Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

2200 Range Avenue, Ste. 201
Santa Rosa, CA 95403
(707) 528-4848
info@swsv.com

DRAFT MEMORANDUM

DATE: December 1, 2022
TO: Denice Hutten, City of Half Moon Bay
FROM: Benjamin Shick, PE
SUBJECT: Pilarcitos Avenue/Kehoe Watercourse Outfall Repair Project (CIP 1005), Project Alternatives

Introduction

The City of Half Moon Bay contracted Schaaf & Wheeler to evaluate, develop alternatives, design repairs, and obtain necessary permits for the Pilarcitos Avenue/Kehoe Watercourse Outfall Repair Project (CIP 1005). This memorandum summarizes the evaluation of the existing pipe and outfall and identifies project alternatives.

The project includes repair of a 24-inch diameter concrete culvert that discharges into the Kehoe Watercourse at the southern end of Pilarcitos Avenue (Pilarcitos outfall) as shown in Figure 1. The final 4-foot-long pipe segment at the outfall terminus has separated from the pipe joint. The pipe joint is exposed, and erosion has occurred on the channel bank surrounding the outfall.

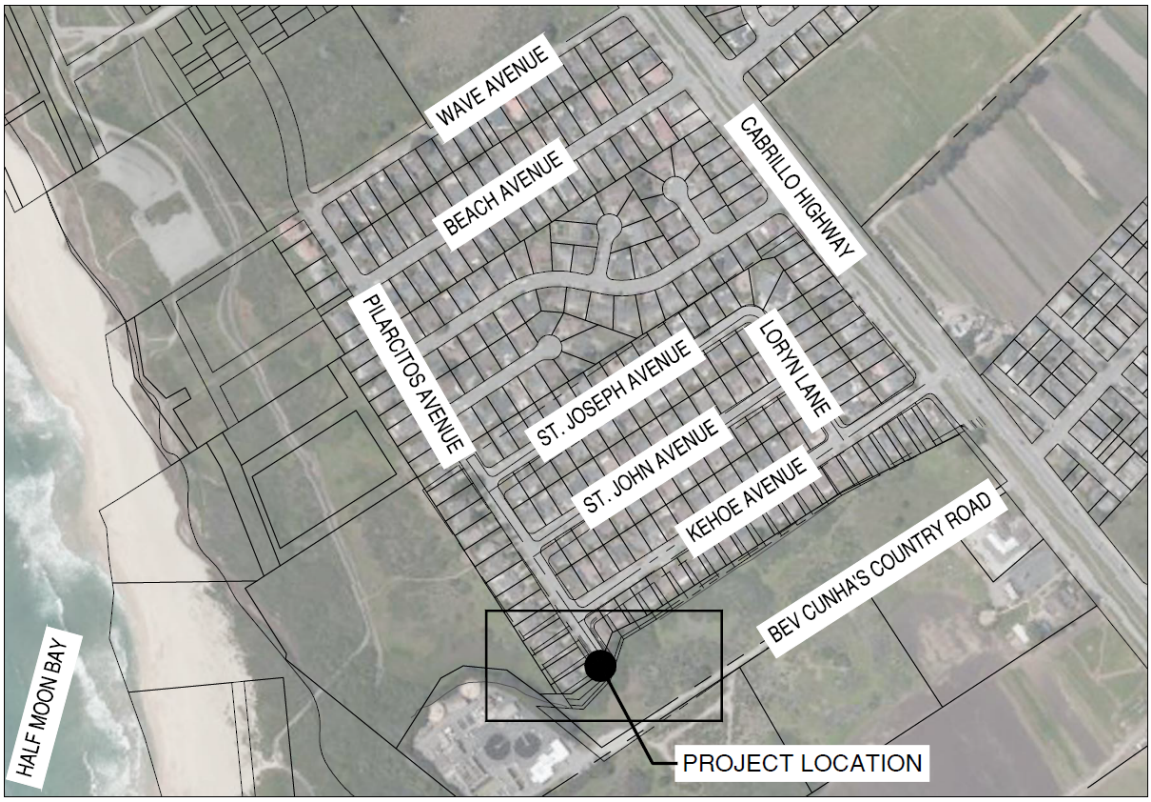


Figure 1: Project Location

Schaaf & Wheeler completed the following preliminary investigations, evaluations, and calculations to identify project alternatives to repair the pipe outfall:

- Conducted a site visit with geotechnical and environmental permitting staff to review and document the existing conditions;
- Performed topographic surveying of the outfall and surrounding channel;
- Performed CCTV inspection of the existing 24-inch culvert from the upstream inlet to the outfall;
- Performed system wide hydrologic calculations to determine peak discharge rates from the Pilarcitos culvert and within the Kehoe Watercourse; and
- Performed localized scour calculations to evaluate stabilization measures for the outfall.

Condition Assessment

Schaaf & Wheeler visited the site on June 9, 2022 to observe and document existing conditions of the culvert and channel adjacent to the outfall. The culvert consists of 24-inch diameter reinforced concrete pipe (RCP) with pipe segments that are approximately 4 feet long. The final 4-foot segment extending to the bank of the channel has subsided and the top of the separated pipe joint is exposed. There is an existing 8-foot long sakrete wall extending from the outfall along the toe of the channel bank (bottom of channel bank slope); a concrete apron also extends from the existing outfall approximately 8 feet. The concrete may have subsided over time, it is approximately 1-foot lower than the invert of the 24-inch RCP outfall pipe.

Erosion has occurred surrounding the outfall. A scour hole is present downstream of the outfall pipe. Ponding water was present in the channel and extended up the culvert to the storm drain inlet at the intersection of Pilarcitos Avenue and Kehoe Avenue. A photograph of the existing outfall and scour hole is included in Figure 2, additional photographs of the channel and outfall are included as Attachment 2 for reference.

Figure 2: Photograph of Outfall, Looking North (10/5/22)

The 24-inch concrete culvert was inspected with closed-circuit television (CCTV) on July 13, 2022 from the storm drain inlet at the intersection of Kehoe Avenue and Pilarcitos Avenue to the outfall into the Kehoe Watercourse. The inspection video indicates that the pipe is in good condition with no observable defects except for the last pipe joint extending into the Kehoe Watercourse where the original pipe joint separation was observed in the field. Therefore, extending the pipe repairs upstream of the outfall is not necessary. The CCTV inspection report is included as an attachment to this memorandum for reference.

Topographic survey of the outfall, fencing, upstream storm drain inlet, and channel surrounding the outfall was conducted in June 2022. The outfall location, storm drain alignment, adjacent property lines and easements, and channel topography are shown in Figure 3.

