Stantec

Drainage Study for 3100 52nd Avenue – Parking Lot Expansion

Level 3 Analysis

Design Review No. DRCP2022-00053

Vertical Datum: NAVD88

July 6, 2022

Prepared for:

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1.0 INTRODUCTION

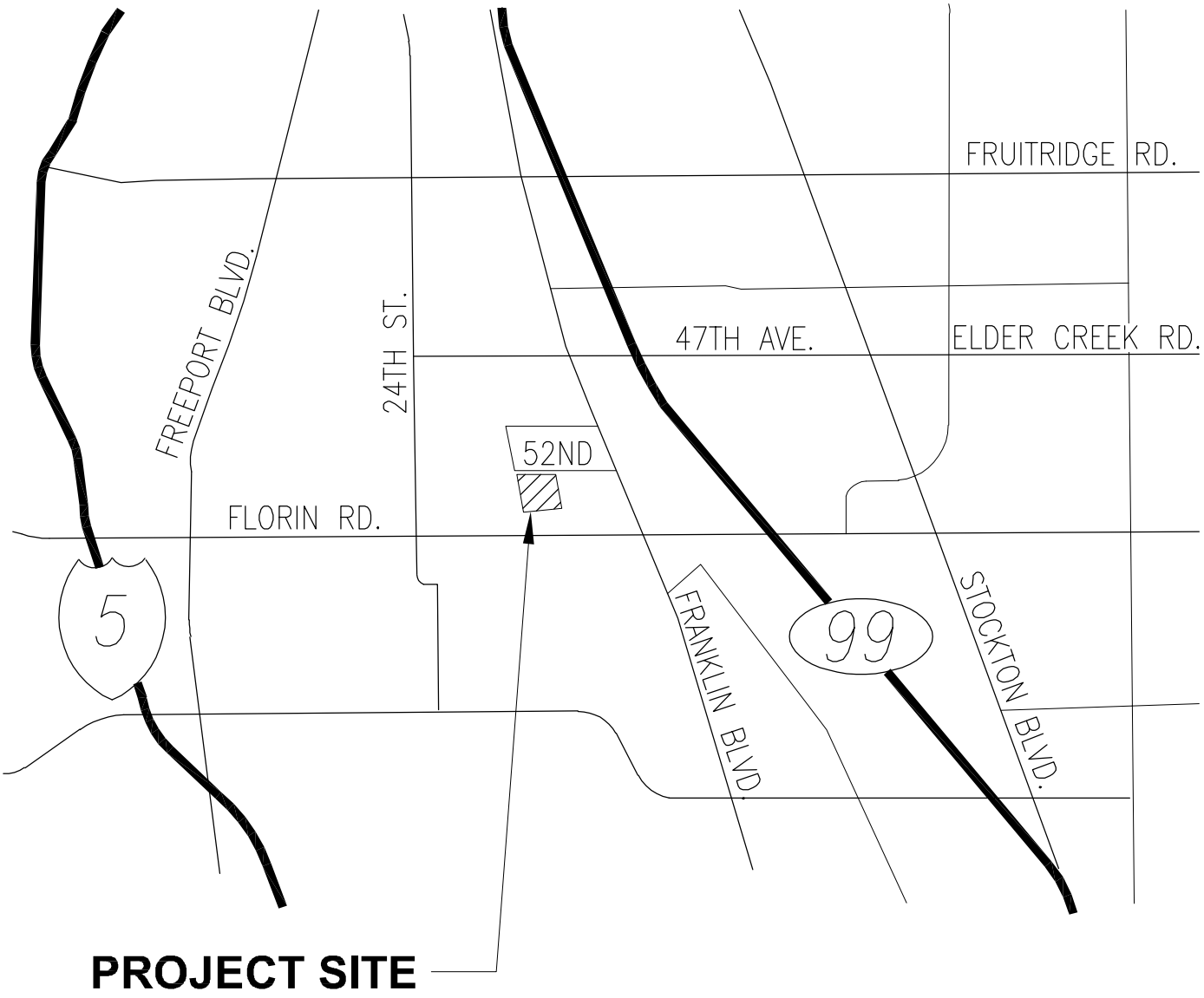
1.1 EXISTING SITE DESCRIPTION

The 3100 52nd Avenue project is located south of Sacramento within unincorporated area of Sacramento County. The project is bounded by an industrial building to the north, railroad tracks to the west, residential mobile home park to the south, and industrial development to the east. The project site is approximately 1.80 acres, see Figures 1-1 and 1-2. Currently, 52nd Avenue is flanked with industrial developments. For purposes of this drainage study, the existing condition development will be considered an industrial land use, and as such, the existing storm drain system was designed for this purpose. The site is relatively flat with a grade change of roughly 3 feet. The project site is predominantly composed of clay and is assigned to hydrologic soil group D, according to the Web Soil Survey provided by the Natural Resources Conservation Service.

