CHILLER PLANT - ENERGY EFFICIENCY UPGRADES

SANTA RITA JAIL

5325 BRODER BLVD.
DUBLIN, CALIFORNIA 94568
COUNTY OF ALAMEDA
PROJECT #1262

GENERAL NOTES

1. THE INTENT OF THE CONTRACT DOCUMENTS IS TO COMPLETE THE PROJECT IN ACCORDANCE WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY CONDITIONS DEVELOPE NOT COVERED BY THE CONTRACT DOCUMENTS WHERE-IN THE FINISHED WORK WILL NOT COMPLY WITH SAID TITLE 24, CCR, A CHANGE ORDER DETAILING AND SPECIFING THE REQUIRED WORK WILL BE SUBMITTED TO, AND APPROVED BY DSA (DIVISION OF THE STATE ARCHITECT) PRIOR TO PROCEEDING WITH THE WORK.
2. ALL WORK PERFORMED UNDER THIS CONTRACT IS TO COMPLY WITH THE APPROPRIATE PORTIONS OF TITLE 24, CCR, PARTS 1 THROUGH 5.

APPLICABLE BUILDING CODES

TITLE 24, PART 2, C.C.R., 1995 C.B.C (1994 UBC WITH 1995 STATE OF CALIFORNIA AMENDMENTS)

TITLE 24, PART 3, C.C.R., 1995 C.E.C (1994 UBC WITH 1995 STATE OF CALIFORNIA AMENDMENTS)

TITLE 24, PART 4, C.C.R., 1995 C.M.C (1994 UBC WITH 1995 STATE OF CALIFORNIA AMENDMENTS)

TITLE 24, PART 5, C.C.R., 1995 C.P.C (1994 UBC WITH 1995 STATE OF CALIFORNIA AMENDMENTS)

UNIFORM FIRE CODE, 1995 EDITION, WITH 1995 STATE OF CALIFORNIA AMENDMENTS

CALIFORNIA CODE OF REGULATIONS, TITLE 19

CALIFORNIA CODE OF REGULATIONS, TITLE 24

DIVISION OF THE STATE ARCHITECT, STRUCTURAL SAFETY SECTION, INTERPRETATION OF REGULATIONS

NOTE: ALL REFERENCE AMENDMENTS SHALL BE THE CURRENT ADOPTED BY THE STATE OF CALIFORNIA

PROJECT INFO

GENERAL CONTRACTOR

CMS / VIRON ENERGY SERVICES
1330 BROADWAY, SUITE 515
OAKLAND, CALIFORNIA 94612
Phone: (510) 464-2973
Fax: (510) 464-2974

MECHANICAL ENGINEER

CMS / VIRON ENERGY SERVICES
1330 BROADWAY, SUITE 515
OAKLAND, CALIFORNIA 94612
Phone: (510) 464-2973
Fax: (510) 464-2974

ELECTRICAL ENGINEER

JEFF SULTAN P. E.
2081 CAMINO DE LOS ROBLES
MENLO PARK, CALIFORNIA 94025
Phone: (650) 854-7585
Fax: (650) 233-1854

SITE LOCATION

DRAWING INDEX

MECHANICAL

M-1.0	COVER SHEET AND GENERAL NOTES
M-2.0	EQUIPMENT SCHEDULES
M-3.0	EXISTING PIPING LAYOUT PLAN
M-4.0	DEMOLITION PLAN
M-5.0	REVISED PIPING LAYOUT PLAN
M-6.0	CONDENSER WATER PIPING DIAGRAM
M-7.0	CHILLED WATER PIPING DIAGRAM

ELECTRICAL

E1.0	COVER SHEET
E1.1	ELECTRICAL PLAN
ED.1	DEMOLITION

REV BY:	REV	DATE
APP BY:	APP	DATE
DWN BY:	PCP	03/16/01
APP BY:	MD	03/16/01
FILE NAME:	m-1_0	
PROJ. NO.	1262-ENG	

1330 Broadway Suite 515
OAKLAND, CA 94612
PHONE NUMBER
(510)464-2973
FAX NUMBER
(510)464-2974
CMS ENERGY
Viron Energy Services

COVER SHEET AND GENERAL NOTES

SANTA RITA JAIL
CMS/VIRON JOB #1262
DUBLIN, CALIFORNIA

M-1.0

NEW MECHANICAL EQUIPMENT

TAG	DISCRIPTION	MANUFACTURER	MODEL NO.	CAPACITY (TONS)	REFRIGERANT	EVAPORATOR					CONDENSER					ELECTRICAL DATA						WEIGHT (lbs)	REMARKS
						GPM	EWT (degF)	LWT (degF)	DELTA P (Ft Hd)	SHELL SIZE	GPM	EWT (degF)	LWT (degF)	DELTA P (Ft Hd)	SHELL SIZE	VOLTAGE	PHASE	HERTZ	kW	LRA	RLA		
CH-1	WATER CHILLER	TRANE	CVHF 0770	850	R-123	1500	57.5	44	21.28	080 LONG	2450	85	95	41.07	080 LONG	460	3	60	464	3313	680	30665	CHILLER TO BE FURNISHED WITH U.L. LISTING, UNIT MOUNTED ADAPTIVE FREQUENCY DRIVE. SEPERABLE SHELLS WITH COMPRESSOR DOWLING. OPTIONS CONTROL MODULE, HONEYWELL/UNITY INTERFACE CONTROL MODULE, BEARING OIL TEMPERATURE SENSORS, TWO FLOW SWITCHES (FIELD INSTALLED), NON-MARINE WATERBOXES, VICTAULIC WATERBOX CONNECTIONS, 150 PSIG WATERBOX PRESSURE, 2-PASS EVAPORATOR AND CONDENSER SHELLS.

TAG	DISCRIPTION	MANUFACTURER	MODEL NO.	SIZE (hp)	ENCLOSURE	OPERATES	REMARKS
VFD-1	VARIABLE FREQUENCY DRIVE	ABB	ACH401	150	NEMA 3R	CHWP-1	DRIVES TO BE FURNISHED WITH OUTPUT REACTOR, FUSED DOOR INTERLOCK DISCONNECT SWITCH, SEISMIC FLOOR STAND.
VFD-2	VARIABLE FREQUENCY DRIVE	ABB	ACH401	150	NEMA 3R	CHWP-2	
VFD-3	VARIABLE FREQUENCY DRIVE	ABB	ACH401	30	NEMA 3R	CT-1A	
VFD-4	VARIABLE FREQUENCY DRIVE	ABB	ACH401	30	NEMA 3R	CT-1B	

EXISTING MECHANICAL EQUIPMENT

TAG	DISCRIPTION	MANUFACTURER	MODEL NO.	CAPACITY (TONS)	REFRIGERANT	EVAPORATOR					CONDENSER					ELECTRICAL DATA						WEIGHT (lbs)	REMARKS
						GPM	EWT (degF)	LWT (degF)	DELTA P (Ft Hd)	SHELL SIZE	GPM	EWT (degF)	LWT (degF)	DELTA P (Ft Hd)	SHELL SIZE	VOLTAGE	PHASE	HERTZ	kW	LRA	RLA		
CH-2	WATER CHILLER	TRANE	CVHF 080	850	R-11	1500	57.6	44	26.53	–	2450	85	95	17.02	–	460	3	60	582	3772	811	31000 (ESTIM.)	SERIAL NUMBER L86G39578, 817 FLA

TAG	DISCRIPTION	MANUFACTURER	MODEL NO.	ORIGINAL CONDITIONS		REVISED CONDITIONS		ELECTRICAL DATA					SERIAL NUMBER	REMARKS
				FLOW (gpm)	HEAD (feet)	FLOW (gpm)	HEAD (feet)	VOLTAGE	PHASE	HERTZ	HOURSEPOWER	RPM		
CHWP-1	CHILLED WATER PUMP	WEINMAN/MULLER	10L2151P14G	3000	150	1500	70	460	3	60	150	1750	37996-1	DOUBLE SUCTION, HORIZONTAL SPLIT-CASE
CHWP-2	CHILLED WATER PUMP	WEINMAN/MULLER	10L2151P14G	3000	150	1500	70	460	3	60	150	1750	37996-2	DOUBLE SUCTION, HORIZONTAL SPLIT-CASE
CWP-1	CONDENSER WATER PUMP	WEINMAN/MULLER	12L2125P14G	4900	70	2450	90	460	3	60	125	1750	37998-1	DOUBLE SUCTION, HORIZONTAL SPLIT-CASE
CWP-2	CONDENSER WATER PUMP	WEINMAN/MULLER	12L2125P14G	4900	70	2450	90	460	3	60	125	1750	37998-2	DOUBLE SUCTION, HORIZONTAL SPLIT-CASE

TAG	DISCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NUMBER	# OF CELLS	EWT (degF)	LWT (degF)	WET BULB (degF)	FLOW (gpm) per cell	ELECTRICAL DATA				REMARKS
										VOLTAGE	PHASE	HERTZ	HOURSEPOWER	
CT-1	COOLING TOWER	B.A.C.	3865-2	86-1556M	2	90	85	70	2450	460	3	60	2@25	EXISTING TOWER WILL BE CONVERTED TO 2 INDEPENDENT CELLS

REV BY:	REV	DATE
APP BY:	APP	DATE
DWN BY:	PCP	03/16/01
APP BY:	MD	03/16/01
FILE NAME:	m-2_0	
PROJ. NO.	1262-ENG	

1330 Broadway Suite 515
Oakland, CA 94612
PHONE NUMBER
(510)464-2973
FAX NUMBER
(510)464-2974
CMS ENERGY
Viron Energy Services

MECHANICAL EQUIPMENT SCHEDULES

SANTA RITA JAIL
CMS/VIRON JOB #1262
DUBLIN, CALIFORNIA

M-2.0

EXISTING PIPING LAYOUT

SERVICE BLDG PARTIAL PLAN – CHILLER ROOM AND ROOF

REV BY:	REV	DATE
APP BY:	APP	DATE
DWN. BY:	PCP	03/05/01
APP BY:	MD	03/05/01
FILE NAME:	m-3_0	
PROJ. NO.	1262-ENG	

1339 Broadway Suite 515
Oakland, CA 94612
PHONE NUMBER
(510)464-2973
FAX NUMBER
(510)464-2974

CMS ENERGY
Viron Energy Services

EXISTING PIPING LAYOUT

SANTA RITA JAIL
CMS/VIRON JOB #1262
DUBLIN, CALIFORNIA

1/4"=1'-0"

M-3.0

DEMOLITION PLAN

SERVICE BLDG PARTIAL PLAN – CHILLER ROOM AND ROOF

REV BY:	REV	DATE
APP BY:	APP	DATE
DWN BY:	PCP	03/05/01
APP BY:	MD	03/05/01
FILE NAME:	m-4.0	
PROJ. NO.	1262-ENG	

1330 Broadway Suite 515
Oakland, CA 94612
PHONE NUMBER
(510)464-2973
FAX NUMBER
(510)464-2974
CMS ENERGY
Viron Energy Services

DEMOLITION PLAN

SANTA RITA JAIL
CMS/VIRON JOB #1262
DUBLIN, CALIFORNIA

1/4"=1'-0"

M-4.0

REVISED PIPING LAYOUT

SERVICE BLDG PARTIAL PLAN – CHILLER ROOM AND ROOF

REV BY:	REV	DATE
APP BY:	APP	DATE
DWN BY:	PCP	03/05/01
APP BY:	MD	03/05/01
FILE NAME:	m-5.0	
PROJ. NO.	1262-ENG	

13330 Broadway Suite 515
Oakland, CA 94612
PHONE NUMBER
(510)464-2973
FAX NUMBER
(510)464-2974
CMS ENERGY
Viron Energy Services

REVISED PIPING LAYOUT

SANTA RITA JAIL
CMS/VIRON JOB #1262
DUBLIN, CALIFORNIA

1/4"=1'-0"

M-5.0

EXISTING CONDENSER WATER PIPING DIAGRAM

REVISED CONDENSER WATER PIPING DIAGRAM

PIPING LEGEND

ELBOW DOWN	UNION
ELBOW UP	PETES PLUG
GATE VALVE	FLEXIBLE CONNECTOR
BALL VALVE	CAP
BUTTERFLY VALVE	PRESSURE REDUCING VALVE
SOLENOID VALVE	AUTOMATIC AIR VENT
2-WAY CONTROL VALVE	AUTOMATIC FLOW DEVICE
3-WAY CONTROL VALVE	FLOW MEASURING STATION
PLUG VALVE	SUCTION DIFFUSER
Y-STRAINER	THERMOMETER
SWING CHECK VALVE	
SOLENOID VALVE	

REV BY:	REV	DATE
APP BY:	APP	DATE
DWN BY:	PCP	03/16/01
APP BY:	MD	03/16/01
FILE NAME:	m-6.0	
PROJ. NO.	1262 ENG	

1330 Broadway Suite 515
Oakland, CA 94612
PHONE NUMBER
(510)464-2973
FAX NUMBER
(510)464-2974

CMS ENERGY
Viron Energy Services

EXISTING & REVISED CONDENSER WATER DIAGRAMS

SANTA RITA JAIL
CMS/VIRON JOB #1262
DUBLIN, CALIFORNIA

M-6.0

CHILLED WATER PIPING SYSTEM – SITE PLAN

DIFFERENTIAL PRESSURE TRANSDUCER LOCATIONS

PIPING LEGEND

ELBOW DOWN	UNION
ELBOW UP	PETES PLUG
GATE VALVE	FLEXIBLE CONNECTOR
BALL VALVE	CAP
BUTTERFLY VALVE	PRESSURE REDUCING VALVE
SOLENOID VALVE	AUTOMATIC AIR VENT
2-WAY CONTROL VALVE	AUTOMATIC FLOW DEVICE
3-WAY CONTROL VALVE	FLOW MEASURING STATION
PLUG VALVE	SUCTION DIFFUSER
Y-STRAINER	THERMOMETER
SWING CHECK VALVE	
SOLENOID VALVE	

NOTE:

CONVERT ALL EXISTING 3-WAY CHILLED WATER CONTROL VALVES TO 2-WAY OPERATION BY CLOSING THE BALL/GATE VALVE IN THE BYPASS PIPE WITH THE FOLLOWING EXCEPTIONS

HOUSING UNIT#4: AHU 4.1, 4.2 & 4.3
HOUSING UNIT#6: AHU 6.1, 6.2 & 6.3
HOUSING UNIT#24: AHU 24.1, 24.2 & 24.3
HOUSING UNIT#25: AHU 25.1, 25.2 & 25.3
SERVICE BLDG#1: FAN COIL @ END OF PIPING RUN

THESE VALVES TO REMAIN 3-WAY TO MEET CHILLER MINIMUM FLOW REQUIREMENTS (675 gpm) AND TO PROVIDE FLOW AT THE END OF THE PIPING RUNS.

EXISTING CHILLED WATER PIPING DIAGRAM

REVISED CHILLED WATER PIPING DIAGRAM

REV BY:	REV	DATE
APP BY:	APP	DATE
DWN BY:	PCP	03/20/01
APP BY:	MD	03/20/01
FILE NAME:	m-7.0	
PROJ. NO.	1262-ENG	

1330 Broadway Suite 515
Oakland, CA 94612
PHONE NUMBER
(510)464-2973
FAX NUMBER
(510)464-2974
CMS ENERGY
Viron Energy Services

EXISTING & REVISED CHILLED WATER DIAGRAMS

SANTA RITA JAIL
CMS/VIRON JOB #1262
DUBLIN, CALIFORNIA

M-7.0

SPECIFICATION SECTION 16010

ELECTRICAL GENERAL PROVISIONS

1.00 GENERAL

1.1 CONDITIONS & REQUIREMENTS:

A. Refer to the General Conditions and Supplementary General Conditions.

B. Provisions of this Section apply to all Sections of Division 16.

1.2 DEFINITIONS (APPLICABLE TO DRAWINGS AND SPECIFICATIONS):

A. Above Grade: Not buried in ground and not embedded in concrete slab on grade.

B. Below Grade: Buried in ground or embedded in concrete slab on grade.

C. Concealed: Inside building above grade and located within walls, furred spaces, crawl spaces, attics, above suspended ceilings, etc. In general, any item not visible or directly accessible.

D. Connect (verb): Make electrical connections including conduit, wire and other accessories.

E. Exposed: Either visible or subject to mechanical or weather damage, indoors or outdoors, including areas such as mechanical and storage rooms. In general any item that is directly accessible without removing panels, walls, ceilings, or other parts of structure.

F. Furnish: Supply and deliver a specified item.

G. Install: Place, secure and connect as required to make fully operational.

H. Project Manager: Representative of the Owner with overall responsibility for the project.

I. Provide: Furnish and install as defined above; perform work.

J. Underground: Buried in ground, including under building slabs.

K. Use (verb): Furnish and install as defined above.

L. Wiring: Electrical raceway, conductors and connections.

1.3 SCOPE OF WORK: Furnish and install all materials and equipment and provide all labor to complete the work shown on the drawings and/or specified for a complete installation. Items not specifically mentioned, but reasonably inferred for a complete installation including all accessories required for testing are included. It is the intent of the drawings and specifications that all systems are complete, and ready for operation.

1.4 CODE COMPLIANCE:

A. All work and materials shall comply with the latest rules, codes and regulations, including, but not limited to the following:

1. Occupational Safety and Health Act Standards (OSHA).

2. 1998 California Electrical Code (CEC), 1996 National Electric Code with 1998 California Amendments.

3. 1998 California Building Code (CBC).

4. Applicable Federal, State and local laws and regulations.

B. Code compliance is mandatory. Nothing in these Drawings and Specifications implies acceptance of work not conforming to these codes. Where work is shown to exceed minimum code requirements, comply with drawings and specifications.

C. Do not conceal any work until after inspection and approval by proper authorities. If work is concealed without inspection and approval, open and restore the concealed areas and make the required modifications without cost to the Owner.

1.5 PERMITS AND FEES: Arrange for required inspections and pay all permit and inspection fees.

1.6 CONDITIONS AT SITE:

A. Visit and become familiar with the site prior to submission of bid. No allowance will be made for conditions that could reasonably be anticipated.

B. Arrange for location of Owner's existing services prior to excavation. Promptly repair lines that are damaged as a result of this work at no expense to and the complete satisfaction of the Owner.

1.7 DRAWINGS AND SPECIFICATIONS:

A. All drawings and all Divisions of these specifications shall be considered as a whole and all electrical work is included under this Division.

B. Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduits and wiring is not assured. Exact requirements shall be governed by architectural, structural and mechanical conditions of the job. Consult all other drawings in preparation of the bid. Include extra lengths of wiring or addition of pull or junction boxes, etc., required by field conditions bid. Check all information and report any apparent discrepancies before submitting bid.

C. Right is reserved to make change up to ten feet in location of any outlet or equipment prior to roughing-in without increasing contract cost.

1.8 SAFETY:

A. The Contractor is solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement applies continuously and is not limited to normal working hours.

B. No act, service, drawing review, or construction review is intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.

1.9 HAZARDOUS MATERIALS:

A. Handling and abatement of hazardous or toxic materials, including asbestos and polychlorinated biphenyls (PCBs), is not included in the electrical Scope of Work.

B. If hazardous materials are discovered or suspected, protect the equipment from damage and report the conditions to the Project Manager.

1.10 CHANGES BY CONTRACTOR: Submit scaled drawing (s) prior to installation of any proposed modifications to equipment layouts, device locations, conduit routing, or conductor groupings. Any approved modifications will be reissued to the Contractor as either a change order or clarification depending on value to the contract.

1.11 RECORD DRAWINGS:

A. Maintain a separate set of electrical drawings at the job site at all times to be used as record drawings. Keep this set current with all changes and additions and deliver to the Project Manager at the completion of the job. Keep the record drawings clean and protected at all times.

B. Mark and dimension actual routing and depth of underground and underslab conduits including stub-outs for future connections

1.12 GUARANTEE:

A. Guarantee workmanship and materials for one year after date of Substantial Completion. Make repairs and replace defective materials at no charge to Owner.

B. Furnish manufacturer's warranties to the Project Manager.

2.00 PRODUCTS

2.1 MATERIAL APPROVAL:

A. The design, manufacture and testing of electrical equipment and materials shall conform to or exceed latest applicable NEMA, IEEE and ANSI standards.

B. All materials shall be new and listed and labeled by Underwriters Laboratories (UL). Materials that are not covered by UL testing standards shall be tested and accepted by an independent testing laboratory or a governmental agency, which laboratory shall be acceptable to the Project Manager and code enforcing authority.

2.2 SHOP DRAWINGS AND MATERIALS LIST:

A. Submit shop drawings and product descriptive literature as specified for review.

B. The material list shall not include items where no specific manufacturer is shown in the Specifications. Where manufacturers are shown, the material list shall include only one manufacturer for each type of equipment or system.

C. Review of submittals is for general conformance to design concept and general compliance with Contract Documents. Review comments do not relieve the Contractor from responsibility for compliance with Contract Documents.

D. Mark all proposed deviations from specifications prominently in the submittals. Deviations not so marked may be disallowed before or after installation of equipment.

E. Confirm and correlate all quantities and dimensions, select fabrication processes and techniques of construction. Where dimensions of proposed equipment differ significantly from that shown on contract documents, submit scaled drawings showing proposed layout of equipment with shop drawing submittals.

2.3 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Deliver, store, and handle materials in a manner to prevent damage.

B. Protect equipment from weather and dampness.

3.00 EXECUTION

3.1 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS:

A. Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work.

B. Provide a foreman on the site and in charge of this work at all times.

3.2 COORDINATION:

A. Coordinate switching and scheduled outages with the Project Manager.

B. Verify equipment dimensions and requirements with provisions specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work. Changes or additions that are made without written authorization and an agreed price are at Contractor's risk and expense.

3.3 MANUFACTURERS' INSTRUCTIONS:

A. Where the Specifications call for an installation to be made in accordance with manufacturers' recommendations, keep a copy of such recommendations on the site and available to the Project Manager.

B. Follow manufacturers' instructions where they cover points not specifically indicated on drawings and specifications. If they are in conflict with the drawings and specifications obtain clarification from the Project Manager before starting work.

3.4 QUALITY ASSURANCE:

A. Provide a meaningful Quality Assurance program. The Specifications include minimum acceptable requirements; take other Quality Assurance measures to obtain a complete operating facility within the scope of this project.

B. Insure that all workmanship, all materials employed, all required equipment, and the manner and method of installation conforms to accepted construction and engineering practices. Verify that each piece of equipment is in working condition and satisfactorily performs its intended function.

3.5 CUTTING AND PATCHING:

A. All cutting and patching required for work of this Division is included. Coordinate with other trades and bear the responsibility for and the added expense of adjusting for improper holes, supports, etc.

B. Obtain permission from Owner before performing any work that may affect the strength of a structural member.

C. Make repairs and patches to match the quality and appearance of the original work.

3.6 SEISMIC RESTRAINT: Anchor all electrical equipment to prevent excessive motion during an earthquake. Provide anchors that meet the requirements of the California Building Code (CBC) and local authorities.

GENERAL NOTES

1. PERFORM ALL WORK ACCORDING TO THE CALIFORNIA ELECTRICAL CODE, 1998
2. USE STRANDED COPPER WIRE, THWN
3. USE EMT CONDUIT AND STEEL LIQUIDTIGHT FLEXIBLE CONDUIT
4. DO NOT RUN VFD LINE AND LOAD CONDUCTORS TOGETHER IN A CONDUIT OR RACEWAY.
5. INSTALL VFDs ACCORDING TO MANUFACTURER'S INSTRUCTIONS
6. LOCATIONS OF (N) EQUIPMENT IS DIAGRAMMATIC. LOCATE THE EQUIPMENT TO AVOID CONFLICTS AND MAINTAIN WORKING CLEARANCE AT LEAST 42" IN FRONT AND 30" AROUND.

LEGEND

H.P. RATED NON-FUSED DISCONNECT SWITCH 480V, NEMA 1

VFD — VARIABLE FREQUENCY DRIVE (VFD), PRE-PURCHASED BY OWNER VERIFY PROPER CONFIGURATION FOR VOLTAGE AND FREQUENCY BEFORE ENERGIZING

M — MOTOR

(N) NEW EQUIPMENT

(E) EXISTING EQUIPMENT

COMBINATION STARTER WITH FUSES

COMBINATION STARTER WITH MOTOR CIRCUIT PROTECTOR

CIRCUIT BREAKER

CMS ENERGY
Viron Energy Services

1330 Broadway, Suite 515
Oakland, CA 94612
(510) 464-2973

FAX: (510) 464-2974

JEFF SULTAN, P.E.
ELECTRICAL ENGINEER

2081 CAMINO DE LOS ROBLES
MENLO PARK, CA 94025
(650) 854-7585

FAX: (650) 233-1854
jmsultan@pacbell.net

SANTA RITA JAIL, DUBLIN CALIFORNIA

ENERGY EFFICIENCY IMPROVEMENTS
CHILLER AND PUMP RELPACEMENT

REV	DESCRIPTION
1	ISSUED FOR CONST 4/16/01
0	ISSUED FOR CLIENT 3/29/01
A	ISSUED FOR REVIEW 3/26/01

DATE: 3/26/01

JOB NUMBER: VIRON 1262

DRAWN BY: JS

APPROVED BY:

ELECTRICAL PLAN

E1.0

1 ELECTRICAL PLAN
SCALE: 1/8"=1'0"

GENERAL NOTES

1. THE FOLLOWING SI FURNISHED UNDER THE MECHANICAL WORK. PROVIDE ALL OTHER MATERIAL AND ALL LABOR TO INSTALL:
   - CHILLER VFD, INTEGRAL WITH CHILLER
   - VFD FOR CWP-3 AND CWP-4
   - VFD FOR TF-1 AND TF-2
   - REFRIGERANT LEAK DETECTOR PANEL
2. CONTROL CONDUIT AND WIRING IS NOT INCLUDED EXCEPT AS SHOWN

SHEET NOTES

(1) (2) PROVIDE AN ENGRAVED SIGN WITH 1/2" LETTERS AT EACH TOWER FAN DISCONNECT:

> NOTICE:
> TURN POWER OFF TO VARIABLE SPEED DRIVE (VFD) IN CHILLER ROOM BEFORE CLOSING THIS SWITCH

(3) PROVIDE (N) SWITCH IN 4" SQUARE BOX AND CONNECT REFRIGERANT LEAK DETECTOR TO (E) 120V SPARE CIRCUIT IN (E) PANEL AT COLUMN LINE F4. USE 1/2"C, 2-#12 +#12 GR.

(4) PROVIDE (N) 120V CLEAR WHITE FLASHING STROBE (MAXI-SIGNAL 800-110 OR EQ.) AND CONNECT TO REFRIGERANT LEAK DETECTOR WITH WITH 1/2"C, 2-#12 +#12 GR. PROVIDE RED SIGN WITH 1/2" WHITE LETTERS: "REFRIGERANT LEAK - DO NOT ENTER"

(5) INTERCEPT (E) CONDUITS FROM TOWER FANS AT ROOF WITH A SEPARATE CONDUIT FOR EACH FAN. PROVIDE (N) CONDUCTORS. (6 E1.1) (7 E1.1)

(6) (E) JUNCTION BOX AT ROOF WITH ONE CIRCUIT FOR EACH FAN FROM (E) PANEL. (E) PANEL IS LOCATED ON WALL BY MAIN SWITCHBOARD (MSB).

(7) (E) MOTOR CONTROL CENTER (MCC) MODIFY (E) PUMP STARTERS (4 E1.1) (5 E1.1)

(8) REPLACE (E) 1200A RATING PLUG WITH (N) 1000A PLUG AND TEST BREAKER.

(9) (N) 1/2"C, 2-#12 +#12GR. TO EACH OF FIVE (N) 4" SQ. BOXES WITH BLANK COVERS FOR VALVE ACTUATORS. COORDINATE EXACT LOCATIONS WITH CONTROLS CONTRACTOR.

(10) (N) 1/2"C, 2-#12 +#12GR TO (E) 120V SPARE CIRCUIT IN (E) PANEL AT COLUMN LINE F4. PROVIDE (N) WEATHERPROOF JUNCTION BOX WITH BLANK COVER AT EACH OF SIX VALVE ACTUATOR LOCATIONS. COORDINATE EXACT LOCATION WITH CONTROLS CONTRACTOR.

2 CHILLER DEMOLITION
SINGLE LINE DIAGRAM

3 (N) CHILLER
SINGLE LINE DIAGRAM

4 CW PUMPS STARTER DEMOLITION
SINGLE LINE DIAGRAM
TYPICAL OF 2

5 (N) CW PUMP VFD
SINGLE LINE DIAGRAM
TYPICAL OF 2

6 TOWER FANS STARTER DEMOLITION
SINGLE LINE DIAGRAM

7 (N) TOWER FAN VFDs
SINGLE LINE DIAGRAM

CMS ENERGY
Viron Energy Services
1330 Broadway, Suite 515
Oakland, CA 94612
(510) 464-2973
FAX: (510) 464-2974

JEFF SULTAN, P.E.
ELECTRICAL ENGINEER
2081 CAMINO DE LOS ROBLES
MENLO PARK, CA 94025
(650) 854-7585
FAX. (650) 233-1834
jsultan@pacbell.net

SANTA RITA JAIL, DUBLIN CALIFORNIA

ENERGY EFFICIENCY IMPROVEMENTS
CHILLER AND PUMP RELPACEMENT

REV	DESCRIPTION
1	ISSUED FOR CONST 4/16/01
0	ISSUED FOR CLIENT 3/29/01
A	ISSUED FOR REVIEW 3/26/01

DATE: 3/26/01

JOB NUMBER: VIRON 1262

DRAWN BY: JS

APPROVED BY:

ELECTRICAL PLAN AND DETAILS

E1.1

1 ELECTRICAL DEMOLITION PLAN
SCALE: 1/8"=1'0"

0 4' 8' 16' 24'
1"=8'

CMS ENERGY
Viron Energy

1330 Broadway, Suite 5
Oakland, CA 94612
(510) 464-2973

FAX: (510) 464-2974

JEFF SULTAN, P.E.
ELECTRICAL ENGINEER

2081 CAMINO DE LOS RORLES
MENLO PARK, CA 94025
(650) 854-7585

FAX: (650) 233-1854
jmsultan@pacbell.net

SANTA RITA JAIL, DUBLIN CALIFORNIA

ENERGY EFFICIENCY IMPROVEMENTS
CHILLER AND PUMP RELPACEMENT

REV	DESCRIPTION
1	ISSUED FOR CONST 4/16/01
0	ISSUED FOR CLENT 3/29/01
A	ISSUED FOR REVIEW 3/26/01

DATE: 3/26/01

JOB NUMBER: VIRON 1262

DRAWN BY: JS

APPROVED BY:

ELECTRICAL DEMOLITION AND DETAILS

ED.1

MODULAR COOLING TOWER

California Hydronics Corp

Tag: Santa Rita Jail R & R Cooling Tower

TWO UNITS MODEL NUMBER: TTXL-081930

Customer's Purchase Order No.: 192175
Tower Tech's Work Order No.: 2014006
As Built - February 28, 2014

TOWER TECH, Inc.
The Technology Company

Telephone (405) 290-7788
FAX (405) 979-2131
E-MAIL cad@towertechinc.com
WEB PAGE http://www.TowerTechInc.com
5400 NW 5TH
Oklahoma City, Oklahoma 73127

Copyright © 2001 Tower Tech, Inc.
U.S. and Foreign Patents Pending
All Rights Reserved

DRAWING INDEX

C	COVER PAGE
1A	GENERAL NOTES
1B	AUXILIARY NOTES
1C	WARRANTY REGISTRATION & ORDER VERIFICATION
1D	CONNECTION RECOMMENDATIONS
1E	WIRING RESPONSIBILITY CHART
2A	PLAN AND ELEVATION
2B	SAFETY TIE OFF DETAIL
2C	WINTER DRAIN DETAIL
2D	CENTER OF GRAVITY DRAWING
3	ANCHOR PAD LAYOUT
4	ANCHOR PAD INSTALLATION
5	PIGTAIL & CABLE LAYOUT
6	CONTROL PANEL CABINET
7A	CONTROL PANEL WIRING
7B	CONTROL PANEL WIRING
7C	CONTROL PANEL WIRING
7D	CONTROL PANEL WIRING
7Ea	N/A
7Eb	N/A
7F	ABB VFD DRIVE PANEL CABINET
7G	ABB VFD DRIVE PANEL WIRING
8A	OVERFLOW EQUALIZATION
8B	STILLING WELL DETAIL
8C	LEVEL CONTROL PANEL CABINET
8D	LEVEL CONTROL PANEL WIRING
9A	N/A
9B	N/A
10	N/A
11	SUMP DETAILS
12	SUBSTRUCTURE INSTALLATION DETAILS
13A	LIFT RIGGING DETAILS
13B	LIFTING BRACKET
14	FAN/MOTOR ACCESS

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Cover Page
Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

REVISIONS

NO.	DATE	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-C
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
COVER PAGE	C

General Notes:

1. These drawings are for technical information purposes only, and do not constitute an acceptance by Tower Tech of any customer order. Order acceptance, production release, and related tower delivery are subject to Tower Tech's approval of customer's purchase order.

2. In the event of a discrepancy between the "General Conditions of Sale" on the Buyer's Purchase Order and those outlined in Tower Tech's "General Conditions of Sale", Tower Tech's "General Conditions of Sale" shall have precedence. Tower Tech shall not be liable to Purchaser for any indirect or consequential damages. Tower Tech shall not be responsible for Purchaser's handling, modification, or end use of Tower Tech cooling Towers.

Installation Notes:

1. All tower modules are designed to provide maximum cooling within the smallest area possible. Errors in module placement can lead to recirculation of tower discharge air, with resultant loss of cooling capacity. Therefore, modules must be installed as shown on drawings. Modules must be placed next to each other at a distance of 2" between modules. Consult factory for recommended placement layouts.

2. Prevailing winds affect cooling tower performance. Never place modules next to existing structures, nor in any area where tower discharge air can be blown or drawn into adjacent HVAC systems. Consult factory for placement assistance.

3. Substructure height affects tower performance. The air inlet area must be as shown on factory drawings. Consult factory when restrictions (such as parapet walls, wind barriers, existing structures or vision barriers) are present.

Piping Notes:

1. NEITHER THE TOWER NOR THE INLET FLANGES ARE INTENDED TO SUPPORT ANY EXTERNAL PIPING WEIGHT. ALL EXTERNAL PIPING MUST BE "STAND ALONE" (SUPPORTED INDEPENDENTLY).

2. Upon tower shutdown, overhead piping can cause system surging and/or sump overflow. Automatic valve actuators on isolation valves will prevent most overflow problems. Consult factory if overhead piping is existing or required.

3. Tower Tech does not recommend the installation or use of orifice plates or bypass valves on its TTXL modules. Tower Tech's variable-flow nozzles are more efficient than those devices and help to prevent the pump head overloading and basin overflow that is possible in towers of conventional design. It is necessary to flow at least 200 GPM through each Rotary Spray Nozzle during cold water operations (when the ambient air temperature is below 32° F.) in order to maintain heat load inside the cooling tower module.

4. In low water-flow applications, sump connection sizes can be adjusted by obtaining written factory approval.

5. Tower Tech suggests the use of an appropriate flex flange connection (provided by customer) on each water inlet, to be field installed by customer, per manufacture's installation instructions.

Tower Storage:

1. Any ready-to-ship tower which is not approved by Customer for timely shipment (for any reason) will be charged demurrage after a one-month grace period. Tower Tech will assess a demurrage charge equal to a two percent (2.0%) of the total purchase price of the cooling tower for each month - or portion thereof - that the cooling tower is stored on Tower Tech property.

2. If Customer is unable to accept shipment of the cooling tower within a three-month period Tower Tech will arrange with the customer to invoice for applicable demurrage then move the cooling tower to an alternate storage site or use the cooling tower for another project.

Invoicing/Prepayment:

1. All ready to ship cooling towers will be invoiced by Tower Tech on the earlier of the original "Required Date" or the actual date of shipment. Payment terms will be as agreed to in writing by Tower Tech's Chief Financial Officer.

2. If the cooling tower invoice is paid in full prior to the "Required Date", all storage fees will be waived. However, the cooling tower unit must in any event be moved off Tower Tech's property within three months after the "Required Date".

APPROVAL: Approved As Is _____ Approved As Noted X

PRINTED NAME: Timothy M Wesig

SIGNATURE: _____

TITLE: Energy Project Manager

DATE: 02-07-2014

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 General Notes

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

REVISIONS		
NO.	DATE	REVISION

	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-1A
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
GENERAL NOTES	1A

DESIGN NOTES:

1) TOWER WEIGHTS - EACH CELL

MODEL NUMBER	TTXL-081930
DRY SHIPPING WEIGHT	15,412 LBS
OPERATING WEIGHT	25,695 LBS

2.) DISCHARGE (COLD WATER) SUMP FLANGE CONNECTION IS 14 INCH*.

* FACTORY CAN SUPPLY REDUCING BUSHING AT ADDITIONAL CHARGE, WHEN REQUIRED.

3) INLET CONNECTION IS 12 INCH.

4) WATER LEVELS:
FOR APPROPRIATE WATER LEVEL REFER TO STARTUP SECTION IN TOWER TECH'S DESIGN, INSTALLATION & OPERATION MANUAL.

LATERAL LOADS:

THE DESIGN LOADS ARE IN ACCORDANCE WITH THE IBC (INTERNATIONAL BUILDING CODE). WIND, SEISMIC AND GRAVITY LOADINGS ARE APPLIED. THE ILLUSTRATED TOWER SHELL AND SUBSTRUCTURE IS DESIGNED TO WITHSTAND A WIND PRESSURE OF 41 PSF (ASCE7-05 150 mph WIND, EXPOSURE C) AND A SEISMIC FORCE FACTOR: Cs - .4x WEIGHT, CATEGORY d (Ss = 200, S1 = 150, SOIL CLASS E).

MAKE-UP CONNECTION:

NOT PROVIDED - PLUGGED

FIELD WIRING:

FIELD WIRING BY OTHERS. ALL COMMUNICATION WIRE TO BE SHIELDED TWISTED PAIR CONDUCTOR - BELDEN OR EQUIVALENT.

MOTOR INFORMATION:

REFER TO TOWER TECH TECHNICAL REFERENCE GUIDE FOR MOTOR AMPS.

SFA/MMC REFERS TO SERVICE FACTOR AMPS/MAXIMUM MOTOR CURRENT. VFD MUST BE SIZED FOR FLA AT A MINIMUM. IF USE OF MOTOR SERVICE FACTOR IS DESIRED, VFD SHOULD BE SIZED FOR SFA/MMC.

STANDARD MOTORS ARE HIGH EFFICIENCY, TEAO SERVE DUTY, STANDARD DIRECT DRIVE WITH L 100,000hr. SEALED BEARINGS, 1/15 SERVICE FACTOR, INVERTER READY WITH QUANTUM SHIELD WIRING, CLASS "F" INSULATION (MINIMUM).

DIRECT-DRIVE FAN MOTORS ARE MANUFACTURED BY BALDOR (OR TOWER TECH APPROVED EQUIVALENT). MOTORS ARE TEAO (1.15 SERVICE FACTOR), INVERTER READY WITH CLASS "F" INSULATION.
SPECIFICATIONS FOR STANDARD MOTORS ARE AS FOLLOWS:

HORSE POWER:	3.0
NUMBER	8
VOLTS	230/460
AMPS	11.2/5.6
RPM	865
FRAME	215T
EFFICIENCY	84%
HZ	60
PHASE	3
POWER FACTOR	.61

WIRING:

SHIELDED 12-4 AWG OIL RESISTANT FLEXIBLE MOTOR SUPPLY CABLE.

CONTROL PANELS:

CONTROL PANELS ARE UL-RATED NEMA 4 AND ARE DESIGNED FOR SINGLE POINT CONNECTIONS. CABINETS HAVE INDIVIDUAL MOTOR POWER AND CONTROL CIRCUITS, AND ALL HOA SWITCHES ARE BACKLIT. CONSULT FACTORY FOR SPECIFIC CUSTOM DESIGN REQUIREMENTS OR INTERFACING DETAILS. AUXILIARY RELAYS ARE PROVIDED FOR REMOTE MONITORING OF THE MOTORS..

TEMPERATURE CONTROL NOTES:

1) THE OPTIONAL PLC IS MOUNTED IN A NEMA 4 FAN CONTROL CABINET. IT IS PROGRAMMED FOR BOTH FAN STAGING AND VARIABLE FREQUENCY DRIVE CONTROL WITH A SINGLE RESETABLE TEMPERATURE CONTROL. FAN CONTROL RESORTS TO FAN CYCLING IN THE ABSENCE OF A VFD EITHER FROM DRIVE FAILURE OR NON-INSTALLATION.
2) AN RTD SENSOR IS PROVIDED WITH A STAINLESS STEEL THERMOWELL (6" X 3/4" NPT). FIELD WIRING BETWEEN THE SENSOR AND THE CONTROL PANEL IS REQUIRED (BY OTHERS).
3) SENSOR IS TO BE LOCATED IN THE COLD WATER DISCHARGE PIPING IN A LOCATION THAT PROVIDES A TOTAL SUBMERSION OF THE SENSOR WELL AT ALL OPERATING CONDITIONS. A STRAIGHT HORIZONTAL RUN IS PREFERRED WITH THE SENSOR LOCATED IN THE SIDE OF THE PIPE.
4) A BACNET GATEWAY COMMUNICATIONS CARD IS PROVIDED TO INTERFACE THE CONTROL PANEL WITH A BUILDING AUTOMATION SYSTEM.

