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# Construction Notes & Specifications

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# Crystal Creek Realignment

Algonquin, Illinois  
Village of Algonquin  
125 Wilbrandt Street  
Algonquin, Illinois 60102

Revisions:			
No.	By	Date	Description
1		02-26-10	Final AES review for ACOE submittal
2		05-28-10	ACOE & MCSWCD
3		05-16-11	Comments
4			ACOE permit submittal
5			
6			
7			

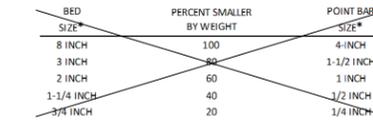
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## SLOPE PROTECTION CONSTRUCTION

- PART 1. GENERAL**
- 1.1 DESCRIPTION**  
A. THIS SECTION INCLUDES GEOTEXTILE MATERIAL AND MULCH INSTALLATION ON THE VEGETATED STREAMBANK SLOPES.
- 1.2 RELATED SECTIONS**  
A. GRADING, SEEDING.
- 1.3 QUALITY ASSURANCE**  
A. QUALIFICATIONS OF WORKMEN: PROVIDE AT LEAST ONE PERSON WHO SHALL BE PRESENT AT ALL TIMES DURING EXECUTION OF THIS PORTION OF THE WORK WHO SHALL BE THOROUGHLY FAMILIAR WITH THE TYPE AND OPERATION OF EQUIPMENT BEING USED. SAID PERSON SHALL DIRECT ALL WORK PERFORMED UNDER THIS SECTION.  
B. STANDARDS: ALL MATERIALS AND METHODS USED DURING THIS PORTION OF THE WORK SHALL MEET OR EXCEED APPLICABLE FEDERAL, STATE, COUNTY AND LOCAL LAWS AND REGULATIONS.
- 1.4 SUBMITTALS**  
A. MATERIALS: THE CONTRACTOR SHALL SUBMIT TO THE OWNER FOR APPROVAL A COMPLETE LIST OF ALL MATERIALS TO BE USED DURING THIS PORTION OF THE WORK PRIOR TO DELIVERY OF ANY MATERIALS TO THE SITE. INCLUDE COMPLETE DATA ON SOURCE, AMOUNT AND QUALITY. THIS SUBMITTAL SHALL IN NO WAY BE CONSTRUED AS PERMITTING SUBSTITUTION FOR SPECIFIC ITEMS DESCRIBED ON THE PLANS OR IN THESE SPECIFICATIONS UNLESS APPROVED IN WRITING BY THE OWNER.  
B. EQUIPMENT: THE CONTRACTOR SHALL PROVIDE A LIST OF EQUIPMENT AND A DESCRIPTION AND LOCATION OF ITS INTENDED USE, AND A LIST OF SAID PERSONS PERFORMING THE WORK AND THEIR QUALIFICATIONS FOR OPERATING AND MAINTAINING THE LISTED EQUIPMENT.  
C. AFTER THE WORK IS COMPLETED THE CONTRACTOR SHALL SUBMIT TO THE OWNER RECORD DRAWINGS. THE CONTRACTOR WILL MARK IN RED INK ON THE ORIGINAL PLANS ANY FIELD CHANGES OR DEVIATIONS FROM THE ORIGINAL PLANS.

## PART 2. PRODUCTS

- 2.1 MATERIALS**  
A. ROCK FOR BOULDER REVEMENTS, CROSS VANES, GRADE CONTROLS AND J-HOOKS SHALL BE QUALITY DESIGNATION "A" STONE, NOT BROKEN CONCRETE, AND SHALL BE REASONABLY FREE OF SHALE AND SHALY GYPSUM. THE STONE SHALL BE REASONABLY FREE OF LAMINATIONS, SEAMS, CRACKS AND OTHER STRUCTURAL DEFECTS OR IMPERFECTIONS TENDING TO DESTROY ITS RESISTANCE TO WEAR AND FREEM FLOWING. THE STONE SHALL BE ANGULAR IN SHAPE AND NEARLY BREADTH-NOT THICKNESS OF A SINGLE STONE SHOULD BE LESS THAN ONE-THIRD ITS LENGTH. ROUNDED STONES OR BOULDERS WILL NOT BE ACCEPTED.  
B. BOULDERS SHALL BE STONE GRADATION AS DEPICTED ON THE PLANS CONFORMING TO SECTION 1005 OF THE IDOT SPECIFICATIONS. EACH LOAD OF BOULDERS SHALL BE REASONABLY WELL GRADED FROM THE SMALLEST TO THE LARGEST TO THE MAXIMUM SIZE SPECIFIED. STONES SMALLER THAN THE SPECIFIED 40 PERCENT SIZE AND SPALLS WILL NOT BE PERMITTED IN AN AMOUNT EXCEEDING 10 PERCENT BY WEIGHT OF EACH LOAD.  
C. CLASS 20 COURSE AGGREGATE BEDDING MATERIAL SHALL BE USED WITH BOULDERS. BEDDING MATERIAL SHALL BE SPREAD UNIFORMLY. PLACING OF MATERIAL BY METHODS WHICH TEND TO SEGREGATE PARTICLE SIZES WITHIN THE BEDDING WILL NOT BE PERMITTED. COMPACTION OF THE BEDDING WILL NOT BE REQUIRED.  
D. STREAMBED STONE IS NATURALLY ROUNDED IN SHAPE AND HAS A NATURALLY SMOOTH SURFACE. SUCH AS STREAM OR RIVER STONE, STREAMBED STONE SHALL BE HARD AND DURABLE STONE, BULK DENSITY SHALL NOT BE LESS THAN 165 POUNDS PER DRY CUBIC FOOT. THE LEAST DIMENSION OF ANY ONE PIECE SHALL NOT BE LESS THAN 1/3 THE GREATEST DIMENSION. SHOT QUARRY STONE, CRUSHED ROCK, BROKEN CONCRETE OR RECYCLED CONSTRUCTION PRODUCTS WILL NOT BE ALLOWED. EACH LOAD OF STREAMBED STONE SHALL BE REASONABLY WELL GRADED FROM THE SMALLEST TO THE MAXIMUM SIZE SPECIFIED. STONE SIZE GRADATION FOR STREAMBED STONE SHALL CONFORM TO THE FOLLOWING GRADATION:



