

BISON EXHIBIT IMPROVEMENTS

ROGER WILLIAMS PARK ZOO
PROVIDENCE, RHODE ISLAND

PRELIMINARY DETERMINATION SUBMISSION

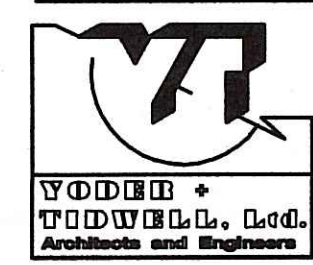
JUNE 16, 2009

PROJECT CONTACTS:

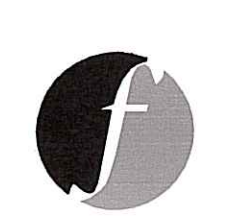
OWNER/APPLICANT
RHODE ISLAND ZOOLOGICAL SOCIETY

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401-861-3070

WETLANDS BIOLOGIST

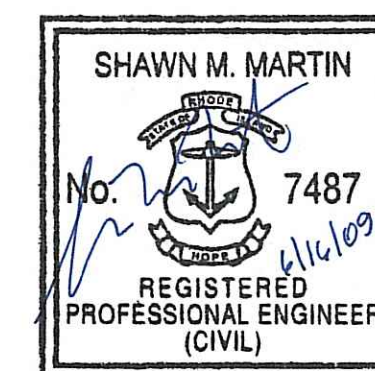
APPLIED BIO-SYSTEMS, INC.
P.O. BOX 985
WEST KINGSTON, RI 02892
P: 401-783-6740; F: 401-284-2004



LOCATION MAP
SCALE: 1" = 500'

PREPARED FOR:
RHODE ISLAND ZOOLOGICAL SOCIETY
1000 ELMWOOD AVENUE
PROVIDENCE, RI 02907
401-785-3510

PREPARED BY:
 **FUSS & O'NEILL**
Discipline to Deliver
317 IRON HORSE WAY, SUITE 204
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SHEET INDEX

SHEET No.	SHEET TITLE
C1.01	COVER SHEET
C2.01	SITE PLAN
C3.01	GRADING & EROSION CONTROL PLAN
C4.01	DETAILS

Kindly be advised that this Permit is not equivalent to a verification of the type or extent of freshwater wetlands on site.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED AUG - 5 2009 FILE # 09-0151
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL.
APPROVED PLANS MUST BE AT CONSTRUCTION SITE.

