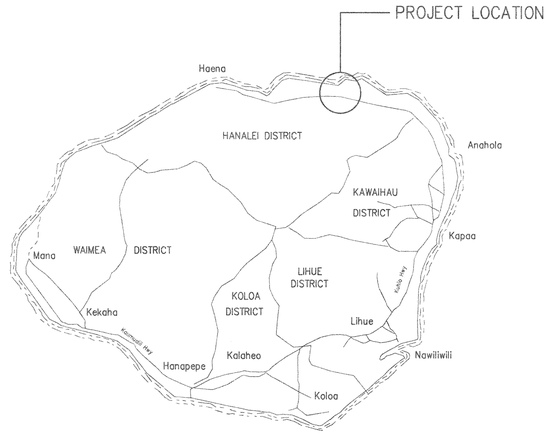
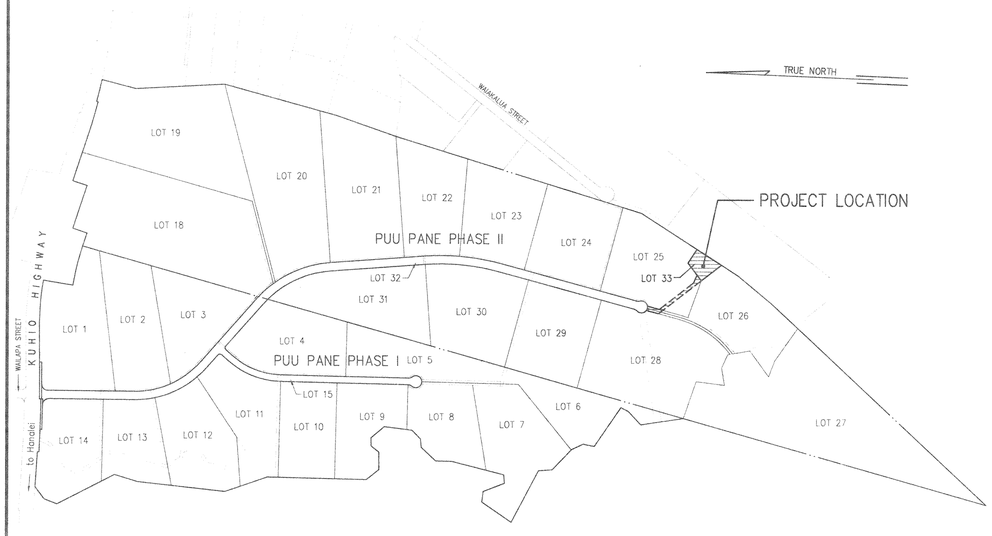


ISLAND OF KAUAI



LOCATION MAP

NOT TO SCALE

PUU PANE
0.1 MILLION GALLON RESERVOIR
KAHILI, HANALEI, KAUAI, HAWAII
PLANNING SUBDIVISION NO. S-92-52

INDEX TO DRAWINGS

MANAGER & CHIEF ENGINEER, DEPARTMENT OF WATER
COUNTY OF KAUAI

D A T E

REVISION	DATE	DESCRIPTION	BY	APPROVED

CONSTRUCTION PLANS
FOR
PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key : (4) 5-1-05 : 3

TITLE SHEET

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS
COUNTY OF KAUAI

APPROVED: 9/10/93

MANAGER & CHIEF ENGINEER, DEPT. OF WATER
COUNTY OF KAUAI

AQUA ENGINEERS, INC.
LAWAI, KAUAI, HAWAII 96765

DESIGNED BY: RSS | DRAWN BY: MANLA ETC. | CHECKED BY: | SHEET OF T-1

GENERAL CONSTRUCTION NOTES

1. All construction work is to be constructed in accordance with the publications "Hawaii Standard Specifications for road, bridge, and Public Works Construction, 1994" and "Standard Details for Public Works Construction, 9-84". Standard Details are available at the Kauai Clerks Office. Standard Specifications are available at the State Department of Transportation.

2. No grading between 6 PM to 6 AM on any given day or on Saturdays, Sundays and holidays without permission from the County Engineer.

3. Contractor to notify Public Works Department five (5) calendar days prior to commencing any grading work. When completed and ready for final inspection, notify Public Works Department inspection section.

4. Construction plans are valid for a period of one year from the date of approval. If construction does not commence within this one year time frame then the construction plans will have to be resubmitted to the County agencies for review and approval.

5. All grading, grubbing and stockpiling work shall be performed in accordance with County of Kauai ordinance no. 695. The contractor shall inform the County Engineer of the location of the disposal site. The disposal site must also fulfill the requirements of the grading ordinances.

6. 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 by the Chief Engineer shall be payable by the Contractor.

7. All slopes and exposed areas shall be sodded or planted immediately after the grading work has been completed.

8. Contractor must obtain all necessary permits before construction commences. Permits to include, but not be limited to grubbing, grading, etc.

9. During cleaning operations, the Contractor shall supply a water truck for dust control purposes until vegetation has re-established itself. Excess water, including silt and dirt, shall not be allowed to run-off the property.

10. All existing flow conditions shall be maintained.

11. The Contractor shall retain services of a registered civil engineer whose specialty is in geotechnical engineering for construction quality control. The "geotechnical" engineer shall submit certification that work complies to project and standard specifications. Tests made by the geotechnical engineer for quality control shall be submitted to the County Engineer.

WATER NOTES

1. Unless otherwise specified, all materials and construction of water facilities and appurtenances shall be in accordance with the "Water System Standards" Volume I and Volume II, 1985, as adopted by the Department of Water, County of Kauai and all subsequent amendments and additions for use in the design and construction of the department's water system facilities. In order to prevent unapproved materials from being ordered, the Contractor is invited to submit his material list description to the Department of Water for cross-check before ordering any materials from the supplier.

2. All materials (pipe, pipe lubricants, paints, sealants, form oil, concrete admixtures, etc.) in direct contact with the potable water shall obtain National Sanitation Foundation (NSF) approvals. The contractor shall submit these approvals to the Department of Water for review and approval prior to it's application.

3. Plastic pipes for service laterals shall be PVC 1120, or PVC 1200 SDR 21, CLASS 200 with NSF seal of approval. Plastic pipes for service laterals shall be of the solvent-welded type.

4. The contractor shall arrange a pre-construction conference at least 10 days before construction and shall notify the Department of Water at least 3 working days prior to the start of construction.

5. The contractor shall submit the name of its authorized superintendent on the job. The contractor shall also submit the names and telephone numbers of at least three (3) persons to contact in case of emergency during non-working hours.

6. The contractor shall notify the department of water at least 24 hours prior to any trenching, pipe laying, backfilling, testing or chlorination to insure the inspectional services will be available.

7. The contractor shall verify in the field the location of the existing water mains and appurtenances. The contractor shall expose existing water main prior to trenching. Excavation around any existing water mains shall be done by hand.

8. Where a utility is found to be in conflict with the waterline, the contractor shall notify the engineer prior to making any adjustment. Any damage to any existing utility not in conflict with the installation of the waterline shall be repaired by the contractor at his own expense.

9. Access to existing fire hydrants and water meters shall be provided by the contractor at all times.

10. Trench excavation, backfilling in lifts, and repaving shall conform to the "Hawaii Standard Specification for Road, Bridge, and Public Works Construction, 1994." All damaged pavement shall be restored to its original condition with a minimum of 2" a.c. and 8" base course.

11. The contractor shall whenever necessary, properly sheet and brace all excavations to render it secure and shall remove all such sheeting and bracing before completion of the backfill.

12. There shall be no physical connection between a public or private potable water system and a sewer, or appurtenance thereto which could permit the passage of any sewage or polluted water into the potable water supply.

    Sewers shall be laid at least 6 ft., horizontally, from any existing or proposed water main. Where conditions prevent a lateral separation of 6 ft., a sewer may be laid as close as 3 feet to the water main if it is laid in a separate trench and the elevation of the top (crown) of the sewer is at least 12 inches below the bottom (invert) of the water main.

    Whenever a sewer line crossed water mains, the sewer line must be jacketed with reinforced concrete for a minimum of 5 feet on both sides of the point of crossing if the sewer is above the water main and for 3 feet on both sides if the sewer line is below the water main. However, jacketing may be eliminated if the sewer line is below the water main and the separation is greater than 18 inches.

13. Unless otherwise directed, prior to the connection of any pipeline to the existing main, the pipeline installed shall be pressure tested, cleaned, chlorinated, flushed, and sampled in accordance to the " Water System Standard" and/or in accordance with the procedures outlined below in notes 14 through 19.

14. All water mains and appurtenances including service laterals and service connections shall be subjected to a 150 PSI hydrostatic pressure test for either"

    A. One (1) hour with a drop in pressure of no more than three (3) PSI pipe and joints may be backfilled.

    B. Thirty (30) minutes with a drop in pressure of no mare than ten (10) PSI. All joints of the pipe must be exposed during the test.

15. Cleaning shall be by the use of "Pigs" introduced into the pipeline and run completely through all installed pipelines excluding branch line for fire hydrants and service laterals. "Pigs" shall consist of a cylindrical piece of polyurethane foam with a density range of 1.25 to 1.45 pounds per cubic foot. For waterlines up to 8" in diameter, the diameter of the pig shall be 2" larger than the pipe to be cleaned and 18" long. For 12" diameter waterlines, the pig shall be 16" in diameter and 30" long. For 16" diameter waterline, the pig shall be 20" in diameter and 36" long.

16. Chlorination of the installed pipeline shall be in accordance with Part III Section 1.12.17 of the "Water System Standard." The contractor shall be responsible for the proper disposal of chlorinated water to safeguard public health and environment in accordance with applicable department of health requirements.

17. The installed pipeline shall be flushed after chlorination. Water samples shall be tested with a low range chlorine test kit to evidence flushing.

18. Microbiological samples shall be taken in all cases after all chlorine has been flushed. Sampling shall be done by the contractor in coordination with the department's inspector with sampling bottles furnished by a certified laboratory. The department shall determine the locations of the sampling point(s) along the new water main. Under no circumstances shall sample bottles be rinsed out.

19. Testing of the water samples shall be made by an approved laboratory certified by the State Department of Health. The contractor may choose to collect one water sample at each sample point or collect two water samples, 24 hours apart, at each sample point.

    A. If one water sample per sample point is collected, the disinfection procedure shall be considered acceptable after the laboratory test results show the absence of both coliform and non-coliform bacteria.

    B. If two water samples (24 hours apart) are collected per sample point, the disinfection procedure shall be considered acceptable after the laboratory test results show the absence of coliform and the non-coliform bacteria count is less than 200 colonies per 100 miles for each sample.

    C. Water samples shall be taken from both the 12" Connecting Pipeline and the O. I. M. G. Reservoir.

20. Metallized tape shall be placed about all installed water mains. Metallized tape shall be installed a maximum of 24' and a minimum of 12" below finished grade. In no instance will the tape be installed in the roadway structure including select borrow, base course or wearing surface. The tape shall be installed on top of a compacted layer of trench backfill material and placed as close as practical to a position directly above the installed pipeline.

21. Metallized tape shall be blue and imprinted with the following, "CAUTION WATER LINE BELOW." Tape shall be two inches in with and shall be readily detectable with any standard pipe or cable locator.

22. All fire hydrants shall be cleaned after installation and painted with two coats of paint. Paint shall be Dupont Dolox High Visibility Yellow or Kem Lustre Enamel Light Yellow #F65Y12.

SPECIAL NOTES TO DEVELOPER:

Developer/Contractor is to submit the Contractors bid tabulation for the itemized Water Facilities at the Pre-Construction meeting.

Certification of Water Facilities shall not be approved until:

A. All water improvements are complete and dedicated to the Department of Water.

B. As-built tracings are submitted to the Department of Water.

C. Final cost breakdown for the water improvements are submitted and approved by the Department of Water.

D. Roadway and pipeline easements are conveyed to the Department of Water, if applicable.

NOTES FOR ENVIRONMENTAL PROTECTION

1. In accordance with Chapter 11-60.1, Air Pollution Control, Title 11, State Administrative Rules, the property Owner/Developer shall be responsible for ensuring that effective control measures are provided to minimize or prevent any visible dust emission caused by the construction work from impacting the surrounding areas including the off-site roadways used to enter/exit the project. These measures include but are not limited to the use of water wagons, sprinkler systems, dust fences, etc.

2. In accordance with Chapter 11-55, Water Pollution Control and Chapter 11-54, Water Quality Standards, Title 11, State Administrative Rules, the property Owner/Developer shall be responsible for ensuring that the Best Management Practice (BMP) to minimize or prevent the discharge of sediments, debris, and other water pollutant into State waters is provided.

3. In accordance with Chapter 11-58.1, Solid Waste Management Control, Title 11, State Administrative Rules, the property Owner/Developer shall be responsible for ensuring that grubb material, demolition waste and construction waste generated by the project are disposed of in a manner or at a site approved by the State Department of Health. Disposal of any of these wastes by burning is prohibited.

4. The property Owner/Developer shall be responsible for obtaining all applicable permits from the Department of Health including but not limited to National Pollution Discharge Elimination System (NPDES) permits for storm water, hydrostatic test and dewatering discharges prior to commencing construction.

TEMPORARY DUST CONTROL

1. The graded or project site that is cleared of vegetation shall be kept damp for seven (7) days a week. At the end of each day, the site shall be sufficiently dampened so that the site will remain moistened during the night.

2. The Contractor shall conduct his operations so that excavation, embankment, and imported material shall be dampened to prevent dust problems.

3. In applying for a grading permit, the Contractor shall submit plans, construction schedules and/or written measures which provide for dust control. The dust control measures shall contain positive statements which require actions or work that prevent dust problems. No permits will be issued unless the County is assured that the dust problems will be minimized.

TEMPORARY EROSION CONTROL MEASURES

1. Temporary vegetative cover shall be planted immediately after grading is completed, 40 lbs. common rye grass seed per acre, 400 lbs. per acre 10-10-10 or equivalent fertilizer worked into seed bed before planting. Temporary sprinkler system is to be installed concurrently with all plantings. Planting and maintenance of grass shall conform to the "Hawaii Standard Specifications for road, bridge, and Public Works Construction, 1994".

2. Temporary vegetative cover shall be planted within a period of 30 calendar days after the site has been graded or bared of vegetation or if final grading of the site will be suspended for more than 30 calendar days.

3. The contractor shall maintain a water truck with jet and dampen the graded or grubbed site with water at all times.

4. The project site shall be kept damp with water for seven (7) days a week. At the end of each day, the site shall be sufficiently dampened so that the site will remain moistened during the night.

5. The Contractor shall conduct his operations so that excavation, embankment and imported material shall be dampened with water during the grading operation.

6. The graded or project site that is cleared of vegetation shall be kept damp.

7. In applying for a grading permit, the Contractor shall submit plans, construction schedules and/or written measures which provide for dust control. The dust control measures shall contain positive statements which require actions or work that prevent dust problems. No permits will be issued unless the County is assured that the dust problems will be minimized.

PERMANENT EROSION CONTROL MEASURES (IF APPLICABLE)

1. The Contractor shall grass the entire project site, except paved areas, with bermuda grass sprigs. The grass shall be planted, fertilized, and maintained in accordance with the "Hawaii Standard Specifications for road, bridge, and Public Works Construction, 1994".

2. The Contractor shall grass all exposed areas that have been constructed to final grades within a period of 30 calendar days.

REVISION	DATE	DESCRIPTION	BY	APPROVED

WAYNE T. WADA
LICENSED PROFESSIONAL ENGINEER
No. 5281-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Wayne T. Wada

CONSTRUCTION PLANS
FOR
PU'U PANE 0.1 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

CONSTRUCTION NOTES

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 4/10/98

MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

ESAKI SURVEYING & MAPPING, INC.
LIHUE, KAUAI, HAWAII 96766

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SHEET OF
	DA		C-1

NOTES.dwg 4/9/98

REVISION	DATE	DESCRIPTION	BY	APPROVED

WAYNE T. WADA
LICENSED PROFESSIONAL ENGINEER
No. 5281-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Wayne T. Wada

CONSTRUCTION PLANS FOR PU'U PANE 0.1 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

GENERAL PLAN

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED:

MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

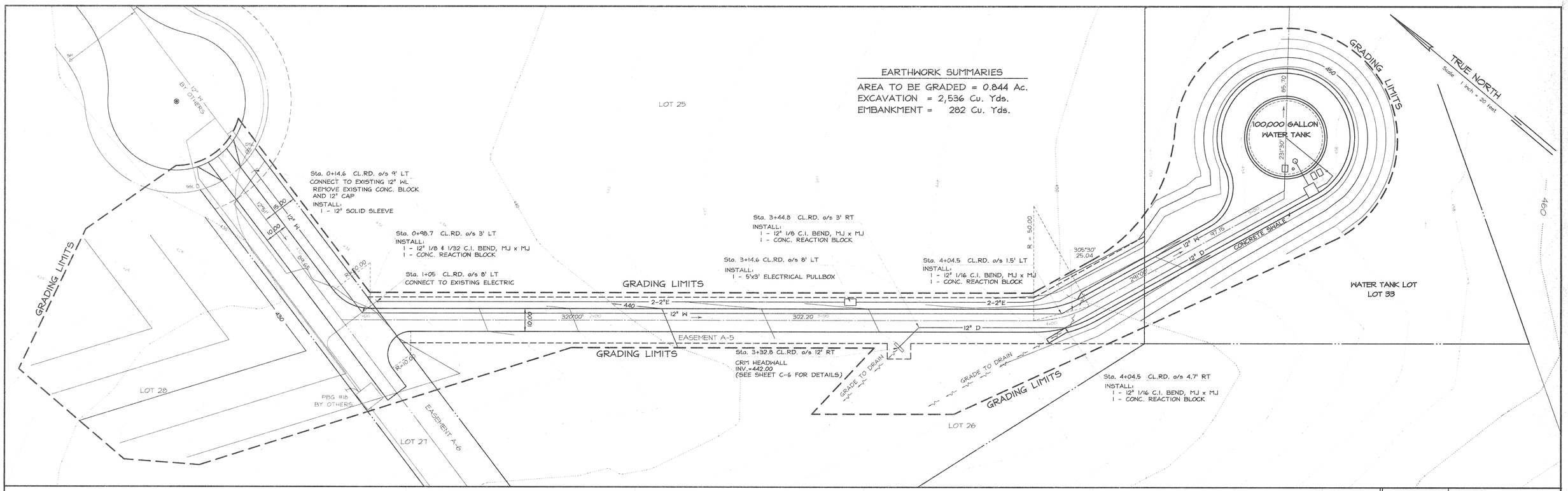
ESAKI SURVEYING & MAPPING, INC.
LIHUE, KAUAI, HAWAII 96766

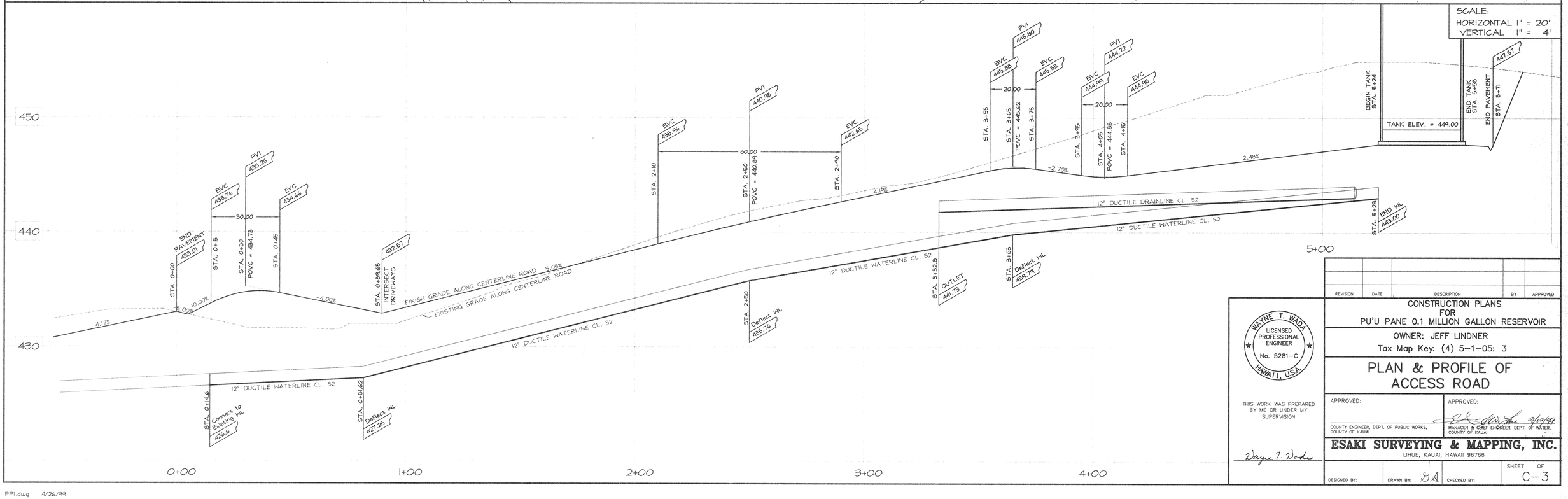
DESIGNED BY:	DRAWN BY: GA	CHECKED BY:	SHEET OF C-2

T-GEN.dwg 4/13/99

EARTHWORK SUMMARIES

AREA TO BE GRADED = 0.844 Ac.
EXCAVATION = 2,536 Cu. Yds.
EMBANKMENT = 282 Cu. Yds.





