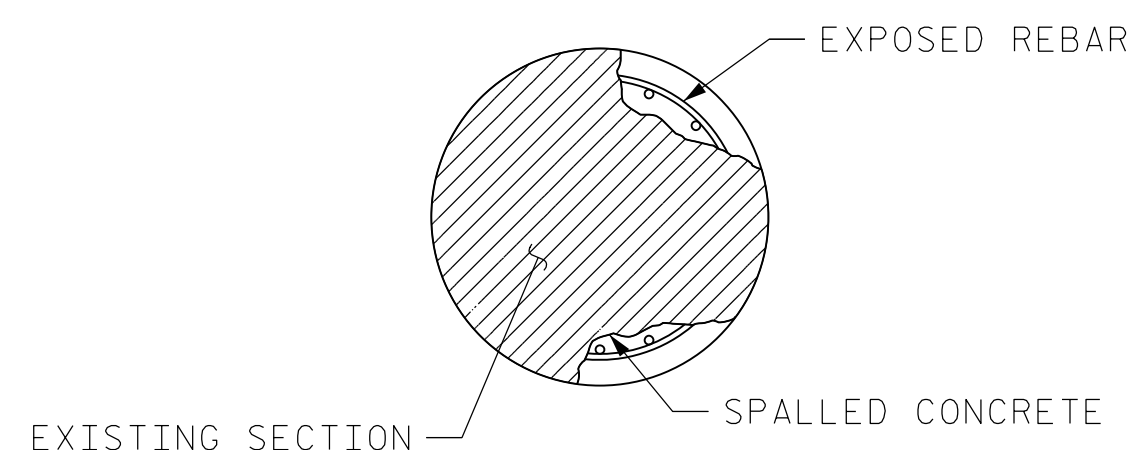
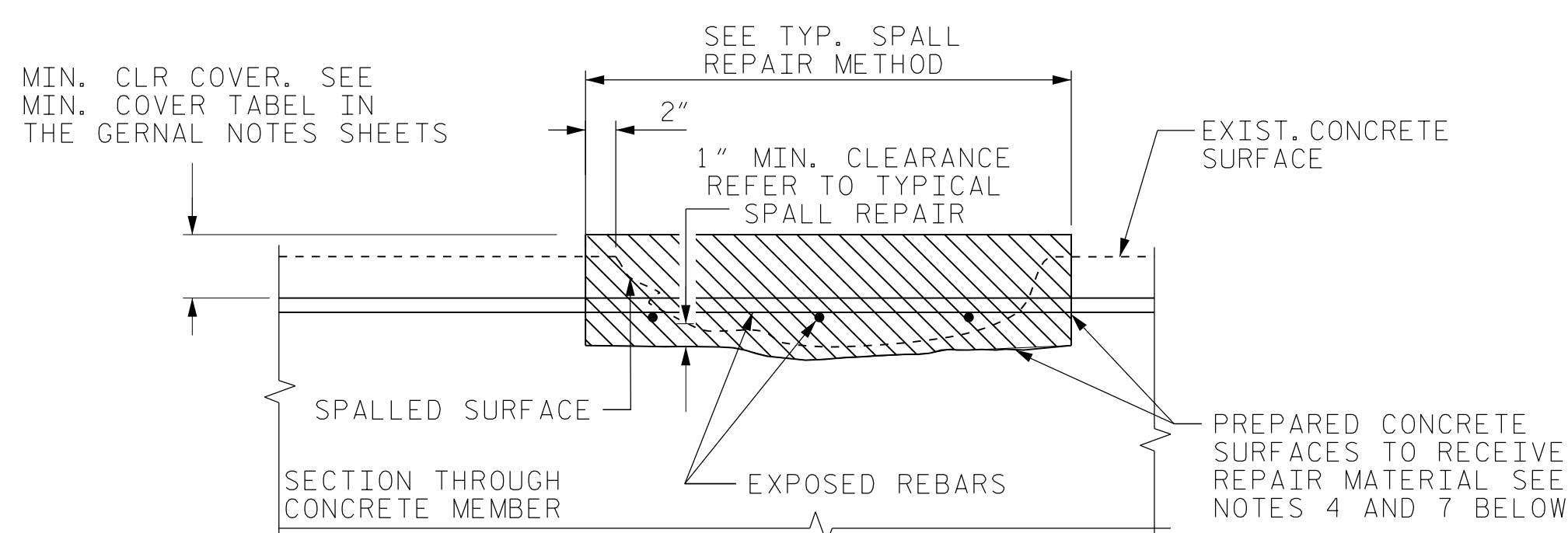


