.

  Report to include:
  - Inventory of all trees being impacted
  - Critical root zone calculations
  - Tree protection zone calculations
  - Tree impact assessment
  - Tree protection requirements and standards
  - Tree protection map with TPZ fencing delineated
  - Photographs

Summary

The proposed project is for the construction of a multi-unit, mixed-use industrial site.
In total, I recommended six (6) native oak trees for removal based on structural and health issues. Proposed tree removals equate to 75% of all oak trees on site.

Tree replacements are required for all native oak trees removed that are six (6) inch diameter and larger. If all proposed oak tree removals are approved, forty-five (45) native oaks at the minimum 1.5-inch caliper or thirty-four (34) native oaks at 2-inch caliper would be required to be planted on the premises or somewhere in the city, upon the Public Works Director's approval.

An International Society of Arboriculture Certified Arborist shall observe and approve all construction activities that occur within or adjacent to the critical root zone (CRZ) of any trees proposed for retention.

A pre-construction meeting shall be held with the project arborist and all parties involved in the project. All tree protection fencing, and tree protection measures shall be in place before any construction activity begins. All necessary pruning shall also be completed before grading and construction.

Introduction

This project is located on an old cattle ranch. Most of the trees had been heavily impacted by cattle and were in severe decline due to root damage and drought or were structurally unstable. On August 2, 2022, I visited the site and performed a basic assessment on all native oaks 6-inch diameter and greater on the property you intend to develop. Initially, I found 4 trees were in such poor condition that I recommended their removal. One (1) tree was in good condition and deemed fit to retain.

As a result of the defects, I found during my basic inspection, 3 of the 8 trees on site required an advanced inspection with a Resistograph, wood density measuring device to determine their structural integrity. I returned to the site on August 5, 2022, and performed the advanced inspections with a Resistograph. On August 12, 2022, I collected additional data for 1 tree via a climbing inspection. I analyzed data collected during the advanced inspections and made recommendations regarding tree condition, tree risk and potential for retention. Ultimately, I determined 1 of the trees included in the advanced inspection could be retained. Combined with the tree deemed retainable during the basic inspection, I recommended 2 native oaks be retained and incorporated within the project.

All tree inspections were based on the potential for a tree to fail within the next 5 years from the date of this report. Any tree retained should be re-inspected on an annual basis to determine health and structural integrity status.

Methodology and Tools

My initial level 2 inspection consisted of a ground based, visual inspection and full walk around of the tree. I used a rubber mallet to sound the trunk to detect decay. I tagged each tree with an aluminum tag and assigned it a number. Based on a previous arborist's inspection of the trees, I assigned the same number that was listed in their report so we would have consistency when referencing the trees.

Advanced inspections consisted of Resistograph wood density testing, and in one instance, an aerial inspection that consisted of determining the extent of decay with a tape measure.

Tree Diameter Measurements

Diameter at Standard Height (DSH) was measured at 4.5' above ground. For multi-stem trees that divided below 4.5', I measured below the division at the narrowest point on the trunk. If it was not possible to measure below the division, I measured each stem individually, then squared the diameter of each stem. Finally, I summed the squared diameters and took the square root of the sum to get the most accurate diameter of the tree. Diameters were rounded up or down depending on fractions of inches.

Tree Numbering

I numbered all trees in the field with a rectangular metal tag and nailed it to the trunk at approximately 5 feet above ground.

Critical Root Zone Measurements

CRZs were determined by giving a radius of 1-foot per every inch of tree diameter. E.g., a 12-inch diameter tree would have a 12-foot CRZ radius measured from the outside of the trunk.

Tree Protection Zone Measurements

Generally, TPZ distances followed the distances listed for CRZs. The exception is if there were proposed tree-root encroachments into the CRZ of less than 25%. In most cases encroachments of less than 25% were allowed unless the structure or health of the tree would be compromised. TPZ's were also adjusted if the tree would outgrow the space and cause damage to foundations or cause clearance issues from buildings.

Tree Condition Ratings

All trees in the inventory were given a condition rating. The rating was based on the health, structure and presence of disease and insects. See the following definitions:

- **Dead** = Severely declining or no foliage, large dead branches, decay cavities, loss of bark, roots decayed or dead.
- **Very Poor** = Evidence of multiple large past failures, advanced decay, uncontrollable pest infestations or disease infection. Tree in severe decline.
- **Poor** = Tree may be suppressed, drought stressed, or had at least 1 large branch failure. Disease or pest infestations may be present. Can potentially be retained with attention to mitigation pruning, cultural care changes, pest and disease control.
- **Fair** = May have had minor past failures. Some pests or structural defects may be present, small deadwood. Minor to moderate drought stress present. Defects may be mitigated with pruning and pests can be controlled.
- **Good** = A relatively healthy tree with minor to no structural defects with minimal to no pest observed. Defects can be mitigated with pruning and pests can be controlled.
- **Very Good** = Trees that have had professional arboricultural care. No structural defects, disease or pests identified.
- **Excellent** = Specimen tree with superior form, root structure and health. Tree has been regularly cared for by professional arborists over its lifetime, E.g., estate or arboretum tree.

Inspection Levels

Level 1 – Limited Visual Inspection – This is a limited walk-by or drive-by, which does not typically include a complete walk around a tree. The inspection focuses on obvious defects, imminent or probable likelihood of failures. There are generally no tools used at this level. This is the fastest and least thorough assessment.

Level 2 – Basic Assessment – Generally includes a complete walk around inspection. Basic tools such as probes, measuring devices, binoculars, mallet or magnifying glass are used. At this level, an aerial inspection is not included. A Level 2 assessment is usually necessary to establish the need for a Level 3 assessment.

Level 3 – **Advanced Inspection –** Detailed inspection which usually employs the use of special equipment, data collection and analysis. A higher level of training is also required, such as International Society of Arboriculture (ISA) Tree Risk Assessment Qualification. Specialized equipment may include an Air Spade (device that uses compressed air to expose roots or root crown for inspections without causing damage to sensitive plant tissues).
Resistograph (drilling device used to measure and graph wood density) Level 3 inspections may also include sending samples to labs for analysis. A Level 3 inspections will usually take place later because of time needed to perform a Level 2 inspection.

Assessing Tree Structure and Potential to Fail

Estimating the structural integrity of trees is a challenge because, unlike steel I-beams or other construction materials there is no precise engineering standard to help determine the load a tree can withstand. Arborists must use measurement of decay, experience with previous, similar trees as well as factor in the various stressors on the compromised areas within the tree. Trees with thicker outer shells are going to be stronger. Oval internal decay areas and areas of decay that have broken through the outer shell of the trunk or branch will be weaker due to the inconsistency of the cylinder.

Tree Risk

Tree risk is determined by identifying the targets e.g. (people, buildings, cars or property) that could be injured or damaged by a whole or partial tree failure, the occupancy rate, exposure of the target to the tree hazard, the size of part of the tree that may impact the target if it were to fail, the likelihood of impact on the target, and the consequences of failure on the target.

The part of the tree most likely to fail and cause the largest impact is used to determine the highest overall risk for the tree.

When considering likelihood of failure, the definitions are as follows:

- **Imminent** – Failure has started or most likely to occur in the near future. Even if there is no significant wind or increased load. The imminent category overrides the time frame stated in the scope of work.
- **Probable** – Failure may be expected under normal weather conditions within the specified time frame.
- **Possible** – Failure may be expected in extreme weather conditions, but is unlikely during normal weather conditions during a specified time frame.
- **Improbable** – The tree or part is not likely to fail during normal weather conditions and may not fail in extreme weather conditions within the specified time frame.

Risk Matrices

I used the International Society of Arboriculture's Basic Tree Risk Assessment Form to determine risk. Matrix 1 the "Likelihood Matrix" determines the likelihood of failure and impact. The result is entered into Matrix 2, the "Risk Rating Matrix" which factors uses Consequences of Failure to get the overall risk rating. In the example below, Likelihood of failure of a part was Probable. The Likelihood of Impact was High. The result was Likely. In Matrix 2, I entered the result of Likely and entered Severe in the Consequences of Failure which gave me a risk rating of High. See example chart below.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Mitigation

When assessing risk for a tree, it is important to determine if the risk of tree failure can be reduced through mitigation. Mitigation can be made through pruning, installing cabling or bracing support structures. Moving targets out of the strike zone of a tree or restricting access to a tree are also viable mitigation measures. The recommended mitigation should not be so excessive that they compromise the health of the tree.

Tree Risk Assessments

I performed level 2 assessments on trees 1,2,3,4,9,10,11 & 13. See Tree Map Appendix B. From those assessments, I determined that trees 1, 2 and 13 required level 3 advanced inspections. Each assessment below includes a condition rating as well as potential for retention and mitigation recommendations. For level 3 inspections, I included a tree risk assessment matrix.

Tree 1 – A 43" diameter valley oak was in Very Poor condition. See Appendix A - Photographs - Photo 1.

Basic Level 2 Inspection –

This tree had drought stress which was indicated by dead wood in the canopy. It also had decay throughout its scaffold branches which was evident from the presence of decay cavities and woodpecker nests excavated in dead wood. See Appendix A - Photographs - Photos 1 & 4.

The trunk had an approximate lean to the east of 10 degrees. It also had a horizontal compression bulge on the east side of its trunk approximately 1' above ground. Compression bulges or wrinkles, indicate that wood fibers are being crushed by the weight of the canopy and trunk due to lack of supportive structure in the trunk. Further the tree had a large, decayed, anchor root on its southwest side. The root was on the opposing side of the lean of the tree and is likely to fail as decay advances and stress from the weight of the canopy continues to build. See Appendix A - Photographs - Photos 1-3.