W. Joseph Casey



PROJ. No.: 20050645.A50
DATE: JUNE 16, 2009
C1.01

EROSION CONTROL NOTES

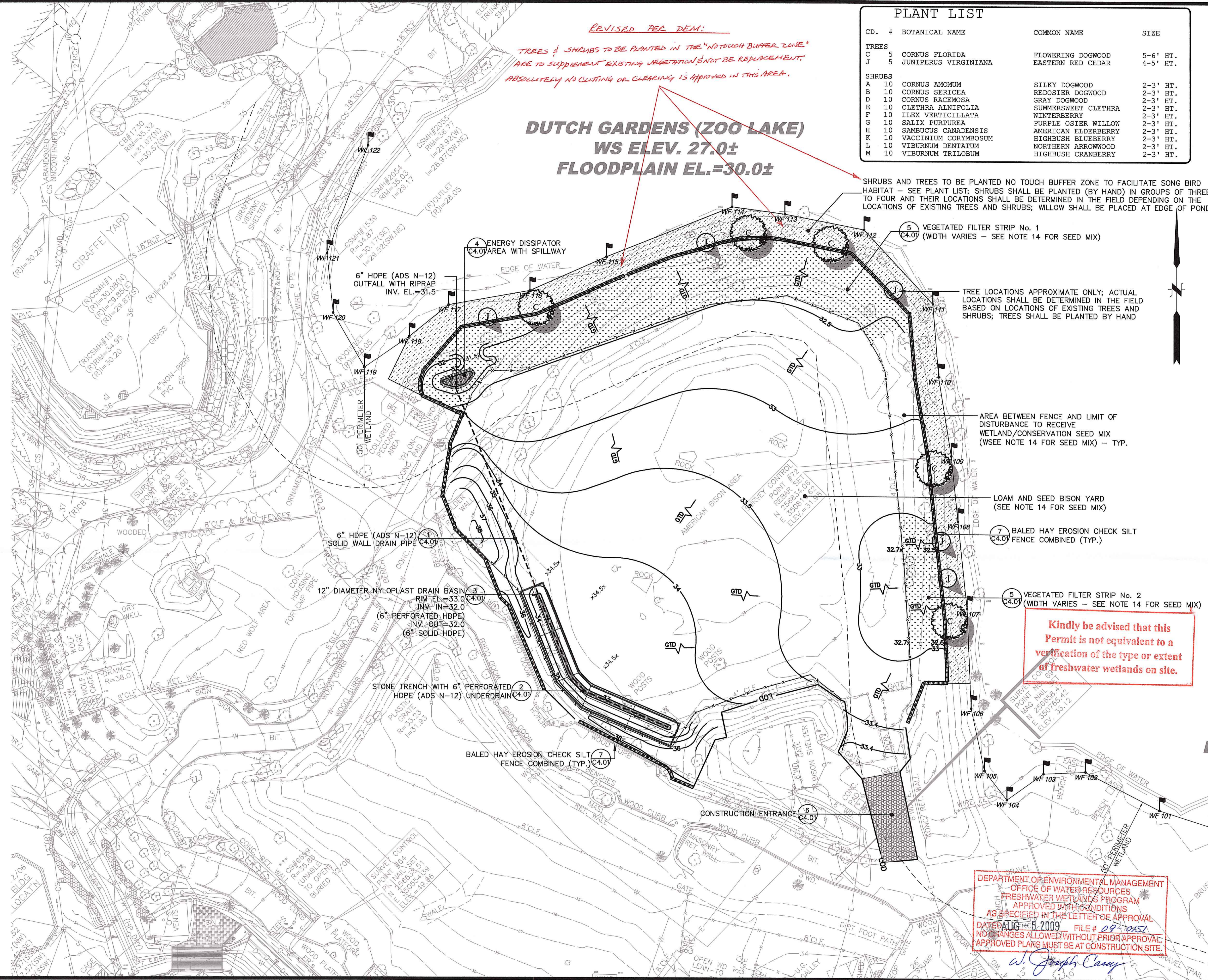
- DISTURBANCE OF SOIL SURFACES IS REGULATED BY STATE LAW. ALL WORK SHALL COMPLY WITH THE FOLLOWING CRITERIA TO PREVENT OR MINIMIZE SOIL EROSION.
- THE INSTALLATION AND MAINTENANCE OF EROSION CONTROL DEVICES IS THE RESPONSIBILITY OF THE CONTRACTOR. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE PLAN, OR AS DICTATED BY THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (RIDEM). ALL EROSION CONTROL DEVICES SHALL BE MAINTAINED IN EFFECTIVE CONDITION DURING CONSTRUCTION.
- THE CONTRACTOR SHALL USE THE LATEST EDITION OF THE "STATE OF RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK" AS A GUIDE IN CONSTRUCTING THE EROSION AND SEDIMENT CONTROLS INDICATED ON THE PLANS. ALL EROSION AND SEDIMENT CONTROL MEASURES OR WORKS AND REHABILITATION MEASURES MUST CONFORM TO OR EXCEED THE SPECIFICATIONS OR STANDARDS SET OUT IN THIS HANDBOOK.
- THE CONTRACTOR SHALL INSPECT EROSION AND SEDIMENT CONTROL DEVICES (INCLUDING THOSE ENCOMPASSING SOIL STOCKPILE AREAS) AT THE END OF EACH WORKING DAY, AFTER EACH STORM EVENT, AND AT LEAST DAILY DURING PROLONGED RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED. CLEANOUT OF ACCUMULATED SEDIMENT BEHIND THE BALES IS NECESSARY IF ONE-HALF OF THE ORIGINAL HEIGHT OF THE BALES BECOMES FILLED IN WITH SEDIMENT.
- THE CONTRACTOR IS RESPONSIBLE FOR THE TIMELY INSTALLATION, INSPECTION, MAINTENANCE, AND REPLACEMENT OF ALL TEMPORARY AND PERMANENT EROSION CONTROL DEVICES TO ENSURE PROPER OPERATION THROUGHOUT THE LIFE OF THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF PERMANENT MEASURES UNTIL CONSTRUCTION OF THE PROJECT IS COMPLETED OR UNTIL IT IS ACCEPTED BY THE OWNER. THE OWNER IS RESPONSIBLE THEREAFTER.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CLEAN ROADS, CONTROL DUST, AND TAKE ALL NECESSARY MEASURES TO ENSURE THAT THE SITE AND ALL ROADS BE MAINTAINED IN A MUD AND DUST-FREE CONDITION AT ALL TIMES THROUGHOUT THE LIFE OF THE PROJECT. DUST CONTROL SHALL INCLUDE WATER AND/OR CRUSHED STONE OR COARSE GRAVEL.
- ALL PROPOSED CONSTRUCTION ENTRANCES SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS AND DETAILS. ALL VEHICLE TRAFFIC ENTERING OR EXITING THE PROJECT SITE SHALL PASS OVER THE CONSTRUCTION ENTRANCES TO REDUCE THE TRACKING OR FLOWING OF SEDIMENT ONTO THE SURROUNDING DRIVEWAYS. ENTRANCES SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE SURROUNDING DRIVEWAYS. THIS WILL REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO THE SURROUNDING DRIVEWAYS MUST BE REMOVED IMMEDIATELY. PROVIDE ADDITIONAL CONSTRUCTION ENTRANCES WITHIN THE SITE AS NEEDED OR DIRECTED BY THE ENGINEER TO ADDRESS SITE CONDITIONS.
- THE CONTRACTOR SHALL INSTALL ALL PERIMETER SEDIMENT CONTROL BARRIERS AS SHOWN ON THE SITE DEVELOPMENT PLANS. A ROW OF STAKED HAYBALES OR A SILT FENCE SHALL ALSO BE INSTALLED AROUND ANY SOIL STOCKPILE AREAS. SEDIMENT BUILDUP AT SEDIMENT BARRIERS OR WITHIN DRAINAGE STRUCTURES SHALL BE REMOVED AND RECORDED ON SITE AS DIRECTED BY THE ENGINEER.
- THE CONTRACTOR SHALL RESTORE DISTURBED AREAS AS CLOSELY AS POSSIBLE. AREAS DAMAGED DURING CONSTRUCTION SHALL BE RESEED, REVEGETATED, OR OTHERWISE RESTORED TO THEIR ORIGINAL STATE. TREES AND OTHER EXISTING VEGETATION SHALL BE RETAINED WHEREVER FEASIBLE.
- TEMPORARY VEGETATIVE COVER SHALL BE APPLIED TO ANY DISTURBED AREAS (INCLUDING SOIL STOCKPILE AREAS) THAT HAVE NOT YET REACHED FINISHED GRADE AS SOON AS POSSIBLE, BUT NOT MORE THAN FOURTEEN (14) DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS TEMPORARILY CEASED, UNLESS THE ACTIVITY IS TO RESUME WITHIN TWENTY-ONE (21) DAYS. THE RECOMMENDED SEEDING DATES ARE MARCH 15 TO NOVEMBER 15.
