GENERAL

1) ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE VERMONT AGENCY OF TRANSPORTATION 2011 STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE 2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND THEIR LATEST REVISIONS.

2) ALL PRECAST CONCRETE ELEMENTS TO BE FABRICATED TO THE SPECIFIED DIMENSIONS WITHIN THE TOLERANCES DICTATED IN THE PRECAST/PRESTRESSED CONCRETE INSTITUTE TOLERANCE MANUAL FOR PRECAST AND PRESTRESSED CONCRETE CONSTRUCTION, MNL 135-00, AND ITS LATEST REVISIONS.

3) ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL, AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE.

4) THE WEARING SURFACE SHALL BE SHIMMED TRANSVERSELY AS NECESSARY TO ACCOUNT FOR POTENTIAL DIFFERENTIAL CAMBER OF THE ADJACENT PRESTRESSED UNITS.

5) THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL BURIED AND AERIAL UTILITIES AND POLES PRIOR TO STARTING WORK. SEE UTILITY SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TRAFFIC CONTROL

6) THE CONTRACTOR WILL BE ALLOWED TO CLOSE THE BRIDGE FOR A MAXIMUM OF FOUR CONSECUTIVE WEEKS TO COMPLETE THE BRIDGE REPLACEMENT. SEE THE SPECIAL PROVISIONS FOR WORK REQUIREMENTS AND INCENTIVE/DISINCENTIVE PROVISIONS FOR THE BRIDGE CLOSURE PERIOD.

7) THE CONTRACTOR SHALL NOTIFY THE CITY OF RUTLAND A MINIMUM OF FOUR WEEKS PRIOR TO CLOSING THE BRIDGE.

8) FULL ACCESS TO ALL SIDE ROADS AND DRIVES WITHIN THE PROJECT LIMITS SHALL BE MAINTAINED AT ALL TIMES. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)".

9) THE CHOICE OF A DETOUR AND THE DETOUR SIGNING WILL BE THE RESPONSIBILITY OF THE CITY OF RUTLAND.

10) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF A SITE-SPECIFIC, TRAFFIC CONTROL PLAN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING THE TRAFFIC CONTROL PACKAGE, IDENTIFYING THE PROJECT BEFORE, DURING AND AFTER THE EXISTING TRAFFIC CONTROL PATTERN IS ALTERED. THE CONTRACTOR SHALL SUBMIT A DETAILED TRAFFIC-CONTROL PLAN TO THE ENGINEER FOR ALL STAGES OF CONSTRUCTION, FOR APPROVAL PER SUBSECTION 105.03. NO WORK SHALL BEGIN UNTIL THE TRAFFIC-CONTROL PLAN HAS BEEN APPROVED. ALL COST SHALL BE INCLUDED IN ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)". SEE SPECIAL PROVISIONS FOR ADDITIONAL DETAILS.

11) THE COST FOR ALL ITEMS REQUIRED TO IMPLEMENT THE CONTRACTOR'S TRAFFIC CONTROL PLAN SHALL BE INCLUDED IN THE PRICE BID FOR ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)".

12) ALL SIGNS, BARRICADES, AND OTHER TRAFFIC CONTROL DEVICES SHALL BE CLEANED WEEKLY OR AS DIRECTED BY THE ENGINEER. THE COST FOR THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)".

13) ALL SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MUTCD. WHERE CONFLICTS EXISTS BETWEEN THE MUTCD AND THE PLANS, THE MUTCD SHALL GOVERN. FOR ADDITIONAL SIGNING SEE THE T SERIES OF THE STANDARDS.

EARTHWORK

14) REMOVAL OF THE EXISTING STRUCTURE SHALL BE UNDER ITEM 529.15, "REMOVAL OF STRUCTURE". THIS WORK SHALL INCLUDE REMOVAL OF ANY PORTIONS OF THE EXISTING STRUCTURE THAT FALL OUTSIDE THE LIMITS OF ANY OF THE EXCAVATION ITEMS.

15) EXCAVATION OF SOILS TO THE LIMITS SHOWN ON THE TYPICAL ABUTMENT SECTION SHALL BE PAID FOR UNDER ITEM 204.25, "STRUCTURE EXCAVATION" AND ITEM 203.27, "UNCLASSIFIED CHANNEL EXCAVATION". ANY EXCAVATION OUTSIDE THESE LIMITS, WHICH IS NOT REMOVAL OF STRUCTURE, WILL BE AT THE CONTRACTOR'S EXPENSE.