1.2 PROPOSED SITE DESCRIPTION

The proposed project will consist of a parking lot for tractor trailers. Pedestrian and vehicular access to the project site will be from 52nd Avenue, see Figure 1-3. The existing striping will be removed on the existing offsite asphalt pavement at the northerly boundary of the project. The existing private 12" storm drain onsite will remain in place and continue to convey stormwater runoff from the existing building roof drain to the north. Proposed onsite storm drain infrastructure will connect to the existing 12" storm drain. The proposed development land use will be industrial. The existing offsite developments to the north and east of the project site have industrial land uses as well.

The purpose of this drainage report is to assess the stormwater impact of the proposed project on the existing storm drain and comply with Sacramento County drainage and stormwater quality criteria.



VICINITY MAP

NOT TO SCALE

FIGURE 1-1

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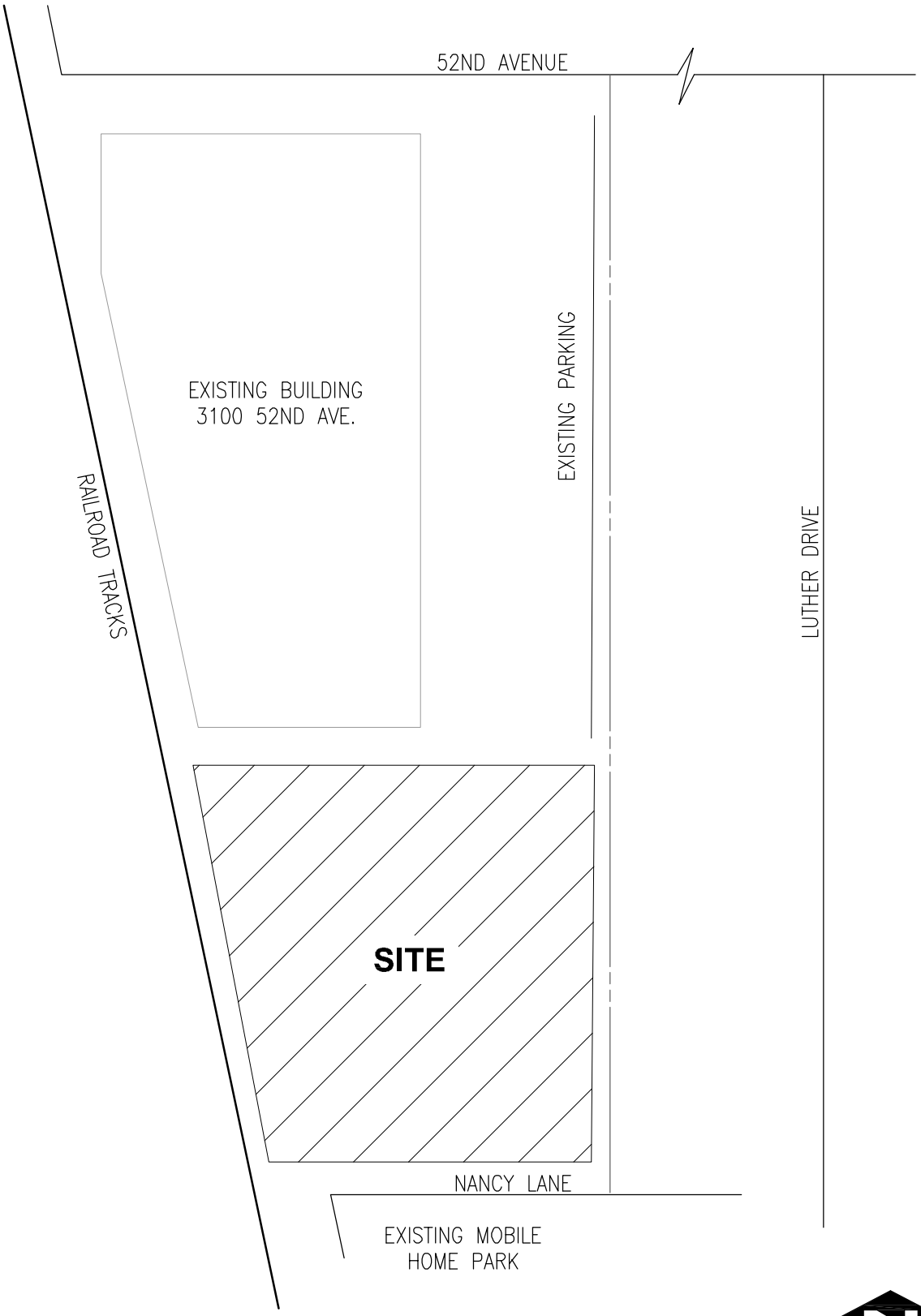
VICINITY MAP

