Appendix D: Preliminary WQMP Infiltration Feasibility Report Woodcrest Christian School

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

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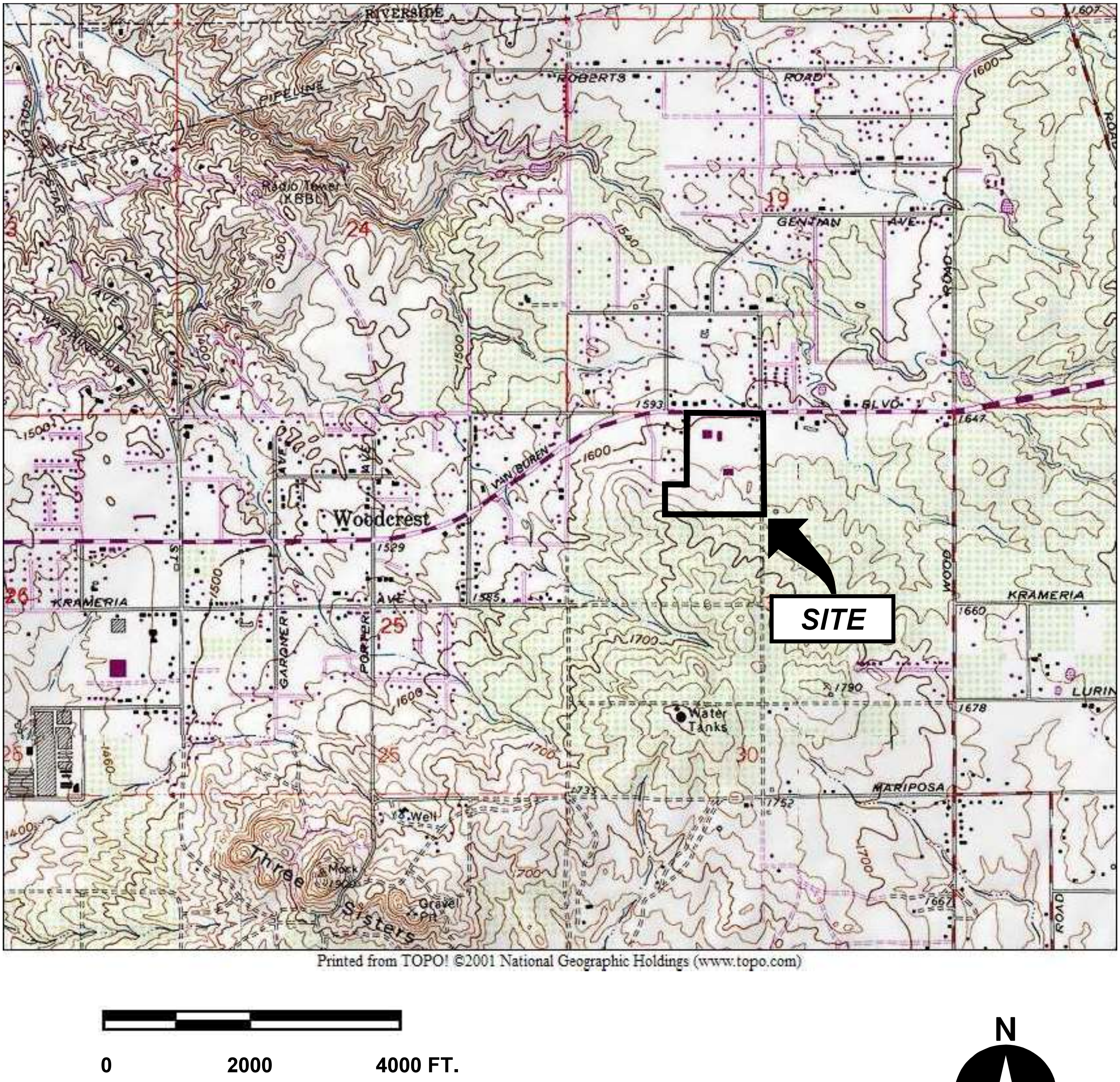


Reference: U. S. Geological Survey 7½-Minute Series Topographic Map, Riverside East and Steele Peak Quadrangles (1980).