REVISION	DATE	DESCRIPTION	BY	APPROVED

CONSTRUCTION PLANS
FOR
PU'U PANE 0.1 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

PLAN & PROFILE OF ACCESS ROAD

WAYNE T. WADA
LICENSED PROFESSIONAL ENGINEER
No. 5281-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Wayne T. Wada

APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED:
9/13/99
MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

ESAKI SURVEYING & MAPPING, INC.
LIHUE, KAUAI, HAWAII 96766

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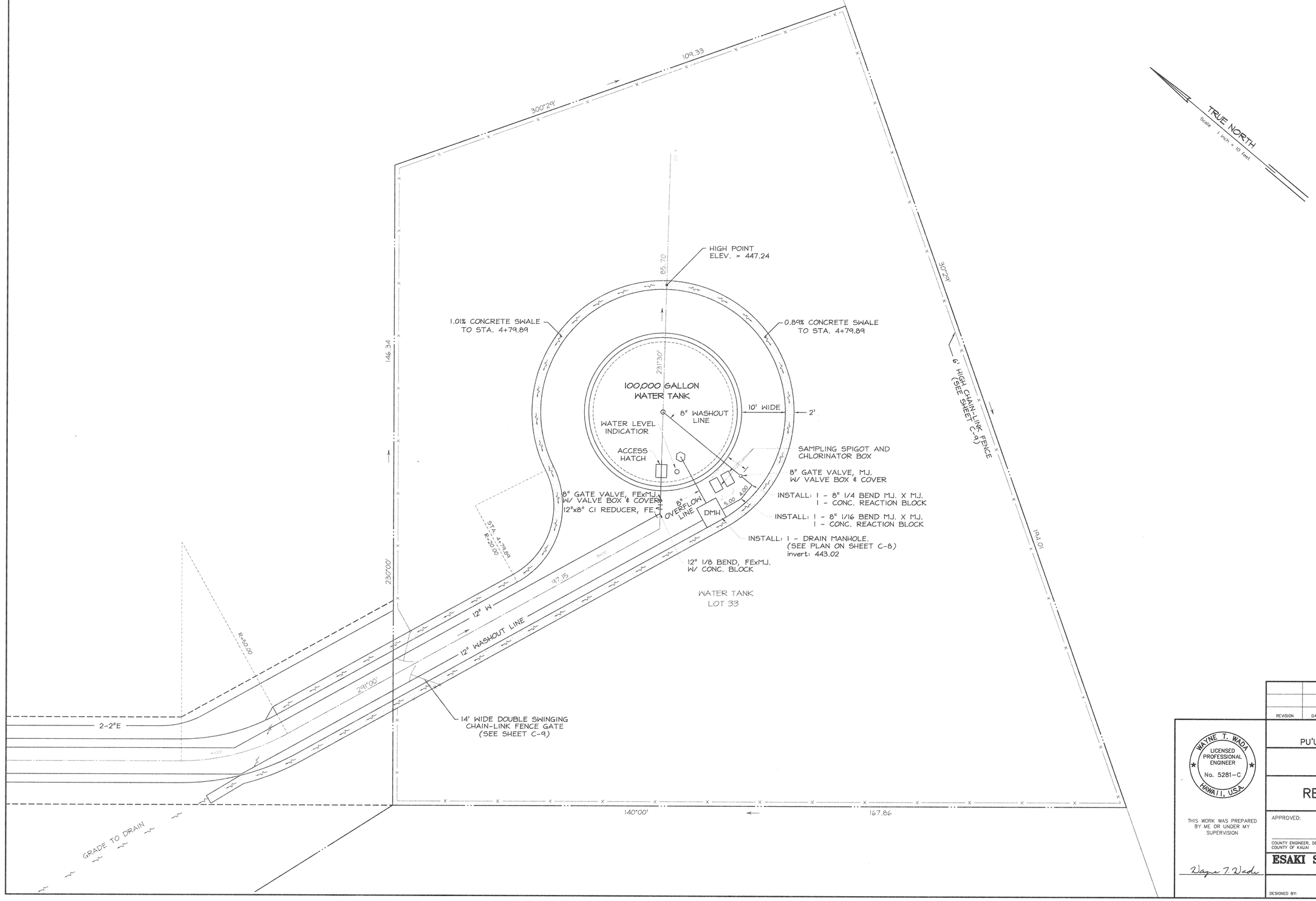

REVISION	DATE	DESCRIPTION	BY	APPROVED

WAYNE T. WADA
LICENSED PROFESSIONAL ENGINEER
No. 5281-C
HAWAII, U.S.A.

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Wayne T. Wada

CONSTRUCTION PLANS
FOR
PU'U PANE 0.1 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER

Tax Map Key: (4) 5-1-05: 3

RESERVOIR SITE PLAN

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 9/6/99

MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

ESAKI SURVEYING & MAPPING, INC.
LIHUE, KAUAI, HAWAII 96766

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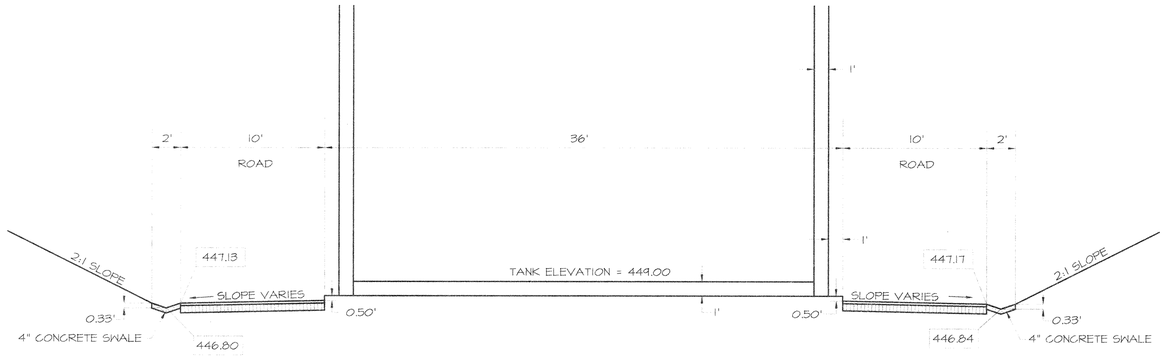
	YA		C-4	

SITE.dwg 4/23/99



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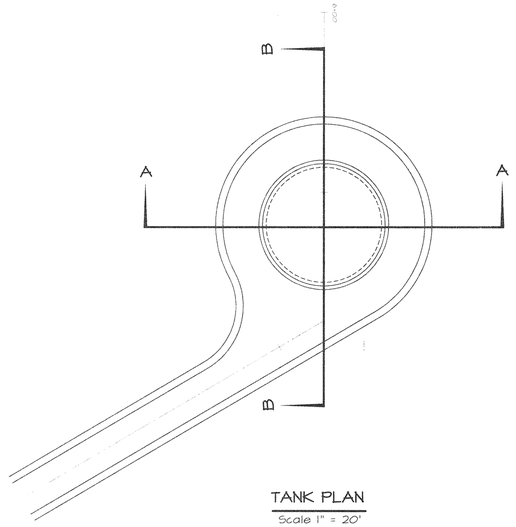

TANK PLAN

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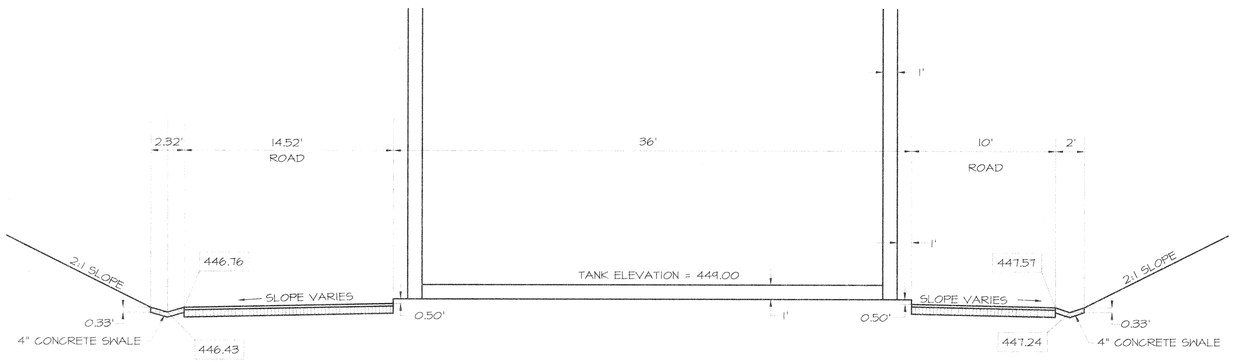

TANK SECTION B-B

Scale 1" = 5'

REVISION	DATE	DESCRIPTION	BY	APPROVED

WAYNE T. WADA
LICENSED PROFESSIONAL ENGINEER
No. 5281-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Wayne T. Wada

CONSTRUCTION PLANS
FOR
PU'U PANE 0.1 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER

Tax Map Key: (4) 5-1-05: 3

RESERVOIR SECTIONS

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED:

MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI — 9/10/99

ESAKI SURVEYING & MAPPING, INC.

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			C-5	

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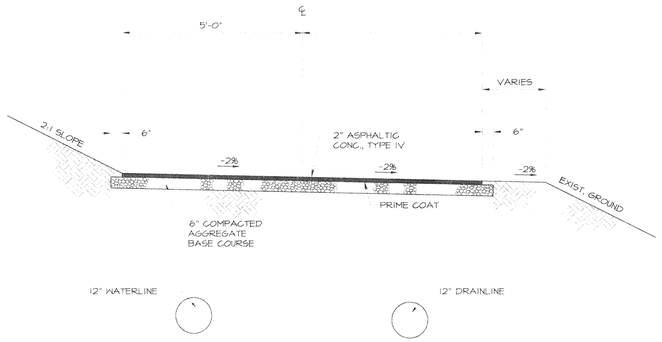

TYPICAL ROAD SECTION

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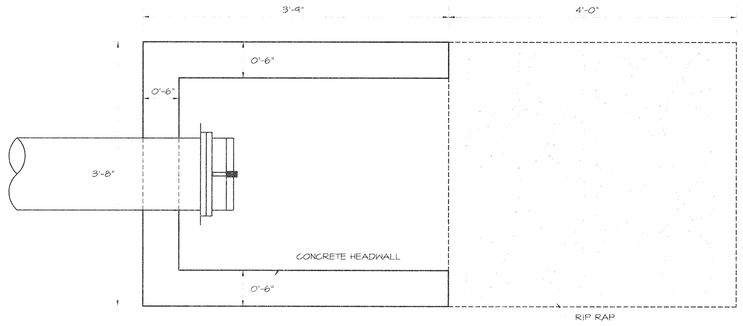

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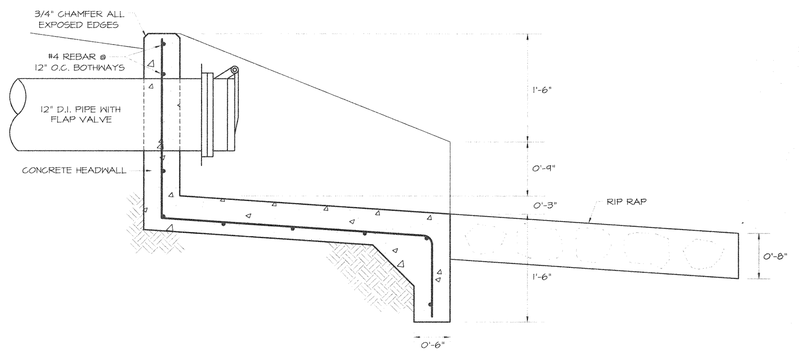

SECTION

DRAINAGE OUTLET STRUCTURE

SCALE: 1" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

WAYNE T. WADA
LICENSED PROFESSIONAL ENGINEER
No. 5281-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Wayne T. Wada

CONSTRUCTION PLANS
FOR
PU'U PANE 0.1 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

MISCELLANEOUS DETAILS

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED:

MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI — 9/10/99

ESAKI SURVEYING & MAPPING, INC.
LIHUE, KAUAI, HAWAII 96766

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			C-6

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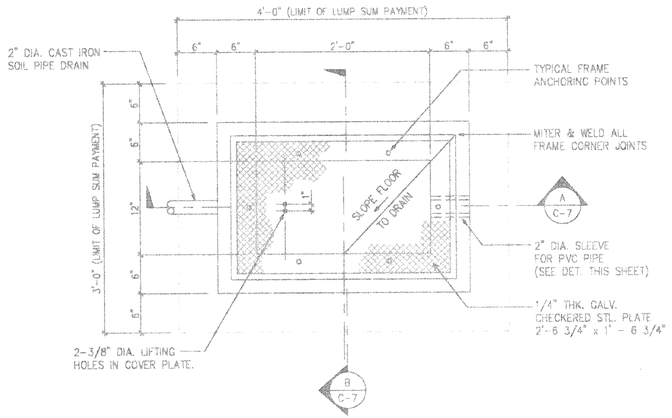

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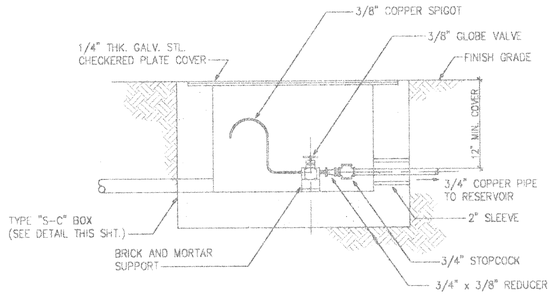

SAMPLING SPIGOT BOX DETAIL
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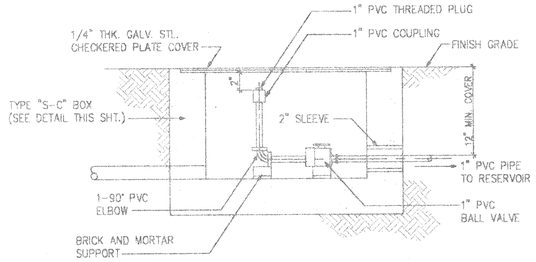

CHLORINATION BOX DETAIL
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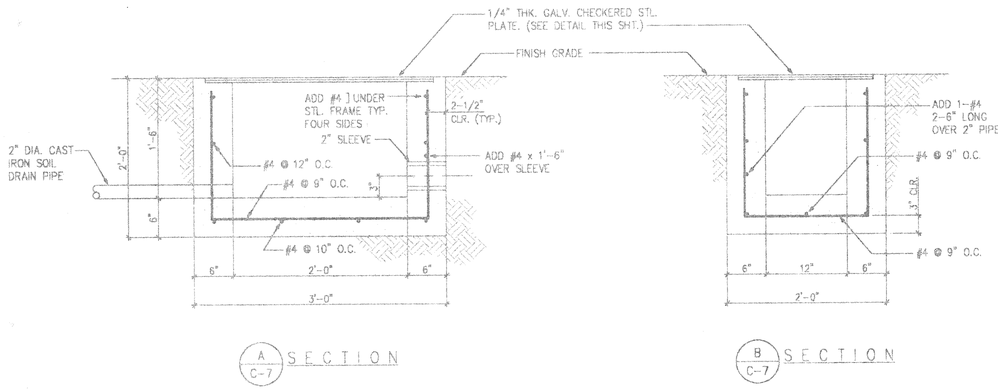

A/C-7 SECTION

B/C-7 SECTION

DETAILS OF TYPE "S-C" BOX
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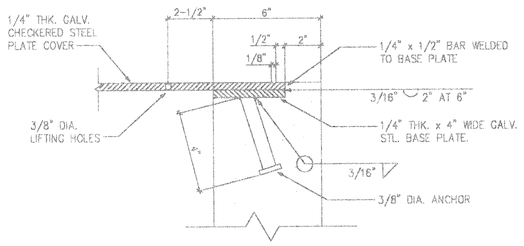

COVER PLATE SEAT DETAIL
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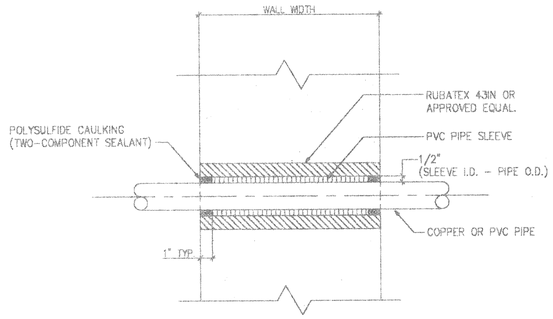

PIPE PENETRATION DETAIL
NOT TO SCALE

REVISION	DATE	DESCRIPTION	BY	APPROVED

CONSTRUCTION PLANS
FOR
PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key : (4) 5-1-05 : 3

CIVIL DETAILS - 1

IAN KAGIMOTO LICENSED PROFESSIONAL ENGINEER No. 3723 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED:
MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

AQUA ENGINEERS, INC.
LAWAI, KAUAI, HAWAII 96765

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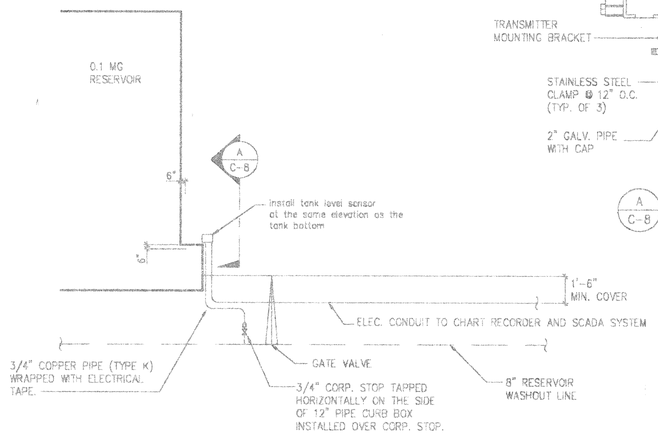
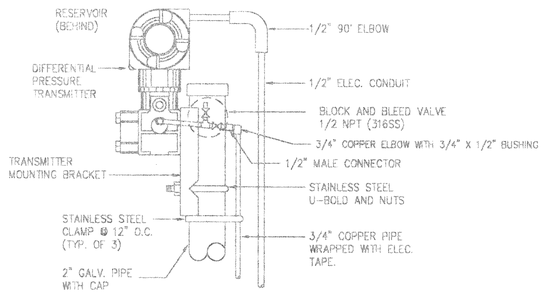
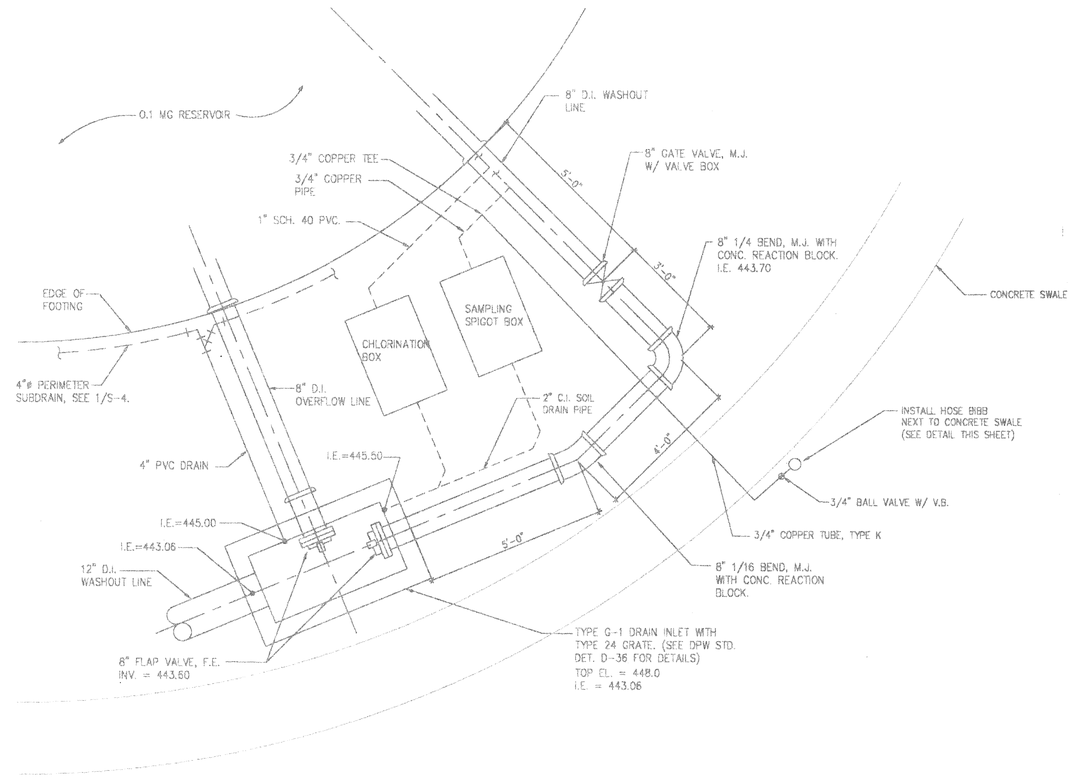
			C-7





A / C-8 DETAIL
NOT TO SCALE

PRESSURE TRANSMITTER SCHEMATICS
NOT TO SCALE



B / C-8 DETAIL
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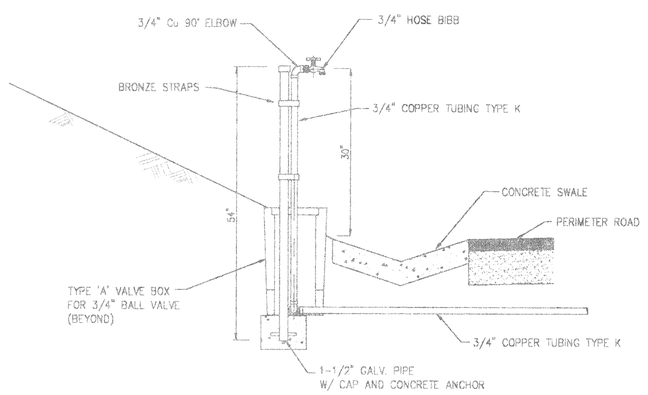


HOSE BIBB LOCATION AND DETAIL
NOT TO SCALE

REVISION	DATE	DESCRIPTION	BY	APPROVED

CONSTRUCTION PLANS
FOR
PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key : (4) 5-1-05 : 3

CIVIL DETAILS – 2

IAN KAGIMOTO
LICENSED PROFESSIONAL ENGINEER
No. 3723
HAWAII, U.S.A.