THIS TEMPORARY VEGETATIVE COVER SHALL CONSIST OF 40% ANNUAL RYEGRASS AND 60% PERENNIAL RYEGRASS. ANNUAL OR PERENNIAL RYEGRASS SHALL BE PLANTED AT A RATE OF 75 POUNDS PER ACRE. LIMESTONE AND FERTILIZER SHALL BE APPLIED ACCORDING TO SOIL TEST RECOMMENDATIONS OFFERED BY THE UNIVERSITY OF RHODE ISLAND SOIL TESTING LABORATORY. IF SOIL TESTING IS NOT FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE TIMING IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 300 POUNDS PER ACRE OR 7.5 POUNDS PER 1,000 SQUARE FEET OF 10-10-10 OR EQUIVALENT. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AS FOLLOWS: (1) 3 TONS PER ACRE (OR 135 POUNDS PER 1,000 SQUARE FEET) FOR CLAY, CLAY LOAM AND HIGH ORGANIC SOIL, (2) 2 TONS PER ACRE (OR 90 POUNDS PER 1,000 SQUARE FEET) FOR SANDY LOAM, LOAM, OR SILT LOAM, AND (3) 1 TON PER ACRE (OR 45 POUNDS PER 1,000 SQUARE FEET) LOAMY SAND OR SAND. TEMPORARY VEGETATIVE COVER SHALL BE INSTALLED AS OUTLINED IN THE RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK.
- AREAS WHICH HAVE BEEN TEMPORARILY SEEDING SHALL BE MULCHED IMMEDIATELY FOLLOWING SEEDING IN ADDITION TO AREAS WHICH CANNOT BE SEEDING WITHIN THE RECOMMENDED SEEDING DATES AND ANY SOIL STOCKPILE AREAS. TEMPORARY MULCHING SHALL BE PERFORMED AS SOON AS POSSIBLE, BUT NOT MORE THAN FOURTEEN (14) DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS TEMPORARILY CEASED UNLESS THE ACTIVITY IS TO RESUME WITHIN TWENTY-ONE (21) DAYS.
ALL MULCHES MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAINSTORMS, TO CHECK FOR RILL EROSION. WHERE EROSION IS OBSERVED, ADDITIONAL MULCH MUST BE APPLIED. IF NETTING IS USED, THE NET SHOULD BE INSPECTED AFTER RAINSTORMS FOR DISLOCATION OR FAILURE. IF WASHOUTS OR BREAKAGE OCCUR, THE NET MUST BE REINSTALLED AS NECESSARY AFTER REPAIRING DAMAGE TO SLOPE. INSPECTIONS SHOULD TAKE PLACE UNTIL GRASSES ARE FIRMLY ESTABLISHED. GRASS IS CONSIDERED TO BE FIRMLY ESTABLISHED AT A MINIMUM HEIGHT OF THREE (3) INCHES.
- STRAW OR HAY MULCH, WOOD FIBER MULCH, AND HYDROMULCH ARE RECOMMENDED. STRAW OR HAY MULCH SHOULD BE APPLIED AT A RATE OF 2 TONS PER ACRE. WOOD FIBER MULCH SHOULD BE APPLIED AT A RATE OF 1,500-2,000 POUNDS PER ACRE, OR HYDROMULCH APPLIED AT A RATE OF 1,500 POUNDS PER ACRE. WOOD FIBER MULCH SHOULD NOT BE USED ALONE IN THE WINTER OR DURING HOT, DRY WEATHER. STRAW OR HAY MULCH MUST BE ANCHORED IMMEDIATELY AFTER SPREADING TO PREVENT WINDBLOWING. MULCH ANCHORING SHOULD ALSO BE USED ON SLOPES GREATER THAN THREE (3) PERCENT AND CONCENTRATED FLOW AREAS SUCH AS DIVERSION AND WATERWAY CHANNELS.
- IF SEEDING CANNOT BE COMPLETED IMMEDIATELY OR WITHIN THE RECOMMENDED SEEDING DATES, USE THE TEMPORARY MULCHING MEASURE TO PROTECT THE SITE AND DELAY SEEDING UNTIL THE NEXT RECOMMENDED SEEDING PERIOD.
- PERMANENT VEGETATIVE COVER SHALL BE APPLIED TO ALL DISTURBED AREAS THAT HAVE REACHED FINISHED GRADE AS SOON AS POSSIBLE, BUT NOT MORE THAN FOURTEEN (14) DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS PERMANENTLY CEASED. SEEDING DATES ARE MAY 1 TO JUNE 15 AND AUGUST 15 TO SEPTEMBER 15. SEED SHALL BE IN CONFORMANCE WITH THE FOLLOWING:
SEED IN BISON YARD AREA:
SHEEP FESCUE (*Festuca ovina*) 70%
HARD FESCUE (*Festuca brevipila*) 10%
WEEPING LOVEGRASS (*Eragrostis curvula*) 10%
BUFFALO GRASS (*Buchloe dactyloides*) 10%
APPLICATION RATE: 20 POUNDS PER ACRE
SEED IN VEGETATED FILTER STRIP AND AREA BETWEEN PROPOSED FENCE AND WETLAND EDGE:
NEW ENGLAND WETLAND SEED MIX (WETLAND SEED MIX PER NEW ENGLAND WETLAND PLANTS, INC. OR APPROVED EQUAL).
APPLICATION RATE: 18 POUNDS PER ACRE