Although this tree had a full canopy it has significant trunk decay. When I sounded the trunk with a rubber mallet, it resounded hollow on all sides. To further confirm the sounding results, I performed an advanced inspection of the decay using a Resistograph.

Advanced Level 3 Inspection -

I took 4 measurements of the wood density of the trunk at 3.5' above ground.

- Sample 1 – west side of tree. Outer shell thickness was 4"
- Sample 2 – south side of tree. Outer shell thickness was 6"
- Sample 3 – east side of tree. Outer shell thickness was 4" with a small 1.25" pocket of sound wood at 8" laterally, then total decay
- Sample 4 – north side of tree. Outer shell thickness was 5.25"

Based on the Resistograph results, it was apparent that the interior wood of the trunk was significantly decayed. The evidence of compression bulges showed that the trunk is losing structural integrity and leaning due to lack of supportive wood fibers.

Armillaria mellea, a.k.a. Oak root fungus is a common disease in valley oaks and is likely the cause of the decay in the roots and the trunk. Christopher J. Luley in his guide *Wood Decay Fungi* calls this fungus *Number one of the "Big Three" of the important decay fungi.* Again, according to Mr. Luley, "Armillaria is a root and butt rot fungus that increases the risk of tree failure and is a pathogen capable of killing cambium of roots and lower trunk of stressed trees". See Appendix A - Photographs - Photos 29 & 30 for example of failed oak due to root and butt rot.

Parts Assessed – Roots and Trunk

I used the International Society of Arboriculture's Basic Tree Risk Assessment Form to determine risk for this tree. In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the roots and trunk as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" in the Likelihood of Failure and Impact section. For the Consequences of Failure section of Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Scaffold Branches

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Combined Inspection Results and Risk Assessment

The highest risk rating for this tree was High and was associated with root and trunk failure. I found decay in one anchor root and significant decay was detected in the trunk. Buckling of trunk fibers was evident. Based on shell strength measurements, the likelihood of trunk failure was probable, due to lack of structural integrity. Root failure was Probable due to significant decay in the anchor root on the southwest side of the tree. Scaffold failure was also probable with a high likelihood of failure.

Mitigation:

Scaffolds - Reducing the canopy through end weight reduction and removing decayed branches 2" diameter and larger would relieve some stress on remaining scaffold branches and reduce their risk to Moderate.

Roots and Trunk - Reducing the canopy through end weight reduction would relieve some stress on the trunk but not enough to offset the overall stress being exerted on the buckling area on the north side of the tree. No structural support or bracing will help the stability of the tree's trunk or roots. Significant decay has been detected in the roots as well as the trunk. Based on shell strength measurements, lean of the tree and buckling of wood fibers on the east side of the trunk made failure likely due to lack of structural integrity. I recommend removing the tree before commencement of construction.

Tree 2 – A 47" diameter valley oak was in Poor condition. See Appendix A - Photographs - Photo 5.

Basic Level 2 Inspection –

On the south side of the trunk there was a decay cavity originating at the root-crown and extending approximately 5.5' upward. When sounded with a rubber mallet on either side of the cavity, it resounded hollow. Moving around the trunk to the east side, I detected another hollow sounding area with my mallet at approximately 3.5' above ground. See Appendix A - Photographs - Photo 6. Like Tree 1, I suspect *Armillaria mellea* - Oak root fungus, is the cause of the rot.

At approximately 8 feet above ground, on the southwest side of the trunk there was another decay area that was almost closed over with scar tissue. Although almost closed, I suspected a large area of decay behind the scar. See Appendix A - Photographs – Photo 7. There was a large scaffold branch attached to the trunk above the scar. It had a desiccated fungal fruiting body growing on it and cankers had killed strips of bark near the fungus. See Appendix A - Photographs – Photo 8. I identified the fungi genus to be that of *Inonotus*. Jessie A. Glaeser and Kevin T. Smith in the winter 2010 issue of Western Arborist, note this fungus to cause a white rot of heartwood in the trunk of living oaks and also decays strips or sections of sapwood, forming elongate cankers and killing the cambium. According to Swiecki, T. J.; Bernhardt, E. A. 2006, A Field Guide to Insects and Diseases of California Oaks, "*Inonotus dryophilus* is one of the most serious pathogens of living oaks in California associated with decline, failure, and mortality". In this tree, the weakened trunk area at the scar combined with the heavy, decayed scaffold branch make this section of the tree likely to fail.

In the upper canopy at approximately 14' above ground there was another decay cavity in the center of the canopy, where a large scaffold branch had failed many years ago. I suspected advanced decay in the trunk at this location. See Appendix A - Photographs - Photo 9.

Advanced Level 3 Inspection -

During the aerial inspection, I discovered that the opening of the decayed scaffold in the upper canopy was 13" in diameter. The depth of the cavity was 13'2" deep. When I measured the distance to the ground from the outside of the cavity, it was 14'3", which illustrated that the entire trunk of the tree was hollow. See Appendix A - Photographs – Photos 9 -14.

From the cavity opening, the decay continued upward into the scaffold branch growing east. This scaffold is very likely to fail due to weak trunk structure. See Appendix A - Photographs – Photo 12.

Based on the decay detected during mallet sounding, I wanted to investigate the extent of the decay further. I performed an advanced inspection for decay using a Resistograph. I took 6 measurements of the wood density of the trunk at 3.5' above ground unless otherwise indicated.

- Sample 1 – west side of tree. Outer shell thickness was 8"
- Sample 2 – south side of tree, 1' west of decay cavity, outer shell thickness was 8.5"
- Sample 3 – south side of tree at decay cavity seam, outer shell thickness was 3" at 3' above ground.
- Sample 4 – south side of tree, 1' east of decay cavity, outer shell thickness was 7.25"
- Sample 5 – east side of tree, outer shell thickness was 5.5"
- Sample 6 – north side of tree, outer shell thickness was 12"

I have highlighted the tables below to show how risk was determined for the part or parts of the tree that was being considered regarding failure potential.

I used the International Society of Arboriculture's Basic Tree Risk Assessment Form to determine risk for this tree.

Part Assessed - Trunk

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the trunk as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" in the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of the Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Scaffold Branches

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Combined Inspection Results and Risk Assessment-

The highest risk rating for this tree was High and was associated with trunk and scaffold branch failure. Significant decay was detected in the trunk and eastern scaffold branch.
Based on shell strength measurements, and the void caused by decay on the south side of the tree, the trunk is likely to fail due to lack of structural integrity. In regard to the eastern scaffold branch and other decayed branches, they could be removed, and end-weight could be reduced to relieve some stress on remaining scaffold branches. However, the reduction of the canopy would be close to 50% and would compromise the health of the tree. Further, since the trunk is not structurally sound, this negates the mitigation measure.

Mitigation: Remove tree before commencement of construction. No structural support or bracing will help the stability of the tree's trunk.

Tree 3 – A 47" diameter valley oak was in Very Poor condition. When I sounded the trunk with a rubber mallet, it resounded hollow on the southwest side. A large wound left by a scaffold branch failure in the crown of the tree has since decayed and left a 3'x 4' hollow at approximately 14' above ground on the east side of tree. Another decay cavity on the north side of the tree at the same height as the previous, measured approximately 2' in diameter. Remaining scaffold was overextended and attached to the decaying trunk. The remaining parts of this tree have a high likelihood of failure. See Appendix A - Photographs – Photos 15 & 16.

Mitigation: Remove tree before commencing project.

Tree 4 – A 52" diameter valley oak was in Very Poor condition. The tree was growing off-site but had critical root zone (CRZ) and crown encroachments into your proposed construction area. This tree has had several large scaffold branch failures.
At the failure points, significant decay was visible. The remaining scaffolds were overextended and potentially had similar internal decay and had a high likelihood of failure. See Appendix A - Photographs – Photo 17.

Mitigation: I highly recommend removal of this tree due to the advancement of decay in the scaffold branches which is compromising their structural integrity. Crown reduction needed to reduce the risk of scaffold branches failing would take up to 50% of the live canopy and jeopardize the tree's health. Because this tree is off site, you will need to coordinate with the owner regarding removal.

At minimum this tree should have all overextended branches reduced to help prevent further failures and protect any buildings or other targets you may place on your property within striking distance of the tree. If the owner of the tree chooses to retain it, you will need to design buildings, service and loading zones outside of the CRZ.

Tree 9 – A 51" diameter valley oak was in Very Poor condition. Multiple large scaffold branches had failed. Extensive decay was present at branch failure points. Only 2 overextended scaffold branches remain, and they are connected to a decaying trunk.

When I sounded the trunk with a rubber mallet, it resounded hollow. A 3' long by 10" wide decay cavity was on the northeast side of trunk. This tree has a high risk of complete failure. See Appendix A - Photographs – Photos 18 & 19.

Mitigation: Remove tree before commencing project.

Tree 10 – A 51" diameter valley oak was in Good condition. The trunk of the tree resounded solid when sounded with a rubber mallet. Tree form was good, but there was some large dead wood and decaying scaffolds. This tree can be retained, but it should have maintenance pruning performed prior to commencement of your project. See Appendix A - Photographs – Photos 20 & 21.

Mitigation: Reduce end-weight up to 25% on overextended scaffold branches. Remove dead wood 2" diameter and larger. Remove decayed and structurally unsound scaffold branches. Supervision of pruning work by the Project Arborist shall be required.

