

ALA WAI CANAL

FLOOD RISK MANAGEMENT STUDY, OAHU, HAWAII

U.S. Army Corps of Engineers
Honolulu District

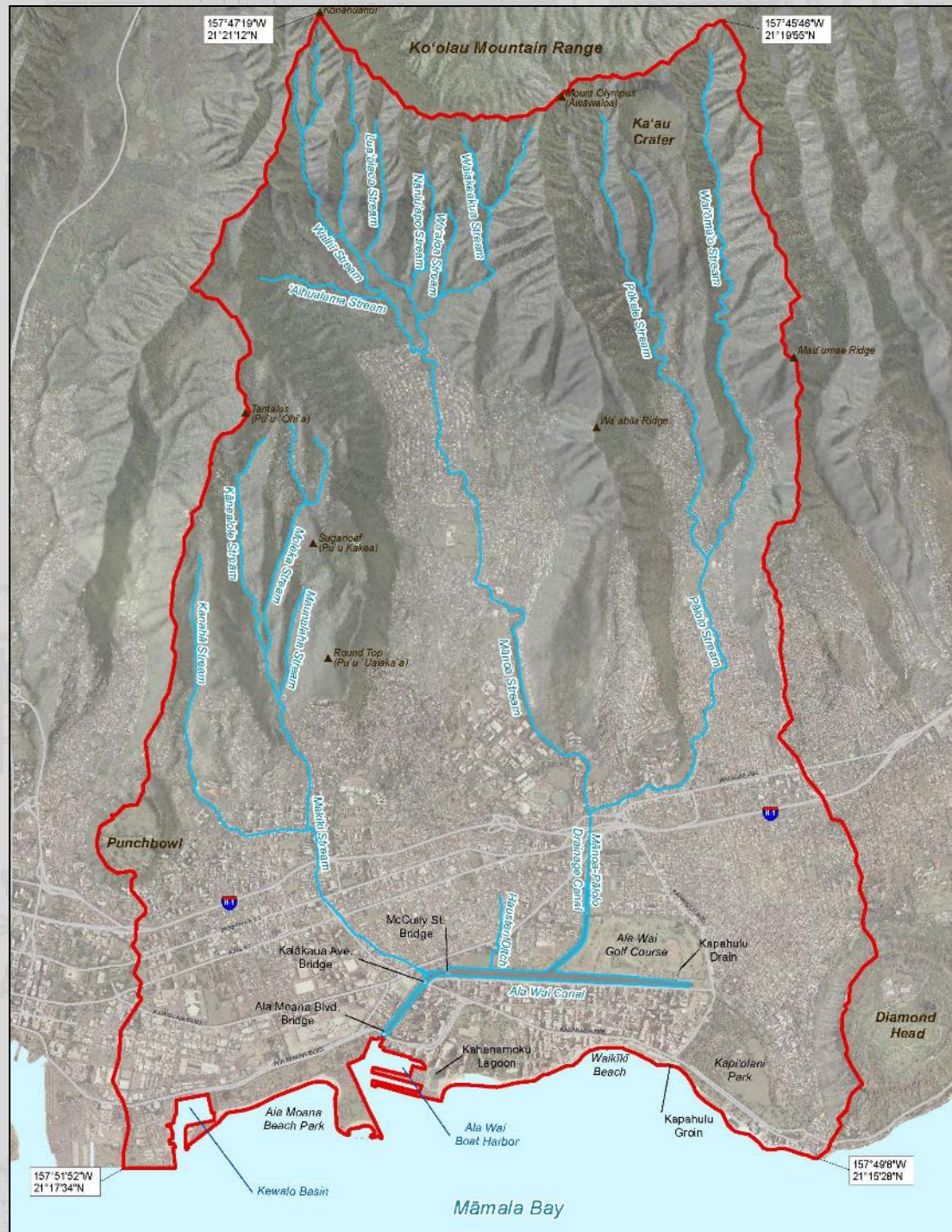


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**US Army Corps
of Engineers**





ALA WAI CANAL FLOOD RISK MANAGEMENT STUDY

Legislative Authority:

- Section 209, Rivers & Harbors Act of 1962

Non-Federal Sponsor:

- State of Hawaii (DLNR Engineering Division)

Product:

- Feasibility Study Report with Integrated Environmental Impact Statement (EIS)



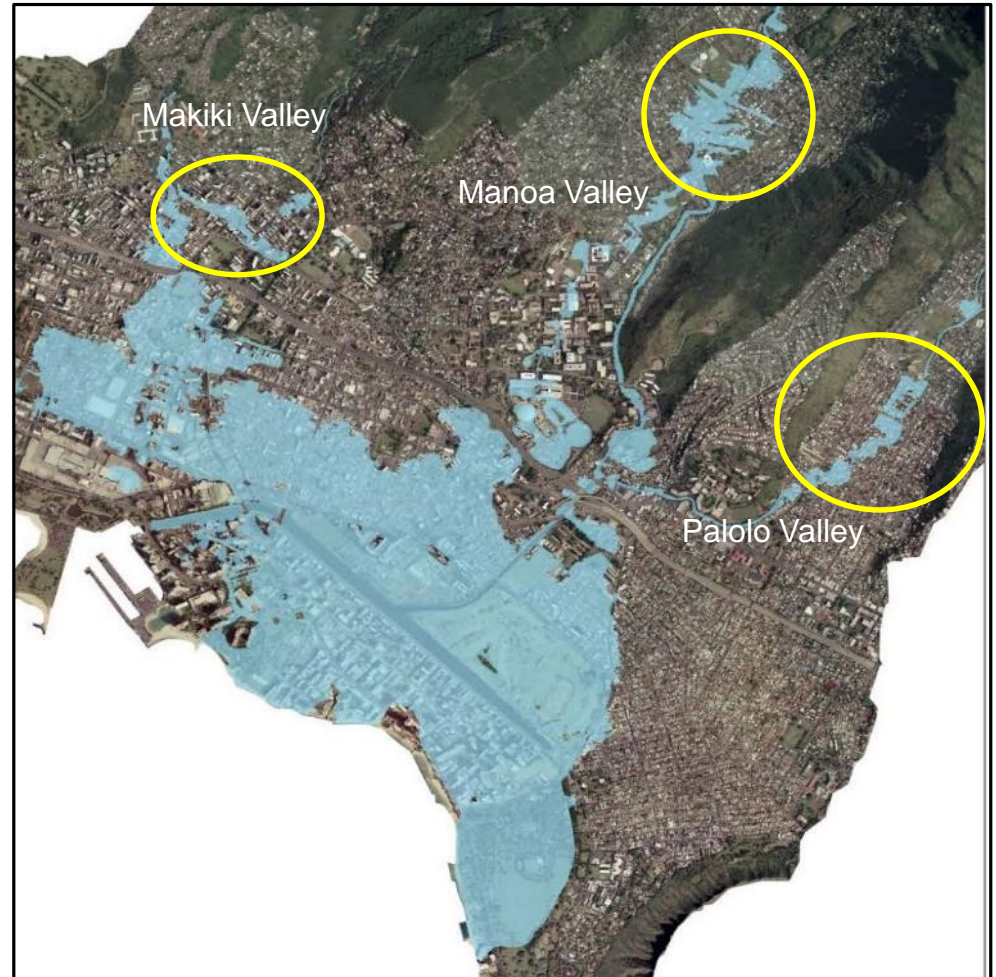
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FORECAST FUTURE CONDITIONS

