Appendix E: Project Specific Water Quality Management Plan

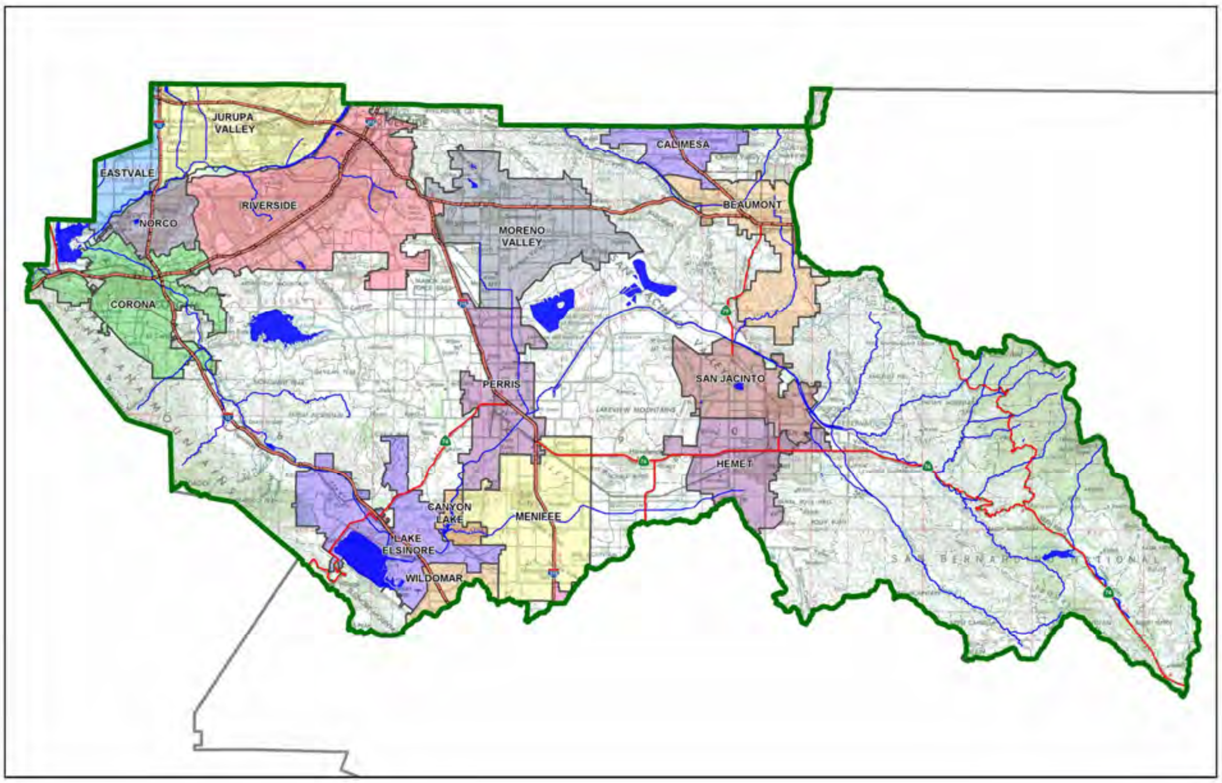
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Woodcrest Christian School, 18401 Van Buren Blvd.

Development No: GP-2023-17709

Design Review/Case No: PR-2023-001080



☒ **Preliminary**
☐ **Final**

Original Date Prepared: July 2023

Revision Date(s): November 2023, May 2024

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

Prepared for:
Woodcrest Christian
18401 Van Buren Blvd
Riverside, CA 92508
Tel: (951) 780-2010

Prepared by:
adkan ENGINEERS
6879 Airport Drive
Riverside, CA 92504
Tel: (951) 688-0241

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Woodcrest Christian by Adkan Engineers for the Woodcrest Christian School.

This WQMP is intended to comply with the requirements of the City of Riverside, which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Riverside Water Quality Ordinance (Municipal Code Section 14.12.315).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

____
Owner's Signature

____
Date

____
Owner's Printed Name

____
Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

[signature]
Preparer's Signature

5-15-2024
Date

Mitch Adkison
Preparer's Printed Name

Executive Vice President
Preparer's Title/Position

Preparer's Licensure:

REGISTERED PROFESSIONAL ENGINEER
MITCHELL JAY ADKISON
NO. 75731
CIVIL
STATE OF CALIFORNIA

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Section A: Project and Site Information

PROJECT INFORMATION		
Type of Project:	School	
Ward Area:	Ward 4	
Community Name:	Orangecrest	
Development Name:	Woodcrest Christian School	
PROJECT LOCATION		
Latitude & Longitude (DMS): 33°/53'07.7"N, 117°20'26.6"W		
Project Watershed and Sub-Watershed: Santa Ana, Reach 3		
APN(s): 266-020-057		
Map Book and Page No.: Thomas Bros Page 746, Grid C3		
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)		PF – Private School
Proposed or Potential SIC Code(s)		8211
Area of Impervious Project Footprint (SF)		171,221
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement		171,221
Does the project consist of offsite road improvements?		☒ Y ☐ N
Does the project propose to construct unpaved roads?		☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?		☐ Y ☒ N
EXISTING SITE CHARACTERISTICS		
Total area of existing Impervious Surfaces within the project limits (SF)		47,314 SF
Is the project located within any MSHCP Criteria Cell?		☐ Y ☒ N
If so, identify the Cell number:		N/A
Are there any natural hydrologic features on the project site?		☒ Y ☐ N
Is a Geotechnical Report attached?		☐ Y ☒ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)		See Appendix 3
What is the Water Quality Design Storm Depth for the project?		0.51in

The proposed project will consist of construction of 5 new buildings and building additions to two existing buildings with new parking areas, driveways and landscape areas on the easterly side of the site along Dauchy Avenue. The treatment area located on the east side are of the site is an oversized bio-retention area design to treat the amount of runoff required by all 5 new building areas and building additions. The buildings proposed on the westerly side of the site, along Little Court, and the building additions will use flow guard downspout filters to treat the run off due to limited area.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Santa Ana River Reach 3	Lead, Copper, Indicator Bacteria	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	7.5 miles
Prado Basin	pH	REC1, REC2, WARM, WILD, RARE	11 miles

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*		☐ N
County of Riverside Conditional Use Permit	☒ Y	☐ N
County of Riverside Design Review	☒ Y	☐ N
County of Riverside Grading Permit	☒ Y	☐ N
County of Riverside Construction Permit	☒ Y	

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?
Yes, the drainage pattern for the site that is being developed was naturally draining to the north. This same pattern was conserved such that the site drains to the proposed bioretention basin.

Did you identify and protect existing vegetation? If so, how? If not, why?
No, trees or other vegetation that is required to be protected was identified at this point in time. The area of the project site that is being developed will have all existing vegetation removed.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?
No, site will use an oversized bio-retention to treat and over-mitigate the east side and the treatment area required by the westerly two building. In addition, the westerly two building will be treated using flow based FloGard +Plus® Downspout Filter or equivalent.

Did you identify and minimize impervious area? If so, how? If not, why?
Impervious area was minimized to the largest extent possible given the parking requirements and amenities being provided for a project of this type.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?
Yes, a pervious area was created within the bioretention. Nearly all of the runoff from the developed project site was dispersed to this pervious area.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
D.1.1	*Roofs*	7,232	D
D.1.2	*Concrete / Asphalt*	*6,309*	D
D.1.3	*Landscape*	*6,801*	D
D.2.1	*Roofs*	15,123	D
D.2.2	*Concrete / Asphalt*	*5,999*	D
D.2.3	*Landscape*	*4,309*	D
D.3.1	*Roofs*	*31,027*	D
D.3.2	*Concrete / Asphalt*	66,043	D
D.3.3	*Landscape*	28,378	D

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A				N/A		

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
N/A					N/A		

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
D.1	Bio-Retention (oversized D.3)
D.2	Bio-Retention (oversized D.3)
D.3	Bio-Retention Basin (Oversized)

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

-

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		
Describe here: (Report N/A currently)		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

☒ None of the above apply.

