

# LAHAINA BOAT HARBOR IMPROVEMENTS

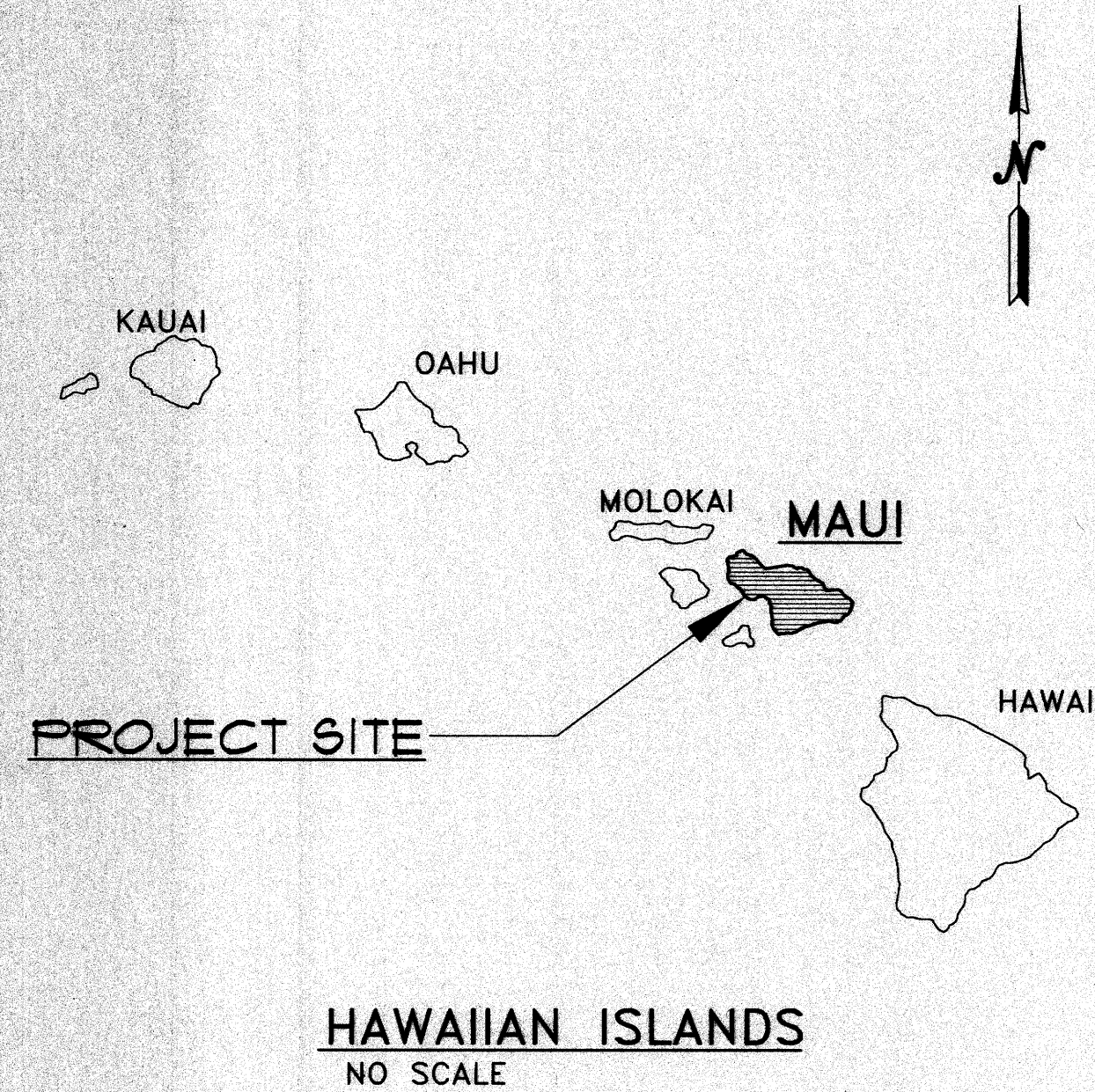
## LAHAINA, MAUI

### STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION

(FOR: DEPARTMENT OF LAND & NATURAL RESOURCES  
DIVISION OF BOATING & OCEAN RECREATION)

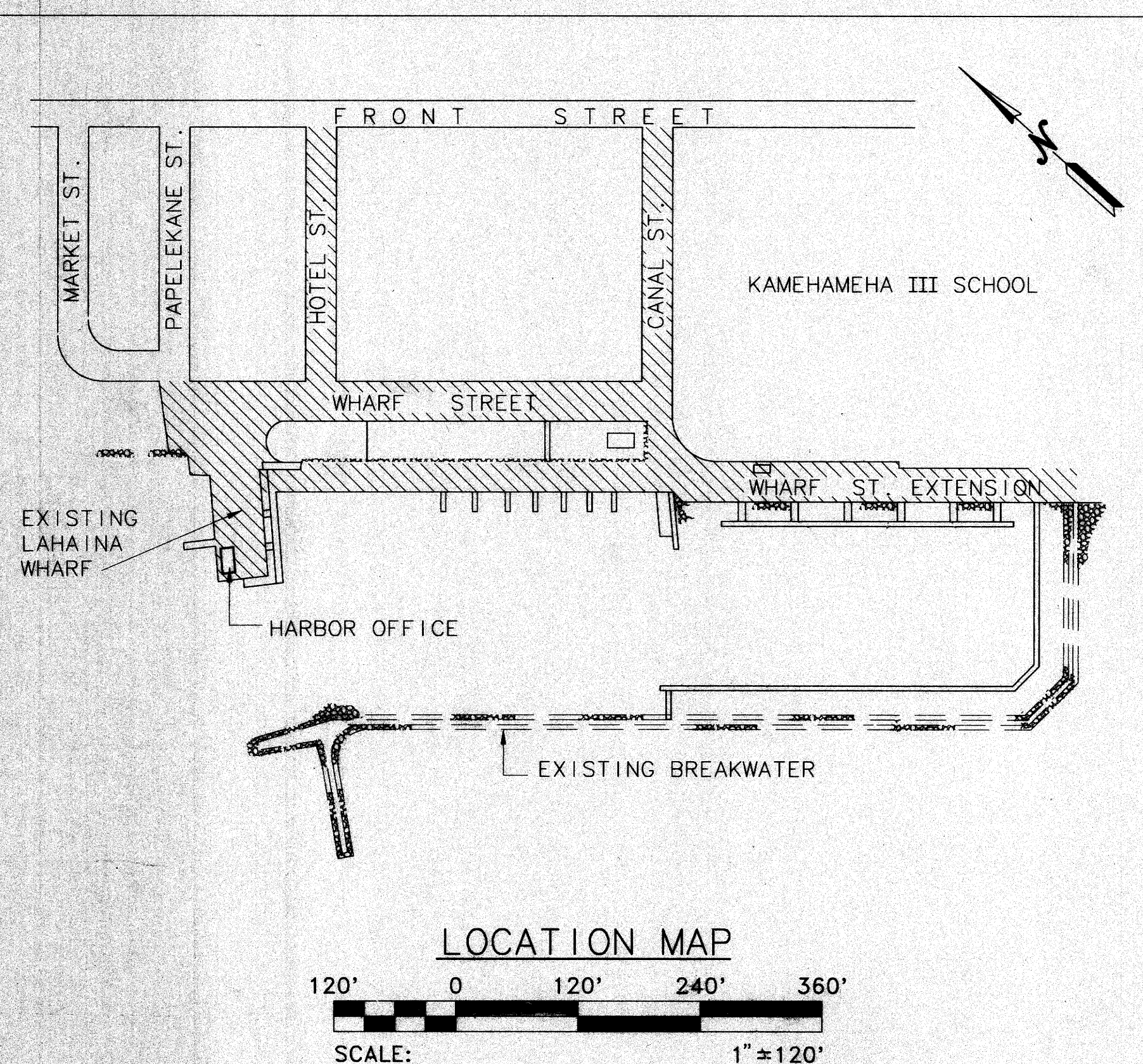
## H. C. 4155

TMK: 4 - 6 - 01



JOB NO. MA24-04  
LAHAINA SMALL BOAT HARBOR WATER SYSTEM LEAK ASSESSMENT AND REPAIR  
LAHAINA, MAUI, HAWAII

NOTE: THESE AS-BUILT PLANS HAVE BEEN MARKED UP TO SHOW THE SCOPE OF WORK FOR WATER SYTEM LEAK ASSESSMENT, PRESSURE TESTING, REPAIR AND NEW WATER SYSTEM WORK.



DWG. NO.	DESCRIPTION
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C-11	DETAILS
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APPROVED:  
*[Signature]*  
DIRECTOR OF PUBLIC WORKS AND WASTE MANAGEMENT  
(Approval for work within County Right-of-way only)  
DATE: 2/2/95

RECOMMEND APPROVAL:  
*[Signature]*  
ADMINISTRATOR, DLNR-BOR  
DATE: 5/18/94

APPROVED:  
*[Signature]*  
DIRECTOR OF WATER SUPPLY  
(APPROVAL LIMITED TO IMPROVEMENTS WHICH WILL BE DEDICATED TO THE DEPARTMENT OF WATER SUPPLY)  
DATE: 5/11/04

APPROVED BY:  
*[Signature]*  
for DIRECTOR OF TRANSPORTATION  
DATE: 5/23/94

DWG. NO.  
C-1

TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS  
LOCATION: LAHAINA, MAUI  
H. C. 4155  
2281E106 04/15/94 03:53 FINAL

**GENERAL NOTES**

1. VERIFY AND CHECK ALL DIMENSIONS AND DETAILS SHOWN ON THESE DRAWINGS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCY SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION.
2. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AND GOVERNMENTAL AGENCIES AND OBTAIN EXCAVATION CLEARANCE A MINIMUM OF 72 HOURS (UNLESS OTHERWISE NOTED ON THESE DRAWINGS) PRIOR TO THE START OF ANY EXCAVATION WORK AND HAVE THEM LOCATE THEIR RESPECTIVE LINES AFFECTED. THE CONTRACTOR SHALL BE HELD RESPONSIBLE AND PAY FOR ALL DAMAGES TO, AND FOR THE MAINTENANCE AND PROTECTION OF, THE EXISTING UTILITIES AND STRUCTURES.
3. THE UNDERGROUND PIPES, CABLES, OR DUCTLINES KNOWN TO EXIST BY THE ENGINEER FROM HIS SEARCH OF RECORDS ARE INDICATED ON THESE DRAWINGS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND DEPTHS OF THE FACILITIES AND EXERCISE PROPER CARE IN EXCAVATING IN THE AREA. WHEREVER CONNECTIONS OF NEW UTILITIES ARE SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL EXPOSE THE EXISTING LINES AT THE PROPOSED CONNECTIONS TO VERIFY THEIR LOCATIONS AND DEPTHS PRIOR TO EXCAVATION FOR THE NEW LINES.
4. THE CONTRACTOR SHALL RESTORE, AT HIS OWN EXPENSE, TO THEIR ORIGINAL CONDITION OR BETTER ALL EXISTING IMPROVEMENTS WHICH ARE DAMAGED AS A RESULT OF HIS WORK.
5. THE CONTRACTOR SHALL OBSERVE AND COMPLY WITH ALL FEDERAL, STATE AND LOCAL LAWS IN DISPOSING OF WATER FROM THE WATER MAIN FOLLOWING TESTING, DISINFECTION, ETC.

**SURVEY NOTES**

1. THESE DRAWINGS ARE BASED ON THE TOPOGRAPHIC SURVEY THAT WAS PERFORMED AND PREPARED BY IMATA & ASSOCIATES, DATED MARCH 13, 1992.
2. BASIS OF AZIMUTHS AS SHOWN ON THESE DRAWINGS ARE BASED ON THE AZIMUTH BETWEEN AN EXISTING NAIL AND SPIKE AS SHOWN ON DRAWING NO. C-4.
3. ELEVATIONS SHOWN ON THESE DRAWINGS ARE BASED ON MEAN LOW WATER AND BENCH MARK IS SHOWN ON DRAWING NO. C-4.

**CONSTRUCTION NOTES WITHIN COUNTY RIGHT-OF-WAY**

1. CONTRACTOR SHALL OBTAIN A PERMIT TO PERFORM WORK ON COUNTY HIGHWAYS FROM DIVISION OF LAND USE & CODES ADMINISTRATION TWO WEEKS PRIOR TO THE COMMENCEMENT OF WORK.
2. STANDARD DETAIL DRAWINGS AND STANDARD SPECIFICATIONS OF THE DEPARTMENT OF PUBLIC WORKS SHALL BE INCLUDED AS PART OF THE CONSTRUCTION PLANS.
3. ALL CONSTRUCTION WORK SHALL STRICTLY CONFORM TO THE APPLICABLE SECTIONS OF THE SEPTEMBER 1986 "STANDARD SPECIFICATIONS", THE SEPTEMBER 1984 "STANDARD DETAILS" FOR PUBLIC WORKS CONSTRUCTION OF THE DEPARTMENT OF PUBLIC WORKS, AND THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES.
4. IF EXISTING UTILITIES, WHETHER OR NOT SHOWN ON PLANS, ARE DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL AT HIS OWN EXPENSE BE REQUIRED TO REPAIR SUCH UTILITIES.
5. CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY AND CONVENIENCE OF THE PUBLIC, ACCORDING TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE FOR STREETS AND HIGHWAYS", 1988, AND TO THE RULES AND REGULATIONS GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORKSITES AND/OR ADJACENT TO PUBLIC STREETS AND HIGHWAYS ADOPTED BY THE HIGHWAY SAFETY COORDINATOR AND THE U.S. FEDERAL HIGHWAY ADMINISTRATION "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS" DATED 1980.
6. THE DIRECTOR OF PUBLIC WORKS AND/OR THE DIRECTOR OF THE DEPARTMENT OF WATER SUPPLY HAS THE RIGHT TO STOP CONSTRUCTION SHOULD ANY WORK BE FOUND CONTRARY TO THE APPROVED CONSTRUCTION PLAN OR DETRIMENTAL TO THE PUBLIC'S INTEREST.
7. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE LAND USE & CODES ADMINISTRATION FIVE (5) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
8. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH AND COUNTY GRADING ORDINANCE.
9. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COST INCURRED FOR ANY NECESSARY REMEDIAL ACTION ORDERED BY THE DIRECTOR OF PUBLIC WORKS SHALL BE PAID BY THE CONTRACTOR.
10. CONSTRUCTION DEBRIS AND WASTES SHALL BE DEPOSITED AT AN APPROPRIATE WORK SITE. THE CONTRACTOR SHALL INFORM THE DIRECTOR OF PUBLIC WORKS OF THE LOCATION OF THE DISPOSAL SITES. THE DISPOSAL SITE MUST FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.
11. THE CONTRACTOR SHALL SUBMIT A MICROFILM COPY AND SIX (6) COPIES OF THE "AS-BUILT" DRAWINGS PRIOR TO THE FINAL APPROVAL OF THE IMPROVEMENTS.
12. IF THE CLEARANCE BETWEEN A WASTEWATER LINE AND A NEW OR EXISTING WATERLINE IS EIGHTEEN INCHES (18") OR LESS, THE WASTEWATER LINE SHALL BE CONCRETE-JACKETED IN ACCORDANCE WITH THE STANDARD DETAILS OF PUBLIC WORKS CONSTRUCTION DATED SEPTEMBER 1984.
13. TESTING OF MATERIALS SHALL BE CONDUCTED BY AN APPROVED INDEPENDENT TESTING AGENCY IN ACCORDANCE WITH ASTM STANDARD METHODS OR AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, AS FOLLOWS:
  - A. EMBANKMENT/SELECT BORROW AND SUBGRADE MATERIALS: ONE (1) COMPACTION TEST PER 600 SQUARE YARDS;
  - B. AGGREGATE SUBBASE COURSE: ONE (1) COMPACTION TEST PER 400 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER PROJECT;
  - C. AGGREGATE BASE COURSE: ONE (1) COMPACTION TEST PER 300 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER PROJECT;
  - D. ASPHALT CONCRETE PAVEMENT OR ASPHALT TREATED BASE COURSE: THREE (3) A.C. CORES FOR THICKNESS AND DENSITY TESTS PER PROJECT;
  - E. TRENCH BACKFILL MATERIAL: ONE (1) TEST FOR EACH 300 LINEAL FEET OF TRENCH PER LIFT OF MATERIAL.

CONTRACTOR SHALL SUBMIT ALL TESTING REPORTS INCLUDING RESULTS TO THE COUNTY'S INSPECTION AGENCY FOR REVIEW AND APPROVAL PRIOR TO COUNTY'S ACCEPTANCE OF WORK.

**WATER SYSTEM**

1. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF WATER SUPPLY (DWS), IN WRITING, ONE (1) WEEK PRIOR TO COMMENCEMENT OF WORK.
2. ALL MATERIALS USED AND METHOD OF CONSTRUCTION OF WATER SYSTEM FACILITIES SHALL BE IN ACCORDANCE WITH THE LATEST REVISIONS OF DWS STANDARDS. CONTRACTOR SHALL OBTAIN THE LATEST REVISIONS OF THE DWS STANDARD DETAILS BEFORE COMMENCING CONSTRUCTION.
3. THE EXACT DEPTH AND LOCATION OF EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES ARE NOT KNOWN. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE SAME PRIOR TO TRENCHING FOR THE NEW WATERLINE. THE COST OF LOWERING, RELOCATING OR ADJUSTING EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE NEW WATERLINE, UNLESS NOTED OTHERWISE, AND WILL NOT BE PAID FOR SEPARATELY.
4. CONCRETE FOR REACTION BLOCKS AND ANCHOR BLOCKS SHALL BE DWS CLASS 2500.
5. THE MAXIMUM DISTANCE BETWEEN VALVE NUT AND TOP OF MANHOLE COVER SHALL BE THREE (3) FEET.
6. THE CONTRACTOR SHALL SUBMIT A MATERIALS LIST TO DWS FOR APPROVAL PRIOR TO CONSTRUCTION.
7. CONNECTION TO DWS SYSTEM:
  - A. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, DEPTH, TYPE, AND CONDITION OF THE EXISTING LINE BEFORE ORDERING MATERIALS FOR THE HOOK-UP. HE SHALL, HOWEVER, CHECK WITH DWS BEFORE EXCAVATING FOR VERIFICATION PURPOSES. HE SHALL BE RESPONSIBLE FOR FURNISHING ALL NECESSARY FITTINGS AND OTHER MATERIALS REQUIRED FOR THE HOOK-UP.
  - B. WHENEVER FEASIBLE, MECHANICAL JOINT FITTINGS SHALL BE USED.
  - C. AUTHORIZED DWS PERSONNEL WILL MAKE THE FINAL CONNECTION TO THE EXISTING LINE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COST INCURRED BY DWS FOR SAID WORK, INCLUDING THE COST OF PRESSURE TESTING.
  - D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR FOR CHLORINATION, TRENCH EXCAVATION, BACKFILLING, PAVING, AND OTHER WORK NECESSARY TO COMPLETE THE HOOK-UP, AS DIRECTED BY AND TO THE SATISFACTION OF DWS.
8. THE DEVELOPER SHALL SUBMIT A COST LIST ALONG WITH AN AFFIDAVIT FOR THE WATER SYSTEM PRIOR TO ACCEPTANCE.
9. THE CONTRACTOR SHALL SUBMIT TWO (2) SETS OF RECORD DRAWINGS VIA A CONSULTANT PRIOR TO ACCEPTANCE OF THE WATER SYSTEM.
10. MINIMUM COVER OVER WATER MAIN, 6" DIAMETER OR LARGER, SHALL BE 3'-0". MINIMUM COVER FOR 4" DIAMETER SHALL BE 2'-6". MINIMUM COVER FOR DIAMETERS LESS THAN 4" SHALL BE 1'-6".
11. THE CONTRACTOR SHALL PAINT AND NUMBER THE FIRE HYDRANT. NUMBERING TO BE FURNISHED BY THE DWS.
12. ALL BURIED METALS SHALL BE WRAPPED WITH POLY-WRAP. FOR DUCTILE IRON PIPE INSTALLATION, POLY-WRAP SHALL BE REQUIRED.
13. ALL NUTS AND BOLTS SHALL BE PAINTED WITH ASPHALTIC PAINT.
14. LUBRICATE HYDRANT NOZZLE THREADS WITH NON-TOXIC GREASE.
15. SALVAGED ITEMS SHALL BE DELIVERED TO THE DWS BASEYARD.