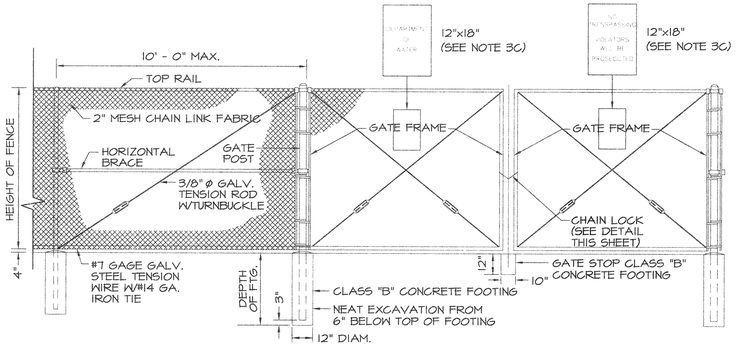
APPROVED:
COUNTY ENGINEER, DEPT OF PUBLIC WORKS
COUNTY OF KAUAI

APPROVED:
MANAGER & CHIEF ENGINEER, DEPT OF WATER
COUNTY OF KAUAI

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

AQUA ENGINEERS, INC.
LAWAI, KAUAI, HAWAII 96765

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SHEET OF
			C-8



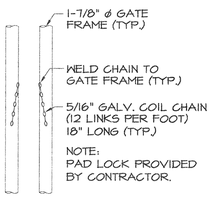
DRIVE GATE DETAIL

NOT TO SCALE

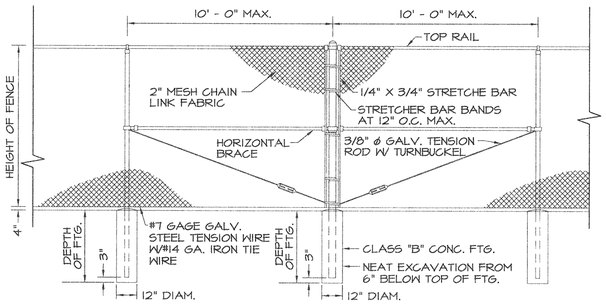
Gate Openings	Nominal Pipe Size of Gate Frames		Nominal Pipe Size of Gate Posts	
	O.D.	WT/FT	O.D.	WT/FT
Single to 4'	1-5/8"	2.27	2-7/8"	5.79
Single to 6' or Double to 12'	1-7/8"	2.72	2-7/8"	5.79

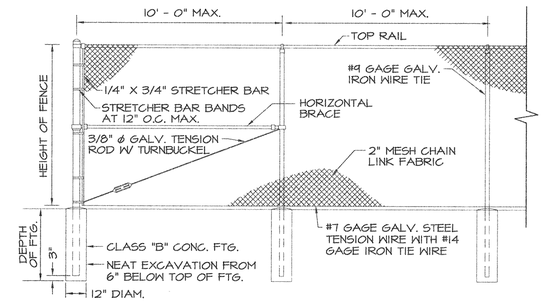
NOTE

1. Double Swing Drive Gate shall be provided with 2 Latch Forks, 2 Fork Catchs, and 2 Gate stops located as directed by the Engineer.
2. Apply 2 Coats of Z.R.C. on all welded Connections.



CHAIN LOCK DETAIL





CHAIN LINK FENCE STANDARD SPECIFICATIONS FOR KAUAI

1. SCOPE OF WORK

This work shall consist of the construction of chain link fences and gates in accordance with the drawings, and as specified herein.

2. MATERIALS

a. Chain link fabric shall conform to requirements of ASTM Designation A392-71a Class 1. Fittings and hardware shall be steel, malleable iron of wrought iron, unless otherwise designated in these specifications, and shall be galvanized in accordance with ASTM Designation A153-71.

b. Steel pipe used for posts, sleeves, braces, top railing and gate frames shall be hot dipped galvanized and seamless steel pipe conforming to ASTM Designation A120.

c. Tension wire shall be at least No. 7 gage galvanized coil spring steel wire and tie wire shall be No. 9 and 14 gage galvanized iron wire.

d. All posts shall be fitted with approved tops designed to fit securely over the posts, and the top rail shall pass through the base of these tops.

e. Concrete for post footing shall be Class B (2,500 psi).

3. INSTALLATION AND WORKMANSHIP

a. The contractor shall perform such clearing and grubbing as may be necessary to construct the fence to the required grade and alignment.

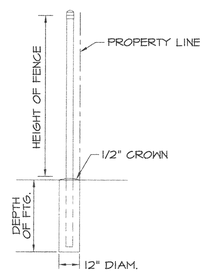
b. Posts shall be set vertically and true to line, spaced not greater than 10 feet on center. Where changes in line occur with an angle of deflection of 30 degrees or more the change point will be considered as a corner and a corner post shall be installed. End, corner and gate posts for 6 feet fabric fence shall be braced at the nearest line post with galvanized horizontal braces and also with galvanized 3/8" ø steel truss rods with drop-forged turnbuckles. The horizontal braces shall be spaced midway between top rail and ground and securely fastened to posts by suitable pressed steel connections. Pull posts at maximum intervals of 300 feet, shall be braced and trussed in both directions as specified above. Couplings for the top rails shall be the outside sleeve type, at least 7 inches long each and shall be installed at intervals of 21 feet maximum. One coupling in every five shall be provided with a heavy spring between rails to take up expansion and contraction. Top rails shall pass through base of line post tops and form a continuous brace from end to end of each stretch of fence, and shall be securely fastened to terminal posts with end clamps or corner clamps of any pressed steel connections as approved.

c. Chain link fabric shall be stretched taut and securely fastened to the posts. Between posts, the top edge of the fabric shall be fastened to the top rail, the lower edge to the tension wire, with No. 14 gage galvanized wire at intervals of not more than 24 inches. Tension wire shall be stretched tight and shall be installed on a straight line between posts. Stretcher bars and stretcher bar bands shall be used for fastening fabric to end, corner and gate posts. Stretcher bar bands shall be spaced at 12 inch intervals. Fastening to line post shall be made with No. 9 gage galvanized wire at intervals of not more than 14 inches. Unless otherwise noted, the bottom of the chin link fabric shall be 4 inches above the ground. Excavate the high points of the ground.

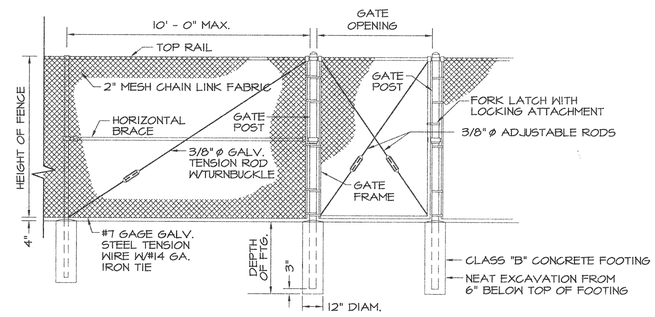
d. The corners of gate frames shall be fastened together and reinforced with malleable iron fittings or by welding as approved. Welds shall all be ground smooth. All drive gate frames and walk gate frames for six foot fence shall be cross-trussed with 3/8" ø adjustable truss rods. Fabric specified for the fence shall be attached to the gate frame with stretcher bars and tie wires as specified for fence construction and suitable tension connectors spaced at 12" intervals. The gates shall be hung by at least two steel or malleable iron hinges not less than 3" in width, so designed as to securely clamp to the gate post and permit the gate to be swung back against the fence. Stops shall consist of a substantial mechanical device for securing and supporting the free end of the gate in full open position. Locks for gates and chain barriers accessible from both sides shall be provided. "BEST" Padlocks No. 41B122-L-PS-1534X1534, Department of Water Security Lock System shall be provided. D.O.W. shall provide core numbers only.

e. Signs shall be same as traffic signs with black lettering and border on white back ground. 1/4" holes shall be punctured in each corner of the sign. #14 gage iron tie wire shall be used to attach the sign to the chin link fabric.

Height of Fence	Minimum Depth of Footing		Nominal Pipe Size of Fence Posts								Chin Link Fabric		
	Line Post	Corner, Pull, End and Gate Posts	Line Posts		Corner, Pull, and End Posts		Top Rail		Braces		Finish		Fabric Gage No.
			O.D.	WT/FT	O.D.	WT/FT	O.D.	WT/FT	O.D.	WT/FT	Top Edge	Bottom Edge	
3'	2'-0"	2'-6"	1-7/8"	2.72	1-7/8"	2.72	1-3/8"	1.68	———	———	Knuckled	Knuckled	11
4'	2'-6"	2'-6"	1-7/8"	2.72	2-3/8"	3.65	1-3/8"	1.68	———	———	Knuckled	Knuckled	11
5'	3'-0"	3'-0"	1-7/8"	2.72	2-3/8"	3.65	1-5/8"	2.27	1-5/8"	2.27	Knuckled	Knuckled	9
6'	3'-0"	3'-0"	2-3/8"	3.65	2-7/8"	5.79	1-5/8"	2.27	1-5/8"	2.27	Knuckled	Knuckled	9



TYPICAL SECTION
(WITH CONCRETE FOOTING)



REVISION	DATE	DESCRIPTION	BY	APPROVED

WAYNE T. WADA
LICENSED PROFESSIONAL ENGINEER
No. 5281-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Wayne T. Wada

CONSTRUCTION PLANS
FOR
PU'U PANE 0.1 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER

Tax Map Key: (4) 5-1-05: 3

STANDARD CHAIN LINK FENCE DETAILS AND SPECIFICATIONS

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 9/10/99

MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

ESAKI SURVEYING & MAPPING, INC.
LIHUE, KAUAI, HAWAII 96766

DESIGNED BY:	DRAWN BY: GA	CHECKED BY:	SHEET OF C-9

FENCE.dwg 6/14/99

GENERAL STRUCTURAL NOTES

A. GENERAL:

1. ALL WORK SHALL CONFORM TO THE BUILDING CODE OF THE COUNTY OF KAUAI.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO THE START OF THE JOB AND NOTIFY ALL DISCREPANCIES TO THE ENGINEER.
3. ALL WORK SHALL CONFORM TO THE BEST PRACTICE PREVAILING IN THE VARIOUS TRADES COMPRISING THE WORK.
4. FEATURES OF CONSTRUCTION SHOWN ARE TYPICAL, AND THEY SHALL APPLY GENERALLY THROUGHOUT FOR SIMILAR CONDITIONS. MODIFY TYPICAL DETAILS AS DIRECTED TO MEET SPECIAL CONDITIONS.
5. SPECIFIC NOTES AND DETAILS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SHORING. THE CONTRACTOR SHALL PROVIDE TEMPORARY ERECTION BRACING AND SHORING FOR ALL STRUCTURAL MEMBERS AS REQUIRED FOR STRUCTURAL STABILITY OF THE STRUCTURE DURING ALL PHASES OF CONSTRUCTION.
7. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO INSURE THE PROPER ALIGNMENT OF THE STRUCTURES.
8. MODIFICATION TO DRAWINGS: THE GENERAL CONTRACTOR AND HIS SUBCONTRACTORS MUST SUBMIT IN WRITING ANY REQUESTS FOR MODIFICATIONS TO THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS THAT ARE SUBMITTED TO THE DESIGN PROFESSIONAL FOR HIS REVIEW DO NOT CONSTITUTE "IN WRITING". IN ANY EVENT, CHANGES TO THE PLANS AND SPECIFICATIONS BY MEANS OF SHOP DRAWINGS BECOME THE RESPONSIBILITY OF THE PERSON INITIATING SUCH CHANGES.
9. THE CONTRACTOR SHALL PROTECT AND SHIELD FROM DAMAGE ALL AREAS ADJACENT TO AND SURROUNDING THE CONSTRUCTION WORK. EXISTING CONDITIONS OR AREAS DAMAGED OR DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.

B. DESIGN DATA:

1. SEISMIC . . . . . ZONE 1
2. BASIC WIND SPEED . . . . . 80 MPH, EXPOSURE C
3. ROOF LIVE LOAD . . . . . 20 PSF
4. ALLOWABLE SOIL BEARING PRESSURE . . . . . 2,500 PSF
5. ALLOWABLE STRESSES:
   - A. RING WALL CIRCUMFERENTIAL STEEL . . . . . Fs = 10,000 PSI
   - B. HYDROSTATIC TENSION & SHRINKAGE (CONCRETE). . Fc = 300 PSI
   - C. BENDING-WALL REINF. . . . . Fs = 24,000 PSI
   - D. BENDING-ROOF, FOOTING & OTHERS. . . . . Fy = 60,000 PSI

C. CONCRETE:

1. ALL WORK SHALL CONFORM TO ACI 318-95.
2. NO CONSTRUCTION LOADS EXCEEDING THE STRUCTURAL DESIGN LIVE LOADS SHALL BE SUPPORTED UPON ANY UNSHORED PORTIONS OF THE CONCRETE STRUCTURE.
3. IN GENERAL, ALL DROP PANELS & SUSPENDED SLABS SHALL BE POURED MONOLITHICALLY.
4. FORMS FOR SLABS OF SPANS 4'-0" OR MORE SHALL BE CAMBERED 1/4" FOR EACH 14'-0" OF SPAN.
5. VERIFY LOCATIONS AND DIMENSIONS OF SLOTS, ANCHORS, DUCTS, ETC., RELATING TO MECHANICAL, ELECTRICAL AND STRUCTURAL WORK BEFORE POURING CONCRETE.
6. LOCATIONS OF ALL VERTICAL CONSTRUCTION JOINTS IN SLABS SHALL BE COORDINATED WITH AND APPROVED BY THE ENGINEER.
7. THE 28-DAY COMPRESSIVE STRENGTH AND CLASS OF CONCRETE (PER WATER SYSTEM STANDARDS) SHALL BE AS FOLLOWS:

	STRENGTH (P.S.I.)	CLASS OF CONCRETE
FLOOR SLAB ON GRADE, FOOTINGS, & PIPE JACKETS	3,500	DWS 3500
COLUMNS, WALLS*, & SUSPENDED SLABS	4,000	DWS 4000
*LOWER 4-1/2' OF RESERVOIR WALLS ONLY	3,000	DWS 3000M
OTHERS	3,500	DWS 3500

   SUBMIT CONCRETE MIX DESIGNS TO THE ENGINEER FOR REVIEW 14 DAYS PRIOR TO CONCRETE POUR.
8. UNLESS OTHERWISE INDICATED, CHAMFER EXPOSED CORNERS 3/4" x 3/4".
9. ALL INTERSECTIONS AND SPLICES OF RUBBER WATERSTOPS SHALL BE JOINED BY VULCANIZING OR OTHER APPROVED MEANS TO FORM A WATERTIGHT CONNECTION.
10. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED DURING PLACEMENT USING A MECHANICAL VIBRATOR. ALL CONCRETE SHALL BE CURED FOR A PERIOD OF NOT LESS THAN 7 DAYS.
    - A) ONCE THE RESERVOIR FLOOR IS POURED, 6" ± OF WATER SHALL BE MAINTAINED IN THE RESERVOIR FOR THE REMAINDER OF THE PROJECT.
    - B) BURLAP BAGS SHALL BE USED AT THE PERIMETER OF THE RESERVOIR FLOOR. THE BURLAP SACKS SHALL BE PLACED SUCH THAT IT COVERS THE SLAB SURFACES IMMEDIATELY INSIDE THE WALL FORMS. THE WATER LEVEL ON THE RESERVOIR FLOOR SHALL BE CONSTANTLY MAINTAINED TO KEEP THE BURLAP SACKS MOIST AT ALL TIMES DURING THE CONSTRUCTION OF THE WALL.
    - C) THE WATER LEVEL OVER THE RESERVOIR FLOOR SHALL BE KEPT AS HIGH AS POSSIBLE AND A SYSTEM TO PROVIDE CONTINUOUS MIST ALONG THE PERIMETER OF THE RESERVOIR SHALL BE USED. THE CONTINUOUS MIST SHALL KEEP THE RESERVOIR FLOOR MOIST AT ALL TIMES.
11. NOTIFY ENGINEER THREE (3) WORKING DAYS PRIOR TO ANY CONCRETE POUR. NO CONCRETE SHALL BE POURED PRIOR TO OBSERVATION BY THE ENGINEER OR HIS REPRESENTATIVE.
12. THE PROTECTIVE COATING AT THE TANK INTERIOR SHALL BE APPLIED AFTER THE ROOF SLAB IS COMPLETED. ALL FORMS AND SHORING REMOVED, AND PRIOR TO PLACEMENT OF THE ASPHALT SEAL AT THE WALL AND FLOOR JOINT.

D. REINFORCING STEEL:

1. ALL REINFORCING STEEL SHALL BE HIGH STRENGTH DEFORMED BARS CONFORMING TO ASTM A 615, GRADE 60.
2. SPLICES IN REINFORCEMENT:
   - A. CIRCULAR HOOP BARS IN WALL SHALL BE CONTINUOUS AND SHALL HAVE A MINIMUM LAP LENGTH OF 48 X BAR DIAMETERS AND STAGGERED AT A SPACING OF THE LAPPED LENGTH, BUT NOT LESS THAN 36 INCHES.
   - B. UNLESS OTHERWISE NOTED, ALL OTHER SPLICES SHALL HAVE MINIMUM LAP LENGTHS OF 48 X BAR DIAMETERS BUT NOT LESS THAN 24 INCHES AND STAGGERED WHERE POSSIBLE.
3. BAR LAPS SHALL BE MADE AWAY FROM POINTS OF MAXIMUM STRESS AND UNLESS NOTED OTHERWISE, SPLICES, LAPS, DOWEL EXTENSIONS AND EMBEDMENTS SHALL BE 48 BAR DIAMETERS BUT NOT LESS THAN 24 INCHES. SPLICES SHALL BE STAGGERED WHERE POSSIBLE. BENDS NOT DIMENSIONED SHALL BE STANDARD HOOKS.
4. BEFORE PLACING OF CONCRETE, GENERAL CONTRACTOR SHALL INSPECT REINFORCEMENT PLACEMENT TO INSURE CONFORMANCE WITH THE DRAWINGS. ALL DISCREPANCIES SHALL BE CORRECTED PRIOR TO CONCRETE POUR OR GROUTING.
5. BARS NOTED "CONT" SHALL BE CONTINUOUS AND SHALL HAVE A MINIMUM LAP SPLICE LENGTH OF 48 BAR DIAMETERS BUT NOT LESS THAN 24 INCHES.

E. STEEL:

1. ALL STEEL WORK, INCLUDING MATERIAL FABRICATION AND ERECTION, SHALL COMPLY WITH THE "SPECIFICATION FOR STRUCTURAL STEEL FOR BUILDINGS - ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN," OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
2. UNLESS NOTED OTHERWISE, ALL STEEL PLATES, BARS, AND SHAPES SHALL COMPLY WITH ASTM A-36, GALVANIZED. STAINLESS STEEL PLATES, BARS AND SHAPES SHALL BE TYPE 316.
3. UNLESS NOTED OTHERWISE, MACHINE BOLTS (M.B.) SHALL COMPLY WITH ASTM A-307 AND SHALL BE GALVANIZED. STAINLESS STEEL BOLTS SHALL BE TYPE 316.
4. EXPANSION ANCHORS: HILTI KWIK-BOLT II (STAINLESS STEEL). INSTALL PER MANUFACTURER'S RECOMMENDATIONS. NOTIFY ENGINEER 3 DAYS PRIOR TO ANCHOR INSTALLATION.
5. NON-SHRINK GROUT SHALL BE PRE-MIXED, NON-METALLIC, NON-CORROSIVE PER CORPS OF ENGINEERS CRD 621.
6. ALL WELDS SHALL BE E70XX ARC WELDED ACCORDING TO AWS STANDARDS AND PERFORMED BY CERTIFIED WELDERS. ALL WELDS SHALL BE GROUNDED SMOOTH AND PAINTED WITH 2 COATS OF Z.R.C. COLD GALVANIZING COMPOUND.
7. UNLESS OTHERWISE INDICATED, ALL STEEL JOINTS NOT DETAILED SHALL BE FULLY WELDED.
8. CORROSION PROTECTION: WHERE METALS ARE INCOMPATIBLE TO OTHER MATERIALS, THE CONTACT AREAS OF THESE MATERIALS SHALL BE BACK COATED BEFORE ERECTION WITH AN APPROVED BITUMINOUS PAINT OR OTHER INSULATION COATING AS RECOMMENDED BY THE FABRICATOR.
9. SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW TO THE ENGINEER FOR ALL STRUCTURAL STEEL, FABRICATED BRACKETS, HARDWARE AND MISCELLANEOUS METALS PRIOR TO FABRICATION.