- WASTE DISPOSAL: MATERIALS WHICH COULD BE A POTENTIAL SOURCE OF STORMWATER POLLUTION SUCH AS GASOLINE, DIESEL FUEL, HYDRAULIC OIL, ETC., SHALL BE STORED AT THE END OF EACH DAY IN A STORAGE TRAILER OR COVERED LOCATION AND TAKEN OFF-SITE AND PROPERLY DISPOSED OF. ALL TYPES OF WASTE GENERATED AT THIS SITE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH STATE LAW AND/OR REGULATIONS.
- GOOD HOUSEKEEPING: THE PROJECT SITE SHALL PROVIDE FOR THE MINIMIZATION OF EXPOSURE OF CONSTRUCTION DEBRIS (INCLUDING, BUT NOT LIMITED TO, INSULATION, WIRING, PAINTS AND PAINT CANS, SOLVENTS, WALL BOARD, ETC.) TO PRECIPITATION BY MEANS OF DISPOSAL AND/OR PROPER SHELTER OR COVER. IN ADDITION, CONSTRUCTION WASTE MUST BE PROPERLY DISPOSED OF IN ORDER TO AVOID EXPOSURE TO PRECIPITATION AT THE END OF EACH WORKING DAY. WASTE MUST ALSO BE CONTROLLED TO AVOID CONTACT WITH ZOO ANIMALS.
- ALL EXCESS MATERIALS, EXCESS FILL, EXCESS CONSTRUCTION MATERIALS, AND DEBRIS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH THE LOCAL, STATE, AND FEDERAL GUIDELINES AND REGULATIONS.

