

STRUCTURAL NOTES:

GENERAL:

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE HAWAII STATE BUILDING CODE (AMENDED IBC, 2018 EDITION). HOWEVER, WHERE REFERENCE IS MADE TO PERFORMANCE CONFORMING TO OTHER STANDARDS THE MORE STRINGENT SHALL APPLY.
2. THE CONTRACTOR SHALL COMPARE ALL THE CONTRACT DOCUMENTS WITH EACH OTHER AND REPORT IN WRITING TO THE ARCHITECT ALL INCONSISTENCIES AND OMISSIONS.
3. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AND VERIFY FIELD CONDITIONS AND SHALL COMPARE SUCH FIELD MEASUREMENTS AND CONDITIONS WITH THE DRAWINGS BEFORE COMMENCING WORK. REPORT IN WRITING TO THE ARCHITECT ALL INCONSISTENCIES AND OMISSIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR METHODS OF CONSTRUCTION, WORKMANSHIP AND JOB SAFETY. THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING AS REQUIRED FOR STABILITY OF STRUCTURAL MEMBERS AND SYSTEMS.
6. CONSTRUCTION LOADING SHALL NOT EXCEED DESIGN LIVE LOAD UNLESS SPECIAL SHORING IS PROVIDED. ALLOWABLE LOADS SHALL BE REDUCED IN AREAS WHERE THE STRUCTURE HAS NOT ATTAINED FULL DESIGN STRENGTH.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF THE ADJACENT PROPERTIES, STRUCTURES, STREETS AND UTILITIES DURING THE CONSTRUCTION PERIOD.
8. DETAILS NOTED AS TYPICAL ON THE STRUCTURAL DRAWINGS SHALL APPLY IN ALL CONDITIONS UNLESS SPECIFICALLY SHOWN OR NOTED.

DESIGN CRITERIA:

1. LOADS
- a. ROOF LIVE LOAD 20 PSF
- b. COLLATERAL ROOF LOAD (ELEC/MECH/MISC) 7 PSF
2. WIND
- a. BASIC WIND SPEED=120 MPH
- b. EXPOSURE C
- c. TOPOGRAPHIC FACTOR $K_{zt}=1.0$
- d. DIRECTIONALITY FACTOR $K_d=0.85$ (MWFRS)
- e. DIRECTIONALITY FACTOR $K_d=0.85$ (COMPONENTS AND CLADDING)
- f. RISK CATEGORY II
3. SEISMIC
- a. $S_s=0.996$
- b. $S_1=0.254$
- c. SITE CLASS D
- d. RISK CATEGORY II
- e. IMPORTANCE FACTOR $I=1.0$
- f. SEISMIC DESIGN CATEGORY D
4. FOUNDATION
- a. MAXIMUM ALLOWABLE FOUNDATION BEARING PRESSURES
- 1) DEAD LOAD + LIVE LOAD 1,500 PSF
- 2) DEAD LOAD + LIVE LOAD + WIND OR SEISMIC 2,000 PSF
- b. PASSIVE EARTH PRESSURE 150 PSF PER FOOT
- c. COEFFICIENT OF FRICTION 0.25

SPECIAL INSPECTION:

1. THE CONTRACTOR SHALL RETAIN AND PAY AN INDEPENDENT SPECIAL INSPECTION FIRM. THE SPECIAL INSPECTOR SHALL BE APPROVED BY THE STATE AND CERTIFIED BY THE COUNTY OF MAUI FOR THE ITEMS OF INSPECTION. CERTIFICATION STATUS SHALL BE CURRENT.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT SPECIAL INSPECTION OF PORTIONS OF THE WORK, AS REQUIRED BY THE BUILDING CODE OF THE COUNTY OF MAUI, BE MADE AT THE APPROPRIATE TIME. THE CONTRACTOR SHALL GIVE TIMELY NOTICE OF WHEN AND WHERE INSPECTIONS ARE TO BE MADE AND PROVIDE ACCESS FOR THE INSPECTOR. THE CONTRACTOR SHALL CORRECT DEFECTIVE WORK AT NO ADDITIONAL COST TO THE OWNER AND PAY FOR RE-INSPECTION.
3. THE FOLLOWING STRUCTURAL WORK REQUIRES SPECIAL INSPECTION:
- a. CONCRETE
- b. BOLTS INSTALLED IN CONCRETE
- c. REINFORCING STEEL
- d. STRUCTURAL WELDING
- e. HIGH STRENGTH BOLTING
- f. COMPLETE LOAD PATH AND UPLIFT TIES