\* THE SIZE IS MEASURED ALONG THE B-AXIS, WHICH IS THE SECOND LARGEST DIMENSION OF THE STONE (I.E., USE THE DIMENSIONS OF LENGTH, HEIGHT, AND WIDTH TO DESCRIBE THE STONE; WITH LENGTH BEING AXIS AND THE LONGEST DIMENSION OF THE STONE, THEN THE B-AXIS IS THE LONGER OF THE HEIGHT AND WIDTH DIMENSIONS).

## PART 3. EXECUTION

- 3.1 CROSS-VANES AND J-HOOKS**  
A. A TRENCH FOR THE DUG CONFORMING TO THE SHAPE OF THE CROSS-VANE OR J-HOOK. THE DEPTH OF THE TRENCH SHALL BE SUCH THAT THE FOOTER, HEADER, AND SILL ROCKS WILL BE 2/3 BURIED.  
B. ROCKS SHALL BE PRECISELY PLACED WITH AN EXCAVATOR. FOOTER ROCKS SHALL BE PLACED FIRST WITH THE HEADER ROCKS PLACED UPSTREAM AND OVERLAPPING THE TOP 1/3 OF THE FOOTER ROCKS PRIOR TO BACKFILLING THE TRENCH.
- 3.2 BOULDER REVEMENTS**  
A. BOULDER MATERIAL AND AGGREGATE MATERIAL SHALL CONFORM TO SECTIONS 210, 201, 1003, 1004 AND 1005 OF THE IDOT SPECIFICATIONS.  
B. SLOPES TO BE PROTECTED BY BOULDERS SHALL BE FREE OF BRUSH, TREES, STUMPS, AND OTHER OBSERVABLE MATERIALS AND BE DRESSED TO SMOOTH SURFACE. ALL SOFT OR SPONGY MATERIAL SHALL BE REMOVED TO THE DEPTH SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER AND REPLACED WITH APPROVED NATIVE MATERIAL. FILLED AREAS WILL BE COMPACTED AS SPECIFIED IN THE IDOT SPECIFICATIONS FOR EMBANKMENTS. A TRENCH AS SHOWN ON THE PLANS SHALL BE DUG AND MAINTAINED UNTIL THE BOULDERS ARE PLACED.  
C. WHEN SHOWN ON THE PLANS, A BLANKET SHALL BE PLACED ON THE PREPARED SLOPE IN ACCORDANCE WITH THE IDOT SPECIFICATIONS.  
D. 4 INCH MINIMUM GRAVEL BEDDING MATERIAL SHALL BE USED.  
E. PROPER STONE PLACEMENT REQUIRES BEGINNING AT THE TOE AND PROCEEDING UP THE SLOPE. DO NOT DROP STONE FROM HEIGHTS GREATER THAN 1 FOOT.  
F. BOULDER LAYER THICKNESS SHOULD NOT BE LESS THAN THE SPHERICAL DIAMETER OF THE (D<sub>10</sub>) STONE OR LESS THAN THE 15 TIMES THE SPHERICAL DIAMETER OF THE (D<sub>15</sub>) STONE, WHICHEVER RESULTS IN THE GREATER THICKNESS. IT SHALL NOT BE LESS THAN 42 INCHES FOR PRACTICAL PLACEMENT. THE THICKNESS SHOULD BE INCREASED BY 50 PERCENT WHEN THE BOULDERS ARE PLACED UNDERWATER TO PROVIDE FOR UNCERTAINTIES ASSOCIATED WITH THIS TYPE OF PLACEMENT. AN INCREASE IN THICKNESS OF 6 TO 12 INCHES ACCOMPANIED BY AN APPROPRIATE INCREASE IN STONE SIZES SHOULD BE PROVIDED WHERE BOULDER REVEMENT WILL BE SUBJECT TO ATTACK BY FLOATING DEBRIS OR ICE OR BY WAVES FROM BOAT WAKES, WIND, OR BEDFORMS.  
G. BOULDERS SHALL BE PLACED ON THE PREPARED SLOPE IN A MANNER WHICH WILL PROVIDE A REASONABLY WELL GRADED MASS OF STONE WITH THE MINIMUM PRACTICABLE PERCENTAGE OF VOID. THE ENTIRE MASS OF STONE SHALL BE PLACED SO AS TO BE IN CONFORMANCE WITH THE LINES, GRADES, AND THICKNESSES SHOWN ON THE PLANS. BOULDERS SHALL BE PLACED TO ITS FULL COURSE THICKNESS AT ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACING THE UNDERLYING MATERIAL. PLACING OF BOULDERS IN LAYERS BY DUMPING INTO CRATES OR BY SIMILAR METHODS LIKELY TO CAUSE SEGREGATION WILL NOT BE PERMITTED.  
H. THE LARGER STONES SHALL BE WELL DISTRIBUTED AND THE ENTIRE MASS OF STONE SHALL CONFORM TO THE GRADATION SPECIFIED BY THE ENGINEER. ALL MATERIAL GOING INTO BOULDERS PROTECTIONS SHALL BE PLACED AND DISTRIBUTED SO THAT THERE WILL BE NO LARGE ACCUMULATIONS OF EITHER THE LARGER OR SMALLER SIZES OF STONE.  