APPROVAL: Approved As Is _____ Approved As Noted X

PRINTED NAME: Timothy M Wesig

SIGNATURE: _____

TITLE: Energy Project Manager

DATE: 02-07-2014

TOWER TECH, Inc.®
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC. ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Auxiliary Notes

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-1B
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
AUXILIARY NOTES	1B

TOWER TECH, INC.
Warranty Registration Information

End User Information:

Company Name: The County of Alameda

Company Main Phone Number: 510-208-9586

Contact Name: David Barba

Contact Phone Number: 510-208-9586

Installation Location: 3525 Broder Blvd. Dublin

Shipping Data Confirmation:

Proposed Shipping Date: ASAP

FOB Factory:

Required Delivery Date: ASAP

Shipping Contact Name: David Barba

Contact Phone Number: 510-208-9586

Freight Notification: n/a

Freight Terms: n/a

Signature: _____ Date: 02-07-14

Tower Tech, Inc.
Order Verification Sheet

Customer Information

CUSTOMER:	California Hydronics Corp
PROJECT:	Santa Rita Jail R&R Cooling Tower
PO Number:	192175

Cooling Tower Information

Product:	Two (2) – TTXL-081930
Substructure:	6'-0"
Prewire Options:	J-Box
Basin Inspection Port:	14
Warranty:	15 / 5 / 1
Fill Media:	CF 1900
DE'S:	CF80-MAX
Voltage:	460
Motor Manufacturer:	Baldor (or Equiv)
Motor:	3.0 HP
Motor Supports:	Stainless Steel
Sump Size:	14"
Makeup Size:	0"
Overflow Size:	6"

Performance Data

Gallons Per Minute:	2450 Each – 4900 Total
Hot Water Temp:	95°F
Cold Water Temp:	85°F
Wet Bulb Temp:	67°F
Special Equipment	Winter Drain Connections 2-per cell NEMA 3R ABB VFD Panel w/Eclipse & dv/dt Filter NEMA 4 T9900 Control Panel w/PLC Split Style Fan Screens Flowline Level Sensor w/Control Panel & Stilling Well

Tower Tech Contacts:

Sales:	405-290-7788
Shipping:	Randall Subieta 405-979-2125
Legal:	Sherry Shearer 405-979-2172 sshearer@towertechinc.com

Thank you for signing this description. Tower Tech accepts no liability for consequential, indirect or other special damages, or are we liable for any loss or damage resulting from delays in delivery caused by conditions beyond the control of Tower Tech, Inc. Also with the submittal is a copy of our general conditions of sale and warranty information.
I, as an authorized purchaser of this equipment, verify that all of the above information is correct. If a section has not been initialed, or noted for change, then I accept the original item as offered in this form and the Tower Tech Submittal Drawings. I also agree to the above items regarding required approval dates needed to meet the estimated ship date.

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Warranty Registration & Order Verification
Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team
DATE

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-1C
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
WARRANTY REGISTRATION & ORDER VERIFICATION	1C

PLAN VIEW SECTION

SIDE ELEVATION SECTION

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Connection
Recommendations
Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team
DATE

REVISIONS

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-1D
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
CONNECTION RECOMMENDATIONS	1D

TYPICAL CABLE LAYOUT

#1 - Factory wiring by Tower Tech. The tower motors are pre-wired to Factory Installed J-Box.

#2 - Field wiring by others. The wiring from the J-Box to the Control Panel to be installed in the field by others. There is a single point terminal connection for the load cable which should be shielded 4 conductor cable grounded on both ends.

TOWER TECH REQUIRES THAT VFD RATED CABLE BE USED WHEN THE TOWERS ARE USING A VFD.

SIDE AND TOP PENETRATIONS WILL VOID CUSTOMER WARRANTY.

#3 - Field wiring by others. Power Distribution Center should be wired to VFD if provided. Otherwise power cable provided by others can be wired to the designated terminals in the Control Panel.

#4 - Field wiring by others. Power feeds to the control panel are to land on the designated terminals.

a. Fan staging operation mode: One 230/460 Volt power feed is needed for the fan motor power supply when operating in the fan staging mode. A separate 120 volt, 20 AMP, power feed is required to power the control circuit.

b. VFD operation mode: One 460 Volt power feed and a separate 120 volt power feed are needed when operating the tower using VFD. The control circuit power cannot be pulled from the 460 volt circuit because the power feed is being altered by the VFD to control the speed of the fans. For that reason a separate 120 volt power feed must be provided to the 120 volt control circuit.

#5 - Field wiring by others. If the VFD or Control Panel is to be monitored or controlled by an outside source, the appropriate communication module must be ordered (the communication module will be installed at the factory) and the wiring to the outside source must be installed by others.

#6 - MOTOR STARTER PROTECTOR (MSP) IS EQUIPPED WITH AN AUXILIARY RELAY SHOULD THE MSP TRIP OR FAIL A DRY CONTACT SIGNAL CAN BE WIRED IN OR PARALLEL BACK TO A BUILDING MANAGEMENT SYSTEM.

#7 - RTD provided with a Stainless Steel Thermo well (6" x ¾" NPT) to be installed within 15ft. of the cooling tower outlet flange. RTD should be installed in side centerline of pipe for total submersion. Field Wiring by others.

FIELD WIRING:

FIELD WIRING BY OTHERS. ALL COMMUNICATION WIRE TO BE SHIELDED TWISTED PAIR CONDUCTOR - BELDEN OR EQUIVALENT.

TOWER TECH REQUIRES VFD RATED CABLE BE USED WHEN OPERATING THE MOTORS USING A VFD.

TOWER TECH REQUIRES A DV/DT FILTER BE INSTALLED WITH ALL VFDs OR THE MOTOR WARRANTY IS VOIDED.

NOTES:

A - Field wiring by others. Communication and power lines must be in separate conduits. Communication conduit should enter CP cabinet on bottom left side as shown.

B - Field wiring by others. All communication wire to be shielded twisted pair conductor - Belden or equivalent and grounded on one end.

C - LOAD WIRE FROM THE VFD PANEL TO THE PREWIRED J-BOX MUST BE VFD RATED CABLE (ARMORED/SHIELDED CABLE) AND GROUNDED ON BOTH ENDS ACCORDING TO MANUFACTURES REQUIREMENTS.

D - Run output motor cables from multiple drive separately. Induced voltage from output motor cables run together can charge equipment capacitors even with the equipment turned off and locked out. Failure to run output motor cables separately could result in death or serious injury.

E - Run input power, motor wiring and control wiring in three separate metallic conduits or raceways for high frequency noise isolation. Failure to isolate power, motor and control wiring could result in less than optimum drive and associated equipment performance.

NOTE: ALL CONTROL PANEL TERMINALS ARE TO BE FIELD CHECKED AND TIGHTENED BY FIELD ELECTRICIAN PRIOR TO INSTALLING POWER. ALL FIELD WIRING TO MEET LOCAL AND NEC WIRING CODES.

FIELD WIRING ——

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC. ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Wiring Responsibility Chart
Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-1E
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
WIRING RESPONSIBILITY CHART	1E

GENERAL INFORMATION:

BASIC DATA (PER CELL):

ACTUAL DESIGN GPM	–	2450 Each – 4900 Total
HWT(°F)	–	95
CWT(°F)	–	85
WBT(°F)	–	67

MOTOR DATA (PER CELL):

BRAND	–	BALDOR (OR EQUIV)
EFFICIENCY	–	HIGH
HP	–	3.0
VOLTAGE	–	460
HZ	–	60
PHASE	–	3
NUMBER	–	8
POWER FACTOR	–	.61

WEIGHTS (PER CELL):

DRY SHIPPING WEIGHT	–	15,412 lbs
OPERATING WEIGHT	–	25,695 lbs

1. ALL EXTERNAL PIPING PROVIDED BY CUSTOMER.
2. EXTERNAL PIPING TO BE "STAND ALONE" (INDEPENDENTLY SUPPORTED).
3. NO LOAD TO BE APPLIED TO TOWER TECH TOWER OR SUMP.
4. FOR APPROPRIATE WATER LEVEL REFER TO STARTUP SECTION IN TOWER TECH'S DESIGN, INSTALLATION & OPERATION MANUAL.
5. MAKE–UP CONNECTION/FLOAT VALVE CONNECTION FLANGE IS MADE FROM HIGH QUALITY PLASTIC TO ELIMINATE CORROSION.
6. THE MAXIMUM MAKE–UP WATER INLET PRESSURE IS 25 PSIG. WHEN USING THE MECHANICAL MAKE–UP FLOAT VALVE. FLOAT VALVE MAY NOT SHUT OFF TIGHT AGAINST HIGHER PRESSURES.

NOTE:
ALL GIVEN DIMENSIONS ARE WITHIN ±1/2"

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Plan & Elevation

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-2A
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
PLAN & ELEVATION	2A

PLAN VIEW
SAFETY POINT BRACKET

Note: Each safety point has been certified for a maximum weight of 5,000 lbs for the sole purpose of an engineered fall protection system. Customer is responsible for the design and certified engineering of the actual fall protection system to meet local, state and federal OSHA requirements. Tower Tech is only providing a certified point to attach the fall protection system designed by others. The safety points are not certified for the purpose of lifting the cooling tower and any attempt to do so would void the warranty.

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Safety Tie Off Bracket

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

REVISIONS

NO.	DATE	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-2B
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
SAFETY TIE OFF BRACKET	2B

BOTTOM VIEW WINTER DRAIN LOCATIONS
TWO LOCATIONS ON EACH CELL

*MOTOR SUPPORTS NOT SHOWN FOR CLARITY

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Winter Drain Detail

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-2C
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
WINTER DRAIN DETAIL	2C

GENERAL INFORMATION:

WEIGHTS (PER CELL):

DRY SHIPPING WEIGHT - 15,412lbs
OPERATING WEIGHT - 25,695 lbs

SUBSTRUCTURE CHART	
SUBSTRUCTURE HEIGHT A	TOWER OVERALL HEIGHT B
1′-0″	12′-0 1/4″
4′-0″	15′-0 1/4″
6′-0″	17′-0 1/4″
8′-0″	19′-0 1/4″
10′-0″	21′-0 1/4″
12′-0″	23′-0 1/4″

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Center of Gravity
Jail R & R Cooling Tower
Tag: Santa Rita Jail R

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

REVISIONS

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-2D
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
CENTER OF GRAVITY	2D

NOTE: FOOT PAD SPACING IN BACK TO BACK INSTALLATIONS MUST BE A MINIMUM OF 6 INCHES. ALL GIVEN DIMENSIONS ARE WITHIN ±1/8".

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

California Hydronics Corp.
2-Unit Installation
TTXL-08 Anchor Pad Layout

Modular Fiberglass Cooling Tower
Model # TTXL-081930

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-3
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
FOOTPRINT & ANCHOR PAD LAYOUT	3

---------- REGIONS ----------

Area: 17.9141
Perimeter: 107.9072
Bounding box: X: -6.1274 -- 8.7476
Y: -6.1274 -- 8.7476
Centroid: X: 0.0000
Y: 0.0000
Moments of inertia: X: 422.8851
Y: 422.8847
Product of inertia: XY: -229.3880
Radii of gyration: X: 4.8586
Y: 4.8586
Principal moments and X-Y directions about centroid:
I: 193.4969 along [0.7071 -0.7071]
J: 652.2729 along [0.7071 0.7071]

FILL POCKET AROUND ANCHOR BOLT WITH NON-SHRINK GROUT BEFORE INSTALLING THE SQUARE WASHER PROVIDED WITH THE MODULE. BEFORE GROUT SETS, INSTALL SQUARE WASHER AND ANCHOR NUT AND TORQUE TO 50 Ft-Lbs. SQUARE WASHER SHOULD ENGAGE THE TWO HORIZONTAL BOLTS SECURING THE FOOTPAD TO THE LEG. RE-TORQUE TO STRUCTURAL ENGINEER'S SPECIFICATION AFTER GROUT HAS SET.
ANCHOR BOLTS PROVIDED BY OTHERS

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Footpad Detail

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

NO.	DATE	REVISIONS	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-4
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
FOOTPAD DETAIL	4

J-BOX LAYOUT

CONNECTION DETAIL

NOTE: ALL PENETRATIONS SHOULD BE IN THE BOTTOM OF THE PANEL CABINET.

*MOTOR SUPPORTS NOT SHOWN FOR CLARITY

TYPICAL CABLE LAYOUT

FIELD WIRING:

FIELD WIRING BY OTHERS. ALL COMMUNICATION WIRE TO BE SHIELDED TWISTED PAIR CONDUCTOR - BELDEN OR EQUIVALENT.

MOTOR PROTECTION:

INDIVIDUAL MOTOR PROTECTION FOR SHORT CIRCUIT AND THERMAL OVERLOAD MUST BE PROVIDED IN ACCORDANCE WITH THE CURRENT NATIONAL ELECTRIC CODE. THE CURRENT LIMIT FUNCTION OF A VARIABLE FREQUENCY DRIVE DOES NOT QUALIFY WHERE MORE THAN ONE MOTOR IS CONNECTED TO THE LOAD SIDE OF THE DRIVE. FAILURE TO PROVIDE THE INDIVIDUAL MOTOR PROTECTION WILL VOID THE MOTOR AND WIRING WARRANTIES.

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Prewired J-Box
Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-5
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
PREWIRED J-BOX	5

1	Enclosure
2	Enclosure mounting panel
3	KTP600 operator panel
4	CPU S7 1200 module
5	S7-1200 Analog Module
6	Circuit Breaker 3P/600Vac/ 250amp frame
7	Internal Auxiliary Contacts
8	-
9	Circuit breaker door mounted disconnect handle
10	S7-1200 8pt digital input module 24VDC
11	Black 2 position selector switch
12	Branch Circuit protector single pole
13	Terminal Strip
14	Control relay 3 pole 120VAC Magnacraft
15	-
16	Manual motor starter protector
17	Contactor

* NOTE: PANEL WILL SHIP LOSE
CUSTOMER TO INSTALL

#1 - Field wiring by others. No Penetrations in Cabinet/Enclosure other than from the bottom. Side and top penetrations will void customer warranty.

#2 - Field wiring by others. Communication and power lines must be in separate conduits. Communication conduit should enter CP cabinet on bottom left side.

#3 - Field wiring by others. 460/230 vac should enter CP cabinet on bottom right hand side as shown. Clean 120 vac should to enter CP cabinet in separate conduit at bottom middle as shown. Communication wires should penetrate CP cabinet at bottom left as shown.

#4 - Field wiring by others. All motor wiring is to exit in conduit from bottom of CP cabinet.

#5 - Field wiring by others. All communication wire to be shielded twisted pair.

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Control Panel Cabinet

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team
DATE

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-6
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
CONTROL PANEL CABINET	6

NOTES:

1) ALL WIRING CONNECTED TO THIS CABINET MUST BE RATED AT LEAST 60° AND BE (LOW HYDROGEN PREFERRED) COPPER.

WIRE COLOR

BLACK - LINE VOLTAGE
RED - 120VAC
WHITE - NEUTRAL
GREEN - GROUND
BLUE - 24VDC +
BLUE W/WHITE - 24VDC -

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Control Panel Wiring

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-7A
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
CONTROL PANEL WIRING - 1	7A

WIRE COLOR

BLACK - LINE VOLTAGE
RED - 120VAC
WHITE - NEUTRAL
GREEN - GROUND
BLUE - 24VDC +
BLUE W/WHITE - 24VDC -

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Control Panel Wiring

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-7B
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
CONTROL PANEL WIRING - 2	7B

WIRE COLOR

BLACK - LINE VOLTAGE
RED - 120VAC
WHITE - NEUTRAL
GREEN - GROUND
BLUE - 24VDC +
BLUE W/WHITE - 24VDC -

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Control Panel Wiring

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-7C
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
CONTROL PANEL WIRING - 3	7C

4-20mA (INPUT) (SCALE 42-200F)
IF ENABLED REMOTE TEMPERATURE
SET POINT WILL OVERRIDE TEMP SET POINT
ON HMI

NOTE:

SELECTING VFD OFF VIA HMI
PROVIDES TOWER FAN STAGING CONTROL BY
PLC WHEN VFD IS NON-OPERATIONAL.

IF ENABLED REMOTE TEMPERATURE
SET POINT WILL OVERRIDE TEMP SET POINT
ON HMI

VFD OFF VIA HMI
(J22 - J25) REPLACE JUMPER WITH
WIRES FROM DRY CONTACT FOR REMOTE
ENABLE OPERATION OF PLC/FAN MOTORS.
OPEN CONTACT STATE (N.O.) DE-ENERGIZES
PLC PROGRAM & ALL AUTO CONTROLS,
WIRE A N.O. (NORMALLY OPEN)DRY CONTACT
TO TERMINALS J22 AND J25 FOR REMOTE
PLC/MOTOR ENABLE CONNECTION.

VFD ON VIA HMI
(J22 - J25) REPLACE JUMPER WITH
WIRES FROM DRY CONTACT FOR REMOTE
ENABLE OF VFD SPEED CONTROL OF
TOWER FANS. OPEN CONTACT STATE (N.O.)
DE-ENERGIZES PLC SPEED CONTROL. N.O.
(NORMALLY OPEN)DRY CONTACT TO
TERMINALS J22 AND J25 FOR REMOTE
ENABLE OF FAN SPEED CONTROL.

ALL COMMUNICATION CABLES TO BE
SHIELDED, TWISTED PAIR BELDEN OR
EQUIVALENT.

NO POWER WIRING AND COMMUNICATION
CABLES TO BE ROUTED IN SAME CONDUIT

WIRE COLOR

BLACK - LINE VOLTAGE
RED - 120VAC
WHITE - NEUTRAL
GREEN - GROUND
BLUE - 24VDC +
BLUE W/WHITE - 24VDC -

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Control Panel Wiring

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-7D
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
CONTROL PANEL WIRING - 4	7D

NOTES
1. DIMENSIONS SHOWN ARE IN MILLIMETERS [INCHES]
2. APPROXIMATE PRODUCT WEIGHT:
WITH BYPASS R4 - 96.8 Kg [213 lbs]
WITH OUT BYPASS R4 - 92.3 Kg [203 lbs]

We reserve all rights in this document and the information contained therein. Reproduction, use, or disclosure to third parties without express written authority is strictly forbidden. ©2009 ABB Automation Inc. (US)

F-3BUA0980502-d, rev. 1, 6-1-00

ECO # -	Rev. descr. -				
Prep. USINY/ MCS	D LACHANCE	5/19/09	Title DIMENSIONAL DRAWING AMC SIZE 2 UL TYPE 3R/NEMA 3R		Cont. sh. 4
Appr. USINY/	J KELLY	5/19/09			
Resp. dept. USINY/ 20500		5/19/09			
ABB Automation and Drives			Document number 3AUA0000060123	Lang. -	Rev. Ind. A / Sheet 3

ABB VFD DRIVE PANEL	DATE: 24 JAN 14
CHECKED BY:	DRAWING#: 14-006-7F
DRAWN BY: RTB	PROJECT#: 2014006
	CUST PO#: 192175
7F	

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

California Hydronics Corp.
2-Unit Installation
TTXL-08 ABB VFD Drive Panel

Tag: Santa Rita Jail R & R Cooling Tower

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

SEE CONTROL WIRING DIAGRAM FOR ADDITIONAL DETAIL

Hardware description

	X1		Hardware description
Analogue I/O	1	SCR	Terminal for signal cable shield (connected internally to chassis earth).
	2	AI1	Analogue input channel 1, programmable. Default[2] = frequency reference. Resolution 0.1%, accuracy ±1%.
			Two different DIP switch types can be used.
			J1: AI1 OFF: 0...10 V (R_i = 312 kohm)
			J1: AI1 ON: 0...20 mA (R_i = 100 ohm)
	3	AGND	Analogue input circuit common (connected internally to the chassis earth through 1 Mohm).
	4	+10 V	10 V/10 mA reference voltage output for analogue input potentiometer (1...10 kohm), accuracy ±2%.
	5	AI2	Analogue input channel 2, programmable. Default[2] = Actual signal 1 (PID1 feedback). Resolution 0.1%, accuracy ±1%.
			Two different DIP switch types can be used.
			J1: AI2 OFF: 0...10 V (R_i = 312 kohm)
			J1: AI2 ON: 0...20 mA (R_i = 100 ohm)
	6	AGND	Analogue input circuit common (connected internally to the chassis earth through 1 Mohm).
	7	AO1	Analogue output, programmable. Default[2] = frequency. 0...20 mA (load < 500 ohm). Accuracy ±3%.
	8	AO2	Analogue output, programmable. Default[2] = current. 0...20 mA (load < 500 ohm). Accuracy ±3%.
	9	AGND	Analogue output circuit common (connected internally to the chassis earth through 1 Mohm).

NOTES:
1. PROGRAMMING:
   DRIVE MACRO = MACRO = HVAC DEFAULT.
2. DASH LINES INDICATE CUSTOMER INSTALLED DEVICES AND WIRING
3. COPPER WIRE RATED FOR 75°C INSULATION MUST BE USED
4. REFER TO USER MANUAL FOR OPERATION, CONNECTIONS AND TIGHTENING TORQUE VALUES.
5. FUSE RATING LABEL IS ON DOOR
6. CUSTOMER REQUIRED TO PROVIDE BRANCH CIRCUIT PROTECTION AND DISCONNECT MEANS PER NEC AND LOCAL CODE.
7. SHORT CIRCUIT CURRENT RATING ON DOOR LABEL
8. REPLACE JUMPER WITH NORMALLY CLOSED SAFTY INTERLOCK CONTACT AS NEEDED X2 - TERMINAL 2 CONNECTS TO J-47 & TERMINAL 7 CONNECTS TO J-48
9. WHEN CONNECTING VFD TO TOWER TECH T9900 CONTROL PANEL WITH PLC INSTALL JUMPER BETWEEN X2-TERMAINAL 1 & 5 AND 5 & 10.

ABB Automation & Drives
800-752-0696

NOTE 1
AFTER A CIRCUIT IS DEENERGIZED BY A CIRCUIT PROTECTIVE DEVICE, THE CIRCUIT MAY NOT BE REENERGIZED UNTIL IT HAS BEEN DETERMINED THAT THE EQUIPMENT AND CIRCUIT CAN BE SAFELY ENERGIZED. THE REPETITIVE RECLOSING OF CIRCUIT BREAKERS OR REENERGIZING CIRCUITS THROUGH REPLACED FUSED IS PROHIBITED.

ABB ACH550
XXX HP XXX VAC
DRIVE WITH CIRCUIT BREAKER
BYPASS
NEMA 3R ENCLOSURE

ABB ACH550-BCRM+B058+
E205
UL TYPE 3R

DRAWN BY: DRP	SCALE: NONE	DRAWING NO ABB ACH550 BCRM+B058+ E205
EDITED BY: DLL	DATE 2/5/09	
	APP'D BY	SHEET 1 OF 1

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

California Hydronics Corp. 2-Unit Installation

TTXL-08 ABB VFD Drive Panel Wiring

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY		DATE
California Hydronics Corp.		
Tower Tech Design Team		

REVISIONS		
NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-7G
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
ABB VFD DRIVE PANEL WIRING	7G

NOTES (TYPICAL ALL TOWER SIZES):

1) ALL EXTERNAL PIPING BY CUSTOMER.
2) ALL EXTERNAL PIPING TO BE INDEPENDENTLY SUPPORTED.
3) OPTIONAL OVERFLOW/EQUALIZATION LINE MUST NOT INTERFERE WITH ACCESS TO INSPECTION PORT OR OPTIONAL BASIN HEATER.

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Overflow/Level Control

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY

	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-8A
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
OVERFLOW/LEVEL CONTROL	8A

FLOW LINE SENSOR SETTING
BOTTOM OF SENSOR TO BOTTOM OF TANK 47"
FILL HEIGHT 33"

4-mA = 0"
20-mA = 33"

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Stilling Well Detail

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team
DATE

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-8B
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
STILLING WELL DETAIL	8B

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Level Control Panel Cabinet
Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-8C
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
LEVEL CONTROL PANEL CABINET	8C

WIRE COLOR

BLACK - LINE VOLTAGE
RED - 120VAC
WHITE - NEUTRAL
GREEN - GROUND
BLUE - 24VDC +
BLUE W/WHITE - 24VDC -

NOTES:

1) ALL WIRING CONNECTED TO THIS CABINET MUST BE RATED AT LEAST 60° AND BE COPPER.

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Level Control Panel Wiring
Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS		
NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-8D
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
LEVE CONTROL PANEL WIRING	8D

SUMP ATTACHMENT DETAIL

1/2"X2" SS BOLT ASSEMBLY

TO INSTALL EXTERNAL SUMP:

NOTE: ONLY ATTACH THE SUMP AFTER THE TOWER HAS BEEN UNLOADED FROM THE TRUCK.

1) REMOVE THE TWO WOODEN PLATES FROM THE SUMP FLANGES.

2) REMOVE SUMP LID THEN REMOVE CONTENTS PACKAGED INSIDE.

3) CHECK CONTENTS TO VERIFY THAT THEY ARE IN AGREEMENT WITH PACKING SLIP AND TO ENSURE THAT ALL NEEDED MATERIALS ARE PRESENT BEFORE PROCEEDING WITH INSTALLATION.

4) CLEAN OUTSIDE SURFACES OF BOTH SUMP FLANGES, THAT IS, THE FACTORY INSTALLED FLANGE (BOLTED TO THE TOWER WALL) AND THE FACTORY INSTALLED SUMP FLANGE.

5) APPLY A 3/8" BEAD OF SILICONE ALONG THE CENTER LINE OF BOLT HOLES AND AROUND EACH BOLT HOLE ON EACH FLANGE.

6) PLACE THE LARGE RECTANGULAR GASKET ON THE FLANGE ATTACHED TO THE TOWER WALL.

7) PLACE ONE 3/8" NEOPRENE WASHER ON EACH OF THE FOUR ALL-THREAD RODS ATTACHED TO THE COOLING TOWER WALL. ORIENT THE WASHER SO THAT THE NEOPRENE FACES TOWARDS THE SUMP BOX WALL.

8) PLACE TWO 1/2" X 2" BOLTS WITH WASHERS IN THE TWO OUTER HOLES OF THE FLANGE ATTACHED TO THE TOWER WALL. ORIENT THE BOLTS SO THAT THE HEAD OF THE BOLT FACES TOWARDS THE TOWER WALL.

9) LIFT THE SUMP INTO POSITION AND ALIGN THE FOUR ALL-THREAD RODS AND THE TWO 1/2" X 2" BOLTS INTO THEIR CORRESPONDING HOLES.

10) LOOSELY ATTACH AND HAND TIGHTEN EACH OF THE REMAINING TWENTY 1/2" X 2" BOLTS USING TWO WASHERS AND ONE NUT PER BOLT. ONCE ALL ARE LOOSELY ATTACHED BEGIN TO TIGHTEN THEM (TIGHTEN IN OPPOSITE PAIRS) FROM THE CENTER OF EACH SIDE TO THE CORNERS. PLEASE NOTE THAT USE OF A RATCHET WRENCH IS REQUIRED TO MAKE THESE CONNECTIONS.

NOTE: TWO FRP BACKER SUPPORTS ARE PROVIDED WITH ONE BACKER SUPPORT HAVING TWO HOLES ACCOMMODATING THE TWO LEFT FACING ALL-THREAD RODS AND THE SECOND BACKER SUPPORT ACCOMMODATING THE TWO RIGHT FACING ALL-THREAD RODS.

11) LOCATE THE TWO 8" x 2" x 1/2" FRP BACKER SUPPORTS. APPLY A BEAD OF SEALING SILICONE AROUND EACH BOLT HOLE (ON ONE SIDE ONLY).

12) THROUGH THE SUMP LID OPENING, INSERT ONTO EACH ALL-THREAD ROD ONE 8"x 2"x 1/2" FRP BACKER SUPPORT (SILICONE TOWARD SUMP WALL), ONE NEO WASHER AND ONE NUT. TIGHTEN NUTS.

13) SET SUMP SCREEN AT THE BOTTOM OF THE SUMP.

14) N/A.

15) REPLACE SUMP LID.

NOTE THAT NEITHER THE TOWER NOR THE FLANGES ARE INTENDED TO SUPPORT ANY EXTERNAL PIPING WEIGHT. ALL EXTERNAL PIPING MUST BE "STAND ALONE" (SUPPORTED INDEPENDENTLY OF THE TOWER).

MAKE-UP CONNECTION/FLOAT VALVE CONNECTION FLANGE IS MADE FROM HIGH QUALITY PLASTIC TO ELIMINATE CORROSION.
THE MAXIMUM MAKE-UP WATER INLET PRESSURE IS 25 PSIG.
FLOAT VALVE MAY NOT SHUT OFF TIGHT AGAINST HIGHER PRESSURES.

SUMP SCREEN
INSTALLATION DETAIL

FLOAT VALVE DETAIL

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Sump Detail

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

NO.	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-11
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
SUMP DETAIL	11

TYPICAL CORNER SUBSTRUCTURE DETAIL
6' LEG KIT

FRONT ELEVATION

STANDARD SUBSTRUCTURE INSTALLATION
WITH THE COOLING TOWER LIFTED SLIGHTLY ABOVE THE MAIN SUPPORT BEAM OR PAD DO THE FOLLOWING:

1. LOOSELY ATTACH THE PULTRUDED LEG (VERTICAL SUPPORT BEAM) TO THE TOWER CORNER ENCLOSURE USING TWO 1/2"X6" STAINLESS STEEL HEX BOLTS WITH WASHERS AND NUTS.
2. LOOSELY ATTACH THE TWO FRP TUBULAR BRACES TO THE COOLING TOWER APRON AND TO THE PULTRUDED LEG USING PROVIDED STAINLESS STEEL HEX BOLTS WITH WASHERS AND NUTS.
3. ONCE THE LEG AND BRACES ARE LOOSELY SECURED, THE COOLING TOWER CAN BE LOWERED ONTO ITS MAIN SUPPORT BEAM OR PAD. TIGHTEN ALL HARDWARE.
4. TIGHTEN ALL BOLTS TO 30 FT. LBS.

TOWER TECH, Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Substructure Installation
Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY	DATE
California Hydronics Corp.	
Tower Tech Design Team	

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-12
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
SUBSTRUCTURE INSTALLATION	12

TOP VIEW

TOWER LIFTING/INSTALLATION NOTES:

WARNING:
THE LIFTING POINTS ARE STRUCTURALLY LOCATED WITHIN THE TOWER'S ENVELOPE. ANY DAMAGE TO THE TOWER ENVELOPE CAUSED BY IMPROPER LIFTING MEANS/METHODS SHALL BE REPAIRED AND/OR REPLACED AS NEEDED, AT NO COST TO TOWER TECH, INC. AND MAY INVALIDATE TOWER WARRANTY.

PRIOR TO LIFTING TOWER, REMOVE ANY EXCESS WATER FROM BASIN. WATER IN BASIN CAN DRASTICALLY INCREASE TOWER WEIGHT, CAUSING FAILURE OF TOWER LIFTING MECHANISM.

1. Owner shall be responsible for lifting and placement of tower. Owner shall furnish all incidental materials required for location of tower in its final position. All work shall be in accordance with requirements of governing authorities and all OSHA safety guidelines.
The accompanying lifting diagrams are for general information purposes only, and owner shall have full responsibility for the work. Monitor weather conditions at all times, and suspend operation when inclement weather is expected.

2. Upon arrival of tower module (prior to any lifting operation), the tower shall be inspected on the truck by the owner's representative for general acceptance. Any items of concern related to lifting operations shall be documented and reported (in writing) to Tower Tech's representative. The owner's rep or his crane contractor shall inspect all corner lifting brackets and their bolting to the tower.

3. Prepare & position lifting items such as clevis, lifting cables, spreader beam, guide rope and any other incidental items that are needed for a complete and safe lifting operation. Carefully position crane and lifting assembly directly over the tower module, in order to eliminate any instability during the operation. All lifting connections and parts shall be checked prior to the final lifting operation. Reference table below for tower weights, recommended cable lengths, and/or I-beam lengths. A guide rope (provided by owner) shall be connected to the bottom of the module such that personnel are not positioned under the suspended tower at any time.

4. Should the tower need to be temporarily placed on the ground prior to its final positioning, the tower shall be stored on sound and level surface. Care shall be taken at all times not to distort or rack the tower module's envelope.

5. Prior to the tower lifting operation, check the pre-installed anchor bolts for alignment. Lift and position the tower near its final location and loosely attach the provided substructure kit and the brace angles. Lower tower into position on the pre-installed anchor bolts. Place proper oversized washer and nut over anchor bolts and tighten as needed. After all anchor nuts are installed, square and plumb tower, and tighten all leg bolts followed by the angle support bracket bolts. All substructure bolts/nuts shall be tightened with 85 ft-lb torque. After all bolts are securely fastened, check overall stability of tower, substructure panels, and tubular brace. Verify that tower is level and stability is adequate for operation. Disconnect crane from lifting brackets.

6. Upon the completion of lifting operation check for plumb and stability again. Attach sump box as shown on sump detail drawing and proceed with the tower start up as described in the Tower Tech Operation and Maintenance Manual.

TOWER LIFTING DATA

SERIES #	WEIGHT *	L (ft)	S (min ft)
TTXL-12	5,245	20	14'-6"
TTXL-13	7,040	20	20'-3"
TTXL-04	7,912	20	14'-6"
TTXL-06	11,662	20	20'-3"
TTXL-08	15,412	20	26'-0"
TTXL-10	19,162	20	31'-9"

* Tower weights vary, based upon optional equipment, residual water, etc. Weights listed are guidelines only.

END ELEVATION

SIDE ELEVATION

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular Fiberglass Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Lift Rigging

Tag: Santa Rita Jail R & R Cooling Tower

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

REVISIONS

NO.	DATE	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-13A
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
LIFT RIGGING	13A

CAUTION: ENSURE THAT ALL HARDWARE SHOWN IS
PRESENT, AS WELL AS, FULLY TIGHTENED
PRIOR TO LIFTING.

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

California Hydronics Corp.
2-Unit Installation
TTXL-08 Lifting Bracket

Cooling Tower

Tag: Santa Rita Jail R & R Cooling

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

DATE

REVISIONS

NO.	DATE	REVISION

DATE:	24 JAN 14
DRAWING#:	14-006-13B
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
LIFTING BRACKET	13B

Santa Rita Jail Cooling Tower

5325 BRODER BLVD., DUBLIN, CA

STRUCTURAL CALCULATIONS

DECEMBER, 2014

REGISTERED PROFESSIONAL ENGINEER
SUNIL GUPTA
SE-2948
Exp 09-30-15
STRUCTURAL
STATE OF CALIFORNIA

Job NO. 2014-19

OLMM CONSULTING ENGINEERS

Santa Rita Jail Cooling Tower

Calculation Index

1	**Design of the support of cooling tower and evaluation of existing beams**	1.1 to 1.10
2	**Design of guardrail attaching to the existing north concrete wall parapet**	2.1 to 2.6
3	**Design of support of the water pipe**	3.1 to 3.18

OLMM Consulting Engineers
• San Francisco (415) 882-9449
• Oakland (510) 433-0828

JOB: 2014-12 SR JAIL COOLING TOWER
JOB NUMBER:
SHEET NO. 1.1 OF
CALCULATED BY: EN DATE: 10/24/14
CHECKED BY: DATE:

ROOF TOP UNIT ATTACHMENT

- ROOF TOP UNIT TYPE : TowerTech MODULAR FIBERGLASS MODEL # TTXL-081930
  DWG DATED: 24 JAN 14
- Total weight : 25,695 lbs / unit
- Total height : 6' + 11'-0¼" = 17'-0¼" = 204 in
- C.G. wrt Roof : 9' = 108"

- Unit width : 12' = 144 in
  length : 25'-6¼" = 306 in
  height : 17'-0¼" = 204 in

1 · 2

USGS Design Maps Summary Report

User-Specified Input

Report Title Santa Rita Jail
Fri October 24, 2014 23:54:06 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 37.7159°N, 121.8876°W

Site Soil Classification Site Class D – "Stiff Soil"

Risk Category I/II/III

USGS-Provided Output

S_S =	1.812 g	S_{MS} =	1.812 g	S_{DS} =	1.208 g
S_1 =	0.667 g	S_{M1} =	1.000 g	S_{D1} =	0.667 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

ROOF TOP UNIT ATTACHMENT

Seismic Parameter:

- Longitude: -121.8876°W
- Latitude: 37.7159°N
- Site class: D
- Risk category: III

$S_s = 1.812\,g$ $\quad S_1 = 0.667g$

$S_{DS} = 1.208\,g$ $\quad S_{D1} = 0.667g$

$I_p = 1.0$

$a_p = 2.5$, $R_p = 3.0$ → Roof mounted cooling tower laterally braced below its center of mass

$z/h \approx 1.0$

- Seismic Force: ASCE 7-10 13.3.1

$$F_p = \frac{0.4\, a_p S_{DS} W_p}{R_p / I_p}\left(1 + 2\frac{z}{h}\right)$$

$$= \frac{0.4 \cdot 2.5 \cdot 1.208 \cdot W_p}{3.0/1.0}(1+2) = 1.208\,W_p \leftarrow \text{Governs!}$$

$F_{pmax} = 1.6\, S_{DS} I_p W_p = 1.94\, W_p$

$F_{pmin} = 0.3\, S_{DS} I_p W_p = 0.36\, W_p$

- $F_p = 1.208\,W_p = 1.208 \times 25{,}695\text{ lbs} = 31040\text{ lbs}$
- Overturning Moment $= 108^{in} \cdot 31040\text{ lbs} = 3{,}352{,}320\text{ lb-in}$

By inspection, wind load will not govern!