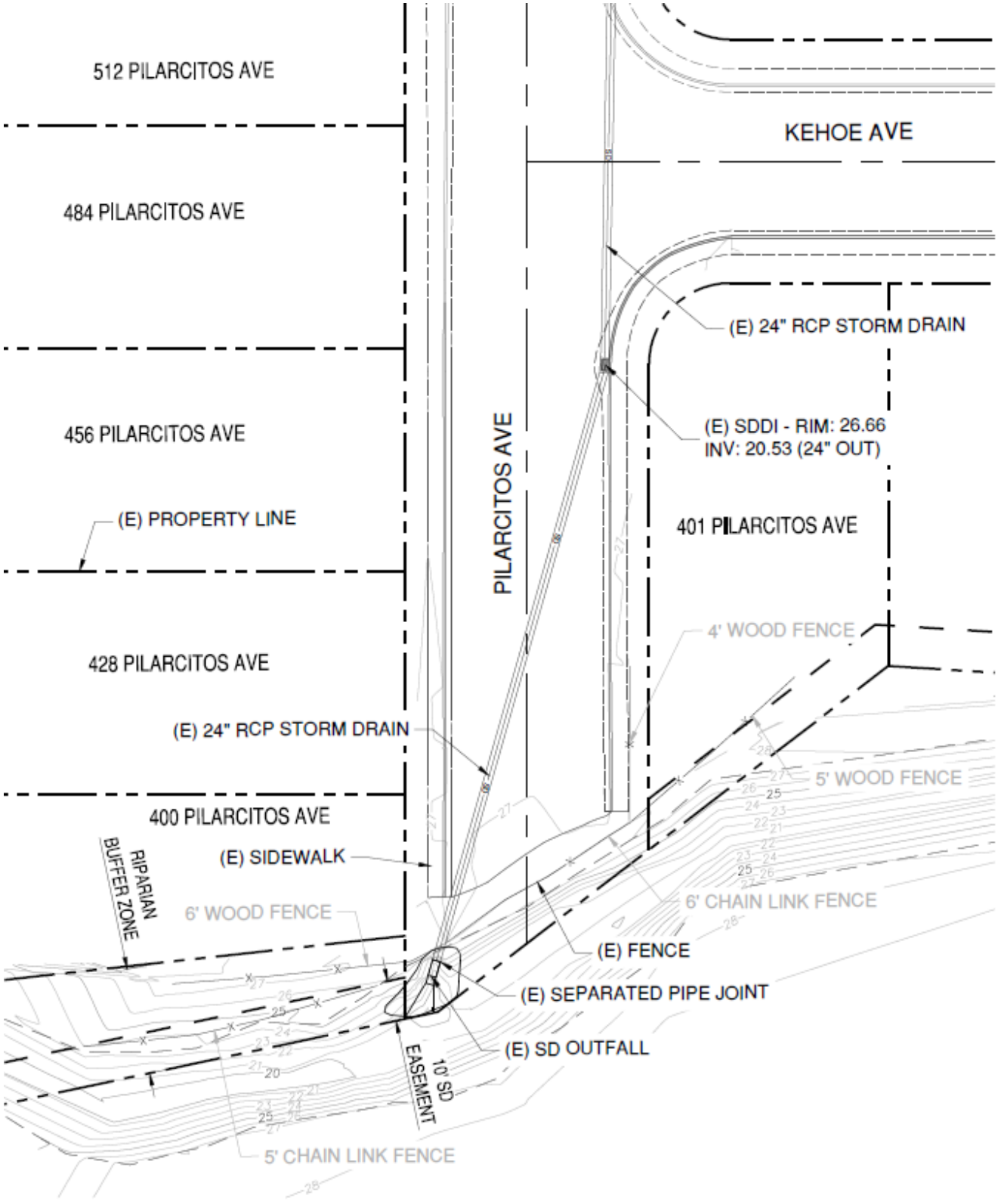


Figure 3: Existing Conditions

Geologic Setting

Previous geotechnical evaluations within the Kehoe Watercourse indicate that the upper 3 to 4 feet of soil within the channel is erodible black clayey silt grading to dense clayey sand. This is consistent with field observations.

Geotechnical boring data from the soil report for the Kehoe Estates (Soil Investigations on Kehoe Estates, Terrasearch, Inc., August 1976) indicates that the area is underlain with clayey silt, silty sand, and sandy clay. The geotechnical boring was taken near the southern end of Pilarcitos Avenue and was drilled to a depth of 15 feet below grade.

These soil types were used for evaluating the estimated scour depths as discussed in the following section.

Hydrologic and Scour Evaluation

Schaaf & Wheeler completed hydrologic and scour calculations to determine peak flow velocities, scour potential, and to size scour protection measures to mitigate associated scour potential. The scour scenarios analyzed include Channel Bend Scour, Channel Bedform Scour, and Culvert Outlet Protection. Hydrology and scour analysis and results are described below.

Hydrologic Evaluation

The hydrology of the Kehoe Watercourse was evaluated as part of the *Kehoe Ditch Hydrology and Hydraulic Study* (Schaaf & Wheeler, December 18, 2015). The watershed was divided into subbasins and the resulting flow hydrographs from each subbasin were used as inputs to the HEC-RAS hydraulic model of the Kehoe Watercourse. The 100-year peak flow rate in the channel is approximately 225 cubic feet per second (cfs) upstream of the Pilarcitos outfall and 253 cfs downstream of the Pilarcitos outfall.

The previously developed HEC-RAS model was updated for this study based on additional survey data near the Pilarcitos outfall. The average channel velocity with the 100-year peak flow rate is approximately 4.3 feet per second (fps) near the Pilarcitos outfall.

The proposed improvements described below include repair of the existing 24-inch storm drain outfall and improvements to stabilize the outfall and surrounding channel bank. The proposed stabilization measures will conform to the upstream and downstream channel contours; therefore, the project will not have hydraulic impacts on the Kehoe Watercourse.

Alternatives 1 through 3 discussed in the following section do not alter the hydrologic conditions within the Kehoe Watercourse or within the storm drain system in Pilarcitos Avenue. Therefore, the proposed alternatives 1 through 3 should not have local or system-wide hydraulic or hydrologic impacts to the Kehoe Watercourse.

Channel Bend Scour

Scour on a channel bend occurs due to the change in flow direction. The channel has a mild bend with the radius of curvature of approximately 200 feet at the outfall location.

The average channel velocity with the 100-year peak flow rate is approximately 4.3 feet per second (fps) near the Pilarcitos outfall. The outfall is near a mild bend in the channel. Therefore, the point velocity at the outfall location may be larger than the average velocity.

U.S. Army Corps of Engineers Engineering Manual 1110-2-1601, Hydraulic Design of Flood Control Channels (EM-1110-2-1601), Plate B-35 indicates that the point velocity can be up to 1.35 times the average velocity. Increasing the velocity by an additional 10% for a factor of safety results in a conservative point velocity of 6.4 fps. Using EM-1110-2-1601, Plate B-29 Stone Stability, the median (D50) rock diameter required to armor against the 100-year peak flow (and resulting flow velocity) in the channel is 7 inches.

Additional channel bend scour calculations were performed using HEC-23 eqn. 4.1. The resulting rock size to protect against scour is Class II (median weight of 60 pounds), with a median (D50) diameter of 8 inches.

The scour depth due to bend scour was calculated using the United States Department of Agriculture (USDA) Technical Supplement 14B, equation in TS14B-33. The estimated scour depth at the toe of the channel bank (bottom of channel bank slope) is 3.6 feet.

Channel Bedform Scour

Channel bedform scour is identified by the formation of troughs between crests of bedforms, which are usually present in sand-bed streams. There are layers of silty gravel sand within the Kehoe Watercourse that may be susceptible to channel bedform scour, and channel scour has been reported within the Kehoe Watercourse. The calculated bedform scour depth assuming black clayey silt and a conservative flow velocity of 6.4 fps (as described above) is 1.7 feet (USDA Technical Supplement 14B, Scour Calculations Equations TS14B-37-44).

Culvert Outlet Protection

The peak flow rate through the 24-inch storm drain culvert is limited by the hydraulic capacity of the pipe. The peak flow rate and resulting flow velocity occur when the pipe is surcharged (upstream inlet is surcharged to the ground surface) and has a free outfall condition (minimal water in the channel).