I. TO THE EXTENT OF THESE SPECIFICATIONS TO PROVIDE A FAIRLY COMPACT BOULDER PROTECTION IN WHICH ALL SIZES OF MATERIAL ARE PLACED IN THEIR PROPER PROPORTIONS, HAND PLACING OR REARRANGING OF INDIVIDUAL STONES BY MECHANICAL EQUIPMENT MAY BE REQUIRED TO THE EXTENT NECESSARY TO SECURE THE RESULTS SPECIFIED.  
J. UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER, THE BOULDER PROTECTION SHALL BE PLACED IN CONJUNCTION WITH THE CONSTRUCTION OF THE EMBANKMENT WITH ONLY SUFFICIENT LAG IN CONSTRUCTION OF THE BOULDER PROTECTION AS MAY BE NECESSARY TO ALLOW FOR PROPER CONSTRUCTION OF THE PORTION OF THE EMBANKMENT PROTECTED AND TO PREVENT MIXTURE OF EMBANKMENT AND BOULDERS. THE CONTRACTOR SHALL MAINTAIN THE BOULDER PROTECTION UNTIL ACCEPTED AND ANY MATERIAL DISPLACED BY ANY CAUSE SHALL BE REPLACED TO THE LINES AND GRADES SHOWN ON THE PLANS AT NO ADDITIONAL COST TO THE OWNER.  
K. WHEN BOULDERS AND BEDDING MATERIAL ARE DUMPED UNDER WATER, THE ENGINEER SHALL BE NOTIFIED SO THAT THICKNESS OF THE LAYERS WILL BE INCREASED AND METHODS SHALL BE EMPLOYED THAT WILL MINIMIZE SEGREGATION.
- 3.3 STREAM BEDDING**  
A. STONE WILL BE PLACED IN THE STREAMBED TO PROVIDE A GRAVEL AND COBBLE BOTTOM. STONE WILL BE PLACED TO THE APPROXIMATE GRADE AND IN THE APPROXIMATE LOCATION AS SHOWN ON THE PLANS.  
B. PLACE STREAMBED STONE MATERIALS CAREFULLY TO AVOID DISTURBING STREAMBANK AND BED, OR AREAS THAT HAVE BEEN RESTORED.  
C. PLACE STREAMBED STONE TO MATCH UPSTREAM AND DOWNSTREAM CHANNEL GRADE OR TO THE ELEVATION OF THE PRE-DISTURBANCE STREAMBED CONDITIONS. THICKNESS OF THE STONE MATERIALS SHALL BE NO LESS THAN 8 INCHES.  
D. PLACE STREAMBED STONE IN THE CHANNEL IN A MANNER SO THAT ONCE IT IS PLACED IN THE CHANNEL IT WILL NOT FURTHER ADJUSTED WITH HEAVY EQUIPMENT BY SPREADING, PUSHING, DIGGING OR OTHER MEANS.
- 3.4 CLEAN-UP, REMOVAL AND REPAIR**  
A. CLEAN-UP: THE WORK AREA SHALL BE KEPT FREE OF DEBRIS BY THE CONTRACTOR. AT NO TIME SHALL TRASH OR OTHER MATERIAL BE ALLOWED TO ACCUMULATE AT THE PROJECT SITE. ALL TOOLS SHALL BE KEPT IN APPROPRIATE CARRYING CASES, TOOL BOXES, ETC. PARKING AREAS, ROADS, SIDEWALKS, PATHS, TRAILS, AND PAVED AREAS SHALL BE KEPT FREE OF MUD AND DIRT.  
B. REMOVAL: AFTER WORK HAS BEEN COMPLETED REMOVE TOOLS AND ALL OTHER DEBRIS GENERATED BY THE CONTRACTOR.  
C. REPAIR: THE CONTRACTOR SHALL REPAIR ANY DAMAGES THAT OCCURRED DURING COMPLETION OF THE WORK DESCRIBED IN THIS SECTION. SAID DAMAGES MAY INCLUDE, BUT ARE NOT LIMITED TO, TIRE RUTS IN THE GROUND, DAMAGE TO PLANTED AREAS, DAMAGE TO TRAILS, ETC. ALL AREAS DAMAGED BY THE CONTRACTOR DURING THE EXECUTION OF THIS WORK SHALL BE REPAIRED BY CONTRACTOR AND RESTORED TO THE CONDITIONS SHOWN ON THE PLANS AT NO ADDITIONAL COST TO THE OWNER. ALL AREAS OUTSIDE OF THE CONSTRUCTION LIMITS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION GRADES AND STABILIZED WITH APPROPRIATE SEED OR PLANTINGS.
- 3.5 INSPECTION**  
A. AFTER COMPLETION, THE CONTRACTOR SHALL SCHEDULE WITH THE OWNER A FINAL ACCEPTANCE INSPECTION OF THE WORK.
- 3.6 ACCEPTANCE AND GUARANTEE**  
A. FINAL ACCEPTANCE: THE WORK SHALL BE CONSIDERED 100% COMPLETE AFTER CONSTRUCTION OF CROSS-VANES, J-HOOKS, AND BOULDER REVEMENTS AND AFTER THE CONTRACTOR HAS COMPLETED ALL CLEAN-UP, REMOVAL AND REPAIRS AS DESCRIBED IN 3.2 OF THIS SECTION.