Tree 11 – A 30" diameter valley oak was in Very Poor condition. The tree was in severe decline due to drought stress and root disease. Many of the smaller branches had died. I detected decay at the root crown on the southwest side of the tree. I found an ant nest at the root-crown decay area indicating ants are excavating and nesting in dead roots and root crown. The dead roots contribute to the decline of the canopy and compromise the stability of the tree. At least five, 12" average diameter scaffolds had extensive decay on the east side of the tree. To reduce scaffold failure risk, up to 50% of the live canopy would need to be removed, which would compromise the health of and already unhealthy tree. See Appendix A - Photographs – Photos 22-24.

Mitigation: Remove tree prior do commencement of project.

Tree 13 – A 42" diameter valley oak was in Poor condition.

Basic Level 2 Inspection –

The tree had a full canopy with a balanced form. On the south side of the tree at the root crown, there was an area of decay in the underside of one of the anchor roots. Like trees 1 and 2, the decay is likely caused by *Armillaria mellea*. I also noted the lower trunk was bulging and larger than normal which may indicate butt-rot caused by A. mellea. Further, I observed that the eastern scaffold branch was decayed, and large dead wood was present throughout the canopy. See Appendix A - Photographs – Photos 25 - 28.

A previous report, by another arborist, expressed concern that a scar at the base of the tree might indicate decay and structural instability. When I sounded the tree's trunk with a rubber mallet, it resounded solid, except on the north side of the trunk. Due to the difference of opinion regarding the structural integrity of the trunk, I performed an advanced inspection for decay using a Resistograph.

Advanced Level 3 Inspection -

I took 5 measurements of the wood density of the trunk at 3.5' above ground.

- Sample 1 – west side of tree. Outer shell thickness was 7"
- Sample 2 – south side of tree. Outer shell thickness was 8.5"
- Sample 3 – east side of tree. Outer shell thickness was 8.5"
- Sample 4 – east side of tree scarred area on east side of trunk approximately 1' above ground. Outer shell thickness was 12".
- Sample 5 – north side of tree. Outer shell thickness was 5"

Like Tree 1, the trunk of this tree had advanced internal decay, however when comparing outer shell thickness, this specimen had thicker walls and did not have indications of trunk fibers buckling, therefore its structural integrity is likely stronger.

Tree Risk - I used the International Society of Arboriculture's Basic Tree Risk Assessment Form to determine the risk. I used Matrix 1 the "Likelihood Matrix" on the form and entered the result into Matrix 2, the "Risk Rating Matrix" to get the overall risk rating.

I have highlighted the tables below to show how risk was determined
for the part or parts of the tree that was being considered regarding failure potential.

Part Assessed - Root

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the roots as Possible. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Somewhat Likely, which I entered into Matrix 2, the "Risk Rating Matrix" for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of Moderate.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Trunk

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Part Assessed – Scaffold Branches

In Matrix 1 the "Likelihood Matrix" I selected Likelihood of Failure of the scaffold branches as Probable. The Likelihood of impacting a target in a built environment would be High. The resulting Likelihood of Impact was Likely, which I entered into Matrix 2, the "Risk Rating Matrix" for the Likelihood of Failure and Impact section. Under Consequences of Failure in Matrix 2, I entered Severe. The Likelihood of Failure and Impact rating combined with the Consequences of Failure resulted in a risk rating of High.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Combined Inspections Results and Risk Assessment-

The highest risk rating for this tree was High and was associated with scaffold and trunk failure. I found decay in one anchor root and significant decay was detected in the trunk, however no bulging of trunk fibers was evident. Based on shell strength measurements, the likelihood of trunk failure is probable due to lack of structural integrity. Scaffold failure was also probable. Risk of root failure remained moderate.

Mitigation:

Mitigations are meant to reduce risk without compromising the health of the tree. Ultimately, the tree manager, owner or other controlling entity must decide if the residual risk assessed is reasonable.

Scaffold Branches - Reduce end weight on overextended scaffold branches between 25% and 40% to reduce the likelihood of failure. Concentrate reduction more on the northeast and east side of the tree. Remove dead branches 2" diameter and larger. Remove decayed and structurally unsound scaffold branches. Supervision of pruning work by the Project Arborist shall be required. If all pruning recommendations are implemented, the risk of branch failure for the next 12 months will be reduced from High to Moderate.

Roots - Reducing the canopy through end weight reduction will relieve some stress on roots, however due to the overall weight of the canopy and stem, the risk rating for root failure will remain Moderate.

Trunk – Scaffold branch reduction will relieve some stress on the trunk of the tree, however it will not likely be enough to lower trunk failure risk to moderate. If this tree is to be retained, and the goal is to reduce the risk rating, the only reasonable way to achieve that goal will be to restrict access by installing a permanent fence around it. The fence shall be a minimum of 4.5' tall and be built at the limits of the tree protection zone. Once access is restricted, the risk rating will be Moderate. See Trees to be Protected section on page 16 of this report for more detail regarding permanent fencing.

Critical Root Zone Calculations

According to the ISA's definition, the CRZ is an area of soil around a tree where the minimum number of roots considered critical to the structural stability or health of the tree are located. CRZ determination is sometimes based on the drip line or a multiple of the DSH.

Per City of Paso Robles oak tree ordinance and ISA guidance, the CRZ was determined by assigning a radius of 1-foot per every inch of tree diameter. E.g., a 12-inch diameter tree would have a 12-foot CRZ radius measured from the outside of the trunk. Calculations for all oaks with CRZs potentially being impacted are listed in Appendix E - Tree Inventory and are shown in Appendix D - Tree Protection Map.

Tree Protection Zone Requirements

A tree protection zone or TPZ is similar to a CRZ. Ideally it will be the same size as the CRZ, however it can be smaller. The general rule for CRZ encroachments is that they may be allowed if the impact to critical roots is not more than 25% with no disturbance of ***Structural Roots*** *(large roots that provide anchorage and stability to the tree).*

Once the TPZ limits have been established, tree protection fencing shall be provided for all trees listed for protection. See Table 1 - Tree Protection Zone Measurements on page 17 of this report. Tree protection fencing is required to be in place for the duration of the construction project and shall be installed before starting any ground disturbing activities.

- Do not remove any tree protection fencing or enter the TPZ without approval of the project arborist. The fencing shall delineate and protect the tree protection zone.

- The fencing shall at minimum, be 4 feet tall and made of orange, high density, polyethylene with 3.5" x 1.5" openings. It shall be installed on steel posts 8 feet on center and tightly stretched to prevent sagging. I **STRONGLY** recommend installing 6' X 8' temporary, chain-link, fence panels secured to driven steel post. This is a more secure and less moveable option than vinyl fencing that can easily be moved by hand or run over by vehicles. See Appendix C - Tree Protection Diagrams & Photos - Diagram 2 – Temporary Chain-link Fence Panel.

- Trunk Protection shall also be provided – Often, the trunk of a tree will be damaged by construction equipment activities. In order to protect as much of the trunk as possible, 2" X 4" wood slats with a minimum height of 8' shall be placed against the trunk of the tree and secured with wire or zip-ties. **DO NOT** use anchors such as screws or nails to connect to the trunk. See Appendix C – Tree Protection Diagrams - Diagram 3- Trunk Protection for more detail.

- Tree protection signs shall be placed on the TPZ fencing and be spaced 10 feet apart. Signs shall be weatherproof, and state, “Tree Protection Zone – Do Not Enter”. The signs shall also include the project manager’s and project arborist’s phone numbers. Signs shall remain in place until completion of the project. See Appendix C – Tree Protection Diagrams - Diagram 1 – Tree Protection Fencing for further detail.

- No construction or ground disturbance shall be allowed inside the fenced TPZ or CRZ without the project arborist’s permission and/or oversite. If you are unsure whether an activity is allowed, refer to Appendix D - Tree Protection Requirements – Quick Reference List or contact the project arborist **Rodney Thurman at 805 234 8760.**

Trees To Be Protected

There were 2 native oaks in this project that were selected for retention and will required protection due to proposed construction encroachments inside the CRZ or within 5 feet of tree canopies. All TPZ fencing shall be set as prescribed in Table 1 - Tree Protection Zone Measurements on page 17 and be completed before construction begins. Trunk protection shall also be installed before construction begins. See Appendix C - Tree Protection Diagrams & Photos- Diagrams 1-3.

If construction occurs during the months of June through November, the TPZs shall be irrigated to a depth of 12 inches 1 time before construction begins, which will ensure the trees are properly hydrated. Additional irrigations during construction may be recommended by the project arborist.

I have recommended retaining and protecting Trees 10 & 13. Refer to Tree Protection Zone map in Appendix B Maps - Map 2.

All work within or adjacent to the CRZs of oak trees will require arborist supervision to ensure that all tree protection measures are implemented. To avoid damage to critical roots, no machine use will be allowed in the TPZ. In order to prevent undue damage to roots when grading, the grading limits along the perimeter of the TPZ shall be **DUG BY HAND** to the final grading depth. If a root 1” diameter or larger is exposed, it shall not be cut without the project arborist’s permission.

If the project arborist determines that a root over 1-inch diameter needs to be cut, it shall be cut by hand with a pruning saw or reciprocating saw. Once the entire perimeter outside the TPZ has been dug and roots are severed, the project arborist can approve use of machinery to complete excavation and grading if work is outside of the TPZ.

Both trees have gravity walls proposed to be built around them to prevent soil erosion. These walls shall be constructed outside the TPZ fencing area.

Tree 13 requires a permanent fence be built at the limits of the tree protection zone to restrict access. I recommend anchoring it on top of the gravity wall. The fence shall be a minimum of 4.5’ tall and be made of ornamental steel or chain-link mounted on anchored fence posts. The fence openings should not be more than 6” wide. A locked access gate shall be provided to allow maintenance personnel to access the tree. See Appendix C - Tree Protection Diagrams & Photos - Photo A, for permanent fence example.