TYPICAL DELAMINATIONS AND SPALLS

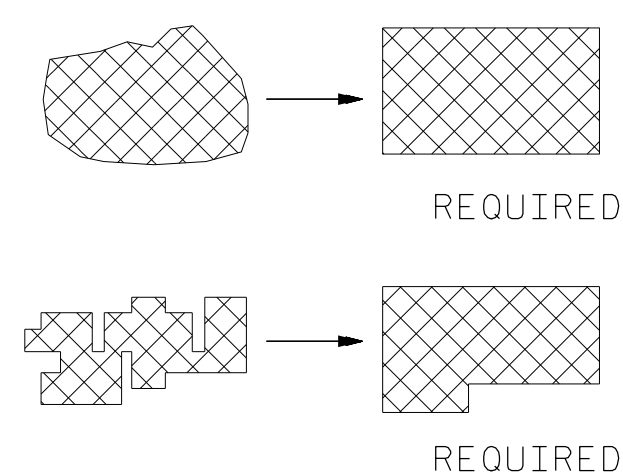


TYPICAL SPALL WITH EXPOSED REBAR



EXPOSING AND UNDERCUTTING REINFORCING STEEL

APPLICABLE TO HORIZONTAL, VERTICAL, AND OVERHEAD LOCATIONS



SIMPLE PATCH CONFIGURATION

AT CORNER LOCATIONS PROVIDE RIGHT ANGLE CUTS. PATCH CONFIGURATION SHALL BE KEPT AS SIMPLE AS POSSIBLE. INDIVIDUAL REPAIR AREAS WITHIN 2 FEET SHALL BE JOINED AT THE DIRECTION OF THE ENGINEER.

TYPICAL SPALL REPAIR

- FOR CONCRETE RESTORATION, REMOVE AND REPAIR UNSOUND CONCRETE FROM AREAS TO BE REPAIRED IN ACCORDANCE WITH THIS SHEET AND THE PROJECT SPECIAL PROVISIONS. AREAS WELL ADHERED TO EXISTING STRAND OR REINFORCEMENT SHALL REMAIN.
- ALL UNSOUND CONCRETE MUST BE REMOVED. HOWEVER, PRESTRESSED STRANDS SHOULD NOT BE DISTURBED UNLESS ABSOLUTELY NECESSARY. USE EXTREME CARE TO NOT DAMAGE STRANDS.
- ALL REPAIRS SHALL BE MARKED FOR APPROVAL OF APPROXIMATE PERIMETER PRIOR TO INITIATION OF WORK.
- THE CONTRACTOR SHALL SUBMIT A PLAN FOR CONTROL AND DISPOSAL OF DEBRIS TO THE ENGINEER FOR APPROVAL.
- ANY REINFORCEMENT WHICH IS LOOSE SHALL BE SECURED IN PLACE BY TYING TO OTHER SECURED BARS OR BY OTHER APPROVED METHODS. LAP SPLICES SHALL BE INSTALLED IN ACCORDANCE WITH THE TABLE BELOW. REFER TO GENERAL NOTES FOR DOWEL DETAIL (IF NECESSARY).
- CLEAN EXPOSED REBARS AND ANY LOOSE CONCRETE OR ABRASIVES BY SANDBLASTING OR APPROVED ALTERNATE. CLEANED STEEL SHALL NOT BE LEFT EXPOSED FOR MORE THAN 72 HOURS PRIOR TO ENCAPSULATION OF CONCRETE.
- AN APPROVED CEMENTITIOUS BASED BONDING AGENT SHALL BE USED ON ALL EXPOSED CONCRETE SURFACES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS BEFORE THE REPAIR MATERIAL IS APPLIED.
- FILL VOIDS WITH REPAIR MATERIAL IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS AND NCDOT SPECIFICATIONS. NOTE THAT ANY REPAIR MATERIAL APPLIED TO OVERHEAD LOCATIONS SHALL BE SPECIFICALLY DESIGNATED FOR OVERHEAD USE BY THE MANUFACTURER'S SPECIFICATIONS.