The peak discharge from the storm drain culvert is approximately 25 cfs, which results in a velocity of 8 fps. Apron dimensions and rock protection size were calculated using the Federal Highway Administration (FHWA) Hydraulic Toolbox software, which uses culvert outlet protection formula (HEC-14, eqn. 10.4). The calculated dimensions of the apron are 11 feet wide, 8 feet long, and 3.4 feet in depth. The calculated rock size is Class III (median weight of 150 pounds), with a median rock diameter of D50 = 10 inches.

Scour Evaluation Summary

Given the analyses above, the governing condition for rock protection at the outfall is based on the peak discharge through the existing 24” diameter outfall. Therefore, the recommended rock size is Class III (median weight of 150 pounds), with a median rock diameter of D50 = 10 inches. The recommended apron dimensions are 11 feet wide, 8 feet long, and 3.6 feet in depth. The actual dimensions will be modified to conform with existing topography and to minimize impacts.

To protect against channel bend scour, the protection measures would typically extend along the channel bank downstream of the bend in the channel. Signs of significant scour/erosion upstream and downstream of the outfall were not observed; therefore, the established vegetation appears to be protecting the channel banks surrounding the existing outfall. The goal of the project is to repair the storm drain outfall, stabilize the channel at the outfall location, and to minimize impacts. To minimize impacts and to minimize removal of stable vegetation, the proposed improvements include repairing the outfall pipe and only stabilizing the channel bank surrounding the outfall. The area around the scour hole at the outfall will be excavated back to sound/stable ground. Native plantings will be utilized to transition from the proposed stabilization measures to the existing ground and vegetation.

Previous geotechnical evaluations within the Kehoe Watercourse indicate that the upper 3 to 4 feet of soil within the channel is erodible black clayey silt grading to dense clayey sand. These soil conditions were taken into account with the scour calculations, and the estimated depth of erodible material aligns with the calculated scour depth. Alternatives 1 through 3, described in the following section, include measures to protect the outfall from the maximum calculated scour depth.

Temporary disturbance to the area surrounding the proposed improvements may be susceptible to scour until vegetation is established. Native plantings will be used within the disturbed areas and at the transition of improvements to stabilize the channel bank and to minimize the potential for scour. Additionally, it is recommended to routinely monitor and document the channel conditions surrounding the outfall following completion of the project.

Outfall Repair Alternatives

Schaaf & Wheeler developed alternatives to repair the storm drain outfall and to stabilize the channel at the outfall location. The alternatives were developed to minimize system-wide and local impacts, minimize permitting and mitigation requirements, and provide protection to the outfall from the 100-year storm event.

The project will require vegetation clearance and removal of fallen/broken tree limbs within the project work area for construction equipment staging and for crew to safely access the site. Each alternative includes the installation of a 3-foot-wide pathway from the end of Pilarcitos Avenue to the outfall.

The proposed pathway will be constructed with compacted Class 2 aggregate base. A new 3-foot-wide access gate will be installed within the existing chain link fence. The project alternatives are detailed below.

Alternative 1: Culvert Repair with Rock Scour Protection

Alternative 1 includes replacing the 4-foot-long pipe segment at the outfall with a new 6-foot-long, 24-inch diameter concrete culvert. The culvert would extend two feet into the channel beyond the existing outfall to reduce the slope of the channel bank and to better conform to the upstream and downstream channel contours. A reinforced concrete collar would be installed around the pipe joint connecting the new and existing pipe segments. The concrete collar would create a reinforced/sealed connection to minimize the potential for leakage through the pipe joint and to mitigate the potential for failure of the pipe joint.

The area surrounding the existing scour hole at the outfall would be excavated back to sound material prior to placing fill and rock as described below. The area within the limits of the culvert repair and rock placement would be over-excavated to a minimum depth of 3.6 feet below the channel invert. Additional excavation will be performed, if necessary, to get to suitable subgrade material. Class III, 150-pound rock would be placed in the approximate limits shown on the attached Alternative 1 figure. The rock would be underlain with stabilization fabric to mitigate migration of material.

The outfall rock protection would extend up the channel bank surrounding the outfall and extend to the limits of excavation. Native fill and plantings would be installed surrounding the improvements as necessary to minimize the potential for scour.

Alternative 2: Culvert Repair with Concrete Headwall

Alternative 2 includes replacing the 4-foot-long pipe segment at the outfall and installing a reinforced concrete collar around the pipe joint to stabilize the pipe segment. The existing scour hole at the outfall would be excavated back to sound material prior to placing fill and crushed rock as described below. The area within the limits of the culvert repair and concrete headwall would be over-excavated to a depth so that suitable subgrade material is encountered.

A concrete headwall would be constructed at the outfall location with wingwalls that contour to the existing channel banks. A concrete apron would span between the wing walls. A cutoff wall would be constructed at the end of the apron and along the eastern side of the pipe alignment to protect the pipe and headwall from scour and erosion. Class III, 150-pound rock would be placed within the existing scour hole, extending from the concrete apron to the approximate limits of the low flow channel. The rock would be underlain with stabilization fabric to mitigate migration of material.

The area behind the headwall and along the adjacent banks would be backfilled and native plantings would be installed. The attached Alternative 2 figure identifies the proposed improvements.

Alternative 3: Culvert Repair with Buried Rock Scour Protection

Alternative 3 includes replacing the 4-foot-long pipe segment at the outfall with a new 6-foot-long, 24-inch diameter concrete culvert. The culvert would extend two feet into the channel beyond the existing outfall to reduce the slope of the channel bank and to better conform to the upstream and downstream channel contours. A reinforced concrete collar would be installed around the pipe joint connecting the new and existing pipe segments. The concrete collar would create a reinforced/sealed connection to minimize the potential for leakage through the pipe joint and to mitigate the potential for failure of the pipe joint.

The area surrounding the existing scour hole at the outfall would be excavated back to sound material prior to placing fill and rock as described below. The area within the limits of the culvert repair and rock placement would be over-excavated to a minimum depth of 3.6 feet below the channel invert. Additional excavation would be performed if necessary to get to suitable subgrade material.

Buried rock (Class III, 150 pound) would be placed in the approximate limits shown on the attached Alternative 3 figure. A layer of native backfill approximately 1-foot thick would be

placed on top of the rock to finish grade. The rock would be underlain with stabilization fabric to mitigate migration of material.

The channel bank surrounding the outfall would be backfilled with native material and native plantings would be installed within the disturbed area.

Alternative 4: Storm Drain Diversion

Alternative 4 includes diverting the existing storm drain system and extending it to the west to eliminate and abandon the existing storm drain outfall. The alternative includes extending a new storm drain system to the west between two residential properties and abandoning the existing storm drain line within Pilarcitos Avenue as shown on the attached Alternative 4 figure.

Due to existing topography west of Pilarcitos Avenue, the new storm drain system would need to extend to the existing Kehoe Watercourse channel to provide positive drainage. Abandonment of the existing storm drain outfall would require removal of existing outfall, bank stabilization, and abandonment of the existing pipe within Pilarcitos Avenue.

Alternative Benefits and Shortcomings

The identified benefits and shortcomings of each alternative are listed in the table below.

