

STRUCTURAL NOTES

STRUCTURAL ABBREVIATIONS

GENERAL

- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE BEGINNING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- NOTES & DETAILS ON THE PLANS SHALL TAKE PRECEDENCE OVER DETAILS ON THE TYPICAL DETAIL SHEETS.
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CONSTRUCTION SPECIFICATIONS.
- PROVIDE ADEQUATE SHORING OR BRACING DURING CONSTRUCTION TO RESIST FORCES SUCH AS WIND AND UNBALANCED LOADING DUE TO CONSTRUCTION.
- REFERENCE TO MNDOT SPECIFICATIONS HAVE BEEN TAKEN FROM "STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION", MINNESOTA DEPARTMENT OF TRANSPORTATION, 1988 EDITION, AND "SUPPLEMENTAL SPECIFICATIONS", MINNESOTA DEPARTMENT OF TRANSPORTATION, MAY 2, 1994.

REINFORCED CONCRETE

- REINFORCEMENT DETAILS SHALL CONFORM TO THE REQUIREMENTS OF "THE ACI MANUAL OF STANDARD PRACTICE (ACI 315)". SPLICES AND EMBEDMENT LENGTHS NOT GIVEN ON THE CONTRACT DRAWINGS SHALL BE PRESUMED TO BE IN TENSION AND SHALL CONFORM TO THOSE REQUIREMENTS. UNLESS OTHERWISE SHOWN SPLICES SHALL BE CLASS "B" TENSION LAP SPLICES AS DEFINED IN ACI 318.
- MINIMUM CLEAR CONCRETE COVER FOR REINFORCING BARS, UNLESS SHOWN OTHERWISE SHALL BE 3" WHEN CAST AGAINST EARTH AND 2" WHEN NOT CAST AGAINST EARTH.
- SPACING OF REINFORCING BARS SHOWN ON THE DRAWINGS SHALL BE A MAXIMUM.
- EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4" BY 3/4" UNLESS NOTED OTHERWISE.
- CONSTRUCTION JOINTS AND REINFORCING STEEL BAR SPLICES SHALL BE WHERE SHOWN ON DRAWINGS. OPTIONAL CONSTRUCTION JOINTS MAY BE PROPOSED BY THE CONTRACTOR SUBJECT TO REVIEW AND APPROVAL BY STRUCTURAL ENGINEER.
- REINFORCING BARS SHALL CONFORM TO THE REQUIREMENTS ASTM A615, GRADE 60.
- ALL MECHANICAL EQUIPMENT, PIPES & OPENING SIZES AND LOCATIONS SHALL BE VERIFIED PRIOR TO PLACING CONCRETE.
- ALL JOINTS SHALL HAVE WATERSTOPS WHERE WATERTIGHT INTEGRITY IS REQUIRED.
- ALL FILL CONCRETE SHALL MEET THE REQUIREMENTS OF MNDOT CLASS 3A GROUT.

STEEL

- ALL STRUCTURAL STEEL SHALL BE ASTM A36, UNLESS NOTED OTHERWISE. WELDING ELECTRODES SHALL BE E70 SERIES FOR A36 STEEL.

ALUMINUM

- ALUMINUM STRUCTURAL MEMBERS SHALL BE 6061-T6 ALLOY. ALL WELDING SHALL BE DONE WITH FILLER WIRE 4043.
- ISOLATE ALL ALUMINUM FABRICATIONS FROM CONTACT WITH CONCRETE WITH 2 HEAVY COATS OF BITUMASTIC.

EARTHWORK / FOUNDATIONS

- ALL FOOTINGS SHALL BEAR ON NATURAL UNDISTURBED SOIL OR ON COMPACTED GRANULAR FILL. ALL FOOTINGS ARE DESIGNED USING AN ALLOWABLE SOIL BEARING PRESSURE OF 3,000 PSF (SEE SOIL REPORT). THE SOILS ENGINEER SHALL CONFIRM THESE BEARING VALUES AT THE TIME OF EXCAVATION. IF SOIL AT THE BOTTOM OF FOOTINGS AS DESCRIBED OR DETAILED IS OF QUESTIONABLE BEARING VALUE THE ENGINEER'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
- FOR DETAILS OF FILL AND COMPACTION REQUIREMENTS REFER TO DIVISION 2 - SITEWORK OF THE SPECIFICATIONS AND SOILS REPORT.
- FOUNDATION WALL BACKFILL SHALL NOT BE UNBALANCED BY MORE THAN TWO (2) FEET ON EITHER SIDE AT ANY TIME.

