



## **ADDENDUM NO. 1**

TO: All Plan Holders and Prospective Bidders

FROM: City of Capitola Public Works

DATE: July 22, 2020

RE: **ADDENDUM NO. 1**  
CAPITOLA BEACH FLUME AND JETTY REHABILITATION

### **ADDENDUM NO. 1**

#### **City of Capitola, California**

This Addendum shall be considered as a part of the bid documents for the subject project as though it had been issued at the same time and shall be incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original documents, this Addendum shall govern and take precedence.

Contractors are hereby notified that they shall make any necessary adjustments in their proposals on account of this Addendum. It will be construed that each proposal is submitted with full knowledge of all modifications and supplemental data specified herein.

Receipt of this Addendum must be acknowledged on the Addendum Acknowledgement form. Signature on said Bid Form indicates acknowledgement of receipt of Addendum No. 1, and that said Addendum No. 1 was properly evaluated in bidder's proposal. Any proposal not in compliance with this requirement may be rejected.

Steven E. Jesberg, Public Works Director

The following is hereby added and/or amended:

**The attached Capitola Flume Rehabilitation – Concept Study, prepared by Moffatt and Nichol, dated January 25, 2013 is provided for informational purposes. The information in this Concept Study is to assist in the understanding of the amount of crack filling that will be required before the liner is installed for the flume. This document shall be made an exhibit to the specifications and made part of the contract documents.**

# MEMORANDUM

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**To:** Steve Jesberg, City of Capitola  
**From:** Brad Porter, PE *Brad Porter*  
**Date:** January 25, 2013  
**Subject:** Capitola Flume Rehabilitation-Concept Study  
**M&N Job No.:** 6628-01

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This memorandum presents our findings of the concept level study we performed of the Capitola flume for your review and distribution. We performed site visits to investigate the condition of the Capitola flume and have developed preliminary design alternatives to improve the condition of the flume and remedy the problem of voids and sinkholes developing below the beach surface around the flume.

## Background

The flume was built in the 1930's to allow Soquel Creek to flow to Monterey Bay in summer months when the beach sand accretes and otherwise blocks the creek flow across the beach. It also creates a lagoon pool for recreational use. The flume is closed in non-summer months when Soquel creek breaches the sand beach and flows on the beach surface to the ocean. The flume is approximately 225 feet long, constructed of concrete (approx. 2 ft x 3 ft) supported on timber piles (see photographs below and Attachment 1-Existing Structure Figures)



1-Soquel Creek at Capitola, Flume at Right



2-Flume Close up

Some of the considerations for the flume are:

1. Voids develop beneath the beach around the flume. This may be due to the flume concrete that has cracked and has leaks that allow water to “pipe” around the flume and wash out sand.
2. These hidden voids can collapse suddenly and endanger people on the beach
3. The flume provides favorable water quality for fish habitat in Soquel Creek
4. Some limited funding (perhaps a range of \$50k to \$400k) may be available to perform repairs on the flume to keep it functioning into the future

### Scope of Services

To address these considerations, we were engaged by the City of Capitola to provide the following services:

1. Perform site visit in late summer/fall to observe inside of flume and measure the elevation of the flume inlet and outlet to assist in calculations of flow capacity.
2. Investigate the feasibility of various repair alternatives to address the deterioration in the concrete and resulting leakage. These may include: slip lining the flume, repairing the concrete in place, using other types of linings, and providing a cutoff wall in the beach sand.
3. Develop 2-3 repair alternatives with costs and figures to allow the City and their partners to choose a course of action and seek funding for the project.

### Site Visit and Findings

Site visits were performed on the following days and a summary of observations that were made.

#### January 29, 2010-Initial observations

Observed the outside of the exposed flume at low tide. Beach sand level was very low at this time of year and allowed observation of the flume exterior. The following photographs were taken during the visit:



3-East side of Flume, Soquel Creek Open



4-West Side Flume Inlet, Beach Sand Low



5- East Side Flume, Looking North



6-Flume Outlet

October 26, 2010-Creek Opening

Observed the interior of the flume when Soquel Creek is first opened and the flume is clear of sand due to summertime water flow through the flume. In the morning there was water depth in the flume due to the tide level, returned at low tide but flume had filled with sand. Surveyed the inlet and outlet invert elevations to establish slope of the flume.



7- Flume outlet 9 am



8-Inside Flume Filled with Sand Near Outlet 5pm

May 25/26, 2011-Creek Closure, Interior Flume Observations

Observed interior of the flume when Soquel Creek had been first closed and the flume was cleared of sand. Creek flow breached the closure which allowed entry in the flume due to sand cleared. Attachment 2 has site notes made during observations of the inside of the flume. The major observations were:

- The bottom of the flume shows little evidence of cracks or leakage
- There is a cold joint on the middle to upper portion of the wall for much of the length of the flume



9-Outlet May 25



10-Sink Hole Near Inlet

See attachment 2 for additional photos of the flume interior.

June 30, 2011-Flume Operation

Observed operation of the flume with larger creek flow. It appears that the tide action may be undercutting the flume sand rather than leakage through the flume concrete. Both sides of the outlet were open to allow the larger flow to discharge.



11-Beach at Outlet, Looking West



12-Outlet, Looking South



13-Outlet, Looking West



14-Outlet, Looking East



15-Inlet, Looking North



16-Inlet, Looking East

May 28, 2012-Flume Operating

One side of the outlet is open. The flow is less than it was in late spring in 2011. No signs of sinkholes are apparent. Sandbags are placed at the inlet with plastic sheeting to stop piping around the exterior of the flume that would create voids in the sand.



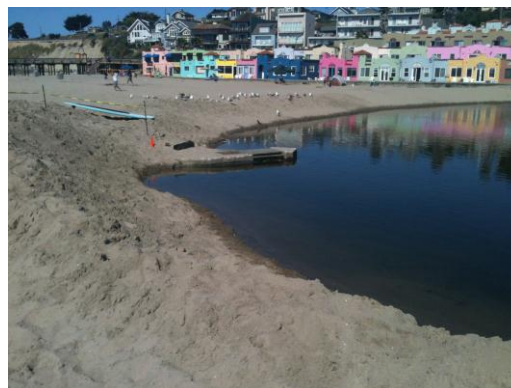
17- East Side Outlet Open



18-West Side Outlet Closed



19-Outlet Looking South



20-Inlet at Creek Lagoon

Findings



Based upon the site visit observations it appears that the source of the sinkholes developing may not be due entirely to condition of the flume concrete. No significant cracks were observed in the bottom of the flume. There were a number of cracks or cold joints observed in the middle to top portion of the wall that would allow some leakage to occur. The operation of the flume is such that the water enters the inlet as a drop inlet: the water falls vertically into the box and has little initial horizontal velocity. Because of this, the box and flume are near full at the upper (inlet) end and consequently water could flow out the cracks in the middle and upper portions of the flume. As the water flows down the flume it increases in velocity due to the flume slope and reduces in depth such that it may not be high enough on the wall to leak out of the cracks on the upper portion of the wall.

The outlet of the flume is exposed to the wave and tidal action of the ocean which acts to erode the sand from under the flume. This may be the cause or a part of the cause of flow around the outside of the flume that allows a conduit for piping out of the sand.

Considering these observations, it is important to better understand the mechanism of water flow that is causing the piping of the sand in developing proposed repairs to the flume. Accordingly, the alternatives described below were developed to address the sinkhole development and improve the function of the flume.

### **Alternatives**

The following alternatives were developed in order of increasing effort and cost. Sketches of these alternatives are shown in attachment 3.

#### Alternative 1-Cut off Boards

In this alternative, plywood or similar boards would be placed beneath the flume to present a barrier to the flow of water beneath the flume. These could be placed at 10-30 foot intervals along the flume at a time when the beach is low, in order to minimize excavation of the sand. They would be placed at closer intervals near the inlet and outlet where flow enters and exits the flow path. The flume should be monitored over a few years to see if sinkholes develop. Parameters to be monitored would be the sinkhole locations, flow stages of the creek and sand level of the beach particularly at the outlet.

#### Alternative 2-Cutoff Sheets

A similar and more permanent approach is to install steel sheet piles at cutoffs beneath the flume. The flume would have a slot cut in the flume to allow the sheet to be driven into the sand below. The flume slot would then be re-cast with concrete that would also seal the top of the steel sheet to provide a secure cutoff to a flow path beneath the flume.



Alternative 3-Interior Pipe/Liner

A pipe would be installed inside of the flume to carry the entire creek flow at all but the highest flows. The inlet would be configured to direct all flow into the pipe at most elevations of the lagoon pool. When the flow increases beyond the capacity of the pipe, an overflow weir would allow water to enter the flume between the exterior pipe wall and the interior of the flume. The pipe would be installed by cutting the ends of the flume to insert the pipe and then recasting the flume concrete to seal the flume.

These alternatives are intended to be conceptual and to be reviewed by the City and their agency partners for this project. We anticipate discussing them with you and your partners to select the most appropriate action to take.