F. FOUNDATION:

1. SEE FOUNDATION INVESTIGATION REPORT ENTITLED "GEOTECHNICAL ENGINEERING STUDY, PROPOSED WATER TANK, PUU PANE SUBDIVISION, HANALEI, KAUAI, HAWAII," DATED NOVEMBER 4,1998 AND AMENDMENT (12/9/98) BY CONSOLIDATED ENGINEERING LABORATORIES (REPORT AVAILABLE AT ENGINEER'S OFFICE)
2. PROPER SAFETY MEASURES SHALL BE IMPLEMENTED TO PROTECT EXCAVATIONS FROM CAVE-INS. CONTRACTOR SHALL CONFORM TO ALL OSHA EXCAVATION REQUIREMENTS INCLUDING BUT NOT LIMITED TO PROPERLY SHORING AND BRACING OF EXCAVATIONS.
3. TEST HOLES: THE CONTRACTOR SHALL DRILL 2 INCH DIAMETER TEST HOLES WITH PNEUMATIC DRILLS UNDER THE PRESENCE OF A SOILS ENGINEER TO INVESTIGATE FOR CAVITIES UNDER THE TANK WALL AT APPROXIMATELY 20 FEET ON CENTER AND AT EACH COLUMN FOOTING. UNLESS CAVITIES ARE ENCOUNTERED, DEPTH OF HOLES HALL BE TEN FEET BELOW FINISHED EXCAVATION. WHERE CAVITIES ARE ENCOUNTERED, THE DRILL HOLES SHALL BE EXTENDED AS DIRECTED BY THE ENGINEER. ALL CAVITIES AND TEST HOLES SHALL BE FILLED WITH DWS 2000 CONCRETE TO GRADE ESTABLISHED ON THE DRAWINGS. TEST HOLES SHALL BE CONSIDERED INCIDENTAL TO RESERVOIR EXCAVATION.
4. FOOTINGS - ALL FOOTINGS SHALL BEAR ENTIRELY ON EITHER COMPACTED ON-SITE SOILS OR ON PROPERLY COMPACTED STRUCTURAL FILL. FOR BEARING ON COMPACTED STRUCTURAL FILL, EXISTING ON-SITE SOILS SHALL BE OVEREXCAVATED AS REQUIRED TO MAINTAIN A MINIMUM OF 12 INCHES OF COMPACTED STRUCTURAL FILL BELOW ALL FOOTINGS.

   ALL LOOSE MATERIAL AND SOFT SPOTS IN FOOTING EXCAVATIONS SHALL BE REMOVED. THE BOTTOM OF ALL FOOTING EXCAVATIONS SHALL BE COMPACTED TO 90 PERCENT RELATIVE COMPACTION. EXISTING ON-SITE SOILS WHICH CANNOT BE COMPACTED TO 90 PERCENT SHALL BE REMOVED AND THE FOOTING SHALL BE DEEPENED TO BEAR ON FIRM SOIL COMPACTED TO 90 PERCENT. AFTER COMPACTION WORK HAS BEEN COMPLETED, ANY LOOSE MATERIAL WHICH HAS FALLEN INTO THE EXCAVATION SHALL BE REMOVED PRIOR TO LAYING OF STEEL OR POURING OF CONCRETE.
5. STRUCTURAL FILL AND BACKFILL SHALL BE NON-EXPANSIVE WITH A PLASTICITY INDEX LESS THAN 15 PERCENT, SHALL BE FEE OF ORGANICS AND DELETERIOUS MATERIALS, AND SHALL HAVE A MAXIMUM PARTICLE SIZE OF 3 INCHES FOR ANY DIMENSION WITH A MINIMUM CBR VALUE OF 7.0. A SOILS ENGINEER SHALL EVALUATE/TEST FILL MATERIALS PRIOR TO USE ON THE SITE.

   STRUCTURAL FILL AND BACKFILL SHALL BE PLACED IN HORIZONTAL LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS. PRIOR TO PLACING OF THE FILL, THE MATERIAL SHALL BE MOISTURE CONDITIONED TO WITHIN 2 PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT. WHERE FILL IS PLACED ON EXISTING GROUND THAT IS STEEPER THAN 5 HORIZONTAL TO 1 VERTICAL, THE EXISTING GROUND SURFACE SHALL BE BENCHED INTO FIRM SOIL AS THE FILL IS PLACED. EACH LAYER OF FILL AND BACKFILL SHALL BE THOROUGHLY COMPACTED TO AT LEAST 90 PERCENT RELATIVE COMPACTION.
6. RELATIVE COMPACTION IS THE DRY DENSITY OF THE COMPACTED MATERIAL EXPRESSED AS A PERCENTAGE OF THE MAXIMUM DRY DENSITY OF THE SAME MATERIAL BASED ON ASTM D1557-91 TEST PROCEDURE.
7. CONCRETE SLABS-ON-GRADE: PROVIDE A 6 INCH THICK COMPACTED CUSHION FILL OF #3 FINE GRANULAR FILL BELOW SLABS ON GRADE.
8. ALL EARTHWORK, STRUCTURAL FILL PLACEMENT AND ALL FOOTING EXCAVATIONS (PRIOR TO PLACEMENT OF REINFORCING STEEL AND CONCRETE) SHALL BE MONITORED AND TESTED BY A QUALIFIED SOILS ENGINEER (REGISTERED IN THE STATE OF HAWAII). NOTIFY THE SOILS ENGINEER THREE (3) WORKING DAYS PRIOR TO FOOTING EXCAVATION AND FILL PLACEMENT WORK.

G. TANK FILL RATE:

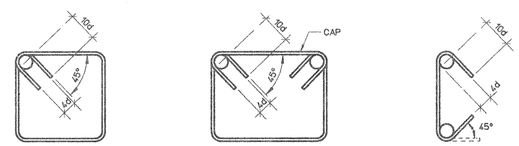
1. IN ORDER TO PREVENT EXCESSIVE BUILD-UP OF POREWATER PRESSURES IN THE SOIL UNDER THE TANK, THE RATE AT WHICH THE TANK IS FILLED DURING THE INITIAL FILLING ONLY SHALL NOT EXCEED 5 FEET OF HEIGHT PER WEEK.
2. IN ORDER TO PREVENT WATER FROM THE RESERVOIR LEAKAGE TEST AND THE DISINFECTION PROCEDURE FROM FLOWING INTO THE COUNTY WATER SYSTEM, A DIRECT CONNECTION WILL NOT BE ALLOWED UNTIL THE RESERVOIR HAS BEEN ACCEPTABLY DISINFECTED.

H. TESTING:

1. THE FOLLOWING TESTS SHALL BE PERFORMED BY A QUALIFIED TESTING LABORATORY. COSTS OF ALL TESTS SHALL BE BORNE BY THE CONTRACTOR.
   - A. CONCRETE TESTING:
     1) SLUMP. ONE EACH STANDARD SLUMP TEST (PER ASTM C 143) FOR EACH 50 CUBIC YARDS OF CONCRETE OR FRACTION THEREOF FOR EACH DAY'S POUR.
     2) COMPRESSIVE STRENGTH. SIX CYLINDERS FOR EACH CLASS OF CONCRETE FOR EACH DAY'S POUR (PER ASTM C39 AND C42). TEST THREE CYLINDERS AT 7 DAYS AND THREE AT 28 DAYS.
   - B. FOOTING COMPACTION TESTS: ONE EACH COMPACTION TEST FOR EACH COLUMN FOOTING AND FOR EACH 50 LINEAR FEET OF WALL FOOTINGS OR FRACTION THEREOF (PER ASTM D1557-91).
2. COSTS OF ADDITIONAL TESTING AND INVESTIGATION FOR WORK WITH TEST RESULTS THAT DO NOT MEET THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS SHALL BE BORNE BY THE CONTRACTOR.

I. INTERIOR TANK COATING: THE ENTIRE TANK INTERIOR SURFACES SHALL BE COATED WITH A PROTECTIVE COATING. SEE SPECIFICATIONS.

J. PAINTING: EXCEPT FOR THE ROOF, THE ENTIRE TANK EXTERIOR SHALL BE PAINTED PER THE SPECIFICATIONS.



COLUMN TIES & BEAM STIRRUPS | ALTERNATE BEAM STIRRUPS | SINGLE STIRRUP OR TIES

TYPICAL COLUMN TIES OR BEAM STIRRUPS

TYP. BAR OFFSET

TYPICAL 90° & 180° HOOK

A / S-1 TYP REINF STEEL DETAILS
N.T.S.

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HANATANI — LICENSED PROFESSIONAL ENGINEER — No. 4359-S — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. PREPARATION OF DRAWINGS IS IN CONFORMANCE WITH THE ADMINISTRATIVE RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS,STATE OF HAWAII

Dennis K. Hanatani
DENNIS K. HANATANI, INC.
DATE: 4/15/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

0.1 MG RESERVOIR
GENERAL NOTES, TYPICAL DETAILS

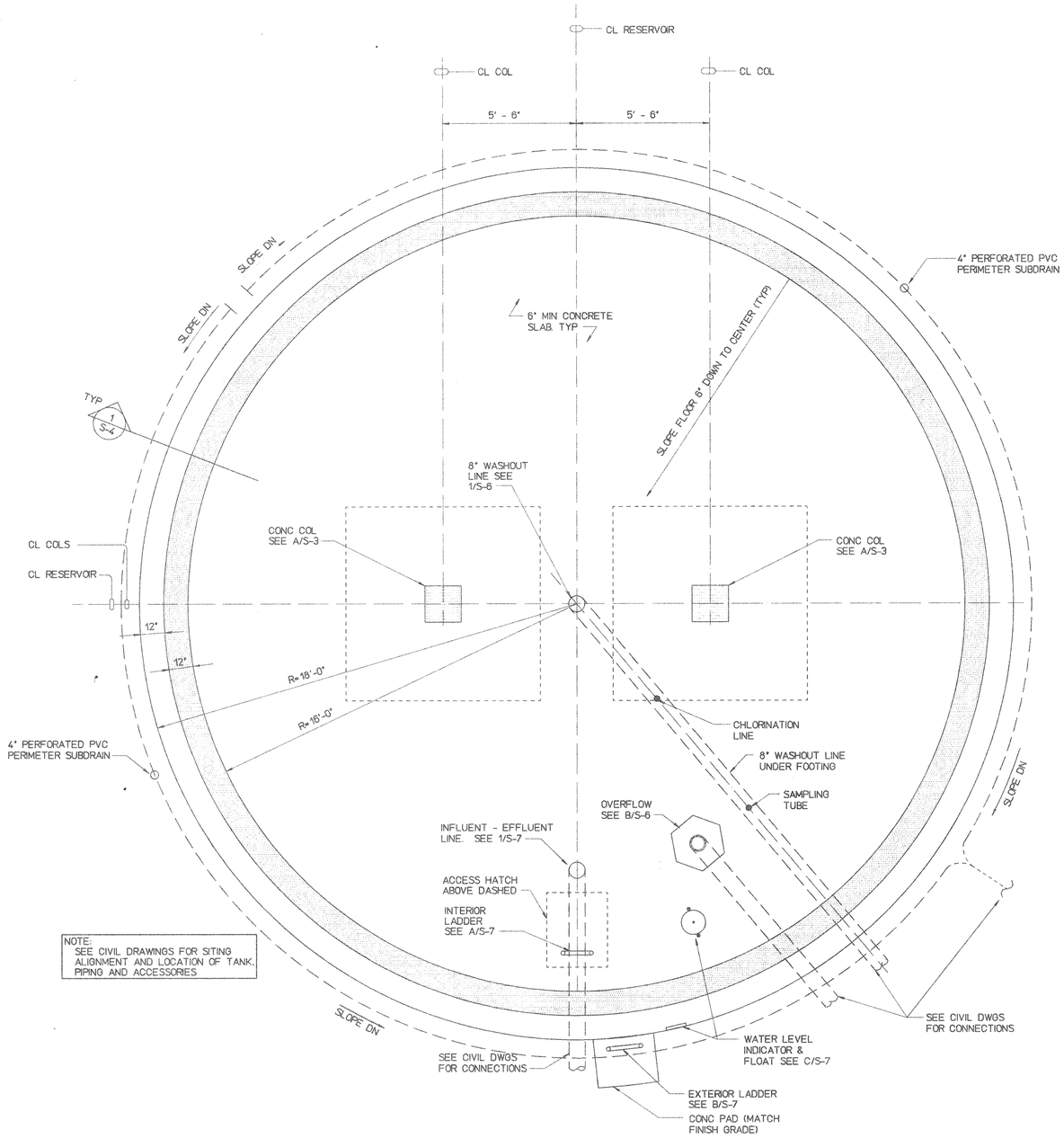
APPROVED: _____ COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 4/10/99 MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

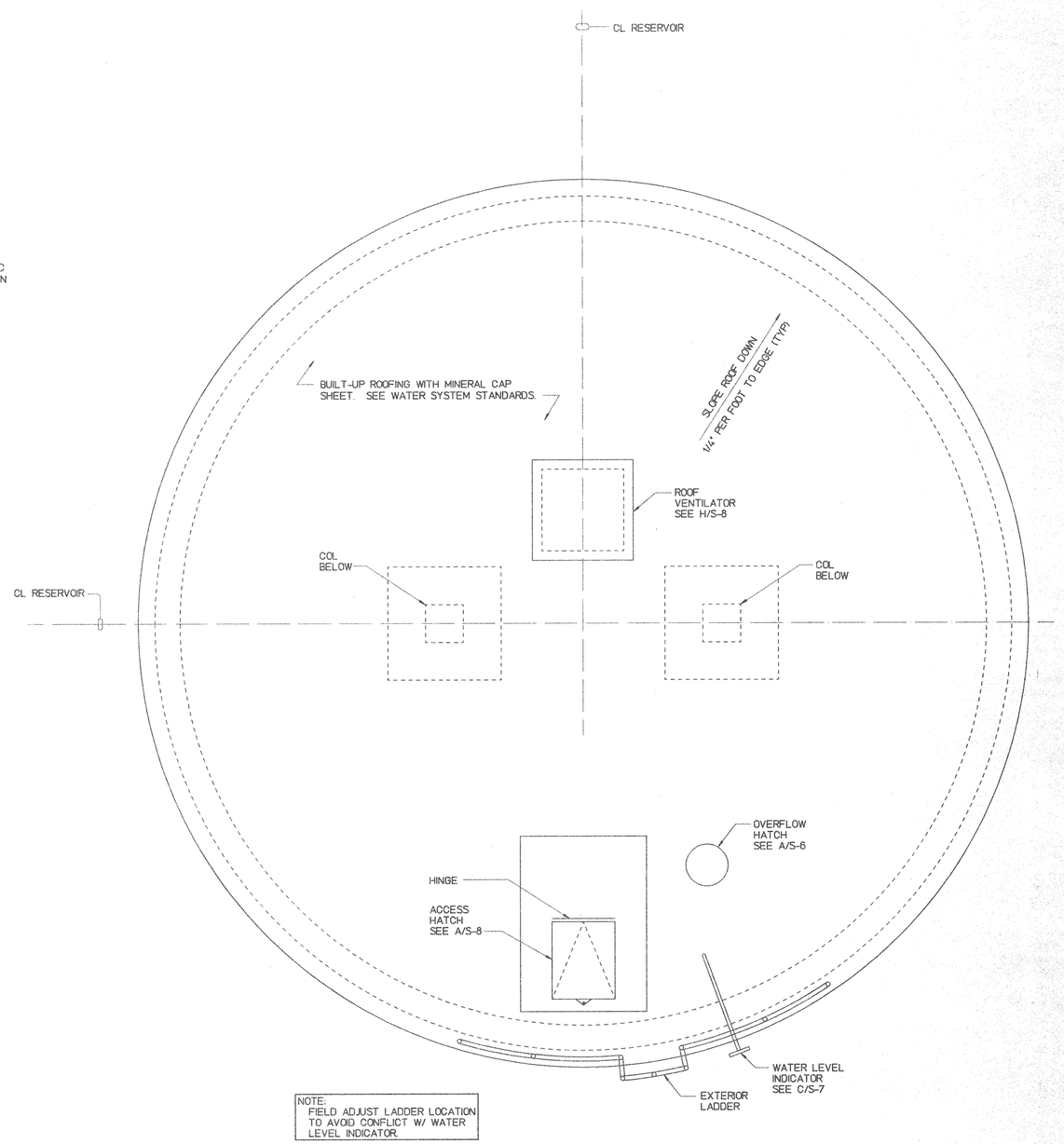
DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-1

Plot date: 14-Apr-99
Full Size Plot
'/users/kathy/a_1903/panel



RESERVOIR FLOOR PLAN

SCALE : 3/8" = 1'-0"



RESERVOIR ROOF PLAN

SCALE : 3/8" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HANATANI
LICENSED PROFESSIONAL ENGINEER
No. 4359-S
HAWAII U.S.A.

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Dennis K. Hanatani
DENNIS K. HANATANI, INC.
DATE: 4/15/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

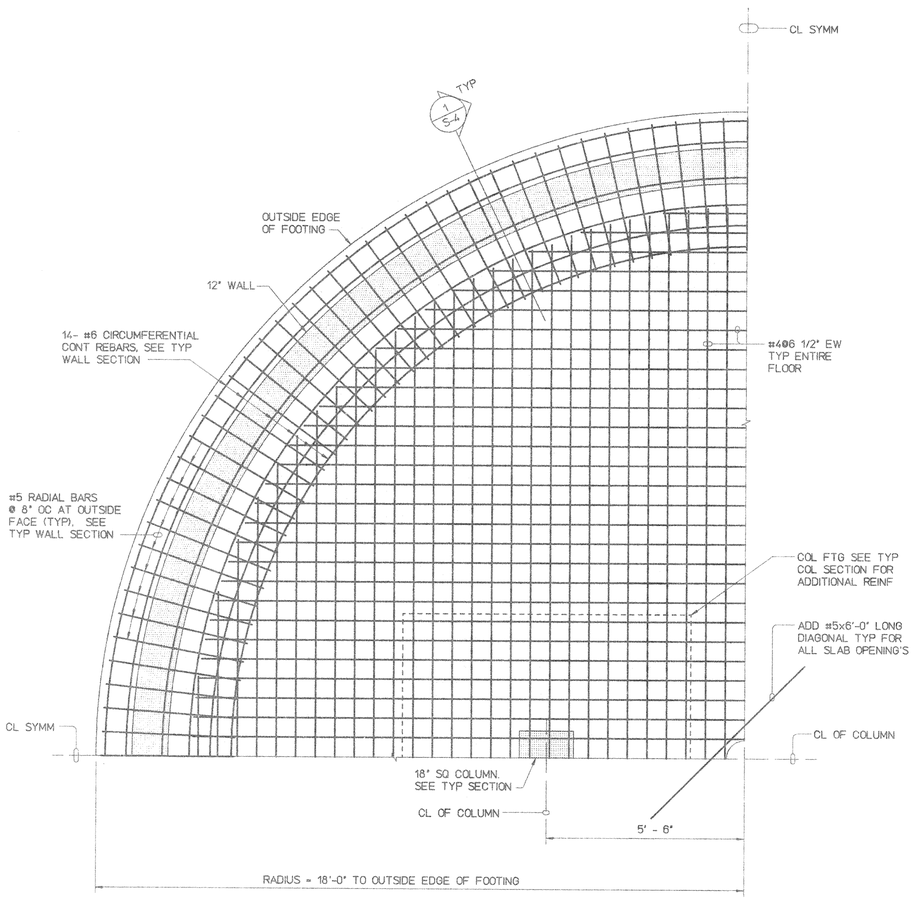
OWNER JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

0.1 MG RESERVOIR
RESERVOIR FLOOR & ROOF PLAN

APPROVED:	APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI	MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI — 9/10/99

AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

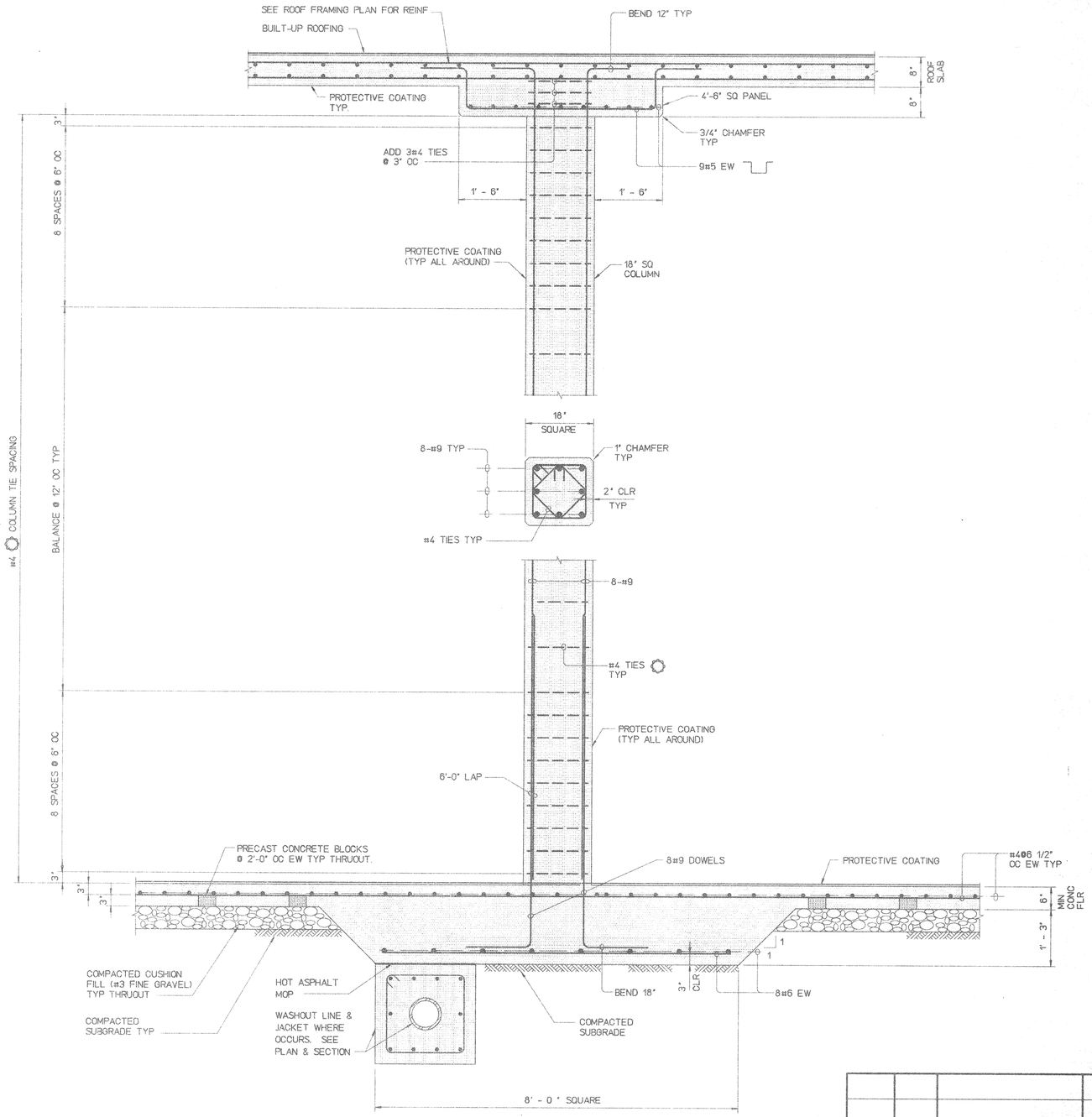
DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-2



NOTE:
ALL LAPS IN THE SAME PLANE SHALL BE STAGGERED 48 BAR DIAMETERS.