16) THE "STONE FILL, TYPE III" UNDER THE BRIDGE AS SHOWN IN THE PLANS SHALL BE PLACED BEFORE THE SUPERSTRUCTURE IS SET.

CONCRETE

17) ITEM 514.10, 'WATER REPELLENT, SILANE", SHALL BE APPLIED TO ALL EXPOSED CONCRETE ON THE BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE, WITH THE EXCEPTION OF THE BOTTOM OF THE PRECAST VOIDED SLABS BETWEEN THE DRIP NOTCHES.

18) ALL CONCRETE PLACED INTEGRALLY WITH THE SUPERSTRUCTURE SHALL BE ITEM 900.608, "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET) (FPQ)". ALL PRECAST SUBSTRUCTURE AND APPROACH SLAB CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 540 – PRECAST CONCRETE.

19) ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE "CONCRETE REINFORCING STEEL INSTITUTE".

20) ALL REINFORCING STEEL SHALL MEET THE REQUIREMENTS FOR REINFORCING STEEL, LEVEL II. PAYMENT WILL BE INCLUDED IN THE UNIT PRICE BID FOR THE APPROPRIATE SECTION 540 CONTRACT ITEM.

PRECAST ABUTMENTS AND POST-TENSIONING

21) IF VERTICAL CONSTRUCTION JOINTS ARE REQUIRED BY THE CONTRACTOR FOR SHIPMENT OF THE ABUTMENTS, THEN THE SECTIONS SHALL BE KEYED AND MATCH CAST. A JOINT DETAIL SHALL BE SHOWN ON THE FABRICATION DRAWINGS.

22) POST-TENSIONING AND ASSOCIATED ITEMS ARE ONLY REQUIRED IF THE PILE CAP IS CONSTRUCTED IN MORE THAN ONE PIECE. ANY POST-TENSIONING STRANDS AND CONDUIT SHALL ADHERE TO THE REQUIREMENTS OF SECTION 510 – PRESTRESSED CONCRETE. GALVANIZED ANCHOR ASSEMBLIES, CONDUIT, AND POST-TENSIONING STRANDS SHALL BE INCLUDED UNDER ITEM 540.10, "PRECAST CONCRETE STRUCTURE (ABUTMENT #1) AND/OR "PRECAST CONCRETE STRUCTURE (ABUTMENT #2)" AS APPROPRIATE. POST-TENSIONING STRANDS SHALL BE COVERED WITH SEAMLESS POLYPROPYLENE SHEATH (WITH CORROSION INHIBITOR GREASE BETWEEN SHEATH AND STRAND) FOR THE LENGTH OF THE STRAND, EXCEPT AT ANCHORAGE LOCATIONS.

23) GALVANIZE ANCHOR ASSEMBLIES AFTER FABRICATION ACCORDING TO AASHTO M232M/M 232.

24) DESIGN VALUES
- a) CONCRETE COMPRESSIVE STRENGTH: f'c = 5000 PSI.
- b) POST-TENSIONING STRANDS: 0.5 INCH DIAMETER, 270 KSI, LOW RELAXATION 7-WIRE STRANDS.
- c) ASSUMED MODULUS OF ELASTICITY IS 28,500 KSI.
- d) THERE SHALL BE 2 STRANDS PER POST-TENSIONING CONDUIT.
- e) THE JACKING FORCE PER STRAND = 32 KIPS

25) THE CONCRETE FOR THE ABUTMENT # 1 AND ABUTMENT #2 PILE CAVITIES SHALL MEET THE REQUIREMENTS OF ITEM 900.608, "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET) (FPQ)".

26) THE CORRUGATED STEEL PIPE SHALL MEET THE REQUIREMENTS OF SUBSECTION 711.01. ALL COSTS ASSOCIATED WITH PLACING THE CORRUGATED STEEL PIPE, SHALL BE INCLUDED IN THE BID PRICE FOR ITEM 540.10, "PRECAST CONCRETE STRUCTURE (ABUTMENT #1)" AND ITEM 540.10, "PRECAST CONCRETE STRUCTURE (ABUTMENT #2)".

