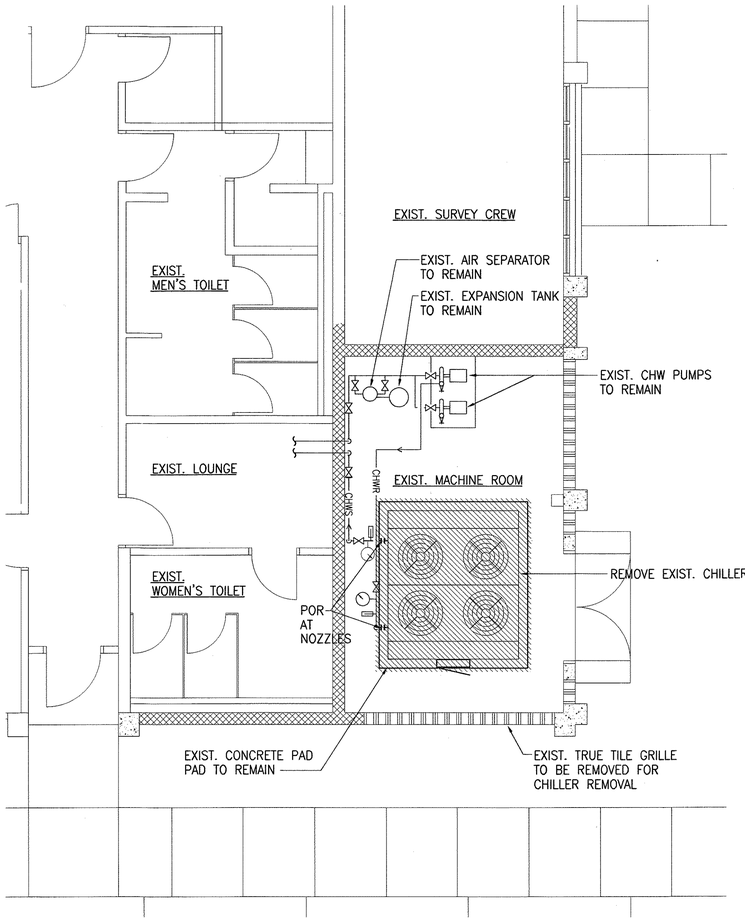
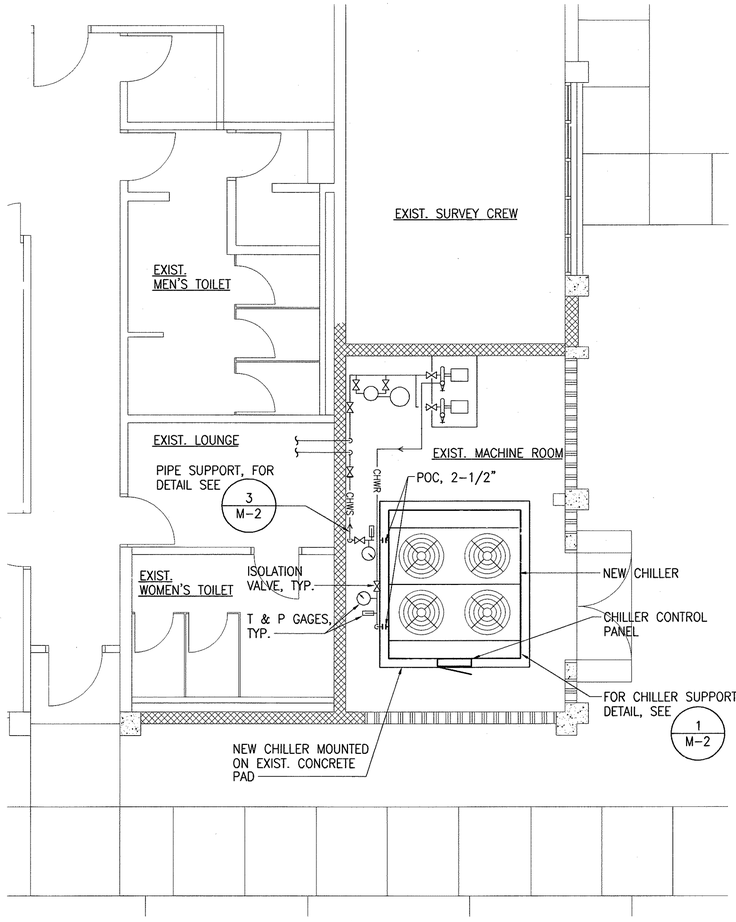
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-03-99M	2001	12	15