1% ACE floodplain (~1,358 acres)

- Health and safety risks:
 - Permanent Population-at-Risk
 - Transient population of students, workers, tourists
- Impacts to utilities (e.g., power, water, sewer, telecommunications)
- Flooding of surface streets, limiting emergency access
- Critical infrastructure:
 - Fire stations
 - Police stations
 - Hospitals
 - Nursing facilities
 - Emergency shelters



Problems and Opportunities

Forecast Future Conditions

Formulate Alternative Plans

Evaluate Alternative Plans

Compare Alternative Plans

Select a Recommended Plan



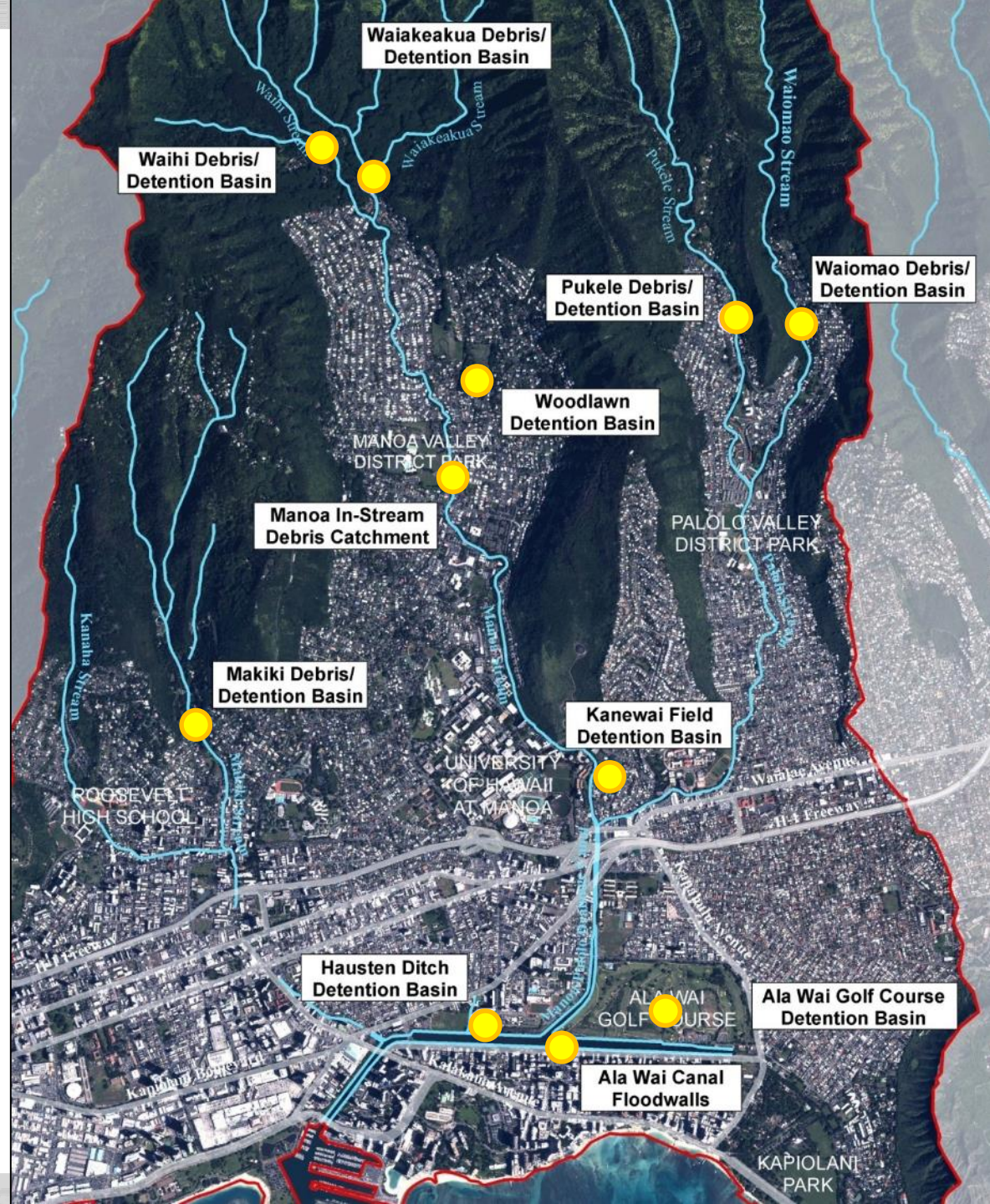
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RECOMMENDED PLAN FEATURES

- 6 debris/detention basins in upper stream reaches
- 1 stand-alone debris catchment structure
- 3 multi-purpose detention basins in open spaces of developed watershed
- Floodwalls along Ala Wai Canal (including two pump stations for interior drainage)
- Flood warning system
- Fish and wildlife mitigation

Authorized Cost: \$345,076,000
Optimized BCR 3.68



PUBLIC OUTREACH



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to be on our
e-mail list!



Public Review:

- Public Meeting: 30 SEP 2015, 180 participants
- Mailings to affected landowners, interest groups, neighborhood boards
- Extended review to 60 days
- Received 64 written comments; individualized written responses

Other Outreach:

- 44 specific stakeholder engagements since 2012
- Dedicated project webpage
- E-mail in-box, list-serve
- Media inquiries



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FEASIBILITY STUDY WITH INTEGRATED EIS

- Feasibility Study was completed June, 2017
- Chief of Engineers Report Submitted to Congress December, 2017
- Record of Decision for Environmental Impact Statement Signed September, 2018
- Agreement Execution, Roles and Responsibilities



- **Bipartisan Budget Act 2018**
 - Long Term Disaster Recovery Investment Program
 - No Expiration of Funds
 - No 902(b) Limit
 - Single Phase Design and Construction
 - Deferred Payment Option