ROOF TOP UNIT ATTACHMENT

- Earthquake parallel to short side $(0.9-0.2S_{DS})D - E$

Overturning moment : 3353 kip-in

Resisting moment : $(0.9-0.2S_{DS})\,W_p \times \text{width}/2$

$= (0.9-0.2\cdot 1.208)\cdot 25{,}695\text{ lbs} \times 12^{ft}\cdot\frac{12''}{1'}/2$

$= 1218$ kip-in

Net Moment = Overturning − Resisting

$= 3353$ kip-in $- 1218$ kip-in

$= 2135$ kip-in

Tension = Net moment / width

$= 2135$ kip-in / 144 in $= 14.83$ kip / 2 legs

$= 7.42$ kip

Shear = $1.208 W_p / 4 = 7.76$ kip

Compression = $(1.2+0.2S_{DS})D + E$

$= (1.2+0.2S_{DS}) \times W_p/4 +$ Overturning Moment / width / 2

$= (1.2+0.2\cdot 1.208)\times 25{,}695/4 + 3353000/144/2$

$= 20.9$ kip

Design (2) bolt for "$T_u = 7.42$ kip, 3.71 kip ea $V_u = 7.76$ kip, 3.88 kip ea" → taken by two bolts

Use 1" ϕ bolt, Say 50 ksi f_{uta}

$\phi N_{sa} = 0.75\cdot A_{se}\cdot f_{uta} = 0.75\cdot 0.69\text{ in}^2\cdot 50\text{ ksi} = 26$ kip

$\phi V_{sa} = 0.6\,\phi N_{sa} = 15.5$ kip

$\frac{T_u}{\phi N_{sa}} + \frac{V_u}{\phi V_{sa}} = 0.14 + 0.25 = 0.39 < 1.0$ (OK)

OLMM Consulting Engineers
• San Francisco (415) 882-9449
• Oakland (510) 433-0828

JOB 2014-12 SR JAIL COOLING TOWER
JOB NUMBER
SHEET NO. 1.5 OF
CALCULATED BY EN DATE 10/24/14
CHECKED BY DATE

ROOF TOP UNIT ATTACHMENT

Check Beam (E) W14×34

DL = 15psf × 6'-0" = 0.45 klf
LL = 20psf × 6'-0" = 0.12 klf

Point load:

① DL: 25695 lb · 1/4 · 1/2 = 3.2 kip ↓
0.5'
EQ: 3353 kin / 144 in / 2 legs / 2 bolts = 5.8 kip ↕

② DL: 25695 lb · 1/4 = 6.4 kip ↓
10.83'
EQ: 3353 kin / 144 in / 2 legs = 11.6 kip ↕

③ DL: 25695 lb · 1/4 = 6.4 kip ↓
12.17'
EQ: 3353 kin / 144 in / 2 legs = 11.6 kip ↕

④ DL: 25695 lb · 1/4 · 1/2 = 3.2 kip ↓
22.5'
EQ: 3353 kin / 144 in / 2 legs / 2 bolts = 5.8 kips ↕

DELUXE FOR BUSINESS 1-800-888-6327
Ref. No: G 606766929

Steel Beam

File = H:\2014\2014-1-4\CALCUL-1\BEAMCH-1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 — Licensee : OLMM CONSULTING ENGINEERS

Description : W14x34

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Load Resistance Factor Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending
Load Combination ASCE 7-10

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.450, L = 0.120 k/ft, Tributary Width = 1.0 ft, (Roof Distributed Dead and Live)
Point Load : D = 3.20, E = 5.80 k @ 0.50 ft, ((1) Cooling Tower Dead and EQ)
Point Load : D = 6.40, E = -11.60 k @ 10.830 ft, ((2) Cooling Tower Dead and EQ)
Point Load : D = 6.40, E = 11.60 k @ 12.170 ft, ((3) Cooling Tower Dead and EQ)
Point Load : D = 3.20, E = -5.80 k @ 22.50 ft, ((4) Cooling Tower Dead and EQ)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.777 : 1	Maximum Shear Stress Ratio =	0.229 : 1
Section used for this span	W14x34	Section used for this span	W14x34
Mu : Applied	159.103 k-ft	Vu : Applied	27.426 k
Mn * Phi : Allowable	204.750 k-ft	Vn * Phi : Allowable	119.70 k
Load Combination	+1.442D+0.50L+0.20S+E+1.60H	Load Combination	+1.442D+0.50L+0.20S+E+1.60H
Location of maximum on span	12.190 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward L+Lr+S Deflection	0.077 in	Ratio =	3,573
Max Upward L+Lr+S Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.978 in	Ratio =	282
Max Upward Total Deflection	-0.008 in	Ratio =	35336

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D+1.60H													
Dsgn. L = 23.00 ft	1	0.704	0.177	144.09		144.09	227.50	204.75	1.00	1.00	21.23	119.70	119.70
+1.20D+0.50Lr+1.60L+1.60H													
Dsgn. L = 23.00 ft	1	0.665	0.170	136.20		136.20	227.50	204.75	1.00	1.00	20.41	119.70	119.70
+1.20D+1.60L+0.50S+1.60H													
Dsgn. L = 23.00 ft	1	0.665	0.170	136.20		136.20	227.50	204.75	1.00	1.00	20.41	119.70	119.70
+1.20D+1.60Lr+0.50L+1.60H													
Dsgn. L = 23.00 ft	1	0.623	0.158	127.47		127.47	227.50	204.75	1.00	1.00	18.89	119.70	119.70
+1.20D+1.60Lr+0.50W+1.60H													
Dsgn. L = 23.00 ft	1	0.603	0.152	123.50		123.50	227.50	204.75	1.00	1.00	18.20	119.70	119.70
+1.20D+0.50L+1.60S+1.60H													
Dsgn. L = 23.00 ft	1	0.623	0.158	127.47		127.47	227.50	204.75	1.00	1.00	18.89	119.70	119.70
+1.20D+1.60S+0.50W+1.60H													
Dsgn. L = 23.00 ft	1	0.603	0.152	123.50		123.50	227.50	204.75	1.00	1.00	18.20	119.70	119.70
+1.20D+0.50Lr+0.50L+W+1.60H													
Dsgn. L = 23.00 ft	1	0.623	0.158	127.47		127.47	227.50	204.75	1.00	1.00	18.89	119.70	119.70
+1.20D+0.50L+0.50S+W+1.60H													
Dsgn. L = 23.00 ft	1	0.623	0.158	127.47		127.47	227.50	204.75	1.00	1.00	18.89	119.70	119.70
+1.442D+0.50L+0.20S+E+1.60H													
Dsgn. L = 23.00 ft	1	0.777	0.229	159.10		159.10	227.50	204.75	1.00	1.00	27.43	119.70	119.70

Steel Beam

File = H:\2014\2014-1-4\CALCUL~1\BEAMCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : W14x34

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.442D+0.50L+0.20S-1.0E+1.60H													
Dsgn. L = 23.00 ft	1	0.777	0.229	159.10		159.10	227.50	204.75	1.00	1.00	27.43	119.70	119.70
+0.90D+W+0.90H													
Dsgn. L = 23.00 ft	1	0.452	0.114	92.63		92.63	227.50	204.75	1.00	1.00	13.65	119.70	119.70
+0.6584D+E+0.90H													
Dsgn. L = 23.00 ft	1	0.365	0.124	74.73		74.73	227.50	204.75	1.00	1.00	14.86	119.70	119.70
+0.6584D-1.0E+0.90H													
Dsgn. L = 23.00 ft	1	0.365	0.124	74.73		74.73	227.50	204.75	1.00	1.00	14.86	119.70	119.70

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.9776	11.615		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	18.759	18.759
Overall MINimum	1.380	1.380
+D+H	15.166	15.166
+D+L+H	16.546	16.546
+D+Lr+H	15.166	15.166
+D+S+H	15.166	15.166
+D+0.750Lr+0.750L+H	16.201	16.201
+D+0.750L+0.750S+H	16.201	16.201
+D+0.60W+H	15.166	15.166
+D+0.70E+H	18.577	11.756
+D-0.70E+H	11.756	18.577
+D+0.750L+0.750Lr+0.450W+H	16.201	16.201
+D+0.750L+0.750S+0.450W+H	16.201	16.201
+D+0.750L+0.750S+0.525E+H	18.759	13.644
+D+0.750L+0.750S-0.5250E+H	13.644	16.759
+0.60D+0.60W+0.60H	9.100	9.100
+0.60D+0.70E+0.60H	12.510	5.689
+0.60D-0.70E+0.60H	5.689	12.510
D Only	15.166	15.166
Lr Only		
L Only	1.380	1.360
S Only		
W Only		
E Only	4.672	-4.872
-1.0E	-4.872	4.872
H Only		

OLMM Consulting Engineers
• San Francisco (415) 882-9449
• Oakland (510) 433-0828

JOB 2014-12 SR JAIL COOLING TOWER
JOB NUMBER
SHEET NO. 1.8 OF
CALCULATED BY EN DATE 10/27/14
CHECKED BY DATE

ROOF TOP UNIT ATTACHMENT

Check Beam (E) W 18×35

Roof Dead, Live

DL = 75 psf × 23' × 6' = 10.4 k ↓

LL = 20 psf × 23' × 6' = 2.76 k ↓

Cooling Tower Dead:

DL = 2569.5 lb × 1/4 = 6.4 k ↓

EQ = 3353 k-in / 144 in / 2 legs = 11.6 k ↕

Steel Beam

File = H:\2014\2014-1-4\CALCUL-1\BEAMCH-1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : W18X35

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Load Resistance Factor Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending
Load Combination ASCE 7-10

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load(s) for Span Number 1
Point Load : D = 10.40, L = 2.760 k @ 6.0 ft, (Roof Dead and Live)
Point Load : D = 6.40, E = 11.60 k @ 6.0 ft, (Cooling Tower Dead and EQ)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.451 : 1	Maximum Shear Stress Ratio =	0.119 : 1
Section used for this span	W18x35	Section used for this span	W18x35
Mu : Applied	112.506 k-ft	Vu : Applied	18.903 k
Mn * Phi : Allowable	249.375 k-ft	Vn * Phi : Allowable	159.30 k
Load Combination	+1.442D+0.50L+0.20S+E+1.60H	Load Combination	+1.442D+0.50L+0.20S+E+1.60H
Location of maximum on span	6.000ft	Location of maximum on span	12.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward L+Lr+S Deflection	0.012 in	Ratio =	12,312
Max Upward L+Lr+S Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.107 in	Ratio =	1347
Max Upward Total Deflection	-0.049 in	Ratio =	2929

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D+1.60H													
Dsgn. L = 12.00 ft	1	0.286	0.076	71.44		71.44	277.08	249.38	1.00	1.00	12.05	159.30	159.30
+1.20D+0.50Lr+1.60L+1.60H													
Dsgn. L = 12.00 ft	1	0.299	0.079	74.49		74.49	277.08	249.38	1.00	1.00	12.54	159.30	159.30
+1.20D+1.60L+0.50S+1.60H													
Dsgn. L = 12.00 ft	1	0.299	0.079	74.49		74.49	277.08	249.38	1.00	1.00	12.54	159.30	159.30
+1.20D+1.60Lr+0.50L+1.60H													
Dsgn. L = 12.00 ft	1	0.282	0.069	65.38		65.38	277.08	249.38	1.00	1.00	11.02	159.30	159.30
+1.20D+1.60Lr+0.50W+1.60H													
Dsgn. L = 12.00 ft	1	0.246	0.065	61.24		61.24	277.08	249.38	1.00	1.00	10.33	159.30	159.30
+1.20D+0.50L+1.60S+1.60H													
Dsgn. L = 12.00 ft	1	0.262	0.069	65.38		65.38	277.08	249.38	1.00	1.00	11.02	159.30	159.30
+1.20D+1.60S+0.50W+1.60H													
Dsgn. L = 12.00 ft	1	0.246	0.065	61.24		61.24	277.08	249.38	1.00	1.00	10.33	159.30	159.30
+1.20D+0.50Lr+0.50L+W+1.60H													
Dsgn. L = 12.00 ft	1	0.262	0.069	65.38		65.38	277.06	249.38	1.00	1.00	11.02	159.30	159.30
+1.20D+0.50L+0.50S+W+1.60H													
Dsgn. L = 12.00 ft	1	0.262	0.069	65.38		65.38	277.08	249.38	1.00	1.00	11.02	159.30	159.30
+1.442D+0.50L+0.20S+E+1.60H													
Dsgn. L = 12.00 ft	1	0.451	0.119	112.51		112.51	277.06	249.38	1.00	1.00	18.90	159.30	159.30
+1.442D+0.50L+0.20S-1.0E+1.60H													
Dsgn. L = 12.00 ft	1	0.172	0.046	42.91		42.91	277.06	249.36	1.00	1.00	7.30	159.30	159.30

Steel Beam

File = H:\2014\2014-1-4\CALCUL~1\BEAMCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : W18X35

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+0.90D+W+0.90H													
Dsgn. L = 12.00 ft	1	0.184	0.049	45.93		45.93	277.08	249.38	1.00	1.00	7.75	159.30	159.30
+0.6584D+E+0.90H													
Dsgn. L = 12.00 ft	1	0.274	0.072	68.40		68.40	277.08	249.38	1.00	1.00	11.47	159.30	159.30
+0.6584D-1.0E+0.90H													
Dsgn. L = 12.00 ft	1	0.005	0.002		-1.20	1.20	277.08	249.38	1.00	1.00	0.27	159.30	159.30

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.525E+H	1	0.1069	6.060		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	12.690	12.690
Overall MINimum	1.106	1.106
+D+H	8.610	8.610
+D+L+H	9.990	9.990
+D+Lr+H	8.610	8.610
+D+S+H	8.610	8.610
+D+0.750Lr+0.750L+H	9.645	9.645
+D+0.750L+0.750S+H	9.645	9.645
+D+0.60W+H	8.610	8.610
+D+0.70E+H	12.670	12.670
+D-0.70E+H	4.550	4.550
+D+0.750L+0.750Lr+0.450W+H	9.645	9.645
+D+0.750L+0.750S+0.450W+H	9.645	9.645
+D+0.750L+0.750S+0.525E+H	12.690	12.690
+D+0.750L+0.750S-0.5250E+H	6.600	6.600
+0.60D+0.60W+0.60H	5.166	5.166
+0.60D+0.70E+0.60H	9.226	9.226
+0.60D-0.70E+0.60H	1.106	1.106
D Only	8.610	8.610
Lr Only		
L Only	1.380	1.380
S Only		
W Only		
E Only	5.800	5.800
-1.0E	-5.800	-5.800
H Only		

MECHANICAL EQUIPMENT ROOF GUARD

Design of Anchorage

$M_u = 1.6 \cdot 200 lbs \times 4.6'$

$= 1472$ lb-ft

$\Rightarrow T/C = 1472$ lb ft / 0.5 ft

$= 2950$ lbs

Design the expansion anchor:

* Use 1/2 ϕ Exp bolt × 3.5" Embed depth

DCR = 0.59 (OK)

2.2

SIMPSON Strong-Tie

Anchor Designer™ Software
Version 2.3.5365.0

Company:	OLMM	Date:	10/27/2014
Engineer:	EN	Page:	1/4
Project:	2014-12 SR Jail Cooling Tower		
Address:			
Phone:			
E-mail:			

1.Project Information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-11
Units: Imperial units

Anchor Information:
Anchor type: Torque controlled expansion anchor
Material: Carbon Steel
Diameter (inch): 0.500
Nominal Embedment depth (inch): 4.000
Effective Embedment depth, h_{ef} (inch): 3.500
Code report: ICC-ES ESR-1771
Anchor category: 1
Anchor ductility: Yes
h_{min} (inch): 6.08
c_{ac} (inch): 7.75
C_{min} (inch): 4.00
S_{min} (inch): 4.00

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 9.00
State: Cracked
Compressive strength, f'_c (psi): 3000
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Do not evaluate concrete breakout in tension: No
Do not evaluate concrete breakout in shear: No
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 9.00 x 9.00 x 0.38

<Figure 1>

SIMPSON Strong-Tie®

Anchor Designer™ Software
Version 2.3.5365.0

Company:	OLMM	Date:	10/27/2014
Engineer:	EN	Page:	2/4
Project:	2014-12 SR Jail Cooling Tower		
Address:			
Phone:			
E-mail:			

<Figure 2>

Recommended Anchor
Anchor Name: Strong-Bolt® - 1/2"Ø Strong-Bolt, hnom:4" (102mm)
Code Report Listing: ICC-ES ESR-1771

SIMPSON Strong-Tie

Anchor Designer™ Software
Version 2.3.5365.0

Company:	OLMM	Date:	10/27/2014
Engineer:	EN	Page:	3/4
Project:	2014-12 SR Jail Cooling Tower		
Address:			
Phone:			
E-mail:			

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1255.6	0.0	0.0	0.0
2	1255.6	0.0	0.0	0.0
3	13.3	0.0	0.0	0.0
4	13.3	0.0	0.0	0.0
Sum	2537.9	0.0	0.0	0.0

Maximum concrete compression strain (‰): 0.09
Maximum concrete compression stress (psi): 393
Resultant tension force (lb): 2538
Resultant compression force (lb): 2540
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 2.94
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

<Figure 3>

4. Steel Strength of Anchor in Tension(Sec. D.5.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13500	0.75	10125

5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. D-6)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	3000	3.500	6097

$\phi N_{cbg} = \phi\,(A_{Nc} / A_{Nco})\,\Psi_{ec,N}\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-4)

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
268.13	110.25	0.641	0.986	1.00	1.000	6097	0.65	6092

6. Pullout Strength of Anchor in Tension (Sec. D.5.3)

$\phi N_{pn} = \phi \Psi_{c,P} \lambda_a N_p (f'_c / 2{,}500)^n$ (Sec. D.4.1, Eq. D-13 & Code Report)

$\Psi_{c,P}$	λ_a	N_p (lb)	f'_c (psi)	n	ϕ	ϕN_{pn} (lb)
1.0	1.00	2995	3000	0.50	0.65	2133

SIMPSON Strong-Tie®

Anchor Designer™ Software
Version 2.3.5365.0

Company:	OLMM	Date:	10/27/2014
Engineer:	EN	Page:	4/4
Project:	2014-12 SR Jail Cooling Tower		
Address:			
Phone:			
E-mail:			

11. Results

Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	1256	10125	0.12	Pass
Concrete breakout	2538	6092	0.42	Pass
Pullout	**1256**	**2133**	**0.59**	**Pass (Governs)**

1/2"Ø Strong-Bolt, hnom:4" (102mm) meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

2.6

3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, *guards* shall not have openings which allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for *alternating tread devices* and ship ladders, *guards* shall not have openings which allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, *guards* at the end of *aisles* where they terminate at a fascia of boxes, balconies and galleries shall not have openings which allow passage of a sphere 4 inches in diameter (102 mm) up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, *guards* shall not have openings which allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual dwelling units and sleeping units in Group R-2 and R-3 occupancies, *guards* on the open sides of *stairs* shall not have openings which allow passage of a sphere $4^3/_8$ (111 mm) inches in diameter.
7. *Lifeguard towers not open to the public, guards shall not have openings which allow passage of a sphere 21 inches (533 mm) in diameter.*

1013.4 Screen porches. Porches and decks which are enclosed with insect screening shall be provided with *guards* where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

1013.5 Mechanical equipment. *Guards* shall be provided where appliances, equipment, fans, roof hatch openings or other components that require service are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The *guard* shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter. The *guard* shall extend not less than 30 inches (762 mm) beyond each end of such appliance, equipment, fan or component.

1013.6 Roof access. *Guards* shall be provided where the roof hatch opening is located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The *guard* shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

SECTION 1014
EXIT ACCESS

1014.1 General. The *exit access* shall comply with the applicable provisions of Sections 1003 through 1013. *Exit access* arrangement shall comply with Sections 1014 through 1019.

1014.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an *exit*.

   Exception: *Means of egress* are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy when the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.

2. An *exit access* shall not pass through a room that can be locked to prevent egress.
3. *Means of egress* from dwelling units or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.
4. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

   Exceptions:

   1. *Means of egress* are not prohibited through a kitchen area serving adjoining rooms constituting part of the same dwelling unit or sleeping unit.
   2. *Means of egress* are not prohibited through stockrooms in Group M occupancies when all of the following are met:
      - 2.1. The stock is of the same hazard classification as that found in the main retail area;
      - 2.2. Not more than 50 percent of the *exit access* is through the stockroom;
      - 2.3. The stockroom is not subject to locking from the egress side; and
      - 2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) *aisle* defined by full- or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the *exit* without obstructions.

5. *Exits shall not pass through any room subject to locking except in Group I-3 occupancies classified as detention facilities.*

1014.2.1 Multiple tenants. Where more than one tenant occupies any one floor of a building or structure, each tenant space, dwelling unit and sleeping unit shall be provided with access to the required *exits* without passing through adjacent tenant spaces, dwelling units and sleeping units.

Exception: The *means of egress* from a smaller tenant space shall not be prohibited from passing through a larger adjoining tenant space where such rooms or spaces of the smaller tenant occupy less than 10 percent of the area of the larger tenant space through which they pass; are the same or similar occupancy group; a discernable path of egress travel to an *exit* is provided; and the *means of egress* into the adjoining space is not subject to locking from the egress side. A required *means*

Water Pipe Support

Design for Support @ A:

- Schedule 10, 14" diameter pipe (37 lb/ft)
- Volume of water: $\pi \cdot 13.5^2/4 \cdot 1/12 \cdot 1/12$
  $= 1.0\ ft^3/ft$
- Weight of water: $62.5\ pcf \times 1.0\ ft^3/ft$
  $= 62.5\ lb/ft$
- Total weight of water & pipe:
  assume 10' of vertical tributary
  & 2.5' of horizontal tributary
  @ the bottom supt "A"

$\Rightarrow (37\ p/f + 62.5\ p/f) \times (10' + 2.5')$
$= 1.25\ k$ @ each supt "A"

Seismic Force:

$$F_p = \frac{0.4\ a_p\ S_{DS}\ W_p}{R_p / I_p}\left(1 + 2\frac{z}{h}\right)$$

$$= \frac{0.4 \cdot 2.5 \cdot 1.208 \cdot W_p}{3.0 / 1.0}(1 + 2) = 1.208\ W_p \leftarrow \text{governs!}$$

$$F_{p\,max} = 1.6 \cdot S_{DS} \cdot I_p \cdot W_p = 1.93\ W_p$$

$$F_{p\,min} = 0.3 \cdot S_{DS} \cdot I_p \cdot W_p = 0.36\ W_p$$

Water Pipe Support

Design for Support @ A :

- $M_u = F_p \times (3')$

  $= 1.208 \cdot 1.25k \cdot (3')$

  $= 4.53$ k-ft $= 55$ k-in

Try HSS 4 × 0.250

$\phi M_n = 0.9 \cdot 42\ ksi \cdot 3.3\ in^3$

$= 126$ k-in (ok)

- Try PL 3/4" × 12" × 12" w/ 8 - 1/2" φ Exp. bolt

  See attached result next page !

1.Project Information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-11
Units: Imperial units

Anchor Information:
Anchor type: Torque controlled expansion anchor
Material: Carbon Steel
Diameter (inch): 0.500
Nominal Embedment depth (inch): 3.500
Effective Embedment depth, h_{ef} (inch): 3.000
Code report: ICC-ES ESR-1771
Anchor category: 1
Anchor ductility: Yes
h_{min} (inch): 5.50
c_{ac} (inch): 8.25
C_{min} (inch): 4.00
S_{min} (inch): 4.00

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 6.00
State: Cracked
Compressive strength, f'_c (psi): 5000
$\Psi_{c,V}$: 1.4
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Do not evaluate concrete breakout in tension: No
Do not evaluate concrete breakout in shear: No
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 14.00 x 14.00 x 0.75

<Figure 1>

<Figure 2>

Recommended Anchor
Anchor Name: Strong-Bolt® - 1/2"Ø Strong-Bolt, hnom:3.5" (89mm)
Code Report Listing: ICC-ES ESR-1771

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1315.3	187.5	0.0	187.5
2	1315.3	187.5	0.0	187.5
3	1315.3	187.5	0.0	187.5
4	619.4	187.5	0.0	187.5
5	0.0	187.5	0.0	187.5
6	0.0	187.5	0.0	187.5
7	0.0	187.5	0.0	187.5
8	619.4	187.5	0.0	187.5
Sum	5184.7	1500.0	0.0	1500.0

Maximum concrete compression strain (‰): 0.08
Maximum concrete compression stress (psi): 352
Resultant tension force (lb): 5185
Resultant compression force (lb): 5186
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.89
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>

4. Steel Strength of Anchor in Tension(Sec. D.5.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13500	0.75	10125

5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. D-6)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	5000	3.000	6246

$\phi N_{cbg} = \phi\ (A_{Nc} / A_{Nco})\ \Psi_{ec,N}\ \Psi_{ed,N}\ \Psi_{c,N}\ \Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-4)

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
279.00	81.00	0.636	1.000	1.00	1.000	6246	0.65	11685

6. Pullout Strength of Anchor in Tension (Sec. D.5.3)

$\phi N_{pn} = \phi \Psi_{c,P} \lambda_a N_p (f'_c / 2{,}500)^n$ (Sec. D.4.1, Eq. D-13 & Code Report)

$\Psi_{c,P}$	λ_a	N_p (lb)	f'_c (psi)	n	ϕ	ϕN_{pn} (lb)
1.0	1.00	2945	5000	0.50	0.65	2707

8. Steel Strength of Anchor in Shear (Sec. D.6.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
5280	1.0	0.65	3432

9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}C_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}C_{a1}^{1.5}|$ (Eq. D-33 & Eq. D-34)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
3.00	0.50	1.00	5000	8.00	11333

$\phi V_{cbgx} = \phi\,(A_{Vc}/A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. D.4.1 & Eq. D-31)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
210.00	288.00	1.000	1.000	1.400	1.414	11333	0.70	11453

Shear parallel to edge in x-direction:

$V_{by} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}C_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}C_{a1}^{1.5}|$ (Eq. D-33 & Eq. D-34)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
3.00	0.50	1.00	5000	8.00	11333

$\phi V_{cbgx} = \phi\,(2)(A_{Vc}/A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. D.4.1 & Eq. D-31)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbgx} (lb)
210.00	288.00	1.000	1.000	1.400	1.414	11333	0.70	22905

10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$\phi V_{cpg} = \phi k_{cp}N_{cbg} = \phi k_{cp}(A_{Nc}/A_{Nco})\,\Psi_{ec,N}\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b$ (Eq. D-41)

k_{cp}	A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cpg} (lb)
2.0	396.00	81.00	1.000	1.000	1.000	1.000	6246	0.70	42752

11. Results

Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	1315	10125	0.13	Pass
Concrete breakout	5185	11685	0.44	Pass
Pullout	**1315**	**2707**	**0.49**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	188	3432	0.05	Pass
T Concrete breakout x+	**1500**	**11453**	**0.13**	**Pass (Governs)**
|| Concrete breakout y-	**563**	**22905**	**0.02**	**Pass (Governs)**
Pryout	1500	42752	0.04	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.49	0.00	48.6 %	1.0	Pass

1/2"Ø Strong-Bolt, hnom:3.5" (89mm) meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

OLMM Consulting Engineers
• San Francisco (415) 882-9449
• Oakland (510) 433-0828

JOB 2014-19 SR Jail Cooling Tower
JOB NUMBER
SHEET NO. 3.8 OF
CALCULATED BY EN DATE 12/2/14
CHECKED BY DATE

Water pipe Support onto existing slab

Assume 2'-0" Trib

Slab DL = 75 psf × 2' Trib = 150 plf ↓
#1 pipe DL = 1250 lb
#1 Pipe M_E = 4530 lb ft
#2 pipe DL = 500 lb
#2 Pipe M_E = 1812 lb ft

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18
Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

CODE REFERENCES

Calculations per ACI 318-11, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

f'c	=	5.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	530.33 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.80
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size # =		# 3
			Number of Resisting Legs Per Stirrup =		2

Load Combination ASCE 7-10

Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 6.0 in
Span #1 Reinforcing....
2-#5 at 1.50 in from Top, from 0.0 to 6.0 ft in this span
2-#5 at 1.50 in from Bottom, from 0.0 to 6.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1
Uniform Load : D = 0.150 k/ft, Tributary Width = 1.0 ft, (Slab DL)
Point Load : D = 1.250 k @ 1.50 ft, (#1 Pipe DL)
Moment : E = 4.530 k-ft, Location = 1.50 ft from left end of this span, (#1 Pipe EQ)
Point Load : D = 0.50 k @ 3.50 ft, (#2 Pipe DL)
Moment : E = 1.812 k-ft, Location = 3.50 ft from left end of this span, (#2 Pipe EQ)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = 0.420 : 1
Section used for this span Typical Section
Mu : Applied 6.146 k-ft
Mn * Phi : Allowable 14.642 k-ft
Load Combination +1.442D+0.50L+0.20S+E+1.60H
Location of maximum on span 1.507 ft
Span # where maximum occurs Span # 1

Maximum Deflection

Max Downward L+Lr+S Deflection	0.004 in	Ratio =	16774
Max Upward L+Lr+S Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.017 in	Ratio =	4311
Max Upward Total Deflection	-0.008 in	Ratio =	8762

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Overall MAXimum	2.336	1.794
Overall MINimum	0.218	-0.107
+D+H	1.598	1.054
+D+L+H	1.596	1.054
+D+Lr+H	1.596	1.054
+D+S+H	1.596	1.054
+D+0.750Lr+0.750L+H	1.596	1.054
+D+0.750L+0.750S+H	1.596	1.054
+D+0.60W+H	1.596	1.054
+D+0.70E+H	0.856	1.794
+D-0.70E+H	2.336	0.314

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18
Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+D+0.750L+0.750Lr+0.450W+H	1.596	1.054
+D+0.750L+0.750S+0.450W+H	1.596	1.054
+D+0.750L+0.750S+0.525E+H	1.041	1.609
+D+0.750L+0.750S-0.5250E+H	2.151	0.499
+0.60D+0.60W+0.60H	0.957	0.633
+0.60D+0.70E+0.60H	0.218	1.372
+0.60D-0.70E+0.60H	1.697	-0.107
D Only	1.596	1.054
Lr Only		
L Only		
S Only		
W Only		
E Only	-1.057	1.057
-1.0E	1.057	-1.057
H Only		

Overall Maximum Deflections

Load Combination	Spen	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Spen
+D+0.70E+H	1	0.0167	2.940		0.0000	0.000

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S-1.0E+1	1	0.00	4.50	3.36	3.36	0.00	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.01	4.50	3.35	3.35	0.04	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.03	4.50	3.35	3.35	0.09	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.04	4.50	3.35	3.35	0.13	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.05	4.50	3.35	3.35	0.18	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.07	4.50	3.34	3.34	0.22	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.08	4.50	3.34	3.34	0.27	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.09	4.50	3.34	3.34	0.31	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.11	4.50	3.33	3.33	0.36	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.12	4.50	3.33	3.33	0.40	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.13	4.50	3.33	3.33	0.45	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.15	4.50	3.33	3.33	0.49	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.16	4.50	3.32	3.32	0.53	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.17	4.50	3.32	3.32	0.58	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.19	4.50	3.32	3.32	0.62	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.20	4.50	3.31	3.31	0.67	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.21	4.50	3.31	3.31	0.71	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.23	4.50	3.31	3.31	0.76	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.24	4.50	3.31	3.31	0.80	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.25	4.50	3.30	3.30	0.84	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.27	4.50	3.30	3.30	0.89	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.28	4.50	3.30	3.30	0.93	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.29	4.50	3.29	3.29	0.96	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.31	4.50	3.29	3.29	1.02	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.32	4.50	3.29	3.29	1.06	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.33	4.50	3.29	3.29	1.11	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.35	4.50	3.28	3.28	1.15	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.36	4.50	3.28	3.28	1.19	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.37	4.50	3.28	3.28	1.24	0.99	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.39	4.50	3.27	3.27	1.28	0.96	12.00	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.40	4.50	3.27	3.27	1.33	0.93	11.96	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.41	4.50	3.27	3.27	1.37	0.90	11.92	Vu < PhiVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.43	4.50	3.27	3.27	1.41	0.87	11.89	Vu < PhiVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.44	4.50	3.26	3.26	1.46	0.84	11.86	Vu < PhiVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.45	4.50	3.26	3.26	1.50	0.81	11.83	Vu < PhiVc/2	Not Reqd 1	11.8	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 — Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S-1.0E+1	1	0.47	4.50	3.26	3.26	1.54	0.79	11.80	Vu < PhiVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.48	4.50	3.25	3.25	1.59	0.77	11.78	Vu < PhiVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.49	4.50	3.25	3.25	1.63	0.75	11.75	Vu < PhiVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.51	4.50	3.25	3.25	1.67	0.73	11.73	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.52	4.50	3.25	3.25	1.72	0.71	11.71	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.53	4.50	3.24	3.24	1.76	0.69	11.69	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.55	4.50	3.24	3.24	1.80	0.67	11.67	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.56	4.50	3.24	3.24	1.85	0.66	11.65	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.57	4.50	3.23	3.23	1.89	0.64	11.63	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.59	4.50	3.23	3.23	1.93	0.63	11.61	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.60	4.50	3.23	3.23	1.98	0.61	11.59	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.61	4.50	3.22	3.22	2.02	0.60	11.58	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.63	4.50	3.22	3.22	2.06	0.59	11.56	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.64	4.50	3.22	3.22	2.10	0.57	11.55	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.65	4.50	3.22	3.22	2.15	0.56	11.54	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.67	4.50	3.21	3.21	2.19	0.55	11.52	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.66	4.50	3.21	3.21	2.23	0.54	11.51	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.69	4.50	3.21	3.21	2.28	0.53	11.50	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.71	4.50	3.20	3.20	2.32	0.52	11.48	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.72	4.50	3.20	3.20	2.36	0.51	11.47	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.73	4.50	3.20	3.20	2.40	0.50	11.46	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.75	4.50	3.20	3.20	2.45	0.49	11.45	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.76	4.50	3.19	3.19	2.49	0.48	11.44	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.77	4.50	3.19	3.19	2.53	0.47	11.43	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.79	4.50	3.19	3.19	2.57	0.46	11.42	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.60	4.50	3.18	3.18	2.62	0.46	11.41	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.81	4.50	3.18	3.18	2.66	0.45	11.40	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.83	4.50	3.18	3.18	2.70	0.44	11.40	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.84	4.50	3.18	3.18	2.74	0.43	11.39	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.85	4.50	3.17	3.17	2.79	0.43	11.38	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.87	4.50	3.17	3.17	2.83	0.42	11.37	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.88	4.50	3.17	3.17	2.87	0.41	11.36	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.89	4.50	3.16	3.16	2.91	0.41	11.36	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.91	4.50	3.16	3.16	2.96	0.40	11.35	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.92	4.50	3.16	3.16	3.00	0.40	11.34	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.93	4.50	3.16	3.16	3.04	0.39	11.33	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.95	4.50	3.15	3.15	3.08	0.38	11.33	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.96	4.50	3.15	3.15	3.12	0.38	11.32	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.97	4.50	3.15	3.15	3.17	0.37	11.32	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	0.99	4.50	3.14	3.14	3.21	0.37	11.31	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.00	4.50	3.14	3.14	3.25	0.36	11.30	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.01	4.50	3.14	3.14	3.29	0.36	11.30	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.03	4.50	3.14	3.14	3.33	0.35	11.29	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.04	4.50	3.13	3.13	3.37	0.35	11.29	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.05	4.50	3.13	3.13	3.42	0.34	11.28	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.07	4.50	3.13	3.13	3.46	0.34	11.28	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.08	4.50	3.12	3.12	3.50	0.33	11.27	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.09	4.50	3.12	3.12	3.54	0.33	11.27	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.11	4.50	3.12	3.12	3.58	0.33	11.26	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.12	4.50	3.12	3.12	3.62	0.32	11.26	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.13	4.50	3.11	3.11	3.67	0.32	11.25	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.15	4.50	3.11	3.11	3.71	0.31	11.25	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.16	4.50	3.11	3.11	3.75	0.31	11.24	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.17	4.50	3.10	3.10	3.79	0.31	11.24	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18
Lic. #: KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S-1.0E+1	1	1.19	4.50	3.10	3.10	3.83	0.30	11.24	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.20	4.50	3.10	3.10	3.87	0.30	11.23	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.21	4.50	3.10	3.10	3.91	0.30	11.23	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.23	4.50	3.09	3.09	3.96	0.29	11.22	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.24	4.50	3.09	3.09	4.00	0.29	11.22	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.25	4.50	3.09	3.09	4.04	0.29	11.22	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.27	4.50	3.08	3.08	4.08	0.28	11.21	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.28	4.50	3.08	3.08	4.12	0.28	11.21	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.29	4.50	3.08	3.08	4.16	0.28	11.20	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.31	4.50	3.07	3.07	4.20	0.27	11.20	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.32	4.50	3.07	3.07	4.24	0.27	11.20	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.33	4.50	3.07	3.07	4.28	0.27	11.19	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.35	4.50	3.07	3.07	4.33	0.27	11.19	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.36	4.50	3.06	3.06	4.37	0.26	11.19	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.37	4.50	3.06	3.06	4.41	0.26	11.19	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.39	4.50	3.06	3.06	4.45	0.26	11.18	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.40	4.50	3.05	3.05	4.49	0.26	11.18	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.41	4.50	3.05	3.05	4.53	0.25	11.18	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.43	4.50	3.05	3.05	4.57	0.25	11.17	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.44	4.50	3.05	3.05	4.61	0.25	11.17	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.45	4.50	3.04	3.04	4.65	0.25	11.17	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.47	4.50	3.04	3.04	4.69	0.24	11.16	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.48	4.50	3.04	3.04	4.73	0.24	11.16	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.49	4.50	3.03	3.03	4.77	0.24	11.16	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.51	4.50	1.23	1.23	0.27	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.52	4.50	1.23	1.23	0.29	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.53	4.50	1.22	1.22	0.30	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.55	4.50	1.22	1.22	0.32	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.56	4.50	1.22	1.22	0.34	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.57	4.50	1.22	1.22	0.35	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.59	4.50	1.21	1.21	0.37	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.60	4.50	1.21	1.21	0.39	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.61	4.50	1.21	1.21	0.40	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.63	4.50	1.20	1.20	0.42	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.64	4.50	1.20	1.20	0.43	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.65	4.50	1.20	1.20	0.45	1.00	12.04	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.67	4.50	1.20	1.20	0.47	0.96	12.00	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.68	4.50	1.19	1.19	0.48	0.93	11.96	Vu < PhiVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.69	4.50	1.19	1.19	0.50	0.90	11.93	Vu < PhiVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.71	4.50	1.19	1.19	0.51	0.87	11.89	Vu < PhiVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.72	4.50	1.18	1.18	0.53	0.84	11.86	Vu < PhiVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.73	4.50	1.18	1.18	0.54	0.81	11.83	Vu < PhiVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.75	4.50	1.18	1.18	0.56	0.79	11.80	Vu < PhiVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.76	4.50	1.17	1.17	0.58	0.77	11.77	Vu < PhiVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.77	4.50	1.17	1.17	0.59	0.74	11.75	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.79	4.50	1.17	1.17	0.61	0.72	11.72	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.80	4.50	1.17	1.17	0.62	0.70	11.70	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.81	4.50	1.16	1.16	0.64	0.68	11.68	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.83	4.50	1.16	1.16	0.65	0.67	11.66	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.84	4.50	1.16	1.16	0.67	0.65	11.64	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.85	4.50	1.15	1.15	0.68	0.63	11.62	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.87	4.50	1.15	1.15	0.70	0.62	11.60	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.88	4.50	1.15	1.15	0.72	0.60	11.58	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.89	4.50	1.15	1.15	0.73	0.59	11.57	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S-1.0E+1	1	1.91	4.50	1.14	1.14	0.75	0.57	11.55	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.92	4.50	1.14	1.14	0.76	0.56	11.54	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.93	4.50	1.14	1.14	0.78	0.55	11.52	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.95	4.50	1.13	1.13	0.79	0.54	11.51	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.96	4.50	1.13	1.13	0.81	0.53	11.49	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.97	4.50	1.13	1.13	0.82	0.52	11.48	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	1.99	4.50	1.13	1.13	0.84	0.50	11.47	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.00	4.50	1.12	1.12	0.85	0.49	11.46	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.01	4.50	1.12	1.12	0.87	0.48	11.45	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.03	4.50	1.12	1.12	0.88	0.48	11.43	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.04	4.50	1.11	1.11	0.90	0.47	11.42	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.05	4.50	1.11	1.11	0.91	0.46	11.41	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.07	4.50	1.11	1.11	0.93	0.45	11.40	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.08	4.50	1.11	1.11	0.94	0.44	11.39	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.09	4.50	1.10	1.10	0.96	0.43	11.39	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.11	4.50	1.10	1.10	0.97	0.43	11.38	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.12	4.50	1.10	1.10	0.98	0.42	11.37	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.13	4.50	1.09	1.09	1.00	0.41	11.36	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.15	4.50	1.09	1.09	1.01	0.40	11.35	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.16	4.50	1.09	1.09	1.03	0.40	11.34	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.17	4.50	1.09	1.09	1.04	0.39	11.34	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.19	4.50	1.08	1.08	1.06	0.38	11.33	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.20	4.50	1.08	1.08	1.07	0.38	11.32	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.21	4.50	1.08	1.08	1.09	0.37	11.31	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.23	4.50	1.07	1.07	1.10	0.37	11.31	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.24	4.50	1.07	1.07	1.11	0.36	11.30	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.25	4.50	1.07	1.07	1.13	0.35	11.29	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.27	4.50	1.07	1.07	1.14	0.35	11.29	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.28	4.50	1.08	1.08	1.16	0.34	11.28	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S-1.0E+1	1	2.29	4.50	1.06	1.06	1.17	0.34	11.28	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.31	4.50	-1.06	1.06	5.37	0.07	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.8(	1	2.32	4.50	-1.06	1.06	5.36	0.07	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.33	4.50	-1.08	1.06	5.34	0.07	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.35	4.50	-1.07	1.07	5.33	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.36	4.50	-1.07	1.07	5.31	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.37	4.50	-1.07	1.07	5.30	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.39	4.50	-1.07	1.07	5.28	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.40	4.50	-1.08	1.08	5.27	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.41	4.50	-1.08	1.08	5.26	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.43	4.50	-1.08	1.08	5.24	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.44	4.50	-1.09	1.09	5.23	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.45	4.50	-1.09	1.09	5.21	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.47	4.50	-1.09	1.09	5.20	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.8(	1	2.48	4.50	-1.09	1.09	5.18	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.49	4.50	-1.10	1.10	5.17	0.08	10.97	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.51	4.50	-1.10	1.10	5.15	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.52	4.50	-1.10	1.10	5.14	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.53	4.50	-1.11	1.11	5.12	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.55	4.50	-1.11	1.11	5.11	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.8(	1	2.56	4.50	-1.11	1.11	5.09	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.57	4.50	-1.11	1.11	5.08	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.59	4.50	-1.12	1.12	5.07	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.60	4.50	-1.12	1.12	5.05	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.61	4.50	-1.12	1.12	5.04	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S+E+1.6(	1	2.63	4.50	-1.13	1.13	5.02	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.64	4.50	-1.13	1.13	5.01	0.08	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.65	4.50	-1.13	1.13	4.99	0.09	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.67	4.50	-1.14	1.14	4.97	0.09	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.68	4.50	-1.14	1.14	4.96	0.09	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.69	4.50	-1.14	1.14	4.94	0.09	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.71	4.50	-1.14	1.14	4.93	0.09	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.72	4.50	-1.15	1.15	4.91	0.09	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.73	4.50	-1.15	1.15	4.90	0.09	10.98	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.75	4.50	-1.15	1.15	4.88	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.76	4.50	-1.16	1.16	4.87	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.77	4.50	-1.16	1.16	4.85	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.79	4.50	-1.16	1.16	4.64	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.80	4.50	-1.16	1.16	4.82	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.81	4.50	-1.17	1.17	4.81	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.83	4.50	-1.17	1.17	4.79	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.84	4.50	-1.17	1.17	4.77	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.85	4.50	-1.18	1.18	4.76	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.87	4.50	-1.18	1.18	4.74	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.88	4.50	-1.18	1.18	4.73	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.89	4.50	-1.18	1.18	4.71	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.91	4.50	-1.19	1.19	4.70	0.09	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.92	4.50	-1.19	1.19	4.68	0.10	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.93	4.50	-1.19	1.19	4.66	0.10	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.95	4.50	-1.20	1.20	4.65	0.10	10.99	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.96	4.50	-1.20	1.20	4.63	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.97	4.50	-1.20	1.20	4.62	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	2.99	4.50	-1.20	1.20	4.60	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.00	4.50	-1.21	1.21	4.58	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.01	4.50	-1.21	1.21	4.57	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.03	4.50	-1.21	1.21	4.55	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.04	4.50	-1.22	1.22	4.54	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.05	4.50	-1.22	1.22	4.52	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.07	4.50	-1.22	1.22	4.50	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.08	4.50	-1.22	1.22	4.49	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.09	4.50	-1.23	1.23	4.47	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.11	4.50	-1.23	1.23	4.45	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.12	4.50	-1.23	1.23	4.44	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.13	4.50	-1.24	1.24	4.42	0.10	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.15	4.50	-1.24	1.24	4.41	0.11	11.00	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.16	4.50	-1.24	1.24	4.39	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.17	4.50	-1.24	1.24	4.37	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.19	4.50	-1.25	1.25	4.36	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.20	4.50	-1.25	1.25	4.34	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.21	4.50	-1.25	1.25	4.32	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.23	4.50	-1.28	1.26	4.31	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.24	4.50	-1.26	1.26	4.29	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.25	4.50	-1.26	1.26	4.27	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.27	4.50	-1.26	1.26	4.25	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.28	4.50	-1.27	1.27	4.24	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.29	4.50	-1.27	1.27	4.22	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.31	4.50	-1.27	1.27	4.20	0.11	11.01	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.32	4.50	-1.28	1.28	4.19	0.11	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.33	4.50	-1.28	1.28	4.17	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 — Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S+E+1.6(	1	3.35	4.50	-1.28	1.28	4.15	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.36	4.50	-1.29	1.29	4.14	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.37	4.50	-1.29	1.29	4.12	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.39	4.50	-1.29	1.29	4.10	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.40	4.50	-1.29	1.29	4.08	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.41	4.50	-1.30	1.30	4.07	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.43	4.50	-1.30	1.30	4.05	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.44	4.50	-1.30	1.30	4.03	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.45	4.50	-1.31	1.31	4.02	0.12	11.02	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.47	4.50	-1.31	1.31	4.00	0.12	11.03	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.48	4.50	-1.31	1.31	3.98	0.12	11.03	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.49	4.50	-1.31	1.31	3.96	0.12	11.03	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.51	4.50	-2.04	2.04	5.75	0.13	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.52	4.50	-2.04	2.04	5.73	0.13	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.53	4.50	-2.04	2.04	5.70	0.13	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.55	4.50	-2.05	2.05	5.67	0.14	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.56	4.50	-2.05	2.05	5.64	0.14	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.57	4.50	-2.05	2.05	5.62	0.14	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.59	4.50	-2.05	2.05	5.59	0.14	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.60	4.50	-2.06	2.06	5.56	0.14	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.61	4.50	-2.06	2.06	5.53	0.14	11.04	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.63	4.50	-2.06	2.06	5.51	0.14	11.05	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.64	4.50	-2.07	2.07	5.48	0.14	11.05	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.65	4.50	-2.07	2.07	5.45	0.14	11.05	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.67	4.50	-2.07	2.07	5.42	0.14	11.05	Vu < PhiVc/2	Not Reqd 1	11.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.68	4.50	-2.08	2.08	5.40	0.14	11.05	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.69	4.50	-2.08	2.08	5.37	0.15	11.05	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.71	4.50	-2.08	2.08	5.34	0.15	11.05	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.72	4.50	-2.08	2.08	5.31	0.15	11.05	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.73	4.50	-2.09	2.09	5.29	0.15	11.05	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.75	4.50	-2.09	2.09	5.26	0.15	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.76	4.50	-2.09	2.09	5.23	0.15	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.77	4.50	-2.10	2.10	5.20	0.15	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.79	4.50	-2.10	2.10	5.17	0.15	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.60	4.50	-2.10	2.10	5.15	0.15	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.81	4.50	-2.10	2.10	5.12	0.15	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.83	4.50	-2.11	2.11	5.09	0.16	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.84	4.50	-2.11	2.11	5.06	0.16	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.65	4.50	-2.11	2.11	5.03	0.16	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.87	4.50	-2.12	2.12	5.00	0.16	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.88	4.50	-2.12	2.12	4.98	0.16	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.89	4.50	-2.12	2.12	4.95	0.16	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.91	4.50	-2.12	2.12	4.92	0.16	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.92	4.50	-2.13	2.13	4.89	0.16	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.93	4.50	-2.13	2.13	4.88	0.16	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.95	4.50	-2.13	2.13	4.63	0.17	11.07	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.96	4.50	-2.14	2.14	4.81	0.17	11.08	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.97	4.50	-2.14	2.14	4.78	0.17	11.08	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	3.99	4.50	-2.14	2.14	4.75	0.17	11.06	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.00	4.50	-2.14	2.14	4.72	0.17	11.08	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.01	4.50	-2.15	2.15	4.69	0.17	11.08	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.03	4.50	-2.15	2.15	4.66	0.17	11.08	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.04	4.50	-2.15	2.15	4.63	0.17	11.08	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.05	4.50	-2.16	2.16	4.61	0.18	11.09	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S+E+1.6(	1	4.07	4.50	-2.16	2.16	4.58	0.18	11.09	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.08	4.50	-2.16	2.16	4.55	0.18	11.09	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.09	4.50	-2.16	2.16	4.52	0.18	11.09	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.11	4.50	-2.17	2.17	4.49	0.18	11.09	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.12	4.50	-2.17	2.17	4.46	0.18	11.09	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.13	4.50	-2.17	2.17	4.43	0.18	11.10	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.15	4.50	-2.18	2.18	4.40	0.19	11.10	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.16	4.50	-2.18	2.18	4.38	0.19	11.10	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.17	4.50	-2.18	2.18	4.35	0.19	11.10	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.19	4.50	-2.18	2.18	4.32	0.19	11.10	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.20	4.50	-2.19	2.19	4.29	0.19	11.10	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.21	4.50	-2.19	2.19	4.26	0.19	11.11	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.23	4.50	-2.19	2.19	4.23	0.19	11.11	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.24	4.50	-2.20	2.20	4.20	0.20	11.11	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.25	4.50	-2.20	2.20	4.17	0.20	11.11	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.27	4.50	-2.20	2.20	4.14	0.20	11.11	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.28	4.50	-2.20	2.20	4.11	0.20	11.12	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.29	4.50	-2.21	2.21	4.08	0.20	11.12	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.31	4.50	-2.21	2.21	4.05	0.20	11.12	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.32	4.50	-2.21	2.21	4.02	0.21	11.12	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.33	4.50	-2.22	2.22	3.99	0.21	11.12	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.35	4.50	-2.22	2.22	3.96	0.21	11.13	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.36	4.50	-2.22	2.22	3.93	0.21	11.13	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.37	4.50	-2.22	2.22	3.91	0.21	11.13	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.39	4.50	-2.23	2.23	3.88	0.22	11.13	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.40	4.50	-2.23	2.23	3.85	0.22	11.14	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.41	4.50	-2.23	2.23	3.82	0.22	11.14	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.43	4.50	-2.24	2.24	3.79	0.22	11.14	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.44	4.50	-2.24	2.24	3.76	0.22	11.14	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.45	4.50	-2.24	2.24	3.73	0.23	11.14	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.47	4.50	-2.25	2.25	3.70	0.23	11.15	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.48	4.50	-2.25	2.25	3.67	0.23	11.15	Vu < PhiVc/2	Not Reqd 1	11.1	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.49	4.50	-2.25	2.25	3.64	0.23	11.15	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.51	4.50	-2.25	2.25	3.61	0.23	11.15	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.52	4.50	-2.26	2.26	3.58	0.24	11.16	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.53	4.50	-2.26	2.26	3.55	0.24	11.16	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.55	4.50	-2.26	2.26	3.52	0.24	11.16	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.56	4.50	-2.27	2.27	3.49	0.24	11.17	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.57	4.50	-2.27	2.27	3.46	0.25	11.17	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.59	4.50	-2.27	2.27	3.43	0.25	11.17	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.60	4.50	-2.27	2.27	3.40	0.25	11.17	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.61	4.50	-2.28	2.28	3.37	0.25	11.18	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.63	4.50	-2.28	2.28	3.33	0.26	11.18	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.64	4.50	-2.28	2.28	3.30	0.26	11.18	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.65	4.50	-2.29	2.29	3.27	0.26	11.19	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.67	4.50	-2.29	2.29	3.24	0.26	11.19	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.68	4.50	-2.29	2.29	3.21	0.27	11.19	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.69	4.50	-2.29	2.29	3.18	0.27	11.20	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.71	4.50	-2.30	2.30	3.15	0.27	11.20	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.72	4.50	-2.30	2.30	3.12	0.28	11.20	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.73	4.50	-2.30	2.30	3.09	0.28	11.21	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.75	4.50	-2.31	2.31	3.06	0.28	11.21	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.76	4.50	-2.31	2.31	3.03	0.29	11.21	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.77	4.50	-2.31	2.31	3.00	0.29	11.22	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S+E+1.6(	1	4.79	4.50	-2.31	2.31	2.97	0.29	11.22	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.80	4.50	-2.32	2.32	2.94	0.30	11.23	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.81	4.50	-2.32	2.32	2.91	0.30	11.23	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.83	4.50	-2.32	2.32	2.87	0.30	11.23	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.84	4.50	-2.33	2.33	2.84	0.31	11.24	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.85	4.50	-2.33	2.33	2.81	0.31	11.24	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.87	4.50	-2.33	2.33	2.78	0.31	11.25	Vu < PhiVc/2	Not Reqd 1	11.2	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.88	4.50	-2.33	2.33	2.75	0.32	11.25	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.89	4.50	-2.34	2.34	2.72	0.32	11.26	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.91	4.50	-2.34	2.34	2.69	0.33	11.26	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.92	4.50	-2.34	2.34	2.66	0.33	11.27	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.93	4.50	-2.35	2.35	2.63	0.34	11.27	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.95	4.50	-2.35	2.35	2.59	0.34	11.28	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.96	4.50	-2.35	2.35	2.56	0.34	11.28	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.97	4.50	-2.35	2.35	2.53	0.35	11.29	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	4.99	4.50	-2.36	2.36	2.50	0.35	11.29	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.00	4.50	-2.36	2.36	2.47	0.36	11.30	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.01	4.50	-2.36	2.36	2.44	0.36	11.31	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.03	4.50	-2.37	2.37	2.41	0.37	11.31	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.04	4.50	-2.37	2.37	2.37	0.37	11.32	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.05	4.50	-2.37	2.37	2.34	0.38	11.32	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.07	4.50	-2.37	2.37	2.31	0.39	11.33	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.08	4.50	-2.38	2.38	2.28	0.39	11.34	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.09	4.50	-2.38	2.38	2.25	0.40	11.34	Vu < PhiVc/2	Not Reqd 1	11.3	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.11	4.50	-2.38	2.38	2.22	0.40	11.35	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.12	4.50	-2.39	2.39	2.18	0.41	11.36	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.13	4.50	-2.39	2.39	2.15	0.42	11.37	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.15	4.50	-2.39	2.39	2.12	0.42	11.37	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.16	4.50	-2.40	2.40	2.09	0.43	11.38	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.17	4.50	-2.40	2.40	2.06	0.44	11.39	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.19	4.50	-2.40	2.40	2.02	0.44	11.40	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.20	4.50	-2.40	2.40	1.99	0.45	11.41	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.21	4.50	-2.41	2.41	1.96	0.46	11.42	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.23	4.50	-2.41	2.41	1.93	0.47	11.43	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.24	4.50	-2.41	2.41	1.90	0.48	11.44	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.25	4.50	-2.42	2.42	1.86	0.49	11.45	Vu < PhiVc/2	Not Reqd 1	11.4	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.27	4.50	-2.42	2.42	1.83	0.50	11.46	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.28	4.50	-2.42	2.42	1.80	0.50	11.47	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.29	4.50	-2.42	2.42	1.77	0.51	11.48	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.31	4.50	-2.43	2.43	1.73	0.52	11.49	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.32	4.50	-2.43	2.43	1.70	0.54	11.50	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.33	4.50	-2.43	2.43	1.67	0.55	11.52	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.35	4.50	-2.44	2.44	1.64	0.56	11.53	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.36	4.50	-2.44	2.44	1.60	0.57	11.54	Vu < PhiVc/2	Not Reqd 1	11.5	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.37	4.50	-2.44	2.44	1.57	0.58	11.56	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.39	4.50	-2.44	2.44	1.54	0.60	11.57	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.40	4.50	-2.45	2.45	1.51	0.61	11.59	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.41	4.50	-2.45	2.45	1.47	0.62	11.61	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.43	4.50	-2.45	2.45	1.44	0.64	11.62	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.44	4.50	-2.46	2.46	1.41	0.65	11.64	Vu < PhiVc/2	Not Reqd 1	11.6	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.45	4.50	-2.46	2.46	1.38	0.67	11.66	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.47	4.50	-2.46	2.46	1.34	0.69	11.68	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.48	4.50	-2.46	2.46	1.31	0.71	11.70	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.49	4.50	-2.47	2.47	1.28	0.72	11.72	Vu < PhiVc/2	Not Reqd 1	11.7	0.0	0.0