Attachments:

- 1-Existing Structure, Figures 1-3
- 2-Site Visit Notes, May 26, 2011
- 3-Alternatives 1-3 Sketches





## Attachment 1

Existing Structure, Figures 1-3



moffatt & nichol

CLIENT	CITY OF CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME REHABILITATION	SHEET	1 OF 3
DESIGN FOR	EXISTING STRUCTURE	DESIGNER	BP
		CHECKER	DATE 5/26/11

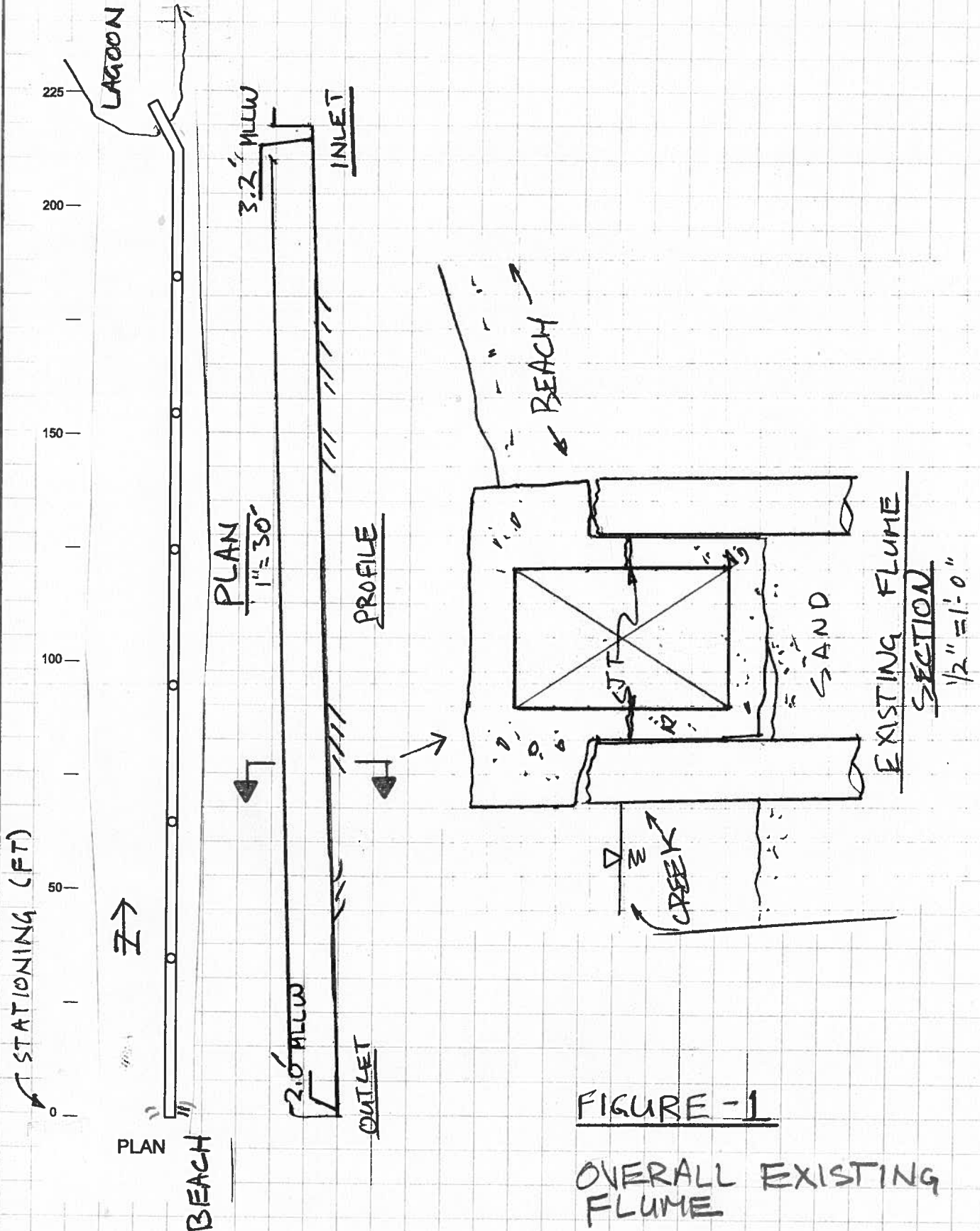


FIGURE - 1

OVERALL EXISTING FLUME



moffatt & nichol

CLIENT	CITY OF CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME REHABILITATION	SHEET	2 OF 3
DESIGN FOR	EXISTING	DESIGNER	BP
		CHECKER	DATE 5/26/11
			DATE