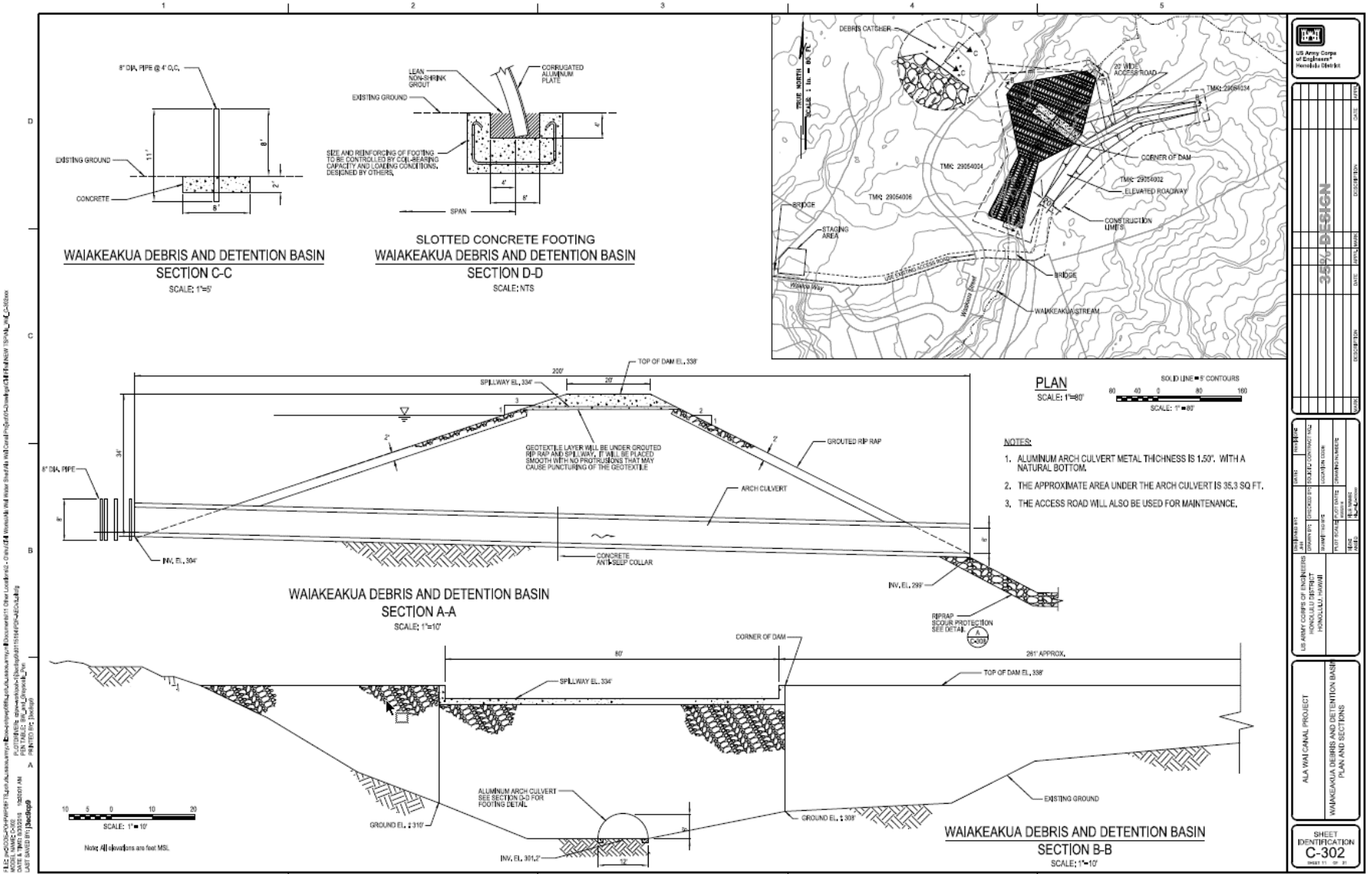
Makiki Detention Basin





Waiakeakua Stream (Manoa)

WAIAKEKUA DEBRIS AND DETENTION BASIN



U.S. ARMY CORPS OF ENGINEERS
 ALA WAI CANAL PROJECT
 WAIAKEKUA DEBRIS AND DETENTION BASIN
 PLAN AND SECTIONS
 SHEET IDENTIFICATION
 C-302

US Army Corps of Engineers Honolulu District

3041 DESIGN

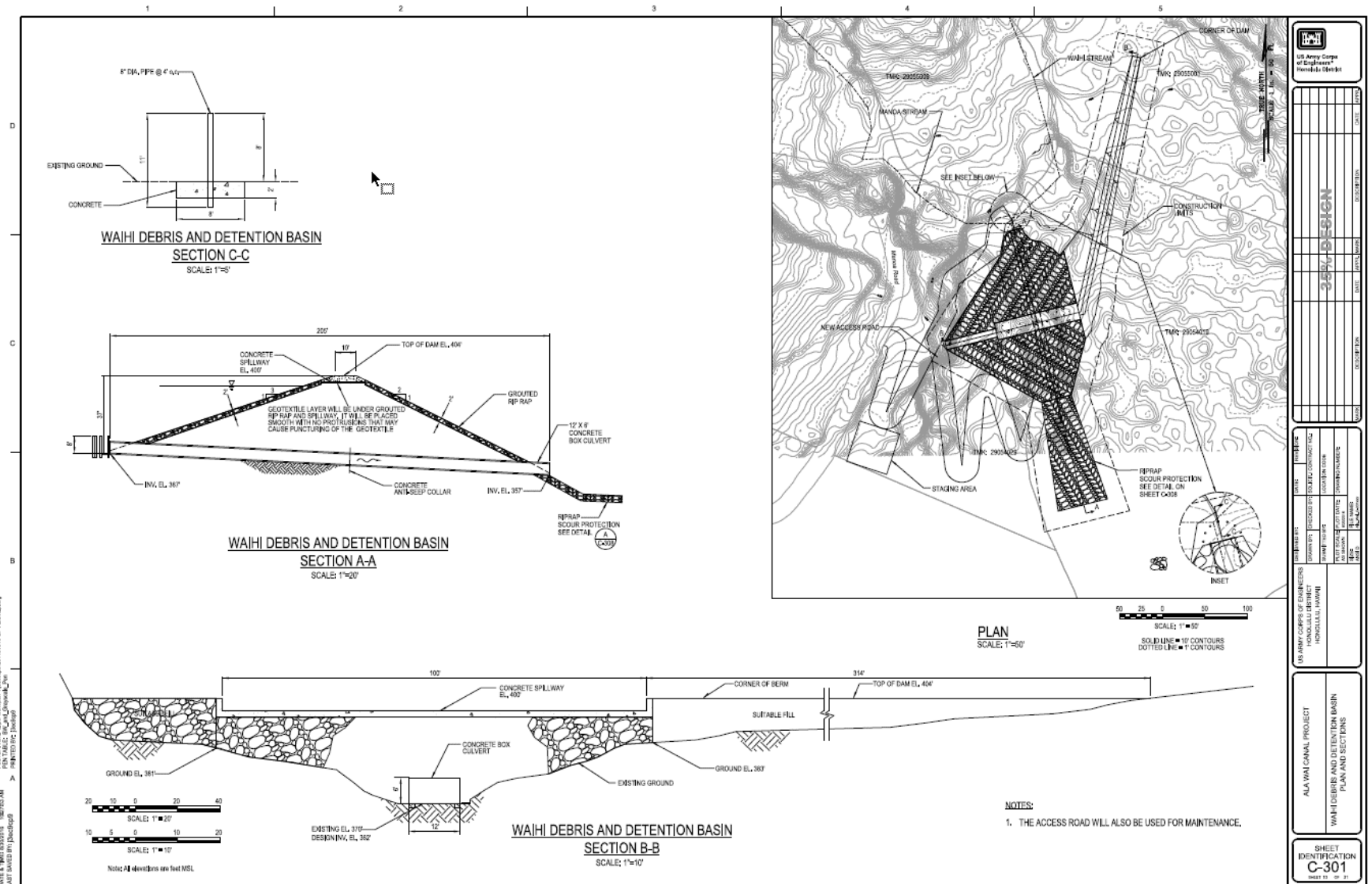
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PROJECT NO.	
SHEET NO.	
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ALA WAI CANAL PROJECT
 WAIAKEKUA DEBRIS AND DETENTION BASIN
 PLAN AND SECTIONS