TYPICAL CRACK REPAIR

- OBTAIN ENGINEER'S APPROVAL TO CARRY OUT CRACK REPAIR (IN LIEU OF SPALL REPAIR) FOR CASES WHERE ADJACENT CONCRETE IS OTHERWISE SOUND AND CRACKING IS NOT A RESULT OF CORRODING REINFORCEMENT.
- ADDRESS CRACKS IN NEW CONSTRUCTION IN ACCORDANCE WITH PROJECT SPECIAL PROVISIONS. ADDRESS EXISTING CRACKS IN ACCORDANCE WITH THIS SHEET AND PROJECT SPECIAL PROVISIONS.
- REMOVE UNSOUND CONCRETE FROM CRACK AREA.
- THE CONTRACTOR SHALL SUBMIT A PLAN FOR CONTROL AND DISPOSAL OF DEBRIS TO THE ENGINEER FOR APPROVAL.
- FOR CRACKS UP TO 1/8" USE AN EPOXY RESIN WITH MINIMUMS OF VISCOSITY OF 325 CPS, 28 DAY COMPRESSIVE STRENGTH OF 13000 PSI. FOR CRACKS 1/8" TO 1/4", USE AN INJECTION GEL OR EQUAL NON-SAG PASTE WITH 28 DAY COMPRESSIVE STRENGTH OF 10000 PSI.
- TO SEAL CRACK SURFACES PRIOR TO CRACK INJECTION, USE INJECTION GEL WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 12000 PSI.
- ENGINEER TO APPROVE CRACK AND CAP SEAL MATERIAL PRIOR TO BEGINNING OF CONSTRUCTION.
- APPLY CLASS II FINISH AT COMPLETION OF CRACK REPAIR TO REMOVE FINS OR KNOBS.

RC GIRDER REPAIR

- SOUND CONCRETE TO DETERMINE EXTENTS OF REPAIR LOCATION.
- IF AFTER UNSOUND CONCRETE REMOVAL ON GIRDERS, MORE THAN 50% SECTION LOSS IS NOTED ON THE REBAR, OR IF SEVERED REBAR IS ENCOUNTERED, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONCRETE REPAIR.
- REMOVE SURFACE CONCRETE TO VERIFY THAT SAW CUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL. SAW CUT AROUND REPAIR AREA TO A NOMINAL DEPTH OF 1/2".
- REMOVE CONCRETE WITHIN SAW CUT AREA TO A MINIMUM 1/2" DEPTH. IF CONCRETE IS DAMAGED BEYOND THE ORIGINAL SAW CUT, A NEW SAW CUT IS REQUIRED.
- IF MORE THAN HALF THE CIRCUMFERENCE OF A REINFORCING BAR IS EXPOSED DURING THIS PROCESS, REMOVE ADDITIONAL CONCRETE TO 1" BEHIND THE BAR.
- CLEAN ALL EXPOSED REINFORCING BARS. FOR BARS WITH MORE THAN 10% SECTION LOSS, SPLICE AND SECURELY TIE SUPPLEMENTAL REINFORCING BARS AS NEEDED.
- REMOVE ALL LOOSE OR WEAKENED MATERIAL THEN CLEAN THE REPAIR AREA OF DIRT, GREASE, OIL, AND FOREIGN MATTER.
- PREPARE SURFACE AND PLACE APPROVED PREPACKAGED MATERIAL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. MAXIMUM AGGREGATE SIZE FOR REPAIR MATERIAL SHALL NOT EXCEED 2/3 THE MINIMUM REPAIR DEPTH.
- FOR GIRDER REPAIRS, SEE SPECIAL PROVISION FOR CONCRETE REPAIRS AND SEE "SUPERSTRUCTURE REPAIRS" SHEETS.