3100 52ND AVENUE



LOCATION MAP

NOT TO SCALE

FIGURE 1-2

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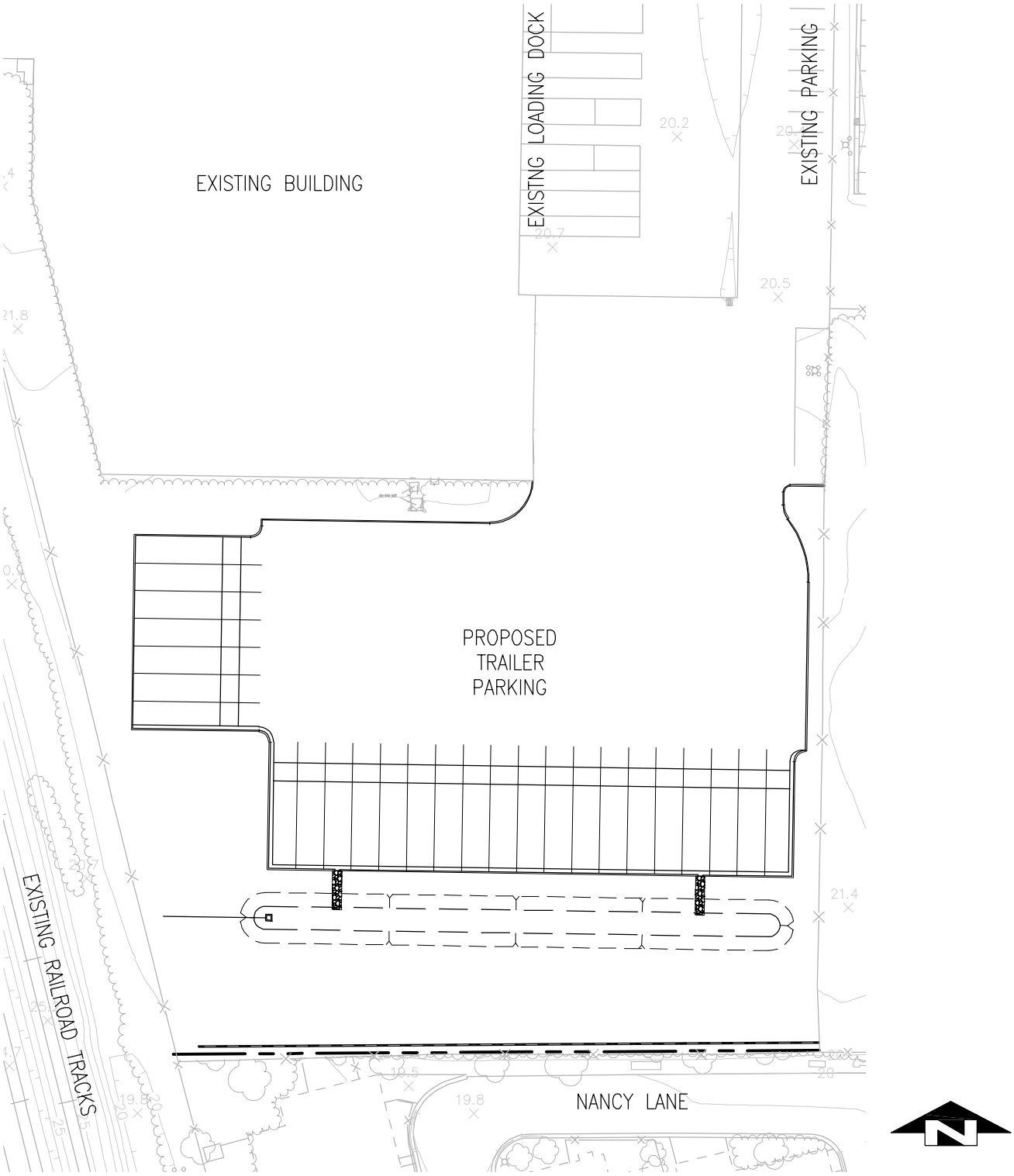
LOCATION MAP

3100 52ND AVENUE



SITE PLAN

NOT TO SCALE

FIGURE 1-3

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SITE PLAN
3100 52ND AVENUE

2.0 PROPOSED SITE IMPROVEMENTS

The proposed grading for the project site will generally be flat. Approximately two-thirds of the project site will have a parking lot for tractor trailers. The surface gradient for this area will be uniform and slope in one direction.

Stormwater will sheet flow across the parking lot and will be intercepted by curb and gutter. The curb and gutter will convey the stormwater to a bioretention basin. The outlet pipe from the bioretention basin will connect to the existing private 12" storm drain system onsite.