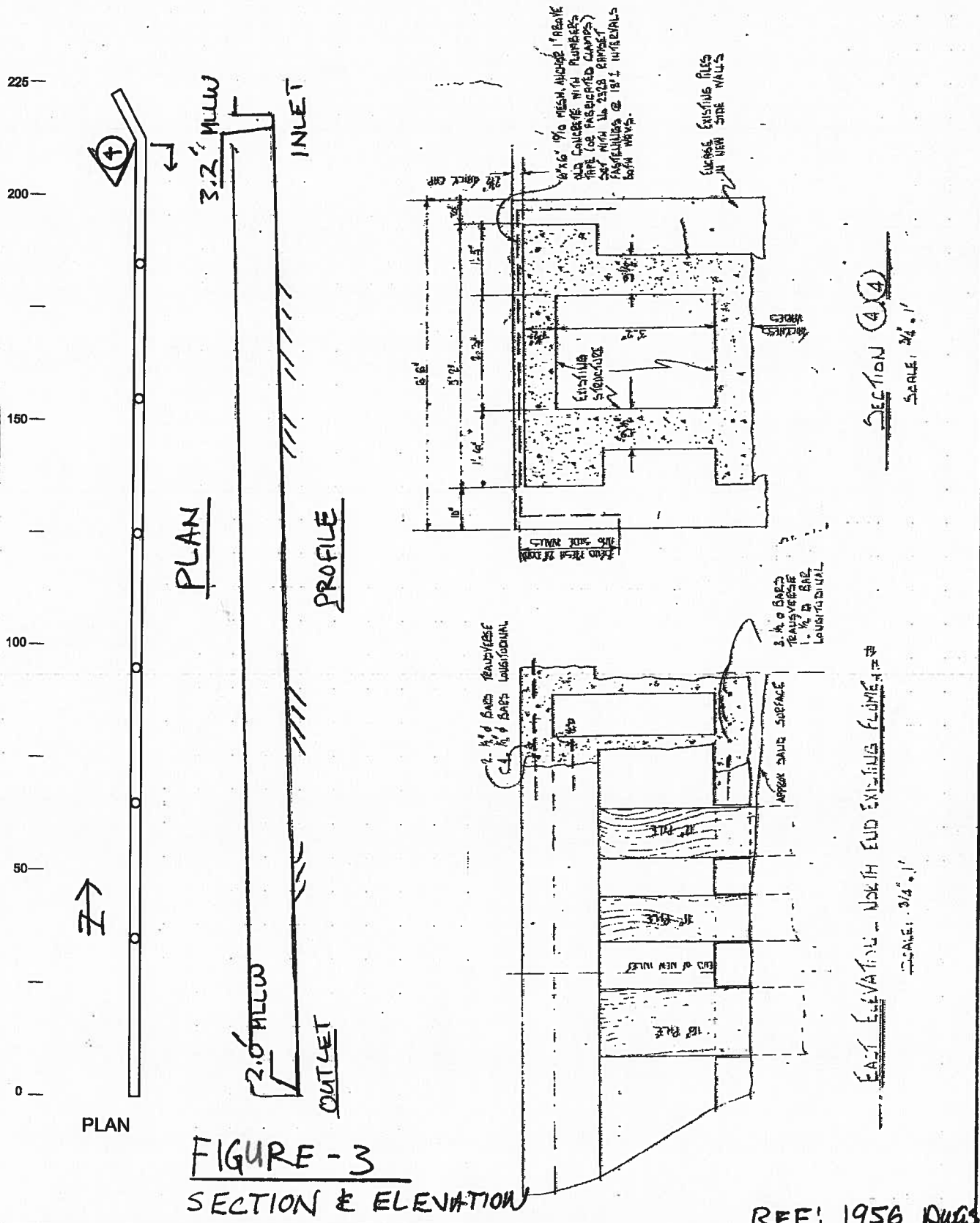
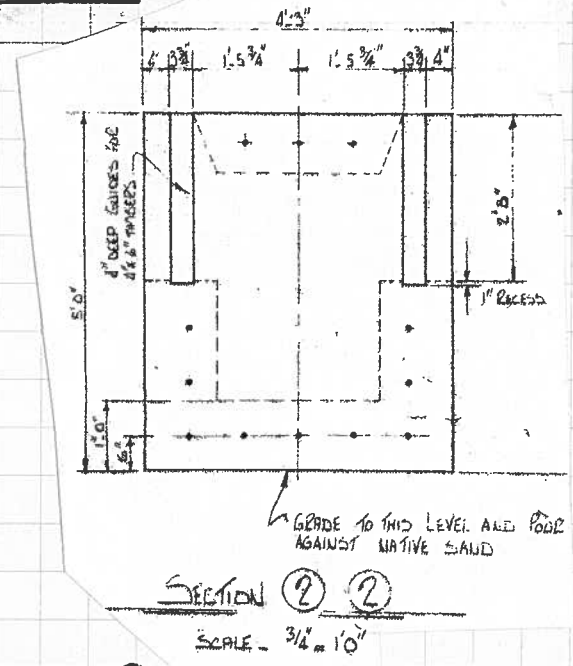
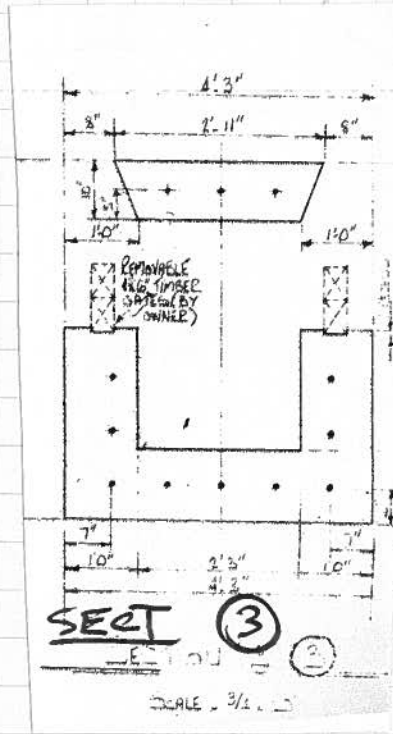
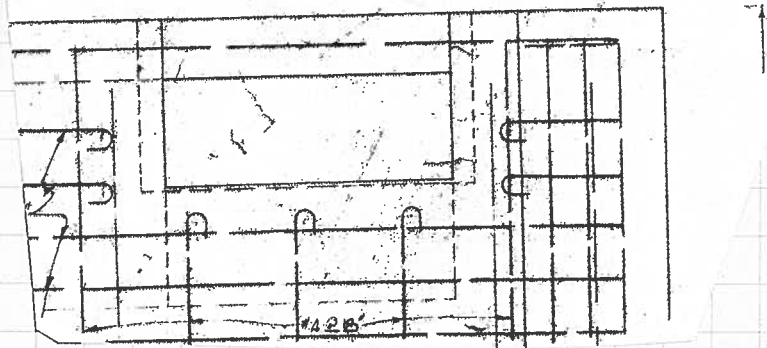
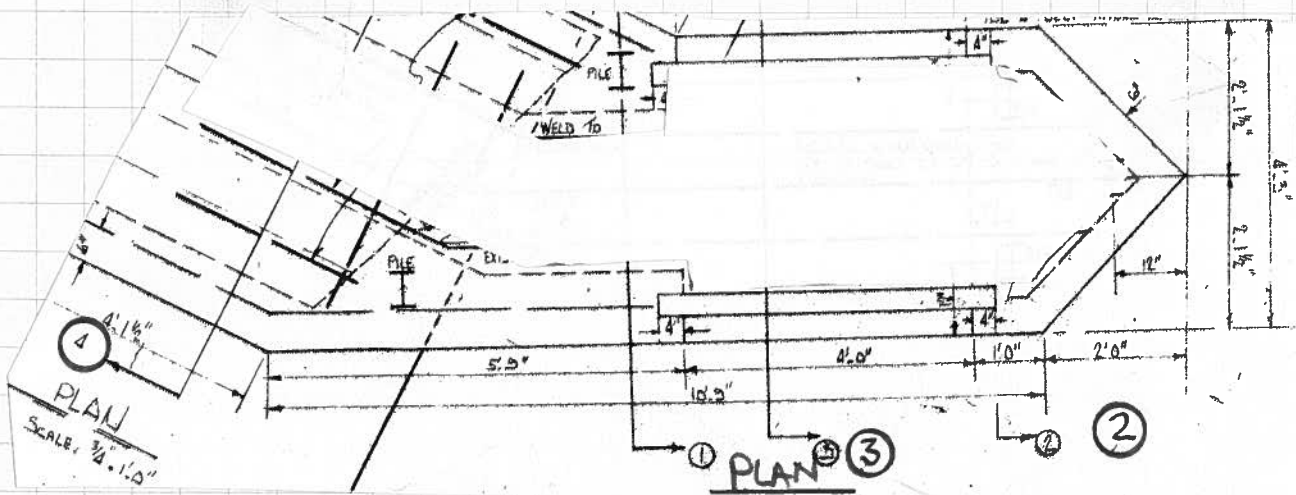


FIGURE - 3  
SECTION & ELEVATION



moffatt & nichol

CLIENT	CITY OF CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME RENOVATION	SHEET	3 OF 3
DESIGN FOR		DESIGNER	BP
		CHECKER	
		DATE	5/26/11
		DATE	



# FIGURE - 2

## FLUME INLET

REF: 1956 dugs

Attachment 2

Site Visit Notes, May 26, 2011

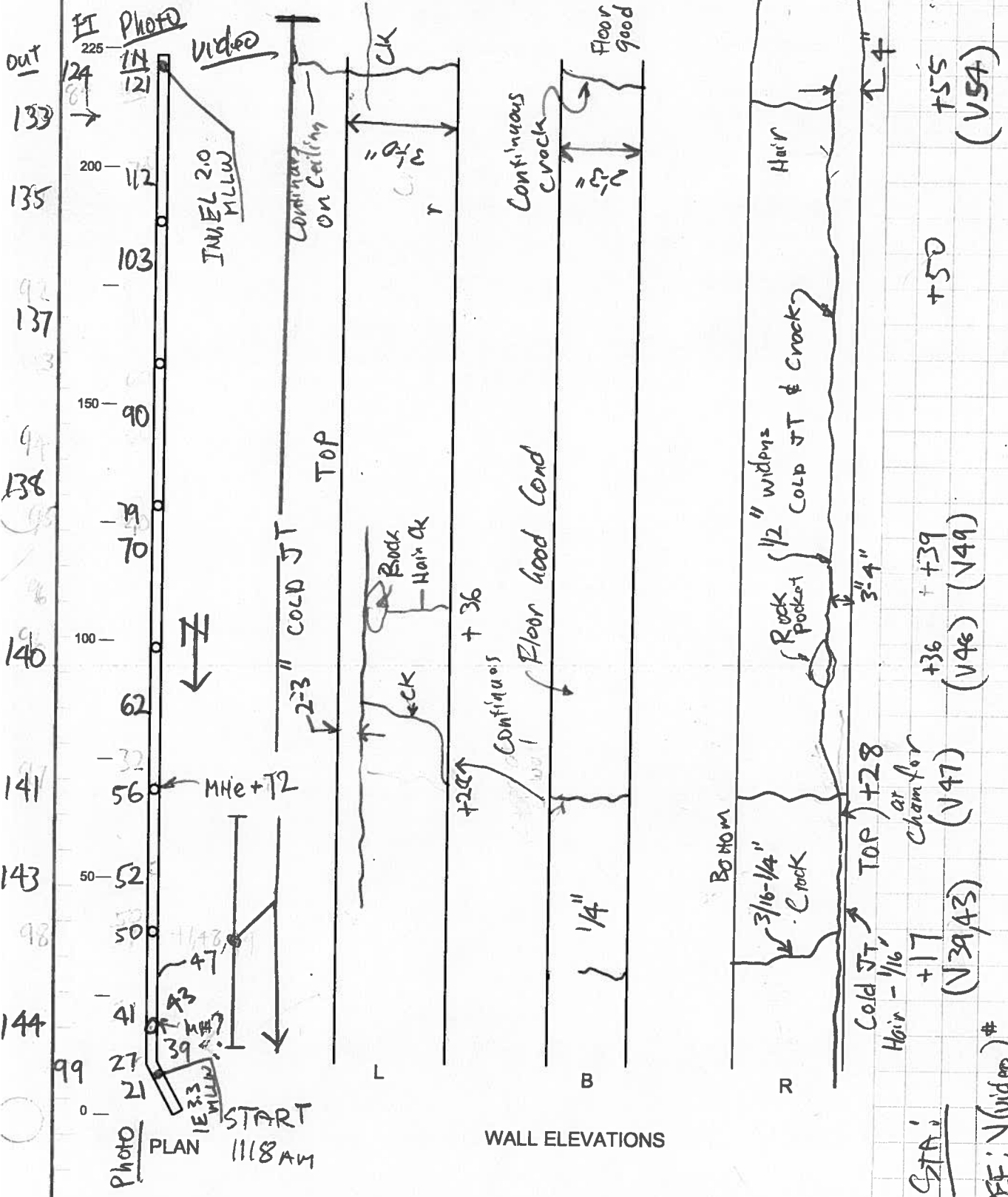




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CLIENT	CITY OF CAPITOLA	JOB NO.	6628-01
PROJECT	SOQUEL CREEK FLUME	SHEET	I OF 6
DESIGN FOR	SITE INVESTIGATION	DESIGNER	BP
	OF MAY 26, 2011	CHECKER	
		DATE	MAY 26, 2011