## MANAGEMENT OF PLANTINGS

- PART 2. PRODUCTS**
- 2.1 MATERIALS**  
A. GEOSYNTHETIC SLOPE PROTECTION BLANKET SHALL BE A THREE-DIMENSIONAL WEB OF POLYOLEFIN FIBERS POSITIONED BETWEEN TWO, DUAL-ORIENTED NETS AND MECHANICALLY BOUND TOGETHER BY PARALLEL STITCHING WITH POLYOLEFIN THREAD (ENKAMAT 7010 OR OWNER APPROVED EQUAL).  
B. GEOTEXTILE SURFACE NETTING SHALL BE NORTH AMERICAN GREEN 5750N OR OWNER APPROVED EQUIVALENT FOR UPLAND SLOPES (LESS THAN 5:1) AND 5015S OR OWNER APPROVED EQUIVALENT FOR FLOOD PRONE AREAS AND SLOPES GREATER THAN 5:1.  
C. METAL PINS SHALL BE 1/2" LONG, 3/16" DIAMETER STEEL WITH 1-1/2" OD STEEL WASHERS. WOOD STAKES SHALL BE PINE OR OAK, FREE FROM CRACKS AND STRUCTURALLY SOUND.
- PART 3. EXECUTION**
- 3.1 SIDESLOPE RESTORATION CONSTRUCTION**  
A. PLACE 4 INCHES OF TOPSOIL ON THE BOTTOM OF THE PREPARED SLOPE ABOVE THE PROPOSED GIBB GRADE.  
B. PLACE THE GEOSYNTHETIC SLOPE PROTECTION BLANKET OVER THE ROCK AND ANCHOR THE BLANKET TO THE UNDERLYING SOIL.  
C. PLACE 2 INCH OF TOPSOIL OVER THE GEOSYNTHETIC SLOPE PROTECTION BLANKET AND SEED ALL SOIL SURFACES.  
D. COVER SEEDED SURFACES WITH GEOTEXTILE SURFACE NETTING, SLITTING OPENINGS IN THE NETTING FOR EMERGING PLANTS IF NEEDED.  
E. WHEN BUTTING SHORT ENDS OF BLANKETS AND NETTING TO ONE ANOTHER, OVERLAP EDGES NOT LESS THAN 3 FEET. 4 INCHES FOR GEOTEXTILE SURFACE NETTING AND METAL PINS. EVERY 6" SEAMS SHALL OVERLAP IN THE DOWNSTREAM DIRECTION. STAGGER SEAMS NOT LESS THAN 47 O.C. IN ADJACENT LIFTS. OVERLAP ADJACENT ROLLS BY A MINIMUM OF 4 INCHES. BURY TOP EDGE OF SLOPE PROTECTING BLANKET AND SURFACE NETTING OF UPPERMOST LIFT IN A 4-12" DEEP TRENCH AROUND ENTIRE PERIMETER. BACKFILL TRENCH WITH EXCAVATED TOPSOIL AND LIGHTLY TAMP. ANCHOR MATS AT 3-FOOT INTERVALS.
- 3.2 CLEAN-UP, REMOVAL AND REPAIR**  
A. CLEAN-UP: THE WORK AREA SHALL BE KEPT FREE OF DEBRIS BY THE CONTRACTOR. AT NO TIME SHALL TRASH OR OTHER MATERIAL BE ALLOWED TO ACCUMULATE AT THE PROJECT SITE. ALL TOOLS SHALL BE KEPT IN APPROPRIATE CARRYING CASES, TOOL BOXES, ETC. PARKING AREAS, ROADS, SIDEWALKS, PATHS, TRAILS, AND PAVED AREAS SHALL BE KEPT FREE OF MUD AND DIRT.  
B. REMOVAL: AFTER WORK HAS BEEN COMPLETED REMOVE TOOLS AND ALL OTHER DEBRIS GENERATED BY THE CONTRACTOR.  
C. REPAIR: THE CONTRACTOR SHALL REPAIR ANY DAMAGES THAT OCCURRED DURING COMPLETION OF THE WORK DESCRIBED IN THIS SECTION. SAID DAMAGES MAY INCLUDE, BUT ARE NOT LIMITED TO, TIRE RUTS IN THE GROUND, DAMAGE TO PLANTED AREAS, DAMAGE TO TRAILS, ETC. ALL AREAS DAMAGED BY THE CONTRACTOR DURING THE EXECUTION OF THIS WORK SHALL BE REPAIRED BY CONTRACTOR AND RESTORED TO THE CONDITIONS SHOWN ON THE PLANS AT NO ADDITIONAL COST TO THE OWNER. ALL AREAS OUTSIDE OF THE CONSTRUCTION LIMITS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION GRADES AND STABILIZED WITH APPROPRIATE SEED OR PLANTINGS.
- 3.3 INSPECTION**  
A. AFTER COMPLETION OF SLOPE PROTECTION CONSTRUCTION, THE CONTRACTOR SHALL SCHEDULE WITH THE OWNER A FINAL ACCEPTANCE INSPECTION OF THE WORK.
- 3.4 ACCEPTANCE AND GUARANTEE**  
A. FINAL ACCEPTANCE: THE WORK SHALL BE CONSIDERED 100% COMPLETE AFTER COMPLETION OF SLOPE PROTECTING BLANKET AND SURFACE NETTING AND AFTER THE CONTRACTOR HAS COMPLETED ALL REQUIRED CLEAN-UP, REMOVAL AND REPAIR AS DESCRIBED IN 3.2 OF THIS SECTION.