The bioretention basin will treat the required amount of stormwater while allowing higher stormwater flow rates to bypass treatment. The bioretention basin will have a 24" square grated inlet with the inlet grate elevated 12" above the basin bottom. See Appendix C LID & SWQ Treatment exhibit for the grated inlet configuration of the bioretention basin. The inlet will intercept and allow the higher flow rates to bypass treatment. The treated stormwater will be intercepted by perforated pipe within the basin's gravel layer and conveyed to the invert of the grated inlet.

3.0 METHODOLOGY

3.1 HYDROLOGY

3.1.1 Existing Condition Hydrology

The Nolte Method was utilized for the analysis of the existing storm drain system. An industrial land use was designated for the existing condition development. Sacramento County Figure 2-5 was used to determine the Nolte Method design runoff. The project site resides in Zone 2.

3.1.2 Proposed Condition Hydrology

The Nolte Method was utilized for the analysis of the existing and proposed storm drain systems. An industrial land use was designated for the proposed condition development. Sacramento County Figure 2-5 was used to determine the Nolte Method design runoff for the offsite area (value per existing condition hydrology) and the SacCalc program was used for determining the onsite Nolte Method design runoff. The project site resides in Zone 2.

3.2 HYDRAULICS

Hydraulic calculations will be included in the Level 4 drainage study.

4.0 DRAINAGE SHEDS – EXISTING CONDITION

4.1 NOLTE METHOD DESIGN RUNOFF

The project site is one drainage shed, E1, and overland flows to an offsite area between the project's westerly property line and the existing railroad tracks. It is assumed to be tributary to the existing public 60" storm drain system. However, it is unknown where the drainage flow is intercepted by the 60" storm drain, see Appendix A for Nolte Method Runoff Existing Condition exhibit. One offsite drainage shed, O1, is also tributary to the existing 60" storm drain system. This drainage shed represents the roof area of the existing building. The roof area is directly tributary to the existing onsite private 12" storm drain that connects downstream to the existing 60" storm drain system. Drainage shed O1 has an industrial land use designation. Sacramento County Figure 2-5 was used to determine the Nolte Method design runoff for drainage sheds E1 and O1. Table 4-1 below summarizes the runoff for the drainage sheds.

Table 4-1 Drainage Shed Runoff Flow Rates

Drainage Shed	Drainage Shed Area (acres)	Nolte Method Design Runoff, Q_N (cfs)
E1	1.80	0.90
O1	0.20	0.10

5.0 DRAINAGE SHEDS – PROPOSED CONDITION

5.1 NOLTE METHOD DESIGN RUNOFF

The project site is one drainage shed, P1, and will have storm drain to convey the Nolte Method runoff flow rate to the existing private 12" storm drain onsite. See Appendix B for Nolte Method Runoff Proposed Condition exhibit. The offsite drainage shed, O1, will continue to be tributary to the existing onsite 12" storm drain. This drainage shed represents the roof area of the existing building. The SacCalc program was used for determining the onsite Nolte Method design runoff for drainage shed P1. Table 5-1 below summarizes the runoff for the drainage sheds. Table 5-2 summarizes the runoff at the onsite private junction.

Table 5-1 Drainage Shed Runoff Flow Rates

Drainage Shed	Drainage Shed Area (acres)	Nolte Method Design Runoff, Q_N (cfs)
P1	1.80	0.87
O1	0.20	0.10

Table 5-2 Runoff Flow Rate at Onsite Private Junction

Drainage Sheds Tributary to Junction	Total Tributary Area (acres)	Nolte Method Design Runoff, Q_N (cfs)
P1 & O1	2.00	0.97

6.0 DRAINAGE SHEDS - LOW IMPACT DEVELOPMENT (LID)

The project site is one drainage shed for low impact development design purposes. The drainage shed is P1, see Appendix C for Low Impact Development (LID) exhibit. The LID Credit Calculation Worksheet for commercial projects, from the Stormwater Quality Design Manual (SQDM) for the Sacramento Region and as modified by the Department of Water Resources, was utilized to calculate the LID points for the drainage shed. The project site must reach a total of 100 points to satisfy the SQDM requirements for new development. The drainage shed points are weighted against the total project site area. Table 6-1 below summarizes the LID points and the weighted points for the drainage shed.

Table 6-1 Drainage Shed LID Points and Weighted Points

Drainage Shed	Drainage Shed Area (acres)	Percentage (%) of Total Project Site Area	LID Points	Weighted Points
P1	1.80	100%	118	118
TOTALS	1.80	100.00%		118.0

The weighted LID points add up to 118 total points. Therefore, the project site meets the requirements of the SQDM for LID implementation.

7.0 HYDROMODIFICATION

According to the latest Applicability Map from the Sacramento Stormwater Quality Partnership website, the project site resides in an area exempt for hydromodification analysis. Therefore, no hydromodification analysis was performed.