Photos: P52600-XX.JPG  
Photo #



WALL ELEVATIONS

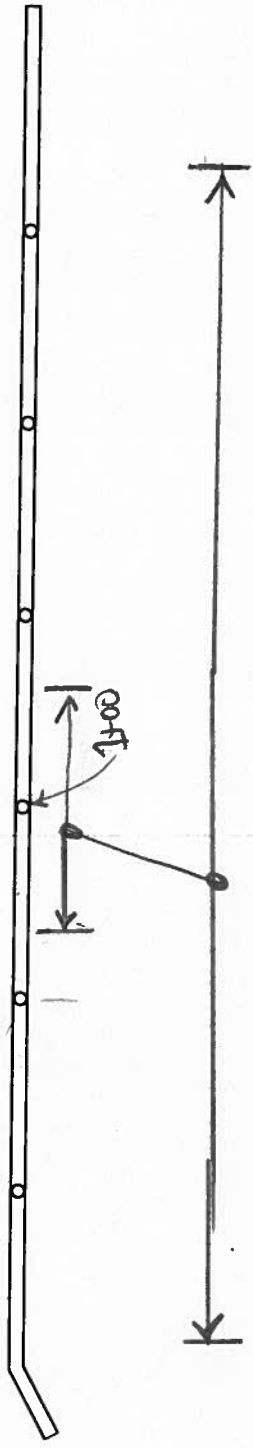
REF: V(video) #  
P (photo) #



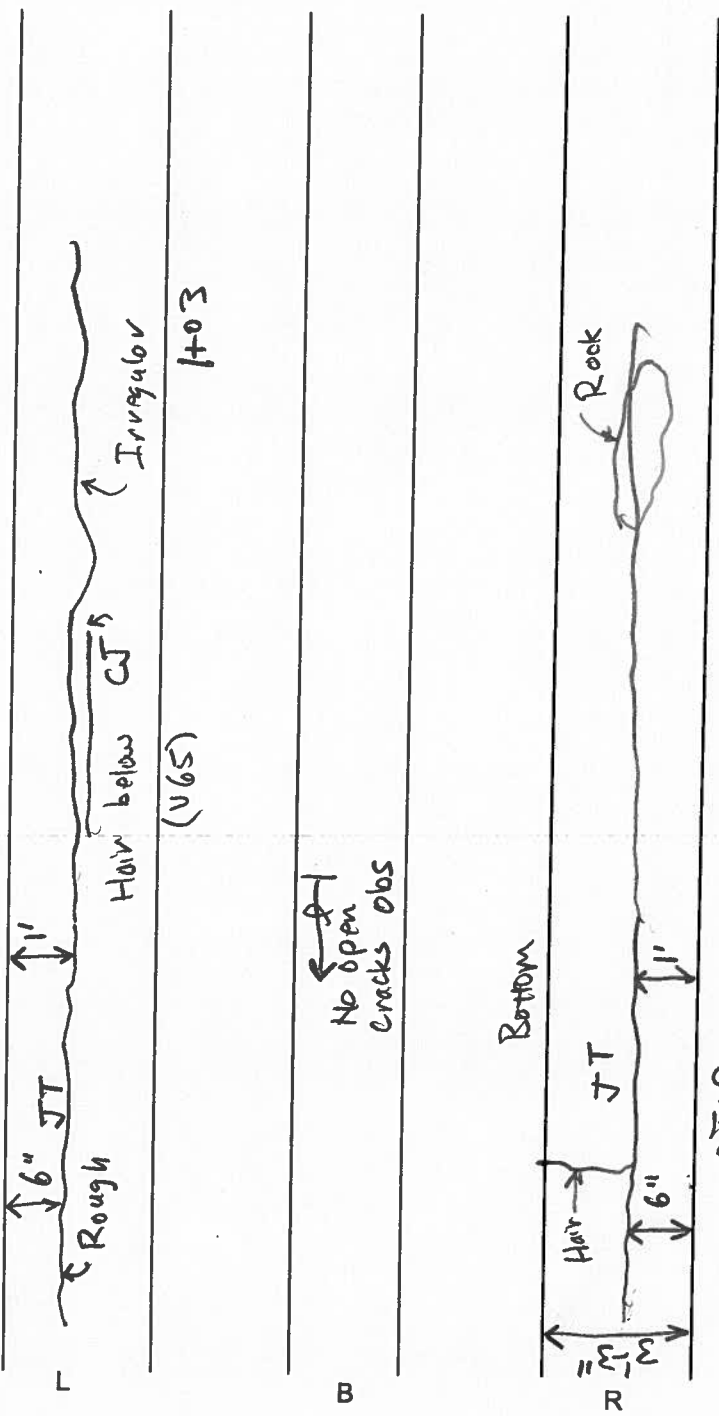
moffatt & nichol

CLIENT	CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME	SHEET	2 OF 6
DESIGN FOR	SITE NOTES OF	DESIGNER	DATE 5/26/2011
	MAY 26, 2011	CHECKER	DATE

225 —  
200 —  
150 —  
100 —  
50 —  
0 —



PLAN



WALL ELEVATIONS

H+03

(V65)

No open cracks obs

H+03 (V65)

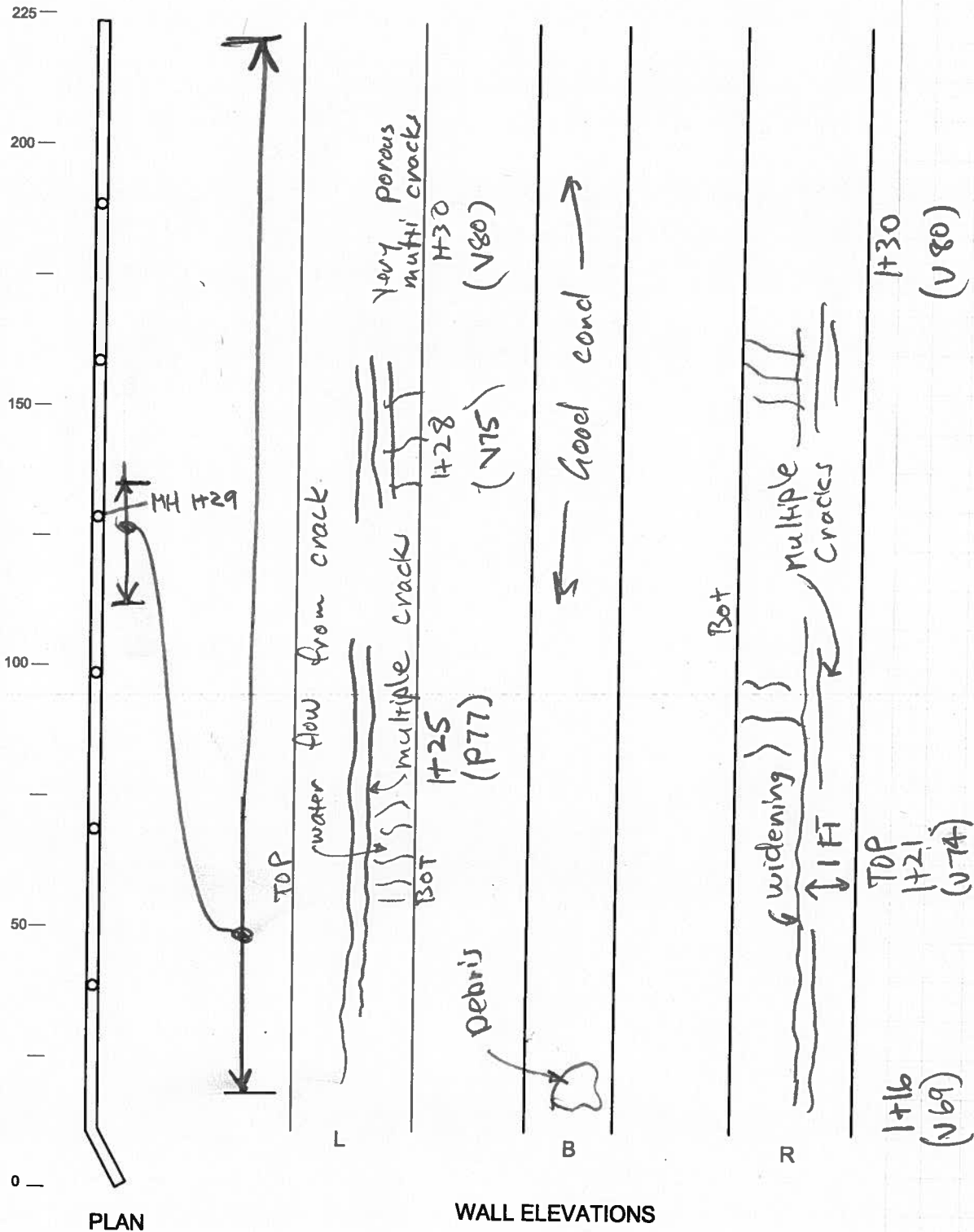
H+80 TOP (V65)