## ROCK BASED CHANNEL STABILIZATION CONSTRUCTION

- PART 1. GENERAL**
- 1.1 DESCRIPTION**  
A. THIS SECTION INCLUDES BOULDER REVEMENTS, CROSS-VANE, GRADE CONTROLS, AND J-HOOK VANE APPURTENANCES AND STREAM BED CONSTRUCTION.
- 1.2 RELATED SECTIONS**  
A. GRADING.
- 1.3 QUALITY ASSURANCE**  
A. QUALIFICATIONS OF WORKMEN: PROVIDE AT LEAST ONE PERSON WHO SHALL BE PRESENT AT ALL TIMES DURING EXECUTION OF THIS PORTION OF THE WORK WHO SHALL BE THOROUGHLY FAMILIAR WITH THE TYPE AND OPERATION OF EQUIPMENT BEING USED. SAID PERSON SHALL DIRECT ALL WORK PERFORMED UNDER THIS SECTION.  
B. STANDARDS: ALL MATERIALS, EQUIPMENT, AND PROCEDURES USED DURING THIS PORTION OF THE WORK SHALL MEET OR EXCEED APPLICABLE FEDERAL, STATE, COUNTY AND LOCAL LAWS AND REGULATIONS.  
C. CONTROL OF BOULDER GRADATION WILL BE VISUALLY INSPECTED BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE SAMPLES OF BOULDERS OF AT LEAST 5 TONS, MEETING THE GRADATION SPECIFIED FOR EACH GRADATION SPECIFIED. THE SAMPLE MAY BE A PART OF THE FINISHED BOULDER COVERING AND SHOULD BE USED AS A FREQUENT REFERENCE FOR JUDGING THE GRADATION OF THE BOULDERS SUPPLIED. ANY DIFFERENCE OF OPINION BETWEEN THE OWNER OR OWNERS REPRESENTATIVE AND THE CONTRACTOR SHALL BE RESOLVED BY DUMPING AND CHECKING TWO RANDOM TRUCK LOADS OF BOULDERS. MECHANICAL EQUIPMENT A SORTING SITE, AND LABOR NEEDED TO ASSIST IN CHECKING GRADATION SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.  
D. IN LOCATIONS SUBJECT TO FREEZING OR WHERE STONE WILL BE EXPOSED TO SALT WATER, THE STONE SHALL BE SUBJECT TO THE SODIUM SULFATE SOUNDNESS LOSS TESTING REQUIREMENTS OUTLINED IN SECTION 1005 OF THE IDOT SPECIFICATIONS FOR QUALITY DESIGNATION "A". HEADER AND FOOTER STONE MUST BE ANGULAR. STONE DIMENSIONS SHOWN ON THE PLANS ARE MINIMUM STONE DIMENSIONS FOR THE ROCK WITH A SPECIFIC GRAVITY OF 2.65. ALL TESTS NECESSARY FOR THE CONTRACTOR TO LOCATE AN APPROVED SOURCE OF STREAMBED STONE WILL BE MADE BY THE CONTRACTOR.  
E. CERTIFICATION THAT THE MATERIAL CONFORMS TO THE SPECIFICATION REQUIREMENTS ALONG WITH COPIES OF THE TEST RESULTS FROM AN APPROVED COMMERCIAL TESTING LABORATORY SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL AT LEAST 30 DAYS BEFORE THE MATERIAL IS REQUIRED FOR USE. SAMPLING OF THE MATERIAL SOURCE SHALL BE DONE BY THE CONTRACTOR UNDER THE REVIEW BY THE OWNER'S REPRESENTATIVE. NO IMPORTED MATERIALS SHALL BE DELIVERED TO THE SITE UNTIL THE PROPOSED SOURCE AND TESTS ON THE MATERIALS HAVE BEEN TENTATIVELY APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.  
F. GRADATION TESTS OF STREAMBED STONE SHALL BE MADE AT THE PLACE OF PRODUCTION BY THE CONTRACTOR PRIOR TO SHIPMENT. SAMPLES OF THE FINISHED PRODUCT FOR GRADATION TESTING SHALL BE TAKEN FROM EACH 100 TONS INSTALLED OR MORE AS REQUESTED BY THE OWNERS REPRESENTATIVE IF VARIATION IN GRADATION IS OCCURRING OR IF THE MATERIAL APPEARS TO DEPART FROM THE SPECIFICATIONS. TEST RESULTS SHALL BE FORWARDED TO THE OWNERS REPRESENTATIVE WITHIN 48 HOURS AFTER SAMPLING. IF TESTS CONDUCTED BY THE CONTRACTOR OR THE OWNERS REPRESENTATIVE INDICATE THAT THE MATERIAL DOES NOT MEET SPECIFICATION REQUIREMENTS, MATERIAL PLACEMENT SHALL BE TERMINATED UNTIL CORRECTIVE MEASURES ARE TAKEN. MATERIAL THAT DOES NOT CONFORM TO THE SPECIFICATION REQUIREMENTS AND IS PLACED IN THE WORK SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE. SAMPLING AND TESTING PERFORMED BY THE CONTRACTOR SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.  
G. STORE MATERIALS ON SITE IN A MANNER THAT ENSURES THAT STREAMBED STONE IS NOT MIXED WITH THE OTHER MATERIALS. STREAMBED STONE MIXED WITH OTHER MATERIALS WILL BE REPLACED AT THE CONTRACTORS EXPENSE. TRANSPORT AND STAGE STREAMBED STONE TO MINIMIZE SORTING OF THE GRADED MIXTURE. THE OWNERS REPRESENTATIVE WILL INSPECT AND APPROVE ALL MATERIALS PRIOR TO INSTALLATION.
- 1.4 SUBMITTALS**  
A. MATERIALS: IT IS INTENDED THAT ROCK USED FOR CONSTRUCTION OF THE BOULDER REVEMENTS, CROSS-VANES, GRADE CONTROLS, J-HOOKS, AND STREAMBED WILL BE OBTAINED FROM OFF-SITE AREAS. PRIOR TO COMMENCING CONSTRUCTION, CONTRACTOR WILL MEET WITH OWNER AND OWNERS REPRESENTATIVE TO DEFINE SOURCES FOR THIS ROCK MATERIAL. BED MATERIALS USED FOR STREAMBED CONSTRUCTION SHALL BE OBTAINED FROM OFF-SITE SOURCES.  
B. EQUIPMENT: WITH SUBMITTAL OF A BID THE CONTRACTOR SHALL PROVIDE A LIST OF EQUIPMENT AND A DESCRIPTION AND LOCATION OF ITS INTENDED USE, AND A LIST OF SAID PERSONS PERFORMING THE WORK AND THEIR QUALIFICATIONS FOR OPERATING AND MAINTAINING THE LISTED EQUIPMENT.  
C. AFTER THE WORK IS COMPLETED THE CONTRACTOR SHALL SUBMIT TO THE OWNER RECORD DRAWINGS. THE CONTRACTOR WILL MARK IN RED INK ON THE ORIGINAL PLANS ANY FIELD CHANGES OR DEVIATIONS FROM THE ORIGINAL PLANS.

