CALIFORNIA COASTAL COMMISSION
CENTRAL COAST DISTRICT
725 FRONT STREET, SUITE 300
SANTA CRUZ, CA 95060
PHONE: (831) 427-4863
FAX: (831) 427-4877
WEB: WWW.COASTAL.CA.GOV

F18a

3-23-0014 (GROSSMAN ARMORING)
FEBRUARY 10, 2023 HEARING
EXHIBITS

Exhibit 1 – Location Maps
Exhibit 2 – View looking downcoast from Florin Street Overlook
Exhibit 3 – California Coastal Records Project photos of the site from 1972 to 2019
Exhibit 4 – April 2020 plans (showing undercut bluff and then-proposed emergency fill)
Exhibit 5 – March 2022 as-built plans (showing new fill and seawall constructed under G-3-20-0025, G-3-21-0023, and G-3-21-0035)
Exhibit 6 – August 2021 plans (showing proposed Phase IIB work)
Exhibit 7 – February 2022 plans (showing additional proposed downcoast seawall work)
Exhibit 8 – May 2005 plans showing nine unpermitted tiebacks
Exhibit 9 – February 2022 Applicant photos of armoring completed under G-3-21-0035
Exhibit 10 – 2005 Staff photos of unpermitted house construction work
Exhibit 11 – Applicant's 2005 calculations for house construction work
Exhibit 12 – January 2023 Staff Sand Supply Impacts Memorandum

Regional Location Map

Project Location

Project Location

Source: Google Earth, 2019

View looking downcoast at project site from Florin Street Overlook

California Coastal Records Project Photo - 1972

California Coastal Records Project Photo - May 1979

California Coastal Records Project Photo - January 1989

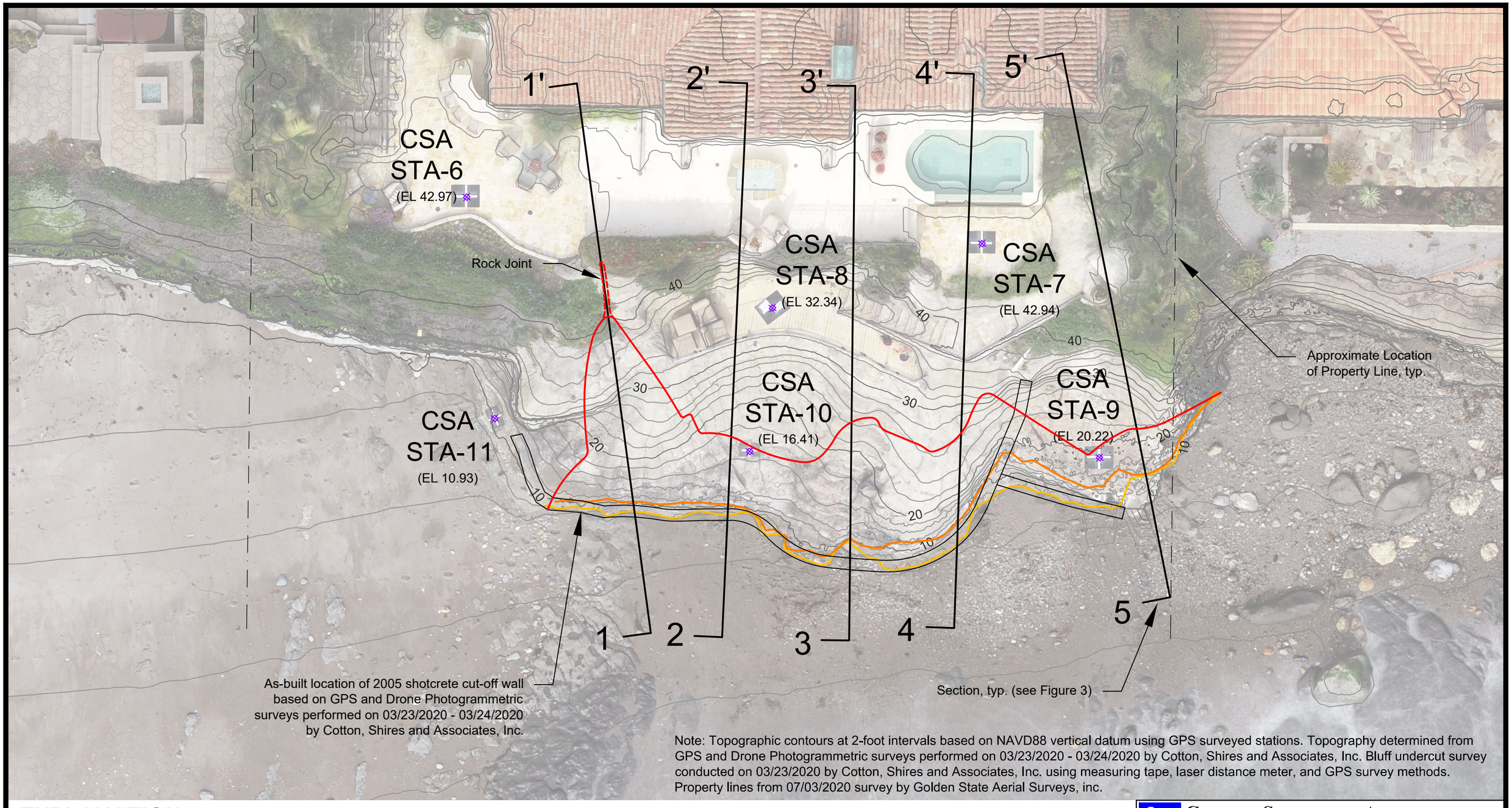
California Coastal Records Project Photo - September 2002

California Coastal Records Project Photo - October 2004

California Coastal Records Project Photo - September 2010

California Coastal Records Project Photo - September 2015

California Coastal Records Project Photo - October 2019



Note: Topographic contours at 2-foot intervals based on NAVD88 vertical datum using GPS surveyed stations. Topography determined from GPS and Drone Photogrammetric surveys performed on 03/23/2020 - 03/24/2020 by Cotton, Shires and Associates, Inc. Bluff undercut survey conducted on 03/23/2020 by Cotton, Shires and Associates, Inc. using measuring tape, laser distance meter, and GPS survey methods. Property lines from 07/03/2020 survey by Golden State Aerial Surveys, inc.

EXPLANATION

- Horizontal landward extent of wave action undercutting (plan view)
- Seaward bottom of wave action undercutting (plan view)
- Seaward top of wave action undercutting (plan view)

North

0 5 10 20
(feet)

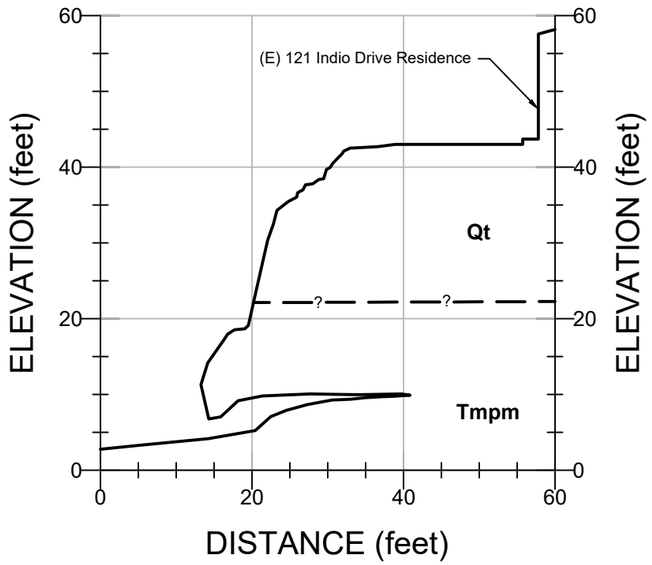
3-23-0014
Exhibit 4
Page 1 of 4

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

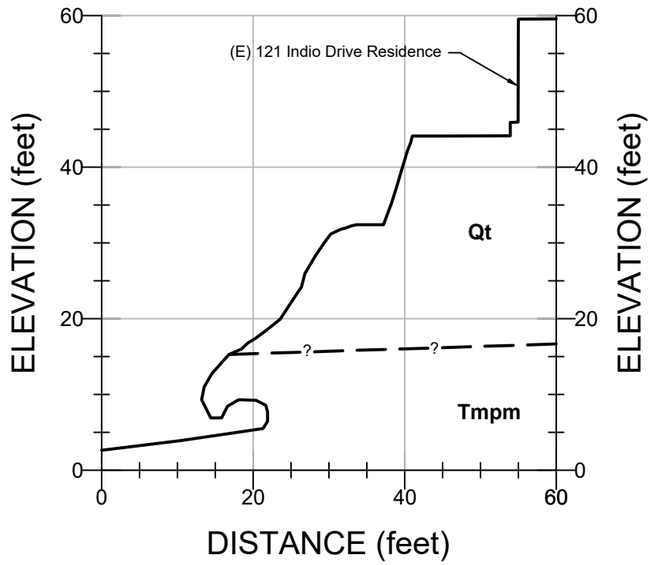
SITE TOPOGRAPHIC AND BLUFF UNDERCUTTING PLAN
IMMEDIATE MITIGATION OF BLUFF UNDERCUTTING
121 INDIO DRIVE
PISMO BEACH, CALIFORNIA

GEO/ENG BY	SCALE	PROJECT NO.
TRH	1"=10'	E0222L
APPROVED BY	DATE	FIGURE NO.
POS	April 2020	2

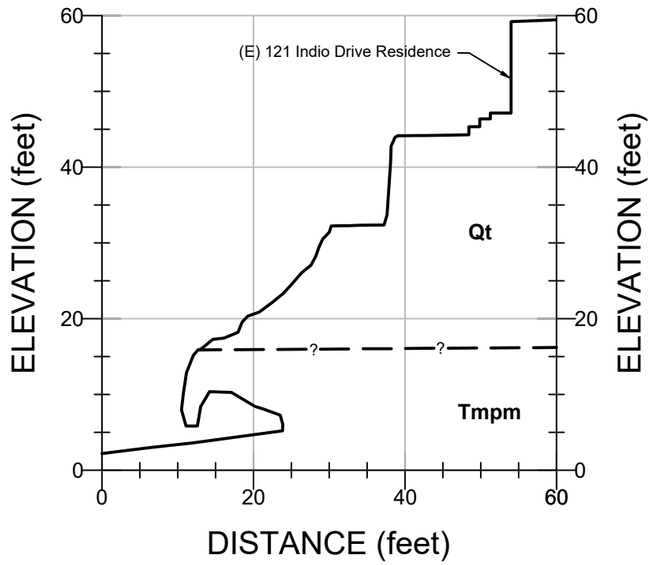
Section 1-1'



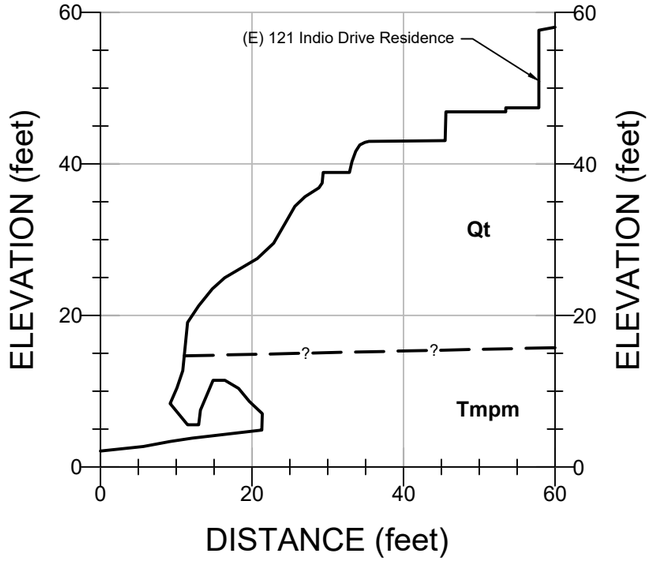
Section 2-2'