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 35,667 sf

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 135,749

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 0.51

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 0.51 * 135,749=69,232

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
69,232	35,661

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

*Projected Number of Daily Toilet Users: 24 tu/ac * 3.94 = 94.56*

Project Type: School

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 135,749/43,560= 3.1163

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 24

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

*Minimum number of toilet users: 24 * 3.1163=74.7912*

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
74.7912	94.56

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: N/A

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy. D.3 Bio-Retention basin is oversized to account for D.1, D.2 and D.3 treatment areas. In addition, the use of down spout filters for buildings in D.1 and D.2 to minimize contaminates.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
D.1.1	☐	☐	☐	☐	☒
D.1.2	☐	☐	☐	☐	☒
D.1.3	☐	☐	☐	☐	☒
D.2.1	☐	☐	☐	☐	☒
D.2.2	☐	☐	☐	☐	☒
D.2.3	☐	☐	☐	☐	☒
D.3.1	☐	☐	☒	☐	☐
D.3.2	☐	☐	☒	☐	☐
D.3.3	☐	☐	☒	☐	☐

No LID for D.1 and D.2, Over-mitigating in DMA D.3 with an oversized bio-retention to treat the east side of the project, including the treatment area required by the westerly two building. In addition, the westerly two building will utilize flow based FloGard +Plus® Downspout Filter or equivalent for pre-treatment.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*D-3 Bio-Retention*		
	[A]		[B]	[C]	[A] x [C]	*Design Storm Depth (in)*	*Design Capture Volume, **V_{BMP}** (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
D-1.1	*7,323*	*Roof*	*1.0*	*0.89*	*6,450.9*			
D-1.2	*6,309*	*Concrete/ Asphalt*	*1.0*	*0.89*	*5,627.6*			
D-1.3	*6,801*	*Landscaping*	*0.1*	*0.11*	*751.2*			
D-2.1	*15,123*	*Roof*	*1.0*	*0.89*	*13,489.7*			
D-2.2	*5,999*	*Concrete/ Asphalt*	*1.0*	*0.89*	*5,351.1*			
D-2.3	*4,309*	*Landscaping*	*0.1*	*0.11*	*476*			
D-3.1	*31,027*	*Roof*	*1.0*	*0.89*	*27,676.10*			
D-3.2	*66,043*	*Concrete/ Asphalt*	*1.0*	*0.89*	*58,910.40*			
D-3.3	*28,378*	*Landscaping*	*0.1*	*0.11*	*3,134.60*			
	177221				121,867.6	0.51	5,179.4	5,263

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Committee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☒ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☒	☒	☒	☒	☒	☒	☒

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

[1]Cannot Exceed 50%
[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	$A_T = \Sigma[A]$				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration			
Volume (Cubic Feet)			

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

☐ a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

☐ b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

☒ c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

☐ d. None of the above.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*****:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*****:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*****:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Onsite Storm Drain Inlets	• Mark all drains with the words, "Only Rain Down the Storm Drain" or similar.	• Maintain and periodically repaint or replace inlet markings. • Provide stormwater pollution prevention information to new site owners, lessees, or operators. • Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Need for future indoor & structural pest control	• Note building design features that discourage entry of pests.	• Provide Integrated Pest Management information to owners, lessees, and operators
Landscape/Outdoor Pesticide Use	• Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. • Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers or pesticides that contribute to stormwater pollution. • Consider using pest-resistant plants, especially adjacent to hardscape. • Select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping using minimum or no pesticides. • See applicable operational BMP educational materials. • Provide IPM information to new owners, lessees, and operators.
Refuse Areas	• Signs shall be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	• Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34 "Waste Handling and Disposal" in Appendix 10.

Vehicle and Equipment Cleaning		• Washwater from vehicle and equipment washing shall not be discharged to the storm drain system.
Fire Sprinkler Test Water	• Provide a means to drain fire sprinkler test water to the sanitary sewer.	• See Fact Sheet SC-41 "Building and Grounds Maintenance" in Appendix 10.
Condensate drain lines	• Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.	
Rooftop equipment	• Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.	
Roofing, gutters, and trim	• Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
Plazas, Sidewalks, and Parking Lots		• Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
Bio	Bio-retention	Conceptual Grading Sheet	33°53’09.3”N, 117°20’26.6”W

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: Property Owner to be responsible for all maintenance onsite.

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Operation and Maintenance Plan and Maintenance Mechanism is included in Appendix 9. Educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP are included in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

WQMP – BMP MAP
WOODCREST CHRISTIAN

OWNER/APPLICANT

WOODCREST CHRISTIAN
18401 VAN BUREN BLVD
RIVERSIDE, CA 92508
(951) 780-2010

ENGINEER

adkan ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA. 92504
951-688-0241

ASSESSOR'S PARCEL NUMBER

266-020-057
TOTAL PARCEL AREA: 0.90 ACRES

LEGEND

- EXISTING STORM DRAIN
- PROPOSED ONSITE STORM DRAIN
- PROPOSED OFFSITE STORM DRAIN
- DMA BOUNDARY
- DRAINAGE FLOW DIRECTION ARROW
- ASPHALT/CONCRETE
- ROOF
- LANDSCAPE
- BIO-RETENTION AREA
- OVER-MITIGATION AREA

SITE DESIGN BMPS

SD-10 SITE DESIGN & LANDSCAPE PLANNING
SD-11 ROOF RUNOFF CONTROLS
SD-12 EFFICIENT IRRIGATION
SD-13 STORM DRAIN SIGNAGE
SD-30 FUELING AREAS
SD-32 TRASH STORAGE AREAS
SD-33 VEHICLE WASHING AREAS

SOURCE CONTROL BMPS

SC-10 STORM DRAIN INLET PROTECTION
SC-11 SPILL PREVENTION, CONTROL AND CLEANUP
SC-20 VEHICLE AND EQUIPMENT FUELING
SC-21 VEHICLE AND EQUIPMENT CLEANING
SC-34 WASTE HANDLING AND DISPOSAL
SC-41 BUILDING AND GROUNDS MAINTENANCE
SC-43 PARKING/STORAGE AREA MAINTENANCE

TREATMENT CONTROL BMPS

TC-32 BIORETENTION

BMP SIZING METHOD FOR BIORETENTION W/ UNDERDRAINS

CAPTURE EFFICIENCY METHOD FOR VOLUME-BASED, CONSTANT DRAWDOWN BMPS
DRAWDOWN TIME = 7.8 HOURS
ADJUSTED DCV (DESIGN VOLUME) = 5,179 CF
PONDING DEPTH = 0.5'
REQUIRED BASIN AREA = 2,878 SF
PROVIDED BASIN AREA = 2,882 SF

*SEE APPENDIX 6 OF WQMP REPORT FOR ADDITIONAL INFORMATION AND CALCULATIONS REGARDING THIS METHOD OF SIZING.

BMP NOTE

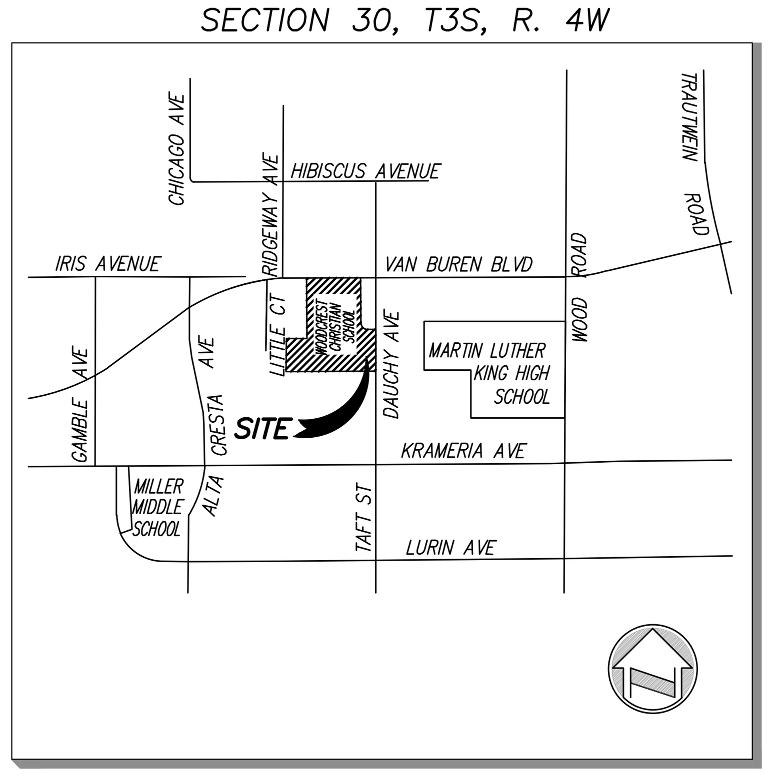
ALL ROCK OR SAND TO BE PLACED IN POST-CONSTRUCTION BMPS SHALL BE CLEAN-WASHED ROCK TO SATISFACTION OF THE GRADING INSPECTOR