REINFORCING STEEL - 1/4 FLOOR PLAN

SCALE : 1/2" = 1'-0"



A / S-3 TYP COLUMN SECTION

SCALE : 3/4" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HANATANI * LICENSED PROFESSIONAL ENGINEER No. 4359-S * HAWAII, U.S.A. *

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION, FOLLOWING OF CONSTRUCTION" AS DEFINED UNDER HAWAII ADMINISTRATIVE RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS, STATE OF HAWAII

Dennis K. Hanatani
DENNIS K. HANATANI, INC.
DATE: 6/15/99

CONSTRUCTION PLANS FOR
PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

0.1 MG RESERVOIR
RESERVOIR FLOOR REINF PLAN, TYP COLUMN SECTION

APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 9/14/99
MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

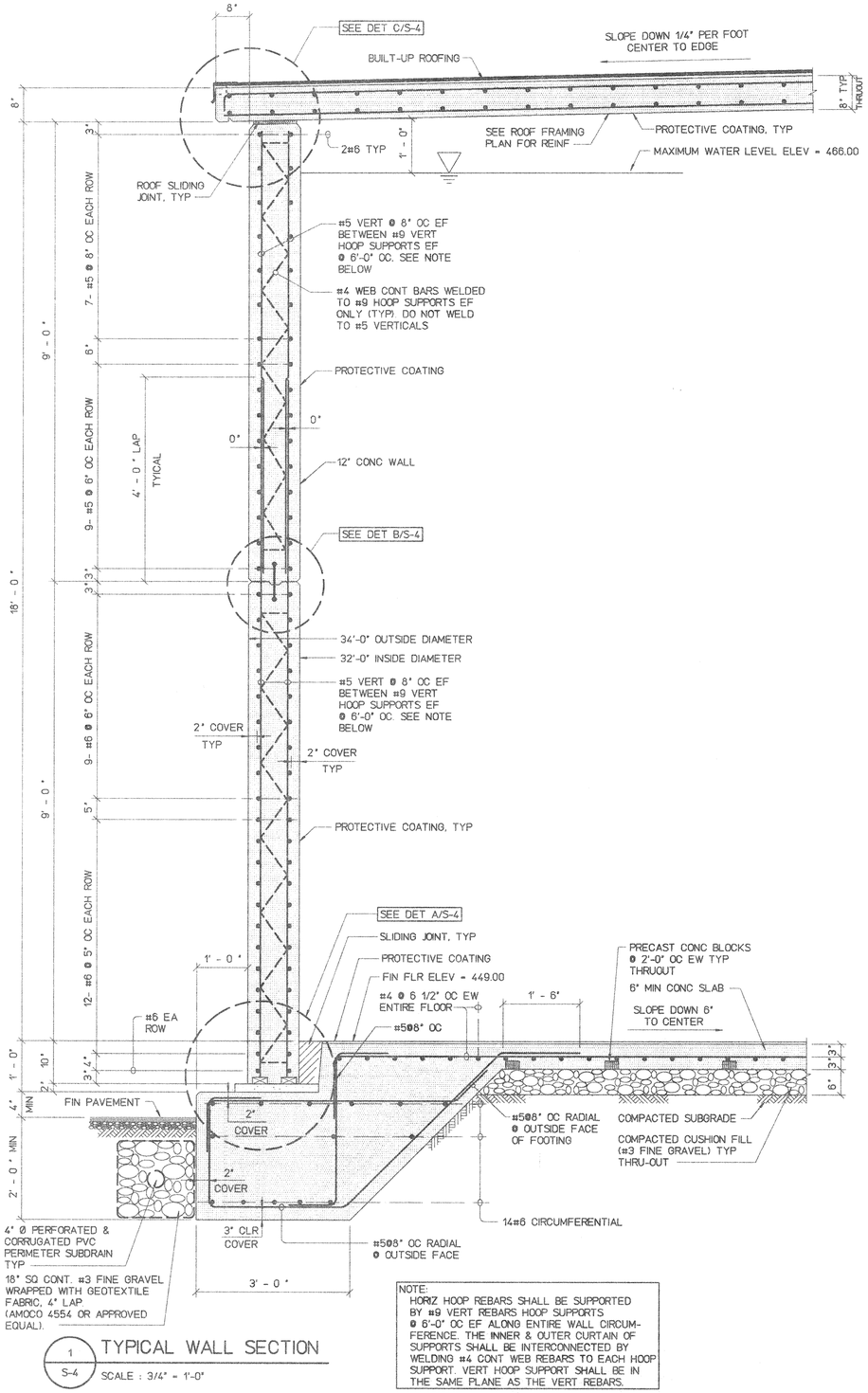
AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-3

Plot date: 14-Apr-99

Full Size Plot

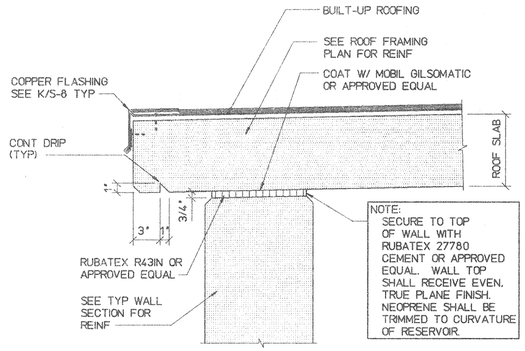
/Users/kathy/dkh9903/pane4



1 / S-4 TYPICAL WALL SECTION

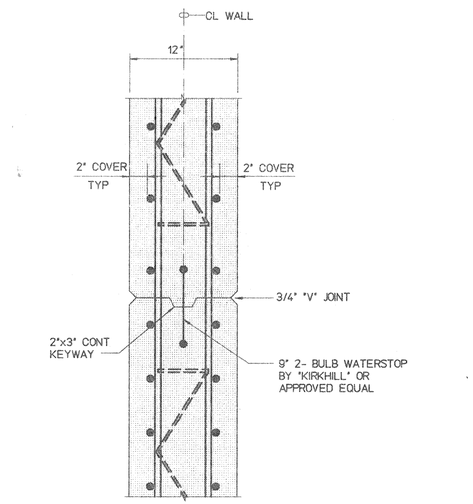
SCALE : 3/4" = 1'-0"

NOTE:
HORIZ HOOP REBARS SHALL BE SUPPORTED BY #9 VERT REBARS HOOP SUPPORTS @ 6'-0" OC EF ALONG ENTIRE WALL CIRCUMFERENCE. THE INNER & OUTER CURTAIN OF SUPPORTS SHALL BE INTERCONNECTED BY WELDING #4 CONT WEB REBARS TO EACH HOOP SUPPORT. VERT HOOP SUPPORT SHALL BE IN THE SAME PLANE AS THE VERT REBARS.



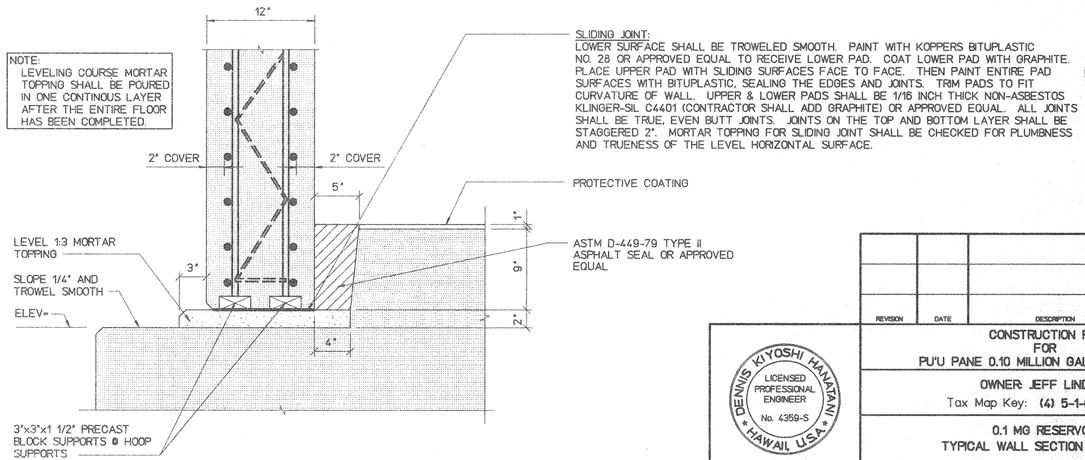
C / S-4 TYP ROOF SLIDING JOINT DETAIL

SCALE : 1 1/2" = 1'-0"



B / S-4 TYP HORIZONTAL WALL CONSTRUCTION JOINT DETAIL

SCALE : 1 1/2" = 1'-0"



A / S-4 TYP WALL SLIDING JOINT DETAIL

SCALE : 1 1/2" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HANATANI — LICENSED PROFESSIONAL ENGINEER — No. 4359-S — HAWAII, U.S.A.

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DENNIS K. HANATANI INC.

DATE: 4/15/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER

Tax Map Key: (4) 5-1-05: 3

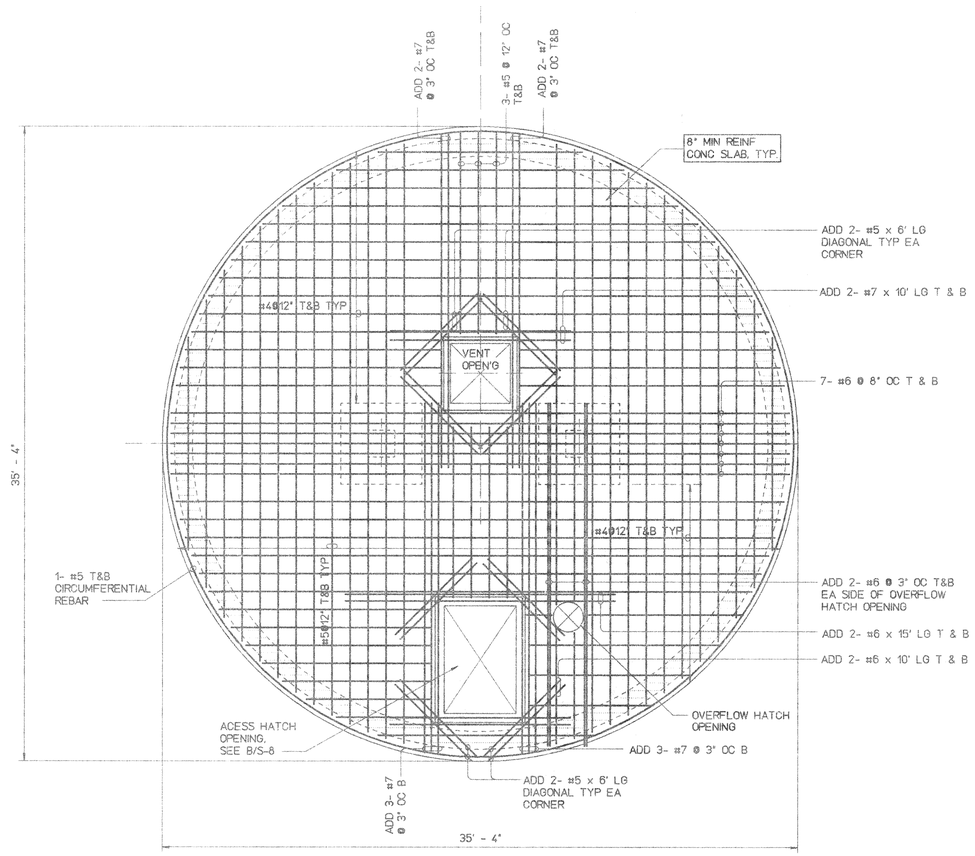
0.1 MG RESERVOIR TYPICAL WALL SECTION & DETAILS

APPROVED: _____ COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 4/6/99 MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

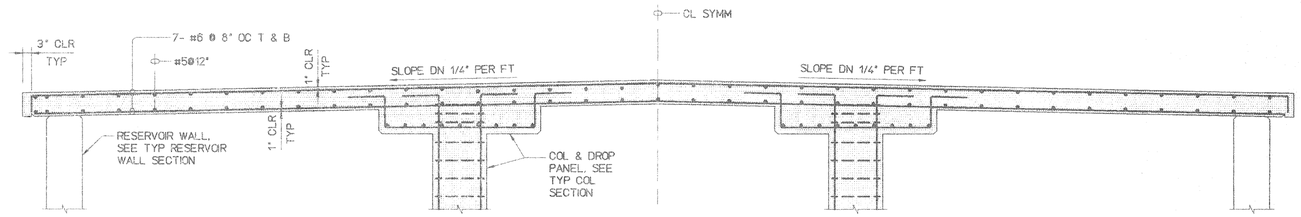
DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-4



NOTE:
TOP REBAR LAP SPLICES SHALL BE AT MIDSPAN.
BOTTOM REBAR LAP SPLICES SHALL BE CENTERED TO COLUMNS.

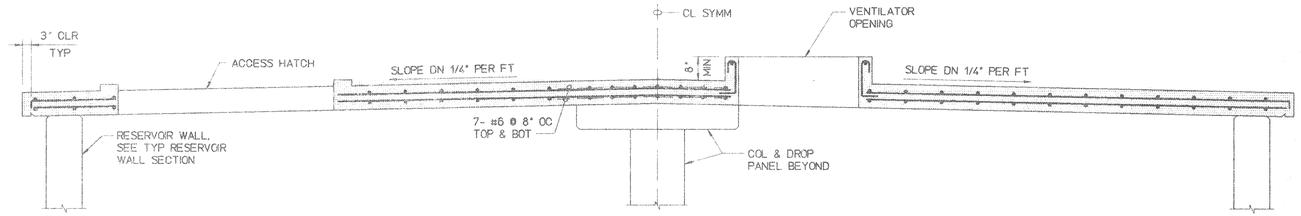
ROOF FRAMING PLAN

SCALE : 1/4" = 1'-0"



A / S-5 SECTION

SCALE : 1/2" = 1'-0"



B / S-5 SECTION

SCALE : 1/2" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HANATANI * LICENSED PROFESSIONAL ENGINEER * No. 4359-S * HAWAII, U.S.A. *

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DENNIS K. HANATANI, INC.

DATE : 2/15/99
4/15/99

CONSTRUCTION PLANS
FOR
PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

0.1 MG RESERVOIR
RESERVOIR ROOF FRAMING PLAN & SECTIONS

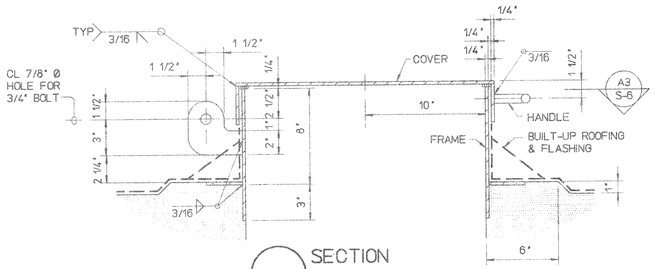
APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED:
MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI 4/19/99

AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

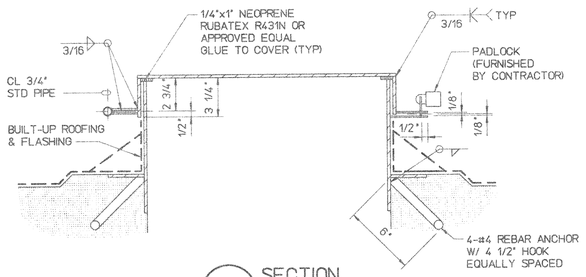
DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-5

Plot date: 15-Feb-99
Full Size Plot
\users\dkh\jobs\9903\parts



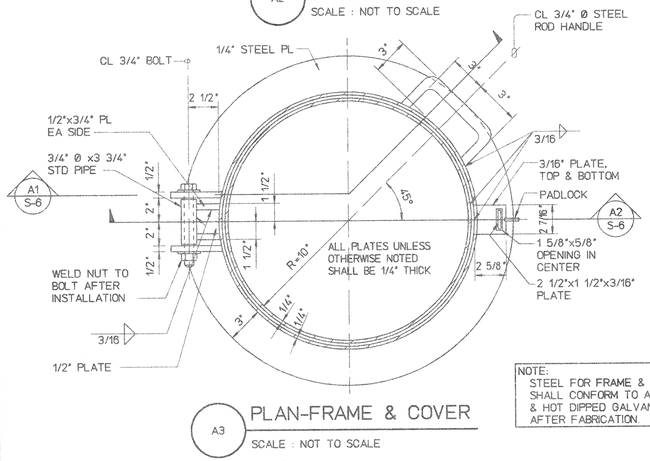
A1 SECTION

SCALE : NOT TO SCALE



A2 SECTION

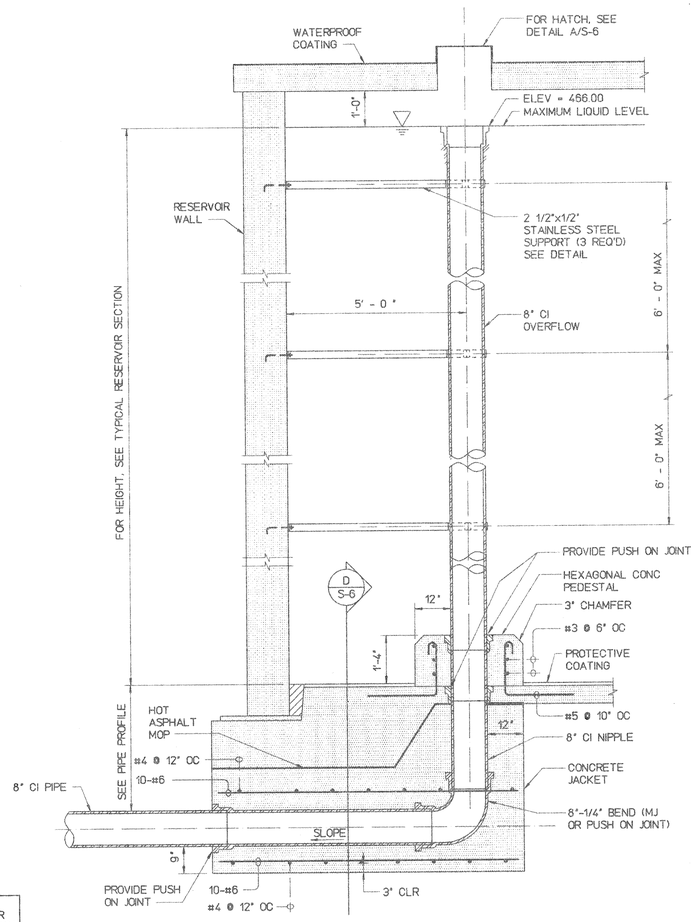
SCALE : NOT TO SCALE



A3 PLAN-FRAME & COVER

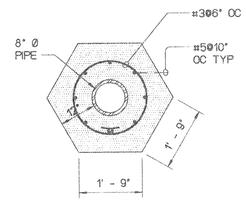
SCALE : NOT TO SCALE

NOTE:
STEEL FOR FRAME & COVER SHALL CONFORM TO ASTM A36 & HOT DIPPED GALVANIZED AFTER FABRICATION



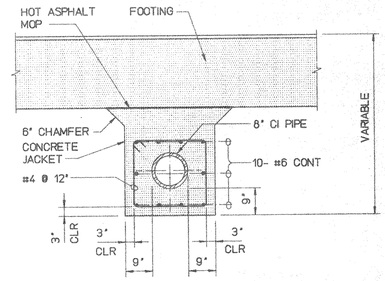
B TYP OVERFLOW DETAIL

S-6 SCALE : 1/2" = 1'-0"



