PRELIMINARY DRAINAGE STUDY

AIRFORCE VILLAGE WEST SPECIFIC PLAN AMENDMENT

JUNE 2021

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Preliminary Drainage Study

JUNE 2021 | PRELIMINARY SUBMITTAL

Prepared By:

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This Drainage Report has been prepared by Kimley-Horn and Associates, Inc. under the direct supervision of the following Registered Civil engineer. The undersigned attests to the technical data contained in this study, and to the qualifications of technical specialists providing engineering computations upon which the recommendations and conclusions are based.

Davie Cowan R.C.E 86803 Date

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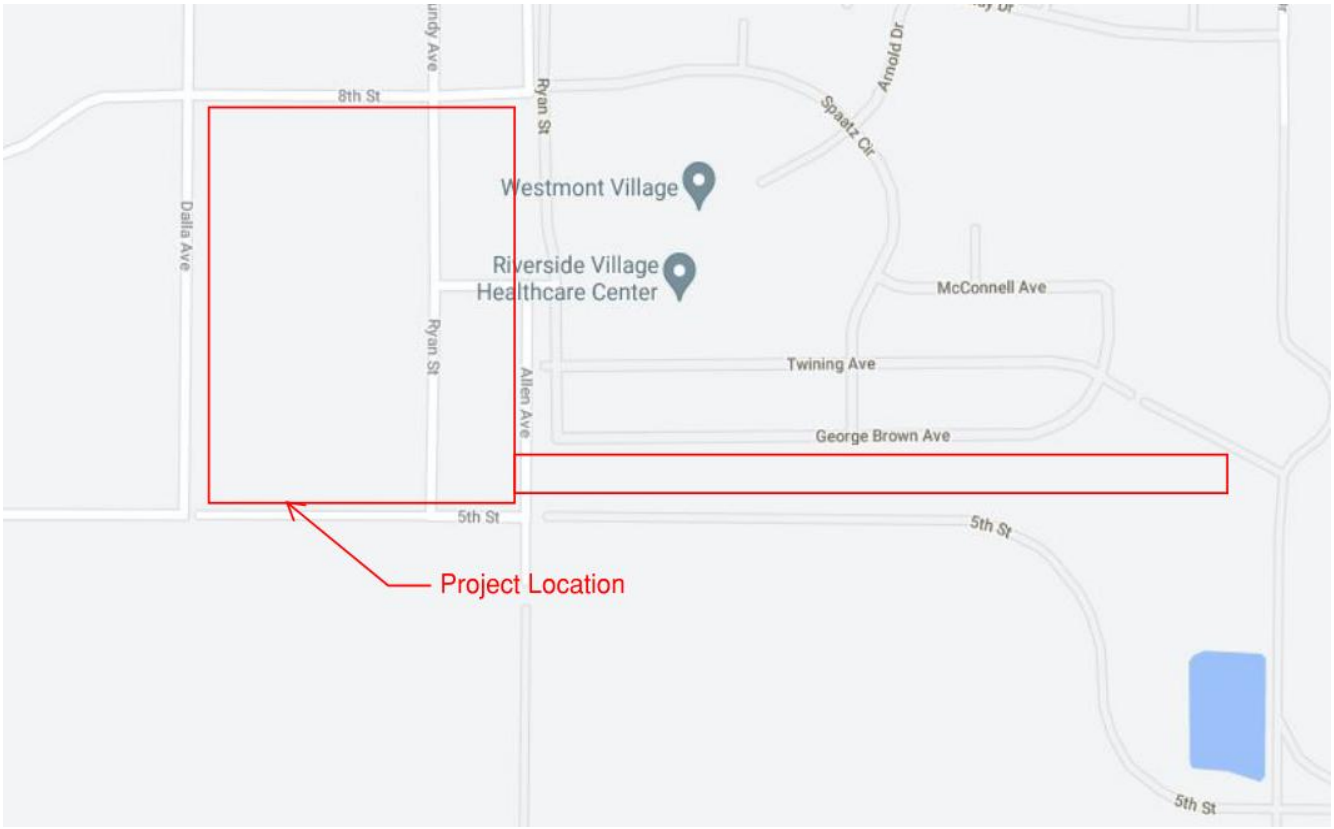
1 INTRODUCTION