Table 1. Alternative Benefits and Shortcomings

Alternative	Benefits	Shortcomings
1: Culvert Repair with Rock Scour Protection	▪ Provides 100-year protection for outfall ▪ Fits within current permitting approach and construction schedule (complete in 2023) ▪ Minimal construction costs ▪ Minimal construction duration ▪ No local or system-wide hydraulic or hydrologic impacts to channel or storm drain system	▪ Bank erosion may occur in areas where native fill is placed if significant runoff occurs prior to plantings being established
2: Culvert Repair with Concrete Headwall	▪ Provides 100-year protection for outfall ▪ Fits within current permitting approach and construction schedule (complete in 2023) ▪ No local or system-wide hydraulic or hydrologic impacts to channel or storm drain system	▪ Use of concrete may require additional mitigation and regulatory agencies may not approve extent of concrete to be used in channel feature ▪ Increased construction costs ▪ Increased construction duration and associated impacts
3: Culvert Repair with Buried Rock Scour Protection	▪ Fits within current permitting approach and construction schedule (complete in 2023) ▪ Minimal construction costs ▪ Minimal construction duration ▪ No local or system-wide hydraulic or hydrologic impacts to channel or storm drain system	▪ Proposed native fill on top of buried rock will likely scour with significant storm events ▪ Bank erosion at outfall may occur if significant runoff occurs prior to plantings being established
4: Storm Drain Diversion	▪ Reduced flow rate in the channel between the existing and proposed outfalls, which may reduce future erosion along this reach	▪ Extended schedule for permitting, easements, coordination, and design phase (construction in 2024 at the earliest) ▪ May require a new easement on residential property ▪ Will likely require additional permitting for a new outfall ▪ May require additional mitigation ▪ Requires State Parks Encroachment ▪ Difficult access for future maintenance ▪ High construction cost

Estimates of Probable Construction Cost

Estimates of probable construction costs were developed for each alternative. A summary is included in Table 2 below. The estimates include 20% construction contingency and exclude permitting, mitigation, easement procurement (Alternative 4), and soft costs.

Table 2. Estimates of Probable Construction Costs

Alternative	Estimated Construction Cost
1: Culvert Repair with Rock Scour Protection	$64,000
2: Culvert Repair with Concrete Headwall	$83,000
3: Culvert Repair with Buried Rock Scour Protection	$67,000
4: Storm Drain Diversion	$350,000*

** The estimate excludes all costs associated with additional permitting, mitigation, easement procurement, and soft costs.*

Conclusion and Recommendations

Repair of the existing outfall should be completed as soon as feasible to prevent additional erosion at the outfall due to the separated pipe joint. As discussed in this memorandum, rock and/or concrete scour protection are necessary to prevent erosion at the storm drain outfall and to protect the storm drain pipe during the 100-year storm event.

Schaaf & Wheeler recommends proceeding with Alternative 1: Culvert Repair with Rock Scour Protection for the following reasons:

1. Provides protection for the 100-year storm event
2. Lowest cost alternative
3. Minimizes biological impacts
4. Fits within the current permitting strategy, which will allow the project to be constructed during the summer of 2023
5. No impacts to system-wide hydraulics of the channel and storm drain system extending up Pilarcitos Avenue

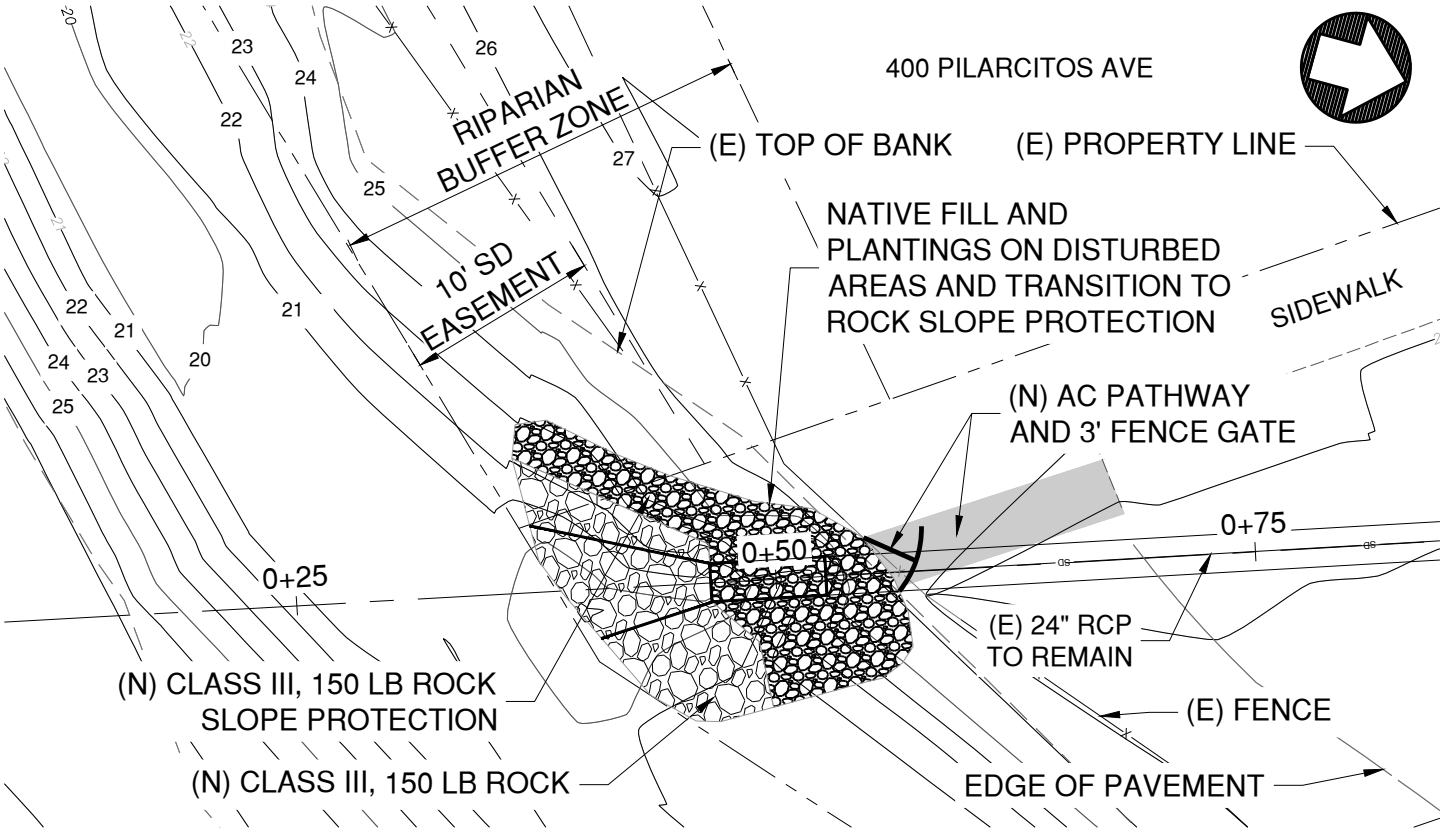
In order to meet the desired schedule of completing construction in 2023, the detailed design needs to proceed as soon as possible so the permitting process can begin.