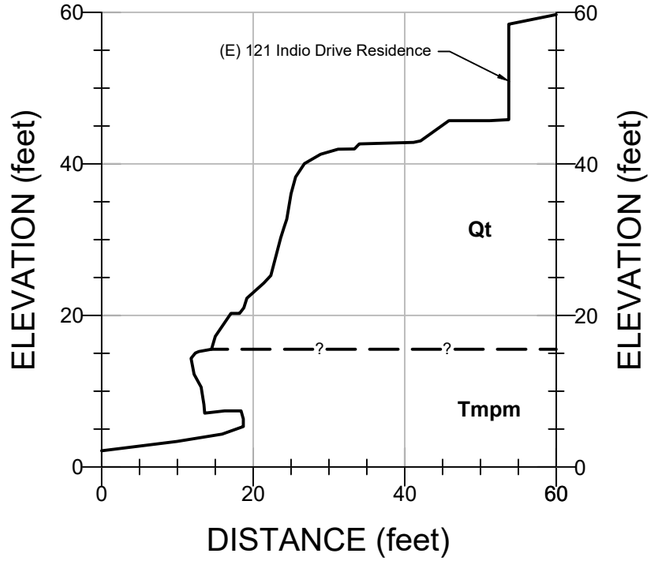
Section 3-3'



Section 4-4'

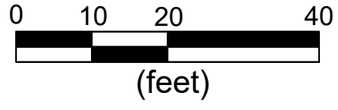


Section 5-5'



EXPLANATION:

Qt	Terrace Deposits
Tmpm	Pismo Formation Bedrock

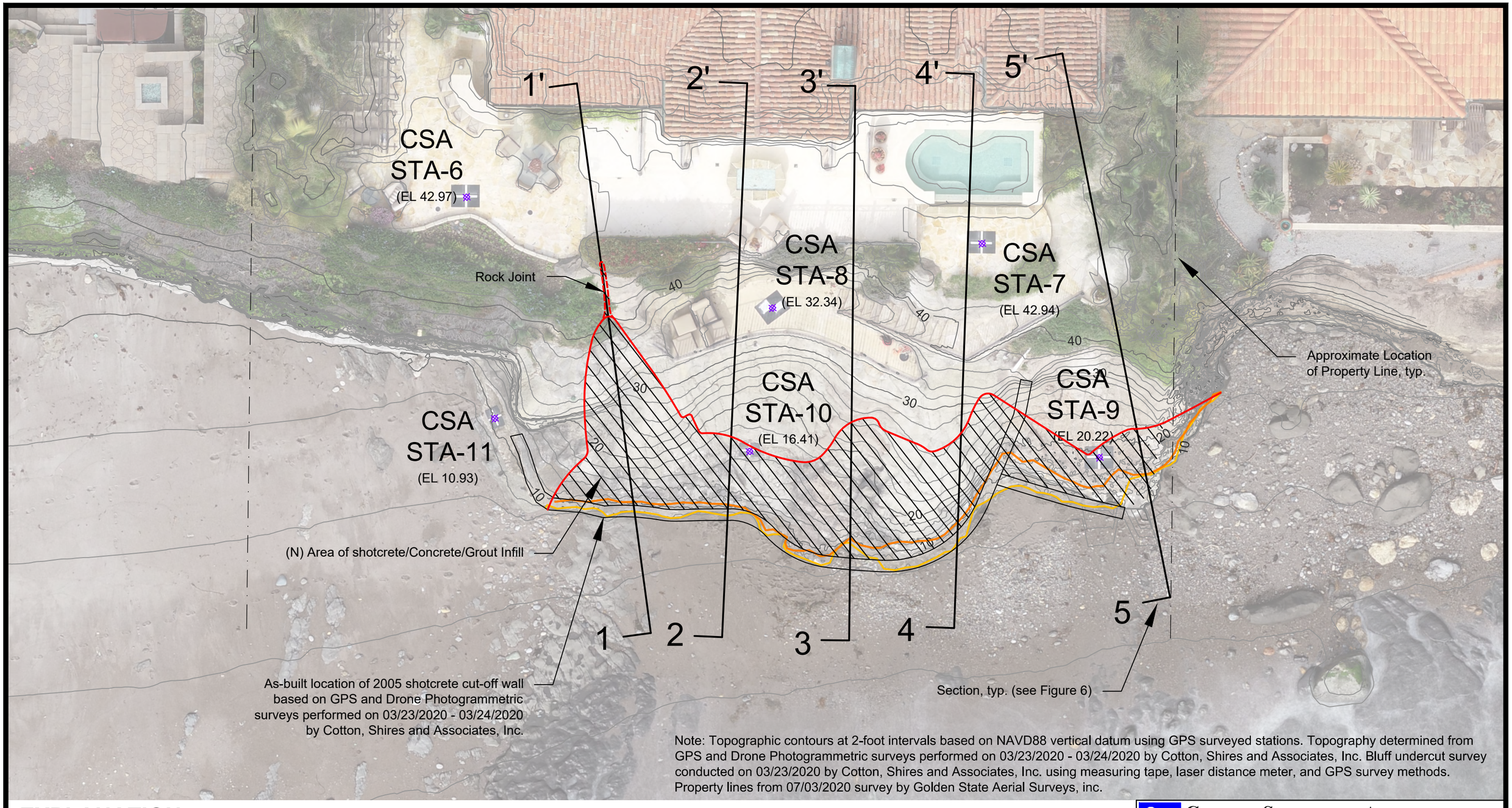


3-23-0014
Exhibit 4
Page 2 of 4

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

SECTIONS 1-1' THROUGH 5-5'
IMMEDIATE MITIGATION OF BLUFF UNDERCUTTING
121 INDIO DRIVE
PISMO BEACH, CALIFORNIA

GEO/ENG BY TRH	SCALE 1"=20'	PROJECT NO. E0222L
APPROVED BY POS	DATE April 2020	FIGURE NO. 3



Note: Topographic contours at 2-foot intervals based on NAVD88 vertical datum using GPS surveyed stations. Topography determined from GPS and Drone Photogrammetric surveys performed on 03/23/2020 - 03/24/2020 by Cotton, Shires and Associates, Inc. Bluff undercut survey conducted on 03/23/2020 by Cotton, Shires and Associates, Inc. using measuring tape, laser distance meter, and GPS survey methods. Property lines from 07/03/2020 survey by Golden State Aerial Surveys, inc.

EXPLANATION

- Horizontal landward extent of wave action undercutting (plan view)
- Seaward bottom of wave action undercutting (plan view)
- Seaward top of wave action undercutting (plan view)

North

0 5 10 20
(feet)

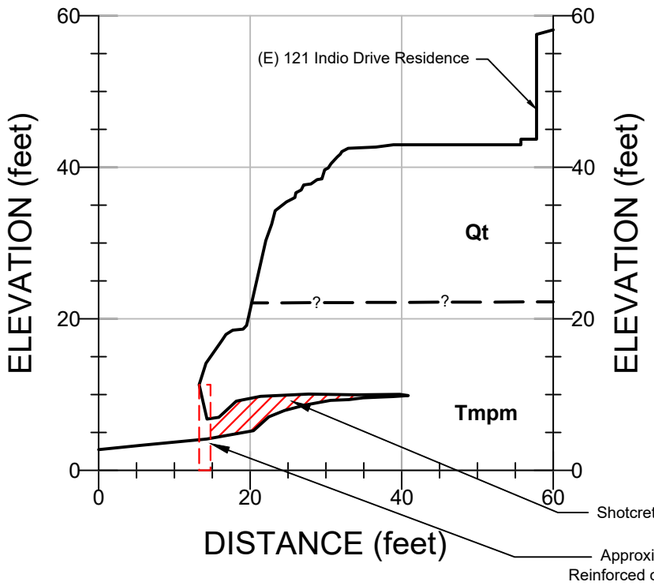
3-23-0014
Exhibit 4
Page 3 of 4

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

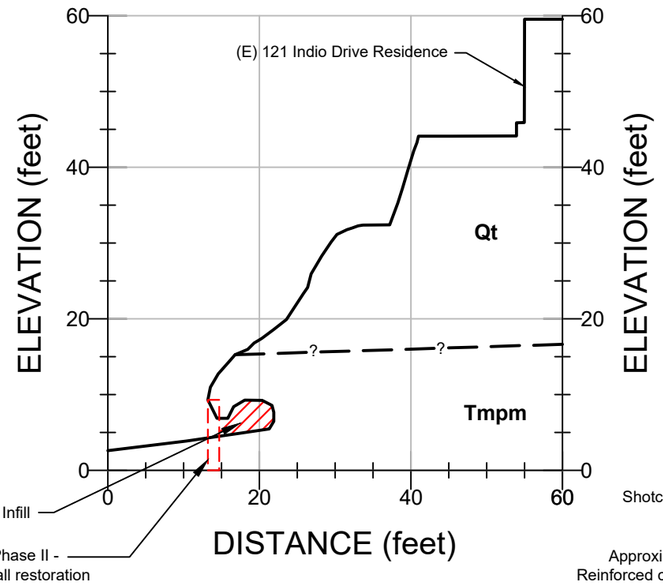
PHASE I - SHOTCRETE/CONCRETE/GROUT INFILL PLAN
IMMEDIATE MITIGATION OF BLUFF UNDERCUTTING
121 INDIO DRIVE
PISMO BEACH, CALIFORNIA

GEO/ENG BY	SCALE	PROJECT NO.
TRH	1"=10'	E0222L
APPROVED BY	DATE	FIGURE NO.
POS	April 2020	5

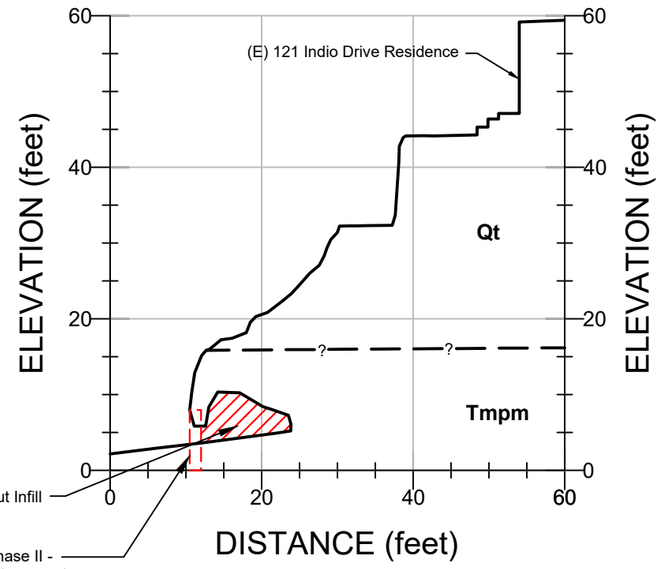
Section 1-1'



Section 2-2'



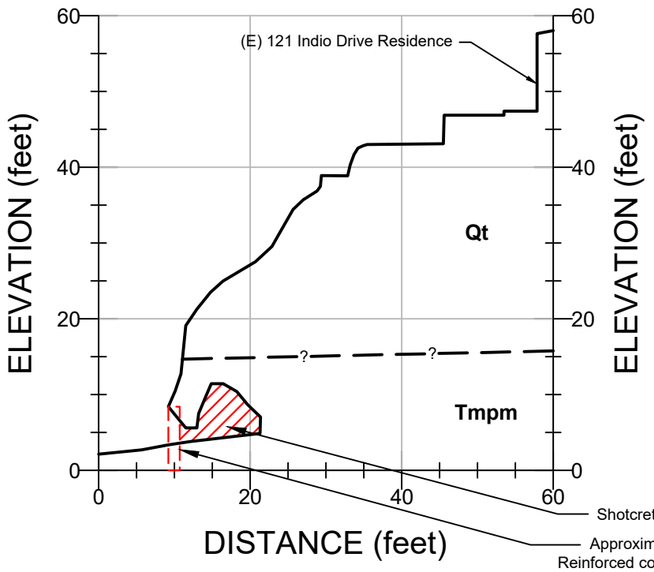
Section 3-3'



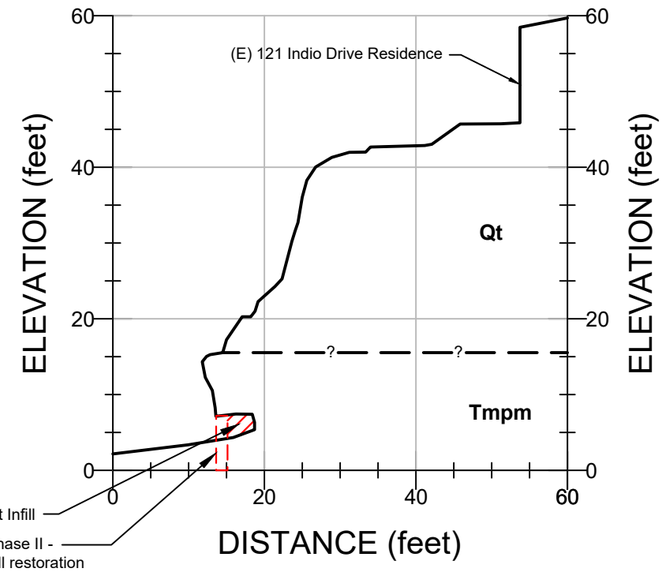
Shotcrete/Concrete/Grout Infill

Approximate location of Phase II - Reinforced concrete cut-off wall restoration (Pursuant to separate consultation with Coastal Commission staff and applicable authorization)

Section 4-4'



Section 5-5'



Shotcrete/Concrete/Grout Infill

Approximate location of Phase II - Reinforced concrete cut-off wall restoration (Pursuant to separate consultation with Coastal Commission staff and applicable authorization)

EXPLANATION:

Qt	Terrace Deposits
Tmpm	Pismo Formation Bedrock

0 10 20 40
(feet)

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Exhibit 4
Page 4 of 4

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

PHASE I - SECTIONS 1-1' THROUGH 5-5'
IMMEDIATE MITIGATION OF BLUFF UNDERCUTTING
121 INDIO DRIVE
PISMO BEACH, CALIFORNIA

GEO/ENG BY TRH	SCALE 1"=20'	PROJECT NO. E0222L
APPROVED BY POS	DATE April 2020	FIGURE NO. 6

Section 1 line extends an additional 51.5' to the NE

Section 3 line extends an additional 51.5' to the NE

Section 5 line extends an additional 53.0' to the NE

Base map aerial image from drone photograph taken by CSA in March 2020

(E) Remnant of 2005 return wall. Only the footing of the wall remains in this location

Shotcrete Infill

As-Built (2022) Location of the Seaward Contoured, Textured, Concave, and 'Midnight" Coloration Facing of the Emergency Replacement Cutoff Wall and Upcoast and Downcoast Return Walls, based on GPS surveys performed in March 2022 by Cotton, Shires and Associates, Inc.