Table 1 - Tree Protection Zone Measurements					
Tree #	**DSH**	**CRZ**	**TPZ Fence Distance from tree trunk**	**% CRZ Impact**	**Specific Protection Requirements**
10	51"	51'	51' North, 48' South. 53' East & West	< 5	Set TPZ fencing according to measurements provided. Refer to Tree Protection Zone map in Appendix B Maps - Map 2
13	42"	42'	42' all directions	0	Set TPZ fencing according to measurements provided. Refer to Tree Protection Zone map in Appendix B Maps - Map 2

Tree Removals & Tree Pruning

All tree removals and pruning maintenance shall be completed prior to construction activities.

Removals - There were 6 native oak trees that I recommended for removal. They were numbered 1,2,3,4 9 and 11. Reasons for removals are listed in Tree Risk Assessment section of this report. See Appendix A – Photographs for pictures of defects. See Appendix B – Maps - Map 1 for locations.

Tree Pruning - I have recommended that Trees 10 and 13 have mitigation pruning performed. See Appendix B – Maps - Map 1 for locations.

> **Tree 10** - Reduce end-weight up to 25% on overextended scaffold branches. Remove dead wood 2" diameter and larger. Remove decayed and structurally unsound scaffold branches. Supervision of pruning work by the Project Arborist shall be required.
>
> **Tree 13** - Reduce end weight on overextended scaffold branches between 25% and 40% to relieve stress on and reduce the likelihood of failure. Concentrate reduction more on the northeast and east side of the tree. Remove dead branches 2" diameter and larger. Remove decayed and structurally unsound scaffold branches. Supervision of pruning work by the Project Arborist shall be required.

Oak Tree Replacements

The City of Paso Robles requires replacements for any native oak removed that is 6-inches in diameter or greater. This requirement is at the discretion of the Director of Public Works. The following is excerpted from the city's Oak Tree Ordinance 835 N.S.:

> Replacement oaks being equivalent to twenty-five percent of the diameter of the removed tree(s). (For example, the replacement requirement for removal of two trees of fifteen-inch DBH (thirty total diameter inches), would be seven and one-half inches (thirty inches removed multiplied by twenty-five hundredths replacement factor).

This requirement could be satisfied by planting five, one and one-half inch caliper trees, or three, two-and one-half-inch caliper trees or any other combination totaling seven and one-half inches).
A minimum of two, twenty-four-inch box, one and one-half inch minimum trunk caliper measurement trees shall be required for each oak tree removed.

Replacement trees shall be located on the same property as where the tree is approved for removal or, subject to approval of the director, arrangements can be made to locate the replacement trees on public property. Planting standards for replacement trees shall he consistent with City Standard Details and Specification L-4 except that deep root barriers shall not be required if the trees are not adjacent to sidewalk areas. Oak tree preservation and maintenance measures shall be consistent with the provisions of this chapter.

The combined diameter of the oak trees proposed for removal within your project is 270 inches. Twenty-five percent of 270 inches is 67.5 inches. Therefore, forty-five (45) native oaks at the minimum 1.5-inch caliper or thirty-four (34) native oaks at 2-inch caliper would be required to be planted on the premises or somewhere in the city, upon the Public Works Director's approval.

When incorporating new oak trees into your landscape, you will need to allow for at least an 8' x 8' planting area. Curbing for the planting area shall not count as part of the planting area dimensions. Planting areas smaller than 8'x 8' will result in sidewalk and curb buckling when tree roots mature. Distances between oak trees should be no less than 25 feet. If oak trees can be incorporated into open, non-hardscape areas, they will have a higher success rate. Planting trees in groups of 3, in larger landscape planting islands is also a great way to ensure better root health and tree survival rates while maximizing parking lot shade benefits.

Landscaping – Irrigation - Amenities

Tree 10 –

- Do not till or trench within the TPZ to install landscaping or irrigation.
- Install only drought tolerant and preferably California native plants beneath the tree canopy.
- Irrigation shall be drip-type and all supply hoses shall be routed above ground.
- Do not install overhead sprinkler irrigation because it will introduce too much moisture and potentially rot the tree's roots.
- Do not install weed block cloth beneath the canopy of the tree. It restricts rainwater from percolating into the soil.
- Provide decorative bark as a top dressing to help retain moisture in the root zone.
- Do not construct permanent concrete or brick patios beneath the canopy of the tree.
- Install Raised deck patios. They are the preferred treatment for seating areas within the critical root zones of trees.

Tree 13 –

- **DO NOT** provide any permanent or temporary amenities such as patios or seating beneath the canopy of this tree.
- Do not till or trench within the TPZ to install landscaping or irrigation.
- Install only drought tolerant and preferably California native plants beneath the tree canopy.
- Irrigation shall be drip-type and all supply hoses shall be routed above ground.

- Do not install overhead sprinkler irrigation because it will introduce too much moisture and potential rot the tree's roots.
- Do not install weed block cloth beneath the canopy of the tree. It restricts rainwater from percolating into the soil.
- Provide decorative bark as a top dressing to help retain moisture in the root zone.

Pre-Construction Meeting

Prior to any construction or ground disturbing activities, the project arborist shall meet with all contractors involved with the development of this project to review tree protection measures. Any new contractors brought on site shall also meet or communicate with the project arborist by phone or video conference to ensure they are aware of all tree protection measures.

Conclusion

Although many of the mature trees on site were not safe to retain, two trees were viable and had good potential to be retained as an asset to your project if all site design recommendations and tree protection measures are implemented. With required native oak replacements, you will have the opportunity to build your project while also restoring a native oak forest on site.

Respectfully Submitted,



Rodney D. Thurman
ISA Board Certified Master Arborist PN-2684BUM
ISA Municipal Specialist
ISA Utility Arborist
ISA Tree Risk Assessor Qualification

Appendices: *photographs, maps, tree protection diagrams & photos, tree protection quick reference list*

Appendix A - Photographs



Photo 1 - View of Tree 1 to south. Note lean to east.



Photo 2 - Tree 1 with decayed anchor root on southwest side, indicated by arrow. Ink pen provided for scale



Photo 3 - Tree 1 with compression bulge east side of trunk indicated by arrow shows lack of structural support.



Photo 4 - Tree 1 with decay in scaffold branches. indicated by arrows.



Photo 5 - View of Tree 2 to north

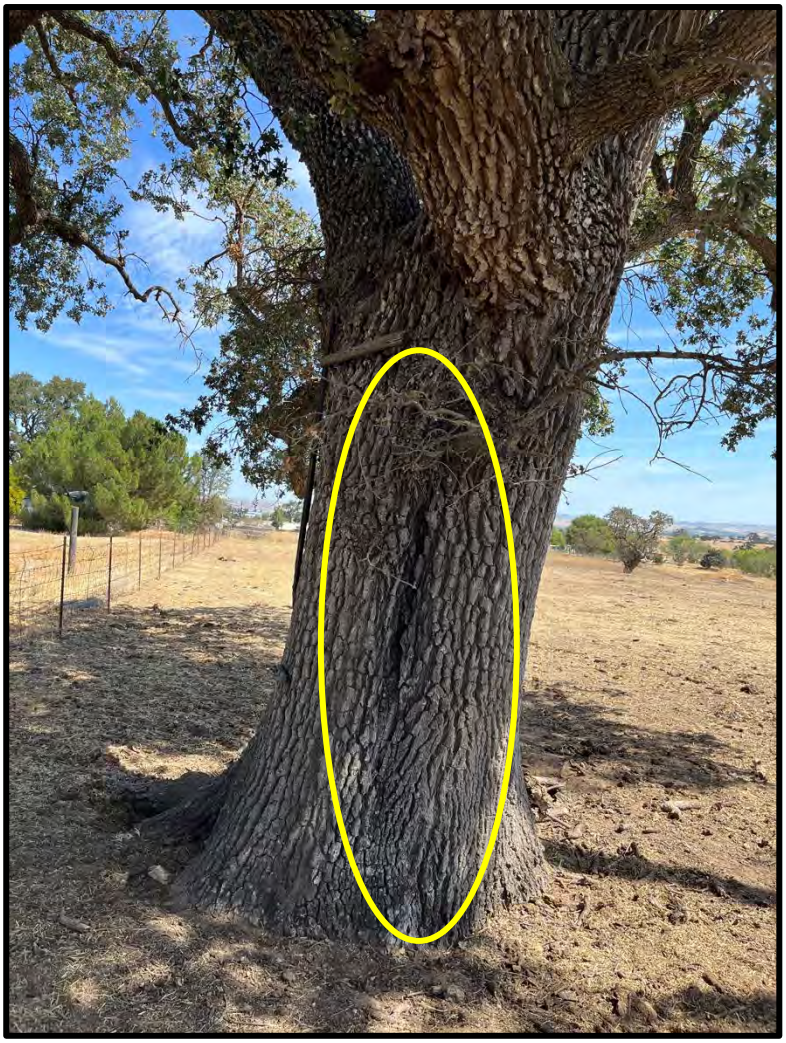


Photo 6 - Tree 2 with decay cavity south side of trunk. Length is approximately 5.5’.



Photo 7 - Tree 2 with decay cavity at scaffold union approx. 8’ above ground on southwest side of tree.



Photo 8 - Tree 2 with fungal fruiting body circled and decay in south scaffold branch indicated by arrow.



Photo 9 - Tree 2 with decay cavity formed by failed scaffold circled at center of tree, approximately 14 feet above ground.



Photo 10 - Tree 2 perspective view of decay cavity formed by failed scaffold circled at center of tree. Cavity is circled. Other decay points below the open cavity are indicated by arrows.