H+76 (V64)

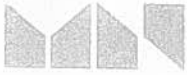


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CLIENT	CAPITOLA		JOB NO.	6628-01	
PROJECT			SHEET	3	OF 6
DESIGN FOR			DESIGNER	BP	DATE 5/26/2011
			CHECKER		DATE

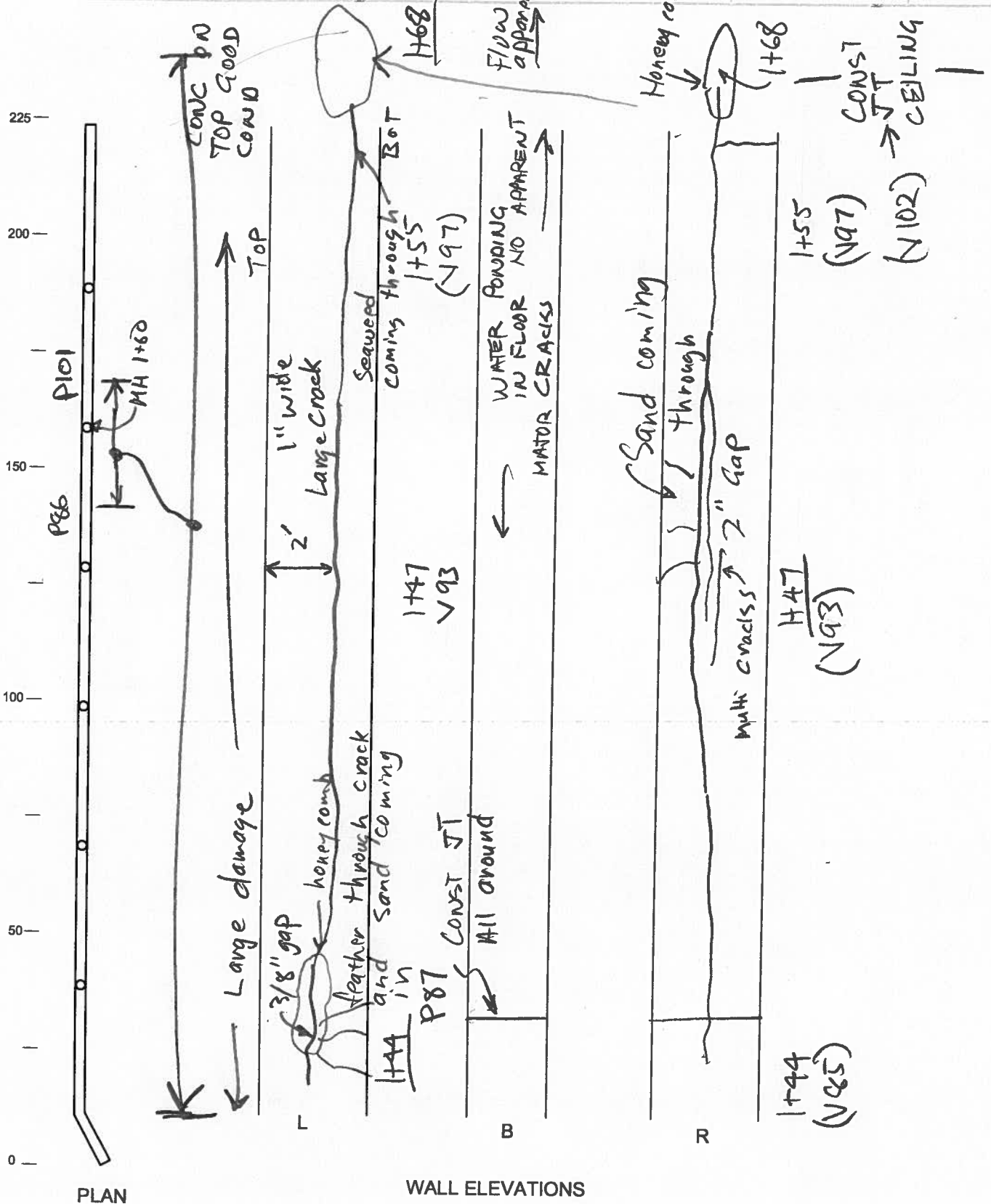






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CLIENT	CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME	SHEET	4 OF 6
DESCRIPTION		DESIGNED BY	BP
		DATE	5/26/2011
		CHECKED	
		PAGE	





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CLIENT	CAPITOLA	JOB NO.	
PROJECT	FLUME	SHEET	5 OF 6
DESIGN FOR	SV	DESIGNER	BP
		CHECKER	
		DATE	5/26/2011

(V128) (V129) OUTSIDE

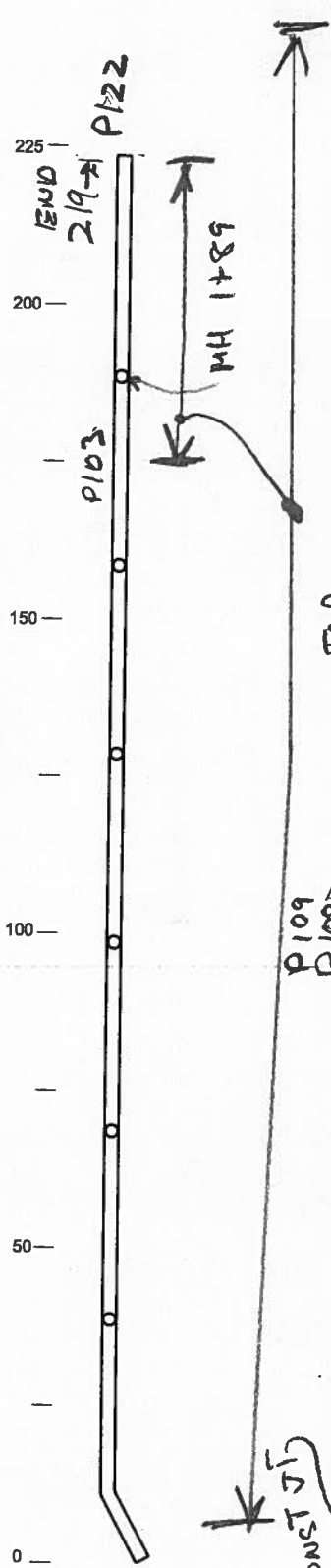
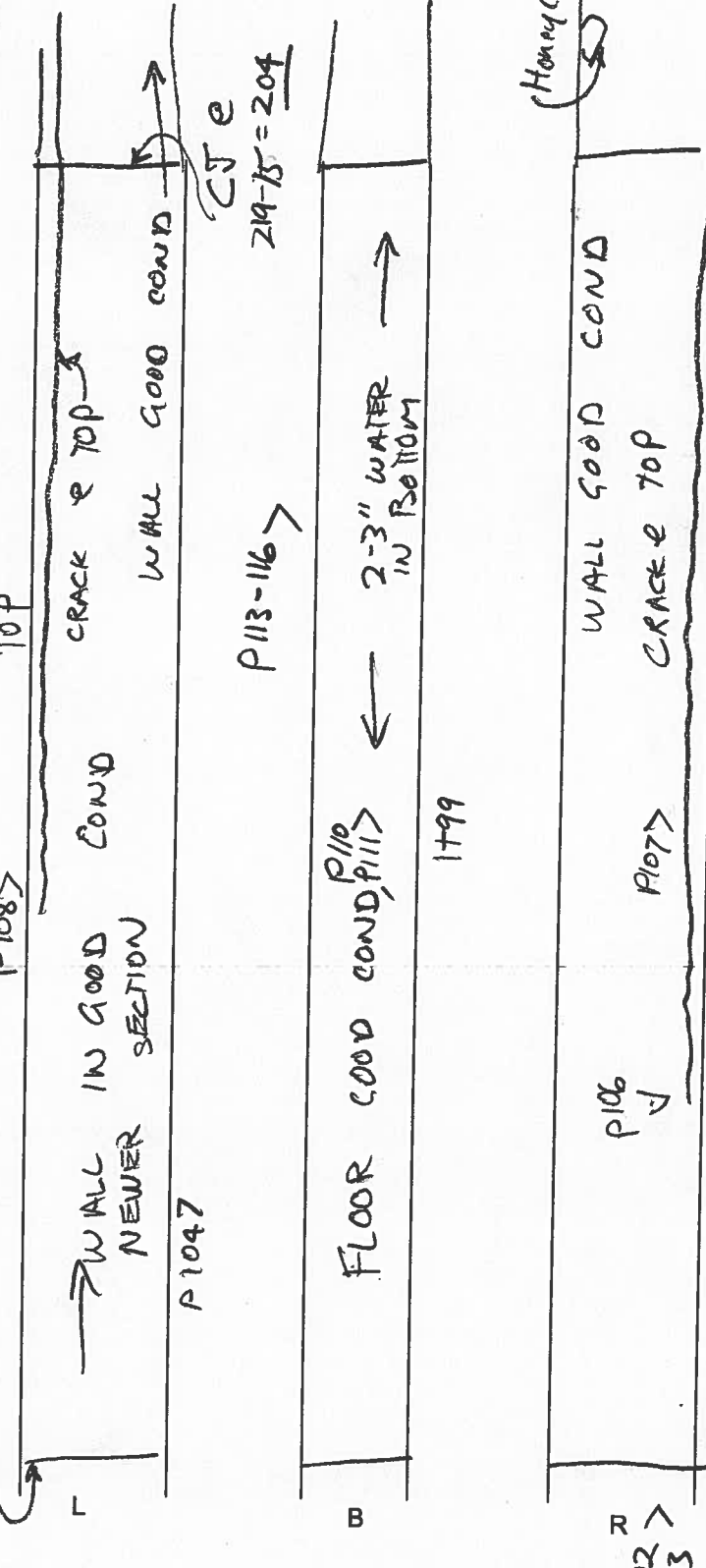