8.0 STORMWATER QUALITY

Source control measures and treatment control measures are required per the SQDM. Both types of measures are to be implemented to prevent pollutants from reaching municipal storm drain systems or local waterways. The LID Credit Calculation Worksheet for commercial projects calculates LID points and required stormwater quality treatment flow rates/volumes for drainage sheds. The LID worksheet will let the user know if stormwater quality treatment has been satisfied or if additional treatment is necessary. Table 8-1 below summarizes the stormwater treatment required for the drainage shed.

Table 8-1 Drainage Shed Stormwater Quality Treatment

Drainage Shed	Treatment Required	Treatment Provided	Treatment Control Measure	Treatment Control Measure Sizing
P1	0.096 ac-ft	0.096 ac-ft	Bioretention basin	2,269 sq-ft (10' x 227') with 12" gravel depth

The drainage shed satisfies the LID worksheet for stormwater quality treatment (see Appendix C). Drainage shed P1 has a bioretention basin for treatment control measures. The drainage shed will have the following source control measures: efficient irrigation and landscaping.

9.0 TRASH CAPTURE

Trash particles that are 5mm or larger in size are required to be captured during a 1-year, 1-hour storm event and not allowed to enter the municipal storm drain systems or local waterways.

Drainage shed P1 has a bioretention basin. The bioretention basin will have a 24" square grated inlet structure fitted with a screening device to provide full trash capture. The screening device will be bolted to the wall of the inlet structure at the opening of the outlet pipe.