- 3.2 CLEAN-UP, REMOVAL AND REPAIR**  
A. CLEAN-UP: THE WORK AREA SHALL BE KEPT FREE OF DEBRIS BY THE CONTRACTOR. AT NO TIME SHALL TRASH OR OTHER MATERIAL BE ALLOWED TO ACCUMULATE AT THE PROJECT SITE. ALL TOOLS SHALL BE KEPT IN APPROPRIATE CARRYING CASES, TOOL BOXES, ETC. PARKING AREAS, ROADS, SIDEWALKS, PATHS, TRAILS, AND PAVED AREAS SHALL BE KEPT FREE OF MUD AND DIRT.  
B. REMOVAL: AFTER WORK HAS BEEN COMPLETED REMOVE TOOLS AND ALL OTHER DEBRIS GENERATED BY THE CONTRACTOR.  
C. REPAIR: THE CONTRACTOR SHALL REPAIR ANY DAMAGES THAT OCCURRED DURING COMPLETION OF THE WORK DESCRIBED IN THIS SECTION. SAID DAMAGES MAY INCLUDE, BUT ARE NOT LIMITED TO, TIRE RUTS IN THE GROUND, DAMAGE TO PLANTED AREAS, DAMAGE TO TRAILS, ETC. ALL AREAS DAMAGED BY THE CONTRACTOR DURING THE EXECUTION OF THIS WORK SHALL BE REPAIRED BY CONTRACTOR AND RESTORED TO THE CONDITIONS SHOWN ON THE PLANS AT NO ADDITIONAL COST TO THE OWNER. ALL AREAS OUTSIDE OF THE CONSTRUCTION LIMITS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION GRADES AND STABILIZED WITH APPROPRIATE SEED OR PLANTINGS.
- 3.3 INSPECTION**  
A. AFTER COMPLETION OF SEEDING, THE CONTRACTOR SHALL SCHEDULE WITH OWNER A PROVISIONAL ACCEPTANCE INSPECTION OF THE WORK.
- 3.4 ACCEPTANCE AND GUARANTEE**  
A. PROVISIONAL ACCEPTANCE: THE WORK SHALL BE CONSIDERED 90% COMPLETE AFTER ALL SEED HAS BEEN INSTALLED AND THE CONTRACTOR HAS COMPLETED ALL SEEDING, AND COMPLETED ALL REQUIRED CLEAN-UP, REMOVAL, AND REPAIR AS DESCRIBED IN 3.2 OF THIS SECTION.  
B. FINAL ACCEPTANCE: THE WORK SHALL BE CONSIDERED 100% COMPLETE AFTER THE CONTRACTOR HAS MET OR EXCEEDED THE PERFORMANCE STANDARDS GIVEN IN 3.4 OF THIS SECTION.  
C. THE CONTRACTOR SHALL GUARANTEE SEEDING AREAS WILL MEET OR EXCEED THE FOLLOWING PERFORMANCE CRITERIA ONE FULL GROWING SEASON AFTER PROVISIONAL ACCEPTANCE: 60% TOTAL PLANT COVER AND AT LEAST 10% TOTAL PLANT COVER BY PLANTED NATIVE SPECIES IN EACH COMMUNITY. REED (CANNARY GRASS (PHALARIS ARUNDINACEA), COMMON REED GRASS (PHRAGMITES AUSTRALIS), AND OTHER INVASIVE NON-NATIVE HERBACEOUS SPECIES SHALL COLLECTIVELY NOT COMPRISE GREATER THAN 10% OF ANY VEGETATION COMMUNITY. INVASIVE NON-NATIVE SHRUBS AND TREES SHALL NOT EXCEED 10% OF ANY VEGETATION COMMUNITY.  
D. THE CONTRACTOR SHALL GUARANTEE SEEDING AREAS WILL MEET OR EXCEED THE FOLLOWING PERFORMANCE CRITERIA TWO FULL GROWING SEASONS AFTER PROVISIONAL ACCEPTANCE: 70% TOTAL PLANT COVER AND AT LEAST 30% TOTAL PLANT COVER BY PLANTED NATIVE SPECIES IN EACH COMMUNITY. REED (CANNARY GRASS (PHALARIS ARUNDINACEA), COMMON REED GRASS (PHRAGMITES AUSTRALIS), AND OTHER INVASIVE NON-NATIVE HERBACEOUS SPECIES SHALL COLLECTIVELY NOT COMPRISE GREATER THAN 10% OF ANY VEGETATION COMMUNITY. INVASIVE NON-NATIVE SHRUBS AND TREES SHALL NOT EXCEED 10% OF ANY VEGETATION COMMUNITY.  
E. THE CONTRACTOR SHALL GUARANTEE SEEDING AREAS WILL MEET OR EXCEED THE FOLLOWING PERFORMANCE CRITERIA THREE FULL GROWING SEASONS AFTER PROVISIONAL ACCEPTANCE: 80% TOTAL PLANT COVER AND AT LEAST 60% TOTAL PLANT COVER BY PLANTED NATIVE SPECIES IN EACH COMMUNITY. REED (CANNARY GRASS (PHALARIS ARUNDINACEA), COMMON REED GRASS (PHRAGMITES AUSTRALIS), AND OTHER INVASIVE NON-NATIVE HERBACEOUS SPECIES SHALL COLLECTIVELY NOT COMPRISE GREATER THAN 10% OF ANY VEGETATION COMMUNITY. INVASIVE NON-NATIVE SHRUBS AND TREES SHALL NOT EXCEED 10% OF ANY VEGETATION COMMUNITY.  
F. THE CONTRACTOR SHALL GUARANTEE SEEDING AREAS WILL MEET OR EXCEED THE FOLLOWING PERFORMANCE CRITERIA FIVE FULL GROWING SEASONS AFTER PROVISIONAL ACCEPTANCE: 90% TOTAL PLANT COVER AND AT LEAST 70% TOTAL PLANT COVER BY PLANTED NATIVE SPECIES IN EACH COMMUNITY. REED (CANNARY GRASS (PHALARIS ARUNDINACEA), COMMON REED GRASS (PHRAGMITES AUSTRALIS), AND OTHER INVASIVE NON-NATIVE HERBACEOUS SPECIES SHALL COLLECTIVELY NOT COMPRISE GREATER THAN 10% OF ANY VEGETATION COMMUNITY. INVASIVE NON-NATIVE SHRUBS AND TREES SHALL NOT EXCEED 10% OF ANY VEGETATION COMMUNITY. IN ADDITION, 70% OF ALL SPECIES INSTALLED IN THE UPLAND AND SAVANNAH AND WET PRAIRIE ZONES AND WETLAND (WET PRAIRIE AND EMERGENT ZONES) AREAS SHALL BE PRESENT IN EACH OF THESE AREAS (I.E. UPLANDS OR WETLANDS). THE NATIVE FLORISTIC QUALITY (FQ) MUST BE GREATER OR EQUAL TO 20 IN EACH OF THESE AREAS (I.E. UPLANDS OR WETLANDS).  
G. REMEDIAL ACTION: IF PLANTINGS FAIL TO MEET THE TERMS OF THE GUARANTEE SHOWN ABOVE, THE CONTRACTOR WILL DEVELOP A REMEDIAL ACTION PLAN THAT TAKES INTO CONSIDERATION THE SOIL AND THE NATURE OF THE REMEDIAL ACTION. THE CONTRACTOR SHALL SUBMIT TO THE OWNER FOR APPROVAL A REMEDIAL ACTION PLAN TO IMPLEMENT THE REMEDIAL ACTION PLAN AND DEVELOP A REPORT THAT DESCRIBES THE REMEDIAL ACTION TAKEN. IF REMEDIAL SEEDING OR PLANTING IS REQUIRED, CONTRACTOR WILL NOT BE REQUIRED TO PERFORM ADDITIONAL REMEDIAL SEEDING OR PLANTING IN THE SAME AREA FOR A MINIMUM OF TWO GROWING SEASONS. AFTER TWO GROWING SEASONS FOLLOWING THE REMEDIAL PLANTING, THE PERFORMANCE CRITERIA MUST BE MET FOR THE THIRD GROWING SEASON OR ADDITIONAL REMEDIAL ACTION MUST BE TAKEN. THIS GUARANTEE REMAINS IN EFFECT UNTIL ALL ZONES MEET THE SECOND GROWING SEASON CRITERIA.