Concrete Beam

File = H:\2014\208B4A~1\CALCUL~1\WATERP~1\SLABCH~1.EC6
ENERCALC, INC. 1983-2014, Build:6.14.9.18, Ver:6.14.9.18

Lic. # : KW-06005888 Licensee : OLMM CONSULTING ENGINEERS

Description : 6" Concrete Slab with Point load from Water Pipe Support

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	PhI*Vc (k)	Comment	PhI*Vs (k)	PhI*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.442D+0.50L+0.20S+E+1.6(	1	5.51	4.50	-2.47	2.47	1.24	0.74	11.75	Vu < PhIVc/2	Not Reqd 1	11.7	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.52	4.50	-2.47	2.47	1.21	0.77	11.77	Vu < PhIVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.53	4.50	-2.48	2.48	1.18	0.79	11.80	Vu < PhIVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S+E+1.8(	1	5.55	4.50	-2.48	2.48	1.15	0.81	11.83	Vu < PhIVc/2	Not Reqd 1	11.8	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.56	4.50	-2.48	2.48	1.11	0.84	11.85	Vu < PhIVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.57	4.50	-2.48	2.48	1.08	0.86	11.89	Vu < PhIVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.59	4.50	-2.49	2.49	1.05	0.89	11.92	Vu < PhIVc/2	Not Reqd 1	11.9	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.60	4.50	-2.49	2.49	1.01	0.92	11.95	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.61	4.50	-2.49	2.49	0.98	0.95	11.99	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.63	4.50	-2.50	2.50	0.95	0.99	12.03	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.64	4.50	-2.50	2.50	0.91	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.65	4.50	-2.50	2.50	0.88	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.67	4.50	-2.50	2.50	0.65	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.8(	1	5.68	4.50	-2.51	2.51	0.81	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.69	4.50	-2.51	2.51	0.78	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.71	4.50	-2.51	2.51	0.75	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.72	4.50	-2.52	2.52	0.71	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.73	4.50	-2.52	2.52	0.68	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.75	4.50	-2.52	2.52	0.65	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.76	4.50	-2.52	2.52	0.61	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.77	4.50	-2.53	2.53	0.58	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.79	4.50	-2.53	2.53	0.54	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.80	4.50	-2.53	2.53	0.51	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.81	4.50	-2.54	2.54	0.48	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.83	4.50	-2.54	2.54	0.44	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.84	4.50	-2.54	2.54	0.41	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.65	4.50	-2.54	2.54	0.38	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.87	4.50	-2.55	2.55	0.34	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.88	4.50	-2.55	2.55	0.31	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.8(	1	5.89	4.50	-2.55	2.55	0.27	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.91	4.50	-2.56	2.56	0.24	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.92	4.50	-2.56	2.56	0.21	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.93	4.50	-2.56	2.56	0.17	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.95	4.50	-2.57	2.57	0.14	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.8(	1	5.96	4.50	-2.57	2.57	0.10	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.97	4.50	-2.57	2.57	0.07	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	5.99	4.50	-2.57	2.57	0.03	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0
+1.442D+0.50L+0.20S+E+1.6(	1	6.00	4.50	-2.58	2.58	0.00	1.00	12.04	Vu < PhIVc/2	Not Reqd 1	12.0	0.0	0.0

1 / S1.0 PLATFORM FRAMING PLAN
SCALE: 1/2"=1'-0"

1/S1.0 2 / S1.0 PLATFORM ELEVATION
SCALE: 1/4"=1'-0"

1/S1.0 3 / S1.0 PLATFORM ELEVATION
SCALE: 1/4"=1'-0"

GENERAL NOTES:

1. ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE 2013 EDITION OF THE CALIFORNIA BUILDING CODE, AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. OLMM CONSULTING ENGINEERS SHALL BE NOTIFIED OF ANY DISCREPANCIES.
3. WHEN DETAILS LABELED "TYPICAL" OR "SIMILAR" ARE GIVEN ON DRAWINGS, THE CONTRACTOR SHALL APPLY THE INTENT OF THE DETAIL TO THAT SPECIFIC CONDITION.
4. STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR THIS WORK HAVE BEEN PREPARED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS OF PRACTICE TO MEET THE MINIMUM REQUIREMENTS OF THE 2013 EDITION OF THE CBC. ANY OMISSIONS OR DISCREPANCIES ON THE PLANS OR ANY DEVIATIONS FROM THE PLANS WHICH ARE NECESSITATED BY FIELD CONDITIONS OR ANY CONDITION DIFFERENT FROM THOSE INDICATED ON THE PLANS SHOULD BE BROUGHT TO THE ATTENTION OF OLMM CONSULTING ENGINEERS, PRIOR TO CONTINUING CONSTRUCTION IMMEDIATELY. OTHERWISE THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTION OF THESE CONDITIONS. ALL WORK IS TO BE COORDINATED SO THAT COORDINATION BETWEEN THE TRADES, WHERE REQUIRED, IS ACCOMPLISHED.
5. STRUCTURAL DRAWINGS ARE ENGINEERING DRAWINGS AND NOT SHOP DRAWINGS. THEY ARE PREPARED TO CONVEY THE DESIGN INTENT TO THE CONTRACTOR. THEY CONTAIN SUFFICIENT INFORMATION TO MAKE THEM BUILDABLE. HOWEVER, THEY DO NOT CONTAIN EACH AND EVERY DETAIL. WHEN A DETAIL IS NOT PROVIDED THE DESIGN INTENT SHALL BE APPLIED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY SHORING AND BRACING DURING CONSTRUCTION, MEANS AND METHODS AND JOB SITE SAFETY.
7. TRADE NAMES AND MANUFACTURERS REFERRED TO ARE FOR QUALITY STANDARDS ONLY, EQUIVALENT SUBSTITUTIONS ARE PERMITTED.
8. THE STRUCTURAL SYSTEMS HAVE BEEN DESIGNED TO CARRY THE SUPERIMPOSED LIVE LOADS AS PRESCRIBED BY THE CALIFORNIA BUILDING CODE AND IN ACCORDANCE WITH STANDARD ENGINEERING PRACTICES, WITH NO SPECIAL PROVISIONS TO CARRY CONCENTRATED LOADS FROM STORAGE AND HANDLING OF CONSTRUCTION MATERIALS OR FROM OPERATION OF CONSTRUCTION EQUIPMENT.
9. CONTRACTOR SHALL COORDINATE WITH THE AUTHORITY HAVING JURISDICTION TO ENSURE ALL INSPECTIONS (INCLUDING SPECIAL INSPECTIONS) ARE COMPLETED PER THE LOCAL BUILDING DEPARTMENT REQUIREMENTS.
10. THE STRUCTURAL INFORMATION REGARDING THE EXISTING ROOF FRAMING MEMBERS IS TAKEN FROM ORIGINAL CONSTRUCTION DRAWING AVAILABLE AT THE FACILITY. THESE SHALL BE VERIFIED IN FIELD BY THE CONTRACTOR PRIOR TO STARTING CONSTRUCTION.
11. (E) CONCRETE CURB SHALL BE DEMOLISHED ONLY AT WHERE (N) COOLING TOWER ANCHORAGE IS IN CONFLICT WITH THE (E) CONCRETE CURB.
12 SCAN TO LOCATE EXISTING REBAR PRIOR TO DRILLING HOLE. DO NOT DAMAGE EXISTING REBAR.
13. THERE IS VERY LITTLE OR NO TOLERANCE IN THE LOCATION OF THE COOLING TOWER SHOWN IN THE DRAWINGS. CONTRACTOR SHALL PRECISELY LOCATE THE COOLING TOWER PER THE DRAWINGS

STRUCTURAL STEEL NOTES:

1. STEEL PLATES SHALL CONFORM TO ASTM A36.
2. STEEL PIPES SHALL CONFORM TO ASTM A53 GRADE B.
3. ALL THREAD RODS SHALL CONFORM TO ASTM F1554.
4. ALL STEEL SHALL BE FREE OF MILL SCALE, RUST, OR OTHER CONTAMINANTS.
5. ALL WELDING SHALL CONFORM TO 2013 CBC AND LATEST EDITION OF THE A.W.S. FOR ARC AND GAS WELDING. USE THE ELECTRIC ARC PROCESS E-70 ELECTRODES, LOW HYDROGEN ELECTRODES FOR WELDING BOLTS AND RE-BAR AS PER A.S.T.M. A233. ALL WELDS SHALL HAVE A MIN. THICKNESS AS PER THE 2013 CBC.
6. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS. WELDING SHALL BE PERFORMED IN A SHOP APPROVED BY LOCAL ORDINANCES, OR IN THE FIELD.
7. HOT DIP GALVANIZE ALL STRUCTURAL STEEL AND MISCELLANEOUS STEEL EXPOSED TO WEATHER PER AISC REQUIREMENTS U.O.N.

POST-INSTALLED ANCHORS:

1. ACCEPTABLE ADHESIVE ANCHORS TO CONCRETE UNLESS OTHERWISE APPROVED BY STRUCTURAL ENGINEER:
   A. HILTI HIT RE500-SD (ICC ESR-2322)
   B. SIMPSON STRONG-TIE SET-XP (ICC ESR-2508)
2. ACCEPTABLE EXPANSION ANCHORS TO CONCRETE UNLESS OTHERWISE APPROVED BY STRUCTURAL ENGINEER:
   A. HILTI KWIK BOLT TZ (ICC ESR-1917)
   B. SIMPSON STRONG BOLT (ICC ESR-1771)

DESIGN CRITERIA:

A. LIVE LOADS:

ROOF	: 20 PSF

B. SEIMIC:

SEISMIC DESIGN CATEGORY	: D
SITE CLASS	: D
IMPORTANCE FACTOR	: 1.0
RESPONSE ACCELERATIONS	: SS =1.812
RESPONSE COEFFICENTS	: SDS =1.208
SEISMIC COEFFICIENT Fp	: 1.208 Wp

C. WIND:

BASIC WIND SPEED	: 115 MPH
EXPOSURE	: C
IMPORTANCE FACTOR	: 1.0

D. COOLING TOWER UNIT:

MANUFACTURER	: TOWER TECH
MODEL NO.	: TTXL-081930
OPERATING WEIGHT	: 25,695 LBS EACH
	: 51,390 LBS FOR 2 UNITS
LENGTH	: 300 IN.
WIDTH	: 290 IN.
HEIGHT	: 204 IN.

CLIENT:

COUNTY OF ALAMEDA GSA 1401 LAKESIDE DRIVE, OAKLAND, CA 94612

OLMM Consulting Engineers
833 Market Street, Suite 316, San Francisco, CA 94103
Phone: 415.882.9449 Fax: 415.247.8088

REGISTERED PROFESSIONAL ENGINEER
ERIC NORTON
SE-2948
Exp. 9-30-2015
STRUCTURAL
STATE OF CALIFORNIA

LICENSE STAMP

ROOF TOP COOLING TOWER REPLACEMENT @ S.R. JAIL

DRAWING RELEASE STATUS DATE

ADDENDA DATE
1
2
3
4
5
6
7
8
9

SHEET TITLE

STRUCTURAL FRAMING PLAN

SCALE AS NOTED

JOB NUMBER	RELEASE DATE
2014-12	
DRAWN BY	CHECKED BY
KL	EN

S1.0

OF SHEETS

1/S1.0 (10) S1.1 WATER PIPE SEISMIC SUPPORT
SCALE: 1 1/2"=1'-0"

NOTE:
IT'S ASSUMED THE HOT WATER PIPE CONNECTION PROVIDED BY MECHANICAL CONTRACTOR CAN SUSTAIN SEISMIC LOADING OF UP TO 10' OF HOT WATER PIPE.

1/S1.0 (11) S1.1 WATER PIPE GRAVITY SUPPORT
SCALE: 1 1/2"=1'-0"

1/S1.0 (G) S1.1 FILTRATION UNIT BASE SUPPORT
SCALE: 1 1/2"=1'-0"

NOTE:
GUARDRAIL POST SPACING SHALL NOT EXCEED 4'-0".

1/S1.0 (H) S1.1 SECTION AT GUARDRAIL
SCALE: 1 1/2"=1'-0"

H/S1.1 (9) S1.1 DETAIL AT GUARDRAIL
SCALE: 1 1/2"=1'-0"

B/S1.1 (4) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

C/S1.1 F/S1.1 (5) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

C/S1.1 (6) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

D/S1.1 F/S1.1 (7) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

E/S1.1 (8) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

1/S1.0 (F) S1.1 PLAN DETAIL
SCALE: 1 1/2"=1'-0"

A/S1.1 D/S1.1 (1) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

A/S1.1 (2) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

B/S1.1 E/S1.1 (3) S1.1 DETAIL
SCALE: 1 1/2"=1'-0"

1/S1.0 (B) S1.1 PLAN DETAIL
SCALE: 1 1/2"=1'-0"

1/S1.0 (C) S1.1 PLAN DETAIL
SCALE: 1 1/2"=1'-0"

1/S1.0 (D) S1.1 PLAN DETAIL
SCALE: 1 1/2"=1'-0"

1/S1.0 (E) S1.1 PLAN DETAIL
SCALE: 1 1/2"=1'-0"

CLIENT:
COUNTY OF ALAMEDA GSA
1401 LAKESIDE DRIVE, OAKLAND, CA 94612

OLMM Consulting Engineers
833 Market Street, Suite 316,
San Francisco, CA 94103
Phone: 415.882.9449 Fax: 415.247.8088

LICENSE STAMP

ROOF TOP COOLING TOWER REPLACEMENT @ S.R. JAIL

DRAWING RELEASE STATUS	DATE

ADDENDA	DATE
1	
2	
3	
4	
5	
6	
7	
8	
9	

SHEET TITLE
SECTIONS AND DETAILS

SCALE AS NOTED

JOB NUMBER	RELEASE DATE
2014-12	
DRAWN BY	CHECKED BY
KL	EN

S1.1

OF SHEETS

NOTE: TO ALLOW FREE MOVEMENT OF HINGED FAN SCREEN ENSURE THAT THREE FOOT (3') TRAJECTORY IS CLEAR OR UNOBSTRUCTED.

TOWER TECH Inc.
THE TECHNOLOGY COMPANY
TELEPHONE: (405) 290-7788
FAX: (405) 979-2131
E-MAIL: cad@towertechinc.com
WEBPAGE: http://www.towertechinc.com
5400 NW 5th
OKLAHOMA CITY, OKLAHOMA 73127

Modular
Fiberglass
Cooling Tower
Model # TTXL-081930

©2001 BY TOWER TECH, INC.
ALL RIGHTS RESERVED

California Hydronics Corp.
2-Unit Installation
TTXL-08 Fan/Motor Access

Tag: Santa Rita Jail R & R Cooling Tower

FOR APPROVAL BY
California Hydronics Corp.
Tower Tech Design Team

NO.	DATE	REVISION	DATE

DATE:	24 JAN 14
DRAWING#:	14-006-14
PROJECT#:	2014006
CUST PO#:	192175
DRAWN BY:	RFB
CHECKED BY:	
FAN/MOTOR ACCESS	14

MECHANICAL GENERAL NOTES

1. EXAMINE ALL DRAWINGS & FIELD VERIFY MECHANICAL AND ELECTRICAL CONDITIONS PRIOR TO WORK & REPORT ANY DISCREPANCIES IN WRITING TO COUNTY'S REPRESENTATIVE.
2. THE DRAWINGS ARE DIAGRAMMATIC & SHALL NOT BE SCALED TO DETERMINE EXACT LOCATION OF MECHANICAL, PLUMBING & EQUIPMENT.
3. REMOVE & REPAIR WALL/CEILING FOR ACCESS TO WORK ON THE MECHANICAL SYSTEMS (SEE ARCHITECTURAL PLANS & SPECIFICATIONS). PATCH & FINISH TO MATCH ADJACENT SURFACE.
4. SECURELY FASTEN ALL PIPING AND DUCTWORK WITHIN STRUCTURES TO THE BUILDING CONSTRUCTION BY MEANS OF HANGERS, SUPPORTS, GUIDES, ANCHORS, AND SWAY BRACES TO MAINTAIN PIPE AND DUCTWORK ALIGNMENT, TO PREVENT SAGGING, AND TO PREVENT NOISE AND EXCESSIVE STRAIN ON PIPING AND DUCTWORK DUE TO MOVEMENT UNDER OPERATING CONDITIONS. SUPPORTS FOR ALL PIPING AND DUCTWORK SHALL BE IN ACCORDANCE WITH LATEST SMACNA GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS AND MSS SP-58 AND SP-69.
5. ALL PIPES AND FITTINGS UTILIZED IN WATER SUPPLY SYSTEMS SHALL ALSO CONFORM TO NSF 61 AS REQUIRED BY INTERNATIONAL PLUMBING CODE.
6. VERIFY AT PROJECT SITE EXACT SIZE, LOCATION, INVERT ELEVATION, AND CLEARANCE OF ALL EXISTING SERVICES BEING EXTENDED, RELOCATED, OR REMOVED.
7. CONTRACTOR IS TO MAINTAIN RECORDED "AS-BUILT" INFORMATION ON ALL EXISTING SERVICES UNCOVERED DURING CONSTRUCTION AND ALL NEW SERVICES BEING INSTALLED. "AS-BUILT" INFORMATION SHALL BE CLEARLY MARKED IN COLORED PENCIL ON A BLUE PRINT OF CONTRACT DRAWING. RECORDED INFORMATION SHALL INCLUDE ROUTING AND INVERT ELEVATIONS. AT THE COMPLETION OF THE CONTRACT, THE CONTRACTOR SHALL TURN RECORDED "AS-BUILT" INFORMATION OVER TO THE ENGINEER.
8. ADVISE THE ENGINEER IN WRITING IN THE EVENT A CONFLICT OCCURS BETWEEN THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND ACTUAL FIELD CONDITIONS. THE CONTRACTOR SHALL BEAR ALL COSTS FOR RELOCATION OF EQUIPMENT, PIPING, ETC., FROM FAILURE TO PROPERLY COORDINATE INSTALLATIONS AND ADVISE OF THE CONFLICT IN WRITING PRIOR TO INSTALLATION.
9. ARRANGE ALL PIPING WITHIN STRUCTURES NEATLY ALONG WALLS AND/OR IN NEAT, HORIZONTAL GROUPS AND MAINTAIN REQUIRED SLOPES.
10. WHERE POSSIBLE, INSTALL VALVES ACCESSIBLE FROM FLOOR LEVEL.
11. PROVIDE VALVES AND OTHER PIPING SPECIALTIES SAME SIZE AS LINE SIZE UNLESS INDICATED OTHERWISE.
12. PROVIDE A HANGER NOT MORE THAN 12-INCHES FROM THE POINT OF CHANGE OF DIRECTION OF A PIPE RUN IN BOTH HORIZONTAL AND VERTICAL PLANE.
13. CONNECTION BETWEEN DISSIMILAR MATERIAL PIPES SHALL BE MADE WITH DIELECTRIC ISOLATING UNIONS, OR GASKETED FLANGES WITH ISOLATED THROUGH BOLTS.
14. CERTAIN VERTICAL AND HORIZONTAL OFFSETS ARE SHOWN IN PIPING AND DUCTWORK ON PLANS TO INDICATE THE GENERAL POSITION RELATIONSHIP OF THE SYSTEMS WITHIN THE SPACE. PROVIDE ADDITIONAL OFFSETS SIMILAR TO THOSE SHOWN, AS REQUIRED TO COORDINATE WITH INSTALLATION REQUIREMENTS OF OTHER SYSTEMS.
15. PROVIDE A TIGHT SEAL OF INCOMBUSTIBLE MATERIAL AROUND ALL PIPES WHICH PENETRATE FIRE SEPARATIONS. PROVIDE COLLARS OR TRIM RINGS AROUND PIPING TO RETAIN PACKING.
16. COOPERATE WITH OTHER TRADES TO LOCATE EXPOSED PIPING AND DUCTWORK RUNS, SPRINKLER HEAD LOCATIONS, ETC., TO FORM A FULLY COORDINATED CEILING PATTERN AND VISUAL APPEARANCE.
17. PERFORM ALL INLET AND DISCHARGE PIPING DESIGN TO PROVIDE SMOOTH FLOW WITH UNIFORM VELOCITY OVER THE ENTIRE AREA OF PIPING.
18. PROVIDE ADEQUATE SUPPORT FOR ALL PARTS OF THE PIPING AND DUCTWORK SYSTEM.
19. CONTRACTOR SHALL PROTECT THE PIPING AND DUCTWORK TO PREVENT ENTRY OF DIRT AND ANY OTHER FOREIGN MATERIAL DURING THE INSTALLATION.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION AND SHALL REPAIR ADJACENT EXISTING AND/OR NEW SURFACES, AREAS AND PROPERTY THAT MAY BE DAMAGED AS A RESULT OF DEMOLITION AND/OR NEW WORK.
21. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING MISCELLANEOUS METAL AND SUPPORTS FOR THE PROPER INSTALLATION OF THE PIPE AND DUCT SUPPORTS TO THE BUILDING STRUCTURE.
22. PROVIDE FLEXIBLE CONNECTIONS AT PIECES OF ISOLATED EQUIPMENT.
23. CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL VERIFICATION AND COORDINATION OF EXISTING CONDITIONS AND ALL OTHER TRADES. VERIFY ALL EXISTING CONDITIONS IN THE FIELD PRIOR TO PURCHASING EQUIPMENT. ALL DISCREPANCIES OR POTENTIAL PROBLEMS SHALL BE BROUGHT TO THE ATTENTION OF THE COUNTY'S REPRESENTATIVE PRIOR TO CONSTRUCTION.
24. THE EXISTING SYSTEMS SHOWN ON THE DRAWINGS ARE BASED ON INFORMATION CONTAINED IN THE ORIGINAL DESIGN "AS-BUILT" DOCUMENTS AND ON A LIMITED FIELD SURVEY.
25. NOT ALL EXISTING SYSTEMS ARE SHOWN TO AID DRAWING INTERPRETATION CLARITY.
26. IN CASE OF DIFFERENCE BETWEEN BUILDING CODES, SPECIFICATIONS, INDUSTRY STANDARDS, UTILITY COMPANY REGULATIONS, FIRE INSURANCE CARRIER'S REQUIREMENTS AND CONTRACT DOCUMENTS, THE MOST STRINGENT SHALL GOVERN. PROMPTLY NOTIFY THE COUNTY IN WRITING OF ANY SUCH DIFFERENCE.
27. CONFORM TO LATEST NFPA 90A "STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS".
28. DUCTWORK, PIPING AND CONDUIT, AS SHOWN ON DRAWINGS ARE SCHEMATIC AND SHALL BE FABRICATED AND INSTALLED ON ACTUAL FIELD MEASUREMENT. COORDINATE WITH OTHER TRADES AS REQUIRED.
29. CONTRACTOR TO PROVIDE SUBMITTALS IN ACCORDANCE WITH COUNTY STANDARDS AND SPECIFICATION REQUIREMENTS.
30. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE FUNCTIONALITY OF THE HVAC SYSTEM INCLUDING ELECTRICAL AND CONTROL ITEMS ASSOCIATED WITH THE MECHANICAL EQUIPMENT.
31. CONTRACTOR SHALL FOLLOW COUNTY/FACILITY SAFETY PROCEDURES INCLUDING BUT NOT LIMITED TO JOB HAZARDOUS ANALYSIS, AND LOCK-OUT-TAG-OUT (LOTO) PROCEDURES.
32. BEFORE PROCEEDING WITH ANY WORK THE CONTRACTOR SHALL SUBMIT FOR COUNTY PROJECT MANAGER APPROVAL THEIR "SEQUENCE OF WORK PLAN" THAT DESCRIBES ALL THE WORK TO BE ACCOMPLISHED DURING THEIR CONTRACT. THE CONTRACTOR'S PLAN SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO:
    - A. DESCRIPTION OF WHAT SYSTEM/SUBSYSTEM/EQUIPMENT THAT SHALL BE SHUTDOWN/ISOLATED/REPLACED ALONG WITH THE STARTING DATE AND DURATION OF THE SHUTDOWN PERIOD.
    - B. A DETAILED DESCRIPTION OF THE WORK THAT WILL BE ACCOMPLISHED DURING THE SHUTDOWN PERIOD.
    - C. SIGN-OFF SHEET THAT INCLUDES THE COUNTY PROJECT MANAGER'S SIGNATURE APPROVING THE PARTICULAR SEQUENCE OF WORK REQUESTED PRIOR TO BEGINNING THE WORK AND THE COUNTY PROJECT MANAGER'S SIGNATURE AUTHORIZING THE CONTRACTOR TO PLACE THE SYSTEM/EQUPMENT BACK IN USE AFTER THE WORK HAS BEEN COMPLETED TO THE COUNTY MANAGER'S SATISFACTION.
35. CONTRACTOR SHALL CLEAN ALL NEW AND ALL COMPONENTS THAT WERE REPLACED OR REMOVED AND RE-INSTALLED PER COUNTY CLEANING PROCEDURES DESCRIBED IN THE PROJECT SPECIFICATIONS.
36. CONTRACTOR SHALL SUBMIT FOR COUNTY PROJECT MANAGER APPROVAL THEIR EXIT PLAN TO MAINTAIN EMERGENCY EGRESS DURING CONSTRUCTION THROUGHOUT EXIT STAIRWELLS PRIOR TO START OF ANY WORK.
37. FIRE SAFETY PROCEDURES DURING CONSTRUCTION AND DEMOLITION SHALL BE FOLLOWED IN ACCORDANCE WITH NFPA 241 AND CFC CHAPTER 14.

MECHANICAL LEGEND

SYMBOL	ABBREV.	DESCRIPTION
	CW	DOMESTIC COLD
	(E)DCW	EXISTING DOMESTIC COLD
CW-HW	CW-HW	DOMESTIC COLD HARD WATER
CW-SW	CW-SW	DOMESTIC COLD SOFT WATER
CWS	CWS	CONDENSER WATER SUPPLY PIPE
CWR	CWR	CONDENSER WATER RETURN PIPE
CWE	CWE	CONDENSER WATER EQUALIZING PIPE
CHWS	CHWS	CHILLED WATER SUPPLY PIPE
CHWR	CHWR	CHILLED WATER RETURN PIPE
CWFS	CWFS	COOLING TOWER FILTER WATER SUPPLY PIPE
CWFR	CWFR	COOLING TOWER FILTER WATER RETURN PIPE
(E)CWS	(E)CWS	(E) CONDENSER WATER SUPPLY PIPE
(E)CWR	(E)CWR	(E) CONDENSER WATER RETURN PIPE
	POC/POD	POINT OF CONNECTION/DEMOLITION
		TRANSFORMER PANEL
		CAPPED LINE
		VALVE ON RISE OR DROP
	DN	DOWN OR DROP
	UP	RISE OR RISER
	FC	FLEXIBLE CONNECTION (PIPE)
	CO	CLEAN-OUT

SYMBOL	DESCRIPTION
	AUTOMATIC AIR VENT – LOW CAPACITY
	AUTOMATIC AIR VENT – HIGH CAPACITY
	BUTTERFLY VALVE
	BALL VALVE – FULL PORT
	3/4" DRAIN W/ FULL PORT BALL VALVE & MALE HOSE FITTING W/ CAP & CHAIN
	ENLARGER/REDUCER PIPE FITTING
	GLOBE VALVE
	MANUAL AIR VENT
	MULTIPORT PRESSURE INDICATOR (3-PORT)
	PETE'S PLUG
	PLUG VALVE
	PRESSURE GAUGE WITH NEEDLE VALVE
	PRESSURE REDUCING VALVE
	WYE STRAINER
PSD	SUCTION DIFFUSER WITH STRAINER
	TWO-WAY MODULATING CONTROL VALVE
	THREE-WAY MODULATING CONTROL VALVE
	BALANCING VALVE

SYMBOL	DESCRIPTION
	9" INDUSTRIAL THERMOMETER WITH 3/4" NPT COPPER WELL
	THERMOMETER
	TRIPLE DUTY VALVE
	T&P (TEMPERATURE AND PRESSURE) RELIEF VALVE
	UNION
W	WATER METER
	UMBILICAL CABLE
	GATE VALVE
	DOMESTIC COLD WATER PRESSURE REDUCING ASSEMBLY
	DOMESTIC COLD WATER BACKFLOW PREVENTER ASSEMBLY
M	MOTORIZED ON/OFF CONTROL BUTTERFLY VALVE
	(N) CONDUCTIVITY PROBE
E	FURNISHED AND/OR INSTALLED BY ELECTRICAL
M	FURNISHED AND/OR INSTALLED BY MECHANICAL
	DEMOLITION WORK

SYMBOL	ABBREV.	DESCRIPTION
FT	FT	FLOW RATE TRANSMITTER
TT	TT	TEMPERATURE TRANSMITTER
TS	TS	TEMPERATURE SENSOR
SPD	SPD	SPEED FEEDBACK
SPA	SPA	SPEED FEEDBACK
ST	ST	STATUS
SS	SS	START/STOP
OC	OC	OPEN/CLOSE
VFD	VFD	VARIABLE FREQUENCY DRIVE
CB	CB	COMMUNICATION BUS
CND	CND	CONDUCTIVITY
LLS	LLS	LOW WATER LEVEL SWITCH
VIB	VIB	VIBRATION SENSOR MONITOR ALARM INPUT
	DDC	DDC PANEL
G		SECTION LETTER
--		SHEET NUMBER

MECHANICAL ABBREVIATIONS

ABBREV.	DESCRIPTION
@	AT
ABBREV	ABBREVIATIONS
ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWWA	AMERICAN WATER WORKS ASSOCIATION
BFP	BACKFLOW PREVENTER
BLW	BELOW
BTUH	BRITISH THERMAL UNITS PER HOUR
CAP	CAPACITY
CONT	CONTINUATION
CTF	COOLING TOWER FILTRATION
CW	COLD WATER
DB	DRY BULB
DEG	DEGREES
DIA ø	DIAMETER
DN	DOWN
DWGS	DRAWINGS

ABBREV.	DESCRIPTION
(E)	EXISTING
ELEV	ELEVATION
ENT	ENTERING
EQUIP	EQUIPMENT
°F	DEGREES FAHRENHEIT
FIN	FINISH
FLR	FLOOR
FT	FEET
GA	GAUGE
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
ø/ID	INSIDE DIAMETER
IT	INFORMATION TECHNOLOGY
LBS	POUNDS
LVG	LEAVING
MAX	MAXIMUM
MIN	MINIMUM
MSS	MANUFACTURERS STANDARD SOCIETY
MSS SP-58	PIPE HANGERS AND SUPPORTS – MATERIALS DESIGN AND MANUFACTURE
MSS SP-69	PIPE HANGERS AND SUPPORTS – SELECTION AND APPLICATION

ABBREV.	DESCRIPTION
(N)	NEW
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NOM	NOMINAL
NSF 61	NATIONAL SANITATION FOUNDATION – DRINKING WATER SYSTEM COMPONENTS – HEALTH EFFECTS
OA	OUTSIDE AIR
%	PERCENT
POC	POINT OF CONNECTION
PSIG	POUNDS PER SQUARE INCH, GAGE
PRV	PRESSURE REDUCING VALVE
PVC	POLYVINYL CHLORIDE PLASTIC
QTY	QUANTITY
RA	RETURN AIR
SA	SUPPLY AIR
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SM	SHEET METAL

ABBREV.	DESCRIPTION
SPC	STATIC PRESSURE CONTROL
SPECS	SPECIFICATION
SQ	SQUARE
TEMP	TEMPERATURE
T'STAT	THERMOSTAT
TYP	TYPICAL
UL	UNDERWRITERS LABORATORY
UNO	UNLESS NOTED OTHERWISE
VEL	VELOCITY

DESIGN CRITERIA

CONDENSER WATER SYSTEM – END USER REQUIREMENT

DEMOLITION WORK:

1. DEMOLISH THE TWO (E) BAC COOLING TOWER INCLUDING ASSOCIATED PIPING, VALVES, DDC VALVE ACTUATORS, FITTINGS, INSTRUMENTATIONS, GAUGES, VFD, ELECTRICAL CONTROLLER PANEL, POWER AND CONTROL WIRING, AND SUPPORTS.
2. DEMOLISH THE (E) DOLPHIN UNIT NON-CHEMICAL WATER TREATMENT SYSTEM INCLUDING ASSOCIATED PIPING, FITTINGS, INSTRUMENTATIONS, ELECTRICAL CONTROLLER PANEL, POWER AND CONTROL WIRING, AND SUPPORTS.
3. DEMOLISH THE TWO (E) CONDENSER WATER PUMPS INCLUDING CONNECTED MOTORS.