SHEET IDENTIFICATION
 C-302

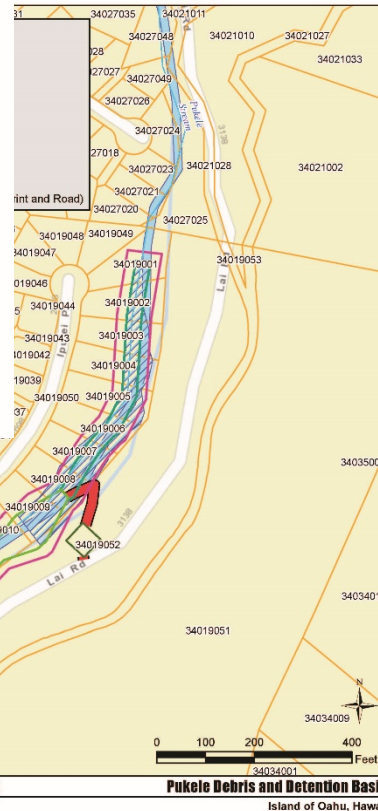
WAIHI DEBRIS AND DETENTION BASIN



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 US Army Corps of Engineers Honolulu District	
304 DESIGN	
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APPROVER	DATE
ALA WAI CANAL PROJECT WAIHI DEBRIS AND DETENTION BASIN PLAN AND SECTIONS	
SHEET IDENTIFICATION C-301 SHEET 13 OF 11	

REAL ESTATE REQUIREMENTS



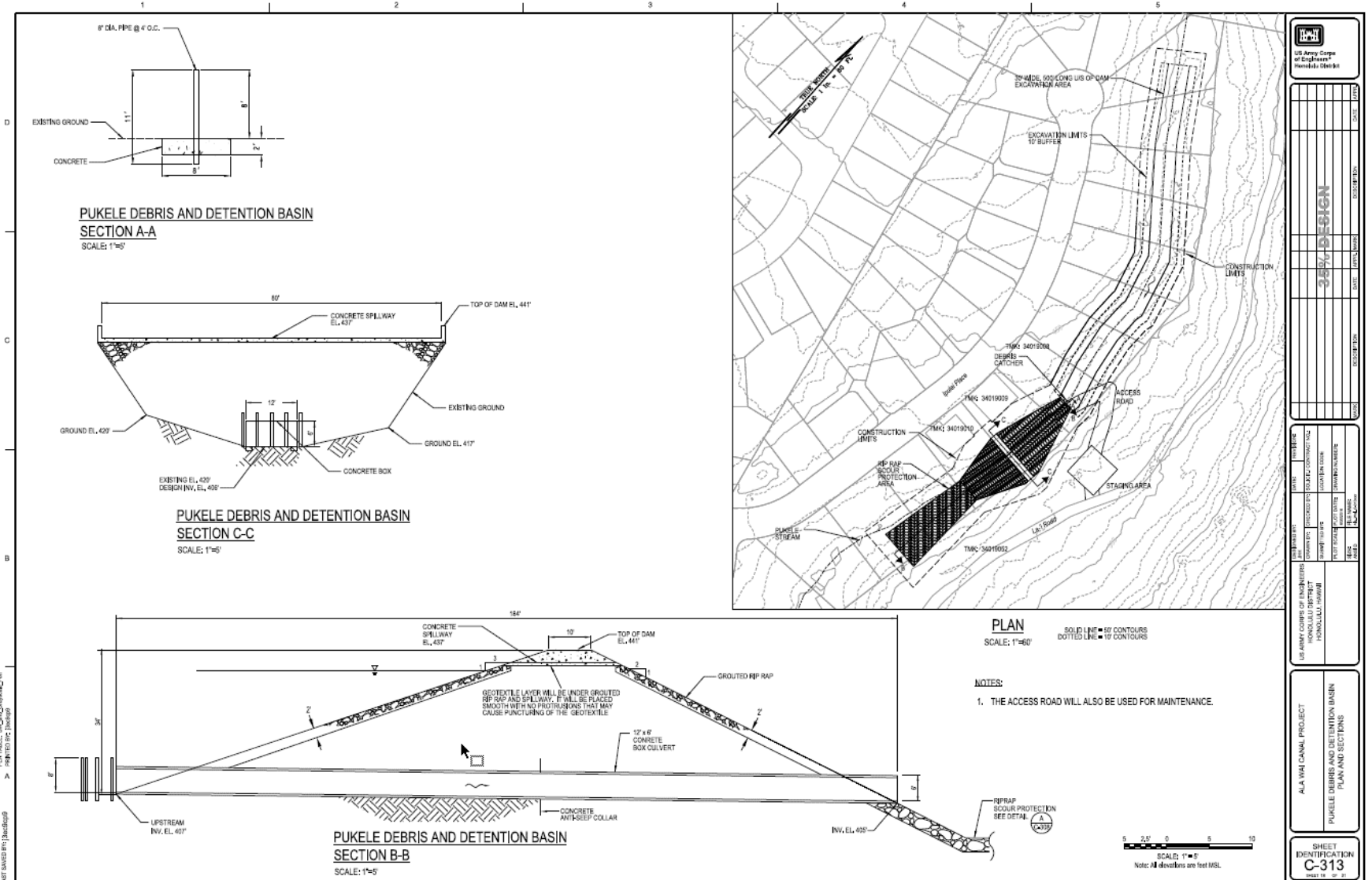
- Feasibility Design completed to 35% level, subject to change
- From current design, 37 private properties affected by the project:
 - 34 properties require some form of permanent acquisition for conveyance
 - 27 properties require temporary acquisition
 - Under conceptual plan: 4 properties proposed to be acquired in fee, 3 contain homes



