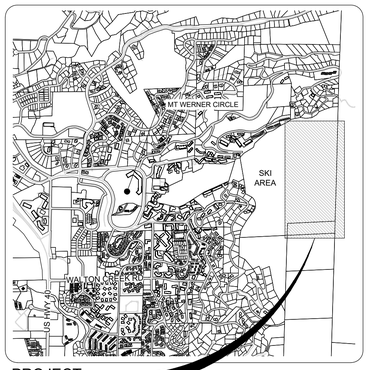
RCRBD Record Set
T.A.
07/14/2021

GRADING & EXCAVATION PERMIT SET

FOR

GREEN HORN RANCH

LOCATED IN THE SE1/4 SECTION 22, THE SW1/4 SECTION 23, AND IN THE NW1/4 SECTION 26
TOWNSHIP 6 NORTH, RANGE 84 WEST, 6TH P.M.;
COUNTY OF ROUTT, STATE OF COLORADO



VICINITY MAP

CONTACT INFORMATION

PROJECT TEAM:

OWNER
STEAMBOAT SKI & RESORT CORP.
2305 MT. WERNER CIRCLE
STEAMBOAT SPRINGS, CO 80487
(303) 749-8262
ATTN: MIKE SCHMIDT

DESIGNER
SE GROUP
131 CHURCH ST, SUITE 200
BURLINGTON, VT 05401
(802) 681-0874
ATTN: MITCH LEFEVRE

GENERAL CONTRACTOR
SAUNDERS CONSTRUCTION, INC.
86 INVERNESS PLACE NORTH
CENTENNIAL, CO 80112
(303) 699-9000
ATTN: ADAM CLEVELAND

CIVIL ENGINEERS & SURVEYORS
LANDMARK CONSULTANTS, INC.
141 9TH STREET
STEAMBOAT SPRINGS, CO 80487
(970) 871-9494
ATTN: ERIK GRIEPENTROG, P.E.

GEOTECHNICAL ENGINEER
NORTHWEST COLORADO CONSULTANTS, INC.
2580 COPPER RIDGE DRIVE
STEAMBOAT SPRINGS, CO 80487
(970) 879-7888
ATTN: BRIAN LEN

UTILITY CONTACT LIST:

UTILITY COMPANY	CONTACT	PHONE NUMBER
CITY PUBLIC WORKS	BEN BEALL, P.E.	(970) 871.8293
CITY OF STEAMBOAT SPRINGS UTILITIES	MICHELLE CARR, P.E.	(970) 871.8207
MT. WERNER WATER	RICHARD BUCCINO	(970) 879.2424
YAMPA VALLEY ELECTRIC ASSOC.	LARRY BALL	(970) 871.2282
ATMOS ENERGY	DON CRANE	(970) 879.3223
CENTURY LINK	JASON SHARPE	(970) 328.8290
COMCAST	ANDY NEWBY	(303) 547.4584
UTILITY NOTIFICATION CTR. OF CO	N/A	(800) 922.1987

THIS LIST IS PROVIDED AS A COURTESY REFERENCE ONLY. LANDMARK CONSULTANTS, INC. ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THIS LIST. IN NO WAY SHALL THIS LIST RELINQUISH THE CONTRACTOR'S RESPONSIBILITY FOR LOCATING ALL UTILITIES PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITY. PLEASE CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT 811 FOR ADDITIONAL INFORMATION

SHEET INDEX

PJ4949-1
Fire Prevention
In: 06/30/2021
Out: 07/06/2021

EARTHWORK QUANTITIES FOR PERMITTING FEE BASIS*:

CUT = 68,702 CY
FILL = 85,786 CY
TOTAL = 154,488 CY
VOLUMES DO NOT REFLECT SOIL BEHAVIOR. SITE IS ANTICIPATED TO BE BALANCED

* THESE QUANTITIES SHOULD NOT BE USED FOR CONTRACTING PURPOSES AS THEY REFLECT THE ESTIMATED RAW EARTHWORK ONLY AND NOT THE SPECIFIC MATERIAL MAKEUP SUCH AS TOPSOIL, STRUCTURAL EMBANKMENT, AND UNCLASSIFIED EXCAVATION. ROAD GRAVELS WERE NOT INCLUDED IN THE CALCULATION.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
Know what's below.
Call before you dig.
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

ERIK J. GRIEPENTROG
33280
NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

CIVIL ENGINEERS | SURVEYORS
141 9th Street / P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

LANDMARK CONSULTANTS, INC.

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NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Cover

SHEET
C.001

DRAWING FILENAME: P:\1012-048\DWGs\Production Drawings\G&E Permit\1012-048-GE-C.001-Cover.dwg LAYOUT NAME: Layout1 DATE: Jun 18, 2021 - 5:24pm CAD OPERATOR: Matt
LIST OF XREFS: [xVICMAP] [xBORDE-G&E Permit]

GENERAL NOTES

1. TOPOGRAPHIC AND EXISTING CONDITIONS PER CITY GIS DATA AND SUPPLEMENTED WITH LANDMARK CONSULTANTS, INC. ARCHIVED SURVEY FIELD DATA. LANDMARK IS NOT RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THE EXISTING CONDITIONS AND/OR PROPERTY INFORMATION (INCLUDING EASEMENTS AND ENCUMBRANCES) AND THE OWNER ASSUMES ALL RISK WITH COMPLYING WITH THE LEGAL REQUIREMENTS OF THIS PROJECT.

2. CITY OF STEAMBOAT SPRINGS PLAN REVIEW AND APPROVAL IS ONLY FOR GENERAL CONFORMANCE WITH CITY DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE COMPLETENESS, ACCURACY AND ADEQUACY OF THE DRAWINGS. DESIGN, DIMENSIONS, AND ELEVATIONS SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE.

3. ONE COPY OF THE APPROVED CONSTRUCTION PLANS AND SPECIFICATIONS SHALL BE KEPT ON THE JOB SITE AT ALL TIMES. PRIOR TO THE START OF CONSTRUCTION, VERIFY WITH PROJECT ENGINEER THE LATEST REVISION DATE OF THE APPROVED CONSTRUCTION PLANS.

4. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION OF PUBLIC IMPROVEMENTS SHALL MEET OR EXCEED THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE CITY OF STEAMBOAT SPRINGS TECHNICAL SPECIFICATIONS (MARCH, 2018 EDITION), THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" BY THE COLORADO DEPARTMENT OF TRANSPORTATION, (2017 EDITION), AND APPLICABLE STATE AND FEDERAL REGULATIONS. WHERE THERE IS A DIRECT CONFLICT BETWEEN THESE PLANS AND THE SPECIFICATIONS, OR ANY APPLICABLE STANDARDS, THE MOST RESTRICTIVE STANDARD SHALL APPLY.

5. ALL WATER AND SANITARY SEWER CONSTRUCTION AND RELATED WORK SHALL CONFORM TO THE MOUNT WERNER WATER STANDARD SPECIFICATIONS FOR WATER AND WASTEWATER UTILITIES, CURRENT EDITION STANDARDS AND SPECIFICATIONS.

6. ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES AS REQUIRED MUST BE OBTAINED IN ORDER TO PERFORM THE WORK. THIS INCLUDES, BUT IS NOT LIMITED TO, RIGHT-OF-WAY PERMIT, GRADING AND EXCAVATION PERMIT, CONSTRUCTION DEWATERING PERMIT, STORM WATER QUALITY PERMIT, ARMY CORP OF ENGINEER PERMIT, ETC. IT IS THE APPLICABLE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COPY OF ALL APPLICABLE CODES, LICENSES, SPECIFICATIONS, AND STANDARDS NECESSARY TO PERFORM THE WORK, AND BE FAMILIAR WITH THEIR CONTENTS PRIOR TO COMMENCING ANY WORK.

7. PRIOR TO ANY WORK IN THE CITY RIGHT-OF-WAY INCLUDING STREET CUTS, CONTACT THE CITY OF STEAMBOAT SPRINGS STREET DEPARTMENT AT 970.879.1807 FOR PERMIT REQUIREMENTS. NO WORK SHALL OCCUR IN THE ROW BETWEEN NOVEMBER 1 - APRIL 1 UNLESS A WRITTEN VARIANCE HAS BEEN APPROVED AND ISSUED BY THE CITY PUBLIC WORKS DIRECTOR.

8. PRIOR TO CLOSURE OF ANY STREET OR PART OF STREET, AN APPROVED OBSTRUCTION PERMIT MUST BE ISSUED BY CITY CONSTRUCTION SERVICES FOREMAN.

9. PRIOR TO START OF CONSTRUCTION A PRE-CONSTRUCTION MEETING SHALL BE SCHEDULED WITH THE APPROPRIATE CONTRACTORS, ENGINEER, SURVEYOR, TESTING COMPANY, AFFECTED AGENCIES AND KEY SUBCONTRACTORS A MINIMUM OF 48-HOURS PRIOR TO THE START OF WORK.

10. THE LOCAL ENTITY AND ENGINEER SHALL BE NOTIFIED AT LEAST 2 WORKING DAYS PRIOR TO THE START OF ANY EARTH DISTURBING ACTIVITY, OR CONSTRUCTION ON ANY AND ALL PUBLIC IMPROVEMENTS. THE LOCAL ENTITY RESERVES THE RIGHT NOT TO ACCEPT THE IMPROVEMENTS IF SUBSEQUENT TESTING REVEALS AN IMPROPER INSTALLATION.

11. COORDINATE WITH THE PROJECT ENGINEER TO IDENTIFY PROJECT INSPECTION AND TESTING REQUIREMENTS. PROVIDE FOR INSPECTIONS AND TESTING AT AN ADEQUATE FREQUENCY FOR THE PROJECT ENGINEER TO DOCUMENT THAT PROJECT IS CONSTRUCTED IN CONFORMANCE WITH THE APPROVED PLANS AND SPECIFICATIONS. PRIOR TO MAKING ANY CHANGES TO THE APPROVED PLANS, IT IS THE APPROPRIATE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE PROJECT ENGINEER.

12. PROVIDE THE OWNER, ENGINEER, THEIR CONSULTANTS, INDEPENDENT TESTING LABORATORIES, ANY GOVERNMENTAL AGENCIES WITH JURISDICTIONAL INTERESTS, OTHER REPRESENTATIVES AND PERSONNEL, ACCESS TO THE SITE AND THE WORK AT REASONABLE TIMES FOR THEIR OBSERVATION, INSPECTING, AND TESTING. PROVIDE THEM PROPER AND SAFE CONDITIONS FOR SUCH ACCESS AND ADVISE THEM OF THE DEVELOPER'S SITE SAFETY PROCEDURES AND PROGRAMS SO THAT THEY MAY COMPLY THEREWITH AS IS APPLICABLE. COORDINATE WITH THE PROJECT ENGINEER SO THAT INSPECTING AND TESTING ARE PROVIDED AT AN ADEQUATE FREQUENCY FOR THE PROJECT ENGINEER TO AFFIRM THAT WORK WAS COMPLETED IN SUBSTANTIAL CONFORMANCE WITH THESE APPROVED PLANS.

13. NO WORK MAY COMMENCE WITHIN ANY IMPROVED PUBLIC RIGHT-OF-WAY UNTIL A RIGHT-OF-WAY PERMIT OR APPROPRIATE CONSTRUCTION PERMIT IS OBTAINED, IF APPLICABLE. SUBMIT A CONSTRUCTION TRAFFIC CONTROL PLAN, IN ACCORDANCE WITH MUTCD, TO THE APPROPRIATE RIGHT-OF-WAY AUTHORITY, (LOCAL ENTITY, COUNTY OR STATE), FOR APPROVAL, PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN, OR AFFECTING, THE RIGHT-OF-WAY. PROVIDE ANY AND ALL TRAFFIC CONTROL DEVICES AS MAY BE REQUIRED BY THE CONSTRUCTION ACTIVITIES.

14. SUBMIT A CONSTRUCTION SITE MANAGEMENT PLAN (CSMP) FOR REVIEW AND APPROVAL BY THE CITY CONSTRUCTION SERVICES FOREMAN PRIOR TO START OF CONSTRUCTION. THE CSMP MUST BE MAINTAINED ON-SITE AND UPDATED AS NEEDED TO REFLECT CURRENT CONDITIONS.

15. ALL CONTRACTORS ARE SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES, AS SHOWN ON THESE PLANS, IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO UNCC) AT 1-800-922-1987, AT LEAST 2 WORKING DAYS PRIOR TO BEGINNING EXCAVATION OR GRADING, TO HAVE ALL REGISTERED UTILITY LOCATIONS MARKED. OTHER UNREGISTERED UTILITY ENTITIES (I.E. DITCH / IRRIGATION COMPANY) ARE TO BE LOCATED BY CONTACTING THE RESPECTIVE REPRESENTATIVE. UTILITY SERVICE LATERALS ARE ALSO TO BE LOCATED PRIOR TO BEGINNING EXCAVATION OR GRADING. THE TYPE, SIZE, LOCATION AND NUMBER OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THE DRAWINGS. VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ALONG THE ROUTE OF THE WORK BEFORE COMMENCING NEW CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ALL EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.

16. FIELD LOCATE AND VERIFY ELEVATIONS OF ALL EXISTING SEWER MAINS, WATER MAINS, CURBS, GUTTERS AND OTHER UTILITIES AT THE POINTS OF CONNECTION SHOWN ON THE PLANS, AND AT ANY UTILITY CROSSINGS PRIOR TO INSTALLING ANY OF THE NEW IMPROVEMENTS. IF A CONFLICT EXISTS AND/OR A DESIGN MODIFICATION IS REQUIRED, COORDINATE WITH THE ENGINEER TO MODIFY THE DESIGN. DESIGN MODIFICATION(S) MUST BE APPROVED BY THE LOCAL ENTITY PRIOR TO BEGINNING CONSTRUCTION.

17. ALL UTILITY INSTALLATIONS WITHIN OR ACROSS THE ROADBED OR OTHER PAVED AREAS MUST BE COMPLETED PRIOR TO THE FINAL STAGES OF ROAD CONSTRUCTION. FOR THE PURPOSES OF THESE STANDARDS, ANY WORK INCLUDING, GRAVELS, PAVEMENTS, CURB AND GUTTER ABOVE THE SUBGRADE IS CONSIDERED FINAL STAGE WORK. ALL SERVICE LINES MUST BE STUBBED BEYOND THE ROAD PLATFORM OR TO THE PROPERTY LINES AND MARKED SO AS TO REDUCE THE EXCAVATION NECESSARY FOR BUILDING CONNECTIONS.

18. COORDINATE AND COOPERATE WITH THE LOCAL ENTITY, AND ALL UTILITY COMPANIES INVOLVED, WITH REGARD TO RELOCATIONS, ADJUSTMENTS, EXTENSIONS AND REARRANGEMENTS OF EXISTING UTILITIES DURING CONSTRUCTION, AND TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION AND WITH A MINIMUM DISRUPTION OF SERVICE. CONTACT, IN ADVANCE, ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY UTILITY SERVICE AS WELL AS THE UTILITY COMPANIES.

19. NO WORK MAY COMMENCE WITHIN ANY PUBLIC STORM WATER, SANITARY SEWER OR POTABLE WATER SYSTEM UNTIL THE UTILITY PROVIDERS ARE NOTIFIED. NOTIFICATION SHALL BE A MINIMUM OF TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF ANY WORK. AT THE DISCRETION OF THE WATER UTILITY PROVIDER, A PRE-CONSTRUCTION MEETING MAY BE REQUIRED PRIOR TO COMMENCEMENT OF ANY WORK.

20. PROTECT ALL UTILITIES DURING CONSTRUCTION AND FOR COORDINATE WITH THE APPROPRIATE UTILITY COMPANY FOR ANY UTILITY CROSSINGS REQUIRED.

21. WHEN APPLICABLE, THE DEVELOPER AND/OR CONTRACTOR SHALL HAVE ONSITE AT ALL TIMES, EACH OF THE FOLLOWING:
- BEST MANAGEMENT PRACTICES (BMP) MAINTENANCE FOLDER
- UP TO DATE STORMWATER MANAGEMENT PLAN (SWMP) THAT ACCURATELY REPRESENTS CURRENT FIELD CONDITIONS
- ONE (1) SIGNED COPY OF THE APPROVED PLANS
- ONE (1) COPY OF THE APPROPRIATE STANDARDS AND SPECIFICATIONS
- A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB.

23. IF, DURING THE CONSTRUCTION PROCESS, CONDITIONS ARE ENCOUNTERED WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, CONTACT THE DESIGNER AND THE LOCAL ENTITY ENGINEER IMMEDIATELY.

24. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD, UNLESS SPECIFICALLY STATED OTHERWISE.

25. PROVIDE ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETION OF THE INTENDED IMPROVEMENTS SHOWN ON THESE DRAWINGS, OR DESIGNATED TO BE PROVIDED, INSTALLED, OR CONSTRUCTED, UNLESS SPECIFICALLY NOTED OTHERWISE.

26. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING AS-BUILT INFORMATION ON A SET OF RECORD DRAWINGS KEPT ON THE CONSTRUCTION SITE, AND AVAILABLE TO THE LOCAL ENTITY'S INSPECTOR AT ALL TIMES.

27. DIMENSIONS FOR LAYOUT AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWING. IF PERTINENT DIMENSIONS OR ELEVATIONS ARE NOT SHOWN, CONTACT THE DESIGNER FOR CLARIFICATION, AND ANNOTATE THE PROVIDED DIMENSION ON THE AS-BUILT RECORD DRAWINGS. CONTOURS ARE NOT SUITABLE FOR CONSTRUCTION LAYOUT.

28. SEQUENCE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO MINIMIZE POTENTIAL UTILITY CONFLICTS. IN GENERAL, GRADE RESTRICTED UTILITIES SUCH AS STORM SEWER AND SANITARY SEWER, SHOULD BE CONSTRUCTED PRIOR TO INSTALLATION OF THE WATER LINES AND DRY UTILITIES.

29. EXISTING FENCES, TREES, STREETS, SIDEWALKS, CURBS AND GUTTERS, LANDSCAPING, STRUCTURES, AND IMPROVEMENTS DESTROYED, DAMAGED OR REMOVED DUE TO CONSTRUCTION OF THIS PROJECT SHALL BE REPLACED OR RESTORED IN LIKE KIND AT THE CONTRACTOR'S EXPENSE, UNLESS OTHERWISE INDICATED ON THESE PLANS.

30. THESE CONSTRUCTION PLANS SHALL BE VALID FOR A PERIOD OF THREE YEARS FROM THE DATE OF APPROVAL BY THE AHJ. USE OF THESE PLANS AFTER THE EXPIRATION DATE WILL REQUIRE A NEW REVIEW AND APPROVAL PROCESS BY THE LOCAL ENTITY PRIOR TO COMMENCEMENT OF ANY WORK SHOWN IN THESE PLANS.

31. ALL CONSTRUCTION IN AREAS DESIGNATED AS WILD FIRE HAZARD AREAS SHALL BE DONE IN ACCORDANCE WITH THE CONSTRUCTION CRITERIA AS ESTABLISHED IN THE WILD FIRE HAZARD AREA MITIGATION REGULATIONS IN FORCE AT THE TIME OF CONSTRUCTION.

32. THE CONTRACTOR AGREES THAT BY COMMENCING CONSTRUCTION THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE CONSTRUCTION OF THE PROJECT, INCLUDING, BUT NOT LIMITED TO THE SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD T THE ENGINEER, AND THE GOVERNING AGENCIES AND THE OFFICERS, DIRECTORS, PARTNERS, EMPLOYEES, AGENTS AND OTHER CONSULTANTS OF EACH AND ANY OF THEM HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPT FOR LIABILITY ARISING FROM THE NEGLIGENCE OF THE OWNER, THE ENGINEER, OR THE GOVERNING AGENCIES.

33. NOTIFY THE ENGINEER IMMEDIATELY UPON DISCOVERING ANY CONFLICTS OR OTHER PROBLEMS IN CONFORMING TO THE APPROVED CONSTRUCTION DRAWINGS, SPECIFICATIONS OR DETAILS FOR ANY ELEMENT OF THE PROPOSED IMPROVEMENTS PRIOR TO PROCEEDING WITH ITS CONSTRUCTION.

34. COORDINATE THE INSTALLATION OR RELOCATION OF THE DRY UTILITY COMPANY'S FACILITIES. COST OF THE DRY UTILITY WORK SHALL BE BORNE BY THE OWNER, EXCEPT AS INDICATED IN THE PLANS AND SPECIFICATIONS.

35. PRESERVE PRIVATE AND PUBLIC PROPERTY AND PROTECT IT FROM DAMAGE THAT MAY RESULT FROM CONSTRUCTING THESE PROPOSED IMPROVEMENTS.

36. ACCESS TO ALL ADJACENT PROPERTIES AND FACILITIES SHALL BE MAINTAINED AT ALL TIMES. REQUIRED INTERRUPTION OF ACCESS SHALL BE COORDINATED WITH THE PROPERTY AND PROJECT OWNERS.

37. IF HAZARDOUS MATERIAL OR SUSPECT MATERIAL IS ENCOUNTERED NOTIFY THE OWNER AND ENGINEER BEFORE CONTINUING WORK. HAZARDOUS MATERIALS SHALL BE REMOVED AS REQUIRED.

38. THE APPROPRIATE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SOURCE OF CONSTRUCTION WATER FOR USE ON THIS PROJECT.

39. EXCESS MATERIAL SHALL BE REMOVED FROM SITE AND HANDLED IN ACCORDANCE TO ALL RULES AND REQUIREMENTS. A SEPARATE PERMIT MAY BE REQUIRED AND SHALL BE COORDINATED WITH THE AUTHORITY HAVING JURISDICTION.

40. OFFSITE AND ADJACENT SITE DATA IS FOR REFERENCE PURPOSES ONLY.

41. ALL LANDSCAPING, REVEGETATION AND WETLANDS REQUIREMENTS DESIGN BY OTHERS. ALL DISTURBED AREAS ARE TO BE REVEGETATED UNLESS OTHERWISE NOTED.

42. ENSURE THAT WORK FOR THIS PROJECT BE PERFORMED BY CONTRACTORS (INCLUDING CONTRACTOR'S EMPLOYEES AND AGENTS) POSSESSING THE SKILLS, EXPERTISE AND UNDERSTANDING OF ALL APPLICABLE CODES, SPECIFICATIONS, STANDARDS AND MANUFACTURER REQUIREMENTS. BY COMMENCING WORK, THE CONTRACTORS REPRESENT THAT THEY UNDERSTAND AND ACCEPT THIS REQUIREMENT.

43. ALL CONSTRUCTION ACTIVITIES AND DISTURBANCES SHALL OCCUR WITHIN THE PROPERTY LIMITS. WHERE OFF-SITE WORK IS APPROVED, WRITTEN PERMISSION OF THE ADJACENT PROPERTY OWNER MUST BE OBTAINED PRIOR TO ANY OFF-SITE GRADING OR CONSTRUCTION.

CONSTRUCTION NOTES

A. GRADING AND DRAINAGE

44. NO WORK SHALL OCCUR IN WETLANDS OR FLOODPLAINS WITHOUT PERMITS. ANY WORK SHALL BE IN ACCORDANCE WITH ISSUED PERMITS.

45. VEGETATED SLOPES GREATER THAN 3:1 REQUIRE SOIL STABILIZATION.

46. CLEAN ALL INSTALLED CULVERTS AND STORM SEWERS PRIOR TO SUBSTANTIAL COMPLETION INSPECTIONS.

47. LENGTHS SHOWN ON PLANS ARE HORIZONTAL LENGTHS FROM CENTER OF MANHOLE TO CENTER OF MANHOLE OR TO THE END OF THE FLARED END SECTIONS, ACTUAL LENGTHS MAY VARY.

48. SLOPES ARE CALCULATED FROM INSIDE EDGE OF MANHOLE/STRUCTURE TO INSIDE EDGE OF MANHOLE/STRUCTURE.

49. IMPERVIOUS CLAY DAMS ARE REQUIRED IN TRENCH AT 50-FT INTERVALS AND AT CHANGES IN PIPE DIRECTION AND/OR AT PIPE JUNCTIONS FOR ALL DRAINAGE STRUCTURES.

50. MINIMUM RECOMMENDATIONS (TO BE CONFIRMED OR REPLACED BY GEOTECHNICAL ENGINEER): PROPOSED FILL AREAS WHERE PAVEMENT OR SITE CONCRETE IS ANTICIPATED SHOULD BE PREPARED BY STRIPPING EXISTING TOPSOIL AND ORGANIC MATERIALS, SCARIFICATION TO A DEPTH OF AT LEAST 8 INCHES AND COMPACTION TO MINIMUM VALUES GIVEN BELOW. MOISTURE CONDITIONING MAY BE REQUIRED TO ATTAIN STABILITY AND MINIMUM COMPACTION.

    SITE FILLS AND TRENCH BACKFILL SHOULD CONSIST OF APPROVED ON-SITE OR IMPORTED MATERIALS. FILLS SHOULD BE UNIFORMLY PLACED AND COMPACTED IN 6 TO 8 INCH LOOSE LIFTS TO AT LEAST 95 PERCENT OF THE MAXIMUM STANDARD PROCTOR DENSITY AND WITHIN 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT (ASTM D698). MOISTURE CONDITIONING OF FILL MATERIALS MAY BE REQUIRED TO ATTAIN MINIMUM COMPACTION AND STABILITY REQUIREMENTS.

51. TWO GEOTECHNICAL REPORTS FOR THIS PROJECT WERE PREPARED UNDER THE TITLE OF "GEOTECHNICAL INVESTIGATION, GREENHORN RANCH/WILDBLUE, NEW BOULEVARD ROAD, STEAMBOAT SKI RESORT, ROUTT COUNTY COLORADO" BY "NWCC" DATED "JANUARY 16, 2020", AND "SUBSOIL AND FOUNDATION INVESTIGATION, THE WILD BLUE TERMINAL AND RESTAURANT, STEAMBOAT SKI RESORT, STEAMBOAT SPRINGS, COLORADO" BY "NWCC" DATED "JULY 19, 2019" AND THEIR RECOMMENDATIONS ARE HEREBY INCORPORATED HEREIN. IF A CONFLICT OR DISCREPANCY OCCURS, NOTIFY THE ENGINEER IMMEDIATELY UPON DISCOVERY.

B. CONSTRUCTION SITE AND STORMWATER MANAGEMENT

52. CONTRACTOR SHALL SUBMIT A CONSTRUCTION SITE MANAGEMENT PLAN TO THE CITY FOR APPROVAL PRIOR TO BUILDING PERMIT ISSUANCE.

53. WHEN REQUIRED THE CONTRACTOR SHALL PREPARE A STORMWATER MANAGEMENT PLAN. THE STORMWATER MANAGEMENT PLAN SHALL BE PREPARED BY A QUALIFIED INDIVIDUAL WITH KNOWLEDGE IN THE PRINCIPLES AND PRACTICES OF EROSION AND SEDIMENT CONTROL AND POLLUTION PREVENTION. THIS INDIVIDUAL SHOULD BE RESPONSIBLE FOR DEVELOPING, IMPLEMENTING, MAINTAINING, AND REVISING THE STORMWATER MANAGEMENT PLAN FOR THE DURATION OF THE PROJECT.

54. THE STORMWATER MANAGEMENT PLAN SHOULD ADDRESS INSTALLATION, INSPECTION AND MAINTENANCE OF ALL NECESSARY EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION AND REMOVE EROSION CONTROL WHEN PROJECT IS COMPLETE AND VEGETATION IS ESTABLISHED. WHEN TEMPORARY EROSION CONTROL MEASURES ARE REMOVED, CLEAN UP AND REMOVE ALL SEDIMENT AND DEBRIS FROM ALL DRAINAGE INFRASTRUCTURE AND OTHER PUBLIC FACILITIES.

55. ALL REQUIRED PERIMETER SILT AND CONSTRUCTION FENCING SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITY (STOCKPILING, STRIPPING, GRADING, ETC). ALL OTHER REQUIRED EROSION CONTROL MEASURES SHALL BE INSTALLED AT THE APPROPRIATE TIME IN THE CONSTRUCTION SEQUENCE AS INDICATED IN THE APPROVED PROJECT SCHEDULE, CONSTRUCTION PLANS, AND STORMWATER MANAGEMENT PLAN.

56. ENSURE THAT NO MUD OR DEBRIS SHALL BE TRACKED ONTO THE EXISTING PUBLIC STREET SYSTEM. MUD AND DEBRIS MUST BE REMOVED BY THE END OF EACH WORKING DAY BY AN APPROPRIATE MECHANICAL METHOD (I.E. MACHINE BROOM SWEEP, LIGHT DUTY FRONT-END LOADER, ETC.) OR AS APPROVED BY THE LOCAL ENTITY STREET INSPECTOR.

57. ALL STRUCTURAL EROSION CONTROL MEASURES SHALL BE INSTALLED AT THE LIMITS OF CONSTRUCTION AND AT AREAS WITH DISTURBED SOIL, ON- OR OFF-SITE, PRIOR TO ANY OTHER GROUND-DISTURBING ACTIVITY. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED IN GOOD REPAIR, UNTIL SUCH TIME AS THE ENTIRE DISTURBED AREAS IS STABILIZED WITH HARD SURFACE OR LANDSCAPING. TO MITIGATE EROSION, UTILIZE STANDARD EROSION CONTROL TECHNIQUES DESCRIBED IN THE URBAN STORM DRAINAGE CRITERIA MANUAL, VOLUME 3 - BEST MANAGEMENT PRACTICES, AS PUBLISHED BY THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT (UDFCD).

58. PRE-DISTURBANCE VEGETATION SHALL BE PROTECTED AND RETAINED WHEREVER POSSIBLE. REMOVAL OR DISTURBANCE OF EXISTING VEGETATION SHALL BE LIMITED TO THE AREA(S) REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS, AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.

59. IMMEDIATELY CLEAN UP ANY CONSTRUCTION MATERIALS INADVERTENTLY DEPOSITED ON EXISTING STREETS, SIDEWALKS, OR OTHER PUBLIC RIGHTS OF WAY, AND MAKE SURE STREETS AND WALKWAYS ARE CLEANED AT THE END OF EACH WORKING DAY.

60. ALL RETAINED SEDIMENTS, PARTICULARLY THOSE ON PAVED ROADWAY SURFACES, SHALL BE REMOVED AND DISPOSED OF IN A MANNER AND LOCATION SO AS NOT TO CAUSE THEIR RELEASE INTO ANY WATERS OF THE UNITED STATES.

61. THE STORMWATER VOLUME CAPACITY OF DETENTION PONDS WILL BE RESTORED AND STORM SEWER LINES WILL BE CLEANED UPON COMPLETION OF THE PROJECT.

62. THE COLORADO DISCHARGE PERMIT SYSTEM (CDPS) REQUIREMENTS MAKE IT UNLAWFUL TO DISCHARGE OR ALLOW THE DISCHARGE OF ANY POLLUTANT OR CONTAMINATED WATER FROM CONSTRUCTION SITES. POLLUTANTS INCLUDE, BUT ARE NOT LIMITED TO DISCARDED BUILDING MATERIALS, CONCRETE TRUCK WASHOUT, CHEMICALS, OIL AND GAS PRODUCTS, LITTER, AND SANITARY WASTE. TAKE WHATEVER MEASURES ARE NECESSARY TO ASSURE THE PROPER CONTAINMENT AND DISPOSAL OF POLLUTANTS ON THE SITE IN ACCORDANCE WITH ANY AND ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.

D. WATER AND SEWER NOTES

63. ALL WATER AND SEWER CONSTRUCTION SHALL BE PER MT. WERNER WATER OR THE CITY OF STEAMBOAT SPRINGS WATER & SEWER STANDARD SPECIFICATIONS, LATEST EDITION, AS APPLICABLE.

64. MAINTAIN 10' HORIZONTAL AND 18" VERTICAL MINIMUM SEPARATION BETWEEN ALL SANITARY SEWER MAINS, WATER MAINS & SERVICES.

65. MANHOLES LOCATED OUTSIDE OF THE ROADWAY SHALL PROTRUDE 1' ABOVE EXISTING GRADE TO REDUCE INFILTRATION. GRADE SURFACE TO DRAIN AROUND/AWAY FROM MANHOLE RIMS.

66. ALL MANHOLES LOCATED IN THE ROADWAY SHALL HAVE RIM ELEVATIONS ADJUSTED TO ¼" BELOW FINISHED GRADE. IF NECESSARY, CONE SECTIONS SHALL BE ROTATED TO PREVENT LIDS BEING LOCATED WITHIN VEHICLE OR BICYCLE WHEEL PATHS.

67. SEWER SERVICE SHALL HAVE A MINIMUM OF 4-FT OF COVER.

68. WATER SERVICE SHALL HAVE A MINIMUM OF 7-FT OF COVER.

69. ALL WATER PIPE SHALL BE INSTALLED WITH A #10 SOLID COPPER WIRE COATED WITH 45 MIL POLYETHYLENE FOR LOCATING PURPOSES. "GLENN TEST STATIONS" BY VALVCO, INC TRACER WIRE TEST STATIONS SHALL BE INSTALLED ADJACENT TO ALL FIRE HYDRANTS. ADDITIONAL LOCATIONS MAY BE REQUIRED.

70. THE PARTICLE SIZE OF BEDDING AND SHADING MATERIAL SHALL BE 3/4 INCH WASHED OR SCREENED ROCK (NOT ROAD BASE OR CLASS 6) AND SHALL EXTEND THE FULL WIDTH OF THE TRENCH.

71. ALL MATERIALS USED FOR BACKFILL SHALL BE FREE FROM REFUSE ORGANIC MATERIAL, COBBLES, BOULDERS, LARGE ROCKS OR STONES OR FROZEN SOILS GREATER THAN 6-INCHES IN DIAMETER.

72. ALL TRENCHES SHALL BE COMPACTED TO 95% AS DETERMINED BY ASTM D698 (STANDARD PROCTOR) OR AS SPECIFIED BY GEOTECHNICAL ENGINEER.

PROJECT NOTES:

73. AN AUTOCAD COMPATIBLE FILE WILL BE PROVIDED FOR CONSTRUCTION STAKING PURPOSES, UPON ACCEPTANCE OF LANDMARK'S CAD RELEASE POLICY.

74. IF THESE DRAWINGS ARE PRESENTED IN A FORMAT OTHER THAN 24" X 36", THE GRAPHIC SCALE SHOULD NOT BE USED.

75. THE CONTRACTOR ACKNOWLEDGES AND UNDERSTANDS THAT THE CONTRACT DOCUMENTS MAY REPRESENT IMPERFECT DATA AND MAY CONTAIN ERRORS, OMISSIONS, CONFLICTS, INCONSISTENCIES, CODE VIOLATIONS AND IMPROPER USE OF MATERIALS. SUCH DEFICIENCIES WILL BE CORRECTED WHEN IDENTIFIED. THE CONTRACTOR AGREES TO CAREFULLY STUDY AND COMPARE THE INDIVIDUAL CONTRACT DOCUMENTS AND REPORT AT ONCE IN WRITING T THE OWNER ANY DEFICIENCIES THE CONTRACTOR MAY DISCOVER. THE CONTRACTOR FURTHER AGREES TO REQUIRE EACH SUBCONTRACTOR TO LIKEWISE STUDY THE DOCUMENTS AND REPORT AT ONCE ANY DEFICIENCIES DISCOVERED.

    THE CONTRACTOR SHALL RESOLVE ALL REPORTED APPLICABLE DEFICIENCIES WITH LANDMARK PRIOR TO AWARDING ANY SUBCONTRACTS OR STARTING ANY WORK WITH THE CONTRACTOR'S OWN EMPLOYEES. IF ANY DEFICIENCIES CANNOT BE RESOLVED BY THE CONTRACTOR WITHOUT ADDITIONAL TIME OR ADDITIONAL EXPENSES, THE CONTRACTOR SHALL SO INFORM THE OWNER IN WRITING. ANY SUCH ADDITIONAL WORK PERFORMED PRIOR TO RECEIPT OF INSTRUCTIONS FROM THE OWNER WILL BE DONE AT THE CONTRACTOR'S RISK.

CONSTRUCTION PHASE SERVICES:

IT IS UNDERSTOOD AND AGREED THAT LANDMARK DOES NOT HAVE AN OBLIGATION TO CONDUCT CONSTRUCTION OBSERVATION OR REVIEW OF THE CONTRACTOR'S PERFORMANCE OR ANY OTHER CONSTRUCTION PHASE SERVICES, AND THAT SUCH SERVICES WILL BE PROVIDED FOR BY THE OWNER AS MAY BE REQUIRED BY THE AUTHORITY HAVING JURISDICTION. THE OWNER ASSUMES ALL RESPONSIBILITY FOR INTERPRETATION OF THESE CONSTRUCTION DOCUMENTS AND FOR CONSTRUCTION OBSERVATION AND THE OWNER WAIVES ANY CLAIMS AGAINST LANDMARK THAT MAY BE IN ANY WAY CONNECTED THERETO.

IN ADDITION, THE OWNER AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LANDMARK, ITS OFFICERS, DIRECTORS, EMPLOYEES AND SUBCONSULTANTS (COLLECTIVELY, LANDMARK) AGAINST ALL DAMAGES, LIABILITIES OR COSTS, INCLUDING REASONABLE ATTORNEYS' FEES AND DEFENSE COSTS, ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF SUCH SERVICES BY OTHER PERSONS OR ENTITIES AND FROM ANY AND ALL CLAIMS ARISING FROM MODIFICATIONS, CLARIFICATIONS, INTERPRETATIONS, ADJUSTMENTS OR CHANGES MADE TO THESE CONSTRUCTION DOCUMENTS TO REFLECT CHANGED FIELD OR OTHER CONDITIONS, EXCEPT FOR CLAIMS ARISING FROM THE SOLE NEGLIGENCE OR WILLFUL MISCONDUCT OF LANDMARK.

ABBREVIATIONS

ADA	AMERICAN'S WITH DISABILITIES ACT
APR	APPROXIMATE
BMP	BEST MANAGEMENT PRACTICE
BOT	BOTTOM
BVCS	BEGIN VERTICAL CURVE STATION
BVCE	BEGIN VERTICAL CURVE ELEVATION
BW OR BOW	BOTTOM OF WALL
C&C	CUT & CAPPED
CAP	CORRUGATED ALUMINUM PIPE
CIP	CAST-IN-PLACE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
C.O.	CLEAN OUT
CP	CONCRETE PIPE
CSP	CORRUGATED STEEL PIPE
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
EG	EXISTING GROUND
EL	ELEVATION
EOA OR EA	EDGE OF ASPHALT
EOC	EDGE OF CONCRETE
EOP	EDGE OF PAVEMENT
EVCE	END VERTICAL CURVE ELEVATION
EVCS	END VERTICAL CURVE STATION
EX	EXISTING
F&G	FRAME & GRATE
F&C	FRAME & COVER
FES	FLARED END SECTION
FFE	FINISH FLOOR ELEVATION
FH	FIRE HYDRANT
FL	FLOW LINE
FG	FINISH GRADE
FG@BW	FINISH GRADE AT BOTTOM OF WALL
GB	GRADE BREAK
GFFE	GARAGE FINISH FLOOR ELEVATION
GTD	GRADE TO DRAIN
HDPE	HIGH DENSITY POLYETHYLENE PIPE
INV	INVERT
LBS	POUNDS
LOD	LIMITS OF DISTURBANCE
M/E/P	MECHANICAL, ELECTRIC, AND PLUMBING
MAX	MAXIMUM
ME	MATCH EXISTING
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
NAP OR N.A.P.	NOT A PART (NOT INCLUDED IN SCOPE)
NTS	NOT TO SCALE
OFF	OFFSET
PC	POINT OF CURVE
PI	POINT OF INTERSECTION
PCC	POINT OF CONCAVE CURVE
PLDP	POROUS LANDSCAPE DETENTION POND
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENT
PVC	POINT OF VERTICAL CURVE
PVC	POLYVINYL CHLORIDE PIPE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
REQ	REQUIRED
ROW	RIGHT OF WAY
STA	STATION
TB	THRUST BLOCK
TBC	TOP BACK OF CURB
TBR	TO BE REMOVED
TG	TOP OF GRATE
TOP	TOP OF PIPE
TTG	TAPERED TO GRADE
TW OR TOW	TOP OF WALL
TYP	TYPICAL
VCP	VITRIFIED CLAY PIPE
VOL	VOLUME
W/	WITH

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COLORADO LICENSED PROFESSIONAL ENGINEER
ERIK J. GRIEPENTROG
33280

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CONSULTANTS, INC.

These drawings are instruments of service provided by Landmark Consultants, Inc. and are not to be used for any type of construction or contracting unless signed and sealed by a Professional Engineer in the employ of Landmark Consultants, Inc.

NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Notes
General

SHEET
C.002

DRAWING FILENAME: P:\1012-048\DWGs\Production Drawings\G&E Permit\1012-048-GE-C.002-Notes.dwg LAYOUT NAME: C.002 DATE: Jun 18, 2021 - 5:21pm CAD OPERATOR: Matt
LIST OF XREFS: [xBORDER-Forest Service] [xVICMAP]

Appendix F- Wildland Fire Plan

This Wildland Fire Plan was developed by the Medicine Bow-Routt National Forest & Thunder Basin National Grassland, Hahns Peak/Bears Ears Ranger District; Routt Zone Fire Management Program. Wildland fire[1] planning, responsibilities, notifications, and prevention actions are outlined within this document and will be referenced for any Wildfire[2] or Prescribed Fire[3] activity. This plan will apply to the Permittee or anyone working within the permitted area on National Forest System lands and will not relieve the Permittee or its contractors of any requirements or obligations set forth in the Permittee's special use permit or timber sale purchase agreement.

Wildfire Responsibilities

Forest Service

The Forest Service is responsible for all wildland fire operations on National Forest System Lands within the permitted area. Fire Management Representatives will be available to the Permittee or and or contractor working within the permitted area for interpretation, discussion and assistance with any item appearing in this Wildland Fire Plan.

Fire Management Representatives will take action on all wildfires within the permitted area as described in the 2011 Medicine Bow-Routt National Forest and Thunder Basin National Grassland Fire Management Plan.

Permittee

The Permittee will report any wildfire located on or threatening National Forest System lands within the permit boundary. This wildfire report will first be communicated to dispatch centers for the initial response to the fire area. Only qualified personnel equipped with the proper Personal Protective Equipment will perform initial attack suppression actions.

The Permittee will monitor the permit area for compliance with the prevention and detection section of this wildland fire plan. If prevention methods are not followed within this plan, both parties will cooperate in taking corrective actions.

Notification and Communication
Critical information on Wildfires will need to be communicated first and foremost to the representative Dispatch Centers:

1. ***Routt County Emergency Dispatch Center: 911***
2. ***Craig Interagency Wildland Fire Dispatch Center: (970) 826-5037***

The following information will be provided when reporting a *Wildfire*:

- Exact location of wildfire and values at risk
- Size of fire and fuel type – grass, brush, timber, and or slash
- Character of fire – smoldering, creeping, running, and or torching
- Best access to fire area
- Weather conditions – cloudy, windy, sunny and or raining

Project Name		
Project Latitude / Longitude	**N**	**W**

KEY ELEMENT CHECKLIST		YES	NO
Are the Administrative Burning Requirements up to date with the current year's information?			
Are ALL county or state permits and clearances obtained?			
Are ALL fire prescription elements met?			
Has Permittee obtained the fire weather forecast and is it favorable?			
There are **NO** USFS, State or County burn restrictions in effect for the planned burn area?			
Are ALL planned personnel and equipment on-site, available, and operational?			
Have ALL assigned personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?			
Have ALL the required pre-burn notifications been made?			
Is a USFS District Fire Duty Officer available to contact as needed?			
Is the contingency plan prepared?			
In your judgment, can this burn be carried out according to the Plan to meet the objectives?			
Permittee Project Supervisor:	*Date*	*Time (24 hr.)*	

Permittee Supervisory Responsibility:
The Permittee shall have a representative (project supervisor) on site that shall be authorized to receive and carry out on behalf of the Permittee any and all notices or instructions by the Forest Service Approving Officer in regard to burning and fire precautions. The project supervisor's duties and responsibilities will be to supervise all debris and slash burning activities in accordance with these requirements provisions of this plan.

Pre-Burn Notifications:
Prior to ignition, the permittee will notify the following agencies and/or individuals:

Name	Phone #	Fax #
Name County 911 Dispatch Center		
Name Forest Fire Duty Officer		
Name Interagency Fire Dispatch		
Notifications required in APCD Permit		
Name Ski Area Permit Administrator		
Other		

General Requirements:

Access: Access to burn piles by firefighting personnel shall not be restricted. Access to burn project areas must be maintained or no burning will be allowed.

Minimum Equipment and Staffing: The permittee is responsible for ensuring the staffing and equipment on site is adequate for maintaining control of the pile burning operation.

- 1 Project Leader, minimum of 2 additional personnel. *Staffing should increase proportional to the number of piles burning and the area involved.*
- 1 hand tool (shovel, Pulaski, chainsaw, axe, etc.) per person assigned.
- Ignition devices (Fussees, drip torches, etc.) and fuel.
- Personnel Protective Equipment (PPE): Hardhat, leather gloves, non-synthetic clothing, and boots.

Prevention and Detection

A wildfire precautionary period will initiate on May 15th and run throughout the summer months until November 15th unless otherwise stated. During this period the Permittee will be required to keep equipment that will aid in the initial control of human caused wildfire started by the Permittee and or contractor completing work operations for the Permittee. This equipment will be strategically located in places that are easily accessible for the Permittee or contactor while conducting work operations that have ignition potential. The Permittee will also insure that field going personnel will have means of communication in case of a wildfire.

- Suggested tools to help with the initial action on Wildfires:
  - Long handle spade shovel
  - Pulaski or Axe
  - Backpack pump or water bucket

During fire restrictions Steamboat Ski Resort Corporation in considered exempt (36 C.F.R. § 261.50 (e)) from restrictions provided that the following precautionary measures are in place:

Under Stage 1 Fire Restrictions:

- A shovel and fire extinguisher will be readily accessible in every SSRC vehicle.
- Employees shall attend a yearly fire prevention and safety briefing.
- A watchperson will be on duty after any explosives are used and will patrol the detonation area for at least one hour after operations have ceased.
- Welding will be accomplished in buildings when possible. If welding at field locations is required, the welding will be done at a location where all flammable material has been cleared to a minimum distance of 15 feet. Water and tools must also be located at this site.
- Flammables will be stored in appropriate containers and will be labeled. Storage buildings will be adequately signed if containing flammables. Areas containing flammables will be devoid of fuels within a 25 foot radius.
- Fueling will occur in areas that are devoid of flammable fuels and or are surrounded by mineral soils.
- Smoking will take place in designated areas and/or areas that are devoid of flammable fuels.

Additional Actions under Stage 2 Fire Restrictions:

- A water source will be available on each active worksite (e.g. snowmaking, ATV mounted tank).
- A 10lb or larger fire extinguisher will be available on each active worksite.
- Employees will visually inspect spark arrestors on chainsaws and other gasoline powered hand tools.
- Any spark requiring fire suppression activities will be monitored for 24 hours after the incident to ensure fire is extinguished.

- Heavy equipment (tractor/dozer) including operator or a readily available water source must be on site if burning without persistent snow cover.

Communication: Radio frequencies and channels used for the burn operation must be consistent with the Permittee's Annual Operating Plan.

Size and Location of Burn Piles: Burn piles shall not be located or constructed in such a manner that improvements or adjacent trees could be damaged.

Weather Monitoring: The Permittee Project Supervisor shall record the following weather every 2 hours: Location of Observations, Cloud Cover %, Dry Bulb Temperature, Relative Humidity, Wind Speed and Direction. All records will be provided to the Forest Service upon request.

Cost: All costs associated with burning operations are the responsibility of the permit holder.

PRESCRIPTION

- Compliance with State Air Pollution Control Division and/or county open burn permit conditions, including pile size, favorable smoke dispersion forecast and wind vectors.
- Snow cover of **3" over 75% of the unit - *OR* - > 0.25 inches precipitation in the last 48 hours**, measured on site or at the *name* weather (RAWS, NWS or Snotel) station.
- Fire Danger is rated Low or Moderate
- The 3 day General Weather Forecast for the Zone has NO Red Flag Watches or Warnings, NO predicted frontal passages and meets the following criteria:
  - If relative humidity is 20-29%, then 20 ft winds must be < 10 mph
  - If relative humidity is 30-39%, then 20 ft winds must be < 20 mph
  - If relative humidity is > 50%, then 20 ft winds must be < 30 mph

HOLDING ACTIONS

General Procedures to maintain the fire within the project area and meet objectives until declared 'out':

A. 'Snow cover' provision:
Ignited piles may be left unattended at night and for multiple days as long as prescription snow cover conditions exist. Periodic checks should be performed on all ignited piles until no heat is detected and the piles can be declared "out". Frequency and duration of the checks will be determined by the Project Leader.

B. Without 'Snow cover' provisions
Ignited piles may be left unattended overnight if prescription conditions are forecast to exist for the next 24 hours. All piles ignited under this condition must be checked daily until no heat is detected and the piles can be declared "out". Mop-up of piles may be required.

CONTINGENCY ACTIONS

If any of the following **Trigger Points** are met, the associated **Contingency Actions** should be implemented:

Trigger Points	Contingency Actions	Results
Consumption objectives are not being met.	1. Cease Ignitions.	If conditions become favorable, ignition may continue.
Smoke or changing conditions are not consistent with Colorado APCD smoke permit	1. Cease Ignitions. 2. Mitigate as possible including mop-up as needed	If contingency actions or change in conditions bring the project back within the scope of this prescribed fire plan, ignition may continue.
Significant weather changes which were not forecasted, particularly an increase in wind or drying.	1. Cease Ignitions. 2. Contact the FS Duty Officer 3. Monitor fire behavior and conditions, adding additional resources as necessary.	If contingency actions bring the project back within the scope of this prescribed fire plan, ignition may continue.
Unwanted fire spread within project boundary	1. Cease ignitions.	If contingency actions bring the project back within the scope of this

Wildfire Costs

The Permittee may be held responsible for costs associated with human caused fire ignitions resulting from project operations by the Permittee or contractor/personnel working on behalf of the Permittee within the permitted area. Standard reimbursement cost rates will be used if reimbursement is sought for any such fires. The Forest Service will be responsible for all management costs associated with any naturally ignited wildfire on National Forest System Lands.

Prescribed Fire Responsibilities

Forest Service

Fire Management Representatives will periodically communicate with the Permittee to insure adequate prescribed fire preparation of designated projects.

Permittee

The Permittee will designate a contact person for the planning and implementation of prescribed fire projects within the permitted area.

The Permittee will cooperate and assist the Forest Service in the preparation and location of prescribed fire project areas.
The Permittee is responsible for all prescribed fire planning, smoke management planning and implementation of projects within the permitted area on National Forest System Lands pursuant to the Regional 2 policy and forms (attached).

Planning and Implementation
The Permittee will develop a prescribed fire burn plan that will guide the implementation of prescribed fire projects. All Colorado Department of Air Quality smoke permits and local fire permits will be obtained by the Permittee.

Communication between the Permittee and Forest Service will periodically take place to insure the location, size and composition of prescribed fuels meet planning document requirements.

Implementation of prescribed fire projects will be conducted and coordinated by the Permittee in cooperation with the Forest Service.

Prescribed Fire Costs

The Permittee will be responsible for costs associated with the planning and implementation of prescribed fire within the permitted area, on National Forest System Lands.

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COLORADO LICENSED PROFESSIONAL ENGINEER ERIK J. GRIEPENTROG 33280
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NO. | DATE: | BY: | DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Notes
SSRC Wildfire Plan

SHEET
C.003

Emergency Response:

Fire plan- Steamboat has a fire plan (Appendix F) which outlines preventative measures and responses related to fire mitigation. Additionally, this plan outlines necessary measures for exemptions to Stage 2 fire restrictions for welding and using vehicles off-road. This operating plan and authorized officer approval of the plan equates to the requirement that an exemption must be applied for in writing, include an appropriate mitigation plan (see Appendix) and must be authorized in writing by the appropriate Forest Service official.

Notice regarding Exemptions: Holders of valid Forest Service permits, leases and authorizations and all other persons are on notice that when proceeding with activities that are authorized pursuant to these Exemptions, such persons are responsible for conducting authorized activities in a safe and prudent manner using extra precautions and are electing to proceed at their own risk. An exemption does not absolve an individual or organization from liability or responsibility for damage, injury or loss to the United States for any fire started while undertaking the exempted activity.

Fire, Health & Sanitation Plan- The Colorado Department of Health, Routt County Building Department, Environmental Health Department, Steamboat Springs Rural Fire Protection District, as well as SSRC's insurance companies (both property and worker's compensation carriers) actively inspect the facilities and operations owned by SSRC. SSRC maintains a separate file of all fire inspections in the Facilities Maintenance offices, health and sanitation inspections in the Food & Beverage offices and other safety reviews in office of the Risk Manager. These files are available for inspection by the Forest Service administering offices. As a function of Hahns Peak/Bear's Ears District's monitoring role of the Special Use Permittee, Forest Service representatives may from time to time participate in insurance and/or regulatory agency inspections and reviews.

Emergency Management Plan- SSRC maintains an up-to-date Emergency Management Plan with copies distributed to key directors and supervisors that might have involvement in a crisis situation.

Law Enforcement- The USFS is responsible for enforcing National Forest regulations as established in Title 36, Code of Federal Regulations.

- SSRC will cooperate with federal, state, and local law enforcement agencies in the performance of their respective duties, i.e., enforcement of Colorado Ski Safety Act of 1979, local ordinances, state laws, etc.
- The Routt County Sheriff has jurisdiction to enforce county and state law on the Steamboat Ski Area.
- The Colorado Division of Wildlife has jurisdiction to enforce state law on the Steamboat Ski Area.

7. Vegetation Management

Trees or shrubbery may be removed or destroyed only after the authorized officer or designated representative has approved in writing and marked or otherwise identified what may be removed or destroyed (Permit III G). See Appendix E for administrative use documentation. It is understood that tree removal could change the character of the forest and affect forest health where concentrated removal is proposed. Therefore, if concentrated removal is proposed through an operating plan or project record sheet, approval would be contingent upon consultation with the Forest Service and conformance with the ski area's vegetation management plan.

Trees that pose a safety concern to guests and infrastructure are authorized for removal.

Currently, SSRC cuts vegetation on groomed runs and mostly focused on those that receive snowmaking; this practice is authorized. Hollyhock, Rabbit Ears gilia, lady fern, broad-leaved twayblade, and white-veined wintergreen may not be damaged. Additionally, a 100-foot buffer around intermittent and perennial streams must be maintained unless authorized by the Forest Service botanist and/or hydrologist. The following ski runs have buffer exemptions: none *(Permit III G).*

Trees are authorized to be planted or transplanted following consultation with Forest Service botanist *(Permit III G).*

To the extent possible, management actions shall integrate SSRC's vegetation management plan recommendations when changing the vegetative component or when efficiencies can be made when working in a coincident area.

SSRC is responsible for nonnative and invasive species treatment. Treatments within the resort shall be reported on an annual basis and include: weed species, treatment locations (a map or GPS), acres treated, name of the herbicide(s) used and the quantity applied (total chemical used and application rate, if possible). Known invasive/noxious species on the resort include but are not limited to: These include whitetop or hoary cress, Canada thistle, bull thistle, yellow toadflax, houndstongue, and scentless chamomile, and reed canarygrass.

Herbicide and pesticide use required annual written approval (Permit V E). This operating plan authorizes the use of: Kernight (6oz/gallon), Curtail (2oz/gallon), 2-4-D (16oz 2-4-D, 4 grams Escort, splash of Activator 90 per 20 gallons).

The approved seed mix for the resort is:
40% mountain brome, 33% blue wildrye, 23% slender wheatgrass and 4% Poa ampla or canbyi.

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NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Notes
SSRC Emergency & Seeding Plan

SHEET
C.004

NORTH

200 0 200 400 600 Feet

(IN FEET)
1 inch = 200 ft.

LEGEND:

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- EASEMENT
- SECTION LINE
- CENTERLINE
- FOUND MONUMENT
- FOUND SECTION CORNER
- BUILDING
- FENCE
- MAJOR CONTOUR
- MINOR CONTOUR
- FEMA SPECIAL FLOOD HAZARD AREA
- 30-FT WATERBODY SETBACK
- WATERCOURSE PER CDC SECTION 802
- SIGN
- SANITARY SEWER
- SANITARY SEWER MANHOLE AND CLEANOUT
- WATER LINE
- FIRE HYDRANT, GATE VALVE & CURB STOP
- GAS
- GAS METER AND MANHOLE/VAULT
- CABLE
- CABLE PEDESTAL
- FIBER OPTIC
- TELEPHONE
- TELEPHONE PEDESTAL AND MANHOLE/VAULT
- ELECTRIC
- ELECTRIC PED, JUNCTION BOX AND METER
- LIGHT POLE AND LIGHT POLE W/ MAST
- OVERHEAD
- UTILITY POLE AND GUY WIRE
- WETLANDS (PROVIDED BY SSRC)
- DITCH/SWALE
- CULVERT W/ END SECTIONS
- INLET AND STORM MANHOLE
- FLOW ARROW
- CONIFEROUS AND DECIDUOUS TREE
- FLOOD HAZARD LIMITS
- 30-FT WATER BODY SETBACK

NOTES:

1. ALL REFERENCES HEREON TO BOOKS, PAGES, FILES, RECEPTION NUMBERS AND FILE NUMBERS ARE TO PUBLIC DOCUMENTS FILED IN THE RECORDS OF ROUTT COUNTY, COLORADO.
2. EASEMENTS AND PUBLIC DOCUMENTS SHOWN OR NOTED HEREON WERE EXAMINED AS TO LOCATION AND PURPOSE AND WERE NOT EXAMINED AS TO RESERVATIONS, RESTRICTIONS, CONDITIONS, OBLIGATIONS, TERMS, OR AS TO THE RIGHT TO GRANT THE SAME.
3. UTILITIES ARE SHOWN PER APPARENT SURFACE EVIDENCE TOGETHER WITH RECORD INFORMATION. IF MORE ACCURATE LOCATIONS OF UNDERGROUND UTILITIES ARE REQUIRED, THE UTILITY WILL HAVE TO BE VERIFIED BY FIELD POTHOLING. LANDMARK CONSULTANTS, INC. AND THE SURVEYOR OF RECORD SHALL NOT BE LIABLE FOR THE LOCATION OF OR THE FAILURE TO NOTE THE LOCATION OF NON-VISIBLE UTILITIES.
4. BASIS OF BEARINGS: THE NORTH LINE OF SECTION 27, T6N, R84W, 6TH P.M., BEING MONUMENTED AS SHOWN HEREON AND BEING ASSUMED TO BEAR N86°54'01"E. BEARINGS SHOWN HEREON HAVE BEEN ROTATED FROM RECORD BEARINGS.
5. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR LAND MONUMENT OR ACCESSORY, COMMITS A CLASS TWO (2) MISDEMEANOR PURSUANT TO STATE STATUTE 18-4-508, C.R.S.
6. THIS SITE CONTAINS A CALCULATED AREA OF 173.88 ACRES.
7. A PORTION OF THE SITE IS LOCATED WITHIN SPECIAL FLOOD HAZARD AREA ZONE A OF THE UNNAMED TRIBUTARY TO BURGESS CREEK AS DETERMINED BY FEMA FLOOD INSURANCE RATE MAP NUMBER 08107C0883D, WITH AN EFFECTIVE DATE OF FEBRUARY 4, 2005 AND LOMR 18-08-0922P.
8. THE MEASURED DISTANCES SHOWN HEREON ARE IN U.S. SURVEY FEET.
9. ALL SYMBOLS ARE ONLY GRAPHICALLY REPRESENTED AND ARE NOT TO SCALE.
10. WETLAND LIMITS PROVIDED BY SSRC.

PROPERTY DESCRIPTION:

11. PARCEL XV AS DESCRIBED IN THAT SPECIAL WARRANTY DEED RECORDED IN BOOK 646 AT PAGE 476 IN THE ROUTT COUNTY RECORD; EXCEPTING THEREFROM THE NORTHERLY 10 ACRES OF THE SE¼ OF THE NE¼ OF SECTION 27, TOWNSHIP 6 NORTH, RANGE 84 WEST, 6TH P.M.;

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PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Existing Conditions - Overall

SHEET
C.005

NORTH

200 0 200 400 600 Feet
(IN FEET)
1 inch = 200 ft.

LEGEND:

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- EASEMENT
- SECTION LINE
- CENTERLINE
- FOUND MONUMENT
- FOUND SECTION CORNER
- BUILDING
- FENCE
- MAJOR CONTOUR
- MINOR CONTOUR
- FEMA SPECIAL FLOOD HAZARD AREA
- 30-FT WATERBODY SETBACK
- WATERCOURSE PER CDC SECTION 802
- SIGN
- SANITARY SEWER
- SANITARY SEWER MANHOLE AND CLEANOUT
- WATER LINE
- FIRE HYDRANT, GATE VALVE & CURB STOP
- GAS
- GAS METER AND MANHOLE/VAULT
- CABLE
- CABLE PEDESTAL
- FIBER OPTIC
- TELEPHONE
- TELEPHONE PEDESTAL AND MANHOLE/VAULT
- ELECTRIC
- ELECTRIC PED, JUNCTION BOX AND METER
- LIGHT POLE AND LIGHT POLE W/ MAST
- OVERHEAD
- UTILITY POLE AND GUY WIRE
- WETLANDS (PROVIDED BY SSRC)
- DITCH/SWALE
- CULVERT W/ END SECTIONS
- INLET AND STORM MANHOLE
- FLOW ARROW
- CONIFEROUS AND DECIDUOUS TREE
- FLOOD HAZARD LIMITS
- 30-FT WATER BODY SETBACK

NOTES:

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3. UTILITIES ARE SHOWN PER APPARENT SURFACE EVIDENCE TOGETHER WITH RECORD INFORMATION. IF MORE ACCURATE LOCATIONS OF UNDERGROUND UTILITIES ARE REQUIRED, THE UTILITY WILL HAVE TO BE VERIFIED BY FIELD POTHOLING. LANDMARK CONSULTANTS, INC. AND THE SURVEYOR OF RECORD SHALL NOT BE LIABLE FOR THE LOCATION OF OR THE FAILURE TO NOTE THE LOCATION OF NON-VISIBLE UTILITIES.
4. BASIS OF BEARINGS: THE NORTH LINE OF SECTION 27, T6N, R84W, 6TH P.M., BEING MONUMENTED AS SHOWN HEREON AND BEING ASSUMED TO BEAR N86°54'01"E. BEARINGS SHOWN HEREON HAVE BEEN ROTATED FROM RECORD BEARINGS.
5. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR LAND MONUMENT OR ACCESSORY, COMMITS A CLASS TWO (2) MISDEMEANOR PURSUANT TO STATE STATUTE 18-4-508, C.R.S.
6. THIS SITE CONTAINS A CALCULATED AREA OF 173.88 ACRES.
7. A PORTION OF THE SITE IS LOCATED WITHIN SPECIAL FLOOD HAZARD AREA ZONE A OF THE UNNAMED TRIBUTARY TO BURGESS CREEK AS DETERMINED BY FEMA FLOOD INSURANCE RATE MAP NUMBER 08107C0883D, WITH AN EFFECTIVE DATE OF FEBRUARY 4, 2005 AND LOMR 18-08-0922P.
8. THE MEASURED DISTANCES SHOWN HEREON ARE IN U.S. SURVEY FEET.
9. ALL SYMBOLS ARE ONLY GRAPHICALLY REPRESENTED AND ARE NOT TO SCALE.
10. WETLAND LIMITS PROVIDED BY SSRC.

<u>PROPERTY DESCRIPTION:</u>

11. PARCEL XV AS DESCRIBED IN THAT SPECIAL WARRANTY DEED RECORDED IN BOOK 646 AT PAGE 476 IN THE ROUTT COUNTY RECORD;
EXCEPTING THEREFROM THE NORTHERLY 10 ACRES OF THE SE¼ OF THE NE¼ OF SECTION 27, TOWNSHIP 6 NORTH, RANGE 84 WEST, 6TH P.M.;

CIVIL ENGINEERS | SURVEYORS
141 9th Street · P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Existing Conditions - Detailed

SHEET
C.006

NORTH

200 0 200 400 600 Feet

(IN FEET)
1 inch = 200 ft.