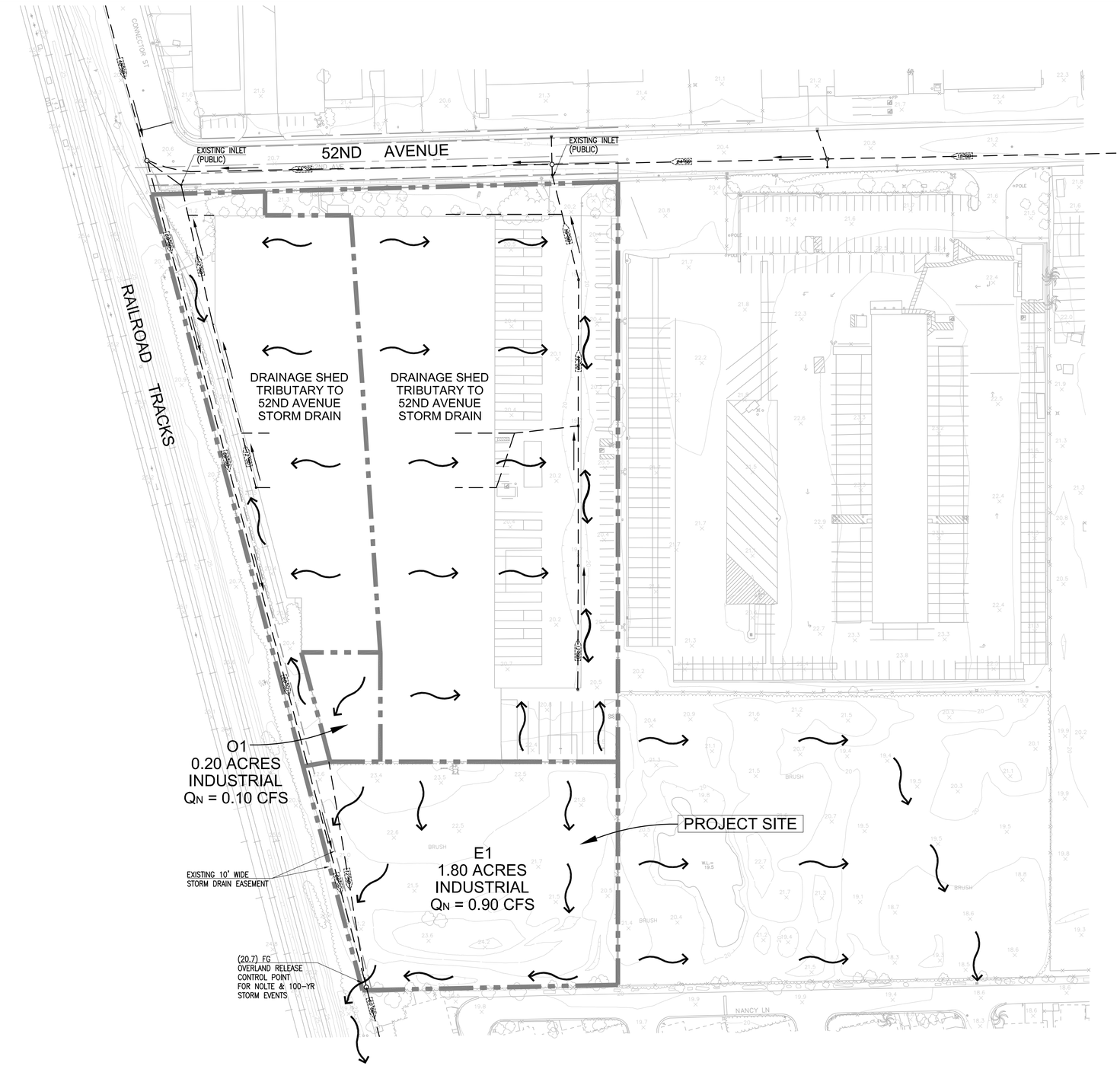
10.0 CONCLUSION

The Nolte Method design stormwater runoff rates for the existing and proposed conditions will be nearly identical. However, the proposed condition runoff is anticipated to be slightly less than the existing condition runoff.

For the 100-yr storm event, the existing and proposed conditions have the same overland release discharge point from the project site. The proposed parking lot and existing building finish floor elevation are well above the ponding water surface elevation expected to occur onsite during a 100-yr storm event. Therefore, the maximum flooding depth possible within the parking area is less than 1 foot.

The LID credit points calculated for the project site exceed the minimum 100 points. The project site resides in an area exempt for hydromodification analysis. Therefore, no hydromodification analysis was performed. Stormwater quality treatment will be provided by a bioretention basin. A trash capture device will be installed in the outlet structure of the bioretention basin.

11.0 APPENDIX A – EXISTING CONDITION NOLTE METHOD DESIGN RUNOFF



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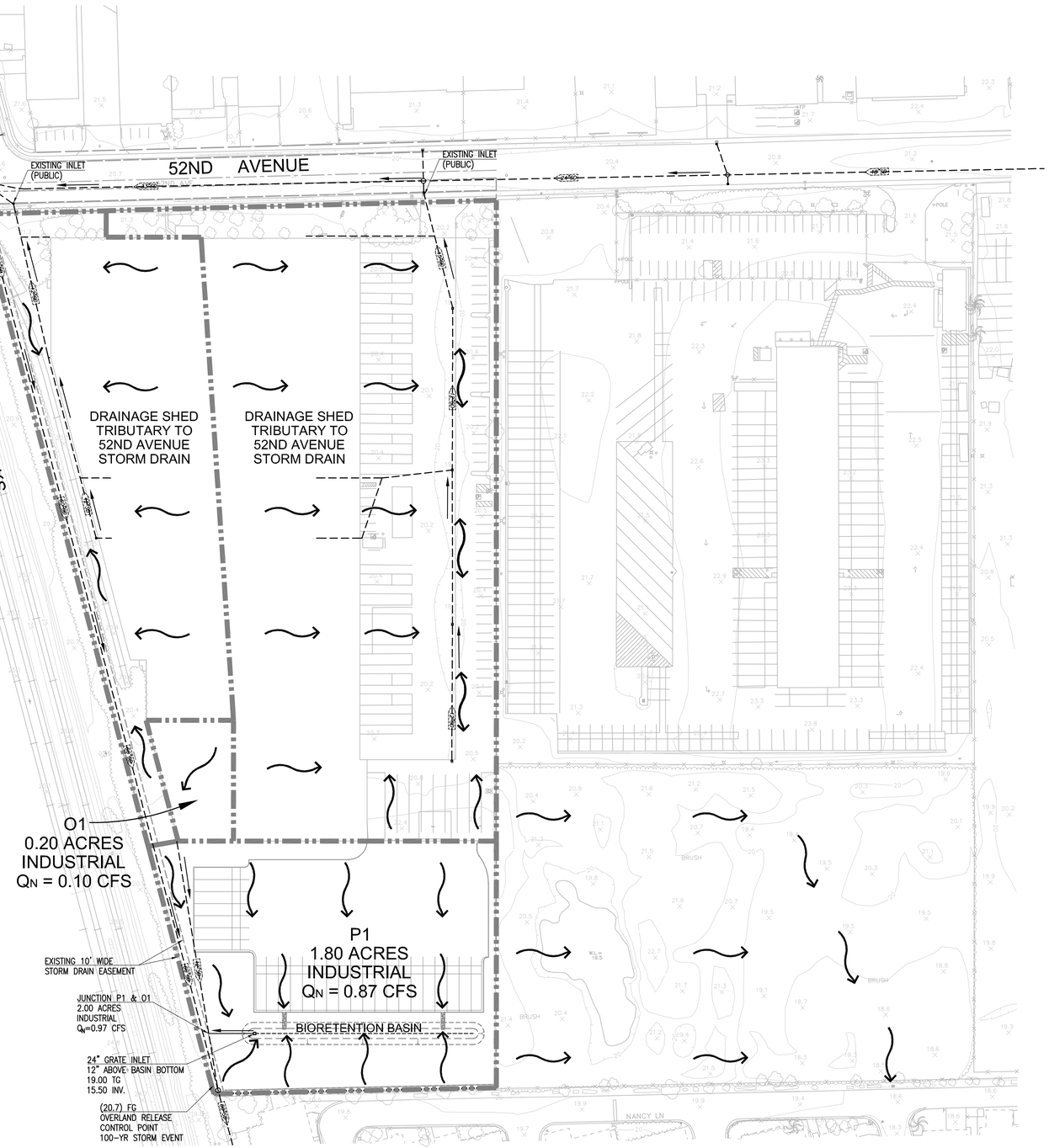
NOLTE METHOD RUNOFF
EXISTING CONDITION
3100 52ND AVENUE