NEW WORK:

1. INSTALL COUNTY FURNISHED TWO (N) TOWER TECH MODULAR COOLING TOWERS INCLUDING VFD AND PANEL, CONTROL PANELS, INSTRUMENTATIONS, BACNET GATEWAY COMMUNICATIONS CARD, VIBRATION SENSOR CUT OFF SWITCH, AND OTHER SHIPPED LOOSE ITEMS.
2. INSTALL COUNTY FURNISHED (N) COOLING TOWER SIDE STREAM FILTRATION SYSTEM INCLUDING OTHER ASSOCIATED SHIPPED LOOSE ITEMS.
3. FURNISH AND INSTALL TWO (N) CONDENSER WATER PUMPS, PUMPS MOTORS AND VARIABLE FREQUENCY DRIVES. RE-CONNECT (E) CONDENSER WATER SUCTION AND DISCHARGE PIPING COMPLETE WITH FITTINGS AND SUPPORTS.
4. FURNISH AND INSTALL (N) COOLING TOWERS CONDENSER WATER SUPPLY AND RETURN PIPING AND DRAIN PIPING COMPLETE WITH SUPPORTS AND SEISMIC BRACING.
5. FURNISH AND INSTALL (N) AUTOMATIC CONDENSER WATER TREATMENT SYSTEM COMPLETE WITH VALVINGS, CONTROLLER, POWER AND CONTROL WIRING.

COUNTY FURNISHED EQUIPMENT AND ASSOCIATED SHIPPED LOOSE ITEMS:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR INVENTORING AND INSTALLING ALL SHIPPED-LOOSE ITEMS REQUIRED BY THE VENDOR FOR INTENDED OPERATION OF THEIR EQUIPMENT WHETHER SHOWN ON THE DRAWING OR NOT.

ENERGY MANAGEMENT AND CONTROL SYSTEM (EMCS) – END USER REQUIREMENT

NEW WORK:

1. ALL SYSTEMS, CONDENSER WATER PUMPS AND VFDS, WATER SOFTENER, CHEMICAL STATIONS, AND FILTRATION UNIT SHALL BE INTEGRATED INTO THE CURRENT FACILITY EMCS TO PROVIDE A COMPLETE FACILITY INTEGRATED SYSTEMS.
2. FURNISH AND INSTALL (N) CONTROL WIRING FROM (N) SENSORS, SWITCHES, ELECTRICAL CONTROLLER PANELS, VFDS AND OTHER CONTROL ACCESSORIES TO (E) FACILITY EMCS.
3. FURNISH AND INSTALL (N) SOFTWARE INCLUDING GRAPHIC CREATION, SCHEDULING, ALARMING, AND TRENDING TO (E) FACILITY'S SERVER AND OPERATOR WORKSTATION.
4. NO NEW PANELS OR DDC CONTROLLER WILL BE REQUIRED AS PART OF THIS PROJECT

DOMESTIC WATER SUPPLY SOFTENER SYSTEM – END USER REQUIREMENT

DEMOLITION WORK:

1. DEMOLISH (E) CULLIGAN WATER SOFTENER SYSTEM INCLUDING TANKS, ALL CONNECTED PIPING, VALVES, FITTINGS, UNIT CONTROLLER, POWER AND CONTROL WIRING, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.

NEW WORK:

1. FURNISH AND INSTALL A COMPLETE (N) DOMESTIC WATER SUPPLY SOFTENER SYSTEM (KINETICO WATER SYSTEM MODEL HYDRUS HS 424s OD SOFTENER) FOR THE FACILITY (E) LAUNDRY SYSTEM AND COOLING TOWER MAKE-UP WATER SYSTEM

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY
SANTA RITA JAIL
COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT
5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE
MECHANICAL LEGEND, ABBREVIATIONS, GENERAL NOTES AND DESIGN CRITERIA

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NONE
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M0.1

Sheet 1 of X

C:\Users\Paul.LOCAL\appdata\local\temp\AcPublish_4860\M01.dwg 12-11-14 04:04:24 PM Paul

SIDE STREAM COOLING TOWER FILTRATION SCHEDULE

EQUIP. I.D.	LOCATION	SERVE	TYPE	FILTER DATA					FILTER FEED/BACKWASH PUMP DATA		MOTOR DATA			MAXIMUM OPERATING WEIGHT	REMARKS
				POD DISK FILTER MODULE QTY	MINIMUM RATED FLOW RATE	NOMINAL FILTER RATING	MAX. BACKWASH FLOW RATE AND DIFFERENTIAL PRESSURE SETPOINT		MINIMUM FLOW RATE	MAXIMUM PUMP HEAD	MINIMUM MOTOR RATING	RPM	V./PH./HZ.		
					GPM	MICRON	GPM	FT WG	GPM	FT WG	HP				
CTF-1	(E) ROOF	CT-1 & CT-2 TOWER WATER SYSTEM	AUTOMATIC SELF-CLEANING DISC FILTER	7	240	55	27	18.5	240	–	10	–	460/3/60	1000	SEE NOTES BELOW

NOTES:

1. PACKAGED FACTORY ASSEMBLED SIDE STREAM COOLING TOWER FILTRATION SYSTEM SHALL BE OUTDOOR-HORIZONTAL TYPE AND SKID MOUNTED WITH AIR ASSISTED BACKWASH SYSTEM.
2. CLEAN FILTER DIFFERENTIAL PRESSURE SHALL BE 2 PSI AND AUTOMATIC BACKWASH SHALL BE AT 8 PSI FILTER DIFFERENTIAL PRESSURE.
3. PROVIDE 10 GALLONS AIR STORAGE TANK.
4. PROVIDE NEMA 4X UL LISTED ELECTRICAL CONTROL PANEL AND ELECTRICAL POWER SUPPLY DISCONNECT SWITCH.
5. FILTER MEDIA SHALL BE PERMANENT POLYPROPYLENE TOWER WATER GRADE DISK PACK INSIDE FILTER PODS.
6. PROVIDE DELTA DAC-606 CONTROLLERS AND INTERFACE TO EXISTING FACILITY EMCS.
7. CTF SHALL BE ARKAL MODEL TC-2x7x4-BP3-AAF.
8. CTF SHALL BE OWNER (GSA) FURNISHED AND INSTALLED BY CONTRACTOR.

COOLING TOWER SCHEDULE

EQUIP. I.D.	LOCATION	TYPE	TOTAL CAPACITY		DESIGN AMBIENT WET BULB	TOWER WATER				FAN MOTOR PER CELL					MAXIMUM OPERATING WEIGHT	REMARKS
						EWT	LWT	FLOW	PD	AIR FLOW RATE	SPEED	QTY	HP	V./PH./HZ.		
			MBH	TONS	°F	°F	°F	GPM	FT W.G.	CFM					LBS.	
CT-1	(E) ROOF	SINGLE CELL, FORCED-DRAFT – COUNTER FLOW	12,255	817	67	95	85	2450	NA	83,700	865	8	3	460/3/60	25,695	SEE NOTES BELOW
CT-2	(E) ROOF	SINGLE CELL, FORCED-DRAFT – COUNTER FLOW	12,255	817	67	95	85	2450	NA	83,700	865	8	3	460/3/60	25,695	SEE NOTES BELOW

NOTES:

1. COOLING TOWER CONSTRUCTION SHALL BE FACTORY-ASSEMBLED AND CONSTRUCTED ENTIRELY OF FIBERGLASS AND STAINLESS STEEL HARDWARE, 10 MIL PVC FILL MEDIA, 15 MIL PVC DRIFT ELIMINATORS, AND ABS (INJECTION MOLDED & EXTRUDED) COLD WATER COLLECTION SYSTEM.
2. INSTALL OWNER (GSA) FURNISHED NEMA 3R VFD FOR EACH COOLING TOWER COMPLETE WITH POWER AND CONTROL WIRING.
3. INSTALL OWNER (GSA) FURNISHED NEMA 4 ELECTRICAL POWER/CONTROL PANEL FOR FOR EACH COOLING TOWER COMPLETE WITH POWER AND CONTROL WIRING.
4. INSTALL OWNER (GSA) FURNISHED 5-PROBE ELECTRONIC WATER LEVEL CONTROL PACKAGE COMPLETE WITH CONTROL WIRING.
5. COOLING TOWER PACKAGES SHALL BE TOWER TECH, INC MODEL TTXL-081930.
6. COOLING TOWER PACKAGES ARE OWNER (GSA) FURNISHED AND INSTALLED BY CONTRACTOR.

HYDRONIC WATER PUMP SCHEDULE

EQUIP. I.D.	LOCATION	SERVE	TYPE	PUMP DATA				MOTOR DATA			REMARKS
				MINIMUM FLOW RATE	TOTAL DYNAMIC HEAD	SUCTION/ DISCHARGE SIZE CONNECTION	MINIMUM EFFICIENCY AT RATED CAPACITY	MINIMUM MOTOR RATING	RPM	V./PH./HZ.	
				GPM	FT WG	INCHES	%	HP			
P-1	1ST FLOOR – (E) REFRIGERATION MACHINE RM #322	CONDENSER WATER SYSTEM	DOUBLE-SUCTION, SPLIT-CASE	2450	70	10/8	83.0	60	1180	460/3/60	SEE NOTES BELOW
P-2	1ST FLOOR – (E) REFRIGERATION MACHINE RM #322	CONDENSER WATER SYSTEM	DOUBLE-SUCTION, SPLIT-CASE	2450	70	10/8	83.0	60	1180	460/3/60	SEE NOTES BELOW

NOTES:

1. PUMP SHALL BE VARIABLE SPEED TYPE.
2. PUMP MOTOR SHALL BE VFD RATED.
3. PROVIDE VARIABLE FREQUENCY DRIVE WITH DISCONNECT SWITCH. REFER TO VFD SCHEDULE.
4. PUMP SIZE SHALL BE ABLE TO CONNECT TO EXISTING FLANGE TO FLANGE WITHOUT MODIFYING THE EXISTING SUCTION AND DISCHARGE PIPING.
5. CONDENSER WATER PUMP SHALL BE ITT BELL & GOSSETT MODEL VSX-VSH 8x10x17-1/2B.

WATER SOFTENER SCHEDULE

EQUIP. I.D.	LOCATION	SERVE	FLOWRATE CAPACITY @ 15 PSI Δ (DIFFERENTIAL PRESSURE)	RESIN TANKS						BRINE TANKS				ELECTRICAL POWER SUPPLY			OPERATING WEIGHT	REMARKS
				NUMBER OF BRINE TANKS	MATERIAL CONSTRUCTION	DIAMETER	HEIGHT	MEDIA TYPE	MEDIA VOLUME PER TANK	NUMBER OF BRINE TANKS	DIAMETER	HEIGHT	SALT CAPACITY PER TANK	HP	AMP	V./PH./HZ.		
			GPM			INCHES	INCHES		FT^3		INCHES	INCHES	LBS				LBS	
WS-1	1ST FLOOR – (E) REFRIGERATION MACHINE RM #322	DOMESTIC WATER SYSTEM	260	4	WRAPPED POLYETHYLENE	24	65	NON-SOLVENT, HIGH CAPACITY CATION RESIN	8	4	24	50	850	12 VDC	–	–	6,421	SEE NOTES BELOW

NOTES:

1. WATER SOFTENER SYSTEM SHALL BE KINETICO WATER SYSTEM MODEL HYDRUS HS 424s OD SOFTENER (TONY SOLTANI/C#925-876-1200) – NO SUBSTITUTION.
2. WATER SOFTENER SYSTEM SHALL HAVE 7-DAY CONTROLLER AND COUNTERCURRENT REGENERATION TYPE.
3. PROVIDE ONE REGENERATION CONTROL VALVE PER RESIN TANK.
4. WATER SOFTENER SYSTEM SHALL BE SUPPLY AND INSTALLED KINETICO WATER SYSTEM (TONY SOLTANI/C#925-876-1200).

WATER METER SCHEDULE

EQUIP. I.D.	LOCATION	SERVICE	TYPE	METER SIZE	MIN. FLOW RATE	REMARKS	MANUFACTURER/MODEL
				INCHES	GPM		
WM-1	1ST FLOOR (E) REFRIGERATION MACHINE RM #322	COOLING TOWER MAKE-UP WATER SYSTEM	POSITIVE DISPLACEMENT	2	84	SEE NOTES BELOW	BADGER METER INC./ M170-ER-420
WM-2	1ST FLOOR (E) REFRIGERATION MACHINE RM #322	WATER SOFTENER SYSTEM – SUPPLY	TURBINE	3	260	SEE NOTES BELOW	BADGER METER INC./ TURBO SERIES 450-ER-420
WM-3	1ST FLOOR (E) REFRIGERATION MACHINE RM #322	DOMESTIC COLD WATER SUPPLY TO WATER SOFTENER SYSTEM	TURBINE	3	260	SEE NOTES BELOW	BADGER METER INC./ TURBO SERIES 450-ER-420
WM-4	(E) ROOF	SIDE STREAM FILTRATION SYSTEM – BLOWDOWN	TURBINE	4	27	SEE NOTES BELOW	BADGER METER INC./ TURBO SERIES 1000-ER-420

NOTES:

1. METER SHALL BE BADGER METER INC.
2. METER SHALL BE PROVIDED METER MOUNTED OR REMOTE MOUNTED INDUSTRIAL DIGITAL REGISTER WITH DIGITAL DISPLAY, TOTALIZER, RATE OF FLOW INDICATOR, AND 4-20 mA OUTPUT SIGNAL (BADGER METER MODEL ER-420)
3. INTERFACE METERDIGITAL REGISTER TO DDC CONTROLLER FOR MONITORING AND ALARM. REFER TO M3.3 FOR CONTROL DIAGRAM.

VARIABLE FREQUENCY DRIVE SCHEDULE

EQUIP. I.D.	SERVED EQUIP.	LOCATION	MIN. HP RATING	V./PH./HZ.	BYPASS SYSTEM	DISCONNECT SWITCH	CONTROL	ENCLOSURE	REMARKS
VFD-CT-1	CT-1 COOLING TOWER	1ST FLOOR (E) REFRIGERATION MACHINE RM #322	40	460/3/60	NO	YES	LEAVING WATER TEMPERATURE	UL LISTED NEMA 3R	SEE NOTES BELOW 2 & 4
VFD-CT-2	CT-2 COOLING TOWER	1ST FLOOR (E) REFRIGERATION MACHINE RM #322	40	460/3/60	NO	YES	LEAVING WATER TEMPERATURE	UL LISTED NEMA 3R	SEE NOTES BELOW 2 & 4
VFD-P-1	P-1 CONDENSER WATER PUMP	1ST FLOOR (E) REFRIGERATION MACHINE RM #322	60	460/3/60	NO	YES	DIFFERENTIAL PRESSURE	UL LISTED NEMA 3R	SEE NOTES BELOW 1, 3 & 5
VFD-P-2	P-2 CONDENSER WATER PUMP	1ST FLOOR (E) REFRIGERATION MACHINE RM #322	60	460/3/60	NO	YES	DIFFERENTIAL PRESSURE	UL LISTED NEMA 3R	SEE NOTES BELOW 1, 3 & 5

NOTES:

1. VARIABLE FREQUENCY DRIVE SHALL BE SQUARE D MODEL EFD.
2. VARIABLE FREQUENCY DRIVE SHALL BE ABB MODEL ACH550-BCRM+B058+E205.
3. PROVIDE LINE CONDITIONING AND EMI/RFI FILTERING, AND FACTORY SET UP BACNET COMMUNICATION.
4. COOLING TOWER VFDs ARE OWNER FURNISHED EQUIPMENT AND SHALL BE INSTALLED BY CONTRACTOR.
5. CONDENSER WATER PUMP VFDs SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

BACKFLOW PREVENTER SCHEDULE

EQUIP. TAG	SIZE	SERVICE	TYPE
BFP-1	2"	COOLING TOWER – DOMESTIC COLD WATER MAKE-UP	REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY

NOTES:

1. PROVIDE DRAIN PIPING AND AIR GAP FITTING. DRAIN TO (E) ROOF DRAIN.
2. BFP SHALL BE ZURN WILKINS MODEL 375-AG.

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY
SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL EQUIPMENT SCHEDULES

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NONE
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M0.2

Sheet - of X

F:\Drawings\2012\2228\E\M02.dwg 12-11-14 04:04:26 PM Paul

0' 2' 4' 8'

1 -- SERVICE BLDG CHILLER PARTIAL PLAN - DEMOLITION

1/4"=1'-0"

0' 2' 4' 8'

2 -- SERVICE BLDG ROOF PARTIAL PLAN - DEMOLITION WORK

1/4"=1'-0"

SHEET NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS FOR EXACT LOCATION PRIOR TO DEMOLITION WORK AND NEW INSTALLATION AND SHALL NOTIFY THE COUNTY'S REPRESENTATIVE OF THE EXISTING CONDITION. CONTRACTOR SHALL PROVIDE AS-BUILT CONDITION.
2. COORDINATE ALL WORK AND SHUTDOWNS WITH THE COUNTY'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND EQUIPMENT NECESSARY SO THAT NO UTILITY SERVICE TO BUILDING WILL BE INTERRUPTED.
3. CONTRACTOR SHALL REPAIR ALL SURFACES DAMAGED OR AFFECTED BY THE DEMOLITION OPERATIONS WITH FINISH TO MATCH EXISTING CONDITION.
4. CONTRACTOR SHALL DISPOSE ALL DEMOLISHED EQUIPMENT, PIPEWORK, ASSOCIATED ACCESSORIES AND MATERIALS OFF PROJECT SITE. NO DEMOLISHED EQUIPMENT AND/OR MATERIALS SHALL BE TURNED OVER TO THE FACILITY, COUNTY OR OTHER GOVERNMENT AGENCY.

KEY NOTES

1. POINT OF DEMOLITION AT CWS & CWR PIPING RISERS 12" ABOVE ROOF.
2. DEMOLISH 14" CWS PIPING AND RISERS INCLUDING CONNECTED INSULATION AND CLADDING, VALVES, FITTINGS AND SUPPORTS.
3. DEMOLISH 14" CWR PIPING AND RISERS INCLUDING CONNECTED INSULATION AND CLADDING, VALVES, FITTINGS AND SUPPORTS.
4. DEMOLISH DOLPHIN UNIT NON-CHEMICAL WATER TREATMENT SYSTEM INCLUDING POWER AND CONTROL WIRING, ELECTRICAL CONTROLLER PANEL, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
5. DEMOLISH 12" CWS PIPING INCLUDING INSULATION AND CLADDING, VALVES, DDC CONTROL VALVE ACTUATORS, POWER AND CONTROL WIRING, FITTINGS AND SUPPORTS.
6. DEMOLISH 10" CWR PIPING INCLUDING INSULATION AND CLADDING, VALVES, DDC CONTROL VALVE ACTUATORS, POWER AND CONTROL WIRING, FITTINGS AND SUPPORTS.
7. DEMOLISH 1 1/2" CW MAKE-UP WATER PIPING DOWN TO ISOLATION VALVE AT MECHANICAL ROOM #319. INCLUDING WATER METER, CONTROL WIRING, VALVES, FITTINGS AND SUPPORTS.
8. DEMOLISH CT DRAIN PIPING INCLUDING VALVE, FITTINGS AND SUPPORTS.
9. DEMOLISH CT OVERFLOW DRAIN PIPING INCLUDING VALVE, FITTINGS AND SUPPORTS.
10. DEMOLISH CT DRIP LOSS DRAIN PIPING INCLUDING FITTINGS AND SUPPORTS.
11. DEMOLISH COOLING TOWER INCLUDING CONNECTED PIPEWORK, VIBRATION CUT OUT SWITCH, POWER AND CONTROL WIRING, FAN AND MOTOR, VFD, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
12. DEMOLISH CT ELECTRICAL CONTROLLER PANEL INCLUDING POWER AND CONTROL WIRING, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
13. DISCONNECT CONDENSER WATER SUCTION AND DISCHARGE PIPING FROM CONDENSER WATER WATER PUMP.
14. DEMOLISH CONDENSER WATER PUMP INCLUDING CONNECTED MOTOR AND POWER WIRING UP TO THE ELECTRICAL DISCONNECT SWITCH.
15. DEMOLISH CT FAN VFD INCLUDING POWER AND CONTROL WIRING, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
16. REFER TO DETAIL 4 FOR CONDENSER WATER TREATMENT AUTOMATIC BLOWDOWN PIPING DIAGRAM FOR SCOPE OF WORK.
17. CAP AT POINT OF DEMOLITION.
18. DEMOLISH 2" CONDENSER WATER TREATMENT AUTOMATIC BLOWDOWN PIPING ASSEMBLY INCLUDING POWER AND CONTROL WIRING, AND SUPPORTS.
19. DEMOLISH CULLIGAN WATER SOFTENER TANK (A & B) INCLUDING ASSOCIATED PIPING, VALVES, FITTINGS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES. REFER TO DRAWING M1.2 DETAIL 1 FOR SCOPE OF WORK.
20. REMOVE AND SALVAGE SALT PELLETS TANK INCLUDING FLEXIBLE PIPING, FITTINGS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES, AND TURN OVER TO FACILITIES FOR FUTURE USE.
21. DEMOLISH 3" CW-HW AND 3" CW-SW INCLUDING VALVES, FITTINGS AND SUPPORTS.
22. DEMOLISH COOLING TOWER WATER TREATMENT CONTROLLER PANEL INCLUDING POWER AND CONTROL WIRING.
23. CONDENSER WATER TREATMENT BIOCIDES AND INHIBITOR DRUMS INCLUDING METERING PUMPS AND POWER WIRING SHALL REMAIN IN PLACE AND PROTECT FROM BEING DAMAGED DURING DEMOLITION AND NEW WORK.
24. DEMOLISH 3/4" CONDENSER WATER CHEMICAL FEED SUPPLY AND RETURN PIPING INCLUDING VALVES, FITTINGS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
25. DEMOLISH ELECTRICAL DISCONNECT SWITCH SERVING CONDENSER WATER PUMP, P-1 INCLUDING SUPPORTS AND WIRING UP TO THE ELECTRICAL PANEL.
26. DEMOLISH ELECTRICAL DISCONNECT SWITCH SERVING CONDENSER WATER PUMP, P-2 INCLUDING SUPPORTS AND WIRING UP TO THE ELECTRICAL PANEL.
27. DEMOLISH DIFFERENTIAL PRESSURE TRANSMITTER INCLUDING TUBINGS, CONTROL WIRINGS UP TO CONTROLLER PANEL, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
28. REMOVE AND SALVAGE CONDENSER WATER TREATMENT PUMP, AND TURN OVER TO FACILITIES FOR FUTURE USE.

3 -- CONDENSER WATER PIPING DIAGRAM - DEMOLITION

NTS

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeienginees.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER PATRICK R. MALLIN NO. M 30258 EXP. 06/30/15 MECHANICAL STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL PARTIAL PLANS DEMOLITION WORK

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NONE
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M1.1

Sheet X of X

F:\Drawings\2012\1226\E\M11.dwg 12-11-14 04:04:28 PM Paul

1 -- DOMESTIC WATER SOFTENER SYSTEM PIPING DIAGRAM - DEMOLITION

NTS

2 -- CONDENSER WATER TREATMENT AUTOMATIC SYSTEM

NTS

SHEET NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS FOR EXACT LOCATION PRIOR TO DEMOLITION WORK AND NEW INSTALLATION AND SHALL NOTIFY THE COUNTY'S REPRESENTATIVE OF THE EXISTING CONDITION. CONTRACTOR SHALL PROVIDE AS-BUILT CONDITION.
2. COORDINATE ALL WORK AND SHUTDOWNS WITH THE COUNTY'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND EQUIPMENT NECESSARY SO THAT NO UTILITY SERVICE TO BUILDING WILL BE INTERRUPTED.
3. CONTRACTOR SHALL REPAIR ALL SURFACES DAMAGED OR AFFECTED BY THE DEMOLITION OPERATIONS WITH FINISH TO MATCH EXISTING CONDITION.
4. CONTRACTOR SHALL DISPOSE ALL DEMOLISHED EQUIPMENT, PIPEWORK, ASSOCIATED ACCESSORIES AND MATERIALS OFF PROJECT SITE. NO DEMOLISHED EQUIPMENT AND/OR MATERIALS SHALL BE TURNED OVER TO THE FACILITY, COUNTY OR OTHER GOVERNMENT AGENCY.

KEY NOTES

1. DEMOLISH 3" CW-HW PIPING INCLUDING CONNECTED VALVES, FITTINGS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
2. DEMOLISH 3" CW-SW PIPING INCLUDING CONNECTED VALVES, FITTINGS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
3. DEMOLISH CULLIGAN WATER SOFTENER TANK (TANK A & B) INCLUDING ALL CONNECTED PIPING, VALVES, FITTINGS, UNIT CONTROLLER, POWER AND CONTROL WIRING, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
4. DEMOLISH WATER SOFTENER DRAIN PIPING INCLUDING VALVES, FITTINGS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES.
5. CAP AT POINT OF DEMOLITION.
6. REMOVE AND SALVAGE 3/4" FLEXIBLE HOSE, AND TURN OVER TO FACILITIES FOR FUTURE USE.
7. REMOVE AND SALVAGE SALT PELLETS TANK INCLUDING FLEXIBLE PIPING, FITTINGS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES, AND TURN OVER TO FACILITIES FOR FUTURE USE.
8. DEMOLISH 2" CONDENSER WATER TREATMENT AUTOMATIC BLOWDOWN PIPING ASSEMBLY INCLUDING POWER AND CONTROL WIRING, AND SUPPORTS.

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL SINGLE LINE DIAGRAMS

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NONE
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M1.2

Sheet X of X

F:\Drawings\2012\1226\E\M12.dwg 12-11-14 04:04:30 PM Paul

1 SERVICE BLDG CHILLER PARTIAL PLAN - NEW WORK
1/4"=1'-0"

SHEET NOTES

1. REFER TO DRAWING M0.1 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. REFER TO DRAWING M0.2 FOR EQUIPMENT SCHEDULES AND DESIGN CRITERIA.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS FOR EXACT LOCATION PRIOR TO DEMOLITION WORK AND NEW INSTALLATION AND SHALL NOTIFY THE COUNTY'S REPRESENTATIVE OF THE EXISTING CONDITION. CONTRACTOR SHALL PROVIDE AS-BUILT CONDITION.
4. COORDINATE ALL WORK AND SHUTDOWNS WITH THE COUNTY'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND EQUIPMENT NECESSARY SO THAT NO UTILITY SERVICE TO BUILDING WILL BE INTERRUPTED.
5. CONTRACTOR SHALL REPAIR ALL SURFACES DAMAGED OR AFFECTED BY THE DEMOLITION OR NEW WORK OPERATIONS WITH FINISH TO MATCH EXISTING CONDITION.
6. ALL CONDENSER WATER SUPPLY AND RETURN PIPING EXPOSED TO WEATHER SHALL BE STAINLESS STEEL SCHEDULE 10 PRE-INSULATED WITH 2" THICK CLOSED CELL POLYURETHANE INSULATION (2.0 LBS/FT³ DENSITY AND MIN. 30 PSI COMPRESSIVE STRENGTH) ND STAINLESS STEEL SPIRAL WOUND JACKETING (THERMACOR PROCESS INC. MODEL SPIRAL-THERM; RON DUNN/C#408-204-2112).
7. BEFORE WORK IS STARTED, SEE SPECIFIC SHEET NOTES AND GENERAL NOTES ON CIVIL DRAWINGS. COORDINATE ELECTRICAL WORK WITH OTHER TRADES.
8. ELECTRICAL WORK SHALL BE PROVIDED IN ACCORDANCE WITH ANSI/IEEE STANDARDS, TRUST AND STANDARD UTILITY (PG&E) REQUIREMENTS, THE NATIONAL ELECTRICAL SAFETY CODE (ANSI C2), AND NATIONAL ELECTRICAL CODE (NFPA 70-2011), AS APPLICABLE. ANY CONFLICTS WITH THE DESIGNS AS SHOWN SHALL BE RESOLVED BY THE ENGINEER.
9. CONTRACTOR SHALL CONFIRM EXISTING FACILITIES AND PROPOSED REVISIONS PRIOR TO BIDDING. NO CHANGES TO CONTRACT SCOPE SHALL BE ALLOWED BASED ON CONTRACTOR'S FAILURE TO KNOW EXISTING SITE CONDITIONS OR CONTRACT REQUIREMENTS.
10. ALL ELECTRICAL CONDUIT AND EQUIPMENT SHOWN ARE DIAGRAMMATIC. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ROUTING SO AS NOT TO DISTURB EXISTING UTILITIES. MINOR CHANGES IN WORK DUE TO EXISTING CONDITIONS SHALL BE MADE WITHOUT ADDITIONAL COST TO OWNER.
11. ANY DAMAGE TO KNOWN EXISTING UTILITIES SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL REPAIR OR REPLACE ALL UTILITIES DAMAGED DURING CONSTRUCTION TO THE OWNER'S SATISFACTION.

KEY NOTES

1. CONNECT (N) 14"Ø CWS TO (E) 14"Ø CWS PIPING RISER COMPLETE WITH FITTINGS AND SUPPORTS.
2. CONNECT (N) 14"Ø CWR TO (E) 14"Ø CWR PIPING RISER COMPLETE WITH FITTINGS AND SUPPORTS.
3. (N) 2"Ø CW MAKE-UP PIPING RISER FROM GROUND FLOOR – REFRIGERATION MACHINE RM #322.
4. CONNECT (N) 12"Ø CWR PIPING TO (N) CT COMPLETE WITH FLANGE ADAPTER (VICTAULIC STYLE), 4 NOS. OF FLEXIBLE COUPLING (VICTAULIC STYLE 177), 2 NOS. OF 3" LENGTH CUT GROOVED NIPPLE (VICTAULIC STYLE 155 ADAPTER NIPPLE), AND 1.5-FEET CUT GROOVED PIPE SPOOL FOR THERMAL EXPANSION AND SEISMIC MOVEMENTS.
5. DRAIN (N) 6"Ø OFD PIPING TO (E) ROOF DRAIN WITH MINIMUM 1" AIR GAP COMPLETE WITH 90-DEGREES ELBOW FITTING AND SUPPORTS.
6. DRAIN (N) 4"Ø CFT BACKWASH DRAIN PIPING TO (E) ROOF DRAIN WITH MINIMUM 1" AIR GAP COMPLETE WITH 90-DEGREES ELBOW FITTING AND SUPPORTS.
7. (E) VENT THRU ROOF PIPING TO REMAIN IN PLACE AND PROTECT FROM BEING DAMAGED DURING NEW WORK.
8. (E) EXHAUST PIPING IS TO REMAIN IN PLACE AND PROTECT FROM BEING DAMAGED DURING NEW WORK.
9. 2" CW-SW CT MAKE-UP PRESSURE REDUCING ASSEMBLY AND SET AT 25 PSI OUTLET PRESSURE WITH 2" BYPASS ASSEMBLY.
10. CONNECT (N) 14"Ø CWS PIPING TO (N) CT SUMP DISCHARGE COMPLETE WITH FLANGE ADAPTER (VICTAULIC STYLE), 4 NOS. OF FLEXIBLE COUPLING (VICTAULIC STYLE 177), 2 NOS. OF 3" LENGTH CUT GROOVED NIPPLE (VICTAULIC STYLE 155 ADAPTER NIPPLE), AND 1.5-FEET CUT GROOVED PIPE SPOOL FOR THERMAL EXPANSION AND SEISMIC MOVEMENTS.
11. CT-1 AND CT-2 WATER LEVEL SENSOR ASSEMBLY. REFER TO DRAWING M4.1/1 FOR DETAILS.
12. 6"Ø OVERFLOW DRAIN PIPING ASSEMBLY. REFER TO DRAWING M4.1/2 FOR DETAILS.
13. (N) 4" TURBINE WATER METER, WM-4 FOR SIDE STREAM FILTRATION SYSTEM BLOWDOWN WITH METER MOUNTED INDUSTRIAL DIGITAL REGISTER. STRICTLY INSTALL METER PER MANUFACTURER RECOMMENDATION FOR PROPER OPERATION.
14. INSTALL NEW 3#2, 1#8G WIRING FROM FACILITY PROVIDED STUB-OUT ELECTRICAL CONDUIT AND WIRING PROVISION TO (N) VFD-P-1 AND TO (N) P-1 MOTOR.
15. INSTALL NEW 3#2, 1#8G WIRING FROM FACILITY PROVIDED STUB-OUT ELECTRICAL CONDUIT AND WIRING PROVISION TO (N) VFD-P-2 AND TO (N) P-2 MOTOR.
16. ROUTE (N) 3#2, 1#8G WIRING FROM EXISTING CONDUIT.
17. (N) 100 AMPERES NON-FUSED ELECTRICAL DISCONNECT SWITCH SERVING (N) CT-2 CONTROL PANEL.
18. (N) 100 AMPERES NON-FUSED ELECTRICAL DISCONNECT SWITCH SERVING (N) CT-2 CONTROL PANEL.
19. ELECTRICAL DISCONNECT SWITCH TO MATCH ELECTRICAL RATING OF SERVED VFD.
20. CONNECT (N) 3/4"Ø CONDENSER WATER TREATMENT PIPING TO (E) 3/4"Ø PIPING COMPLETE WITH FITTINGS AND SUPPORTS, AND TIE-IN TO (N) PRE-FABRICATED WALL MOUNTED AUTOMATIC WATER TREATMENT SYSTEM.
21. AUTOMATIC CONDENSER WATER TREATMENT CONTROL AND MONITORING SYSTEM CONTROLLER (ADVANTAGE CONTROLS MODEL MEGATRON CONTROLLER MGCPRF3E-D1PE-CPRE-B2-H21-N806 – NO SUBSTITUTION).
22. (E) BIOCIDE TANKS, INHIBITOR DRUM & FEEDER TANK INCLUDING ASSOCIATED CHEMICAL METERING PUMPS.
23. CONNECT (N) 3"Ø CW-HW PIPING TO (E) 3"Ø CW-HW PIPING COMPLETE WITH FITTINGS, AND SUPPORTS.
24. CONNECT (N) 3"Ø CW-SW PIPING TO (E) 3"Ø CW-SW PIPING COMPLETE WITH FITTINGS, AND SUPPORTS.
25. REFER TO DRAWING M4.1 DETAIL 3 FOR COMPLETE DOMESTIC WATER SOFTENING SYSTEM.
26. (N) PRE-FABRICATED WALL MOUNTED AUTOMATIC WATER TREATMENT SYSTEM (ADVANTAGE CONTROLS – MODEL WM) COMPLETE WITH LOOP PIPING, INJECTION TEES, PROBE TEES, STRAINER, COUPONS RACK, PUMP MOUNTING SHELF, CONTROLLER, 3/4" AUTOMATIC BLOWDOWN SYSTEM, MOUNTING RAILS AND OTHER ASSOCIATED APPURTENANCES.
27. CONNECT TO FACILITY PROVIDED STUB-OUT ELECTRICAL JUNCTION BOX AND WIRING PROVISION COMPLETE WITH SUPPORTS, FITTINGS AND ASSOCIATED APPURTENANCES. FIELD VERIFY FOR EXACT LOCATION.
28. 1 1/4" CONDUIT, 3X#4 WIRE, 1X#8 (VFD RATED SHIELDED CABLE) TO FACILITY PROVIDED STUB-OUT ELECTRICAL JUNCTION BOX AND WIRING PROVISION COMPLETE WITH SUPPORTS, FITTINGS AND ASSOCIATED APPURTENANCES.
29. 1 1/4" CONDUIT, 3X#4 WIRE, 1X#8 (VFD RATED SHIELDED CABLE) TO COOLING TOWER, CT-1 ELECTRICAL DISCONNECT COMPLETE WITH SUPPORTS, FITTINGS AND ASSOCIATED APPURTENANCES.
30. 1 1/4" CONDUIT, 3X#4 WIRE, 1X#8 (VFD RATED SHIELDED CABLE) TO COOLING TOWER, CT-2 ELECTRICAL DISCONNECT COMPLETE WITH SUPPORTS, FITTINGS AND ASSOCIATED APPURTENANCES.
31. PRE-FABRICATES CHILLED WATER FLOW LOOPS (ADVANTAGE CONTROLS MODEL CM10-AE4K-U / THOM FETTIK / C#760-310-1579) COMPLETE WITH 3/4" FLOW LOOPS PIPING, STRAINER, INJECTION TEES, SENSOR TEES, SENSORS, ISOLATION BALL VALVES, FITTINGS, 1/2" HD BLUE POLYETHYLENE BOARD, MOUNTING RAILS. CONNECT PIPING TO (E) CHILLED WATER LOOP COMPLETE WITH ISOLATION BALL VALVES, FITTINGS AND SUPPORTS.
32. PRE-FABRICATES SOFT WATER, CW-SW FLOW LOOPS (ADVANTAGE CONTROLS MODEL CM10-AE4K-U / THOM FETTIK / C#760-310-1579) COMPLETE WITH 3/4" FLOW LOOPS PIPING, STRAINER, INJECTION TEES, SENSOR TEES, SENSORS, ISOLATION BALL VALVES, FITTINGS, 1/2" HD BLUE POLYETHYLENE BOARD, MOUNTING RAILS. CONNECT PIPING TO (N) 3" CW-SW PIPING COMPLETE WITH ISOLATION BALL VALVES, FITTINGS AND SUPPORTS.
33. PROVIDE 1"C WITH 2#12, 1#12G TO THE NEAREST 120V PANEL. VERIFY IN FIELD.

3 TYPICAL VFDs & DISCONNET SWITCH RACK DETAIL
NTS

0' 2' 4' 8'

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY SANTA RITA JAIL
COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT
5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE
MECHANICAL PARTIAL PLANS NEW WORK

Floor Number:	
Date:	NOV. 24, 2014
Scale:	1/4"=1'-0"
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M2.1

Sheet X of X

F:\Drawings\2012\228\E\M21.dwg 12-16-14 03:08:31 PM Rose

A -- ROOF SECTION
1/2"=1'-0"

SHEET NOTES

1. REFER TO DRAWING M0.1 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. REFER TO DRAWING M0.2 FOR EQUIPMENT SCHEDULES AND DESIGN CRITERIA.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS FOR EXACT LOCATION PRIOR TO DEMOLITION WORK AND NEW INSTALLATION AND SHALL NOTIFY THE COUNTY'S REPRESENTATIVE OF THE EXISTING CONDITION. CONTRACTOR SHALL PROVIDE AS-BUILT CONDITION.
4. COORDINATE ALL WORK AND SHUTDOWNS WITH THE COUNTY'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND EQUIPMENT NECESSARY SO THAT NO UTILITY SERVICE TO BUILDING WILL BE INTERRUPTED.
5. CONTRACTOR SHALL REPAIR ALL SURFACES DAMAGED OR AFFECTED BY THE DEMOLITION OR NEW WORK OPERATIONS WITH FINISH TO MATCH EXISTING CONDITION.
6. ALL CONDENSER WATER SUPPLY AND RETURN PIPING EXPOSED TO WEATHER SHALL BE STAINLESS STEEL SCHEDULE 10 PRE-INSULATED WITH 2" THICK CLOSED CELL POLYURETHANE INSULATION (2.0 LBS/FT^3 DENSITY AND MIN. 30 PSI COMPRESSIVE STRENGTH) ND STAINLESS STEEL SPIRAL WOUND JACKETING (THERMACOR PROCESS INC. MODEL SPIRAL-THERM; RON DUNN/C#408-204-2112).

KEY NOTES

1. 2" CW-SW CT MAKE-UP PRESSURE REDUCING ASSEMBLY AND SET AT 25 PSI COMPLETE WITH 2" BYPASS ASSEMBLY.
2. DURA-BLOK ROOFTOP SUPPORT WITH 12 GA. X 2 7/16" GALVANIZED CHANNEL (DURA BLOK MODEL DB610). GLUE DURA-BLOK ROOFTOP SUPPORT TO (E) ROOF WITH WEATHERPROOF TYPE GLUE.
3. BOLT CHANNEL STRUT TO COOLING TOWER SKIRT. COORDINATE WITH COOLING TOWER MANUFACTURER FOR APPROVAL PRIOR TO ANY WORK.
4. DURA-BLOK ROOFTOP SUPPORT WITH TWO ½" ELECTRO ZINC ALL THREADED ROD RISERS AND 14 GA. X 1" HIGH GALVANIZED SLOTTED CHANNEL AND LOAD DISTRIBUTION STEEL PLAT (DURA BLOK MODEL DB10-12-CLDP10). GLUE DURA-BLOK ROOFTOP SUPPORT TO (E) ROOF WITH WEATHERPROOF TYPE GLUE.