LEGEND:

- PROPERTY BOUNDARY
- EASEMENT
- SECTION LINE
- FOUND MONUMENT
- FOUND SECTION CORNER
- FENCE
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- ASPHALT
- CONCRETE
- GRAVEL
- SIGN
- PROPOSED SANITARY SEWER W/ MH
- EXISTING SANITARY SEWER W/ MH
- PROPOSED WATER
- PROPOSED GV, FH & CS
- EXISTING WATER
- GAS
- GAS METER AND MANHOLE/VAULT
- CABLE
- CABLE PEDESTAL
- FIBER OPTIC
- TELEPHONE
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- LIGHT POLE AND LIGHT POLE W/ MAST
- OVERHEAD ELECTRIC
- UTILITY POLE AND GUY WIRE
- DITCH/SWALE
- EXISTING STORM SEWER W/ FES
- PROPOSED STORM SEWER W/ FES
- INLET AND STORM MANHOLE
- OVERLAND AND CHANNEL FLOW ARROWS
- CONIFEROUS AND DECIDUOUS TREE
- FLOOD HAZARD LIMITS
- 30-FT WATER BODY SETBACK
- WATERCOURSE PER CDC SECTION 802

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811
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COLORADO LICENSED PROFESSIONAL ENGINEER 43280 6/18/21

NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

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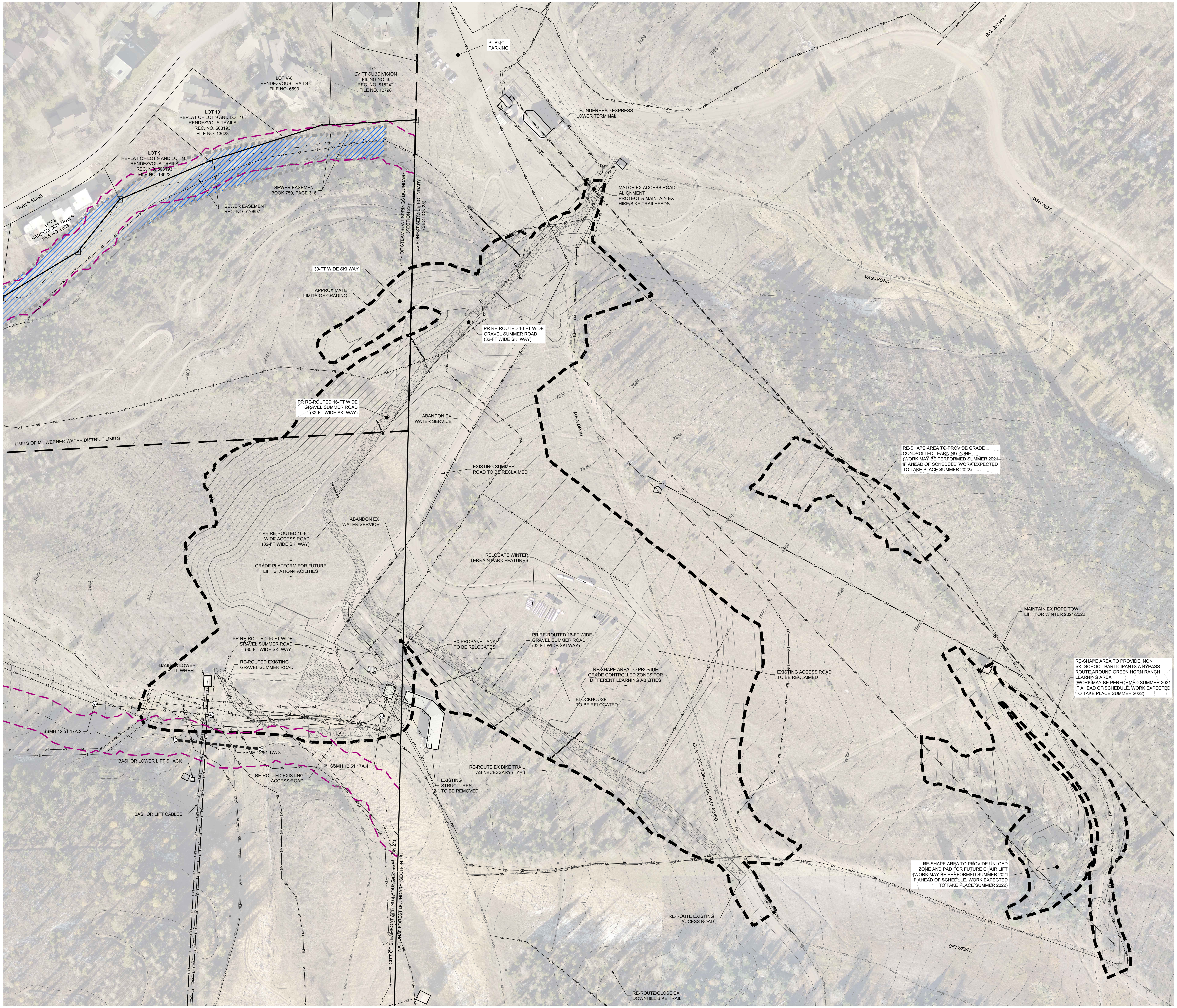
DESCRIPTION: | BY: | DATE: | NO.

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Site Plan

SHEET
C.100



NORTH

80 0 80 160 240 Feet

(IN FEET)
1 inch = 80 ft.

LEGEND:

PROPERTY BOUNDARY
EASEMENT
SECTION LINE
FOUND MONUMENT
FOUND SECTION CORNER
FENCE
PROPOSED MAJOR CONTOUR (6805)
PROPOSED MINOR CONTOUR
EXISTING MAJOR CONTOUR (6805)
EXISTING MINOR CONTOUR
ASPHALT
CONCRETE
GRAVEL
SIGN
PROPOSED SANITARY SEWER W/ MH (SS)
EXISTING SANITARY SEWER W/ MH (XS)
PROPOSED WATER (W)
PROPOSED GV, FH & CS
EXISTING WATER (XW)
GAS (XG)
GAS METER AND MANHOLE/VAULT (GM, G)
CABLE (XTV)
CABLE PEDESTAL (TV)
FIBER OPTIC (XFO)
TELEPHONE (XT)
TELEPHONE PEDESTAL AND MANHOLE/VAULT (T)
ELECTRIC (XE)
ELECTRIC PED, JUNCTION BOX AND METER (E, EJ, EM)
LIGHT POLE AND LIGHT POLE W/ MAST
OVERHEAD ELECTRIC (XOH)
UTILITY POLE AND GUY WIRE
DITCH/SWALE
EXISTING STORM SEWER W/ FES
PROPOSED STORM SEWER W/ FES
INLET AND STORM MANHOLE (ST)
OVERLAND AND CHANNEL FLOW ARROWS
CONIFEROUS AND DECIDUOUS TREE (EX)
FLOOD HAZARD LIMITS
30-FT WATER BODY SETBACK
WATERCOURSE PER CDC SECTION 802

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COLORADO LICENSED PROFESSIONAL ENGINEER
ERIK GRIEPENTROG 33280
6/18/21
NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

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Steamboat Springs, Colorado 80477
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LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

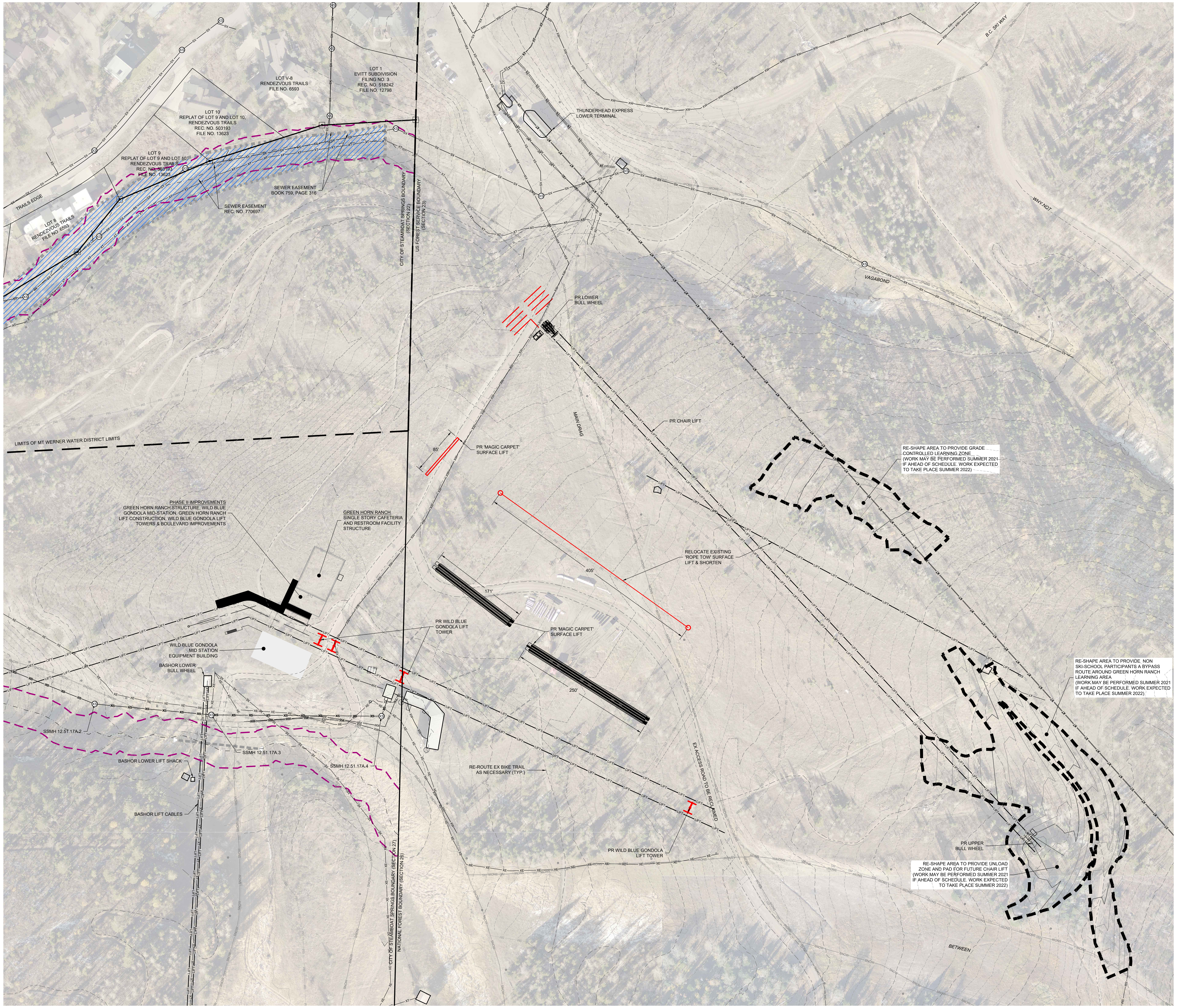
PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Detailed Site Plan

SHEET
C.110

RCRBD Record Set
T.A
07/14/2021



NORTH

80 0 80 160 240 Feet

(IN FEET)
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LEGEND:

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COLORADO LICENSED PROFESSIONAL ENGINEER
ERIK J. GRIEPENTROG
33280
6/18/21

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DATE: 6/18/2021
CONTACT: Erik Griepentrog
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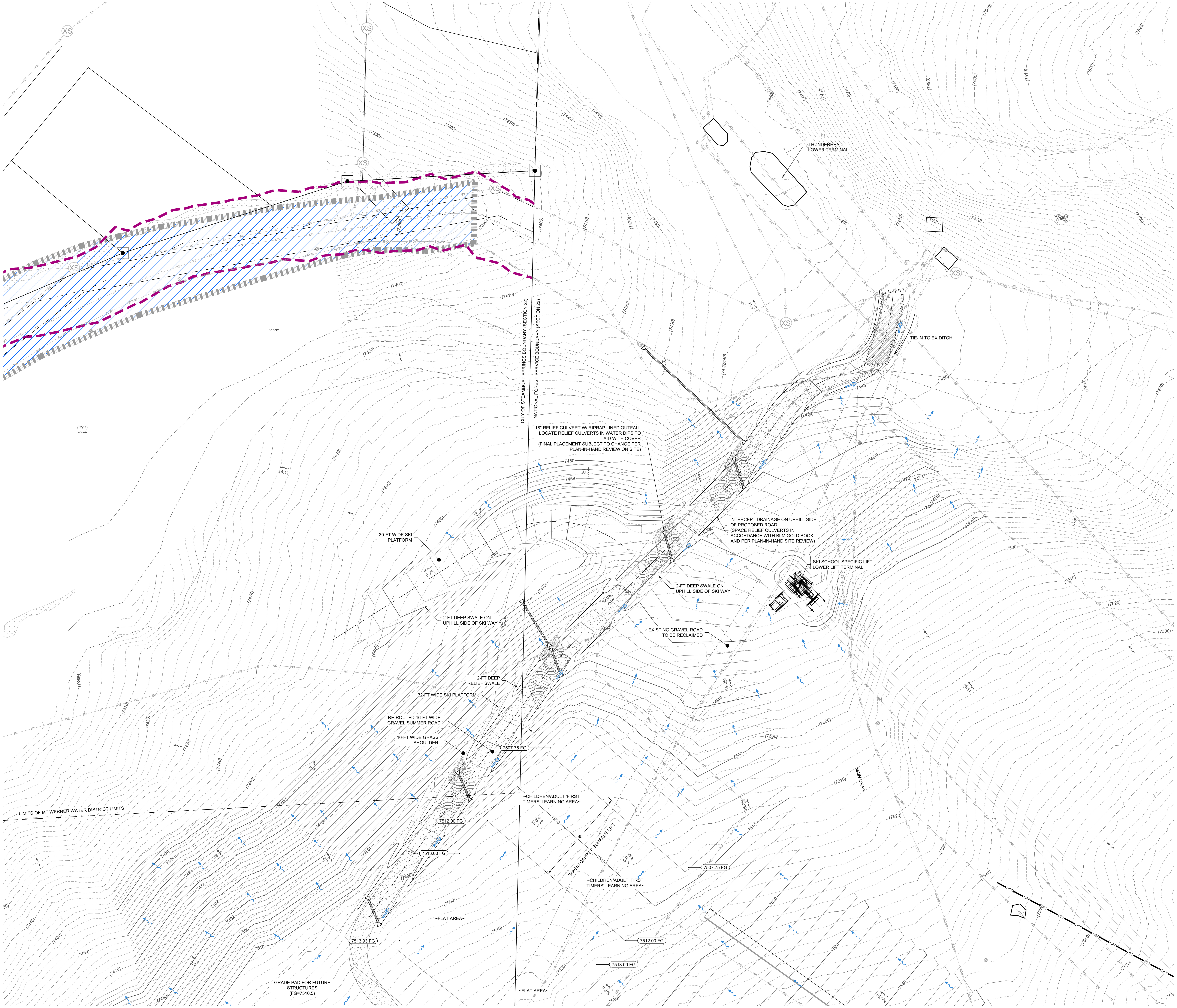
GREEN HORN RANCH
Detailed Site Plan

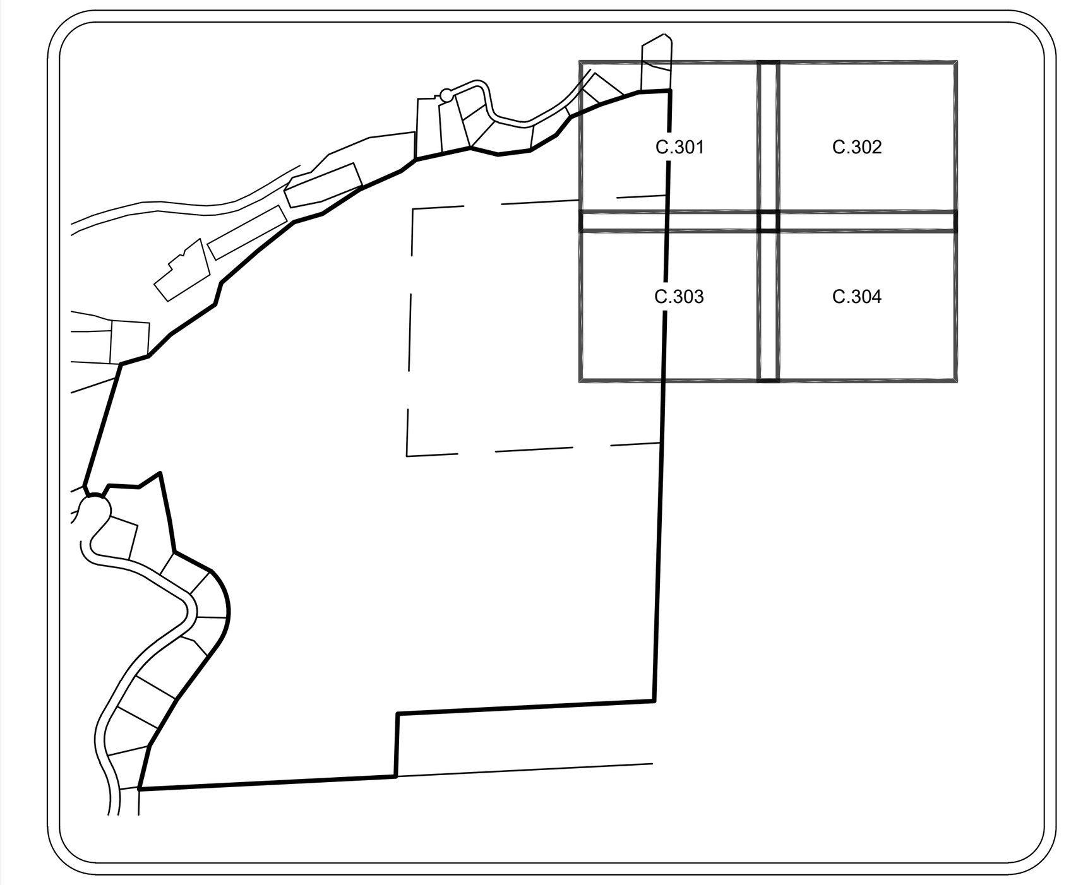
SHEET
C.110



NORTH

40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.



KEY MAP
N.T.S.

LEGEND:

EXISTING STORM SEWER	
PROPOSED STORM SEWER	
PROPOSED STORM INLET (CURB & AREA)	
PROPOSED MAJOR CONTOUR	6805
PROPOSED MINOR CONTOUR	
EXISTING MAJOR CONTOUR	6805
EXISTING MINOR CONTOUR	
PROPOSED SWALE	
PROPOSED CURB & GUTTER	
PROPERTY BOUNDARY	
PROPOSED LOT LINE	
EXISTING RIGHT OF WAY	
PROPOSED SPOT ELEVATION	00.10
EXISTING SPOT ELEVATION	00.10 X
PROPOSED OVERLAND FLOW DIRECTION W/SLOPE	2.0%
PROPOSED CHANNELIZED FLOW DIRECTION W/ SLOPE	2.0%
EXISTING CHANNELIZED FLOW DIRECTION	
SKI RUN / FLOOD HAZARD LIMITS	
30-FT WATER BODY SETBACK	

NOTES:

1. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR FOR ALL UNKNOWN UNDERGROUND UTILITIES.
2. ALL PROJECT DATA IS ON VERTICAL DATUM; NAVD 88. SEE NOTES SHEET FOR BENCHMARK REFERENCES.
3. ELEVATIONS FOR IMPROVEMENTS THAT ARE CONTROLLED BY ADJACENT EXISTING FACILITIES (SUCH AS PROPOSED GUTTERS ALONG EXISTING ASPHALT) MAY REQUIRE ADJUSTMENT BASED ON ACTUAL CONDITIONS. COORDINATE WITH ENGINEER TO ENSURE A CONSISTENT SECTION WITH SMOOTH TRANSITIONS WHERE NECESSARY.
4. SEE SOILS REPORT FOR PAVEMENT, SUBGRADE AND MATERIAL PREPARATION, DESIGN AND RECOMMENDATIONS.
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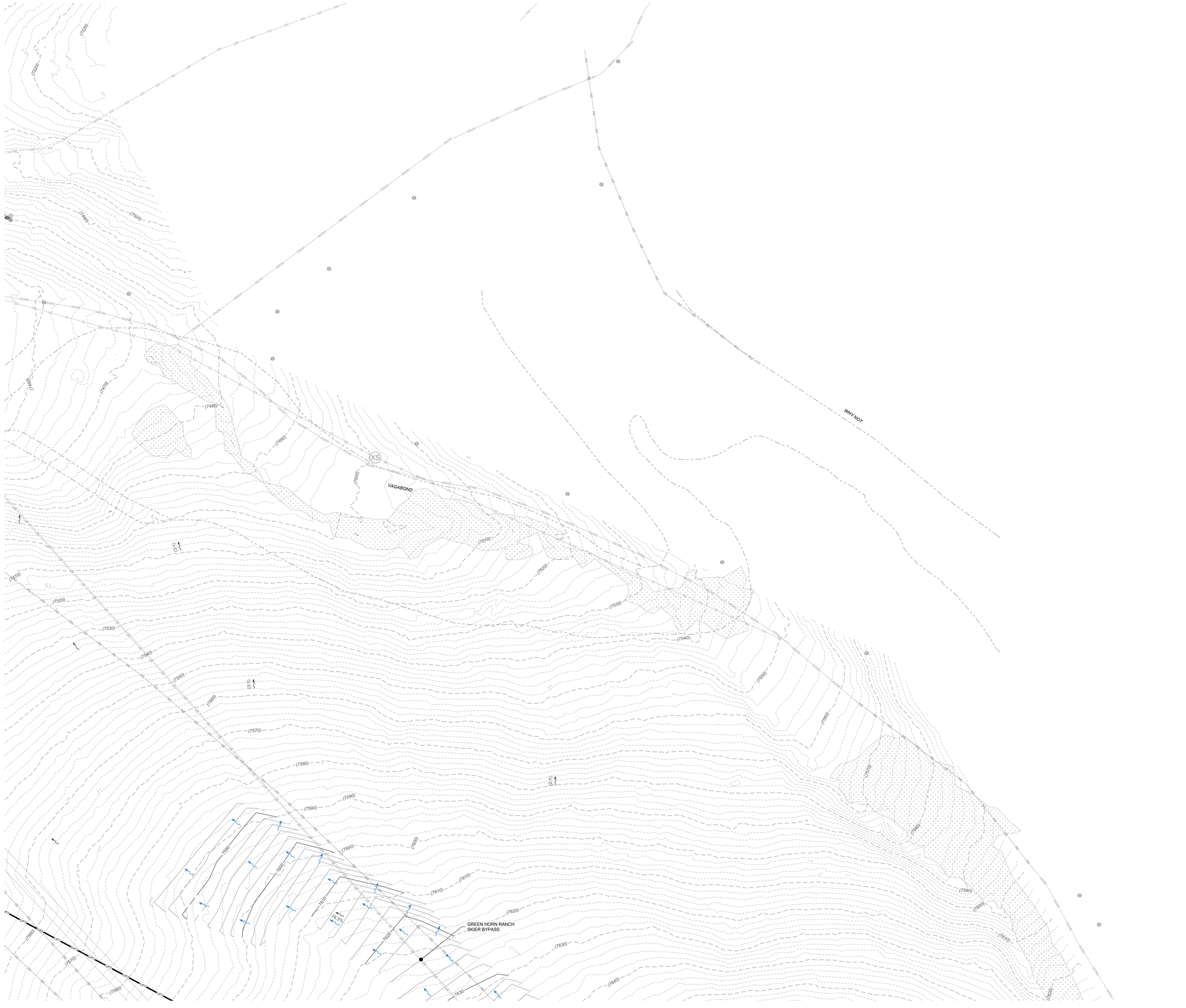
GREEN HORN RANCH

Grading Plan - Detailed

SHEET
C.301



RCRBD Record Set
T.A.
07/14/2021

KEY MAP
N.T.S.

LEGEND:

EXISTING STORM SEWER	▬ ▬ ▬
PROPOSED STORM SEWER	▬ ▬ ▬
PROPOSED STORM INLET (CURB & AREA)	▣ ▣
PROPOSED MAJOR CONTOUR	—— 6805 ——
PROPOSED MINOR CONTOUR	————
EXISTING MAJOR CONTOUR	— — 6805 — —
EXISTING MINOR CONTOUR	— — — —
PROPOSED SWALE	—— · · ——
PROPOSED CURB & GUTTER	═ · · · ═
PROPERTY BOUNDARY	━━━━
PROPOSED LOT LINE	────
EXISTING RIGHT OF WAY	—— —— ——
PROPOSED SPOT ELEVATION	00.10
EXISTING SPOT ELEVATION	00.10 X
PROPOSED OVERLAND FLOW DIRECTION W/SLOPE	← 2.0%
PROPOSED CHANNELIZED FLOW DIRECTION W/ SLOPE	⇐ 2.0%
EXISTING CHANNELIZED FLOW DIRECTION	⇐
SKI RUN ~~FLOOD~~ HAZARD LIMITS	▨
30-FT WATER BODY SETBACK	— — —

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LANDMARK
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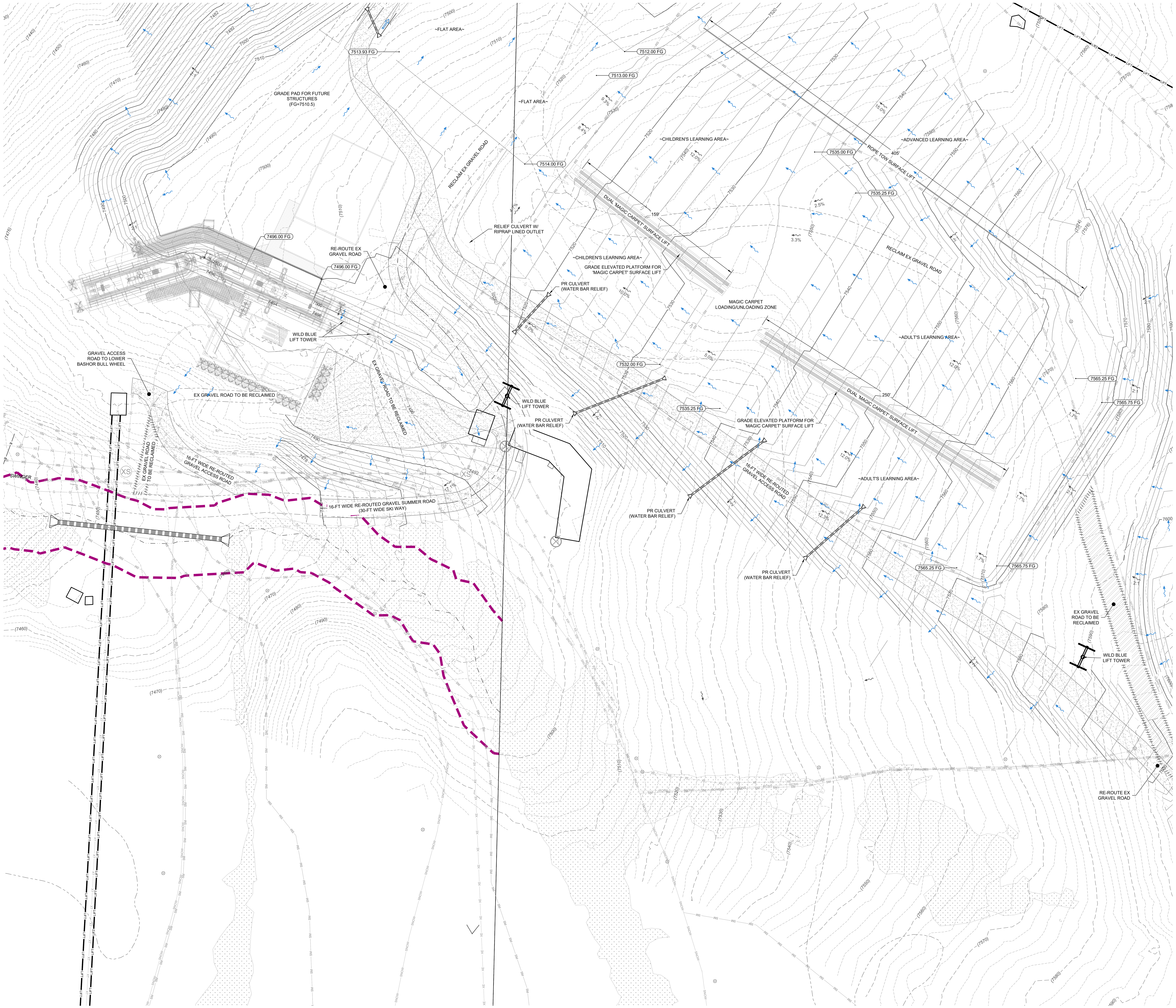
GREEN HORN RANCH
Grading Plan - Detailed

SHEET
C.302

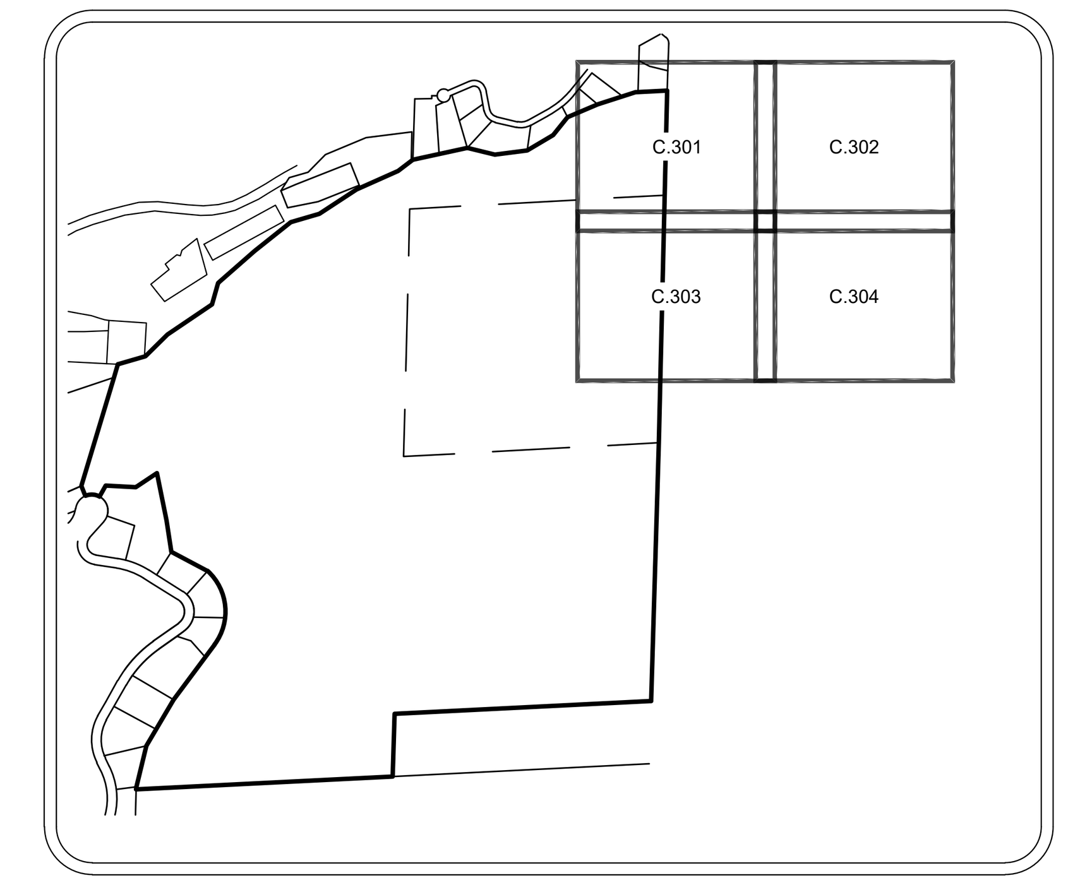
DRAWING FILENAME: P:\1012-048\DWGs\Production Drawings\G&E Permit\1012-048-GE-C.301-Grading Detail.dwg LAYOUT NAME: C.302 DATE: Jun 18, 2021 - 5:07pm CAD OPERATOR: Matt
LIST OF XREFS: [1012-048-xExist-MTN] [1012-048-xBndy-MTN] [xBORDER-PP] [1012-048-xExist-Utils] [1012-048-xSite-PP] [1012-048-xUtil] [1012-048-EROSION VIC MAP] [xEROSION_Leg] [1012-048-xSITE - FINAL DEVELOPMENT] [1012-048-xHatch]



NORTH

40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.



KEY MAP
N.T.S.

LEGEND:

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PROPOSED STORM INLET (CURB & AREA)
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SWALE
- PROPOSED CURB & GUTTER
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING RIGHT OF WAY
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- PROPOSED OVERLAND FLOW DIRECTION W/SLOPE
- PROPOSED CHANNELIZED FLOW DIRECTION W/ SLOPE
- EXISTING CHANNELIZED FLOW DIRECTION
- SKI RUN / FLOOD HAZARD LIMITS
- 30-FT WATER BODY SETBACK

NOTES:

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COLORADO LICENSED PROFESSIONAL ENGINEER ERIK J. GRIEPENTROG 33280 6/18/21

NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

CIVIL ENGINEERS | SURVEYORS
141 9th Street / P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

LANDMARK CONSULTANTS, INC.

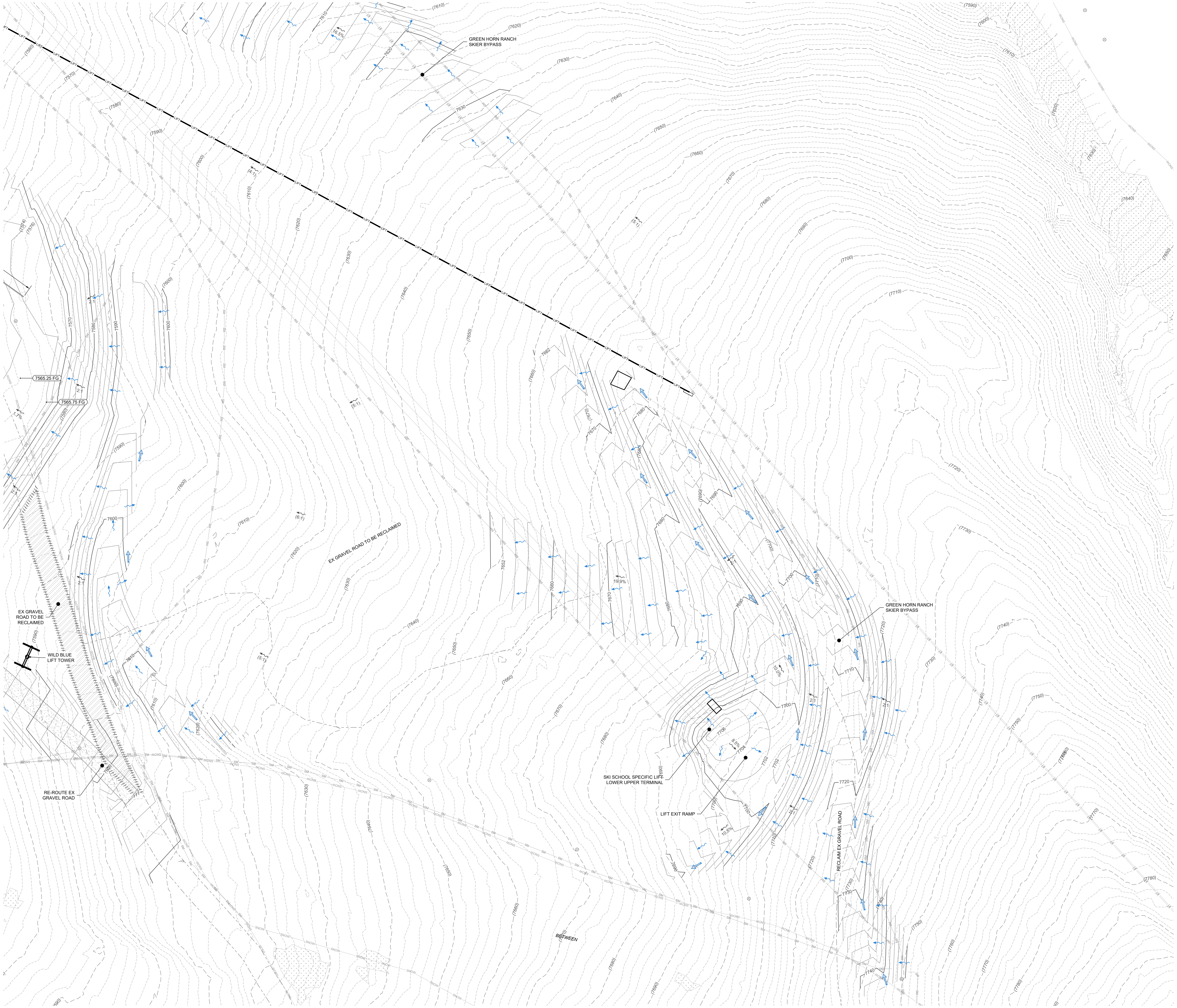
NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Grading Plan - Detailed

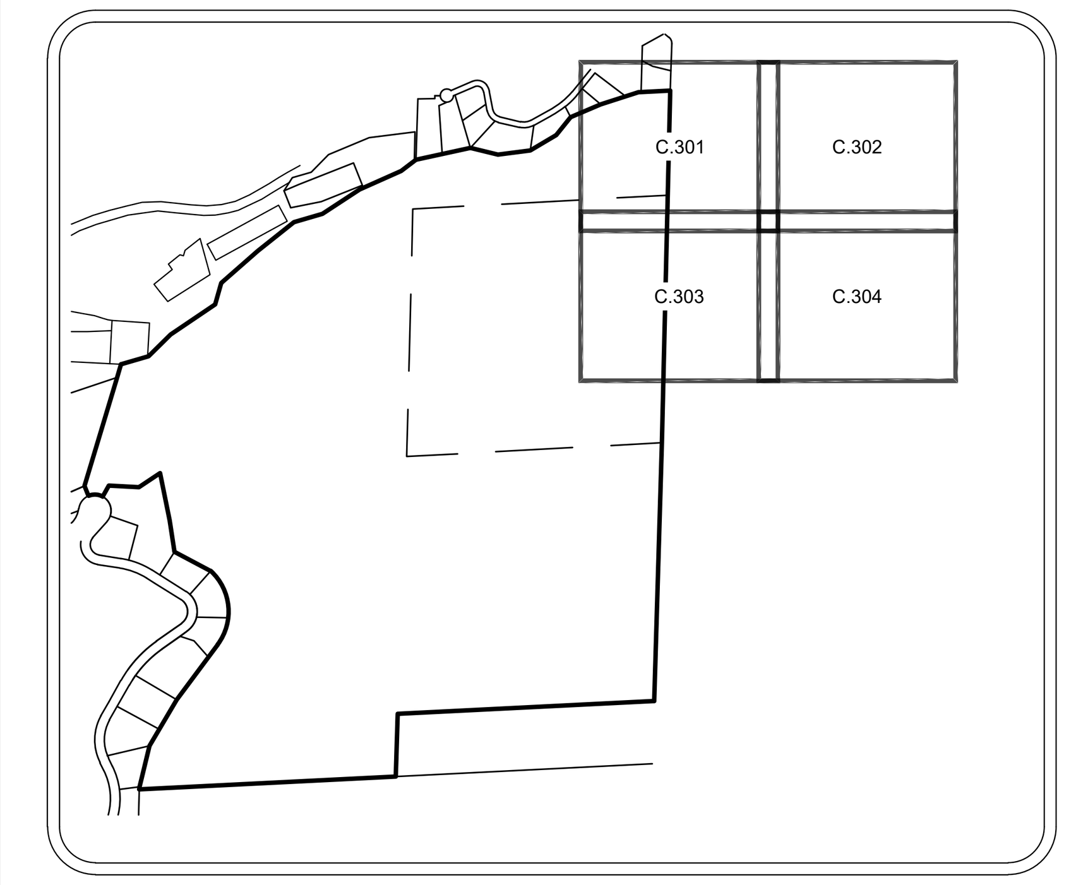
SHEET
C.303



NORTH

40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.



KEY MAP
N.T.S.

LEGEND:

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PROPOSED STORM INLET (CURB & AREA)
- PROPOSED MAJOR CONTOUR — 6805
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR — 6805
- EXISTING MINOR CONTOUR
- PROPOSED SWALE
- PROPOSED CURB & GUTTER
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING RIGHT OF WAY
- PROPOSED SPOT ELEVATION — 00.10
- EXISTING SPOT ELEVATION — 00.10 X
- PROPOSED OVERLAND FLOW DIRECTION W/SLOPE — 2.0%
- PROPOSED CHANNELIZED FLOW DIRECTION W/ SLOPE — 2.0%
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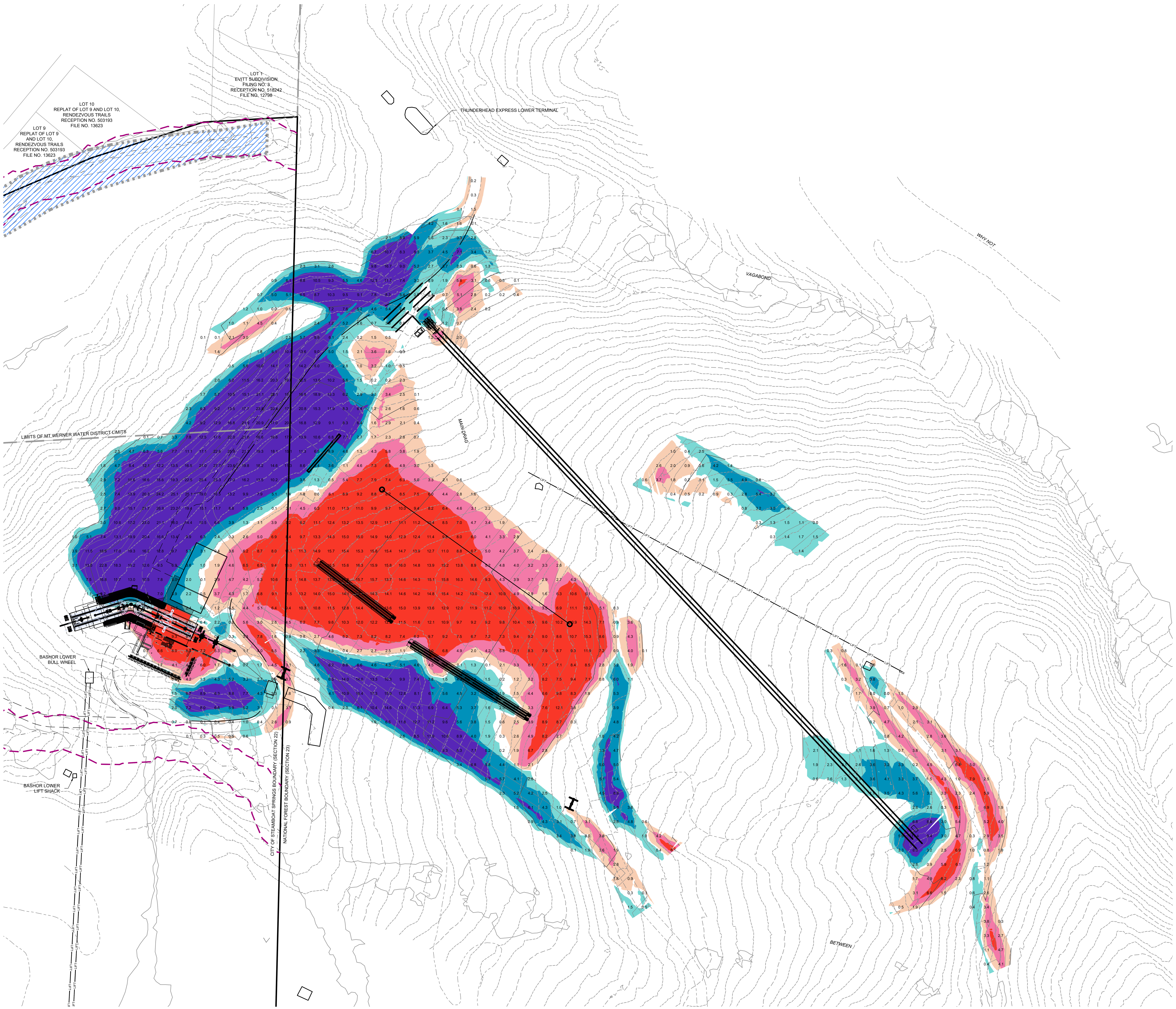
GREEN HORN RANCH

Grading Plan - Detailed

SHEET
C.304



NORTH

80 0 80 160 240 Feet

(IN FEET)
1 inch = 80 ft.

LEGEND:

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PROPOSED STORM SEWER
PROPOSED STORM INLET (CURB & AREA)
PROPOSED MAJOR CONTOUR — 6805
PROPOSED MINOR CONTOUR
EXISTING MAJOR CONTOUR — 6805
EXISTING MINOR CONTOUR
PROPOSED SWALE
PROPOSED CURB & GUTTER
PROPERTY BOUNDARY
PROPOSED LOT LINE
EXISTING RIGHT OF WAY
PROPOSED SPOT ELEVATION — 00.10
EXISTING SPOT ELEVATION — 00.10 X
PROPOSED OVERLAND FLOW DIRECTION W/SLOPE — 2.0%
PROPOSED CHANNELIZED FLOW DIRECTION W/ SLOPE — 2.0%
EXISTING CHANNELIZED FLOW DIRECTION
FLOOD HAZARD LIMITS
30-FT WATER BODY SETBACK

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LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

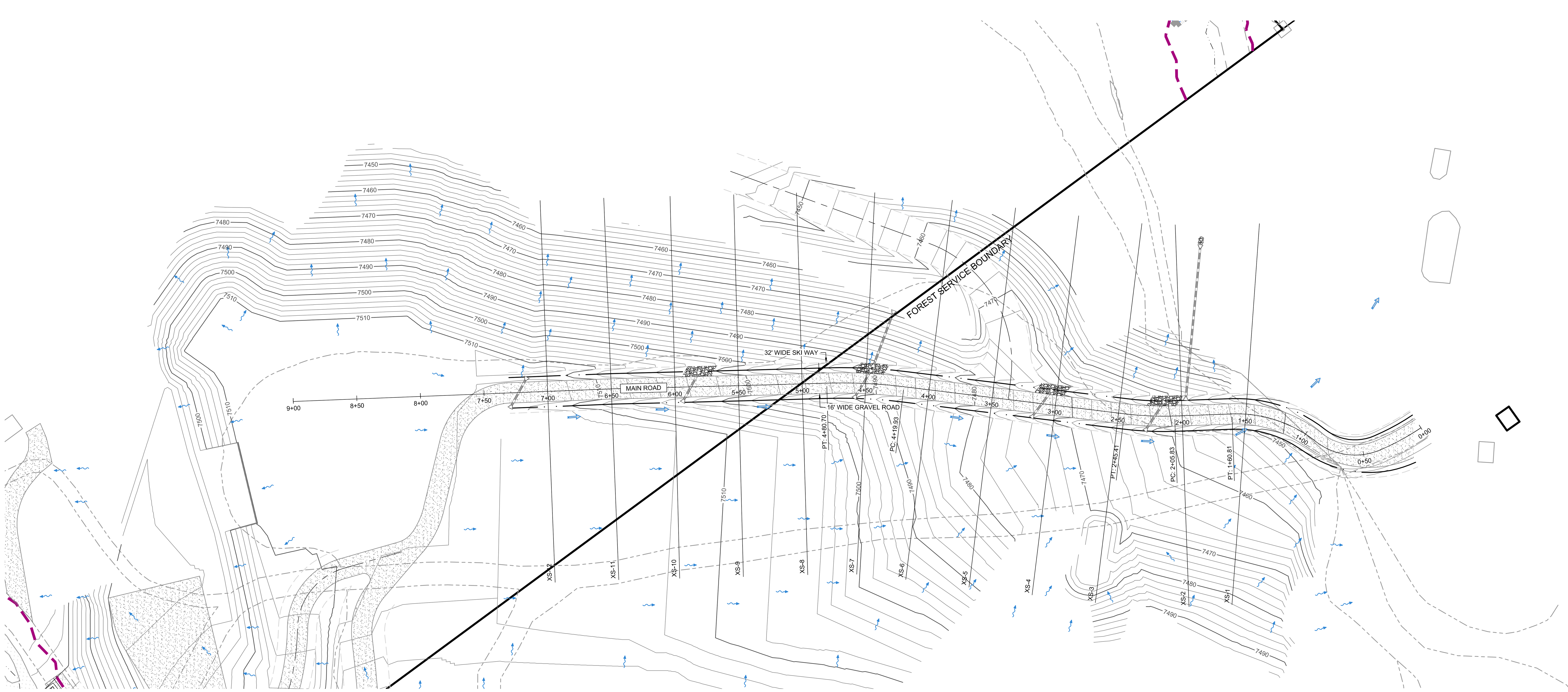
PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

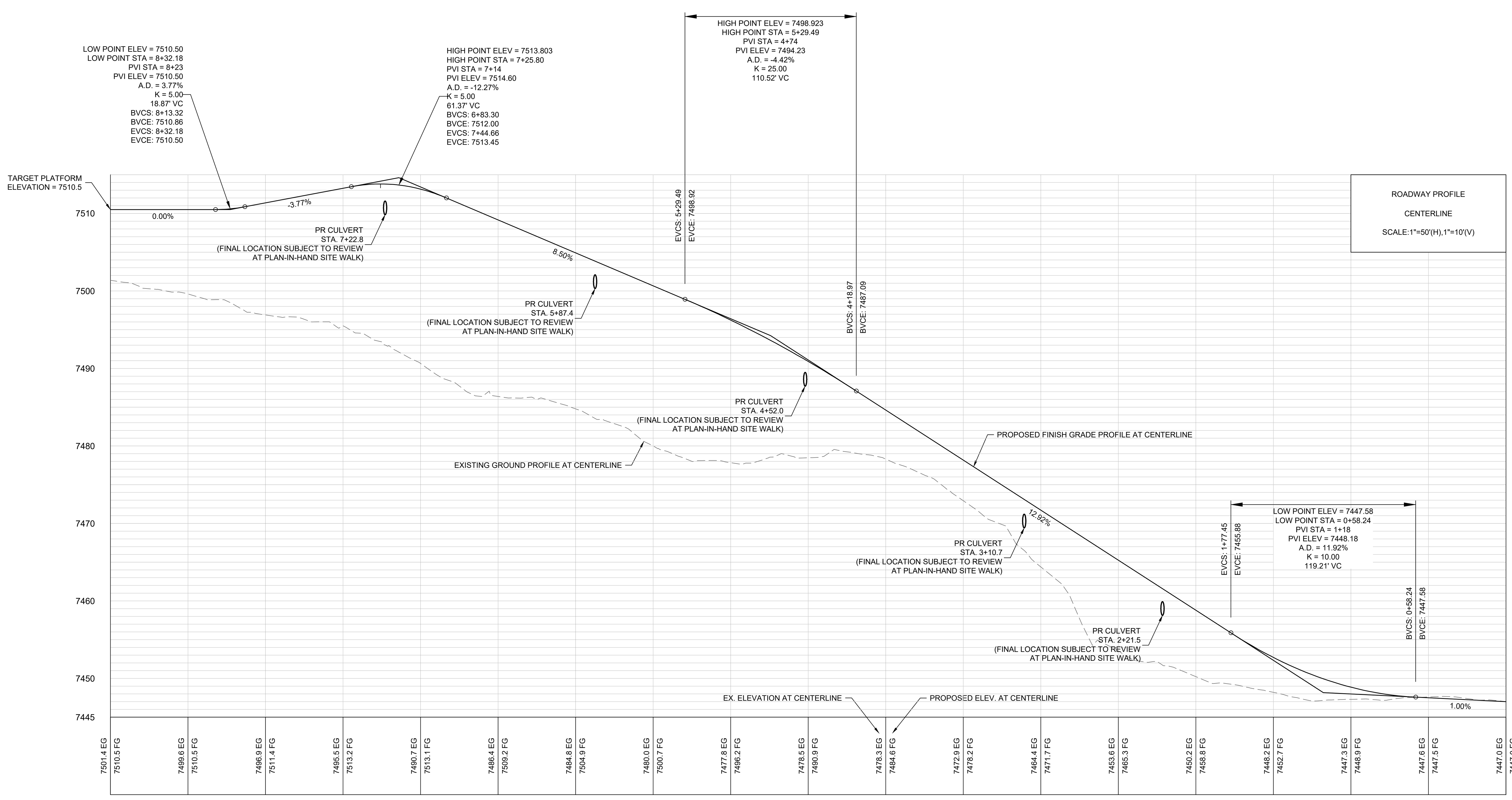
Grading Cut-Fill Heatmap

SHEET
C.310

RCRBD Record Set
T.A.
07/14/2021



MAIN ROAD



LEGEND:

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- PROPOSED STORM SEWER
- PROPOSED STORM INLET (CURB & AREA)
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
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- EXISTING MINOR CONTOUR
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- PROPOSED CURB & GUTTER
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING RIGHT OF WAY
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION (00.10 X)
- PROPOSED OVERLAND FLOW DIRECTION W/SLOPE
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- EXISTING CHANNELIZED FLOW DIRECTION
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- 30-FT WATER BODY SETBACK

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COLORADO LICENSED PROFESSIONAL ENGINEER 33280 6/18/21

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LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

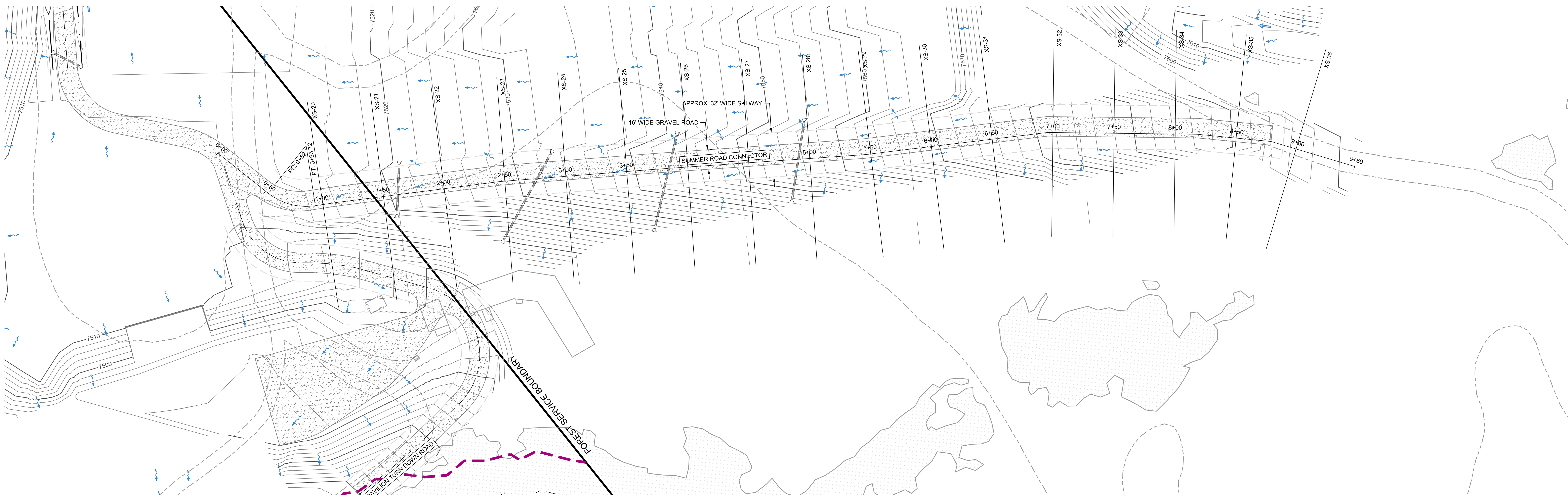
PROJECT:	1012-048
DATE:	6/18/2021
CONTACT:	Erik Griepentrog
EMAIL:	erikg@landmark-co.com

GREEN HORN RANCH
Roadway Plan & Profile Main Road

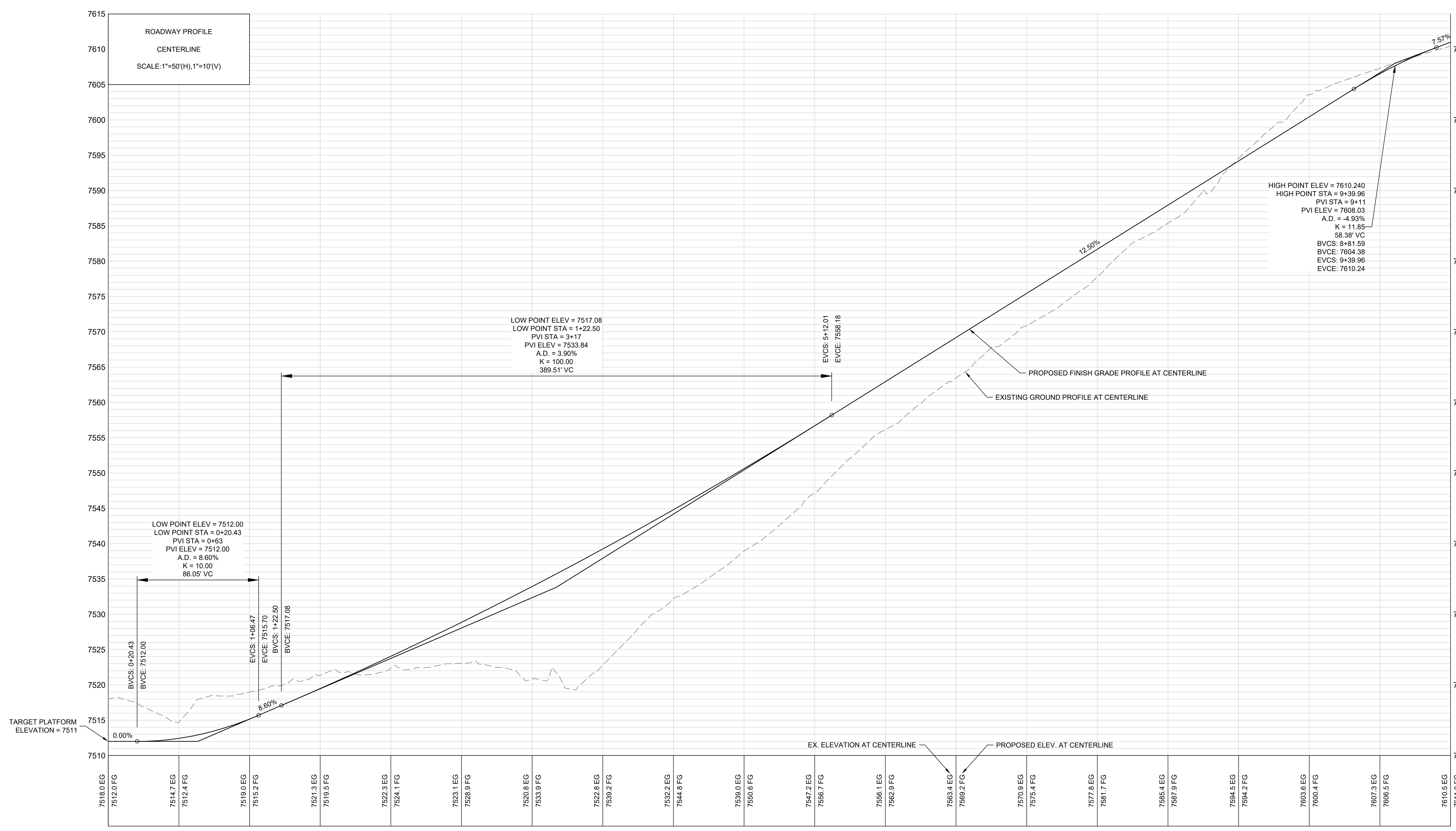
SHEET
C.410

NORTH

50 0 50 100 150 Feet
(IN FEET)
1 inch = 50 ft.