The proposed project is located within the March Joint Powers Authority (MJPA) jurisdiction, located south of Van Buren Boulevard (± 6,050 feet) and west of Village West Drive (±2,500 feet). The project is located adjacent to the existing Air Force Village West retirement community (Westmont Living) in the vacant area that makes up roughly 60.93-acres of roughly graded land. This project is proposing the construction of (4) industrial buildings with a total area of approximately 1,203,769 square feet. The project includes parking for delivery trucks and passenger vehicles within the northern and central portion of the project site. There will be access to the project site via 8th Street and Dalla Avenue.

Figure 1–1 Vicinity Map



2 DESIGN CRITERIA

The March Joint Powers Authority is located within Riverside County. Drainage calculations comply with the requirements outlined in the Riverside County Flood Control and Water Conservation District's Hydrology Manual (RCFC & WCD) dated April 1978. Runoff values were calculated based on the 100-year storm event using the Modified Rational Method.

Basin boundaries, initial subareas, and flow paths were delineated for each basin with AutoCAD Civil 3D software. These hydrologic parameters are shown for existing conditions and proposed conditions in **Exhibit A** and **Exhibit B** attached. Elevations, flow path slopes, and estimated shape of routing reaches was determined for each basin.

The RCFC & WCD Hydrology Manual was used to calculate loss rates and subsequent runoff coefficients for each basin based on land use type, hydrologic soil group, and Antecedent Moisture Condition (AMC). The AMC is a commonly used index used to describe how saturated a soil is before the design storm occurs. AMC III describes a watershed soil that is already saturated, typically used for the 100-year storm analysis. AMC II, a moderately wet condition, was used for the 10-year storm analysis.

Hydrologic soil group D was used for the entire project. Runoff coefficients for the project were determined using Plate D-5.7 of the RCFC & WCD Hydrology Manual.

Runoff calculations were performed using the rational method computer program Advanced Engineering Software (AES), 2011 version. This method calculates time of concentration and runoff rates using criteria as specified in the Hydrology Manual.

The hydrology results are presented in **Appendix A.**

2.1 EXISTING CONDITIONS

Hydrologic design

The project site is currently in a roughly graded condition- with six discharge locations to the south and east of the property. The site is on a vacant land to the south and west of a senior living facility. The existing topography of the site generally slopes from north to south. Runoff is captured from north and northwest to the south and southwest of the property in the existing discharge locations.

Runoff coefficients for the existing site were based on the existing mass graded condition. The runoff index for the existing project site was taken from Plate D-5.5 of the RCFC & WCD Hydrology Manual. For Soil Group D, barren, graded land, the runoff coefficient is 0.78. The existing site consists of only 3.97 acres of impervious area.

Table 1 Summary of Existing Peak Discharge

Discharge Location	Existing Drainage Area	Area, A (AC)	Discharge, Qex (cfs) 100 Year
1	DA-1	31.59	34.72
2	DA-2	15.36	15.59
3	DA-3	0.98	1.94
4	DA-4	4.89	6.34
5	DA-5	10.44	12.76
6	DA-6	6.78	11.14

See Exhibit A for Existing Hydrology Map and Appendix A for hydrology results.

2.2 PROPOSED CONDITIONS

The proposed site will be approximately 81% impervious and 19% pervious. In the proposed condition, the impervious area runoff coefficient for industrial development is 0.89. The runoff from the propose site discharges to six locations to the south of the project site. Runoff from the 100-year storm event will be captured by onsite storm drain, and into proposed detention basins before being discharged into an existing discharge location. The underground detention basins were sized based on the peak volume calculations of the existing and proposed conditions. A stormwater pump was added near DA-3 to allow large volumes of water to be detained in the landscaped area. A diversion structure was added between DA-1 and DA-2 to take the water from both of these drainage areas and discharge it in location 1.