MASONRY

- THE MINIMUM REQUIRED COMPRESSIVE STRENGTH OF THE CONCRETE MASONRY BLOCK UNITS SHALL BE 2,800 PSI (BASED ON NET AREA)
- THE 28 DAY MINIMUM COMPRESSIVE STRENGTH OF MASONRY GROUT SHALL 3,000 PSI.
- BOND BEAM LINTELS SHALL BE FILLED WITH CONCRETE HAVING A 28 DAY MINIMUM COMPRESSIVE STRENGTH f_c OF 3,000 PSI. COARSE AGGREGATE SHALL BE PEA GRAVEL.
- TENSION LAP SPLICES FOR REINFORCED MASONRY SHALL BE 40 BAR DIAMETERS MINIMUM, UNLESS OTHERWISE NOTED.
- HORIZONTAL REINFORCING STEEL IN FOOTINGS SHALL BE CONTINUOUS AROUND CORNERS.
- UNLESS OTHERWISE NOTED, ALL MASONRY WALLS SHALL HAVE HORIZONTAL REINFORCING CONSISTING OF GALVANIZED STANDARD WEIGHT 9 GAUGE "DUROWALL" OR EQUAL. ALL REINFORCING SHALL BE LOCATED EVERY SECOND COURSE.

SPECIAL INSPECTIONS

SPECIAL INSPECTION SHALL BE PROVIDED IN ACCORDANCE WITH UBC CHAPTER 17 AS OUTLINED BELOW. THE SPECIAL INSPECTOR SHALL BE EMPLOYED BY THE OWNER AND SHALL MEET THE QUALIFICATIONS OF THE CODE.

- THE SPECIAL INSPECTOR(S) MUST HAVE THE APPROVAL OF THE BUILDING OFFICIAL AND THE STRUCTURAL ENGINEER OF RECORD SUBJECT TO MEETING AT LEAST ONE OF THE FOLLOWING QUALIFICATION GUIDELINES:
 - REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MINNESOTA, ABLE TO DEMONSTRATE SUITABLE PREVIOUS EXPERIENCE.
 - ICOB CERTIFIED INSPECTOR, ABLE TO DEMONSTRATE SUITABLE PREVIOUS EXPERIENCE.
 - STRUCTURAL ENGINEER OF RECORD OR QUALIFIED TECHNICIAN UNDER THE SUPERVISION OF THE STRUCTURAL ENGINEER OF RECORD.
- THE FOLLOWING ITEMS WILL REQUIRE SPECIAL INSPECTION:
 - CONCRETE AND REINFORCEMENT STEEL.
 - ALL FOOTINGS HAVE BEEN DESIGNED FOR f_c OF 3,000 PSI AND THEREFORE SPECIAL INSPECTION IS NOT REQUIRED.
 - STRUCTURAL WELDING.
 - ALL FIELD WELDING OF STRUCTURAL MEMBERS.
 - WELDING OF REINFORCING STEEL.
 - STRUCTURAL MASONRY.
 - DURING PREPARATION AND TAKING OF ANY REQUIRED PRISMS OR TEST SPECIMENS, AT THE START OF LAYING UNITS, AFTER THE PLACEMENT OF REINFORCING STEEL, GROUT SPACE PRIOR TO EACH GROUTING OPERATION, AND DURING ALL GROUTING OPERATIONS.