**CHLORINATION OF WATER SYSTEMS**

1. LIQUID CHLORINE OR CALCIUM HYPOCHLORITE, CONFORMING TO AWWA STANDARDS SHALL BE USED FOR THE CHLORINATION OF THE PROJECT.
2. PRIOR TO CHLORINATION, THE PROJECT SHALL BE THOROUGHLY FLUSHED.
3. THE INTERIOR SURFACES OF THE PROJECT SHALL BE EXPOSED TO THE CHLORINATING SOLUTION FOR A MINIMUM OF 24 HOURS AND THE CHLORINE RESIDUAL SHALL NOT BE LESS THAN 10 PPM AFTER SUCH TIME.
4. SHOULD CALCIUM HYPOCHLORITE BE USED, NO SOLID AND/OR UNDISSOLVED PORTION OF THE COMPOUND SHALL BE INTRODUCED INTO ANY SECTION OF THE PROJECT TO BE CHLORINATED.
5. AT THE END OF THE 24 HOUR DISINFECTION PERIOD, REPRESENTATIVE SAMPLES SHALL BE TAKEN AND ANALYZED TO ASSURE A CHLORINE RESIDUAL OF AT LEAST 10 PPM.
6. SHOULD THE RESULTS INDICATE ADEQUATE CHLORINATION, THE PROJECT SHALL BE THOROUGHLY FLUSHED AND FILLED WITH WATER FROM THE EXISTING SYSTEM AND AGAIN TESTED FOR CHLORINE RESIDUAL. THE FLUSHING SHALL BE CONSIDERED ADEQUATE IF THE TEST RESULTS INDICATE THAT THE WATER IN THE PROJECT HAS A COMPARABLE CHLORINE RESIDUAL AS THE WATER IN THE EXISTING SYSTEM.
7. FOLLOWING THE ACCEPTABLE FLUSHING OF THE PROJECT, TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES, TAKEN AT LEAST 24 HOURS APART, FROM REPRESENTATIVE POINTS IN THE PROJECT SHALL BE TAKEN AND SUBJECTED TO MICROBIOLOGICAL TESTS. AT LEAST ONE SET OF SAMPLES SHALL BE COLLECTED FROM EVERY 1,200 FEET OF THE NEW WATER MAIN, PLUS ONE FROM THE END OF THE LINE AND AT LEAST ONE SET FROM EACH BRANCH. POSITIVE RESULTS WILL NOT BE ACCEPTABLE AND THE PROCESS WILL BE REPEATED.
8. ANALYSIS FOR RESIDUAL CHLORINE SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, 18TH EDITION.
9. MICROBIOLOGICAL TESTS SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, 18TH EDITION.
10. ALL MEASUREMENTS FOR CHLORINE RESIDUAL AND MICROBIOLOGICAL TESTS SHALL BE PERFORMED BY A LABORATORY APPROVED BY THE DIRECTOR.
11. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ALL OF THE FOREGOING.

**DWS STANDARD DETAILS**

NO.	DESCRIPTION
18R	SLIDING VALVE BOX ASSEMBLY
27R	HYDRANT CONNECTION - STRAIGHT RUN
31R	HYDRANT CURB GUARD
45R	1 1/2" METER MANHOLE (STANDARD)
63M	DETECTOR CHECK METER DETAIL
67M	10" DOUBLE-CHECK DETECTOR ASSEMBLY
85R	SINGLE SERVICE LATERAL (TYPE C 1 1/2" METER)
105	CONCRETE BLOCK (MINIMUM BEARING AREAS)
126	BACKFLOW PREVENTER - TYPICAL INSTALLATION

JOB NO. MA24-04  
LAHAINA SMALL BOAT HARBOR WATER SYSTEM LEAK ASSESSMENT AND REPAIR  
LAHAINA, MAUI, HAWAII

NOTE: THESE NOTES SHALL APPLY TO THE SCOPE OF WORK FOR JOB NO. MA24-04.

APPROVED BY  
*[Signature]*  
DEPUTY DIRECTOR FOR HARBORS

	ENGINEERS ARCHITECTS PLANNERS	E 5/04/94 FINAL DESIGN	JCL
	REVISION DATE DESCRIPTION BY APPROVED		
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION			
JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI			
SHEET TITLE: FIRE PROTECTION WATER MAIN CONSTRUCTION NOTES			
SUBMITTED BY: <i>[Signature]</i>		RECOMMENDED BY: <i>[Signature]</i> ASSISTANT CHIEF FOR ENGINEERING	
DESIGNED BY: AML		DRAWN BY: AML	
CHECKED BY: JCL		DATE: 05/04/94	
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.		DWS NO. C-2	
SCALE: NTS		H.C. 4155	
		2 OF 12 SHEETS	

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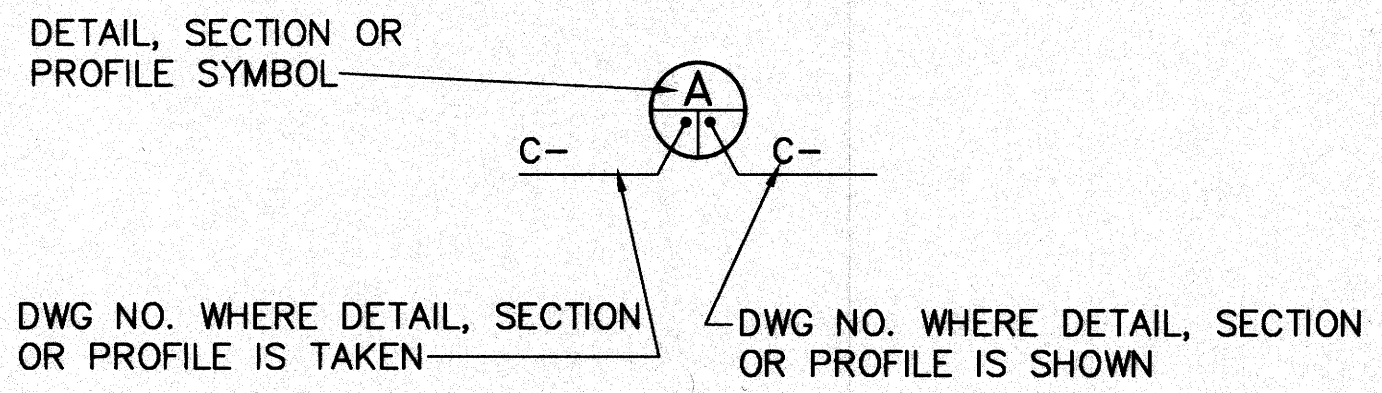
# ABBREVIATIONS

<b>A</b>	AC A.C. AWWA &	ASPHALTIC CONCRETE ASBESTOS CEMENT AMERICAN WATER WORKS ASSOCIATION AND
<b>B</b>	BLK(S) BLDG	BLOCK(S) BUILDING
<b>C</b>	☉ CLR CONC. CONN CONT	CENTERLINE CLEAR CONCRETE CONNECT CONTINUATION
<b>D</b>	DEFL. DET. DIA., ∅ DWG. DWS	DEFLECTION DETAIL DIAMETER DRAWING COUNTY OF MAUI DEPARTMENT OF WATER SUPPLY
<b>E</b>	E ELEC. ELEV., EL. EXIST. EW EXTN.	EAST ELECTRICAL ELEVATION EXISTING EXISTING WATER LINE EXTENSION
<b>F</b>	FF FG FH FM	FINISHED FLOOR FINISHED GRADE FIRE HYDRANT FORCED MAIN (SEWER)
<b>G</b>	GV GP	GATE VALVE GUARD POST
<b>H</b>	HT HORIZ	HEIGHT HORIZONTAL
<b>I</b>	INV.	INVERT
<b>L</b>	LT LF	LEFT LINEAR FOOT
<b>M</b>	MH MIN.	MANHOLE MINIMUM
<b>N</b>	N NTS NO., #	NORTH NOT TO SCALE NUMBER
<b>O</b>	O.D.	OUTSIDE DIAMETER
<b>P</b>	PPM PVMT PVC PCC PSI #	PARTS PER MILLION PAVEMENT POLYVINYL CHLORIDE PORTLAND CEMENT CONCRETE POUNDS PER SQUARE INCH POUND(S)

<b>S</b>	S SHT(S). SVB STD. STA.	SANITARY SEWER SHEET(S) SLIDING VALVE BOX STANDARD STATION
<b>T</b>	TYP	TYPICAL
<b>V</b>	VB VIF VERT.	VALVE BOX VERIFY IN FIELD VERTICAL
<b>W</b>	W WM WP W/	WATER LINE WATER METER WORK POINT WITH

# LEGEND

EXISTING	NEW	DESCRIPTION
		STRUCTURE
		PORTLAND CEMENT CONCRETE
		UNDERGROUND UTILITY LINE
		GATE VALVE WITH SLIDING VALVE BOX
		ASPHALTIC CONCRETE PAVEMENT
		FIRE HYDRANT
		TREE



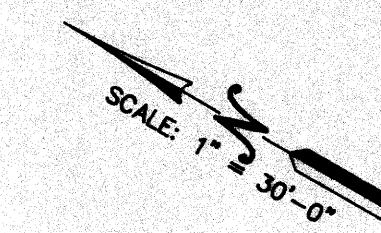
## DETAIL, SECTION & PROFILE IDENTIFICATION

 ENGINEERS ARCHITECTS PLANNERS	REVISION: E DATE: 5/04/94 DESCRIPTION: FINAL DESIGN BY: JCL APPROVED:
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION
REGISTERED PROFESSIONAL ENGINEER No. 3629-C HAWAII, U.S.A.	JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI SHEET TITLE: FIRE PROTECTION WATER MAIN ABBREVIATIONS AND LEGEND SUBMITTED BY: [Signature] RECOMMENDED BY: [Signature] ASSISTANT CHIEF FOR ENGINEERING
DESIGNED BY: AML DRAWN BY: B5 CHECKED BY: JCL DATE: 05/04/94 SCALE: NONE	RECOMMENDED BY: [Signature] CHIEF, HARBORS DIVISION JOB NUMBER: H.C. 4155 DWG. NO. C-3 3 of 12 SHTS
APPROVED BY: [Signature] DEPUTY DIRECTOR FOR HARBORS	THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. Signature: Jimmy C. Lagravan Date: 5/1/94

2281E330 05/04/94 16:12 FINAL

**NOTE:**

1. PORTION OF WORK FOR THE COUNTY OF MAUI DEPARTMENT OF WATER SUPPLY INCLUDES INSTALLATION OF WATERLINES ALONG HOTEL, CANAL & WHARF STREETS INCLUSIVE OF 6-INCH LATERALS & FIRE HYDRANTS, 2-INCH & 2½-INCH WATERLINES UP TO THE WATER METERS AND DOUBLE CHECK DETECTORS WITH MANHOLES (SEE ITEMS 2 TO 5 OF THE PROPOSAL SCHEDULE).

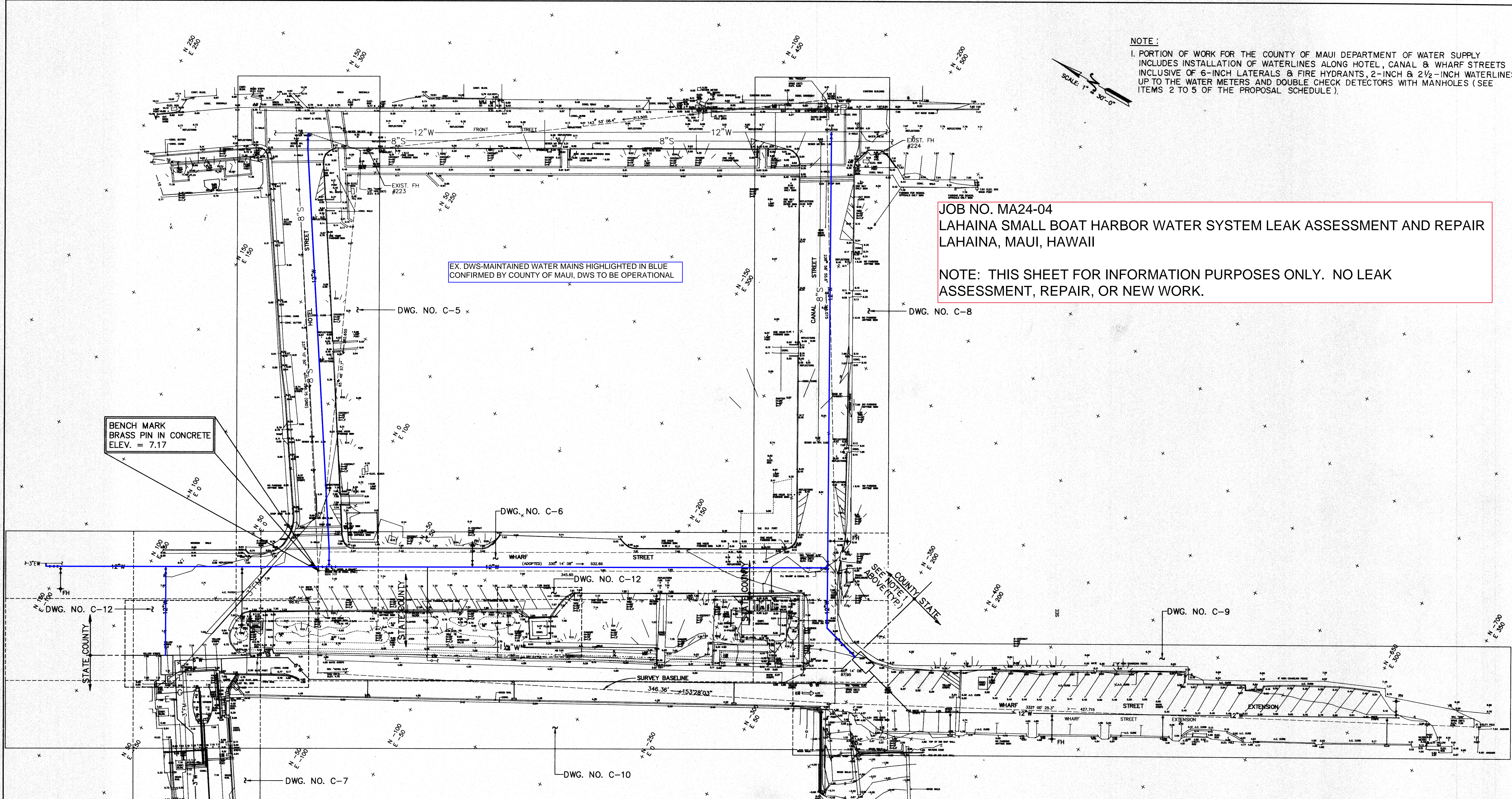


**JOB NO. MA24-04**  
**LAHAINA SMALL BOAT HARBOR WATER SYSTEM LEAK ASSESSMENT AND REPAIR**  
**LAHAINA, MAUI, HAWAII**

**NOTE: THIS SHEET FOR INFORMATION PURPOSES ONLY. NO LEAK ASSESSMENT, REPAIR, OR NEW WORK.**

EX. DWS-MAINTAINED WATER MAINS HIGHLIGHTED IN BLUE  
 CONFIRMED BY COUNTY OF MAUI, DWS TO BE OPERATIONAL

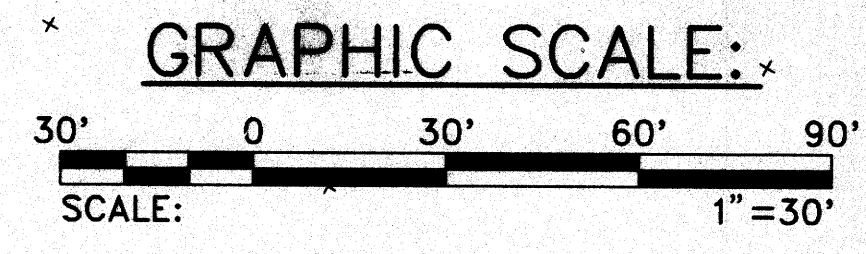
BENCH MARK  
 BRASS PIN IN CONCRETE  
 ELEV. = 7.17



APPROVED BY  
  
 DIRECTOR FOR HARBORS

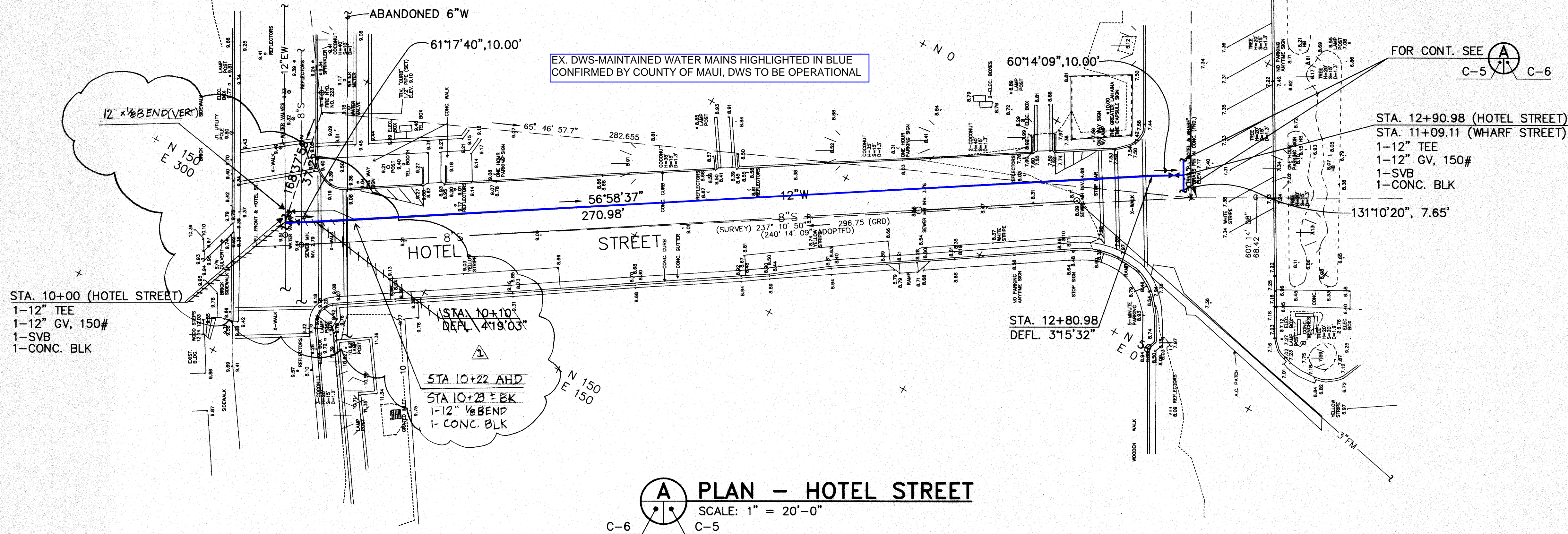
**SURVEY NOTES:**

1. THIS MAP IS FROM A SURVEY DONE ON JAN. 31, TO FEB. 4, 1992.
2. ORIGIN OF ELEVATIONS AND AZIMUTHS FROM D.O.T., HARBORS DIVISION FIELD BOOK, NO NUMBER, ENTITLED "LAHAINA HARBOR, LAHAINA CHANNEL, MALA CHANNEL. ELEVATIONS REFERRED TO MEAN LOWER LOW WATER (M.L.L.W.)"
3. UNDERGROUND UTILITIES SHOWN ARE FOR INFORMATION ONLY. NO GUARANTEE IS MADE ON THE ACCURACY OR COMPLETENESS OF SAID INFORMATION.