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeienginneers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL SECTION

Floor Number:	
Date:	NOV. 24, 2014
Scale:	1/2"=1'-0"
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M2.2

Sheet X of X

F:\Drawings\2012\1228\E\M22.dwg 12-11-14 04:04:36 PM Paul

1 -- MECHANICAL CONDENSER WATER PIPING DIAGRAM

NTS

SHEET NOTES

1. REFER TO DRAWING M0.1 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. REFER TO DRAWING M0.2 FOR EQUIPMENT SCHEDULES AND DESIGN CRITERIA.
3. ALL CONDENSER WATER SUPPLY AND RETURN PIPING EXPOSED TO WEATHER SHALL BE STAINLESS STEEL SCHEDULE 10 PRE-INSULATED WITH 2" THICK CLOSED CELL POLYURETHANE INSULATION (2.0 LBS/FT³ DENSITY AND MIN. 30 PSI COMPRESSIVE STRENGTH) ND STAINLESS STEEL SPIRAL WOUND JACKETING (THERMACOR PROCESS INC., MODEL SPIRAL-THERM; RON DUNN/C#408-204-2112).

KEY NOTES

1. CONNECT (N) 14"ø CWS TO (E) 14"ø CWS PIPING RISER COMPLETE WITH FITTINGS AND SUPPORTS.
2. CONNECT (N) 14"ø CWR TO (E) 14"ø CWR PIPING RISER COMPLETE WITH FITTINGS AND SUPPORTS.
3. CONNECT (N) 12"ø CWR PIPING TO (N) CT COMPLETE WITH FLANGE ADAPTER (VICTAULIC STYLE).
4. 2 NOS. OF FLEXIBLE COUPLING (VICTAULIC STYLE 177) AND 3" LENGTH CUT GROOVED NIPPLE (VICTAULIC STYLE 155 ADAPTER NIPPLE) ASSEMBLY.
5. 1.5-FEET CUT GROOVED PIPE SPOOL.
6. CONNECT (N) 14"ø CWS PIPING TO (N) CT SUMP DISCHARGE COMPLETE WITH FLANGE ADAPTER (VICTAULIC STYLE).
7. 6" BUTTERFLY VALVE AT COOLING TOWER EXTERNAL SUMP – EQUALIZATION/OVERFLOW CONNECTION.
8. CT-1 AND CT-2 WATER LEVEL SENSOR ASSEMBLY. REFER TO DRAWING M4.1/1 FOR DETAILS.
9. 6" OVERFLOW DRAIN PIPING ASSEMBLY. REFER TO DRAWING M4.1/2 FOR DETAILS.
10. REFER TO DRAWING M4.1 DETAIL 3 FOR 2" CW-SW CT MAKE-UP PIPING CONTINUATION.
11. (N) 2" CW MAKE-UP WATER REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY.
12. INSTALL (N) CONDENSER WATER PUMP AND MOTOR ASSEMBLY TO THE (E) CONCRETE HOUSEKEEPING PAD AND RECONNECT TO (E) CWS AND CWR PIPING COMPLETE WITH FITTINGS AND SUPPORTS.
13. PRE-FABRICATED AUTOMATIC CONDENSER WATER TREATMENT CONTROL AND MONITORING SYSTEM (ADVANTAGE CONTROLS MODEL WM21-AB3D3E4G2JK – NO PRODUCT SUBSTITUTION / THOM FETTIK / C#760-310-1579):
    - ADVANTAGE CONTROLS MODEL MEGATRON CONTROLLER MGCPRF3E-D1PE-CPRE-B2-H21-N806 (NO SUBSTITUTION)
    - MODEM
    - WEB ACCESSABILITY
    - SENSORS
    - CONDUCTIVITY MEASUREMENT AND CONTROL
    - PH MEASUREMENT AND CONTROL
    - ORP MEASUREMENT AND CONTROL
    - BIOCIDE TIMERS
    - SCALE CONTROL
    - BIO-CONTROL
    - CORROSION MONITORING
    - SERVICE REPORTS
    - ELECTRICAL POWER SUPPLY REQUIREMENTS: 95-240 VAC @ 110V/1PH/60HZ
    - CUSTOMIZABLE LCD DISPLAY
    - BACNET COMMUNICATION
    - FOUR (4) INDEPENDENT SYSTEMS MONITORING
    - 4-20MA INPUTS AND OUTPUTS
14. INTERFACE TO PRE-FABRICATED AUTOMATIC CONDENSER WATER TREATMENT CONTROL AND MONITORING SYSTEM.
15. TWO-WAY MOTORIZED CONTROL VALVE WITH SPRING RETURN ACTUATOR. INTERFACE TO PRE-FABRICATED AUTOMATIC CONDENSER WATER TREATMENT CONTROL AND MONITORING SYSTEM.
16. PRE-FABRICATES CHILLED WATER FLOW LOOPS (ADVANTAGE CONTROLS MODEL CM10-AE4K-U / THOM FETTIK / C#760-310-1579) COMPLETE WITH 3/4" FLOW LOOPS PIPING, STRAINER, INJECTION TEES, SENSOR TEES, SENSORS, ISOLATION BALL VALVES, FITTINGS, 1/2" HD BLUE POLYETHYLENE BOARD, MOUNTING RAILS. CONNECT PIPING TO (E) CHILLED WATER LOOP COMPLETE WITH ISOLATION BALL VALVES, FITTINGS AND SUPPORTS.
17. CONNECT (N) 3/4"ø CONDENSER WATER TREATMENT PIPING TO (E) 3/4"ø CONDENSER WATER TREATMENT PIPING COMPLETE WITH FITTINGS AND SUPPORTS.
18. MULTI-PORT PRESSURE INDICATOR (MINIMUM 4-PORTS) WITH PRESSURE GAUGE AND DIFFERENTIAL PRESSURE TRANSMITTER.
19. 2" CW-SW CT MAKE-UP PRESSURE REDUCING ASSEMBLY AND SET AT 25 PSI COMPLETE WITH 2" BYPASS ASSEMBLY.
20. (N) 3" TURBINE WATER METER, WM-4 FOR SIDE STREAM FILTRATION SYSTEM BLOWDOWN WITH METER MOUNTED INDUSTRIAL DIGITAL REGISTER AND WIRE TO EMCS AS AI INTO FILTRATION CONTROLLER WITH WATER TIGHT EMT AND FITTINGS. STRICTLY INSTALL METER PER MANUFACTURER RECOMMENDATION FOR PROPER OPERATION.
21. PRE-FABRICATES SOFT WATER, CW-SW FLOW LOOPS (ADVANTAGE CONTROLS MODEL CM10-AE4K-U / THOM FETTIK / C#760-310-1579) COMPLETE WITH 3/4" FLOW LOOPS PIPING, STRAINER, INJECTION TEES, SENSOR TEES, SENSORS, ISOLATION BALL VALVES, FITTINGS, 1/2" HD BLUE POLYETHYLENE BOARD, MOUNTING RAILS. CONNECT PIPING TO (N) 3" CW-SW PIPING COMPLETE WITH ISOLATION BALL VALVES, FITTINGS AND SUPPORTS.

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL PIPING AND CONTROL SCHEMATIC

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NONE
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M3.1

Sheet X of X

F:\Drawings\2012\2226\E\M31.dwg 12-11-14 04:04:39 PM Paul

MECHANICAL DIRECT DIGITAL CONTROL SYSTEM POINT LIST

| CONTROL PANEL NUMBER | SYSTEM POINT DESCRIPTION | ANALOG INPUT: GRAPHIC | TEMPERATURE | PRESSURE | RH | KW | PPM | CFM | PERCENT | CFM | HERTZ | PH | CONDUCTIVITY | MILLIVOLT | ANALOG OUTPUT: DDC (4-20 ma, 0-10 vdc) | SET POINT ADJ./CONTROL | | | | | DIGITAL INPUT: STATUS ON/OFF | NORMAL/LOW | STATUS OPEN/CLOSED | NO. OF STARTS | TIMED OVERRIDE | HIGH LIMIT | LOW LIMIT | ALARM/NORMAL | DIGITAL OUTPUT: OFF/ON | OPEN/CLOSE | LOCK OUT | ENABLE/DISABLE | SERIAL COMMUNICATION | SYSTEM FEATURES ALARMS: HIGH ANALOG | LOW ANALOG | HIGH BINARY | LOW BINARY | PROOF | SENSOR FAIL | FLOW FAIL | COMM. FAIL | TRIP | DIAGNOSTICS | PROGRAMS: TIME SCHEDULING | DEMAND LIMITING | OPTIMAL START/STOP | RESET | EVENT PROGRAM | DDC | ALARM INSTRUCT | MAINT. WK. ORD. | RUN TIME | EXP. MESSAGE | SET BACK/SET UP | NIGHT PURGE | TENANT BILLING | TRENDING | NOTES |
|---|---|---

SHEET NOTES

1. REFER TO DRAWING M0.1 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. REFER TO DRAWING M0.2 FOR EQUIPMENT SCHEDULES AND DESIGN CRITERIA.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING COMPLETE WORKING SYSTEM INCLUDING ADDITIONAL DEVICES AS REQUIRED TO MAINTAIN COMPLETE AND FUNCTIONAL SYSTEM.
4. ALL SYSTEMS, CONDENSER WATER PUMPS AND VFDS, WATER SOFTENER, CHEMICAL STATIONS, AND FILTRATION UNIT SHALL BE INTEGRATED INTO THE CURRENT FACILITY EMCS TO PROVIDE A COMPLETE FACILITY INTEGRATED SYSTEMS.

KEY NOTES

1. EQUIPMENT/DEVICE IS OWNER (GSA) FURNISHED AND SHALL BE INSTALLED BY THE CONTRACTOR PER MANUFACTURER RECOMMENDATION.
2. REFER TO DRAWING M3.4 FOR CONTINUATION OF CONTROL DIAGRAM.
3. COORDINATE WITH THE FACILITY ENGINEER FOR EXACT LOCATION OF EXISTING DDC CONTROLLER.
4. IF CTF-1 IS IN THE PROCESS OF BLOWDOWN, THE AUTOMATIC CONDENSER WATER TREATMENT BLEED-OFF SYSTEM SHALL BE DE-ACTIVATED OR VICE-VERSA. PROVIDE 30 MINUTES (ADJUSTABLE) TIME DELAY FOR BLEED-OFF IF STILL REQUIRED BY THE AUTOMATIC CONDENSER WATER TREATMENT CONTROLLER AFTER CTF-1 BLOWDOWN IS COMPLETED.

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL CONTROL SCHEMATIC

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NONE
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M3.3

Sheet X of X

F:\Drawings\2012\2226\E\M33.dwg 12-11-14 04:04:43 PM Paul

SHEET NOTES

1. REFER TO DRAWING M0.1 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. REFER TO DRAWING M0.2 FOR EQUIPMENT SCHEDULES AND DESIGN CRITERIA.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING COMPLETE WORKING SYSTEM INCLUDING ADDITIONAL DEVICES AS REQUIRED TO MAINTAIN COMPLETE AND FUNCTIONAL SYSTEM.
4. ALL SYSTEMS, CONDENSER WATER PUMPS AND VFDS, WATER SOFTENER, CHEMICAL STATIONS, AND FILTRATION UNIT SHALL BE INTEGRATED INTO THE CURRENT FACILITY EMCS TO PROVIDE A COMPLETE FACILITY INTEGRATED SYSTEMS.

KEY NOTES

(1) CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION OF THE EXISTING DDC CONTROLLER FOR EXACT LOCATION PRIOR TO NEW WORK INSTALLATION.

1 / M3.4 MECHANICAL (WATER SOFTENER) CONTROL DIAGRAM

NTS

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY
SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL
WATER SOFTENER
CONTROL DIAGRAM

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NTS
Drawn:	R. HEYER
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M3.4

Sheet X of X

F:\Drawings\2012\1226\E\M34.dwg 12-11-14 04:04:44 PM Paul

NOTES:
1. ALL PIPING SHALL BE INDEPENDENTLY SUPPORTED.
2. OPTIONAL OVERFLOW/EQUALIZATION LINE MUST NOT INTERFERE WITH ACCESS TO INSPECTION PORT.

1 / M4.1 COOLING TOWER EQUALIZATION/LEVEL CONTROL INSTALLATION DETAIL

NTS

NOTES:
1. FLOW LINE SENSOR SETTING
   - BOTTOM OF SENSOR TO BOTTOM OF TANK 47"
   - FILL HEIGHT 33"
   - 4-mA = 0"
   - 20-mA = 33"

2 / -- COOLING TOWER STILLING WELL INSTALLATION DETAIL

NTS

SHEET NOTES

1. REFER TO DRAWING M0.1 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. REFER TO DRAWING M0.2 FOR EQUIPMENT SCHEDULES AND DESIGN CRITERIA.
3. ALL CONDENSER WATER SUPPLY AND RETURN PIPING EXPOSED TO WEATHER SHALL BE STAINLESS STEEL SCHEDULE 10 PRE-INSULATED WITH 2" THICK CLOSED CELL POLYURETHANE INSULATION (2.0 LBS/FT³ DENSITY AND MIN. 30 PSI COMPRESSIVE STRENGTH) ND STAINLESS STEEL SPIRAL WOUND JACKETING (THERMACOR MODEL SPIRAL THERM; RON DUNN/C#408-204-2112).

KEY NOTES

1. CONNECT (N) 3"ø CW-HW TO (E) 3"ø CW-HW PIPING COMPLETE WITH FITTINGS AND SUPPORTS.
2. CONNECT (N) 3"ø CW-SW TO (E) 3"ø CW-SW PIPING COMPLETE WITH FITTINGS AND SUPPORTS.
3. (N) 3" TURBINE WATER METER, WM-2 FOR CW-SW WITH REMOTE MOUNTED INDUSTRIAL DIGITAL REGISTER. STRICTLY INSTALL METER PER MANUFACTURER RECOMMENDATION FOR PROPER OPERATION.
4. CORE DRILL EXISTING CONCRETE WALL FOR PIPE PENETRATION COMPLETE WITH HILTI FS-ONE FIRE SEALANT AND STEEL ESCUTCHEON PLATE ON BOTH SIDES OF CONCRETE WALL.
5. 2"Ø CW-SW CT MAKE-UP TO (N) COOLING TOWERS AT (E) ROOF.
6. DOMESTIC WATER SOFTENER SYSTEM SHALL BE SUPPLIED AND INSTALLED BY KINETICO (TONY SOLTANI, C#925-876-1200).
7. SUPPORT AND SEISMICALLY ANCHOR RESIN AND BRINE TANKS TO (E) BUILDING STRUCTURE.
8. (N) 2" POSITIVE DISPLACEMENT WATER METER, WM-1 FOR COOLING TOWER CW-SW MAKE-UP WITH REMOTE MOUNTED INDUSTRIAL DIGITAL REGISTER. STRICTLY INSTALL METER PER MANUFACTURER RECOMMENDATION FOR PROPER OPERATION.
9. (N) 3" POSITIVE DISPLACEMENT WATER METER, WM-3 FOR CW SUPPLY TO WATER SOFTENER SYSTEM WITH REMOTE MOUNTED INDUSTRIAL DIGITAL REGISTER. STRICTLY INSTALL METER PER MANUFACTURER RECOMMENDATION FOR PROPER OPERATION.
10. WALL MOUNTED INDUSTRIAL DIGITAL REGISTER FOR WATER METER, WM-1. PROVIDE WALL BRACKET SUPPORT.
11. WALL MOUNTED INDUSTRIAL DIGITAL REGISTER FOR WATER METER, WM-2. PROVIDE WALL BRACKET SUPPORT.
12. WALL MOUNTED INDUSTRIAL DIGITAL REGISTER FOR WATER METER, WM-3. PROVIDE WALL BRACKET SUPPORT.
13. SMART START CONTROLLER ELECTRIC POWER SUPPLY PLUG. PLUG TO NEAREST (E) ELECTRICAL SOCKET OUTLET.

3 / M4.1 DOMESTIC WATER SOFTENER INSTALLATION DETAIL

NTS

Revisions	Date	By

General Services Agency of Alameda County

Technical Services Department
1401 Lakeside Drive
Oakland, CA 94612
(510) 208-9551
(510) 208-3995 Fax

CONSULTANTS:

YEI ENGINEERS, INC.
7700 Edgewater Drive, Suite 128, Oakland, CA 94621
Phone: (510) 383-1050 Fax: (510) 383-1057
web: www.yeiengineers.com

SEAL & SIGNATURE

REGISTERED PROFESSIONAL ENGINEER
PATRICK R. MALLIN
NO. M 30258
EXP. 06/30/15
MECHANICAL
STATE OF CALIFORNIA

AGENCY APPROVAL:

ALAMEDA COUNTY SANTA RITA JAIL

COOLING TOWERS, WATER SOFTENER AND CONDENSER WATER PUMPS PROJECT

5325 BRODER BLVD.
DUBLIN, CA 94568

DRAWING TITLE

MECHANICAL DETAILS

Floor Number:	
Date:	NOV. 24, 2014
Scale:	NTS
Drawn:	P. WINGERD
Checked:	H. HIDALGO
Building:	XXXXX
Job:	XXXXX
Sheet:	

M4.1

Sheet X of X

F:\Drawings\2012\1226\E\M41.dwg 12-11-14 04:04:47 PM Paul

CENTRAL PLANT — CONDENSER AND CHILLED WATER SYSTEM PIPING 1

CENTRAL PLANT — HEATING / DOMESTIC HOT WATER SYSTEM PIPING DIAGRAM 2

Bull. # 2
Item # 24
RELIEF VALVE DISCHARGE PIPE SHALL EXTEND THROUGH BUILDING FOR WH 1 & 2 and B 1 & 2

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Nobuno Nakamura AIA
Lee Karney AIA
Dean Aron Iatsuno AIA
Harold T. Hayashi CCS, CSI

Security:
Walker, McGough, Foltz, Lyrange & Sullivan
Spokane, WA 99201

Mechanical Structures Electrical:
Severinsen & Parker and Associates
San Francisco, CA 94104

Landscape:
Rich Saylorsh
Oakland, CA 94610

Civil:
Bissell & Karn, Inc.
Pleasanton, CA 94566

Food Service:
Mitchell Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING SYSTEMS SCHEMATICS SANTA RITA REPLACEMENT FACILITY

LEE KARNEY

C3158

DATE 9-30-85

REVISIONS
1 ADD. 1 - 12/13/85

JOB NO 80-27 BGGB

DRAWN BY

CHECKED GG

SCALE NONE

FOR CONSTRUCTION

CONTROLS

SERVICE

SHEET NO

T2.01

OF SHEETS

FIRST FLOOR PLAN

BASEMENT PLAN - HVAC

BASEMENT PLAN - PLUMBING

SECTION A

GUARD HOUSE 1

SECTION B
N.T.S.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
telephone (415) 763-3313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Security
Walker, McGough, Foltz, Lyerla, P.S.
Spokane, WA 99201

Mechanical, Structural, Electrical
Sverdrup & Parcel and Associates
San Francisco, CA 94104

Landscape
Rich Sayfann
Oakland, CA 94610

Civil
Brown & Kern Inc.
Pleasanton, CA 94566

Food Service
Mc Marshall Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING/SECTOR 5
1ST FLOOR HVAC AND PIPING
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED

LEE KARNEY

JOB NO. 80-27 BGGB
DRAWN BY AS
CHECKED JAL/GG
SCALE 1/8" = 1'-0"

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
T2.02
OF SHEETS

NOTES

1. VARIABLE AIR VOLUME FOR MAXIMUM FLOW OF 600CFM, 0.3"S.P., NC OF 40 LINING TO FOLLOW FOR 8 FT. AND SET FOR MINIMUM CLOSE POSITION OF 10% BELOW CFM SPECIFIED.
2. ALL UNIT HEATERS @ EL +14'-0" U.O.N. SEE DETAIL 4 ON DWG M0.06
3. SEE STANDARD DRAWINGS M0.01 THROUGH M0.06, P0.01 & P0.04.
4. ALL STATS SHALL BE MOUNTED AT +5'-0" AND PROTECTED WITH HEAVY DUTY WIRED GUARD.
5. ALL CHILLED WATER CONTROL VALVES AT FAN-COIL UNITS ARE 3 WAY VALVES UNLESS OTHERWISE NOTED.
6. VAV BOX SHALL BE OF BY-PASS TYPE, TITUS MODEL LS-MB-B.
7. PROVIDE AND INSTALL ECONOMIZER CYCLE CONTROL AND ACCESSORIES.
8. FAN COIL UNITS USED IN SYSTEM WITH PLENUM RETURN SHALL BE COMPLETED WITH RA PLENUM AS PART OF FAN-COIL.
9. PIPE/DUCT RISERS SHALL BE INSTALLED WITHIN CHASES AS SHOWN.

VBN CORPORATION
ARCHITECTURE INTERIORS PLANNING RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Leo Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Security
Sidney J. McGough
Fred J. Lyons, Inc.
Spokane, WA 99201
Mechanical, Structural, Electrical
Sverdrup & Parcel and Associates
San Francisco, CA 94104
Landscape
Rich Sarfarth
Oakland, CA 94610
Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566
Food Service
Sp Marshall Associates, Inc.
Burlingame, CA 94030

SERVICE BUILDING PLANS/ SECTOR 1
1ST & 2ND FLRS HVAC
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the Architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the Architect.

C3158

LEE KARNEY

DATE	9-30-85
REVISED	
JOB NO	80-27 BGGB
DRAWN BY	AS
CHECKED	JAL/GG
SCALE	1/8" = 1'-0"

FOR CONSTRUCTION

CONTENTS: SERVICE

SHEET NO: M2.01

NOTES:

1. VARIABLE AIR VOLUME FOR MAXIMUM FLOW OF 600 CFM, 0.8" S.P., N.C OF 40. LINING TO FOLLOW FOR 8 FT. AND SET FOR MINIMUM CLOSE POSITION OF 10% BELOW CFM SPECIFIED.
2. ROOF OPENING SIZES ARE TO BE REVISED TO REFLECT ACTUAL EQUIPMENT SUPPLIED.
3. ALL UNIT HEATERS AT EL +14'-0 U.O.N. SEE DETAIL 6 ON DWG M0.06.
4. SEE STANDARD DRAWINGS M0.01 THROUGH M0.06, P0.01 & P0.04.
5. ALL STATS SHALL BE MOUNTED AT +5'-0" AND PROTECTED WITH HEAVY DUTY WIRE GUARD.
6. PIPE/DUCT RISERS SHALL BE INSTALLED WITHIN CHASES AS SHOWN.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamey AIA
Dean Avon Tatsuno AIA
Harold T. Hayashi CES, CSI

Security
Walker, McGough, Foltz, Lyrintzis P.S.
Spokane, WA 99201

Mechanical, Structural, Electrical
Sverdrup & Parcel and Associates
San Francisco, CA 94104

Landscape
Rich Severin
Oakland, CA 94610

Civil
Bryant & Kern, Inc.
Pleasanton, CA 94566

Fire Service
The Wentzel Associates, Inc.
Montgomery, CA 94110

SERVICE BUILDING PLANS/ SECTOR 2
1ST & 2ND FLRS HVAC
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY

C3158

DATE	8-30-85
REVISED	
JOB NO	80-27 SGGS
DRAWN BY	AS
CHECKED	JAL/GG
SCALE	1/8"=1'-0"

FOR CONSTRUCTION

CONTENTS: SERVICE

SHEET NO: M2.02

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Security
Walter H. McGough
Pulis, Lawrence, P.S.
Spokane, WA 99201

Mechanical, Structural, Electrical
Sverdrup & Parcel and Associates
San Francisco, CA 94104

Landscape
Mark Gerlach
Oakland, CA 94610

Civil
Brown & Kerr, Inc.
Pleasanton, CA 94588

Food Service
Mc Mahan Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING PLANS/ SECTOR 3
1ST & 2ND FLOOR HVAC
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner or others on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY

DATE 9-30-85
REVISED

JOB NO. 80-27 8668
DRAWN BY MB
CHECKED JAL/GG
SCALE

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
M2.03

C3150

NOTES:

1. SEE STANDARD DRAWINGS M0.01 THROUGH M0.06, P0.01 & P0.02
2. DUCT SIZE MUST BE VERIFIED PRIOR TO FABRICATION.
3. DUCTS AND FITTINGS ARE TO BE FABRICATED FROM STAINLESS STEEL.

KEY PLAN

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T Hayashi CCS, CSI

Security
Walter McGough
Fritz, Lyons, P.S.
Spokane, WA 99201
Mechanical, Structural, Electrical
Sverdrup & Parcel
Associates
San Francisco, CA 94104
Landscape
Rich Seyforth
Oakland, CA 94610
Civil
Bissell & Karn, Inc
Pleasanton, CA 94566
Food Service
Rip Marshall Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING PLAN/ SECTOR 4
1ST FLOOR HVAC
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the Architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the Architect

DATE 9-30-85
REVISED ④ ADD. 4 - 1/10/86

LEE KARNEY

JOB NO 80-27 BGGB
DRAWN BY MG
CHECKED JAL/GG
SCALE 1/8" = 1'0"

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
M2.04

C3158

NOTES:

1. VARIABLE AIR VOLUME FOR MAX. FLOW OF 600 CFM, 0.3" SR N.C. 40 LINING TO FOLLOW FOR 3 FT. AND SET FOR MIN. CLOSE POSITION OF 10% BELOW CFM SPECIFIED.
2. SEE STANDARD DWGS. M0.01 THRU M0.06, P0.01 & P0.04.
3. DUCTS AND FITTINGS SHALL BE FABRICATED FROM STAINLESS STEEL.
4. SEE SHEET NOTES, DWG. M0.01.

CR #1069 Empm. Controls & Exhaust Fan Thermostat Clarifications

KEY PLAN

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Avon Tatsuno AIA
Harold T. Hayashi CCS, CSI

Security
Grant A. McDough, Pres.
Fire Lyons P.S.
Spokane, WA 99201
Mechanical, Structural, Electrical
Everling & Parcel and Associates
San Francisco, CA 94104
Landscape
Ron Sarfarth
Oakland CA 94610
Cost
Bobel & Kern Inc.
Pasadena, CA 94566
Food Service
Food Service Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING PLAN SECTOR 4
2ND FLOOR HVAC
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED

LEE KARNEY

JOB NO 80-27 8888
DRAWN BY MG
CHECKED JAL/GG
SCALE 1/8" = 1'-0"

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
M2.05

C3158

NOTES:
1. PUMPCASING SHALL HAVE AIR VENT WITH PETCOCK.
2. PROVIDE UNIONS FOR PUMPS WITHOUT FLANGED CONNECTIONS.
3. PRESSURE GAUGES MAY BE LOCATED IN PIPE WITH TAPPINGS.
4. PROVIDE MINIMUM 5x DIA. OF STRAIGHT PIPE RUN OR SUCTION DIFFUSER AT PUMP INLET.
5. SEE SCHEDULE FOR FLOW VALVE SETTING.
6. FOR PIPE SIZES SEE MECHANICAL FLOOR PLANS AND PIPING DIAGRAMS.

SPLIT CASE PUMP MOUNTING DETAIL (1)
NOT TO SCALE

NOTE: POWER SUPPLY (115V) SHALL BE INTERLOCKED WITH AUXILARY CONTACT IN STARTERS OF CONDENSER WATER PUMPS. (SEE ELECT. DWGS)

AUTOMATIC CHEMICAL FEED & BLEED SYSTEM FOR COOLING TOWER (4)
NOT TO SCALE

COOLING TOWER MOUNTING (7)

NOTE: THIS TYPE OF CONNECTION APPLIES TO ALL MOTORS, REGARDLESS OF TYPE OF MOUNTING. LENGTH OF FLEXIBLE CONDUIT NOT TO EXCEED ELECTRICAL CODE. CONSULT LOCAL ELECTRICAL INSPECTOR IF LONGER CONNECTIONS ARE REQUIRED.

MOTOR CONDUIT CONNECTION DETAIL (10)
NOT TO SCALE

NOTES:
1. PUMPCASING SHALL HAVE AIR VENT WITH PETCOCK.
2. PROVIDE UNIONS FOR PUMPS WITHOUT FLANGED CONNECTIONS.
3. PRESSURE GAUGES MAY BE LOCATED IN PIPE WITH TAPPINGS.
4. PROVIDE MINIMUM 5x DIA. OF STRAIGHT PIPE RUN OR SUCTION DIFFUSER AT PUMP INLET.
5. SEE SCHEDULE FOR FLOW VALVE SETTING.
6. FOR PIPE SIZES SEE MECHANICAL FLOOR PLANS AND PIPING DIAGRAMS.

END SUCTION PUMP MOUNTING DETAIL (2)
SCALE: NONE

NOTES: 1. SOLENOID VALVE SHALL BE CONNECTED TO COOLING TOWER CHEMICAL TREATMENT CONTROL PANEL AND OR FLOAT VALVE RELAY.
2. FOR PIPING CONTINUATION REFER TO FLOOR PLANS.

COOLING TOWER PIPING DETAIL (5)
NOT TO SCALE

FLUE SUPPORT (8)
NOT TO SCALE

EQUIPMENT ANCHOR BOLT (11)
NOT TO SCALE

EXPANSION TANK DETAIL (3)
NOT TO SCALE

NOTES: 1. SYSTEM SHALL BE DRAINED PRIOR TO CHEMICAL TREATMENT.
2. FEEDER SHALL BE LABELED: "CHILLED WATER" OR "HEATING WATER" SYSTEM.

POT FEEDER DETAIL (6)
NOT TO SCALE

NOTE: BASES FOR FANS AND OTHER ROTATING EQUIPMENT ARE SIMILAR.

SPRING MOUNT @ FAN BASE (9)
NOT TO SCALE

NOTES
1. USE TYPE "B" FLUE FOR B-3 & B-4 TYPE "RE" FLUE FOR B-1 & B-2.
2. COORDINATE FLUE SUPPORT WITH STRUCTURAL WORK.

BOILER FLUE THRU ROOF DETAIL (12)
NOT TO SCALE

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamey AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Programming & Security
WSFL Spokane, Wa.
Mechanical Electrical Structural
Sverdrup & Parcel & Assoc.
San Francisco, Ca
Civil, Landscape
Rasset & Kern, INC
San Leandro, Ca
Food Service
Marshall Assoc.

SERVICE BUILDING CENTRAL PLANT DETAILS, HVAC SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED

JOB NO 80-87
DRAWN BY MJB/CV
CHECKED GG
SCALE NONE

LEE KARNEY
C3158

FOR CONSTRUCTION
CONTENTS
SERVICE

SHEET NO.
M3.01
OF SHEETS

SECTION (A) M2.04 & M2.05

SECTION (B) M2.04 & M2.05

SECTION (L) M2.04 & M2.05

SECTION (D) M2.04 & M2.05

SECTION (E) M2.04 & M2.05

SECTION (F) M2.04 & M2.05

SECTION (M) M2.04 & M2.05

SECTION (G) M2.04 & M2.05

SECTION (H) M2.04 & M2.05

SECTION (N) M2.04 & M2.05

1. EXTEND DUCT FROM THE SOURCE OF THE GREASE EXHAUST FAN.
2. ADD REASONABLE GREASE COLLECTION PAN AT THE END OF THE DISCHARGE DUCT.
3. SLOPE HORIZONTAL RUN OF GREASE EXHAUST DISCHARGE DUCT AT 1/4" PER FT.
4. PROVIDE CLEAN-OUT AT THE TOP OF TO GREASE EXHAUST DUCT (UPSTREAM OF THE FAN).
5. EXCEPTIONS TO DUCT FROM TOP TO THE BOTTOM OF THE GREASE EXHAUST DISCHARGE DUCT SHALL BE AS

Add #5 from M-2

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363 13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Security
Walker, McGough, Foltz, Lyerla, P.S.
Spokane WA 99201

Mechanical, Electrical, Plumbing
Smithline & Parent and Associates
San Francisco, CA 94104

Landscape
Rich Sorkin
Oakland, CA 94610

Civil
Bissell & Karn, Inc
Pleasanton, CA 94566

Food Service
Tom Marshall Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING DETAILS, HVAC SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED

JOB NO. 80-27 8688
DRAWN BY MG
CHECKED JAL/GG
SCALE 1/4" = 1'-0"

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
M3.02

LEE KARNEY

C3158

SECTION I
M2.04 & M2.05

SECTION K
M2.04 & M2.05

SECTION O
M2.05

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-7313

Mitch Van Bourg AIA
Naboru Nakamura AIA
Lee Karney AIA
Dean Avon Tatsuno AIA
Harold T. Hovash CCS, CSI

Security
Walker, McGough, Foltz, Lyerla, P.S.
Spokane, WA 99201

Mechanical, Structural, Electrical
Everdrue & Parcel and Associates
San Francisco, CA 94104

Landscape
Hall Sawyers
Oakland, CA 94610

Civil
Bezzel & Kern, Inc.
Pleasanton, CA 94566

Food Service
Bo Marshall Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING DETAILS, HVAC SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED

JOB NO 80-27 8668
DRAWN BY AS
CHECKED JAL/GGG
SCALE 1/4" = 1'-0"

LEE KARNEY

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
M3.03

C3158

EXHAUST FANS

CODE	SECTOR/ ROOM NO	CFM	ESP EXT.	MAX RPM	DRIVE TYPE	MOTOR HP	TYPE-STYLE	CONTROLS	MANUFACTURER MODEL
E.S.1A	1/1112	150	0.625	1500	DD	1/20	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;G-05
E.S.2A	1/1101	2700	0.25	810	BD	1/3	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-18
E.S.2B	1/1101	2700	0.25	810	BD	1/3	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-18
E.S.2C	1/1160	2200	0.25	810	BD	1/3	CENTRIF.BI.MUSH	MSTR SW;INTLOK EC-5.E.S.7F.G.H	GREENHECK;GB-18
E.S.3	1/2112	450	0.75	1500	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-9
E.S.4A	1/2116	450	0.25	800	BD	1/4	CENTRIF.BI.UB	CONTINUOUS	GREENHECK;CUBE-10
E.S.4B	1/2116	450	0.625	1350	BD	1/4	CENTRIF.BI.UB	CONTINUOUS	GREENHECK;CUBE-10
E.S.6	1/1121	300	0.375	1550	DD	1/15	CABINET	SOLID STATE CONTROL	GREENHECK; SP-27
E.S.7A	1/2120	4200	0.25	550	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-3A.E.S.7B	GREENHECK;GB- 24
E.S.7B	1/1114	4200	0.13	500	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-3A.E.S.7A	GREENHECK;GB- 24
E.S.7C	1/2140	4200	0.25	550	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-4A.E.S.13A	GREENHECK;GB- 24
E.S.7D	1/2141	4200	0.25	550	BD	1/2	CENTRIF.BI.UB	INTLOK EC-3B.E.S.7E	GREENHECK;GB- 24
E.S.7E	1/1149	4200	0.13	500	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-3B.E.S.7D	GREENHECK;GB- 24
E.S.7F	1/2160	5400	0.25	655	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-5.E.S.7G.H.2C	GREENHECK;GB- 24
E.S.7G	1/1161	5400	0.25	655	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-5.E.S.7F.H.2C	GREENHECK;GB- 24
E.S.7H	1/1161	5400	0.25	655	BD	3/4	CENTRIF.BI.UB	INTLOK EC-5.E.S.7F.G.2C	GREENHECK;GB- 24
E.S.7I	2/2210	3600	0.75	1150	BD	1	CENTRIF.BI.MUSH	INTLOK EC-6A	GREENHECK;GB-24
E.S.7N	2/2221	1200	0.25	1500	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-10
E.S.7O	2/1220	12400	0.13	500	BD	2	CENTRIF.BI.MUSH	MSTR SW; THERMO SET 75F.INTLOK E.S.7R	GREENHECK;GB-36
E.S.7K	1/2115	300	0.375	1500	BD	1/4	CENTRIF.BI.MUSH	WALL SWITCH (HALON PURGE)	GREENHECK;GB-9
E.S.7P	2/1220	12400	0.13	500	BD	2	CENTRIF.BI.MUSH	MSTR SW; INTLOK E.S.7O	GREENHECK;GB-36
E.S.7Q	2/1220	12400	0.13	500	BD	2	CENTRIF.BI.MUSH	MSTR SW; THERMO SET 75F.INTLOK E.S.7R	GREENHECK;GB-36
E.S.7R	2/1220	12400	0.13	500	BD		CENTRIF.BI.MUSH	MSTR SW; INTLOK E.S.7Q	GREENHECK;GB-36
E.S.7S	3/1322	4200	0.13	550	BD	1/2	CENTRIF.BI.MUSH	THERMO SET 75 F	GREENHECK;GB-24
E.S.9	1/2120	700	0.75	1450	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-10
E.S.10	1/2102	200	0.13	1300	BD	1/4	CENTRIF.BI.MUSH	WALL SWITCH	GREENHECK;GB-7
E.S.11	1/2140	350	0.75	1700	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-8
E.S.12	1/1141	350	0.75	1750	DD	1/4	CENTRIF.FI.BMD	CONTINUOUS	BUFFALO; D
E.S.13A	1/1140	6200	0.13	450	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-4A.E.S.7C	GREENHECK;GB-30
E.S.14	1/2141	700	0.25	1725	DD	1/2	CENTRIF.FI.BMD	CONTINUOUS	BUFFALO; E
E.S.18	2/2211	250	0.25	860	DD	1/8	CENTRIF.BI.UB	THERMO SET 75 F	GREENHECK;CUBE-10
E.S.19A	2/2212	500	0.25	1475	BD	1/4	CENTRIF.BI.MUSH	THERMO SET 75 F	GREENHECK;GB-8
E.S.19B	2/2210	500	0.25	1475	BD	1/4	CENTRIF.BI.MUSH	THERMO SET 75 F	GREENHECK;GB-8
E.S.20	2/2223	400	0.75	1500	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-9
E.S.21	2/2223	150	0.25	990	BD	1/4	CENTRIF.BI.MUSH	WALL SWITCH	GREENHECK;GB-7
E.S.22	3/2310	500	0.75	1200	BD	1/4	CENTRIF.FI.BMD	CONTINUOUS	TRANE;12B1SW
E.S.23A	3/1321	3750	0.13	1050	BD	3/4	CENTRIF.BI.UB	CONTINUOUS	GREENHECK;CUBE-18
E.S.23B	3/1319	3750	0.13	1050	BD	3/4	CENTRIF.BI.MUSH	THERMO SET 75 F	GREENHECK;GB-18
E.S.23C	3/1340	3750	0.13	1050	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-9.E.S.23D	GREENHECK;GB-18
E.S.23D	3/2350	3750	0.13	1050	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-9.E.S.23C	GREENHECK;GB-18
E.S.24A	3/1310	3750	0.13	1050	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-4B.ES.37A.B.24B. THERMO SET 75F	GREENHECK;GB-18
E.S.24B	3/1310	3750	0.13	1050	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-4B.ES.37A.B.24A. THERMO SET 75F	GREENHECK;GB-18
E.S.24C	3/2310	1200	0.13	725	BD	1/4	CENTRIF.BI.MUSH	THERMO SET 75 F	GREENHECK;GB-14
E.S.24D	4/1410	1200	0.13	725	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-14
E.S.24E	4/1410	1200	0.50	1000	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-14
E.S.25	3/2320	205	0.50	1600	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-7
E.S.26	3/2350	200	0.50	1600	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-7
E.S.28A	3/1320	3200	0.13	900	BD	1/2	CENTRIF.BI.MUSH	INTLOK E.S.28D.THERMO 75 F	GREENHECK;GB-18
E.S.28B	3/1320	3200	0.13	900	BD	1/2	CENTRIF.BI.MUSH	INTLOK E.S.28C	GREENHECK;GB-18
E.S.28C	3/1320	3200	0.13	900	BD	1/2	CENTRIF.BI.MUSH	INTLOK E.S.28B.THERMO 75 F	GREENHECK;GB-18
E.S.28D	3/1320	3200	0.13	900	BD	1/2	CENTRIF.BI.MUSH	INTLOK E.S.28A	GREENHECK;GB-18
E.S.30	4/2404	3400	0.50	940	BD	1/2	CENTRIF.BI.MUSH	INTLOK FC.S.10	GREENHECK;GB-18
E.S.31	4/1453	100	0.13	1725	DD	1/6	CENTRIF.FI.BMD	CONTINUOUS	BUFFALO; A
E.S.32A	4/1452	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-11.E.S.321.35	GREENHECK;GB-24
E.S.32B	4/1452	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-12.E.S.32C.E.36	GREENHECK;GB-24
E.S.32C	4/1452	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-12.E.S.32B.E.36	GREENHECK;GB-24
E.S.32D	4/1452	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-17A	GREENHECK;GB-24
E.S.32E	4/1452	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-12.E.S.32B.C.36	GREENHECK;GB-24
E.S.32F	4/1456	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-17B	GREENHECK;GB-24
E.S.32G	4/1456	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	MSTR SW	GREENHECK;GB-24
E.S.32H	4/1471	3000	0.75	575	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-8.E.S.39 SHUTS DOWN WHEN E.S.39 ON	GREENHECK;GB-21 CR #1699
E.S.32I	4/1452	4800	0.13	575	BD	1/2	CENTRIF.BI.MUSH	INTLOK EC-11,E.S.35,32A	GREEN;HECK;GB-24
E.S.33	4/1450	2000	1.50	1200	BD	3/4	CENTRIF.BI.MUSH	INTLOK DISH WASHER.EC-17E	NEW YORK;18 CR #1699
E.S.34	4/1450	3600	1.80	1050	BD	1.5	CENTRIF.BI.MUSH	INTLOK OVENS.EC-17F	NEW YORK; 22
E.S.35	4/1452	9600	2.50	830	BD	5.0	CENTRIF.BI.MUSH	INTLOK EXH.HOOD. EC-11. E.S.32A.321	NEW YORK; 33
E.S.36	4/1452	14400	2.50	825	BD	7.5	CENTRIF.BI.MUSH	INTLOK EXH.HOOD.EC-12 E.S.32B.32C.32E	NEW YORK; 369
E.S.37A	3/1310	3750	0.13	1050	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-4B.E.S.24A.B.37B	GREENHECK;GB-18
E.S.37B	3/1310	3750	0.13	1050	BD	3/4	CENTRIF.BI.MUSH	INTLOK EC-4B.E.S.24A.B.37A	GREENHECK;GB-18
E.S.37C	4/1413	360	0.25	1400	BD	1/4	DO	CONTINUOUS	GREENHECK;GB-8