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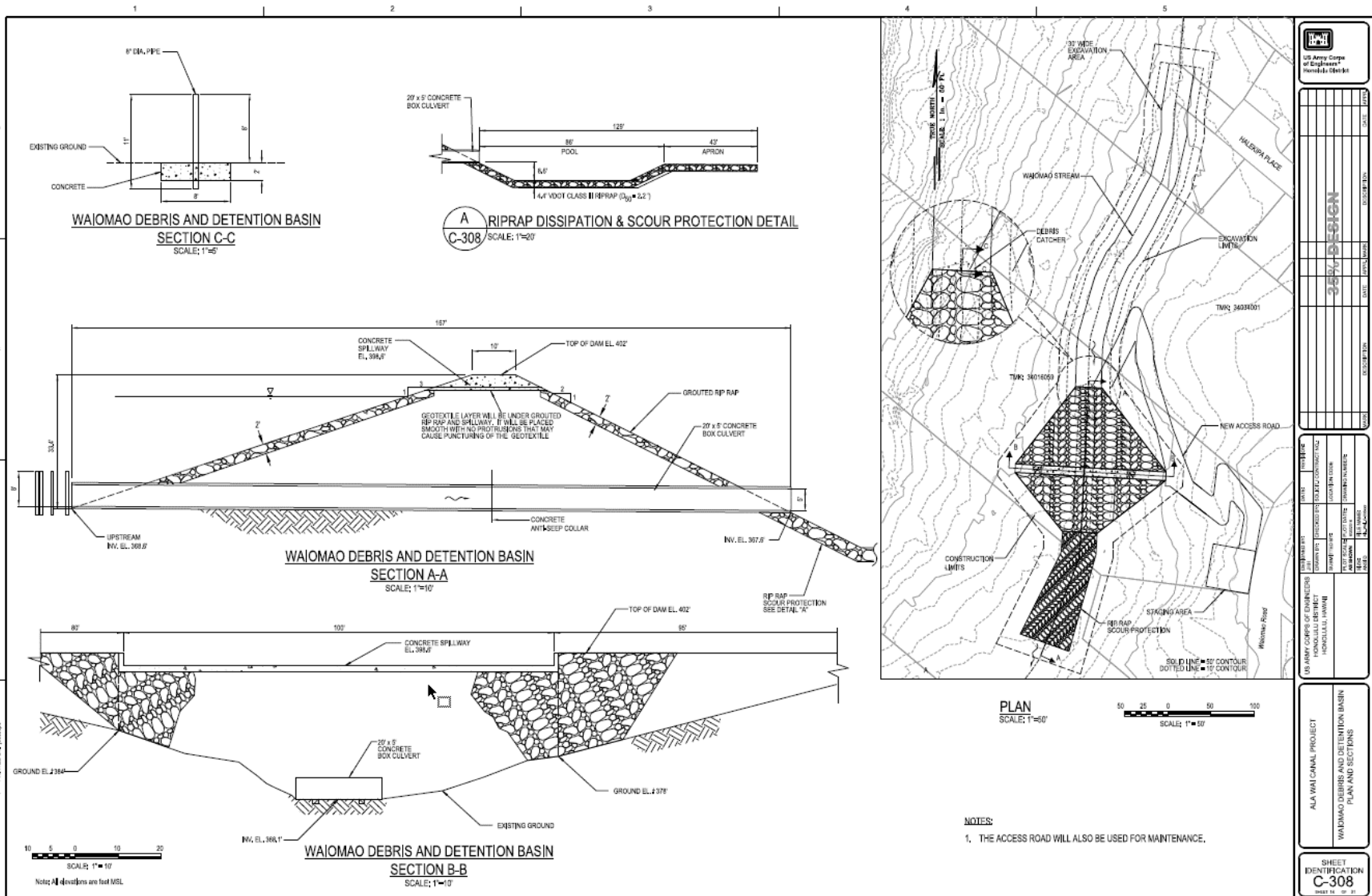


PUKELE DEBRIS AND DETENTION BASIN



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WAIOMAO DEBRIS AND DETENTION BASIN



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 PLOT TIME: 09/19/2024 09:19:14
 PLOT BY: JAY BARRIS

 U.S. Army Corps of Engineers Honolulu District Honolulu Office	
35% DESIGN	
SHEET IDENTIFICATION C-308	DATE: 09/19/2024 DRAWN BY: JAY BARRIS CHECKED BY: JAY BARRIS PROJECT NUMBER: WAIOMAO DEBRIS AND DETENTION BASIN
U.S. ARMY	

RECOMMENDED PLAN FEATURES: DEBRIS AND DETENTION BASINS

- Culverts sized to maintain normal stream flows
- Flood waters detained for <10 hours (1% ACE storm)
- O&M requirements
 - ▶ Vegetation clearing around perimeter of berm
 - ▶ Sediment/debris removal



- Debris catchment incorporated into detention basins in upper watershed
- One stand-alone debris basin near Manoa District Park



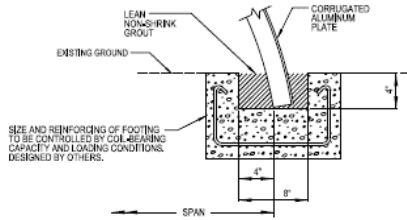
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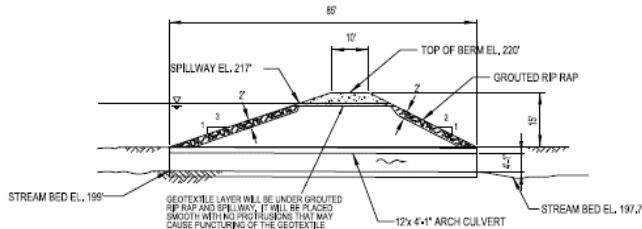
Woodlawn Detention Basin