 ENGINEERS ARCHITECTS PLANNERS	E 5/04/94 FINAL DESIGN JCL
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION
REGISTERED PROFESSIONAL ENGINEER No. 3629-C HAWAII, U.S.A.	JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI
DESIGNED BY: AML DRAWN BY: AML CHECKED BY: JCL DATE: 05/04/94 SCALE: 1"=30'	SHEET TITLE: FIRE PROTECTION WATER MAIN GENERAL SITE PLAN
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. 	SUBMITTED BY: RECOMMENDED BY: ASSISTANT CHIEF FOR ENGINEERING
DWG. NO. C-4 4 of 12 SPTS.	H.C. 4155

AS BUILT DRAWING



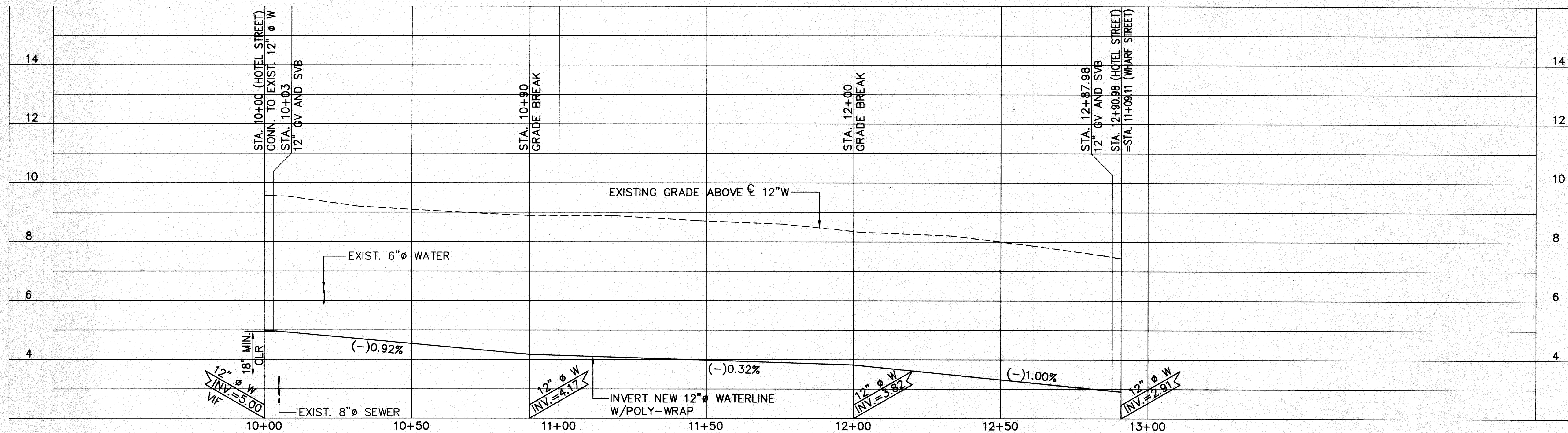
FOR CONT. SEE C-5 C-6

STA. 12+90.98 (HOTEL STREET)  
 STA. 11+09.11 (WHARF STREET)  
 1-12" TEE  
 1-12" GV, 150#  
 1-SVB  
 1-CONC. BLK

131'10"20", 7.65'

NOTES:  
 1. CROSSING EXISTING UTILITIES:  
 CONTRACTOR SHALL MAINTAIN 6" VERTICAL CLEARANCE BETWEEN O.D. OF EXISTING UTILITIES; 18" VERTICAL CLEARANCE BETWEEN O.D. FOR SANITARY SEWER ONLY (TYPICAL FOR ALL PLAN & PROFILE DRAWINGS).

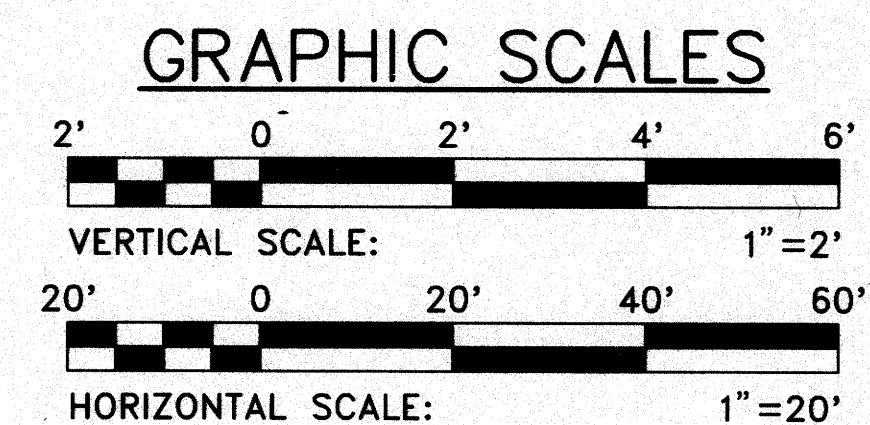
**A PLAN - HOTEL STREET**  
 SCALE: 1" = 20'-0"



**PROFILE - HOTEL STREET**  
 SCALES: HORIZ: 1" = 20', VERT: 1" = 2'

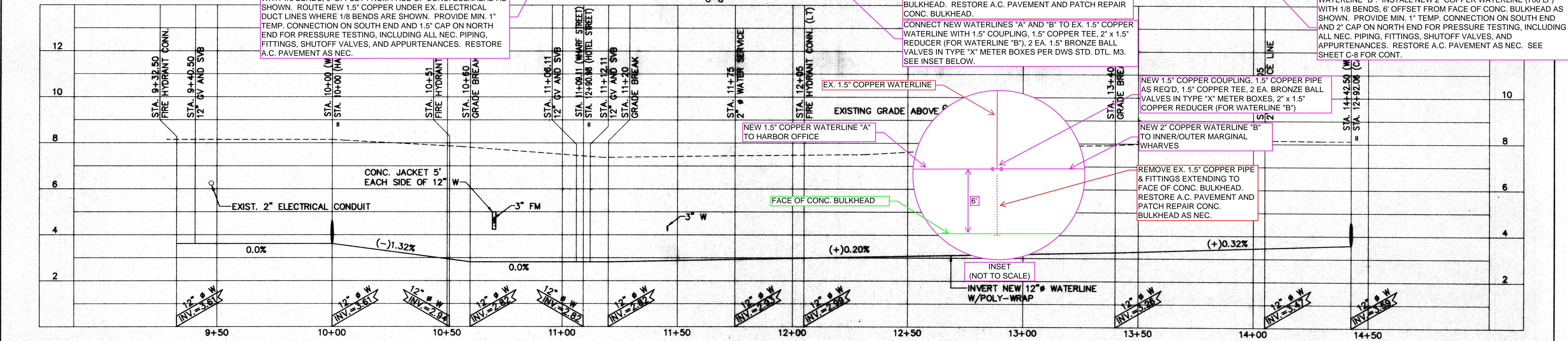
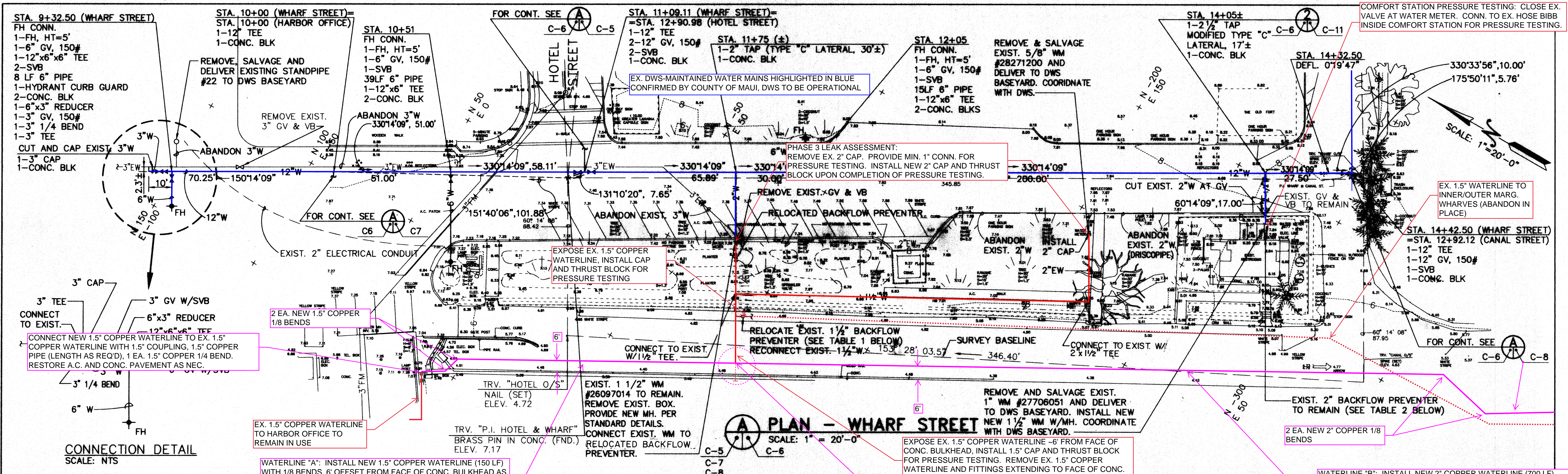
JOB NO. MA24-04  
 LAHAINA SMALL BOAT HARBOR WATER SYSTEM LEAK ASSESSMENT AND REPAIR  
 LAHAINA, MAUI, HAWAII

NOTE: THIS SHEET FOR INFORMATION PURPOSES ONLY. NO LEAK ASSESSMENT, REPAIR, OR NEW WORK.



 ENGINEERS ARCHITECTS PLANNERS	1/03/96 AS BUILT	
	5/04/94 FINAL DESIGN	JCL
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION		
JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI		
SHEET TITLE: FIRE PROTECTION WATER MAIN PLAN AND PROFILE - HOTEL STREET		
DESIGNED BY: AML	RECOMMENDED BY: <i>[Signature]</i>	DWG. NO. C-5
CHECKED BY: JCL	JOB NUMBER: H.C. 4155	5 OF 12 SHEETS
DATE: 05/04/94	SCALE: AS SHOWN	

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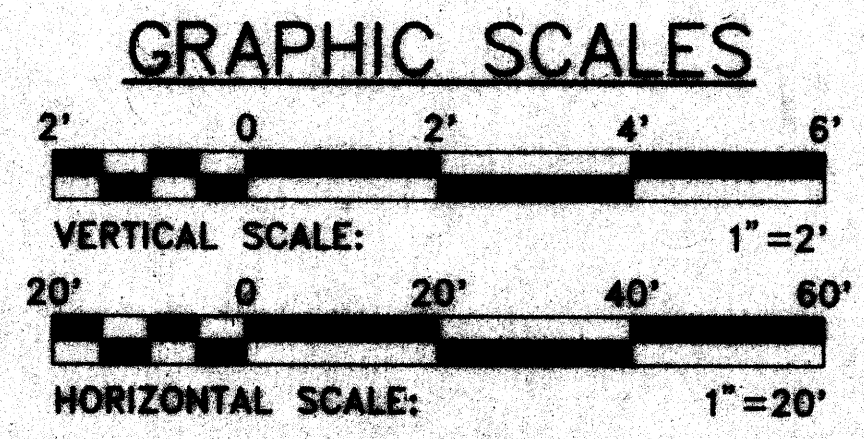
**PROFILE - WHARF STREET**  
 SCALES: HORIZ: 1" = 20', VERT: 1" = 2'

**TABLE 1**  
 BACKFLOW PREVENTION DATA

TAX MAP KEY: 4-6-01
PROJECT: LAHAINA BOAT HARBOR IMPROVEMENTS
SERVICE ADDRESS: LAHAINA BOAT HARBOR SLIPS
TYPE OF DEVICE: REDUCED PRESSURE PRINCIPLE
SIZE/MAKE/MODEL: 1 1/2" / WATTS/909
REMARKS:

**TABLE 2**  
 BACKFLOW PREVENTION DATA

TAX MAP KEY: 4-6-01
PROJECT: LAHAINA BOAT HARBOR IMPROVEMENTS
SERVICE ADDRESS: LAHAINA BOAT HARBOR RESTROOM
TYPE OF DEVICE: REDUCED PRESSURE PRINCIPLE
SIZE/MAKE/MODEL: 2" / FEBCO/825Y
REMARKS: ASSE 1013 175 MWFP SPRING LOADED



 ENGINEERS ARCHITECTS PLANNERS	E 5/04/94 FINAL DESIGN JCL
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION
APPROVED BY: <i>[Signature]</i> DEPUTY DIRECTOR FOR HARBORS	REGISTERED PROFESSIONAL ENGINEER No. 3629-C HAWAII, U.S.A.
JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI	SHEET TITLE: FIRE PROTECTION WATER MAIN PLAN AND PROFILE - WHARF STREET
DESIGNED BY: AML CHECKED BY: JCL DATE: 05/04/94	DWG. NO. <b>C-6</b> 6 OF 12 SHEETS

AS BUILT DRAWING

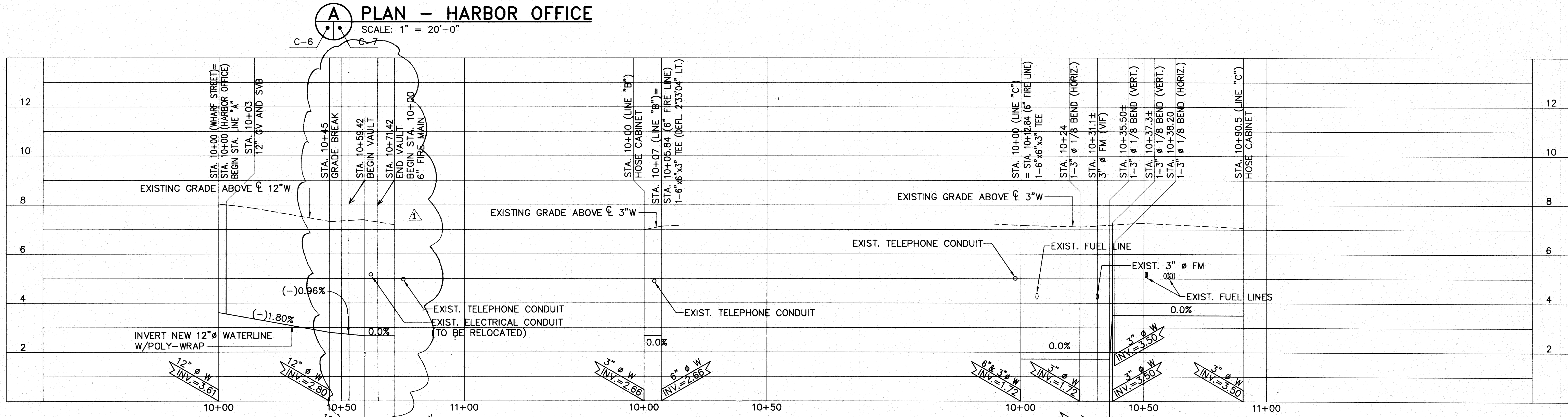
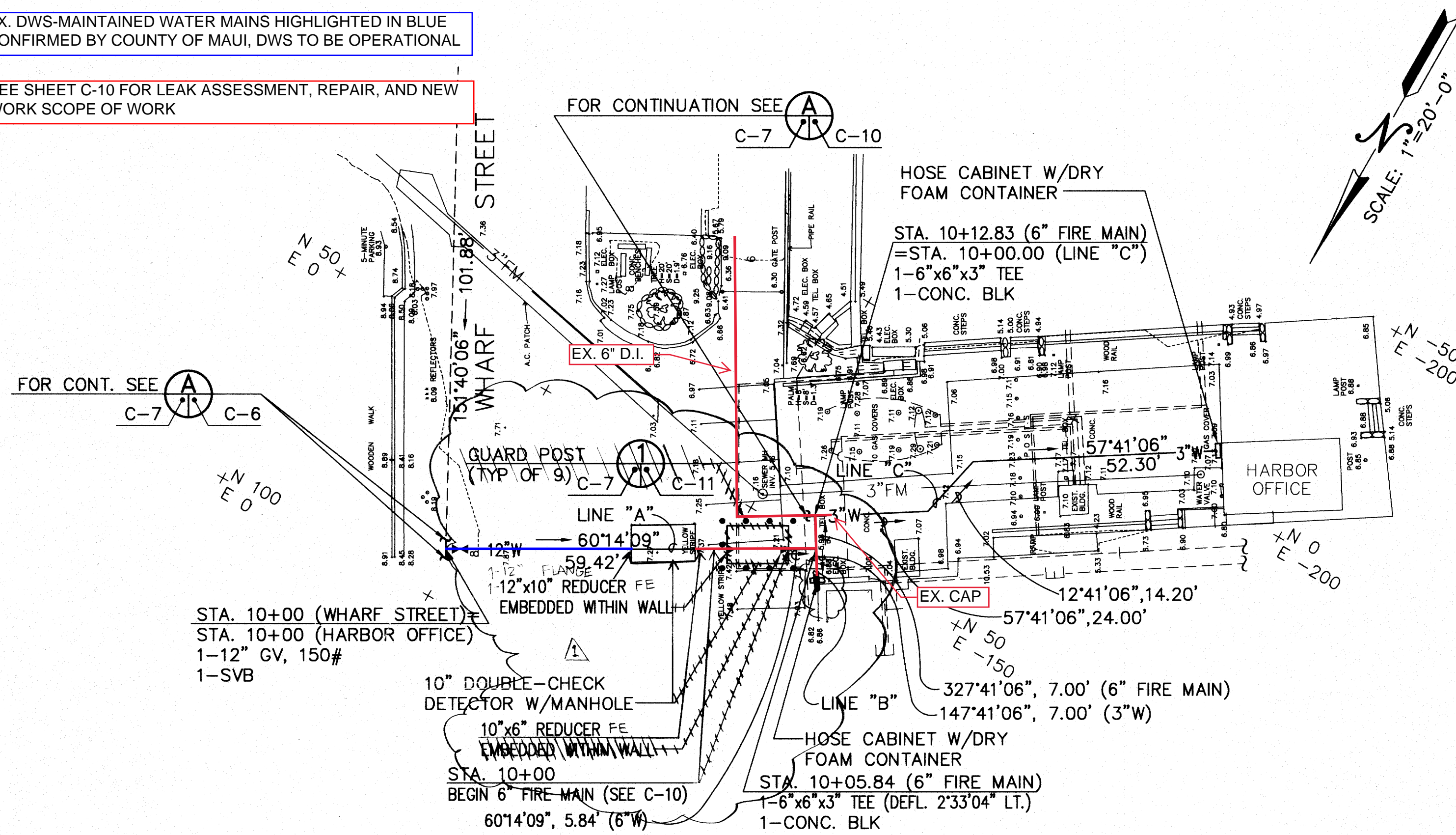
228/E326 05/04/94 09:03 FINAL