DATE: 6/28/2022

SHEET 1 OF 1

JOB NO. 2042 633000

12.0 APPENDIX B – PROPOSED CONDITION NOLTE METHOD DESIGN RUNOFF



GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

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NOLTE METHOD RUNOFF
PROPOSED CONDITION
3100 52ND AVENUE

DATE: 6/29/2022

SHEET 1 OF 1

JOB NO. 2042 633000

Nolte method results
(Project: 3100 52nd Avenue Nolte Flows - Proposed Condition)
(Hydrologic zone 2)

ID	Drainage area (acres)	Impervious area (%)	Design Q (cfs)
P1	1.80	85.00	0.87

Sacramento Hydrologic Calculator Report

June 29, 2022 14:26

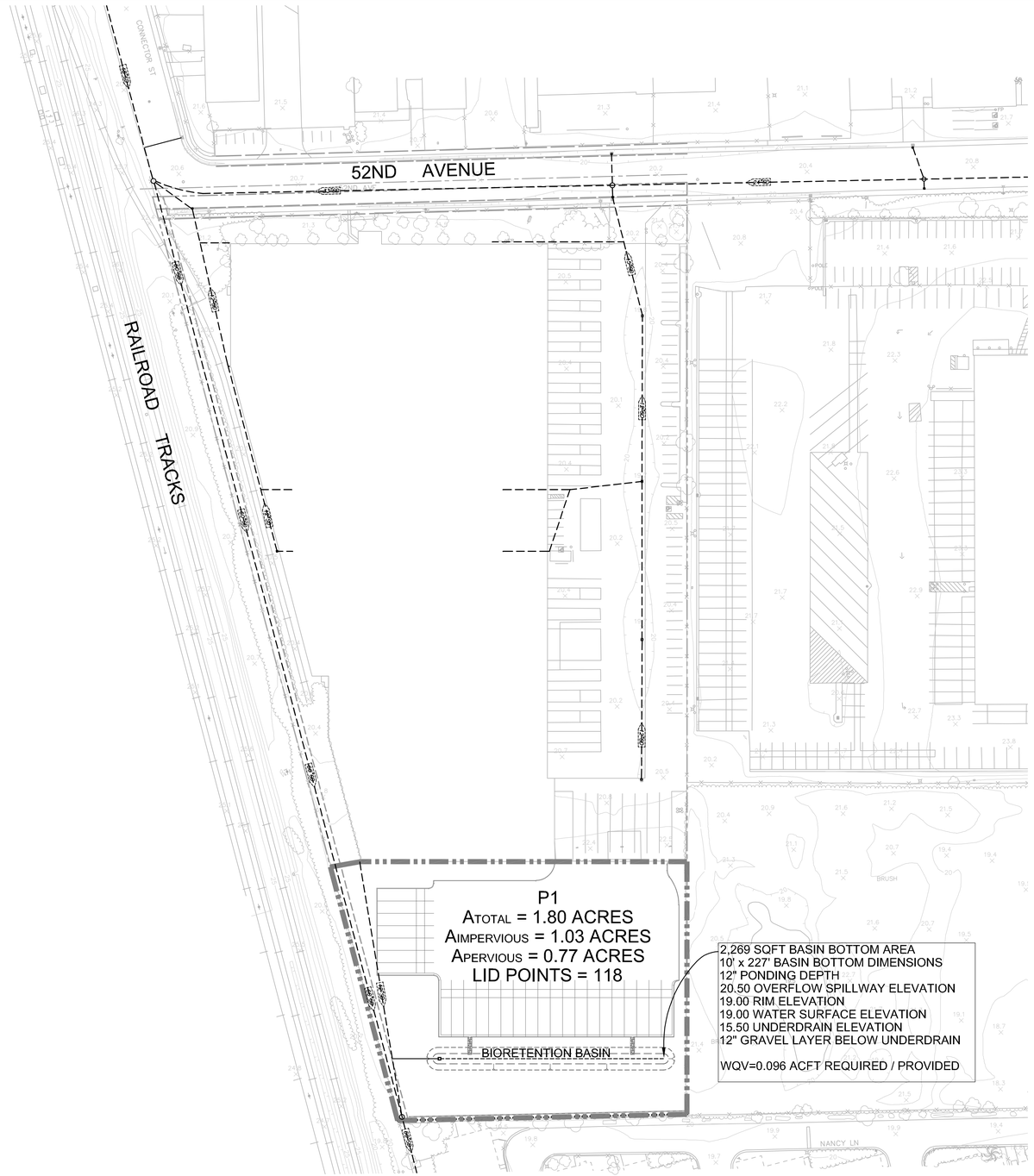
Project Title: 3100 52nd Avenue Nolte Flows - Proposed Condition
Comments: Nolte Method for proposed condition drainage shed P1
Prepared by: mbm
Method: Nolte method
Date: 6/29/2022