Photo 11 - Tree 2 view of decay cavity formed by failed scaffold. Opening measures 13”

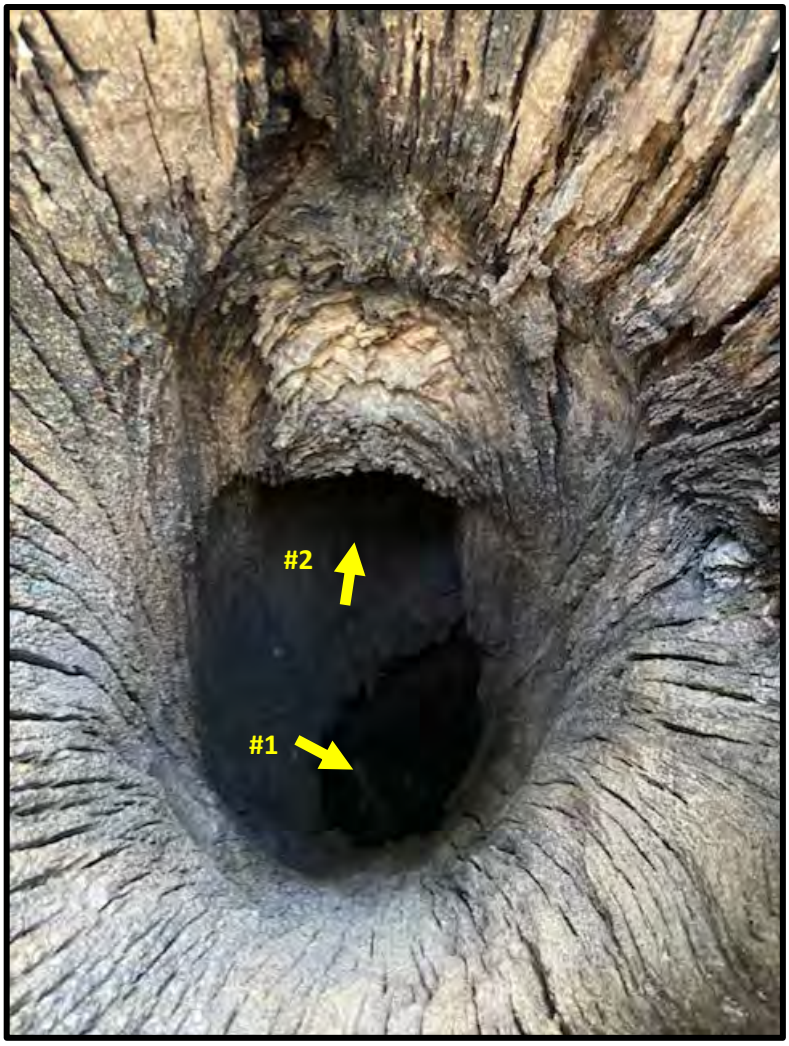


Photo 12 - Tree 2 view of interior decay cavity formed by failed scaffold. Arrow 1 shows depth of cavity down to roots of tree. Arrow 2 shows decay that has advanced into eastern scaffold branch.



Photo 13 - Tree 2 measurement of interior depth of decay cavity formed by failed scaffold. 13’ 2”



Photo 14 - Tree 2 measurement of exterior depth of decay cavity formed by failed scaffold. 14’ 3”



Photo 15 - View of Tree 3 to north. Overextended scaffold to west. Large decay cavity at connection to trunk.



Photo 16 - Tree 3 with large decay cavity at scaffold connection to trunk.



Photo 17 - View of Tree 4 with to northwest. Numerous failed scaffold branches due to overextension and internal decay.



Photo 18 - View of Tree 9 to north. Numerous failed scaffold branches due to overextension and internal decay.

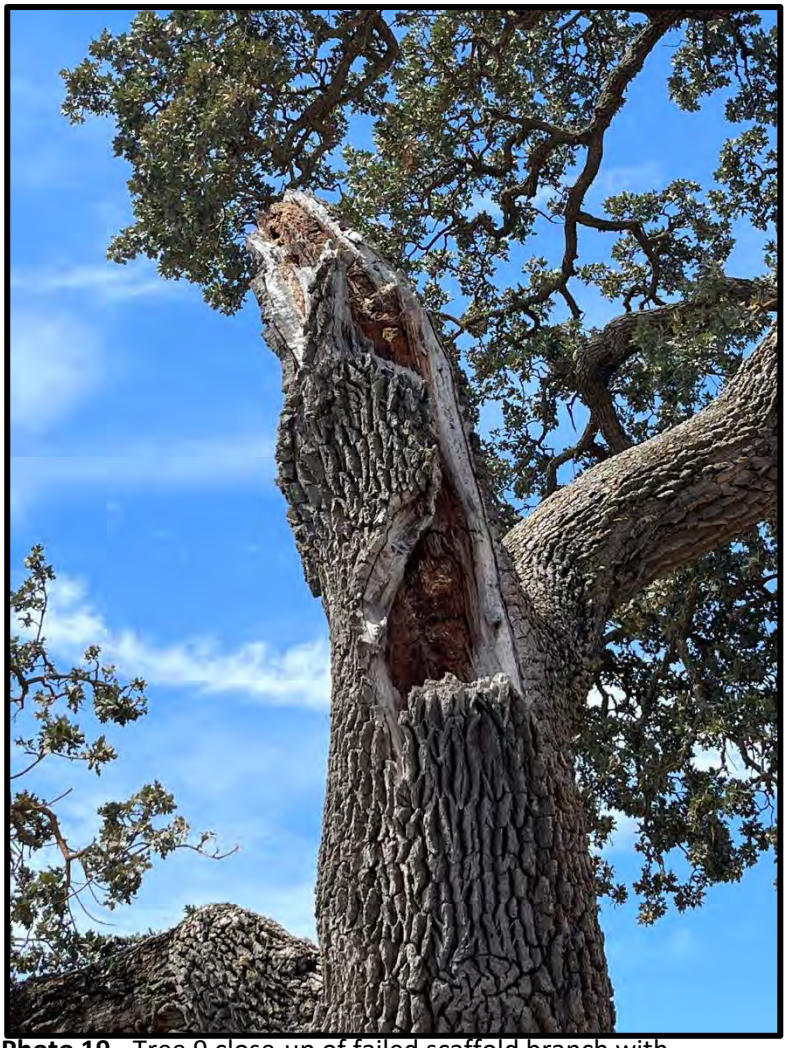


Photo 19 - Tree 9 close-up of failed scaffold branch with internal decay.



Photo 20 - View of Tree 10 to south.

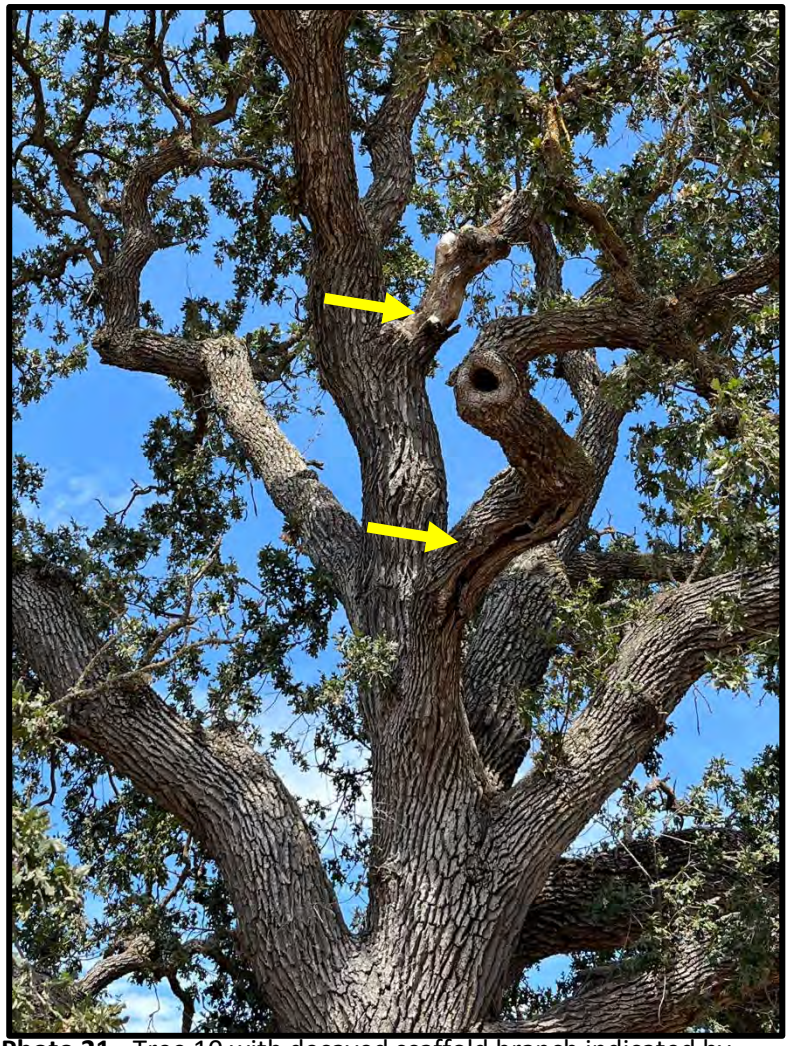


Photo 21 - Tree 10 with decayed scaffold branch indicated by yellow arrows.



Photo 22 - View of Tree 11 to north. At least 5 decayed scaffold branches would be removed which would reduce the tree at least 50%. Arrows indicate branch removal points.



Photo 23 - Tree 11 close up of declining canopy, decayed branches, and dead wood indicated by arrows.



Photo 24 - Tree 11 close up of root crown decay at southwest side of tree indicated by yellow arrow. Ant nest discovered here which indicates dead and rotting wood.