FOUNDATION:

1. FOUNDATION DESIGN IS BASED ON CHAPTER 18 OF THE INTERNATIONAL BUILDING CODE.
2. CONTRACTOR SHALL PROVIDE FOR DE-WATERING OF EXCAVATION FROM SURFACE WATER, GROUND WATER OR SEEPAGE.
3. CONTRACTOR SHALL PROVIDE FOR DESIGN AND INSTALLATION OF ALL UNDERPINNING, CRIBBING, SHEETING, AND SHORING NECESSARY TO PRESERVE EXCAVATIONS AND EARTH BANKS.
4. FOOTINGS SHALL BEAR ON UNDISTURBED IN-SITU FIRM SOILS. BOTTOM OF FOOTINGS SHALL BE COMPACTED TO PROVIDE A RELATIVELY FIRM AND SMOOTH BEARING SURFACE PRIOR TO PLACEMENT OF REINFORCING STEEL AND CONCRETE. IF SOFT AND/OR LOOSE MATERIALS ARE ENCOUNTERED AT THE BOTTOM OF FOOTING EXCAVATIONS, THEY SHALL BE OVER-EXCAVATED TO EXPOSE THE UNDERLYING FIRM MATERIALS. THE OVER-EXCAVATION SHALL BE BACKFILLED WITH SELECT GRANULAR MATERIAL COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION OR THE FOOTING BOTTOM MAY BE EXTENDED DOWN TO THE UNDERLYING COMPETENT MATERIAL.
5. EXCAVATIONS FOR FOOTINGS SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE AND REINFORCING.
6. EXCAVATIONS SHALL BE PROPERLY BACKFILLED.
- a. BACKFILL MATERIAL SHALL CONSIST OF SOIL WHICH IS FREE OF ORGANICS, EXPANSIVE CLAY AND DEBRIS. BACKFILL MATERIAL SHALL BE LESS THAN 3 INCHES IN GREATEST DIMENSION.
- b. BACKFILL MATERIAL SHALL BE PLACED IN LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS.
- c. EACH LAYER OF BACKFILL MATERIAL SHALL BE THOROUGHLY COMPACTED TO AT LEAST 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE ASTM D1557 TEST PROCEDURE.
7. DURING CONSTRUCTION, DRAINAGE SHALL BE PROVIDED TO MINIMIZE PONDING OF WATER ADJACENT TO OR ON FOUNDATION AND PAVEMENT AREAS. PONDED AREAS SHALL BE DRAINED IMMEDIATELY. ANY SUBGRADE SOIL THAT HAS BECOME SOFT DUE TO PONDING SHALL BE REMOVED TO FIRM MATERIAL AND REPLACED WITH COMPACTED STRUCTURAL FILL.

CONCRETE:

1. CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE ACI 318-14.
2. CONCRETE SHALL BE REGULAR WEIGHT HARD ROCK CONCRETE AND SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
3. MAXIMUM WATER TO CEMENTITIOUS MATERIALS RATIO SHALL BE 0.40.
4. CONCRETE DELIVERY TICKETS SHALL RECORD ALL FREE WATER IN THE MIX: AT BATCHING BY PLANT, FOR CONSISTENCY BY DRIVER, AND ANY ADDITIONAL REQUEST BY CONTRACTOR IF PERMITTED BY THE MIX DESIGN.
5. ALL INSERTS, ANCHOR BOLTS, PLATES, AND OTHER ITEMS TO BE CAST IN THE CONCRETE SHALL BE HOT-DIPPED GALVANIZED UNLESS OTHERWISE NOTED.
6. REINFORCING BARS, ANCHOR BOLTS, INSERTS, AND OTHER ITEMS TO BE CAST IN THE CONCRETE SHALL BE SECURED IN POSITION PRIOR TO PLACEMENT OF CONCRETE.
7. CONDUITS, PIPES, AND SLEEVES PASSING THROUGH A SLAB OR FOOTING AND NOT CONFORMING TO TYPICAL DETAILS SHALL BE LOCATED AND SUBMITTED TO THE ARCHITECT FOR APPROVAL.
8. CONDUITS, PIPES, AND SLEEVES EMBEDDED WITHIN A SLAB (OTHER THAN THOSE MERELY PASSING THROUGH) SHALL BE:
- a. NO LARGER IN OUTSIDE DIMENSIONS THAN ONE THIRD THE OVERALL SLAB THICKNESS IN WHICH THEY ARE EMBEDDED.
- b. PLACED IN THE MIDDLE ONE THIRD OF SLAB THICKNESS
- c. SPACED NO CLOSER THAN THREE DIAMETERS OR WIDTHS ON CENTER.
9. THE CONTRACTOR SHALL LOCATE CONSTRUCTION JOINTS SO AS NOT TO IMPAIR THE STRENGTH OF THE STRUCTURE AND TO MINIMIZE SHRINKAGE STRESSES. SUBMIT LOCATION OF CONSTRUCTION JOINTS TO THE ARCHITECT FOR APPROVAL, UNLESS OTHERWISE NOTED.
10. SEE ARCHITECTURAL DRAWINGS FOR CHAMFERS, EDGE RADII, DRIPS, REGLETS, FINISHES AND OTHER NON-STRUCTURAL ITEMS NOT SHOWN OR SPECIFIED ON THE STRUCTURAL DRAWINGS.
11. NON-SHRINK GROUT SHALL BE A PREMIXED NON-METALLIC FORMULA, CAPABLE OF DEVELOPING A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI IN 1 DAY AND 5,000 PSI IN 28 DAYS.

REINFORCING STEEL:

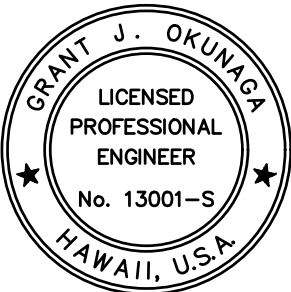
1. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615/A615M, GRADE 60.
2. CLEAR CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
- a. FOOTINGS CAST AGAINST EARTH 3"
- b. FOOTINGS FORMED AND EXPOSED TO EARTH OR WEATHER 2"
- c. PEDESTALS
PRIMARY REINFORCEMENT, STIRRUPS, TIES AND SPIRALS 1-1/2"
- d. STRUCTURAL SLABS
- 1) FACES EXPOSED TO EARTH OR WEATHER 1-1/2"
- 2) INTERIOR FACES 1"
3. REINFORCING STEEL SHALL BE SPliced WHERE INDICATED ON PLANS. PROVIDE LAP SPlice LENGTH PER TYPICAL DETAILS AND SCHEDULE, UNLESS OTHERWISE NOTED.
4. BAR BENDS AND HOOKS SHALL BE "STANDARD HOOKS" IN ACCORDANCE WITH ACI 318.
5. EPOXY SHALL BE SIMPSON SET-3G HIGH STRENGTH EPOXY ADHESIVE AS MANUFACTURED BY SIMPSON STRONG TIE CO., INC. OR APPROVED EQUAL. INSTALL PER MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.

METAL BUILDING SYSTEMS (MBS):