SUMMER ROAD CONNECTOR



LEGEND:

EXISTING STORM SEWER
PROPOSED STORM SEWER
PROPOSED STORM INLET (CURB & AREA)
PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR
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PROPERTY BOUNDARY
PROPOSED LOT LINE
EXISTING RIGHT OF WAY

PROPOSED SPOT ELEVATION
EXISTING SPOT ELEVATION 00.10 X
PROPOSED OVERLAND FLOW DIRECTION W/SLOPE 2.0%
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FLOOD HAZARD LIMITS
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COLORADO LICENSED PROFESSIONAL ENGINEER
ERIK J. GRIEPENTROG
33280
6/18/21
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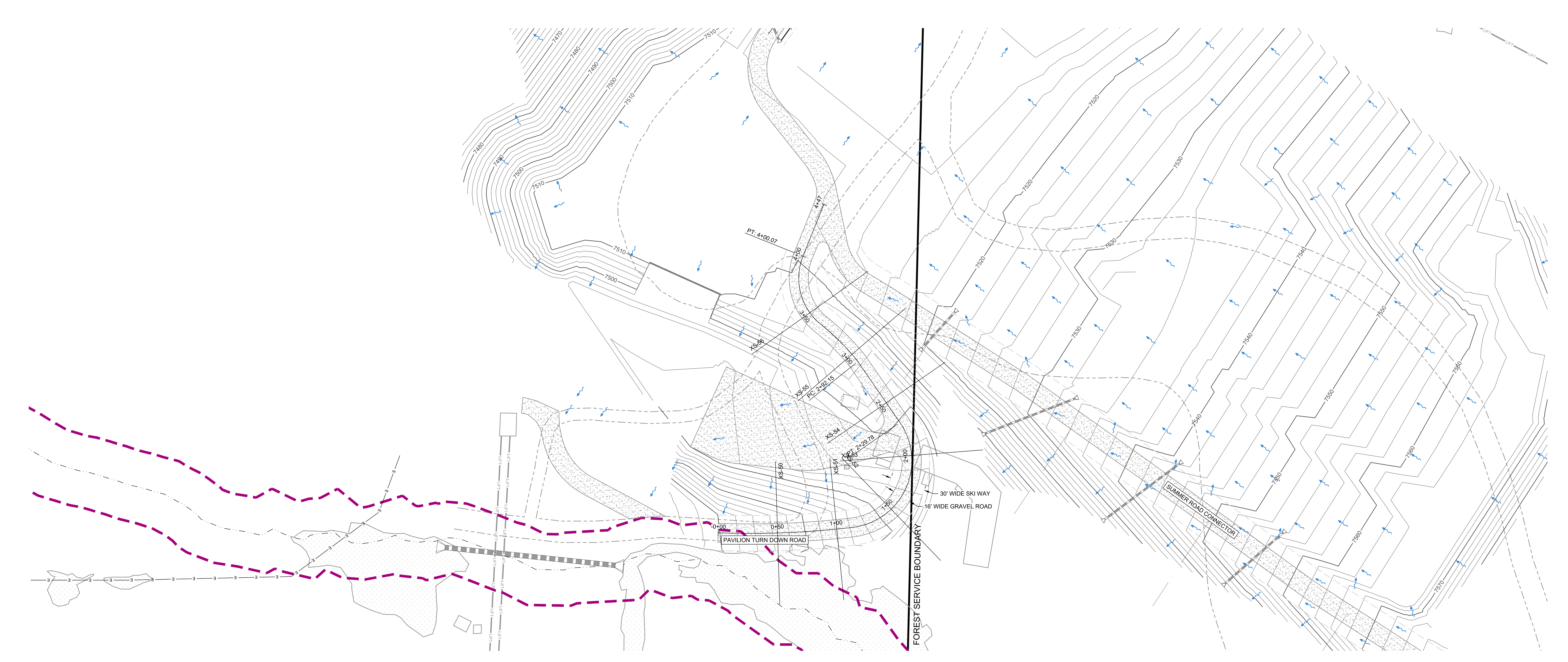
LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

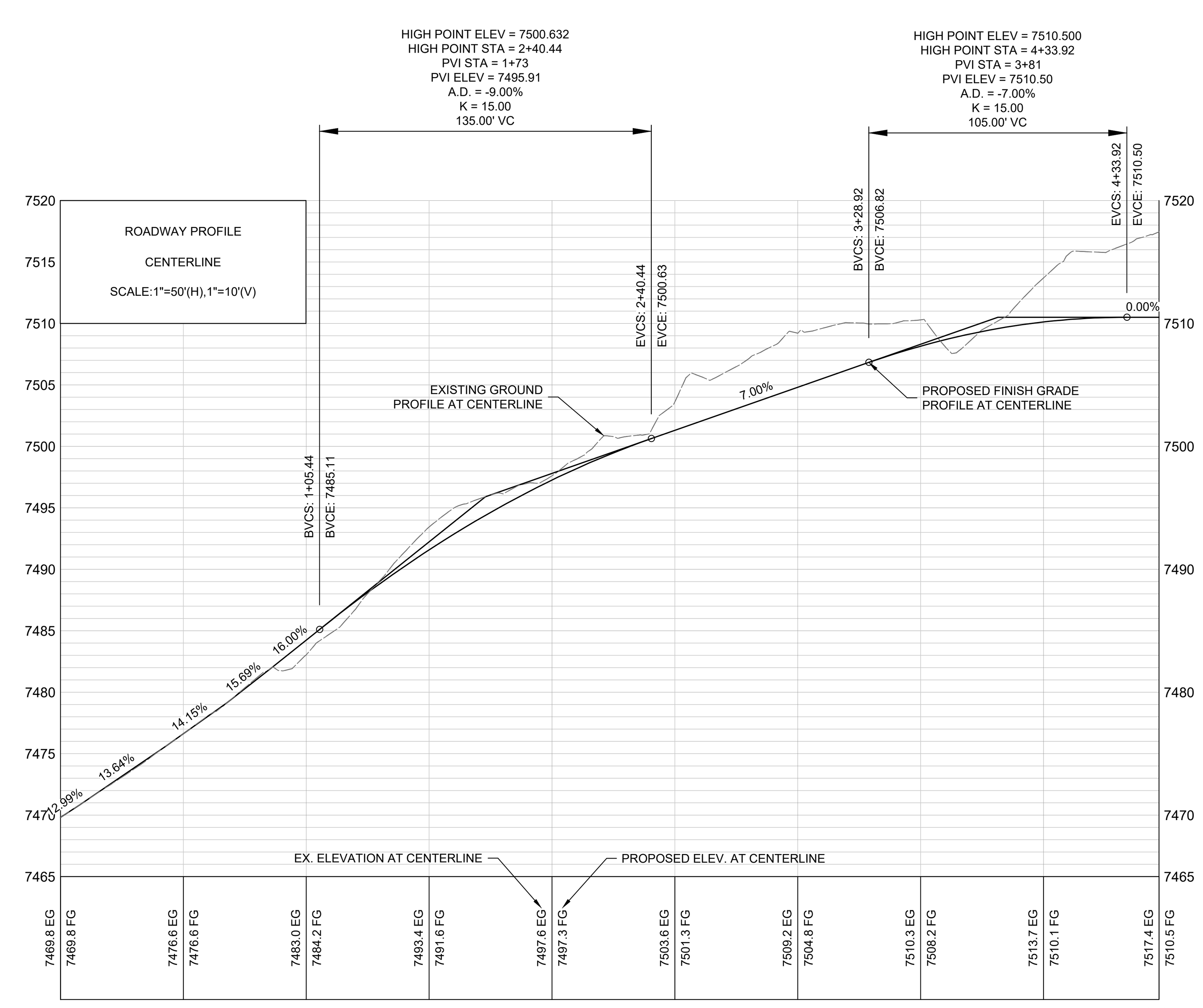
PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Roadway Plan & Profile
Summer Road Connector

SHEET
C.411



ROADWAY PLAN & PROFILE (STA 0+00 - 10+00)



LEGEND:

EXISTING STORM SEWER	
PROPOSED STORM SEWER	
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PROPOSED MAJOR CONTOUR	6805
PROPOSED MINOR CONTOUR	
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EXISTING MINOR CONTOUR	
PROPOSED SWALE	
PROPOSED CURB & GUTTER	
PROPERTY BOUNDARY	
PROPOSED LOT LINE	
EXISTING RIGHT OF WAY	
PROPOSED SPOT ELEVATION	00.10
EXISTING SPOT ELEVATION	00.10 X
PROPOSED OVERLAND FLOW DIRECTION W/SLOPE	2.0%
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PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

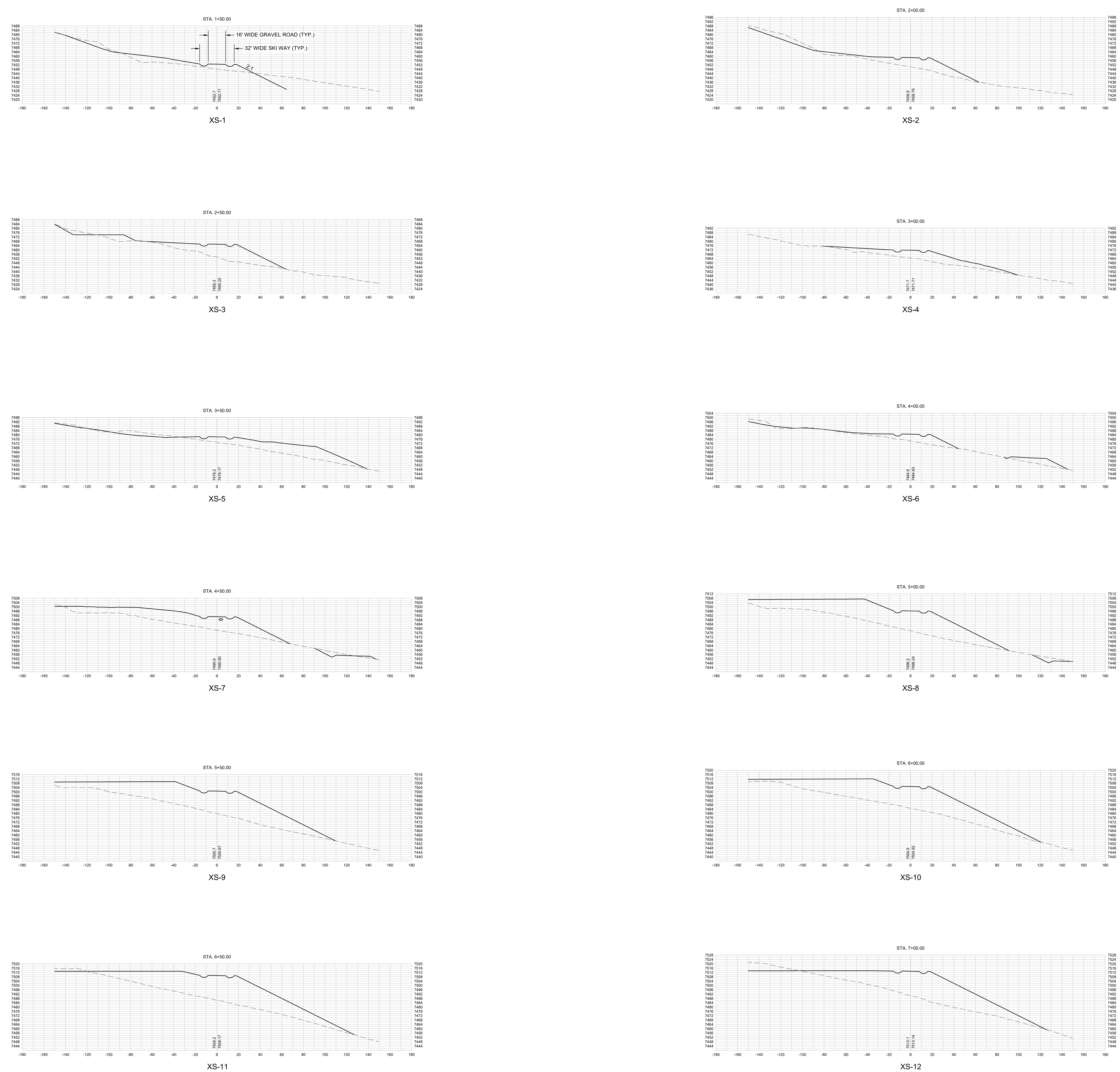
GREEN HORN RANCH

Roadway Plan & Profile

SHEET C.412

NORTH

SCALE 0 SCALE SCALE SCALE feet
(IN FEET)
1 inch = SCALE ft.



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30-FT WATER BODY SETBACK	

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COLORADO LICENSED
ERIK L. GRIEPENTROG
33280
6/18/21
PROFESSIONAL ENGINEER

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EMAIL:	erikg@landmark-co.com

GREEN HORN RANCH

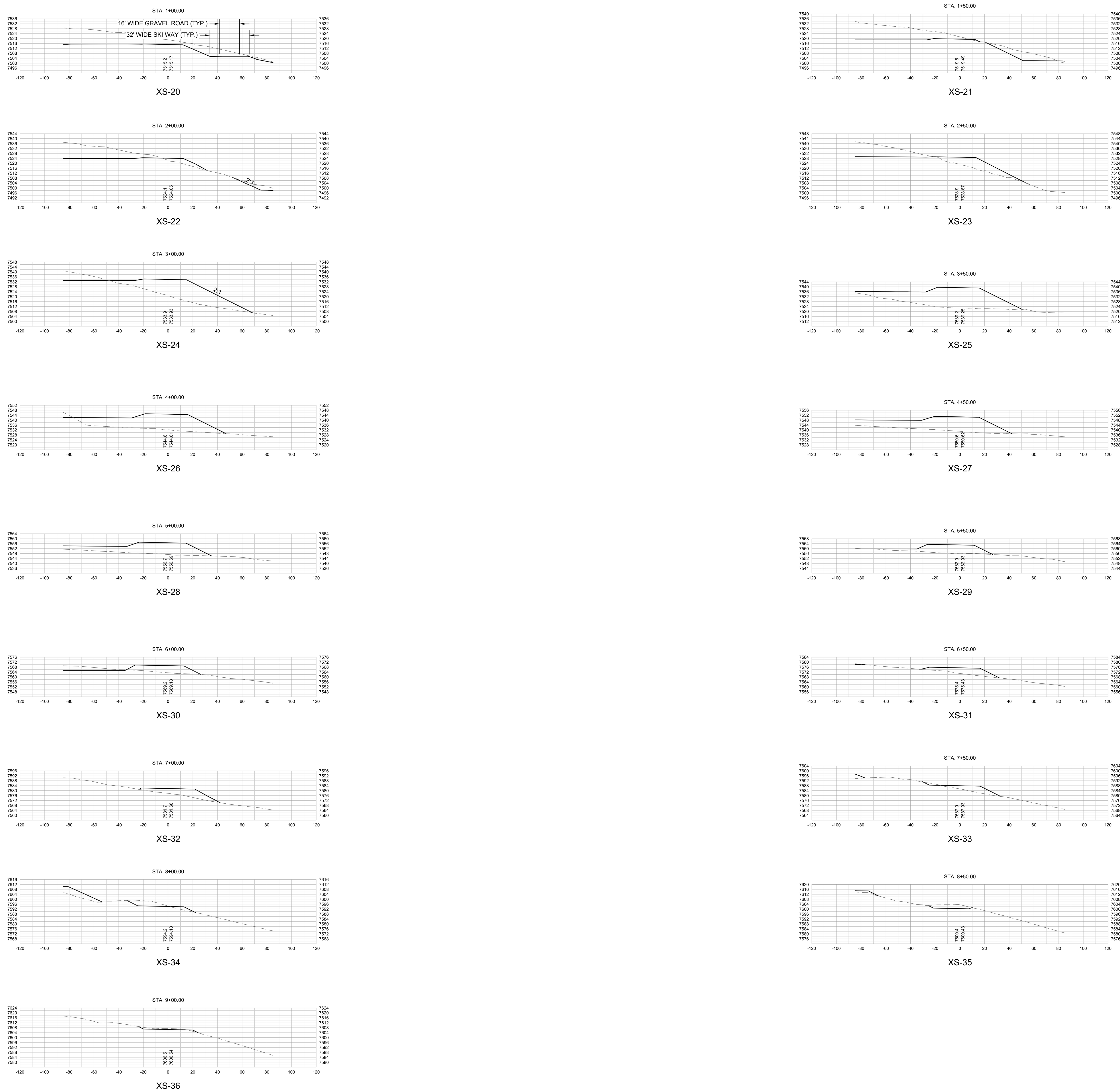
Roadway Plan & Profile

SHEET
C.412

NORTH

SCALE 0 SCALE SCALE SCALE feet

(IN FEET)
1 inch = SCALE ft.



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Roadway Plan & Profile

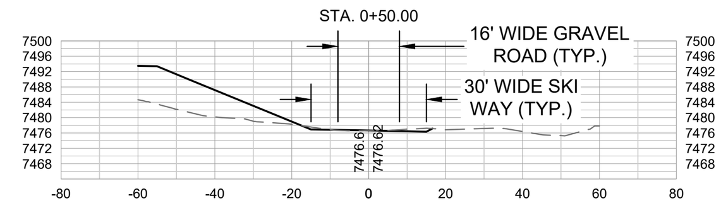
SHEET
C.412

RCRBD Record Set
T.A.
07/14/2021

NORTH

SCALE 0 SCALE SCALE feet
(IN FEET)
1 inch = SCALE ft.

STA. 0+50.00



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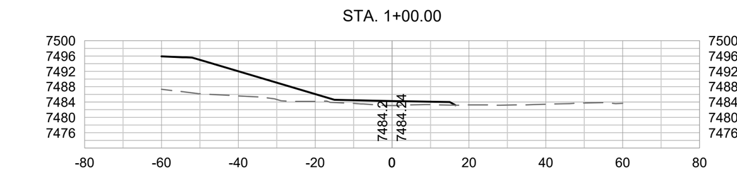

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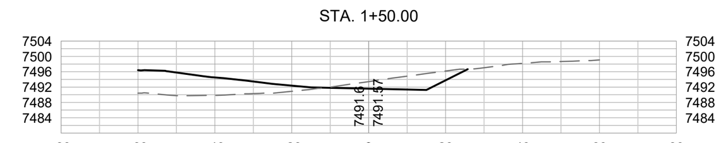

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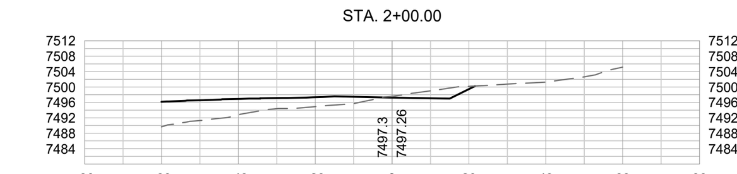

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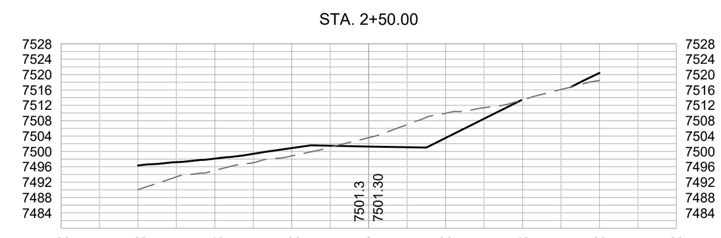

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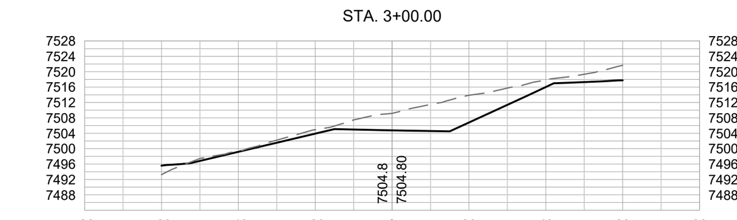

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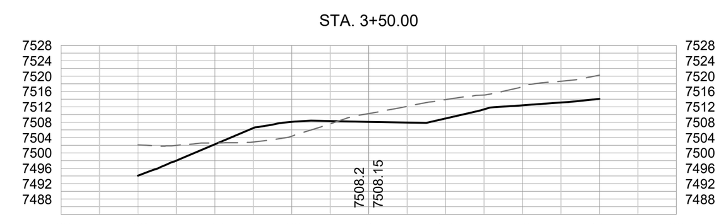

LEGEND:

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PROPOSED STORM INLET (CURB & AREA)
- PROPOSED MAJOR CONTOUR — 6805
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR — 6805
- EXISTING MINOR CONTOUR
- PROPOSED SWALE
- PROPOSED CURB & GUTTER
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING RIGHT OF WAY
- PROPOSED SPOT ELEVATION — 00.10
- EXISTING SPOT ELEVATION — 00.10 X
- PROPOSED OVERLAND FLOW DIRECTION W/SLOPE — 2.0%
- PROPOSED CHANNELIZED FLOW DIRECTION W/ SLOPE — 2.0%
- EXISTING CHANNELIZED FLOW DIRECTION
- FLOOD HAZARD LIMITS
- 30-FT WATER BODY SETBACK

NOTES:

1. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES.
2. ALL PROJECT DATA IS ON VERTICAL DATUM; NAVD 88. SEE NOTES SHEET FOR BENCHMARK REFERENCES.
3. ELEVATIONS FOR IMPROVEMENTS THAT ARE CONTROLLED BY ADJACENT EXISTING FACILITIES (SUCH AS PROPOSED GUTTERS ALONG EXISTING ASPHALT) MAY REQUIRE ADJUSTMENT BASED ON ACTUAL CONDITIONS. COORDINATE WITH ENGINEER TO ENSURE A CONSISTENT SECTION WITH SMOOTH TRANSITIONS WHERE NECESSARY.
4. SEE SOILS REPORT FOR PAVEMENT, SUBGRADE AND MATERIAL PREPARATION, DESIGN AND RECOMMENDATIONS.
5. ALL CURB SPOTS SHOWN ARE FLOWLINE ELEVATIONS, UNLESS NOTED OTHERWISE. ALL OTHER SPOTS ARE FINISHED GRADE ELEVATIONS.

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COLORADO LICENSED PROFESSIONAL ENGINEER
ERIK L. GRIEPENTROG
33280
6/18/21

NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

CIVIL ENGINEERS & SURVEYORS
141 9th Street P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

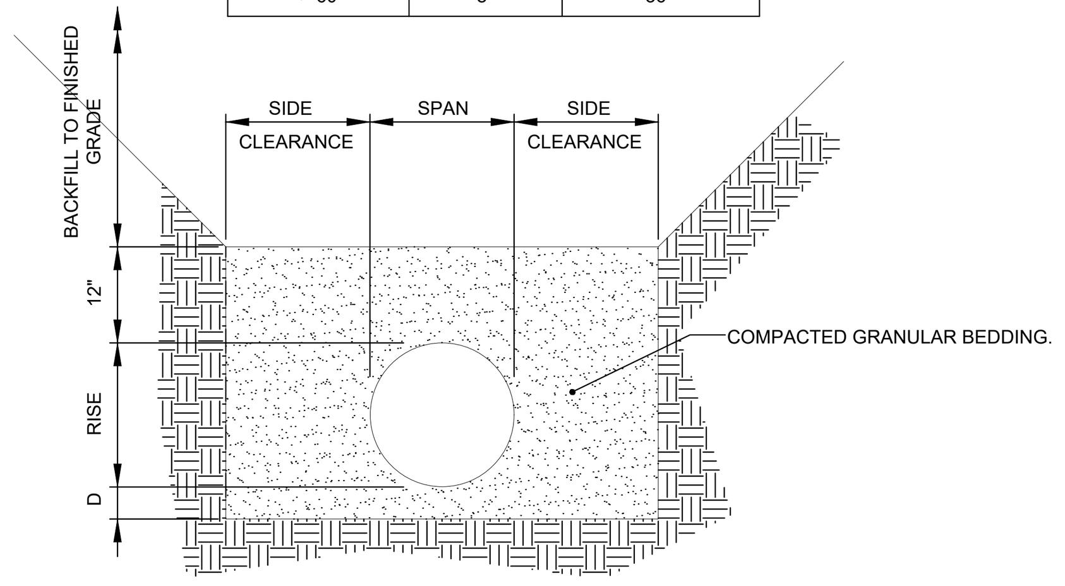
PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Roadway Plan & Profile

SHEET
C.412

PIPE SPAN	BEDDING DEPTH, D	MAX. SIDE CLEARANCE
15" OR LESS	3"	SPAN
18" TO 30"	4"	18"
36" TO 60"	6"	SPAN/2
> 60"	8"	36"



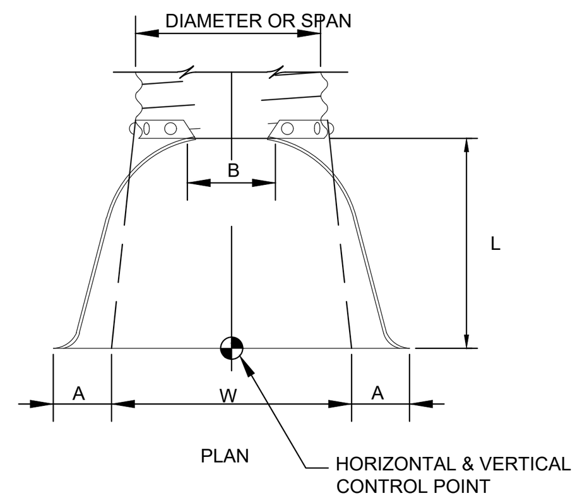
STORM SEWER NOTES

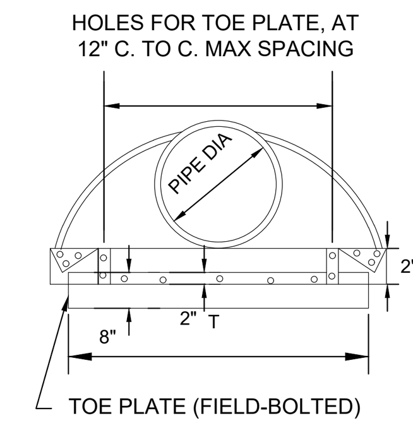
1. ADEQUATE COVER SHALL BE PROVIDED DURING CONSTRUCTION TO PROTECT THE STRUCTURE FROM DAMAGE.
2. PIPE SHALL BE PLACED WITH LONGITUDINAL SEAMS AT THE SIDES OR QUARTER POINTS BUT NOT ALONG TOP OF VERTICAL AXIS.
3. STRUCTURAL PLATE PIPES OF EQUAL OR GREATER DIAMETER, CONFORMING TO THE SPECIFICATIONS, MAY BE USED WITH PERMISSION OF THE ENGINEER.
4. WHEN A CULVERT IS TO BE EXTENDED WITH PIPE OF A DIFFERENT MATERIAL, THE CONNECTION SHALL CONFORM TO THE DETAILS ON THE PLANS OR BE APPROVED.
5. EXTENSIONS FOR CMP ARCH CULVERT SHALL MATCH THE CORRUGATIONS AND THE SPAN AND RISE DIMENSIONS OF THE CULVERT TO BE EXTENDED.
6. MINIMUM COVER FOR METAL AND PLASTIC PIPE IS THE DISTANCE FROM THE TOP OF THE PIPE TO THE TOP OF RIGID PAVEMENT OR TO THE TOP OF SUBGRADE FOR FLEXIBLE PAVEMENT.
7. ALL FOUNDATION, BEDDING AND BACKFILL SHALL BE COMPACTED TO NO LESS THAN 90% DENSITY AND WITHIN 2% OF THE OPTIMUM MOISTURE CONTENT OF THE MODIFIED PROCTOR.
8. ADDITIONAL TRENCH EXCAVATION OR MEASURES MAY BE REQUIRED FOR UNANTICIPATED SOIL CONDITIONS.
9. LENGTHS ARE MEASURED HORIZONTALLY FROM END OF END SECTION TO END OF END SECTION OR CENTER OF MANHOLE.

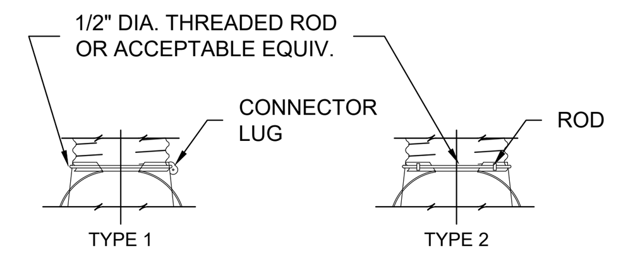
STORM PIPE TRENCH DETAIL
N.T.S

THIN-WALL ROUND PIPE

PIPE DIA.	THICK.	DIMENSIONS A	B	H	L	W	T
(inches)							
12	0.064	6	6	6	21	24	34
18	0.064	8	10	6	31	36	46
21	0.064	9	12	6	36	42	52
24	0.064	10	13	6	41	48	58
30	0.079	12	16	8	51	60	70
36	0.079	14	19	9	60	72	94
42	0.109	16	22	11	69	84	106
48	0.109	18	27	12	78	90	112
54	0.109	18	30	12	84	102	124
60	0.109	18	33	12	87	114	136
66	0.109	18	36	12	87	120	142
72	0.109	18	39	12	87	126	148
78	0.109	18	42	12	87	132	154
84	0.109	18	45	12	87	138	160

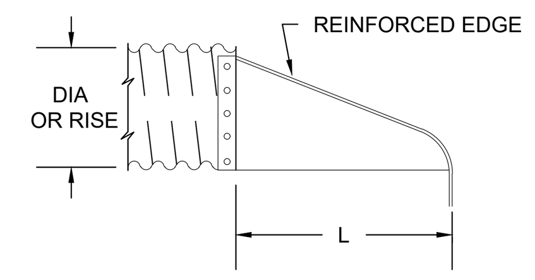






FOR 18 IN. THRU 24 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY0 FORMED PIPE UNLESS RECORRUGATED

FOR 30 IN. THRUE 36 IN. ROUND PIPE WITH ANNULGAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

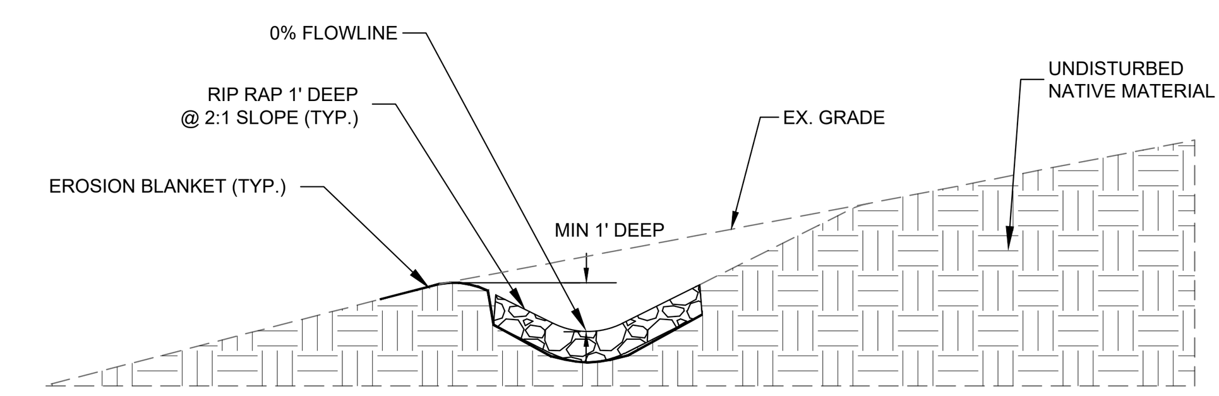


END SECTION AND CONNECTION DETAILS FOR THIN WALL PIPE CULVERTS

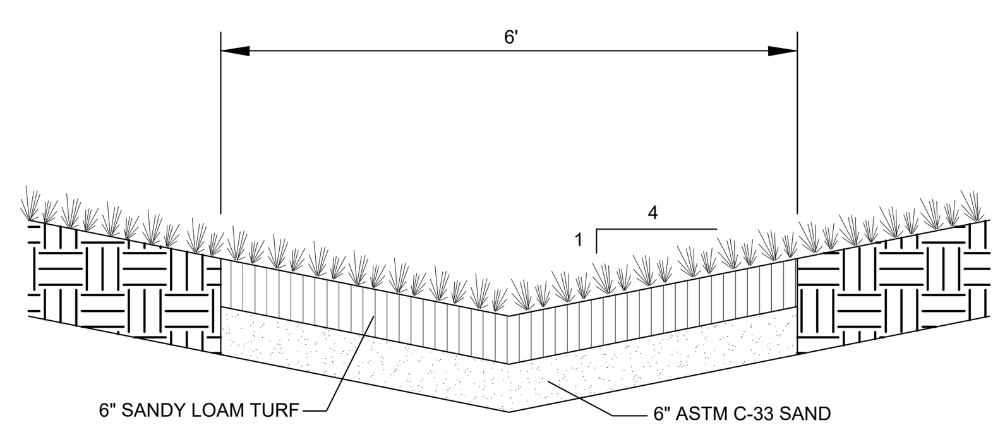
METAL END SECTION NOTES

1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURER'S VARIATIONS.
2. END SECTIONS FOR CMP ARCH CULVERT SHALL MATCH THE DIMENSIONS OF THE CULVERT SHOWN ON THE PLANS.
3. GALVANIZED TOE PLATE, AS SHOWN, REQUIRED ON END SECTIONS FOR ALL THIN WALL PIPE AND SHALL BE THE SAME THICKNESS AS END SECTIONS. TOE PLATE SHALL BE FIELD-BOLTED TO END SECTION WITH 3/8" GALVANIZED BOLTS, NUTS AND WASHERS.
4. GALVANIZED STEEL SHALL BE IN CONFORMANCE WITH AASHTO M 111, M 218 OR M 232.

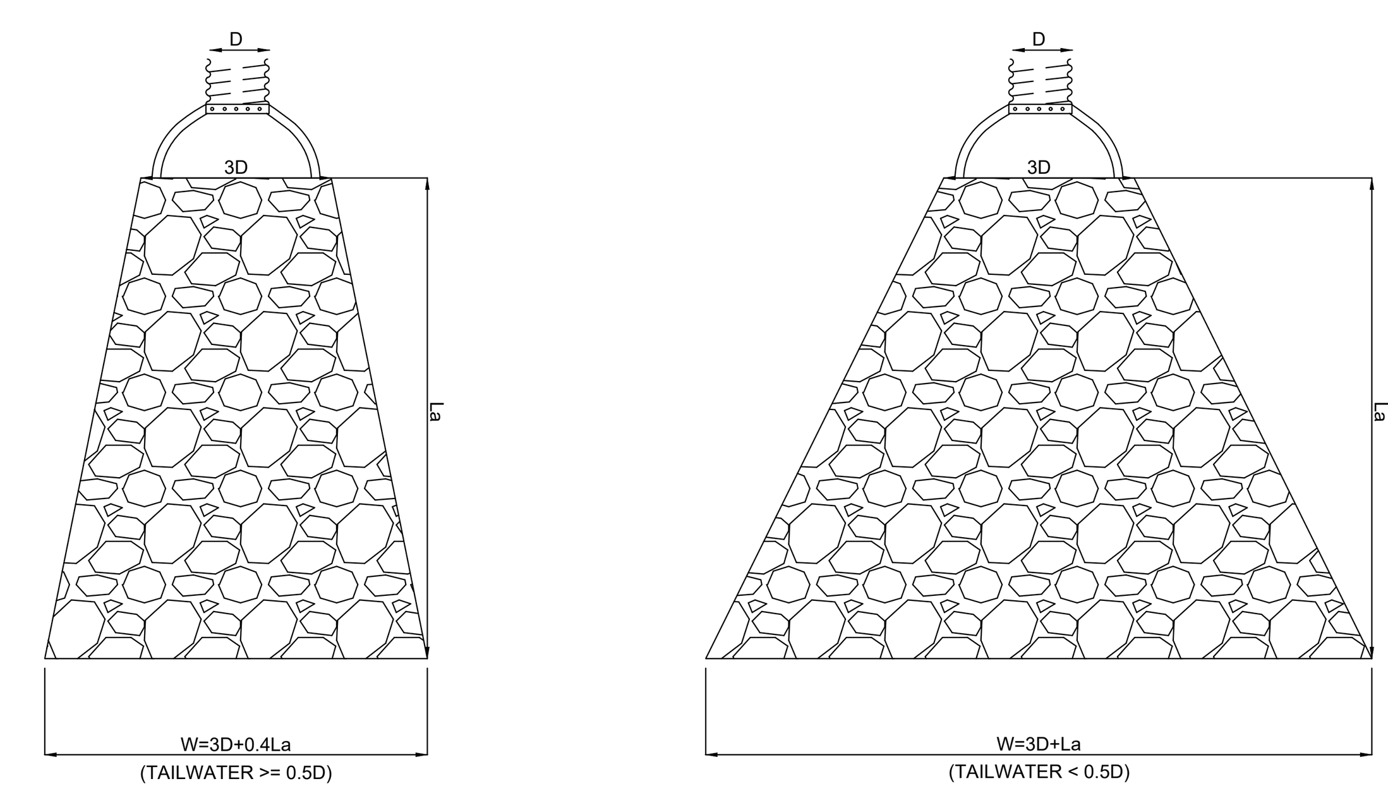
FLARED END SECTION
N.T.S



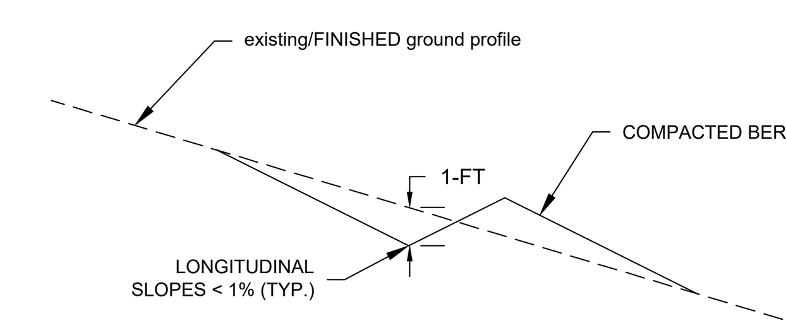
LEVEL SPREADER SWALE
N.T.S



GRASS LINED SWALE
N.T.S



RIP-RAP OUTFALL
N.T.S



TYP. WATER BAR
N.T.S.

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LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Details

SHEET
C.500

DRAWING FILENAME: P:\1012-048\DWGs\Production Drawings\G&E Permit\1012-048-GE-C.500-Details.dwg LAYOUT NAME: C.500 DATE: Jun 18, 2021 - 5:16pm CAD OPERATOR: Matt
LIST OF XREFS: [xBORDER-Forest Service] [xVICMAP]

TYPICAL BEST MANAGEMENT PRACTICES

CLEARING AND GRUBBING:

1. STUMPS AND SLASH MUST BE DISPOSED OF IN A MANNER PRE-APPROVED BY THE USFS OR PROJECT ENGINEER. STUMPS SHOULD BE FLUSH CUT; HOWEVER, IN SOME CASES, AND IF PRE-APPROVED, STUMPS MAY BE BURIED OR HAULED OFF THE PROJECT SITE. SLASH MAY BE CHIPPED OR LOPPED AND SCATTERED BASED ON THE TYPE AND VOLUME OF SLASH AND SITE SPECIFIC CONDITIONS.
2. FELLED TREES, SLASH, AND ANY OTHER CLEARING DEBRIS WILL NOT BE ALLOWED TO ACCUMULATE OUTSIDE OF THE ROAD LIMITS UNLESS SPECIFICALLY PRE-AUTHORIZED BY THE USFS. BOULDERS SHOULD BE BLASTED, BURIED OR REMOVED. THEY SHOULD NOT BE STOCKPILED.
3. USE OF APPROVED HERBICIDES FOR CONTROLLING NOXIOUS WEEDS WILL CONFORM TO CURRENT USFS REQUIREMENTS. ALL HERBICIDES WILL BE APPROVED IN WRITING BY THE USFS.

CONSTRUCTION ACCESS:

1. THE NORMAL ACCESS TO PROJECT SITES WILL BE ON EXISTING ROADS, OLD ROADS, AND TRAILS WHEN POSSIBLE.
2. PROJECT ACCESS WILL BE ASSESSED ON A CASE BY CASE BASIS DETERMINED BY MOISTURE CONTENT OF SOILS, COMPACTION NATURE OF SOILS, AND VEGETATION COVER. AVOID SOIL DISTURBING ACTIONS DURING PERIODS OF HEAVY RAIN OR WET SOILS.
3. EXCAVATION EQUIPMENT SHALL BE TRACK VEHICLES UNLESS PROJECT SITE ALLOWS FOR RUBBER TIRED EQUIPMENT.
4. MOTORIZED VEHICLES SHOULD NOT TRAVEL CROSS COUNTRY. CROSS COUNTRY TRAVEL NEEDS APPROVAL PRIOR TO ACTIVITY.

GRADING:

1. MINIMIZE THE AREA OF EXPOSED SOILS AT ANY ONE TIME TO THAT ABSOLUTELY NECESSARY FOR PROJECT CONSTRUCTION.
2. DOZED SURFACES SHOULD BE LEFT ROUGH OR STEPPED INSTEAD OF BACKBLADED SMOOTH. A ROUGH SURFACE WILL AID IN HOLDING MOISTURE AND REDUCING EROSION.
3. ALL ERODIBLE CUT AND FILL AREAS MUST BE BACKSLOPED TO A DEGREE WHICH WILL ALLOW PROPER REVEGETATION.
4. THE RECONTOURED SURFACE OF THE GRADED AREAS SHOULD BLEND AND MATCH GRADE WITH THE SURROUNDING UNDISTURBED TERRAIN. CLEARING WIDTH FOR TREES SHOULD GENERALLY BE 6 FEET BEYOND THE TOP OF CUT, OR WIDE ENOUGH TO PREVENT EXPOSURE OF TREE ROOTS, AND THE FORMATION OF TURFCAP.
5. GRADING AND OTHER GROUND DISTURBING ACTIVITIES SHOULD NOT BE CARRIED OUT DURING PERIODS OF HEAVY PRECIPITATION.

SURFACE RUNOFF AND EROSION CONTROL:

1. INTERCEPT AND CAPTURE RUNOFF FROM UNDISTURBED AREAS AND PREVENT IT FROM ENTERING THE DISTURBED AREAS.
2. STRAW WATTLES SHALL BE INSTALLED AND MAINTAINED ALONG THE LOWER PORTION OF THE DISTURBED AREAS TO INTERCEPT AND DETAIN SEDIMENT CARRIED ACROSS THE DISTURBED AREA BY ONSITE RUNOFF.
3. HAVE AN ADEQUATE SUPPLY OF SURFACE AND EROSION CONTROL MATERIALS (WATTLES, WEED-FREE HAY/STRAW BALES, AND TOOLS) ONSITE AT ALL TIMES FOR EMERGENCIES.
4. WATER BARS SHOULD MEET THE FOLLOWING SPECIFICATIONS:

A. THE OVERALL GRADE SHALL TRAVERSE THE DISTURBED AREA AT A CONSTANT GRADIENT OF BETWEEN FIVE AND TEN PERCENT WITH AN INCREASING GRADE TOWARDS THE END FOR SELF CLEANING.

B. THEY SHOULD BE CONSTRUCTED BY EXCAVATING A TRENCH ONE FOOT DEEP AND SIDECASTING THE MATERIAL TO THE LOWER SIDE, CREATING A WATER BAR APPROXIMATELY 18 INCHES DEEP.

C. THEY MUST CARRY THE WATER COMPLETELY OFF THE DISTURBED AREA AND SPREAD IT AS WIDELY AS POSSIBLY ON AN UNDISTURBED AREA. THE WATER BARS MUST NOT MERELY MOVE THE WATER OFF THE TRAILS AND CONCENTRATE IT NEAR THE EDGE OF THE TRAIL.

D. ENERGY DISSIPATERS SHOULD BE CONSTRUCTED AT THE POINT OF WATER BAR DISCHARGE, IF NECESSARY

E. EACH WATER BAR MUST HAVE A SEPARATE DISCHARGE POINT. SEVERAL WATER BARS SHALL NOT EMPTY INTO ONE WATER BAR WHICH COULD CAUSE OVERLOADING AND FAILURE.

F. WATERBARS SHOULD INCORPORATE NATURAL TERRAIN FEATURES.

G. CONSTRUCT WATER BARS ACROSS ALL DISTURBED AREAS AT THE FOLLOWING RECOMMENDED SPACING:

SLOPE GRADIENT (%)	INTERVAL (FEET)
10	150
15	100
20	50
30	40

H. ONCE BARS ARE CONSTRUCTED, ALL VEHICLE TRAFFIC, INCLUDING TRACKED VEHICLES, MUST AVOID THE WATER BARRED AREA TO AVOID BREAKING DOWN THE BERM.

TOPSOIL MANAGEMENT

1. TOPSOIL SHOULD BE CONSIDERED AS ANY SOIL MATERIAL THAT IS SUITABLE AS A PLANT GROWTH MEDIUM WHICH WILL ULTIMATELY PRODUCE A VEGETATIVE GROUND COVER CAPABLE OF PREVENTING SURFACE EROSION. TOPSOIL SUITABILITY IS DEPENDENT ON DEPTH, TEXTURE, ORGANIC MATTER, FERTILITY, AND COARSE FRAGMENT CHARACTERISTICS.
2. THE SALVAGED TOPSOIL SHOULD BE SECURELY STORED AWAY FROM ALL CONSTRUCTION ACTIVITIES AND HYDROLOGICALLY ISOLATED FROM WATERCOURSES.
3. ALL TOPSOIL IDENTIFIED IN AREAS TO BE GRADED SHOULD BE SELECTIVELY REMOVED FROM UNSUITABLE SUBSOILS WITH THE MINIMUM AMOUNT OF SOIL MIXING.
4. SELECTIVE BOULDER REMOVAL MAY BE REQUIRED TO FACILITATE ADEQUATE TOPSOIL RESPREADING AND REVEGETATION.
5. TOPSOIL SHOULD BE RESPREAD TO A DEPTH NORMAL FOR THE SITE. ALL AVAILABLE TOPSOIL SHOULD BE SALVAGED, STORED, AND RESPREAD.

REVEGETATION

1. REVEGETATION ON ANY AREA MAY BE REQUIRED WHERE GROUND COVER IS DISTURBED. AS A GENERAL GUIDELINE, GROUND COVER SHOULD RECOVER TO ITS NORMAL RANGE OF VARIABILITY FOR THE LANDTYPE AND GEOCLIMATIC AREA BY THE END OF THE THIRD GROWING SEASON. NATIVE PLANT SPECIES SHOULD ULTIMATELY DOMINATE THE SITE, ALTHOUGH INTRODUCING ANNUAL SPECIES MAY BE USED TO ENSURE VEGETATION COVER INITIALLY.
2. SEEDING SHOULD OCCUR IN THE FALL AND IMMEDIATELY AFTER A RAIN OR THE FIRST SNOWFALL. ON HIGH ELEVATION SLOPES OR AREAS OF SPECIAL EROSION CONCERNS, REVEGETATION SHOULD BE COMPLETED IMMEDIATELY AFTER THE DISTURBANCE.
3. WHEN NO SEEDING IS NEEDED OR SEEDING WILL BE ACCOMPLISHED IN THE FALL, THEN EROSION CONTROL MEASURES AND MULCHING NEED TO BE APPLIED IMMEDIATELY AFTER RECONTOURING IS COMPLETED ON ALL AREAS WITH ERODIBILITY POTENTIAL.

SEED BED PREPARATION

1. LEAVE AN IRREGULAR OR ROUGHENED SURFACE AS IN A DISKED FIELD. DO NOT BACKBLADE SMOOTH.
2. SOIL SHOULD BE MOIST AND FLUFFY, CONSISTING OF SUFFICIENT TOPSOIL WHEN AVAILABLE.
3. COMPACTED AREAS SHALL BE SCARIFIED AND LOOSENED BY DISK, HARROW OR HAND RAKE.

SEEDING

1. SEED MIXTURES SHOULD BE DESIGNED BASED ON SITE-SPECIFIC CONDITIONS OF A PARTICULAR AREA (IE. ELEVATION, ASPECT, VEGETATION COMMUNITY TYPE, SITE MOISTURE, SOIL TYPE ETC.) TO MEET THE SPECIFIC OBJECTIVES OF REVEGETATION. SPECIES NAME AND VARIETY, GERMINATION PERCENT, AND PURE LIVE SEED SHOULD BE SPECIFIED ON THE BAG.
2. ONLY CERTIFIED WEED-FREE SEED SOURCES WILL BE UTILIZED. ALL SEED PURCHASED WILL BE REQUIRED TO BE TESTED FOR "ALL STATES NOXIOUS WEEDS" ACCORDING TO THE ASSOCIATION OF OFFICIAL SEED ANALYSTS (AOSA) STANDARDS AND WILL BE CERTIFIED IN WRITING BY A REGISTERED SEED TECHNOLOGIST OR SEED ANALYST AS MEETING THE REQUIREMENTS OF THE FEDERAL SEED ACT AND THE APPROPRIATE STATE SEED LAW REGARDING TESTING, LABELING, SALE AND TRANSPORT OF PROHIBITED AND RESTRICTED NOXIOUS WEEDS.
3. SEED SHOULD BE PRIMARILY OF NATIVE SPECIES AND VARIETIES. IF NON-NATIVE SPECIES ARE DEMONSTRATED TO NOT BE OVERLY AGGRESSIVE AND ALLOW FOR ESTABLISHMENT OF NATIVE SPECIES, THEN SEED MIX CONTAINING NON-NATIVES MAY BE ALLOWED, SUCH AS STERILE WHEAT OR WINTER RYE.
4. BROADCAST SEEDING SHOULD BE AT A RATE OF 40 TO 80 LBS PER ACRE.
5. IF HYDROMULCH IS USED, APPLICATION OF THE SEED SHOULD BE SEPARATE FROM THE MULCH TO PREVENT THE SEED FROM BEING "CAUGHT-UP" IN THE MULCH, GERMINATING, AND NOT COMING IN CONTACT WITH THE MINERAL SOIL.
6. SEED SHOULD BE LIGHTLY RAKED OR HARROWED INTO THE SOIL.
7. SEED DRILLING SHOULD BE DONE ON THE CONTOUR AND AT A RATE OF 15 TO 20 LBS. PER ACRE.
8. WHEN DRILLSEEDING, SEED SHALL BE PLANTED USING A DRILL EQUIPPED WITH A DEPTH REGULATOR TO ENSURE PROPER DEPTH OF PLANTING.
9. THE SEED MIXTURE SHALL BE EVENLY AND UNIFORMLY PLANTED OVER THE DISTURBED AREA. IFUSING A SPREADER OR DRILL AND SEEDS ARE SIMILAR IN SIZE, THEY CAN BE SEEDED TOGETHER; OTHERWISE, THEY NEED TO BE SEEDED SEPARATELY.
10. THE USFS WILL APPROVE SEED MIXTURES AND RATE OF APPLICATION.

FERTILIZATION

1. USE OF FERTILIZERS MUST BE PRE-APPROVED BY THE USFS.
2. FERTILIZER MAY BE USED ON PROBLEM AREAS WHERE LACK OF ADEQUATE TOPSOIL AND OTHER SITE CONDITIONS WOULD PREVENT THE ESTABLISHMENT OF AN ADEQUATE GROUND COVER.
3. UTILIZE CHEMICAL FERTILIZERS OR OTHER CHEMICALS WHERE SUCH USE WILL NOT REACH SURFACE OR GROUND WATER SOURCES.

MULCH

I. MULCHING WILL BE REQUIRED IN MOST SITUATIONS WHERE THERE IS SOIL DISTURBANCE.

2. MULCHING MATERIALS TO BE USED CAN BE STRAW, HYDROMULCH (1,500 LBS PER ACRE), WOOD FIBER, AND MULCH TACKIFIERS. THEY SHOULD BE APPLIED AT A RATE OF 1 TO 2 TONS PER ACRES.
3. ONLY CERTIFIED WEED-FREE STRAW/HAY MULCH WILL BE USED.
4. CARE SHALL BE TAKEN TO AVOID THICK (GREATER THEN THREE INCHES OF DEPTH) SPOTS.
5. CRIMPING, TACKIFYING, AND NETTING MAY BE REQUIRED TO BIND THE LOOSE MULCH TO THE SOIL SURFACE TO MINIMIZE REMOVAL BY WIND OR SURFACE RUNOFF. THE METHOD SELECTED SHOULD BE DETERMINED BY THE CONDITION OF THE AREA.
6. A TACKIFIER MAY BE USED AFTER REPLACEMENT OF TOPSOIL TO REDUCE THE POTENTIAL FOR SOIL LOSS. THE RATE SHOULD BE 90 TO 100 LBS/ACRE.
7. EVALUATE EACH REVEGETATED SITE REGULARLY IN ORDER TO DETERMINE SUCCESS.
8. HIGH TRAFFIC AREAS NEED TO BE FENCED OFF OR IDENTIFIED IN SOME WAY UNTIL REVEGETATION IS ESTABLISHED.

TABLE OF CONSTRUCTION SEQUENCE AND BMP APPLICATION/REMOVAL

Project: Green Horn Ranch — Date: 4/21/2021

Contractor to utilize this table to indicate when construction activities occur and when each associated BMP is installed or removed.

CONSTRUCTION PHASE (Monthly)	1	2	3	4	5	6	7	8	9	10	11	12	Comments
Grading													
Overlot													
Gravel Roads													
Swales, Drainageways													
Pipeline Installation													
Stormwater													
Water Service													
Sanitary Sewer Service													
Snowmaking Main													
Gas Service													
BEST MANAGEMENT PRACTICES													
Temporary													
Contour Furrows and Diversion Dikes (Ripping/Disking)													
Inlet Protection (IP)													
Vehicle Tracking Control (VTC)													
Flow Barriers (Bales, Wattles, Etc) (WD)													
Concrete Washout Area (CWA)													
Preventative Maintenance Activities/Meetings/ etc.													
Permanent													
Mulching/Sealant													
Permanent Seed Planting													

STANDARD CHECK DAM SPACING CRITERIA

FLOW LINE GRADIENT	2%	3%	4%	5%	6%
SPACING (FEET)	100	67	50	40	33

STANDARD EROSION LOG SPACING CRITERIA

FLOW LINE GRADIENT	MAXIMUM CHECK DAM SPACING BASED ON NOMINAL LOG DIAMETER (FEET)		
	8 - 9 INCHES	12 INCHES	18 - 20 INCHES
0% - 2%	33	55	75
2% - 5%	25	40	55
5% - 10%	15	30	40
10% - 33%	10	15	20
33% - 50%	5	10	15

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NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

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141 9th Street • P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

LANDMARK CONSULTANTS, INC.

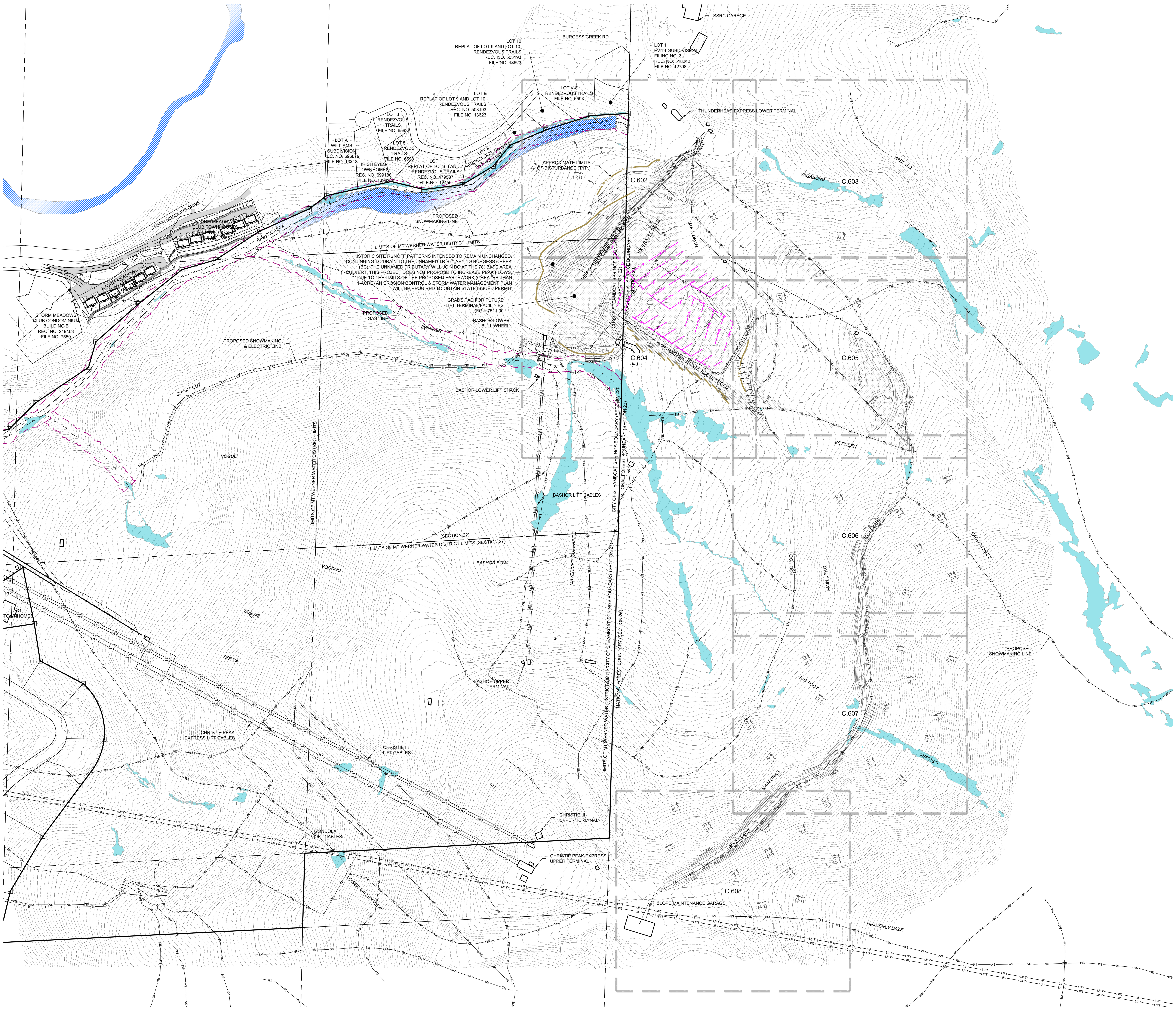
NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Erosion Control Notes

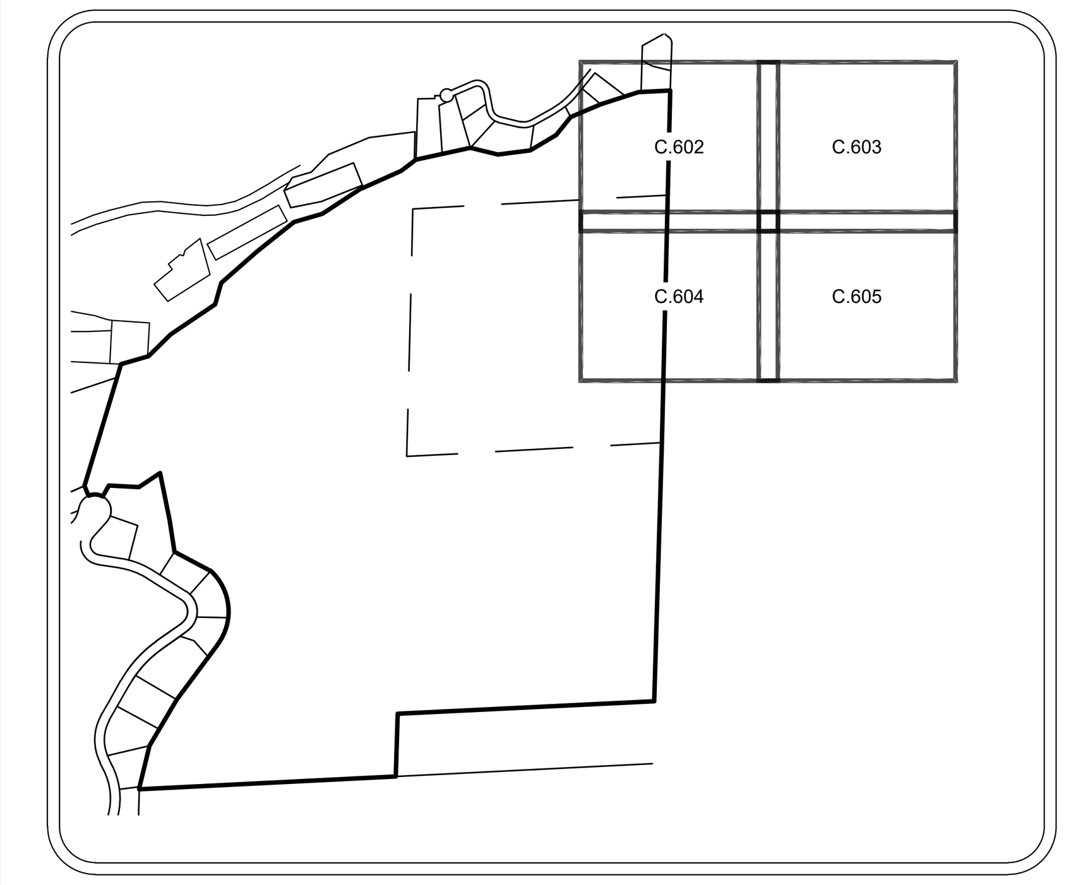
SHEET C.600



NORTH

200 0 200 400 600 Feet

(IN FEET)
1 inch = 200 ft.



KEY MAP
N.T.S.