## HERBACEOUS PERENNIAL PLANTING

- PART 1. GENERAL**
- 1.1 DESCRIPTION**  
A. THIS SECTION INCLUDES INSTALLATION OF LIVE HERBACEOUS PERENNIAL PLANTS, TUBERS, BULBS, AND DORMANT ROOT STOCKS OF HERBACEOUS PERENNIAL PLANTS.
- 1.2 RELATED SECTIONS**  
A. SOIL PREPARATION AND SEEDING.
- 1.3 QUALITY ASSURANCE**  
A. QUALIFICATIONS OF WORKMEN: PROVIDE AT LEAST ONE PERSON WHO SHALL BE PRESENT AT ALL TIMES DURING EXECUTION OF THIS PORTION OF THE WORK WHO SHALL BE THOROUGHLY FAMILIAR WITH THE TYPE AND OPERATION OF EQUIPMENT BEING USED. SAID PERSON SHALL DIRECT ALL WORK PERFORMED UNDER THIS SECTION.  
B. STANDARDS: ALL MATERIALS AND METHODS USED DURING THIS PORTION OF THE WORK SHALL MEET OR EXCEED APPLICABLE FEDERAL, STATE, COUNTY AND LOCAL LAWS AND REGULATIONS. ALL LIVE HERBACEOUS PERENNIAL PLANTS, TUBERS, BULBS, AND DORMANT ROOT STOCKS OF HERBACEOUS PERENNIAL PLANTS SHALL BE FREE FROM INSECTS AND DISEASE.
- 1.4 SUBMITTALS**  
A. MATERIALS: THE CONTRACTOR SHALL SUBMIT TO THE OWNER FOR APPROVAL A COMPLETE LIST OF ALL MATERIALS TO BE USED DURING THIS PORTION OF THE WORK PRIOR TO DELIVERY OF ANY MATERIALS TO THE SITE. INCLUDE COMPLETE DATA ON SOURCE, AMOUNT AND QUALITY. TAGS SHALL REMAIN ON DELIVERED MATERIAL UNTIL OWNER APPROVAL. THIS SUBMITTAL SHALL IN NO WAY BE CONSTRUED AS PERMITTING SUBSTITUTION FOR SPECIFIC ITEMS DESCRIBED ON THE PLANS OR IN THESE SPECIFICATIONS UNLESS APPROVED IN WRITING BY THE OWNER.  
B. EQUIPMENT: THE CONTRACTOR SHALL PROVIDE A LIST OF EQUIPMENT AND A DESCRIPTION AND LOCATION OF ITS INTENDED USE, AND A LIST OF SAID PERSONS PERFORMING THE WORK AND THEIR QUALIFICATIONS FOR OPERATING AND MAINTAINING THE LISTED EQUIPMENT.  
C. AFTER THE WORK IS COMPLETED THE CONTRACTOR SHALL SUBMIT TO THE OWNER RECORD DRAWINGS. THE CONTRACTOR SHALL MARK IN RED INK ON THE ORIGINAL PLANS ANY FIELD CHANGES OR DEVIATIONS FROM THE ORIGINAL PLANS.
- PART 2. PRODUCTS**
- 2.1 MATERIALS**  
A. ALL LIVE HERBACEOUS PLANTS SHALL BE POTTED, TWO-YEAR OLD NURSERY-GROWN STOCK FROM WITHIN A 150-MILE RADIUS OF THE PROJECT SITE UNLESS APPROVED IN WRITING BY THE OWNER. PLANT MATERIAL SHALL CONFORM TO ANSI STANDARDS FOR NURSERY STOCK. SEE PLANTING PLAN FOR PLANTING LISTS AND QUANTITIES.
- PART 3. EXECUTION**
- 3.1 METHOD**  
A. PLANTING OF ALL LIVE HERBACEOUS PERENNIAL PLANTS SHALL BE COMPLETED AFTER MAY 15TH BUT NO LATER THAN JULY 15TH.  
B. ALL LIVE HERBACEOUS PERENNIAL PLANTS SHALL BE APPROVED BY THE OWNER PRIOR TO INSTALLATION.  
C. PROVIDE HEALTHY, WIGGERS LIVE HERBACEOUS PERENNIAL PLANTS; DO NOT USE MATERIALS THAT HAVE BEEN IN COLD STORAGE FOR LONGER THAN 45 DAYS.  
D. DELIVER LIVE HERBACEOUS PERENNIAL PLANTS TO PROJECT SITE AFTER PREPARATIONS FOR PLANTING HAVE BEEN COMPLETED.  