Approximate Location of Property Line, typ.

Recommended Shotcrete Cut-off Wall and Upcoast, Downcoast Return Walls on Design Drawings (CSA, 2020, 2021)

(E) (2005) Cutoff Wall, Eroded and Undercut by Marine Erosion after 2018

Note: As-Built Emergency Replacement (2022) Cutoff Wall Extends 4' Laterally as the Recurved Upcoast and Downcoast Return Wall and Into Adjacent Pismo Formation Bedrock at each End

1

3

6

5

North

0 5 10 20

(feet)

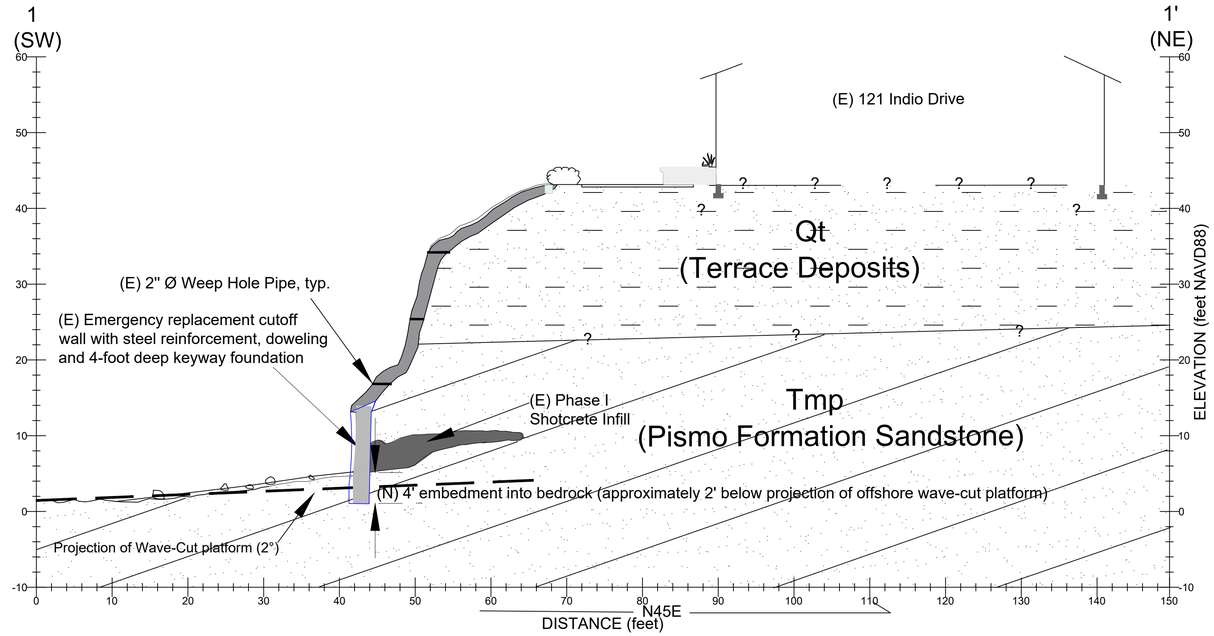
3-23-0014
Exhibit 5
Page 1 of 2

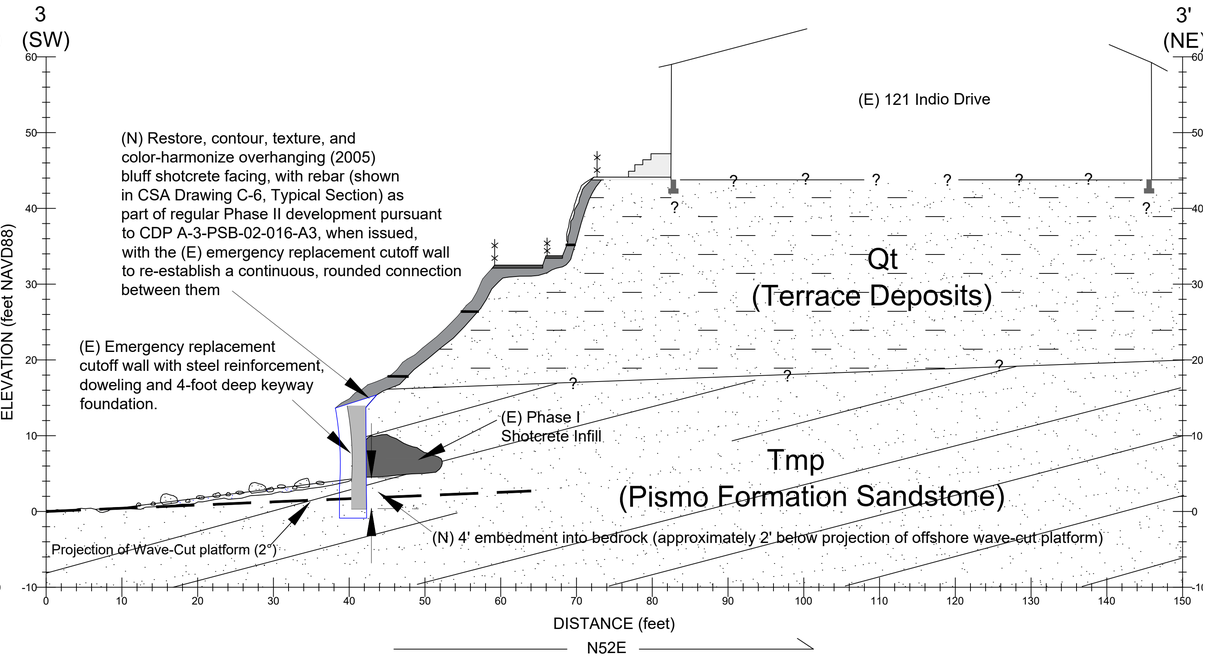
COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

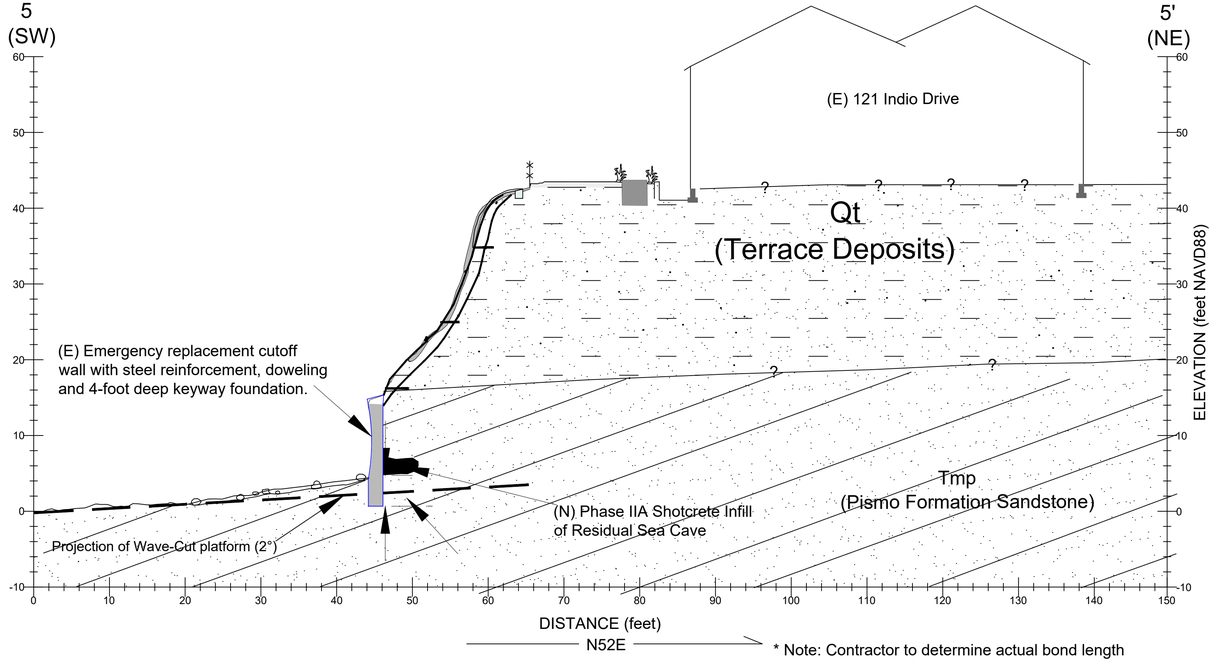
As-Built Emergency Replacement Cutoff Wall and Upcoast, Downcoast Return Walls

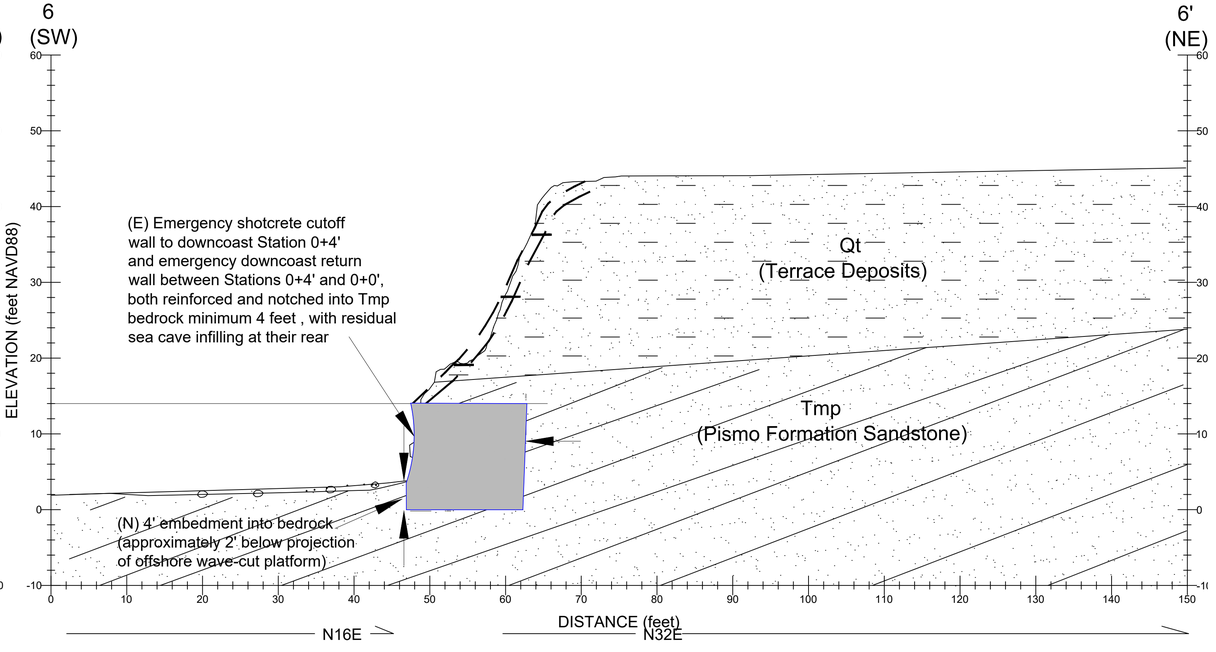
121 INDIO DRIVE
PISMO BEACH, CALIFORNIA

GEO/ENG BY KH/QIT	SCALE 1"=10'	PROJECT NO. E0222M
APPROVED BY POS	DATE March 2022	FIGURE NO. 1









ELEVATION (feet NAVD88)

* Note: Contractor to determine actual bond length necessary to meet design and test capacity loads

EXPLANATION

As-built Cutoff Wall and Return Walls

ECDP-approved Emergency Cutoff Wall and Return Walls as per Cotton, Shires and Associates, Inc. Drawings and Specifications (2021)

0 5 10 20
(feet)

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

As-Built Cross Sections 1-1', 3-3', 5-5' and 6-6'

121 INDIO DRIVE
PISMO BEACH, CALIFORNIA

GEO/ENG BY	SCALE	PROJECT NO.
KH/QIT	1"=10'	E0222M
APPROVED BY	DATE	FIGURE NO.
POS	March 2022	2

All work still to be completed highlighted in blue

Note: Restoration of the bluff drainage system and construction of contoured, textured, and color harmonized bluff shotcrete facing with tiebacks, and limited excavation of oversteepened Terrace Deposits, above the downcoast cutoff wall segment, will be implemented in coordination with the construction of bluff protective works proposed by others on adjacent 117 Indio Drive as Phase IIB.