Photo PLAN



WALL ELEVATIONS



(V128)

(V130)

CJE  
219-15-204

P113-116

1+99

(Honeycomb)

2+00  
(V115)  
(V116)

1+89  
(V105)

1+70  
(V102)

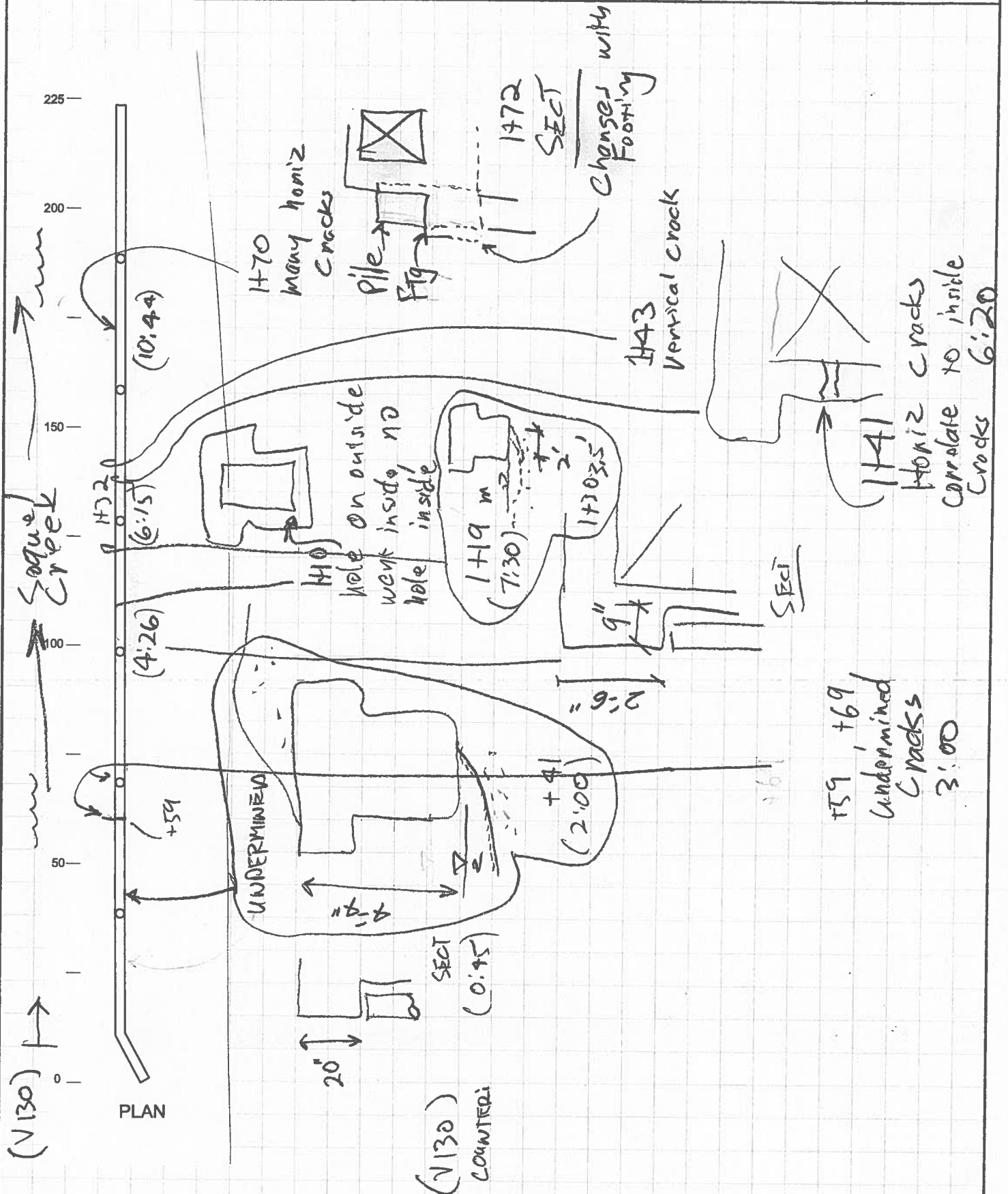
2+00  
(V115)

P106  
P107  
P102  
P103



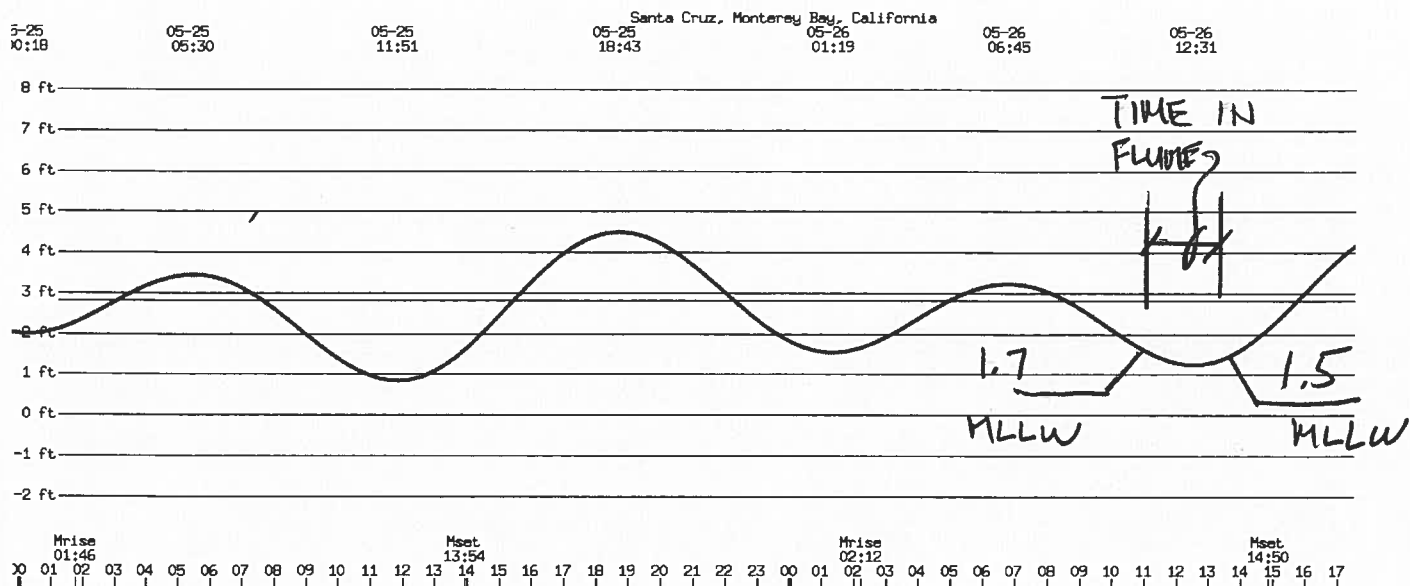
moffatt & nichol

CLIENT	CAPITOLA	JOB NO.	0628-01
PROJECT	FLUME	SHEET	6 OF 6
DESIGN FOR	OUTSIDE INSPECTION	DESIGNER	TBP
		CHECKER	DATE 5/26/2011
			DATE



Santa Cruz, Monterey Bay, California

25 May 2011 - 27 May 2011



If present, horizontal lines mark mean sea level and datum (usually mean lower low water). Colors under the curve indicate rising and falling tide (not ebb and flood currents).