BIORETENTION/FILTRATION BMPS

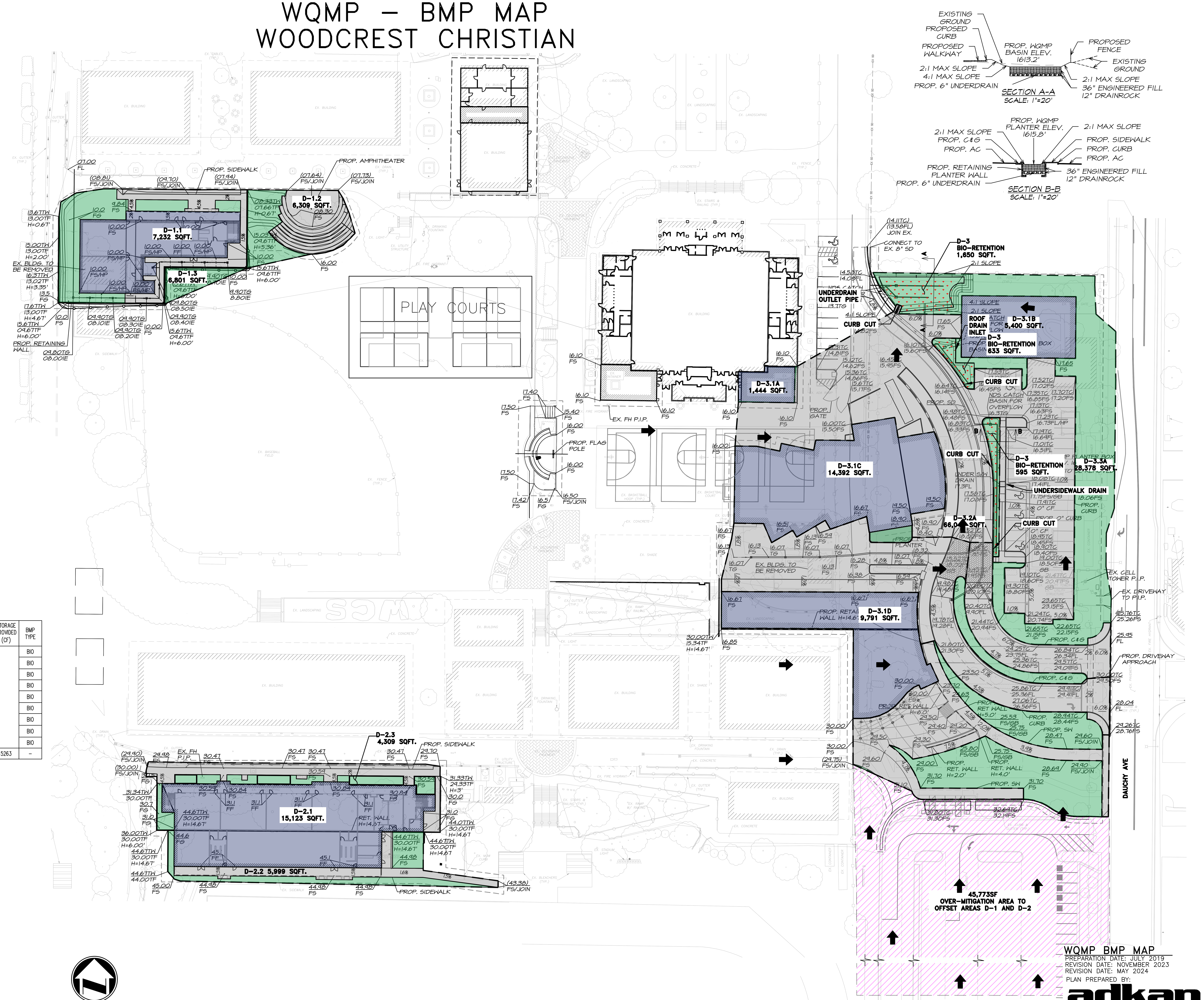
IMMEDIATELY BELOW THE SOIL MEDIA (BMS) INCLUDE A SECTION OF 12" GRAVEL LAYER DEPTH. ALL SUBDRAINS SHALL BE 6" PERFORATED SCH. 40 WITH MINIMUM SLOPE OF 0.5%

DMA	SURFACE TYPE	DMA TYPE	TOTAL AREA	PERVIOUS AREA	IMPERVIOUS AREA	% PERVIOUS	% IMPERVIOUS	EFFECTIVE IMPERVIOUS FRACTION	DMA RUNOFF FACTOR	V BMP (CF)	BIO-RETENTION PROPOSED SURFACE AREA	STORAGE REQUIRED (CF)	STORAGE PROVIDED (CF)	BMP TYPE
DMA 1.1	ROOF	D	7232	0	7232	0	100	1	0.89					BIO
DMA 1.2	CONC/AC	D	6309	0	6309	0	100	1	0.89					BIO
DMA 1.3	LANDSCAPE	D	6801	6801	0	100	0	0.10	0.11					BIO
DMA2.1	ROOF	D	15123	0	15123	0	100	1	0.89					BIO
DMA2.2	CONC/AC	D	5999	0	5999	0	100	1	0.89					BIO
DMA2.3	LANDSCAPE	D	4309	4309	0	100	0	0.10	0.11					BIO
DMA3.1	ROOF	D	31027	0	31027	0	100	1	0.89					BIO
DMA3.2	CONC/AC	D	66043	0	66043	0	100	1	0.89					BIO
DMA3.3	LANDSCAPE	D	28378	28378	0	100	0	0.10	0.11					BIO
TOTAL	–	–	171221	39488	131733	–	–	–	–	5179.40	2882	5179.40	5263	–

SECTION 30, T3S, R. 4W



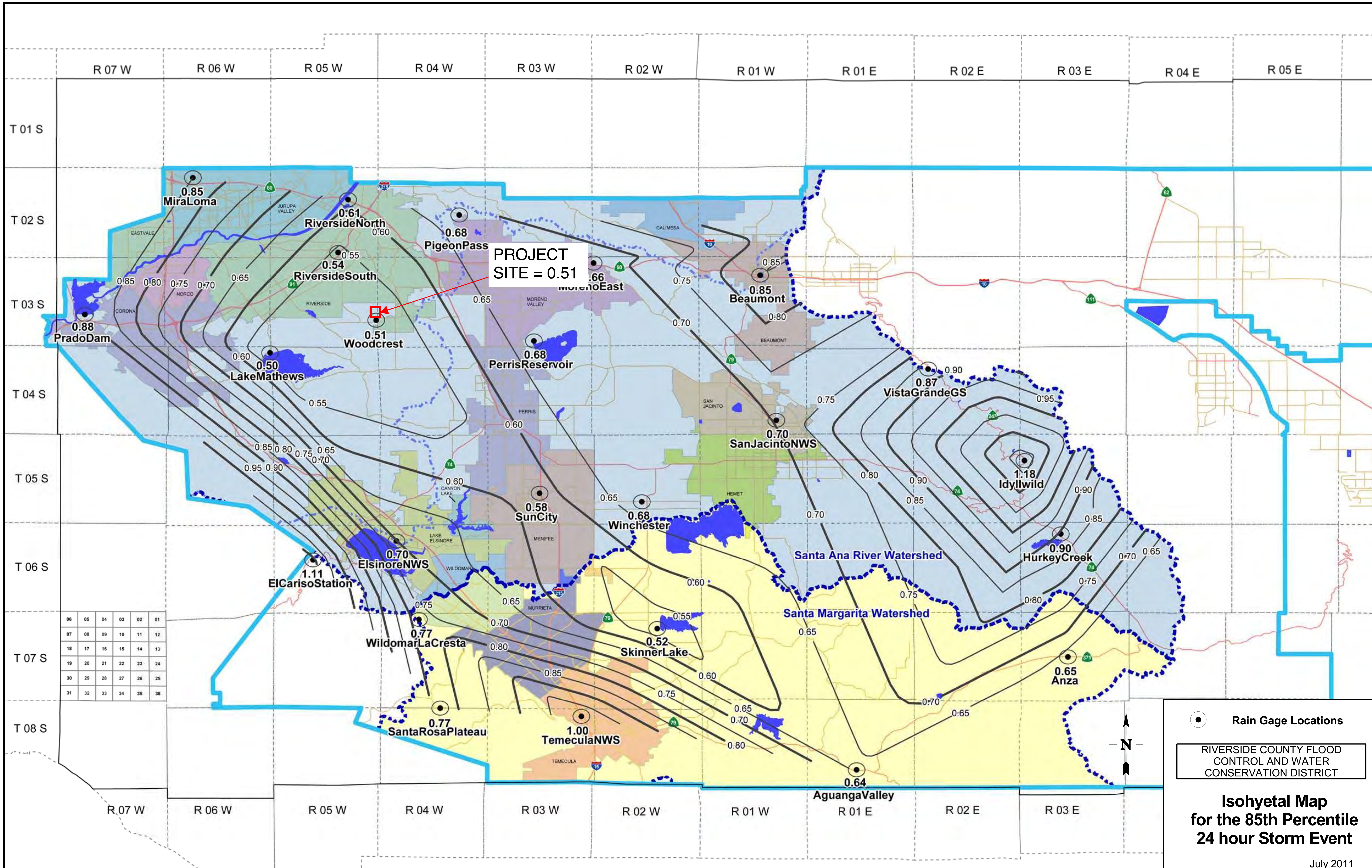
VICINITY MAP
N.T.S.