1/M-1 MECHANICAL PLAN - DEMOLITION WORK
SCALE: 1/4" = 1'-0"



2/M-1 MECHANICAL PLAN - NEW WORK
SCALE: 1/4" = 1'-0"

MECHANICAL LEGEND

CH		CHILLER
POR/POC	—||—	POINT OF REMOVAL/CONNECTION
		FLEX CONNECTION
—CHWR—	CHWR	CHILLED WATER RETURN
—CHWS—	CHWS	CHILLED WATER SUPPLY
	ET	EXPANSION TANK
CHWP		CHILLED WATER PUMP
FS	FS	FLOW SWITCH
		PRESSURE GAUGE
	CV	CHECK VALVE
	GV	GATE VALVE
		REDUCER
		THERMOMETER
		STRAINER

GENERAL NOTES

1. THE CONTRACTOR SHALL INSPECT THE PROJECT SITE BEFORE PROCEEDING WITH THE WORK AND SHALL NOTIFY AND COORDINATE WITH THE ENGINEER ANY MAJOR DEVIATIONS OR DISCREPANCIES DISCOVERED IN THE PLANS AND SPECIFICATIONS DUE TO UNFORESEEN OR VARYING FIELD CONDITIONS. BID SUBMMISSION SHALL BE EVIDENCE THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS RESOLVED ALL DISCREPANCIES AND QUESTIONS AND NO EXTRA PAYMENT WILL BE AUTHORIZED FOR WORK MADE NECESSARY BY THE CONTRACTOR'S FAILURE TO DO SO.
2. THE ENTIRE INSTALLATION SHALL COMPLY WITH CHAPTER 16 OF THE BUILDING CODE OF THE CITY & COUNTY OF HONOLULU, STATE DEPARTMENT OF HEALTH REGULATIONS, UNIFORM PLUMBING CODE, UNIFORM FIRE CODE, NATIONAL ELECTRICAL CODE, HAWAII STATE MODEL ENERGY CODE AND ALL OTHER AGENCIES HAVING JURISDICTION.
3. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL AND EQUIPMENT INCLUDING CUTTING AND PATCHING AS REQUIRED FOR COMPLETE AND OPERATING SYSTEMS. "PROVIDE" SHALL MEAN TO PROCURE ALL NECESSARY MATERIALS AND INSTALL A COMPLETE WORKING INSTALLATION AS REFERENCED ON THE CONSTRUCTION DRAWINGS.
4. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO COVER THE COMPLETE INSTALLATION OF SYSTEMS TO FUNCTION AS DESCRIBED. THE OMISSION OF REFERENCE TO ANY NECESSARY ITEM OF LABOR OR MATERIAL SHALL NOT RELIEVE THE CONTRACTOR FROM PROVIDING SUCH LABOR AND MATERIAL.
5. ALL EQUIPMENT SHALL BE CAPABLE OF FITTING INTO THE SPACES ALLOCATED WHILE MEETING THE MANUFACTURER'S RECOMMENDED ACCESS REQUIREMENTS. REVIEW ALL SPACES WHERE EQUIPMENT IS TO BE INSTALLED PRIOR TO ORDERING OF EQUIPMENT AND NOTIFY THE ENGINEER OF ANY INADEQUATE CLEARANCES OR CONDITIONS THAT WILL PREVENT THE PROPER INSTALLATION, MAINTENANCE, AND OPERATION OF THE EQUIPMENT.
6. PROVIDE SHOP DRAWINGS FOR THE LAYOUT OF EQUIPMENT, PIPING, AND DUCTWORK SHOWING COORDINATION OF ALL WORK WITH ALL OTHER TRADES, INCLUDING PLUMBING, CONTROLS, AND ELECTRICAL WORK. ALL CONFLICTS BETWEEN TRADES SHALL BE NOTED AND RESOLVED.
7. OBTAIN APPROVAL FROM THE ENGINEER BEFORE MAKING ANY PENETRATIONS THROUGH STRUCTURAL MEMBERS, WALLS, AND SLABS.
8. DRAWINGS DO NOT ATTEMPT TO SHOW EXACT DETAILS OF PIPING AND DUCTWORK. PROVIDE OFFSETS AS NECESSARY TO AVOID LOCAL OBSTRUCTIONS OR INTERFERENCES WITH OTHER TRADES. REVIEW ALL PIPING AND DUCT RUNS PRIOR TO FABRICATION AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY INTERFERENCE AND/OR LACK OF ADEQUATE CLEARANCES.
9. SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF WORK, MARK SUCH CHANGES ON THE AS-BUILT DRAWINGS. IF THESE CHANGES REQUIRE ALTERNATE METHODS TO THOSE APPROVED BY THE CONTRACT DOCUMENTS, SUBMIT SHOP DRAWINGS SHOWING THE PROPOSED ALTERNATE METHODS TO THE ENGINEER FOR APPROVAL. DO NOT PROCEED UNTIL REVIEWED.
10. REPAIR ANY DAMAGE TO EXISTING CONSTRUCTION RESULTING FROM THE INSTALLATION OF MECHANICAL ITEMS. THE AREAS REPAIRED SHALL MATCH THE ADJACENT SURFACES IN TEXTURE AND COLOR.
11. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS AND DRAINS AT ALL LOW POINTS IN CHILLED WATER PIPES.
12. SEISMICALLY BRACE ALL EQUIIPMENT, PIPING, AND DUCTWORK IN ACCORDANCE WITH THE CURRENT CITY AND COUNTY OF HONOLULU BUILDING CODE FOR SEISMIC ZONE 2A.
13. ROUTE ALL CONTROL AND MOTOR STARTER WIRING IN CONDUIT.