WWW Tide/Current Predictor: <http://tbone.biol.sc.edu/tide>  
 Dean Pentcheff <[tide@crustacea.nhm.org](mailto:tide@crustacea.nhm.org)>  
 Biological Sciences, University of South Carolina, Columbia SC 29208 USA



1)-Inlet at sta 225



2)-Inlet East Side



3)-Inlet sill



4) Sta 10 at Angle



5) Sta 10 Right Side Top Long Crack



6) Sta 16 Left Side Horizontal Crack



7) Sta 30 Left Side Longitudinal Cold Joint/Crack



8) Sta 51 Right Side Cold Joint/Crack



9) Sta 128 Left Side Longitudinal Cold Joints



10) Sta 128 Right Side Longitudinal Cold Joint/Crack



11) Sta 128 Floor and Sides



12) Sta 128 Floor, No Visible Cracks



13) Sta 145 Cold Joint with Outside Material Entering



14) Sta 153 Cold Joint



15) Sta 199 Left Side Crack at Top



16) Right Side Crack at Top

13) Sta





17) Sta 200 Bottom



18) Sta 216 Outlet



19) Sta 200 East Side



20) Sta 175 East Side



21) Sta 150 East Side



22) Sta 125 East Side



23) Sta 100 East Side



24) Sta 75 East Side



25) Sta 50 East Side



26) Sta 0 East Side



27) Lagoon Breach Prior to Closure

Attachment 3

Alternatives 1-3 Sketches



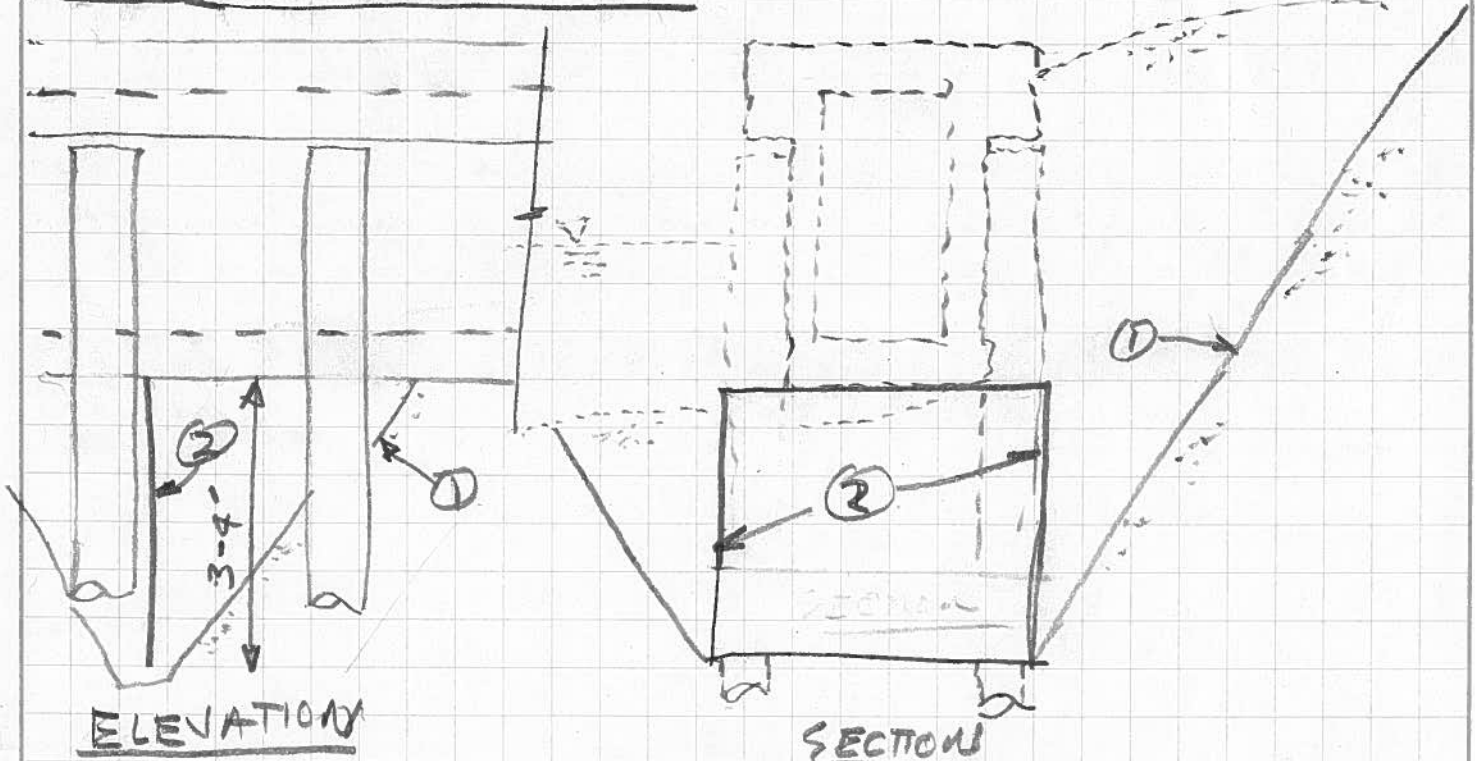


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CLIENT	CITY CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME REHABILITATION	SHEET	1 OF 3
DESIGN FOR	ALTS FOR PRELIM ASSESSMENT	DESIGNER	BP
		DATE	DEC 16, '11
		CHECKER	
		DATE	

INCREASING COST ORDER

ALT 1 BOARDS CUT-OFF



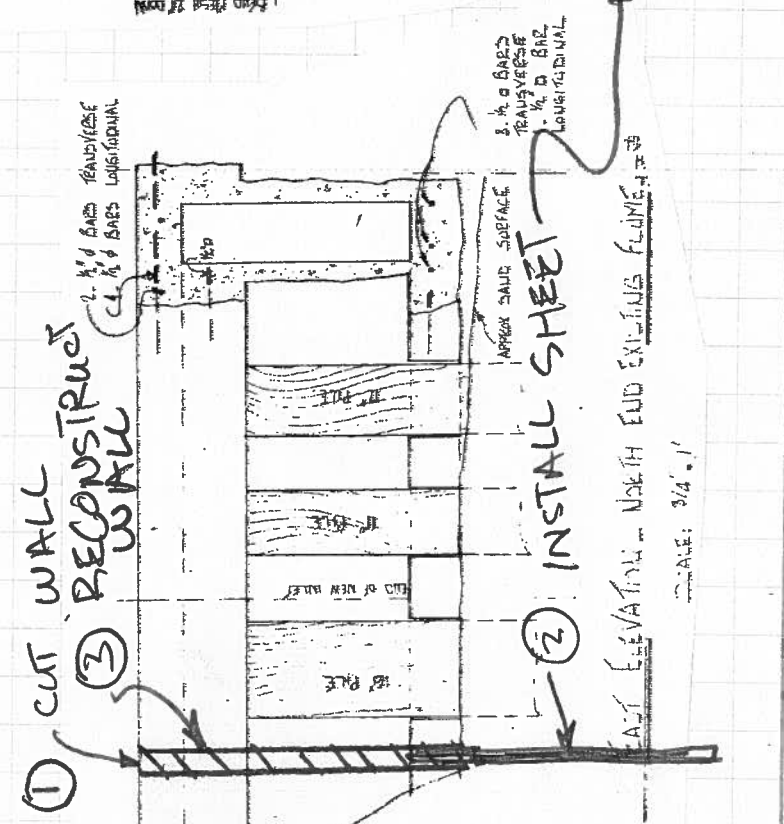
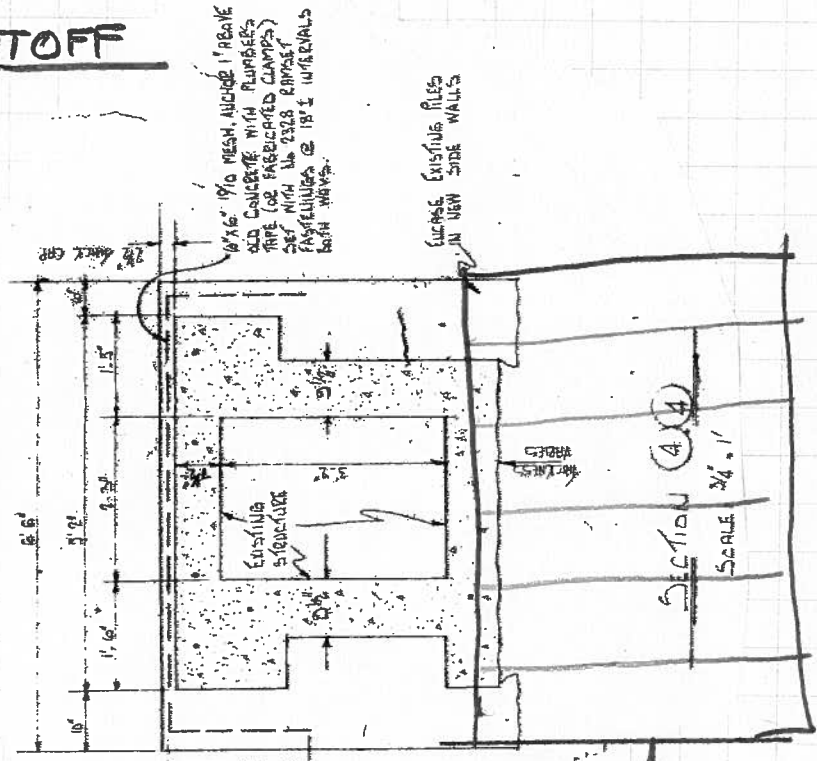
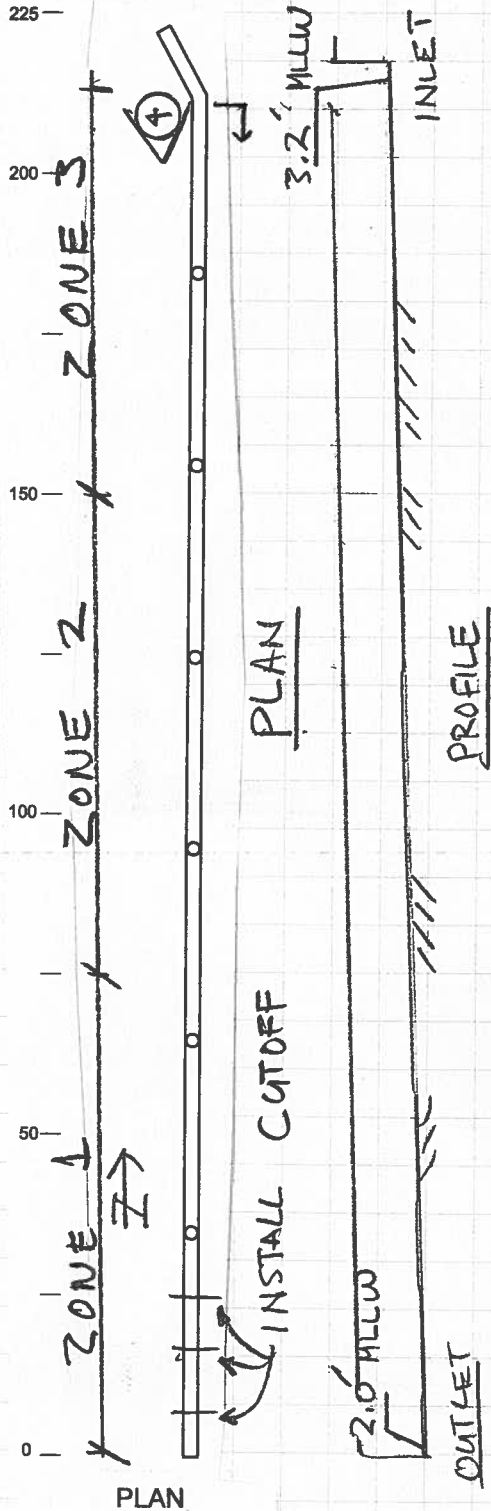
- ELEVATION
- SECTION
- ① EXCAVATE SAND AS REQ'D TO INSTALL CUTOFF BOARD
  - ② INSTALL CUTOFF BOARD - 1" THICK PLYWOOD OR PLASTIC, OR STEEL.
  - ③ BACKFILL SAND