E. LIVE HERBACEOUS PERENNIAL PLANTS SHALL BE PACKED IN SUCH A MANNER AS TO INSURE ADEQUATE PROTECTION AGAINST WIND DAMAGE, DESICCATION, AND OTHER PHYSICAL DAMAGE WHILE IN TRANSIT.  
F. IF PLANTING IS DELAYED MORE THAN FOUR HOURS AFTER DELIVERY, KEEP PLANTS IN REFRIGERATED CONTAINER OR SET PLANTS IN SHADE PROTECTED FROM WEATHER AND MECHANICAL DAMAGE, AND KEEP MOIST AND COOL.  
G. EMERGENT LIVE HERBACEOUS PERENNIAL PLANTS SHALL BE INSTALLED IN 1/2" DEPTH OF WATER DEPENDING ON THE TOLERANCE OF EACH SPECIES.  
H. WET PRAIRIE LIVE HERBACEOUS PERENNIAL PLANTS SHALL BE PLACED 1/2" TO 1" ABOVE BOTH SIDES OF THE CREEK.  
I. ALL LIVE HERBACEOUS PERENNIAL PLANTS SHALL BE ADEQUATELY HEALED IN TO PREVENT DESICCATION.  
J. IF PLANTING INTO AN AREA TREATED WITH HERBICIDE, PLANT MATERIALS SHALL BE INSTALLED NOT LESS THAN 14 DAYS AFTER HERBICIDE TREATMENT.
- 3.2 CLEAN-UP, REMOVAL AND REPAIR**  
A. CLEAN-UP: THE WORK AREA SHALL BE KEPT FREE OF DEBRIS BY THE CONTRACTOR. AFTER THE WORK IS COMPLETE, CLEAN UP ANY REMAINING MATERIALS, PLANT CONTAINERS, DEBRIS, TRASH, ETC. AVOID DRIVING OR WALKING OVER PLANTED AREAS TO MINIMIZE DISTURBANCE.  
B. REMOVAL: AFTER WORK HAS BEEN COMPLETED REMOVE ANY TOOLS, EQUIPMENT, EMPTY CONTAINERS, AND ALL OTHER DEBRIS GENERATED BY THE CONTRACTOR.  
C. REPAIR: THE CONTRACTOR SHALL REPAIR ANY DAMAGES THAT OCCURRED DURING COMPLETION OF THE WORK DESCRIBED IN THIS SECTION. SAID DAMAGES MAY INCLUDE, BUT ARE NOT LIMITED TO, TIRE RUTS IN THE GROUND, DAMAGE TO PLANTED AREAS, DAMAGE TO TRAILS, ETC. ALL AREAS DAMAGED BY THE CONTRACTOR DURING THE EXECUTION OF THIS WORK SHALL BE REPAIRED BY CONTRACTOR AND RESTORED TO THE CONDITIONS SHOWN ON THE PLANS AT NO ADDITIONAL COST TO THE OWNER. ALL AREAS OUTSIDE OF THE CONSTRUCTION LIMITS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION GRADES AND STABILIZED WITH APPROPRIATE SEED OR PLANTINGS.
- 3.3 INSPECTION**  
A. AFTER COMPLETION OF PLANTING, THE CONTRACTOR SHALL SCHEDULE WITH THE OWNER A PROVISIONAL ACCEPTANCE INSPECTION OF THE WORK.
- 3.4 ACCEPTANCE**  
A. PROVISIONAL ACCEPTANCE: THE WORK SHALL BE CONSIDERED 90% COMPLETE AFTER THE CONTRACTOR HAS COMPLETED ALL PLANTING, AND COMPLETED ALL REQUIRED CLEAN-UP, REMOVAL, AND REPAIR AS DESCRIBED IN 3.2 OF THIS SECTION.  
B. FINAL ACCEPTANCE: THE WORK SHALL BE CONSIDERED 100% COMPLETE AFTER THE CONTRACTOR HAS MET OR EXCEEDED THE PERFORMANCE STANDARDS GIVEN IN 3.4 OF THIS SECTION.  
C. THE CONTRACTOR SHALL GUARANTEE PLANTED AREAS IN ALL PLANT COMMUNITIES WILL MEET OR EXCEED THE FOLLOWING PERFORMANCE CRITERIA ONE FULL GROWING SEASON AFTER PROVISIONAL ACCEPTANCE: 60% SURVIVAL OF PLANTS INSTALLED IN THE EMERGENT, WET PRAIRIE, PRAIRIE, AND SAVANNA ZONES. ALL SPECIES PLANTED MUST BE REPRESENTED.

NOTES:  
SEE STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DETAILS FOR ADDITIONAL INFORMATION.