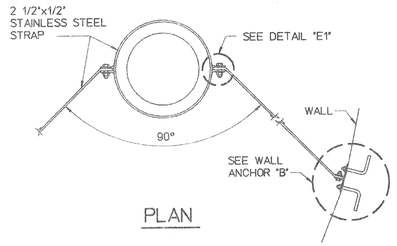
C PEDESTAL FOR OVERFLOW

S-6 SCALE : 1/2" = 1'-0"

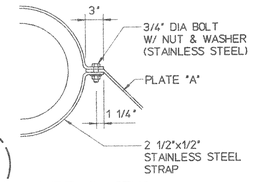


D SECTION

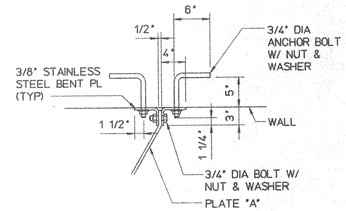
S-6 SCALE : 1/2" = 1'-0"



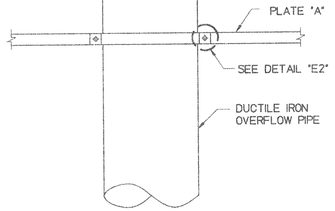
PLAN



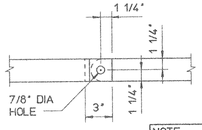
DETAIL "E1"



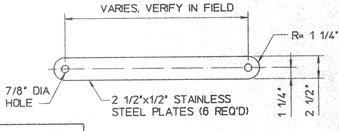
WALL ANCHOR "B"



ELEVATION



DETAIL "E2"

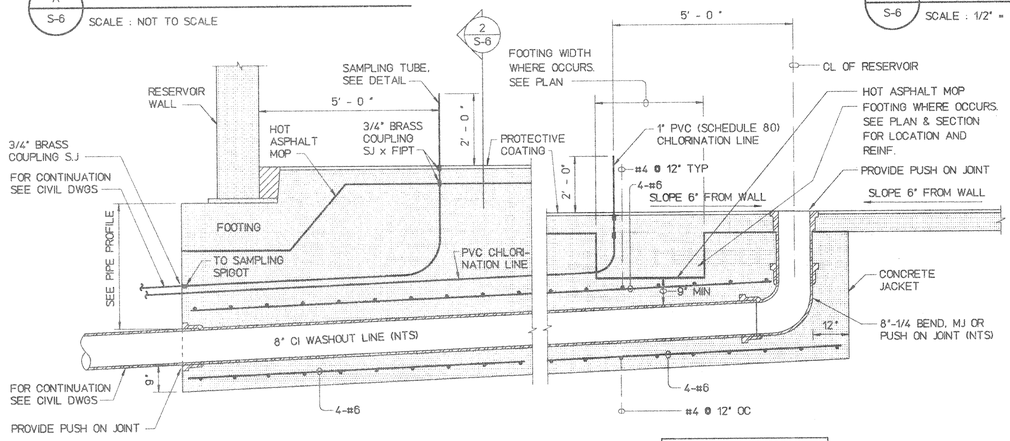


NOTE:
ALL PLATES, BOLTS, STRAPS & HARDWARE SHALL BE STAINLESS STEEL, TYPE 316

PLATE "A"

A TYP OVERFLOW HATCH DETAILS

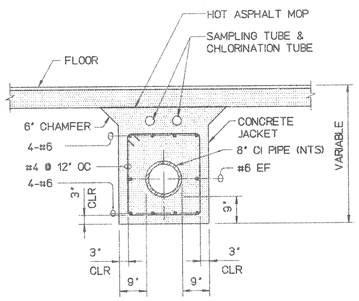
S-6 SCALE : NOT TO SCALE



1 S-6 TYP WASHOUT LINE

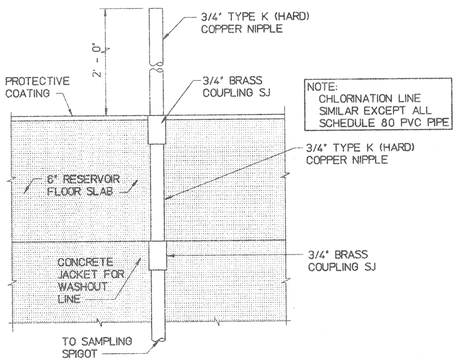
SCALE : 1/2" = 1'-0"

NOTE:
CONCRETE JACKET TO BE POURED TO BOTTOM OF FOOTING AND FLOOR SLAB UNLESS OTHERWISE NOTED.



2 S-6 SECTION

SCALE : 1/2" = 1'-0"



NOTE:
CHLORINATION LINE SIMILAR EXCEPT ALL SCHEDULE 80 PVC PIPE

3 S-6 SAMPLING TUBE DETAIL (CHLORINATION LINE, SIMILAR)

SCALE : 3" = 1'-0"

E OVERFLOW PIPE SUPPORT DETAILS

S-6 SCALE : NTS

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HAMATANI
LICENSED PROFESSIONAL ENGINEER
No. 4359-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION, OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER HAWAII ADMINISTRATIVE RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS,STATE OF HAWAII

DENNIS K. HAMATANI, INC.

DATE: 6/15/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER

Tax Map Key: (4) 5-1-05: 3

0.1 MG RESERVOIR RESERVOIR OVERFLOW & PIPING DETAILS

APPROVED:

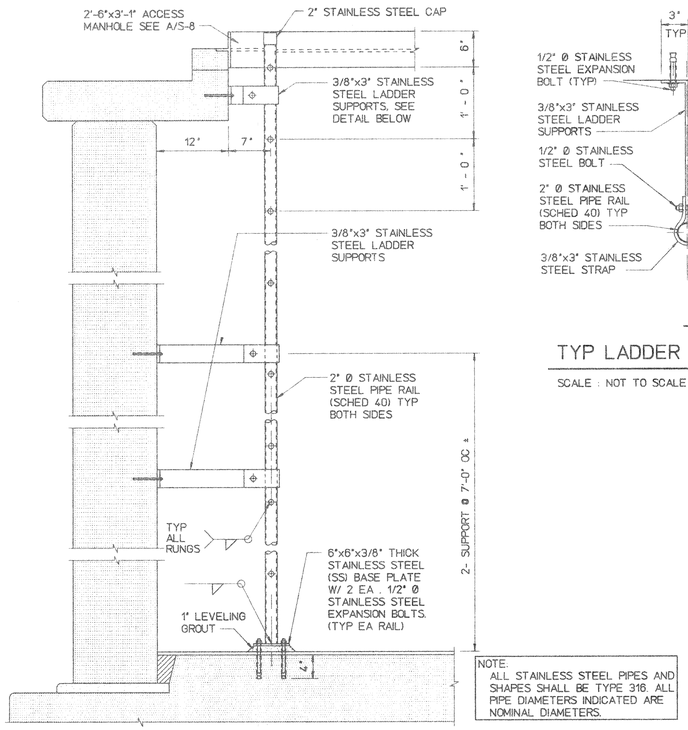
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 6/19/99

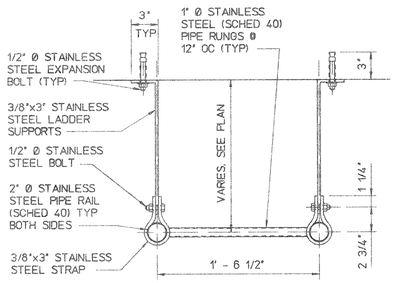
MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-6



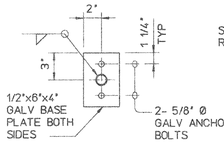
NOTE:
ALL STAINLESS STEEL PIPES AND SHAPES SHALL BE TYPE 316. ALL PIPE DIAMETERS INDICATED ARE NOMINAL DIAMETERS.

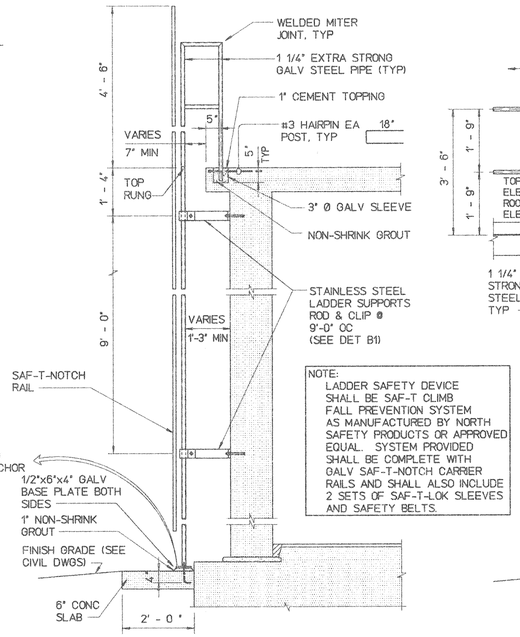


PLAN

TYP LADDER SUPPORT DETAIL

SCALE : NOT TO SCALE

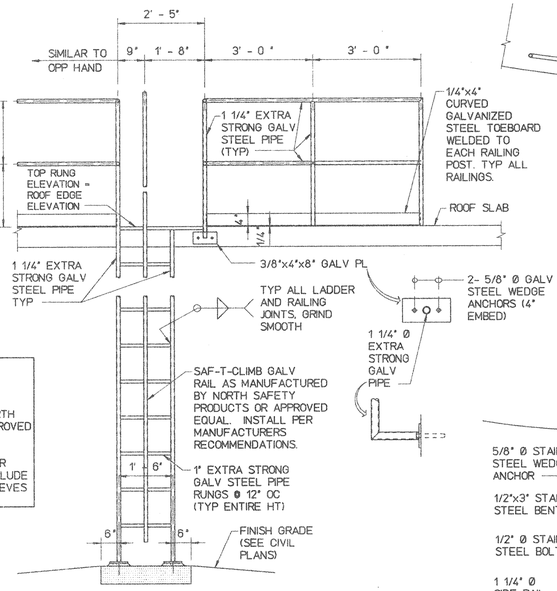




NOTE:
LADDER SAFETY DEVICE SHALL BE SAF-T CLIMB FALL PREVENTION SYSTEM AS MANUFACTURED BY NORTH SAFETY PRODUCTS OR APPROVED EQUAL. SYSTEM PROVIDED SHALL BE COMPLETE WITH GALV SAF-T-NOTCH CARRIER RAILS AND SHALL ALSO INCLUDE 2 SETS OF SAF-T-LOK SLEEVES AND SAFETY BELTS.

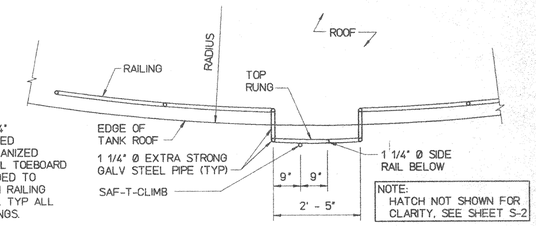
SECTION

SCALE : NOT TO SCALE



ELEVATION

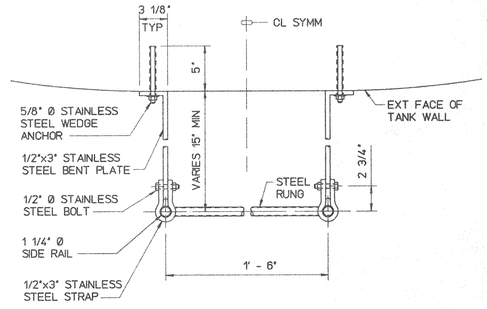
SCALE : NOT TO SCALE



NOTE:
HATCH NOT SHOWN FOR CLARITY, SEE SHEET S-2

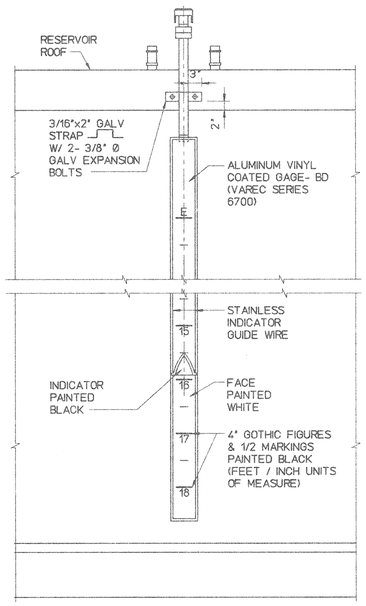
PARTIAL LADDER PLAN @ ROOF

SCALE : NOT TO SCALE

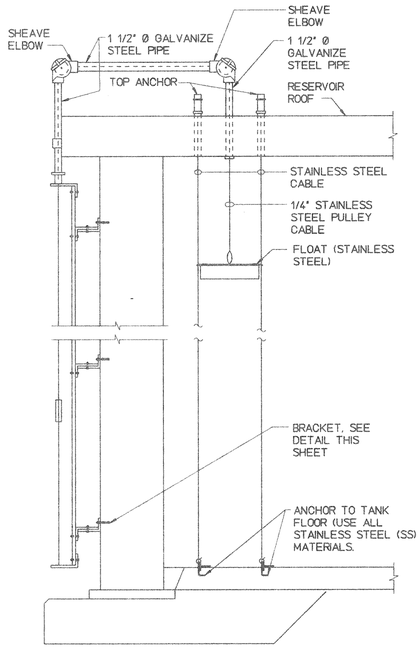


A S-7 ELEVATION OF INTERIOR LADDER

SCALE : 1" = 1'-0"



FRONT

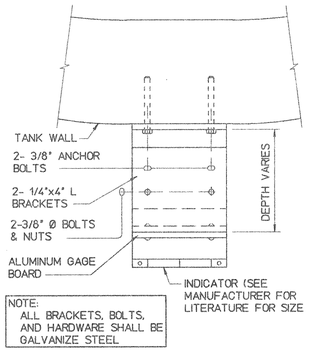


SIDE

NOTE:
WATER LEVEL INDICATOR SHALL BE VAREC 6700 SERIES OR APPROVED EQUAL

C S-7 WATER LEVEL INDICATOR

SCALE : 3/4" = 1'-0"



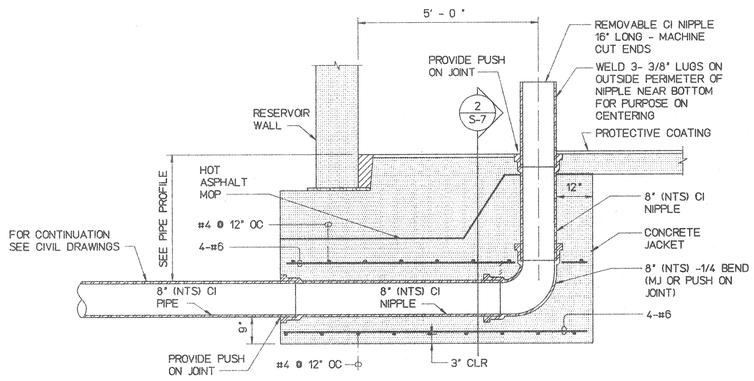
NOTE:
ALL BRACKETS, BOLTS, AND HARDWARE SHALL BE GALVANIZE STEEL

D S-7 TYP BRACKET DETAIL

SCALE : 1" = 1'-0"

B S-7 EXTERIOR LADDER DETAILS

SCALE : NOT TO SCALE

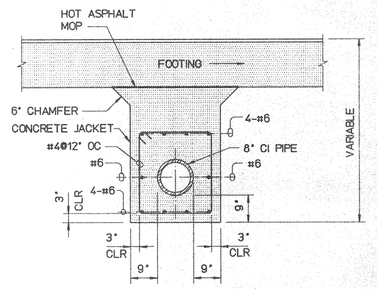


1 S-7 INFLUENT - EFFLUENT LINE

SCALE : 1/2" = 1'-0"

B1 S-7 EXTERIOR LADDER SUPPORT DETAILS

SCALE : 1 1/2" = 1'-0"



2 S-7 SECTION

SCALE : 1/2" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HANATANI
LICENSED PROFESSIONAL ENGINEER
No. 4359-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTITUTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. FOBSERVATION OF CONSTRUCTION" AS DEFINED UNDER HAWAII ADMINISTRATIVE RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS STATE OF HAWAII

DENNIS K. HANATANI, INC.
DATE: 4/15/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER JEFF LINDNER
Tax Map Key: (4) 5-1-05: 3

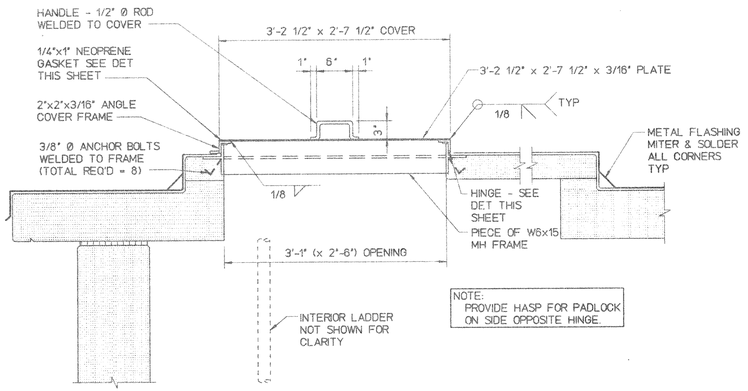
0.1 MG RESERVOIR
RESERVOIR ACCESSORIES & DETAILS

APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 9/10/99
MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

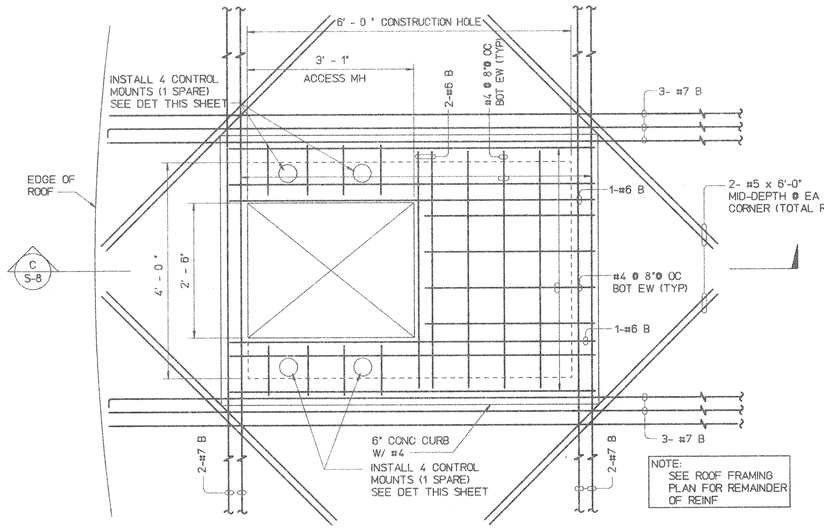
AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

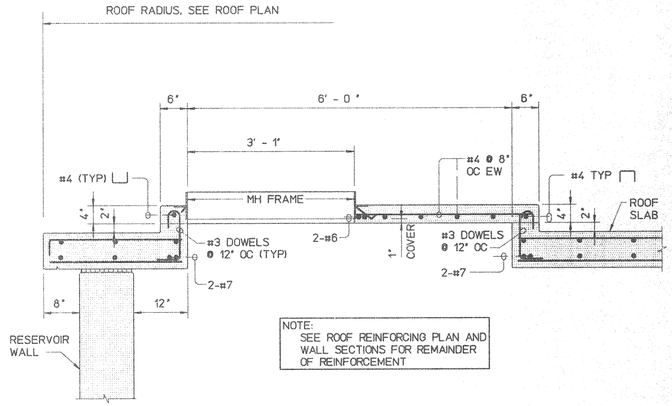
DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-7



A S-8 ACCESS MANHOLE DETAIL

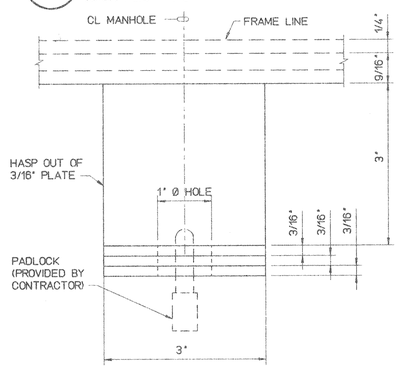
SCALE : 1" = 1'-0"





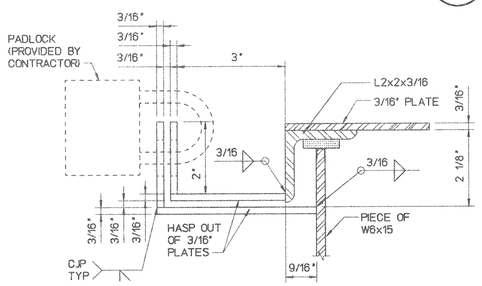
B S-8 ACCESS MANHOLE FRAMING PLAN

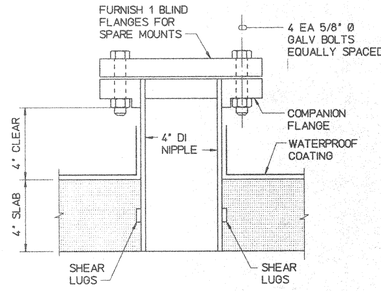
SCALE : 3/4" = 1'-0"