CONCRETE REPAIR NOTES

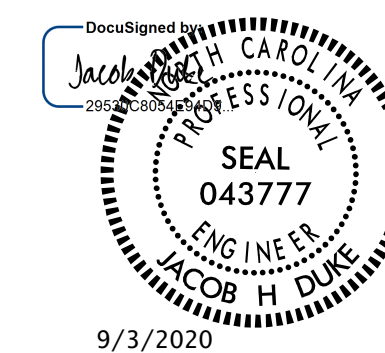
- PERFORM A SOUNDING SURVEY IN THE PRESENCE OF THE ENGINEER TO IDENTIFY ALL LOCATIONS IN NEED OF CONCRETE REPAIR.
- GAIN CONCURRENCE ON ALL REPAIR AREAS AT EACH LOCATION PRIOR TO COMMENCING WORK AT THE BENT.
- THE DETERIORATED AREAS SHOWN ON OTHER PAGES ARE BASED ON BRIDGE INSPECTION REPORT, AND PARTIAL FIELD REVIEWS OF THE STRUCTURE. AS SUCH, THEY ARE FOR INFORMATIONAL PURPOSES AND SUBJECT TO CHANGE BASED ON CONTINUING DETERIORATION.
- GENERALLY EXTEND REPAIR AREAS 2"-3" INTO SOUND CONCRETE BEYOND EDGE OF SPALLS AND SQUARE OFF AREAS IN ACCORDANCE WITH DETAILS ON THIS SHEET.
- THE METHOD USED TO DELINEATE THE AREAS OF UNSOUND CONCRETE TO BE REPAIRED SHALL NOT PERMANENTLY MARK THE CONCRETE, LEAVE ANY RESIDUE AFTER REMOVAL, OR REQUIRE HARSH CHEMICALS TO REMOVE.
- THE CONTRACTOR SHALL REMOVE THE DETERIORATED CONCRETE IN ACCORDANCE WITH THE GUIDELINES SET IN THESE NOTES, IN THE PROJECT SPECIAL PROVISIONS, AND THE STANDARD SPECIFICATIONS.
- REMOVE UNSOUND CONCRETE TO THE EXTENT NECESSARY. MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT.
- REINFORCING STEEL, WHICH IS DETERMINED BY THE ENGINEER TO BE REPLACED, SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE ON THIS SHEET.
- FOR REPAIRS OVER TRAFFIC AND SHALLOW REPAIRS THAT DO NOT ENGAGE REINFORCEMENT, ANCHOR PATCH MATERIAL USING 1/4" GALVANIZED BOLTS, EPOXY ANCHORED WITH 2" EMBEDMENT. PLACE BOLTS IN A 6" GRID. USE A LATEX OR EPOXY PATCH MATERIAL FOR IMPROVED BOND.
- FOR ADHESIVELY ANCHORED DOWELS OR ANCHOR BOLTS, SEE STANDARD SPECIFICATIONS.
- FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.
- FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.
- FOR EPOXY RESIN INJECTION (ERI), SEE SPECIAL PROVISIONS.
- FOR SUPERSTRUCTURE REPAIRS SEE "SUPERSTRUCTURE REPAIRS" SHEETS.
- FOR SUBSTRUCTURE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3 AND "SUBSTRUCTURE CONCRETE REPAIRS" SHEETS.

| CONCRETE REPAIR SCHEDULE | |
|--------------------------|--|
| REPAIR AREA | APPROVED MATERIAL |
| BEAMS | CONCRETE REPAIRS (RC GIRDERS) |
| SUBSTRUCTURE | "FORM AND POUR" CONCRETE REPAIR, SHOTCRETE, OR CONTRACTOR OPTION |

| LAP SPLICE TABLE | |
|------------------|-------------------|
| REBAR SIZE | LAP SPLICE LENGTH |
| 4 | 1'-9" |
| 5 | 2'-2" |
| 6 | 2'-7" |
| 7 | 3'-6" |
| 8 | 4'-6" |
| 9 | 5'-10" |
| 10 | 7'-4" |

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**CONCRETE RESTORATION
 DETAILS**

DRAWN BY : JACOB H. DUKE DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

301 FAYETTEVILLE ST., SUITE 1500
 RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | |
| 1 | | | 3 | | | S-19 |
| 2 | | | 4 | | | TOTAL SHEETS 45 |