LEGEND:

PROPOSED STORM SEWER
PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
PROPOSED SWALE
REVEGETATION AREA

PERMANENT BMP'S

RIPRAP PROTECTION (RP)

TEMPORARY BMP'S

WATTLE DIKE (WD)
ROCK SOCK (RS)
VEHICLE TRACKING CONTROL PAD (VTC)
SILT FENCE (SF)
INLET PROTECTION (IP)
CONCRETE WASHOUT AREA (CWA)
MULCH/HYDROMULCH (HMU)

DRAINAGE

OVERLAND FLOW
DIRECT FLOW

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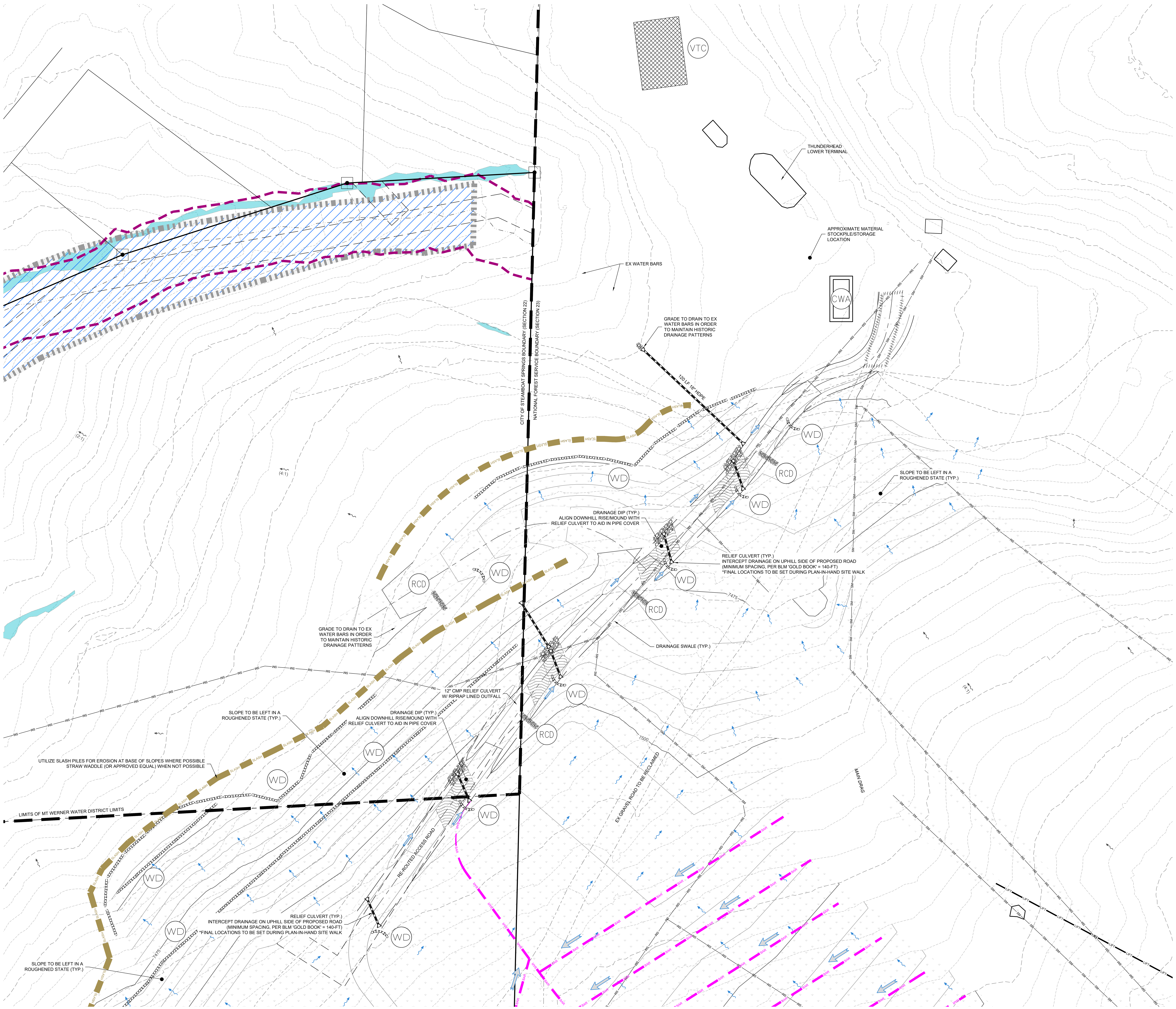
Erosion Control Plan
Overall

SHEET
C.601



NORTH

40 0 40 80 120 Feet

(IN FEET)
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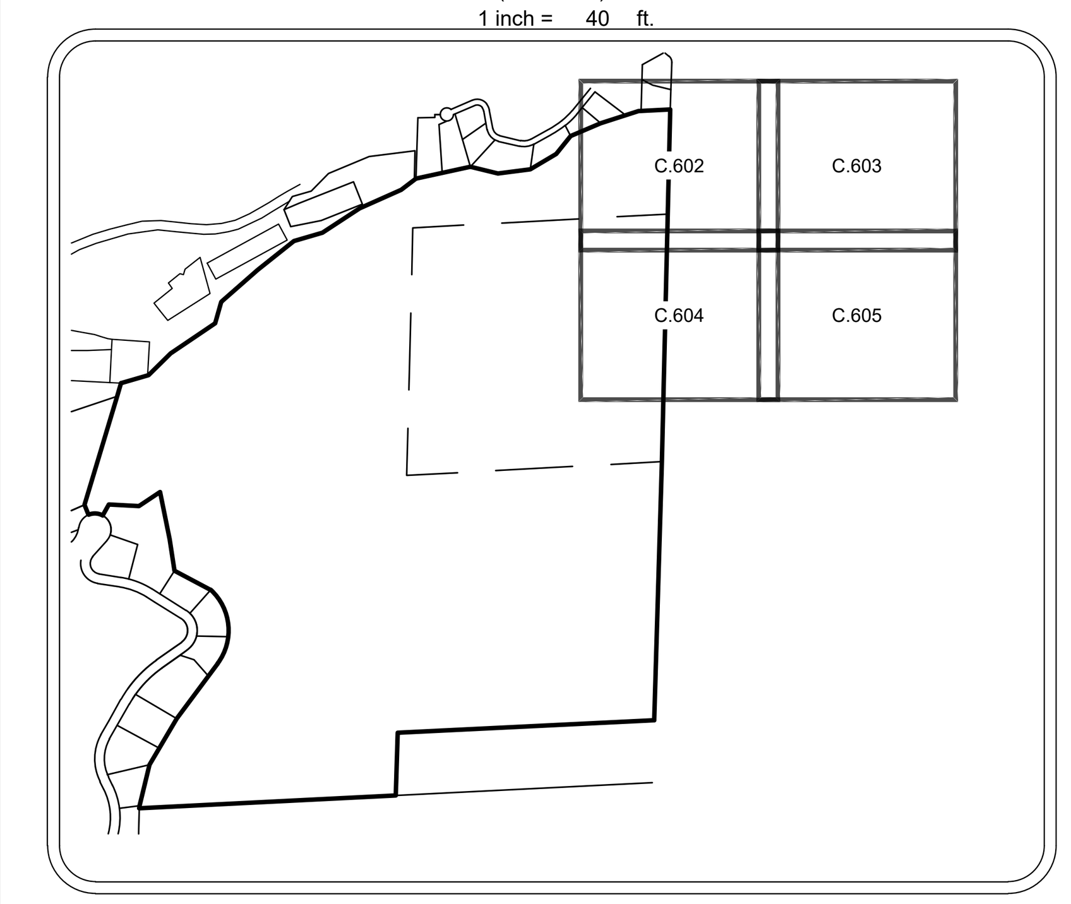

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SHEET
C.602

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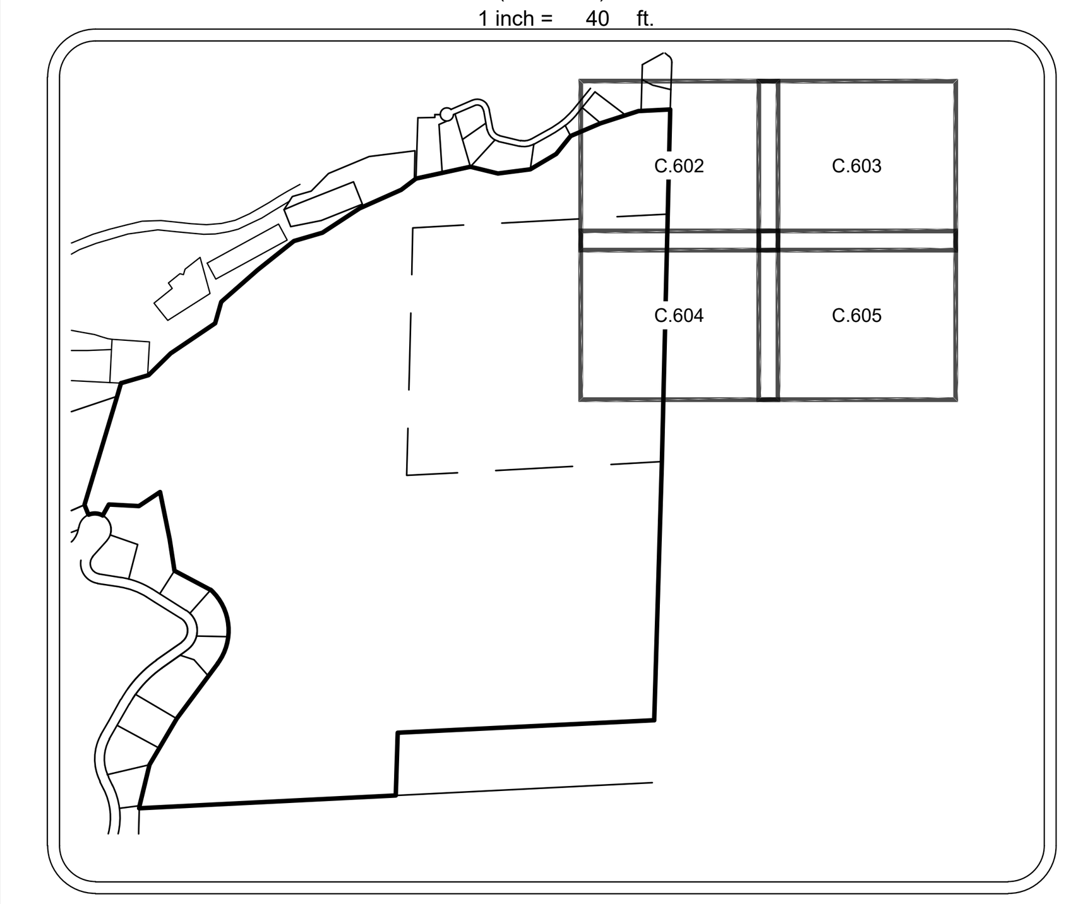

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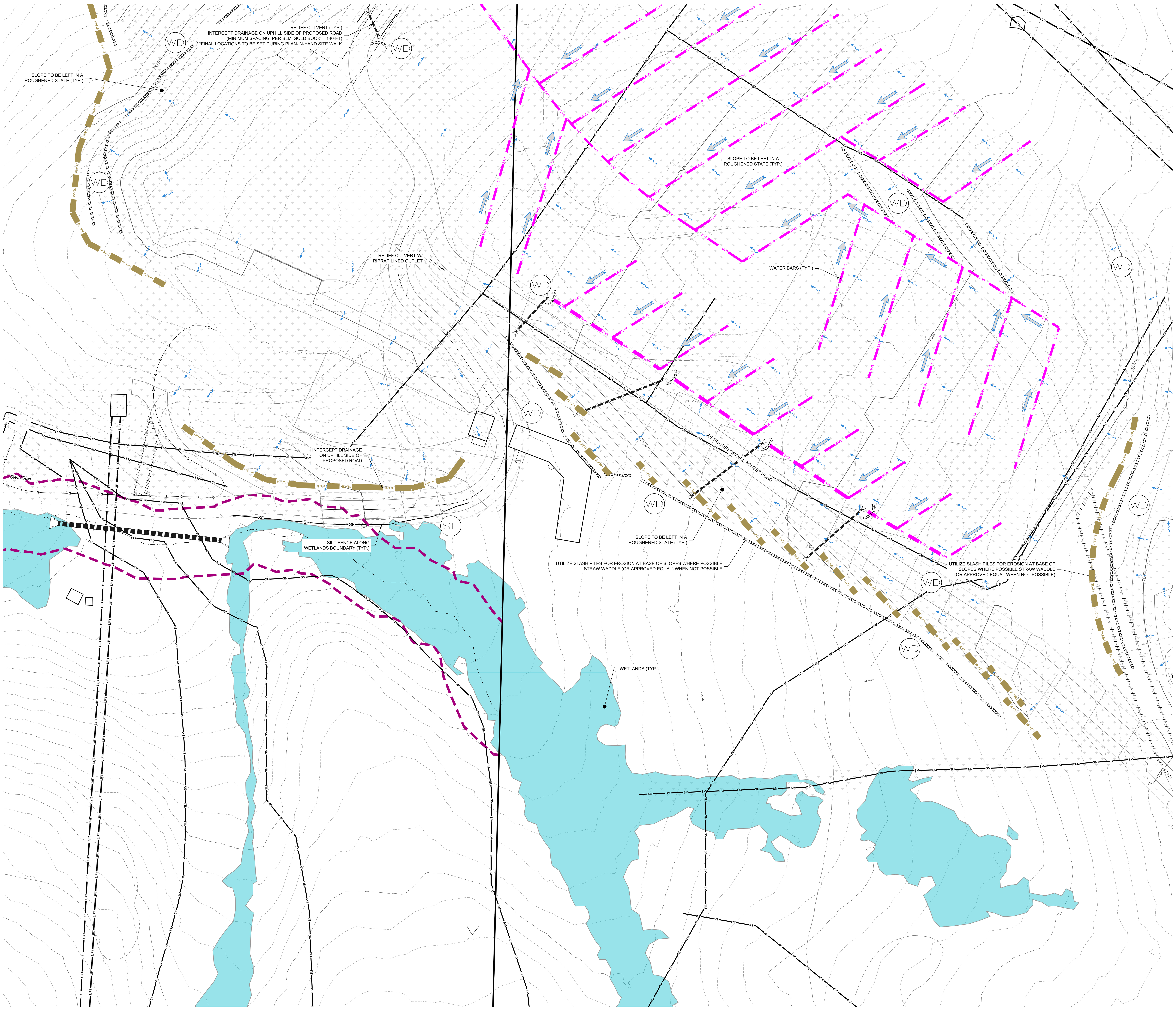
LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Erosion Control Plan
Detailed

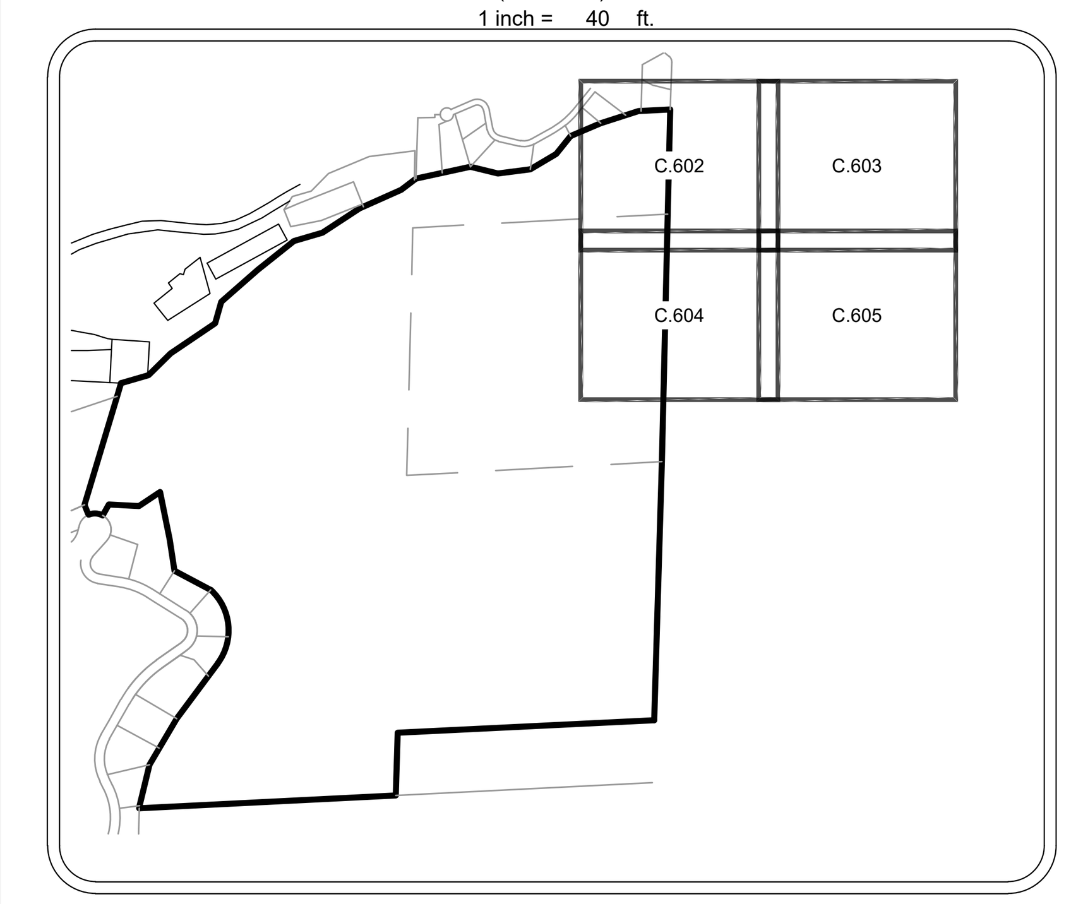
SHEET
C.603



NORTH

40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.



KEY MAP
N.T.S.

LEGEND:

PROPOSED STORM SEWER
PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
PROPOSED SWALE
REVEGETATION AREA

PERMANENT BMP'S

RIPRAP PROTECTION (RP)

TEMPORARY BMP'S

WATTLE DIKE (WD)
ROCK SOCK (RS)
VEHICLE TRACKING CONTROL PAD (VTC)
SILT FENCE (SF)
INLET PROTECTION (IP)
CONCRETE WASHOUT AREA (CWA)
MULCH/HYDROMULCH (HM)

DRAINAGE

OVERLAND FLOW
DIRECT FLOW

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GREEN HORN RANCH
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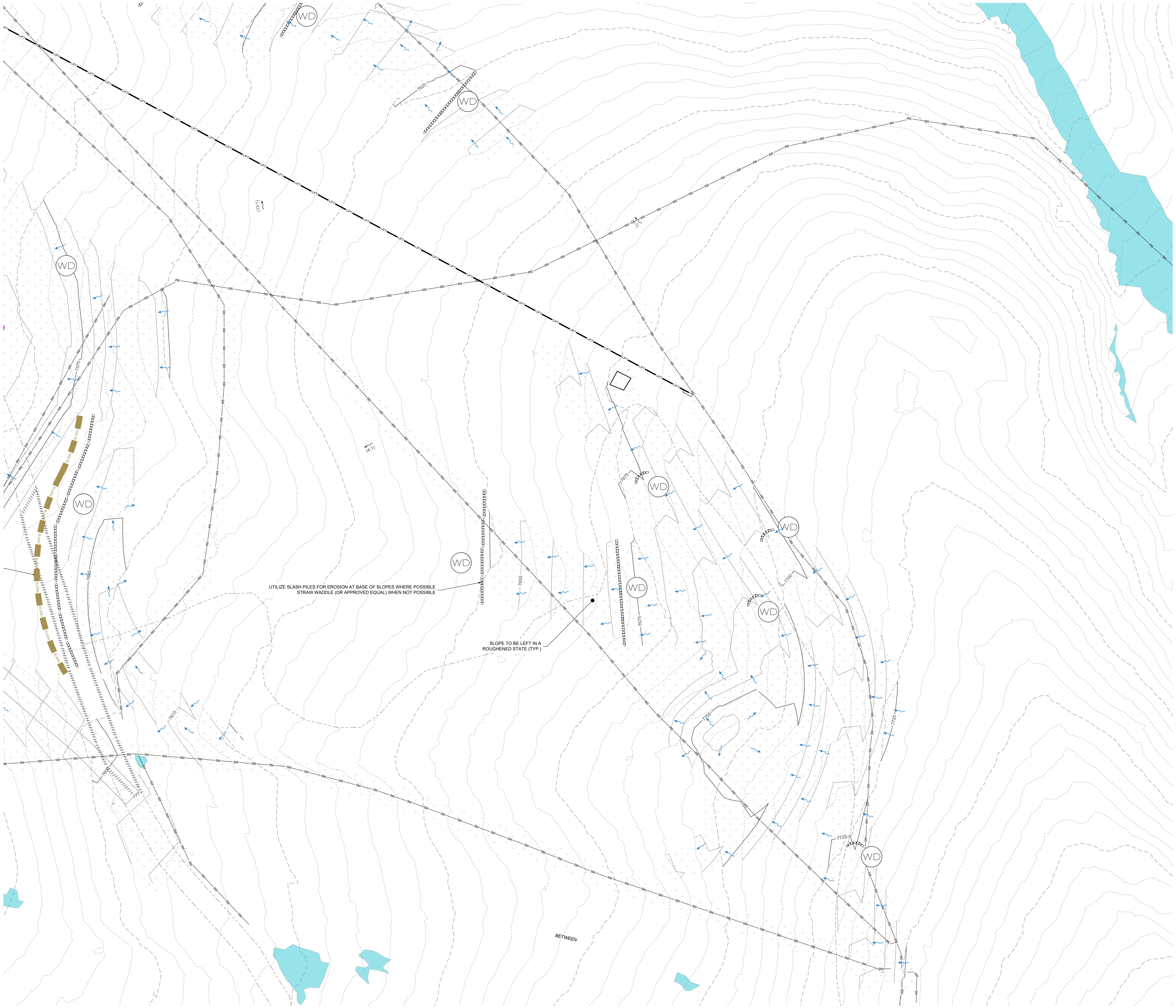
Detailed

SHEET
C.604



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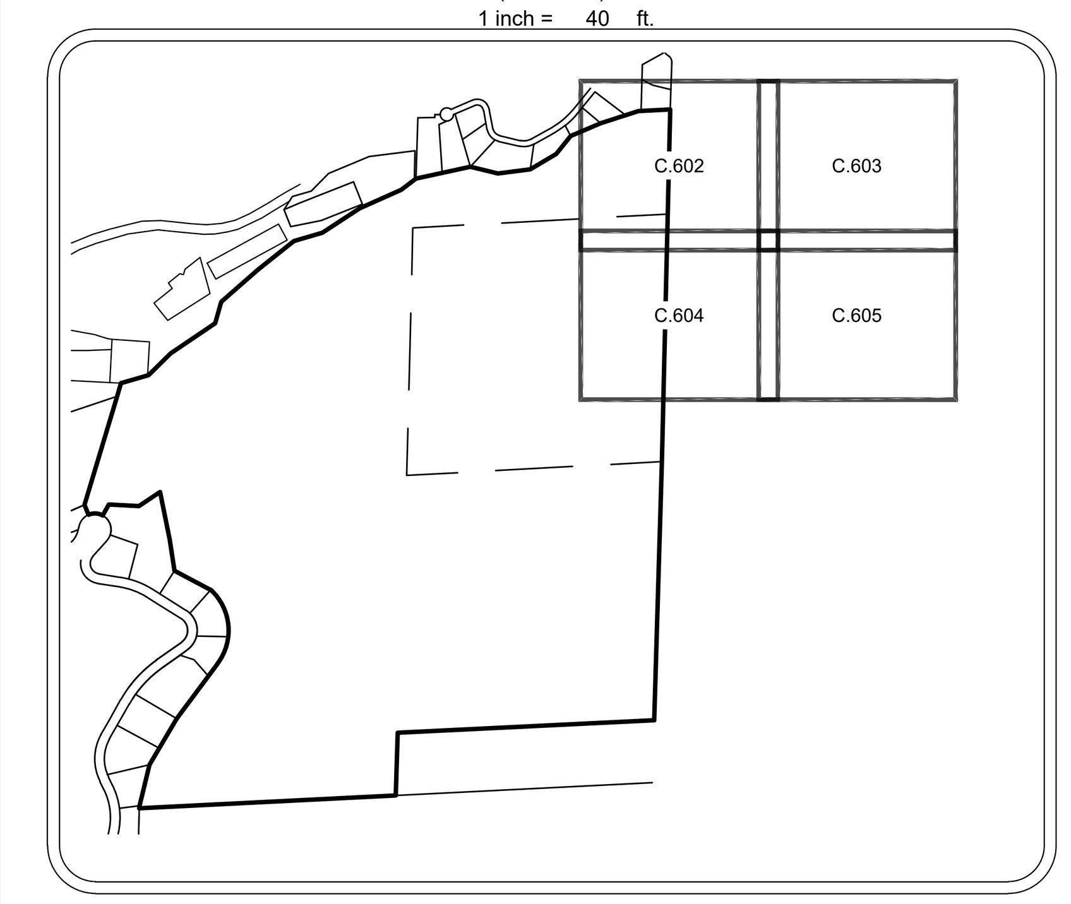

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CONTACT: Erik Griepentrog
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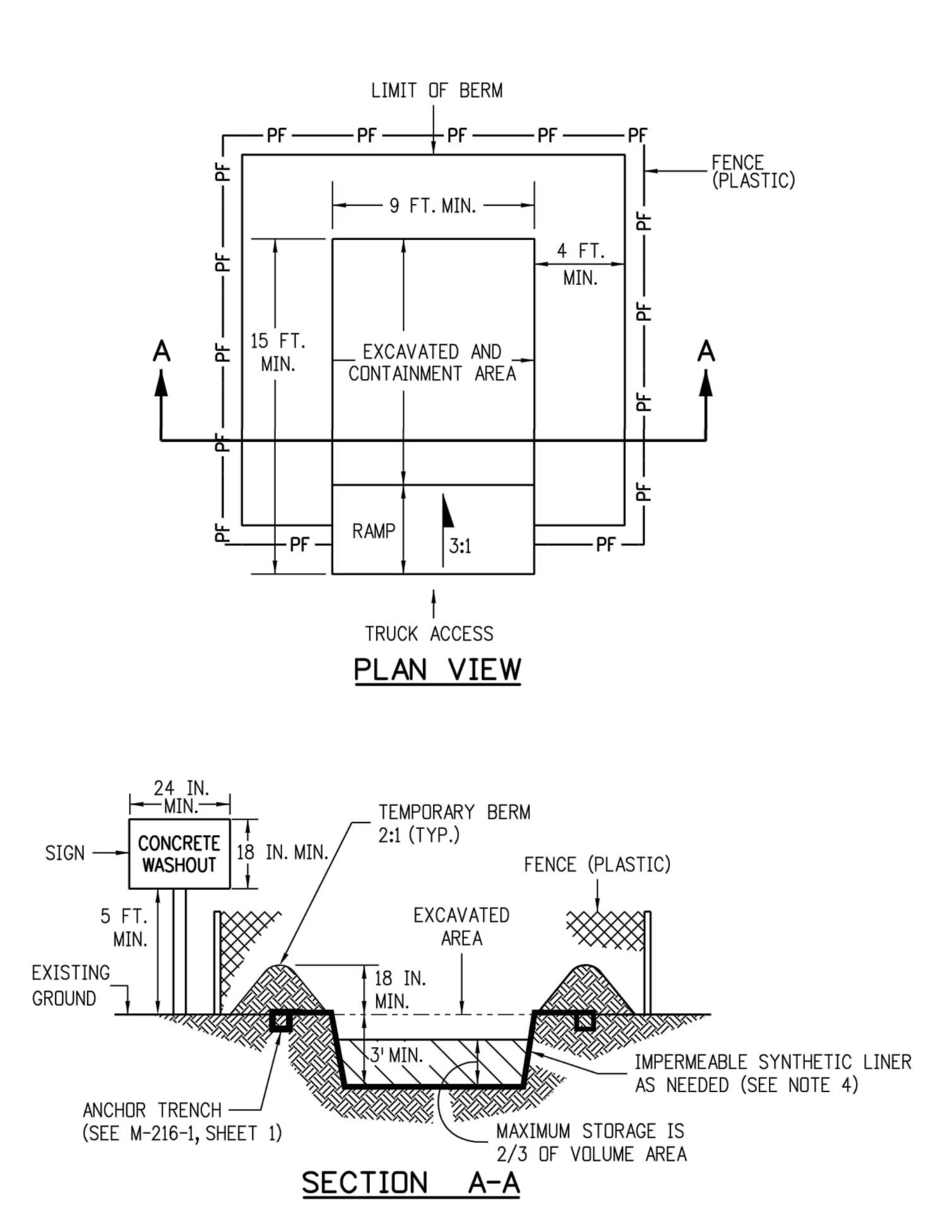
GREEN HORN RANCH
Erosion Control Plan
Detailed

SHEET
C.605

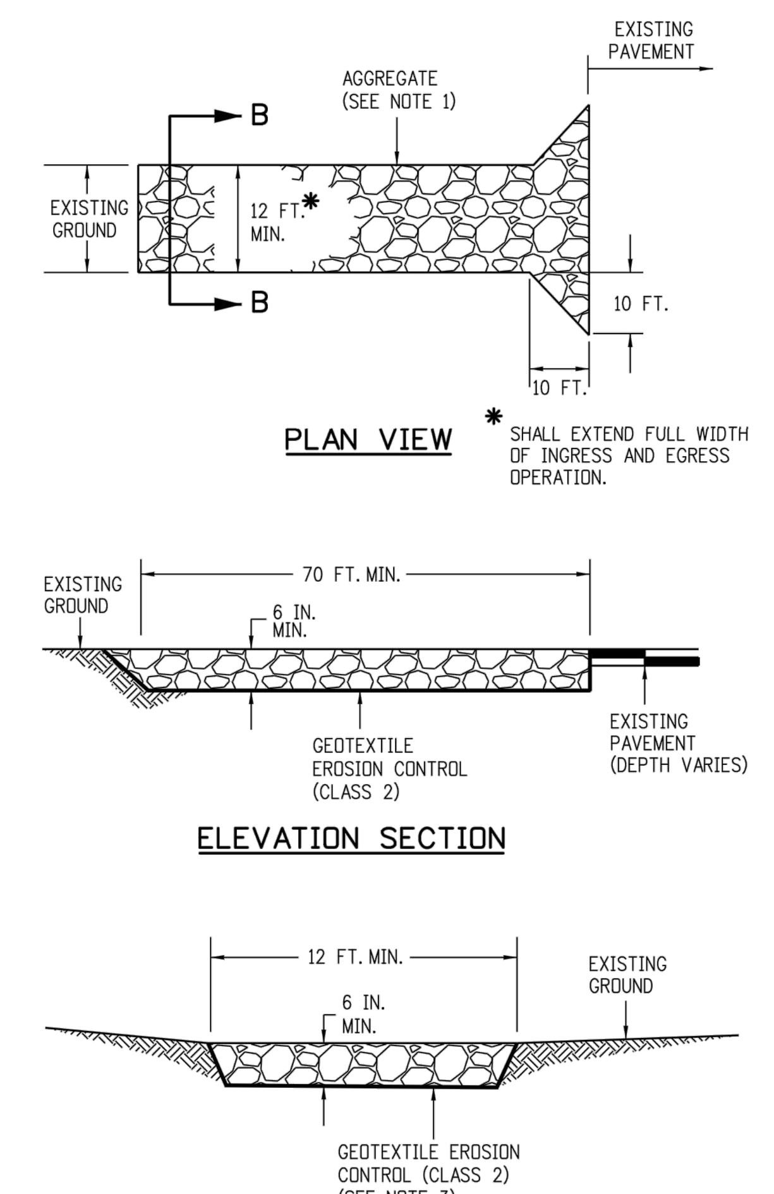


SECTION A-A

NOTES:

1. A FENCE (PLASTIC) CONFORMING TO SECTION 607 SHALL BE INSTALLED AROUND THE CONCRETE WASHOUT AREA, EXCEPT AT THE OPENING.
2. THE CONCRETE WASHOUT SIGN SHALL HAVE LETTERS AT LEAST 3 INCHES HIGH AND CONFORM TO SUBSECTION 630.02.
3. ALL MATERIALS AND LABOR TO COMPLETE THE CONCRETE WASHOUT STRUCTURE SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
4. THE BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF FIVE FEET ABOVE GROUND WATER. IF NOT, THE BOTTOM OF EXCAVATION SHALL BE IN ACCORDANCE WITH 208.02 (j).
5. THE PAY ITEM NUMBER FOR CONCRETE WASHOUT STRUCTURE (EACH) IS 208-00045.

CONCRETE WASHOUT STRUCTURE



SECTION B-B

NOTES:

1. AGGREGATE SHALL CONFORM TO SUBSECTION 208.02 (l).
2. THE CONTRACTOR SHALL PROTECT CURB AND GUTTER THAT CROSSES THE ENTRANCE FROM DAMAGE, WHILE NOT BLOCKING FLOW OF WATER THRU STRUCTURE. PROTECTION OF THE CURB AND GUTTER SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
3. GEOTEXTILE SHALL CONFORM TO SUBSECTION 712.08.
4. ALL MATERIALS AND LABOR TO COMPLETE THE VEHICLE TRACKING PAD SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
5. THE PAY ITEM NUMBER FOR VEHICLE TRACKING PAD (EACH) IS 208-00070.

VEHICLE TRACKING PAD

CWA

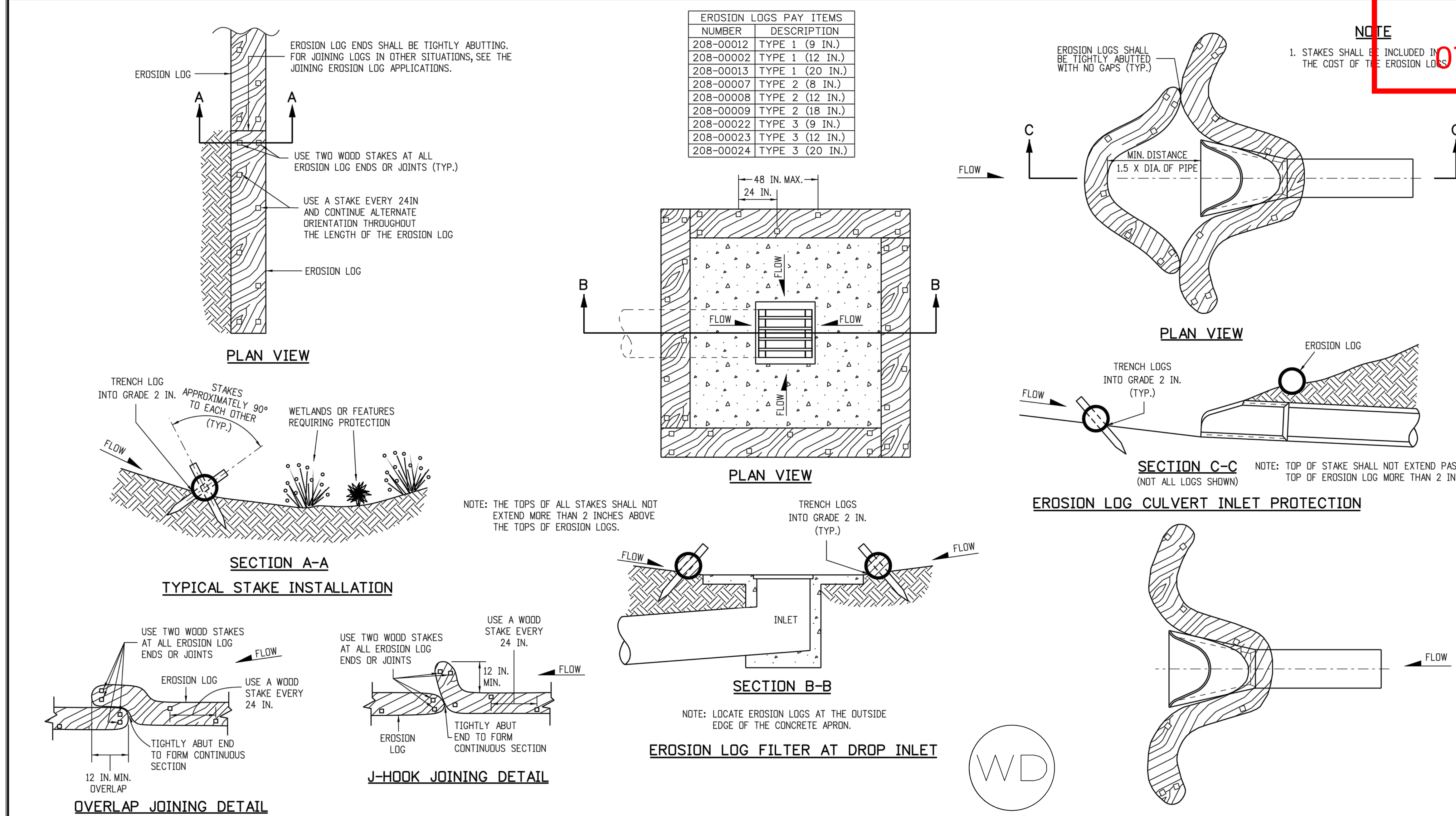
Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

TEMPORARY EROSION CONTROL

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 1 of 11
Project Sheet Number:



EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

NOTE

1. STAKES SHALL BE INCLUDED IN THE COST OF THE EROSION LOG.

EROSION LOG APPLICATIONS

WD

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
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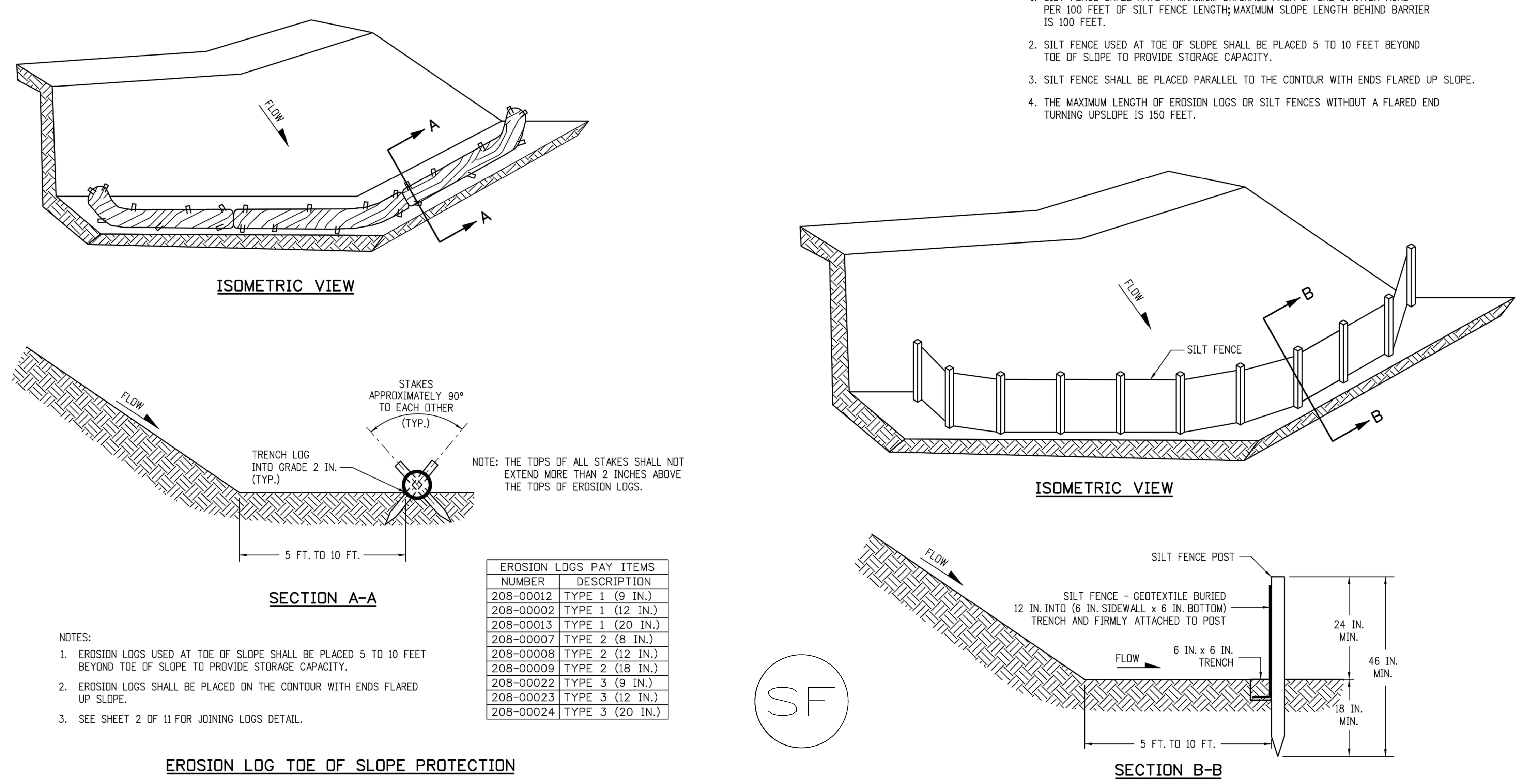
TEMPORARY EROSION CONTROL

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 2 of 11
Project Sheet Number:

NOTES

1. SILT FENCE SHALL HAVE A MAXIMUM DRAINAGE AREA OF ONE-QUARTER ACRE PER 100 FEET OF SILT FENCE LENGTH; MAXIMUM SLOPE LENGTH BEHIND BARRIER IS 100 FEET.
2. SILT FENCE USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
3. SILT FENCE SHALL BE PLACED PARALLEL TO THE CONTOUR WITH ENDS FLARED UP SLOPE.
4. THE MAXIMUM LENGTH OF EROSION LOGS OR SILT FENCES WITHOUT A FLARED END TURNING UPSLOPE IS 150 FEET.



SECTION A-A

NOTES:

1. EROSION LOGS USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
2. EROSION LOGS SHALL BE PLACED ON THE CONTOUR WITH ENDS FLARED UP SLOPE.
3. SEE SHEET 2 OF 11 FOR JOINING LOGS DETAIL.

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208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

EROSION LOG TOE OF SLOPE PROTECTION

SF

SECTION B-B

SILT FENCE TOE OF SLOPE PROTECTION

NOTE: THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.

TOE OF SLOPE PROTECTION APPLICATIONS

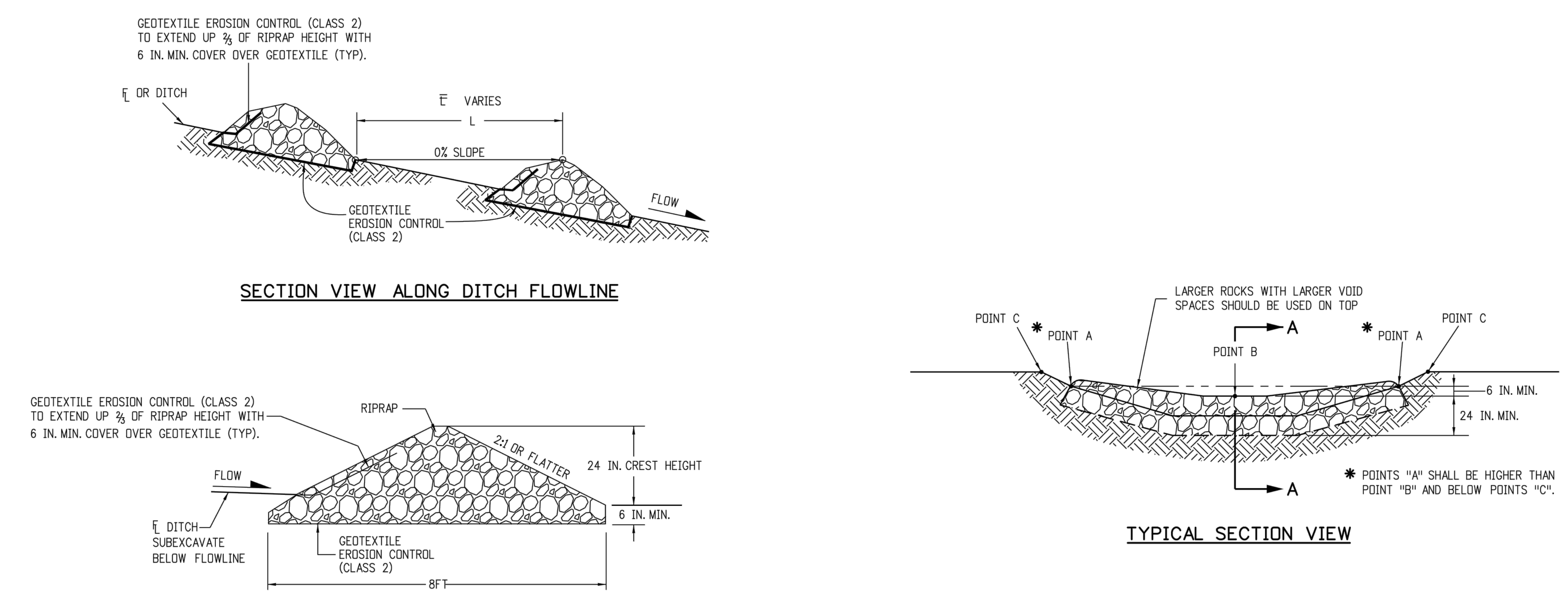
Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

TEMPORARY EROSION CONTROL

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 3 of 11
Project Sheet Number:



SECTION A-A

NOTES:

1. RIPRAP SIZE D_{50} = 6IN OR AS SHOWN ON THE PLANS.
2. THE GEOTEXTILE EROSION CONTROL SHALL BE CLASS 2 AND CONFORM TO THE REQUIREMENTS OF SUBSECTION 712.08.
3. THE ENDS OF RIPRAP CHECK DAM SHALL BE A MINIMUM OF 6 IN. HIGHER THAN CENTER OF CHECK DAM.
4. FOR USE AS TEMPORARY CHECK DAMS ONLY AND NOT FOR PERMANENT INSTALLATIONS.
5. THE PAY ITEM NUMBER FOR ROCK CHECK DAM (EA) IS 208-00041.

NOTE: ALL MATERIALS AND LABOR TO COMPLETE THE ROCK CHECK DAM SHALL BE INCLUDED IN THE COST OF WORK.

ROCK CHECK DAM

RCD

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CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
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Project Development Branch JBK

TEMPORARY EROSION CONTROL

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 4 of 11
Project Sheet Number:

CALL UTILITY NOTIFICATION CENTER OF COLORADO
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RCRBD Record Set
T.A.
07/14/2021

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LANDMARK CONSULTANTS, INC.

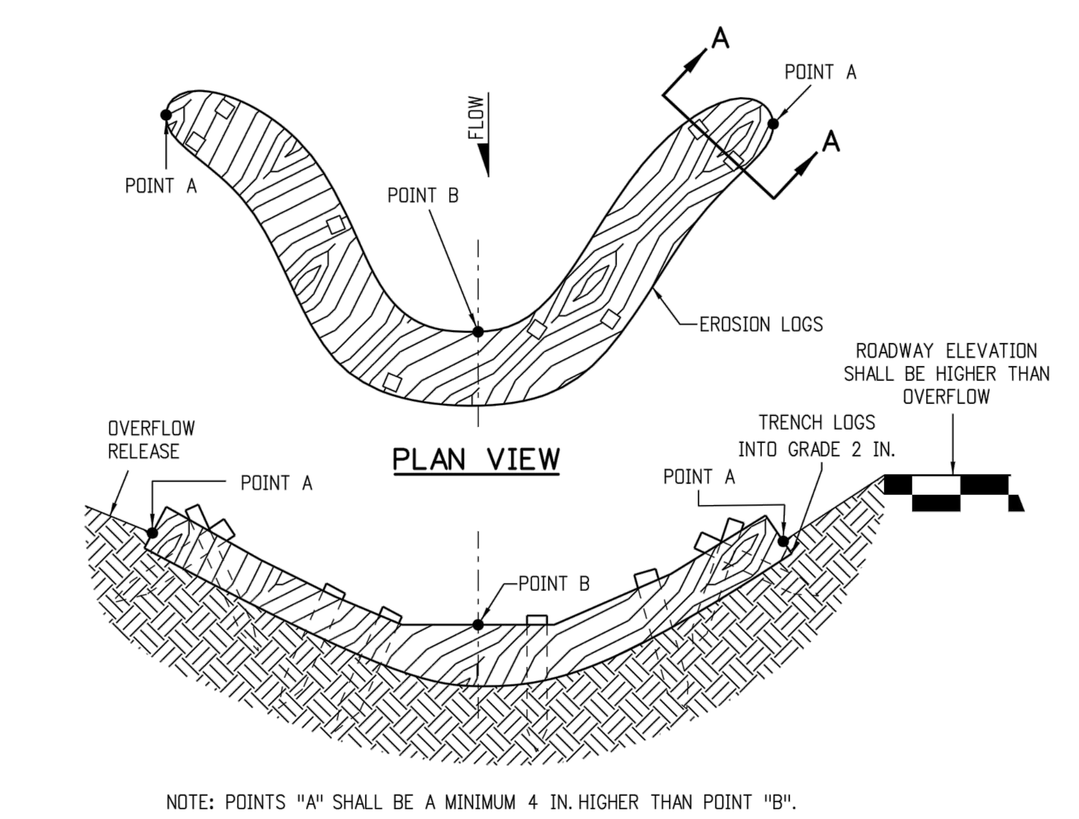
NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Erosion Control Details

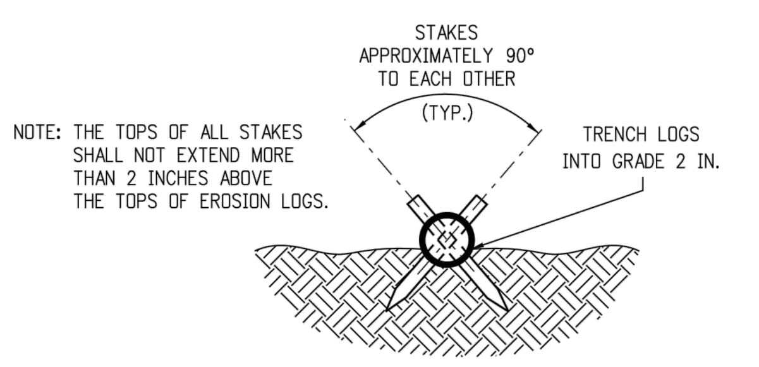
SHEET
C.610

DRAINAGE DITCH APPLICATIONS (WD)



NOTE: POINTS "A" SHALL BE A MINIMUM 4 IN. HIGHER THAN POINT "B".

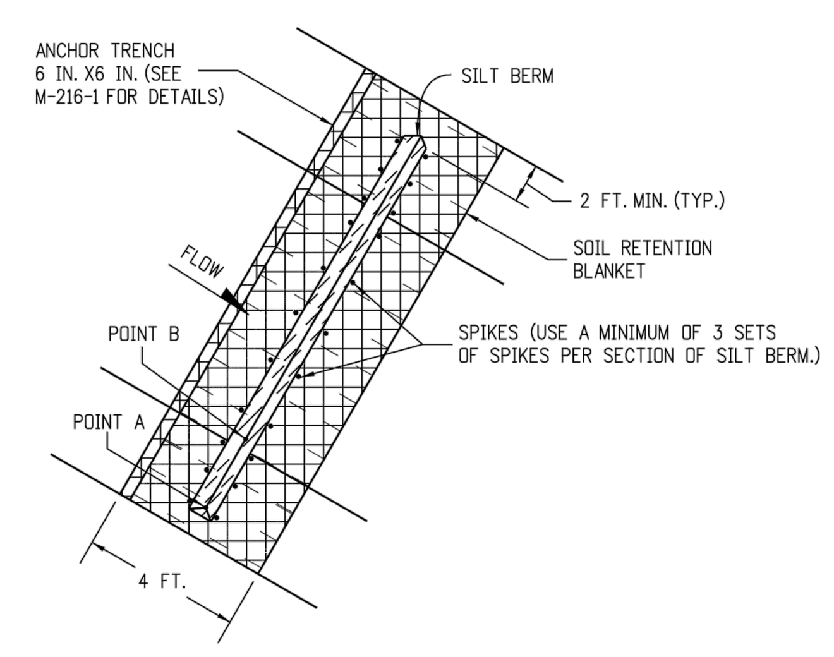
ELEVATION



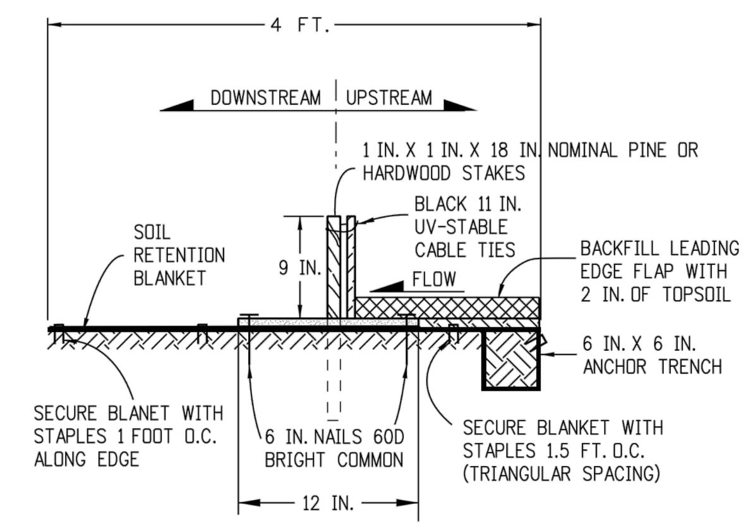
SECTION A-A

NOTES:
1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.
3. V-SHAPED TEMPORARY DITCHES SHALL NOT BE USED. DITCHES SHAL BE GRADED IN A PARABOLIC OR TRAPEZOIDAL SHAPE.

EROSION LOG INSTALLATION

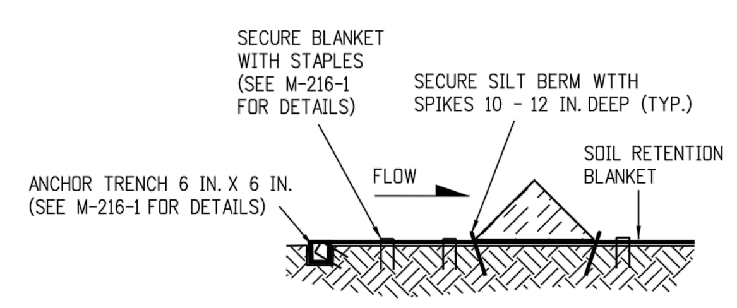


PLAN VIEW

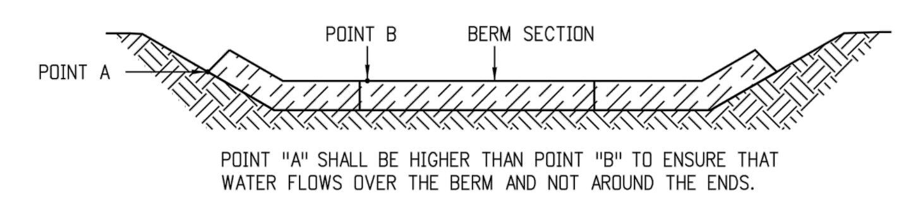


NOTES:
1. MINIMUM 4 NAILS PER SEGMENT (UPSTREAM).
2. MINIMUM 2 NAILS PER SEGMENT (DOWNSTREAM).
3. MINIMUM 2 WOOD STAKES PER SEGMENT.

SILT BERM (2) SECTION VIEW



SILT BERM (1) SECTION VIEW



POINT "A" SHALL BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE BERM AND NOT AROUND THE ENDS.

FRONT VIEW

NOTES
1. ANCHOR SOIL RETENTION BLANKET INTO TRENCH WITH 8 INCHES MIN. STAPLES PLACED AT 1 FOOT INTERVALS ALONG EDGE.
2. FILL AND COMPACT TRENCH.
3. SECTIONS OF THE SILT BERM SHALL BE OVERLAPPED WITH NO GAPS.
4. FOR SLOPE AND CHANNEL SPACING SEE THE "SECTION VIEW ALONG DITCH FLOWLINE" DETAIL ON SHEET 11 OF 11.
5. SOIL RETENTION BLANKET SHALL ALWAYS BE REQUIRED.
6. THE PAY ITEM NUMBER FOR SILT BERM (LF) IS 208-00004.

SILT BERM INSTALLATION

DRAINAGE DITCH APPLICATIONS

WD

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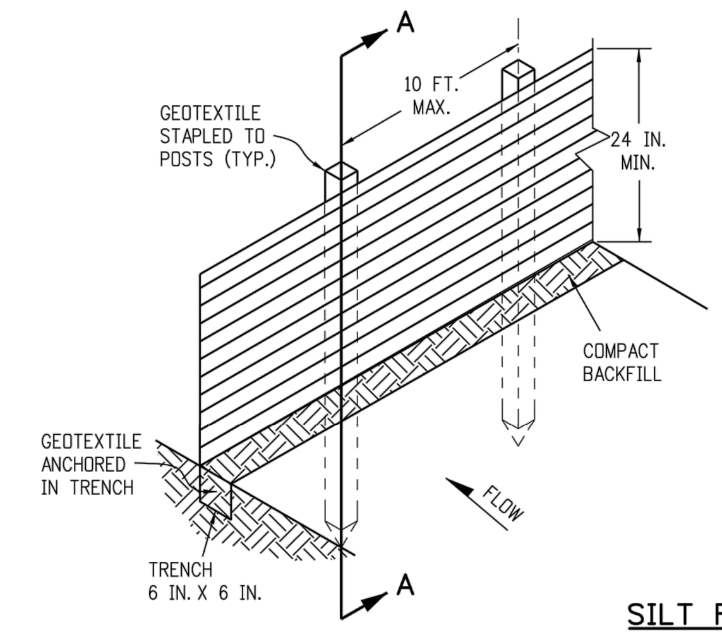
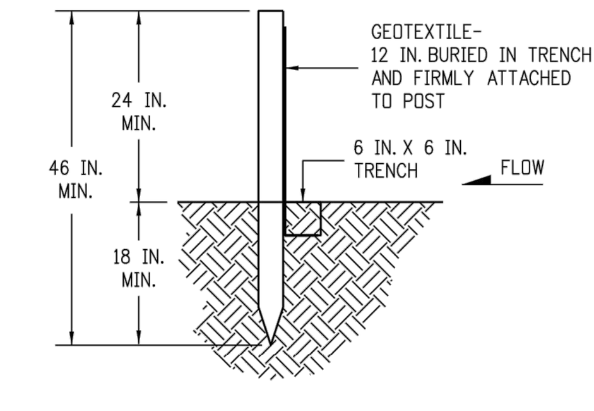
Designer Initials: JBK	(R-X)					Standard Sheet No. 6 of 11
Last Modification Date: 07/31/19	(R-X)			Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Project Sheet Number:
Detailer Initials: LTA	(R-X)					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)					

SILT FENCE APPLICATIONS (SF)

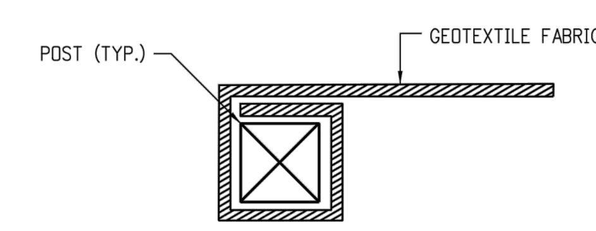


SILT FENCE



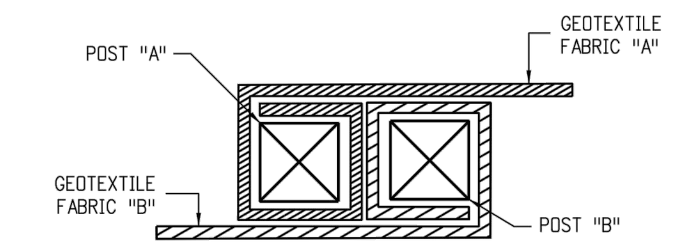
SECTION A-A

NOTES:
1. GEOTEXTILE SHALL BE ATTACHED TO WOOD POSTS WITH THREE OR MORE STAPLES PER POST. STAPLES SHALL BE HEAVY DUTY WIRE AND AT LEAST 1 INCH LONG.
2. WOOD POST SHALL BE 1 IN. X 1 IN. NOMINAL.
3. THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.
4. THE SILT FENCE SHALL BE PLACED ON THE CONTOUR (AT THE SAME ELEVATION ±6 IN.). THE ENDS SHALL BE FLARED UP SLOPE (MINIMUM ELEVATION GAIN OF 18 IN.).



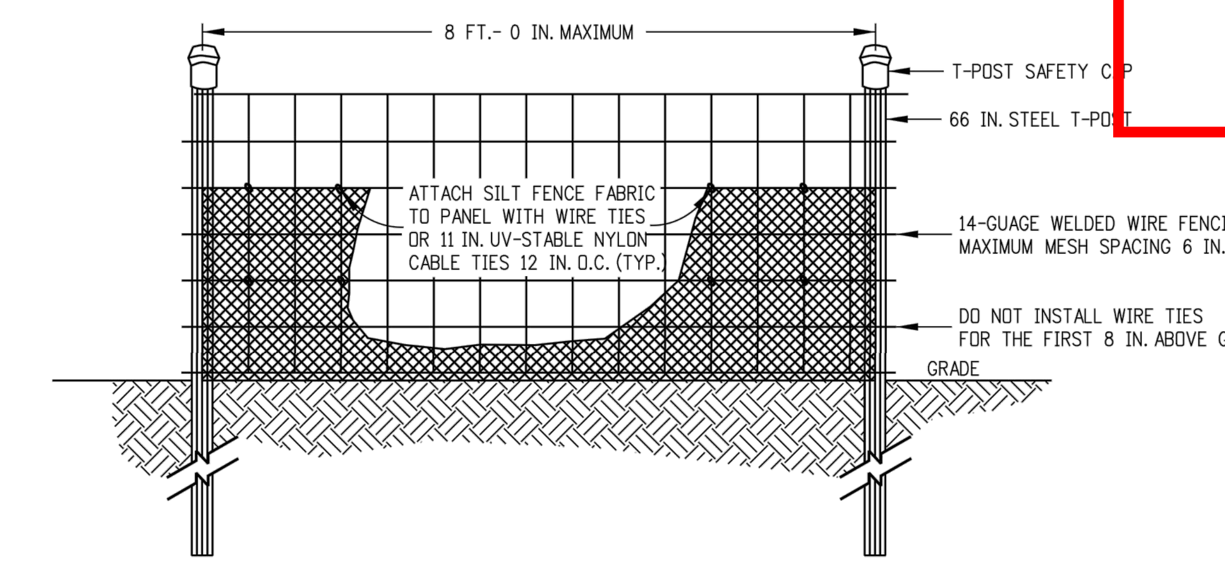
END SECTION DETAIL (PLAN VIEW)

NOTE:
1. THE END OF THE SILT FENCE FABRIC SHALL BE WRAPPED APPROX. 6 INCHES AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.

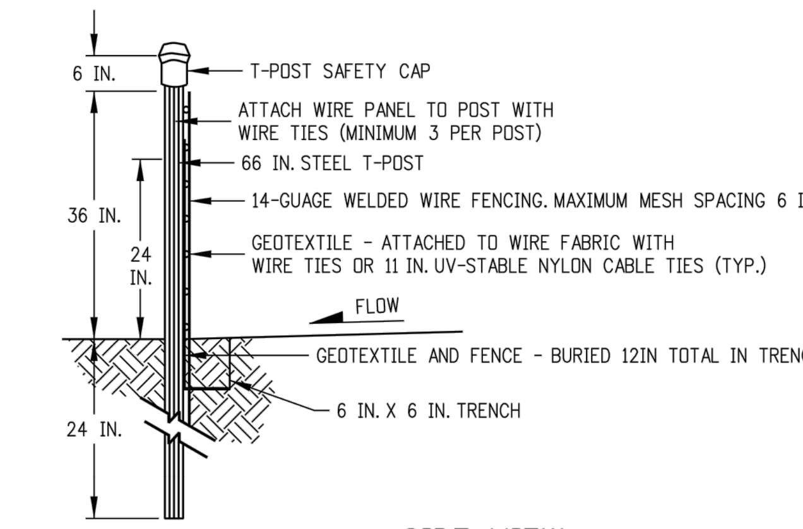


JOINING SECTION DETAIL (PLAN VIEW)

NOTES:
1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.



ELEVATION VIEW



SIDE VIEW

NOTES:
1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A STEEL T-POST, THEN SECURED ALONG THE POST WITH WIRE TIES (MINIMUM 3 PER POST).
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.
3. SILT FENCES SHALL NOT BE USED FOR CHECK DAMS.
4. THE PAY ITEM NUMBER FOR SILT FENCE (REINFORCED) (LF) IS 208-00021.

SILT FENCE (REINFORCED)

SILT FENCE APPLICATIONS

SF

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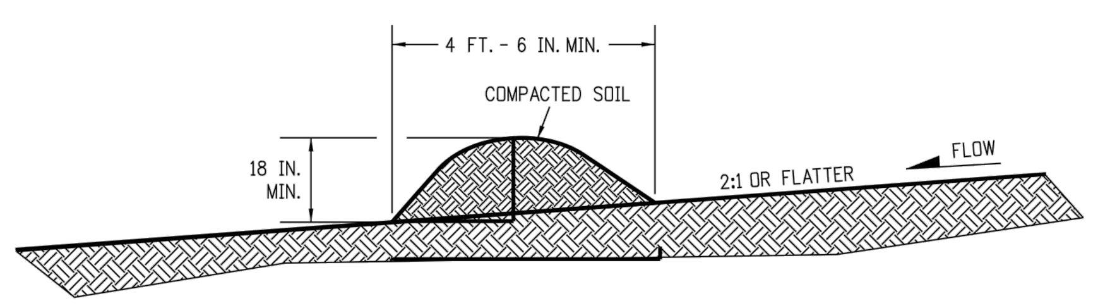
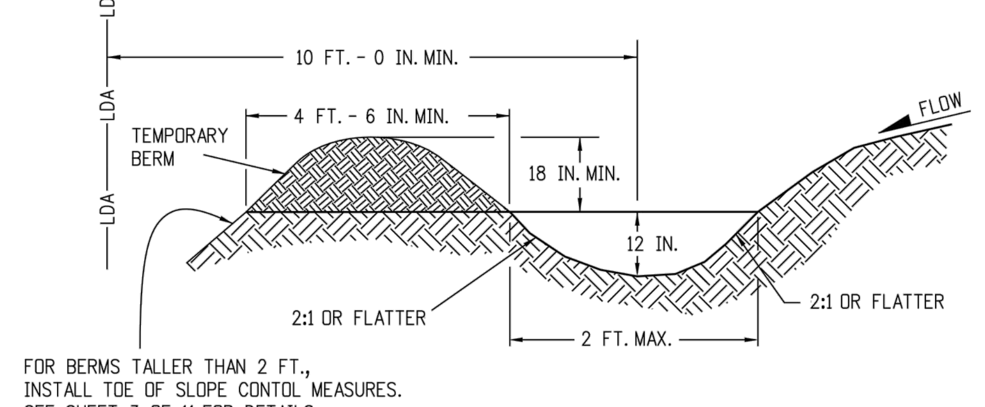
Designer Initials: JBK	(R-X)					Standard Sheet No. 8 of 11
Last Modification Date: 07/31/19	(R-X)			Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Project Sheet Number:
Detailer Initials: LTA	(R-X)					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)					

GRADING APPLICATIONS



NOTES:
1. BERMS SHALL HAVE A HEIGHT OF 18 INCHES, SIDE SLOPES OF 2:1 OR FLATTER AND A MINIMUM BASE WIDTH OF 4 FT. -6 IN.
2. BERMS SHALL BE USED TO INTERCEPT AND DIVERT DRAINAGE TO A DESIGNATED OUTLET.
3. BERMS SHALL NOT BE USED WHERE DRAINAGE AREA EXCEEDS 10 ACRES.
4. BERMS SHALL BE CONSTRUCTED OUT OF ACCEPTABLE MATERIAL THAT CAN BE COMPACTED AND RECEIVE AT A MINIMUM HEAVY EQUIPMENT WHEEL ROLLED COMPACTION.
5. TEMPORARY BERMS SHALL BE CONSTRUCTED OUT OF EMBANKMENT (SUBSOIL) AND IN NO CIRCUMSTANCE CONSTRUCTED OUT OF SALVAGED TOPSOIL.
6. THE PAY ITEM NUMBER FOR TEMPORARY BERM (LF) IS 208-00300.

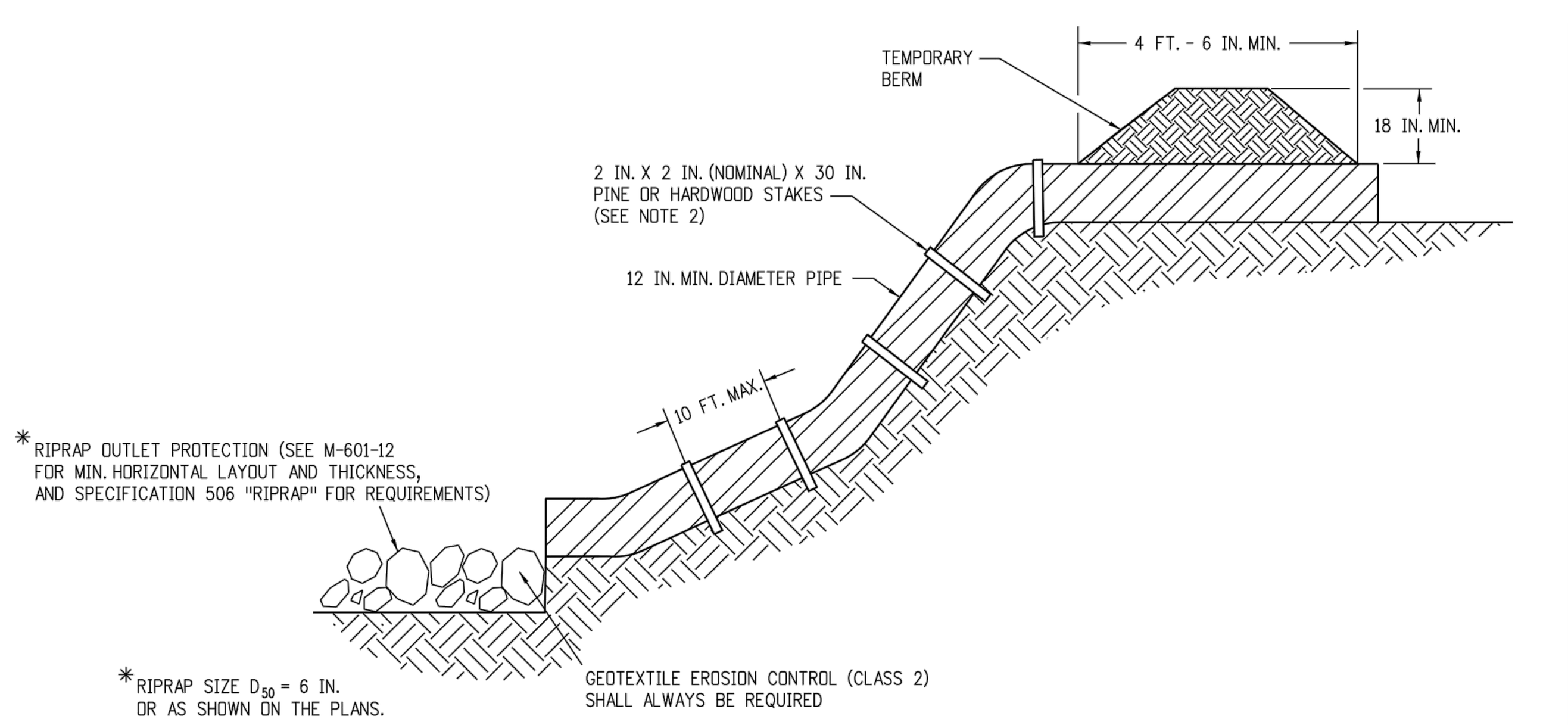
TEMPORARY BERM



FOR BERMS TALLER THAN 2 FT., INSTALL TOE OF SLOPE CONTOL MEASURES. SEE SHEET 3 OF 11 FOR DETAILS.