PHASING NOTE

1. SCHEDULE AN 8 HOUR AIR CONDITIONING OUTAGE AT NIGHT OR ON THE WEEKEND TO REPLACE THE EXISTING CHILLER.

MECHANICAL ENERGY CODE COMPLIANCE FORM	
CODE ARTICLES	COMPLIANCE METHOD
ENVELOPE	NOT APPLICABLE
HVAC SYSTEMS	PRESCRIPTIVE
HVAC EQUIPMENT	BASIC REQUIREMENTS
ENERGY MANAGEMENT	NOT APPLICABLE

ROOF: NOT APPLICABLE

WALL: NOT APPLICABLE

WINDOWS/SKYLIGHTS: NOT APPLICABLE

EQUIPMENT: FOR EQUIPMENT EFFICIENCIES, SEE EQUIPMENT SCHEDULES.

REVISED ORDINANCES OF HONOLULU
CHAPTER 32
BUILDING ENERGY EFFICIENCY STANDARDS

THE BUILDING ENERGY EFFICIENCY STANDARDS HAVE BEEN REVIEWED AND TO THE BEST OF MY KNOWLEDGE THIS DESIGN SUBSTANTIALLY CONFORMS TO THE REQUIREMENTS OF SECTIONS 8.3, 9.3, 10.3, 11.3, 12.3 OR 13.3.

SIGNATURE

BARRY G.S. JIM ON
NAME (PRINT)

MECHANICAL ENGINEER
TITLE

9546-M
PE LICENSE NO.

BARRY G. S. JIM ON
LICENSED PROFESSIONAL ENGINEER
No. 9546-M
HAWAII, U.S.A.

BARRY G. S. JIM ON
LICENSED PROFESSIONAL ENGINEER
No. 9546-M
HAWAII, U.S.A.