125 Indio Drive

121 Indio Drive

117 Indio Drive

1′ 3′ 5′ 6′

(E) Seawall Tieback #18 (2004)

Approximate work area shotcreted to full height prior to 4/30/2020

As-built location of seaward edge of 2005 shotcrete cutoff wall based on GPS and Drone Photogrammetric surveys performed on 03/23/2020 - 03/24/2020 by Cotton, Shires and Associates, Inc.

(N) Phase IIB Tiebacks, typ. (Minimum 38 to 83 feet long)

*Note: Contractor to determine actual bond length as necessary to meet design criteria and test capacity loads

(N) 10' Contours; actual contours to blend with bluff restoration work on 117 Indio Drive property

(N) Phase IIB Limited Excavation of oversteepened Bluff Terrace Materials. Bluff Restoration Work Along the 121-117 Indio Drive Property Line Continues to be Coordinated with the Adjacent 117 Indio Drive Owner

Inboard Limits of (N) Cutoff wall

(N) Shotcrete Infill (Residual Sea Cave Infill)

Approximate Location of Property Line, typ.

(E) Phase I Shotcrete Infill

(N) Phase IIA Shotcrete Cutoff Wall

1 3 6 5

North

0 5 10 20
(feet)

EXPLANATION

Horizontal landward extent of wave action undercutting (plan view)

Note: Notch (N) Phase IIA shotcrete cutoff wall full height and depth as adjacent segment 4' laterally into Pismo Formation bedrock at each end.

Note: All work shown in the lower area of Pismo Formation bedrock (new shotcrete infill and shotcrete cutoff wall) to be performed as part of Phase IIA.

Note: Topographic contours at 2-foot intervals based on NAVD88 vertical datum using GPS surveyed stations. Topography determined from GPS and Drone Photogrammetric surveys performed on 03/23/2020 - 03/24/2020 by Cotton, Shires and Associates, Inc. Bluff undercut survey conducted on 03/23/2020 by Cotton, Shires and Associates, Inc. using measuring tape, laser distance meter, and GPS survey methods. Property lines from 07/03/2002 survey by Golden State Aerial Surveys, Inc.

3-23-0014
Exhibit 6
Page 1 of 2

NO.	REVISIONS	BY	DATE	APP'D

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS
330 Village Lane
Los Gatos, California 95030
(408) 354-5542 Fax: (408) 354-1852

Patrick O. Shires, P.E. 10-13-2020

REGISTERED PROFESSIONAL ENGINEER PATRICK O. SHIRES NO. 26397 CIVIL STATE OF CALIFORNIA

DESIGNED DATE
DRAWN DATE
CHECKED DATE

SUBMITTED:

APPROVAL:

Mr. Gary Grossman TRE
Gary H. Grossman Trust
P.O. Box 13
Pismo Beach, CA
(805) 556-3060

DRAWING TITLE:

Restoration Plan

Phase II Bluff Protection Restoration Project

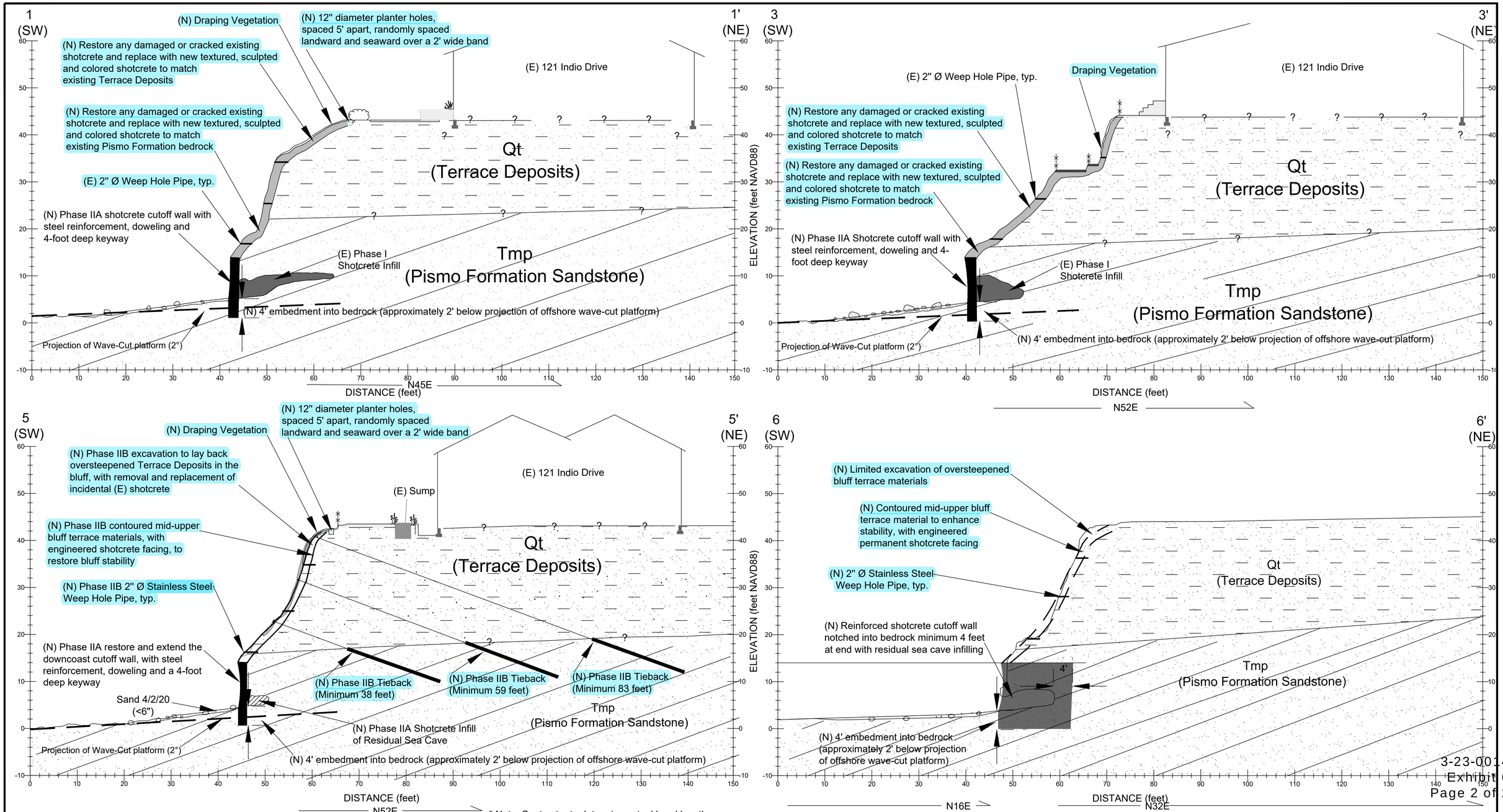
121 Indio Drive
Pismo Beach, California

DRAWING NO. C-4

SHEET NO. 4 OF 9

CSA PROJECT NO. E0222M

All work still to be completed highlighted in blue



* Note: Contractor to determine actual bond length necessary to meet design and test capacity loads

3-23-0014
Exhibit 6
Page 2 of 2

NO.	REVISIONS	BY	DATE	APP'D

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS
330 Village Lane
Los Gatos, California 95030
(408) 354-5542 Fax: (408) 354-1852

Patrick O. Shires, P.E. 10-13-2020

DESIGNED DATE

DRAWN DATE

CHECKED DATE

SUBMITTED:

REGISTERED PROFESSIONAL ENGINEER — PATRICK O. SHIRES — NO. 26397 — CIVIL — STATE OF CALIFORNIA

Mr. Gary Grossman TRE
Gary H. Grossman Trust
P.O. Box 13
Pismo Beach, CA
(805) 556-3060

APPROVAL:

DRAWING TITLE:

Restoration Sections
1-1', 3-3', 5-5' and 6-6'

Phase II Bluff Protection Restoration Project

121 Indio Drive
Pismo Beach, California

DRAWING NO. C-5

SHEET NO. 5 OF 9

CSA PROJECT NO. E0222M

Section 1 line extends an additional 51.5' to the NE

Section 3 line extends an additional 51.5' to the NE

Section 5 line extends an additional 53.0' to the NE

T
R

(E) SE-Most 2004 Tieback, Approximate

(N) Phase II Tiebacks (30 to 65 feet long)

(N) Downcoast Sea cave infill.

Area of additional work still to be completed shown in blue

0-13'

0-10'

Area of Phase II Bluff Trimming/Smoothing and New Shotcrete Placement

0+00'

0+86'

0+80'

0+70'

0+60'

0+50'

0+40'

0+30'

0+20'

0+10'

(N) Shotcrete Infill

Approximate Location of Property Line, typ.

As-built location of seaward edge of 2005 shotcrete cut-off wall based on GPS and Drone Photogrammetric surveys performed on 03/23/2020 - 03/24/2020 by Cotton, Shires and Associates, Inc.

(E) Phase I shotcrete Infill

(N) Phase II A Shotcrete Cut-off Wall

1

3

6

5

Note: Notch (N) Phase II A shotcrete cutoff wall full height and depth as adjacent segment min. 4' laterally into Pismo Formation bedrock at each end.

Note: All work shown in the lower area of Pismo Formation bedrock (new shotcrete infill and shotcrete cut-off wall) to be performed as part of Phase II A.