EX. DWS-MAINTAINED WATER MAINS HIGHLIGHTED IN BLUE  
CONFIRMED BY COUNTY OF MAUI, DWS TO BE OPERATIONAL

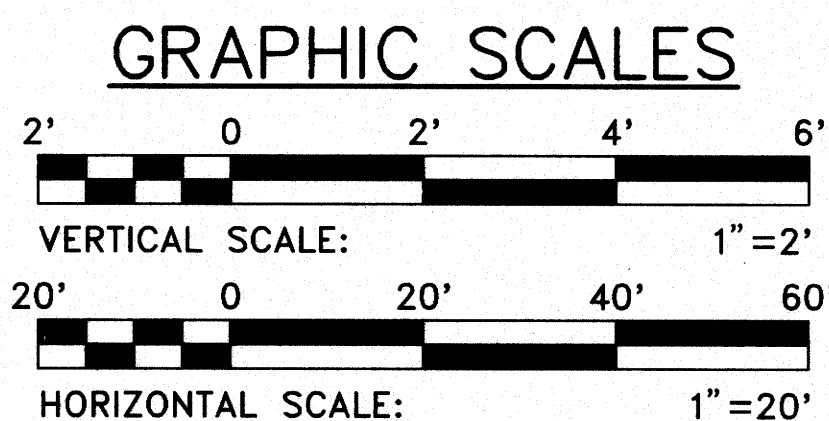
SEE SHEET C-10 FOR LEAK ASSESSMENT, REPAIR, AND NEW  
WORK SCOPE OF WORK

JOB NO. MA24-04  
LAHAINA SMALL BOAT HARBOR WATER SYSTEM LEAK ASSESSMENT AND REPAIR  
LAHAINA, MAUI, HAWAII

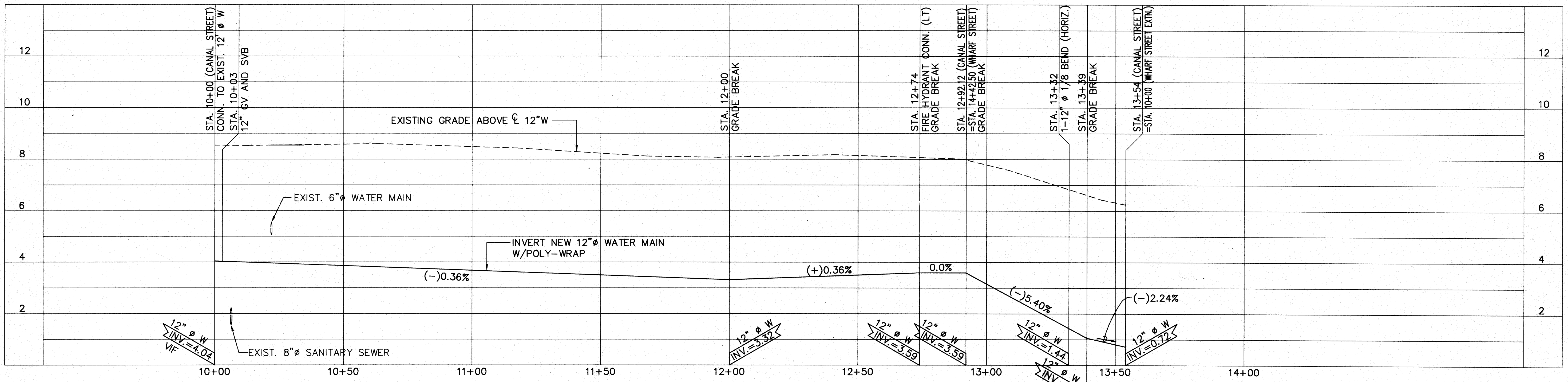
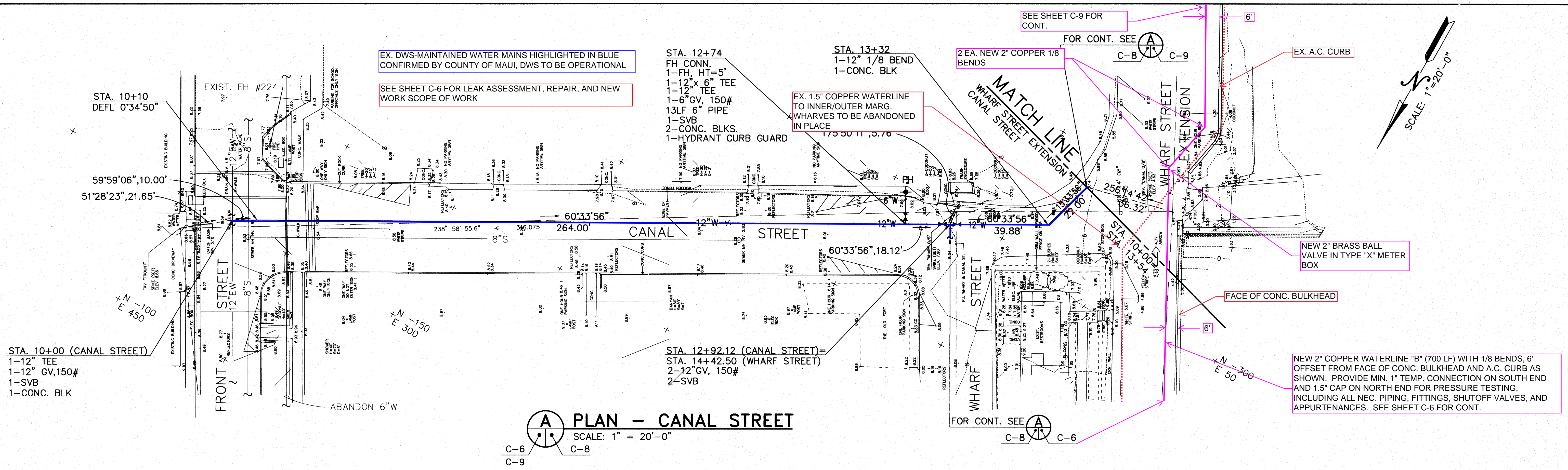
NOTE: THIS SHEET FOR INFORMATION PURPOSES ONLY. NO LEAK  
ASSESSMENT, REPAIR, OR NEW WORK.



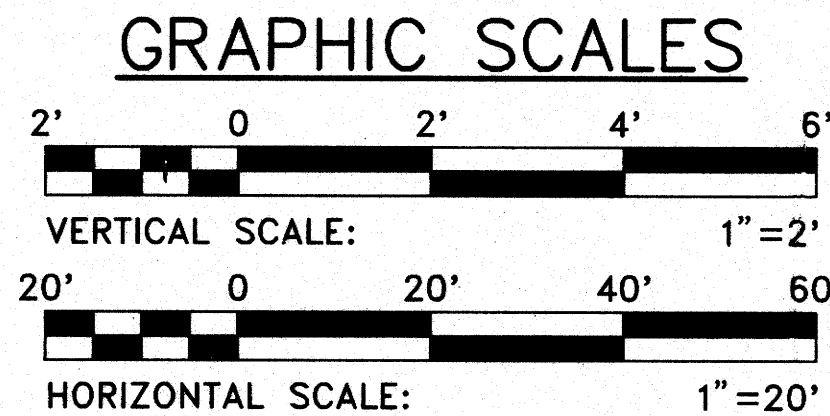
**PROFILES - HARBOR OFFICE**  
SCALES: HORIZ: 1" = 20', VERT: 1" = 2'



	1/03/96 AS BUILT 5/04/94 FINAL DESIGN	JCL
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION	
JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI		
SHEET TITLE: FIRE PROTECTION WATER MAIN PLAN AND PROFILES - HARBOR OFFICE		
DESIGNED BY: AML DRAWN BY: AML CHECKED BY: JCL DATE: 05/04/94	RECOMMENDED BY: H.C. CHIEF, HARBORS DIVISION JOB NUMBER:	DWG. NO. C-7 7 OF 12 SHEETS
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. 		

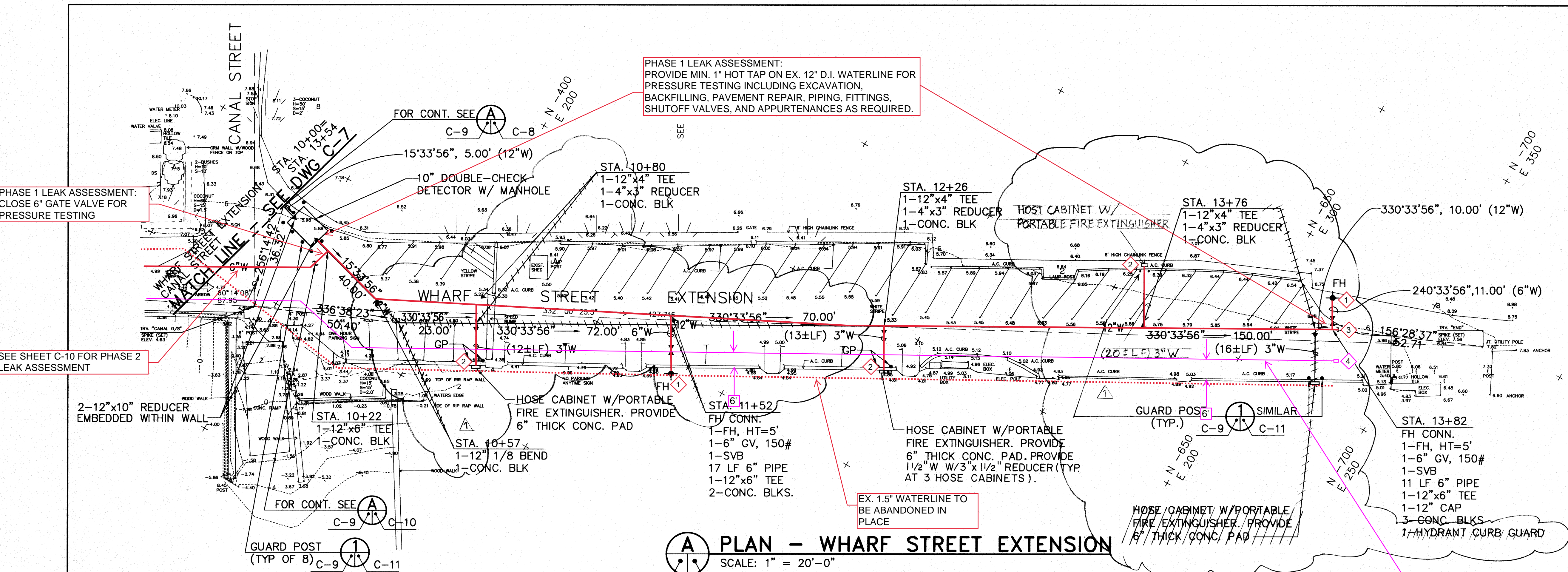


**PROFILE - CANAL STREET**  
SCALES: HORIZ: 1" = 20', VERT: 1" = 2'

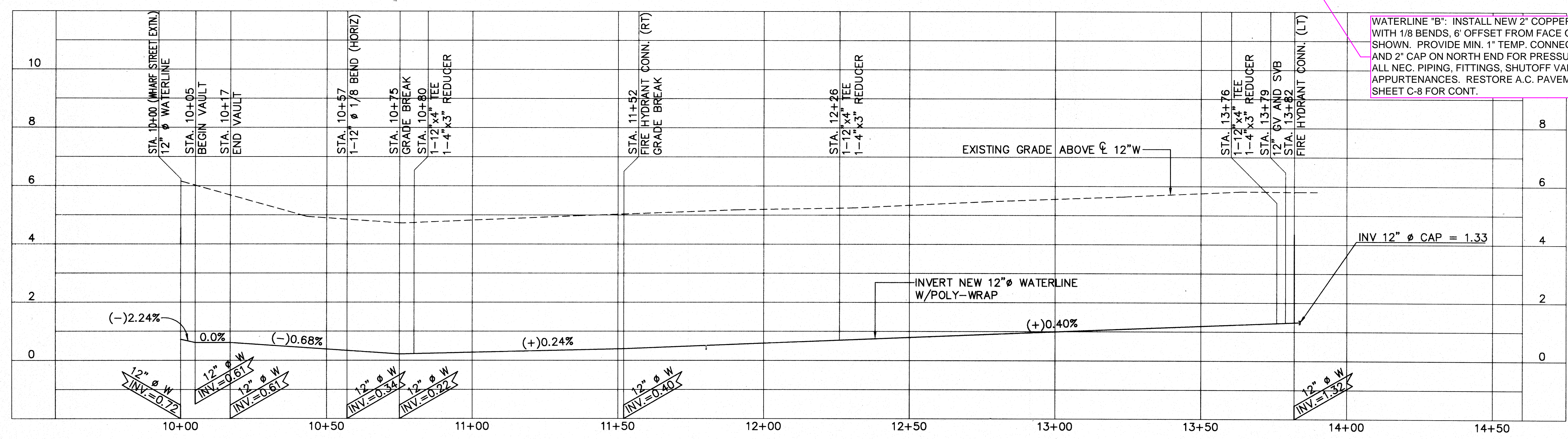


	ENGINEERS ARCHITECTS PLANNERS	E 5/04/94 FINAL DESIGN	JCL
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION		
JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI			
SHEET TITLE: FIRE PROTECTION WATER MAIN PLAN AND PROFILE - CANAL STREET			
DESIGNED BY: AML		RECOMMENDED BY:	
CHECKED BY: JCL		DATE: 05/04/94	
SCALE: AS SHOWN		H.C. 4155	
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.		DWG. NO. C-8	
APPROVED BY: DEPUTY DIRECTOR FOR HARBORS		8 of 12 SHEETS	

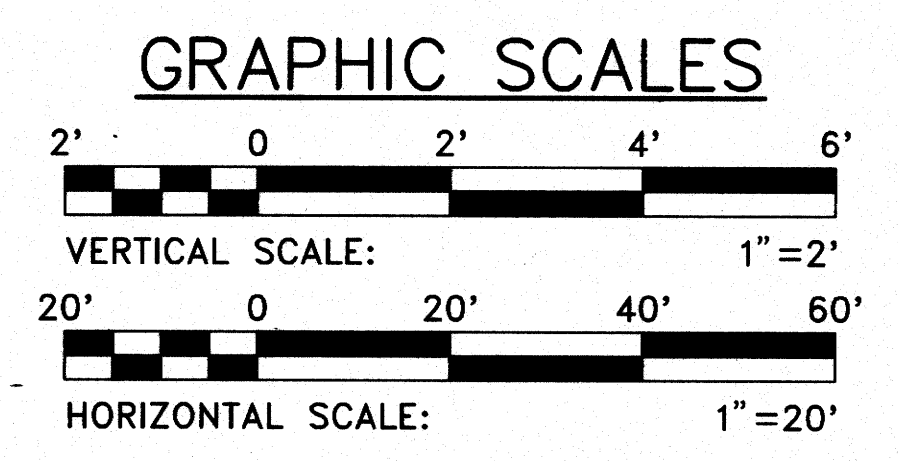




- LEGEND**
- 1 EXPOSE EX. 6" D.I. FH LATERAL, CUT 4' FROM EX. FH, INSTALL NEW 6" CAP, AND CONCRETE THRUST BLOCK FOR PRESSURE TESTING. INSTALL NEW FH PER DETAIL.
  - 2 EXPOSE EX. 3" COPPER FIRE HOSE CABINET LATERAL, CUT 2' FROM EX. STANDPIPE, INSTALL NEW 3" CAP, AND CONCRETE THRUST BLOCK FOR PRESSURE TESTING. REMOVE EX. CONCRETE SLAB AND BOLLARDS WHERE APPLICABLE. INSTALL NEW FIRE DEPARTMENT CONNECTION PER DETAIL.
  - 3 INSTALL NEW CLEANOUT PER DWS STD. DTL. V21 AT END OF EX. 12" D.I. WATERLINE.
  - 4 INSTALL NEW CLEANOUT ON NEW 2" COPPER WATERLINE "B": 1 EA. 2" COPPER 1/4 BEND, 2" COPPER VERT. RISER PIPE (LENGTH AS REQ'D), AND 2" BRONZE BALL VALVE IN TYPE "X" METER BOX.