0 15 30 60 90 120
SCALE: 1" = 30'

WQMP BMP MAP
PREPARATION DATE: JULY 2019
REVISION DATE: NOVEMBER 2023
REVISION DATE: MAY 2024
PLAN PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599


PROJECT SITE = 0.51
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011
Santa Ana River Watershed
Santa Margarita Watershed
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.51 Woodcrest
0.85 Beaumont
0.88 PradoDam
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
R 01 W
R 01 E
R 02 E
R 03 E
R 04 E
R 05 E
T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S
N


Interstate Towing
Van Buren Boulevard
Van Buren Boulevard
Little Ct
Little Ct
Dauchy Ave
Woodcrest Christian
Arde
SITE
Blue Sky St
Frontline Missions
Kett

RECEIVING WATERS MAP

LEGEND

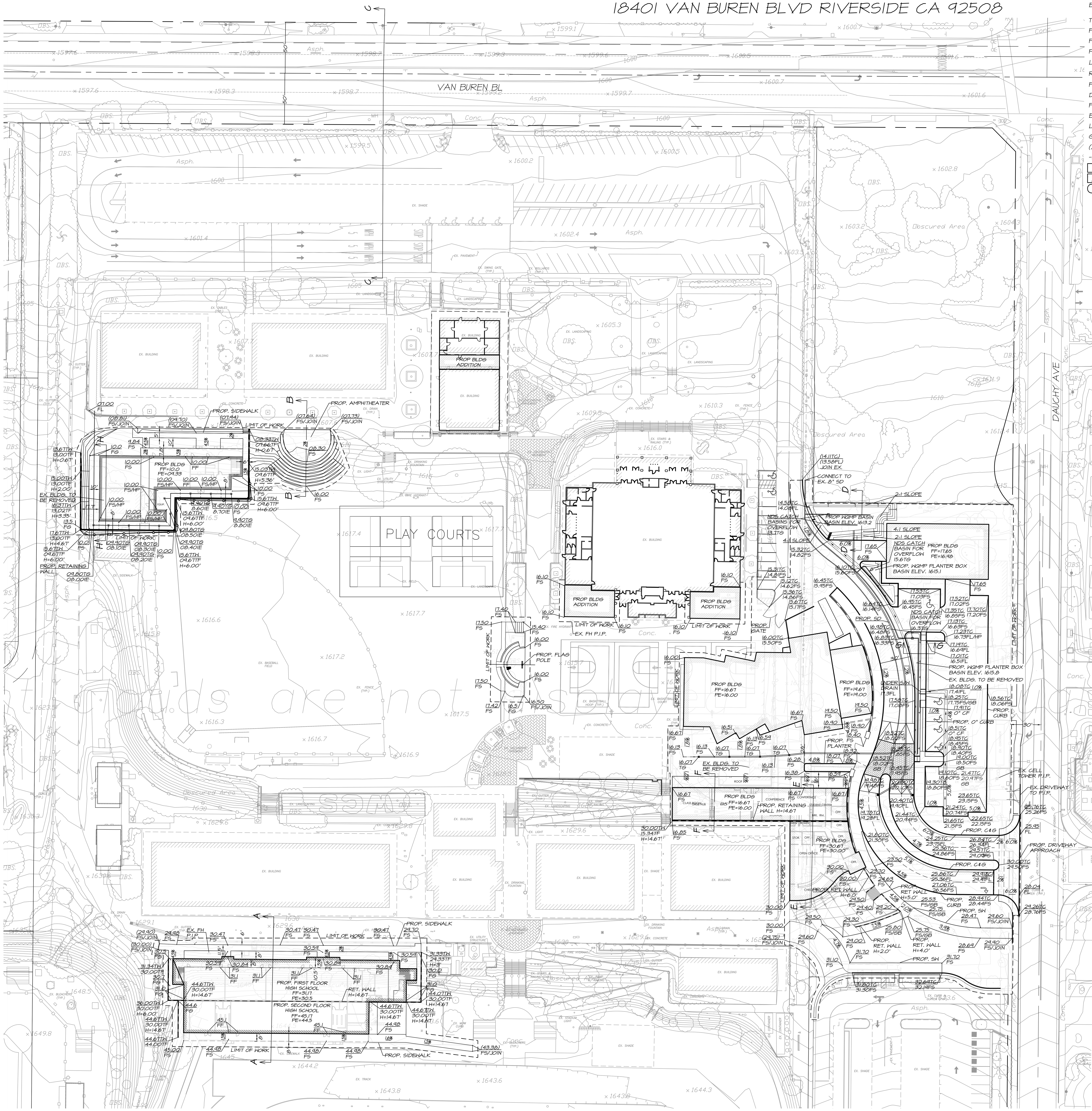
- Lake Evans to Santa Ana River, Reach 3
- Tequesquite Arroyo (Sycamore Creek) to Santa Ana River, Reach 3
- Anza Park Drain to Santa Ana River, Reach 3
- Santa Ana River, Reach 3
- Mockingbird Reservoir to Temescal Creek, Reach 1 to Santa Ana River, Reach 3 - via Arlington Channel
- Temescal Creek, Reach 1 to Santa Ana River, Reach 3 - via Arlington Channel
- Temescal Creek, Reach 1 to Santa Ana River, Reach 3 - via La Sierra Channel to Arlington Channel
- Outside City Limits
- San Jacinto Watershed

Appendix 2: Construction Plans

Grading and Drainage Plans

CONCEPTUAL GRADING PLAN
WOODCREST CHRISTIAN SCHOOL

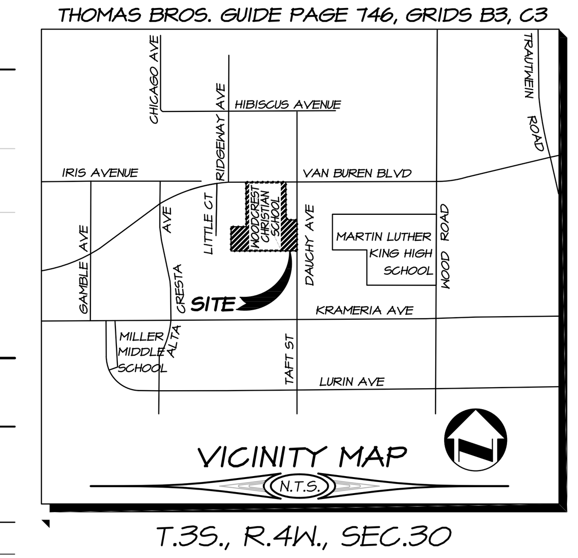
18401 VAN BUREN BLVD RIVERSIDE CA 92508



LEGEND

EC	EDGE OF CONCRETE	
ASPH.	ASPHALT	
EP	EDGE OF PAVEMENT	
CO	SEWER CLEAN-OUT	
EX. R/W	OFF-SITE EXISTING RIGHT OF WAY	
TE	TRASH ENCLOSURE	
FF	FINISHED FLOOR	
FH	FIRE HYDRANT	
PROP. P/L	PROPOSED PROPERTY LINE	
LLA	LOT LINE ADJUSTMENT	
R/W	ON-SITE RIGHT OF WAY	
FDC	FIRE DEPT. CONNECTION	
DDC	DOUBLE DETECTOR CHECK	
FL	FLOWLINE	
EX. CL	EXISTING CENTERLINE	
LS	LANDSCAPE	
GB	GRADE BREAK	
(XX.XX)	EXISITNG TOPO ELEVATION	
-XX-	NUMBER OF PARKINGS	
	PROP. CONCRETE SLAB	
	PROP. LANSCAPING	
	PROP. BMP AREA	
	FREE STANDING BLOCK WALL	
	BMP WATER QUALITY TREATMENT AREAS	

THOMAS BROS. GUIDE PAGE 746, GRIDS B3, C3



T.3S., R.4W., SEC.30

OWNER / APPLICANT

WOODCREST CHRISTIAN SCHOOL
18401 VAN BUREN BLVD
RIVERSIDE, CA 92508
TEL: (951) 780-2079

ENGINEER

ADKAN ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA 92504
TEL: (951) 688-0241

ASSESSOR'S PARCEL NUMBERS

266-020-013 266-020-057
266-020-014 266-020-058
266-020-015 266-020-059

ZONING / LAND USE

EXISTING ZONING:
PF - PUBLIC FACILITIES / INSTITUTIONAL
CR - COMMERCIAL
PROPOSED ZONING:
PF - PUBLIC FACILITIES / INSTITUTIONAL

UTILITY PURVEYORS

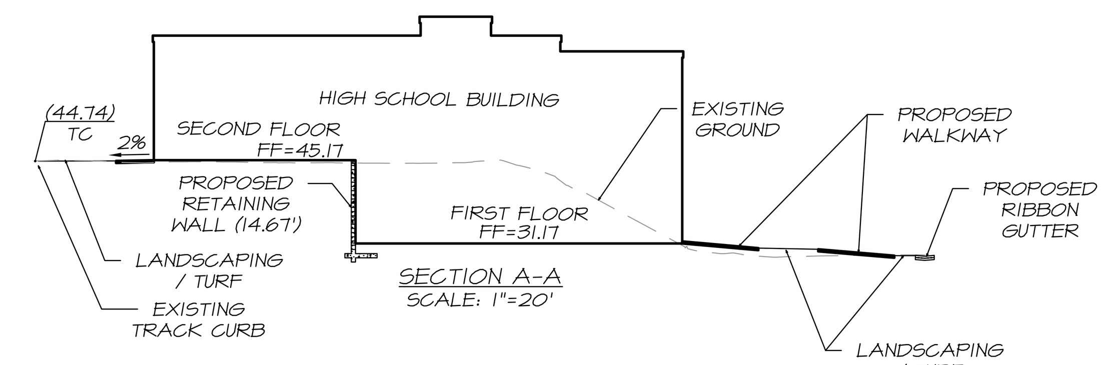
WATER: WESTERN MUNICIPAL WATER DISTRICT
SEWER: CITY OF RIVERSIDE
GAS: SOUTHERN CALIFORNIA GAS COMPANY
ELECTRICITY: CITY OF RIVERSIDE

BENCHMARK

DATUM: NGVD88 ELEVATION:1585.301

A BRASS DISK MARKED "VB-12-64" SET IN A 1X3X7 FOOT GRANITE BOULDER, 2 FEET EAST OF A MARKER POST, 116 FEET NORTH OF VAN BUREN BLVD., 92 FEET EAST OF CHICAGO AVENUE, AT THE SOUTHEAST CORNER OF VAN BUREN BLVD, AND CHICAGO AVENUE IN THE WOODCREST AREA. NOTE: THIS DESCRIPTION CONTAINS A DISCREPANCY RELATED TO THE QUADRANT THE BM FALLS IN.