North

0 5 10 20

(feet)

EXPLANATION

Horizontal landward extent of wave action undercutting (plan view)

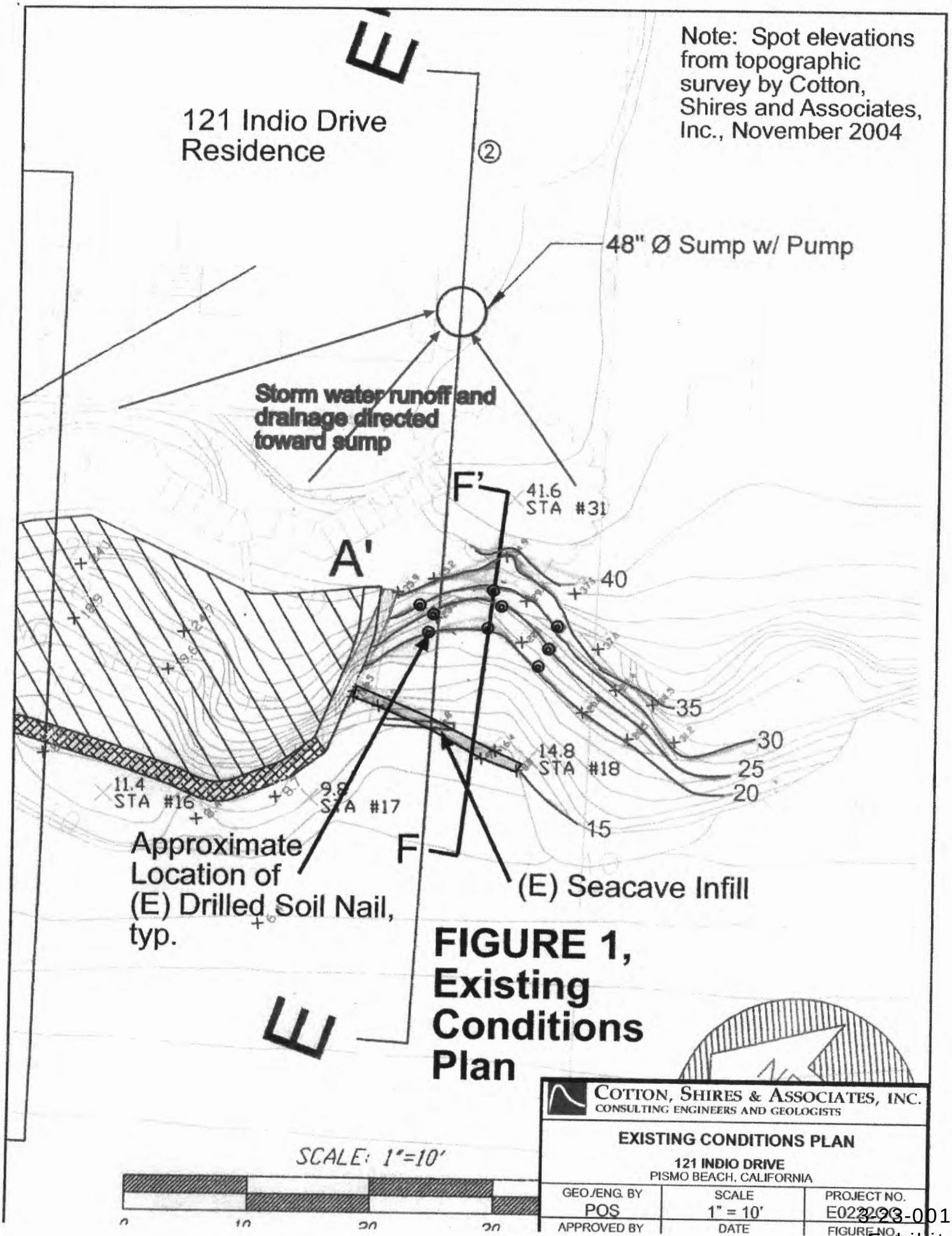
3-23-0014
Exhibit 7
Page 1 of 1

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

Revised Drawing No. C-4

MAINTENANCE/REPAIR/RESTORATION - PHASE II
GEOTECHNICAL INVESTIGATION
121 INDIO DRIVE
PISMO BEACH, CALIFORNIA

GEO/ENG BY QIT	SCALE 1"=10'	PROJECT NO. E0222M
APPROVED BY POS	DATE February 2022	EXHIBIT NO. 4


E
121 Indio Drive
Residence
②
Note: Spot elevations from topographic survey by Cotton, Shires and Associates, Inc., November 2004
48" Ø Sump w/ Pump
Storm water runoff and drainage directed toward sump
F'
41.6
STA #31
A'
40
35
30
25
20
15
14.8
STA #18
11.4
STA #16
9.8
STA #17
F
Approximate Location of (E) Drilled Soil Nail, typ.
(E) Seacave Infill
E
FIGURE 1, Existing Conditions Plan
SCALE: 1"=10'
0
10
20
20
COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS
EXISTING CONDITIONS PLAN
121 INDIO DRIVE
PISMO BEACH, CALIFORNIA
GEO./ENG. BY
POS
SCALE
1" = 10'
PROJECT NO.
E02220
APPROVED BY
DATE
FIGURE NO.

SECTION F-F'

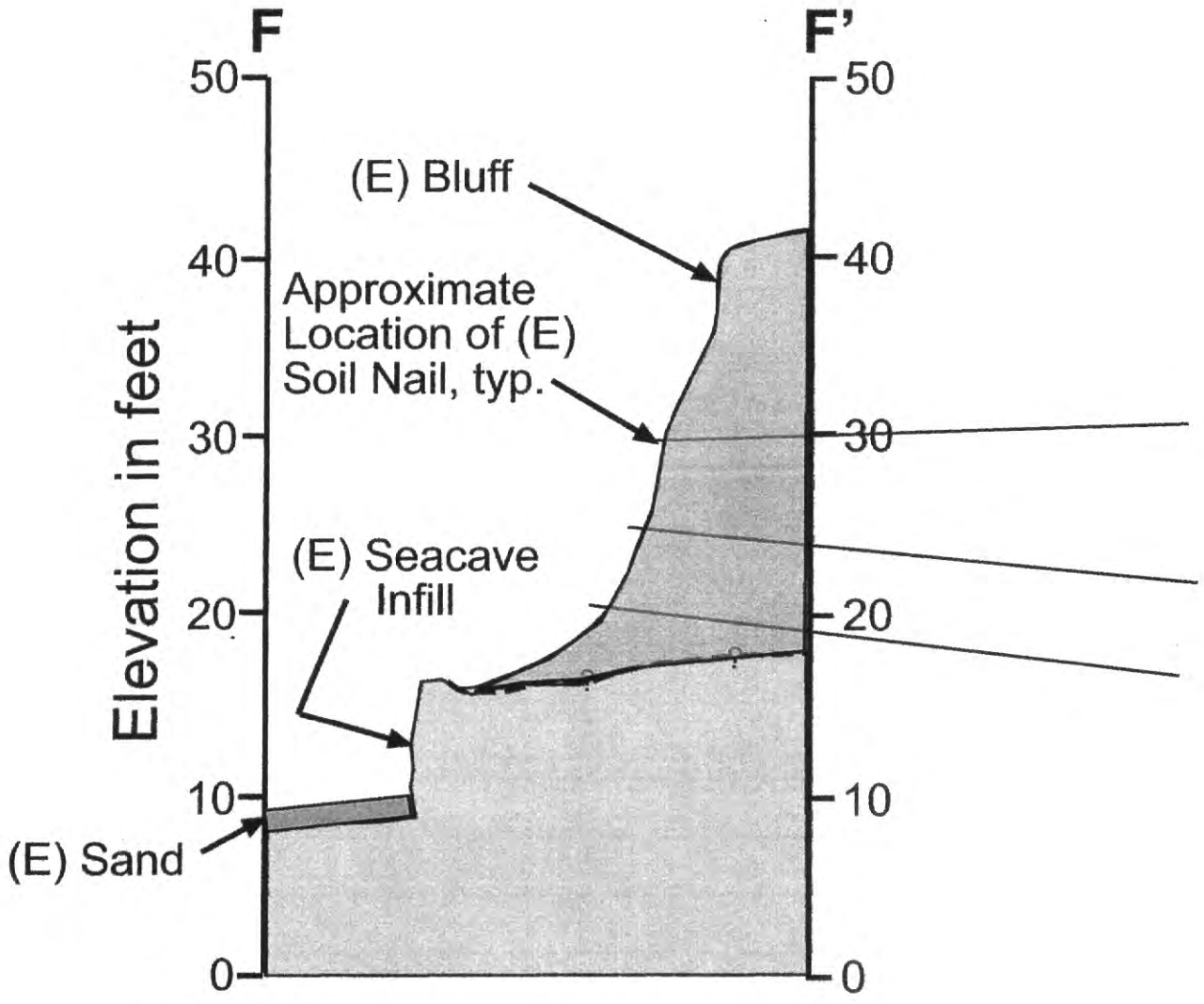
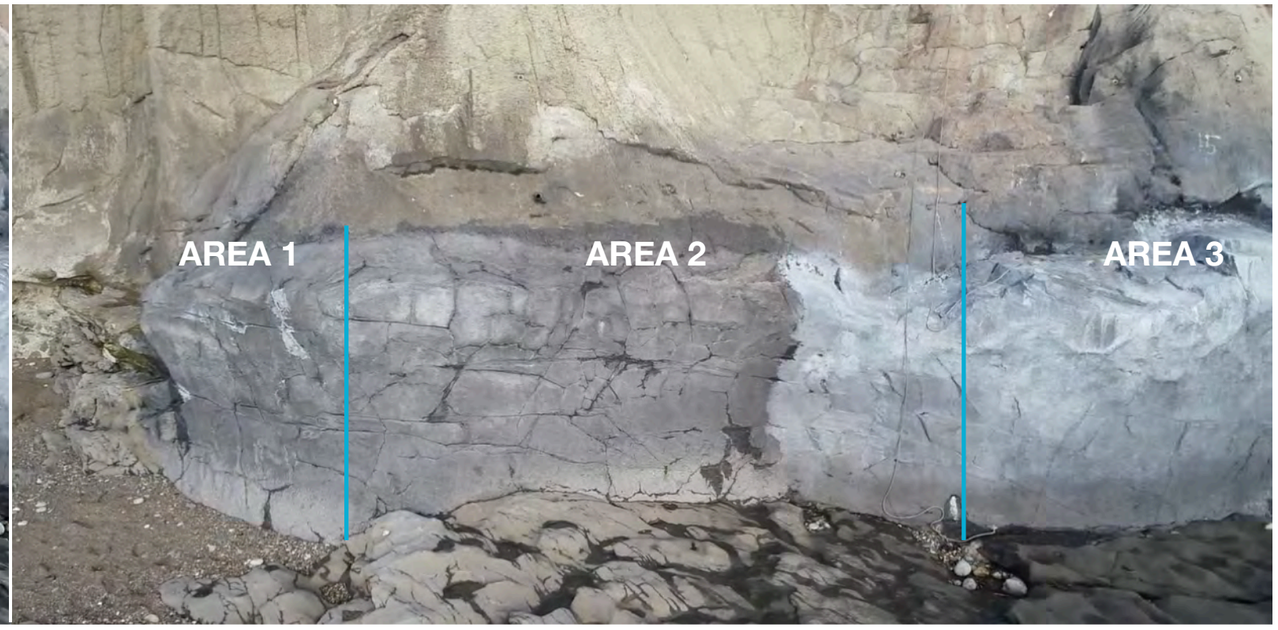
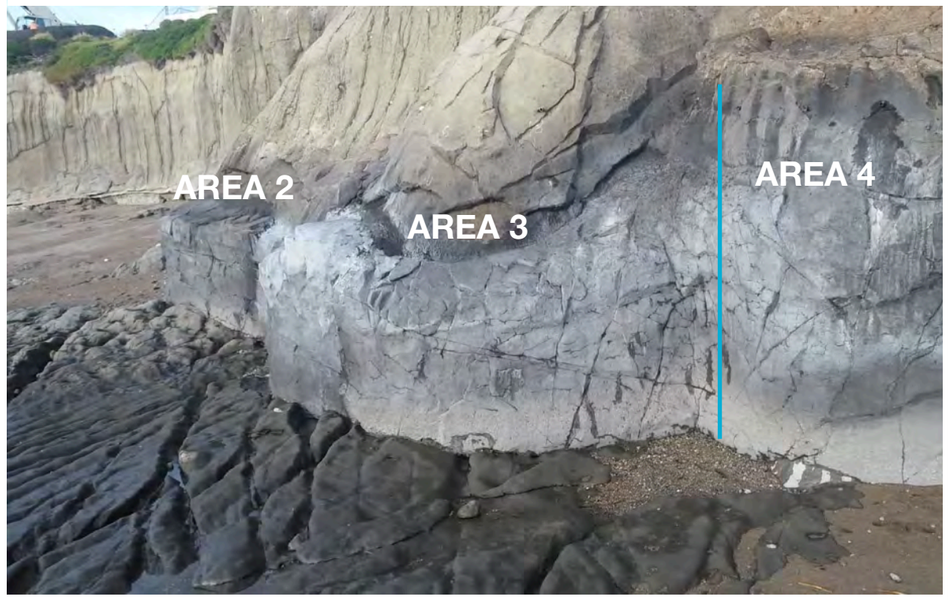


FIGURE 2, Existing Conditions Section F-F'

COTTON, SHIRES & ASSOCIATES, INC. CONSULTING ENGINEERS AND GEOLOGISTS		
EXISTING CONDITIONS SECTION F-F' 121 INDIO DRIVE PISMO BEACH, CALIFORNIA		
GEO./ENG. BY POS	SCALE 1" = 10'	PROJECT NO. E0222GG
APPROVED BY POS	DATE MAY 2005	FIGURE NO. 2



Drone aerial photo sequence (late afternoon direct sunlight/dried shotcrete conditions, February 3, 2022) of ECDP G-3-21-35 emergency replacement cutoff wall [rCOW] and upcoast/downcoast return walls [RW] after completion of construction: **Upper left:** In Area 1, reduced height, textured, concave, dry "Midnight" and Tmp-harmonized coloration, recessed RW, locally w/mineralization, groundwater exfiltratation (upcoast STA 0+84' to STA 0+80'); in Area 2, reduced height, textured, concave, "Midnight" and dry Tmp-harmonized coloration rCOW, along the varied downworn back beach plane Tmp (STA 0+80' to STA 0+60'), locally w/mineralization, groundwater exfiltratation, looking n'e'ly. **Upper right:** In Area 1, reduced height, textured, concave, dry "Midnight" and Tmp-harmonized coloration, recessed RW; in Area 2, contoured, textured, concave rCOW (STA 0+80' to 0+60'); in Area 3, reduced height, textured, concave, sunlight-reflecting "Midnight", and dry Tmp-harmonized coloration rCOW (STA 0+60' to near 0+45', conformed to varied downworn back beach plane Tmp and head-cutting erosional channels, looking e'n'e'ly. **Lower left:** In Area 2, varied height, textured, concave, dry "Midnight" and Tmp-harmonized coloration rCOW; in Area 3 (near STA 0+58' to 0+26') and Area 4 (STA 0+26' to shown 0+16') conformed to varied downworn back beach plane Tmp, head-cutting erosional channels, and adjacent beach sand coloration, looking n'n'e'ly. **Lower right:** In downcoast Area 3, reduced height, textured, contoured, "Midnight" coloration rCOW (STA 0+39' to 0+29'); in downcoast Area 4 (STA 0+19' to 0+4'), full height, textured, contoured, rCOW, w/"Midnight" coloration, mineralization, groundwater exfiltrtation, adjacent accreted beach sand; and in Area 5 (STA 0+4' to 0+0'), full height, textured, contoured rCOW, w/"Midnight" coloration, mineralization, substantial groundwater exfiltratation, accreted adjacent beach sand, and e'ly of STA 0+0', the newly prograded downcoast sea cave, w/horizontal joints ("HJ") & overhanging highly fractured Tmp, looking n'ly.