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|-----------|--|---------|-----------------------------------|---------|---|
| ADDM | Addendum | GA | Hot Dipped Galvanized | SCH | Schedule |
| ADDL | Additional | GA | Gauge | SECT | Section |
| ALT | Alternate | GC | General Contractor | SHT | Sheet |
| ALUM | Aluminum | GL LAM | Glue Laminated | SIM | Similar |
| AB | Anchor Bolt | GR | Grade | SL | Snow Load |
| ANCH | Anchorage | GRG | Grating | SP | Space/Spacing |
| L | Angle | GT | GROUT | SPEC | Specification |
| APPROX | Approximate(ly) | HS | Headed Studs | SQ | Square |
| ARCH | Architectural | HDR | Header | STAG | Staggered |
| ASTM | American Society for Testing & Materials | HGT | Height | SS | Stainless Steel (preceded by type 304, 316, etc.) |
| ⊙ | At | HP | High Point | STD | Standard |
| AVG | Average | HK | Hook/Hooked | STA | Station |
| B/B | Back to Back | HORIZ | Horizontal | STL | Steel |
| BAL | Balance | IN | Inch | STL JST | Steel Joist |
| BF | Back Face | INCH | Include | STIF | Stiffener |
| B PL | Base Plate | INFO | Information | STIR | Stirrup |
| BSMT | Basement | ID | Inside Diameter | STRUCT | Structure/Structural |
| BM | Beam or Bench Mark | IF | Inside Face | SYMM | Symmetrical |
| BRG | Bearing | INSUL | Insulation | TEMP | Temporary |
| BRG PL | Bearing Plate | INT | Interior | THK | Thickness |
| BTWN | Between | INV | Invert | KIP | Thousand Pounds |
| BITUM | Bituminous | JT | Joint | T&B | Top & Bottom |
| BLK | Block | JST | Joist | TBE | Top of Beam Elevation |
| BLKG | Blocking | KO | Knockout | TCE | Top of Concrete Elevation |
| BD BM | Bond Beam | LAM | Laminate/Lamination | TDE | Top of Deck Elevation |
| BS | Both Sides | LG | Long/Length | TDF | Top of Footing Elevation |
| BOT | Bottom | LWGT | Light Weight | TGE | Top of Grout Elevation |
| BFE | Bottom of Footing Elevation | LIN | Lineal/Linear | TPE | Top of Pier Elevation |
| BPE | Bottom of Plate Elevation | LL | Live Load | TPLE | Top of Plank Elevation |
| BRCC | Bracing | LD BRG | Load Bearing | TSE | Top of Slab Elevation |
| BRKT | Bracket | LOC | Location | TRANSV | Transverse |
| BRK | Brick | LLH | Long Leg Horizontal | TYP | Typical |
| BRDG | Bridging | LLV | Long Leg Vertical | UNEXCAV | Unexcavated |
| BLDG | Building | LONGIT | Longitudinal | UON | Unless Otherwise Noted |
| BU | Built Up | LP | Low Point | VB | Vapor Barrier |
| X | By | MFR | Manufacturer | VERT | Vertical |
| CPTY | Capacity | MK | Mark | WS | Waterstop |
| CIP | Cast in Place | MAS | Masonry | WGT | Weight |
| CTR | Center | MO | Masonry Opening | WWM | Welded Wire Mesh |
| ⊕ | Centerline | MATL | Material | WF | Wide Flange |
| C/C | Center to Center | MAX | Maximum | WL | Wind Load |
| C | Channel | MECH | Mechanical | W/ | With |
| CLR | Clear/Clearance | MED | Medium | W/O | Without |
| COL | Column | MH | Manhole | WP | Working Point |
| COMP | Composite | MTL | Metal | YD | Yard |
| CONC | Concrete | MEZZ | Mezzanine | | |
| CMU | Concrete Masonry Unit | MID | Middle | | |
| CONN | Connection | MIN | Minimum | | |
| CONSTR | Construction | MNDOT | Minnesota Dept. of Transportation | | |
| CONSTR JT | Construction Joint | MISC | Miscellaneous | | |
| CONT | Continuous | MOD | Module/Modular | | |
| CONTR | Contractor | MTR | Mortar | | |
| CJ | Control Joint | MTD | Mounted | | |
| COORD | Coordinate | NS | Near Side | | |
| CRS | Course | NOM | Nominal | | |
| DL | Dead Load | NA | Not Applicable | | |
| DEG | Degree | NIC | Not in Contract | | |
| DEMO | Demolition | NTS | Not to Scale | | |
| DET | Detail | NO or # | Number | | |
| DIAG | Diagonal | OC | On Center | | |
| DIA or Ø | Diameter | OPNG | Opening | | |
| DIM | Dimension | OPP | Opposite | | |
| DIP | Ductile Iron Pipe | O/O | Out to Out | | |
| DBL | Double | OD | Outside Diameter | | |
| DT | Double Tee | OF | Outside Face | | |
| DWL | Dowel | OH | Overhead | | |
| DN | Down | PNL | Panel | | |
| DRWG | Drawing | PAR | Parallel | | |
| EA | Each | PERP | Perpendicular | | |
| EE | Each End | PT | Point | | |
| EF | Each Face | R | Plate | | |
| ES | Each Side | PREF | Preformed | | |
| EW | Each Way | LB | Pound/Pounds | | |
| ELEC | Electrical | PSF | Pounds per Square Foot | | |
| EL | Elevation | PSI | Pounds per Square Inch | | |
| EMB | Embedment | P.T. | Pressure Treated | | |
| ENGR | Engineer | PROC | Process | | |
| EQ | Equal | PROJ | Projection | | |
| EQUIP | Equipment | PVC | Polyvinyl Chloride | | |
| EXCAV | Excavate | QTY | Quantity | | |
| EX | Existing | QUAD | Quadrant | | |
| EXP | Expansion | R | Radius | | |
| EXP BT | Expansion Bolt | REF | Reference | | |
| EXP JT | Expansion Joint | REINF | Reinforcing/Reinforcement | | |
| EXT | Exterior | RCP | Reinforced Concrete Pipe | | |
| FAB | Fabricate(d) | REQD | Required | | |
| F/F | Face to Face | REQMT | Requirement | | |
| FS | Far Side | REV | Revise/Revision | | |
| FT | Foot/feet | RO | Rough Opening | | |
| FIN | Finish | | | | |
| FLG | Flange | | | | |
| FLR | Floor | | | | |
| FTG | Footing | | | | |
| FDN | Foundation | | | | |
| FRMG | Framing | | | | |
| FRP | Fiber Reinforced Polyester | | | | |
| FF | Front Face | | | | |