NOTE: THE BM IS FOUND 116 FEET SOUTH OF VAN BUREN BLVD.



SECTION A-A
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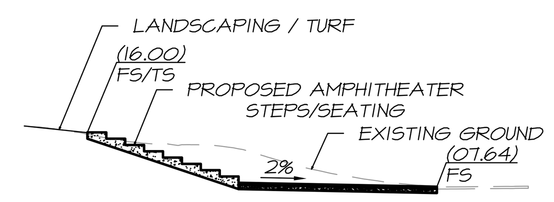

SECTION B-B
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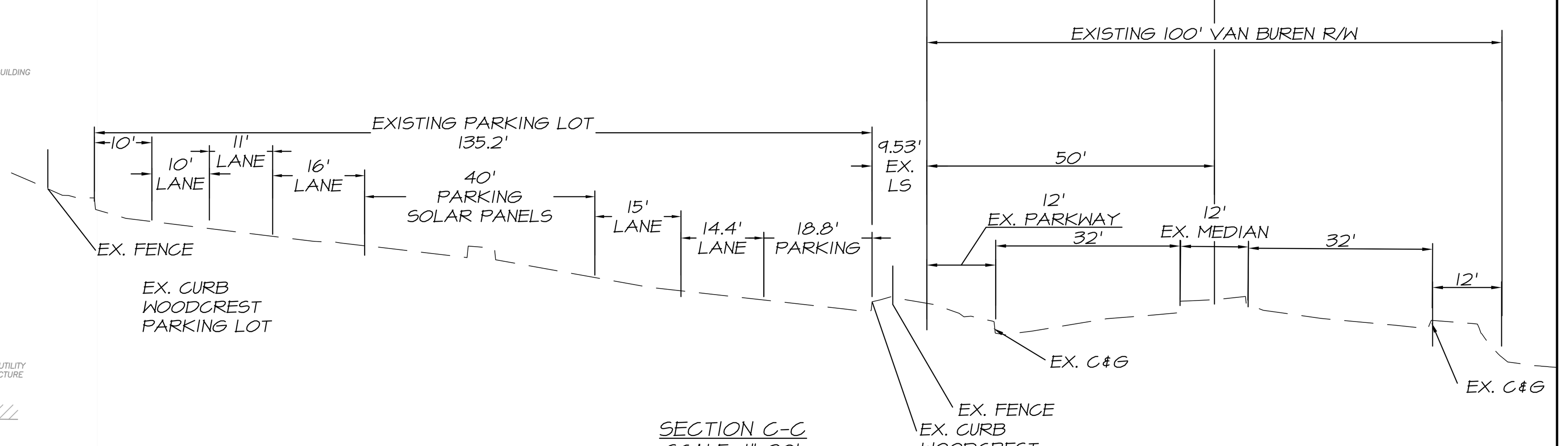
SECTION H-H
SCALE: 1"=20'



SECTION C-C
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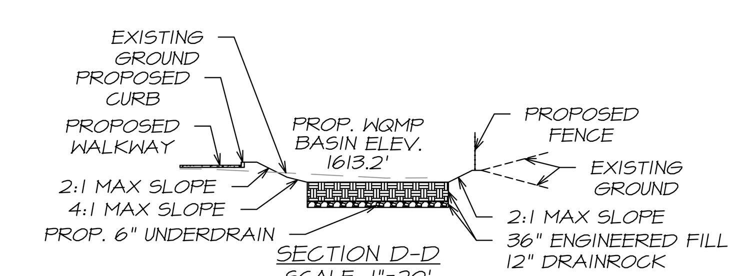

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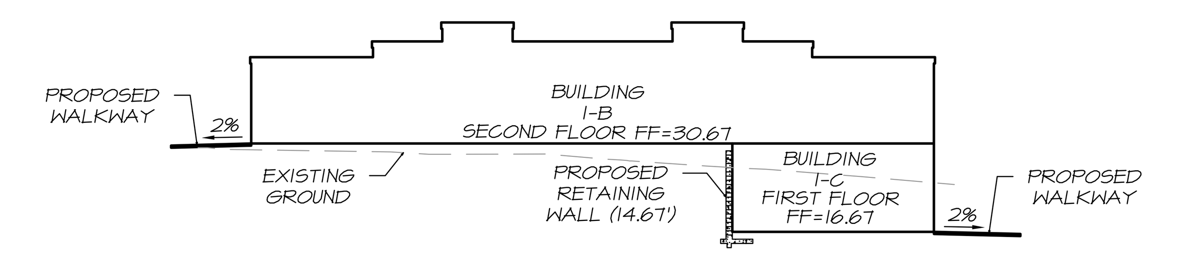

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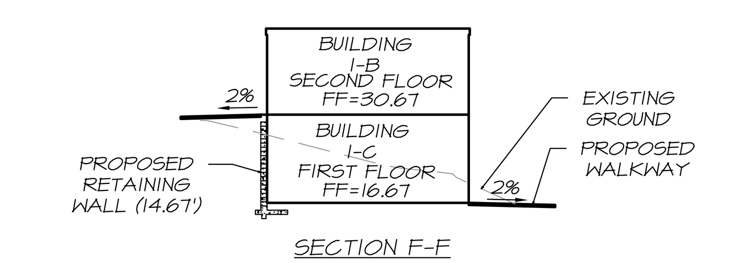

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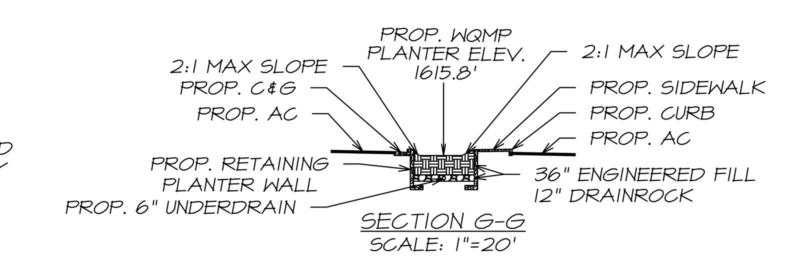

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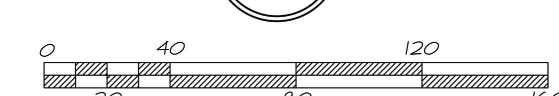


SCALE: 1" = 40'

Plot Date: 2/15/2024

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

ARAGÓN GEOTECHNICAL, INC.
Consultants in the Earth & Material Sciences

July 28, 2021
Project No. 4725-SFI

Adkan Engineers
6870 Airport Drive
Riverside, California 92504

Attention: Mr. Mitch Adkison, P.E.

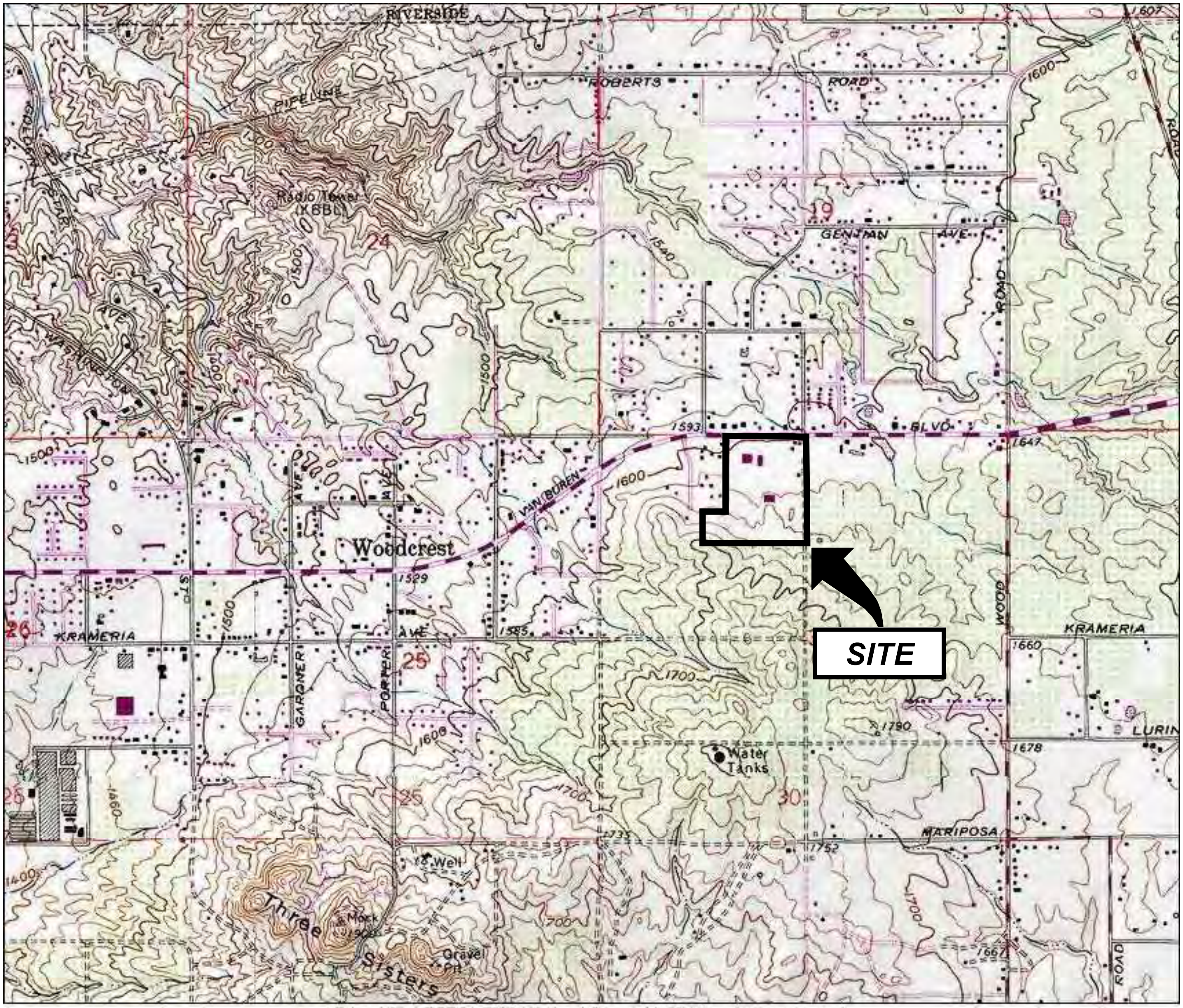
Subject: Preliminary WQMP Infiltration Feasibility Report
Woodcrest Christian School
18401 Van Buren Boulevard
Woodcrest, Riverside County, California.