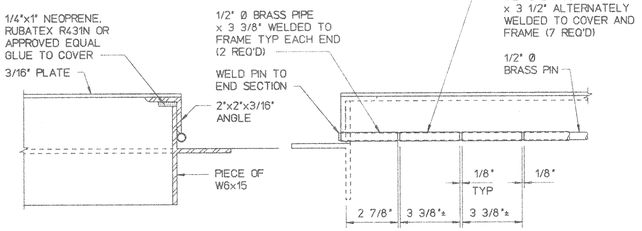
C S-8 ACCESS HATCH SECTION

SCALE : 3/4" = 1'-0"

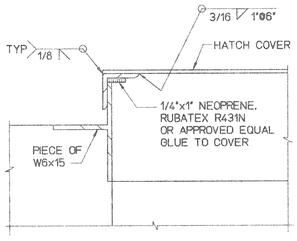




SECTION



ELEVATION



D S-8 MANHOLE HINGE DETAIL

SCALE : 3" = 1'-0"

E S-8 GASKET DETAIL @ OVERFLOW & ACCESS MHS

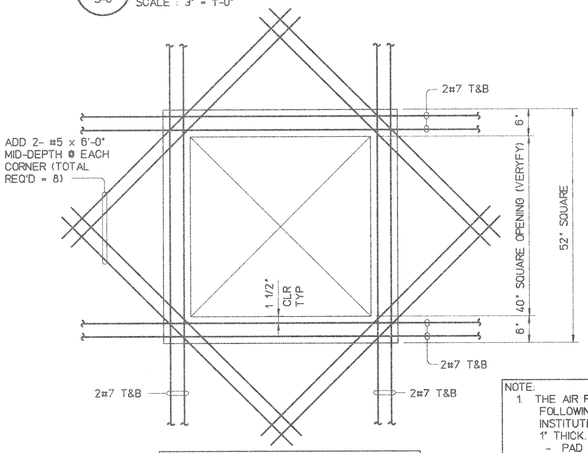
SCALE : 3" = 1'-0"

F S-8 MANHOLE HASP DETAIL

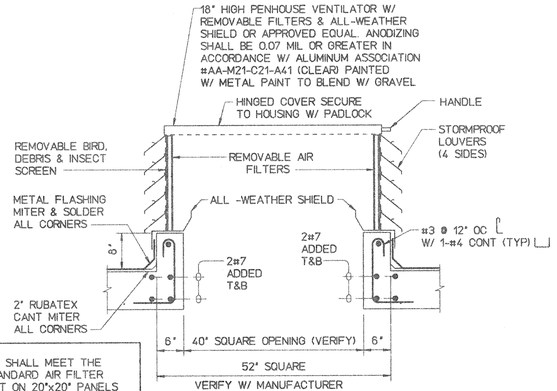
SCALE : NOT TO SCALE

G S-8 CONTROL MOUNT DETAIL

SCALE : 3" = 1'-0"



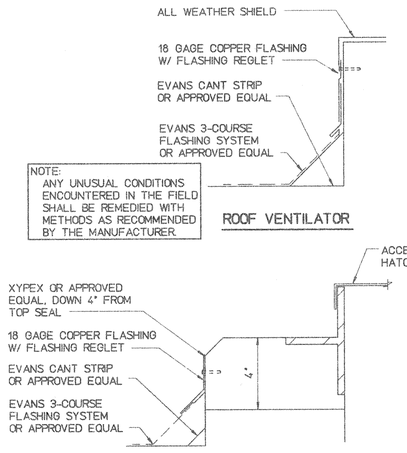
H1 PLAN-OPENING



NOTE:
1. THE AIR FILTER SHALL MEET THE FOLLOWING STANDARD AIR FILTER INSTITUTE TEST ON 20"x20" PANELS 1" THICK.
   - PAD POROSITY = 10 PORES / LIN. IN., RESISTANCE TO 600 CFM AIR = 0.08 IN. OF WATER
   AVERAGE EFFICIENCY = 63%
   DUST CAPACITY @ 0.5 IN. WATER RESISTANCE = 363 GRAMS
2. AK 500 FILTER FOAM-DRY 10 P.P.I.- 1" THICK DISTRIBUTED BY HAWAIIAN AIR FILTER INC OR APPROVED EQUAL
3. PROVIDE PADLOCK SYSTEM D.W. WILL PROVIDE PADLOCK. SUBMIT 6 SETS OF SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.

NOTE: ANCHOR STUDS FOR MOUNTING STUDS SHALL BE STAINLESS STEEL OR APPROVED EQUAL.

H2 SECTION



PADLOCK NOTES:

A. PADLOCKS SHALL BE "BEST", MANUFACTURED BY BEST LOCK CORPORATION D/B/A BEST ACCESS SYSTEMS, MODEL 4J8722-L-PS-1534X1534. THE PADLOCK SHALL BE SPECIFICALLY STAMPED WITH THE FOLLOWING: "DOW" ON ONE SIDE, AND "COUNTY OF KAUAI" ON THE OTHER SIDE.

B. THE DEPARTMENT OF WATER (DOW) SECURITY SYSTEM IS MASTER KEYED TO THE BEST LOCK CORPORATION SYSTEM AND THEREFORE NO SUBSTITUTES WILL BE ACCEPTED.

C. THE CONTRACTOR SHALL FURNISH ONE (1) PADLOCK EACH FOR THE DRIVE GATE, ACCESS MANHOLE, OVERFLOW HATCH, ROOF VENTILATOR, SCADA ENCLOSURE AND BATTERY ENCLOSURE. THE CONTRACTOR SHALL ALSO PROVIDE THE CORE AND 2 KEYS FOR EACH PADLOCK.

D. THE DOW WILL ASSIGN THE CORE NUMBERS AND WILL INSERT THE CORES INTO THE PADLOCKS WITH THE DOW CONTROL KEY. THE PADLOCKS AND CORES SHALL BE HAND CARRIED TO THE DOW OFFICE FOR CORE INSERTION.

H S-8 ROOF VENTILATOR DETAILS

SCALE : 3/4" = 1'-0"

J S-8 ROOF DETAILS

SCALE : NTS

K S-8 COPPER FLASHING DETAIL

SCALE : 3" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

DENNIS KIYOSHI HANATANI LICENSED PROFESSIONAL ENGINEER No. 4359-S * HAWAII, U.S.A. *

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION OF CONSTRUCTION AS DEFINED UNDER HAWAII ADMINISTRATIVE RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS,STATE OF HAWAII

Dennis K. Hanatani

DENNIS K. HANATANI, INC.

DATE: 6/15/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER

Tax Map Key: (4) 5-1-05: 3

0.1 MG RESERVOIR
RESERVOIR ACCESSORIES & DETAILS

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 9/10/99

MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

AQUA ENGINEERS, INC.
Lawai, Kauai, Hawaii 96765

DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET OF SHEETS
DKH	KNP	DKH	S-8

GENERAL NOTES TO CONTRACTOR

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ANY OTHER REGULATORY AGENCY HAVING JURISDICTION IN THIS AREA.
2. ALL CONDUCTORS SHALL BE COPPER, INSULATION THW, THHN, OR THWN. CONDUIT FILL SHALL NOT EXCEED N.E.C. REQUIREMENTS.
3. CONTRACTOR SHALL SUPPLY ALL MISCELLANEOUS PARTS AND MATERIALS FOR THE TELEMETRY RTU TO PROVIDE A COMPLETE AND FUNCTIONING SYSTEM.
4. ALL CONSTRUCTION PRACTICES SHALL CONFORM WITH STANDARD PRACTICE AND BE COMPLETED IN A NEAT AND TIDY MANNER.
5. ANY EXISTING ELECTRICAL EQUIPMENT LOCATIONS SHOWN ARE APPROXIMATE. VERIFY EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION.
6. OBTAIN AND PAY FOR ELECTRICAL PERMIT, ARRANGE FOR PERIODIC INSPECTION BY REGULATORY AUTHORITIES AND DELIVER CERTIFICATE OF FINAL INSPECTION TO OWNER.

SCOPE OF WORK

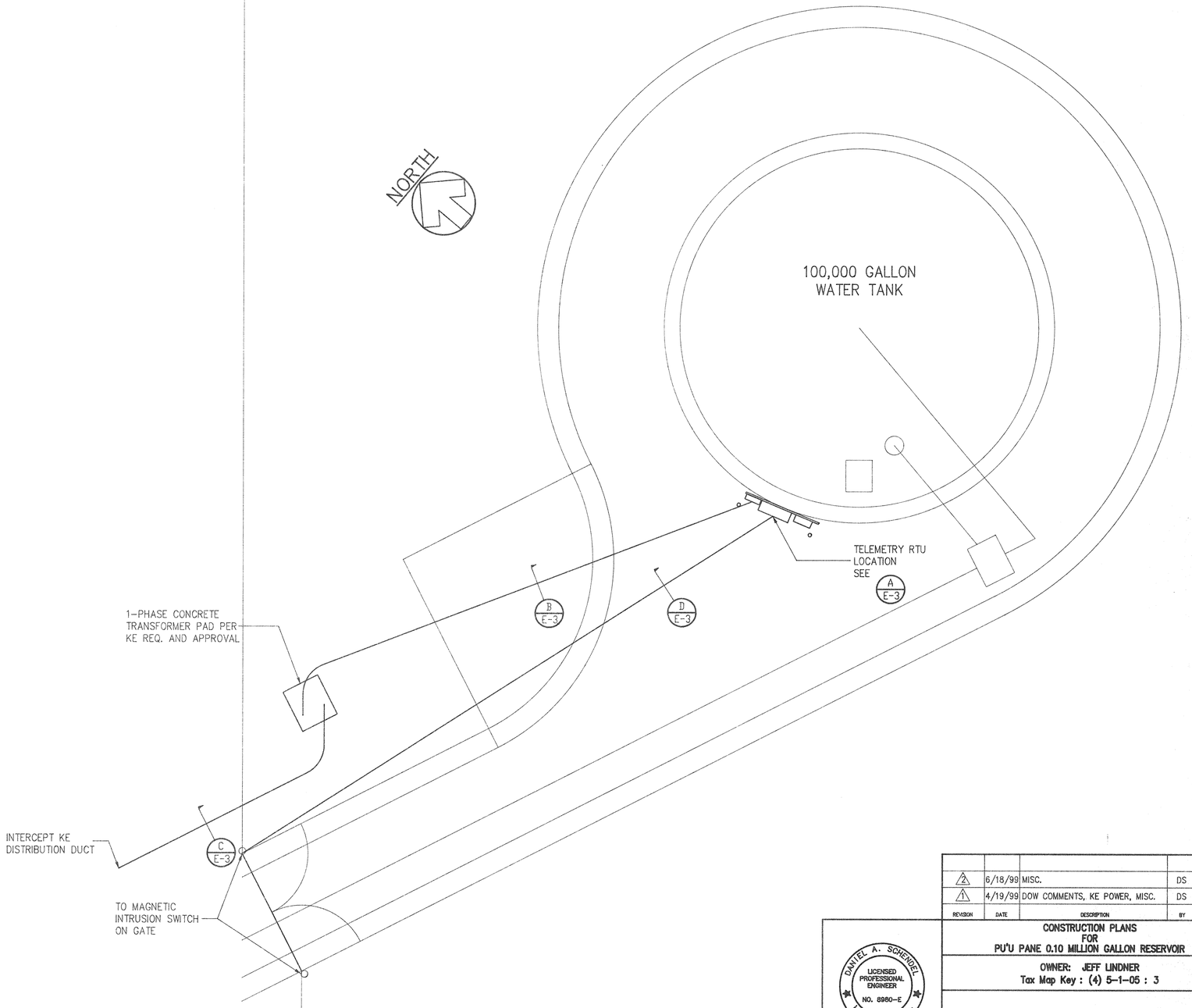
1. PROVIDE A TELEMETRY RTU WHICH IS COMPATIBLE WITH THE EXISTING COUNTY OF KAUAI DEPARTMENT OF WATER TELEMETRY AND WHICH WILL ALLOW FOR REMOTE MONITORING OF THE RESERVOIR LEVEL.
2. THE MOSCAD RTU SHALL BE PROGRAMMED TO READ, COLLECT, STORE AND DOWNLOAD A MINIMUM OF 8 CONTINUOS DAYS OF DATA. THE DATA SHALL BE READ EVERY 10 MINUTES (24 HOURS/DAY) AND INCLUDE THE DATE AND TIME OF THE READING. THE FOLLOWING DATA SHALL BE COLLECTED:

   A. TANK WATER LEVEL.
   B. ELECTRIC POWER STATUS.
   C. INTRUSION STATUS.

   UPON REQUEST, THE DATA SHALL BE ABLE TO BE DOWNLOADED TO AN IBM COMPATIBLE (MICROSOFT WINDOWS 95/98) LAPTOP COMPUTER USING MOTOROLA'S TOOLBOX APPLICATION SOFTWARE AND SHALL BE ABLE TO BE IMPORTED INTO A MICROSOFT EXCEL SPREADSHEET WITHOUT ANY MODIFICATIONS.
   THE PROGRAMMING SHALL ALSO INCLUDE, UPON REQUEST OF THE USER, INITIALIZING THE RTU TO BEGIN COLLECTING A NEW DATA SET. THE CONTRACTOR SHALL PROVIDE THE DEPARTMENT OF WATER, FULL HARD COPY SOURCE CODE PROGRAMMING OF THE RTU (MOTOROLA TOOLBOX APPLICATION SOFTWARE) AND THE FILE ON AN IBM 3-1/2" DISKETTE.

KE UNDERGROUND CONSTRUCTION NOTES AND REQUIREMENTS

1. CONTRACTOR SHALL CONTACT KAUAI ELECTRIC'S (KE) QUALITY ASSURANCE COORDINATOR PRIOR TO START ON KE FACILITIES AND FOR SCHEDULING SITE INSPECTIONS.
2. CONTRACTOR SHALL CONTACT KE'S ENGINEERING DEPARTMENT 246-4340 FOR DESIGN APPROVALS, STANDARD DETAIL DRAWINGS, AND ANY ITEMS NOT ADDRESSED IN THESE NOTES OR DRAWINGS.
3. ALL CONTRACTORS ENTERING KE FACILITIES MUST BE APPROVED BY KE AND MUST HAVE PROPER LICENSING AND INSURANCE COVERAGE. CONTACT KE RISK MANAGEMENT AT 246-4369 FOR DETAILS.
4. ALL WORK ON ELECTRICAL FACILITIES SHALL BE IN STRICT ACCORDANCE WITH SPECIFICATIONS AND REQUIREMENTS OF KE. THE CONTRACTOR SHALL CLOSELY COORDINATE ALL WORK WITH KE'S ENGINEERING DEPARTMENT.
5. ALL TRENCHES AND PULLBOXES MUST BE INSPECTED BY KE'S INSPECTOR PRIOR TO BACKFILLING AND CONCRETE-ENCASING OPERATIONS.
6. THE CONTRACTOR SHALL PROVIDE A POLY-LINE 200 LB. TEST LINE OR EQUIVALENT AS A PULLING WIRE IN ALL CONDUITS.
7. ALL CONDUITS, PULLBOXES, HANDHOLES, AND MANHOLES SHALL BE CLEANED AND FREE FROM OBJECTIONABLE MATERIALS. CONDUIT ENDS SHALL BE ADEQUATELY COVERED UNTIL THE CONDUCTOR IS INSTALLED BY THE ELECTRIC COMPANY. (COVERS SHALL BE CARLON PLUG WITH PULL TAB SERIES P258, EQUIVALENT OR BETTER)
8. CONDUIT TYPE EB WILL NOT BE ACCEPTED.
9. FOR CONDUIT OTHER THAN SERVICES, REFER TO CONDUIT SCHEDULE ON DRAWINGS.
10. FOR ALL SERVICES WHERE THE CONDUCTOR SHALL BE 3/0 OR LESS, AND THE DISTANCE FROM THE KE HANDHOLE AND CUSTOMER'S METER IS LESS THAN 125 FEET, THE CONDUIT SHALL BE 2 INCH SCHEDULE 40 PVC. ANY DEVIATIONS MUST BE APPROVED BY KE ENGINEERING DEPARTMENT.
11. FOR SERVICES WITH CONDUIT UNDER DRIVEWAYS, ROADWAYS, AND PAVED AREAS THE CONDUIT SHALL BE CONCRETE ENCASED (AS NOTED IN ITEM 12) SCHEDULE 40 PVC (EQUIVALENT OR BETTER). SCHEDULE 80 PVC CONDUIT MAY BE SUBSTITUTED FOR THE CONCRETE ENCASED SCHEDULE 40 PVC UNDER CONCRETE DRIVEWAYS.
12. ALL PRIMARY AND SECONDARY ROADWAY CROSSINGS SHALL BE ENCASED IN A MINIMUM 3 INCH CONCRETE JACKET, WHICH SHALL EXTEND A MINIMUM OF 12 INCHES OUTSIDE OF EDGE OF PAVEMENT.
13. SUPPLY CONDUITS, WHEN INSTALLED NEAR COMMUNICATION CABLES, SHALL BE SEPARATED FROM COMMUNICATION DUCT SYSTEMS AND BURIED COMMUNICATION CABLES OR CONDUCTORS BY NOT LESS THAN 3 INCHES OF CONCRETE OR 12 INCHES OF EARTH WHEN PARALLELING OR CROSSING.
14. CHAIRS (DUCT SEATS) SHALL BE INSTALLED AND SPACED AT A MAXIMUM OF 5 FEET SEPARATION WHEN CONCRETE ENCASING CONDUITS.
15. BACKFILL MATERIAL AROUND ALL DUCTS SHALL BE SELECT MATERIAL. (REFER TO PAGE 21 OF KE SERVICE INSTALLATION MANUAL)
16. ALL CONDUITS SHALL ENTER BOXES AT 90 DEGREE ANGLE AND FLUSH TO THE WALL WITH BELL ENDS TO PREVENT CABLE DAMAGE.
17. 90 DEGREE CONDUIT BENDS SHALL BE FACTORY MADE WITH A MINIMUM RADIUS OF 3 FEET IN TRENCH RUNS.
18. CONDUIT BENDS GREATER THAN 90 DEGREES WILL NOT BE ACCEPTED.
19. A 36 INCH MINIMUM CLEARANCE SHALL BE MAINTAINED WHEN RUNNING KE CONDUITS PARALLELING, AND BY AT LEAST 6 INCHES WHEN CROSSING WATER AND SEWER LINES. IF CLEARANCES ARE REDUCED BELOW 36 INCHES, THE KE CONDUIT SHALL BE CONCRETE ENCASED.
20. NO FOREIGN PULLBOXES, HANDHOLES, MANHOLES, CONCRETE SLABS/BOXES, STRUCTURES, ETC. ARE TO BE INSTALLED OVER KE FACILITIES WITH THE EXCEPTION OF HTCO, CATV OR WATERLINE CONDUIT CROSSINGS. SUCH CROSSING MUST BE APPROVED BY KE'S ENGINEERING DEPARTMENT AND KE CONDUIT TO BE CONCRETE ENCASED. CONCRETE ENCASEMENT MUST BE MINIMUM OF 3 INCH ENCASEMENT AND EXTEND A MINIMUM OF 1 FOOT BEYOND CROSSING CONDUIT OR PIPE.
21. YELLOW MARKER TAPE TO BE PLACED 1 FOOT ABOVE ELECTRICAL CONDUITS IN TRENCH DURING BACKFILLING. (E-Z CODE WBT 6 INCH WIDE 4 MIL POLYETHYLENE PROTECT-A-LINE WARNING TAPE NA-0708 "ELECTRIC LINE" IN YELLOW, EQUIVALENT OR BETTER)
22. UNLESS OTHERWISE NOTED, THE TOP OF ALL CONDUITS SHALL BE AT A MINIMUM DEPTH OF 24 INCHES BELOW FINISHED GRADE.
23. ALL HANDHOLES, PULLBOXES, AND MANHOLES SHALL MEET KAUAI ELECTRIC'S SPECIFICATIONS AND BE MANUFACTURED BY A KE APPROVED SUPPLIER.
24. TYPICALLY, THE TOP OF ALL ELECTRICAL UTILITY BOXES SHALL BE 1 INCH ABOVE FINISHED GRADE UNLESS OTHERWISE NOTED. SINGLE PHASE TRANSFORMER PADS SHALL BE 2 INCHES ABOVE, AND THREE PHASE TRANSFORMER PADS SHALL BE 4 INCHES ABOVE FINISHED GRADE. (SPECIAL CONDITIONS MAY APPLY TO SIDEWALKS, ROADWAYS, ETC. SEE SPECIFIC LOCATION NOTATION)
25. AT NO TIME SHALL CEMENT MORTAR, WOOD OR ANY OTHER MATERIAL BE USED BETWEEN PRE-CAST SECTIONS OF KE PULLBOXES, HANDHOLES, OR MANHOLES. THE PERMANENT INSTALLATION OF WOODEN WEDGES TO LEVEL OR RAISE THE PRE-CAST SECTIONS SHALL NOT BE PERMITTED.
26. A MINIMUM OF 6 INCHES #3 CRUSHED ROCK BACKFILL SHALL BE PLACED LOOSELY BENEATH THE BOTTOM SECTION OF HANDHOLES AND PULLBOXES. CRUSHED ROCK OR OTHER FOREIGN MATERIALS ARE NOT TO BE PLACED INSIDE HANDHOLES AND PULLBOXES.