NOTES:
1. TEMPORARY DIVERSION DITCHES SHALL BE CONSTRUCTED ACROSS THE SLOPE TO INTERCEPT RUNOFF AND DIRECT IT TO A STABLE OUTLET OR SEDIMENT TRAP.
2. USE THE TEMPORARY DIVERSION DITCH IMMEDIATELY ABOVE A NEW CUT, FILL SLOPE, OR AROUND THE PERIMETER OF A DISTURBED AREA.
3. THE GRADIENT ALONG THE FLOW PATH SHALL HAVE A POSITIVE GRADE TO ASSURE DRAINAGE, BUT SHALL NOT BE SO STEEP AS TO RESULT IN EROSION DUE TO HIGH VELOCITY.
4. THE DIVERSION FLOWLINE SHALL ALWAYS BE LOCATED A MINIMUM 10 FEET FROM THE OUTSIDE LIMITS OF DISTURBED AREA BOUNDARY.
6. DIVERSION BERMS SHALL BE CONSTRUCTED OUT OF EMBANKMENT (SUBSOIL) AND IN NO CIRCUMSTANCE CONSTRUCTED OUT OF SALVAGED TOPSOIL.
5. THE PAY ITEM NUMBER FOR TEMPORARY DIVERSION (LF) IS 208-00301.

TEMPORARY DIVERSION



NOTES:
1. ANCHOR SIZE VARIES ACCORDING TO PIPE SIZE
2. TO SECURE THE PIPE, DRIVE STAKES INTO GROUND, THEN TIE A 12 GUAGE WIRE BETWEEN THEM ABOVE AND ACROSS THE PIPE'S WIDTH.
3. THE OUTLET SHALL BE ALIGNED WITH THE FLOW DIRECTION OF THE EXISTING GRADE. PERPENDICULAR DISCHARGE TO A CHANNEL SHALL NOT BE ACCEPTABLE.
4. THE GRADE AROUND THE INLET TO THE PIPE SHALL BE COMPACTED.
5. THE PAY ITEM NUMBER FOR TEMPORARY SLOPE DRAINS (LF) IS 208-00060.

TEMPORARY SLOPE DRAINS

(NOT SPECIFIED - DETAIL PROVIDED IF FIELD CONDITIONS WARRANT APPLICATION)

GRADING APPLICATIONS

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Designer Initials: JBK	(R-X)					Standard Sheet No. 7 of 11
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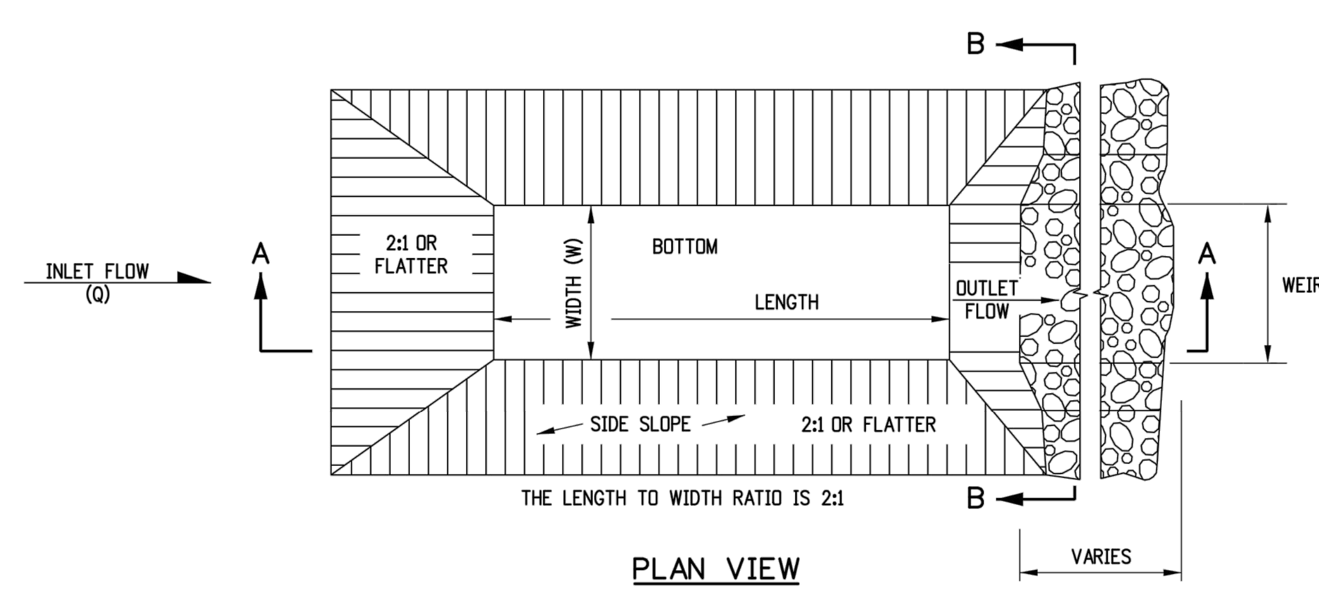
Detailer Initials: LTA	(R-X)					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)					

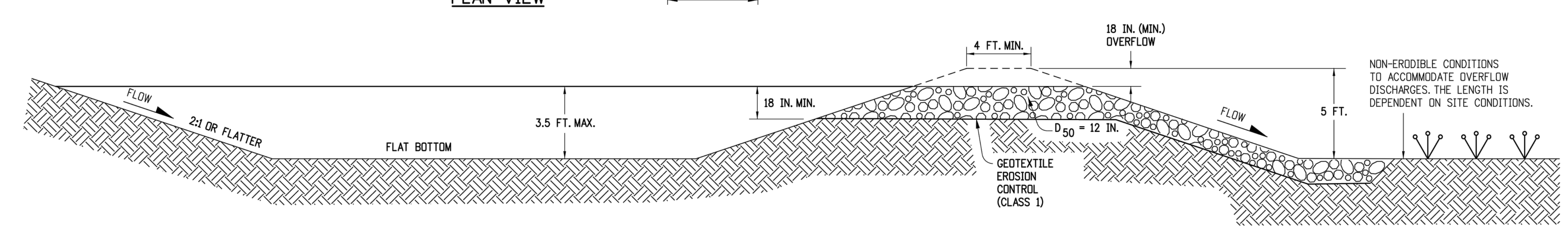
SEDIMENT TRAP (ST)



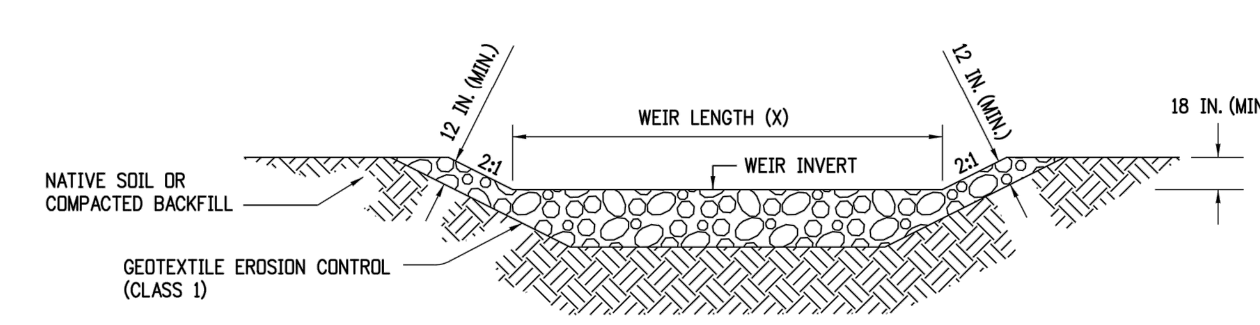
PLAN VIEW

NOTES

1. THE MAXIMUM DRAINAGE AREA IS 5 ACRES.
2. THE MAXIMUM STRUCTURE LIFE IS 2 YEARS.
3. THE STORAGE AREA IS 1800 CUBIC FEET PER ACRE.
4. THE MAXIMUM EMBANKMENT HEIGHT SHALL BE 5 FT. MEASURED ON THE DOWNSTREAM SIDE.
5. THE LENGTH/WIDTH RATIO MAY BE ADJUSTED TO MEET SITE CONDITIONS WHEN APPROVED BY THE ENGINEER.
6. WIDTH (W) OF SEDIMENT TRAP IS APPROXIMATELY EQUAL TO THE WEIR LENGTH (X).
7. SEDIMENT TRAP DESIGN SHALL BE APPROVED BY THE ENGINEER.
8. THE DOWN GRADE FROM WEIR SHALL BE STABLE AND NON-ERODIABLE.
9. THE PAY ITEM NUMBER FOR SEDIMENT TRAP (LF) IS 208-00033.



SECTION A-A



SECTION B-B

DRAINAGE AREA (ACRES)	WEIR LENGTH (FEET)
1	4
2	6
3	8
4	10
5	12

WEIR LENGTH TABLE

SEDIMENT TRAP

ST

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Designer Initials: JBK	(R-X)					Standard Sheet No. 9 of 11
Last Modification Date: 07/31/19	(R-X)			Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Project Sheet Number:
Detailer Initials: LTA	(R-X)					
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CALL UTILITY NOTIFICATION CENTER OF COLORADO

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6/18/21

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LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH

Erosion Control Details

SHEET

C.611

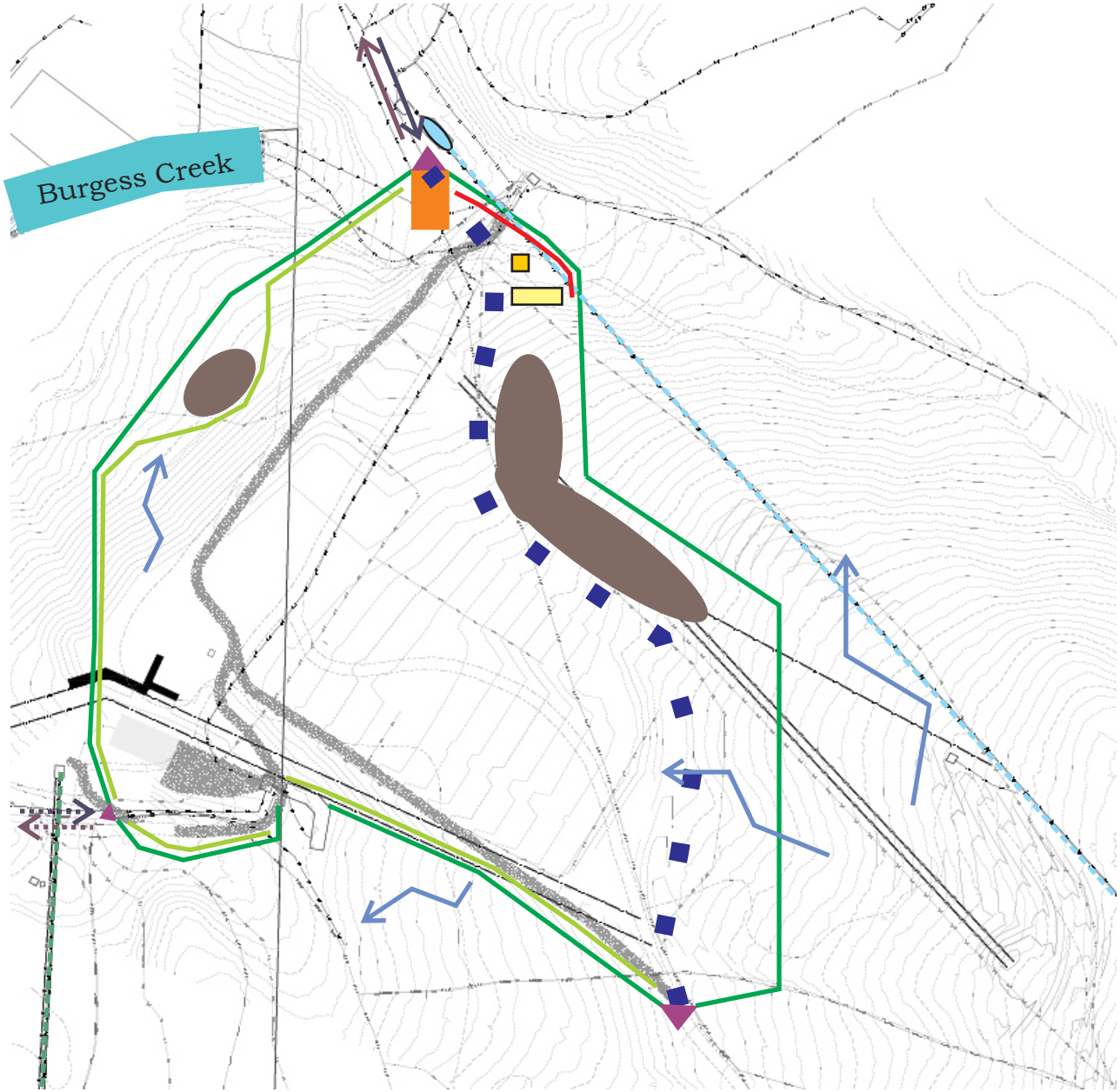
Construction Site Management Plan for:
Greenhorn Ranch
Prepared by Betsy Wilbanks

RCRBD Record Set
T.A.

N
W E
S

Not to Scale

07/14/2021



Legend:

- Project Boundary and Construction Fence
- Restricted Access Gate
- Vehicle Tracking Control
- Temporary Access Road
- Primary Ingress
- Secondary Ingress
- Primary Egress
- Secondary Egress
- Wattles
- Brush Berm
- Stockpile
- Direction of Overland Flow
- Port-a-let
- Dumpster
- Thunderhead Lift
- Bashor Lift

RCRBD Record Set
T.A.

07/14/2021

CSMP
Greenhorn Ranch
Job #522

Standard Notes for Construction Site Management Plans:

1. This plan shall be kept on site at all times and updated to reflect any changes.
2. Concrete waste and washout water from mixing trucks shall be contained on site, removed from the site, and properly disposed of. Materials shall not enter state waters.
3. Contractor is responsible for installing and maintaining temporary erosion and sediment control during construction and establishing any required permanent Control Measures to prevent release of pollutants from the project site.
4. The contractor is responsible for complying with all local, state, and federal laws. In addition, the contractor must obtain required permits.
5. Clearing or grading shall not begin until all sediment control devices have been installed.
6. The contractor shall promptly remove all sediment, mud, and construction debris that may accumulate in the right of way, private property, or waterways as a result of the construction activities.
7. All ingress, egress, and vehicle access points onto the disturbed site must be stabilized with a vehicle tracking control pad. Access shall only be via approved locations, as shown on the approved CSMP.
8. Soil stabilization measures shall be in place and/or areas are to be re-vegetated if: 1) stockpiles are inactive for more than 30 days or 2) the disturbance extends past one growing season.
9. Inlet protection shall be installed in conjunction with storm drain inlets where the drainage area is not vegetated.
10. Control Measures shall be used, modified, and maintained whenever necessary to reflect current conditions. Control Measures shall be inspected weekly and after every precipitation event. Accumulated sediment shall be removed from the BMPs when the sediment level reaches half of the height of the Control Measure.
11. Emergency access must be kept obstacle free and passable at all times.
12. Contractor shall coordinate with the City Construction Site Manager regarding special permitting for any work done in the Right of Way (ROW). No work shall be conducted in the ROW between November 1 and April 1 without prior approval from the director of Public Works.
13. Where required as part of the ROW permit or where site work affects the pedestrian or vehicle travel way, traffic control shall be installed. All traffic control

shall be in accordance with the Manual on Uniform Traffic Control Devices, latest edition.

14. Sidewalks adjacent to construction shall be maintained by the contractor for public use. In areas where construction is taking place next to the sidewalk and overhead hazards are possible, the contractor is responsible for installing and maintaining sidewalk protection.

Site Specific Notes:

1. The project boundaries are marked on the map and will be approximately 19.05 acres, most of which will be disturbed.
2. A General Permit for Stormwater Discharges Associated with Construction Activities will be applied for. A copy will be provided when it is issued. A copy will also be included in the Stormwater Management Plan (SWMP) when it is issued.
3. Employee parking will occur on site, within the project boundary.
    a. Restricted access gates will ensure that only Steamboat Ski and Resort Corporation and construction team members will be allowed on site.
4. Wattles will be the standard 9” x 25’ and will be installed as per industry standards.
    a. Refer to the SWMP for more information
5. Rock socks will be constructed as per industry standards.
    a. Refer to the SWMP for more information.
6. Brush berms will be constructed as per industry standards.
    a. Refer to the SWMP for more information.
7. Stockpiles will be protected via wattles, brush berms, or rock socks. Which is used will be determined by the location of the stockpile.
8. Dust control will be managed via a water truck. There is water access on site to fill water trucks.
    a. Refer to the SWMP for more information.
9. Vehicle tracking control (VTC) will be constructed as per industry standards.
    a. Refer to the SWMP for more information.
    b. Only the primary ingress and egress will require VTCs as it is the only one that exits to pavement.
10. Concrete trucks will either be directed to washout in their own yards or in a constructed concrete washout located on site.
    a. Refer to the SWMP for more information.
11. As inlets and outlets are encountered and/or constructed they will be provided with adequate protection.
    a. Refer to the SWMP for more information.

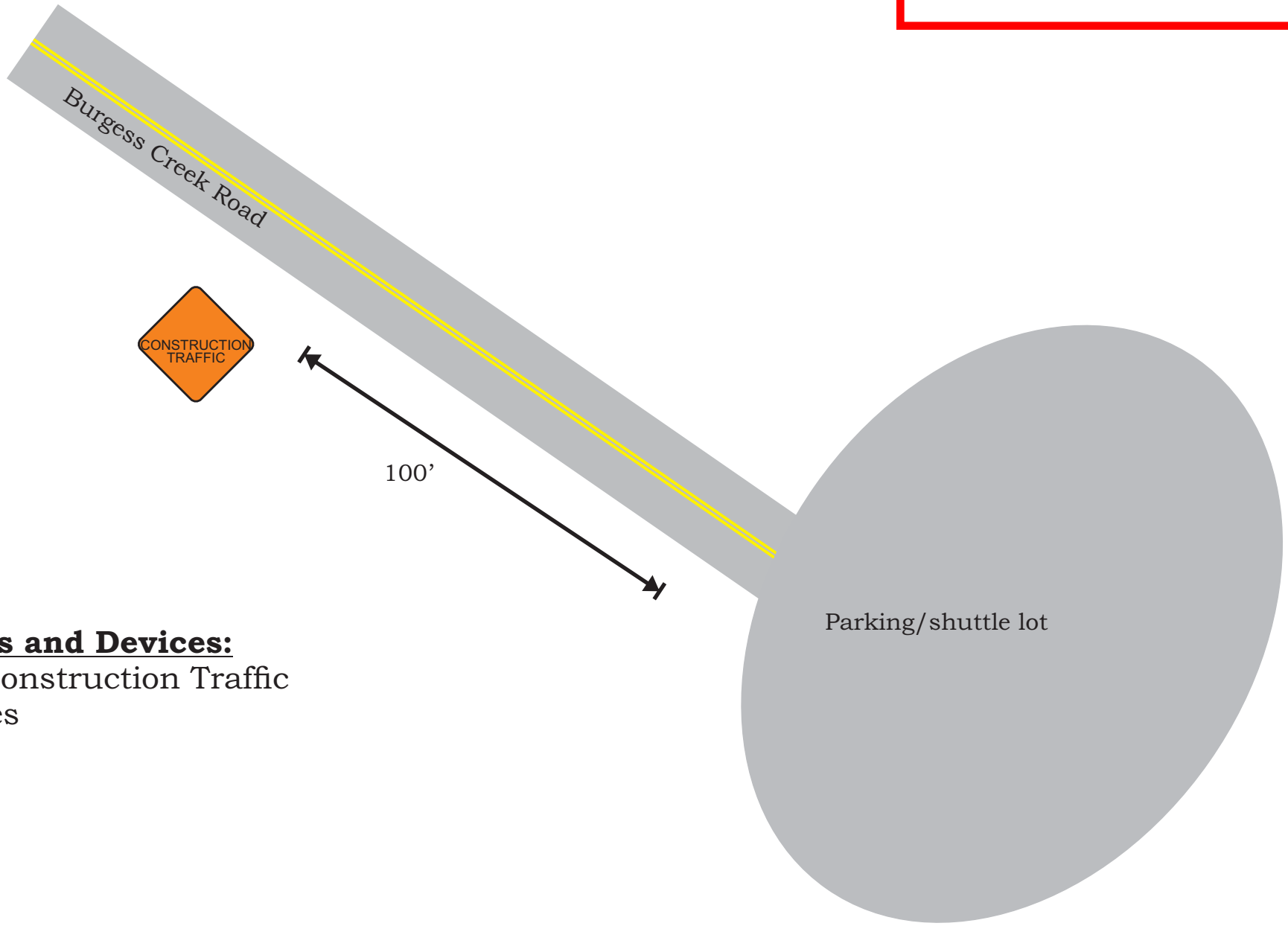
12. The project will have approximately 90,000 cubic yards of cut, but all of it will be utilized in fill areas.
13. Specific phasing will be as follows:
    a. Site Layout and Mobilization
        i. 2-4 days
    b. Installation of Erosion Control and Tree Mulching
        i. 5-7 days
    c. Site Fencing and Installation of Road/Trail Bypass
        i. 2-4 days
    d. Topsoil Strip
        i. 10-14 days
    e. Site Earthwork
        i. 30-50 days
    f. Road Construction
        i. 5-7 days
    g. Final Grading
        i. 10-14 days
    h. Revegetation
        i. 5-7 days for application
        ii. 6-9 months for growth
14. Please note that some phases may occur simultaneously.
15. Work will begin the first week of August 2021 and conclude the first week of November 2021.
    a. All areas will have at least temporary stabilization at this time.
16. There will not be any storage of materials on site that would require a spill kit. However, spill kits are available in the foremen, superintendents, and fueler's trucks.
17. A general traffic control plan (TCP) has been developed for the site, which is MUTCD compliant. A copy is attached.
    a. A copy of the proposed trail/road bypass is also attached. This will be finalized and formalized at a meeting in a few days.
18. A Qualified Stormwater Manager will conduct all SWMP and control measure inspections.
19. Revegetation will be established via seeding and hydromulch.
    a. Refer to the SWMP for more information.
20. Final stabilization will be achieved when 70% of the pre-construction vegetation is achieved in a uniform coverage.

Traffic Control Plan
Job Name: Greenhorn Ranch
Job Number: 522

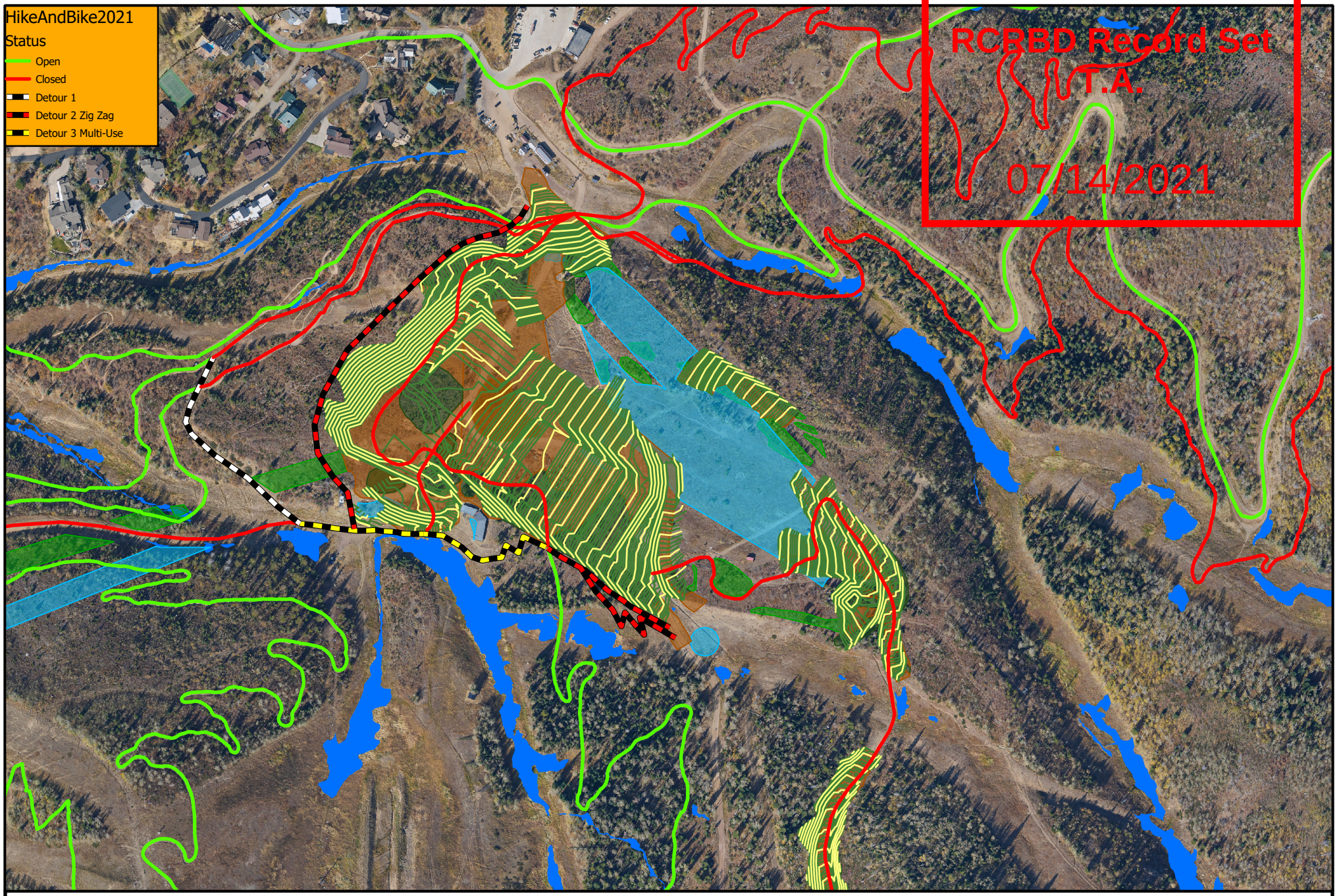
Prepared By:
Elizabeth Wilbanks *06/21/2021*
ATSSA TCS T.A. Date
Phone: 970-879-6231
Issue Date: 05/04/2020
Expiration Date: 05/03/2024

RCRBD Record Set
07/14/2021

Not to Scale



Signs and Devices:
1 - Construction Traffic Cones

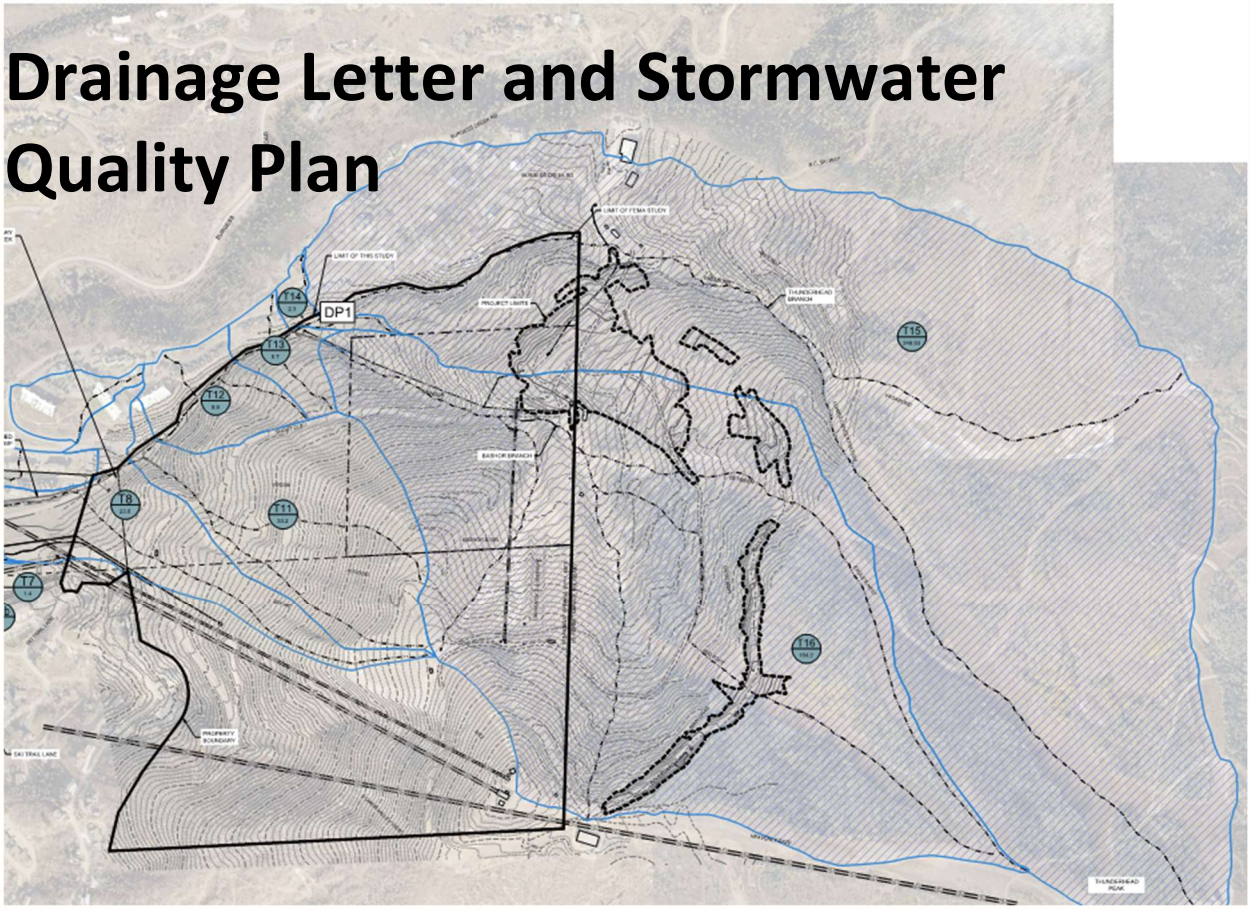


Hike and Bike Base Area Overview Map

Date Saved: 6/16/2021 12:17 PM

DRAFT

Drainage Letter and Stormwater Quality Plan



Green Horn Ranch

Preliminary Plat

Located in the SE ¼ and in the SE1/4 Section 22 and in the NE ¼ NW1/4 and in the NE1/4 Section 27, T6N, R84W, 6th P.M.

Original Date: February 26, 2021
Revised: June 18, 2021

Prepared by: Deborah Spaustat, P.E.

NOTE
City of Steamboat Springs plan review and approval is only for general conformance with City design criteria and the City code. The City is not responsible for the accuracy and adequacy of the design, dimensions, and elevations that shall be confirmed and correlated at the job site. The City of Steamboat Springs assumes no responsibility for the completeness or accuracy of this document.

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141 9th St • Steamboat Springs, CO. 80477 • (970) 871.9494 • www.landmark-co.com

Table of Contents

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www.landmark-co.com

CERTIFICATION

I hereby affirm that this Drainage Letter and Stormwater Quality Plan for the Preliminary Plat for Green Horn Ranch was prepared by me (or under my direct supervision) for the owners thereof and is, to the best of my knowledge, in accordance with the provisions of the City of Steamboat Springs Storm Drainage Criteria and approved variances. I understand that the City of Steamboat Springs does not and will not assume liability for drainage facilities designed by others.

Deborah Spaustat, P.E.
State of Colorado No. 0041286

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INTRODUCTION AND LOCATION

The purpose of this report is to estimate peak stormwater runoff, evaluate existing infrastructure and design required infrastructure to manage the existing stormwater experienced onsite and the incremental stormwater generated by the proposed Green Horn Ranch Preliminary Plat (the Project). This report includes all the base data, methods, assumptions, and calculations used by Landmark Consultants, Inc. (Landmark) to design the stormwater management system for the project. It was prepared in conjunction with the Preliminary Plat application and for Forest Service review and input.

The subject property is an unplatted lot located in the SE ¼ and in the SE ¼ Section 22 and in the NE ¼ NW ¼ and in the NE ¼ Section 27, T6N, R84W, 6th P.M. as described by Parcel Number 936271001. It is 173.88-acres in total area and encompasses a portion of the ski and bike trails of the Steamboat Ski Resort, roughly from the Christie Peak Express mid-station to the Christie Peak Express Upper Terminal and the Thunderhead Express lower terminal.

This project proposes to regrade approximately 4.4 acres within the limits of the City of Steamboat Springs and an additional 14.5 acres on US Forest Service Property in the vicinity of the Lower Bashor Bull-Wheel. The drainage basin containing the proposed activity is 250-acres in total. The 4.4-acre disturbed area is considered the "site" for purposes of the City's review of this drainage study; however, this study also addresses drainage infrastructure design on Forest Service Property.

The property is zoned open space and recreation and is currently used as a ski area and a summer recreation area. There is no proposed change in zoning or use.

Landmark prepared this report in accordance with City of Steamboat Springs Drainage Criteria for the purpose of designing the storm water infrastructure required by the project at the time of this report. This report may not be used by other parties without the express written consent of Landmark.

The facts and opinions expressed in this report are based on Landmark's understanding of the project and data gathered from:

- Site visits
- Steamboat Springs GIS data
- FEMA FIRM Map Number 08107C0883D and FIS Study
- LOMR 15-08-0994P
- NRCS soil maps
- Field survey by Landmark Consultants, Inc.
- Final Drainage Report for Steamboat Base Area Redevelopment by Drexel, Barrell & Co.
- Citywide Stormwater Masterplan by SHE
- The Gold Book – Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development
- References listed at the end of this report

The location of the project is shown on Figure 1: Vicinity Map.

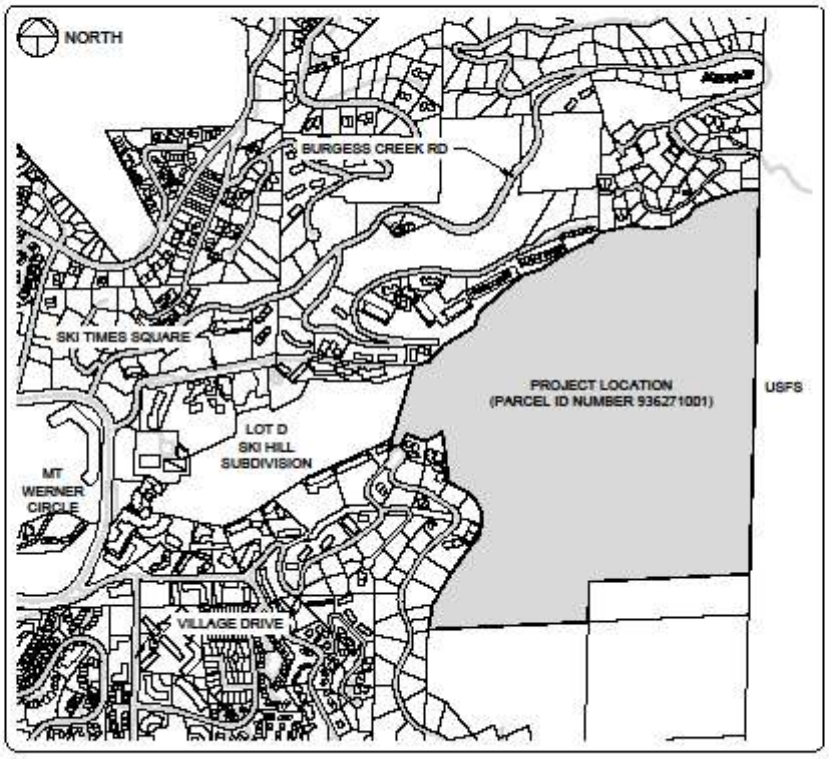


Figure 1- Vicinity Map

DRAINAGE CRITERIA AND METHODOLOGY

Landmark prepared this report in accordance with City of Steamboat Springs, Colorado Drainage Criteria, effective July 2019 and BLM and USFS's "The Gold Book" standards for oil and gas exploration and develoment. The methods used by Landmark are described below and the actual calculations are presented in the Appendices. The scope of this report is limited to flow determinations related to the described hydrological storm event. This report does not attempt to model subsurface flows nor is it intended to be used in the design of structure features including foundation drains and roof drains.

Design Rainfall and Runoff Frequency

For this project, determining the imperviousness of the basins was sufficient to conclude that the project will not increase the peak flows from the site and thus no peak flows were calculated. Site imperviousness was determined using Table 6-3 in the MHFCD's Urban Sotrm Drainage Criteria Manual Volume 1.

Additional hydrologic information was referenced from FEMA LOMR 18-08-0922P, effective June 29, 2019. This LOMR provided the 100-year estimated peak flow in the contributing basins to the Unnamed Tributary to Burgess Creek using the EPA SWMM method. It is discussed further below.

Stormwater Quality

The approximately 4.4-acres of disturbed area is excluded from the MS4 permit requirement to implement permanent stormwater treatment facilities as defined in the City's Drainage Design Standards by:

> *"Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped*: Land disturbance to undeveloped land that will remain undeveloped with no human-made structures such as buildings or pavement."

Form 6: Permanent Stormwater Treatment Facilities Exclusion Tracking Form has been included in Appendix B for this area.

EXISTING SITE CONDITIONS

In this report the term "historic condition" refers to the conditions of the site at the time of this report and may also be referred to as "pre-development condition" or "existing condition". The affected 4.4-acres (the site) are partially "developed" in the sense that they have been previously disturbed and revegetated from their native state, albeit with native vegetation. It slopes steeply to the west at grades up to 40%, however the grades in the area proposed disturbed area range from 10%-35% with an average slope of 20%.

The soils in project area are a Dorpat-Reddles complex (hydrologic soil group C). The soils in offsite contributing basins are a mix of Dorpat-Reddles complex, (HSG C), mine loam (HSG B) and Boatsteam Storm family (HSG A).

The site contains a small ski operation building, hiking and biking trails, gravel forest service access roads and ski lift terminals. Existing utilities onsite include potable water, sanitary sewer service, electric, telephone and snowmaking lines. Three propane tanks are also located in the project area. There are numerous small diameter culverts put in place by Ski Area operations on both Ski Corps and USFS land to manage runoff along the access roads. Most runoff flows overland to one of the tributary drainages with water bars and swales providing direction where needed.

Unnamed Tributary to Burgess Creek & FEMA Floodplain

Several natural drainage channels descend from the mountain and join to form the "Unnamed Tributary to Burgess Creek", which runs from northeast to southwest along the Right-O-Way ski trail. It is confined to a large diameter storm sewer as it enters the base of the ski area and then discharges to the Burgess Creek Culvert at the creek diversion structure adjacent to Slopeside Grill. The eventual outfall is the Yampa River.

LOMR 18-08-0922P, effective July 29, 2019, revised FEMA FIRM Number 08107C0883D dated February 4, 2005 to remove a portion of the Tributary from the SFHA leaving approximately 1,670-lineal feet of the tributary in the SFHA zone A. The effective floodplain limits are shown in Figure 2: FEMA FIRM and in Figure 3: Drainage Plan.

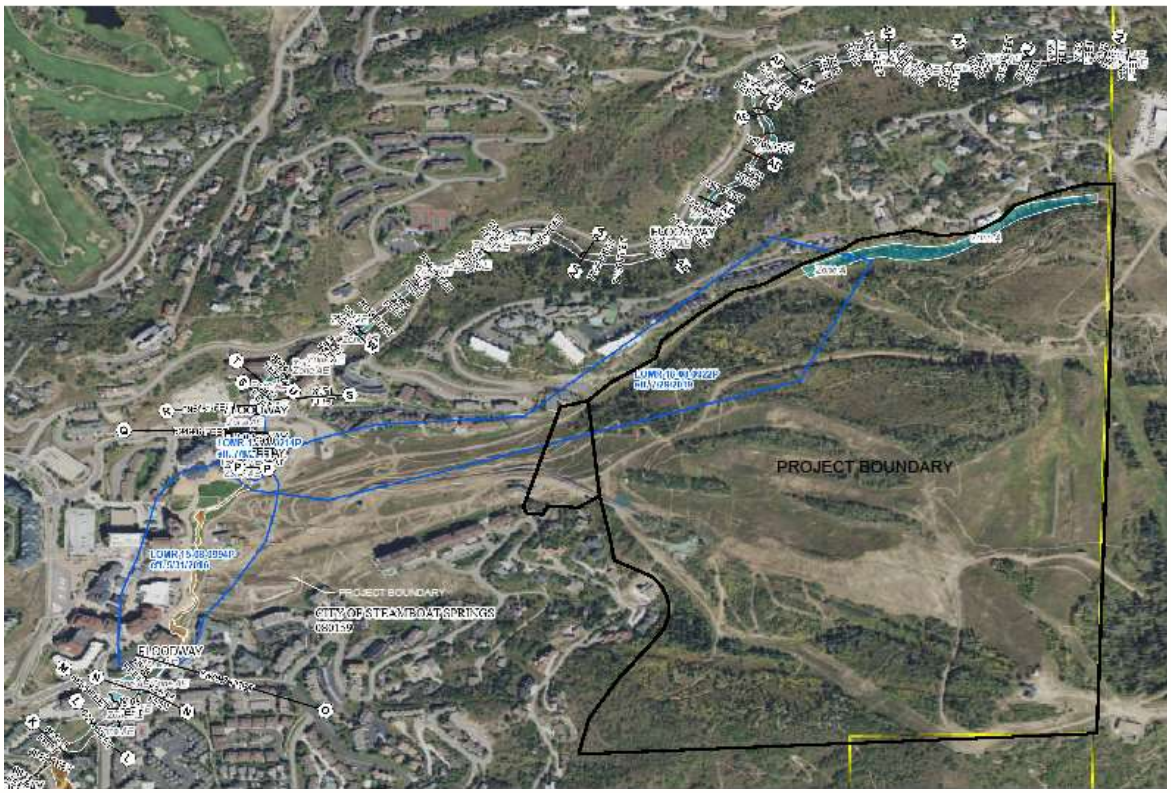


Figure 2-FEMA FIRM

The LOMR analyzed 10 subbasins and this project site is located in basins T15 and T16 between the Bashor Branch and the Thunderhead branch of the Unnamed Tributary.

The Citywide Master Stormwater Plan identifies several areas downstream on Burgess Creek in need of maintenance or replacement. This project does not propose to increase peak flows in Burgess Creek and will not affect downstream properties.

Easements

Several sanitary sewer easements exist onsite as shown in Figure 3: Drainage Plan.

Drainage Basins

The project is located in two subbasins of the Unnamed Tributary, basins T15 and T16 (see Figure 3: Drainage Plan). Runoff from basin T15 is collected in the "Thunderhead Branch" and runoff from T16 is collected in the "Bashor Branch".

Total runoff from both basins is quantified at design point 1 (DP1), which is representative of the total flow from basins T15 and T16 to the Unnamed Tributary.

The imperviousness of the drainage basins was calculated based on site features (i.e. gravel road, roof, ski slope) for areas within the ski area and Forest service boundaries. Imperviousness for portions of the basins outside of these areas were based on City of Steamboat Springs zoning.

Table 1 summarizes the imperviousness of the existing basins and design point:

Table 1: Existing Conditions Imperviousness

Basin	Total Area (acres)	%Imp	C_5	C_{100}
T15	249.88	5.15%	0.08	0.51
T16	164.19	2.35%	0.06	0.50
DP1	414.07	4.04%	0.08	0.50

The overall imperviousness of the combined drainage basins is 4.04%.

The LOMR application calculated the peak 100-year flows in each basin as Q_{T15}=73.8-cfs and Q_{T16}=34.9-cfs

PROPOSED SITE CONDITIONS

The project proposes to re-grade and re-vegetate with native seed approximately 4.4 acres of existing ski area terrain within the limits of the City of Steamboat Springs. A water line will be replaced and a sanitary sewer service will be installed. Additional work is proposed in Routt County on US Forest Service Land.

The proposed access roads will be constructed with roadside swales. Surface water on the roads will be diverted by "water dips" to the swales. 18-inch "ditch relief culverts" will be installed at intervals of 140-feet to 200-feet to convey water from the uphill to downhill side of the roads. "Rundown" culverts, half 18-inch culverts anchored to the top of fill slopes, will convey runoff from ditches on the downhill side of the roads safely down steep slopes to prevent erosion. Final locations of culverts will be determined in the field during a "plan-in-hand" meeting with the USFS.

Additionally, the existing 30-inch culvert that crosses under the Bashor Lift will be replaced with a culvert that can convey the 100-year flow in the Bashor Branch of the Unnamed tributary per the calculations included in the LOMR for that area.

Drainage patterns will be largely maintained with the intent to avoid diverting runoff from its historical basin to another.

Temporary stormwater quality management such as slope stabilization will be implemented until vegetation is established.

The proposed work will not change the imperviousness or any other hydrological feature of the drain basins and therefore will not increase or decrease the peak flows. Flows were not calculated since no stormwater systems exist onsite and none are proposed.

Stormwater Quality

Because the site will remain undeveloped, the project is eligible to be excluded from the MS4 permit requirement to implement permanent stormwater treatment facilities as defined in the City's Drainage Design Standards by:

"Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped: Land disturbance to undeveloped land that will remain undeveloped with no human-made structures such as buildings or pavement.".

Water quality in the Yampa River is degraded by the washing off of accumulated deposits on the urban landscape of Steamboat Springs. Metals, salts, sand, gravel, trash, debris, and organics (including oil and gasoline) all accumulate on the streets and in parking lots of Steamboat Springs over the course of time. During a rainstorm event, these pollutants are washed by the runoff into the Yampa River and its tributaries. Water quality problems caused by these pollutants include turbid water, nutrient enrichment, bacterial contamination, reduction in dissolved oxygen, and increased stress on aquatic life. The most prevalent pollutant in Steamboat Springs is sediment. BMP's included in this project are designed to minimize the amount of sediment leaving the site and entering the waterways.

Potential Pollutant Sources: The following are anticipated pollutant sources for this project:

1. Ski Area operations vehicles
2. Landscaping maintenance
3. Snow removal and related transport of sand, dirt and oils;
4. Trash.

TEMPORARY EROSION AND SEDIMENT CONTROL

The primary source of storm water contaminants in the City of Steamboat Springs are suspended sediments and are most susceptible during construction activities. Temporary erosion and sediment control during construction is the responsibility of the permit holder (including NPDES permitting). Appropriate best management practices (BMP's) for construction activities are detailed in Erosion and Sediment Control During Construction by Routt County, Colorado. It is the responsibility of the permit holder to identify and properly handle all materials that are potential pollution sources prior to mobilization. The following are some common examples of potential pollution sources:

- Stockpiling of materials that can be transported to receiving waterways
- Uncovered trash bins
- Exposed and stored soils, management of contaminated soils
- Off-site tracking of soils and sediment
- Loading and unloading operations
- Outdoor storage of building materials, chemicals, fertilizers, etc.
- Vehicle and equipment maintenance and fueling
- Significant dust or particulate generating processes
- Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc.
- On-site waste disposal practices (waste piles, dumpsters, etc.)
- Concrete truck/equipment washing.
- Non-industrial waste sources that may be significant, such as worker trash and portable toilets.

It is not possible to identify all materials that will be used or stored on the construction site. It is the sole responsibility of the permit holder to identify and properly handle all materials that are potential pollutant sources prior to mobilization.

Some temporary BMP's include, but are not limited to, straw bales, silt fences, ditch checks, berms, slope drains, seeding and mulching, pipes, and sediment basins. In order to prevent mud

from being transported into public right of ways, vehicle tracking pads and wheel wash areas should be utilized. Temporary BMP's should be coordinated with the site's permanent erosion control measures to assure continuous and economical erosion control. Because different BMP's are required at different stages of construction, the site should be periodically reviewed by the permit holder to verify the proper BMP's are in place.

Temporary BMP's should be inspected at a minimum once every two weeks, after each significant storm event, and at 24 hour intervals during extended storm events. Repairs or reconstruction of temporary BMP's shall occur within two working days in order to ensure continued performance. It is the responsibility of the Construction Site Operator to conduct bi-weekly inspections, maintain BMP's, and keep records of site conditions and inspections.

Areas used for material storage which are exposed to precipitation, disturbed areas, the construction site perimeter, and all applicable/installed erosion and sediment control measures shall be inspected for evidence of, or the potential for, pollutants entering the drainage system.

Preventative maintenance of all temporary BMP's shall be provided in order to ensure continued performance. Maintenance activities and actions shall be noted and recorded during inspections. All temporary erosion control measures must be kept in place and maintained until the site has been sufficiently stabilized in accordance with permit requirements.

It is recommended that a Stormwater Management Plan (SWMP) be completed prior to commencement of any land disturbing activities. Additionally, all pertinent local, state, and federal permits should be obtained prior to construction.

CONCLUSIONS

The improvements proposed for Green Horn Ranch include regrading and re-vegetating 4.6-acres of the ski area. Stormwater runoff will be collected in the Thunderhead and Bashor Branches of the unnamed tributary to Burgess Creek, flow through the unnamed tributary, Burgess Creek Culvert, and Burgess Creek and ultimately discharge to the Yampa River maintaining historical drainage patterns. The project will not increase imperviousness of the drainage basins nor increase peak flows. It is exempt from MS4 permit requirements for water quality treatment because it will remain undeveloped. No detention or water quality treatment is proposed.

The design contained herein complies with the criteria set forth in the City's Drainage Design Manual.

LIMITATIONS

This study is intended to estimate and analyze peak stormwater runoff volumes generated by hydrologic events to evaluate existing drainage infrastructure and design new infrastructure needed to manage these flows. It does not account for groundwater, springs, or seeps and is not intended to be used for the evaluation or design of foundation drains or roof drains.

Basin delineations, areas, and soil characteristics are based on the best available information listed in the INTRODUCTION AND LOCATION section of the report. Actual conditions may vary. Landmark's assumptions, recommendations and opinions are based on this information and the proposed site plan. If any of the data is found to be inaccurate or the proposed site plan is changed, Landmark should be contacted to review this report and make any necessary revisions.

The 100-year event is defined as the rainfall, runoff, or flooding event which has a probability of 1-percent of occurring in any given year based on available data. The 100-year event could occur in successive years or even multiple times in a single year. Events greater than the 100-year event or lesser events combined with malfunctioning drainage works can occur on rare occasion and may cause flooding damage.

The data, opinions, and recommendations of this report are applicable to the specific design elements and location that is the subject of this report. The report is not applicable to any other design elements or to any other locations. Any and subsequent users accept any and all liability resulting from any use or reuse of the data, opinions, and recommendation without the prior written consent of Landmark Consultants, Inc.

Landmark Consultants, Inc. has no responsibility for construction means, methods, techniques, sequences, or procedures, or for safety precautions or programs in connection with the construction, for the acts or omissions of the contractor, or any other person performing any of the construction, or for the failure of any of them to carry out the construction in accordance with the Final Construction Drawings and Specifications.

The only warranty or guarantee made by Landmark Consultants, Inc. in connection with the services performed for this project is that such services are performed with the care and skill ordinarily exercised by members of the profession practicing under similar conditions, at the same time, and in the same or similar locality. No other warranty, expressed or implied, is made or intended by rendering such services or by furnishing written reports of the findings.

This study is intended to estimate and analyze peak stormwater runoff volumes generated by hydrologic events in order to evaluate existing drainage infrastructure and design new infrastructure needed to manage these flows. It does not account for groundwater, springs, or seeps and is not intended to be used for the evaluation or design of foundation drains or roof drains.

REFERENCES

1. Section 5.0 Drainage Criteria, City of Steamboat Springs Department of Public Works, September 2007.

2. Drainage Criteria Manual (Volumes 1 – 3), Urban Drainage and Flood Control District, June 2001

3. Hydraulic Design of Highway Culverts (HDS-5), Federal Highway Administration, September 2001

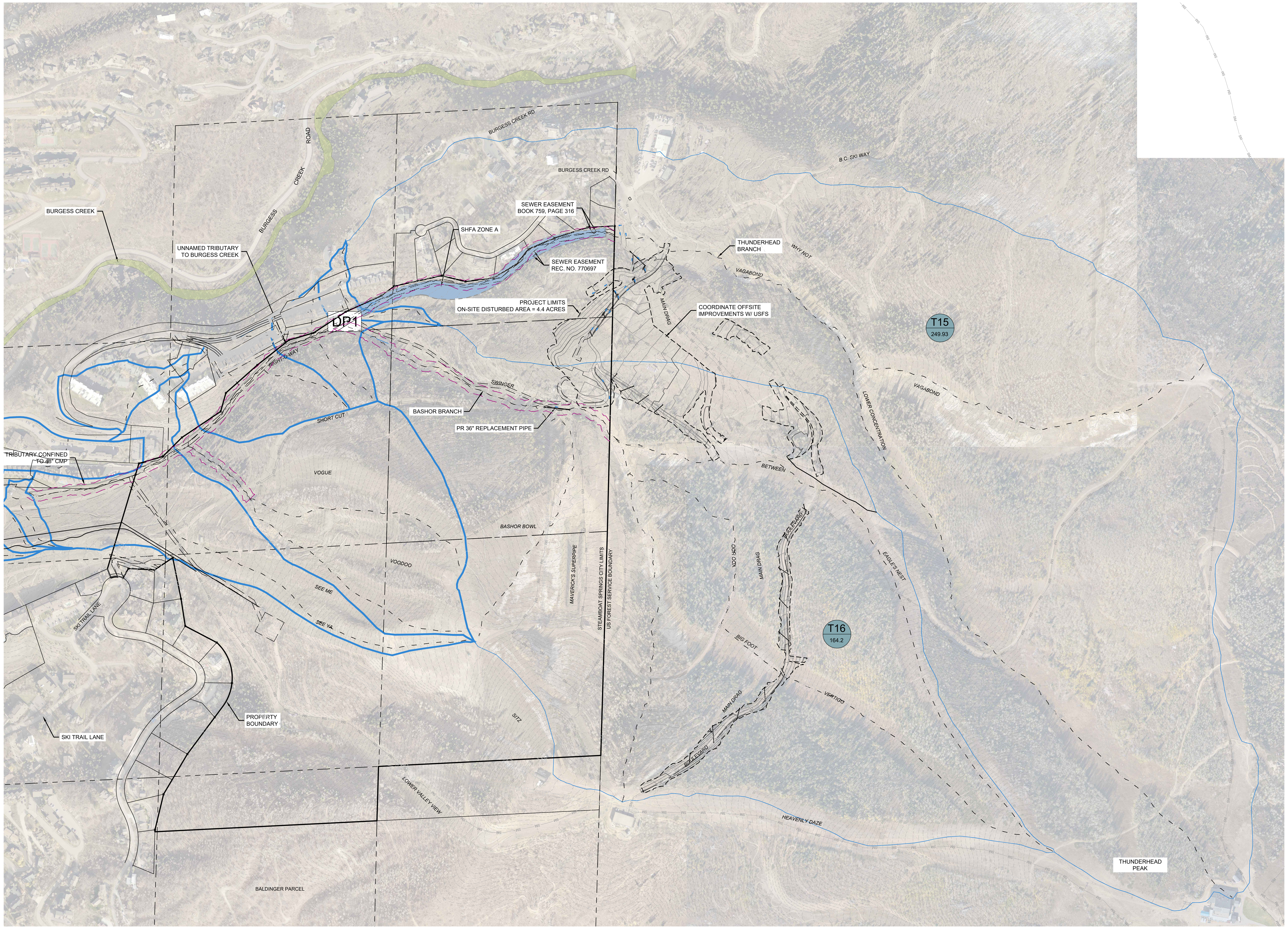
4. Procedures for Determining Peak Flows in Colorado, Natural Resource Conservation Service, 1984

5. Urban Hydrology for Small Watersheds (TR-55), Natural Resource Conservation Service, June 1986

6. Final Drainage Report for Steamboat Base Area Redevelopment, Drexel, Barrell & Co., December 1, 2006.

7. Citywide Stormwater Master Plan for the City of Steamboat Spring, Colorado, SEH, March 2013.

8. The Gold Book, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, United States Department of the Interior Bureau of Land Management & United States Department of Agriculture Forest Service, 2007.



NORTH

300 0 300 600 900 Feet

(IN FEET)
1 inch = 300 ft.

LEGEND:

- EXISTING STORM SEWER
- PROPOSED MAJOR CONTOUR (6805)
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR (6805)
- EXISTING MINOR CONTOUR
- PROPOSED SWALE
- PROPOSED CURB & GUTTER
- PROPERTY BOUNDARY
- FLOOD HAZARD LIMITS
- EXISTING OVERLAND FLOW DIRECTION

NOTES:

1. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR FOR ALL UNKNOWN UNDERGROUND UTILITIES.
2. ALL PROJECT DATA IS ON VERTICAL DATUM; NAVD 88. SEE NOTES SHEET FOR BENCHMARK REFERENCES.
3. ELEVATIONS FOR IMPROVEMENTS THAT ARE CONTROLLED BY ADJACENT EXISTING FACILITIES (SUCH AS PROPOSED GUTTERS ALONG EXISTING ASPHALT) MAY REQUIRE ADJUSTMENT BASED ON ACTUAL CONDITIONS. COORDINATE WITH ENGINEER TO ENSURE A CONSISTENT SECTION WITH SMOOTH TRANSITIONS WHERE NECESSARY.
4. SEE SOILS REPORT FOR PAVEMENT, SUBGRADE AND MATERIAL PREPARATION, DESIGN AND RECOMMENDATIONS.
5. ALL CURB SPOTS SHOWN ARE FLOWLINE ELEVATIONS, UNLESS NOTED OTHERWISE. ALL OTHER SPOTS ARE FINISHED GRADE ELEVATIONS.

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LANDMARK CONSULTANTS, INC.

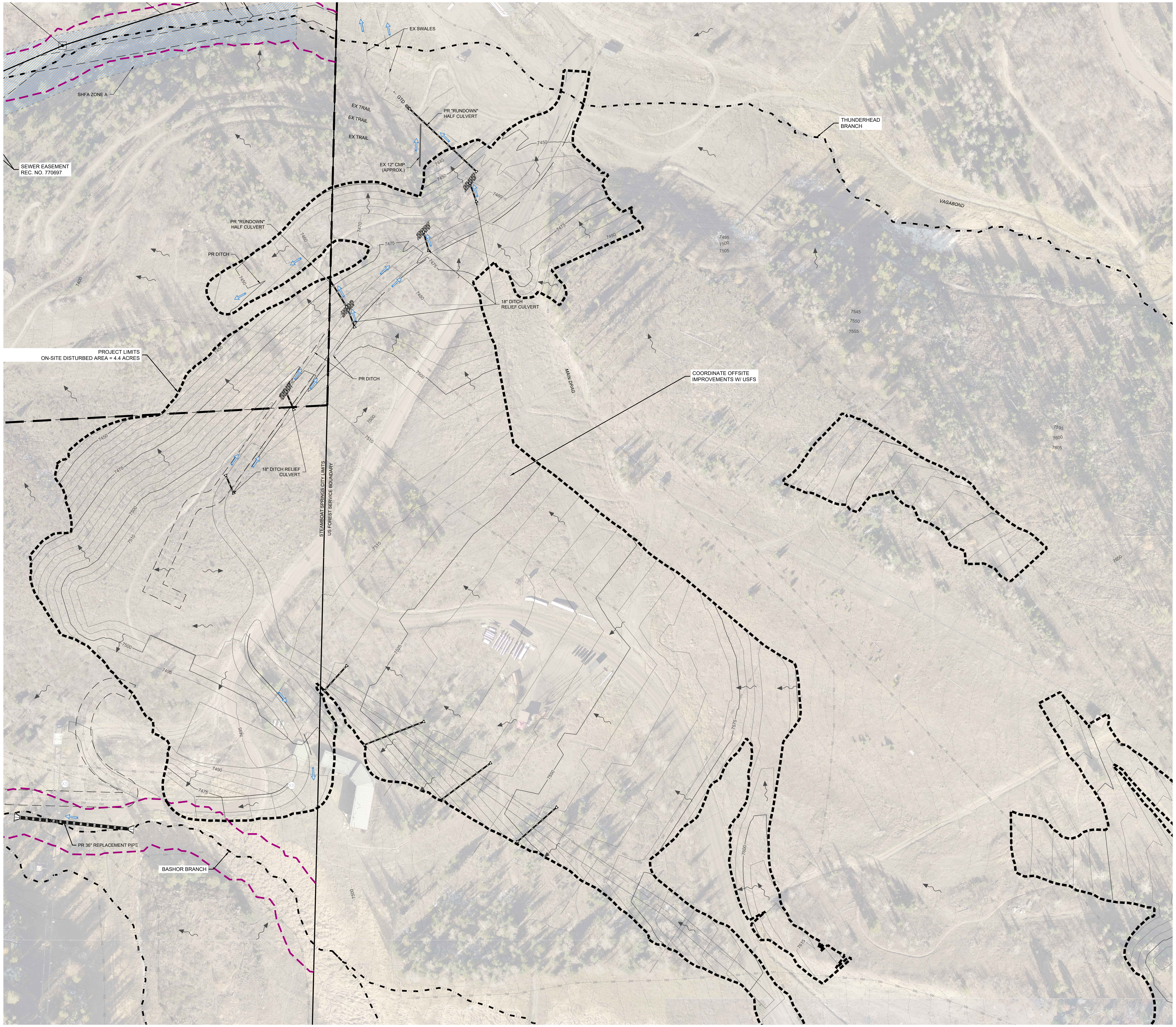
NO.	DATE:	BY:	DESCRIPTION:

REVIEW SET
NOT FOR CONSTRUCTION
2/19/2021

PROJECT:	1012-047
DATE:	2/26/2021
DRAWN BY:	DCS
CHECKED BY:	LCI

SSRC Green Horn Ranch
Figure 3: Drainage Plan

SHEET
1
Of 1 Sheets



NORTH

60 0 60 120 180 Feet
(IN FEET)
1 inch = 60 ft.