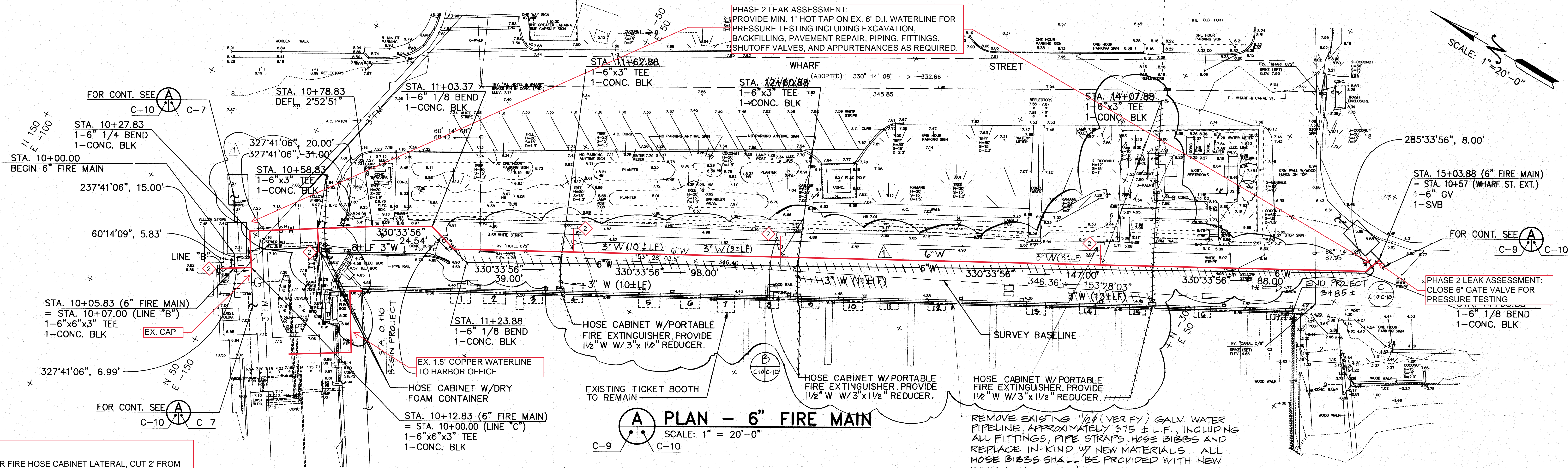
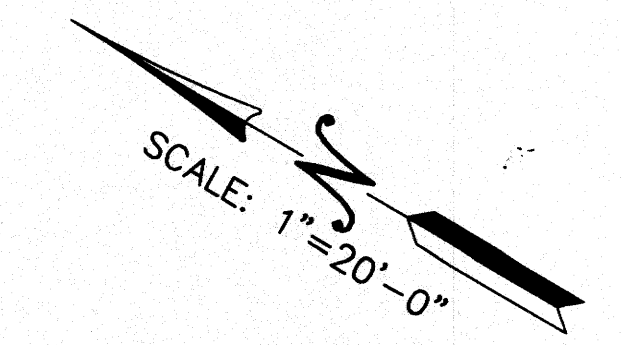
**PROFILE - WHARF STREET EXTENSION**  
 SCALES: HORIZ: 1" = 20', VERT: 1" = 2'



	1/04/94 AS BUILT E 5/04/94 FINAL DESIGN JCL
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION
JOB TITLE: <b>LAHAINA BOAT HARBOR IMPROVEMENTS</b> LAHAINA, MAUI	SHEET TITLE: <b>FIRE PROTECTION WATER MAIN</b> <b>PLAN AND PROFILE - WHARF STREET EXTENSION</b>
DESIGNED BY: AML DRAWN BY: AML CHECKED BY: JCL DATE: 05/04/94 SCALE: AS SHOWN	RECOMMENDED BY: [Signature] CHIEF, HARBORS DIVISION JOB NUMBER: <b>H.C. 4155</b> DWG. NO. <b>C-9</b> 9 of 12 SHTS.

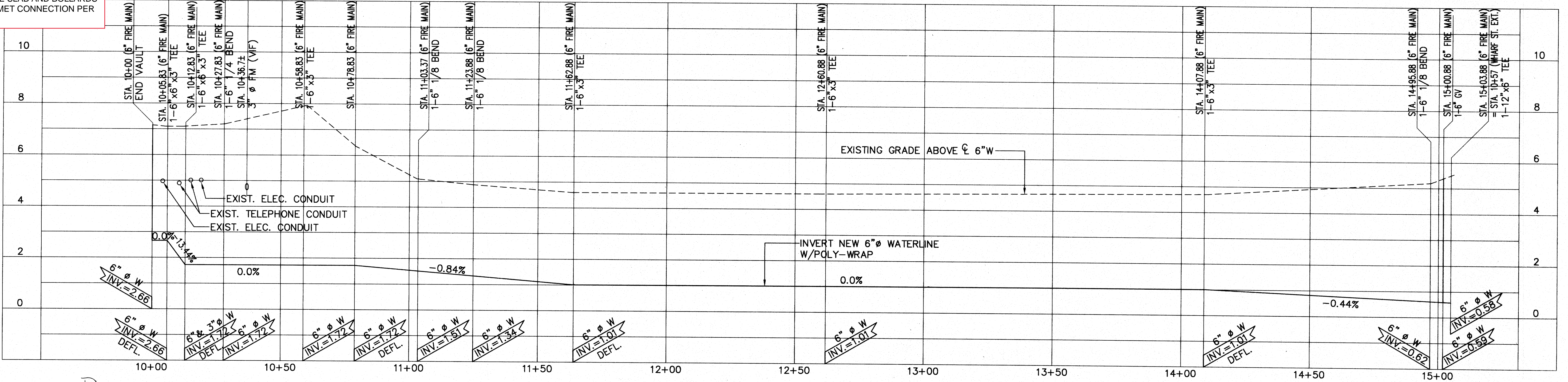
APPROVED BY: [Signature]  
 DEPUTY DIRECTOR FOR HARBORS

PHASE 2 LEAK ASSESSMENT:  
 PROVIDE MIN. 1" HOT TAP ON EX. 6" D.I. WATERLINE FOR  
 PRESSURE TESTING INCLUDING EXCAVATION,  
 BACKFILLING, PAVEMENT REPAIR, PIPING, FITTINGS,  
 SHUTOFF VALVES, AND APPURTENANCES AS REQUIRED.

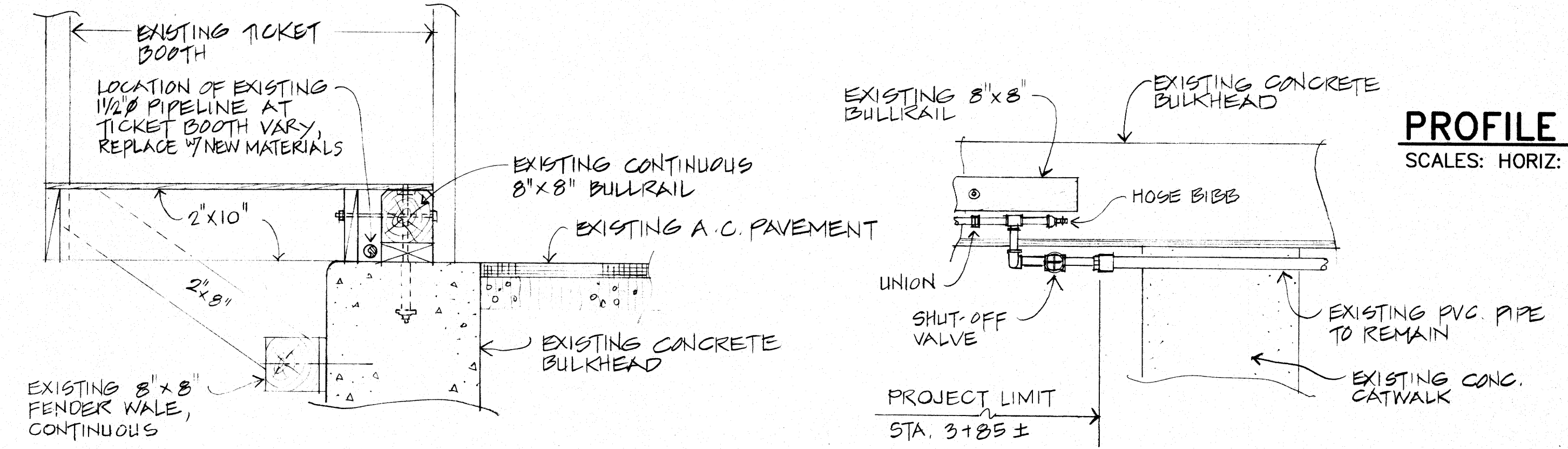


**A PLAN - 6" FIRE MAIN**  
 SCALE: 1" = 20'-0"

**LEGEND**  
 2 EXPOSE EX. 3" COPPER FIRE HOSE CABINET LATERAL, CUT 2' FROM EX. STANDPIPE, INSTALL NEW 3" CAP, AND CONCRETE THRUST BLOCK FOR PRESSURE TESTING. REMOVE EX. CONCRETE SLAB AND BOLLARDS WHERE APPLICABLE. INSTALL NEW FIRE DEPARTMENT CONNECTION PER DETAIL.

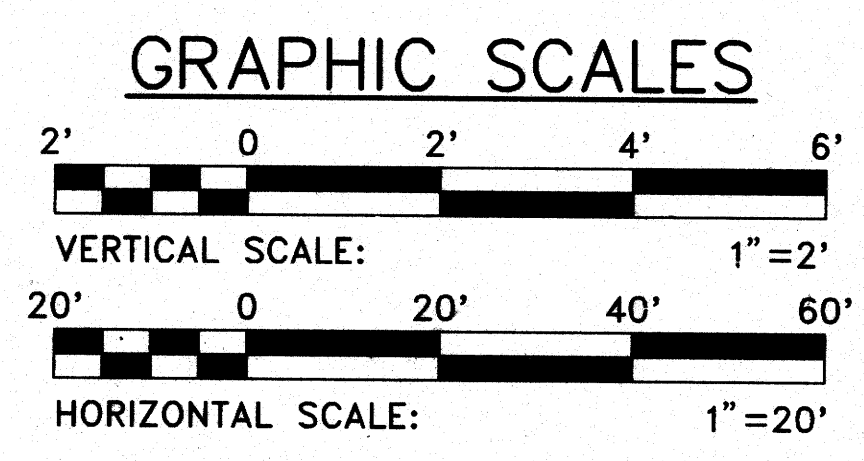


**PROFILE - 6" FIRE MAIN**  
 SCALES: HORIZ: 1" = 20', VERT: 1" = 2'



**B TYP. SECTION AT CONG. BULKHEAD**  
 C-10/C-10

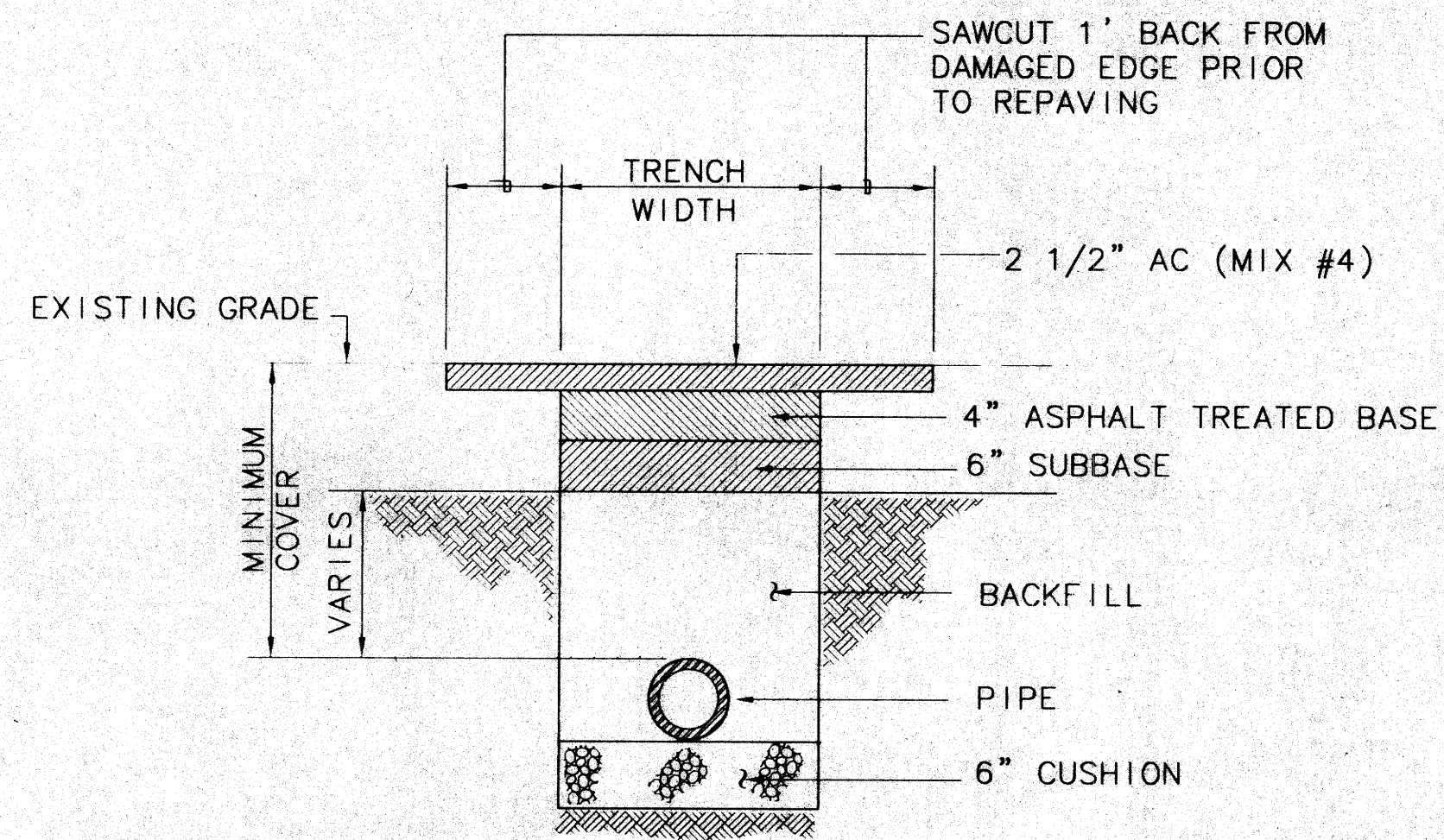
**C PLAN - END CONNECTION**  
 C-10/C-10



	1/04/94 AS BUILT 5/04/94 FINAL DESIGN	JCL BY APPROVED
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION	
JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI		
SHEET TITLE: FIRE PROTECTION WATER MAIN PLAN AND PROFILE - 6" FIRE MAIN		
DESIGNED BY: AML DRAWN BY: AML CHECKED BY: JCL DATE: 05/04/94 SCALE: AS SHOWN	RECOMMENDED BY: <i>[Signature]</i> ASSISTANT CHIEF FOR ENGINEERING	DWG. NO. <b>C-10</b> 10 of 12 SHEETS