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.

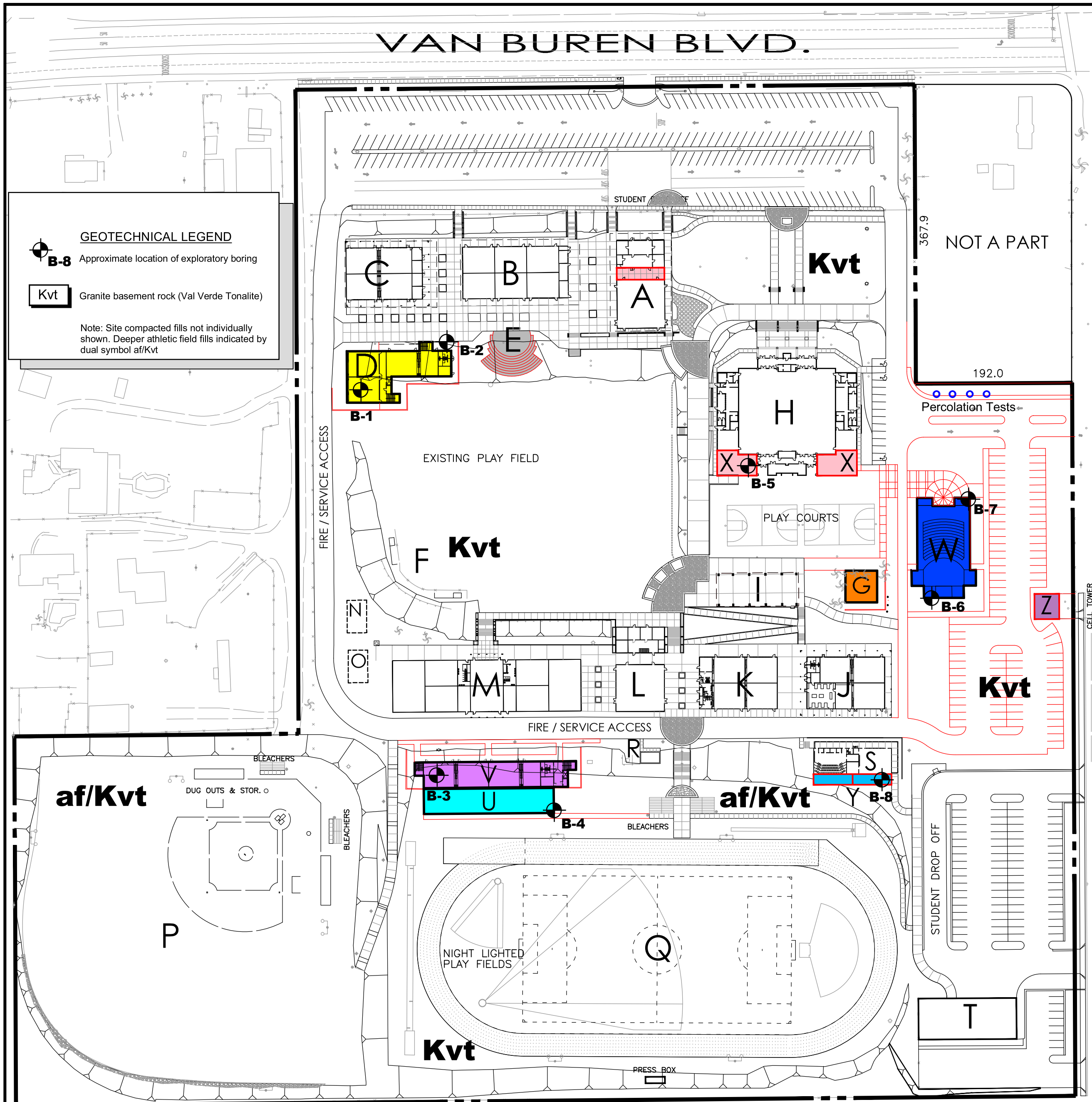
Field Observations and Permeability Testing

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 APRIL 30, 2023 RENEWAL DATE 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.