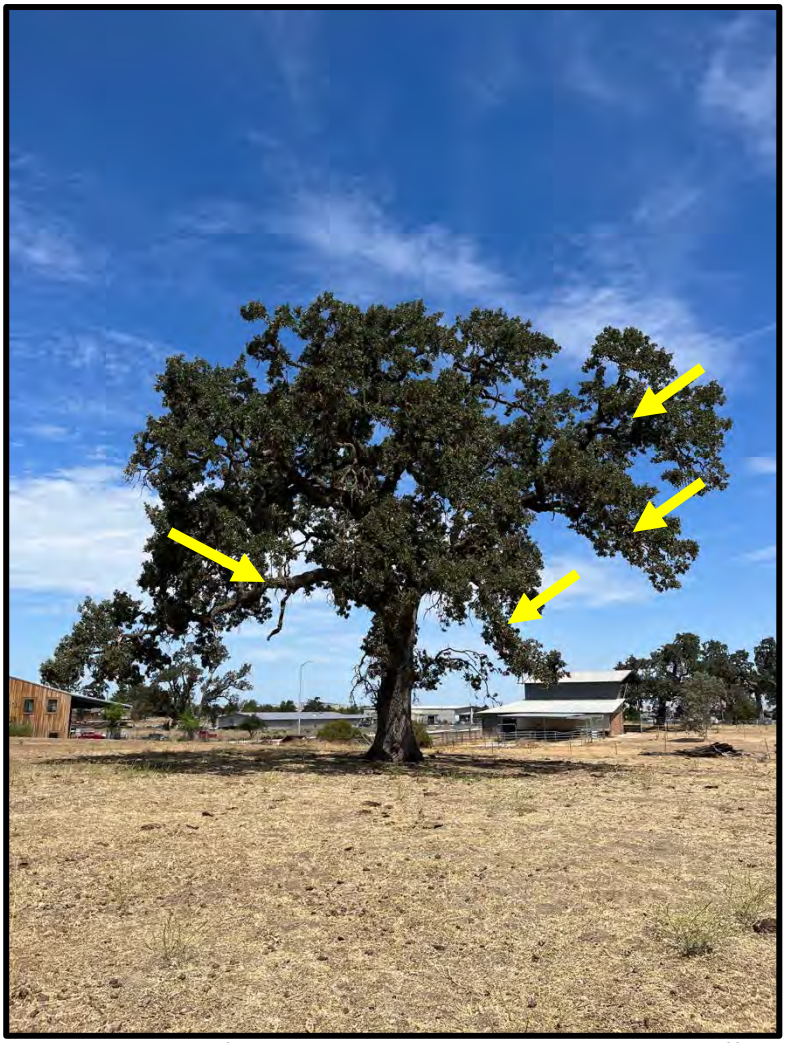


Photo 25 - View of Tree 13 to north. Note overextended scaffold branches indicated by arrows.



Photo 26 - Tree 13 with root decay cavity on south side of tree indicated by arrow.



Photo 27 - Tree 13 with bulging root-crown indicating possible butt-rot.



Photo 28- Tree 13 with decaying scaffold branch east side of canopy indicated by arrow. Line indicates locations for removal

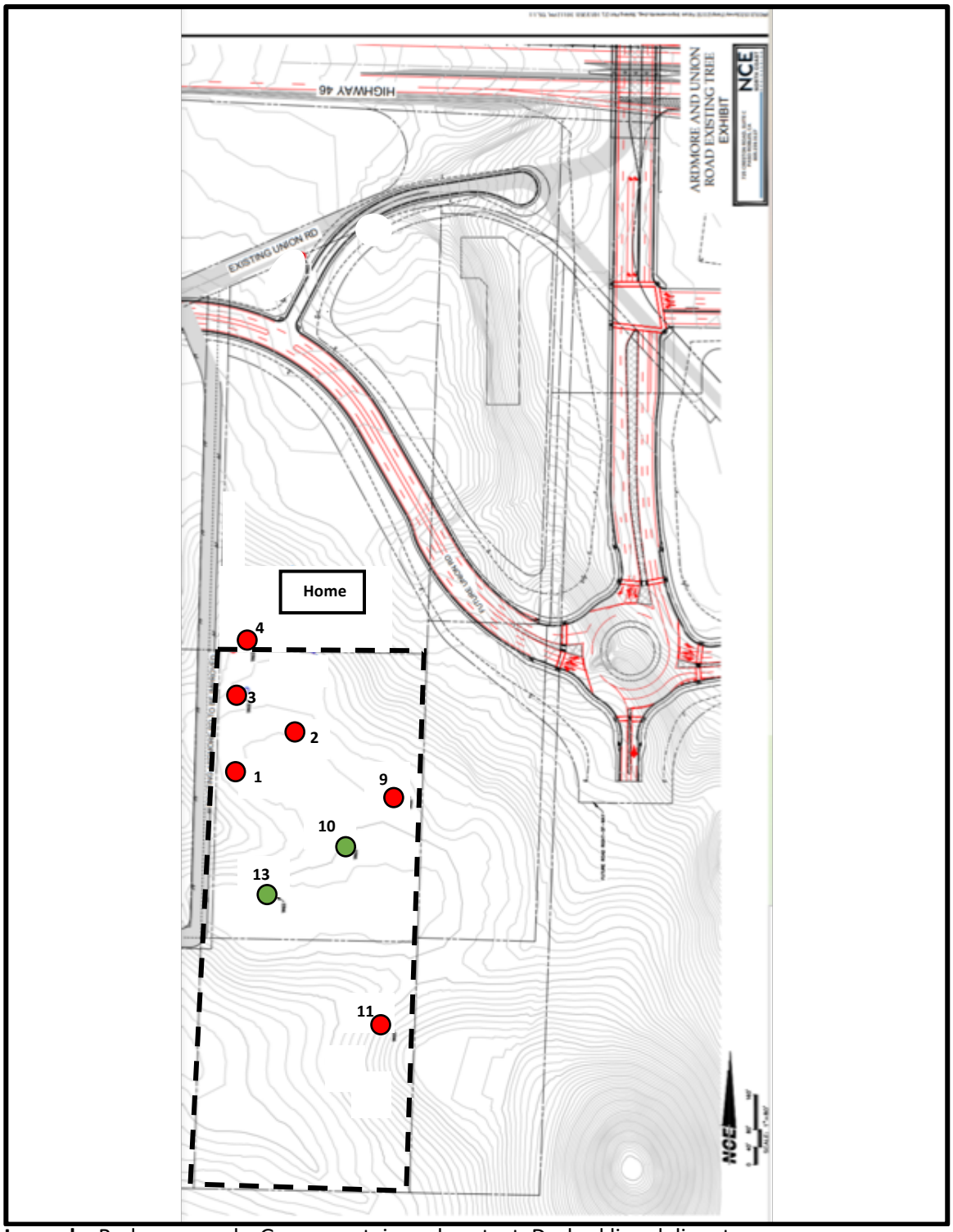




Photos 29 & 30 - Example of oak tree that failed due to root and butt-rot. Photo 29 shows failed roots. Photo 30 shows internal decay of trunk.

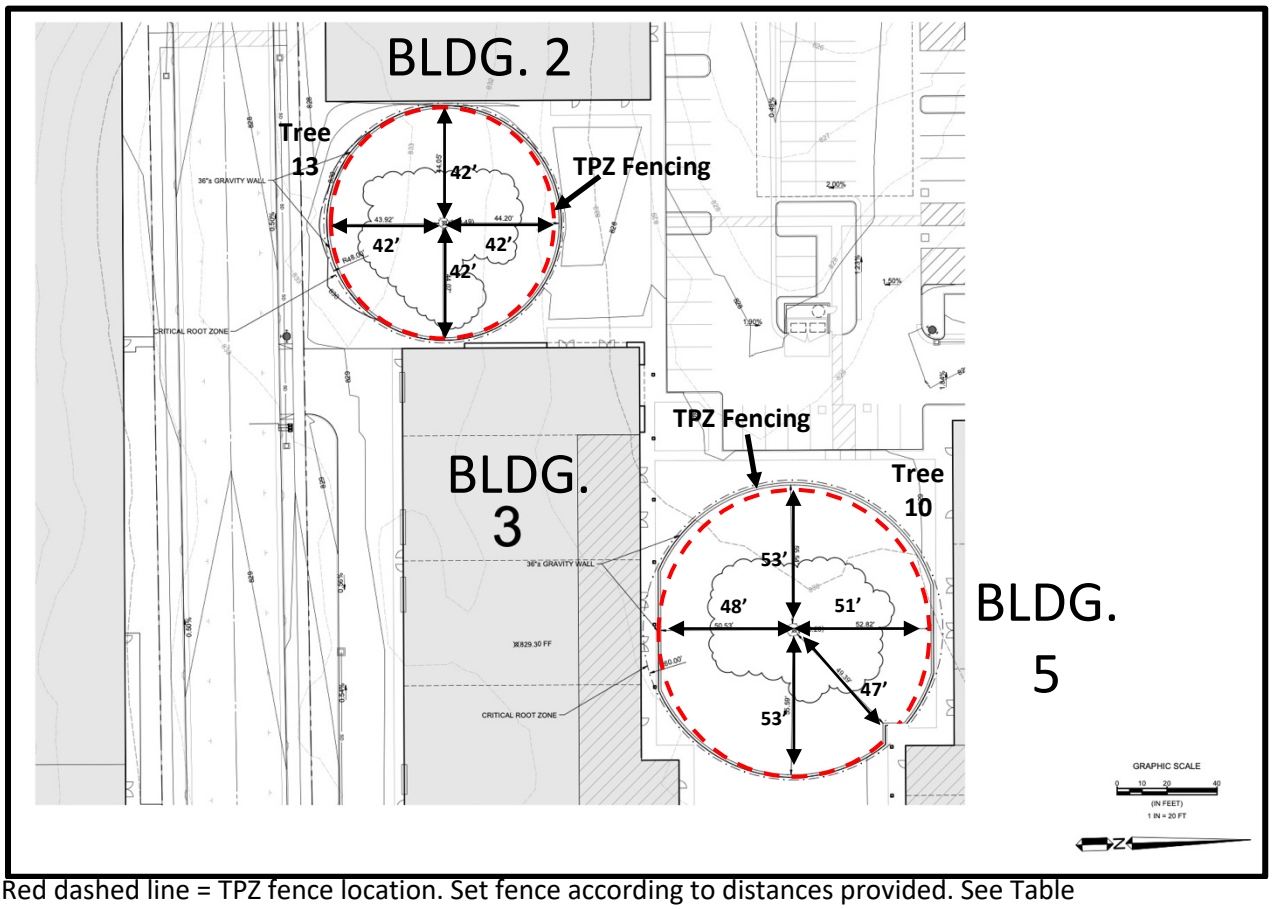
Appendix B – Maps

Map 1 - Tree Locations



Legend – Red = removals, Green = retain and protect, Dashed line delineates property boundaries.

