Appendix E
Storm Water Quality Design Memo

MEMORANDUM

To: Eric Lee, City of Davis

From: Steve Greenfield, Cunningham Engineering Corporation

Date: 08 July 2022

Subject: Communicare Davis Expansion – Storm Water Quality Design

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The purpose of this memo is to summarize the preliminary storm water quality analysis for the Communicare Davis Expansion project and address revised incompleteness comments provided by the City via email on June 1, 2022.

Storm Water Quality

The proposed project has been divided into four Drainage Management Areas (DMA) for the purposes of analyzing the required stormwater quality treatment measures (see Attachment A). DMA 1 encompasses the majority of the site, including the proposed building, and drains to the proposed bioretention/hydromodification management basin. DMA 2 and 3 encompass portions of the entry driveways which drain to areas of pervious pavement. DMA 4 is the frontage landscaping which, because of the runoff reduction credits afforded by proposed soil quality improvement and tree planting, requires no additional volumetric treatment storage.

The stormwater quality treatment measures are sized for the 85th Percentile 24 hour storm event (0.65 in) using the SMARTS Post-Construction Calculator as shown in Attachment B.

Hydromodification Management

The project design seeks to limit the post-project 2-year, 24-hour peak flow rate to pre-project conditions to comply with the City of Davis hydromodification management requirements. The DMA 1 bioretention/hydromodification basin has been sized to contain the increased runoff volume from the proposed development and a restricted outflow will be incorporated into the design.

The rainfall/runoff analysis and detention routing were conducted using an HEC-HMS model with the following parameters:

Rainfall:	2-yr, 24-hr frequency storm (NOAA local rainfall data)
Transform:	SCS Unit Hydrograph
Loss:	Initial/Constant; 0.4 in (initial), 0.1 in/hr (constant) Hydrologic Soil Group C
Existing Shed:	3.09 ac; 0% impervious; 43.0 min lag time
Proposed Sheds:	
SHED 1-	2.66 ac; 67.4% impervious; 15.0 min lag time
SHED 2-	0.061 ac; 78.8% impervious; 5.0 min lag time
SHED 3-	0.047 ac; 58.9% impervious; 5.0 min lag time
SHED 4-	0.322 ac; 3.5% impervious; 10.0 min lag time

As shown in the following modeling results, by providing peak flow attenuation with detention storage in the hydromodification basin with a restricted outflow, the proposed project successfully limits the proposed runoff discharge (1.07 cfs) to be less than existing levels for the 2 year-24 hour design storm (1.21 cfs):

Global Summary Results for Run "Run 1"

Project: 1896 Communicare Hydromod Simulation Run: Run 1

Start of Run: 01Jan1800, 00:00 Basin Model: Basin 1
End of Run: 03Jan1800, 00:00 Meteorologic Model: 2yr 24hr
Compute Time: 05Jul2022, 10:01:39 Control Specifications: Control 1

Show Elements: All Elements Volume Units: IN ACRE-FT Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
EXIST	0.00509	1.2138	01Jan1800, 12:45	0.1765
SHED1	0.00416	2.0051	01Jan1800, 12:16	0.3693
POND	0.00416	0.7937	01Jan1800, 12:40	0.3693
SHED 4	0.0005	0.2726	01Jan1800, 12:11	0.0188
SHED 2	0.00009	0.0717	01Jan1800, 12:06	0.0092
SHED 3	0.00007	0.0548	01Jan1800, 12:06	0.0059
TOTAL OUT	0.00482	1.0752	01Jan1800, 12:11	0.4032