27) PROPOSED SEQUENCE OF CONSTRUCTION:
- a) PREPARE AND GRADE FOUNDATION TO REQUIRED ELEVATION.
- b) DRIVE PILES.
- c) PLACE PRECAST ABUTMENTS AND INSTALL TRANSVERSE STRANDS (IF MORE THAN ONE UNIT).
- d) APPLY EPOXY TO MATCH CAST FACES OF VERTICAL CONSTRUCTION JOINT.
- e) USE A CALIBRATED JACK TO TENSION TO 3 KIPS TO REMOVE SAG IN STRANDS.
- f) CHECK ALIGNMENT OF PILE CAP ELEMENTS.
- g) STRESS POST-TENSIONING STRANDS USING A CALIBRATED JACK OPERATED BY QUALIFIED PERSONNEL WITH PREVIOUS EXPERIENCE IN POST-TENSIONING.
- h) FILL PILE CAVITIES WITH ITEM 900.608, "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET) (FPQ)".

28) ALTERNATE SEQUENCE OF CONSTRUCTION MAY BE SUBMITTED TO THE VTRANS PROJECT MANAGER FOR APPROVAL.

PRESTRESSED VOIDED SLABS

29) DESIGN VALUES
- a) CONCRETE COMPRESSIVE STRENGTH: f'c = 7,500 PSI.
- b) LIVE LOAD HL-93.
- c) CONCRETE COMPRESSIVE STRENGTH AT RELEASE: f'ci = 5,000 PSI
- d) PRESTRESSING STRANDS: 0.6 INCH DIAMETER, 270 KSI, LOW-RELAXATION 7-WIRE STRAND PULLED TO 75% OF THEIR ULTIMATE TENSILE STRENGTH.
- e) POST TENSIONING STRANDS: 0.5 INCH DIAMETER, 270 KSI, LOW-RELAXATION 7 WIRE STRAND.
- f) THERE SHALL BE TWO (2) TRANSVERSE STRANDS PER CONDUIT. JACKING FORCE PER STRAND = 32 KIPS.
- g) POST-TENSIONING STRANDS SHALL BE COVERED WITH SEAMLESS POLYPROPYLENE SHEATH (WITH CORROSION INHIBITOR GREASE BETWEEN SHEATH AND STRAND) FOR THE LENGTH OF THE STRAND, EXCEPT AT ANCHORAGE LOCATIONS
- h) ASSUMED MODULUS OF ELASTICITY = 28,500 KSI.
- i) SERVICE LOADS

	FASCIA UNITS	INTERIOR UNITS
MEMBER MOMENT	298* K-FT	307 K-FT
SUPERIMPOSED DEAD LOAD MOMENT	81 K-FT	81 K-FT
LIVE LOAD AND IMPACT MOMENT	411 K-FT	357 K-FT
DEAD LOAD REACTION (PER BRG)	16* KIPS	15 KIPS
LIVE LOAD AND IMPACT REACTION (PER BRG)	19 KIPS	17 KIPS
TOTAL REACTION (PER BRG)	35 KIPS	32 KIPS
FINAL CAMBER	3/8 INCH	3/8 INCH

*INCLUDES WATERLINE DEAD LOAD

30) FILL KEYWAY WITH TYPE IV MORTAR ACCORDING TO SECTION 510. GROUTING SHALL BE PAID FOR UNDER ITEM 510.24, "GROUTING SHEAR KEYS".

31) THE FABRICATOR MAY ALTER THE DESIGN AS DETAILED IN THESE PLANS TO ACCOMMODATE THEIR SPECIFIC OPERATION. ALTERNATE CONFIGURATIONS SHALL MEET ALL OF THE APPLICABLE DESIGN CRITERIA, LOADINGS AND CODES; AND SHALL BE STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER, LICENSED IN VERMONT.

PROPOSED CONSTRUCTION SEQUENCE FOR PRESTRESSED VOIDED SLABS

32) LAYOUT WORKING LINES:
- A. LAYOUT WORKING LINES FOR THE ENTIRE BRIDGE WIDTH ON THE SLAB SEAT.
- B. MEASURE ALL WORKING LINES FROM A COMMON WORKING POINT.
- C. BASE THE WORKING LINES ON THE NOMINAL SLAB WIDTHS.

33) VERIFY SLAB SEAT ELEVATIONS
- 1. MEASURE ELEVATIONS AT SLAB SEATS.
- 2. IF SEATS ARE HIGH OR LOW, TAKE CORRECTIVE ACTION.
- 3. INSTALL BEARINGS.