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							
5		RING 4 8 11 (19)	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	SAMPLE INTERVALS: 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-SFI
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. LODGE	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	39½	DRY	>21½	
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.

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

Project: WOODCREST CHRISTIAN		Project No. 4725-SF1	
Test Hole No. P-2		Date Excavated: 6/21/21	
Depth of Test Hole: 57" 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. LONG		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.)
0927 0957	30	30	31 3/4	DRY	>25 1/4	
0957 1027	30	60	26.0	DRY	>31	
1027 1057	30	90	29 1/2	DRY	>27 1/2	
1057 1127	30	120	30.0	48.0	12.0	
1127 1157	30	150	30.0	47.0	17.0	
1157 1227	30	180	30 1/2	45 1/2	15.0	
1227 1257	30	210	30.0	42 1/2	12 1/2	
1257 1327	30	240	31.0	39 1/2	8 1/2	
1327 1357	30	270	31.0	36.0	5.0	
1357 1427	30	300	31.0	35 1/4	4 1/4	
1427 1457	30	330	30.0	34.0	4.0	
1457 1527	30	360	30.0	34.0	4.0	7.5

Aragón Geotechnical, Inc.

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

Project: WOODCREST CHRISTIAN		Project No. 4725-SFI	
Test Hole No. P-3		Date Excavated: 6/21/21	
Depth of Test Hole: 43" bgs		Soil Classification: D.G. @ BOT	
Check for Sandy Soil Criteria Tested By: N/A		Date: N/A	Presoak: NONE
Field Percolation Test By: J. LONG		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.)
0928 0958	30	30	18 1/4	27.0	8 3/4	
0958 1028	30	60	17 1/2	24.0	6 1/2	
1028 1058	30	90	16 1/2	22.0	5 1/2	
1058 1128	30	120	19 1/2	23.0	4.0	
1128 1158	30	150	18.0	20.0	2.0	
1158 1228	30	180	18.0	20.0	2.0	
1228 1258	30	210	18.0	20.0	2.0	
1258 1328	30	240	18.0	20.0	2.0	
1328 1358	30	270	17 1/2	19 1/2	2.0	
1358 1428	30	300	17.0	19.0	2.0	
1428 1458	30	330	17.5	19 1/2	2.0	
1458 1528	30	360	18.0	20.0	2.0	15.0

END

Aragón Geotechnical, Inc.

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

Project: WOODCREST CHRISTIAN	Project No. 4725-SFI
Test Hole No. P-4	Date Excavated: 6/21/21
Depth of Test Hole: 37" bgs	Soil Classification:
Check for Sandy Soil Criteria Tested By: N/A	Date: N/A — Presoak: NONE
Field Percolation Test By: J. LONG	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.) BGS	Final Water Level (In.)	Δ in Water Level (In.)	Percolation Rate (Min./In.)
0930 / 1000	30	30	13 1/2	17 1/4	3 3/4	
1000 / 1030	30	60	13 1/2	16.0	2 1/2	
1030 / 1100	30	90	13.0	15 1/2	2 1/2	
1100 / 1130	30	120	13.0	14 3/4	1 3/4	
1130 / 1200	30	150	13 1/2	15.0	1 1/2	
1200 / 1230	30	180	13 1/2	14 1/2	1.0	
1230 / 1300	30	210	13 1/2	14 1/2	1.0	
1300 / 1330	30	240	13 1/2	14 1/2	1.0	
1330 / 1400	30	270	13 1/2	14 1/2	1.0	
1400 / 1430	30	300	14.0	14 3/4	3/4	
1430 / 1500	30	330	14.0	14 3/4	3/4	
1500 / 1530	30	360	14.0	14 3/4	3/4	40.0

END

Aragón Geotechnical, Inc.