EXHAUST FANS (CONT'D)

CODE	SECTOR/ ROOM NO	CFM	ESP EXT.	MAX RPM	DRIVE TYPE	MOTOR HP	TYPE-STYLE	CONTROLS	MANUFACTURER MODEL
E.S.38A	4/1438	350	0.50	1465	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-8
E.S.38B	4/1454	300	0.38	1300	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-8
E.S.39	4/1460	2500	1.50	1250	BD	1	CENTRIF.BI.UB	INTLOK DISH WASHER.EC-8.ES.32H	NEW YORK; 181 CR #1699
E.S.40	4/1462	150	0.50	1465	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-7
E.S.41	4/2415	400	0.13	1250	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-8
E.S.42	4/1440	4500	2.00	1250	BD	2.0	CENTRIF.BI.UB	INTLOK OVENS.EC-15.E.S.43.44	NEW YORK; 221
E.S.43	4/1440	2000	0.50	655	BD	3/4	CENTRIF.BI.MUSH	MSTR SW.INTLOK EC-15,E.S.42,44	GREENHECK;GB-24
E.S.44	4/1440	2000	0.13	600	BD	1/4	CENTRIF.BI.MUSH	MSTR SW.INTLOK EC-15,E.S.42.43	GREENHECK;GB-18
E.S.45	4/2411	800	0.75	1725	DD	3/4	CENTRIF.FI.BMD	CONTINUOUS	BUFFALO; F
E.S.46	4/1440	2800	2.00	1350	BD	1 1/2	CENTRIF.BI.UB	INTLOK EXH. HOOD.EC-14	NEW YORK; 181
E.S.47	4/1440	2125	2.00	135	BD	1	CENTRIF.BI.UB	INTLOK EXH. HOOD.EC-14	NEW YORK; 181
E.S.48	4/2405	800	0.13	1100	BD	1/4	CENTRIF.BI.MUSH	INTLOK THERMO SET 70F.FC.S.16	GREENHECK;GB-10
E.S.49	4/1437	600	0.50	1725	BD	1/2	CENTRIF.FI.BMD	INTLOK FC.S.13	BUFFALO; E
E.S.50	4/2405	2000	0.50	1425	BD	1/2	CENTRIF.BI.UB	CONTINUOUS	NEW YORK; 151
E.S.51	4/2406	100	0.50	1000	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-7
E.S.53A	4/2400	200	0.13	1150	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-8
E.S.53B	4/2402	400	0.13	1150	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-8
E.S.54	4/ELEV.	500	0.25	950	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-10
E.S.55	4/1423	100	0.50	1725	BD	1/4	CENTRIF.BI.BMD	CONTINUOUS	BUFFALO; A
E.S.56	5/BOILER	430	0.13	1200	BD	1/4	CENTRIF.BI.MUSH	THERMO SET 75 F	GREENHECK;GB-8
E.S.57	4/1419	100	0.25	1725	DD	1/6	CENTRIF.BI.BMD	CONTINUOUS	BUFFALO; A
E.S.58	4/2404	450	0.13	985	BD	1/4	CENTRIF.BI.MUSH	CONTINUOUS	GREENHECK;GB-7
E.S.59	GUARD H	75	0.13	1150	DD	1/40	CABINET	CONTINUOUS	GREENHECK;SP-25

EVAPORATIVE COOLERS

CODE	SECTOR/ ROOM NO	CFM	ESP EXT	MAX RPM	EVAP. GPH	MOTOR HP	HEATING MBH	HEATING GPM	CONTROLS	MANUFACTURER MODEL
EC-3A	1/1114	8400	1.00	750	25.2	3;1/6	----	----	MSTR SW,THERM SET 75F,INTLOK E.S.7A E.S.7B	HASTINGS;100SNH/SB-215
EC-3B	1/1149	8400	0.75	750	25.2	3;1/6	----	----	MSTR SW,THERM SET 75F,INTLOK E.S.7D E.S.7E	HASTINGS;100SNH/SB-215
EC-4A	1/1140	10400	1.00	750	31.2	5;1/6	----	----	MSTR SW,THERM SET 75F,INTLOK E.S.7C E.S.13A	HASTINGS;140SNH/SB-215
EC-4B	3/1310	15000	1.25	820	45.0	5;1/6	1058	48.5	MSTR SW,THERM SET 75F,INTLOK E.S.24A E.S.24B.37A.37B	HASTINGS;140SNH/SB-215
EC-5	1/1161	18400	0.75	800	55.2	10;1/3	----	----	MSTR SW,THERM SET 75F,INTLOK E.S.7F E.S.7G.7H.2C	HASTINGS;180SNH/SB-218
EC-6A	2/1210	3600	0.75	700	10.8	1.5;1/6	254	11.6	MSTR SW,THERM SET 75F,INTLOK E.S.7I	HASTINGS;50SNH/SB-115
EC-8	4/1480	2400	0.75	725	16.2	1.5;1/6	167	5.2	MSTR SW,THERM ON PUMP 75F.INTLOK E.S.32H E.S.39	HASTINGS;50SNH/SB-115
EC-9	3/1340	7500	0.75	750	22.5	3;1/6	529	24.2	MSTR SW,THERM SET 75F.INTLOK E.S.23C E.S.23D	HASTINGS;100SNH/SB-215
EC-11	4/1452	7800	0.75	750	23.4	3;1/6	550	25.2	MSTR SW,THERM ON PUMP 75F.INTLOK E.S.32A, E.S.321.35	HASTINGS;100SNH/SB-215
EC-12	4/1456	15600	0.75	725	45.9	7.5;1/3	1079	49.4	MSTR SW,THERM ON PUMP 75F.INTLOK E.S.32B E.S.32C.32E.36	HASTINGS;180SNH/SB-218
EC-14	4/1444	4800	0.75	700	14.4	2;1/6	338	15.5	MSTR SW,THERM ON PUMP 75F.INTLOK E.S.46 E.S.47	HASTINGS;50SNH/SB-115
EC-15	4/2405	8140	1.00	750	24.5	5;1/6	540	25.5	MSTR SW,THERM ON PUMP 75F.INTLOK E.S.42 E.S.43.44	HASTINGS;100SNH/SB-215
EC-17A	4/1452	4800	0.75	650	14.4	1.5;1/6	338	15.5	MSTR SW. INTLOK E.S.32D	HASTINGS;50SNH/SB-115
EC-17B	4/1452	4800	0.75	650	14.4	1.5;1/6	338	15.5	MSTR SW. INTLOK E.S.32F	HASTINGS;50SNH/SB-115
EC-17E	4/2404	4800	1.00	750	14.4	2;1/6	338	15.5	INTLOK E.S.33	HASTINGS;50SNH/SB-115
EC-17F	4/2404	4800	1.00	750	14.4	2;1/6	338	15.5	INTLOK E.S.34	HASTINGS;50SNH/SB-115

CR #1037
CR #1087
CR #1084
CR #1157

AIR CURTAINS

CODE	SECTOR/ ROOM#	CFM	MAX RPM	MOTOR HP	ELECTRICAL VOLT/PH	CONTROLS (OPERATION)	MANUFACTURER MODEL
ACT - 1	4/1417	1,650	1,150	1/3	120/1	CONTINUOUS	PEERLESS F - 82 (LESS CABINET)
ACT - 2	4/1427	2,515	1,750	1/3	120/1	CONTINUOUS	PEERLESS F - 81 (LESS CABINET)

FAN COIL UNITS

CODE	SECTOR/ ROOM NO.	CFM	MOTOR HP	HEATING MBH	HEATING GPM	COOLING MBH	COOLING GPM	CONTROLS	MANUFACTURER MODEL
FC.S.1A	1/1120	850	1/2	32.6	1.3	19.3	3.9	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.1B	2/1222	600	1/2	22.6	0.9	13.0	2.6	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.2A	1/1131	150	1/8	5.7	0.3	3.3	0.7	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.2B	1/1165	150	1/8	5.7	0.3	3.3	0.7	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.2C	2/1212	150	1/8	5.7	0.3	3.3	0.7	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.3	1/2113	1000	1/2	37.8	1.5	21.7	4.3	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.4A	1/1111	270	1/8	10.2	0.4	5.9	1.2	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.4B	1/1144	275	1/8	10.4	0.45	6.0	1.2	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.4C	3/1312	275	1/8	10.4	0.45	6.0	1.2	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.4E	3/1330	600	1/2	22.7	0.9	13.0	2.6	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24 BHW-4
FC.S.5	1/2100	800	1/2	43.4	1.7	17.4	3.5	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.6	1/1107	230	1/8	8.7	0.4	5.0	1.0	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.7	1/2110	5050	2.0	191.0	7.8	109.6	21.9	MAST SW;THERMO ADJ.;NT SET BK C/W ECONOMIZER CONTROL	MAGICAIRE;180BHW
FC.S.8	2/1223	900	1/2	36.8	1.5	19.5	3.9	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.9	3/1350	650	1/2	24.6	1.0	14.1	2.8	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.10	4/2404	4000	1.5	151.2	6.0	86.8	17.4	MAST SW;THERMO ADJ.;NT SET BK C/W ECONOMIZER CONTROL	CARRIER;42BH5
FC.S.11	4/1423	1000	1/2	37.8	1.5	26.0	5.2	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.12	4/1436	500	1/2	16.3	0.7	10.8	2.1	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.13	4/1437	975	1/2	36.9	1.5	21.2	4.2	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;24BHW-4
FC.S.14	4/1426	150	1/60	5.7	0.3	3.3	0.7	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04
FC.S.15	4/2410	1281	3/4	48.4	2.0	29.3	5.9	MAST SW;THERMO ADJ.;NT SET BK	MAGICAIRE;36BHW-4
FC.S.16	4/2405	1800	3/4	68.0	2.7	39.1	7.8	MAST SW;THERMO ADJ.;NT SET BK	CARRIER;42BH5
FC.S.17	5/1503	150	1/60	5.7	0.3	3.3	0.7	MAST SW;THERMO ADJ.;NT SET BK	TRANE;C-04

UNIT HEATERS

CODE	SECTOR/ ROOM NO.	CFM	MOTOR HP	HEATING MBH	HEATING GPM	CONTROLS	MANUFACTURER MODEL
UH-1A	1/1114	540	1/20	6	0.50	MSTR SW(UH-1A,1B),THERMO SET 65 F	TRANE; 38-S
UH-1B	1/1114	540	1/20	6	0.50	MSTR SW(UH-1A,1B),THERMO SET 65 F	TRANE;# 38-S
UH-1C	1/1160	540	1/20	6	0.50	MSTR SW(UH-1C),THERMO SET 65 F	TRANE; 38-S
UH-1D	1/1161	540	1/20	6	0.50	MSTR SW(UH-1D,1E,2F,2G),THERMO SET 65 F	TRANE; 38-S
UH-1E	1/1161	540	1/20	6	0.50	MSTR SW(UH-1D,1E,2F,2G),THERMO SET 65 F	TRANE; 38-S
UH-2A	1/1140	590	1/20	18	0.75	MSTR SW(UH-2A,2B,2C),THERMO SET 65 F	TRANE; 42-S
UH-2B	1/1140	590	1/20	18	0.75	MSTR SW(UH-2A,2B,2C),THERMO SET 65 F	TRANE; 42-S
UH-2C	1/1140	590	1/20	18	0.75	MSTR SW(UH-2A,2B,2C),THERMO SET 65 F	TRANE; 42-S
UH-2D	1/1149	590	1/20	18	0.75	MSTR SW(UH-2D,2E),THERMO SET 65 F	TRANE; 42-S
UH-2E	1/1149	590	1/20	18	0.75	MSTR SW(UH-2D,2E),THERMO SET 65 F	TRANE; 42-S
UH-2F	1/1161	590	1/20	18	0.75	MSTR SW(UH-1D,1E,2F,2G),THERMO SET 65 F	TRANE; 42-S
UH-2G	1/1161	590	1/20	18	0.75	MSTR SW(UH-1D,1E,2F,2G),THERMO SET 65 F	TRANE; 42-S
UH-2I	2/1220	590	1/20	18	0.75	MSTR SW(UH-2I,2M,2N,2P),THERMO SET 65 F UH-2E,2G	TRANE; 42-S
UH-2J	2/1220	590	1/20	18	0.75	MSTR SW(UH-2J,2K,2L),THERMO SET 65 F	TRANE; 42-S
UH-2K	2/1220	590	1/20	18	0.75	MSTR SW(UH-2J,2K,2L),THERMO SET 65 F	TRANE; 42-S
UH-2L	2/1220	590	1/20	18	0.75	MSTR SW(UH-2J,2K,2L),THERMO SET 65 F	TRANE; 42-S
UH-2M	2/1220	590	1/20	18	0.75	MSTR SW(UH-2I,2M,2N,2P),THERMO SET 65 F UH-2E,2G	TRANE; 42-S
UH-2N	2/1220	590	1/20	18	0.75	MSTR SW(UH-2I,2M,2N,2P),THERMO SET 65 F UH-2E,2G	TRANE; 42-S
UH-2P	2/1220	590	1/20	18	0.75	MSTR SW(UH-2I,2M,2N,2P),THERMO SET 65 F UH-2E,2G	TRANE; 42-S
UH-2Q	2/1220	590	1/20	18	0.75	MSTR SW(UH-2Q,2R),THERMO SET 65 F UH-2I,2M,2N,2P	TRANE; 42-S
UH-2R	2/1220	590	1/20	18	0.75	MSTR SW(UH-2Q,2R),THERMO SET 65 F UH-2I,2M,2N,2P	TRANE; 42-S
UH-3A	1/2120	300	1/25	12	0.24	MSTR SW(UH-3A),THERMO SET 65 F	TRANE; 20-S2

CR #1186 "Mast Sw" vs "Asta Sw"

NOTES:

1. THE MAXIMUM PRESSURE DROP FOR COOLING AND HEATING COILS SHALL NOT EXCEED 12 PSI UNLESS OTHERWISE STATED.
2. THE MAXIMUM WATER VELOCITY THROUGH ANY COIL SHALL NOT EXCEED 10 FEET PER MINUTE.
3. FAN MOTORS SHALL BE SELECTED TO OPERATE AT OR BELOW 90% OF THE MOTOR NAMEPLATE RATING.
4. AIR VELOCITY THRU HOT WATER COILS SHALL NOT EXCEED 700 FEET PER MINUTE.
5. MOTORS 1/2 HP AND LARGER ARE 460V/3PH; LESS THAN 1/2 HP ARE 120V/1PH; ALL MOTORS ARE 1750 RPM U.O.N.
6. MAXIMUM AIR VELOCITY THROUGH AIR WASHERS SHALL NOT EXCEED 525 FT/MIN.; HAVE AN EFFICIENCY LESS THAN 85%;AND HAVE A PRESSURE DROP GREATER THAN 0.25 "WC AT RATED FLOW.
7. BELT DRIVEN FANS SHALL EACH HAVE VARIABLE SPEED SHEAVES SET AT MIDRANGE.
8. FAN COIL UNITS SELECTION BASED ON 0.75 IN. WG. EXTERNAL STATIC PRESSURE UNLESS OTHERWISED.
9. FAN COIL UNITS SHALL BE EQUIPPED WITH 4 ROW COOLING/ 2 ROW HEATING COILS.
10. EVAPORATIVE COOLERS SHALL BE FACTORY ASSEMBLED AND PREWIRED AND COMPLETE WITH REMOTE CONTROL PANEL WITH INDICATING LIGHTS FOR THREE MODES OF OPERATION: HEAT, COOL, AND VENTILATE.
11. MECHANICAL CONTRACTOR SHALL FURNISH MOTOR STARTERS AND DISCONNECT SWITCHES FOR ALL FAN COIL UNITS, ROOF TOP HEATING AND COOLING UNITS, POWER VENTILATORS AND ROOF MOUNTED FANS, EVAPORATIVE COOLERS AND CONDENSERS AND UNIT HEATERS.
12. ELECTRICAL CONTRACTOR WILL FURNISH MOTOR STARTERS AND DISCONNECT SWITCHES FOR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND THE CENTRAL PLANT.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamey AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Programing & Security
WMFL Spokane, Wa.
Mechanical Electrical Structural
Sverdrup & Parcel & Assoc
San Francisco, Ca
Civil Landscape
Bissell & Karn, INC.
San Leandro, Ca
Food Service
Marshall Assoc.

SERVICE BUILDING EQUIPMENT SCHEDULES SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect

DATE 9-30-85
REVISED
2 ADD. 2-12/31/85
1 ADD. 4- 10/82

JOB NO 80-27
DRAWN BY AS
CHECKED JAL
SCALE NONE

LEE KARNEY

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO.
M4.01

C3158

SPECIAL REFRIGERATION UNITS

CODE	AC.S.1	AC.S.2
SERVICE	COOL STORAGE ROOM	MEAT PREPARATION
LOCATION	SECTOR 3 - ROOM 1341	SECTOR 4 - ROOM 1419
TYPE	ROOFTOP AC UNIT W/AIR-COOLED CONDENSER	ROOFTOP AC UNIT W/AIR-COOLED CONDENSER
CAPACITY, MBH T/S	12 / 0.4	132/122
OUTSIDE AIR F ROOM DESIGN TEMP F	95 55-60	95 52
FAN INDOOR: CFM	400	28 800
INCHES SP MOTOR 120V / 1PH	0.5 1/4 HP	0.5 1/4 HP
COMPRESSOR	1 TON	12 TONS
MOTOR 460V / 3PH	2 HP	7.5 HP
CONDENSING UNIT FAN(S)		
FAN MOTOR 460V / 3PH	1 HP	2 & 3 HP

EXPANSION JOINTS

MARK NO.	SIZE	AXIAL MOVEMENT	LATERAL MOVEMENT	NUMBER CORRUGATIONS	REMARKS
1CH	8"	1.25"	1/4"	5	EXPANSION JOINTS ARE 150# FLANGED, CONTROLLED FLEXING TYPE, FLEXONIC, OR APPROVED EQUAL. NATURAL GAS & #2 FUEL OIL
1HW	4"	2.00"	1/4"	7	
2CH	8"	1.50"	1/4"	5	
2HW	4"	2.50"	1/4"	8	
3CH	6"	1.00"	1/4"	4	
3HW	3"	1.75"	1/4"	8	
4CH	6"	1.25"	1/4"	5	
4HW	3"	2.00"	1/4"	8	
5CH	6"	1.50"	1/4"	5	
5HW	3"	2.50"	1/4"	9	
6CH	8"	2.00"	1/4"	6	
6HW	4"	2.40"	1/4"	8	

FLOW CONTROL VALVES

CODE	SERVICE	FLOW GPM	PSI ABSORBTION RATE	VALVE SIZE INCH	MFGR/MODEL
GFV-1	COOLING TOWERS PUMPS	4900	2-32	30	GRISWOLD;SERIES 3302A
GFV-2	CHILLED WATER PUMPS	3000	4-57	20	GRISWOLD;SERIES 3384A
GFV-3	HEATING WATER PUMPS	710	4-57	10	GRISWOLD;SERIES 3684A
GFV-4	HEAT EXCHANGER PUMPS	230	2-32	6	GRISWOLD;SERIES 3342A
GFV-5	BOILERS	940	2-32	12	GRISWOLD;SERIES 3692A

NOTE: REDUCING FLANGES ARE ACCEPTABLE FOR VALVE INSTALLATION

WATER CHILLERS

CODE	TONS REFRIG.	MOTOR KW	MOTOR V/PH	MOTOR AMPS LRA / FLA	COMPONENT	WATER EWT F	WATER LWT F	WATER GPM	WATER MAX P.D. FT	NO. OF PASSES	MFGR/MODEL
CH-1	850	582	460/3	3772 / 817	EVAPORATOR	57.6	44	1500	26.5	2	TRANE; CVHE-80 F W/HEAT RECOVERY
					CONDENSER	85	95	2454	17.5	2	CONDENSER
CH-2	850	582	460/3	3772 / 817	EVAPORATOR	57.6	44	1500	26.5	2	TRANE; CVHE-80 F W/HEAT RECOVERY
					CONDENSER	85	95	2454	17.1	2	CONDENSER

PUMPS

CODE	SERVICE	GPM	TOTAL HEAD FT.W.	SPEED RPM	MOTOR HP	MOTOR V/PH	MFGR/MODEL
P-1	CHILLED WATER	3000	150	1750	150	460/3	BELL & GOSSET MOD. VSCS 10X12X17 CENTRIF. DBL. SUCTION
P-2	CHILLED WATER (STAND-BY)	3000	150	1750	150	460/3	BELL & GOSSET MOD. VSCS 10X12X17 CENTRIF. DBL. SUCTION
P-3	COOLING TOWER	4900	70	1750	125	460/3	BELL & GOSSET MOD. VSCS 12X14X12 1/2 CENTRIF. DBL SUCTION
P-4	COOLING TOWER (STAND-BY)	4900	70	1750	125	460/3	BELL & GOSSET MOD. VSCS 12X14X12 1/2 CENTRIF. DBL SUCTION
P-5	HEATING WATER	710	150	1750	50	460/3	BELL & GOSSET MOD. 1510 5"CB CENTRIF. SINGLE SUCTION
P-6	HEATING WATER (STAND-BY)	710	150	1750	50	460/3	BELL & GOSSET MOD. 1510 5"CB CENTRIF. SINGLE SUCTION
P-7	HEAT EXCHANGER	230	70	1750	7.5	460/3	BELL & GOSSET MOD. 2.5"BB CENTRIF. SINGLE SUCTION
P-8	HEAT EXCHANGER (STAND-BY)	230	70	1750	7.5	460/3	BELL & GOSSET MOD. 2.5"BB CENTRIF. SINGLE SUCTION

EXPANSION TANKS

CODE	MFR AND MODEL NO	TYPE	ASME PRESSURE RATED PSI	PRE-CHARGED PRESSURE PSI	TANK VOLUMES GAL	SERVICE LOCATION	REMARKS
ET-1	BELL & GOSSETT B-2000	DIAPHRAGM	125	15	528	HEATING SYSTEM	BASE BID PACKAGE
ET-2	BELL & GOSSETT B-2000	DIAPHRAGM	125	15	528	HEATING SYSTEM	FUTURE INSTALLATION (ALT. BID)
ET-3	BELL & GOSSETT B-1200	DIAPHRAGM	125	15	317	CHILLED WATER SYSTEM	BASE BID PACKAGE

COOLING TOWERS

CODE	AMBIENT AIR T. WB. F	MOTOR HP	MOTOR V/PH	FAN CFM	HEAT REJECT. MBH	WATER EWT F	WATER LWT F	WATER GPM	WATER CONTROL VALVE ΔP	MFGR/MODEL
CT-1	70	30	460/3	123,048	8365	95	85	2450	20	MARLEY ; 8815
CT-1	70	30	460/3	123,048	8365	95	85	2450	20	MARLEY ; 8815

NOTES:

1. MECHANICAL CONTRACTOR SHALL FURNISH MOTOR STARTERS AND DISCONNECT SWITCHES FOR ALL FAN COIL UNITS, ROOF TOP HEATING AND COOLING UNITS, POWER VENTILATORS AND ROOF MOUNTED FANS, EVAPORATIVE COOLERS AND CONDENSERS AND UNIT HEATERS.
2. ELECTRICAL CONTRACTOR WILL FURNISH MOTOR STARTERS AND DISCONNECT SWITCHES FOR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND THE CENTRAL PLANT.

BOILERS

CODE	BOILER CAPACITY OUTPUT MBH	BOILER CAPACITY HP	FUEL CONSUMPTION GAS CFH	FUEL CONSUMPTION OIL GPH	CIRCULTING PUMP GPM	CIRCULTING PUMP HEAD FT	PRESSURE RATING PSI	VENT DIA. IN.	ELECTRICAL BLOWER MOTOR HP	ELECTRICAL AIR COMPRESSOR HP	ELECTRICAL OIL PUMP HP	ELECTRICAL BOILER CIRCULATOR HP	MFGR/MODEL
B - 1	20.088	600	25.200	180	300	15	60	24	25	7 1/2	1/2	2	INDUSTRIAL BOILER MOD. RELIANCE 3WB600 NATURAL GAS & #2 FUEL OIL
B - 2	20.088	600	25.200	180	300	15	60	24	25	7 1/2	1/2	2	INDUSTRIAL BOILER MOD. RELIANCE 3WB600 NATURAL GAS & #2 FUEL OIL

NOTES:
1. ALL MOTORS SHALL BE 460V/3PH
2. STARTER(S), CONTROL PANEL W/STEP DOWN TRANSFORMER SHALL BE PROVIDED AS PART OF BOILER TRIM
3. BOILER CIRCULATOR SHALL BE OF STAINLESS STEEL

AIR INTAKES

CODE	MAX. CFM	FILTERED	OVERALL DIMENSIONS	MANUFACTURER MODEL	REMARKS
AI # 1	600	YES	33x33x18	PENN-AIRETTE	COMPLETE W/BDD
AI # 2	2500	YES	28x28x18	PENN-PENNHOUSE	COMPLETE W/BDD
AI # 3	4000	YES	28x48x20	PENN-AIRETTE	COMPLETE W/BDD
AI # 4	6000	NO	58x58x24	PENN-AIRETTE	COMPLETE W/BDD
AI # 5	100000	NO	144x250x36	PENN-AIRETTE	COMPLETE W/BDD

AIR CONDITIONING UNITS

CODE	AC.G.1	AC.S.3
SERVICE LOCATION: CONDENSER EVAPORATOR	GUARD HOUSE ROOF ABOVE CEILING	UPS ROOM ROOF FREE STANDING C/W DISCHARGE PLENUM
TYPE	SPLIT TYPE SYSTEM	SPLIT TYPE SYSTEM
MFGR/MODEL	SANYO SAP241TC	DATA TEMP DMA 2120
COOLING T/S (MBH)	24/20	22.8/19.3
OUTDOOR AIR TEMP: SUMMER/WINTER F°	95°/30	95/30
INDOOR DESIGN TEMP F°	75	72 DB/60 WB
HEATING CAPACITY (kW/BTUH)		2/6800
FAN INDOOR: CFM	550	700
EXTERNAL STATIC "SP" INCH	0.13	0.375
SPEEDS (NUMBER) MOTOR, HP VOLTAGE/PHASE AMPS	2 230/3 13.5	 1/5 208/1 20
OUTDOOR SECTION: MODEL NO. VOLTAGE/PHASE AMPS	 230/3	 ACR 2120 208/1 15
HUMIDIFIER	NONE	ELECT. INFRA RED 9LB/HR
FILTERS	THROWAWAY TYPE	20x24x2

REMARKS: UNITS SHALL BE FACTORY TESTED AND WIRED, COMPLETE WITH CONTROLS, FILTERS AND ALL NECESSARY ACCESSORIES.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363 13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Avon Iotsuna AIA
Harold T. Hayashi CCS, CSI

Programing & Security
WMFL Spokane, Wa.
Mechanical, Electrical, Structural
Svendrup & Parcel & Assoc.
San Francisco, Ca
Civil, Landscape
Bissell & Karn, INC.
San Leandro, Ca
Food Service
Marshall Assoc.

SERVICE BUILDING EQUIPMENT SCHEDULES SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-86
REVISED
JOB NO 80-27 2666
DRAWN BY AS
CHECKED JAL
SCALE NONE
FOR CONSTRUCTION
CONTENTS
SERVICE
SHEET NO
M4.02
OF SHEETS

LEE KARNEY
C3158

STRIP FOOTING SCHEDULE				
WIDTH "W"	THICKNESS "T"	REINFORCEMENT LONG.	REINFORCEMENT TRANSV.	REMARKS
2'-0"	1'-0"	3-#5	#4@9	
2'-6"	1'-0"	4-#5	#4@9	
3'-0"	1'-0"	4-#5	#4@9	
3'-6"	1'-0"	5-#5	#4@9	
4'-0"	1'-4"	5-#5	#5@10	
4'-6"	1'-4	5-#6	#5@10	
5'-0"	1'-4	6-#6	#5@10	
5'-6"	1'-8	7-#6	#5@10	
6'-0"	1'-8	7-#6	#5@10	
3'-0"*	1'-6"	4-#7 TLB	#5@10	GRID LINE ② FROM ③ TO ⑭
1'-8"	1'-0"	3-#5	#4@10	
8'-0"	1'-8"	6-#7	#7@10	
		4-#5	#4@18	NOTE: TOP REINF UNDER ALL TILT-UP WALLS U.O.N.

SPREAD FOOTING SCHEDULE			
TYPE	SIZE (L x W)	THICKNESS "T"	REINFORCEMENT
(A)	3'-0"x3'-0"	1'-0"	4-#4 EW BOT.
(B)	3'-6"x3'-6"	1'-0"	5-#4 EW BOT.
(C)	4'-0"x4'-0"	1'-0"	6-#5 EW BOT.
(D)	4'-6"x4'-6"	1'-4"	6-#5 EW BOT.
(E)	5'-0"x5'-0"	1'-4"	6-#6 EW BOT.
(F)	5'-6"x5'-6"	1'-8"	6-#6 EW BOT.
(G)	6'-0"x6'-0"	1'-8"	6-#6 EW BOT.
(H)	6'-6"x6'-6"	1'-8"	7-#6 EW BOT.
(I)	7'-0"x7'-0"	1'-8"	8-#6 EW BOT.
(J)	8'-0"x8'-0"	1'-8"	9-#7 EW BOT.
(K)	9'-0"x9'-0"	1'-10"	11-#7 EW BOT.
(L)	6'-0"x7'-0"	1'-8"	8-#5 SW, 5-#6 LW BOT
(M)	8'-0"x20'-0"	3'-6"	21-#9 SW, 9-#9 LW BOT
(N)	6'-0"x9'-0"	1'-0"	10-#5 SW, 7-#5 LW T&B

STRIP FTG SCHEDULE AT OPENINGS		
OPENING WIDTH	THICKNESS (T)	REINF
2'-0 To 5'-0	1'-0"	#5@12 T&B
5'-0 To 6'-6	1'-0"	#5@6 T&B
6'-6 To 8'-0	1'-0"	#6@6 T&B
8'-0 To 9'-0	1'-0"	#7@6 T&B
9'-0 To 10'-0	1'-4"	#7@6 T&B

NOTE: SEE DIAGRAM ABOVE

NOTES:

1. FOR STEEL COLUMN BASE CONNECTION DETAILS SEE DWG. S4.03.
2. FOR CONCRETE COLUMNS SEE SCHEDULE ON DWG. S4.02.
3. STEEL COLUMN SIZES ARE SHOWN ON DWG. S3.02.
4. FOUNDATIONS ARE SYMMETRICAL ABOUT COLUMN OR WALL CENTER LINES U.O.N.
5. TOP OF ALL INTERIOR COLUMN FOOTINGS TO BE EL. 387.5 U.O.N.
6. FOR FOUNDATIONS OF WALLS NOT SHOWN SEE DRAWINGS S2.08 THROUGH S2.12
7. FOR STEPPED FOUNDATION SEE DET. 6 ON DRAWING S3.01 AND DET. 31 DRAWING S3.03.
8. FOOTING STEPS SHOWN ARE FOR GUIDANCE ONLY. CONTRACTOR MAY LOCATE THESE AS DICTATED BY CONSTRUCTION REQUIREMENTS.
9. FOR BASE PLATE EMBEDS AND FOUNDATION ANCHORS SEE DRAWING S2.05 AND S3.04.
10. ALL CMU WALLS ON THIS DRAWING ARE REFERRED TO AS STRUCTURAL WALLS ON DRAWING S0.03.. FOR ALL NON-STRUCTURAL WALLS SEE DRAWING S2.08 THRU S2.12 (GEN. WALL LAYOUTS).

CR #1243 Base embed fix for slotted holes
CR #1262 Fix misaligned base embeds
CR #1198 Backfill at interior walls

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamey AIA
Dean Avon Ishiuno AIA
Harold T. Hayashi CCS, CSI
Security
Walter McGough
Fehl, Lipsig P.S.
Spokane, WA 99201
Mechanical, Structural, Electrical
Sherlund & Parsel Associates
San Francisco, CA 94104
Landscape
Rich Sexton
Oakland, CA 94610
Civil
Bryant & Kern, Inc
Pleasanton, CA 94566
Fire Service
Ted Wendell Associates, Inc.
Burlingame, CA 94010

SE2660 REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

SERVICE BUILDING FOUNDATION PLAN SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISE: 1 ADDENDUM NO. 1 12/19/85
LEE KAMEY
C3158
JOB NO. 80-27 BGGB
DRAWN BY N.A.H.
CHECKED W.S.
SCALE
FOR CONSTRUCTION
CONTENTS
SERVICE
SHEET NO. S2.01
OF

FIRST FLOOR SLAB ON GRADE PLAN

NOTES:

1. ALL SLABS ON GRADE TO BE AT EL 390.0 EXCEPT AS NOTED.
2. RECESSES SHOWN ARE TO BE BELOW EL 390.0.
3. ALL SLABS ON GRADE TO BE 6" THICK EXCEPT AT FIRE STATION AND AT TRUCK BIN AREA WHERE SLABS ARE TO BE 8" THICK. FOR SLAB THICKNESS UNDER NON-STRUCTURAL WALLS AND DOUBLE WYTHE WALLS, SEE DWG. S0.03.
4. FOR EXACT LOCATIONS AND DIMENSIONS OF RECESSES, SEE ARCHITECTURAL DRAWINGS.
5. FOR FLOOR DRAIN AND SHOW DRAIN LOCATIONS AND DETAILS, SEE ARCHITECTURAL AND MECHANICAL DRAWINGS FLOOR DRAINS AND SHOWER DRAINS ARE 3/4" BELOW FINISHED FLOOR ELEVATION.
6. FOR LOCATION OF WALLS AND PARTITIONS AND DOOR AND WINDOW OPENINGS, NOT SHOWN ON THIS DRAWING SEE ARCHITECTURAL DRAWINGS AND DRAWINGS S2.08 THROUGH S2.12. ONLY STRUCTURAL WALLS ARE SHOWN ON THIS PLAN.
7. FOR TILT UP WALL PANEL PLAN, SEE DRAWING S2.05.
8. FOR TYPICAL STRUCTURAL MASONRY WALL DETAILS, SEE STANDARD DETAIL DRAWINGS S0.02 AND S0.03.
9. FOR FOUNDATION PLAN, SEE DRAWING S2.01.
10. EXTERIOR TILT-UP WALL PANELS ALONG GRID LINES (K) (1) (1A) (2) AND (3) ARE 9" THICK, ALL OTHER TILT-UP WALL PANELS ARE 8" THICK, U.O.N.
11. FOR TYPICAL TRENCH, SUMP FRAME AND COVER DETAILS, SEE STANDARD DETAIL DRAWING S0.02.
12. FOR MISCELLANEOUS ATTACHMENTS SUCH AS BUMPERS, RAILINGS, ETC. SEE ARCHITECTURAL DRAWINGS.
13. WHERE CONTROL JOINTS IN SLAB ARE REQUIRED, ANY JOINT BETWEEN HARDENED AND NEW CONCRETE MUST BE AS PER (10/S0.02), EXCEPT AN EXPANSION JOINT WHERE (11/S0.02) IS REQUIRED.
14. BOTTOM OF ALL T.S. COLUMNS AT EL. 389'-6, ALL OTHER STEEL COLUMNS SHOWN ___ SIZE ___ BOT. OF COL. EL.

TYPICAL REINFORCEMENT FOR SLAB ON GRADE
U.O.N.

8" SLAB #4 @ 18" E.W.
6" SLAB #5 @ 18" E.W.

NBN CORPORATION
ARCHITECTURE INTERIORS PLANNING RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-4383
Milich Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Security: Walker, McGough, Foltz, Lyerle, P.S. Spokane, WA 99201
Mechanical, Structural, Electrical: Rosenoue & Parker and Associates San Francisco, CA 94104
Landscape: Nan Sayleth Oakland, CA 94610
Cost: Bossel & Kern, Inc. Pleasanton, CA 94566
Food Service: The Marshall Associates, Inc. Burlingame, CA 94010

REGISTERED PROFESSIONAL ENGINEER LAMES R. MCGRAW SE2660 STRUCTURAL STATE OF CALIFORNIA

SERVICE BUILDING GRADE SLAB PLAN SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED
(4) ADDENDUM NO. 4 1/10/86

C3158 LEE KARNEY

JOB NO. 80-27 BGGB
DRAWN BY N.A.H.
CHECKED W.S.
SCALE

FOR CONSTRUCTION

CONTENTS: SERVICE

SHEET NO. S2.02 OF SHEETS

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamney AIA
Dean Aron Tokuno AIA
Harold T. Hayashi CCS, CSI

Structural
Walter McBough
Fehr, Lyons P.S.
Seattle WA 98101

Mechanical, Structural, Electrical
Sverdrup & Parker
Bechtel Associates
San Francisco, CA 94104

Landscape
Rich Seyforth
Oakland, CA 94610

Civil
Bissell & Karn, Inc
Pleasanton, CA 94566

Food Service
Food Service Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING 2ND FLOOR FRAMING PLAN SANTA RITA REPLACEMENT FACILITY

CR #1260 2ND Floor slab/beam 4½" x 4½"

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85

REVISE:
1. ADDENDUM NO. 1 - 12/13/85
4. ADDENDUM NO. 4 - 1/10/86

LEE KARNEY

C3158

JOB NO 80-27 BGGB

DRAWN N.A.H.

CHECKED W.S.

SCALE

FOR CONSTRUCTION

CONTENTS

SERVICE

SHEET NO

S2.03

OF SHEETS

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363 13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg AIA
Nobuo Nakamura AIA
Lee Kamey AIA
Dean Alan Iatauro AIA
Harold T. Horvath CCS, CSI

SERVICE BUILDING
STEEL DETAILS
SANTA RITA REPLACEMENT FACILITY

S2.03
F1

ROOF STEEL WORK NOTES:

1. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY THAT THE OPEN WEB JOISTS SHOWN ON THESE DRAWINGS AND AS SPECIFIED CAN SAFELY SUPPORT ALL VERTICAL LOADS AS PER SJI CAPACITY TABLES AND IN COMBINATION WITH SEISMIC LATERAL FORCES. SHOP DRAWINGS SHALL BE ACCOMPANIED BY CALCULATIONS, ICBO OR OTHER APPROVED TEST CERTIFICATES TO PROVE THE ADEQUACY OF ALL OWJS UNDER VERTICAL AND LATERAL LOADING. JOISTS HAVE BEEN SELECTED ON BASIS OF 3 P.S.F. MECHANICAL/ELECTRICAL LOADS. CHORDS ARE TO BE PROVIDED TO CARRY 12000 (MAX. TOTAL PER TRUSS) MECHANICAL/ELECTRICAL CONCENTRATED LOADS BETWEEN PANEL POINTS IN EQUIPMENT. IF HIGHER CONCENTRATED LOADS OCCUR, CONTRACTOR IS TO NOTIFY COUNTY.

2. METAL DECK SPAN AND ORIENTATION:

DENOTES DIRECTION OF DECK SPAN PARALLEL TO FLUTES

DENOTES LIMIT OF DECK WITHIN A SPECIFIED AREA

3. BRACING SHALL BE CROSS-BRACING AS PER SJI. ALL CROSS BRACING MEMBERS SHALL BE WELDED OR BOLTED AT THEIR POINT OF INTERSECTION.

4. ROOF METAL DECK AND WELDING: PROVIDE ASC PACIFIC 1-1/2" DEEP, TYPE "B" 1 GA DECKING OR EQUAL, WITH SAME OR BETTER ICBO LATERAL SHEAR CAPACITY.

SIDE SEAM WELDING 1-1/2" LONG @ 12" O/C AT ALL TRANSVERSE SUPPORTS INCLUDING O.W.J.'S.

AT CHANNEL, OWJ AND WALL SUPPORT EMBEDS, PROVIDE 1" @ MIN PUDDLE WELDS PER SHEET WIDTH AT 1ST, 3RD AND 5TH FLUTE.

PERIMETER 1" @ PUDDLE WELDS @ 12" O/C (MAX.).

5. FOR SIZES AND LOCATIONS OF ROOF OPENINGS, SEE MECHANICAL DRAWINGS M2.01, M3.01, M3.05. FOR FRAMING AT ROOF OPENINGS, SEE DETAILS 1 THRU 3 ON DRAWING S0.02.

CR #1421 CR #1114 Location of axial forces carrying joist CR #1494 CR #1092 Provide bracing for openings > 4" & < 16" CR #1093 Roof fascia support clips for openings CR #1146 Decking Splice Support Angles CR #1496 "FIX" CR #1183 "Fix" CR #1208 OWJ Bracing in Sector 2 CR #1582 Deck "Fix" CR #1583 Deck "Fix" CR #1584 Deck "Fix" CR #1624 Expansion Joints CR #1649 Revised Conn. Det for Added Tension

ROOF FRAMING PLAN

1/16" = 1'-0"

TOP OF STEEL (T.O.S.) = EL. 412'-9" U.D.N.