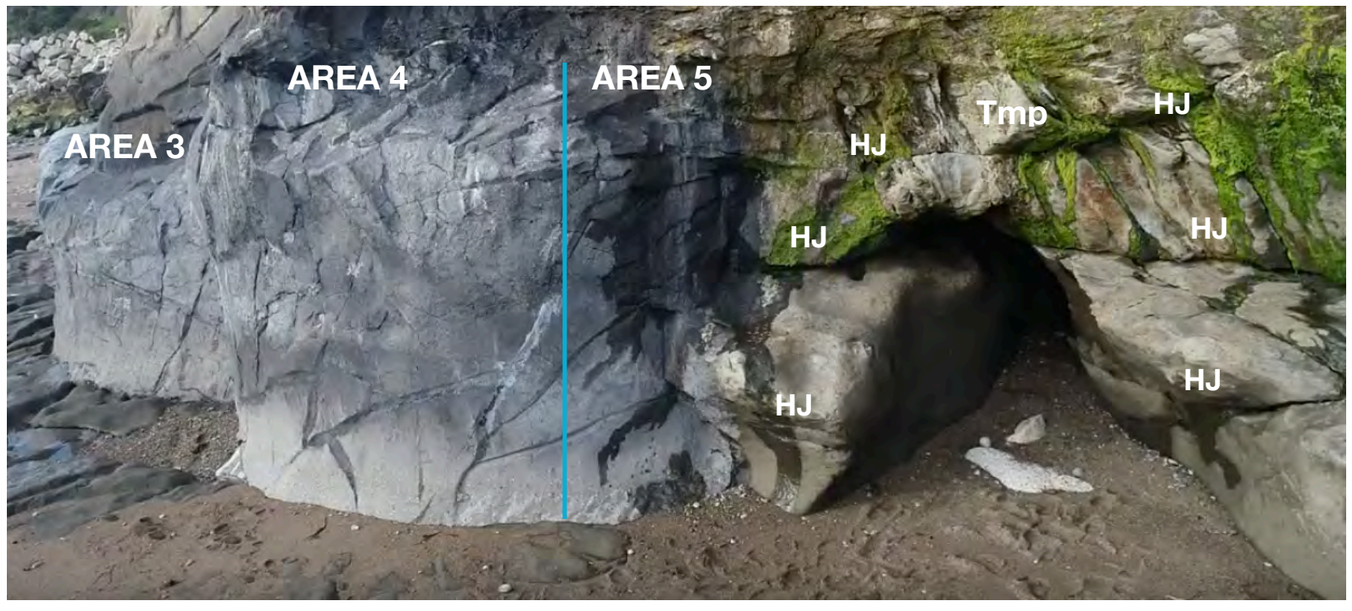
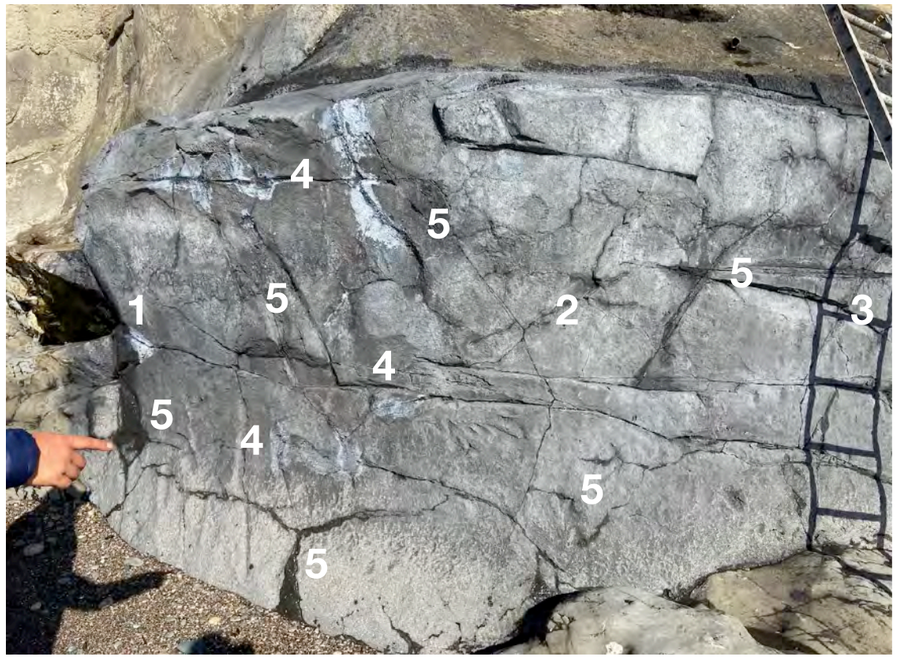
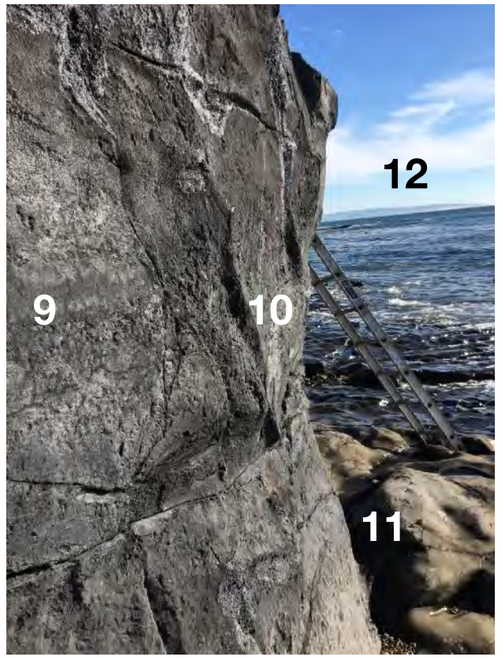


Exhibit 5. Post-Emergency Replacement Cutoff Wall and Return Walls Construction Site Conditions; DA, 20220325.



Upper left: Sun-dried "Midnight" coloration, concave, textured, reduced height RW (STA 0+84' [**1**] to 0+80' [**2**], rCOW contoured along Tmp outcrop (STA 0+80' [**2**] to 0+78' [**3**]), w/mineralization [**4**], exfiltrating groundwater [**5**], accreting beach quality sand and pebbles [**6**], looking e'n'e'ly.

Upper left center: Sun-dried "Midnight" coloration, concave, textured, reduced height rCOW (STA 0+79' [**7**] to 0+72' [**8**], looking n'ly.

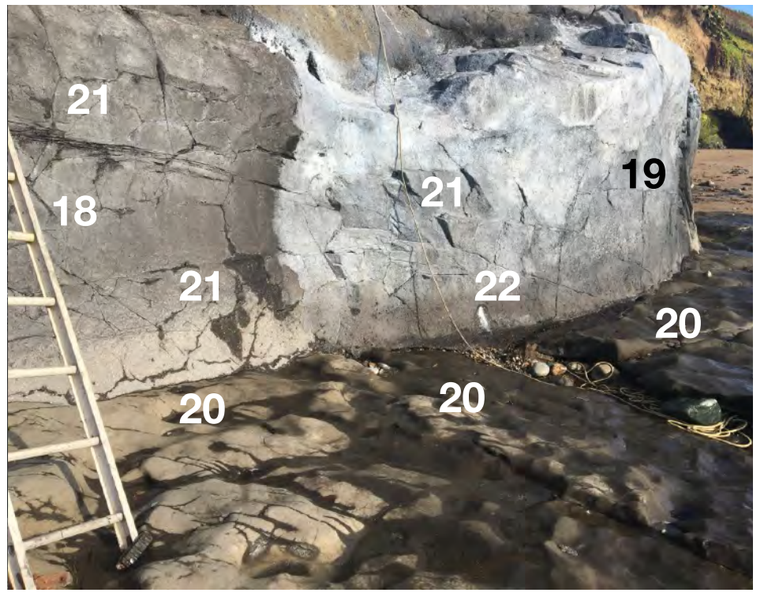


Upper right center: W'ly-facing "Midnight" coloration, concave, textured, reduced height rCOW (STA 0+63' [**9**] to 0+60' [**10**], contoured to Tmp [**11**], looking s'ly at the Pismo-Guadalupe Dunes [**12**].

Upper right: S's'w'ly-facing "Midnight" coloration, concave, textured, reduced height rCOW (STA 0+59' [**13**] to near 0+43' [**14**], contoured to back beach Tmp terrain, erosional channels [**15**], looking n'ly.

Lower left: S'w'ly-facing "Midnight" coloration, concave, tectured rCOW (STA 57 [**16**], looking n'n'w'ly to the Irish Hills [**17**].

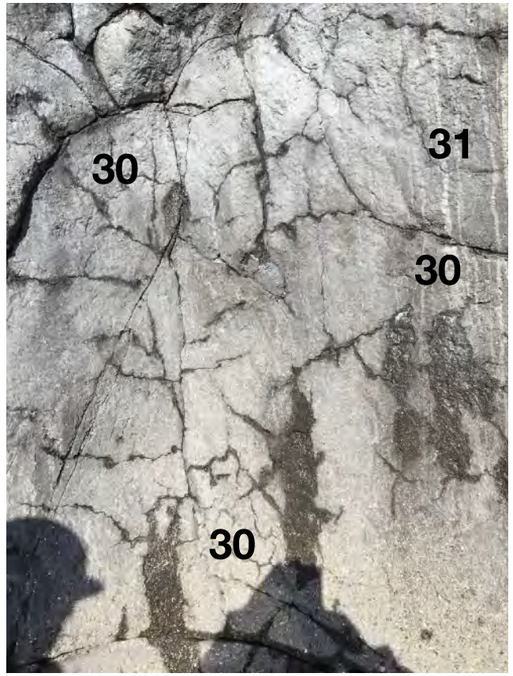
Lower left center: S'w'ly-facing "Midnight" coloration, textured, reduced height rCOW (STA 0+56' [**18**] to 0+38' [**19**], contoured to back beach Tmp, erosional channels [**20**], w/groundwater exfiltratation [**21**], mineralization [**22**], looking e'ly.



Lower right center: Detail of concave rCOW facing (**19a**), Tmp contour (**20a**), STA 0+38'.

Lower right: S'ly-facing Tmp contured [**23**], textured,"Midnight" coloration rCOW (STA 0+36' [**24**], 0+26' [**25**], 0+18' [**26**], recent wave runup [**27**], accreted sand [**28**], looking n'ly.