Map 2 - Tree Protection Zones



Red dashed line = TPZ fence location. Set fence according to distances provided. See Table 1 - Tree Protection Zone Measurements in this report as well as full sized Tree Protection Zone Map in plan set for more detail. *This map has been cropped from the original provided by Wallace Group.*

Appendix C – Tree Protection Diagrams & Photos

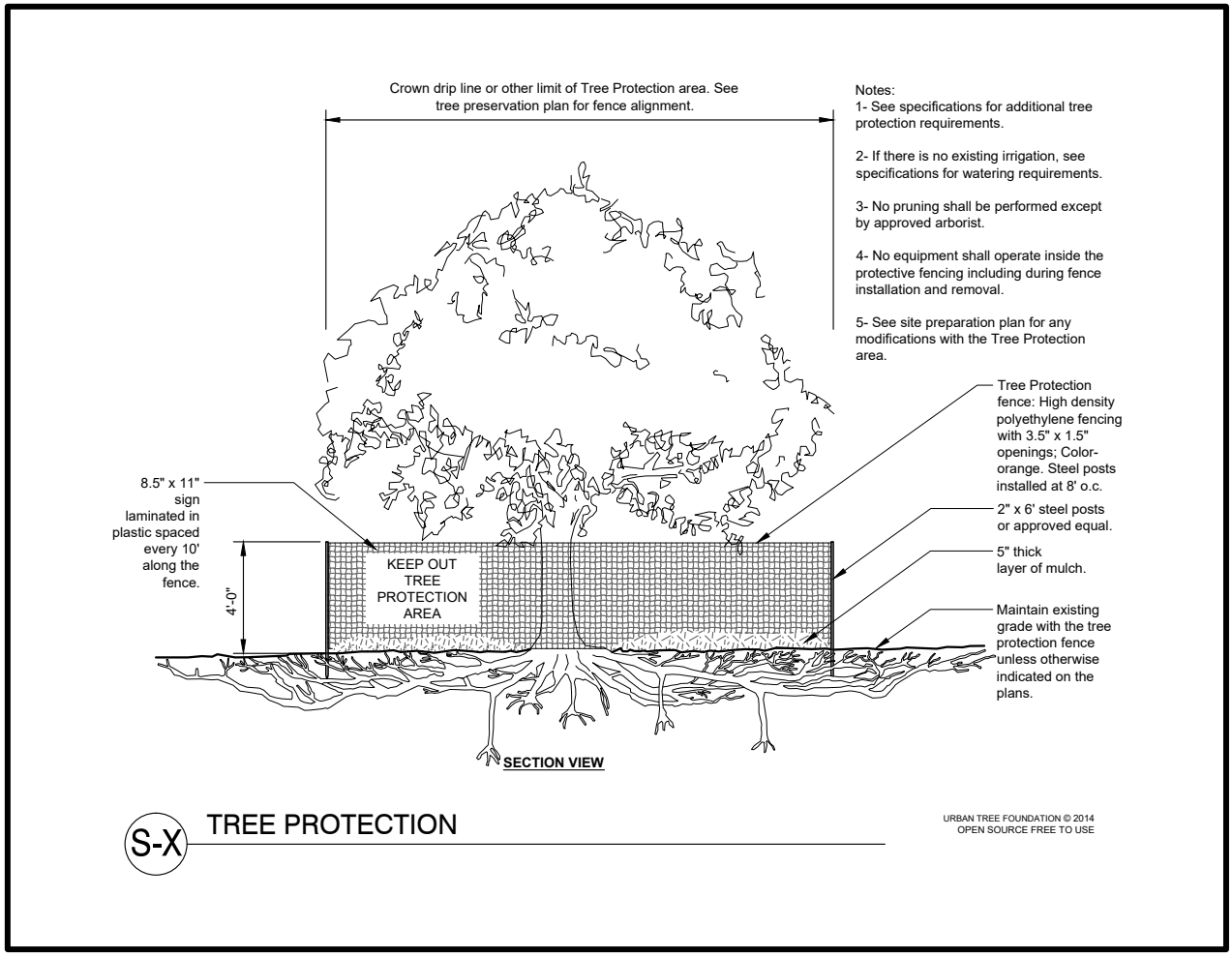


Diagram 1 –Vinyl Tree Protection Fencing

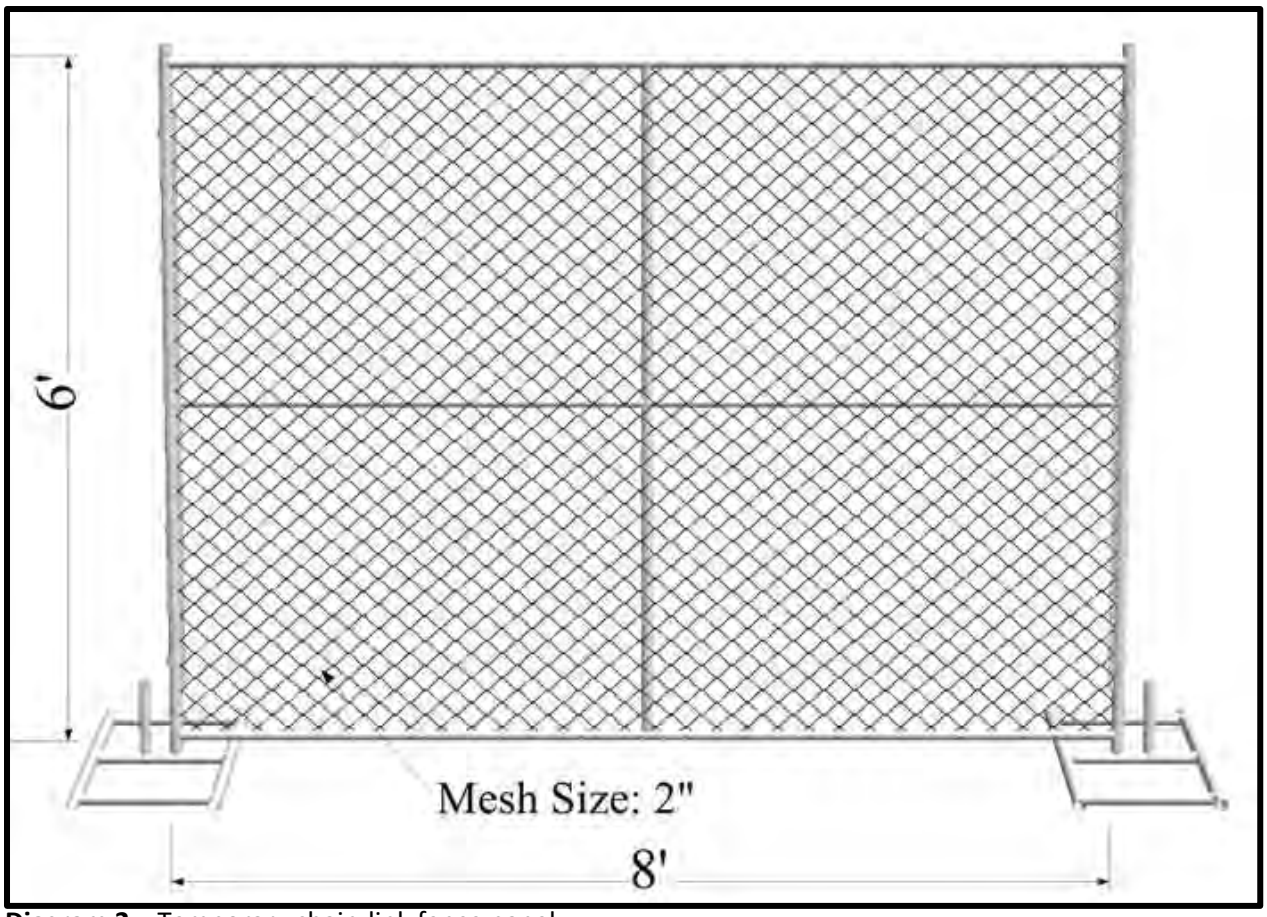


Diagram 2 – Temporary chain-link fence panel

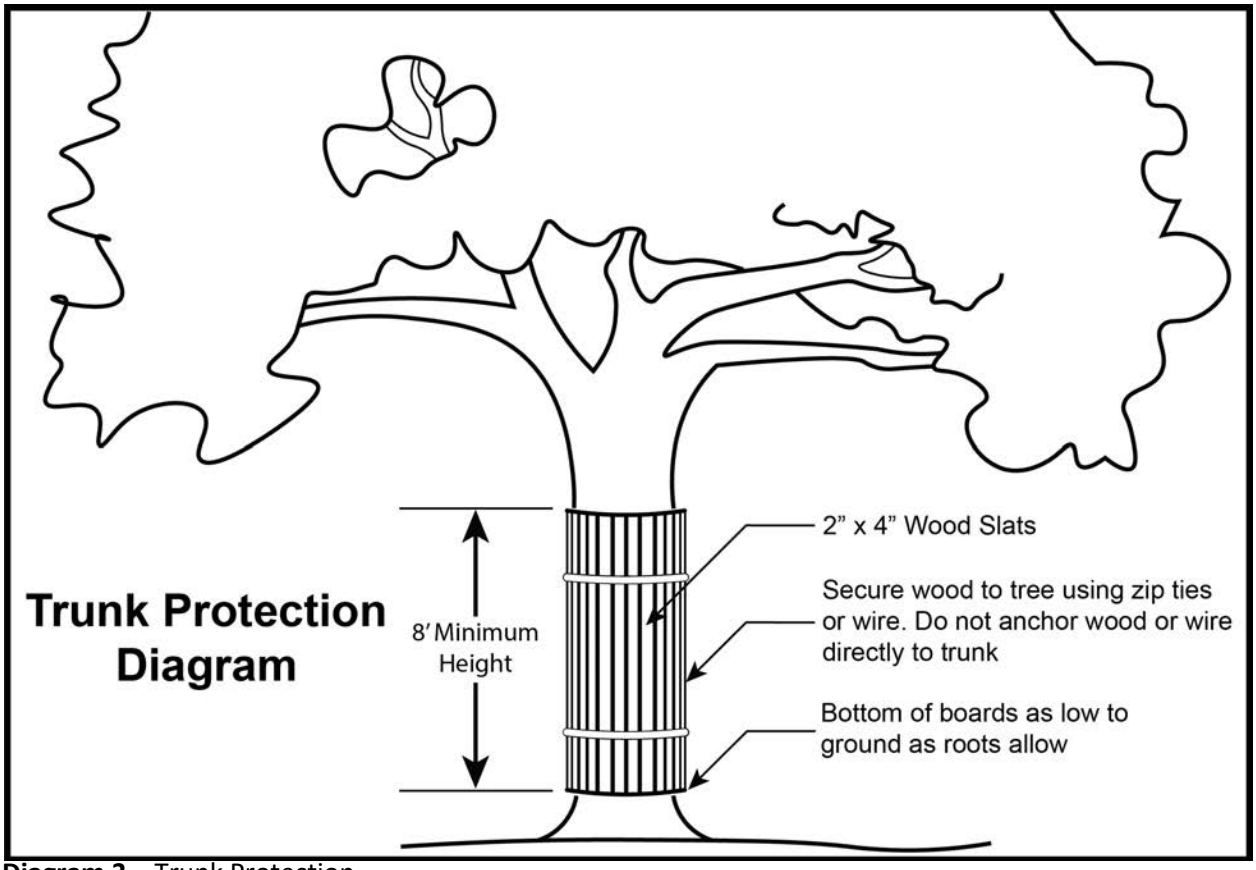


Diagram 3 – Trunk Protection



Photo A – Example of permanent fencing to exclude human activity beneath tree.

Appendix D - Tree Protection Requirements - Quick Reference List

Tree Protection During Construction - Tree protection shall be provided during the entire time construction activities occur. A Tree Protection Zone (TPZ) shall be established and maintained to ensure protected roots remain undisturbed.

Tree Protection Fencing - Tree protection fencing is required to be in place for the duration of the construction project and shall be installed before starting any ground disturbing activities. Do not remove any tree protection fencing or enter the TPZ without approval of the project arborist. The fencing shall delineate and protect the tree protection zone. The fencing shall be at minimum, 4 feet tall and made of orange, high density, polyethylene with 3.5" x 1.5" openings. It shall be installed on steel posts 8 feet on center and tightly stretched to prevent sagging. I **STRONGLY** recommend installing 6' X 8' temporary, chain-link, fence panels secured to driven steel post. This is a more secure and less moveable option than vinyl fencing that can easily be moved by hand or run over by vehicles. See Appendix C - Tree Protection Diagrams & Photos- Diagrams 1 & 2 – Tree Protection Fencing.

Trunk Protection - Trunk protection is required. The trunk shall also be protected by installing 2x4's against the trunk and securing them with zip-ties or wire. Do not anchor wood or wire directly to trunk. See Appendix C - Tree Protection Diagrams & Photos- Diagram 3 – Trunk Protection.

Tree Protection Signage - Weatherproof, tree protection signs stating, "Tree Protection Zone – Do Not Enter" shall be placed on the fencing & be spaced 10 feet apart. The Project Arborist's and General Foreman's contact numbers shall also be included on the sign. Signs shall remain in place until completion of the project. See Appendix C - Tree Protection Diagrams & Photos- Diagram 1 – Tree Protection Fencing.

Pre-Construction Meeting - A meeting with all contractors involved in the project shall occur with the project arborist before beginning construction activities. Any new contractors brought on site shall also meet or communicate with the project arborist to ensure they are aware of tree protection measures.

Preparing Tree Protection Zone - If construction occurs during the months of June through November, the TPZ's shall be irrigated to a depth of 12 inches before construction begins. This will ensure the trees are properly hydrated. Additional irrigations during "heat-waves" may be recommended by the project arborist.

Root Protection - No grading, trenching, paving or any other soil disturbance shall occur within or adjacent to the TPZ of the tree without permission and supervision by the project arborist. No trenching or excavation for footings, foundations, utilities or roadways shall occur within or adjacent to the TPZ without first, hand trenching the location and exposing roots.