Attachments

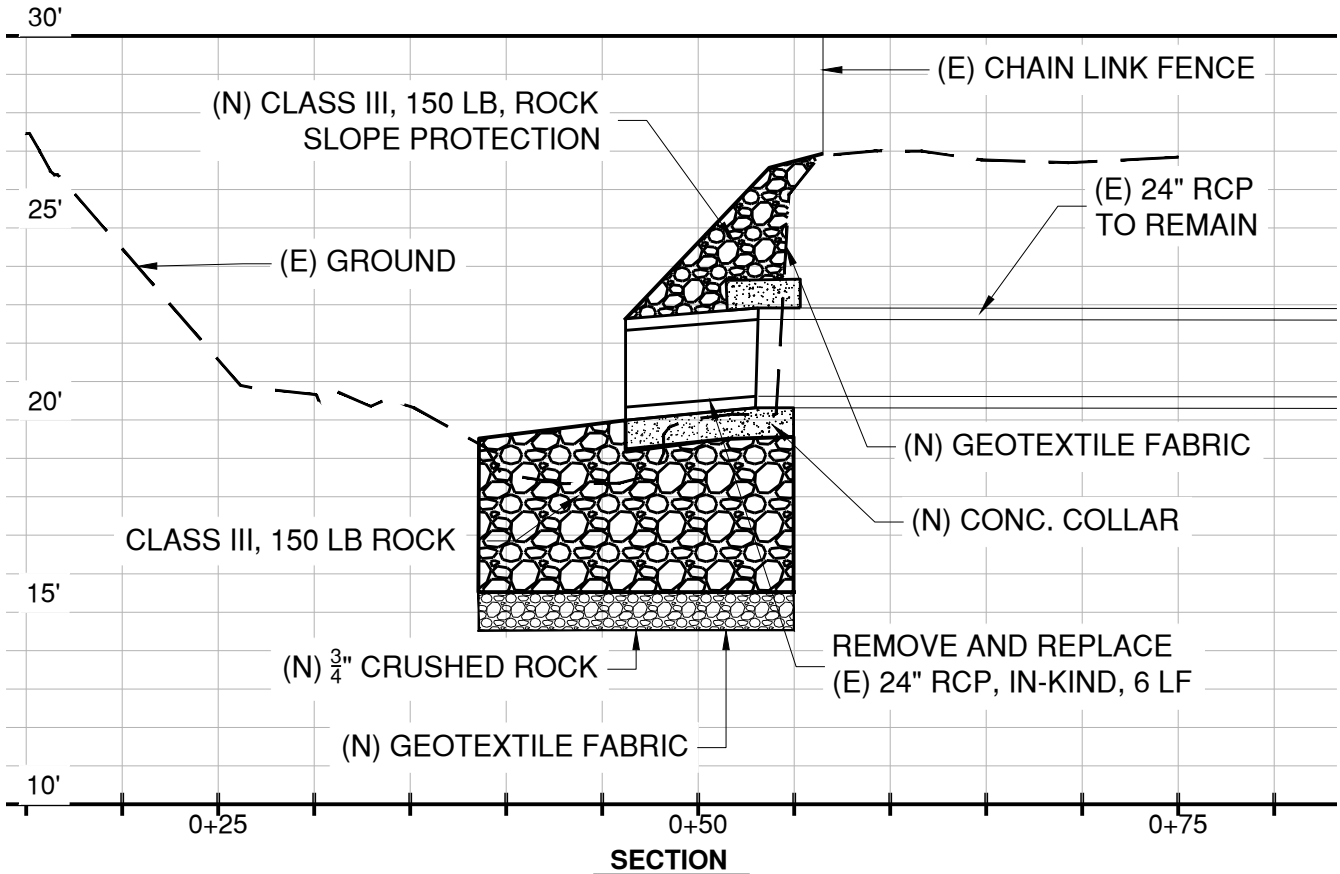
1. Alternative Figures
2. Photographs of existing conditions
3. CCTV Inspection Report for 24-inch storm drain

Attachment 1: Alternative Figures

ALTERNATIVE 1: CULVERT REPAIR WITH ROCK SCOUR PROTECTION



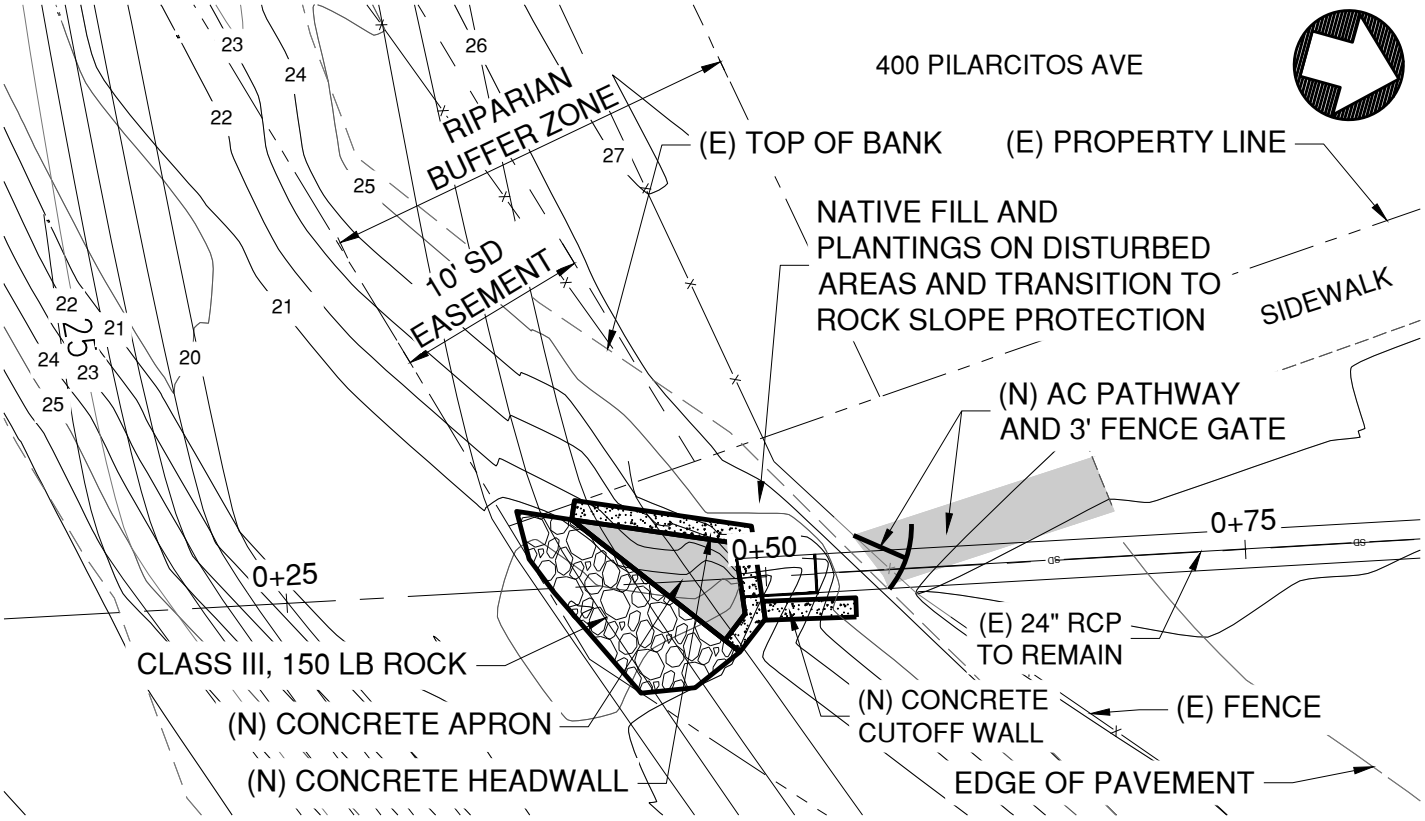
PLAN
HOR. SCALE: 1" = 10'