LEGEND:

EXISTING STORM SEWER	
PROPOSED MAJOR CONTOUR	6805
PROPOSED MINOR CONTOUR	
EXISTING MAJOR CONTOUR	6805
EXISTING MINOR CONTOUR	
PROPOSED SWALE	
PROPOSED CURB & GUTTER	
PROPERTY BOUNDARY	
FLOOD HAZARD LIMITS	
EXISTING OVERLAND FLOW DIRECTION	

NOTES:

1. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR FOR ALL UNKNOWN UNDERGROUND UTILITIES.
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LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:
1	6/18/2021	DCS	DRT COMMENTS

REVIEW SET
NOT FOR CONSTRUCTION
2/19/2021

PROJECT:	1012-047
DATE:	2/26/2021
DRAWN BY:	DCS
CHECKED BY:	LCI

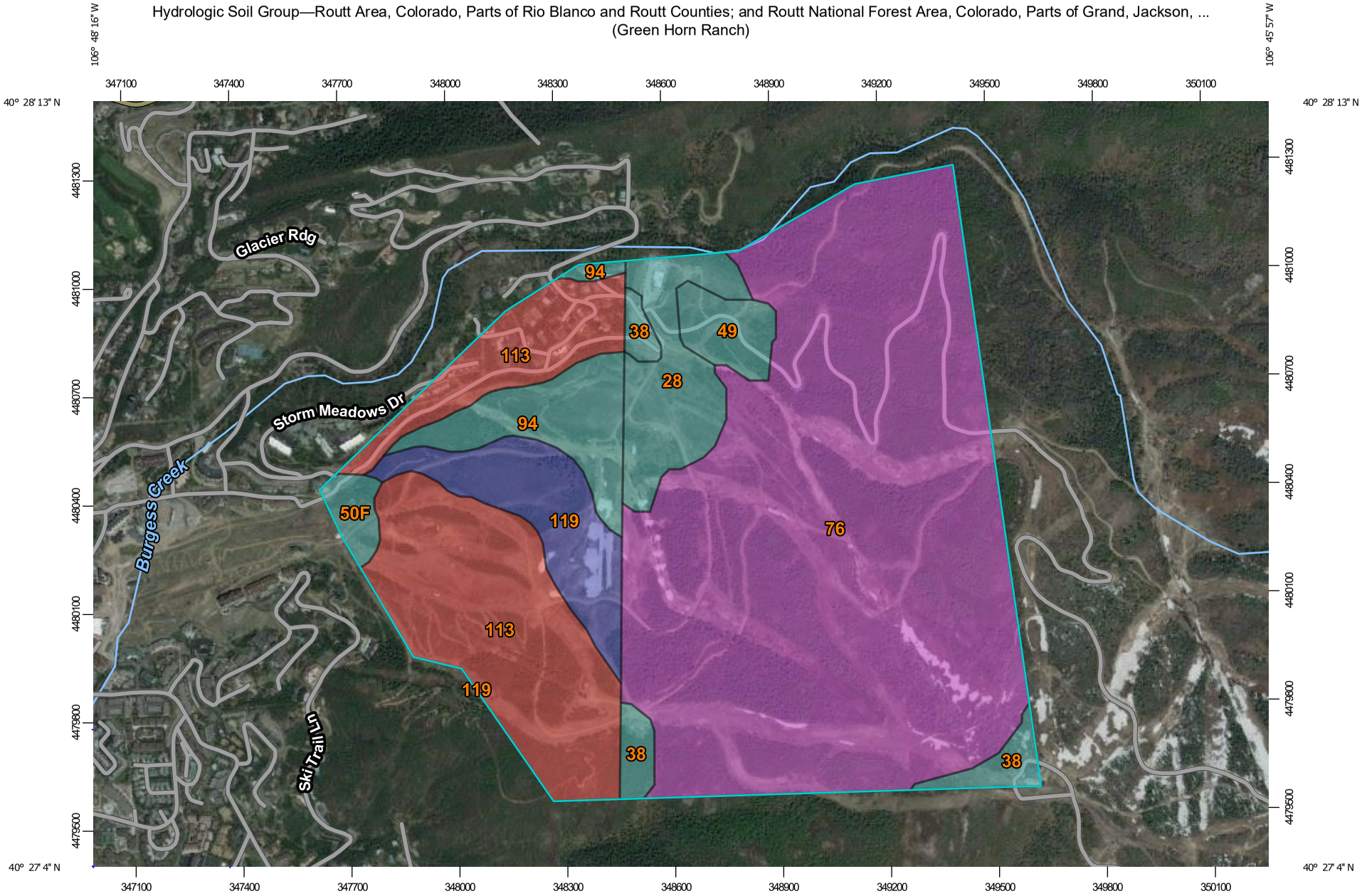
SSRC Green Horn Ranch
Figure 4: Drainage Plan Detail

SHEET
1
Of 1 Sheets

APPENDIX A

HYDROLOGIC CALCULATIONS

Hydrologic Soil Group—Routt Area, Colorado, Parts of Rio Blanco and Routt Counties; and Routt National Forest Area, Colorado, Parts of Grand, Jackson, ...
(Green Horn Ranch)



Map Scale: 1:14,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
50F	Routt loam, 25 to 65 percent slopes, very stony	C	7.0	1.1%
94	Dorpat-Reddles complex, 30 to 65 percent slopes	C	31.2	5.1%
113	Bucklon, very stony-Skyway complex, 30 to 75 percent slopes	D	119.1	19.5%
119	Mine loam, 30 to 75 percent slopes	B	37.0	6.1%
Subtotals for Soil Survey Area			**194.3**	**31.9%**
Totals for Area of Interest			**609.9**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
28	Haviland-Hollandlake families, complex, 10 to 40 percent slopes, landslides	C	34.2	5.6%
38	Namela-Rogert, very flaggy-Rock outcrop complex, 35 to 75 percent slopes	C	16.0	2.6%
49	Uinta-Pineguest families, complex, 15 to 40 percent slopes, landslides, very bouldery	C	12.9	2.1%
76	Boatsteam-Storm family, very bouldery-Pineguest family complex, 30 to 55 percent slopes	A	352.5	57.8%
Subtotals for Soil Survey Area			**415.6**	**68.1%**
Totals for Area of Interest			**609.9**	**100.0%**

Table 6-3. Recommended percentage imperviousness values

Land Use or Surface Characteristics	Percentage Imperviousness (%)
Business:	
Downtown Areas	95
Suburban Areas	75
Residential lots (lot area only)**:**	
Single-family	
2.5 acres or larger	12
0.75 – 2.5 acres	20
0.25 – 0.75 acres	30
0.25 acres or less	45
Apartments	75
Industrial:	
Light areas	80
Heavy areas	90
Parks, cemeteries	10
Playgrounds	25
Schools	55
Railroad yard areas	50
Undeveloped Areas:	
Historic flow analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (packed)	40
Drive and walks	90
Roofs	90
Lawns, sandy soil	2
Lawns, clayey soil	2

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www.LANDMARK-CO.com

PROJECT	Green Horn Ranch
DESIGNER	Deb Spaustat
DATE	2/19/2021
LOCATION	Steamboat Springs, CO

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS

Character of Surface	Percent Impervious
Zone RE1	30%
Zone RE 2	45%
Zone RN 1	20%
Zone RR 1	75%
Zone OR	2%
Right-of-Way	90%
Ski Slope	2%
Gravel Surfaces	40%
Roof	90%

IDF	Soil Type
Steamboat Springs NOAA	C

Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Area of Gravel Surfaces (sq. ft.)	Area of Gravel Surfaces (acres)	Area of Roof (sq. ft.)	Area of Roof (acres)	Area of Ski Slope (sq. ft.)	Area of Ski Slope (acres)	Area of Ski Slope (USFS, Unzoned) (sq. ft.)	Area of Ski Slope (USFS, Unzoned) (acres)	Zone RN 1 (sq. ft.)	Zone RN 1 (acres)	Zone RE 1 (sq. ft.)	Zone RE 1 (acres)	Zone RE 2 (sq. ft.)	Zone RE 2 (acres)	Zone RR 1 (sq. ft.)	Zone RR 1 (acres)	Zone OR (sq. ft.)	Zone OR (acres)	R-O-W (sq.ft.)	R-O-W (acres)	Percent Impervious
T15	10884818.00	249.88	35589.54	0.82	0.00	0.00	663494.92	15.23	9141694.49	209.86	639174.27	14.67	47711.14	1.10	58539.70	1.34	86654.31	1.99	84142.71	1.93	127623.89	2.93	5.15%
T16	7152256.29	164.19	61864.08	1.42	1669.28	0.04	2107444.81	48.38	4981285.27	114.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.35%
Total		414.07																					4.04%

HY-8 Culvert Analysis Report

Water Surface Profile Plot for Culvert: REPLACEMENT PIPE

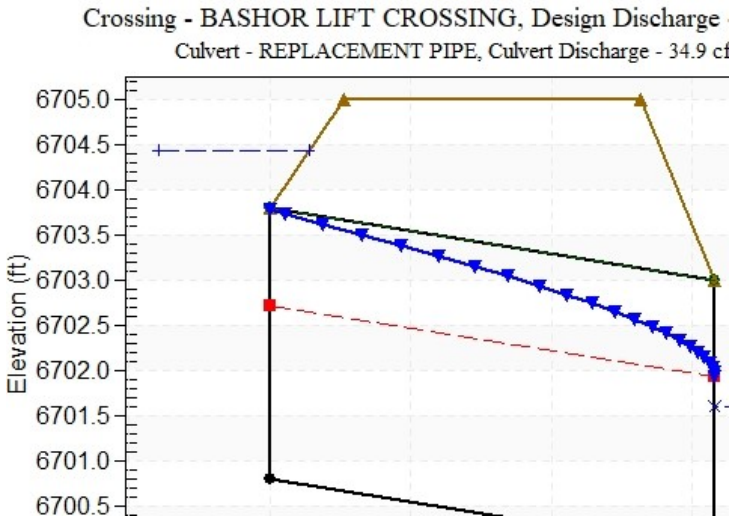


Table 1 - Culvert Summary Table: REPLACEMENT PIPE

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
1.00	1.00	6701.28	0.435	0.486	2-M2c	0.404	0.309	0.309	0.146	2.604	2.281
5.90	5.90	6702.00	1.087	1.208	2-M2c	0.979	0.762	0.762	0.454	4.175	4.329
10.80	10.80	6702.47	1.499	1.675	2-M2c	1.360	1.041	1.041	0.682	4.957	5.276
15.70	15.70	6702.86	1.853	2.070	2-M2c	1.698	1.264	1.264	0.885	5.547	5.915
20.60	20.60	6703.23	2.159	2.441	2-M2c	2.039	1.457	1.457	1.074	6.048	6.395
25.50	25.50	6703.60	2.451	2.805	2-M2c	2.449	1.630	1.630	1.254	6.501	6.779
30.40	30.40	6703.98	2.755	3.192	7-M2c	3.000	1.786	1.786	1.428	6.927	7.097
34.90	34.90	6704.43	3.059	3.637	7-M2c	3.000	1.919	1.919	1.584	7.307	7.345
40.20	38.73	6705.03	3.345	4.241	7-M2c	3.000	2.025	2.025	1.763	7.627	7.599
45.10	39.11	6705.08	3.375	4.291	7-M2c	3.000	2.035	2.035	1.927	7.660	7.803
50.00	39.36	6705.12	3.395	4.329	7-M2t	3.000	2.042	2.088	2.088	7.495	7.984

****
****
****

Straight Culvert

Inlet Elevation (invert): 6700.79 ft, Outlet Elevation (invert): 6700.00 ft

Culvert Length: 158.00 ft, Culvert Slope: 0.0050

****
****
****

Site Data - REPLACEMENT PIPE

Site Data Option:

Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6700.79 ft

Outlet Station: 158.00 ft

Outlet Elevation: 6700.00 ft

Number of Barrels: 1

Culvert Data Summary - REPLACEMENT PIPE

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Mitered to Conform to Slope

Inlet Depression: None

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 1 cfs

Design Flow: 34.9 cfs

Maximum Flow: 50 cfs

Table 2 - Summary of Culvert Flows at Crossing: BASHOR LIFT CROSSING

Headwater Elevation (ft)	Total Discharge (cfs)	REPLACEMENT PIPE Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6701.28	1.00	1.00	0.00	1
6702.00	5.90	5.90	0.00	1
6702.47	10.80	10.80	0.00	1
6702.86	15.70	15.70	0.00	1
6703.23	20.60	20.60	0.00	1
6703.60	25.50	25.50	0.00	1
6703.98	30.40	30.40	0.00	1
6704.43	34.90	34.90	0.00	1
6705.03	40.20	38.73	1.37	26
6705.08	45.10	39.11	5.86	5
6705.12	50.00	39.36	10.51	4
6705.00	38.68	38.68	0.00	Overtopping

Table 3 - Downstream Channel Rating Curve (Crossing: BASHOR LIFT CROSSING)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
1.00	6700.15	0.15	2.28	0.36	1.05
5.90	6700.45	0.45	4.33	1.13	1.13
10.80	6700.68	0.68	5.28	1.70	1.13
15.70	6700.88	0.88	5.91	2.21	1.11
20.60	6701.07	1.07	6.40	2.68	1.09
25.50	6701.25	1.25	6.78	3.13	1.07
30.40	6701.43	1.43	7.10	3.56	1.05
34.90	6701.58	1.58	7.35	3.95	1.03
40.20	6701.76	1.76	7.60	4.40	1.01
45.10	6701.93	1.93	7.80	4.81	0.99
50.00	6702.09	2.09	7.98	5.21	0.97

Tailwater Channel Data - BASHOR LIFT CROSSING

Tailwater Channel Option: Rectangular Channel

Bottom Width: 3.00 ft

Channel Slope: 0.0400

Channel Manning's n: 0.0340

Channel Invert Elevation: 6700.00 ft

Roadway Data for Crossing: BASHOR LIFT CROSSING

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 6705.00 ft

Roadway Surface: Gravel

Roadway Top Width: 105.00 ft

APPENDIX B

CITY CHECKLISTS

STANDARD FORM NO. 1 DRAINAGE LETTER CHECKLIST

Instructions:

1. The applicant shall identify with a "check mark" if information is provided with letter. If applicant believes information is not required, indicate with "N/A" and attach separate sheet with explanation.
2. The reviewer will determine if information labeled "N/A" is required and whether additional information must be submitted.

I. General

✓ A. Typed and legible in 8½ x 11" format.
✓ B. Drawings that are 8½" x 11" or 11 x 17 bound within letter, larger drawings (up to 24 x 36) included in a pocket attached to the letter. Drawings shall be at an appropriate size and scale to be legible and include project area.

II. Title Page

✓ A. Type of Letter.
✓ B. Project Name, Subdivision, Original Date, Revision Date.
✓ C. Preparer's name, firm, address, and phone number.
✓ D. Certifications, PE stamp, signature and date from licensed Colorado PE (for FINAL letter).
✓ E. "DRAFT" for 1st Submittal and revisions; "FINAL" once approved.
✓ F. Note: City of Steamboat Springs plan review and approval is only for general conformance with City design criteria and the City code. The City is not responsible for the accuracy and adequacy of the design, dimensions, and elevations that shall be confirmed and correlated at the job site. The City of Steamboat Springs assumes no responsibility for the completeness or accuracy of this document.

III. Introduction

✓ A. Description of site location, size in acres, existing and proposed land use, and any pertinent background info.
✓ B. Identify drainage reports for adjacent development.

IV. Drainage Criteria and Methodology Used

✓ A. Identify design rainfall and storm frequency.
✓ B. Identify runoff calculation method used.

V. Existing Conditions (Pre-Development/Historic)

✓ A. Indicate ground cover, imperviousness, topography, and size of site (acres).
✓ B. Describe existing stormwater system (sizes, materials, etc.).
✓ C. Describe other notable features (canals, major utilities, etc.).
✓ D. Note site outfall locations and ultimate outfall location (typically Yampa River).
NA E. Note capacity of existing system and identify any constraints. NO EXISITNG SYSTEM
✓ F. Identify NRCS soil type.
✓ G. Identify the FEMA Map reviewed, if site is in floodplain/way, and zone designation.

VI. Proposed Conditions

SINCE NO STORMWATER SYSTEMS EXIST ONSITE OR ARE PROPOSED FLOWS WERE NOT CALCULATED.

✓ A. Indicate ground cover, imperviousness, topography, and disturbed area (acres).
NA B. Describe proposed stormwater system (sizes, materials, etc.). NO PROPOSED SYSTEM
NA C. Describe proposed outlets and indicate historic and proposed flow for each.
NA D. Include calculations for all pipes, inlets, culverts, ditches, ponds, etc. in appendix.
NA E. Include a summary table for the 5- and 100-year events showing historic flow and proposed flow for total site and each basin.
NA F. Include a summary of proposed water quality measures to be constructed. EXEMPT FROM WQ

VII. Conclusions

✓ A. Provide general summary.
✓ B. Note if site does or does not comply with criteria and any variances to criteria.
✓ C. Indicate if peak proposed flow is less than, equal to, or greater than peak historic flow for each outfall, design point, and for the total site.
NA D. Indicate proposed stormwater quality system.

VIII. References

✓ A. Provide a reference list of all criteria, master plans, drainage reports and technical information used.

IX. Figures

SITE PLAN, EXISTING CONDITIONS PLAN AND PROPOSED CONDITIONS PLAN ARE COMBINED INTO A SINGLE PLAN FIGURE 3: DRAINAGE PLAN

✓ A. Vicinity Map.
✓ B. Site Plan (include the horizontal and vertical datum used and all benchmarks).
C. Existing conditions.
✓ 1. Delineate existing basin boundaries.
✓ 2. Show existing runoff flow arrows.
✓ 3. Show existing topography.
✓ 4. Show existing stormwater features (structures, sizes, materials, etc.).
✓ 5. Show floodplain limits and information.
✓ 6. For each basin, show bubble with basin number, acreage and percent impervious or provide information in summary table or figure.
✓ 7. For each outlet show bubble with acreage and historic flow and proposed flow or provide information in summary table on figure.

D. Proposed Conditions
✓ 1. Delineate proposed basin boundaries.
✓ 2. Show proposed runoff flow arrows.
✓ 3. Show existing and proposed topography at an interval of at least 5-ft.
✓ 4. For each basin show bubble with basin number, acreage and percent impervious or provide a summary table or figure.
✓ 5. For each outlet show bubble with acreage, historic flow, and proposed flow or provide a summary table or figure.
✓ 6. Show floodplain limits and information.
NA 7. Show proposed stormwater system (components, sizes, materials, & slopes).
✓ 8. Show property lines and easements.
NA 9. Show any new easements required.

X. Appendices

✓ A. Runoff Calculations
NA B. Culvert Calculations
NA C. Pond Calculations.
NA D. Other Calculations

Acknowledgements:

Standard Form No. 1 was prepared by: Deborah Spaustat Digitally signed by Deborah Spaustat DN: C=US, E=debs@landmark-co.com, O="Landmark Consultants, Inc.", CN=Deborah Spaustat Date: 2021.02.24 12:50:02-07'00' _____

Date

Include Attachment A – Scope Approval Form (see Standard Form No. 5)
Include Attachment B – Storm Water Quality Plan (see Standard Form No. 4)

Standard Form No. 5 Drainage and Stormwater Treatment Scope Approval Form

Prior to starting a development plan and before the first drainage submittal, a Drainage and Stormwater Treatment Scope Approval Form must be submitted for review and signed by the City Engineer. A signed form shall also be included in every drainage submittal as Attachment A. This Scope Approval Form is for City requirements only. Values may be approximate. The City encourages supporting calculations and figures to be attached.

Project Information	
Project name:	Green Horn Ranch
Project location:	2305 Mt Werner Circle (Parcel ID Number 936271001)
Developer name/contact info:	Steamboat Ski & Resort Corp. Jim Schneider, 970-871-5381, jschneider@steamboat.com
Drainage engineer name/contact info:	Deborah Spaustat, P.E., Landmark Consultants, Inc. debs@landmark-co.com, 970-871-9494
Application Type:	Preliminary Plat - Administrative
Proposed Land Use:	Open Space & Recreation (OR); Ski Area

Project Site Parameters	
Total parcel area (acres):	181 acres (Drainage Basin = 414 acres)
Disturbed area (acres):	4.6 acres
Existing impervious area (acres, if applicable):	4.04% overall imperviousness
Proposed new impervious area (acres):	0 acres
Proposed total impervious area (acres):	4.04% overall imperviousness
Proposed number of project outfalls:	1
Number of additional parking spaces:	0
Description and site percentage of existing cover/land use(s):	OR - Open Space & Recreation (100%)
Description and site percentage of proposed cover/land use(s):	OR - Open Space & Recreation (100%)
Expected maximum proposed conveyance gradient (%):	Sheet flow slopes up to 50% (2:1)
Description of size (acres) and cover/land use(s) of offsite areas draining to the site	OR - 16.4%, RE 1 - 0.3%, RE 2 - 0.3%, RN 1 - 3.5% RR 1 - 0.5%, Ski Area (outside city limits) - 78.2% R-O-W - 0.7%

Type of Study Required:

☑ Drainage Letter
☐ Final Drainage Study
☐ Conceptual Drainage Study
☐ Stormwater Quality Plan

Hydrologic Evaluation:

☑ Rational Method ☐ CUHP/SWMM ☐ HEC-HMS ☐ Other_____

Project Drainage	
Number of subbasins to be evaluated:	1
Presence of pass through flow (circle):	(YES) NO
Description of proposed stormwater conveyance on site:	n/a
Project includes roadway conveyance as part of design evaluation (circle):	YES (NO)
Description of conveyance of site runoff downstream of site, identify any infrastructure noted in Stormwater Master Plan noted as lacking capacity for minor or major storm event:	Site runoff patterns will remain unchanged, continuing to drain to the unnamed tributary to Burgess Creek (BC). The unnamed tributary will join BC at the 78" base area culvert. This project does not propose to increase peak flows.
Detention expected onsite (circle):	YES (NO)
Presence of Floodway or Floodplain on site (circle):	(YES) NO
Anticipated modification of Floodway or Floodplain proposed (circle):	YES (NO)
Describe culvert or storm sewer conveyance evaluative method:	n/a

Permanent Stormwater Treatment Facility Design Standard (check all that apply with only one standard per tributary basin):

☐ WQCV Standard ☐ TSS Standard ☐ Infiltration Standard
☐ Constrained Redevelopment WQCV Standard
☐ Constrained Redevelopment TSS Standard
☐ Constrained Redevelopment Infiltration Standard
☑ Does not Require Permanent Stormwater Treatment (attach Exclusion Tracking Form)

Project Permanent Stormwater Treatment	
Justification of choice of proposed design standard, including how the site meets the constrained redevelopment standard, infiltration test results, etc.:	The site is remaining unchanged except for grading including re-vegetation.
Concept-level permanent stormwater treatment facility design details (type, location of facilities, proprietary structure selection, treatment train concept, etc.):	n/a
Proposed LID measures to reduce runoff volume:	n/a
Will treatment evaluation include off-site, pass through flow (circle):	YES (NO)

Approvals

Deborah Spaustat	2/19/21	970-871-9494
Prepared By: (Insert drainage engineer name & firm)	Date	Phone number

Approved By:

Emrick Soltis

Digitally signed by Emrick Soltis
DN: C=US, E=esoltis@steamboatsprings.net, O=City of Steamboat Springs, OU=PW - Engineering Div., CN=Emrick Soltis
Date: 2021.02.23 06:42:12-07'00'

Printed Name: Date
City Engineer

Standard Form No. 6 Permanent Stormwater Treatment Facility Exclusions Tracking Form

If a site development is eligible for an exclusion from the requirement to implement permanent stormwater treatment facilities, this form must be filled out and submitted for approval. If an exclusion is sought, this form shall be attached to the development's Drainage and Stormwater Treatment Scope Approval Form when it is submitted for review. The City is required to track all sites excluded from the requirement to implement permanent stormwater treatment facilities. Initial values may be approximate, but final values must meet the requirements of Section 5.12.3 of the City's Engineering Standards. Supporting calculations, figures, and narrative must be included.

Project Information	
Project/site name:	Green Horn Ranch
Project/site location:	2305 Mt Werner Circle (Parcel ID Number 936271001)
Developer name/ contact info:	Steamboat Ski & Resort Corp. Jim Schneider, 970-871-5381, jschneider@steamboat.com
Drainage engineer name/contact info:	Deborah paustat, P.E., Landmark Consultants, Inc. debs@landmark-co.com, 970-871-9494
Owner name/ contact info:	Steamboat Ski & Resort Corp. Jim Schneider, 970-871-5381, jschneider@steamboat.com
Anticipated Construction Completion Date:	September 2021

Project Site Parameters	
Total parcel area (acres):	181 acres (Drainage Basin = 414 acres)
Disturbed area (acres):	4.6 acres
Existing impervious area (acres):	4.04% overall imperviousness
Proposed new impervious area (acres):	0 acres
Proposal total impervious area (acres):	4.04%
Excluded impervious area (acres):	0 acres

Exclusion Category:

☐ 1. Pavement Management Site ☐ 2. Excluded Roadway Redevelopment

☐ 3. Excluded Existing Roadway Area ☐ 4. Aboveground & Underground Utilities

☐ 5. Large Lot Single Family Site

☐ 6. Non-Residential & Non-Commercial Infiltration Conditions

☑ 7. Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped

☐ 8. Stream Stabilization Sites ☐ 9. Trails

1. Pavement Management Site		
Describe the nature of the activity having to do with roads and bridges used for vehicle traffic or those contiguous impervious areas used for pedestrian or bicycle traffic, roadway drainage, or roadside parking.		
Existing Impervious Area:		
Proposed Impervious Area:		Impervious area must not increase.

2. Excluded Roadway Redevelopment		
Length of roadway redevelopment:		
Total additional paved area:		
Additional paved area/mile:		Must be less than 1 acre.
Maximum increase in paved width:		Must be no more than 8.25'.

3. Excluded Existing Roadway Area		
Existing Roadway Ave. Width (feet):		
Proposed Roadway Ave. Width (feet):		
Average of Increase in Roadway Width:		Must be less than 2x.
Only the existing roadway portion of the project may be excluded from requiring permanent water quality treatment. If existing roadway drains to new roadway, existing roadway runoff must be accounted for in the design of the treatment facility for the new roadway.		

4. Aboveground & Underground Utilities
Describe the type of utility or utilities, the owner(s) of each utility, the nature, location, length, and width of the land disturbance, whether utilities are new or being maintained, and how vegetation, topography, and drainage patterns will be reestablished once the project is completed.

5. Large Lot Single Family Site		
Zoning:		Must be single family or agricultural
Parcel size (acres):		Must be at least 2.5 acres.
Proposed Site Imperviousness (%):		Must be less than 10%.
If proposed site imperviousness is 10% or more and less than or equal to 20%, a report is required to justify exclusion. See Engineering Standards.		

6. Non-Residential/Non-Commercial Infiltration Conditions

Submit a narrative study that describe the nature and extent of the non-residential and non-commercial development, and how vegetation will be reestablished once the disturbance is completed. Describe topography and drainage patterns on the existing and proposed sites.

Existing vegetation and percent coverage:		
Proposed vegetation and percent coverage:		Must be at least 70%
80% percentile runoff flow rate (cfs):		
Soil types on site and percent of each:		Must be A or B HSG.

The City may accept more detailed studies that do not meet these criteria if they show the required infiltration is achieved.

7. Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped

Describe the nature and extent of the land disturbance and how vegetation will be reestablished once the disturbance is completed.

Approximately 4.6 acres of the ski area will be regraded and re-vegetated using a native seed mix. Temporary construction storm-water quality management will include slope stabilization measures until vegetation is established.

8. Stream Stabilization Sites

Describe the name of the stream and the nature and location of the stabilization activities including which banks and the length of the stabilization.

9. Trails

Describe the trail geometry, trail location with respect to other roadways, trails, or sidewalks, and anticipated trail use. Confirm the trail is not an attached or detached sidewalk that is part of a roadway.

Approvals

Deborah Spaustat, P.E., Landmark Consultants, Inc.	2/19/2021	970-871-9494
Prepared By: (Insert drainage engineer name & firm)	Date	Phone

Approved By:

Emrick Soltis

Digitally signed by Emrick Soltis
DN: C=US, E=esoltis@steamboatsprings.net, O=City of Steamboat Springs, OU=PW - Engineering Div., CN=Emrick Soltis
Date: 2021.02.23 06:43:03-07'00'

Print Name: City Engineer	Date	Phone

LANDMARK CONSULTANTS, INC.

CIVIL ENGINEERS | SURVEYORS

141 9th Street ~ P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

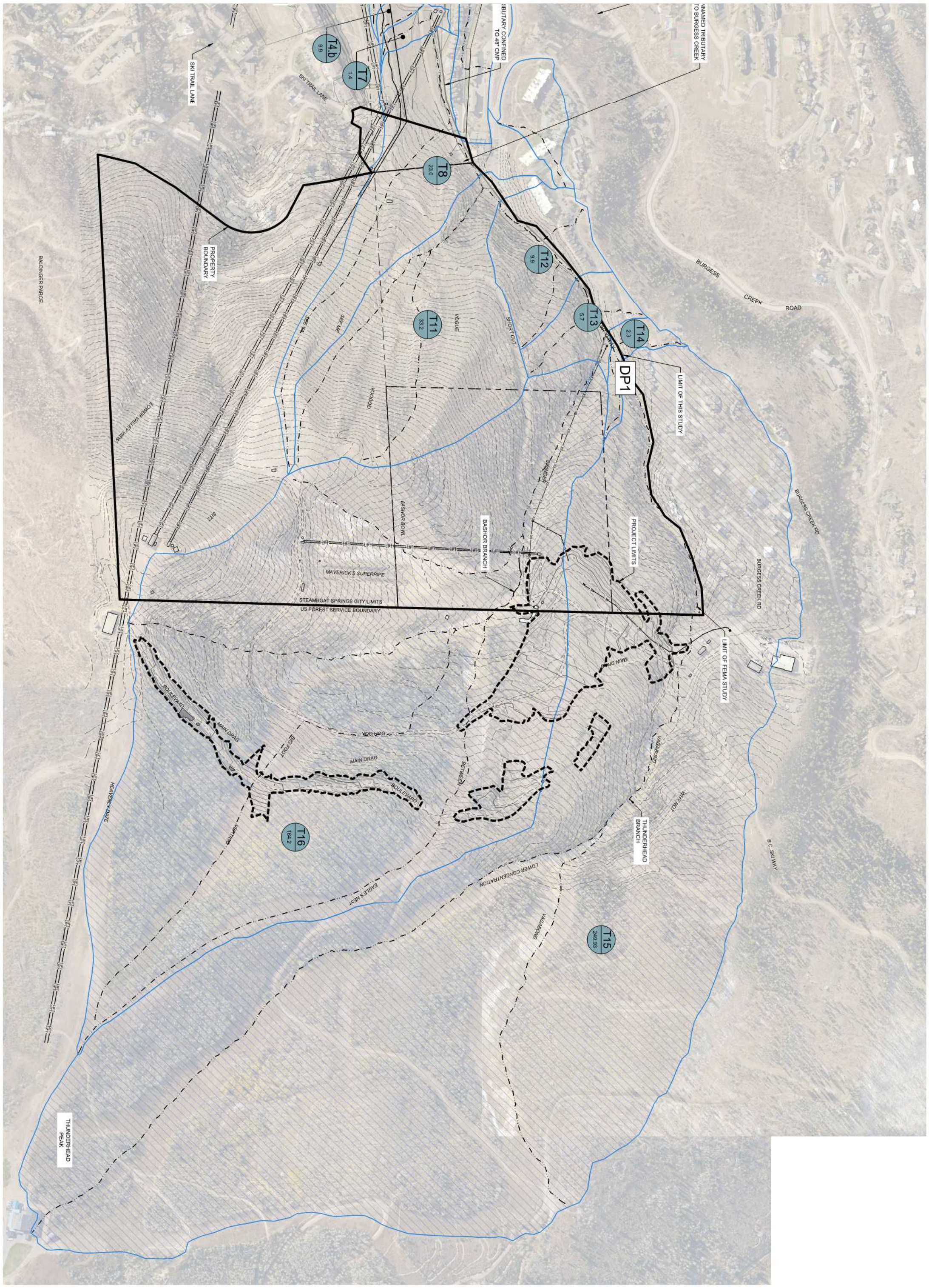
PROJECT	Green Horn Ranch
DESIGNER	Deb Spaustat
DATE	2/19/2021
LOCATION	Steamboat Springs, CO

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS

Character of Surface	Percent Impervious
Zone RE1	30%
Zone RE 2	45%
Zone RN 1	20%
Zone RR 1	75%
Zone OR	2%
Right-of-Way	90%
Ski Slope	2%
Gravel Surfaces	40%
Roof	90%

IDF	Soil Type
Steamboat Springs NOAA	C

Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Area of Gravel Surfaces (sq. ft.)	Area of Gravel Surfaces (acres)	Area of Roof (sq. ft.)	Area of Roof (acres)	Area of Ski Slope (sq. ft.)	Area of Ski Slope (acres)	Area of Ski Slope (USFS, Unzoned) (sq. ft.)	Area of Ski Slope (USFS, Unzoned) (acres)	Zone RN 1 (sq. ft.)	Zone RN 1 (acres)	Zone RE 1 (sq. ft.)	Zone RE 1 (acres)	Zone RE 2 (sq. ft.)	Zone RE 2 (acres)	Zone RR 1 (sq. ft.)	Zone RR 1 (acres)	Zone OR (sq. ft.)	Zone OR (acres)	R-O-W (sq.ft.)	R-O-W (acres)	Percent Impervious
T15	10884818.00	249.88	35589.54	0.82	0.00	0.00	663494.92	15.23	9141694.49	209.86	639174.27	14.67	47711.14	1.10	58539.70	1.34	86654.31	1.99	84142.71	1.93	127623.89	2.93	5.15%
T16	7152256.29	164.19	61864.08	1.42	1669.28	0.04	2107444.81	48.38	4981285.27	114.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.35%
Total		414.07																					4.04%



NORTH

SCALE: 1 inch = SCALEft.

(IN FEET)

LEGEND:

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PROPOSED STORM INLET (CURB & AREA)
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SWALE
- PROPOSED CURB & GUTTER
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING RIGHT OF WAY
- FLOOD HAZARD LIMITS
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- PROPOSED OVERLAND FLOW DIRECTION W/SLOPE
- PROPOSED CHANNELIZED FLOW DIRECTION W/ SLOPE
- EXISTING CHANNELIZED FLOW DIRECTION

NOTES:

1. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES.
2. ALL PROJECT DATA IS ON VERTICAL DATUM; NAVD 88. SEE NOTES SHEET FOR BENCHMARK REFERENCES.
3. ELEVATIONS FOR IMPROVEMENTS THAT ARE CONTROLLED BY ADJACENT EXISTING FACILITIES (SUCH AS PROPOSED GUTTERS ALONG EXISTING ASPHALT) MAY REQUIRE ADJUSTMENT BASED ON ACTUAL CONDITIONS. COORDINATE WITH ENGINEER TO ENSURE A CONSISTENT SECTION WITH SMOOTH TRANSITIONS WHERE NECESSARY.
4. SEE SOILS REPORT FOR PAVEMENT, SUBGRADE AND MATERIAL PREPARATION, DESIGN AND RECOMMENDATIONS.
5. ALL CURB SPOTS SHOWN ARE FLOWLINE ELEVATIONS, UNLESS NOTED OTHERWISE. ALL OTHER SPOTS ARE FINISHED GRADE ELEVATIONS.

SHEET 1 Of 1 Sheets

SSRC Green Horn Ranch

Drainage Study
Figure 2: Overall Drainage Basins

PROJECT:	1012-047
DATE:	12/18/2020
DRAWN BY:	DCS
CHECKED BY:	LCI

NO.	DATE:	BY:	DESCRIPTION:

REVIEW SET
NOT FOR CONSTRUCTION
2/19/2021

LANDMARK CONSULTANTS, INC.
CIVIL ENGINEERS | SURVEYORS
141 9th Street ~ P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

Contact and Site Information

Project Address: (Steamboat Ski Area - On Mountain) 2305 Mt. Werner Circle			**Project Name (if applicable):** Green Horn Ranch Grading Steamboat On Mountain Improvements		
Project Contractor: Saunders Construction LLC			**Project Owner:** Alterra Mountain Company Steamboat Ski & Resort Corporation		
Contractor Address: 86 Inverness Place North			**Owner Address:** 2305 Mt. Werner Circle		
City: Englewood	**State:** CO	**Zip:** 80112	**City:** Steamboat Springs	**State:** CO	**Zip:** 80487
Phone: 303-699-9000			**Phone:** 970-871-5319		
Email: j.boh@saundersinc.com			**Email:** dhunter@steamboat.com		
Qualified Stormwater Manager: Charlie MacArthur			**Total Area of Disturbance (Acres):** 18.8		
Phone: 970-879-6231			**CDPHE CDPS Certification No. (if applicable)**		
Email: charli@nativeexcavating.com			**Building Permit No.** TB-21-751		

Project Description:

"Green Horn Ranch" project proposes to regrade approximately 4.4 acres within the limits of the City of Steamboat Springs and an additional 14.5 acres on US Forest Service Property in the vicinity of the current Lower Bashor Bull-Wheel at Steamboat Ski Resort. 2021 Grading will lay the ground work for future 2022 terminal station at Green Horn Ranch.

RCRBD Record Set
T.A.

07/14/2021

Terms and Conditions of Permit

1. **Applicability:** A City of Steamboat Springs Construction Stormwater Permit is required whenever construction occurs within city limits that will result in a land disturbance of greater than or equal to one acre, or that is less than one acre, but is part of a larger common plan of development or sale that would disturb, or has disturbed, one acre or more, unless the disturbed areas have been finally stabilized.
2. **Control Measures:** All stormwater discharges must be controlled through the use of properly installed, operated and maintained control measures to prevent pollutants including trash from entering the City's drainageways and other surface waters within City limits. Inadequate or unmaintained control measures must be corrected immediately.
3. **Compliance:** The project shall not violate City Municipal Code, City Engineering Standards, or other applicable state and federal requirements.
4. **SWMP:** All work must conform to the approved Stormwater Management Plan (SWMP). The SWMP shall be updated as necessary to reflect current site conditions and maintained on site.
5. **Enforcement:** Any violation in any terms or conditions of this permit or the provisions of the City of Steamboat Springs Municipal Code shall be subject to enforcement actions.
6. **Permit Modification:** If the operator is replaced by a different contractor, City Stormwater staff must be notified and a new stormwater permit shall be completed. Transfer of property ownership of discrete subparcels within an area permitted for construction activities by an original permittee does not in and of itself constitute grounds for transfer of a City Stormwater Permit. Until a permit for construction activity is issued for the discrete subparcel, the original, primary permittee is still responsible for management of stormwater within the area encompassed by the original permit.
7. **Permit Termination:** Before this permit can be terminated, the site must have achieved final stabilization as determined by the City Stormwater Staff, and all temporary non-biodegradable control measures no longer needed must be removed.
8. **Right of Entry:** The City, its authorized agents and employees may enter the permitted site in order to determine compliance with the terms and conditions of this permit.
9. **Upset**: Is an exceptional incident in which there is unintentional and temporary noncompliance with the permit terms and conditions because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.
10. **Notification:** The permittee shall notify the City as soon as practicable, but no later than 24 hrs after becoming aware of any significant spill, or discharge of pollutants.

By signing below Owner and Contractor certify that the information provided on this application is factual to the best of their knowledge. Owner and Contractor understand that this permit is granted under terms and conditions listed above and special provisions as noted. The Contractor agrees that all applicable City and State permits have been obtained. Permit is not valid until signed by City staff.

Property Owner:	Date:	Project Contractor:	Date:
Dave Hunter	4/6/21	Josh Boh	4/2/2021

This section to be completed by City Stormwater Staff

Permit Type: Large Site ☐ Small Site ☐ Area of Disturbance:	COSS Permit No.
Review Date:	
Comments or Special Conditions:	
Permit is not valid until signed by City Stormwater Staff	
City Stormwater Staff:	Permit Issue Date:

RCRBD Record Set
T.A.
07/14/2021

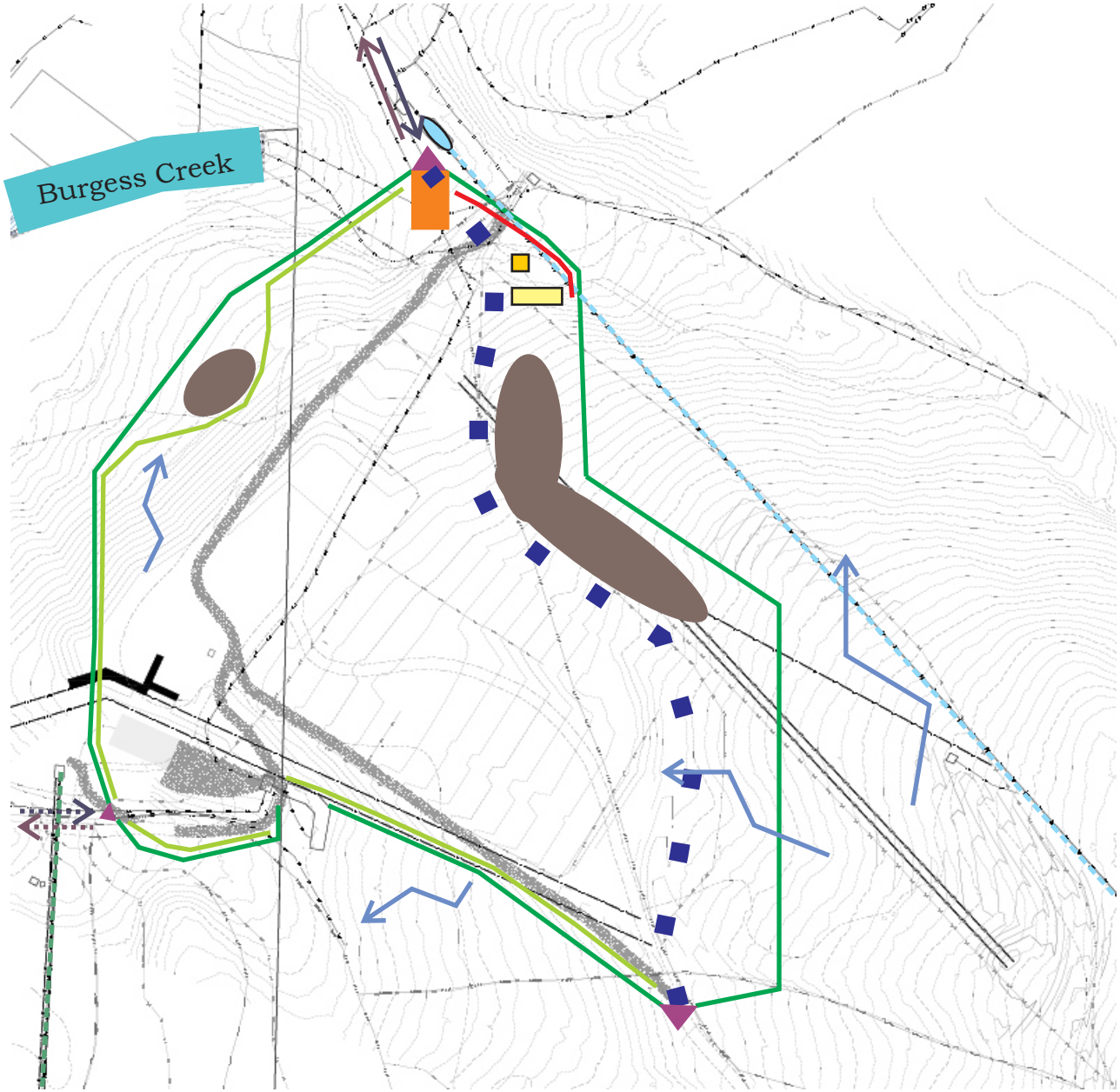
Construction Site Management Plan for:
Greenhorn Ranch
Prepared by Betsy Wilbanks

RCRBD Record Set
T.A.

N
W E
S

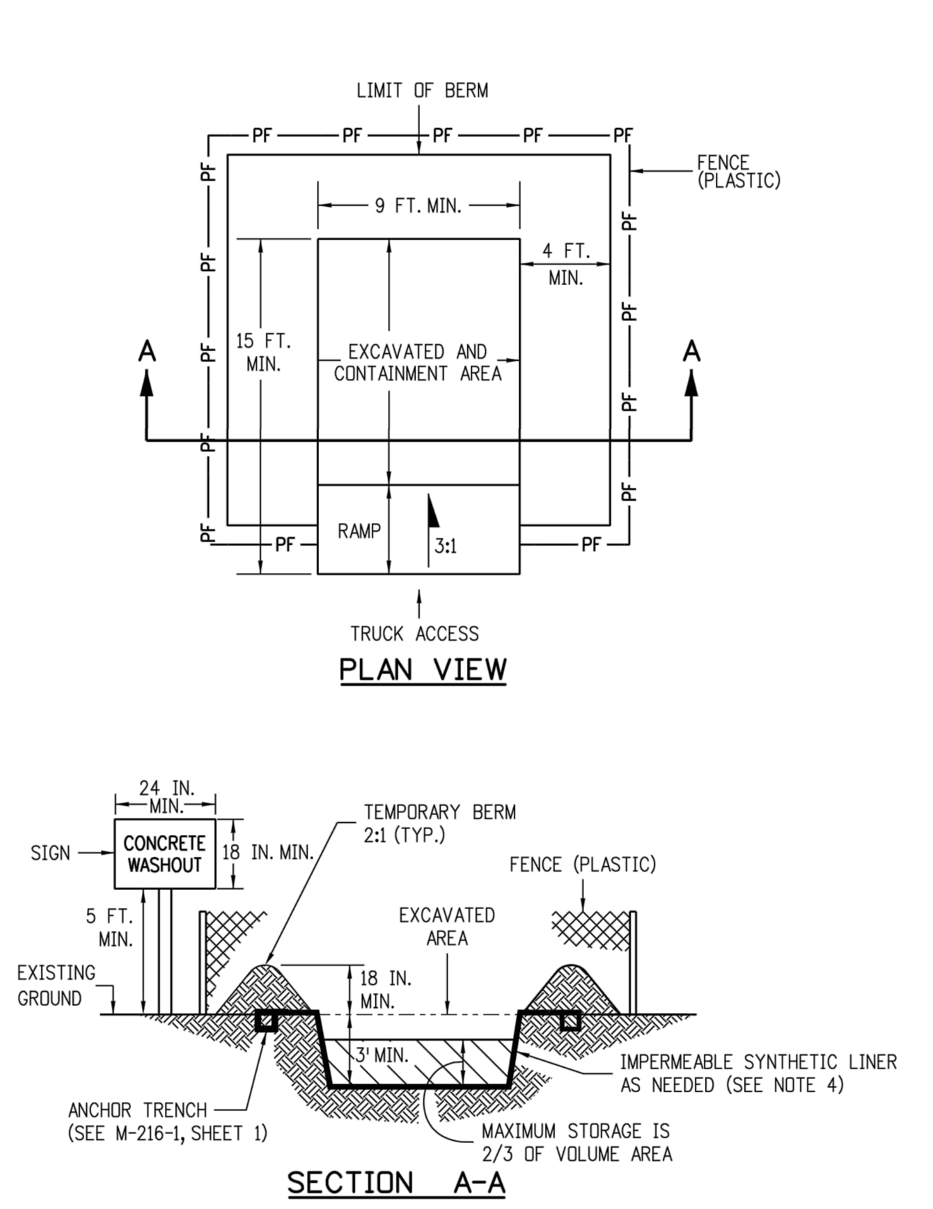
Not to Scale

07/14/2021



Legend:

- Project Boundary and Construction Fence
- Restricted Access Gate
- Vehicle Tracking Control
- Temporary Access Road
- Primary Ingress
- Secondary Ingress
- Primary Egress
- Secondary Egress
- Wattles
- Brush Berm
- Stockpile
- Direction of Overland Flow
- Port-a-let
- Dumpster
- Thunderhead Lift
- Bashor Lift

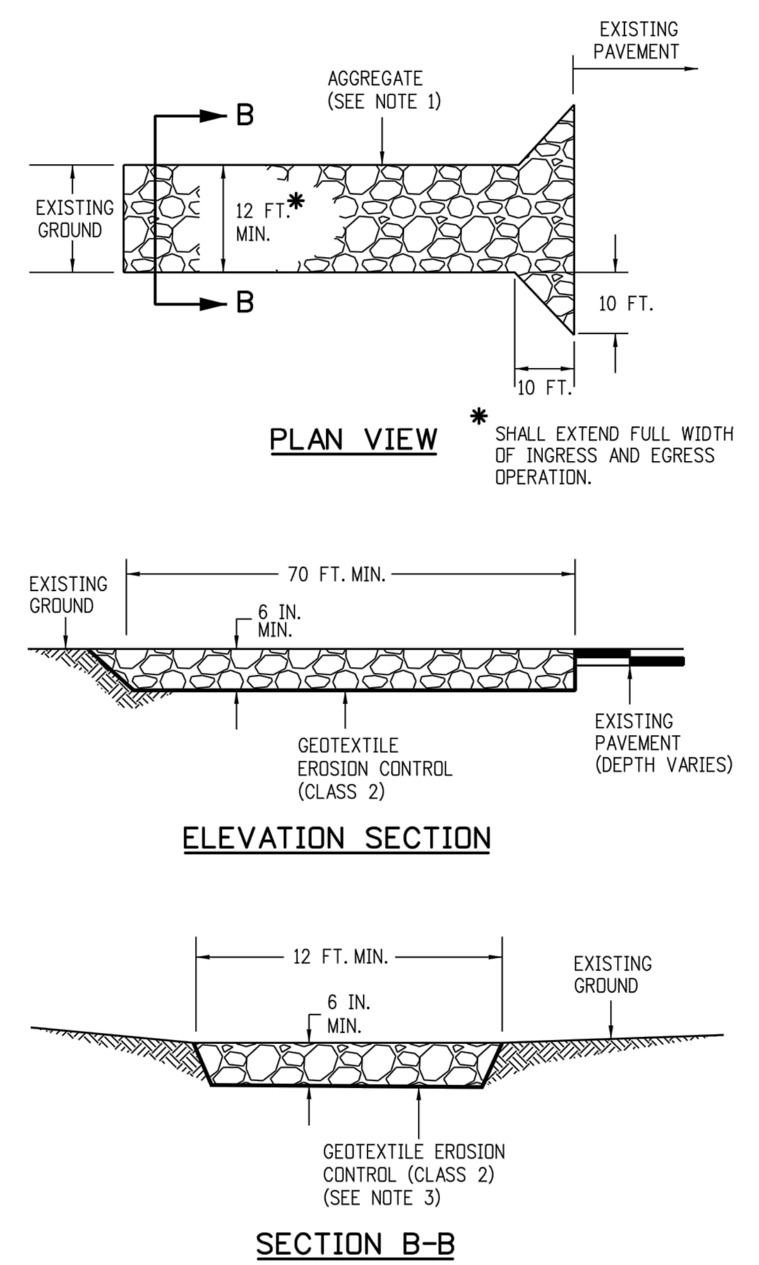


NOTES:

1. A FENCE (PLASTIC) CONFORMING TO SECTION 607 SHALL BE INSTALLED AROUND THE CONCRETE WASHOUT AREA, EXCEPT AT THE OPENING.
2. THE CONCRETE WASHOUT SIGN SHALL HAVE LETTERS AT LEAST 3 INCHES HIGH AND CONFORM TO SUBSECTION 630.02.
3. ALL MATERIALS AND LABOR TO COMPLETE THE CONCRETE WASHOUT STRUCTURE SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
4. THE BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF FIVE FEET ABOVE GROUND WATER. IF NOT, THE BOTTOM OF EXCAVATION SHALL BE IN ACCORDANCE WITH 208.02 (j).
5. THE PAY ITEM NUMBER FOR CONCRETE WASHOUT STRUCTURE (EACH) IS 208-00045.

CONCRETE WASHOUT STRUCTURE

CWA



NOTES:

1. AGGREGATE SHALL CONFORM TO SUBSECTION 208.02 (I).
2. THE CONTRACTOR SHALL PROTECT CURB AND GUTTER THAT CROSSES THE ENTRANCE FROM DAMAGE, WHILE NOT BLOCKING FLOW OF WATER THRU STRUCTURE. PROTECTION OF THE CURB AND GUTTER SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
3. GEOTEXTILE SHALL CONFORM TO SUBSECTION 712.08.
4. ALL MATERIALS AND LABOR TO COMPLETE THE VEHICLE TRACKING PAD SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
5. THE PAY ITEM NUMBER FOR VEHICLE TRACKING PAD (EACH) IS 208-00070.

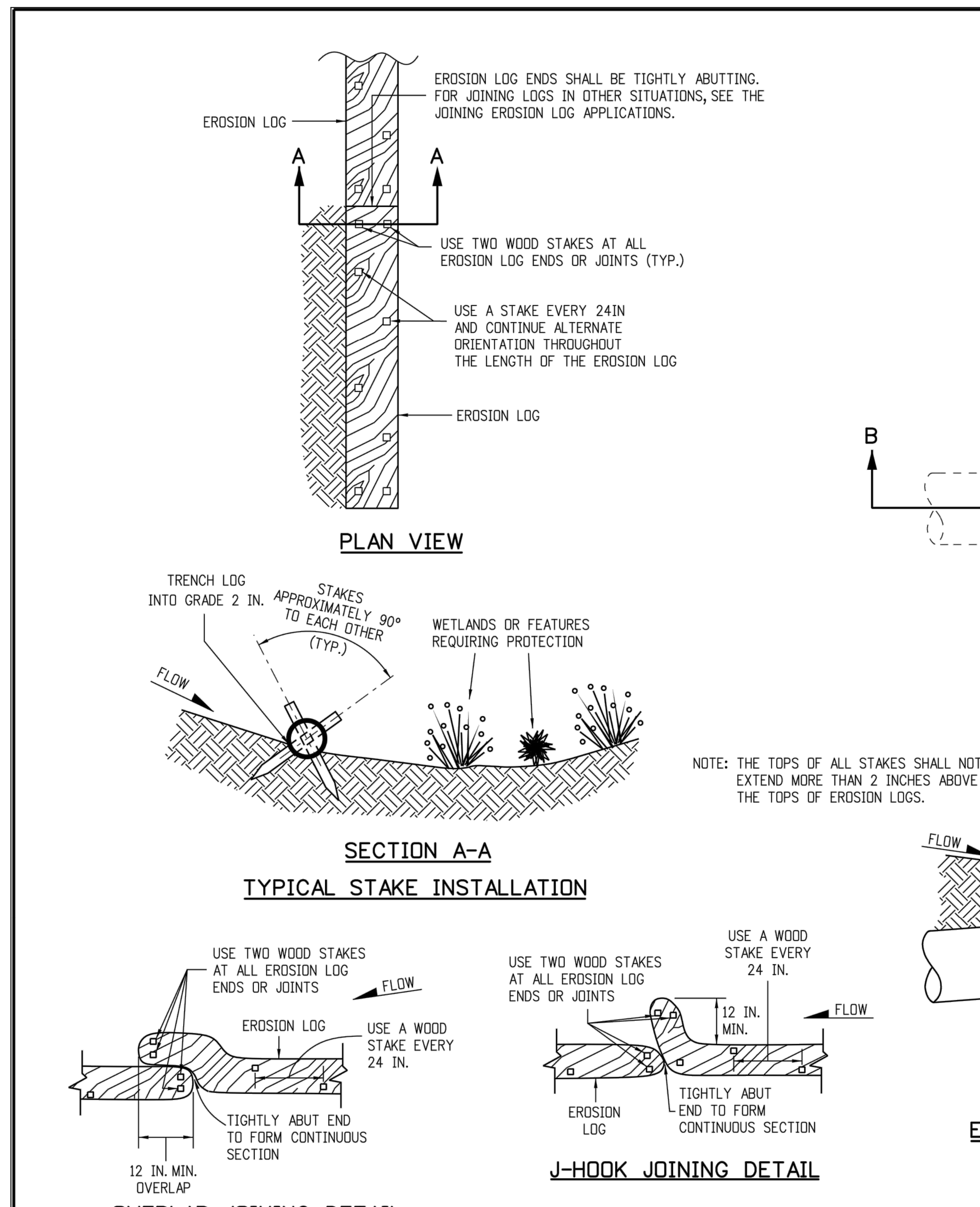
VEHICLE TRACKING PAD

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

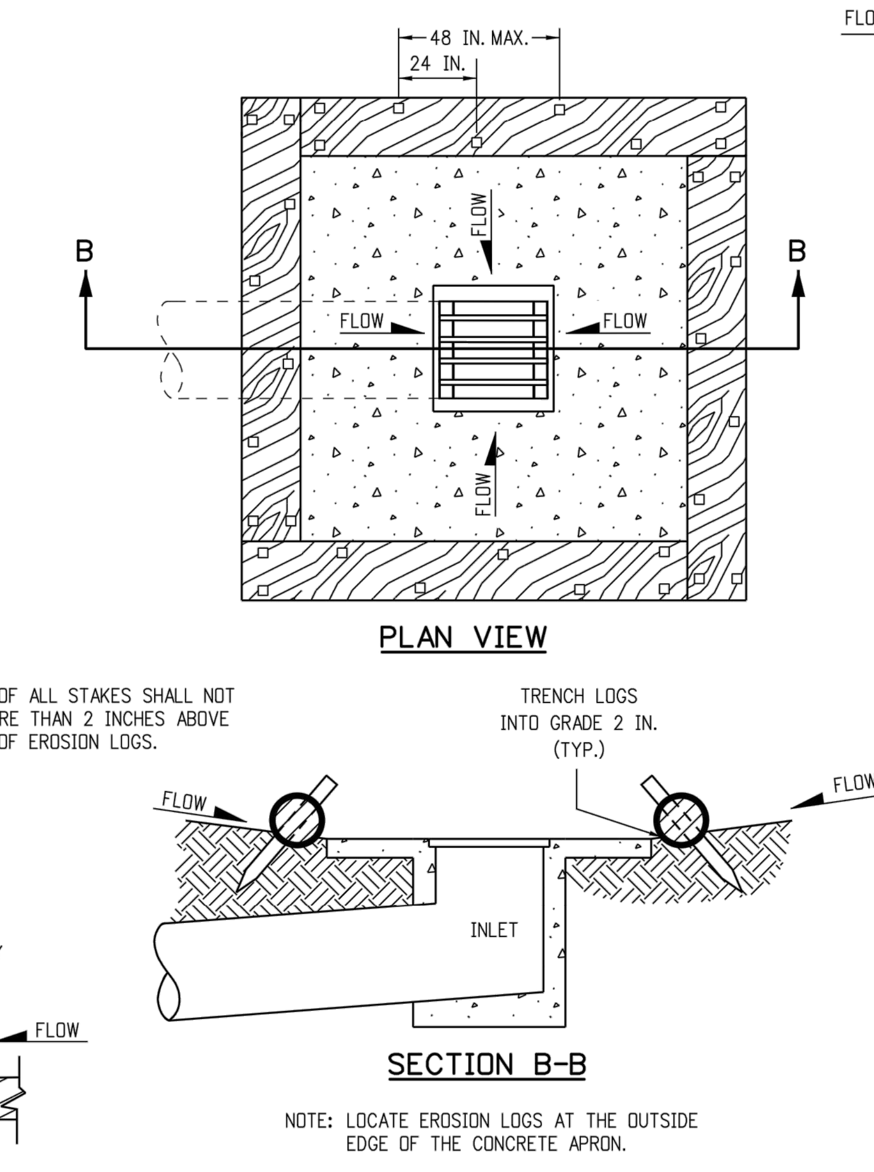
Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

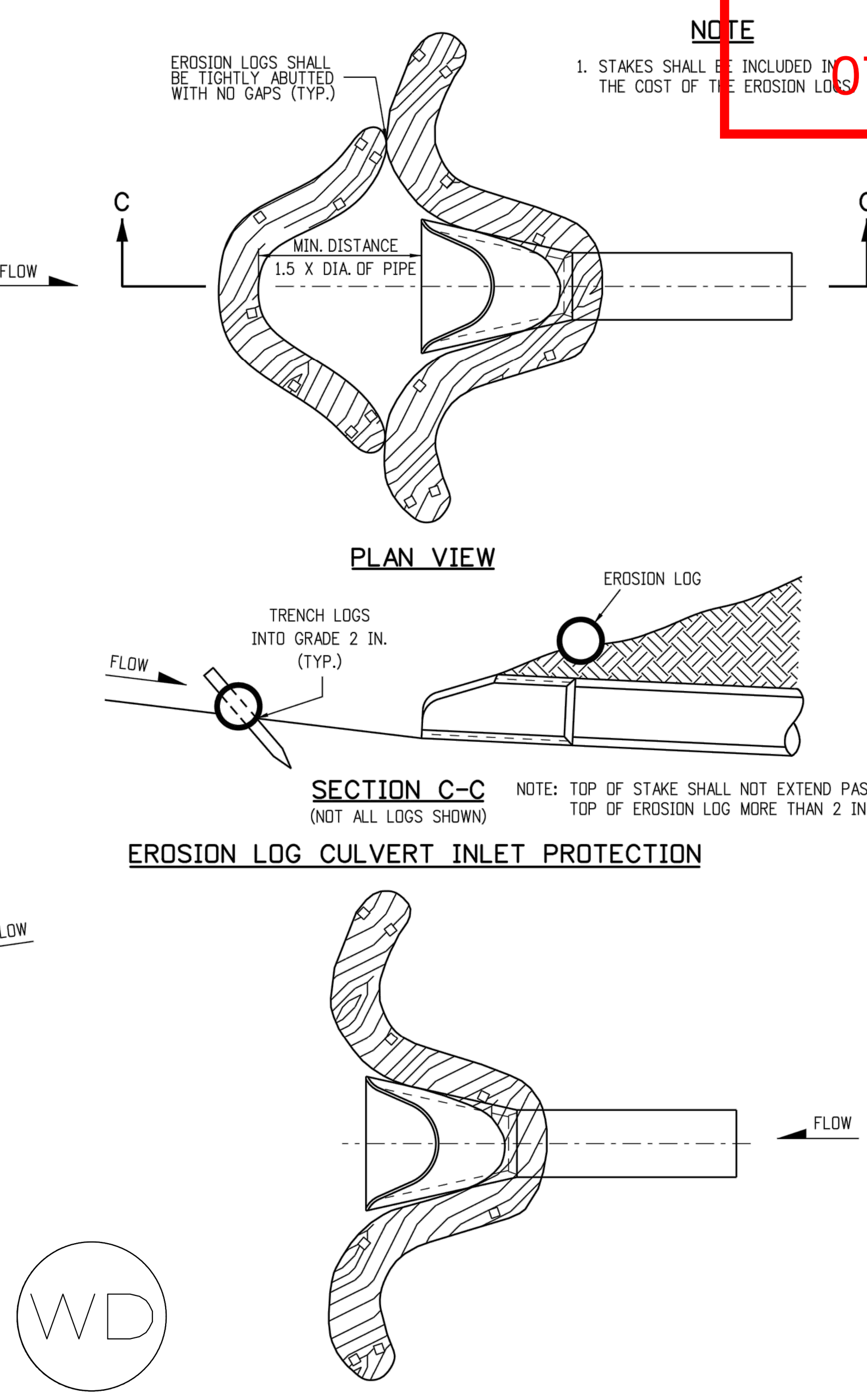
TEMPORARY EROSION CONTROL
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 1 of 11
Project Sheet Number:



EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)





NOTE

1. STAKES SHALL BE INCLUDED IN THE COST OF THE EROSION LOG.

EROSION LOG APPLICATIONS

WD

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
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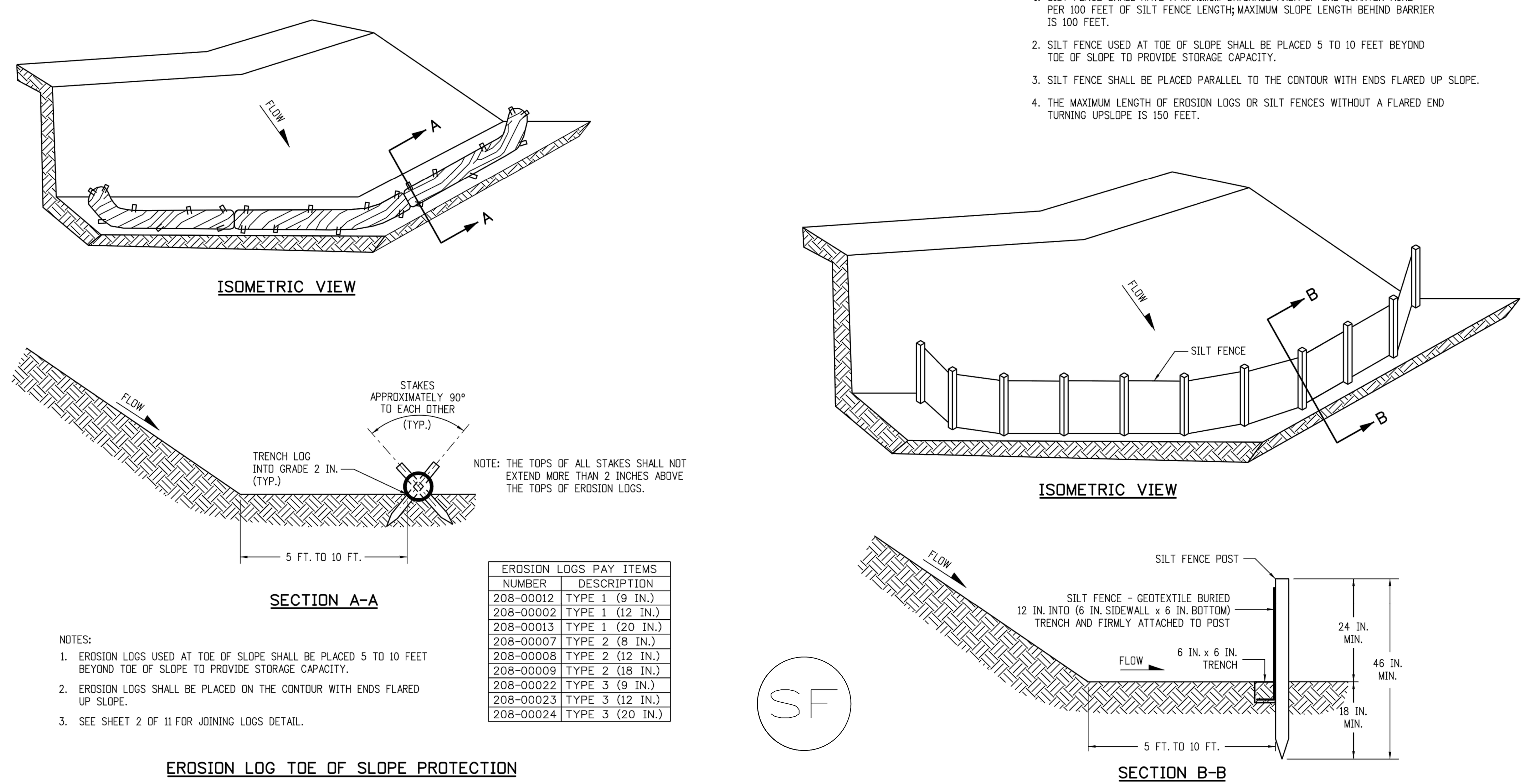
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

TEMPORARY EROSION CONTROL
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 2 of 11
Project Sheet Number:



NOTES

1. SILT FENCE SHALL HAVE A MAXIMUM DRAINAGE AREA OF ONE-QUARTER ACRE PER 100 FEET OF SILT FENCE LENGTH; MAXIMUM SLOPE LENGTH BEHIND BARRIER IS 100 FEET.
2. SILT FENCE USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
3. SILT FENCE SHALL BE PLACED PARALLEL TO THE CONTOUR WITH ENDS FLARED UP SLOPE.
4. THE MAXIMUM LENGTH OF EROSION LOGS OR SILT FENCES WITHOUT A FLARED END TURNING UPSLOPE IS 150 FEET.