PLANT LIST				
CD.	#	BOTANICAL NAME	COMMON NAME	SIZE
TREES				
C	5	CORNUS FLORIDA	FLOWERING DOGWOOD	5-6' HT.
J	5	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	4-5' HT.
SHRUBS				
A	10	CORNUS AMOMUM	SILKY DOGWOOD	2-3' HT.
B	10	CORNUS SERICEA	REDOSIER DOGWOOD	2-3' HT.
D	10	CORNUS RACEMOSA	GRAY DOGWOOD	2-3' HT.
E	10	CLETHRA ALNIFOLIA	SUMMERSWEET CLETHRA	2-3' HT.
F	10	ILEX VERTICILLATA	WINTERBERRY	2-3' HT.
G	10	SALIX PURPUREA	PURPLE OSIER WILLOW	2-3' HT.
H	10	SAMBUCUS CANADENSIS	AMERICAN ELDERBERRY	2-3' HT.
K	10	VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	2-3' HT.
L	10	VIBURNUM DENTATUM	NORTHERN ARROWWOOD	2-3' HT.
M	10	VIBURNUM TRILOBUM	HIGHBUSH CRANBERRY	2-3' HT.

REVISED PER DEM:
TREES & SHRUBS TO BE PLANTED IN THE "NO TOUCH BUFFER ZONE" ARE TO SUPPLEMENT EXISTING VEGETATION NOT BE REPLACEMENT. ABSOLUTELY NO CUTTING OR CLEARING IS APPROVED IN THIS AREA.

**DUTCH GARDENS (ZOO LAKE)
WS ELEV. 27.0±
FLOODPLAIN EL.=30.0±**



SHRUBS AND TREES TO BE PLANTED NO TOUCH BUFFER ZONE TO FACILITATE SONG BIRD HABITAT - SEE PLANT LIST. SHRUBS SHALL BE PLANTED (BY HAND) IN GROUPS OF THREE TO FOUR AND THEIR LOCATIONS SHALL BE DETERMINED IN THE FIELD DEPENDING ON THE LOCATIONS OF EXISTING TREES AND SHRUBS; WILLOW SHALL BE PLACED AT EDGE OF POND

VEGETATED FILTER STRIP No. 1 (WIDTH VARIES - SEE NOTE 14 FOR SEED MIX)

TREE LOCATIONS APPROXIMATE ONLY; ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD BASED ON LOCATIONS OF EXISTING TREES AND SHRUBS; TREES SHALL BE PLANTED BY HAND

AREA BETWEEN FENCE AND LIMIT OF DISTURBANCE TO RECEIVE WETLAND/CONSERVATION SEED MIX (WSEE NOTE 14 FOR SEED MIX) - TYP.

LOAM AND SEED BISON YARD (SEE NOTE 14 FOR SEED MIX)

BALED HAY EROSION CHECK SILT FENCE COMBINED (TYP.)

VEGETATED FILTER STRIP No. 2 (WIDTH VARIES - SEE NOTE 14 FOR SEED MIX)

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OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
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AS SPECIFIED IN THE LETTER OF APPROVAL
DATED AUG - 5 2009 FILE # 09-70457
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE
W. Joseph Camp

No.	DATE	DESCRIPTION	BY
1.			
REVISIONS			

PROJ. MANAGER: SMM
CHIEF DESIGNER: SA
REVIEWED BY: DATE



SCALE:
HORIZ.: 1" = 20'
VERT.:
DATUM:
HORIZ.:
VERT.:
GRAPHIC SCALE

WWW.FandO.COM
f **FUSS & O'NEILL**
Disciplines to Deliver
317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070

ROGER WILLIAMS PARK ZOO
GRADING AND EROSION AND
CONTROL PLAN
BISON EXHIBIT IMPROVEMENTS
PROVIDENCE RHODE ISLAND

PROJ. No.: 20050645.A50
DATE: JUNE 16, 2009
C3.01

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