If possible, conduit or other utilities shall be "fished" below roots larger than 1-inch diameter. Any roots 1-inch diameter or larger that are approved for pruning shall be hand cut with a clean pruning saw or Sawzall. Once roots are hand cut, machinery can remove the severed roots. Cutting any roots 1-inch diameter or larger requires supervision by the project arborist.

Root Pruning - If the project arborist determines that a root over 1-inch diameter needs to be cut, it shall be cut by hand with a pruning saw or reciprocating saw "Sawzall". After cutting a root, the area shall be backfilled as soon as possible with moist soil or covered with wet burlap until backfill can be completed. Burlap shall be kept wet the entire time it is in use for cut-root protection.

Dumping, Cleanout or Storage of Materials - No construction materials, soils, or debris shall be stored in the TPZ. No concrete, plaster, paint or chemical washout shall be allowed within the Tree Protection Zone (TPZ) or Critical Root Zone (CRZ).

Monitoring - An initial inspection shall be completed by the project arborist prior to commencement of construction activities to ensure that all tree protection measures have been put in place. Weekly inspections of the TPZ and associated fencing shall also be completed by the project arborist until construction is complete. Any root pruning, excavation, grading or filling within 5 feet of the TPZ shall a be monitored by the project arborist.

Project Arborist Contact Information - Rodney Thurman – Heritage Tree Arboricultural Consulting – Cell: 805 234 8760 – Email: rodney@heritagetreeconsulting.com

3/14/2023

Ardmore Industrial

PRELIMINARY ESTIMATE OF WATER USE

LAND USE TYPE	QUANTITY	UNIT	TOTAL DEMAND (acre-ft/yr.)	NOTES
Building 1				
Large Warehouse	116,812	SF	1.6	144 employees (assumed based on number of parking spaces) @ 10 gpd[1]
Office	9,000	SF	0.8	125 sf/employee, 10 gpd[1]/employee (Metcalf & Eddy)
Building 2-6				
Commercial	7,392	SF	0.3	Assume 250 sf/employee, 10 gpd[1]/employee
Storage	40,271	SF	0.0	
Manufacturing	25,836	SF	6.7	6,000 gpd [2] - Assume Food Processing/Winery as worst case
Wine Making	41,016	SF	7.7	6,900 gpd [2]
Landscape	2.63	AC	3.7	Based upon EAWU
TOTAL ESTIMATED WATER USE			**21**	**acre-ft/year**

1. Taken from *Wastewater Engineering, Treatment and Reuse* , 4th Edition, Metcalf and Eddy.

2. Estimate based upon historical Wallace Group knowledge

3/9/2023

WALLACE GROUP®

Ardmore Industrial

PRELIMINARY ESTIMATE OF WASTEWATER DEMAND

LAND USE TYPE	QUANTITY	UNIT	TOTAL DEMAND (gal/day)	NOTES
Building 1				
Large Warehouse	116,812	SF	1,440	144 employees (assumed based on number of parking spaces) @ 10 gpd[1]
Office	9,000	SF	720	125 sf/employee 10gpd[1]/employee
Buildings 2-6 (Industrial Flex)				
Commercial	7,392	SF	296	Assume 250 sf/employee, 10gpd[1]/employee
Storage	40,271	SF	0	
Manufacturing	25,836	SF	6,000	6,000 gpd [2] - Assume Food Processing/Winery as worst case
Wine Making	41,016	SF	6,900	6,900 gpd [2]
TOTAL ESTIMATED SEWAGE USE (PRE-TREATMENT REQUIRED)			**15,356**	**gpd**
			11	**gpm**
		Design Flow	**21**	**gpm - 2.0 Peaking Factor**

1. Taken from *Wastewater Engineering, Treatment and Reuse* , 4th Edition, Metcalf and Eddy.

2. Estimate based upon historical Wallace Group knowledge