NOTES:

1. EROSION LOGS USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
2. EROSION LOGS SHALL BE PLACED ON THE CONTOUR WITH ENDS FLARED UP SLOPE.
3. SEE SHEET 2 OF 11 FOR JOINING LOGS DETAIL.

EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

EROSION LOG TOE OF SLOPE PROTECTION

SF

SILT FENCE TOE OF SLOPE PROTECTION

NOTE: THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.

TOE OF SLOPE PROTECTION APPLICATIONS

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
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Denver, CO 80204
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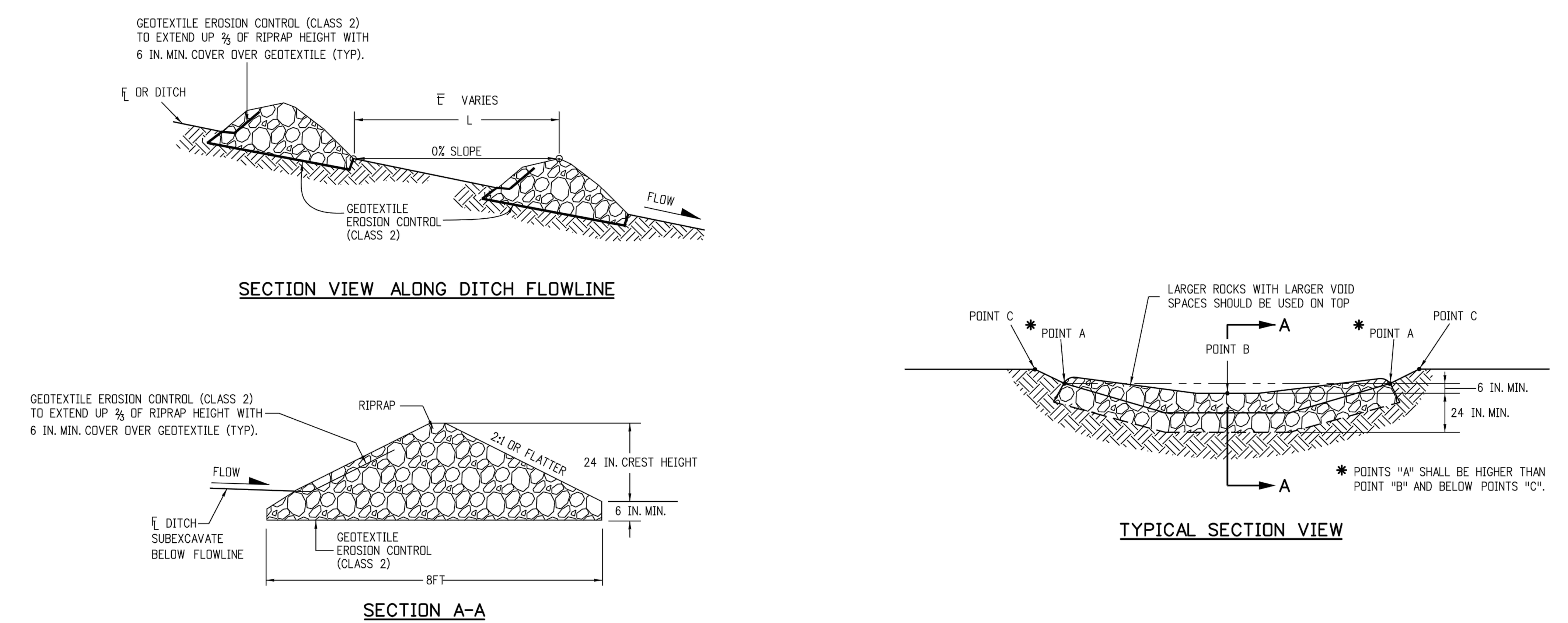
Project Development Branch JBK

TEMPORARY EROSION CONTROL
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 3 of 11
Project Sheet Number:



NOTES:

1. RIPRAP SIZE D_{50} = 6IN OR AS SHOWN ON THE PLANS.
2. THE GEOTEXTILE EROSION CONTROL SHALL BE CLASS 2 AND CONFORM TO THE REQUIREMENTS OF SUBSECTION 712.08.
3. THE ENDS OF RIPRAP CHECK DAM SHALL BE A MINIMUM OF 6 IN. HIGHER THAN CENTER OF CHECK DAM.
4. FOR USE AS TEMPORARY CHECK DAMS ONLY AND NOT FOR PERMANENT INSTALLATIONS.
5. THE PAY ITEM NUMBER FOR ROCK CHECK DAM (EA) IS 208-00041.

NOTE: ALL MATERIALS AND LABOR TO COMPLETE THE ROCK CHECK DAM SHALL BE INCLUDED IN THE COST OF WORK.

ROCK CHECK DAM

RCD

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
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TEMPORARY EROSION CONTROL
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-208-1
Standard Sheet No. 11 of 11
Project Sheet Number:

Know what's below. Call before you dig.
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

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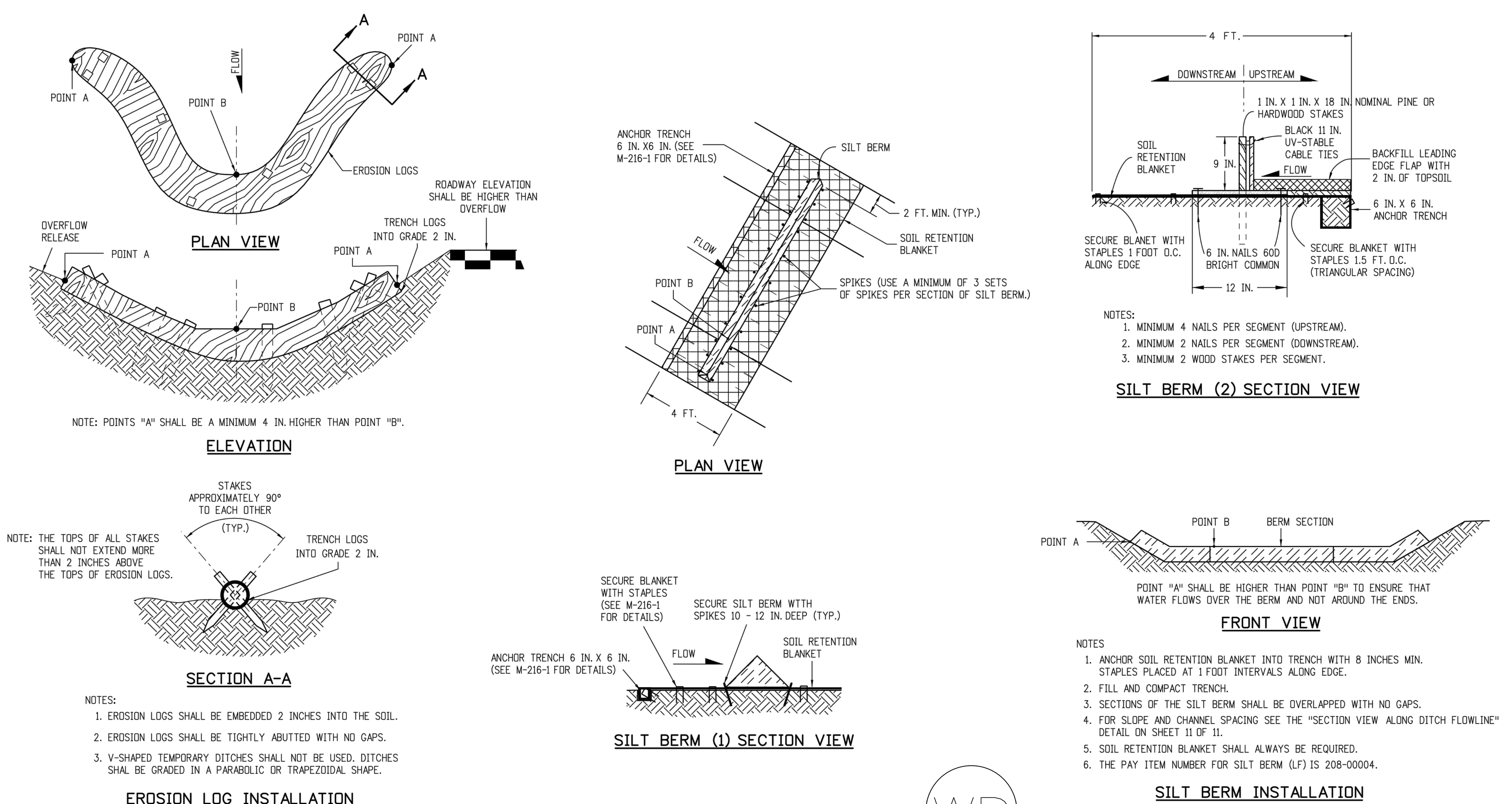
141 9th Street · P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com
LANDMARK CONSULTANTS, INC.

NO.	DATE:	BY:	DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Erosion Control Details

SHEET
C.610



NOTES:
1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.
3. V-SHAPED TEMPORARY DITCHES SHALL NOT BE USED. DITCHES SHAL BE GRADED IN A PARABOLIC OR TRAPEZOIDAL SHAPE.

EROSION LOG INSTALLATION

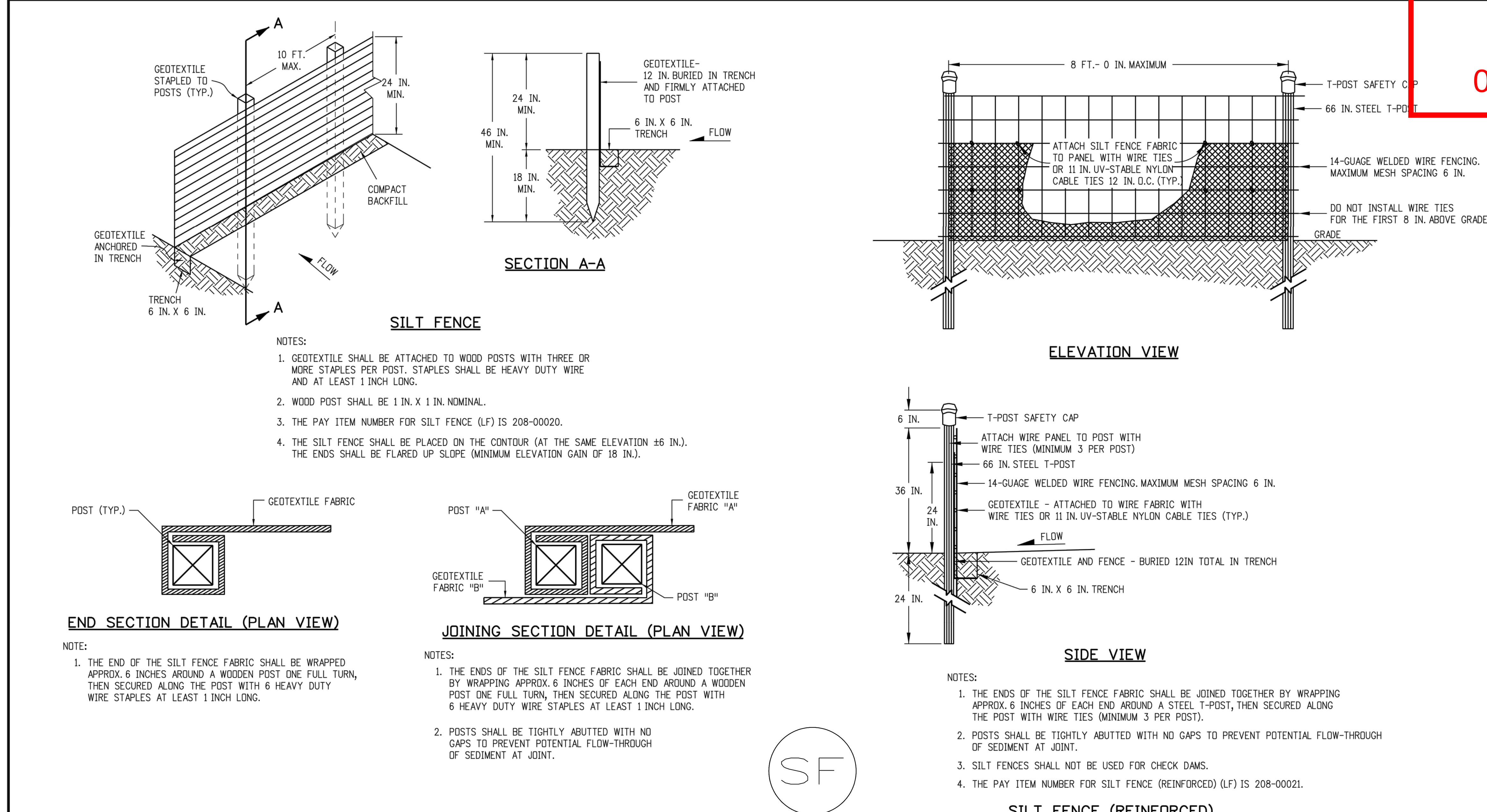
NOTES:
1. MINIMUM 4 NAILS PER SEGMENT (UPSTREAM).
2. MINIMUM 2 NAILS PER SEGMENT (DOWNSTREAM).
3. MINIMUM 2 WOOD STAKES PER SEGMENT.

NOTES
1. ANCHOR SOIL RETENTION BLANKET INTO TRENCH WITH 8 INCHES MIN. STAPLES PLACED AT 1 FOOT INTERVALS ALONG EDGE.
2. FILL AND COMPACT TRENCH.
3. SECTIONS OF THE SILT BERM SHALL BE OVERLAPPED WITH NO GAPS.
4. FOR SLOPE AND CHANNEL SPACING SEE THE "SECTION VIEW ALONG DITCH FLOWLINE" DETAIL ON SHEET 11 OF 11.
5. SOIL RETENTION BLANKET SHALL ALWAYS BE REQUIRED.
6. THE PAY ITEM NUMBER FOR SILT BERM (LF) IS 208-00004.

SILT BERM INSTALLATION

DRAINAGE DITCH APPLICATIONS (WD)

Computer File Information	Sheet Revisions	Colorado Department of Transportation	TEMPORARY EROSION CONTROL	STANDARD PLAN NO. M-208-1
Creation Date: 07/31/19; Designer Initials: JBK; Last Modification Date: 07/31/19; Detailer Initials: LTA; CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	Date: / Comments	2829 West Howard Place, CDOT HQ, 3rd Floor, Denver, CO 80204, Phone: 303-757-9021 FAX: 303-757-9868; Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 6 of 11; Project Sheet Number:



NOTES:
1. GEOTEXTILE SHALL BE ATTACHED TO WOOD POSTS WITH THREE OR MORE STAPLES PER POST. STAPLES SHALL BE HEAVY DUTY WIRE AND AT LEAST 1 INCH LONG.
2. WOOD POST SHALL BE 1 IN. X 1 IN. NOMINAL.
3. THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.
4. THE SILT FENCE SHALL BE PLACED ON THE CONTOUR (AT THE SAME ELEVATION ±6 IN.). THE ENDS SHALL BE FLARED UP SLOPE (MINIMUM ELEVATION GAIN OF 18 IN.).

NOTE:
1. THE END OF THE SILT FENCE FABRIC SHALL BE WRAPPED APPROX. 6 INCHES AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.

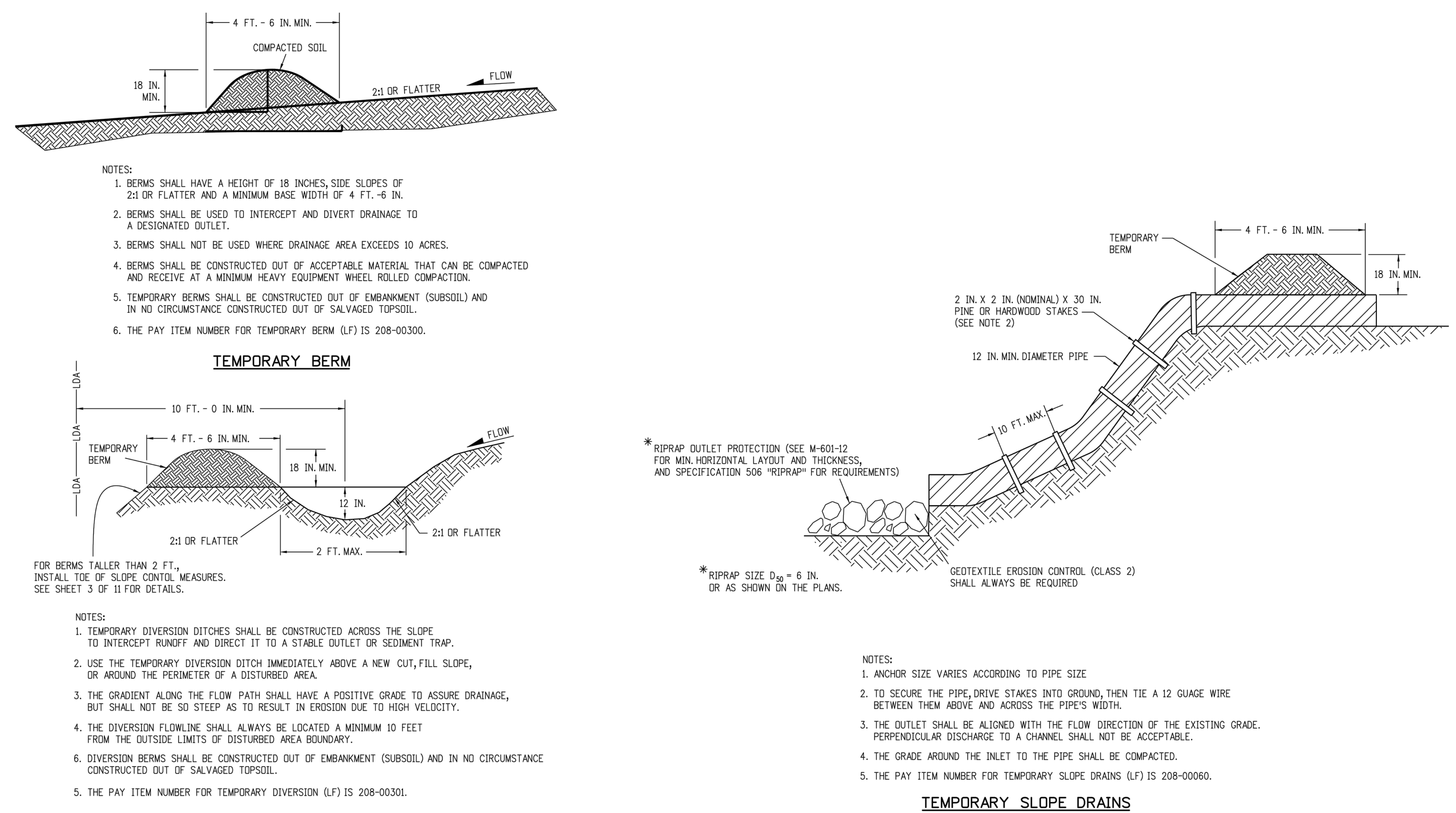
NOTES:
1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.

NOTES:
1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A STEEL T-POST, THEN SECURED ALONG THE POST WITH WIRE TIES (MINIMUM 3 PER POST).
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.
3. SILT FENCES SHALL NOT BE USED FOR CHECK DAMS.
4. THE PAY ITEM NUMBER FOR SILT FENCE (REINFORCED) (LF) IS 208-00021.

SILT FENCE (REINFORCED)

SILT FENCE APPLICATIONS (SF)

Computer File Information	Sheet Revisions	Colorado Department of Transportation	TEMPORARY EROSION CONTROL	STANDARD PLAN NO. M-208-1
Creation Date: 07/31/19; Designer Initials: JBK; Last Modification Date: 07/31/19; Detailer Initials: LTA; CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	Date: / Comments	2829 West Howard Place, CDOT HQ, 3rd Floor, Denver, CO 80204, Phone: 303-757-9021 FAX: 303-757-9868; Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 8 of 11; Project Sheet Number:



NOTES:
1. BERMS SHALL HAVE A HEIGHT OF 18 INCHES, SIDE SLOPES OF 2:1 OR FLATTER AND A MINIMUM BASE WIDTH OF 4 FT.-6 IN.
2. BERMS SHALL BE USED TO INTERCEPT AND DIVERT DRAINAGE TO A DESIGNATED OUTLET.
3. BERMS SHALL NOT BE USED WHERE DRAINAGE AREA EXCEEDS 10 ACRES.
4. BERMS SHALL BE CONSTRUCTED OUT OF ACCEPTABLE MATERIAL THAT CAN BE COMPACTED AND RECEIVE AT A MINIMUM HEAVY EQUIPMENT WHEEL ROLLED COMPACTION.
5. TEMPORARY BERMS SHALL BE CONSTRUCTED OUT OF EMBANKMENT (SUBSOIL) AND IN NO CIRCUMSTANCE CONSTRUCTED OUT OF SALVAGED TOPSOIL.
6. THE PAY ITEM NUMBER FOR TEMPORARY BERM (LF) IS 208-00300.

TEMPORARY BERM

FOR BERMS TALLER THAN 2 FT., INSTALL TOE OF SLOPE CONTROL MEASURES. SEE SHEET 3 OF 11 FOR DETAILS.

NOTES:
1. TEMPORARY DIVERSION DITCHES SHALL BE CONSTRUCTED ACROSS THE SLOPE TO INTERCEPT RUNOFF AND DIRECT IT TO A STABLE OUTLET OR SEDIMENT TRAP.
2. USE THE TEMPORARY DIVERSION DITCH IMMEDIATELY ABOVE A NEW CUT, FILL SLOPE, OR AROUND THE PERIMETER OF A DISTURBED AREA.
3. THE GRADIENT ALONG THE FLOW PATH SHALL HAVE A POSITIVE GRADE TO ASSURE DRAINAGE, BUT SHALL NOT BE SO STEEP AS TO RESULT IN EROSION DUE TO HIGH VELOCITY.
4. THE DIVERSION FLOWLINE SHALL ALWAYS BE LOCATED A MINIMUM 10 FEET FROM THE OUTSIDE LIMITS OF DISTURBED AREA BOUNDARY.
6. DIVERSION BERMS SHALL BE CONSTRUCTED OUT OF EMBANKMENT (SUBSOIL) AND IN NO CIRCUMSTANCE CONSTRUCTED OUT OF SALVAGED TOPSOIL.
5. THE PAY ITEM NUMBER FOR TEMPORARY DIVERSION (LF) IS 208-00301.

TEMPORARY DIVERSION

*RIPRAP OUTLET PROTECTION (SEE M-601-12 FOR MIN. HORIZONTAL LAYOUT AND THICKNESS, AND SPECIFICATION 506 "RIPRAP" FOR REQUIREMENTS)

*RIPRAP SIZE D_{50} = 6 IN. OR AS SHOWN ON THE PLANS.

GEOTEXTILE EROSION CONTROL (CLASS 2) SHALL ALWAYS BE REQUIRED

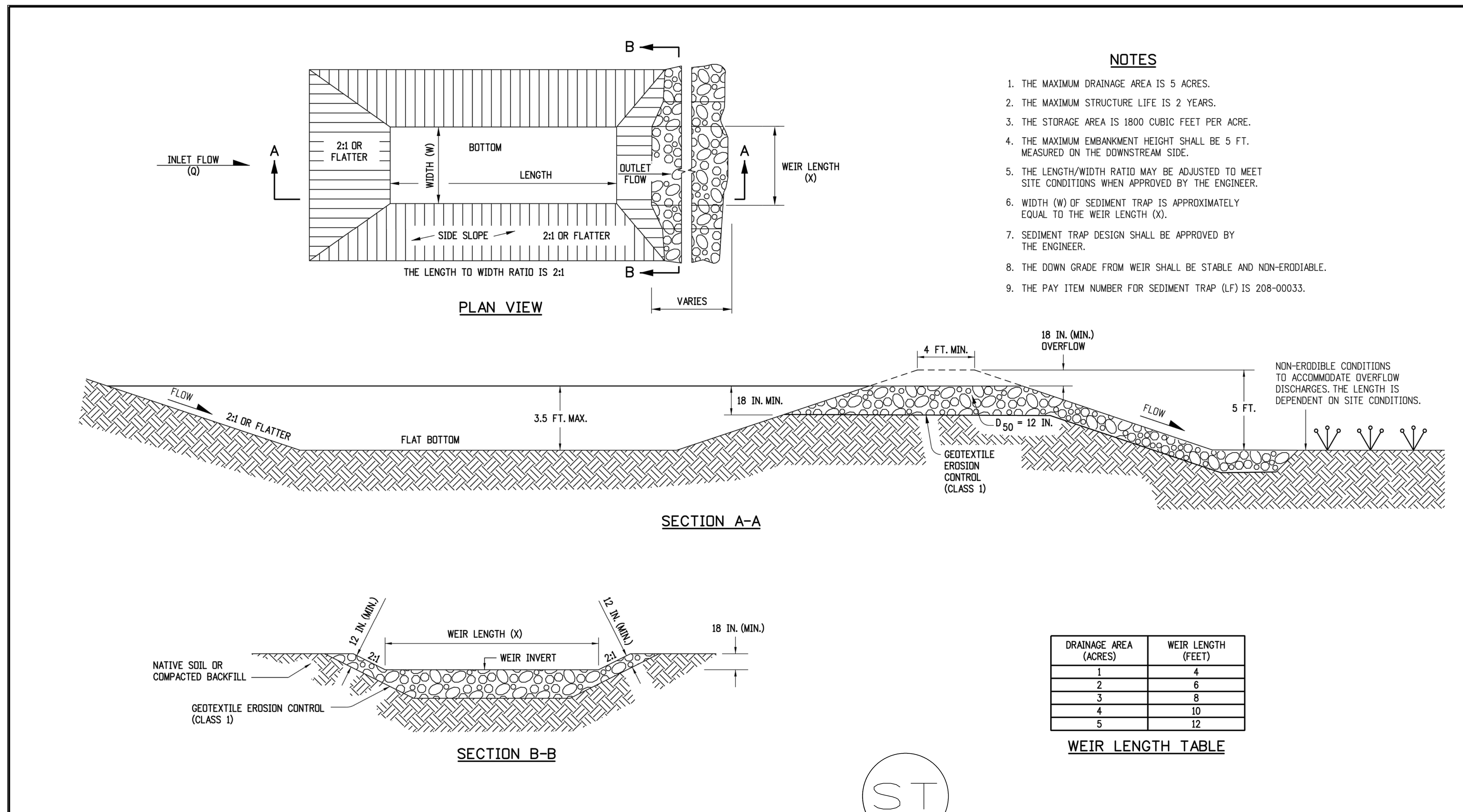
NOTES:
1. ANCHOR SIZE VARIES ACCORDING TO PIPE SIZE
2. TO SECURE THE PIPE, DRIVE STAKES INTO GROUND, THEN TIE A 12 GUAGE WIRE BETWEEN THEM ABOVE AND ACROSS THE PIPE'S WIDTH.
3. THE OUTLET SHALL BE ALIGNED WITH THE FLOW DIRECTION OF THE EXISTING GRADE. PERPENDICULAR DISCHARGE TO A CHANNEL SHALL NOT BE ACCEPTABLE.
4. THE GRADE AROUND THE INLET TO THE PIPE SHALL BE COMPACTED.
5. THE PAY ITEM NUMBER FOR TEMPORARY SLOPE DRAINS (LF) IS 208-00060.

TEMPORARY SLOPE DRAINS

(NOT SPECIFIED - DETAIL PROVIDED IF FIELD CONDITIONS WARRANT APPLICATION)

GRADING APPLICATIONS

Computer File Information	Sheet Revisions	Colorado Department of Transportation	TEMPORARY EROSION CONTROL	STANDARD PLAN NO. M-208-1
Creation Date: 07/31/19; Designer Initials: JBK; Last Modification Date: 07/31/19; Detailer Initials: LTA; CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	Date: / Comments	2829 West Howard Place, CDOT HQ, 3rd Floor, Denver, CO 80204, Phone: 303-757-9021 FAX: 303-757-9868; Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 7 of 11; Project Sheet Number:



NOTES
1. THE MAXIMUM DRAINAGE AREA IS 5 ACRES.
2. THE MAXIMUM STRUCTURE LIFE IS 2 YEARS.
3. THE STORAGE AREA IS 1800 CUBIC FEET PER ACRE.
4. THE MAXIMUM EMBANKMENT HEIGHT SHALL BE 5 FT. MEASURED ON THE DOWNSTREAM SIDE.
5. THE LENGTH/WIDTH RATIO MAY BE ADJUSTED TO MEET SITE CONDITIONS WHEN APPROVED BY THE ENGINEER.
6. WIDTH (W) OF SEDIMENT TRAP IS APPROXIMATELY EQUAL TO THE WEIR LENGTH (X).
7. SEDIMENT TRAP DESIGN SHALL BE APPROVED BY THE ENGINEER.
8. THE DOWN GRADE FROM WEIR SHALL BE STABLE AND NON-ERODIBLE.
9. THE PAY ITEM NUMBER FOR SEDIMENT TRAP (LF) IS 208-00033.

DRAINAGE AREA (ACRES)	WEIR LENGTH (FEET)
1	4
2	6
3	8
4	10
5	12

WEIR LENGTH TABLE

SEDIMENT TRAP (ST)

Computer File Information	Sheet Revisions	Colorado Department of Transportation	TEMPORARY EROSION CONTROL	STANDARD PLAN NO. M-208-1
Creation Date: 07/31/19; Designer Initials: JBK; Last Modification Date: 07/31/19; Detailer Initials: LTA; CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	Date: / Comments	2829 West Howard Place, CDOT HQ, 3rd Floor, Denver, CO 80204, Phone: 303-757-9021 FAX: 303-757-9868; Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 9 of 11; Project Sheet Number:

CALL UTILITY NOTIFICATION CENTER OF COLORADO
Know what's below. Call before you dig.
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE

CIVIL ENGINEERS & SURVEYORS
141 9th Street, P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com
LANDMARK CONSULTANTS, INC.

NO. | DATE: | BY: | DESCRIPTION:

PROJECT: 1012-048
DATE: 6/18/2021
CONTACT: Erik Griepentrog
EMAIL: erikg@landmark-co.com

GREEN HORN RANCH
Erosion Control Details

SHEET C.611

USMS Stormwater Management Plan
(SWMP)

For Construction Activities At:

Steamboat Gondola Relocation
2305 Mt Werner Circle
Steamboat Springs, CO 80487
Routt County

RCRBD Record Set
T.A.

07/14/2021

SWMP Prepared For:

Saunders Heath
1212 Riverside Avenue
Suite 130
Fort Collins, CO 80524
970-221-4195

SWMP Prepared By:

Stormwater Risk Management, LLC
16350 E. Arapahoe Rd.
#108-316
Foxfield, CO 80016
303-627-7867

SWMP Preparation Date:

04/10/2021

SWMP Revision Dates:

7/1/2021 Added Greenhorn Ranch and Base Village Haul Route to the SWMP per attached site plan.

Estimated Project Dates:

Project Start Date: 04/16/2021
Project Completion Date: 02/07/2022

Permits:

CDPHE project or permit tracking number:
Other CDPS Permits: A Dewatering Permit will apply to this project - please see the appendices/binder for more information.

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Introduction

This storm water management plan (SWMP) has been prepared for Steamboat Gondola Relocation following a recognized industry standard called the Uniform Stormwater Management System (USMS) methodology. The goal of the USMS SWMP is to identify the major hydrologic phases of the project, identify significant construction activities within those phases that have the potential to introduce pollutant sources to stormwater, and identify control measures that, when implemented effectively, will reduce or eliminate potential negative impacts to surface water quality resulting from this project. Where necessary, this SWMP will be coordinated with other environmental permits obtained by the project.

1) Qualified Stormwater Manager(s)

Company: Saunders Construction, LLC
Name: Justin Tourdot
Title: Safety & Environmenal
Qualifications: CISEC
Contact Information: j.tourdot@saundersinc.com
Role(s): Oversees SWMP Implementation, conducts inspections, control measure installation/maintenance, manages spill response

2) Spill Prevention and Response Plan

CDPHE requires that any hazardous material spill be reported when any of the following conditions occur:

- Over 25 gallons of petroleum
- 5 CCs of mercury
- Any and all raw sewage releases
- Any/all State waters impacted

If any of the above criteria is met or exceeded, the Colorado Department of Public Health and Environment, Local Emergency Planning committee, downstream users and other agencies (MS4s) will be notified. The CDPHE will be notified by telephone within 24 hours. In addition, written notification describing the spill and the clean up procedures used will be sent to the agencies 5 days following the spill. If a spill does not meet the above criteria, reporting is not mandatory.

WQCD Toll Free 24-hour Environmental Emergency Spill Reporting Line: 1-877-518-5608

When any spill occurs:

1) Notify the Qualified Stormwater Manager and controlling operator of the site immediately following a hazardous spill.
2) Documentation of the spill should occur and its clean-up procedures.
3) At a minimum the following should be documented:
   - Nature of spill
   - Quantity of spill
   - Date/time spill occurred
   - Agency notification if necessary
   - Clean-up procedures used
   - Daily monitoring (7 days) after clean-up
   - Photographs
   - Interview(s) with any witnesses of the event

General guidelines for clean-up procedures:

- Immediately control or stop the release/spill
  - Mitigate the spill area as needed with a spill prevention kit
  - Obtain approved secondary containers to store any absorbents used
  - Report the spill to the Qualified Stormwater Manager and Responsible Person on the jobsite for determination if further reporting is required or if emergency notification is appropriate.

General Spill Control Practices:
In addition to the good housekeeping and material management practices discussed in this plan, the following practices will be followed for spill prevention and cleanup:

Equipment and materials necessary for spill cleanup may include but are not be limited to: brooms, dust pans, mops, rags, gloves, goggles, absorbent powder / kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose. The location of spill cleanup materials and equipment will be identified on the site map.

The operator will inform the jobsite personnel that if a spill of any size occurs they are to always notify the Qualified Stormwater Manager and, depending on the nature and severity of the spill, the operator will contact the CDPHE, downstream users and other regulatory agencies.

Refer to the following sections for more information:
- Section "3) Materials Handling" for practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.
- Section "3.d) Equipment Maintenance / Fueling" for practices to minimize the discharge of pollutants from equipment and vehicle fueling and maintenance activities.
- Section "5.i) Concrete Washout Waste" for procedures for properly washing out concrete truck chutes and other equipment.

3) Materials Handling

3.a) Good Housekeeping

Good housekeeping practices:
- An effort will be made to store only enough material required to do the job.
- Building materials and products such as paints, solvents, landscape materials, fertilizers, pesticides or other chemicals, will be stored in a neat, orderly manner in secondary containment or covered as necessary.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendations for proper use will be followed.
- Any remaining chemicals shall be disposed of according to manufacturers' recommendations and in accordance with Federal, State and local regulations.
- A Qualified Stormwater Manager will inspect regularly to ensure proper use and disposal of materials onsite.

3.b) Sanitary Waste

Practices used to minimize the discharge of pollutants from sanitary waste:
Portable toilets will be secured so that they will not be tipped or knocked over and located away from surface waters and stormwater inlets or conveyances.

Refer to the respective control measure and pollution source log sheets for more information.

3.c) Construction and Domestic Wastes

Practices used to minimize the discharge of pollutants from construction and domestic waste:
- On business days, waste will be cleaned up and disposed of in designated waste containers
- If a container overflows, it will be cleaned up immediately

Refer to the respective control measure and pollution source log sheets for more information.

3.d) Equipment Maintenance / Fueling

Practices used to minimize the discharge of pollutants from equipment and vehicle fueling and maintenance activities:
- Equipment and vehicle fueling and maintenance activities will be located away from surface waters and stormwater inlets or conveyances
- Secondary containment and cover will be provided where appropriate
- Drip pans and absorbents will be provided under or around leaky vehicles
- Oil and oily wastes will be disposed of or recycled in accordance with other federal, state, tribal, or local requirements
- A spill kit will be available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill
- Spills or contaminated surfaces will be cleaned up immediately, using dry clean up measures (areas of spills will NOT be hosed down) and the source of the spill wil be eliminated to prevent a discharge or a continuation of an ongoing discharge

If implemented on the project, refer to the respective control measure and pollution source log sheets for more information.

3.e) Hazardous Products

Practices used to reduce the risks associated with hazardous materials:
- Products will be kept in original containers unless they are not re-sealable.
- Original labels and material safety data will be retained.
- Products will be stored under cover or in secondary containment.
- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

4) Potential Sources of Pollution

Table 4.1

The pollution sources below were evaluated for their impact on this project prior to the start of construction. Refer to Tables 6.b.1 - 6.b.5 in Section "6.b) Phased Control Measure Implementation" for related construction activities.

Pollution Source (PS) Designation	Pollution Source (PS) Description	Control Measures Typically Utilized For This Pollution Source
ACP	Asphalt/Concrete Batch Plant	Not anticipated to be present on site
CC	Construction Chemicals	CNX - Connex GH - Good Housekeeping Practices/Material Management SK - Spill Kit SSA - Stabilized Staging Area
CP	Construction Parking	GH - Good Housekeeping Practices/Material Management SK - Spill Kit SSA - Stabilized Staging Area

Table 4.1 (continued)

Pollution Source (PS) Designation	Pollution Source (PS) Description	Control Measures Typically Utilized For This Pollution Source
CS	Contaminated Soil	Not anticipated to be present on site
CSC	Concrete Saw-Cutting	GH - Good Housekeeping Practices/Material Management
CWW	Concrete Wash Waste	CWA - Concrete Washout Area GH - Good Housekeeping Practices/Material Management
DSF	Disturbed Soil Flat	CD - Check Dam - Loose Rock or Riprap CF - Construction Fence DD - Diversion Ditch ECB - Erosion Control Blankets FLS - Final Landscaping IP-1 - Inlet Protection - Curb - Block & Gravel Bags IP-3 - Inlet Protection - Area Inlet w/ Rock Socks IP-7 - Inlet Protection - Dandy Curb Bag IP-8 - Inlet Protection - Area Inlet - Dandy Bag IP-9 - Inlet Protection - Curb - Rock Bags only IP-10 - Inlet Protection - Culvert LF - Landform LG - Lowered Grade OP - Outlet Protection RRL - Recycled Rubber Log RS - Rock Sock SF - Silt Fence SMP - Seed & Mulch - Permanent SR - Surface Roughening ST - Sediment Trap WD - Wattle Dike / Sediment Control Log / Straw Wattle
DSS	Disturbed Soil Steep	Not anticipated to be present on site
EM	Equipment Cleaning/Fueling/Maint.	GH - Good Housekeeping Practices/Material Management SK - Spill Kit SSA - Stabilized Staging Area
FD	Fugitive Dust	DC - Dust Control
FN	Fertilizers & Nutrients	EB - Earth Berm
GWD	Groundwater Dewatering to Land	DW - Dewatering Operations
HWS	Hand Washing Station	HWSM - Hand Washing Station Management
LUO	Loading & Unloading Operations	GH - Good Housekeeping Practices/Material Management SSA - Stabilized Staging Area
MMO	Masonry Mixing Operations	Not anticipated to be present on site
MS	Material Storage	CNX - Connex GH - Good Housekeeping Practices/Material Management SSA - Stabilized Staging Area

Table 4.1 (continued)

Pollution Source (PS) Designation	Pollution Source (PS) Description	Control Measures Typically Utilized For This Pollution Source
P	Petroleum-based Products	CNX - Connex GH - Good Housekeeping Practices/Material Management SC - Secondary Containment SK - Spill Kit
PT	Portable Toilet	GH - Good Housekeeping Practices/Material Management SWM - Sanitary Waste/Portable Toilet Management
S	Stockpile	CD - Check Dam - Loose Rock or Riprap DD - Diversion Ditch EB - Earth Berm IP-10 - Inlet Protection - Culvert RRL - Recycled Rubber Log RS - Rock Sock SF - Silt Fence ST - Sediment Trap WD - Wattle Dike / Sediment Control Log / Straw Wattle
SEE	Site Entry/Exit	CF - Construction Fence SS - Street Sweeping and Scraping VTC-A - Vehicle Tracking Control
SWD	Stormwater Dewatering	DW - Dewatering Operations
SWT	Solid Waste/Trash	DMP - Dumpster GH - Good Housekeeping Practices/Material Management
TC	Tool Cleaning	GH - Good Housekeeping Practices/Material Management

Table 4.2

The pollution sources below were evaluated for their impact on this project during weekly pre-inspection planning. Refer to Tables 6.b.6 - 6.b.10 in Section "6.b) Phased Control Measure Implementation" for related construction activities.

Pollution Source (PS) Designation	Pollution Source (PS) Description	Control Measures Typically Utilized For This Pollution Source
ACP	Asphalt/Concrete Batch Plant	Not yet present on the site
CC	Construction Chemicals	Not yet present on the site
CS	Contaminated Soil	Not yet present on the site
CSC	Concrete Saw-Cutting	Not yet present on the site
CWW	Concrete Wash Waste	Not yet present on the site
DSF	Disturbed Soil Flat	Not yet present on the site
DSS	Disturbed Soil Steep	Not yet present on the site
EM	Equipment Cleaning/Fueling/Maint.	Not yet present on the site
FD	Fugitive Dust	Not yet present on the site
FN	Fertilizers & Nutrients	Not yet present on the site

Table 4.2 (continued)

Pollution Source (PS) Designation	Pollution Source (PS) Description	Control Measures Typically Utilized For This Pollution Source
LUO	Loading & Unloading Operations	Not yet present on the site
MMO	Masonry Mixing Operations	Not yet present on the site
MS	Material Storage	Not yet present on the site
P	Petroleum-based Products	Not yet present on the site
PT	Portable Toilet	Not yet present on the site
S	Stockpile	Not yet present on the site
SEE	Site Entry/Exit	Not yet present on the site
SWT	Solid Waste/Trash	Not yet present on the site
TC	Tool Cleaning	Not yet present on the site

All anticipated potential pollutants will be addressed with an individual pollution source log sheet. See site map(s) for locations.

5) Implementation of Control Measures

Stormwater runoff from all disturbed areas and soil storage areas will utilize or flow to one or more control measures to minimize erosion or sediment in the discharge. This may be accomplished through filtering, settling, or straining. Control measures will be selected, designed, installed and adequately sized in accordance with good engineering, hydrologic and pollution control practices for the intended application. The control measure(s) will contain or filter flows in order to prevent the bypass of flows without treatment and will be appropriate for stormwater runoff from disturbed areas and for the expected flow rate, duration, and flow conditions (i.e., sheet or concentrated flow).

Selected control measures will prioritize the use of structural and nonstructural control measures that minimize the potential for erosion (i.e. covering materials). Selected control measures will also prioritize phasing construction activities to minimize the amount of soil disturbance at any point in time throughout the duration of construction.

5.a) Table of Control Measures

The control measures in Table 5.a.1 were evaluated prior to the start of construction as being potentially necessary to control/treat the pollution sources evaluated in Section "4) Potential Sources of Pollution".

Table 5.a.1

Control Measure (CM) Designation	Control Measure (CM) Description	Notes
CD	Check Dam - Loose Rock or Riprap	Refer to the respective control measure log sheet for more information
CF	Construction Fence	Refer to the respective control measure log sheet for more information

CNX	Connex	Refer to the respective control measure log sheet for more information
CWA	Concrete Washout Area	Refer to the respective control measure log sheet for more information
DC	Dust Control	Refer to the respective control measure log sheet for more information
DD	Diversion Ditch	Refer to the respective control measure log sheet for more information
DMP	Dumpster	Refer to the respective control measure log sheet for more information
DW	Dewatering Operations	Refer to the respective control measure log sheet for more information
EB	Earth Berm	Refer to the respective control measure log sheet for more information
ECB	Erosion Control Blankets	Refer to the respective control measure log sheet for more information
FLS	Final Landscaping	Refer to the respective control measure log sheet for more information
GH	Good Housekeeping Practices/Material Management	Refer to the respective control measure log sheet for more information
HWSM	Hand Washing Station Management	Refer to the respective control measure log sheet for more information
IP-1	Inlet Protection - Curb - Block & Gravel Bags	Refer to the respective control measure log sheet for more information
IP-3	Inlet Protection - Area Inlet w/ Rock Socks	Refer to the respective control measure log sheet for more information
IP-7	Inlet Protection - Dandy Curb Bag	Refer to the respective control measure log sheet for more information
IP-8	Inlet Protection - Area Inlet - Dandy Bag	Refer to the respective control measure log sheet for more information
IP-9	Inlet Protection - Curb - Rock Bags only	Refer to the respective control measure log sheet for more information
IP-10	Inlet Protection - Culvert	Refer to the respective control measure log sheet for more information
LF	Landform	Refer to the respective control measure log sheet for more information
LG	Lowered Grade	Refer to the respective control measure log sheet for more information
OP	Outlet Protection	Refer to the respective control measure log sheet for more information
RRL	Recycled Rubber Log	Refer to the respective control measure log sheet for more information

RS	Rock Sock	Refer to the respective control measure log sheet for more information
SC	Secondary Containment	Refer to the respective control measure log sheet for more information
SF	Silt Fence	Refer to the respective control measure log sheet for more information
SK	Spill Kit	Refer to the respective control measure log sheet for more information
SMP	Seed & Mulch - Permanent	Refer to the respective control measure log sheet for more information
SR	Surface Roughening	Refer to the respective control measure log sheet for more information
SS	Street Sweeping and Scraping	Refer to the respective control measure log sheet for more information
SSA	Stabilized Staging Area	Refer to the respective control measure log sheet for more information
ST	Sediment Trap	Refer to the respective control measure log sheet for more information
SWM	Sanitary Waste/Portable Toilet Management	Refer to the respective control measure log sheet for more information
VTC-A	Vehicle Tracking Control	Refer to the respective control measure log sheet for more information
WD	Wattle Dike / Sediment Control Log / Straw Wattle	Refer to the respective control measure log sheet for more information

The control measures in Table 5.a.2 were evaluated during weekly pre-inspection planning as being potentially necessary to control/treat the pollution sources evaluated in Section "4) Potential Sources of Pollution".

Table 5.a.2

Control Measure (CM) Designation	Control Measure (CM) Description	Notes
No control measures have been entered		

Control Measure log sheets will provide information about each control measure implemented on the project including narratives on proper installation, inspection and maintenance and installation details, as required.

5.b) Vehicle Tracking Control

Structural and nonstructural vehicle tracking controls shall be implemented to minimize vehicle tracking of sediment from disturbed areas and may include tracking pads, minimizing site access, wash racks, graveled parking areas, maintaining vehicle traffic to paved areas, street sweeping and sediment control measures. Inlet protection cannot be the sole means of treatment.
- Where necessary, additional controls will be used to remove sediment from vehicle tires prior to exit;
- Where sediment has been tracked-out from the site onto the surface of off-site streets, paved areas, or sidewalks, deposited sediment will be removed by the end of the same workday in which it has occurred.

Refer to the respective control measure log sheet for more information.

5.c) Basins / Impoundments

If implemented on the project, refer to the respective pollution source log sheet for more information.

5.d) Natural Buffers / Equivalent Controls

Pre-existing vegetation will be maintained or equivalent control measures will be installed for areas within 50 feet of a state surface water body.

5.e) Minimize Soil Compaction

Where final vegetation stabilization will occur or where infiltration practices will be installed, the site will either restrict vehicle and equipment use in these locations to avoid soil compaction, or use soil conditioning techniques that rehabilitate and condition the soils as necessary prior to seeding or planting of these locations if necessary and feasible.

5.f) Topsoil Preservation

Native topsoil will be preserved at the site by stockpiling.

Refer to the respective pollution source and control measure log sheets for more information.

5.g) Diversion Controls

If implemented on the project, refer to the respective control measure log sheet for more information.

5.h) Bulk Storage Of Chemicals

Practices used to minimize the discharge of pollutants associated with the bulk storage of petroleum products and other liquid chemicals:
Bulk storage, individual containers of 55 gallons or greater, for petroleum products and other liquid chemicals will have secondary containment, or equivalent protection, in order to contain spills and to prevent spilled material from entering state waters.

If implemented on the project, refer to the respective control measure and pollution source log sheets for more information.

5.i) Concrete Washout Waste

Practices used to minimize the discharge of pollutants from concrete washout waste:
Control measures designed for concrete washout waste will be implemented to ensure that washing activities do not contribute pollutants to stormwater runoff, or receiving waters. Discharges that may reach groundwater will flow through soil that has buffering capacity prior to reaching groundwater, as necessary to meet the effluent limits. Concrete washout activities will not be not be performed in an area where shallow groundwater may be present and could result in buffering capacity not being adequate, such as near natural drainages, springs, or wetlands.

If implemented on the project, refer to the respective pollution source log sheet for more information.

5.j) Administrative / Operational Practices

Scheduling / Planning:
Pre-activity planning of stormwater management controls for upcoming construction activities, including forecasting weather is an important step in the proper management of the site. Appropriate adjustments will be made to minimize the amount of soil exposed during construction activity, including the disturbance of steep slopes, and reduce the negative impact of any other pollutants to stormwater quality to the best extent that is practicable.

Training / Meetings:
New employees and contractors will be educated on the contents of the SWMP as it applies to them and the importance of pollution prevention for the project. This will be done informally in the field as necessary and may be discussed in routine meetings held on-site.

5.k) Control Measures Operated By Others

If implemented on the project, the SWMP will contain a documented use agreement, location, installation specifications, design specifications and maintenance requirements for the control measure. A Qualified Stormwater Manager will regularly inspect the control measure to ensure it is properly maintained and in compliance.

6) Site Description

6.a) Nature of Construction Activities

The project involves base improvements of an existing ski resort which will involve demolition of one existing structure and the addition of new
infrastructure for a new Gondola. Grading/excavation operations will occur, foundation/vertical construction activities, and associated hardscapes/landscaping throughout the site.

6.b) Project Location

The project is located at 2305 Mt Werner Circle in Steamboat Springs, CO.

Latitude: 40.457226
Longitude: -106.804367

6.c) Proposed Sequence of Major Activities

Construction for all work associated with the project will begin on or about 04/16/2021 with project completion around 02/07/2022.

Many circumstances that cannot be anticipated, such as weather, material shortages, and many others will change the schedule of activities on a construction project on an ongoing basis until construction is complete. Regardless of these schedule changes, Hydrologic Phases (or sequences) consistently reflect the major changes to the hydrology of a project that will influence the type of control measures effective in controlling pollutants in stormwater runoff. The USMS Hydrologic Phases are:

1. Existing Conditions/Site Mobilization

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

The following Tables 6.b.1 - 6.b.5 were developed prior to the start of construction. The tables outline the major construction activities planned during the major hydrologic phases of the project. The tables also list the pollution sources anticipated to be present during the construction activity and the control measures anticipated to be implemented to control/contain such pollutants.

Table 6.b.1

Estimated Start Date 04/13/2021	**1. Existing Conditions/Site Mobilization**		**Estimated End Date 04/21/2021**
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
Install Initial Control Measures, Mobilize Equipment	4/13/21 - 4/21/21 8 days	CP, DSF, EM, HWS, LUO, MS, P, PT, SEE, SWT	CF, CNX, DMP, GH, HWSM, IP-1, IP-3, IP-7, IP-8, IP-9, IP-10, RRL, RS, SC, SF, SK, SS, SSA, SWM, VTC-A, WD

Table 6.b.2

Estimated Start Date 04/19/2021	**2. Clearing/Grubbing, Rough/Overlot Grading, Demolition**		**Estimated End Date 08/02/2021**
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
Demo Gondola Building & Bldg B, Clearing/Grubbing, Mass Excavation, Overlot/Rough Grading	4/19/21 - 8/2/21 105 days	CP, DSF, FD, HWS, LUO, P, PT, S, SEE, SWT	CD, CF, DC, DD, DMP, EB, GH, HWSM, IP-3, IP-7, IP-8, IP-9, IP-10, LF, LG, OP, RRL, RS, SC, SF, SK, SR, SS, SSA, ST, SWM, VTC-A, WD

Table 6.b.3

Estimated Start Date 06/21/2021	**3. Utility Installation**		**Estimated End Date 07/09/2021**
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
Site Utilities Installation	6/21/21 - 7/9/21 18 days	CP, CSC, DSF, EM, FD, GWD, HWS, LUO, MS, P, PT, S, SEE, SWD, SWT	CD, CF, CNX, DC, DD, DMP, DW, EB, GH, HWSM, IP-3, IP-9, IP-10, LG, OP, RRL, RS, SC, SF, SK, SS, SSA, ST, SWM, VTC-A, WD

Table 6.b.4

Estimated Start Date 08/05/2021	**4. Impervious Surfaces, Vertical/Building Construction**		**Estimated End Date 01/28/2022**
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**

Excavate, Form/Pour Footings, Drill/Pour Caissons, Form/Pour Foundation Walls, Form/Pour Slab-on-Grade	8/5/21 - 10/5/21 61 days	CC, CP, CSC, CWW, DSF, EM, HWS, LUO, MS, P, PT, SEE, SWD, SWT, TC	CD, CF, CNX, CWA, DD, DMP, DW, GH, HWSM, IP-10, LF, LG, RRL, RS, SC, SF, SK, SS, SSA, ST, SWM, VTC-A, WD
Structural Steel, Form/Pour Slab-on-Deck	10/6/21 - 10/14/21 8 days	CC, CP, CSC, CWW, DSF, EM, HWS, LUO, MS, P, PT, SEE, SWD, SWT, TC	CD, CF, CNX, CWA, DD, DMP, DW, GH, HWSM, IP-10, LF, LG, OP, RRL, RS, SC, SK, SS, SSA, ST, SWM, VTC-A, WD
Framing & Rough-ins	10/18/21 - 1/14/22 89 days	CP, EM, HWS, LUO, MS, P, PT, SEE, SWT	CF, CNX, DMP, GH, HWSM, SC, SK, SS, SSA, SWM, VTC-A
Interior Finishes (Core & Shell)	1/10/22 - 1/28/22 18 days	CC, CP, HWS, LUO, MS, PT, SEE, SWT, TC	CF, CNX, DMP, GH, HWSM, SK, SS, SSA, SWM, VTC-A

Table 6.b.5

Estimated Start Date 09/08/2021	**5. Final Grading/Stabilization**		**Estimated End Date 02/07/2022**
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
Final Grading, Install Irrigation System, Plants/Sod, Permanent Seeding/Mulch	9/8/21 - 2/7/22 153 days	CP, DSF, EM, FN, HWS, LUO, MS, P, PT, S, SEE, SWT	CD, CF, CNX, DD, DMP, EB, ECB, FLS, GH, HWSM, IP-3, IP-9, IP-10, LF, LG, RRL, RS, SC, SF, SK, SMP, SS, SSA, ST, SWM, WD
Temporary control measures will be removed upon Final Stabilization of project			

The following Tables 6.b.6 - 6.b.10 are derived from construction activities described during weekly pre-inspection planning. The tables outline the major construction activities planned during the major hydrologic phases of the project. The tables also list the pollution sources anticipated to be present during the construction activity and the control measures anticipated to be implemented to control/contain such pollutants.

Table 6.b.6

Estimated Start Date	**1. Existing Conditions/Site Mobilization**		**Estimated End Date**
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
No activities have been entered			

Table 6.b.7

Estimated Start Date	**2. Clearing/Grubbing, Rough/Overlot Grading, Demolition**		**Estimated End Date**
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
No activities have been entered			

Table 6.b.8

Estimated Start Date	3. Utility Installation		Estimated End Date
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
No activities have been entered			

Table 6.b.9

Estimated Start Date	4. Impervious Surfaces, Vertical/Building Construction		Estimated End Date
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
No activities have been entered			

Table 6.b.10

Estimated Start Date	5. Final Grading/Stabilization		Estimated End Date
Construction Activity	**Est. Dates/Duration**	**Potential Pollution Sources (PSs)**	**Control Measures (CMs)**
No activities have been entered			
Temporary control measures will be removed upon Final Stabilization of project			

6.d) Total Site Area & Disturbed Area

Total Site Area: 5.0 acres
Disturbed Area: 3.0 acres

6.e) Soils Information

The predominant soils on this project are Lintim loam which have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Soils data was obtained from NEPAssist.

6.f) Existing Vegetation

The existing vegetation on the project consists of primarily native grasses, bushes, and trees, with an approximate coverage of 80%. Determination was made through visual observations of native vegetation in nearby areas.

6.g) Non-Stormwater Discharges

Discharges from the following sources have been evaluated and have the potential for being present on the project during construction:

1) Discharges from uncontaminated springs that do not originate from an area of land disturbance.
2) Discharges to the ground of concrete washout water associated with the washing of concrete tools and concrete mixer chutes. Discharges of concrete washout water must not leave the site as surface runoff or reach receiving waters. Concrete on-site waste disposal is not authorized by this permit.
3) Discharges of landscape irrigation return flow.
4) Discharges from diversions of state waters within the permitted site.
5) Discharges resulting from emergency firefighting activities during the active emergency response are authorized by this permit. After active emergency response is complete, the remaining water containing pollutants must be properly removed and disposed of in order to minimize pollutants from discharging from the site, unless infeasible.

Please refer to the pollution source and control measure log sheets for more information on how they will be managed.

6.h) Drainage Patterns / Receiving Waters

Pre-construction site drainage patterns:
Runoff wll sheet flow from east to west and enter on-site inlets to a man-made conveyance that runs north to south.

Refer to Inspection Records for current descriptions of site drainage patterns.

Receiving waters:
Runoff will discharge to Burgess Creek which is tributary to the Yampa River.

6.i) Stream Crossings

There will be no stream crossings located on the project.

6.j) Alternate Temporary Stabilization Schedule

Refer to site maps and/or the "ATSS - Alternate Temporary Stabilization Schedule" log sheet for a description of any alternate temporary stabilization schedules implemented.

6.k) Alternative Diversion Criteria

Refer to section "5.g) Diversion Controls" for a description of any alternative diversion criteria implemented.

7) Site Map(s)

The SWMP includes a legible site map(s), showing the entire site, identifying:
a) Construction site boundaries;
b) Flow arrows that depict stormwater flow directions on-site and runoff direction;
c) All areas of ground disturbance including areas of borrow and fill;
d) Areas used for storage of soil;
e) Locations of all waste accumulation areas, including areas for liquid, concrete, masonry, and asphalt;
f) Locations of dedicated asphalt, concrete batch plants and masonry mixing stations;

g) Locations of all structural control measures;
h) Locations of all non-structural control measures (e.g. temporary stabilization);
i) Locations of springs, streams, wetlands, diversions and other state waters, including areas that require pre-existing vegetation be maintained within 50 feet of a receiving water, where determined feasible in accordance with Part I.B.1.a.i(e)
j) locations of all stream crossings located within the construction site boundary.
k) Locations where alternative temporary stabilization schedules apply.

8) Stabilization Requirements

Temporary stabilization:

Temporary stabilization must be implemented for earth disturbing activities on any portion of the site where ground disturbing construction activity has permanently ceased, or temporarily ceased for more than 14 calendar days. Temporary stabilization methods may include, but are not limited to, tarps, soil tackifier, and hydroseed. The permittee may exceed the 14-day schedule when either the function of the specific area of the site requires it to remain disturbed or physical characteristics of the terrain and climate prevent stabilization. The SWMP must document the constraints necessitating the alternative schedule, provide the alternate stabilization schedule, and identify all locations where the alternative schedule is applicable on the site map. Minimum inspection frequency and scope, as directed in Part I.D., must be followed for temporarily stabilized areas.

Final stabilization and long term stormwater management:

Final stabilization must be implemented for all construction sites covered under this permit. Final stabilization is reached when (1), (2), and (3) below are complete:
1) All construction activities are complete.
2) Permanent stabilization methods are complete. Permanent stabilization methods include, but are not limited to, permanent pavement or concrete, hardscape, xeriscape, stabilized driving surfaces, vegetative cover, or equivalent permanent alternative stabilization methods. The division may approve alternative final stabilization criteria for specific operations. Vegetative cover must meet the
following criteria:
2.a) Evenly distributed perennial vegetation, and
2.b) Coverage, at a minimum, equal to 70 percent of what would have been provided by native vegetation in a local, undisturbed area or adequate reference site, and
3) The permittee must ensure all temporary control measures are removed from the construction site once final stabilization is achieved, except when the control measure specifications allow the control measure to be left in place (i.e. bio-degradable control measures).

Final stabilization must be designed and installed as a permanent feature. Final stabilization measures for obtaining a vegetative cover or alternative stabilization methods include, but are not limited to, the following as appropriate:
1) Seed mix selection and application methods;
2) Soil preparation and amendments;
3) Soil stabilization methods to provide adequate protection to minimize erosion (e.g., crimped straw, hydro mulch or rolled erosion control products);
4) Appropriate sediment control measures as needed until final stabilization is achieved; or
5) Permanent pavement, hardscape, xeriscape, stabilized driving surfaces, and other alternative stabilization practices as applicable.

9) USMS Inspection Procedures And Site Maintenance

9.a) Person(s) Responsible for Conducting Inspections

Refer to section "1) Qualified Stormwater Manager(s)" for personnel assigned the role of conducting inspections.

9.b) Inspection Frequency

Site inspections will occur every seven calendar days or every fourteen calendar days if post-storm event inspections are conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosion. Inspections may be conducted more frequently as site conditions warrant. The first site inspection will be performed within seven calendar days of the commencement of construction activities on site.

Refer to the inspection report records for the actual inspection frequency used.

9.c) Reduced Inspection Frequency

When portions of the site meet the following criteria, but final stabilization has not been achieved due to a vegetative cover that has not become established, a thorough inspection of the stormwater management system will be conducted at least every 30 days. Post storm event inspections will not be conducted. This reduced inspection schedule is allowed if all of the following criteria are met:
1) All construction activities that will result in surface ground disturbance are completed;
2) All activities required for final stabilization, in accordance with Part I.B.1.a.iii(b) & (c) and with the SWMP, have been completed, with the exception of the application of seed that has not occurred due to seasonal conditions or the necessity for additional seed application to augment previous efforts; and
3) The SWMP has been amended to indicate those areas that will be inspected in accordance with the reduced schedule allowed for in this paragraph.

Winter Conditions Inspections Exclusion:
Inspections are not required for sites that meet all of the following conditions: construction activities are temporarily halted, snow cover exists over the entire site for an extended period, and melting conditions posing a risk of surface erosion do not exist. This inspection exception is applicable only during the period where melting conditions do not exist, and applies to the routine 7-day, 14-day and monthly inspections, as well as the post-storm-event inspections. When this inspection exclusion is implemented, the following information must be documented in accordance with the requirements in Part I.C.3 and Part I.D.5.c:
1) dates when snow cover existed;
2) date when construction activities ceased; and
3) date melting conditions began.

9.d) Areas to be Inspected

When conducting a site inspection the following areas, if applicable, must be inspected for evidence of, or the potential for, pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to state waters:

1) Construction site perimeter;
2) All disturbed areas;
3) Locations of installed control measures;
4) Designated haul routes;
5) Material and waste storage areas exposed to precipitation;
6) Locations where stormwater has the potential to discharge offsite; and
7) Locations where vehicles exit the site.

All erosion and sediment control practices identified in the SWMP shall be evaluated to ensure that they are maintained and operating correctly.