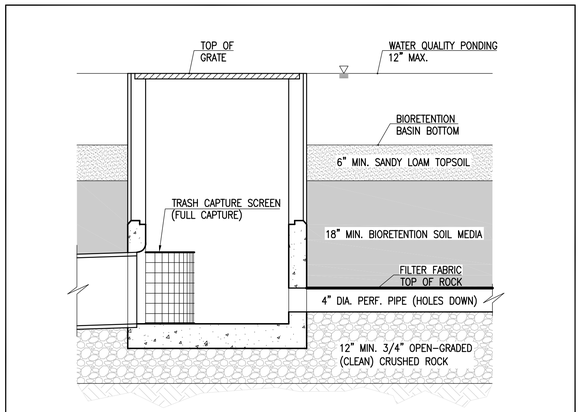
Watershed Hydrologic Summary Data

Watershed	Area (acres)	Area Percent											
		Given as	90	85	80	75	70	60	50	40	30	25	20
P1	1.8	fraction		1									

Refer to the Drainage manual for Land Use Impervious Area Percent

13.0 APPENDIX C – LID/SWQ/TRASH CAPTURE EXHIBIT & LID CREDIT CALCULATION WORKSHEET





BASIN OUTLET STRUCTURE A
N.T.S. -

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

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LID & SWQ TREATMENT
PROPOSED CONDITION
3100 52ND AVENUE

DATE: 6/23/2022
SHEET 1 OF 1
JOB NO. 2042 633000

This portion is to use a variable depth of gravel below the underdrain

A new worksheet is being done to consider this.

1:1 points for pervious + WQV

RED text is calculated

50% = 100 points
(max 200 points)

C=0.95
i=0.18 in/hr
A= AAT

AAT

Flow = CiA

			Contributes to runoff			do not include the diameter of underdrain											
Shed	Watershed (AC)	Pervious (AC)	Impervious (AC)	Bioretention Area (sq-ft)	Points for pervious (1:1 ratio)	*Depth of gravel below underdrain (in)*	*Ponding Depth (in)*	*Infiltrated (ac) Assumed 0.40 void space	*Treated (ac)	Points for Bioretention Infiltration	TOTAL LID points	% of site	**Weighted LID points**	Adjusted Area for Flow-Based, Non-LID Treatment	Additional Flow that needs to be treated (cfs)	Additional treatment required?	WQV (ac-ft) Pnot=0.64 in*
P1	1.80	0.77	0.98	2,269	42.8	12	12	0.391	0.977	75.7	118.5	100%	118.5	-0.337	-0.058	no	0.096
Sub-total		0.77	1.03														
Totals	1.80																
		verify Sub-total	*1.80*									100%	118				

*chart in Appendix E for 12-hr drawdown - assumed 100% impervious since the pervious area is already being credited

LID Credit Calculation Worksheet (for commercial projects) as modified by the Department of Water Resources, Storm Water Quality division

14.0 APPENDIX D – PRELIMINARY GRADING PLAN & OVERLAND RELEASE PATH

EXISTING BUILDING
3100 52ND AVENUE

APN: 041-0092-001

PROPERTY LINE

EXIST. 10' WIDE DRAINAGE ESMT. SACRAMENTO COUNTY

RAILROAD TRACKS

TRAILER PARKING

TRAILER PARKING

AIRCON UNITS

DOORSTEP

5%

18.81'

5.03'

55.00'

288.00'

8.00'

98.50'

UNDEVELOPED LAND

BRUSH

LIMITS OF PONDING (TYP.)

3:1

BOTTOM=18.00

20.70 WATER SURFACE ELEVATION

75' LANDSCAPE BUFFER PER 52ND AVE. NEIGHBORHOOD PRESERVATION AREA (NPA)

1.5%

2%

(20.7) FG
OVERLAND RELEASE
CONTROL POINT
100-YR STORM EVENT

PROPERTY LINE

NANCY LANE

PROPERTY LINE HIGH POINT

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

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DRAWING: u:\2042633000\drawing\exhibit_files\633000c-ex7007.dwg PLOTTED: 7/6/2022 12:43 PM BY: McLellan, Mark