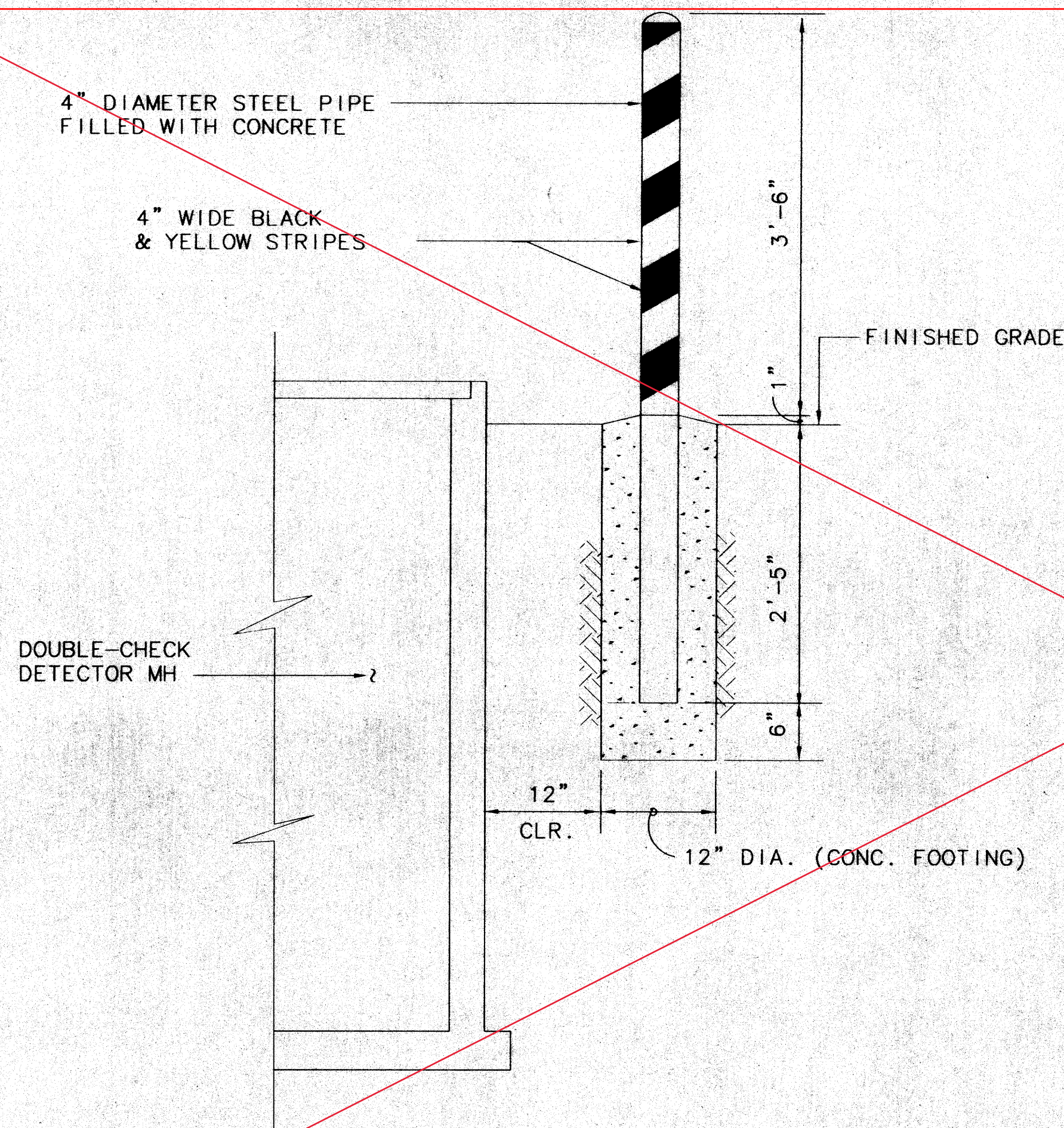
2281F187 05/04/94 14:13 FINAL

FOLLOW THIS DETAIL FOR TRENCH AND A.C. PAVEMENT RESTORATION

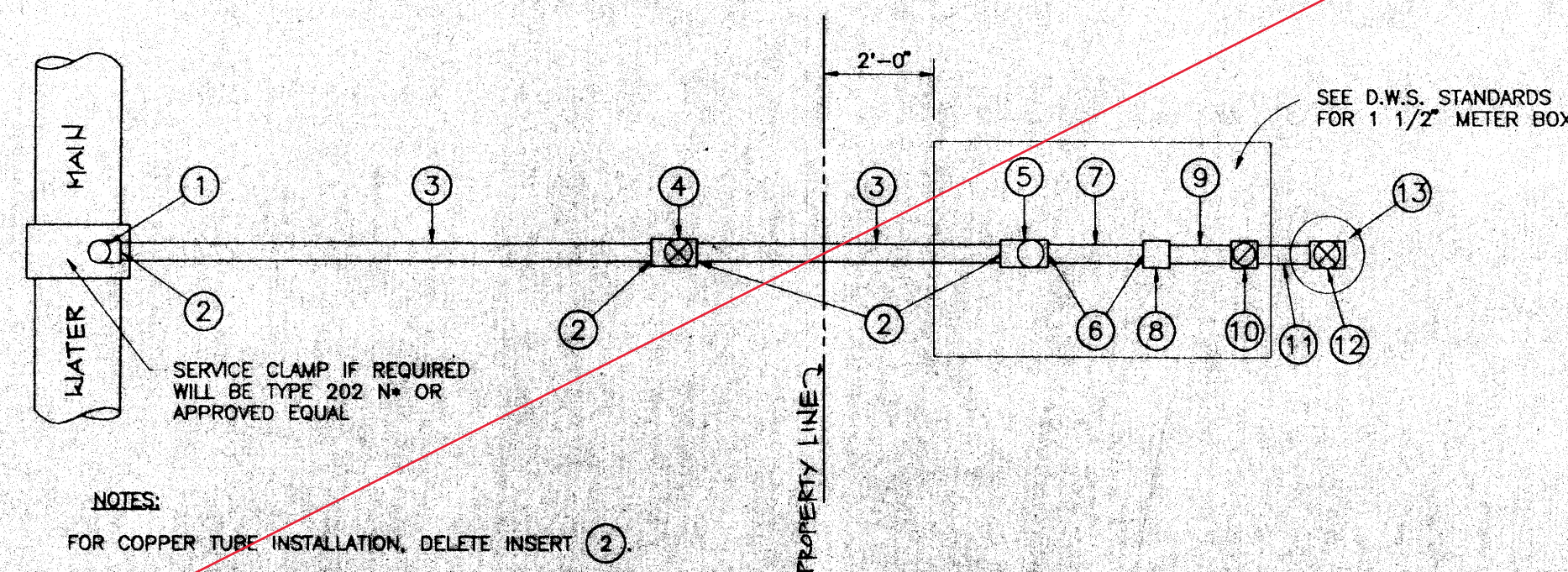


- NOTES:
- CONTRACTOR SHALL PROVIDE A TEMPORARY COLD MIX PATCH IF PERMANENT RESTORATION CANNOT BE MADE WITHIN 24 HOURS OF BACKFILL.
  - ALL EXPOSED AREAS TO BE GRASSED.
  - MINIMUM COVER:
    - SMALLER THAN 4" = 1.5'
    - 4" = 2.5'
    - 6" AND LARGER = 3.0'

**SECTION - TRENCH RESTORATION**  
SCALE: NTS  
C-4 TO C-10 C-11



**DETAIL - GUARD POST**  
SCALE: NTS  
C-7 TO C-9 C-10



- NOTES:
- FOR COPPER TUBE INSTALLATION, DELETE INSERT (2).
  - ALL FITTINGS AND MATERIALS LISTED BY BRAND NAMES OR APPROVED EQUAL.
  - \* FORD METER BOX MANUFACTURING CO'S. NO. CORPORATION TO BE MUELLER H-10003 W/ PACK JOINT COUPLING IF LIVE TAP, OR APPROVED EQUAL.

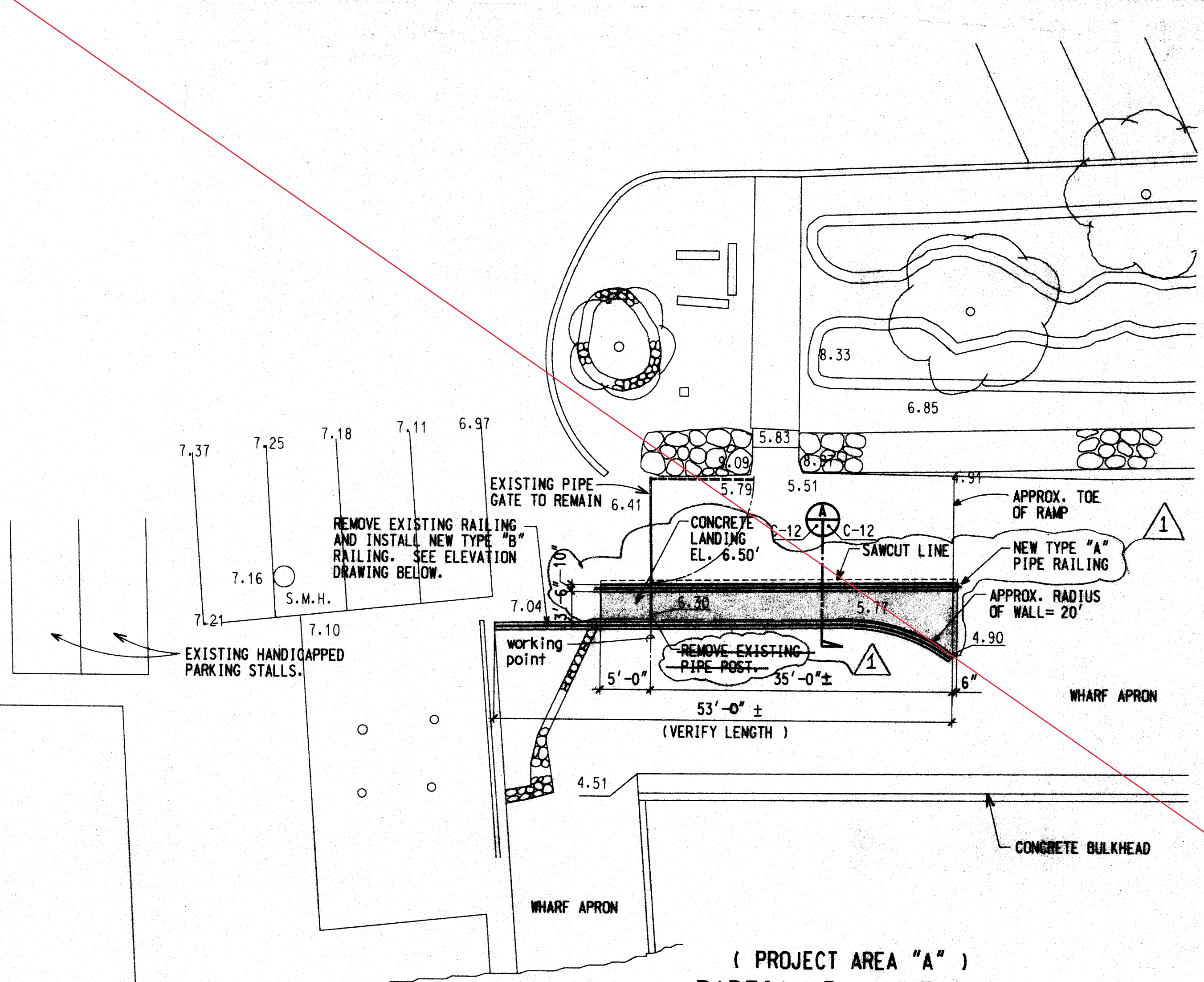
N.I.C.

TYPE	METER SIZE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
C	1 1/2"	1 1/2" x 2 1/2" ANNA THREAD P.S. (FB-1000)	2 1/2" STAINLESS STL INSERT (04)	2 1/2" COPPER OR P.E. TUBING CLASS 150	2 1/2" x 2 1/2" P.S. x P.S. (044-777)	2 1/2" x 1 1/2" P.S. x P.S. (BF-43-076)	5/8" x 2 1/2" TYPE (304)	1 1/2" x 15" FLG. x FLG. LOW PAK ONE END PLUGGED	1 1/2" FLG. x 15" P.J. LOW PAK CF 35-66	1 1/2" x 6"
		(10) BRASS CHECK VALVE	(11) BRASS NIPPLE	(12) BRASS GATE VALVE	(13) PLASTIC VALVE BOX					
		1 1/2" HAMMOND (004) OR STOCKHAM (B-315)	1 1/2" x 14"	1 1/2" HAMMOND (009) OR STOCKHAM (B-103)	10" MUXEK (10-181-014) W/ GREEN COVER (10-181-015)					

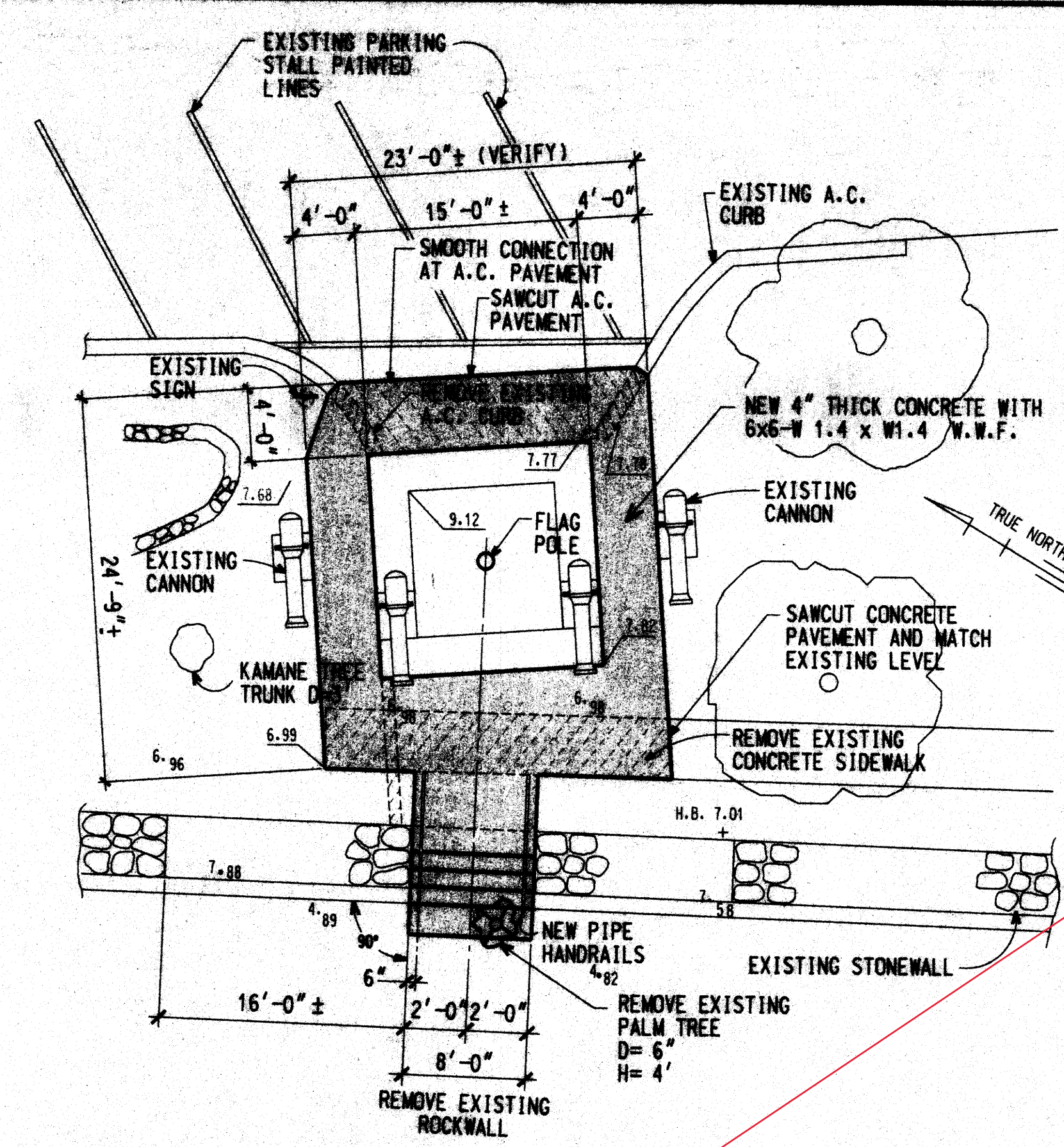
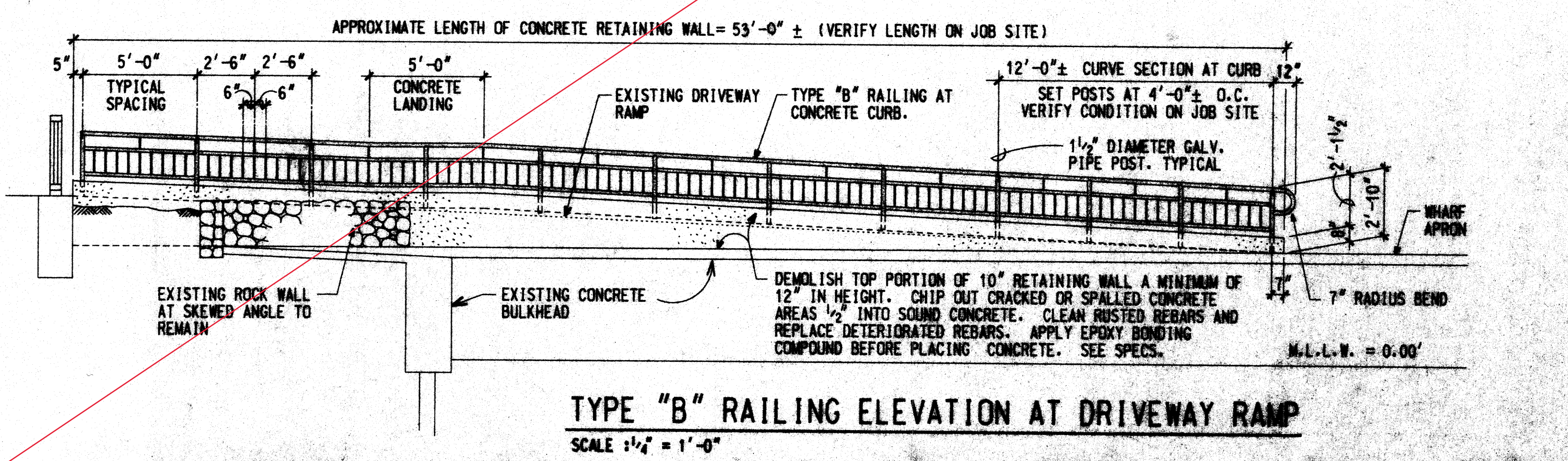
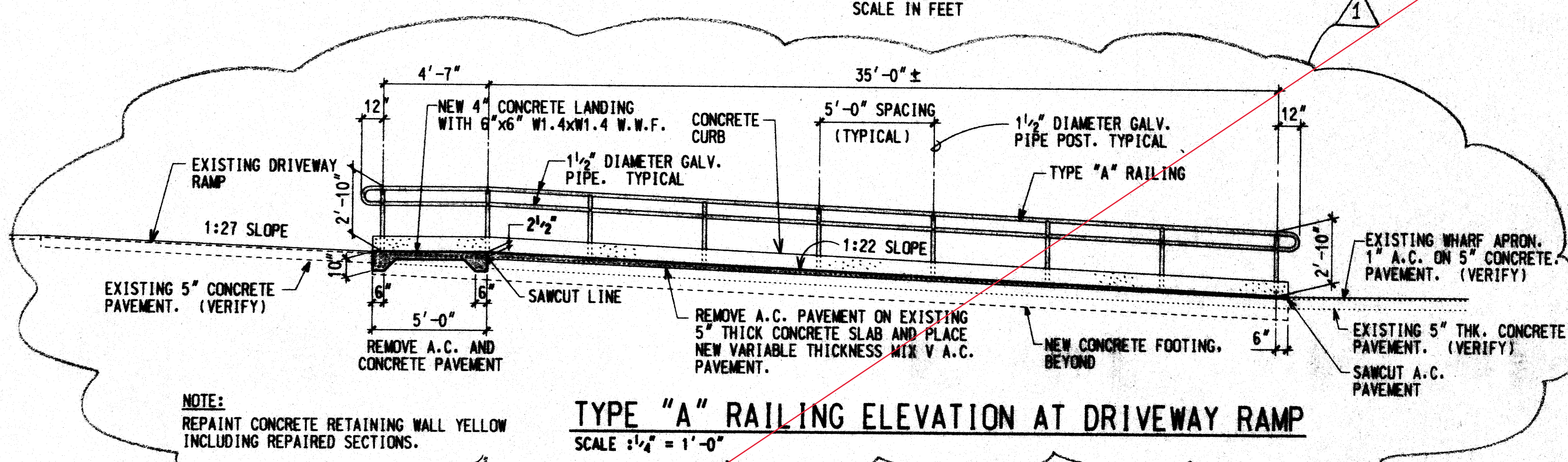
**MODIFIED TYPE C LATERAL**  
SCALE: NTS  
C-6 C-11

	ENGINEERS ARCHITECTS PLANNERS	E 5/04/94 FINAL DESIGN JCL
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION	
JOB TITLE: LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI		
SHEET TITLE: FIRE PROTECTION WATER MAIN DETAILS		
DESIGNED BY: AML DRAWN BY: BS CHECKED BY: JCL DATE: 05/04/94 SCALE: AS SHOWN		RECOMMENDED BY: <i>H. H. Muehlenheim</i> H.C. 4155 JOB NUMBER: C-11 11 of 12 SHEETS