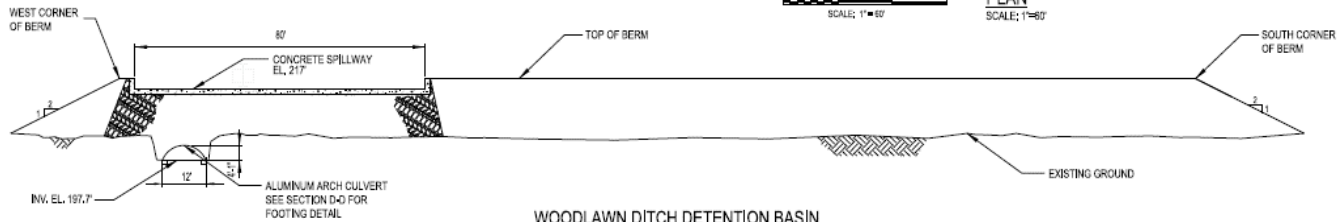
WOODLAWN DETENTION BASIN



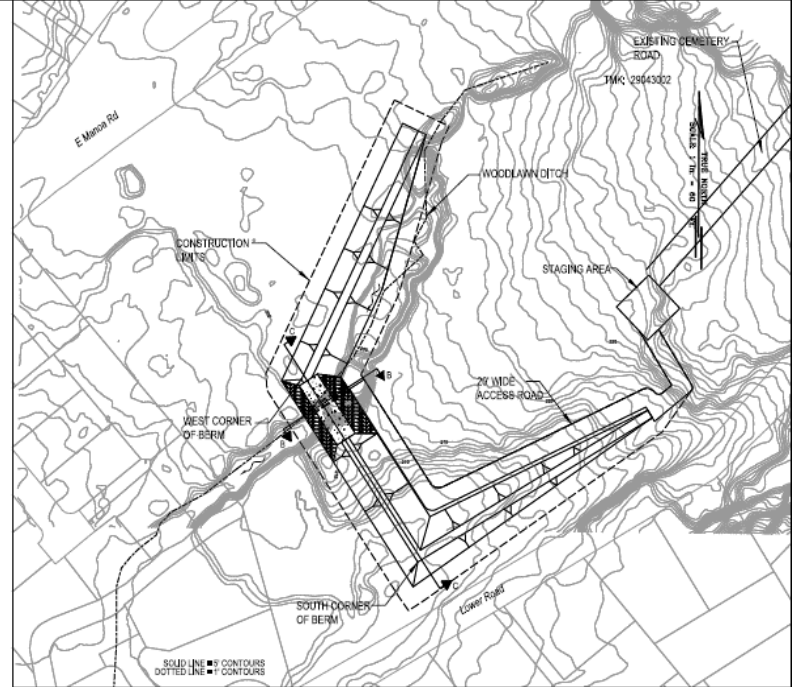
SLOTTED CONCRETE FOOTING
WOODLAWN DITCH DETENTION BASIN
SECTION D-D
SCALE: NTS



WOODLAWN DITCH DETENTION BASIN
SECTION B-B
SCALE: 1"=15'



WOODLAWN DITCH DETENTION BASIN
SECTION C-C
SCALE: 1"=15'



PLAN
SCALE: 1"=60'



Note: All elevations are feet MSL.

NOTES:

1. ALUMINUM ARCH CULVERT METAL THICKNESS IS 1.50", WITH A NATURAL BOTTOM.
2. THE APPROXIMATE AREA UNDER THE ARCH CULVERT IS 35.3 SQ. FT.



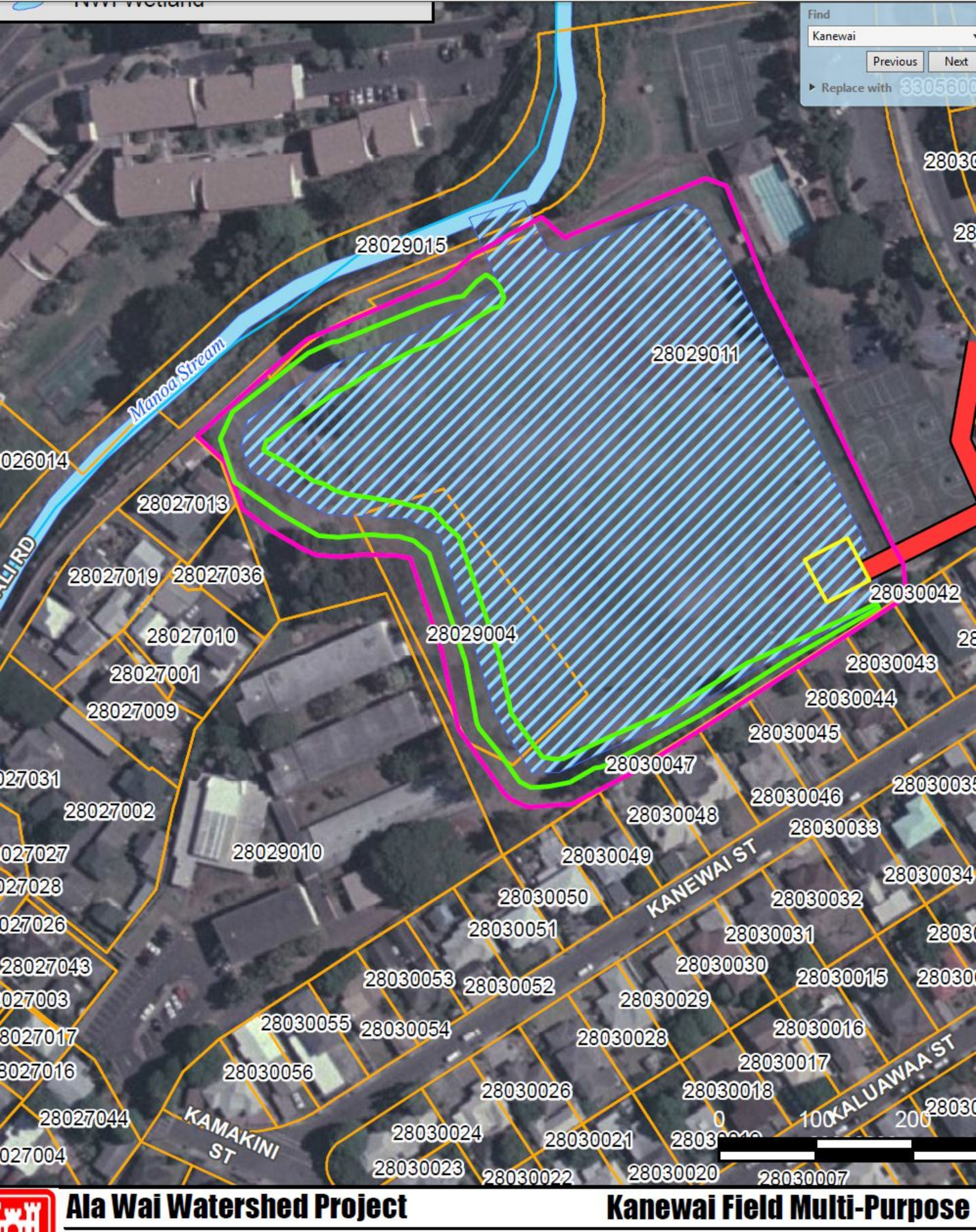
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PROJECT NAME	
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PROJECT SCALE	
PROJECT SHEET NO.	
PROJECT SHEET TOTAL	