STRUCTURAL SYMBOLS

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|--|-------------------------------|--|-----------------------------------|
| | Grout | | Dimensioned Wood (Size Indicated) |
| | Grating (in Plan) | | Water |
| | Concrete | | Steel |
| | Aluminum, Misc. Metals or FRP | | Earth |
| | Precast Conc. or Masonry | | Brass/Bronze |
| | Rigid Insulation | | Batt/Loose Fill Insulation |

DEMOLITION NOTES

- SAW CUT CONCRETE AND MASONRY TO LINES AND SHAPES SHOWN ON THE PLANS PRIOR TO DEMOLITION OR REMOVAL. DO NOT CUT EXISTING REINFORCING STEEL BARS WHERE THEY ARE SHOWN TO BE CLEANED AND PRESERVED.
- PROVIDE SHORING AND BRACING AS NECESSARY DURING REMOVAL OPERATIONS TO ELIMINATE DAMAGE TO FACILITIES TO REMAIN.
- DAMAGE TO FACILITIES TO REMAIN, OR ADJACENT TO FACILITIES TO BE REMOVED, SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
- EXISTING STRUCTURES THAT ARE TO REMAIN IN PLACE SHALL BE PROTECTED FROM OVERLOADING DUE TO CONSTRUCTION LOADINGS.

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|--|---|-----------|-------------|-------------------|--|----------------------------------|---|
| I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. DATE: 11/27/95 REG. NO. 22222 | 1326 ENERGY PARK DRIVE ST. PAUL, MINNESOTA 55108 (612) 644-4389 9800 SHELARD PARKWAY MINNEAPOLIS, MINNESOTA 55441 (612) 546-0432 | DATE | DESCRIPTION | DESIGNED - D.L.C. | CITY OF ELK RIVER WASTEWATER TREATMENT FACILITY UPGRADE | STRUCTURAL NOTES & ABBREVIATIONS | DATE OCT. 1995 SHEET 21 OF 112 SHEETS PROJECT NO. 230-151 |
| | | REVISIONS | | CHECKED - L.J.L. | | | |