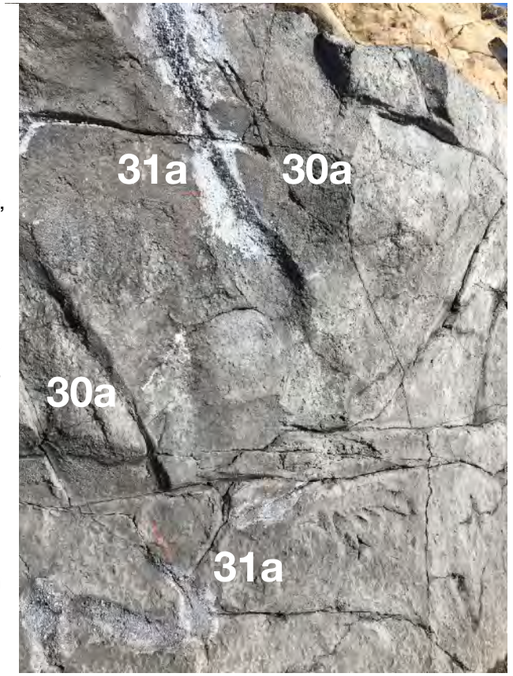
Exhibit 5. Post-Emergency Replacement Cutoff Wall and Return Walls Construction Site Conditions; DA, 20220325.



Upper left: Sun-dried, slightly diagonal, s'ly & s'w'ly-facing textured, contoured, concave rCOW near previously reemergent sea cave @ STA 0+26' (**25a**), w/accreted beach sand (**28a**), exfiltrating groundwater (**29**), "Midnight" coloration, looking e'n'e'ly.

Upper left center: Detail of textured rCOW w/ exfiltrating ground water (**30**), mineral stains that darken the sun-dried surface (**31**).

Upper right center & Upper right: Detail of groundwater (**30a**) & mineral staining (**31a**) on textured rCOW.



Lower left: Sun-dried, s'ly-facing textured, concave, "Midnight" coloration rCOW, downcoast from STA 0+38' (**32**), w/base contours along the varied adjacent back beach Tmp terrain (**33**), exfiltrating groundwater (**30b**). The remaining relatively larger near vertical texture scarp (**35**) will be monitored for performance in comparison to the adjacent reduced near horizontal texture scarp (**36**).

Lower right: Context photo of the contoured, concave, textured, reduced height, "Midnight" coloration upcoast RW (**37**, Area 1) and rCOW (**38**, Areas 2 & 3) during ebb tide following Higher High Tide, w/the restored Florin Street Cove beach (**39**), the (2005) seawall at 125 Indio Drive (**40**) and 121 Indio Drive (**41**), small waves breaking on the varied Tmp contours and outcrops on the downworn beach plane (**42**), the worker in the orange vest (**43**, for relative scale), the older seawall at 113 Indio Drive (**44**), the reef off South Palisades Park (**45**), s'e'ly San Luis Obispo Bay (**46**), and the s'ly dune field at Pismo State Beach (**47**), looking s's'e'ly from the Florin Street vista point.

Note: All photo dates are Feb. 3, 2022, on which physical construction of the rCOW and RW's was completed. Demobilization of equipment and site cleaning continued through February 9, 2022.

Exhibit 5. Post-Emergency Replacement Cutoff Wall and Return Walls Construction Site Conditions; DA, 20220325.

2005 Staff Photo of Unpermitted Demolition and Construction at 121 Indio Drive

2005 Staff Photo of Unpermitted Demolition and Construction at 121 Indio Drive

EXHIBIT 4

STRUCTURAL CALCULATIONS AND ELEVATIONS
REPAIR AND MAINTENANCE OF SINGLE-FAMILY HOME
121 INDIO DRIVE, PISMO BEACH (GROSSMAN)[1]

Prepared by LGA/LEONARD GRANT, ARCHITECT:[2]

1. Perimeter (pre-project) exterior walls, in lineal feet (LF):[3]	294.3 LF
2. Perimeter exterior walls removed for replacement:[4]	143.2 LF
3. Percentage of total lineal footage exterior walls removed for replacement:	**48.7%**
4. Percentage of total existing home removed for replacement:	**33.8%**

The repair and maintenance work involved no change in the location of the foundation (building footprint).

Prepared by DALL & ASSOCIATES[5]

1. Exterior walls perimeter (pre-project), in lineal feet: [6]		279.5 LF
Front:	94.2 feet	
North (right):	49.3 feet	
South (left):	49 feet	
Rear:	87 feet	
2. Exterior walls perimeter removed for replacement:		133.4 LF
Front:	36.7 feet	
North (right):	16.5 feet	
South (left):	33.5 feet	
Rear:	46.7 feet	
3. Percentage of total exterior walls removed for replacement:[7]		**47.7%**

1 Prepared by Stephanie Dall, Dall & Associates, February, 2005 from information as noted.

2 February, 2005. LGA is the architect to Mr. Grossman for the repair and maintenance project.

3 Includes window space.

4 Includes window space.

5 Dall & Associates (D&A) is the coastal consultant to the Gary H. Grossman Trust (Gary Grossman, Trustee), owner of the home and property at 121 Indio Drive, Pismo Beach. D&A's calculations (February, 2005) are based on to-scale elevations prepared by the Robert Richmond Company Architects, which were field-checked on 2/11/05, and have been compared to California Coastal Records imagery for confirmation of spatial accuracy.

6 Includes window space. Measurements did not include the column perimeters in the exterior facade that were apparently included by LGA.

7 Includes window space.

STRUCTURAL CALCULATIONS AND ELEVATIONS
REPAIR AND MAINTENANCE OF SINGLE-FAMILY HOME
121 INDIO DRIVE, PISMO BEACH (GROSSMAN)

Prepared by DALL & ASSOCIATES, cont'd.:

4. Exterior walls (pre-project), in square feet (SF): 2,910.9 SF
   - Front: 891.2 sq. ft.
   - North (right): 587.6 sq. ft.
   - South (left): 566.5 sq. ft.
   - Rear: 865.6 sq. ft.

5. Exterior walls removed for replacement: 1,194.2 SF
   - Front: 336.3 sq. ft.
   - North (right): 151.6 sq. ft.
   - South (left): 303.2 sq. ft.
   - Rear: 403.1 sq. ft.

6. Percentage of total exterior walls removed for replacement: **41.0%**

7. Foundation perimeter (pre-project), in lineal feet (LF): 280 LF

8. Foundation perimeter reinforced or removed and replaced:[8] 29 LF

9. Foundation total cubic yards repaired or removed and replaced, in cubic yards (CY): 1.2 CY

10. Percentage of total foundation removed and replaced: **10.3%**

The repair and maintenance work involved no change in the location of the foundation (building footprint).

8 Also reflected in the exterior wall "removed" calculations, broken out here for further clarity.

CALIFORNIA COASTAL COMMISSION
455 MARKET STREET, SUITE 228
SAN FRANCISCO, CA 94105-2219
VOICE (415) 904-5200
FAX (415) 904-5400

January 26, 2023

SAND SUPPLY IMPACTS MEMORANDUM

To: Katie Butler, Coastal Program Supervisor

From: Jeremy Smith, Coastal Engineer
Joseph Street, Ph.D., P.G., Staff Geologist

Re: 121 Indio Drive, Pismo Beach (Grossman Property),
CDP application 3-23-0014

The purpose of this memorandum is to assess the adverse impacts of the proposed armoring associated with the above-referenced site and CDP application on shoreline sand supply, and therefore, on public access and recreational opportunities.

To this end, we have reviewed the following documents provided by the Applicant:

1) Cotton, Shires and Associates, Inc., 2020, "Maintenance/Repair - Phase I Geotechnical Investigation Report", dated March 31, 2020, signed by P.O. Shires and J.M. Wallace.
2) Cotton, Shires and Associates, Inc., 2020, "Maintenance/Repair/Restoration - Phase I Geotechnical Investigation Report Update", dated April 6, 2020, signed by P.O. Shires and J.M. Wallace.
3) Cotton, Shires and Associates, Inc., 2021, "Calculation of Projected Volumes of Beach Quality Sand Production During 20 Years at 121 Indio Drive Without Phase I and Phase II Development", dated February 17, 2021, signed by P.O. Shires and J.M. Wallace.
4) Cotton, Shires and Associates, Inc., 2022, "As-Built Emergency Replacement Cutoff Wall and Upcoast, Downcoast Return Walls", site plan dated March 2022.
5) Cotton, Shires and Associates, Inc., 2022, "Emergency Replacement Cutoff Wall and Minor Cutoff Wall/Return Wall Extension (ECDP G-3-21-0035) – Condition 10 Checklist", dated March 25, 2022, signed by P. Shires.

In addition, we have consulted several other documents providing geologic information relevant to the project site and vicinity:

6) TerraCosta Consulting Group, Inc., 2020, "Coastal Bluff Evaluation and Geotechnical Basis of Design, Bluff Stabilization Project, 117 Indio Dr., Pismo Beach, California", Dated September 10, 2020, signed by W.F. Crampton and B.R. Smillie.
7) California Coastal Commission Adopted Findings, Coastal Development Permit A-3-PSB-02-016, approved August 6, 2003.

8) Cotton, Shires and Associates, Inc., 2003, “Geotechnical Investigation Potential Seacliff Hazards, 121 and 125 Indio Drive and Florin Street Cul-De-Sac, Pismo Beach, California, dated January 2003.

Coastal Act Section 30235 allows for shoreline armoring in specific cases “when designed to eliminate or mitigate the adverse impacts on shoreline sand supply”. In the present case, adverse effects from proposed armoring, including fixing the back beach, encroaching on potential beach space, and preventing the natural supply of beach-quality sand cannot be eliminated, and thus must be adequately mitigated.

Three of the effects due to shoreline armoring can be quantified: 1) loss of the beach area on which the structure is located (encroachment); 2) the long-term loss of beach which will result when the back beach location is fixed on an eroding shoreline (passive erosion); and 3) the amount of sand-generating material which would have been supplied to the beach if the back beach or bluff were to erode naturally (sand retention). Passive erosion and sand retention are in part based on the assumed rate of retreat in the absence of armoring. As is discussed in more detail in the section “Bluff Retreat Rate”, we calculated impacts for a range of retreat rates: one foot per year, considered to be a likely mid-range estimate, and two feet per year, considered to be a conservative estimate.

Encroachment and passive erosion are assessed as areas (square feet), where the former represents the area under the armoring itself (i.e., its footprint on the beach) and the latter represents the area of future beach that would be naturally created if not for the fixing of the shoreline. Sand retention is assessed as a volume of sand (cubic yards) that would enter the littoral system but for the fixing of the shoreline. In-kind mitigation would involve creating the equivalent amount of beach area and placing the equivalent volume of sand into the littoral system. In-lieu mitigation involves paying compensatory fees and/or providing compensatory improvements to enhance coastal resources (typically in the form of public access and recreation improvements) of similar monetary value.

The Commission has used a variety of methods to evaluate these areas and volumes for in-lieu mitigation fees. The methods used here are fairly standard and representative of the Commission’s approach to such impact assessment and mitigation, and involve 1) the use of a real estate valuation method for the calculated encroachment and passive erosion areas in which the cost of acquiring property nearby that could be purchased and allowed to erode and turn into similar beach naturally is applied (dollars per square foot); and 2) for the retained sand volume, the cost of purchasing and transporting beach quality sand to the project vicinity is applied (dollars per cubic yard of sand).

In this case, and as detailed more specifically below, the total calculated impacts on sand supply, and therefore, on public access and recreational opportunities are assessed to be 1,120.29 to 2,268.58 cubic yards of retained sand, 236 square feet of encroachment, and 1,610 to 3,220 square feet of passive erosion. Using a cost of sand of $60.54 per cubic yard and a cost of property acquisition of $450.25 per square foot, **the total range of a potential in-lieu fee calculated is $898,984 to $1,693,404** (rounded to the nearest dollar).

The following section elaborates on the values used in this assessment.