Table 1 Summary of Proposed Peak Discharge

Discharge Location	Existing Drainage Area	Area, A (AC)	Discharge, Qprop (cfs) 100 Year
1,2	DA-1, DA-2, DA-15, DA-16	43.70	43.50
3	DA-3, DA-14	4.10	7.79
4	DA-4, DA-13	4.60	8.71
5	DA-5, DA-6, DA-12	9.9	24.01
6	DA-7, DA-8, DA-8A, DA-9, DA-10, DA-11	10.20	20.42

See Exhibit B for proposed hydrology map and Appendix B for hydrology calculations.

3 OPERATION AND MAINTENANCE OF PROPOSED STORM DRAIN SYSTEMS

The project consists of the development of a 60.93-acre site in the March Joint Powers Authority in the County of Riverside, CA. The site is proposed to be developed into four industrial buildings with loading docks and associated parking areas. As part of the development, a new storm drain system is proposed. The proposed storm drain system for the site consists of storm drain inlets, bioretention basins, proprietary storm drain treatment, and storm drain pipe. The purpose of this document is to provide guidelines for the operation and maintenance of this proposed storm drain system. Five Bioclean Vault Type Modular Wetlands Units and nine bioretention basins are proposed for stormwater quality treatment; please reference the Water Quality Management Plan for operation and maintenance of those facilities. The owner of the properties will form maintenance association that all properties will pay into and will be responsible for the proper maintenance of the storm drain system. The current owner of the property is:

Westmont Living
7660 Fay Avenue, Suite N
La Jolla, CA 92037
Phone: 858-456-1233
Contact: Andy Plant

The maintenance association will be responsible for ensuring that all personnel involved in the routine inspection, routine and non-routine maintenance are familiar with the contents of the plan and the requirements for the routine inspection, and routine and non-routine tasks as described herein.

Inspection

The association will be responsible for ensuring that all storm drains are inspected. The general site conditions and drainage facilities will be inspected to verify that systems are operating as designed. Routine inspection will be performed monthly as part of maintenance activities. Inspection of drainage facilities including roof gutters, roof and deck drains and area drains will be performed at least annually before October 1.

Maintenance

Functional maintenance has two components: preventive maintenance and corrective maintenance. Preventive maintenance activities to be instituted are intended to minimize siltation and clogging of the storm drain and include regular collection and removal of trash, debris, and sediment. Corrective maintenance is required on an emergency or non-routine basis to routine the intended operation and safe function of the storm drain system. If the system does not adequately drain, then stagnant pools of water may become a mosquito breeding area. If standing water in the area persists for more than 72 hours, then corrective maintenance activities is required to unclog the system. All materials that are removed in connection with the corrective maintenance, including soil, sediment, and debris, shall be disposed offsite in accordance with all applicable local, county, state, and federal regulatory requirements.

APPENDICES

EXHIBIT A

EXISTING HYDROLOGY MAP

EXHIBIT B

PROPOSED HYDROLOGY MAP

APPENDIX A

EXISTING HYDROLOGY CALCULATIONS (100 YEAR)

APPENDIX B

PROPOSED HYDROLOGY CALCULATION (100 YEAR)

APPENDIX C

DETENTION BASIN CALCULTION

DETENTION BASIN 1

NODE 303

FINISH GRADE = 1696.00

INVERT ELEVATION = 1692.42

MINIMUM COVER (REQUIRED) = 1.50’

STORAGE VOLUME (REQUIRED) = 81082.40 CF

DESIGN

STORAGE HEIGHT (HS31) = 16” = 1.33’

ELEVATION TOP OF STORAGE = 1692.42 + 1.33 = 1693.75

COVER (DESIGN) = 1696.00 – 1693.75 = 2.25’

STOARGE AREA (DESIGN) = 762’ X 80’ = 60960 SF

VOLUME (DESIGN) = 762’ X 80’ X 1.33’ = 81280 CF

DETENTION BASIN 2

NODE 703

FINISH GRADE = 1695.80

INVERT ELEVATION = 1692.41

MINIMUM COVER (REQUIRED) = 1.50’