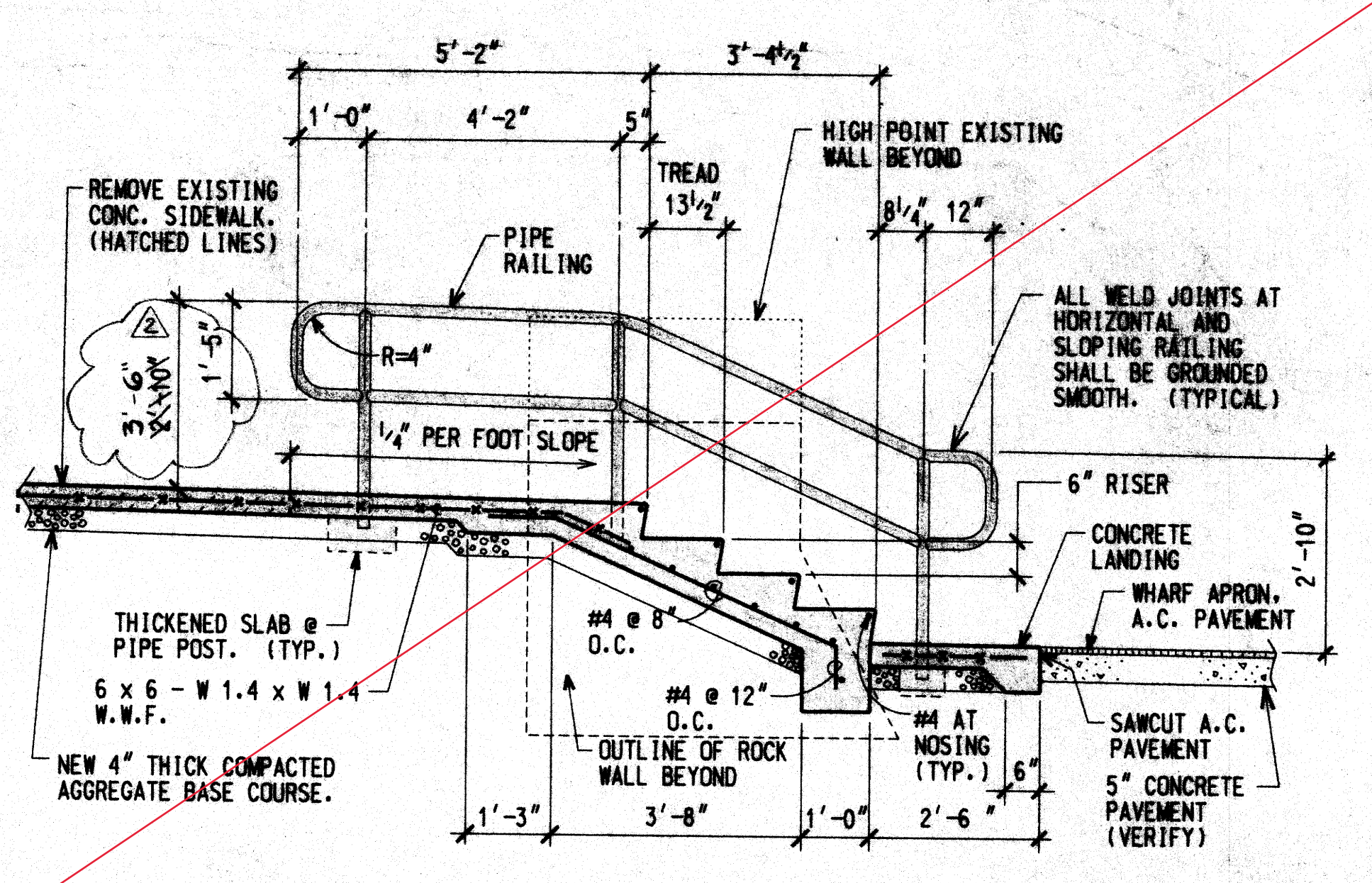
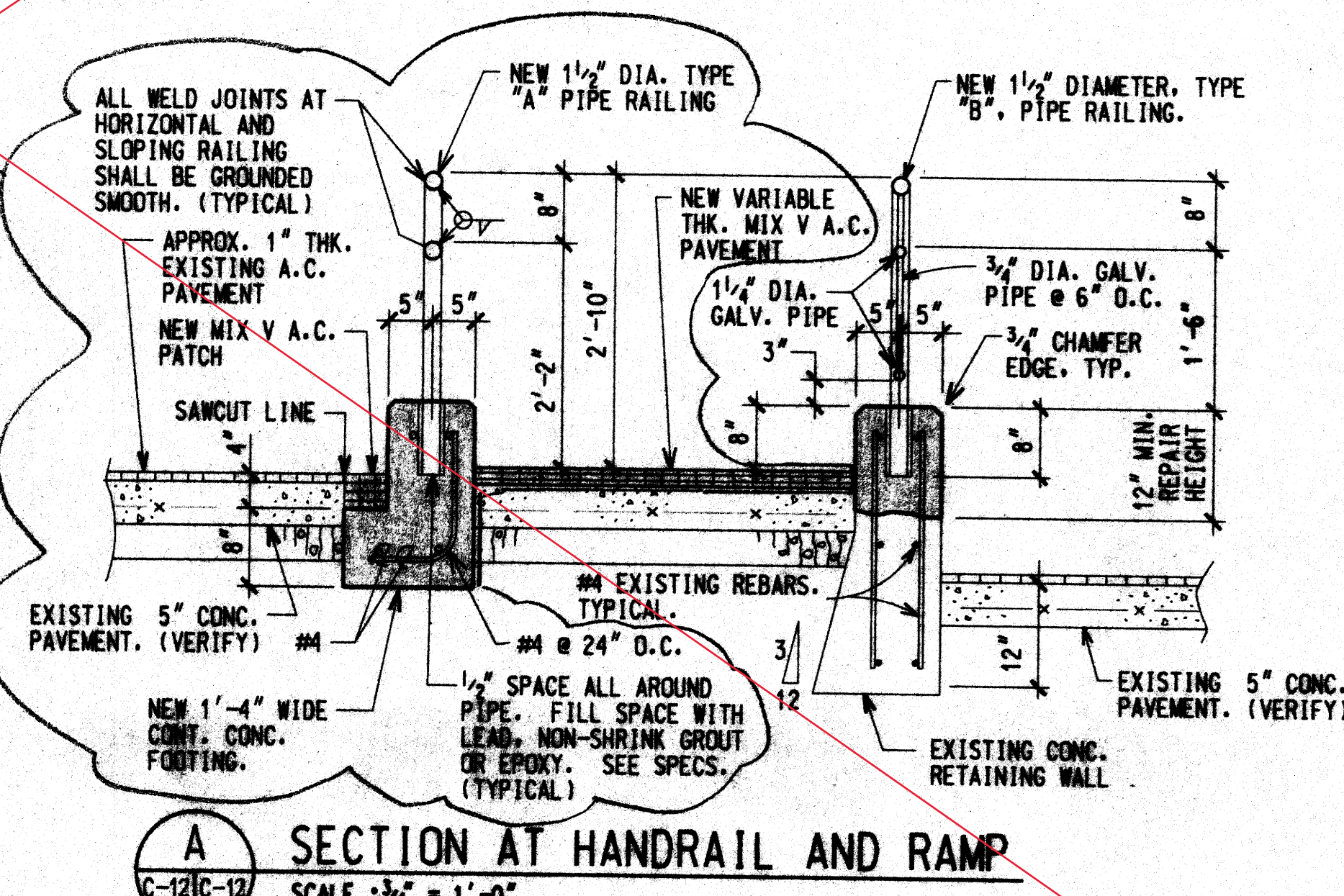
2281E570 05/04/94 16:22 FINAL



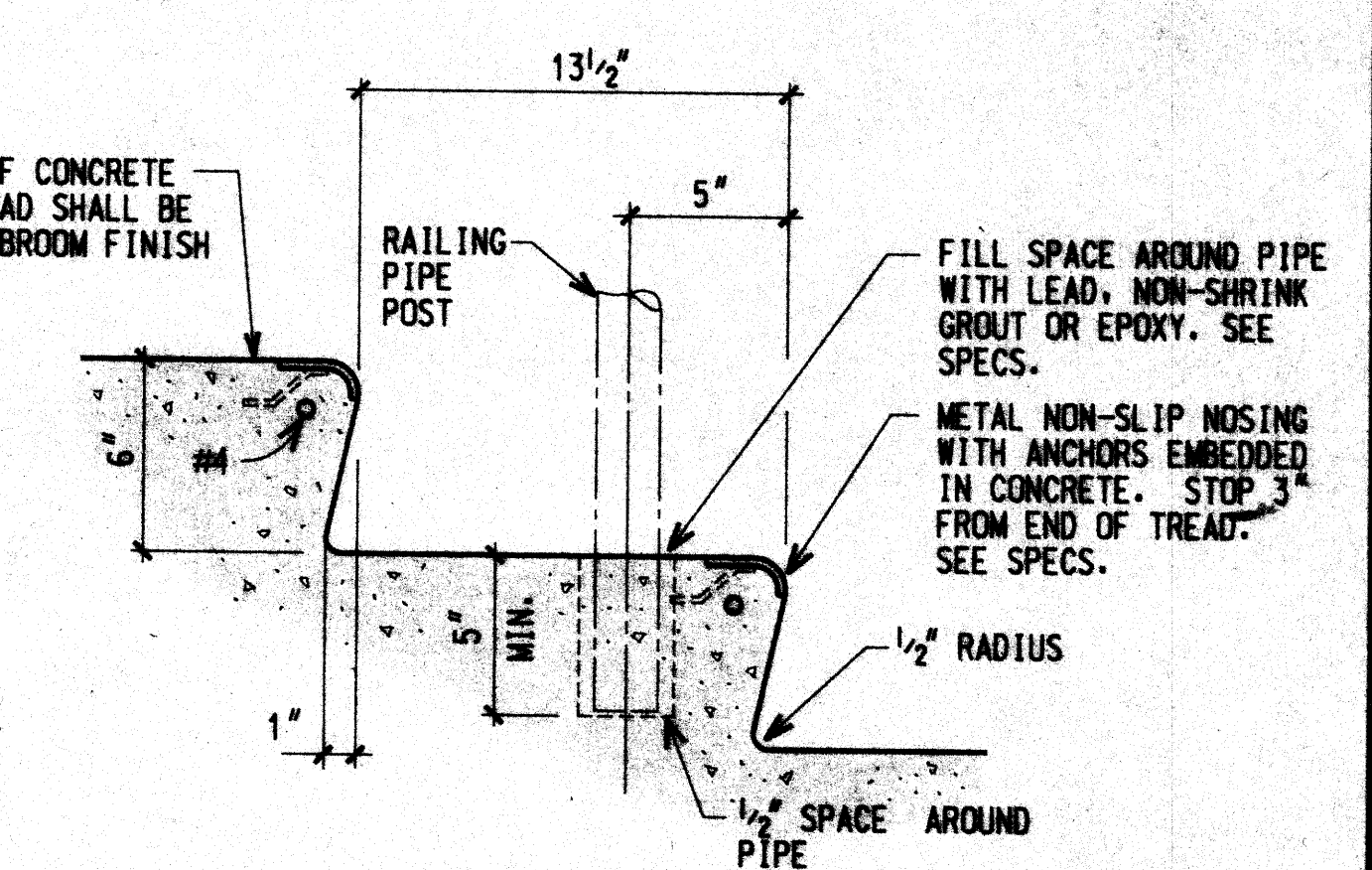
(PROJECT AREA "A")  
PARTIAL PLAN AT RAMP  
SCALE: 1/2" = 1'-0"



(PROJECT AREA "B")  
PARTIAL PLAN AT NEW STAIRWAY  
SCALE: 1/2" = 1'-0"

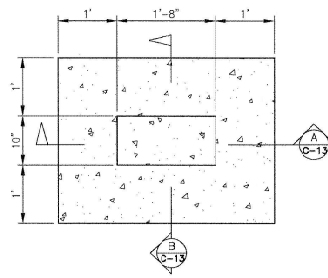


TYPICAL SECTION THRU STAIRS  
SCALE: 1/2" = 1'-0"

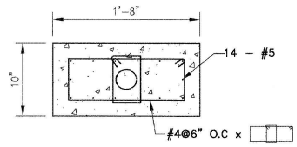


1/04/94	AS BUILT	
1-27-99	DELETE	
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBOR DIVISION		
JOB TITLE LAHAINA BOAT HARBOR IMPROVEMENTS LAHAINA, MAUI		
SUBJECT TITLE RAMP AND STAIR PLAN, RAILING ELEVATION AND STAIR DETAILS		
DESIGNED BY N.A.	CHECKED BY R.H.D.	DATE MAY 20, 1994
APPROVED BY H.C. 4155		SCALE 12" = 12'

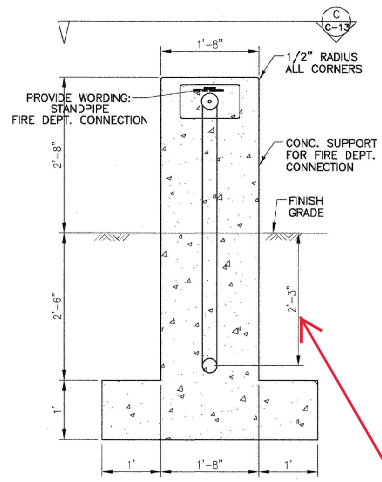
JOB NO. MA24-04  
 LAHAINA SMALL BOAT HARBOR WATER SYSTEM LEAK ASSESSMENT AND REPAIR  
 LAHAINA, MAUI, HAWAII  
 FIRE DEPARTMENT CONNECTION DETAIL



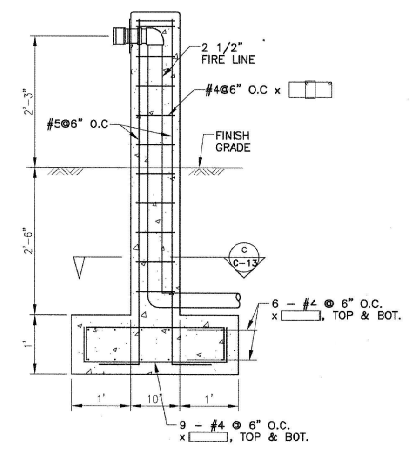
2 PLAN  
 C-13 SCALE: 1" = 1'-0"



C SECTION "C"  
 C-13 SCALE: 1 1/2" = 1'-0"

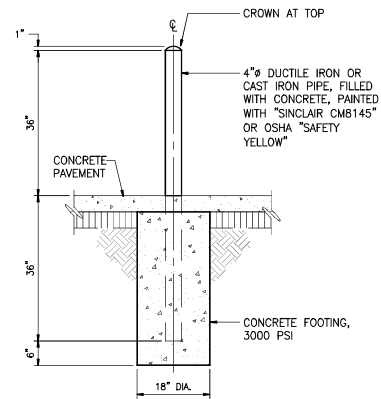


A SECTION "A"  
 C-13 SCALE: 1" = 1'-0"

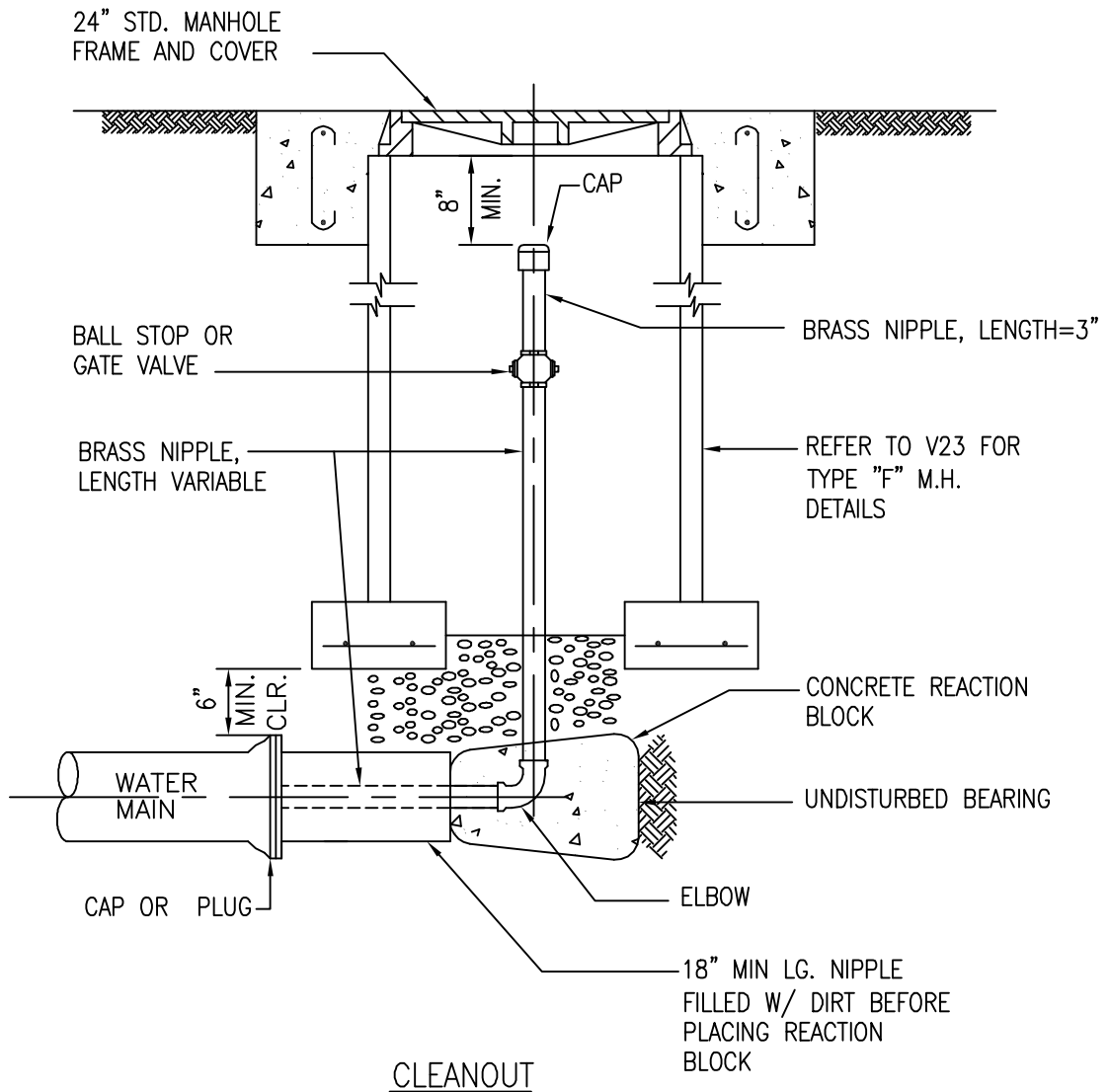


B SECTION "B"  
 C-13 SCALE: 1" = 1'-0"

DEPTH MAY VARY BASED ON  
 DEPTH OF EX. WATERLINES. ALL  
 OTHER DIMENSION SHALL APPLY.