Encroachment

Encroachment considers the amount of beach space taken up by a shoreline protection device. Using the Applicant's March 2022 As-Built Plans, the area (looking from plan view) of the as-built emergency replacement cutoff wall and upcoast and downcoast return walls, including the roughly four feet of remnant footing of the 2005 return wall, proposed to remain as part of this project, as well as a 13 foot long, 2 foot wide cutoff wall extension proposed as part of this project was calculated using the measure tool in Adobe Acrobat to be approximately 236 square feet. Note, the footprint of the sea cave infill is not included in the encroachment calculation because that area is effectively captured by the passive erosion calculation below.

$$A_e = 236\ square\ feet$$

Passive Erosion

Passive erosion considers the amount of beach that would be created over time through natural erosion processes if not for the effects of the proposed shoreline protection device, which will fix the back of the beach (i.e., here, the toe of the bluff) in its current position. To estimate a yearly value, the expected average annualized erosion rate (feet per year) and the width of the shoreline protection device (feet) are multiplied together.

$$A_w/year = R * W$$

The width of the structure was determined by Cotton, Shires, and Associates, Inc. (CSA, Ref. 3) to be 70 feet. We confirmed this to be an appropriate estimate of the alongshore width. We determined the appropriate retreat rate over this period to be one foot per year, approximately double the Applicant's consultant's estimate. Our rationale is described in the "Retreat Rate" section on page four. Therefore, the amount of passive erosion was calculated to be 70 to 140 square feet per year.

$$A_w/year = 1.0 * 70 = 70\ square\ feet/year$$
$$A_w/year = 2.0 * 70 = 140\ square\ feet/year$$

Consistent with the Commission's experience that shoreline armoring often needs to be reinforced, augmented, replaced, or substantially changed within twenty years of its original installation, and to provide for re-review on a regular basis to allow for consideration of possible changes in policy, law, and physical conditions associated with armoring, the Commission typically applies an initial twenty-year period from the date of approval as its initial mitigation window. Thus, mitigation is assessed and applied in time increments, where impacts past the first timeframe are not quantified here, but would be required to be quantified, and commensurate mitigation provided, if the proposed armoring were to be in place past the initial mitigation period. In this case, the typical twenty-year time frame was elongated slightly because the armoring has been in place (and therefore adversely impacting coastal resources) for approximately three years. Thus, the assessment period was determined to be 23 years. And therefore, the amount of passive erosion over 23 years was calculated to be 1,610 to 3,220 square feet.

Sand Retention

Sand retention considers the amount of beach quality sand that is prevented from entering the littoral system through bluff/shoreline erosion as a result of the shoreline protection device. To estimate this, the expected average annualized erosion rate (feet per year), the width of the shoreline protection device (feet), and the height of the bluff (feet) are

multiplied together and then converted from cubic feet to cubic yards to establish a yearly impact value. This represents the amount of bluff material being retained by the structure on average per year. Because beaches are primarily made of sand, an assumed bluff sand fraction is determined and multiplied by the volume to estimate the amount of material that is beach quality sand. If the shoreline protection device is not anticipated to halt the erosion of entire bluff face, but instead allows for retreat of the upper bluff, an adjusted formula can be used to account for the pro-rated amount of bluff that may continue to erode. The proposed project is anticipated to halt the erosion of the full bluff face and so this adjusted formula does not apply.

$$V_b/year = S * (R * W * h_s) * \frac{1}{27}$$

The “beach compatible” sand fractions estimated by CSA in its 2/17/2021 sand supply impact analysis (Ref. 3) were 8% for the Pismo Formation bedrock and 7.3% for the Terrace Deposits based on their grain-size analysis of the sand present on the beach below the project site. It is important to recognize, however, that due to the relatively high wave energy at the site only the coarser fractions of the sand present in the bluff remain on the beach, with the rest carried offshore or downdrift. In their 2003 report (Ref. 8), CSA found that 40% of the Pismo Formation bedrock and 54% of the Terrace Deposits would degrade to sand-sized particles. The latter estimates represent the full sand fraction, which is often used by the Commission in evaluating sand retention impacts. The fine and medium sized sand particles perform an important role in the offshore (submerged) portions of the beach, as well as within the larger littoral cell; fine- and medium-grained sand is transported downdrift and deposited on other beaches nearby. Using the approximate ratio of Pismo Formation to Terrace Deposits, a weighted-average sand fraction was determined to be approximately 0.49 (i.e., 49 percent sand). We used the same alongshore width of armoring of 70 feet, the expected average annual bluff retreat rate of 1.0 feet per year, and initial mitigation assessment period of 23 years. For the height, the full height of the bluff was used since the project is intended to halt the erosion of the full bluff. This was estimated by CSA (Ref. 3) to be 39.3 feet. These parameters are summarized below:

When multiplied together and converted to cubic yards, the estimated sand retained by the project is 1,148.29 cubic yards or approximately 1,148 cubic yards.

$$V_b = 0.49 * (1.0 * 23 * 70 * 39.3) * \frac{1}{27} = 1{,}148.29\ cubic\ yards$$

$$V_b = 0.49 * (2.0 * 23 * 70 * 39.3) * \frac{1}{27} = 2{,}296.58\ cubic\ yards$$

Prior to the emergency work at the site, an extensive sea cave formed as a result of erosion of the bedrock material at the base of the bluff. Because the analysis above assumes this material to still be present, the volume of sand eroded should be subtracted from the total theoretical volume of sand retained. CSA estimated the volume of the eroded sea cave to be approximately 70 cubic yards (Ref. 3). Using the sand fraction for the Pismo formation bedrock of 40%, this equates to 28 cubic yards of sand. Additionally, the proposal includes approximately 20 cubic yards of excavation of the upper bluff to install stability improvements. This volume of material is effectively captured in the sand retention estimates. The project should maximize the beneficial use of excavated material to the extent any suitable material can be placed on the beach.

Therefore, the total amount of sand retained by the project, accounting for sand already lost to erosion, is 1,120.29 to 2,268.58 cubic yards.

Bluff Retreat Rate

As noted above, an estimate of the bluff retreat/erosion rate (*R*) is needed as part of the Commission's typical method for assessing the "passive erosion" and "sand retention" components of the sand supply impact of shoreline protection devices. On many occasions the Commission has used the estimated long-term annualized bluff erosion rate, based on historical observations, for this purpose. However, coastal bluff erosion is generally episodic in nature, and actual bluff retreat rates over short periods of time can vary substantially from the long-term average. When applied predictively to relatively short time periods, such as the approximate 20-year assessment period for sand supply impacts often used by the Commission, the long-term average rate is very likely to be "wrong", either overpredicting or underpredicting reality; use of a long-term rate is often justified, however, because of the difficulty of predicting the timing and magnitude of future episodic bluff retreat. Nonetheless, in situations where site-specific conditions or other evidence provide a reasonable basis for predicting future bluff erosion rates that differ from the long-term rate, greater or lesser rates can and should be used for evaluating hazards and the sand supply impacts of shoreline armoring.

The Applicant's sand supply impact analysis (CSA 2/17/2021, Ref. 3) estimated a long-term average annualized bluff retreat rate for the site based on an analysis of aerial photographs spanning the period 1955 – 2020. Within the Phase I and Phase IIA project areas, the bluff edge ("top of bluff") has retreated between 24 and 45 feet over this 65-year period, yielding an average annualized erosion rate of 0.54 feet per year (range 0.36 – 0.69 feet per year). On the southeastern (downcoast) portion of the bluff (Phase IIB project area), the estimated average erosion rate is 0.4 feet per year. The range in estimated erosion rates likely reflects both alongshore variability in the amount of erosion over this time period and normal, expected measurement error for this type of analysis.

For several reasons, however, we think it likely that the Applicant's long-term average annualized bluff erosion rate of 0.54 feet per year underestimates the rate of bluff erosion at the subject site over the next 20 years, assuming the site were left in an unarmored condition.

- The 1955 - 2020 period assessed in the aerial photograph analysis includes long periods when large portions of the bluff were protected by armoring devices. Oblique aerial photographs from the California Coastal Records Project (http://californiacoastaline.org) indicate that the bluff face on the central portion of the site was covered with shotcrete/gunite at some point between 1979 and 1987 (possibly in the aftermath of the 1982-83 El Niño storms), and additional armoring, including a bluff toe seawall ("cut off wall") was added in 2004 - 2005 in association with a 2003 CDP. Although the bluff toe armoring has subsequently been penetrated and undermined by wave attack, the upper bluff protection remains largely intact. It is almost certain that these shoreline protection elements have, as intended, slowed bluff erosion over most of the period (41 out of 65 years) evaluated by CSA. Thus, the long-term erosion rate (1955 – 2020) provided by CSA reflects bluff erosion under natural conditions only for approximately 25 – 30 years, between 1955 and whenever the shotcrete was added in the 1980s, and very likely

underestimates the rate of erosion under natural, unarmored conditions. Given the uncertain timing and effectiveness of these prior armoring efforts, it is difficult to quantify their overall effect on the historical average annualized bluff erosion rate (0.54 feet per year) estimated by CSA. Nonetheless, if it is assumed that all the bluff retreat measured by CSA occurred during a 32-year period between 1955 – 1987, then the average annualized bluff retreat over this period would be 1.1 feet per year, twice as great as the CSA estimate.

- Since the construction of the bluff toe seawall in 2004 - 2005, wave attack at the base of the bluff has evidently been relatively intense, sufficient to destroy the base of the seawall and erode sea caves extending 7 - 27 feet into the Pismo Formation bedrock (CSA, Refs. 2 - 4). Even with the temporary protection provided by the seawall, this amount of undercutting yields bluff toe retreat rates of 0.47 – 1.8 feet per year between 2005 and 2020 (CSA reported an average of 12 feet of retreat, or 0.8 feet per year). Apparently, much of this erosion occurred since 2018 during stormy conditions. Recent bluff toe erosion rates thus generally exceed the long-term average rate proposed by the Applicant.

- The extensive undercutting and sea cave formation on the lower bluff effectively "sets up" future upper bluff failures, and thus relatively rapid retreat of the bluff edge and face in the near-term absent armoring. In previous reports, (e.g., Refs. 1 - 3), CSA concluded that upper bluff failures and rapid upper bluff retreat triggered by lower bluff erosion and sea cave collapse pose a significant, near-term threat to the blufftop residence, and this imminent danger was the primary justification for both several recent emergency CDPs issued by the Commission and for the proposed Phase I and II shoreline protective work (some of which has already been built). In our estimation, relatively rapid upper bluff retreat, potentially matching or exceeding the annualized rates (0.47 - 1.8 feet per year) observed recently in the lower bluff undercutting, is likely to occur within the next 20 years absent the proposed armoring.

- Recent high rates of bluff erosion are not confined to the project site, but have been observed elsewhere in the Shell Beach area. For example, TerraCosta (2020) (Ref. 6) reported 20 – 30 feet of retreat in the last 20 years (1 – 1.5 feet per year) along unarmored bluffs in Shell Beach, and concluded that a near-term retreat rate of 1.5 feet per year was applicable at 117 Indio Drive, immediately downcoast of the subject site. Prior to the construction of the 2005 seawall, short-term bluff retreat rates of up to 2 feet per year (1990 – 2000) were reported immediately upcoast at 125 Indio Drive (along with a retreat rate of 0.83 feet per year at 121 Indio Drive, likely lesser because the bluff there was already partially armored) and used as justification for the original seawall construction at the site (Gorman/ Earth Systems Pacific 2001 peer review, as cited in Ref. 7).

- Over the next several decades, it is widely predicted that rates of sea level rise along the California coast will increase above observed historical rates. Greater rates of sea level are expected to increase rates of retreat along coastal bluffs, and could result in more rapid erosion of the bluff at the project site.

For these reasons, we conclude that average annualized bluff retreat rates greater than 0.54 feet per year (as estimated by the Applicant) are very likely to occur at this location

over the next 20 years in the absence of further shoreline armoring. Based on the available evidence, we believe an erosion rate of 1 foot per year is likely, and that higher erosion rates of 1.5 to 2 feet per year are possible.

In-lieu Fee Calculation

Often, the Commission has determined that it is not practicable or appropriate to pursue in-kind mitigation for sand supply impacts, and has instead required in-lieu mitigation. The Commission has used a variety of methods to translate area of beach lost (encroachment and passive erosion) and/or volume of sand retained to dollar amounts. As previously mentioned, the approaches used here are 1) the cost of acquiring property nearby that could be purchased and allowed to erode thereby turning into beach naturally (dollars per square foot); and 2) the cost of purchasing and transporting beach quality sand to the project vicinity (dollars per cubic yard of sand).

The cost of acquiring property nearby was estimated to be $450.25 per square foot based property values in the project area. The cost of purchasing and transporting sand to the project vicinity was estimated to be approximately $60.54 per cubic yard of sand based on the value of $50 per cubic yard of sand used in similar projects in the area from 2017, adjusted for inflation to 2023 (using cumulative inflation rate for US Consumer Price Index). It is our understanding the basis for these values is to be elaborated on in the staff report.

Using these costs, the total impacts on sand supply, and therefore, on public access and recreational opportunities are assessed to be **1,120.29 to 2,268.58 cubic yards of retained sand, 236 square feet of encroachment**, and **1,610 to 3,220 square feet of passive erosion**. Using a cost of sand of $60.54 per cubic yard and a cost of property acquisition of $450.25 per square foot, **the total in-lieu fee calculated is $898,984 to $1,693,404** (rounded to the nearest dollar).

Jeremy Smith, Coastal Engineer

Joseph Street, Ph.D, P.G., Staff Geologist