ALA WAI CANAL PROJECT
WOODLAWN DITCH
DETENTION BASIN
PLAN AND SECTIONS

SHEET IDENTIFICATION
C-305
OF 31

U.S. ARMY CORPS OF ENGINEERS
 HONOLULU DISTRICT
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 HONOLULU, HI 96860
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 PLOT SHEET TOTAL: 31



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Kanewai
Previous Next
Replace with 3305600

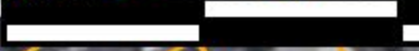
Manoa Stream

ALIRD

KANEWAI ST

KAMAKINI ST

KALUAWAA ST



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Ala Wai Canal Flood Risk Management Study – Sea Level Rise Analysis

Year		LOW (ft)	INTERMEDIATE (ft)	HIGH (ft)
2025	Mean High-High Water	1.08	1.08	1.08
	Inter-annual Variability	0.40	0.40	0.40
	Sea Level Rise	0.16	0.26	0.57
	Starting backwater	1.64	1.74	2.05
2075	Mean High-High Water	1.08	1.08	1.08
	Inter-annual Variability	0.40	0.40	0.40
	Sea Level Rise	0.41	1.02	2.96
	Starting backwater	1.89	2.50	4.44
2125	Mean High-High Water	1.08	1.08	1.08
	Inter-annual Variability	0.40	0.40	0.40
	Sea Level Rise	0.66	2.23	7.21
	Starting backwater	2.14	3.71	8.69

Starting backwater value in HEC-RAS model for specified scenarios



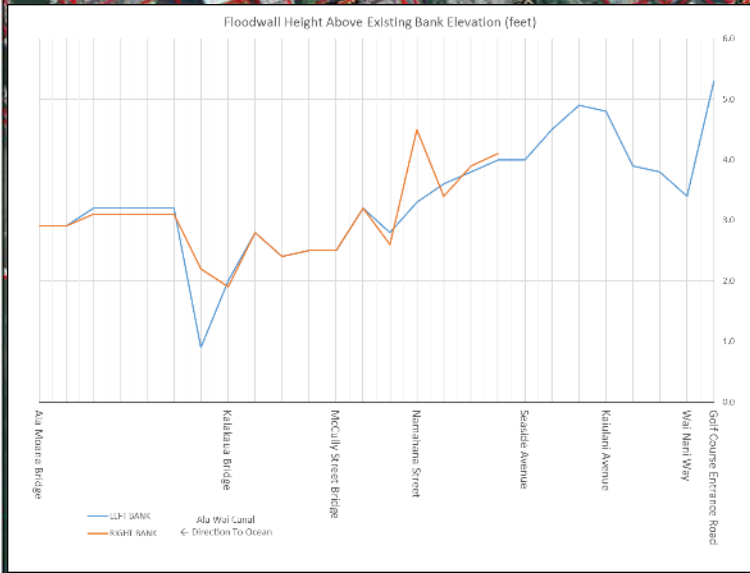
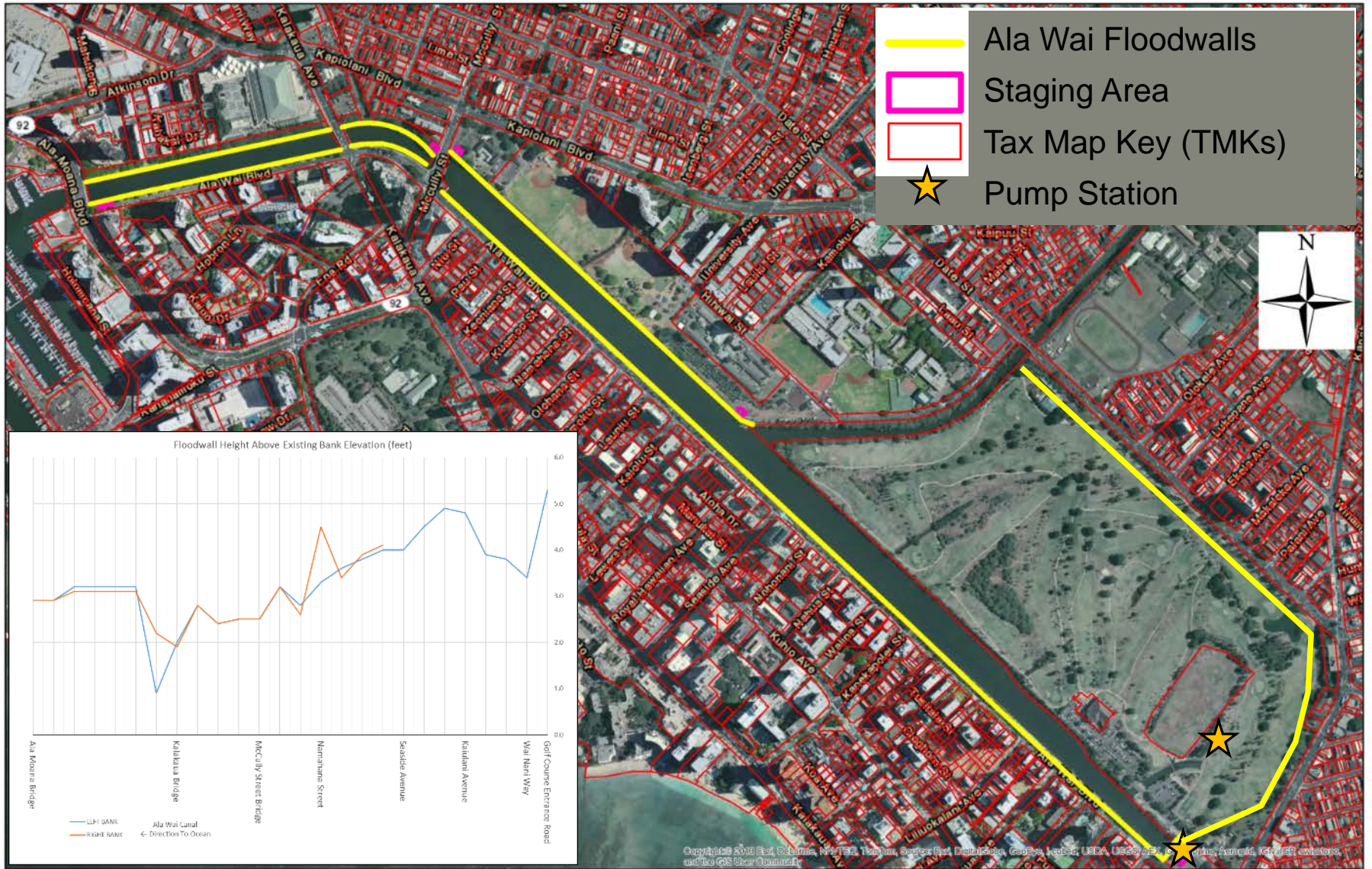
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Canal Walls and Hausten (rock walls)