STORAGE VOLUME (REQUIRED) = 81082.40 CF

DESIGN

STORAGE HEIGHT (HS31) = 16” = 1.33’

ELEVATION TOP OF STORAGE = 1692.41 + 1.33 = 1693.74

COVER (DESIGN) = 1695.80 – 1693.74 = 2.06’

STOARGE AREA (DESIGN) = 762’ X 80’ = 60960 SF

VOLUME (DESIGN) = 762’ X 80’ X 1.33’ = 81280 CF

DETENTION BASIN 3

NODE 44

FINISH GRADE = 1705.88

INVERT ELEVATION = 1700.9

MINIMUM COVER (REQUIRED) = 1.96’

STORAGE VOLUME (REQUIRED) = 6577.54 CF

DESIGN

STORAGE HEIGHT (HS180) = 45.5” = 3.79’

ELEVATION TOP OF STORAGE = 1700.9 + 3.79 = 1703.88

COVER (DESIGN) = 1705.88 – 1703.88 = 2.0’

STOARGE AREA (DESIGN) = 30’ X 60’ = 1800 SF

VOLUME (DESIGN) = 30’ X 60’ X 3.79’ = 6822 CF

DETENTION BASIN 4

NODE 57

FINISH GRADE = 1709.88

INVERT ELEVATION = 1704.09

MINIMUM COVER (REQUIRED) = 1.96’

STORAGE VOLUME (REQUIRED) = 18160.12 CF

DESIGN

STORAGE HEIGHT (HS180) = 45.5” = 3.79’

ELEVATION TOP OF STORAGE = 1704.09 + 3.79 = 1707.88

COVER (DESIGN) = 1709.88 – 1707.88 = 2.0’

STOARGE AREA (DESIGN) = 244’ X 20’ = 4880 SF

VOLUME (DESIGN) = 20’ X 244’ X 3.79’ = 18495.2 CF

DETENTION BASIN 5

NODE 73

FINISH GRADE = 1721.86

INVERT ELEVATION = 1715.83

MINIMUM COVER (REQUIRED) = 1.96’

STORAGE VOLUME (REQUIRED) = 27298.51 CF

DESIGN

STORAGE HEIGHT (HS75) = 30” = 2.5’

ELEVATION TOP OF STORAGE = 1715.83 + 2.50 = 1718.33

COVER (DESIGN) = 1721.86 – 1718.33 = 3.53’

STOARGE AREA (DESIGN) = 364’ X 30’ = 10920 SF

VOLUME (DESIGN) = 364’ X 30’ X 2.50’ = 27300 CF

	HS290	HS180	HS75	HS31
Installed Storage Capacity*	164 ft^3/chamber	180 ft^3/chamber	75 ft^3/chamber	31 ft^3/chamber
Height	59.5"	45.5"	30"	16"
Width	100.5"	77.8"	51"	34"
Unit Length	51.8"	88.7"	85.4"	87.8"
Installed Length	48.3"	85.3"	84.9"	85.4"
Weight	125 lbs	127 lbs	70 lbs	32 lbs
Chambers/Pallet	10	19	33	45
Material	Polypropylene	Polypropylene	Polypropylene	Polypropylene
Mfg. Process	Injection Molding	Injection Molding	Injection Molding	Injection Molding
Special Features	Integrated Handles	Integrated Handles	Integrated Handles	Integrated Connectors
ASTM Standards	Meets or Exceeds	Meets or Exceeds	Meets or Exceeds	Meets or Exceeds

* Assuming 40% void volume of backfill with 9" bedding & 12" cover for HS180 and 6" bedding & 6" cover for HS75 & HS31

Installation Specifications

	HS290	HS180	HS75 & HS31
Backfill Above Chamber	12" min.	12" min.	6" min.
Bedding	9" min.	9" min.	6" min.
Chamber Spacing	8.5"	8"	6"
Backfill at Edge of System	12"	12"	12"
Minimum Cover	24"	23.5"	18"
Maximum burial Depth	8'	8'	8'