Dear Mr. Adkison:

In accordance with the technical scope detailed in our proposal dated June 7, 2021, Aragón Geotechnical, Inc. (AGI) has completed site testing and analyses of soil infiltration potential. Field test data are required for purposes of developing a site-specific preliminary water quality management plan (WQMP) with the related selection of stormwater best management practices (BMPs). These services were performed concurrently with a comprehensive geotechnical investigation by AGI for a variety of proposed site improvements. Subsurface borings, geological research, and characterization of the local groundwater regime were requirements for each separately reported study. Figure 1 (next page) outlines the school site on a 1:24,000-scale topographic base map. This report is intended to support the design and construction of low-impact development (LID), hydromodification, and pollution prevention features for site stormwater runoff as required by the Santa Ana Region (SAR) *Water Quality Management Plan* effective January 1, 2013.

Our primary tasks for the infiltration feasibility assessment consisted of (1) Review of regional geotechnical and geologic data along with AGI's on-site deep exploration data; (2) Field tests of water absorption rates at shallow soil depths, reflective of limited options we envision for microbasins or vegetated swales but *not* for subsurface infiltration systems

16801 Van Buren Blvd., Bldg. B
Riverside, CA 92504
Tel: 951.776.0345 ● **Fax:** 951.776.0395
www.aragongeo.com



Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)

0 2000 4000 FT.

Reference: U. S. Geological Survey 7½-Minute Series Topographic Map, Riverside East and Steele Peak Quadrangles (1980).

N

SITE LOCATION MAP

WOODCREST CHRISTIAN SCHOOL, RIVERSIDE, CALIF.

PROJECT NO. 4725-SFI	DATE: 7/28/21	**FIGURE 1**

such as chambers; and (3) Preparation of this results report. Investigation findings of very shallow groundwater reduced AGI's testing scope. Few site areas have any capability for even nuisance water disposal, as outlined in other parts of this letter. Calculations or recommendations for the design precipitation event, storm water detention volume, or treatment flow rates were not within the scope of AGI's services.

Background Information & Proposed Construction

Woodcrest Christian School is spread across 6 contiguous land parcels that encompass 29.29 acres in the Alta Cresta area of the City of Riverside. Bordering the school is major-arterial Van Buren Boulevard to the north, and Dauchy Avenue, a smaller collector street, to the east. Residential areas abut the school site on the remaining sides. Local terrain comprises a sloped surface with a north-directed surface gradient that averages around 4 percent. The school site has been substantially modified by historical cut-and-fill grading. Existing facilities include middle school and high school classrooms, administration and maintenance buildings, a large gymnasium building, and athletic fields. The school utilizes an on-site wastewater treatment system (OWTS) composed of conventional septic tanks and a leach-line absorption field. The latter occupies a large grassy area in the approximate geometric center of the school that is partly open space and partly a baseball/softball playing field. Known historical site uses have included cultivation of dry-farmed grain crops and limited poultry ranching, but not citrus orchards or intensive stock raising.

AGI received a master plan exhibit dated April 16, 2021, depicting the proposed new construction. Up to 10 new buildings or building additions and student amenities are proposed. Twelve classrooms would be situated in a pair of 2-story structures. A 300-seat chapel arts building would be situated close to Dauchy Avenue. The gymnasium would receive a pair of structural additions for weight training and equipment storage. Other improvements such as a snack bar, lockers, an outdoor amphitheater, a multi-purpose room, and more would be scattered around the school site. New driveway and parking lot pavements are depicted. Some existing buildings and improvements will need to be demolished. The supplied plan lacked defined locations for either surface or subsurface retention features. For feasibility-study purposes, however, the topographically lowest site area north of the proposed chapel arts building and auto parking lots was evaluated for absorption capacity. These proposed improvements would be the largest sources of uncontrolled runoff from new construction.

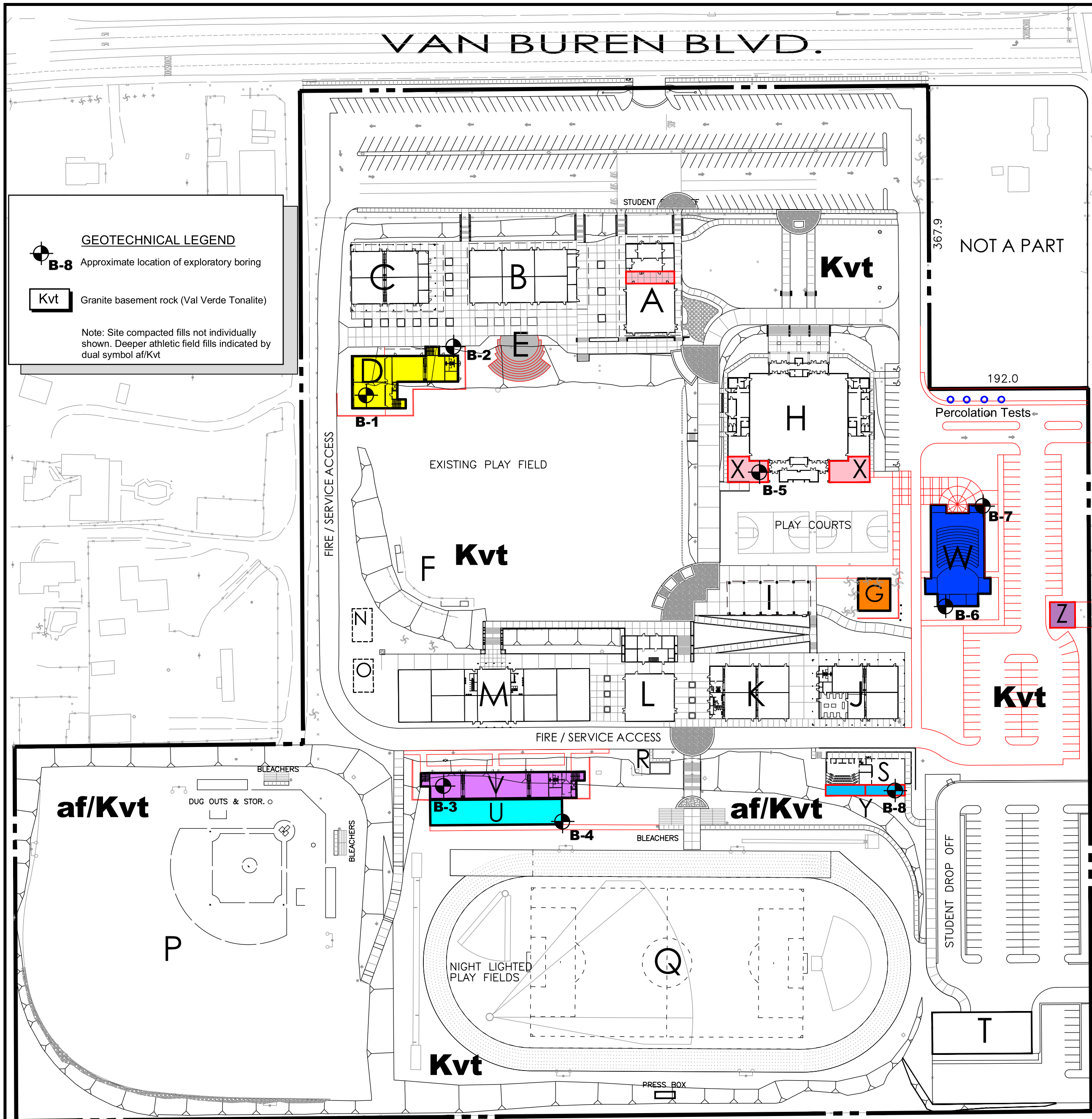
Field Observations and Permeability Testing

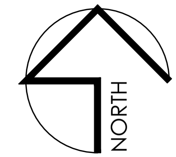
AGI's infiltration determinations were based on Riverside County's technical guidelines for percolation testing in small-diameter boreholes. These tests are customarily done for on-site wastewater treatment systems. Most California jurisdictions including the City of Riverside accept percolation test results for stormwater BMP design, with the proviso that percolation test data be adjusted to an equivalent one-dimensional (1-D) infiltration velocity. Methods and requirements for percolation testing are outlined in the *Local Agency Management Plan for Onsite Wastewater Treatment Systems* prepared by the County of Riverside Department of Environmental Health (DEH, October 5, 2016). All field exploration, percolation testing, and derivations of equivalent infiltration velocities were performed or supervised by the following qualified company representatives:

- Justin Long, Engineering Technician.
- Fernando Aragón, P.E.: California Registered Geotechnical Engineer, with over 15 years of professional experience.
- Mark G. Doerschlag: California Professional Geologist and Certified Engineering Geologist, with over 35 years of professional experience.