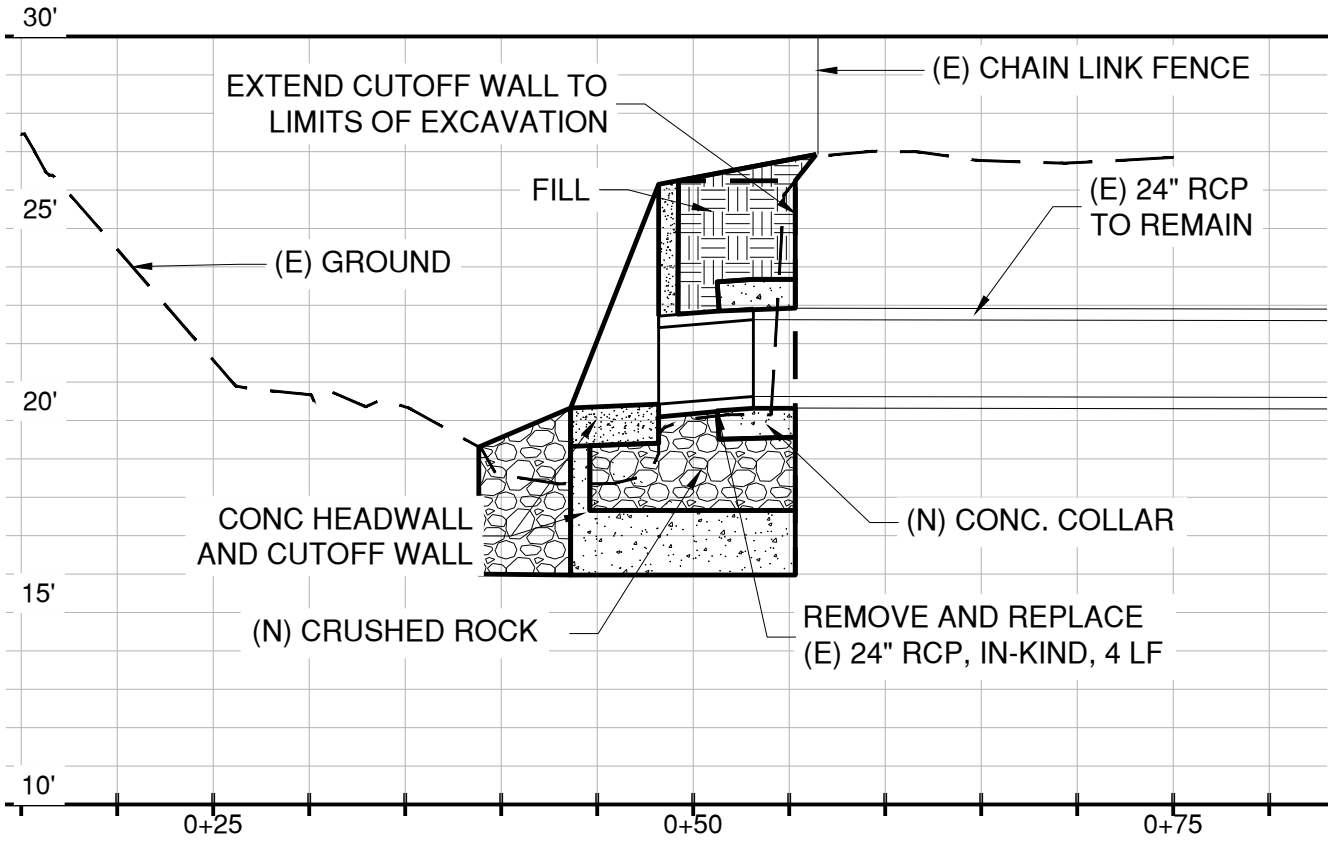
SECTION
HOR. SCALE: 1" = 10'
VER. SCALE: 1" = 5'

Schaaf & Wheeler

ALTERNATIVE 2: CULVERT REPAIR WITH CONCRETE HEADWALL



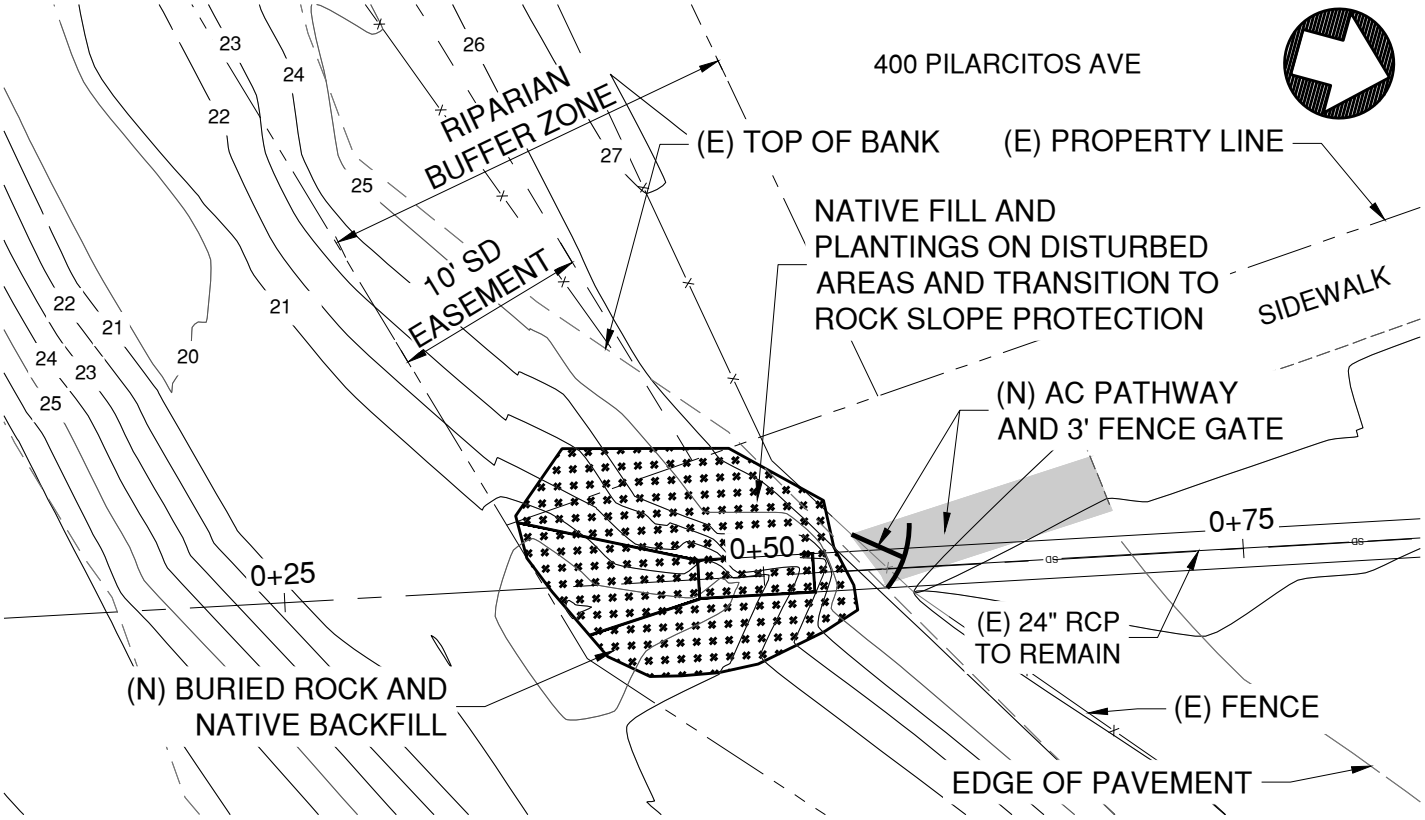
PLAN
HOR. SCALE: 1" = 10'