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CLIENT	CITY OF CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME REHABILITATION	SHEET	2 OF 3
DESIGN FOR		DESIGNER	BP
		CHECKER	
		DATE	Dec 16, 11
		DATE	

# ALT 2 SHEET CUTOFF



REF: 1956 Dwg's

3-D.D

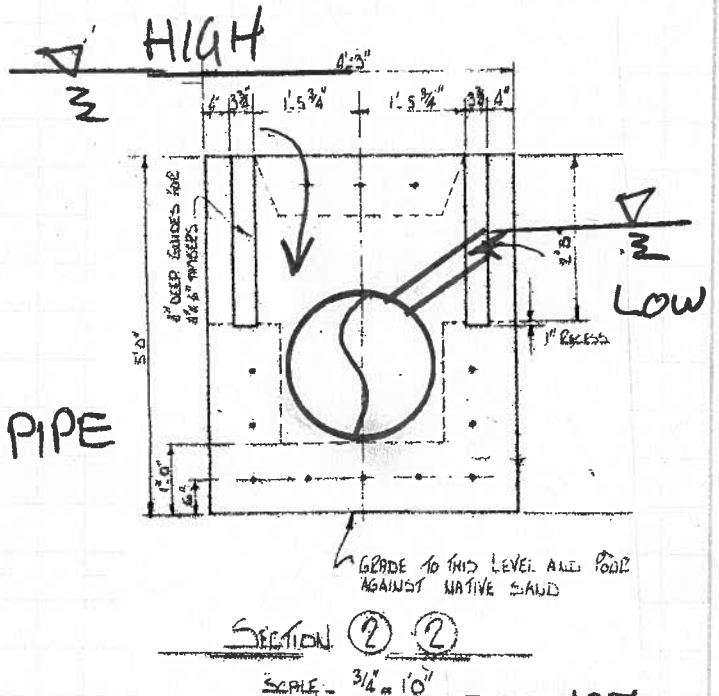
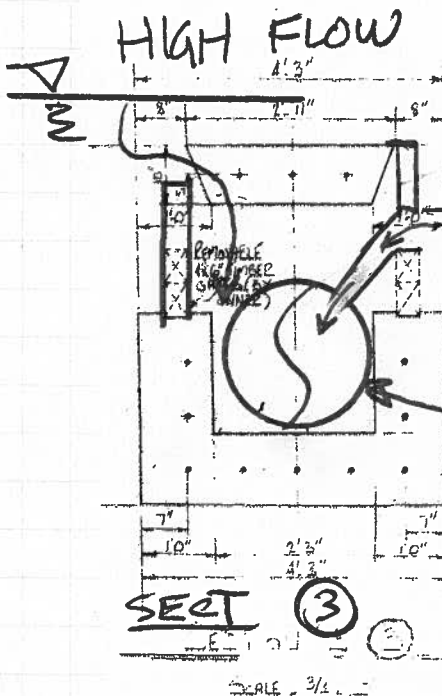
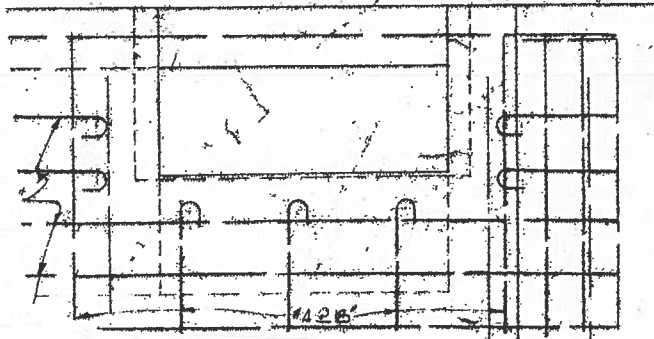
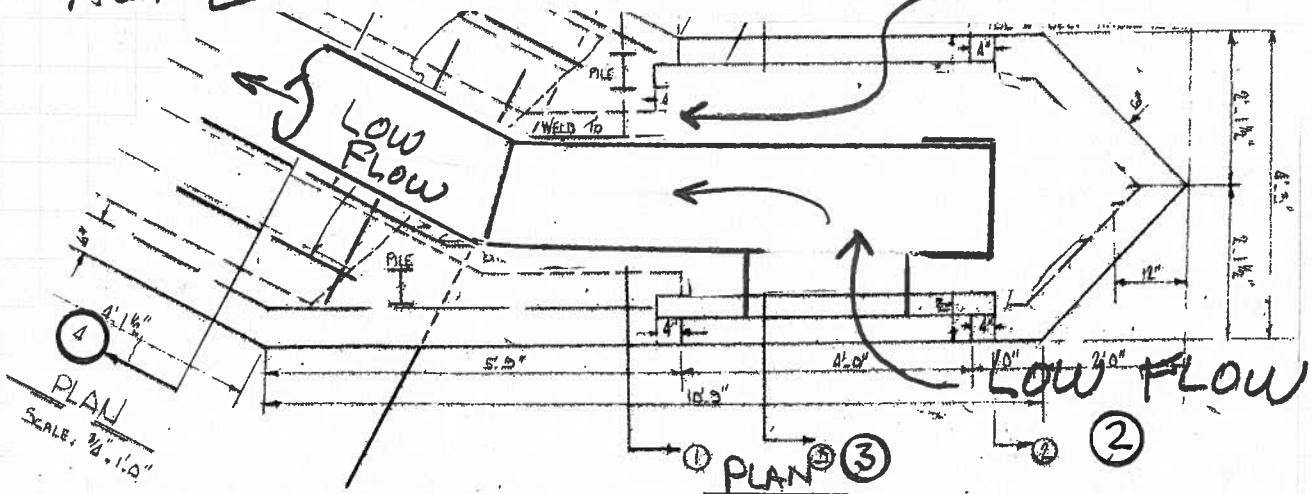


moffatt & nichol

CLIENT	CITY OF CAPITOLA	JOB NO.	6628-01
PROJECT	FLUME RENABILITATION	SHEET	3 OF 3
DESIGN FOR		DESIGNER	BP
		CHECKER	
		DATE	Dec 16, 2011

ALT 3

HIGH FLOW



GRADE TO THIS LEVEL AND POOR AGAINST NATIVE SAND

REF: 1956 dugs