A geotechnical boring drilled for the proposed chapel improvements served as the required deep exploration in accordance with the requirements of Appendix A, Table 1 of the *Design Handbook for Low Impact Development Best Management Practices* (Riverside County, 2011). The boring was advanced on June 21, 2021. Related geotechnical borings were completed the same day. All deep borings were drilled with a truck-mounted Mobile Drill B-61 hollow-stem auger rig, at the locations shown on the Geotechnical Map, Figure 2 on the next page. Exploratory borings were checked for groundwater inflows or seepage before subsequent backfilling with compacted soil cuttings. All exploratory borings were observed and continuously logged during drilling by a qualified engineering geologist. The drill log for the WQMP-specific exploratory boring (Boring B-7) is reproduced as an attachment to this report.

AGI opened four 7½-inch-diameter percolation test holes on the same day as the exploration drilling with the same truck-mounted rig. The holes were cleaned of all loose slough and lightly scored with manual auger tools on July 7, 2021. The holes were not pre-soaked, in anticipation of relatively slow absorption given the logged soil types. Measured final depths ranged from 37 to 61 inches. About two inches of crushed rock was placed in the bottom of each test hole for erosion/sediment control. AGI waived any trials to





LEGEND

MIDDLE SCHOOL

BUILDING NUMBER	BUILDING NAME	SQUARE FOOTAGE	EXISTING / PROPOSED
A	ADMINISTRATION & MULTIPURPOSE ROOM	5,310 S.F. OFFICE - 900 S.F.	EXISTING PROPOSED
B	CLASSROOMS (6)	8,320 S.F.	EXISTING
C	CLASSROOMS (4)	6,016 S.F.	EXISTING
D	2 STORY OFFICE/ CLASSROOMS (6)	11,600	PROPOSED
E	AMPHITHEATER	300 SEATS	PROPOSED
F	BASEBALL FIELD	-	EXISTING

HIGH SCHOOL

BUILDING NUMBER	BUILDING NAME	SQUARE FOOTAGE	EXISTING / PROPOSED
G	FOOD SERVICES	1,600 S.F.	PROPOSED
H	GYMNASIUM & LOCKERS	20,208 S.F.	EXISTING
I	LUNCH SHELTERS	5,600 S.F.	EXISTING
J	CLASSROOMS (4)	6,144 S.F.	EXISTING
K	CLASSROOMS (4)	6,142 S.F.	EXISTING
L	ADMINISTRATION & LIBRARY	LOWER 2,933 S.F. FIRST 5,400 S.F.	EXISTING
M	CLASSROOMS (9)	14,848 S.F.	EXISTING
N&O	TEMPORARY CLASSROOMS	960 S.F. EACH TOTAL OF 2	EXISTING
P	BASEBALL FIELD	-	EXISTING
Q	TRACK & FIELD	-	EXISTING
R	ELECTRICAL		EXISTING
S	CHOIR & BAND	3,066 S.F.	EXISTING
T	BUS BARN	6,000 S.F.	EXISTING
U	LOCKERS/SNACK BAR	5,000 S.F.	PROPOSED
V	2 STORY OFFICE/ CLASSROOMS (6)	10,000 S.F.	PROPOSED
W	CHAPEL ARTS BUILDING	300 SEATS 8,300 S.F.	PROPOSED
X	WEIGHT ROOM STORAGE ROOM	1,400 S.F. 1,400 S.F.	PROPOSED
Y	STORAGE ROOMS	1,400 S.F.	PROPOSED
Z	EXPAND CELL TOWER	1,000 S.F.	PROPOSED

PARKING

2 PARKING SPACES FOR EVERY MIDDLE SCHOOL CLASS ROOM
10 MIDDLE SCHOOL CLASS ROOMS WHICH EQUALS 20 PARKING SPACES
7 PARKING SPACES FOR EVERY HIGH SCHOOL CLASS ROOM
25 HIGH SCHOOL CLASS ROOMS WHICH EQUALS 175 PARKING SPACES
FOR A REQUIREMENT TOTAL OF 195 PARKING SPACES
290 TOTAL PARKING SPACES PROVIDED

29.29 ACRES

APN 266-020-013,-014,-015,-037,-038,-059

AGI

GEOTECHNICAL MAP

WOODCREST CHRISTIAN SCHOOL, RIVERSIDE, CA.

PROJECT NO. 4725-SFI | DATE: 7/28/21 | FIGURE NO. 2

CHARLES BROWN ARCHITECT
5140 VICTORIA AVENUE, RIVERSIDE CA 92501
951-683 6222 / cbrown@cbarchitect.org

LICENSED ARCHITECT CHARLES JERRY BROWN C-4786 RENEWAL DATE APRIL 30, 2023 STATE OF CALIFORNIA

WOODCREST CHRISTIAN HIGH SCHOOL
MASTER PLAN
18401 VAN BUREN BLVD. RIVERSIDE, CA. 92508

JOB
DATE 04/16/21
REV. -
SCALE: 1" = 60'-0"

SITE PLAN

A-1

DRAWING #
OF #

determine if "rapid" tests were feasible based on soils classifications. All tests were run as normal 6-hour (cumulative) duration tests. Standard test protocols were followed, based on measured water level drops (*inches*) for a fixed time increment. All test trials began with approximately 24-inch-deep water pools. Water was restored to near the initial starting depth following each timed drop. The field data sheets are included in the Appendix.

FINDINGS

Local Soil Conditions

Regional geologic maps and AGI geotechnical drilling data indicate the entire school site is underlain by very thin colluvial and residual soils over granitic basement rocks (where not already modified by mass grading). AGI advanced the BMP-relevant chapel boring, B-7, in highly weathered bedrock ("decomposed granite") starting only 4½ feet below grade. The boring intercepted an abandoned leach-line trench before encountering the bedrock. Moderately weathered and slow-to-drill materials abruptly started at about 15 feet below grade, and continued with some rate variability until a termination depth of 25.0 feet was achieved.

From a soil science viewpoint, the native surficial materials in the 29-plus acre site are assigned to the Fallbrook soil series FcF2 where weathered bedrock is typically under two feet below natural grade, and the Monserate soil series MmB where colluvium ranges to more than 60 inches deep (Natural Resources Conservation Service, 2021). Monserate soils are guessed to be limited to terrain close to Van Buren Boulevard. Fallbrook rocky sandy loam is categorized as a low-permeability material (hydrologic soil group D). Geotechnical findings correlate quite closely with the NRCS standard profile. Fallbrook soils are residuum derived from intense *in situ* weathering of the parent granitic rock, and in the Woodcrest area tend to be very cohesive with significant clay content. The reported effective hydraulic conductivity K_{sat} for the most limiting layer is presented as "0.0" inches per hour. NRCS soil profile characterizations are generally limited to only 60 inches from grade.

All four aligned test bores P-1 through P-4 were bottomed in highly weathered bedrock ("decomposed granite"). Depths to bedrock increased from east to west. The test intervals were just below zones of slightly clayey colluvium and clayey residual soil plus a surficial layer of man-made fill that we interpreted to also thicken to the west. The ground surfaces were barren and not part of an irrigated lawn or garden.

Groundwater

Soil boring B-7 began producing free groundwater during drilling near the 12 to 13-foot depth, and had a final measured static water depth of 8.8 feet below grade. Groundwater occurrences in other portions of the school site were highly variable. Referring to the Geotechnical Map, soil borings B-1, B-3, B-4, B-5, and B-8 were dry. Some "dry" holes met very shallow rig refusal due to hard rock, or were otherwise halted above likely perched-water depths. Boring B-2, in contrast, penetrated a thin perched-water zone starting only 15 inches below grade.

From a hydrogeological viewpoint, the site is considered to be atop "non-water bearing" granitic basement rock. However, Woodcrest Christian School and the many neighboring residential tract developments share a propensity for the development of anthropic perched-water horizons caused by infiltration of landscape irrigation and OWTS effluent. Perched water can be found near soil-bedrock contacts, or within the "decomposed granite" layer. Manufactured slopes and slope toes become favored sites for rising water conditions such as seeps and minor springs. We understand that the cut slope toe south of the athletic field has had perennial problems with wet ground and phreatophytic vegetation since the completion of homes bordering the property.