A E-1 ELECTRICAL SITE PLAN
SCALE: 3/16" = 1'-0"

NOTES:
1) TMK (4) 5-1-05:3

REVISION	DATE	DESCRIPTION	BY	APPROVED
2	6/18/99	MISC.	DS	
1	4/19/99	DOW COMMENTS, KE POWER, MISC.	DS	

DANIEL A. SCHENDEL
LICENSED PROFESSIONAL ENGINEER
NO. 8960-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

CONSTRUCTION PLANS
FOR
PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key : (4) 5-1-05 : 3

TELEMETRY RTU - 1

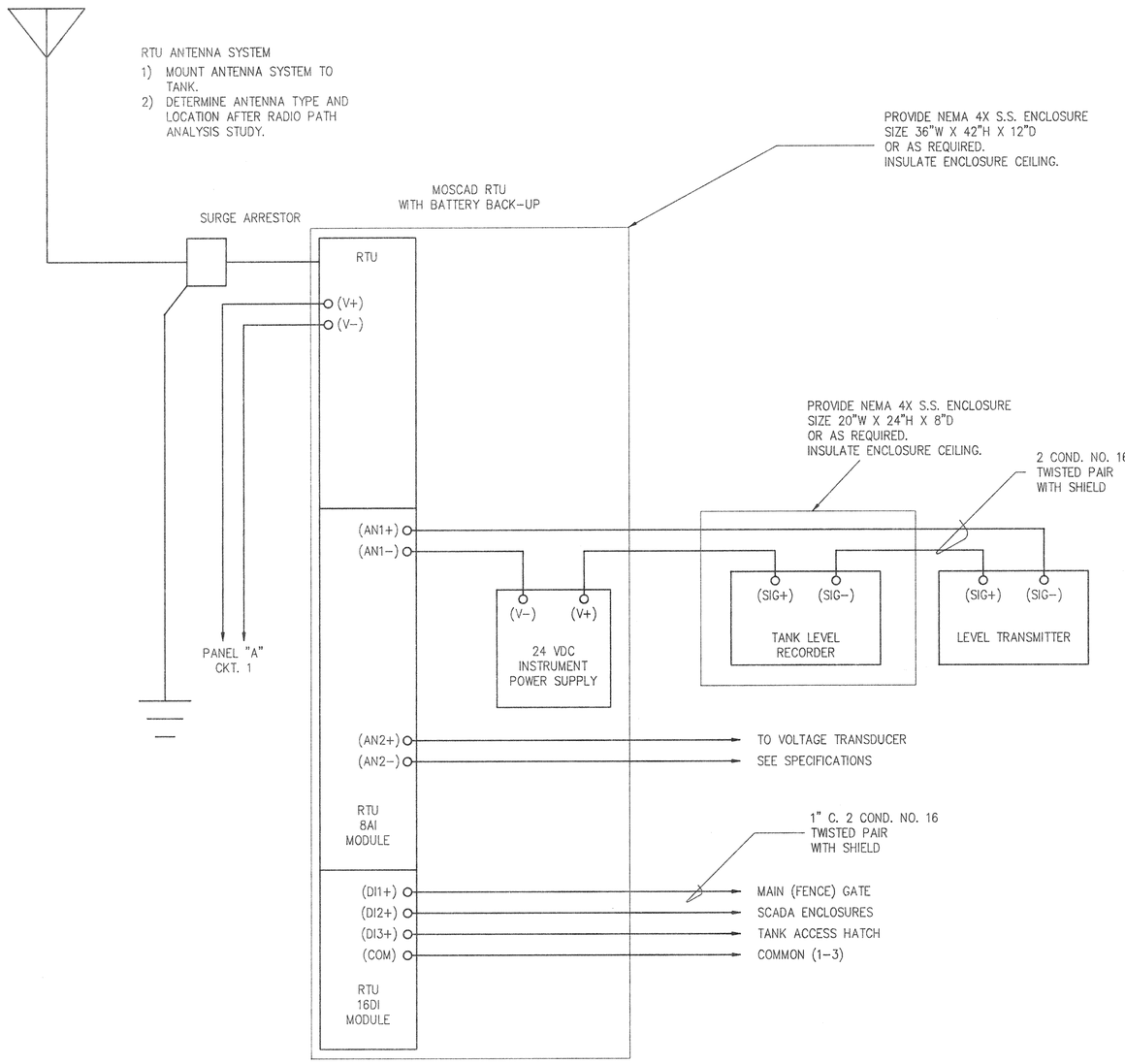
APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS
COUNTY OF KAUAI

APPROVED:
MANAGER & CHIEF ENGINEER, DEPT. OF WATER
COUNTY OF KAUAI
9/16/99

AQUA ENGINEERS, INC.
LAWAI, KAUAI, HAWAII 96765

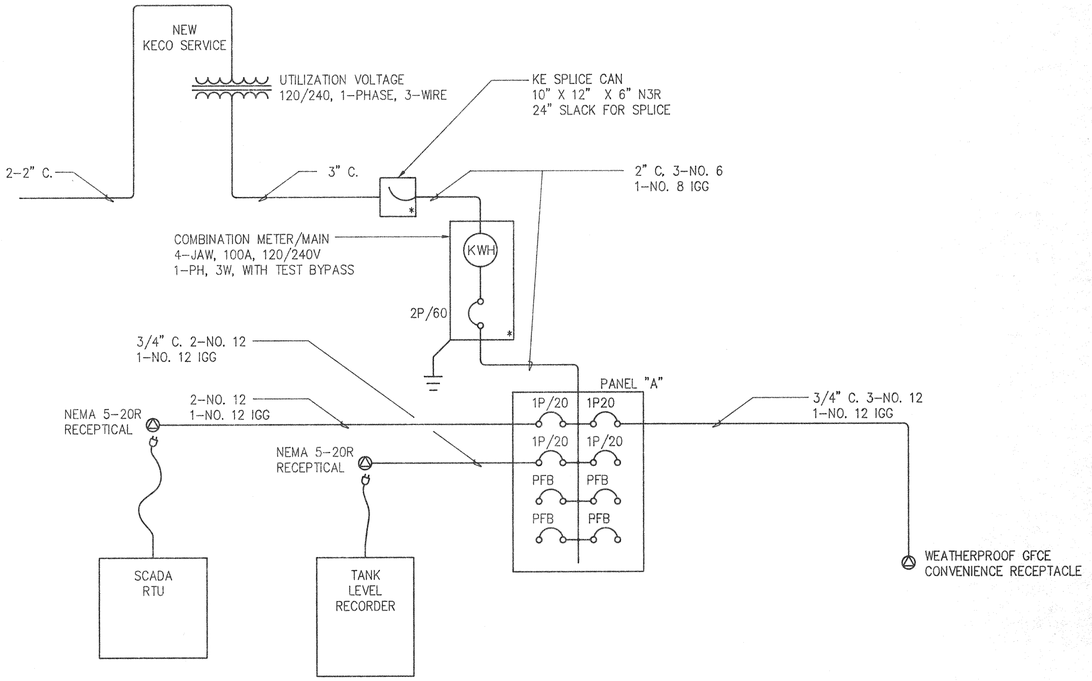
DESIGNED BY: DS | DRAWN BY: DS | CHECKED BY: DS | SHEET E-1

Dan Schendel, PE/PL Electrical-Mechanical, Inc. 6/30/99 2:00 AM Sheet1.dwg



A E-2 CONNECTION DIAGRAM
NOT TO SCALE

NOTES:
1) THE CONNECTION DIAGRAM IS TYPICAL FOR RTU WIRING. CONSULT MANUFACTURERS INSTRUCTIONS.
2) PROVIDE FOR RADIO PATH ANALYSIS STUDY TO BE COMPLETED PRIOR TO CONSTRUCTION PLAN APPROVAL.



B E-2 ONELINE DIAGRAM
NOT TO SCALE

NOTES:
1) * INDICATES PROVISION FOR KE SEAL.

PANEL NAME	A
PROJECT NAME	PU'U PANE RTU
PROJECT NUMBER	99.7437
100 AMP	3 POLE MAIN LUGS
240 VOLTS (L-L)	3 W
100 AMP BUSS	ISOLATED GROUND BUSS
10,000 A.I.C. MINIMUM	FLUSH MOUNTED ENCLOSURE

PANEL SCHEDULE NOTES:

CKT #	LOAD	KVA (CONN) A		BREAKER AMP	P	CONNECTED KVA	AMPS
1	SCADA RTU	.6		20-	1	0.6	5
3	PFB		0			0.0	0
5	R-CONVENIENCE	.2		20-	1	0.2	2
7	PFB		0			0.0	0
2	TANK LEVEL RECORDER		.6	20-	1	0.6	5
4	PFB	0				0.0	0
6	SPARE		.2	20-	1	0.2	2
8	PFB	0				0.0	0
	TOTAL PHASE A	.8					
	TOTAL PHASE B		.8				
	TOTAL		1.6				

C E-2 PANEL SCHEDULE
NOT TO SCALE

REVISION	DATE	DESCRIPTION	BY	APPROVED
3	8/24/99	DOW COMMENTS.	DS	
2	6/18/99	MISC.	DS	
1	4/19/99	DOW COMMENTS, KE POWER, MISC.	DS	

DANIEL A. SCHENDEL LICENSED PROFESSIONAL ENGINEER NO. 8980-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. 8/24/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key : (4) 5-1-05 : 3

TELEMETRY RTU - 2

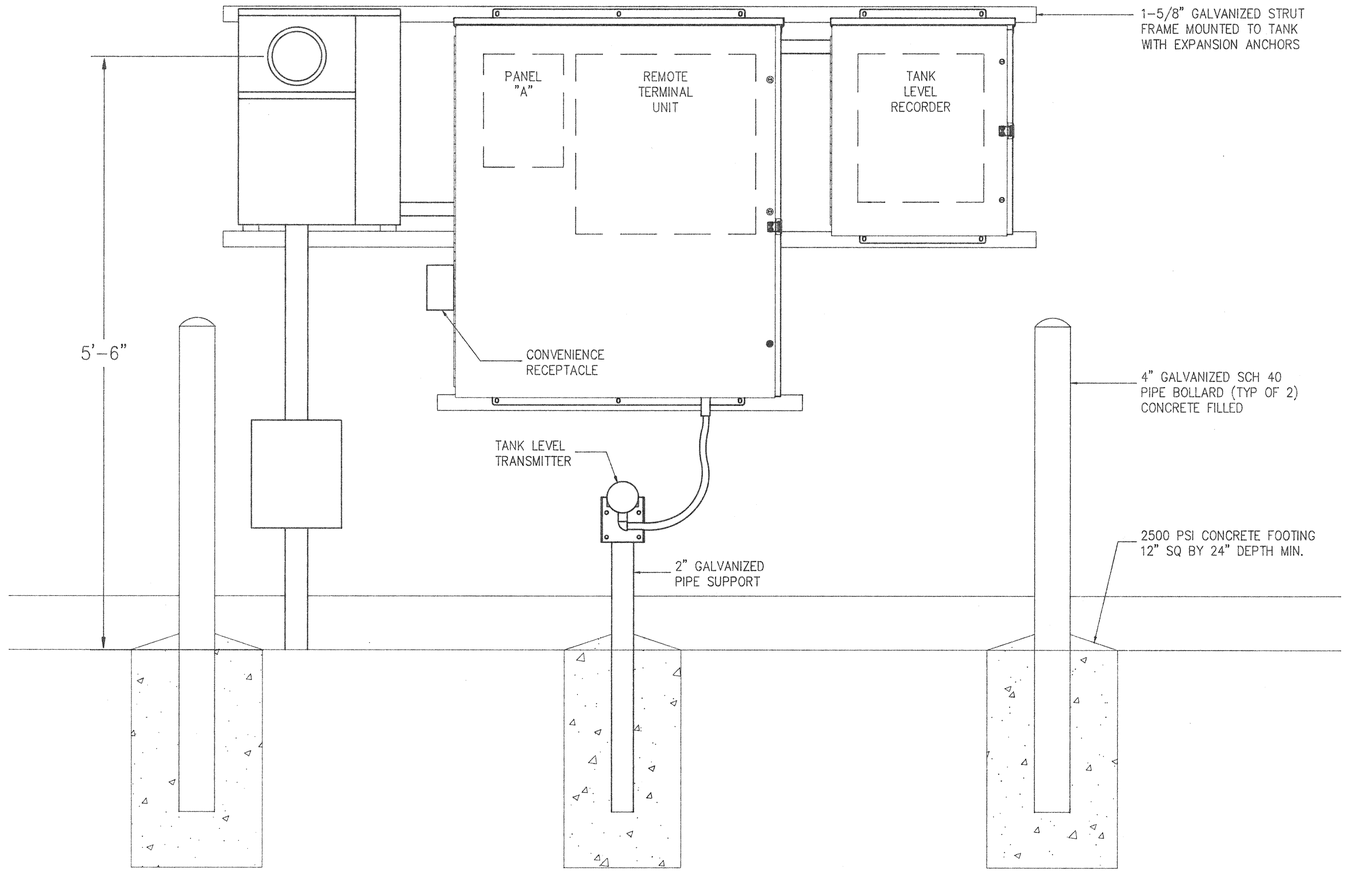
APPROVED: COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI

APPROVED: 9/13/99 MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI

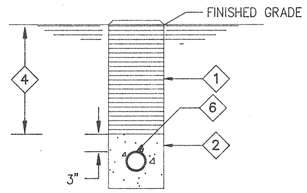
AQUA ENGINEERS, INC.
LAWAI, KAUAI, HAWAII 96765

DESIGNED BY: DS | DRAWN BY: DS | CHECKED BY: DS | SHEET E-2

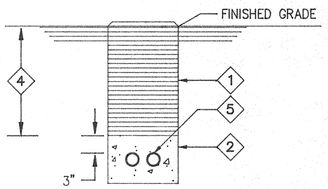
Jon Schendel, PE/PE Electromechanical, Inc. 8/24/99 2:03 PM Sheet2.dwg



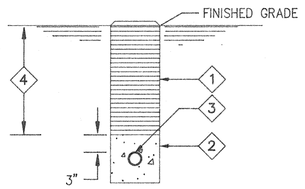
A E-3 RTU ELEVATION
NOT TO SCALE



B E-3 DUCT SECTION
NOT TO SCALE



C E-3 DUCT SECTION
NOT TO SCALE



D E-3 DUCT SECTION
NOT TO SCALE

1. TYPE A BACKFILL—BEING ABLE TO PASS THROUGH 1" MESH CONTAINING NO MORE THAN 20% VOLUME OF ROCK PARTICLES.
2. CONCRETE ENCASED: 2,500 PSI IN 28 DAYS, MAX. 3/4" AGGREGATE. MINIMUM 3" ENCASEMENT ON ALL SIDES.
3. 1" SCHEDULE 40 PVC DUCT.
4. 18" MINIMUM DUCT DEPTH.
5. 2" SCHEDULE 40 PVC DUCT. (2 EA) MAINTAIN MINIMUM 1-1/2" SEPARATION.
6. 3" SCHEDULE 40 PVC DUCT.

REVISION	DATE	DESCRIPTION	BY	APPROVED
2	6/18/99	MISC.	DS	
1	4/19/99	DOW COMMENTS, KE POWER, MISC.	DS	

DANIEL A. SCHENKEL LICENSED PROFESSIONAL ENGINEER NO. 8980-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key : (4) 5-1-05 : 3

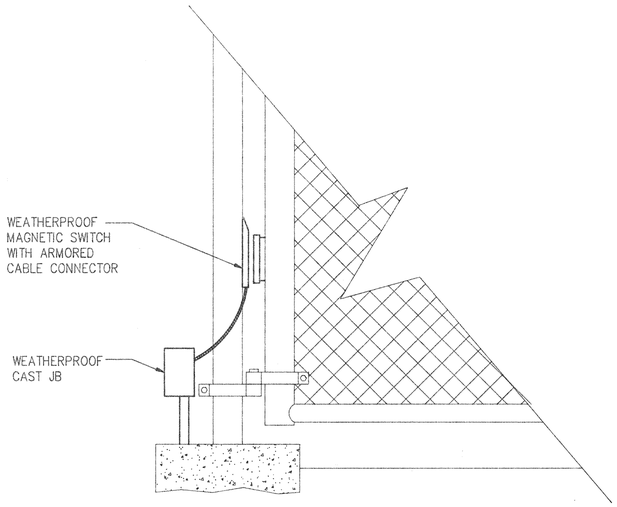
TELEMETRY RTU - 3

APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS COUNTY OF KAUAI

APPROVED:
MANAGER & CHIEF ENGINEER, DEPT. OF WATER COUNTY OF KAUAI

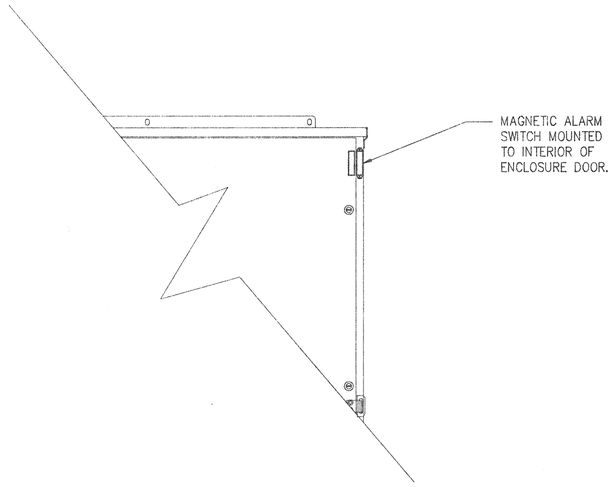
AQUA ENGINEERS, INC.
LAWAI, KAUAI, HAWAII 96765

DESIGNED BY: DS | DRAWN BY: DS | CHECKED BY: DS | SHEET E-3



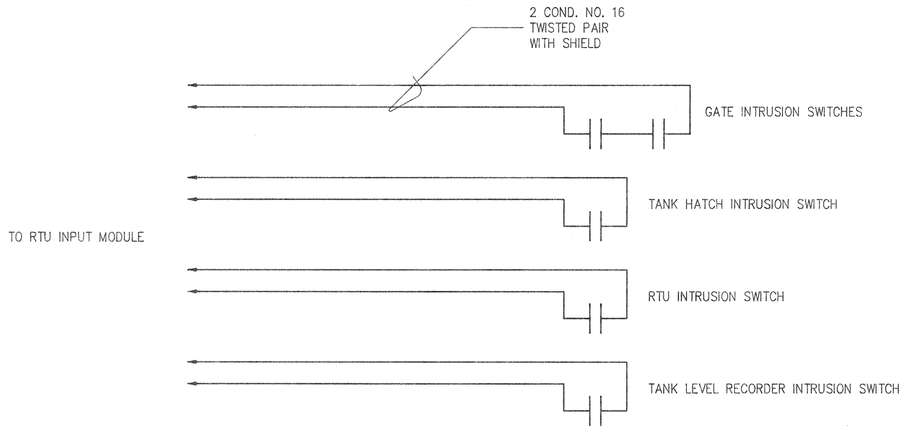
A / E-4 MAIN GATE INTRUSION SWITCH
NOT TO SCALE

NOTES:
1) TYPICAL FOR TWO (2) MAIN GATES.
2) MOUNT MAGNETIC SWITCH ON GATE POST.
3) MOUNT MAGNET ON GATE SO THAT WHEN THE GATE IS CLOSED THE SWITCH IS ACTIVATED. OPENING THE GATE ROTATES THE MAGNET AWAY FROM THE SWITCH, DEACTIVATING IT.

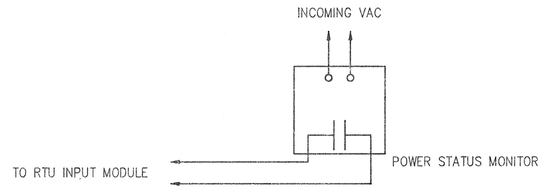


B / E-4 ENCLOSURE INTRUSION SWITCH
NOT TO SCALE

NOTES:
1) INTRUSION SWITCHES TO BE MOUNTED TO RTU ENCLOSURE, TANK LEVEL RECORDER ENCLOSURE, AND TANK ACCESS HATCH.
2) INPUTS TO BE CONNECTED TO RTU FOR MONITORING.



C / E-4 INTRUSION SENSOR WIRING DIAGRAM
NOT TO SCALE



D / E-4 POWER STATUS MONITOR
NOT TO SCALE

REVISION	DATE	DESCRIPTION	BY	APPROVED
2	6/18/99	MISC.	DS	
1	4/19/99	DOW COMMENTS, KE POWER, MISC.	DS	

DANIEL A. SCHENDEL
LICENSED PROFESSIONAL ENGINEER
NO. 8980-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
4/25/99

CONSTRUCTION PLANS FOR PU'U PANE 0.10 MILLION GALLON RESERVOIR

OWNER: JEFF LINDNER
Tax Map Key : (4) 5-1-05 : 3

TELEMETRY RTU – 4

APPROVED:
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS
COUNTY OF KAUAI

APPROVED:
MANAGER & CHIEF ENGINEER, DEPT. OF WATER
COUNTY OF KAUAI
9/10/99

AQUA ENGINEERS, INC.
LAWAI, KAUAI, HAWAII 96765

DESIGNED BY: DS | DRAWN BY: DS | CHECKED BY: DS | SHEET E-4

Dan Schendel, Pacific Electro-Mechanical, Inc. 4/25/99 3:05 PM Sheet4.dwg