This work was prepared by me or under my supervision, Supervision of construction to be as defined in Section 16-82-21, Department of Regulatory agencies, State of Hawaii, Rules relating to Engineers, Architects, Land Surveyors and Landscape Architects.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MECHANICAL DEMO AND NEW WORK PLAN AND MECHANICAL LEGEND

MAUI DISTRICT BASEYARD
Project No. HWY-M-03-99M

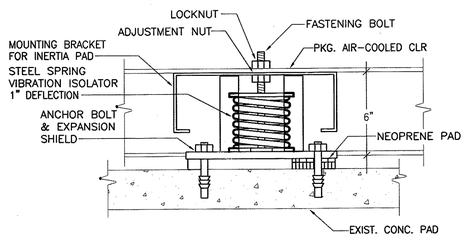
Scale: AS SHOWN Date: APR. 2001

SHEET No. M1.0 OF 2 SHEETS

ORIGINAL PLAN | NOTE BOOK | No. | BURIED PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

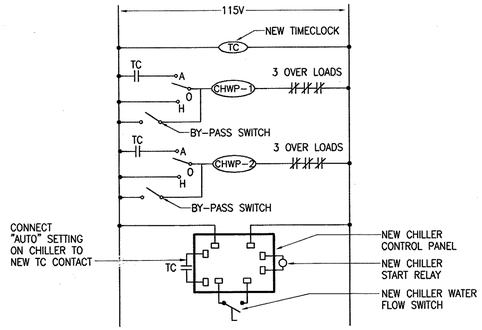
Z:_#Projects (numbered)\2001\01036\Drawing Files\Drawings ~ HVAC\1c6m1010.dwg ~ 20010503.1139

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-03-99M	2001	13	15

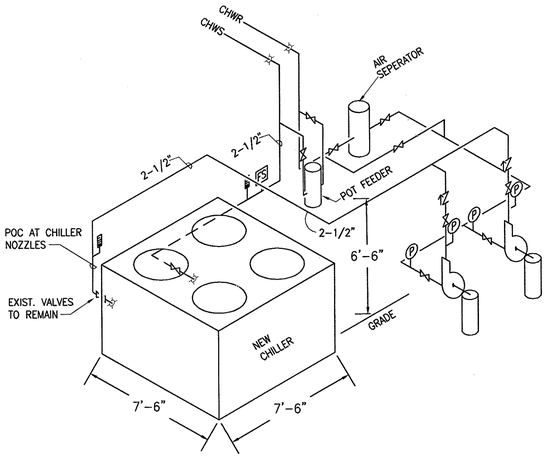


NOTE: 1) ISOLATORS SHALL BE SEISMIC TYPE RATED W/ SNUBBERS
2) WEIGHT RATING TO CONFORM TO PKG. AIR-COOLED CLR MANUFACTURER'S RECOMMENDATIONS

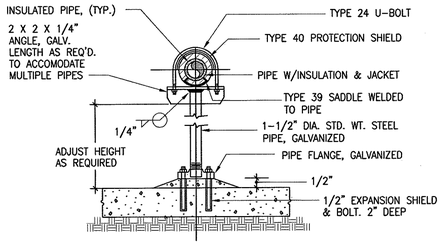
1 / M-2 **SPRING ISOLATOR DETAIL**
NOT TO SCALE



2 / M-2 **NEW CHILLER CONTROL DIAGRAM**
NOT TO SCALE



3 / M-2 **NEW CHILLER PLANT ISOMETRIC DIAGRAM**
NOT TO SCALE



4 / M-2 **TYPICAL PIPE SUPPORT**
NOT TO SCALE

SEQUENCE OF OPERATION

I. GENERAL:

A. THE PROGRAMMABLE TIME CLOCK SHALL START AND STOP THE CHILLER, AND INDIRECTLY START UP THE CHILLED WATER PUMP VIA A RELAY IN ACCORDANCE WITH THE TIME SCHEDULES REQUIRED BY THE BUILDING ACTIVITY. PROVIDE PUMP WITH HAND-OFF-AUTO SWITCH TO ALLOW MANUAL OVERRIDE OF THE CHILLER RELAY.

II. OPERATION OF CH-1:

A. UPON A SIGNAL FROM THE TIME CLOCK OR REMOTE ON-OFF SWITCH TO START CH-1, THE CHILLER CONTROL SYSTEM START CHWP-1 AND WILL VERIFY THE INCOMING POWER TO ENSURE THAT THERE ARE NO PROBLEMS WITH SINGLE PHASING, PHASE REVERSAL, OR UNBALANCED VOLTAGES. THE CHILLER PANEL SHALL ALSO BE EQUIPPED WITH A MANUAL START/STOP SWITCH TO OVERIDE THE AUTOMATIC START/STOP CONTROLS.