ALA WAI CANAL FLOODWALLS



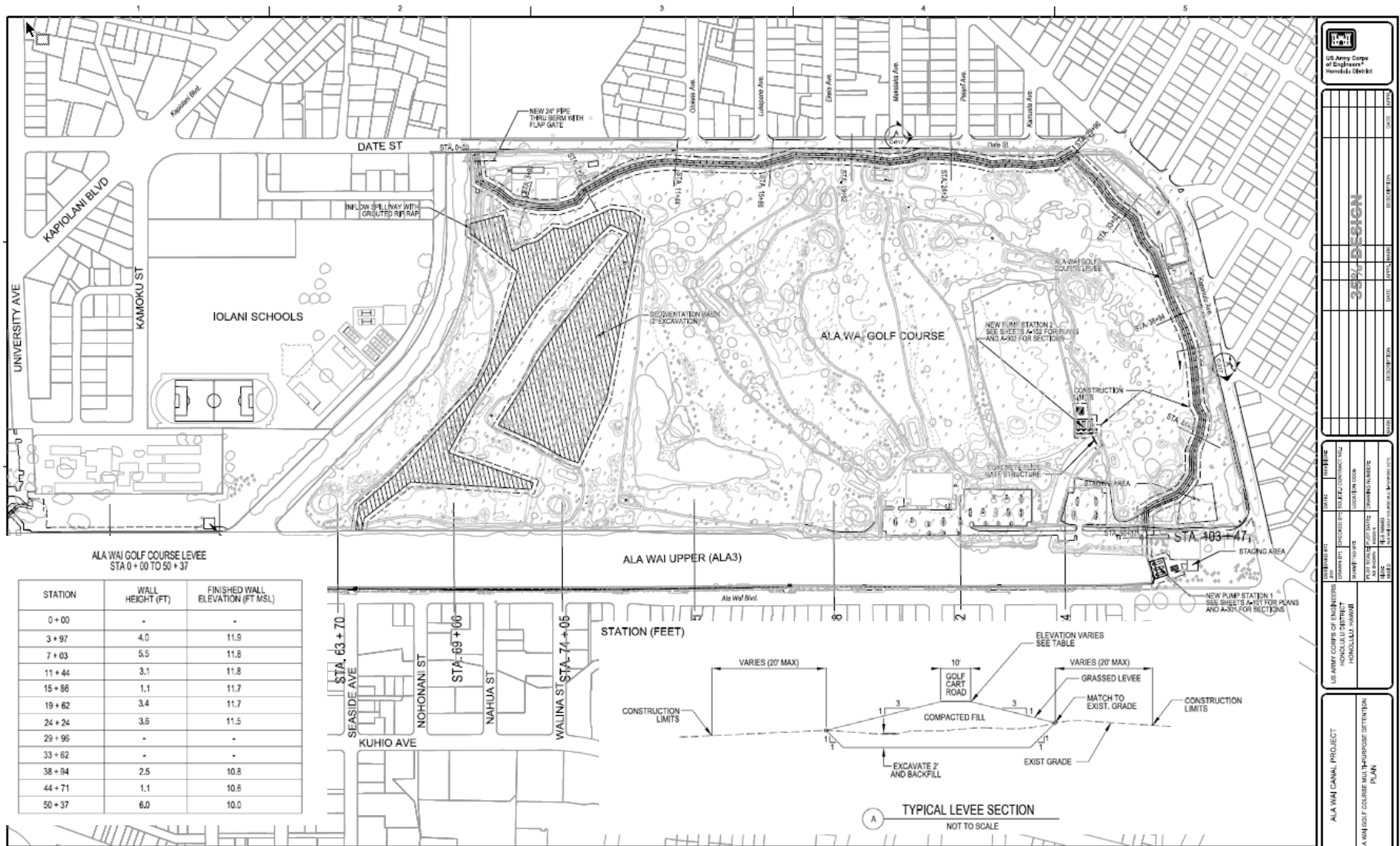
RECOMMENDED PLAN FEATURES: ALA WAI GOLF COURSE & LOWER WATERSHED DETENTION

- Sited in open space areas that currently flood
- Recreational uses to be maintained during non-flood periods
- Golf course levee to be co-located with golf cart path
- O&M Requirements:
 - Vegetation clearing around levees
 - Sediment removal
 - Flood gate and slide/slucice gate maintenance

Entrance to Ala Wai Golf Course Detention



ALA WAI GOLF COURSE DETENTION BASIN



STATION	WALL HEIGHT (FT)	FINISHED WALL ELEVATION (FT MSL)
0 + 00	-	-
3 + 97	4.0	11.9
7 + 03	5.5	11.8
11 + 44	3.1	11.8
15 + 86	1.1	11.7
19 + 62	3.4	11.7
24 + 24	3.6	11.5
29 + 96	-	-
33 + 62	-	-
38 + 94	2.5	10.8
44 + 71	1.1	10.6
50 + 37	6.0	10.0

- NOTES:
1. STAGING AREA WILL HAVE GEOTEXTILE AND 3" OF SURGE MATERIAL.
 2. SEE SHEET C-117 FOR THE ALA WAI GOLF COURSE MULTI-PURPOSE DETENTION, PROFILE AND SECTION.

ALA WAI GOLF COURSE MULTI-PURPOSE DETENTION
PLAN
 SCALE: 1"=200'



US Army Corps of Engineers
Hawaii District

30% DESIGN

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 PROJECT NUMBER: []
 SHEET NUMBER: [] OF []
 SHEET TITLE: []

ALA WAI CANAL PROJECT
 ALA WAI GOLF COURSE MULTI-PURPOSE DETENTION
 PLAN

SHEET IDENTIFICATION
C-103
 (REVISED 11/18/11)

**WEBSITE: [https://www.poh.usace.army.mil/Missions/Civil-Works/Civil-Works-Projects/
Ala-Wai-Flood-Risk-Management-Project/](https://www.poh.usace.army.mil/Missions/Civil-Works/Civil-Works-Projects/Ala-Wai-Flood-Risk-Management-Project/)**

EMAIL: Alawaifloodproject@USACE.army.mil



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