Submittal of Required City Forms

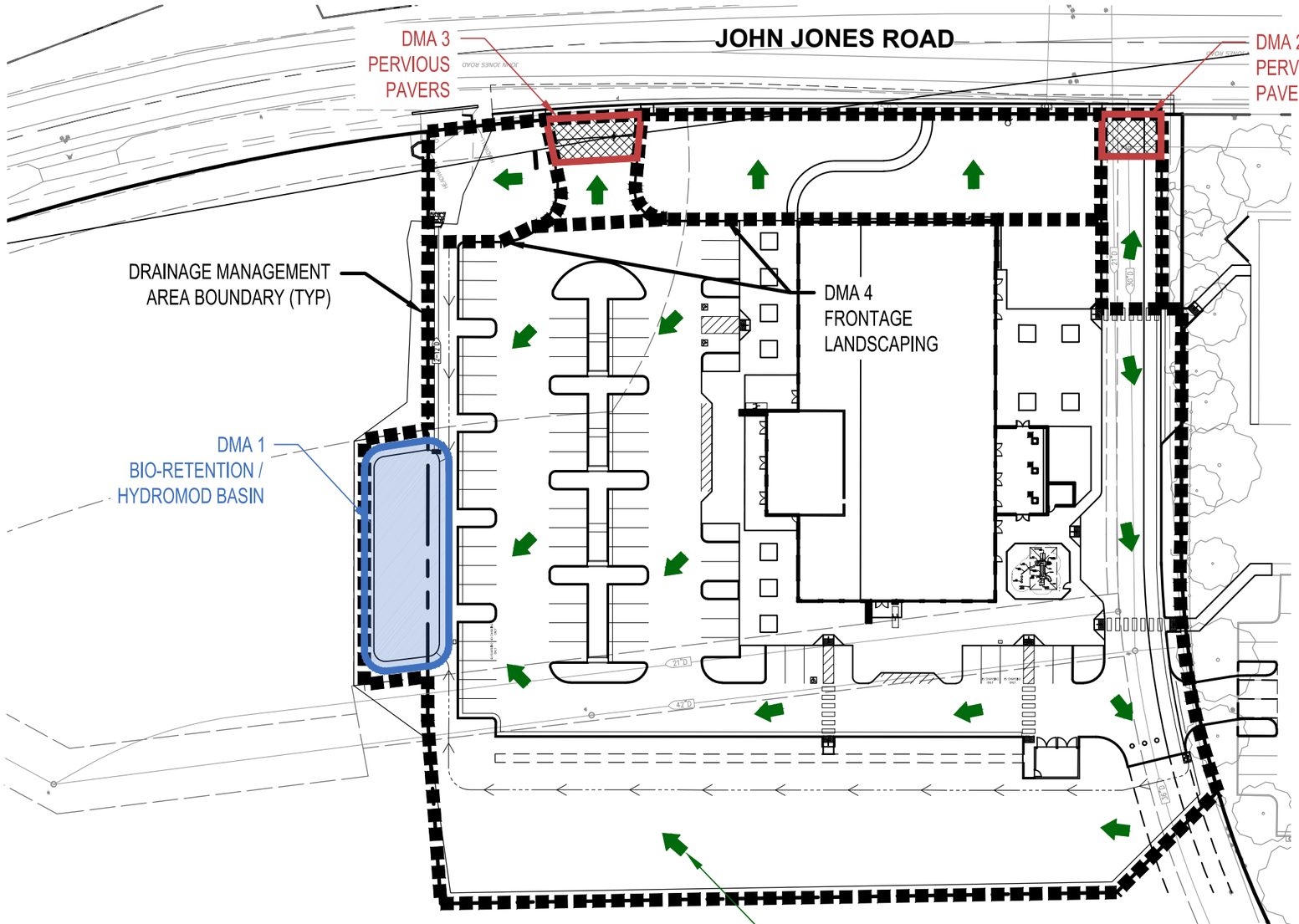
See Attachment C for Site Assessment Checklist (Performance Requirement No. 1) and Attachment D for Source Control Checklist (Performance Requirement No. 3).

Drainage Management Areas are illustrated in Attachment A.

Attachments

A. Drainage Management Areas Exhibit
B. SWQ Calculation Spreadsheet
C. Site Assessment Checklist (Performance Requirement No. 1)
D. Source Control Checklist (Performance Requirement No. 3)

Attachment A



NOTE:
SEE SEPARATE SPREADSHEET CALCULATIONS FOR INDIVIDUAL BMP SIZING DETAILS.

0 30 60
SCALE: 1" = 60'

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DCC EXPANSION PHASE II
DRAINAGE MANAGEMENT AREAS EXHIBIT

DAVIS CALIFORNIA

DESIGNED	SG
DRAWN	NC
CHECKED	SG
SCALE	1" = 60'
SHEET	1 OF 1
DATE:	7/8/22
JOB No:	1896.02-01

S:\Projects\1800\1896 Communicare Davis Expansion\AutoCAD\1896-02 SD\1896-02-01 CIVIL\EXHIBITS\1896-02 SWQ EXHIBIT.dwg - Layout 7/11/2022 - 9:11AM Plotted by: Niki

	DRAINAGE SHED CHARACTERISTICS							BMP CHARACTERISTICS							CHECK
Shed No.	Shed Area (AC)	Rooftop Impervious Area (AC)	Non-rooftop Impervious Area (AC)	Landscaped Pervious Area (AC)	Proposed Evergreen Trees #	Proposed Deciduous Trees #	Bio-retention Volume Required (1) (CF)	BMP Type	BMP Bot Area (SF)	BMP Top Area (SF)	Ponding Depth (FT)	Bio-soil Mix Depth (FT)	Permeable Material Depth (FT)	Bio-retention Volume Provided (CF)	Provided > or = Required (YES/NO)
1	2.6600	0.4056	1.3844	0.8700	0	40	935	Det Basin	2999	3771	1.00	1.50	1.00	5,184	YES
2	0.0610	0.0000	0.0480	0.0130	0	0	60	Pervious Pav	561	561	0.00	0.00	1.00	168	YES
3	0.0470	0.0000	0.0280	0.0190	0	0	19	Pervious Pav	840	840	0.00	0.00	1.00	252	YES
4	0.3220	0.0000	0.0110	0.3110	0	12	0	n/a	0	0	0.00	0.00	0.00	0	YES
Total	3.0900	0.4056	1.4714	1.2130	0	52	1,014							5,605	YES

Notes:

1 As determined by the SMARTS Post-Construction Calculator using Drainage Shed Characteristics listed hereon (copies available upon request).