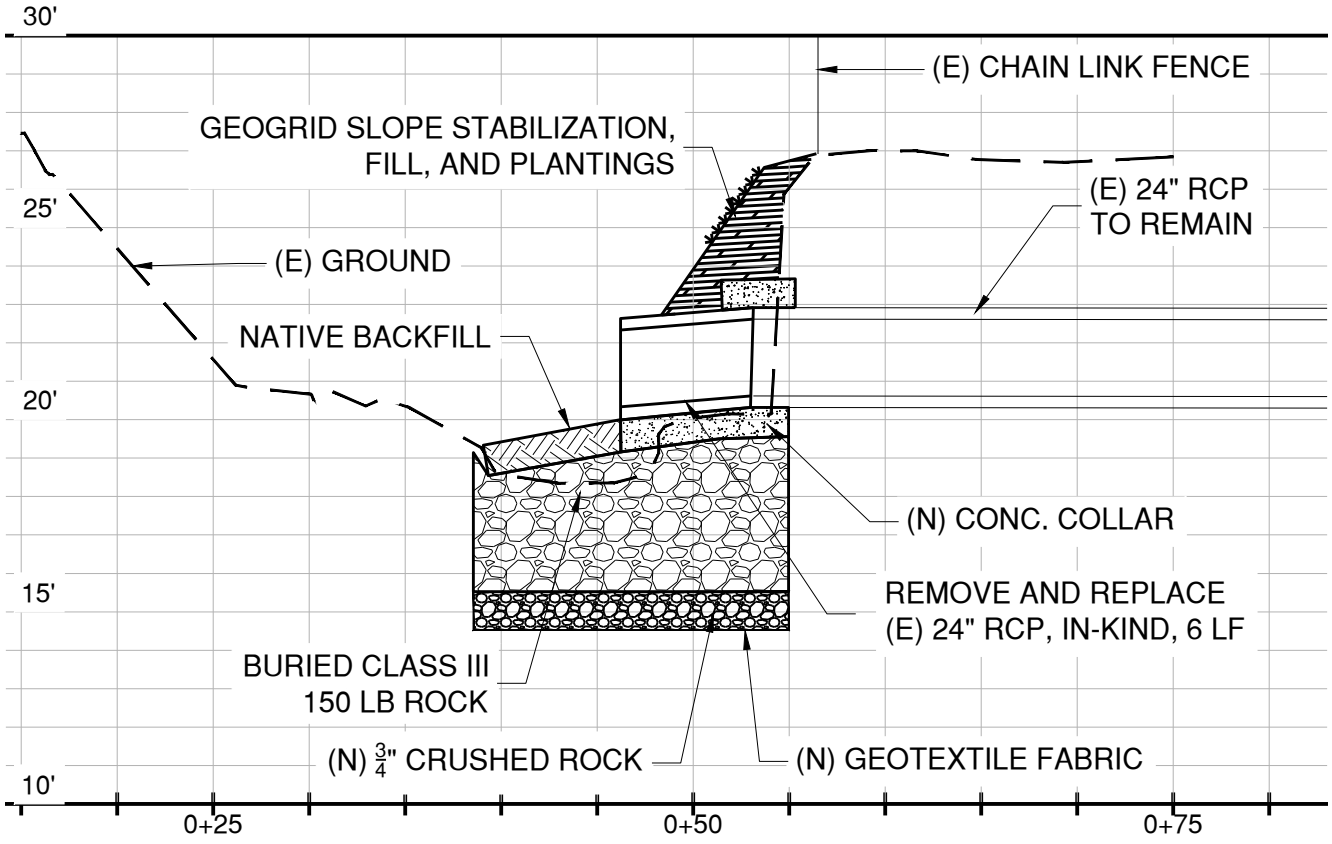
SECTION
HOR. SCALE: 1" = 10'
VER. SCALE: 1" = 5'

Schaaf & Wheeler

ALTERNATIVE 3: CULVERT REPAIR WITH BURIED ROCK SCOUR PROTECTION



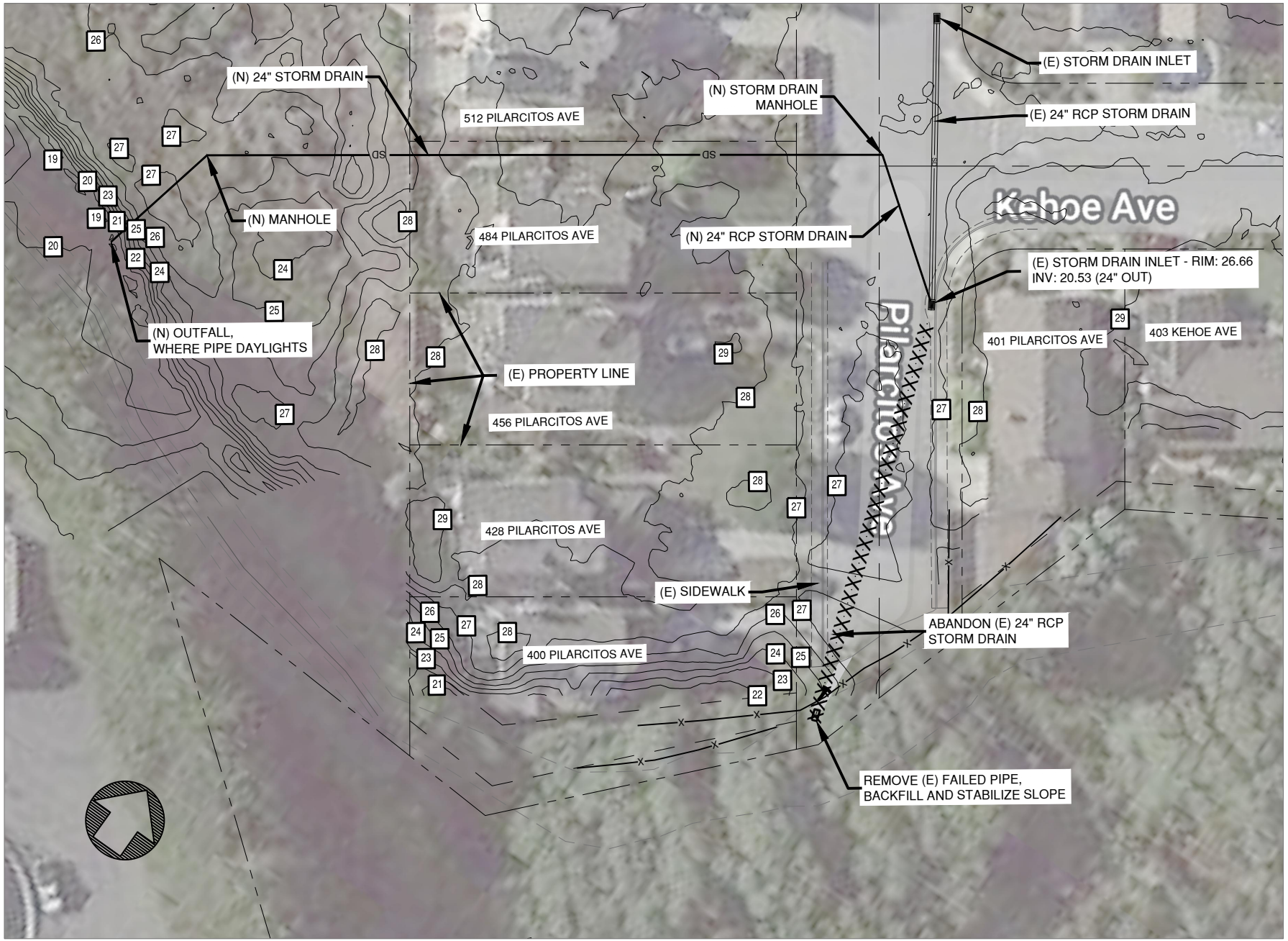
PLAN
HOR. SCALE: 1" = 10'