B. THE SYSTEM WILL CHECK IF THE CHILLER WAS STARTED WITHIN THE LAST 20 MINUTES OR IF THE MOTOR WINDING TEMPERATURE IS WITHIN SAFE GUIDELINES.

C. UPON CONFIRMATION OF IIA AND IIB. THE FLOW SWITCH WILL CONFIRM THAT THERE IS SUFFICIENT CHILLED WATER FLOWING THROUGH THE CHILLER.

D. ONCE FLOW THROUGH THE EVAPORATOR HAS BEEN ESTABLISHED, THE CHILLER WILL THEN CLOSE THE AUXILIARY CONTACTS, ALLOWING POWER TO PASS THROUGH THE LOW TEMP. CUT OUT TO ENERGIZE THE CHW FLOW INTERLOCK RELAY

E. THE OIL PUMP IS THEN STARTED AND CONFIRMED WITH A PRESSURE SWITCH. AFTER A 60 SECOND TIME DELAY AND IF EVERY SAFETY AND INTERLOCK IS CONFIRMED, THE CHILLER COMPRESSOR MOTOR IS THEN STARTED. THE START-UP FROM SIGNAL TO START TO ACTUAL COMPRESSOR MOTOR START SHALL BE ACCOMPLISHED WITHIN A MAXIMUM OF 2 MINUTES.

F. ONCE THE CHILLER IS STARTED AND CONFIRMED TO BE IN OPERATION, MONITORING SENSORS WILL THEN MONITOR CURRENT LIMITS, CONDENSER LIMITS, EVAPORATOR LIMITS, AND SURGE CONDITION FOR PROPER OPERATION.

G. THE CONTROL SYSTEM WILL STOP THE CHILLER FOR THE FOLLOWING REASONS: LOW LOAD, SET POINT DEVIATION, LATCHING SAFETY OR MANUAL SHUT OFF.

H. SAFETY CONTROLS: THE CONTROL SYSTEM WILL MONITOR ALL ROTOR BEARING TEMPERATURES INCLUDING GEAR BOX BEARINGS AND MOTOR WINDING TEMPERATURES TO INDICATE TO THE OPERATOR IF UNUSUAL HEATING OF THESE COMPONENTS IS OCCURRING. IF THE TEMPERATURES EXCEED A VALUE OF 180°F, IT WILL ANNUNCIATE AN ALARM TO INDICATE SPECIFICALLY WHAT IS WRONG WITH THE CHILLER AND THE TEMPERATURE VALUES SENSED. MOTOR WINDING TEMPERATURE SENSORS MUST BE IMBEDDED WITHIN THE MOTOR WINDINGS PROPER BY THE MANUFACTURER AT THE TIME OF ASSEMBLY. A LATCHING DIAGNOSTIC SHALL OCCUR IF THE TEMPERATURE OF THE MOTOR WINDING REACHES A TEMPERATURE OF 250°F.

I. EVAPORATOR AND CONDENSER REFRIGERANT TEMPERATURES: THE CONTROL SYSTEM WILL MONITOR THESE POINTS IN ORDER TO DETERMINE THE APPROACH TEMPERATURE BETWEEN THE WATER AND THE REFRIGERANT FOR AN INDICATION OF HEAT EXCHANGER EFFICIENCY.

J. DIAGNOSTICS: THE CONTROL SYSTEM WILL MONITOR DIAGNOSTIC POINTS WITHIN THE CHILLER ITSELF TO DETERMINE IF ANY PROBLEMS EXISTS IN ITS OPERATION. THESE SHALL INCLUDE; HIGH AND LOW CHILLED WATER TEMPERATURES, EVAPORATOR AND CONDENSER EVAPORATOR REFRIGERANT TEMPERATURES, PHASE IMBALANCE, REVERSAL, LOSS AND HIGH AND LOW AMPERAGES, MOTOR WINDING TEMPERATURES, BEARING TEMPERATURES, AND GENERAL SENSOR FAILURE.