**4** PIPE BOLLARD DETAIL  
NOT TO SCALE



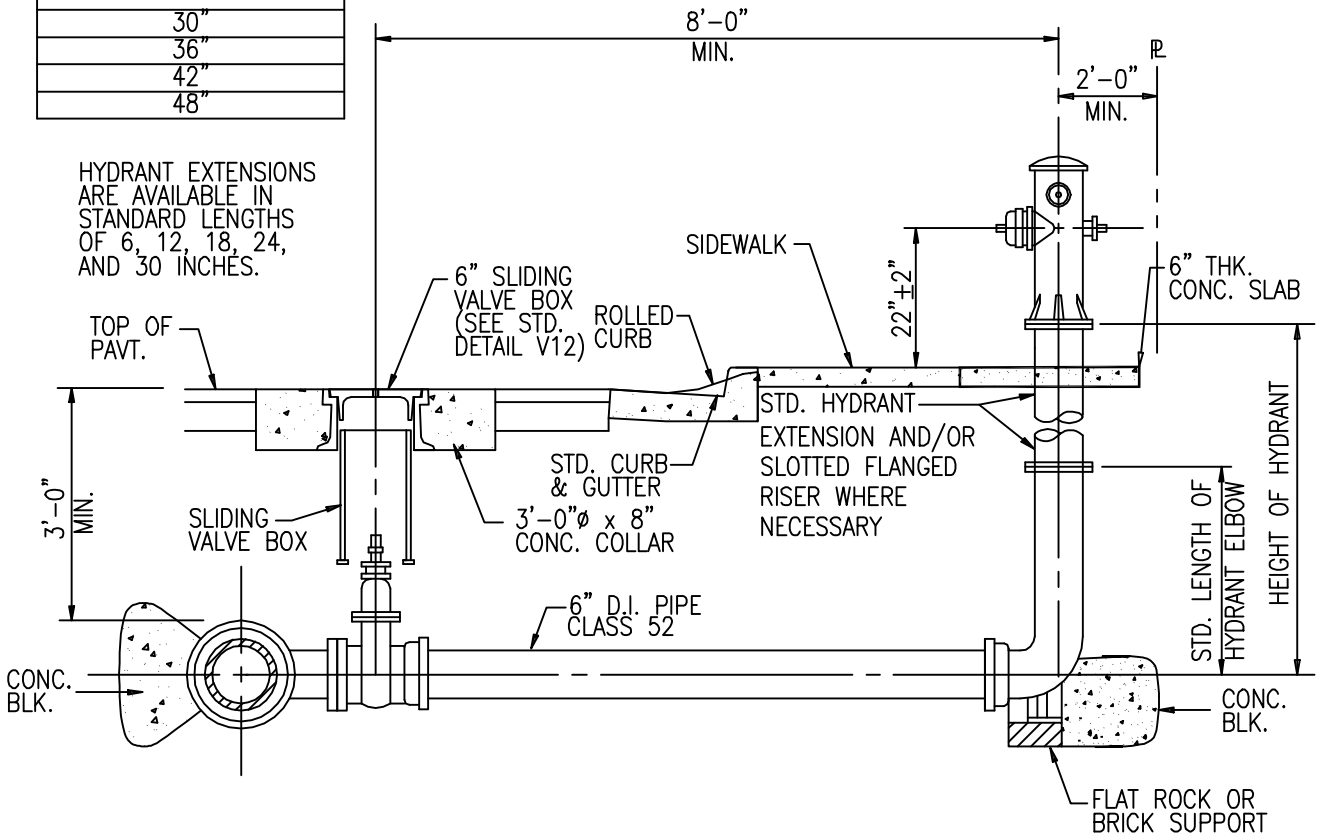
SCHEDULE OF CLEANOUTS		
MAIN SIZE	CLEANOUT SIZE	MANHOLE ENCLOSURE
6" & SMALLER	2"	TYPE "F"
8" & 12"	2 1/2"	TYPE "F"
LARGER THAN 12"	FURNISH SPECIAL DESIGN FOR DISCHARGE NOZZLE OR HYDRANT ASSEMBLY	

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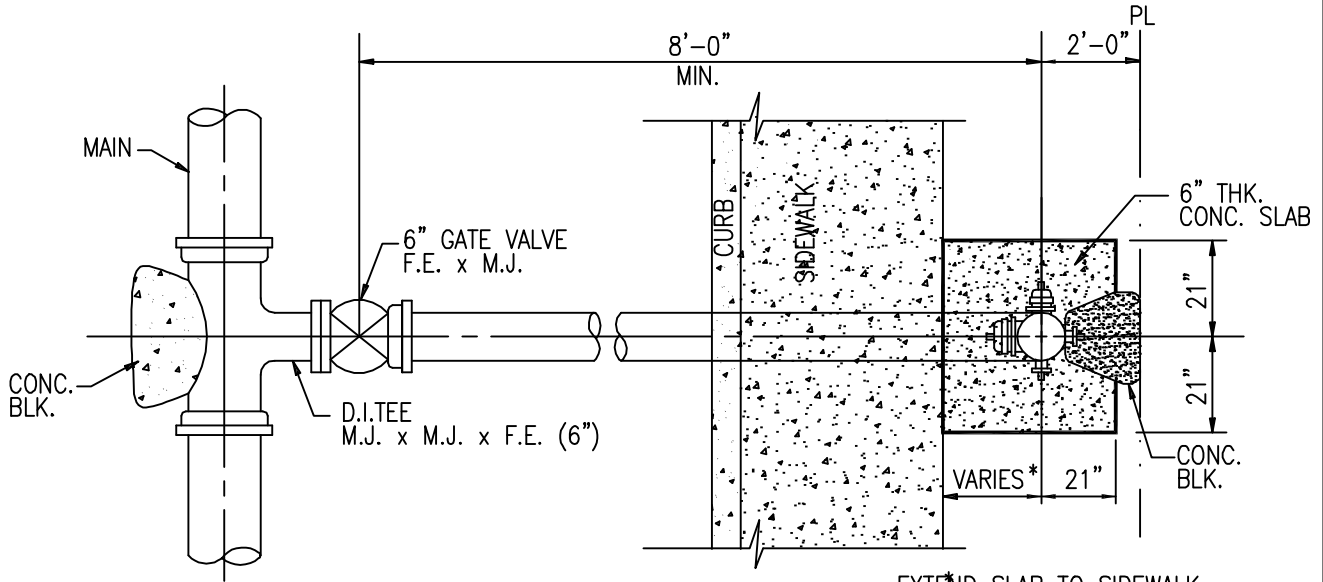
MAUI	<b>CLEANOUT</b> SCALE: NTS	STANDARD DETAILS	V21
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STANDARD LENGTHS FOR HYDRANT ELBOWS	
30"	
36"	
42"	
48"	

HYDRANT EXTENSIONS ARE AVAILABLE IN STANDARD LENGTHS OF 6, 12, 18, 24, AND 30 INCHES.



SECTION



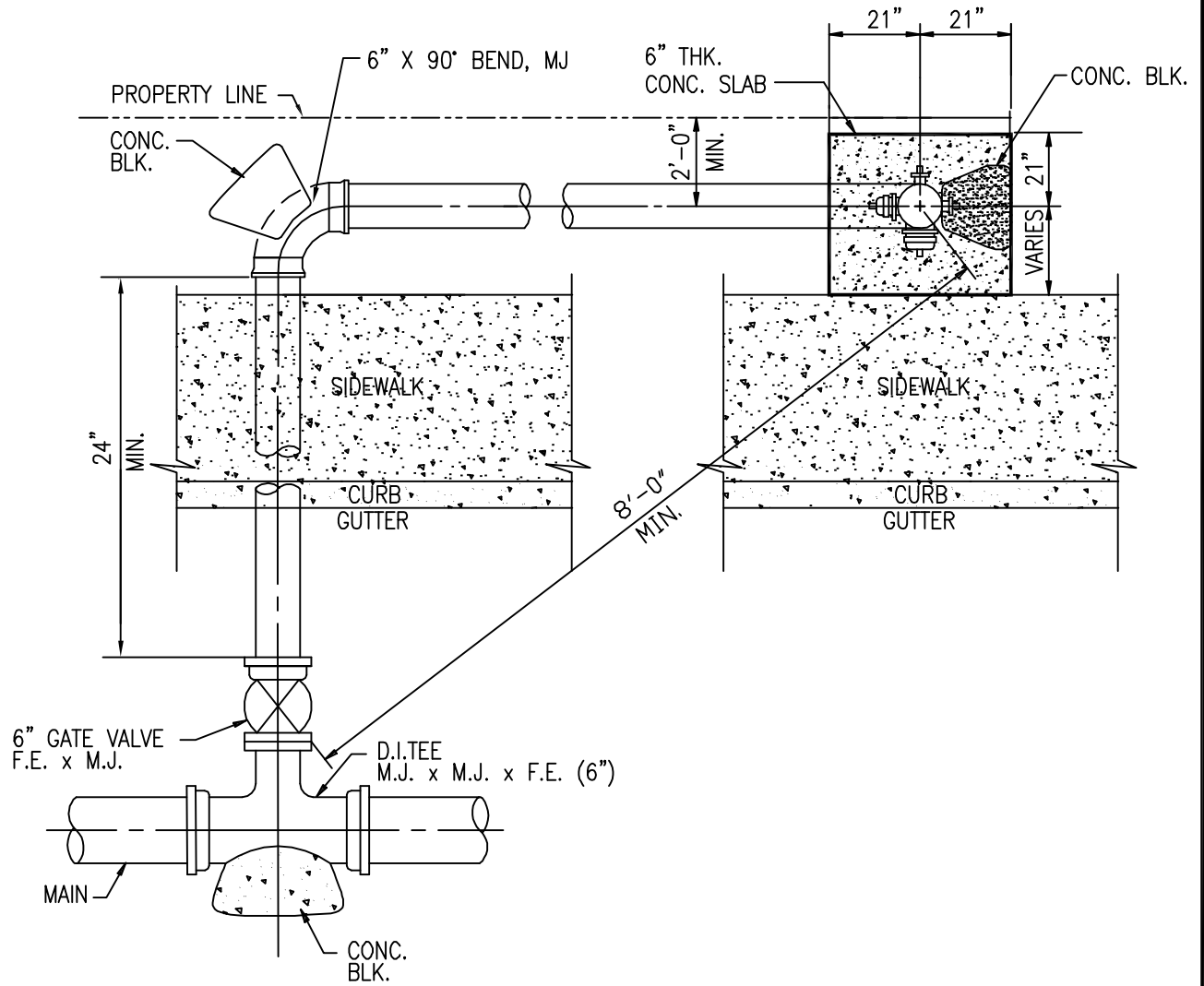
PLAN

REFER TO STANDARD DETAIL FH8 FOR NOTES.

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MAUI	<b>HYDRANT CONNECTION</b> STRAIGHT RUN SCALE: NTS	STANDARD DETAILS	<b>FH6</b>
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PLAN

REFER TO STANDARD DETAIL FH8 FOR NOTES.  
 REFER TO STANDARD DETAIL FH6 FOR ADDITIONAL  
 INFORMATION FOR FIRE HYDRANT INSTALLATION.

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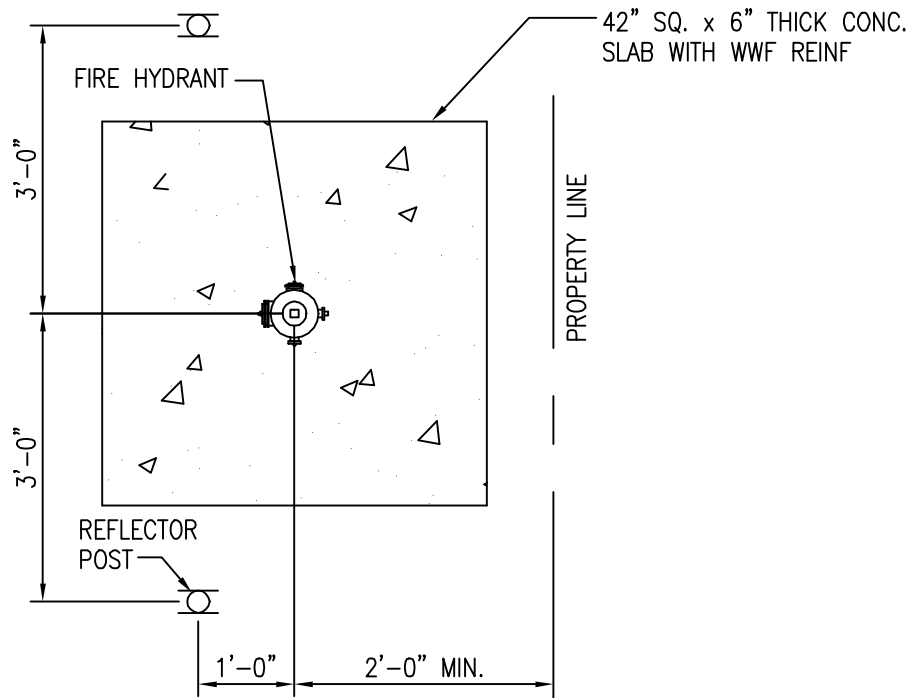
MAUI	<b>HYDRANT CONNECTION          WITH ELBOW</b> SCALE: NTS	STANDARD DETAILS	FH7
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NOTE:

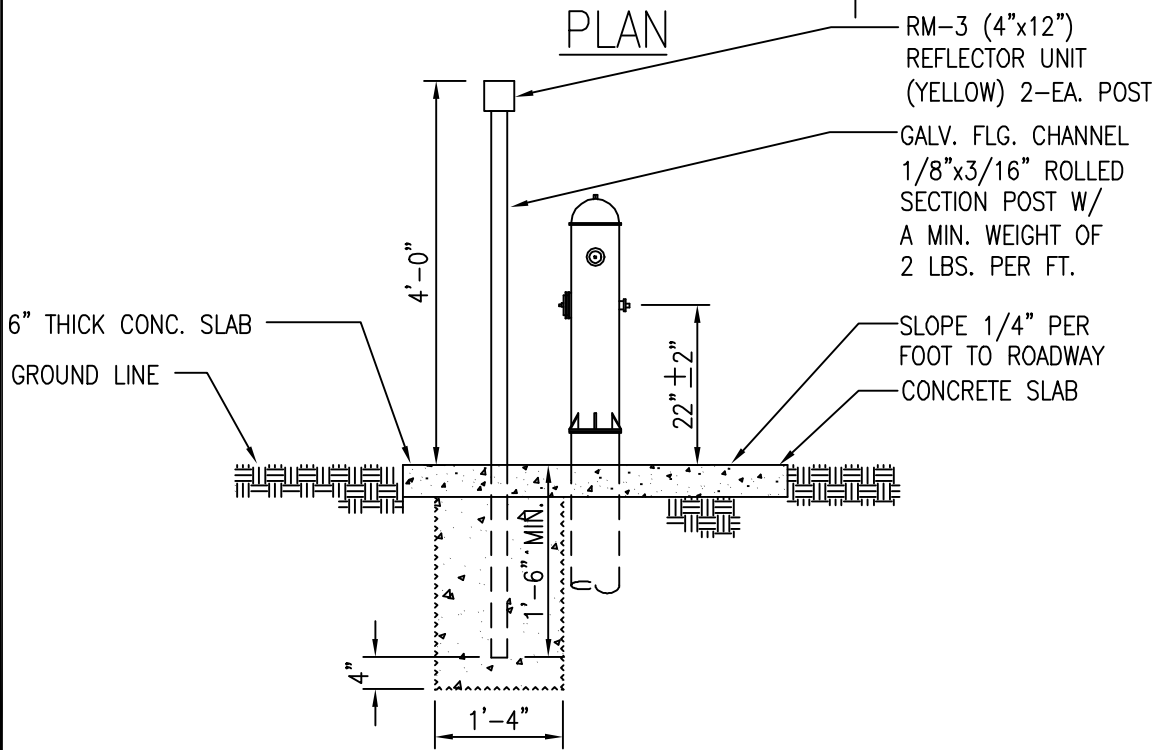
1. GASKETS FOR FLANGED JOINTS SHALL BE 1/8" DUCK-INSERTED RUBBER PACKING GARLOCK NO. 19.
2. BOLTS SHALL BE BREAK-OFF TYPE, 5/8" DIA. x 3" LONG MACHINE BOLTS WITH CUT THREADS, AMERICAN STANDARD COARSE HEXAGON HEADS, STAINLESS STEEL OR SILICON BRONZE. INSTALL BOLT WITH THREADS FACING DOWN.
3. NUTS SHALL BE AMERICAN STANDARD HEAVY COLD PUNCHED HEXAGON NUTS, STAINLESS STEEL OR SILICON BRONZE.
4. CONCRETE SHALL BE DWS 2500.
5. REFER TO PLATE FH11 FOR FIRE HYDRANT INSTALLATION WITH CURB GUARD. (OAHU & KAUAI ONLY). FOR MAUI, REFER TO PLATE FH9 WHERE NO STREET CURBING.
6. FLANGED OUTLET FOR THE TEE IS OPTIONAL FOR OAHU; MANDATORY FOR KAUAI AND MAUI.
7. TAPPING SLEEVE WITH TAPPING VALVE ASSEMBLY MAY BE USED FOR CONNECTION TO EXIST MAIN.
8. LUBRICATE HYDRANT NOZZLE THREADS WITH NON-TOXIC GREASE.
9. PROVIDE SLOTTED FLANGED RISER FOR HYDRANT AS NEEDED TO ALIGN 4-1/2" NOZZLE PERPENDICULAR TO CURB. (FOR MAUI ONLY)
10. INSTALL HYDRANT MARKERS. (SEE PLATES FH12 AND FH13)

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KAUAI OAHU MAUI	<b>HYDRANT CONNECTION</b> NOTES SCALE: NTS	STANDARD DETAILS	<b>FH8</b>
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**PLAN**



**ELEVATION**  
 (REFLECTOR POST DETAIL  
 FOR MARKING HYDRANTS  
 WITHOUT STREET CURBING)

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MAUI	<b>HYDRANT CONCRETE SLAB &amp; REFLECTOR POST</b> SCALE: NTS	STANDARD DETAILS	<b>FH9</b>
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