34) ERECT SLAB:
- A. PLACE SLAB TO FIT WITHIN WORKING LINES.
- B. AS WORK PROGRESSES, INSTALL HARDWOOD WEDGES BETWEEN ADJACENT SLABS TO MAINTAIN PROPER JOINT OPENING, A MINIMUM OF ONE WEDGE AT TRANSVERSE TENDON.
- C. DRILL ANCHOR BOLT HOLES.
- D. PLACE ANCHOR BOLTS.

35) INSTALL BACKER ROD:
- A. PLACE FILLER BELOW THE KEYWAY BOTTOM, AS SHOWN ON THE PLANS.

36) INSTALL TRANSVERSE TENDONS:
- A. FEED TENDONS THROUGH DUCTS.
- B. VERIFY THAT HARDWOOD WEDGES ARE IN PLACE AS REQUIRED TO PREVENT SLIPPAGE OF SLABS.
- C. USING A CALIBRATED JACK, POST-TENSION TENDONS TO APPROXIMATELY 5 KIPS TO REMOVE SAG IN THE TENDON AND SEAT THE CHUCK.

37) GROUT SHEAR KEYS:
- A. CLEAN JOINT WITH AND OIL-FREE AIR-BLAST IMMEDIATELY BEFORE GROUT PLACEMENT. VERIFY THAT BACKER ROD IS STILL IN PLACE.
- B. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR ADDITIONAL JOINT PREPARATION AND GROUT PLACEMENT.
- C. CAREFULLY ROD JOINTS TO ELIMINATE THE POSSIBILITY OF VOIDS.

38) POST-TENSION TRANSVERSE TENDONS:
- A. GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI, BASED ON THE MANUFACTURER'S RECOMMENDATIONS, PRIOR TO STRESSING.
- B. POST-TENSION TENDONS TO 32 KIPS EACH USING A CALIBRATED JACK OPERATED BY QUALIFIED PERSONNEL. BEGIN WITH TENDONS AT THE ENDS AND WORK SYMMETRICALLY TOWARDS THE MID-SPAN FROM EACH END.

39) END DETAILS:
- A. GROUT ANCHOR BOLTS INTO THE SLEEVES IN THE PRE-STRESSED UNITS, BEFORE THE GROUT CURES, PLACE THE WASHER PLATE AND INSTALL THE NUT ON TOP AND TIGHTEN.
- B. GROUT OVER THE NUT AND BOLT IN THE ANCHOR BOLT BLOCKOUTS.

40) FINISH WORK:
- A. REMOVE WEDGES AND SURFACE PATCH THE FASCIA SLABS AT TRANSVERSE TENDONS.

H-PILES

41) TO PREVENT DAMAGE TO THE PILES, PILE SHOES ARE REQUIRED AND SHALL CONFORM TO SUBSECTION 505.04 (f).

42) THE PILES SHALL BE DRIVEN TO A NOMINAL PILE DRIVING RESISTANCE (R_{NDR}) OF 286 KIPS, PROVIDED A MINIMUM PENETRATION OF 25 FEET BELOW THE BOTTOM OF PILE CAP HAS BEEN ACHIEVED.

43) A MINIMUM OF TWO DYNAMIC TESTS ARE REQUIRED DURING PILE INSTALLATION. NO LESS THAN ONE DYNAMIC PILE TEST SHALL BE CONDUCTED AT EACH ABUTMENT. PAYMENT WILL BE MADE UNDER ITEM 505.45, "DYNAMIC PILE LOADING TEST".

44) THE TOPS OF THE PILES AFTER DRIVING SHALL NOT VARY FROM THE POSITION SHOWN ON THE PLANS BY MORE THAN 3 INCHES. THE PILE ORIENTATION SHALL NOT VARY BY MORE THAN 5 DEGREES. THE CONTRACTOR SHALL DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER HOW THE TOLERANCES WILL BE MET. THESE MEASURES SHALL BE DEMONSTRATED IN A SUBMITTAL TO BE ACCEPTED BEFORE PILE DRIVING COMMENCES.

45) FOR ESTIMATING PURPOSES, THE PILE TIP ELEVATIONS WERE ASSUMED AS SHOWN ON THE BORING LOGS. THE ACTUAL IN PLACE LENGTHS MAY VARY.