K. THE CHILLER CONTROL SYSTEM SHALL RESET THE CHILLED WATER LEAVING TEMPERATURE AS A FUNCTION OF RETURN WATER TEMPERATURE. THE FORMULA FOR DETERMINING THE RESET SCHEDULE SHALL BE AS FOLLOWS:

CHWR TEMP	CHWS SETPOINT
54° F	44° F
52° F	46° F
50° F	48° F

L. THE CHILLER WILL SHUT DOWN IF A LATCHING OR NON-LATCHING DIAGNOSTIC IS DETECTED OR IF THE LOAD IS TOO LOW. IF THE SHUTDOWN IS FOR LOW LOAD, THE CHILLER WILL RESET ITSELF AND BE READY FOR OPERATION IF THE LOAD IS TO INCREASE. IF IT IS A DIAGNOSTIC, THE CHILLER WILL NOT RESTART UNTIL AN OPERATOR CORRECTS THE PROBLEM AND RESETS THE MACHINE.

PACKAGED AIR COOLED CHILLER SCHEDULE

UNIT	TYPE	MIN. TONS	EVAPORATOR			FOULING FACTOR UNITS	CONDENSER					COMPRESSOR				MIN. EER	ELECTRICAL				MIN. CAPACITY STEPS	MAKE AND MODEL OR APPROVED EQUAL	REMARKS
			ENT/LVG (°F)	GPM	MAX. PD (FT.)		AMB. TEMP.	NO. OF FANS	FAN HP (EA)	KW (EA)	FLA (EA)	NO.	RLA (EA)	LRA (EA)	KW (EA)		MIN CIRCUIT AMPS	V	PH	HZ			
CH 1	PKG. AIR COOLED CLR	33.8	55/45	81.0	11	0.00025	95	4	1.0	.9	4.1	4	39.4	269	11.6	9.6	184	208	3	60	4	TRANE, CARRIER MCQUAY, YORK	PROVIDE WITH NEW FLOW SWITCH, NONFUSED UNIT MOUNTED DISCONNECT SWITCH, HERESITE AND AMERON COATING, SPRING ISOLATORS, FIBERGLASS ACOUSTICALLY LINED CABINET COMPARTMENT AND CHILLED WATER TEMP. RESET

EXISTING PUMP SCHEDULE (TO REMAIN)

UNIT	TYPE	GPM	TOTAL HEAD (FT)	RPM	MIN% EFF	ELECTRICAL				MAKE & MODEL OR APPROVED EQUAL	REMARKS
						HP	V	PH	HZ		
CHWP 1	CENTRIFUGAL END SUCTION CLOSED COUPLED	90	70	1750	60	3.0	208	3	60	AURORA MODEL 340 SERIES	EXISITING SINGLE-STAGE, 2X2-1/2X9, 8" IMP. DIA., BRONZE FITTED, CAST IRON CASING, BALL BEARING AND ENCLOSED MOTOR
CHWP 2	CENTRIFUGAL END SUCTION CLOSED COUPLED	90	70	1750	60	3.0	208	3	60	AURORA MODEL 340 SERIES	EXISITING SINGLE-STAGE, 2X2-1/2X9, 8" IMP. DIA., BRONZE FITTED, CAST IRON CASING, BALL BEARING AND ENCLOSED MOTOR

SURVEY PLOTTED BY: DATE:
DRAWN BY:
TRACED BY:
DESIGNED BY:
QUANTITIES BY:
CHECKED BY:
ORIGINAL PLAN
NOTE BOOK
No.

BARRY G. S. JIM ON
LICENSED PROFESSIONAL ENGINEER
No. 9546-M
HAWAII, U.S.A.

This work was prepared by me or under my supervision. Supervision of construction to be as defined in Section 16-82-2, Department of Regulatory agencies, State of Hawaii, Rules relating to Engineers, Architects, Land Surveyors and Landscape Architects.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EQUIPMENT SCHEDULES AND DETAILS

MAUI DISTRICT BASEYARD
Project No. HWY-M-03-99M

Scale: AS SHOWN Date: APR. 2001

SHEET No. M2.0 OF 2 SHEETS