Our interpretation is that groundwater depths of under 10 feet from ground surface are ubiquitous and now permanent everywhere in the 29-plus acre school site except where elevated compacted fills provide greater separation. Fluctuations in static water elevations may result from on- or off-site grading, addition or subtraction of anthropic recharge sources, increased precipitation after an extremely dry 2021 season, and other factors. Speculation would be that average depths can rise even higher than noted from our studies. Groundwater depths and the potential for mounding will rule out large-scale infiltration BMPs such as basins or subterranean chambers.

Percolation Test Results

The following table *(next page)* summarizes the obtained field test results. Raw percolation rates for each borehole percolation test were converted to a 1-D infiltration velocity by Porchet's method. The corrected infiltration test velocities I_t would roughly correspond to velocities obtained by double-ring infiltrometers.

Highly variable uptake rates were noted. Test site P-1 had an anomalously fast rate that we suspect was due to unseen soil disturbance from past historical uses. The hole consistently percolated ~24 inches of water in under 30 minutes. Test sites P-2 through P-4 matched a predicted progression to less-favorable conditions as residual clay proportions of wetted intervals increased toward Dauchy Avenue.

Test Location	Saturation Test Interval Depth Below Existing Ground Surface (inches)	Raw Percolation Rate, DEH Test Method (min/in)	Corrected 1-D Infiltration Velocity I_t (in/hr via Porchet method)
P-1	37 - 61	<1.25	Min. 8.4
P-2	30 - 57	7.5	0.7
P-3	18 - 43	15.0	0.4
P-4	14 - 37	40.0	<0.2

Conclusions, Recommendations, and Advice

The SAR *Water Quality Management Plan* explicitly requires any infiltration-based BMP to be clear of water in 72 hours or less after the design storm event. Mathematically, for typical volume-based BMP designs this requires field infiltration velocities I_t of roughly 1.6 inches per hour or faster. After rejecting P-1 results as non-representative, none of the remaining recorded site test data clear this hurdle. We can conclude with certainty that ordinary infiltration basins or buried infiltration chambers are not feasible and are not recommended. These could be considered for hydromodification purposes, though.

Lower-priority treatment control BMPs such as flow-based bioretention basins or filtration trenches should be acceptable alternatives. Water-quality objectives would be met by ensuring filtration occurs through suitable media such as sand and compost before passing into underdrains that direct flows to off-site and non-erosive MS4 facilities.

Our preliminary opinion is that filtration or detention BMPs for the chapel arts building and associated pavements should not require a watertight liner (incidental and ephemeral infiltration will not be a hazard nor contribute to groundwater mounding). Only at this improvement site, the civil engineer may optionally assume **0.2 in/hr** infiltration capability for flow-based BMPs that fully penetrate fill or clayey residual soils, i.e., bottoms greater than 3 feet or so in the chapel building vicinity. This velocity may also be applicable to permeable pavement installations as long as sufficient reservoir rock is present to store the incidental precipitation, bottoms are level (may require stepped grading with check dams on a sloped site), and bottoms are entirely composed of in-place decomposed granite. The design velocity I_d must include a safety factor that will reduce the field-determined velocity presented above by a factor of at least 3, if Riverside County standards apply to this project.

For the remainder of the Woodcrest Christian School, zero infiltration should be permitted. If location-specific BMPs are required for structures and improvements not associated with the chapel arts building, we recommend that **only** flow-based systems such as filter strips with impermeable bottoms be considered. The main concern is shallow groundwater and potential mounding within the OWTS absorption field.

Investigation Limitations

The findings in this report may require modification as a result of later field observations. Our opinions have been based on the results of limited testing within AGI-conceived water-quality BMP sites combined with extrapolations of soil conditions away from the test array. The nature and extent of variations within or beyond the tested areas may not become evident until construction. If a permeable pavement system meeting design parameters recommended in this report becomes one preferred option, then additional site testing of the accepting weathered-rock layer, preparation recommendations, or as-built tests may be needed to achieve correct designs for this treatment control BMP.

Closure

This report was prepared for the use of Adkan Engineers, principals at Woodcrest Christian School, and authorized owner-designates in cooperation with this office. Our findings and recommendations were prepared in accordance with generally accepted professional principles and local practice in the fields of engineering geology and geotechnical engineering. We make no other warranties either expressed or implied. Questions concerning the test results or design advice are invited, and may be directed to the undersigned at our Riverside office at (951) 776-0345 or through the convenience of email at www.aragongeo.com.

Respectfully submitted,
Aragón Geotechnical, Inc.

PROFESSIONAL GEOLOGIST MARK G. DOERSCHLAG No. 1752 Exp. 9/30/22 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

7/28/21

REGISTERED PROFESSIONAL ENGINEER CARLOS FERNANDO ARAGON No. 2994 Exp: 06/30/22 GEOTECHNICAL STATE OF CALIFORNIA

Mark G. Doerschlag, CEG 1752
Engineering Geologist

C. Fernando Aragón, P.E., M.S.
Geotechnical Engineer, G.E. 2994

MGD/CFA:mma

Attachments: Exploratory Boring Log, Boring B-7
Percolation Field Test Data, Sites P-1 through P-4

REFERENCES

Morton, D.M., and Miller, F.K., 2006, Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California [Ver. 1.0], U.S. Geological Survey Open File Report 2006-1217, scale 1:100,000.

Natural Resources Conservation Service, 2021, Web Soil Survey utility, accessed 7/20/21 from Internet URL http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

Riverside County Flood Control and Water Conservation District, 2011, *Design Handbook for Low Impact Development Best Management Practices*, Riverside, California, download file at Internet URL http://rcflood.org/downloads/NPDES/Documents/LIDManual/LID_BMP_Design_Handbook.pdf

FIELD LOG OF BORING B - 7

Sheet 1 of 2

Project: ***WOODCREST CHRISTIAN SCHOOL***

Location: ***WOODCREST, RIVERSIDE COUNTY, CA***

Date(s) Drilled:	**6/21/21**	Logged By:	**M. Doerschlag**
Drilled By:	**GP Drilling**	Total Depth:	**25.0 Ft.**
Rig Make/Model:	**Mobile B-61**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**7½ In.**	Surface Elevation:	**± 1614 Ft. AMSL per older topo**

Comments: Exploration sited in northeastern corner of proposed chapel building.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0			SC	Clayey Sand: Dark brown; loose; moist. Locally derived. [Trench backfill]				
		RING 5 8 10 (18)			117.0	11.5		
			GP	Gravel: Clean or nearly clean, imported 1" rounded-clast drain rock. [Leach line (?) bedding. Pipe not found]				
	1610	RING 4 8 11 (19)						
5			ROCK	Tonalite: Speckled light brown and black; medium grained; little or no foliation fabric; highly weathered; extremely weak, friable, and soft; apparently massive. Soil boring proceeds with easy and chatter-free drilling. [Granitic bedrock -- Val Verde pluton]	114.4	6.1		
		RING *50/5"			110.5	4.1		
	1605							
10								
	1600							
15								

Continued on next sheet.

FIELD LOG OF BORING B - 7

Project: ***WOODCREST CHRISTIAN SCHOOL***

Location: ***WOODCREST, RIVERSIDE COUNTY, CA***

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS BULK	SAMPLE INTERVALS DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15						ROCK	Tonalite: Speckled grayish brown and black; medium grained. At 15 feet, abruptly becomes moderately weathered, with very slow but smooth drilling to ~17 feet.. [Granitic bedrock -- Val Verde pluton]				
							Drilling rate increases (softer). Probable fractures zone immediately begins to produce water to the bore.				
	1595										
20							Slow drilling.				
							Brief interval of highly weathered rock.				
							Very slow progress. Moderately weathered.				
	1590										
25											

Bottom of boring at 25.0 feet.
Groundwater measured at 8.8 feet.
Boring backfilled with compacted soil cuttings.

Percolation Data Sheet (Leach Line, ATU, Stormwater BMP)

Project: WOODCREST CHRISTIAN	Project No. 4725-SF1	
Test Hole No. P-1	Date Excavated: 6/21/21	
Depth of Test Hole: 61" bgs	Soil Classification: BOT = D.G.	
Check for Sandy Soil Criteria Tested By: N/A	Date: N/A	Presoak: NONE
Field Percolation Test By: J. LODE	Date: 7/7/21	

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (In.)	Final Water Level (In.)	Δ in Water Level (In.)
1					
2					

Use: ☒ Normal Soil Criteria ☐ Sandy Soil Criteria (>6" drop in <25 min. both trials)

Time	Time Interval (Min.)	Total Elapsed Time (Min.)	Initial Water Level (In.)	Final Water Level (In.)	Δ in Water Level (In.)	Percolation Rate (Min./In.)
0925 / 0955	30	30	BGS 39.0	DRY	>22	
0955 / 1025	30	60	40.0	52.0	12.0	
1025 / 1055	30	90	40.0	52.0	12.0	
1055 / 1125	30	120	39.0	DRY	>22	
1125 / 1155	30	150	38.0	DRY	>23	
1155 / 1225	30	180	39 1/2	DRY	>21 1/2	
1225 / 1255	30	210	39.0	DRY	>22	
1255 / 1325	30	240	38.0	DRY	>23	
1325 / 1355	30	270	38.0	DRY	>23	
1355 / 1425	30	300	38.0	DRY	>23	
1425 / 1455	30	330	37.0	DRY	>24	
1455 / 1525	30	360	37.0	DRY	>24	MINIMUM 1.25

END

Aragón Geotechnical, Inc.