Section 2 Site Design Measures

For projects that create or replace 2,500 but less than 5,000 s.f. of impervious surfaces.

For projects that create or replace 2,500 but less than 5,000 square feet of impervious surface, the Developer shall submit a stamped and signed Performance Requirement No.2 Certification by the Project Engineer prior to the issuance of a building permit. Performance Requirement No. 1 is optional for Developers more than 2,500 but less than 5,000 square feet of impervious surface. Developers may find it helpful to perform a Site Assessment Checklist below. See Section E.12.b Site Design Measures of the Permit in Appendix A.

(a) **Site Assessment**

At the earliest planning stages, all projects shall assess and evaluate how site conditions, such as soils, vegetation, and flow paths, will influence the placement of buildings and paved surfaces. The evaluation will be used to meet the goals of capturing and treating runoff and assuring these goals are incorporated into the project design. The Site Assessment Checklist below, may be helpful in achieving compliance with the Permit.

Performance Requirement No.1 - Site Assessment Checklist (Optional for Projects less than 5,000 sf of impervious surface)	
Project Name: Communicare Davis Expansion	Date: 7/8/2022
Project Address:	
	Included
1. Site topography	Yes - see plans
2. Hydrologic features including contiguous natural areas, wetlands, watercourses, seeps, or springs	None
3. Depth to seasonal high groundwater	+/- 30'
4. Locations of groundwater wells used for drinking water	None
5. Depth to an impervious layer such as bedrock	Unknown
6. Presence of unique geology (e.g., karst)	None
7. Geotechnical hazards	None
8. Documented soil and/or groundwater contamination	None
9. Soil types and hydrologic soil groups	Type C - silty clay
10. Vegetative cover/trees	vacant, grassy, few trees
11. Run-on characteristics (source and estimated runoff from offsite which discharges to the project area)	See drainage memos
12. Existing drainage infrastructure for the site and nearby areas including the location of municipal storm drains	Yes - see plans
13. Structures including retaining walls	Yes - see plans
14. Utilities	Yes - see plans
15. Easements	Yes - see plans
16. Covenants	None
17. Zoning/Land Use	Yes - see architect's plans
18. Setbacks	Yes - see architect's plans
19. Open space requirements	Yes - see architect's plans
20. Other pertinent overlay(s)	None

Step 3. Source Control Measures

All Regulated Projects with pollutant-generating activities and sources are required to implement standard permanent and/or operation source control measures consistent with recommendations from the CASQA Stormwater BMP Handbook for Development (See the referenced BMP Fact Sheets in Appendix C) and Redevelopment and Municipal BMP Handbook or equivalent for the following activities (See Section E.12.d Source Control Measures of the Permit in Appendix B):

PERFORMANCE REQUIREMENT NO. 3 - CERTIFICATION OF SOURCE CONTROL MEASURES			
	POLLUTANT SOURCE	CASQA BMP FACTSHEET NUMBER	BMP INCORPORATED
1.	(a) Accidental spills or leaks	SC-11**	N/A
2.	(b) Interior floor drains	SC-10**	Yes
3.	(c) Parking/storage areas and maintenance	SC-43**	Yes
4.	(d) Indoor and structural pest control	SC-10**	Yes
5.	(e) Landscape/outdoor pesticide use	SC-41**	Yes
6.	(f) Pools, spas, ponds, decorative fountains, and other water features	SC-72**	N/A
7.	(g) Restaurants, grocery stores, and other food service operations	SC-10 & SC-11**	N/A
	(h) Refuse areas	SD-32*	Yes
	(i) Industrial processes	SC-10 & SC-11**	N/A
	(j) Outdoor storage of equipment or materials	SD-34*	N/A
	(k) Vehicle and equipment cleaning	SD-33*	N/A
	(l) Vehicle and equipment repair and maintenance	SD-31*	N/A
	(m) Fuel dispensing areas	SD-30*	N/A
	(n) Loading docks	SD-31*	N/A
	(o) Fire sprinkler test water	SC-10**	Yes
	(p) Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources	SC-10**	N/A
	(q) Unauthorized non-storm water discharges	SC-10**	Yes
	(r) Building and grounds maintenance	SC-41**	Yes

* Source CASQA Development and Redevelopment BMP Handbook

** Source: CASQA Municipal, and Industrial and Commercial BMP Handbooks.

I, Niki Crucillo , acting as the Project Engineer for Communicare Expansion project, located at , hereby state that LID Site Design Measures initialed have been incorporated into the design of the project.

Signature _____ Date 7/8/2022