SECTION
HOR. SCALE: 1" = 10'
VER. SCALE: 1" = 5'

Schaaf & Wheeler

ALTERNATIVE 4: STORM DRAIN DIVERSION



PLAN

HOR. SCALE: 1" = 50'

Schaaf & Wheeler

Attachment 2: Photographs of Existing Conditions

Photo 1: Looking downstream (west) from outfall location 6/9/22

Photo 2: Existing Outfall 6/9/22

Photo 3: Erosion at Separated Pipe Joint 6/9/22

Photo 4: Separated Pipe Joint, 4 Feet Upstream of Outfall 6/9/22

Photo 5: Existing Sakrete Wall Downstream of Outfall 10/5/22

Attachment 3: CCTV Inspection Report for 24-inch storm drain

(from inlet at intersection of Kehoe Avenue to the outfall at the southern end of Pilarcitos Avenue)

Project Information

Surveyor Name	PHIL	**Certificate Number**	070402222
Owner		**Customer**	
Drainage Area		**PO Number**	
Pipe Segment Reference		**Date**	7/13/2022 10:10
Street	PILARCITOS AVE	**City**	HALF MOON BAY
Comments			

Manhole

Upstream MH	CB1	**Rim to Invert (U)**	
Grade to Invert (U)		**Rim to Grade (U)**	
Downstream MH	OUTLET	**Rim to Invert (D)**	
Grade to Invert (D)		**Rim to Grade (D)**	
Pipe Use	Stormwater Pipe	**Direction of Survey**	Downstream

Pipe

Height (Diameter)	24	**Width**	
Shape	Circular	**Material**	Reinforced Concrete Pipe
Lining Method		**Pipe Joint Length**	
Total Length		**Length Surveyed**	152.7
Year Constructed		**Year Renewed**	

Misc

Flow Control		**Media Label**	DVD
Purpose		**Consequence of Failure**	
Pre-Cleaning	No Pre-Cleaning	**Date Cleaned**	
Weather		**Location Code**	
Additional Info		**Location Details**	

Custom

Custom 1		**Custom 2**	
Custom 3		**Custom 4**	
Custom 5		**Custom 6**	
Custom 7		**Custom 8**	
Custom 9		**Custom 10**	

Project

Reverse Setup ID		**Sheet (Group) Number**	
Imperial Units (US)	True	**Pressure Value**	
Work Order		**Project**	
Coating Method		**Completed**	Yes

Insp Tech Used

CCTV	Yes	**Laser**	No
Sidewall	No	**Sonar**	No
Zoom	No	**Other**	No

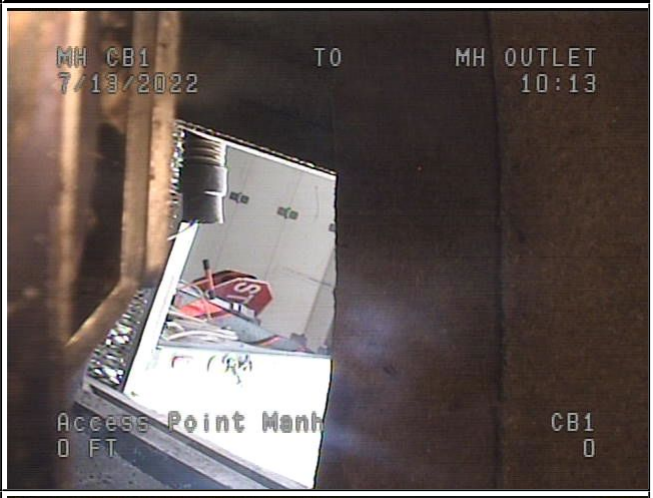
Inspection

Inspection Status	Complete Inspection		
Reviewed By		**Reviewer Certificate Number**	

Count Groups

Taps	0	**Roots**	1
Cracks / Fractures	1	**Broken / Holes / Collapse**	0
Deposits	0	**Obstruction**	0
Abandoned Survey	0		

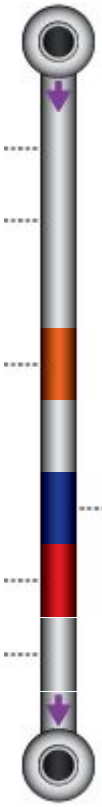
Project:	
Date: 7/13/2022 10:10:00 AM	**Pipe Segment Reference:**
Street: PILARCITOS AVE	**Upstream MH:** CB1
Length Surveyed: 152.7	**Downstream MH:** OUTLET
Run Number:	**Direction of Survey:** Downstream
Height (Diameter): 24	**Material:** Reinforced Concrete Pipe

Distance	Fault Observation	Time	Picture
0.0	Access Point Manhole Severity: None Remarks: CB1	00:00:22	
0.0	Miscellaneous Water Level Severity: None Percent: 10	00:00:51	
63.0	Fracture Longitudinal Position: 12 Severity: None Struct Weight: 3	00:07:09	

Distance	Fault Observation	Time	Picture
146.3	Roots Fine Joint Position: 11 To 7 Severity: None Joint Maint Weight: 1	00:10:53	
148.5	Joint Separated Large Severity: None Struct Weight: 4	00:12:22	
152.7	Access Point Manhole Severity: None Remarks: OUTLET	00:13:11	

Project:	
Date: 7/13/2022 10:10:00 AM	**Pipe Segment Reference:**
Street: PILARCITOS AVE	**Upstream MH:** CB1
Length Surveyed: 152.7	**Downstream MH:** OUTLET
Run Number:	**Direction of Survey:** Downstream
Height (Diameter): 24	**Material:** Reinforced Concrete Pipe

Severity
Light–1
Moderate–2
Average–3
Heavy–4
Severe–5



ID Number: CB1

(0.0) AMH - Access Point Manhole Remark: CB1

(0.0) MWL - Miscellaneous Water Level

(63.0) FL - Fracture Longitudinal - Position: 12

(146.3) RFJ - Roots Fine Joint - Position: 11 To 7

(148.5) JSL - Joint Separated Large

(152.7) AMH - Access Point Manhole Remark: OUTLET

Total Distance: 152.7

ID Number: OUTLET

Created with the **report generator**

Nassco C.C.T.V. Defect Code Information

Grade	Structural	O&M	Overall
5	0	0	0
4	4	0	4
3	3	0	3
2	0	0	0
1	0	1	1
Overall	7	1	8
Number of Defects	2	1	3
Pipe Rating	4131	1100	4131
Pipe Ratings Index	3.5	1	2.7

Nassco C.C.T.V. Defect Code Information

Distance	Video Ref	Code	Cont Defect	Value			Joint	Circumferential Location	
				Dimension		%		At / From	To
				1st	2nd				
0	22	AMH - Access Point Manhole							
		CB1							
0	51	MWL - Miscellaneous Water Level				10			
63	429	FL - Fracture Longitudinal						12	
146.3	653	RFJ - Roots Fine Joint					X	11	7
148.5	742	JSL - Joint Separated Large							
152.7	791	AMH - Access Point Manhole							
		OUTLET							

Videos Created for Session

_CB1-OUTLET_7132022-1012_D_47198.mp4 Size: 201 MB

Your browser does not support the video tag.