1. THE MBS FRAMING SHOWN ON THESE DRAWINGS IS CONCEPTUAL. THE ACTUAL MBS FRAMING SHALL BE CONFIRMED WITH THE MBS MANUFACTURER/SUPPLIER PRIOR TO STARTING THE WORK AND ORDERING MATERIALS.
2. THE MBS MANUFACTURER/SUPPLIER SHALL PROVIDE A COMPLETE METAL BUILDING SYSTEM. THE MBS SHALL INCLUDE, BUT NOT BE LIMITED TO THE STRUCTURAL STEEL FRAMING SYSTEM, STEEL ROOF PURLINS AND WALL GIRTS, SAG RODS, STEEL ROOF DECKING AND SIDING, CROSS-BRACING AND PORTAL FRAMES (AS REQUIRED), STEEL FRAMING FOR ALL WALL AND ROOF OPENINGS, DOORS AND WINDOWS, RIDGE VENTS, METAL GUTTERS/DOWNSPOUTS, AND ALL REQUIRED CONNECTORS. THE INSTALLED MBS SHALL BE ABLE TO SUPPORT THE DESIGN LOADS REFERENCED IN THE "DESIGN CRITERIA" ON THIS SHEET.
3. THE MBS MANUFACTURER/SUPPLIER SHALL SUBMIT SHOP DRAWINGS SHOWING ALL INFORMATION PERTAINING TO THE MBS BEING CONSTRUCTED INCLUDING, BUT NOT LIMITED TO, DIMENSIONS, MEMBER SIZES, MEMBER PROPERTIES, MBS FRAMING PLANS, MBS SECTIONS/DETAILS, AND FOUNDATION PLANS AND DETAILS.
4. DESIGN OF THE MBS SHALL CONFORM TO CURRENT EDITION OF THE METAL BUILDING SYSTEMS MANUAL (MBSM) OF THE METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA). THE SHOP DRAWINGS AND DESIGN CALCULATIONS SUBMITTED BY THE MBS MANUFACTURER/SUPPLIER SHALL CLEARLY SHOW ALL LOAD COMBINATIONS AND REACTIONS TO BE RESISTED BY THE MBS FOUNDATIONS AND SHALL BE STAMPED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF HAWAII.
5. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL OF STEEL CONSTRUCTION, FIFTEENTH EDITION
6. THE METAL ROOFING SHALL NOT BE USED TO RESIST LATERAL LOADS.
7. THE MBS MANUFACTURER/SUPPLIER SHALL BE RESPONSIBLE FOR THE DESIGN OF ERECTION BRACING FOR THE MBS TO ASSURE STABILITY OF THE MBS DURING ERECTION. ALL BRACING SHALL BE SHOWN ON THE ERECTION DRAWINGS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPLY, FABRICATION, AND INSTALLATION OF ALL ERECTION BRACING FOR THE MBS IN ACCORDANCE WITH THE DESIGN AND ERECTION DRAWINGS PREPARED BY THE MBS MANUFACTURER/SUPPLIER.
9. ANCHOR BOLT SIZES AND LOCATIONS SHALL BE VERIFIED AND APPROVED BY THE MBS MANUFACTURER/SUPPLIER PRIOR TO THE START OF CONSTRUCTION OF THE FOUNDATION.
10. ALL MBS FOUNDATION ANCHOR BOLTS SHALL BE POSITIONED WITH A RIGID TEMPLATE PROVIDED BY THE MBS MANUFACTURER TO ENSURE ALIGNMENT WITH THE BASE PLATES. ALL HEADED ANCHOR BOLTS SHALL CONFORM TO ASTM F1554, GRADE 36 AND SHALL BE GALVANIZED.
11. ALL FIELD CONNECTIONS FOR THE MBS SHALL BE BOLTED WITH HIGH STRENGTH BOLTS AND NUTS CONFORMING TO ASTM F3125/F3125M, GRADE A325.
12. STRUCTURAL STEEL SHALL CONFORM WITH ASTM A36/A36M UNLESS OTHERWISE NOTED.
13. ALL WIDE FLANGE SHAPES SHALL CONFORM WITH ASTM A992/A992M.
14. WELDS AND WELDING PROCEDURES SHALL CONFORM TO THE STRUCTURAL WELDING CODE AWS D1.1 OF THE AMERICAN WELDING SOCIETY.
15. WELDING SHALL BE PERFORMED BY WELDERS PREQUALIFIED FOR WELDING PROCEDURES TO BE USED.
16. WELDING ELECTRODES SHALL BE E70XX.
17. ALL STEEL SHALL BE PRIME PAINTED IN THE SHOP.
18. ALL STEEL EXPOSED TO WEATHER SHALL BE HOT-DIPPED GALVANIZED.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-ART18-01	2022	41	80

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
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Grant J. Okunaga
This work was prepared by me or
under my supervision and construction
of the project will be under my
observation. Expiration date 04/30/24.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STRUCTURAL NOTES
MAUI DISTRICT BASEYARD Project No. HWY-M-ART18.01
Scale: AS SHOWN Date: MAY 2022
SHEET No. S1 OF 80 SHEETS