ITC #95 Add HT #13 Deck Support Fillet Clips

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Buskirk AIA
Noboru Nakamura AIA
Lee Kearney AIA
Dean Alan Tatsuno AIA
Harold T. Hayashi CCS, CSI

Structural
Walter, McGough, Fehr, Lyons, P.S.
Sacramento, CA 95201
Mechanical, Structural, Electrical
Everstrand & Parker and Associates
San Francisco, CA 94106
Landscape
Mark Sexsmith
Oakland, CA 94610
Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566
Food Service
Ed Marshall Associates, Inc.
Burlingame, CA 94010

REGISTERED PROFESSIONAL ENGINEER — E2660 — LEE KARNEY — ELECTRICAL — STATE OF CALIFORNIA

SERVICE BUILDING ROOF FRAMING PLAN SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or for extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY C3158

DATE	9-30-85-R
REVISED	① ADDENDUM NO. 1 12/13/85
JOB NO	80-27 SGSB
DRAWN BY	N.A.H.
CHECKED	W.S.
SCALE	1/16" = 1'-0"

FOR CONSTRUCTION

CONTENTS: SERVICE

SHEET NO S2.04 OF SHEETS

NOTES:

1. ◇ DENOTES CONNECTION TYPE DETAILED ON DRAWING S3.02 & S3.03. RDTATE DETAILS ACCORDING TO PLAN.
2. ALL CONNECTIONS FOR WALLS & SPANDRELS TO BE TYPE (A) U.O.N. EXCEPTIONS ARE TYPE (B) U.O.N. ON SPANDREL SCHEDULE.
3. ALL PILASTER CONNECTIONS TO WALLS & SPANDRELS TO BE TYPE (C) U.O.N. EXCEPTIONS ARE TYPE (D) U.O.N. ON SPANDREL SCHEDULE.
4. PILASTER TO PILASTER CONNECTIONS TO BE TYPE (A) U.O.N. EXCEPTIONS ARE TYPE (B) U.O.N.
5. ALL EXTERIOR TILT-UP WALL PANELS TO BE 9" THICK U.O.N.
6. ALL INTERIOR TILT-UP WALL PANELS TO BE 8" THICK U.O.N.
7. FOR ROOF SCUPPER LOCATIONS AND DETAILS, SEE ARCHITECTURAL DRAWINGS.
8. FOR DOOR AND WINDOW OPENING LOCATIONS AND DETAILS SEE ARCHITECTURAL DRAWINGS.
9. FOR RB (SPANDREL BM) SCHEDULE, SEE DRAWING S4.02 WHERE ARCHITECTURAL DWGS. SHOW PANEL JOINTS IN SPANDREL BEAMS, PROVIDE A REVEAL OF 1" DEPTH OF SAME EXTERIOR SHAPE AS A PANEL JOINT. (DUMMY JOINT).

PANEL JOINT LOCATIONS

1. CONTRACTOR MAY INCREASE PANEL WIDTHS TO SUIT CONSTRUCTION OPERATIONS.
2. CONTRACTOR SHALL PLACE PANEL JOINTS OR DUMMY JOINTS AT THE VERTICAL RUSTICATION LOCATIONS SHOWN, UNLESS OTHERWISE REQUIRED BY THE LIMITATIONS BELOW.
3. PANELS WITH CORBELS SHALL NOT BE SPLIT, EXCEPT AT PILASTERS.
4. CRITERIA FOR LOCATION OF JOINTS ARE AS SHOWN BELOW:

PANEL JOINTS ARE NOT PERMITTED IN SPANDREL BEAMS, WHERE ARCHITECTURAL DRAWINGS SHOW PANEL JOINTS IN SPANDREL BEAMS, PROVIDE A REVEAL OF 1" DEPTH OF SAME EXTERIOR SHAPE AS A PANEL JOINT (DUMMY JOINT).

VBN CORPORATION
ARCHITECTURE INTERIORS PLANNING RESEARCH
353-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI
Structural
Walker McGough, Foran, Lyons, Inc.
Sunnyvale, CA 94201
Mechanical, Sanitary, Electrical
Sedgwick & Parker and Associates
San Francisco, CA 94104
Landscape
Rich Sachsen
Oakland, CA 94610
Civil
Bissell & Karn, Inc
Pleasanton, CA 94566
Cost Service
Rutledge & Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING TILT UP PANEL PLAN SANTA RITA REPLACEMENT FACILITY

Drawings and specifications or instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY

C3158

DATE 9-30-85

REVISED: (1) ADDENDUM NO. 1 12/13/85

JOB NO. 80-27 BG&B

DRAWN BY N. A. H.

CHECKED W. S.

SCALE

FOR CONSTRUCTION

CONTENTS SERVICE

SHEET NO S2.05

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Milton Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamney AIA
Dean Alan Tatsuno AIA
Harold T. Hayashi CCS, CSI

Structural
Walker, McGough, Foltz, Lorenz, P.C.
Spokane, WA 99201

Mechanical, Electrical
Civil
Sverdrup & Parcel and Associates
San Francisco, CA 94104

Landscape
Mark Bayfarm
Oakland, CA 94610

Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566

Food Service
Gc Wagner Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING /SECTOR 5 FOUNDATION PLAN SANTA RITA REPLACEMENT FACILITY

LEE KAMNEY

C3158

Drawings and specifications as instruments of service are and shall remain the property of the Architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the Architect.

DATE 9-30-85

REVISED
1 ADDENDUM NO. 1 12/13/85

JOB NO 80-27 SGGB

DRAWN N. A. H.

CHECKED W. S.

SCALE

FOR CONSTRUCTION

CONTENT: SERVICE

SHEET NO S2.06

OF SHEETS

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamey AIA
Dean Aron Tatuno AIA
Harold T. Hayashi CCS, CS

Structural
Walker, McGough, Foltz, Lyons, P.C.
Seattle, WA 98201

Mechanical, Structural, Electrical
Sverdrup & Parcel and Associates
San Francisco, CA 94108

Landscape
Rich Seyfarth
Oakland, CA 94610

Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566

Fire Service
Rp Marshall Associates, Inc.
Burlingame, CA 94010

REGISTERED PROFESSIONAL ENGINEER
LEE KARNEY
C3158
STATE OF CALIFORNIA

SERVICE BUILDING / SECTOR 5 ROOF FRAMING PLAN SANTA RITA REPLACEMENT FACILITY

Drawings and specifications or instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85

REVISIONS
1 ADDENDUM NO. 1 12/13/85

JOB NO 80-27 SSGB
DRAWN N A H
CHECKED W.S.
SCALE

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
S2.07
OF SHEETS

NOTES:

1. FOR SIZE & EXACT LOCATION OF WALLS AND PARTITIONS, SEE ARCHL. DWG. A2.01.
2. ALL CMU WALLS ON THIS DWG. SHALL BE CONSTRUCTED AS SHOWN ON DETAIL 32 DWG. S0.03, U.O.N..
3. FOR TYPICAL CMU LINTEL, SEE DETAIL 45 DWG. S0.03.

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-1313

Milich Van Brunt FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Programing & Security
WMFL Spokane, Wa.

Mechanical Electrical Structural
Sverdrup & Parcel & Assoc.
San Francisco, Ca

Civil, Landscape
Bissell & Karn, INC.
San Leandro, Ca

Food Service
Marshall Assoc.

SERVICE BUILDING GENERAL WALL LAYOUT/SECTOR 1 SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED

JOB NO 80-27 8608

DRAWN BY LDW

CHECKED W.S.

SCALE 1/8" = 1'-0"

FOR CONSTRUCTION

CONTENTS
SERVICE

SHEET NO
S2.08

OF SHEETS

LEE KARNEY

C3158

REGISTERED PROFESSIONAL ENGINEER
SE 2660
STATE OF CALIFORNIA

NOTES:
1. FOR SIZE AND EXACT LOCATION OF WALLS AND PARTITIONS, SEE ARCHL. DWG. A2.02.
2. ALL CMU WALLS ON THIS DWG. SHALL BE CONSTRUCTED AS SHOWN ON DETAIL 3Z DWG. S0.03, U.O.N.
3. FOR TYPICAL CMU LINTEL SEE DET. 4S DWG. S0.03, AND DET. 2G DWG. S0.02.
MATCH LINE
RAMP DOWN
SERVICE BUILDING
GENERAL WALL LAYOUT/SECTOR 2
SANTA RITA REPLACEMENT FACILITY
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
FOR CONSTRUCTION
SERVICE
S2.09
LEE KARNEY
C3158
NORTH

NOTES:

1. FOR SIZE AND EXACT LOCATION OF WALLS AND PARTITIONS, SEE ARCHL. DWG. A2.03.
2. ALL CMU WALLS ON THIS DWG. SHALL BE CONSTRUCTED AS SHOWN ON DETAIL 32 DWG. S0.03, U.O.N.
3. FOR TYPICAL CMU LINTEL, SEE DET. 45 DWG. S0.03, AND DET. 26 DWG. S0.02.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Akin Tatsuno AIA
Harold T. Hayashi CCS, CSI

Programing & Security
WMFL Spokane, Wa.
Mechanical Electrical Structural
Svendrup & Parcel & Assoc.
San Francisco, Ca
Civil Landscape
Bissell & Karn, INC
San Leandro, Ca
Food Service
Marshall Assoc.

SERVICE BUILDING GENERAL WALL LAYOUT/SECTOR 3 SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect

C3158 LEE KARNEY

DATE	9-30-85
REVISED	
JOB NO	80-27
DRAWN BY	L D W
CHECKED	W.S
SCALE	1/8" = 1'-0"

FOR CONSTRUCTION

CONTENTS: SERVICE

SHEET NO S2.10 OF SHEETS

NOTES:

1. FOR SIZE AND EXACT LOCATION OF PARTITIONS AND WALLS, SEE ARCHL. DWG. A2.04.
2. ALL CMU WALLS ON THIS DWG. SHALL BE CONSTRUCTED AS SHOWN ON DETAIL 32 DWG. S0.03, U.O.N.
3. FOR TYPICAL CMU LINTELS, SEE DET. 26 DWG S0.02, & 45 DWG. S0.03.
4. SEE ARCHL. DWGS. A2.04 A5.05 & A5.06 FOR WALL & PARTITION HEIGHTS.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg AIA
Noboru Nakamura AIA
Lee Kamey AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Programing & Security
WMFL Spokane, Wa.
Mechanical, Electrical, Structural
Greenthal & Parker & Assoc.
San Francisco, Ca
Civil, Landscape
Bissell & Karn, INC.
San Leandro, Ca.
Food Service
Marshall Assoc.

SERVICE BUILDING GENERAL WALL LAYOUT/SECTOR 4 SHT. 1
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY

C3158

DATE	9-30-85
REVISED	
JOB NO	80-27
DRAWN BY	LDW
CHECKED	W.S.
SCALE	1/8"=1'-0"

FOR CONSTRUCTION

CONTENTS: SERVICE

SHEET NO. S2.11

NOTES:

1. FOR SIZE AND EXACT LOCATION OF WALLS AND PARTITIONS, SEE ARCHL. DWG. A2.05.
2. ALL CMU WALLS ON THIS DWG. SHALL BE CONSTRUCTED AS SHOWN ON DETAILS 36 AND 39, UON.
3. FOR TYPICAL CMU LINTEL SEE DETAILS 26 DWG. S0.02, AND 45 DWG. S0.03.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Avron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Programming & Security
WMFL Spokane, Wa.
Mechanical Electrical Structural
Sverdrup & Parpet & Assoc.
San Francisco, Ca
Civil Landscape
Gasset & Kern, INC.
San Leandro, Ca.
Food Service
Marshall Assoc.

SERVICE BUILDING
GENERAL WALL LAYOUT/SECTOR 4 SHT. 2
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY

DATE	9-30-88
REVISED	
JOB NO	80-27
DRAWN BY	DW
CHECKED	W. S.
SCALE	1/8" = 1'-0"

C3158

FOR CONSTRUCTION

CONTENTS

SERVICE

SHEET NO.

S2.12

OF SHEETS

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-1313

Milton Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamney AIA
Dean Aron Iokiuno AIA
Harold T. Hayashi CCS, CSI

Security
Walker, McGough, Foltz, Lyons, P.S.
Seattle, WA 98201

Mechanical, Structural, Electrical
Sverdrup & Parcel and Associates
San Francisco, CA 94104

Landscape
Mark Bertram
Oakland, CA 94610

Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566

Food Service
The Marshall Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING FOUNDATION SECTIONS SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KAMNEY
C3158

DATE 9-30-85
REVISED

JOB NO 80-27 SSSB
DRAWN BY N.A.H.
CHECKED W.S.
SCALE

FOR CONSTRUCTION
CONTRACT
SERVICE

SHEET NO
S3.01
OF SHEETS

ELEVATION : WALL PANEL CHORD CONNECTION

TYPE A OR B CONNECTION

SEE DET 2 & 3 DWG S3.03

ELEVATION : PILASTER TO WALL PANEL CHORD CONN

TYPE C OR D CONNECTION

SEE DETAIL 3 DWG S3.03

NOTE: PROVIDE CHORD CONNECTIONS @ ROOF & 2ND FLOOR AS DETAILED

ELEVATION: WALL PANEL INTERMEDIATE CONN

INTERMEDIATE CONNECTION

SEE DET 2 & 3 DWG S3.03

TYPE A OR B

ELEVATION : PILASTER TO WALL PANEL INTERMEDIATE CONN

INTERMEDIATE CONNECTION

SEE DETAIL 3 DWG S3.03

TYPE C OR D

TYPE G CR #1415 "FIX"

TYPE G1

TYPE H CR #1420 "FIX" (SHOWN OPP. HAND)

NOTE: CONNECT PANEL 1 & 2 FINAL CONNECTION PANEL 3

SECTION A TYP 3 PLACES

TYPE J

DETAIL 3 S2.05 ROTATED 180°

CR #1549 "FIX"

TYPE K

SECTION B

SECTION X

NOTE: SEE SECT T FOR SPANDRELS CONNECTED TO SHORT WALLS

CR #252 LONG WALL L > 40' SHORT WALL L ≤ 40'

SECTION U TYPE B

SECTION W TYPE D

CR #1411 "FIX"

TYP @ SPANDREL BEAMS CONNECTED TO LONG WALLS

NOTE: SEE SECT V FOR SPANDRELS CONNECTED TO SHORT WALLS

TYPE L

NOTE: FOR DETAILING NOT SHOWN SEE V

CR #1414 "FIX" CR #1412 "FIX" CR #1411 "FIX"

TYP. PANEL CONNECTION

SECTION T TYPE A

TYPICAL JOINT SEAL

DETAIL 1

TYPICAL PILASTER REINF

DETAIL 2

TYP. PANEL CONNECTION

SECTION V TYPE C

NOTE: CONNECTOR TYPES G, G1, H, J, K & L ARE CORNER CONNECTIONS. FOR SPACING SEE 2 & 3 S2.05 S2.03

GENERAL NOTES FOR TILT UP PANELS:

1. CONTRACTOR TO SUBMIT SHOP DETAILS SHOWING LOCATION OF PANEL JOINTS USING CONNECTIONS AS DETAILED ON THESE DRAWINGS. LOCATION OF EXPANSION JOINTS SHOWN ON THE DRAWINGS SHALL NOT BE ALTERED.
2. PANEL JOINTS SHALL BE LOCATED SO THAT NO BEAM OR TRUSS SUPPORT SHALL STRADDLE ANY JOINT BETWEEN PANELS. SEE DRAWING S2.05 FOR ADDITIONAL NOTES.
3. ALL ARCHITECTURAL, MECHANICAL AND ELECTRICAL OPENINGS, SHEEDS AND RECESSES IN THE WALL PANELS SHALL BE COORDINATED AND SHOWN ON THE SHOP DRAWINGS.
4. TYPICAL EXTERIOR PANEL 8" O/A THICK WITH HORIZONTAL REVEALS 1" X 1" AS ON ARCH. DWGS.
5. TYPICAL INTERIOR WALLS AND DIVIDING WALLS AT EXP. JTS. ARE TO BE 8" THICK U.O.N.
6. ALL CONNECTORS OR DOWELS TO BE ASTM A 615 GRADE 40, AND HEADED STUDS OF ASTM A108 WHERE SHOWN.
7. COVER CONNECTIONS WITH TYPE I GROUT.

VBN CORPORATION
ARCHITECTURE INTERIORS PLANNING RESEARCH
363 13th Street
Oakland, California 94612
telephone (415) 763-1313
Mitch Van Balug FAIA
Nobuo Nakamura AIA
Lee Karney AIA
Dean Alan Tatsuno AIA
Harold T. Hayashi CCS, CSI

Security: Walker, Wellington, Fritz, Lyons P.S. Seattle, WA 98101
Mechanical, Structural, Electrical: Everroad & Parrot and Associates San Francisco, CA 94109
Landscape: Dan Sanborn Oakland, CA 94612
Civil: Bissell & Karn, Inc. Pleasanton, CA 94566
Food Service: Van Warmerdam Associates, Inc. Emeryville, CA 94608

SERVICE BUILDING TILT UP WALL DETAILS SHT. I SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85
REVISED
LEE KARNEY
C3158
JOB NO 80-27 8688
DRAWN BY N.A.H.
CHECKED W.S.
SCALE
FOR CONSTRUCTION
CONTENTS SERVICE
SHEET NO S3.02

NBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363 13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg AIA
Noboru Nakamura AIA
Lee Kamley AIA
Dean Alan Tatsuno AIA
Harold T. Hayashi CCS, CSI

Structural
Walker, McBride, Fahr, Lyons, P.S.
Spokane, WA 99201

Mechanical, Electrical
Sverdrup & Parcel and Associates
San Francisco, CA 94104

Landscape
Rich Sarjeant
Oakland, CA 94610

Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566

Food Service
Sin Wai Hall Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING TILT UP WALL DETAILS SHT.2 SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY

DATE	9-30-85
REVISIONS	
JOB NO.	80-27 BGGB
DRAWN BY	N.A.H.
CHECKED	W.S
SCALE	

FOR CONSTRUCTION

CONTENTS

SERVICE

SHEET NO.

S3.03

C3158

VBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363-13th Street
Oakland, California 94612
Telephone (415) 763-1383

Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kearney AIA
Dean Aron Tofsuno AIA
Harold T. Hayashi CCS, CSI

Security
Walter, McDougall, Fatta, Lynch, P.S.
Seattle, WA 98201

Mechanical, Electrical, Sanitary
Smithroe & Parsch
San Francisco
San Francisco, CA 94109

Landscape
Rich Sorensen
Oakland, CA 94610

Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566

Structural
Rutherford & Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING
WALL SECTIONS & DETAILS
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect. The reproduction of which, when made, is restricted to the original site for which they are not to be used by the owner or others for extensions to the project except by agreement in writing and with appropriate compensation to the architect.

DATE 8-30-85
REVISIONS
1 ADDENDUM No. 1 12/13/85

JOB NO 80-27 SSB
DRAWN: A
CHECKED: W.S.
SCALE

FOR CONSTRUCTION
CONTINUE

SERVICE

SHEET NO
S3.04
OF SHEETS

LEE KARNEY
C3158

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363 10th Street
Oakland, California 94612
Telephone (415) 763-1313
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Arpa Tatsuno AIA
Harold T Hayashi CCS, CSI

Structural
Wilson, McGough, Tate, Lynch P.S.
Sacramento, CA 95821

Mechanical, Electrical
Sandrow & Parrot and Associates
San Francisco, CA 94108

Landscape
Park Seymour
Oakland, CA 94610

Civil
Bissell & Karn Inc
Pleasanton, CA 94566

Field Survey
Bay Worldwide Association, Inc.
Burlingame, CA 94010

SERVICE BUILDING STEEL DETAILS SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

LEE KARNEY
C3158

DATE	9-30-85
REVISIONS	
JOB NO	80-27 B&GS
DRAWN BY	N. A. H.
CHECKED	W.S
SCALE	

FOR CONSTRUCTION
(CONTINUED)

SERVICE

SHEET NO
S3.05
OF SHEETS

NBN CORPORATION

ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363 15th Street
Oakland, California 94612
telephone (415) 763-1313

Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Kamney AIA
Dean Aron Tatsuno AIA
Harold I. Hayashi CCS, CS

Security
Walker, McGough, Foltz, Lyons, P.C.
Spokane, WA 99201

Mechanical, Electrical
Engineers
Rosendahl & Parker and Associates
San Francisco, CA 94104

Landscape
Hoch Bernstein
Oakland, CA 94610

Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566

Geotechnical
Kleinfelder Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING MISCELLANEOUS DETAILS
SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the undersigned whether the project for which they are made is erected or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the architect.

DATE 9-30-85-R

REVISE
1 ADDENDUM NO. 1-12/13/85
5 ADDENDUM NO. 3-1/16/86

JOB NO 80-27 S&B

DRAWN N.A.H.

CHECKED W.S.

SCALE

FOR CONSTRUCTION

COMMENT SERVICE

SHEET NO S3.06

OF SHEETS

LEE KARNEY C3158

SECTION A
S2.01 THRU S2.04
SECTION B
S2.01
S2.02
SECTION C
SECTION G
S2.02
SECTION D
S2.01 THRU S2.03
SECTION E
S2.01 THRU S2.03
SECTION K L AS NOTED
DETAIL I
SECTION F
S2.01 THRU S2.04
S2.06 & S2.07
SECTION J
SECTION H
S2.05
SECTION M
SECTION N
SECTION P
SECTION R
SECTOR 5
SECTOR 4
SPANDREL RB-11 FOR REINF SEE SCHED S4.02
SPANDREL RB-8 FOR REINF SEE SCHED S4.02
TILT-UP WALL
CMU WALL
C/P WALL
WINDOW OPNG
FOR REINF SEE DWG S4.01
FOR REINF SEE DWG S2.02
RECESS WHERE SHOWN ON PLAN
STRIP FTG REINF SEE SCHED S2.01
FTG REINF SEE SCHED S2.01
STRIP FTG REINF SEE SCHED S2.01
FOR PILASTER BASE ANCHORS @ GRID LINE H & J SEE DET. 3 S3.08
FUSION WELD TO EQUAL FULL BAR YIELD CAPACITY, TYP
FLEXIBLE SEALANT OVER SHEET METAL COVER
TACK WELD
CENTER IN PANEL
EMBED IN 3 PLACES SEE SECT A S3.02
TILT-UP WALL
PILASTER 18" x 18"
SIM DPP HAND
TYP BOTH SIDES
5-#6 E.F. LAP SPLICES TO #8 ABOVE 2ND FLOOR
#3 TIES @ 8"
#3 @ 16
2½" CLR
4-#6 E.F.
#4 TIES
12-#8
2-#6
#6 E.F.
1½" CLR TYP U.O.N.
EL 415.5' (REF)
EL 390.0'
EL 387.5'
EL 386.0'
EL 385.0'
EL 400.0'
EL 414'-7½"
T/FTG EL 387.5
T/FTG EL 385.0'
1ST FL EL 390.0'
T/2ND FL EL 400.5'
T/1ST FL EL 390.0'
T/2ND FL
1ST FL
2ND FL
6" SLAB
3" EXP JT
WG
ENV 394'-0"
CONN DETAILING T & B OF TS
CONN DETAILING SEE SECT F S3.05
CURB DETAILING @ SUMP SIM DET 4 S0.02
TRENCH OPNG 12" x 14" W/ FINE SCREEN SEE LAUNDRY DWGS (TYP)
FOR RAMP REINF NOT SHOWN SEE SECT E S3.01
INTERIOR COATING SEE SPECS
WINDOW OPNG SEE DWGS A2.04 & A9.03
REINF NOT SHOWN SEE SECT D
SEE ARCH DWG FOR DIMS
VERIFY W/ARCH DWGS
DOOR OPNG
#4 @ 18 DOWELS STAGGERED
#4 @ 12 DOWELS STAG
#5 @ 12 EW
CSJ DET 10 S0.02
#4 @ 10 DOWELS STAGGERED
#4 @ 10 DOWELS STAGGERED
#4 @ 12 DOWELS STAGGERED
#4 @ 18" x 2'-0" LG DOWELS STAGGERED
#4 @ 18" x 2'-0" LG DOWELS STAGGERED (BEND @ PIT)
#4 @ 12 DOWELS 2'-6" STAGGERED
#5 @ 12 DOWELS STAGGERED 2'-6"
#4 @ BOND BMS (T & B)
#4 @ 16
#4 @ 10
#4 @ 12
#4 @ 18
#4 E.W.
#5 @ 12
#5 @ 12 EW
#6 @ 12 DOWELS
#6 @ 6
#5 @ 12
#4 @ 12 (TYP WALL UON)
#4 @ 18 (TYP U.O.N.)
#4 @ 18 DOWELS STAGGERED
#4 @ 12 TIES TYP U.O.N.
#6 @ 9 E.F. TYP U.O.N.
#6 @ 9 E.F. TYP U.O.N.
#3 @ 8" TYP U.O.N.
#6 VERT
#4 TIES
6-#8 E.F. @ SECT K
6-#6 E.F. @ SECT L
L5x5
MIN 3 EACH FACE
16 Ga SHEET METAL COVER
3-¾" ϕ BOLTS
L5x5x½ CONT ALONG EDGE W/ ⅝"ϕ x 4½" HEADED STUDS @ 8" Ga. & #6 DOWELS 8" Ga. ALT 3'-0" LG W/3'-9" LG
⅝"ϕ x 10" x 1'-0" @ 3'-0" SPA
W/ ⅝"ϕ BOLT IN SLOTTED HOLE WASHER & NUT FINGER TIGHT
FOR EXACT DIMENSIONS SEE DWGS. A2.01 & A9.03
E.J. DET 11 S0.02
CSJ DET 10 S0.02
DET 4 S0.02
DET 3 S3.08
DET 1 S3.04
DET 2 S3.04
DET 1 S3.04
DET 3 S3.08
DET 1 S3.04
DET 2 S3.04
DET 1 S3.04
DET 1 S3.04
DET 1

DETAIL 1 @ TYP EXTERIOR WALL
S2.05

DETAIL 2 TYP INTERIOR WALL
S2.05

SECTION A

SECTION B

DETAIL 3
S2.05

DETAIL 4
1/4"=1'-0"
S2.03

SECTION C
S2.07

SECTION D

NOTE:
ADD'L WALL REINF.
REINF APPLIES TO BOTH WALLS @ LINE (H)

SECTION E
1/4"=1'-0"
S2.03

SECTION F
1"=1'-0"

SECTION G

NBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH

363 13th Street
Oakland, California 94612
Telephone (415) 763-1313

Mitch Van Bourg FAIA
Nobuo Nakamura AIA
Lee Karney AIA
Dean Aron Tatsuno AIA
Harold T. Hayashi CCS, CSI

Structural
Walker McGough Foltz, Lyons PS
Seattle, WA 98101

Mechanical, Structural (Electrical)
Sverdrup & Parcel and Associates
San Francisco, CA 94104

Landscape
Rich Sachatz
Oakland, CA 94610

Civil
Bissell & Karn, Inc.
Pleasanton, CA 94566

Food Service
Mc Morrow Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING WALL SECTIONS & DETAILS SHT. 2
SANTA RITA REPLACEMENT FACILITY

"These plans and specifications are and shall remain the property of the architect whether the project for which they are made is executed or not. They are not to be used by the owner on other work, except by agreement in writing and with appropriate compensation to the architect."

LEE KARNEY

DATE 9-30-85
REVISED
(4) - ADDENDUM NO. 4 1/10/86

JOB NO 80-27 8888
DRAWN BY N.A.H.
CHECKED W.S.
SCALE

FOR CONSTRUCTION
CONTRACT
SERVICE

SHEET NO
S3.08
OF

C3158

TYPICAL 2 ND FLOOR SLAB PANEL - TOP REINF

TYPICAL 2 ND FLOOR SLAB PANEL - BOTT. REINF

EXCEPTION # 1

2 ND FLOOR SLAB PARTIAL PNL PLAN

TYPICAL DROP PANEL

SECTION A

3/4" = 1'-0"

SECTION K

S2.07

DETAIL ELEVATION E

S3.04

DETAIL ELEVATION F

S3.04

ELEVATION @ BEAM MB-1

SECTION B

3/4" = 1'-0"

S2.03

SECTION G

SECTION H

SECTION D

3/4" = 1'-0"

S2.03

EXCEPTION #2

2 ND FLOOR SLAB PARTIAL PNL PLAN

1/8" = 1'-0"

SECTION J

NOTES:

1. ALL EMBEDS FOR OTHER TRADES TO BE LOCATED BEFORE REINFORCEMENT IS PLACED.
2. FOR COLUMN STRIP AND MIDDLE STRIP DIMENSIONS, SEE DWG. S2.03.

VBN CORPORATION
ARCHITECTURE
INTERIORS
PLANNING
RESEARCH
363 15th Street
Oakland, California 94612
Telephone (415) 763-7313
Mitch Van Bourg FAIA
Nabozou Nakamura AIA
Lee Karney AIA
Dean Akira Tatsuno AIA
Harold F. Hovath CCS, CSI

Structural
Weber, McGough, Foltz, Lyons P.S.
Spokane, WA 99201

Mechanical, Structural, Electrical
Syranus & Parsons and Associates
San Francisco, CA 94108

Landscape
Hoch Associates
Oakland, CA 94618

Civil
Brown & Kaul, Inc.
Pleasanton, CA 94566

Cost Services
Rex Marshall Associates, Inc.
Monterey, CA 93940

SERVICE BUILDING CONCRETE REINFORCEMENT DETAILS SANTA RITA REPLACEMENT FACILITY

Drawings and specifications as instruments of service are and shall remain the property of the Architect whether the project for which they are made is executed or not. They are not to be used by the owner on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the Architect.

DATE 9-30-85

REVISED

LEE KARNEY

C3158

JOB NO. 80-27 SSSS

DRAWN BY N.A.H

CHECKED W.S.

SCALE

FOR CONSTRUCTION

CONTEXT

SERVICE

SHEET NO. S4.01

OF sheets

CONCRETE SPANDREL BEAM SCHEDULE

Bull. # 7 Item # 32

MARK	DETAIL No.	SIZE W	SIZE D	SIZE B	REINFORCING BOTTOM No.	BOTTOM SIZE	HORIZONTAL BARS NO. AT EACH FACE	HORIZONTAL BARS SIZE	STIRRUPS SIZE	STIRRUPS SPACING THRU-OUT SPAN	END DETAILS (SEE DWGS S2.03 & S3.02 FOR CHORD & SHEAR CONNECTIONS)		REMARKS
RB-1 RB-1A	1	12"	7'-1½"	7"	3	#9	12	#6	#3	10"	SECT C @ WALL	SECT D @ COL	
RB-2	1	12"	7'-1½"	7"	3	#9	12	#6	#3	10"	SIM TO DETAIL D.H. @ 2nd LINE	SECT C @ 2nd LINE	
RB-3	1	9"	7'-1½"	7"	2	#7	8	#4	#3	12"	DET 1 S3.05		
RB-4	1	9"	7'-1½"	7"	2	#7	8	#4	#3	12"	DET 1 S3.05		
RB-5	1	8"	VARIES 14"-3½" IN 4'-5½"	VARIES 2'-3½" TO 2'-6½"	2	#9	15	#4	#3	12"	DET 11	DET 1 S3.05	Soffit of Beam Elev 398'-6½"
RB-6	1	12"	12'-0"	2'-2½"	3	#9	13	#6	#3	10"	DET 6	DET 7	
RB-7	2	9"	SEE REMARKS	N/A	2	#9	16	#4	#3	12"	DET 12	DET 13	SEE ELEV 5 ON S3.04 FOR MORE INFO
RB-8	1	12"	VARIES 14"-3½" IN 7'-1½"	VARIES 1'-7" TO 1'-5½"	3	#9	8	#6	#3	10"	SECT B	DWG S3.03	
RB-9	3	9"	VARIES 14"-3½" IN 7'-1½"	N/A	2	#7	9	#4	#3	12	SECT E @ LINE 1X	SECT E @ LINE 2	CHORD CONNS & BRG REINF NOT REQ'D
RB-10	1	9"	SEE REMARKS		3	#8	11	#4	#3	12	SECT A	DWG S3.03	BOT OF BM IS AT EL 401'-0"
RB-11	5	9"	VARIES 14"-9" TO 16'-7"	VARIES 1'-5" TO 2'-9½"	2	#7	9	#4	#3	12"	DET 1 S3.03	SECT C O.H.	
RB-12	3	9"	SEE REMARKS	N/A	2	#9	18	#4	#3	12"	DETAIL 10		SEE 7 S3.04 1
RB-13	1 K	16"	10'-11½" TO 13'-8½"		2	#8	14	#4	#3	12"	DETAIL 1 S3.03		
RB-14	1	8"	VARIES 14"-3½" IN 10'-11"	VARIES 1'-7" TO 1'-11"	2	#4	2	#4	#3	12"	SECT E S4.01	SECT F S4.01	CHORD CONNECTIONS & BRACING REINFORCEMENT NOT REQUIRED
RB-15	1	9	VARIES 14"-3½" IN 10'-11"	VARIES 1'-7" TO 1'-10"	2	#9	10	#4 EF	#3	12"	SECT E S4.01	SECT F S4.01	
RB-16	3	8"	VARIES 14"-3½" TO 8'-10½"	N/A	2	#6	7	#4	#3	12"	SIMILAR TO SECT E	SIMILAR TO SECT E	NO BEARING SEAT - ERECTION SUPPT REQUIRED
RB-17			VARIES 14"-3½" IN 7'-1½"	VARIES 1'-7" TO 1'-9"	2	#6	6	#4 EF	#3	12"			

Bull. # 6 Item # 33

Bull. # 7 Item # 38

Bull. # 4 Item # 33

COLUMN REINFORCEMENT SCHEDULE

SIZE & TYPE	LOCATION	V	S1	S2	E	TIE DETAIL
16"φ C.I.P.	SECTOR 5	8-#8	#4 @ 4" O/C	#4 @ 6" O/C	0"	#4 TIES @ 4" FULL HT INCL. WITHIN PTG
18"x18" C.I.P.	COL LINE 2 UNDER RB-1/RB-1A	8-#8	SETS OF #3 @ 8	SETS OF #3 @ 8	SEE NOTE 1	
18"x18" C.I.P.	UNDER 10" FLAT SLAB	16-#9	SETS OF #3 @ 8	SETS OF #3 @ 16	8"	
18"x18" x10" PILASTER	SEE DWG S2.05	4-#7	SETS OF #3 @ 5	SETS OF #3 @ 10	SEE DETAILS S3.05	
18"x18" PILASTER	UNDER 10" FLAT SLAB	8-#8	SETS OF #3 @ 8	SETS OF #3 @ 16	8"	
18"x18" PILASTER	COL LINES 4 & C UP TO 2ND FL	6-#7	8-#3	SETS OF #3 @ 16	SEE DETAILS S3.03	
18"x18" PILASTER	UP TO ROOF SEE DWG S2.05	6-#7	SETS OF #3 @ 8	SETS OF #3 @ 16	N/A	
18"x18" C.I.P. ENCASED W/10	INTERSECTION OF COL LINES 3B & 2	4-#7	#3 @ 8	#3 @ 8	8"	

NOTES:
1. VERT REINF IN 18" SQ COL UNDER RB-1 TO HAVE 2" CLEAR FROM TOP OF COL (NO HOOKS REQ'D).
2. CONC COL TO FTG AS SHOWN. STEEL COL TO FTG SEE DET 4 S4.03

VBN CORPORATION
ARCHITECTURE INTERIORS PLANNING RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1383
Mitch Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Alan Tatsuno AIA
Harold T. Hayashi CCL CSI

Structural
Walter McGough
Palo Alto, Calif.
Sandra Wit 280201

Mechanical, Electrical
Electrical
Engineering & Design
and Associates
San Francisco, CA 94106

Landscape
Ruth Sorlanda
Oakland, CA 946 18

Civil
Bessey & Sung, Inc.
Burlingame, CA 94066

Soils Service
Rex Moriyal Associates, Inc.
Burlingame, CA 94010

SERVICE BUILDING CONC. SCHEDULES & DETAILS SANTA RITA REPLACEMENT FACILITY

DATE 9-30-85
REVISIONS 1 ADDENDUM NO. 1 12/16/85

LEE KARNEY

C3158

JOB NO 80-27 8888
DRAWN N. A. H.
CHECKED W. S.
SCALE

FOR CONSTRUCTION

SERVICE

SHEET NO S4.02
OF SHEETS

FRAMED BEAM CONNECTION TABLE		
BEAM DEPTH	MIN LENGTH L* INCHES	BEAM SHEAR * KIPS
8	5½	12
10	5½	12
12	7½	20
14	8½	35
16	8½	40
18	8½	52
21	11½	55
24	11½	70
27	11½	70
30	14½	75
33	17½	75
36	17½	90 + LATERAL

* - USE SHEAR VALUES SHOWN TO PROPORTION CONNECTIONS EXCEPT WHERE HIGHER BEAM REACTIONS ARE SHOWN ON FRAMING PLANS OR DETAILS.

NOTE:

A 325 F BOLTS USED UNLESS OTHERWISE NOTED. WHERE SHORT SLOTTED TYPE HOLE CONNECTIONS ARE REQUIRED, AISC CONNECTIONS TABLE II (PAGE 4-26) MAY BE USED, PROVIDED THE NUMBER OF BOLTS OR BOLT DIAMETER IS INCREASED SO AS TO PROVIDE A SHEAR CAPACITY LISTED UNDER CORRESPONDING TABLES IIA PAGES 4-24; 4-25. IN AISC (1980) MANUAL OF STEEL CONSTRUCTION. FOR SINGLE PLATE TAB CONNECTIONS USE AISC ENGINEERING FOR STEEL CONSTRUCTION (1984 EDITION) TABLES C7 THROUGH C13 AS APPROPRIATE TO MATCH SHEAR CAPACITY FOR TABLE II CONNECTIONS.

1-

COLUMN SIZE	A	B	BASE PL THK.	BOLT DIA.
W8	1'-2"	11"	¾"	⅞"
W10	1'-5"	1'-1"	¾"	1"
W12	1'-7"	1'-3"	⅞"	1"

NOTES:
1. MIN WELDING SIZE 3/16" FILLET U.O.N

VBN CORPORATION
ARCHITECTURE INTERIORS PLANNING RESEARCH
363-13th Street
Oakland, California 94612
Telephone (415) 763-1313
Milton Van Bourg FAIA
Noboru Nakamura AIA
Lee Karney AIA
Dean Auon Tatsuno AIA
Harold T. Hayashi CCS, CSI

SERVICE BUILDING
STEEL SCHEDULES & DETAILS
SANTA RITA REPLACEMENT FACILITY

DATE 9-30-85
REVISED
JOB NO 80-27 BBB
DRAWN BY N. A. H.
CHECKED W. S.
SCALE
FOR CONSTRUCTION
SERVICE
SHEET NO S4.03
C3158

GatewayData [DB46]

GatewayData Properties			
General			
Name	GatewayData	**Number**	46
Type	DB	**Language**	DB
Information			
Title		**Author**	
Comment		**Family**	
Version	0.1	**User-defined ID**	

Name	Data type	Offset	Start value	Retain	Accessible from HMI	Visible in HMI	Comment
Static							
Fan 1 On	Bool	0.0	false	False	True	True	To BMS
Fan 2 On	Bool	0.1	false	False	True	True	To BMS
Fan 3 On	Bool	0.2	false	False	True	True	To BMS
Fan 4 On	Bool	0.3	false	False	True	True	To BMS
Fan 5 On	Bool	0.4	false	False	True	True	To BMS
Fan 6 On	Bool	0.5	false	False	True	True	To BMS
Fan 7 On	Bool	0.6	false	False	True	True	To BMS
Fan 8 On	Bool	0.7	false	False	True	True	To BMS
Fan 9 On	Bool	1.0	false	False	True	True	To BMS
Fan 10 On	Bool	1.1	false	False	True	True	To BMS
Fan 11 On	Bool	1.2	false	False	True	True	To BMS
Fan 12 On	Bool	1.3	false	False	True	True	To BMS
Tower Enabled	Bool	1.4	false	False	True	True	To BMS
Remote Setpoint Enabled	Bool	1.5	false	False	True	True	To BMS
VFD Mode Enabled	Bool	1.6	false	False	True	True	To BMS
Spare4	Bool	1.7	false	False	True	True	
Fan 1 Contactor Fault	Bool	2.0	false	False	True	True	To BMS
Fan 2 Contactor Fault	Bool	2.1	false	False	True	True	To BMS
Fan 3 Contactor Fault	Bool	2.2	false	False	True	True	To BMS
Fan 4 Contactor Fault	Bool	2.3	false	False	True	True	To BMS
Fan 5 Contactor Fault	Bool	2.4	false	False	True	True	To BMS
Fan 6 Contactor Fault	Bool	2.5	false	False	True	True	To BMS
Fan 7 Contactor Fault	Bool	2.6	false	False	True	True	To BMS

Name	Data type	Offset	Start value	Retain	Acces-sible from HMI	Visible in HMI	Comment
Fan 8 Contactor Fault	Bool	2.7	false	False	True	True	To BMS
Fan 9 Contactor Fault	Bool	3.0	false	False	True	True	To BMS
Fan 10 Contactor Fault	Bool	3.1	false	False	True	True	To BMS
Fan 11 Contactor Fault	Bool	3.2	false	False	True	True	To BMS
Fan 12 Contactor Fault	Bool	3.3	false	False	True	True	To BMS
VFD Fault	Bool	3.4	false	False	True	True	To BMS
Spare6	Bool	3.5	false	False	True	True	
Spare7	Bool	3.6	false	False	True	True	
Spare8	Bool	3.7	false	False	True	True	
Actual Temp	Real	4.0	0.0	False	True	True	To BMS
Temp Setpoint	Real	8.0	0.0	False	True	True	To BMS
Remote Setpoint	Real	12.0	0.0	False	True	True	From BMS
Spare Input 1	Bool	16.0	false	False	True	True	
Spare Input 2	Bool	16.1	false	False	True	True	
Spare Input 3	Bool	16.2	false	False	True	True	
Spare Input 4	Bool	16.3	false	False	True	True	
Spare Input 5	Bool	16.4	false	False	True	True	
Spare Input 6	Bool	16.5	false	False	True	True	
Spare Input 7	Bool	16.6	false	False	True	True	
Spare Input 8	Bool	16.7	false	False	True	True	
Remote Enable	Bool	17.0	false	False	True	True	From BMS
Spare Input 9	Bool	17.1	false	False	True	True	
Spare Input 10	Bool	17.2	false	False	True	True	
Spare Input 11	Bool	17.3	false	False	True	True	
Spare Input 12	Bool	17.4	false	False	True	True	
Spare Input 13	Bool	17.5	false	False	True	True	
Spare Input 14	Bool	17.6	false	False	True	True	
Spare Input 15	Bool	17.7	false	False	True	True	