9.e) Inspection Requirements

When conducting a site inspection:

1) Visually verify whether all implemented control measures are in effective operational condition and are working as designed in their specifications to minimize pollutant discharges.
2) Determine if there are new potential sources of pollutants.
3) Assess the adequacy of control measures at the site to identify areas requiring new or modified control measures to minimize pollutant discharges.
4) Identify all areas of non-compliance with the permit requirements and, if necessary, implement corrective action in accordance with Part I.B.1.c of the Permit.

9.f) Inspection Reports

A record of inspections will be maintained. Inspection reports will identify any incidents of non-compliance with the terms and conditions of the permit. Inspection records will be retained for three years from expiration or inactivation of permit coverage. Inspection reports will include:
1) The inspection date;
2) Name(s) and title(s) of personnel making the inspection;
3) Weather conditions at the time of inspection;
4) Phase(s) of construction at the time of inspection;
5) Estimated acreage of disturbance at the time of inspection;
6) Location(s) and identification of control measures requiring routine maintenance;
7) Location(s) and identification of discharges of sediment or other pollutants from the site;
8) Location(s) and identification of inadequate control measures;
9) Location(s) and identification of additional control measures needed that were not in place at the time of inspection;
10) Description of corrective action(s) for items 7, 8, 9, above, dates corrective action(s) were completed, including requisite changes to the SWMP, as necessary;
11) Description of the minimum inspection frequency utilized;
12) Deviations from the minimum inspection schedule as noted above;
13) After adequate corrective action(s) have been taken, or where a report does not identify any incidents requiring corrective action, the report shall contain a statement as required in Part I.A.3.f.

9.g) Required Actions Following Site Inspections

Maintenance Issues
Where site inspections note the need for control measure maintenance activities, control measures will be maintained in accordance with the SWMP and the permit as soon as possible.

Corrective Action Issues
Repair, replacement, or installation of new control measures when determined necessary during site inspections to address ineffective or inadequate control measures, will be conducted in accordance with the permit. SWMP updates required as a result of deficiencies in the SWMP noted during site inspections shall be made in accordance with the permit. If it is infeasible to install or repair of control measure immediately after discovering the deficiency, the following documentation will be made for the issue:
1) A description of why it is infeasible to initiate the installation or repair immediately; and
2) A schedule for installing or repairing the control measure and returning it to an effective operating condition as soon as possible.

If applicable, the permittee will remove and properly dispose of any unauthorized release or discharge within and from the permitted area (e.g., discharge of non-stormwater, untreated stormwater containing pollutants, spill, or leak not authorized by this permit.) The permittee will also clean up any contaminated surfaces, if feasible, to minimize discharges of the material in subsequent storm events, including water remaining from the response that contains pollutants after active emergency firefighting response is complete.

10) SWMP Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name: Rich Jackson

Title: Environmental Compliance Specialist

Contact Information: rich.jackson@stormwaterrm.com, 303-993-9083 (mobile)

Signature: *Electronically signed by Rich Jackson* **Date:** 04/10/2021 10:06 MST

APPENDICES

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: CD

Name/Description:
Check Dam - Loose Rock or Riprap

Description, Purpose and Applicability:

A check dam is a barrier constructed of rock, gravel bags, sandbags, fiber rolls (wattles), or reusable products, placed across a swale or drainage ditch/channel. Check dams reduce the effective slope of the channel, thereby reducing the velocity of flowing water, reducing the potential for erosion, and may also allow sediment to settle out of the runoff.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

- The ends of the check dam must be higher than the middle, allowing flows to go over the BMP in the center and not go around it, which could cause erosion in the slopes/banks of the channel
- Smaller rock (vs. riprap) may be used as temporary measures during construction to increase the filtration of runoff, as long as it is large enough (or secured if necessary) that it won't erode from the velocity of flows in the channel/swale.
- Missing rock will be replaced as necessary.
- Sediment should be removed when the accumulation reaches one-third of the barrier height.
- The spacing of the check dams depend on the height of the control and the slope severity - the bottom of the upper check dam should be approximately equal to the top of the lower check dam

Instances of this Control Measure (CM)

CD - Check Dam - Loose Rock or Riprap
There are no items to display

Attachments

Filename: CD.pdf *(click to download original file)*

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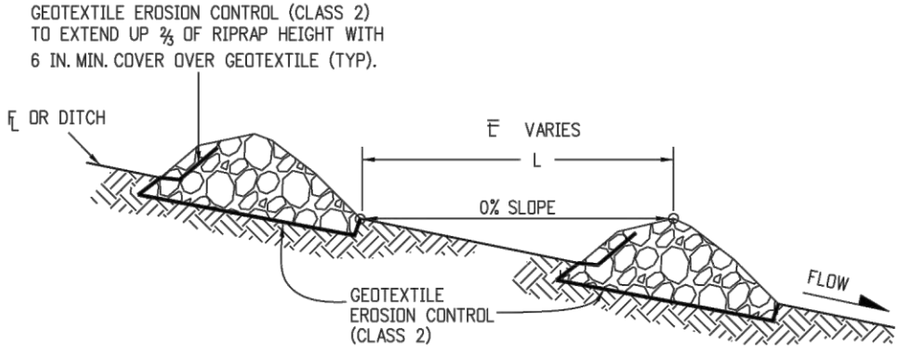
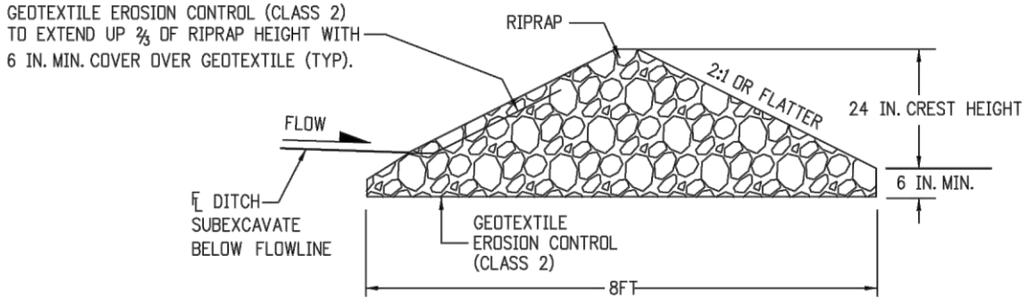
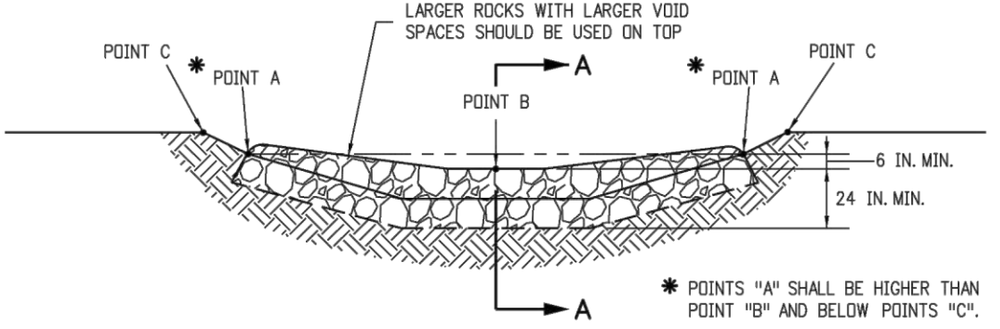


SECTION VIEW ALONG DITCH FLOWLINE



SECTION A-A



TYPICAL SECTION VIEW

NOTES:

1. RIPRAP SIZE D_{50} = 6IN OR AS SHOWN ON THE PLANS.
2. THE GEOTEXTILE EROSION CONTROL SHALL BE CLASS 2 AND CONFORM TO THE REQUIREMENTS OF SUBSECTION 712.08.
3. THE ENDS OF RIPRAP CHECK DAM SHALL BE A MINIMUM OF 6 IN. HIGHER THAN CENTER OF CHECK DAM.
4. FOR USE AS TEMPORARY CHECK DAMS ONLY AND NOT FOR PERMANENT INSTALLATIONS.
5. THE PAY ITEM NUMBER FOR ROCK CHECK DAM (EA) IS 208-00041.

RCD

NOTE: ALL MATERIALS AND LABOR TO COMPLETE THE ROCK CHECK DAM SHALL BE INCLUDED IN THE COST OF WORK.

ROCK CHECK DAM

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: CF

Name/Description:
Construction Fence

Description, Purpose and Applicability:

A construction fence restricts site access to designated entrances and exits, delineates construction site boundaries, and keeps construction out of sensitive areas such as natural areas to be preserved as open space, wetlands and riparian areas.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Construction fencing may be chain link or plastic mesh and should be installed following manufacturer's recommendations. See Detail for typical installations.
- Inspect fences for damage; repair or replace as necessary.
- Fencing should be tight and any areas with slumping or fallen posts should be reinstalled.
- Fencing should be removed once construction is complete.

Instances of this Control Measure (CM)

CF - Construction Fence
There are no items to display

Attachments

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Filename: UDFCD Construction Fence.pdf *(click to download original file)*

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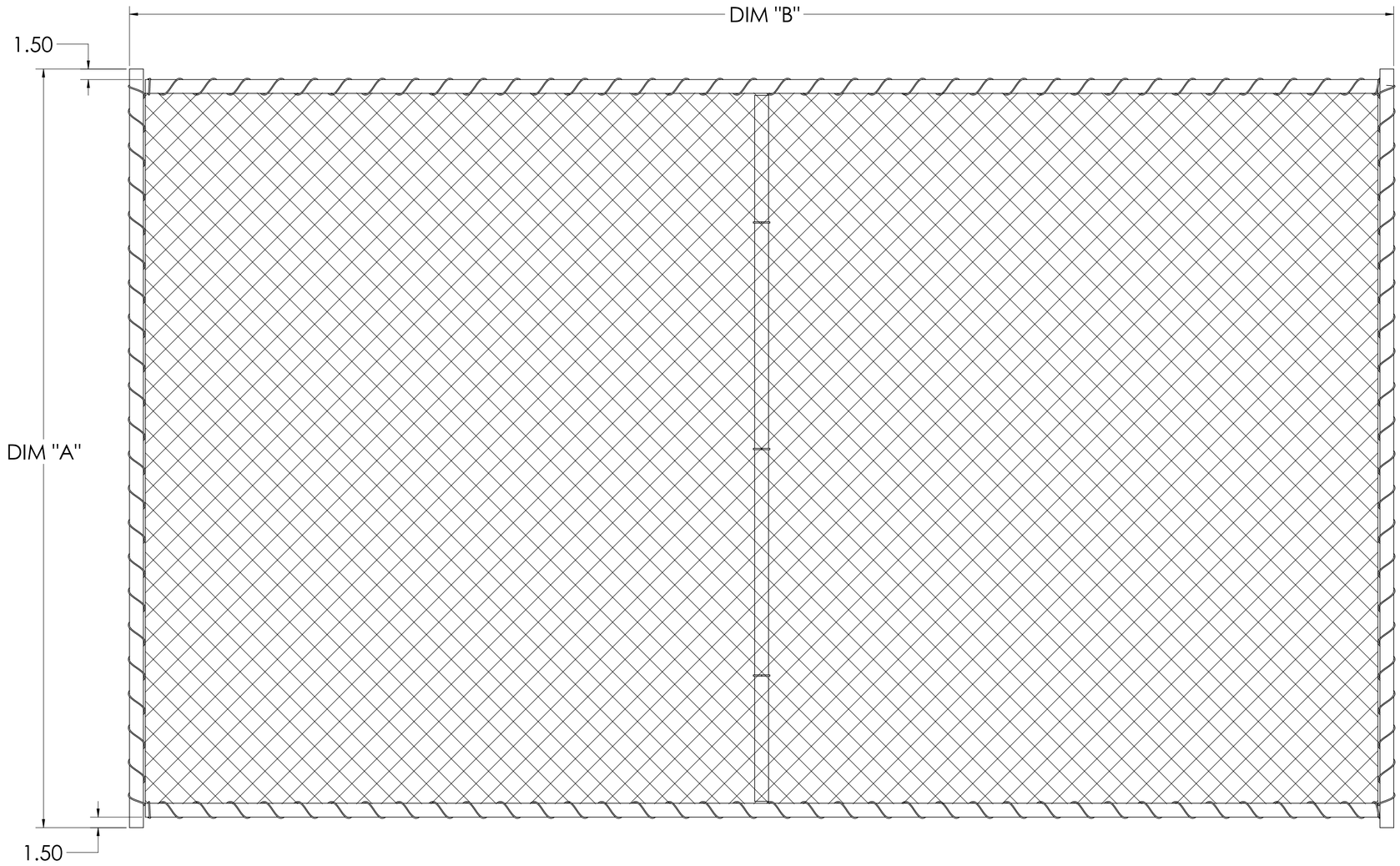


				CHAIN LINK WIRE	
PART NUMBER	DIM. "A"	DIM. "B"	TUBING MATERIAL	GAUGE	DIAMOND SIZE
071070	6'	10'	1-3/8" x 16 Gauge	12.5	2-3/8"
071071	6'	12'	1-3/8" x 16 Gauge	12.5	2-3/8"
071075	6'	10'	1-3/8" x 16 Gauge	11.5	2-3/8"
071076	6'	12'	1-3/8" x 16 Gauge	11.5	2-3/8"
071083	6'	14'	1-3/8" x 16 Gauge	12.5	2-3/8"

RELEASE STAMP - ORIGINAL IN BLUE

MATERIAL

NOTE: DO NOT SCALE DRAWING

ALL DIMENSIONS ARE INCHES UNLESS OTHERWISE NOTED.

Master Halco
One City Blvd. West,
Suite 900 Orange,
CA 92868
PHONE: 1-888-643-3623

DRAWN BY: BDS — DATE: 05/29/09

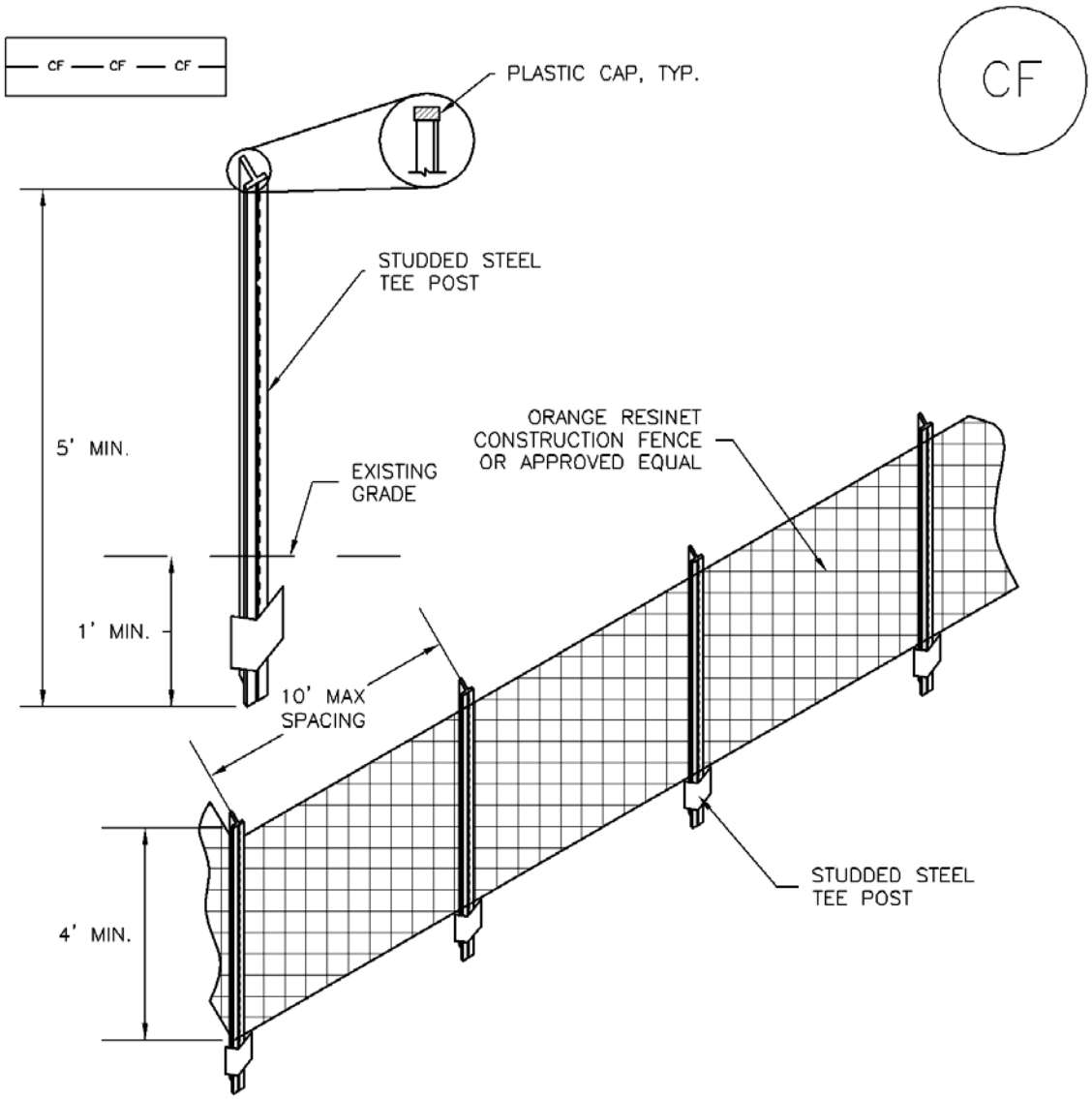
CHECKED BY — DATE

TOLERANCES UNLESS NOTED: DECIMAL .XX ±.031 .XXX ±.005 FRACTIONAL ±1/16 ANGULAR ±1°

MASTER HALCO®

DRAWING TITLE: TEMP PANEL - LACED

SIZE: D — DRAWING NUMBER — SHEET: 1 OF 1 — REV



CF–1. PLASTIC MESH CONSTRUCTION FENCE

CONSTRUCTION FENCE INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   –LOCATION OF CONSTRUCTION FENCE.

2. CONSTRUCTION FENCE SHOWN SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

3. CONSTRUCTION FENCE SHALL BE COMPOSED OF ORANGE, CONTRACTOR–GRADE MATERIAL THAT IS AT LEAST 4' HIGH. METAL POSTS SHOULD HAVE A PLASTIC CAP FOR SAFETY.

4. STUDDED STEEL TEE POSTS SHALL BE UTILIZED TO SUPPORT THE CONSTRUCTION FENCE. MAXIMUM SPACING FOR STEEL TEE POSTS SHALL BE 10'.

5. CONSTRUCTION FENCE SHALL BE SECURELY FASTENED TO THE TOP, MIDDLE, AND BOTTOM OF EACH POST.

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: CNX

Name/Description:
Connex

Description, Purpose and Applicability:

Connex Box self contained, secure units may be deployed around the site to store tool and materials used by contractors throughout construction.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

The containers will be delivered by a sub-contractor, inspected weekly, and damaged containers will be replaced, as necessary.

Instances of this Control Measure (CM)

CNX - Connex
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: CWA

Name/Description:
Concrete Washout Area

Description, Purpose and Applicability:

Concrete waste management involves designating and properly managing a specific area of the construction site as a concrete washout area. A concrete washout area can be created using one of several approaches designed to receive wash water from washing of tools and concrete mixer chutes, liquid concrete waste from dump trucks, mobile batch mixers, or pump trucks. Surface discharges of concrete washout water from construction sites are prohibited.

During what phase(s) of construction/activity will this control measure be implemented?

4. Impervious Surfaces, Vertical/Building Construction

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

- The use of the washout site should be temporary (less than 1 year), and
- The washout site should be not be located in an area where shallow groundwater may be present, such as near natural drainages, springs, or wetlands. Do not locate an unlined washout area within 400 feet of any natural drainage pathway or waterbody or within 1,000 feet of any wells or drinking water sources. Even for lined concrete washouts, it is advisable to locate the facility away from waterbodies and drainage paths.

Remove concrete waste in the washout area, as needed to maintain BMP function (typically when filled to about two-thirds of its capacity). Collect concrete waste and deliver offsite to a designated disposal location. Upon termination of use of the washout site, accumulated solid waste, including concrete waste and any contaminated soils, must be removed from the site to prevent on-site disposal of solid waste. If the wash water is allowed to evaporate and the concrete hardens, it may be recycled.

Instances of this Control Measure (CM)

CWA - Concrete Washout Area
There are no items to display

Attachments

Filename: CWA.pdf *(click to download original file)*

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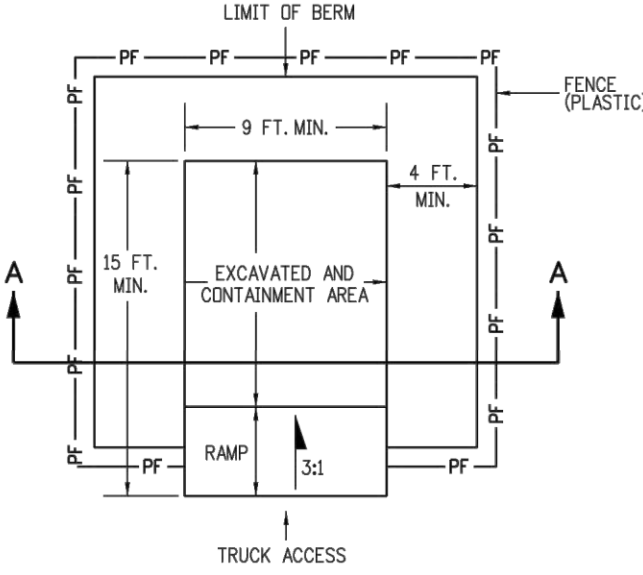
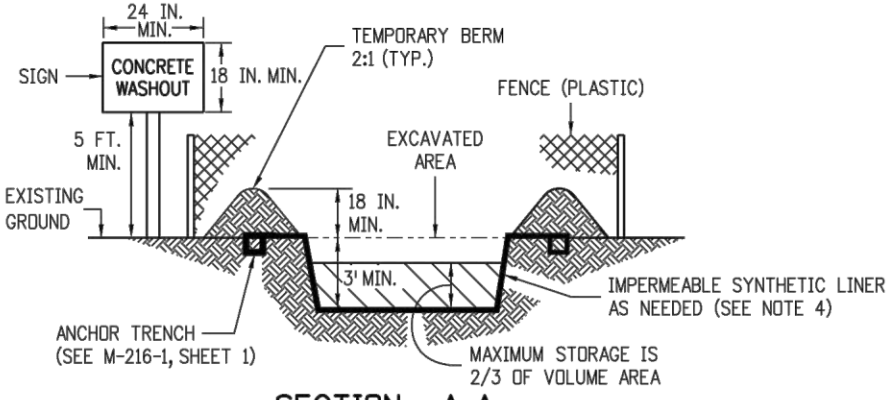


PLAN VIEW



SECTION A-A

NOTES:

1. A FENCE (PLASTIC) CONFORMING TO SECTION 607 SHALL BE INSTALLED AROUND THE CONCRETE WASHOUT AREA, EXCEPT AT THE OPENING.

2. THE CONCRETE WASHOUT SIGN SHALL HAVE LETTERS AT LEAST 3 INCHES HIGH AND CONFORM TO SUBSECTION 630.02.

3. ALL MATERIALS AND LABOR TO COMPLETE THE CONCRETE WASHOUT STRUCTURE SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.

4. THE BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF FIVE FEET ABOVE GROUND WATER. IF NOT, THE BOTTOM OF EXCAVATION SHALL BE IN ACCORDANCE WITH 208.02 (j).

5. THE PAY ITEM NUMBER FOR CONCRETE WASHOUT STRUCTURE (EACH) IS 208-00045.

CONCRETE WASHOUT STRUCTURE

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: DC

Name/Description:
Dust Control

Description, Purpose and Applicability:

Wind erosion and dust control BMPs help to keep soil particles from entering the air as a result of land disturbing construction activities. These BMPs include a variety of practices generally focused on either graded disturbed areas or construction roadways. Dust control measures should be used on any site where dust poses a problem to air quality. Dust control is important to control for the health of construction workers and surrounding waterbodies.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Please see attached BMP Description, Installation and Maintenance Specification Sheet - Urban Drainage and Flood Control District - Urban Storm Drainage Criteria Manual Volume 3.

Instances of this Control Measure (CM)

DC - Dust Control
There are no items to display

Attachments

Description: EC-14 Wind Erosion/Dust Control - Urban Drainage and Flood Control District
Filename: EC-14 Wind Erosion-Dust Control.pdf *(click to download original file)*

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Wind Erosion/Dust Control (DC) EC-14

Description

Wind erosion and dust control BMPs help to keep soil particles from entering the air as a result of land disturbing construction activities. These BMPs include a variety of practices generally focused on either graded disturbed areas or construction roadways. For graded areas, practices such as seeding and mulching, use of soil binders, site watering, or other practices that provide prompt surface cover should be used. For construction roadways, road watering and stabilized surfaces should be considered.

Photograph DC-1. Water truck used for dust suppression. Photo courtesy of Douglas County.

Appropriate Uses

Dust control measures should be used on any site where dust poses a problem to air quality. Dust control is important to control for the health of construction workers and surrounding waterbodies.

Design and Installation

The following construction BMPs can be used for dust control:

- An irrigation/sprinkler system can be used to wet the top layer of disturbed soil to help keep dry soil particles from becoming airborne.
- Seeding and mulching can be used to stabilize disturbed surfaces and reduce dust emissions.
- Protecting existing vegetation can help to slow wind velocities across the ground surface, thereby limiting the likelihood of soil particles to become airborne.
- Spray-on soil binders form a bond between soil particles keeping them grounded. Chemical treatments may require additional permitting requirements. Potential impacts to surrounding waterways and habitat must be considered prior to use.
- Placing rock on construction roadways and entrances will help keep dust to a minimum across the construction site.
- Wind fences can be installed on site to reduce wind speeds. Install fences perpendicular to the prevailing wind direction for maximum effectiveness.

Wind Erosion Control/ Dust Control	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	Moderate

Maintenance and Removal

When using an irrigation/sprinkler control system to aid in dust control, be careful not to overwater. Overwatering will cause construction vehicles to track mud off-site.

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: DD

Name/Description:
Diversion Ditch

Description, Purpose and Applicability:

An earth dike is a berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

The ditch(es) will be installed per the installation detail and inspected at the frequency indicated in the Stormwater Management Plan. Accumulated sediment in the ditch will be removed when it impedes the flows in the ditch and damaged sections will be repaired as soon as possible.

Instances of this Control Measure (CM)

DD - Diversion Ditch
There are no items to display

Attachments

Filename: DD-EB Diversion Ditch or Earthen Berm.pdf *(click to download original file)*

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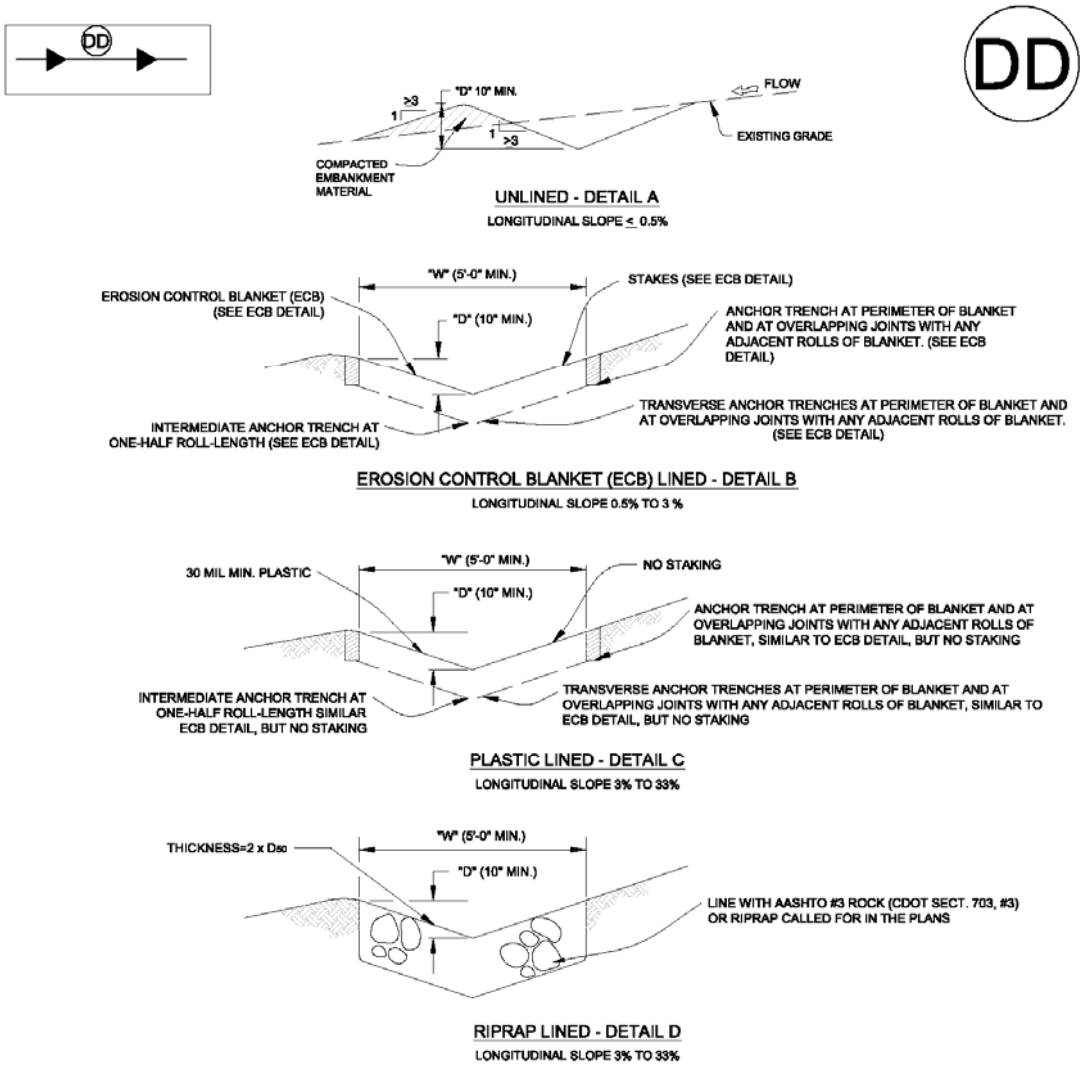


DIVERSION DITCH INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF DIVERSION DITCH.
   - TYPE OF DITCH (UNLINED, ECB LINED, PLASTIC LINED OR RIPRAP LINED).
   - LENGTH OF EACH TYPE OF DITCH.
   - DEPTH, "D", AND WIDTH, "W" DIMENSIONS.
   - FOR ECB LINED DITCH, EROSION CONTROL BLANKET TYPE (SEE ECB DETAIL).
   - FOR RIPRAP LINED DITCH, SIZE OF RIPRAP, "D_{50}".
2. SEE DRAINAGE PLANS FOR DETAILS OF ANY PERMANENT CONVEYANCE FACILITIES OR DIVERSION DITCHES EXCEEDING A 2-YEAR FLOW RATE OF 10 CFS.
3. DIVERSION DITCHES INDICATED ON INITIAL SWMP PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
4. FOR ECB LINED DITCHES, INSTALLATION OF EROSION CONTROL BLANKET SHALL CONFORM TO THE REQUIREMENTS OF THE ECB DETAIL.
5. IN LOCATIONS WHERE CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION DITCH, THE PERMITTEES SHALL INSTALL A TEMPORARY CULVERT WITH A MINIMUM DIAMETER OF 12 INCHES.

DIVERSION DITCH MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT DIVERSION DITCHES WEEKLY AND DURING AND AFTER ANY STORM. MAKE REPAIRS AS NECESSARY.
2. DIVERSION DITCHES ARE TO REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION, OR IF APPROVED BY LOCAL JURISDICTION MAY BE LEFT IN PLACE.
3. IF DIVERSION DITCHES ARE REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, DRILL SEEDED, HAY CRIMPED, MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

DETAIL BASED ON DETAILS PROVIDED BY DOUGLAS COUNTY, COLORADO

Figure C5-3—Temporary Diversion Dike & Ditch

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: DMP

Name/Description:
Dumpster

Description, Purpose and Applicability:

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers and arranging for regular disposal.
Dumpsters will be implemented where the following wastes are generated or stored:
- Packaging materials including wood, paper, and plastic scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces and masonry products.
- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Inspections of the Dumpster will be consistent with the project stated frequency in the narrative and will be called in for service prior to reaching 100% capacity.

Instances of this Control Measure (CM)

DMP - Dumpster
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: DW

Name/Description:
Dewatering Operations

Description, Purpose and Applicability:

The BMPs selected for construction dewatering vary depending on site-specific features such as soils, topography, anticipated discharge quantities, and discharge location. Dewatering typically involves pumping water from an inundated area to a BMP, and then downstream to a receiving waterway, sediment basin, or well-vegetated area. Dewatering typically involves use of several BMPs in sequence.

Dewatering operations are used when an area of the construction site needs to be dewatered as the result of a large storm event, groundwater, or existing ponding conditions. This can occur during deep excavation, utility trenching, and wetland or pond excavation.

During what phase(s) of construction/activity will this control measure be implemented?

3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Please see attached BMP Description, Installation and Maintenance Specification Sheet - Urban Drainage and Flood Control District - Urban Storm Drainage Criteria Manual Volume 3.
Inspections of the operations implemented will occur at least daily, during the dewatering activities and any maintenance will occur as soon as possible to ensure the controls function properly.

Instances of this Control Measure (CM)

DW - Dewatering Operations
There are no items to display

Attachments

Description: SM-09 Dewatering Operations - Urban Drainage and Flood Control District
Filename: SM-09 Dewatering Operations.pdf *(click to download original file)*

File is included after this page

Description

The BMPs selected for construction dewatering vary depending on site-specific features such as soils, topography, anticipated discharge quantities, and discharge location. Dewatering typically involves pumping water from an inundated area to a BMP, and then downstream to a receiving waterway, sediment basin, or well-vegetated area. Dewatering typically involves use of several BMPs in sequence.

Photograph DW-1. A relatively small dewatering operation using straw bales and a dewatering bag.

Appropriate Uses

Dewatering operations are used when an area of the construction site needs to be dewatered as the result of a large storm event, groundwater, or existing ponding conditions. This can occur during deep excavation, utility trenching, and wetland or pond excavation.

Photograph DW-2. Dewatering bags used for a relatively large dewatering operation.

Design and Installation

Dewatering techniques will vary depending on site conditions. However, all dewatering discharges must be treated to remove sediment before discharging from the construction site. Discharging water into a sediment trap or basin is an acceptable treatment option. Water may also be treated using a dewatering filter bag, and a series of straw bales or sediment logs. If these previous options are not feasible due to space or the ability to passively treat the discharge to remove sediment, then a settling tank or an active treatment system may need to be utilized. Settling tanks are manufactured tanks with a series of baffles to promote settling. Flocculants can also be added to the tank to induce more rapid settling. This is an approach sometimes used on highly urbanized construction sites. Contact the state agency for special requirements prior to using flocculents and land application techniques.

Some commonly used methods to handle the pumped water without surface discharge include land application to vegetated areas through a perforated discharge hose (i.e., the "sprinkler method") or dispersal from a water truck for dust control.

Dewatering Operations	
Functions	
Erosion Control	Moderate
Sediment Control	Yes
Site/Material Management	Yes

Dewatering discharges to non-paved areas must minimize the potential for scour at the discharge point either using a velocity dissipation device or dewatering filter bag.

Design Details are provided for these types of dewatering situations:

DW-1. Dewatering for Pond Already Filled with Water

DW-2 Dewatering Sump for Submersed Pump

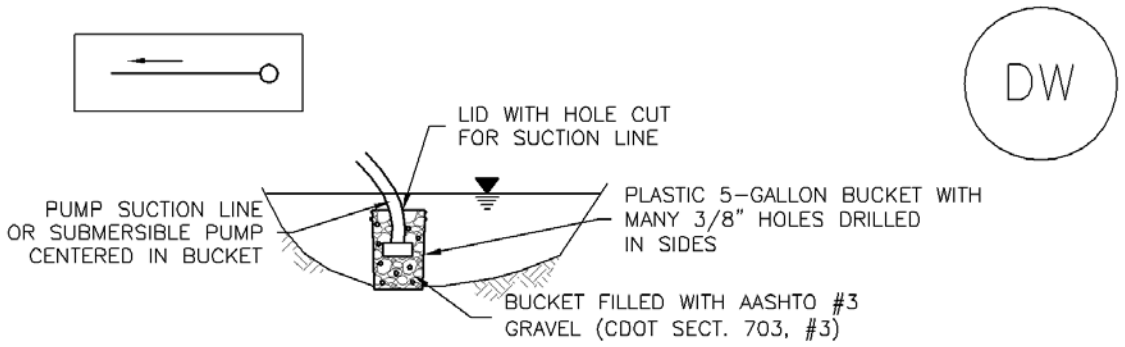
DW-3 Sump Discharge Settling Basin

DW-4 Dewatering Filter Bag

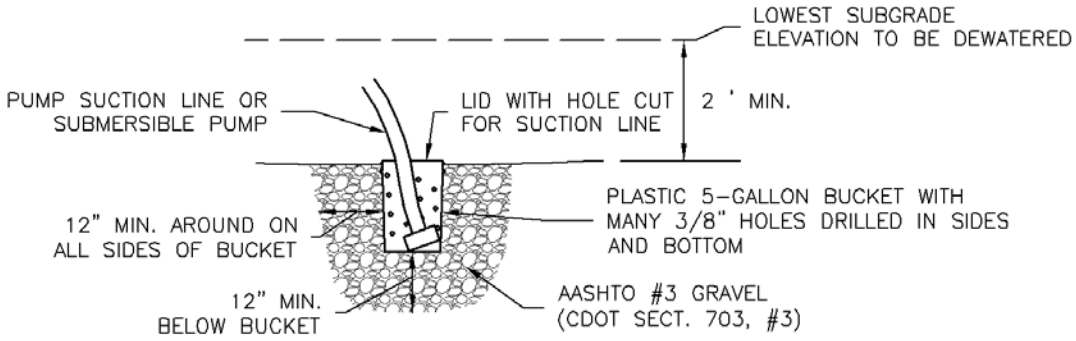
Maintenance and Removal

When a sediment basin or trap is used to enable settling of sediment from construction dewatering discharges, inspect the basin for sediment accumulation. Remove sediment prior to the basin or trap reaching half full. Inspect treatment facilities prior to any dewatering activity. If using a sediment control practice such as a sediment trap or basin, complete all maintenance requirements as described in the fact sheets prior to dewatering.

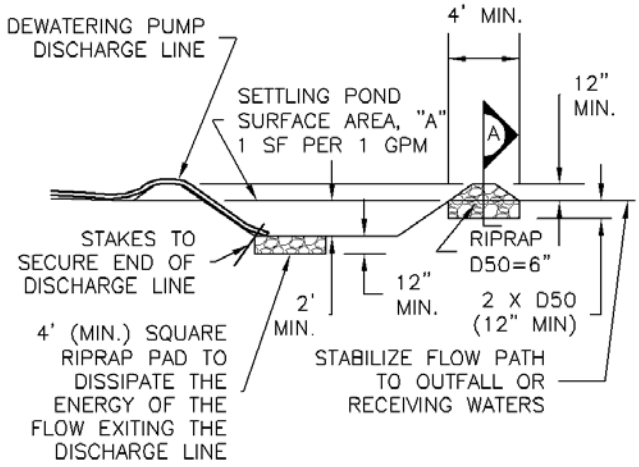
Properly dispose of used dewatering bags, as well as sediment removed from the dewatering BMPs. Depending on the size of the dewatering operation, it may also be necessary to revegetate or otherwise stabilize the area where the dewatering operation was occurring.



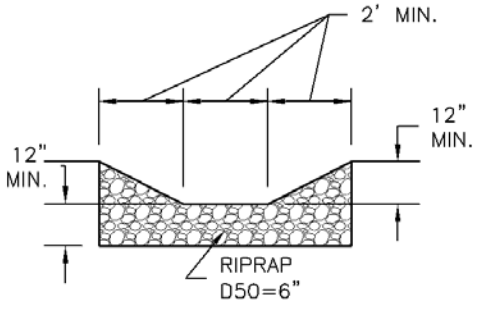
DW-1. DEWATERING POND ALREADY FILLED WITH WATER



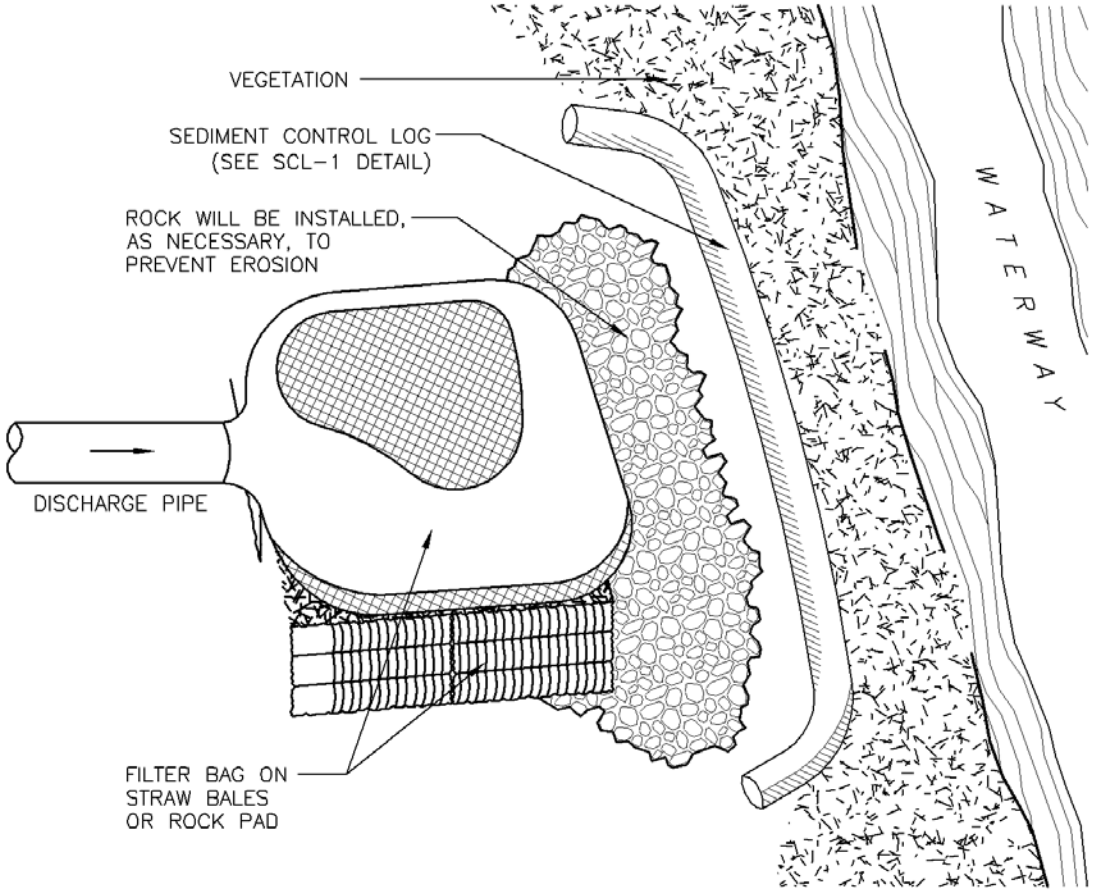
DW-2. DEWATERING SUMP FOR SUBMERSED PUMP



DW-3. SUMP DISCHARGE SETTLING BASIN



SETTLING BASIN SECTION A



DW-4. DEWATERING FILTER BAG

DEWATERING INSTALLATION NOTES

1. SEE PLAN VIEW FOR;
   -LOCATION OF DEWATERING EQUIPMENT.
   -TYPE OF DEWATERING OPERATION (DW-1 TO DW-4).

2. THE OWNER OR CONTRACTOR SHALL OBTAIN A CONSTRUCTION DISCHARGE (DEWATERING) PERMIT FROM THE STATE PRIOR TO ANY DEWATERING OPERATIONS DISCHARGING FROM THE SITE. ALL DEWATERING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE PERMIT.

3. THE OWNER OR OPERATOR SHALL PROVIDE, OPERATE, AND MAINTAIN DEWATERING SYSTEMS OF SUFFICIENT SIZE AND CAPACITY TO PERMIT EXCAVATION AND SUBSEQUENT CONSTRUCTION IN DRY CONDITIONS AND TO LOWER AND MAINTAIN THE GROUNDWATER LEVEL A MINIMUM OF 2-FEET BELOW THE LOWEST POINT OF EXCAVATION AND CONTINUOUSLY MAINTAIN EXCAVATIONS FREE OF WATER UNTIL BACK-FILLED TO FINAL GRADE.

DEWATERING INSTALLATION NOTES

4. DEWATERING OPERATIONS SHALL USE ONE OR MORE OF THE DEWATERING SUMPS SHOWN ABOVE, WELL POINTS, OR OTHER MEANS APPROVED BY THE LOCAL JURISDICTION TO REDUCE THE PUMPING OF SEDIMENT, AND SHALL PROVIDE A TEMPORARY SEDIMENT BASIN OR FILTRATION BMP TO REDUCE SEDIMENT TO ALLOWABLE LEVELS PRIOR TO RELEASE OFF SITE OR TO A RECEIVING WATER. A SEDIMENT BASIN MAY BE USED IN LIEU OF SUMP DISCHARGE SETTLING BASIN SHOWN ABOVE IF A 4-FOOT-SQUARE RIPRAP PAD IS PLACED AT THE DISCHARGE POINT AND THE DISCHARGE END OF THE LINE IS STAKED IN PLACE TO PREVENT MOVEMENT OF THE LINE.

DEWATERING MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. DEWATERING BMPs ARE REQUIRED IN ADDITION TO ALL OTHER PERMIT REQUIREMENTS.

5. TEMPORARY SETTLING BASINS SHALL BE REMOVED WHEN NO LONGER NEEDED FOR DEWATERING OPERATIONS. ANY DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: EB

Name/Description:
Earth Berm

Description, Purpose and Applicability:

An earth berm or ridge of compacted soil with or without a ditch/swale is used to divert stormwater runoff or channel water to a desired location or to contain sediment and other potential pollutants, such as fuel spills, masonry mixing activities, etc.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Inspect berm for voids, failed compaction and significant disfigurement of side slopes, height and width (repair to above specifications where/as necessary). Refer to information/detail sheet included in the SWMP.

Instances of this Control Measure (CM)

EB - Earth Berm
There are no items to display

Attachments

Description: Compacted Earthen Berm Detail
Filename: Berm Detail.pdf *(click to download original file)*

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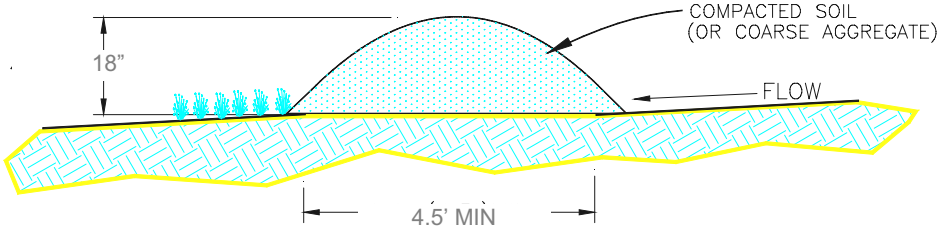
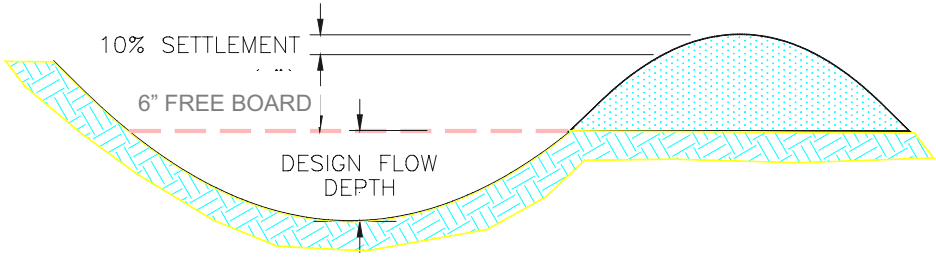
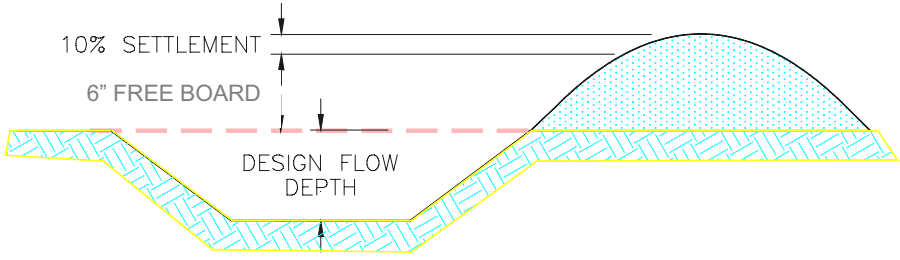
BERM



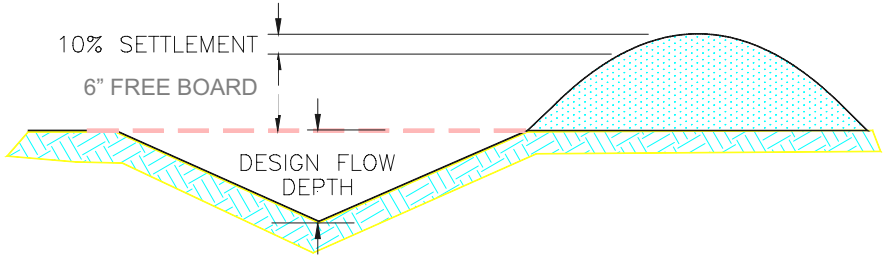
DIVERSIONS



PARABOLIC DIVERSION



TRAPEZOIDAL DIVERSION



V–SHAPED DIVERSION

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: ECB

Name/Description:
Erosion Control Blankets

Description, Purpose and Applicability:

Erosion control blanket is a fibrous blanket of straw, jute, excelsior, or coconut material trenched in and staked down over prepared, seeded soil. The blanket reduces the effects of both wind and water erosion.

During what phase(s) of construction/activity will this control measure be implemented?

5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Inspection of erosion control blankets and other Rolled Erosion Control Products will include:
- Checking for general signs of erosion, including voids beneath the mat. If voids are apparent, fill the void with suitable soil and replace the erosion control blanket, following the appropriate staking pattern.
- Checking for damaged or loose stakes and secure loose portions of the blanket. The end of blankets will be trenched in to prevent runoff from undermining the BMP and damaged blankets will be repaired or replaced as soon as possible.

Instances of this Control Measure (CM)

ECB - Erosion Control Blankets
There are no items to display

Attachments

Filename: ECB Erosion Control Blanket.pdf *(click to download original file)*

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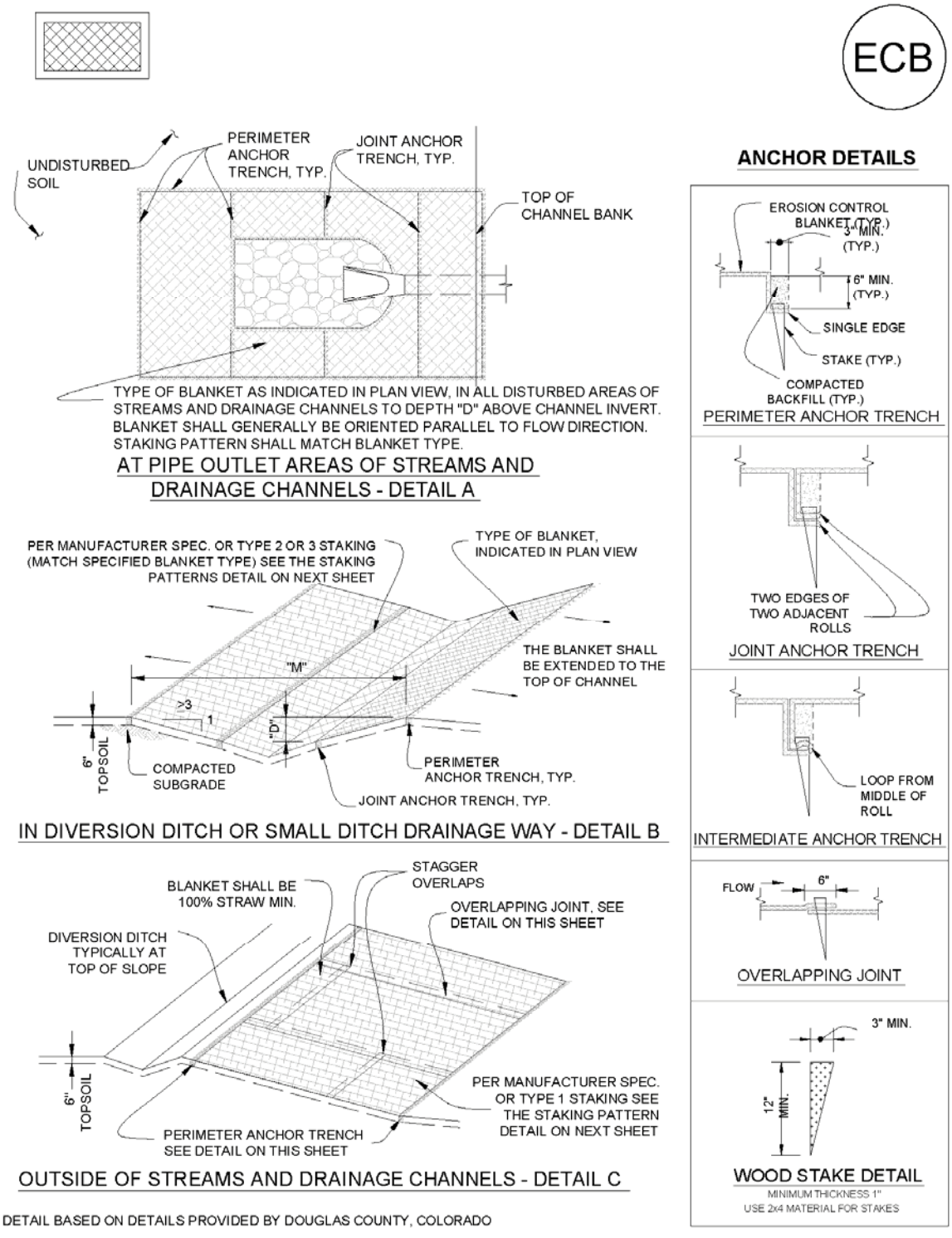
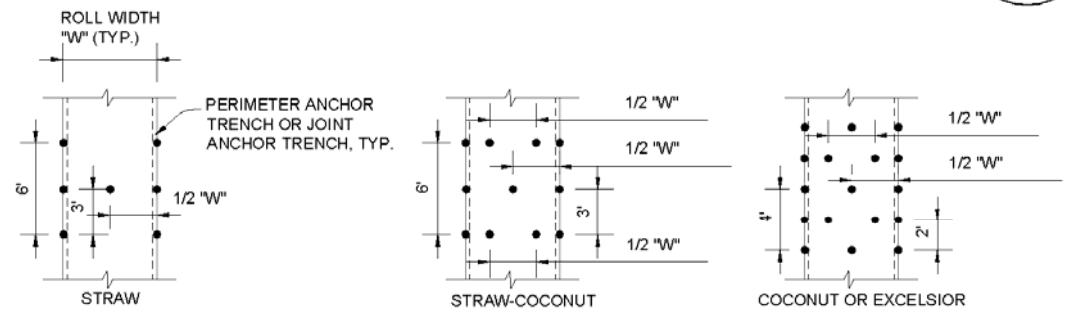


Figure C4-3—Orientation of Erosion Control Blankets, Netting and Matting

EROSION CONTROL BLANKET CONTINUED

ECB



STAKING PATTERNS

SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. IF NO MANUFACTURER'S SPECIFICATION IS AVAILABLE USE THE ACCEPTABLE STAKING PATTERN (AS SHOWN ABOVE)

EROSION CONTROL BLANKET INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF PERIMETER OF EROSION CONTROL BLANKET.
   - TYPE OF BLANKET (STRAW, STRAW-COCONUT, COCONUT, OR EXCELSIOR).
   - AREA "A" IN SQUARE YARDS OF EACH TYPE OF BLANKET.
2. ALL EROSION CONTROL BLANKETS AND NETTING SHALL BE MADE OF 100% NATURAL AND BIODEGRADABLE MATERIAL; NO PLASTIC OR OTHER SYNTHETIC MATERIAL, EVEN IF PHOTO DEGRADABLE, SHALL BE ALLOWED.
3. IN AREAS WHERE EROSION CONTROL BLANKET IS SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING BELOW THE SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO BLANKET INSTALLATION AND THE BLANKET SHALL BE IN FULL CONTACT WITH SUBGRADE, NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
4. PERIMETER ANCHOR TRENCH SHALL BE USED AT OUTSIDE PERIMETER OF ALL BLANKET AREAS.
5. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL BLANKETS EXCEPT STRAW, WHICH MAY USE AN OVERLAPPING JOINT.
6. INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF THE ROLL LENGTH FOR COCONUT AND EXCELSIOR BLANKETS.
7. THE OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER FOR BLANKETS ON SLOPES.
8. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKET SHALL CONFORM TO TABLE 7.1.
9. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKET SHALL BE RESEEDED AND MULCHED.
10. DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM ONES SHOWN HERE.

TABLE 7.1 - EROSION CONTROL BLANKET TYPE

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	NETTING MIN.
STRAW *	–	100%	–	DOUBLE/NATURAL
STRAW-COCONUT	30% MIN	70% MAX	–	DOUBLE/NATURAL
COCONUT	100%	–	–	DOUBLE/NATURAL
EXCELSIOR	–	–	100%	DOUBLE/NATURAL

* FOR OUTSIDE OF STREAMS AND DRAINAGE CHANNELS

EROSION CONTROL BLANKET MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT EROSION CONTROL BLANKETS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. EROSION CONTROL BLANKET IS TO BE LEFT IN PLACE UNLESS REQUESTED TO BE REMOVED BY THE LOCAL JURISDICTION.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE RE-INSTALLED. ANY SUBGRADE AREAS BELOW THE BLANKET THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.

DETAIL BASED ON DETAILS PROVIDED BY DOUGLAS COUNTY, COLORADO

Figure C4-3a—Orientation of Erosion Control Blankets, Netting and Matting (con't)

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: FLS

Name/Description:
Final Landscaping

Description, Purpose and Applicability:
Final Landscaping will entail Seed & Mulch, Sod, Mulch, Trees, Shrubs, etc to stabilize disturbed areas.

During what phase(s) of construction/activity will this control measure be implemented?
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*
Refer to Landscape/Civil Plans for locations and methods of final stabilization/landscaping on the project.

Instances of this Control Measure (CM)

FLS - Final Landscaping
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: GH

Name/Description:
Good Housekeeping Practices/Material Management

Description, Purpose and Applicability:

The project will implement construction site good housekeeping practices to prevent pollution associated with solid, liquid and hazardous construction-related materials and wastes. The Stormwater Management Plan clearly specifies BMPs including these good housekeeping practices:
- Providing for waste management.
- Establishing proper building material staging areas.
- Control tool/equipment/vehicle washing and allowable non-stormwater discharges.
- Implement spill prevention and response procedures.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

The following principles and actions will be addressed:
- Providing for Waste Management. Implementing management procedures and practices to prevent or reduce the exposure and transport of pollutants in stormwater from solid, liquid and sanitary wastes that will be generated at the site. Practices such as trash disposal, recycling, proper material handling, and cleanup measures to reduce the potential for stormwater runoff to pick up construction site wastes and discharge them to surface waters. The project will implement a set of waste-management practices for hazardous or toxic materials, such as paints, solvents, petroleum products, pesticides, wood preservatives, acids, roofing tar, and other materials. Practices include storage, handling, inventory, and cleanup procedures, in case of spills.

Also, the spill prevention and response procedures outlined in the stormwater management plan will be implemented for construction equipment and vehicles.

Instances of this Control Measure (CM)

GH - Good Housekeeping Practices/Material Management
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: HWSM

Name/Description:
Hand Washing Station Management

Description, Purpose and Applicability:

Hand washing stations will be present on-site and may be either a self-contained unit or a 'home-made' set-up that will include a sink/basin with water, soap/detergent, and/or hand-sanitizer.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

The unit will be secured from tipping over, if necessary. If it is a self-contained unit, it will be serviced when the portable toilets are cleaned (typically weekly). If it is a custom/'home-made' unit, the handwashing water may also be drained into enclosed equipment such as a bucket with a lid or IBC Tote and then it will be dumped into the sanitary sewer or concrete washout area.

Instances of this Control Measure (CM)

HWSM - Hand Washing Station Management
There are no items to display

Attachments

Filename: hand-wash-stations-1.pdf *(click to download original file)*

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Filename: hand-wash-stations-2.pdf *(click to download original file)*

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LITERS

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: IP-1

Name/Description:
Inlet Protection - Curb - Block & Gravel Bags

Description, Purpose and Applicability:

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet.
The potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets will be considered when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and will be used in conjunction with other upgradient BMPs.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Protection will be installed at storm sewer inlets that are operable during construction.
To function effectively, inlet protection measures will be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs will also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.
Sediment accumulated in front of/upstream of the inlet protection shall be removed as necessary to maintain BMP effectiveness and reduce the potential of a discharge of sediment laden runoff.

Instances of this Control Measure (CM)

IP-1 - Inlet Protection - Curb - Block & Gravel Bags
There are no items to display

Attachments

Filename: Inlet Protection Type 1 - Curb - Block & Rock Sock.pdf *(click to download original file)*

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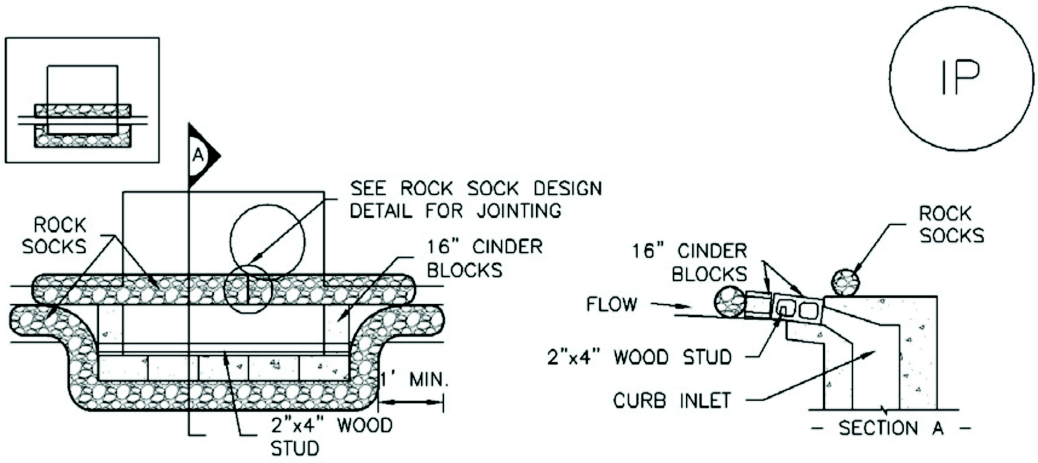

IP-1. BLOCK AND ROCK SOCK SUMP

BLOCK AND CURB SOCK INLET PROTECTION INSTALLATION NOTES

1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.

2. CONCRETE "CINDER" BLOCKS SHALL BE LAID ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW, ABUTTING ONE ANOTHER WITH THE OPEN END FACING AWAY FROM THE CURB.

3. GRAVEL BAGS SHALL BE PLACED AROUND CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINTED TOGETHER IN ACCORDANCE WITH ROCK SOCK DESIGN DETAIL.

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: IP-3

Name/Description:
Inlet Protection - Area Inlet w/ Rock Socks

Description, Purpose and Applicability:

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet.
The potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets will be considered when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and will be used in conjunction with other upgradient BMPs.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Protection will be installed at storm sewer inlets that are operable during construction. Filter Fabric may be utilized as an additional measure to treat runoff prior to discharging into the inlet. The rock socks will be butted tightly together or overlapped 2"+ to adequately treat the runoff prior to reaching the inlet.
To function effectively, inlet protection measures will be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs will also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.

Instances of this Control Measure (CM)

IP-3 - Inlet Protection - Area Inlet w/ Rock Socks
There are no items to display

Attachments

Filename: Area Inlet Protection - Filter Fabric.pdf *(click to download original file)*

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Filename: Inlet Protection Type 3 - Area Inlet - Rock Socks.pdf *(click to download original file)*

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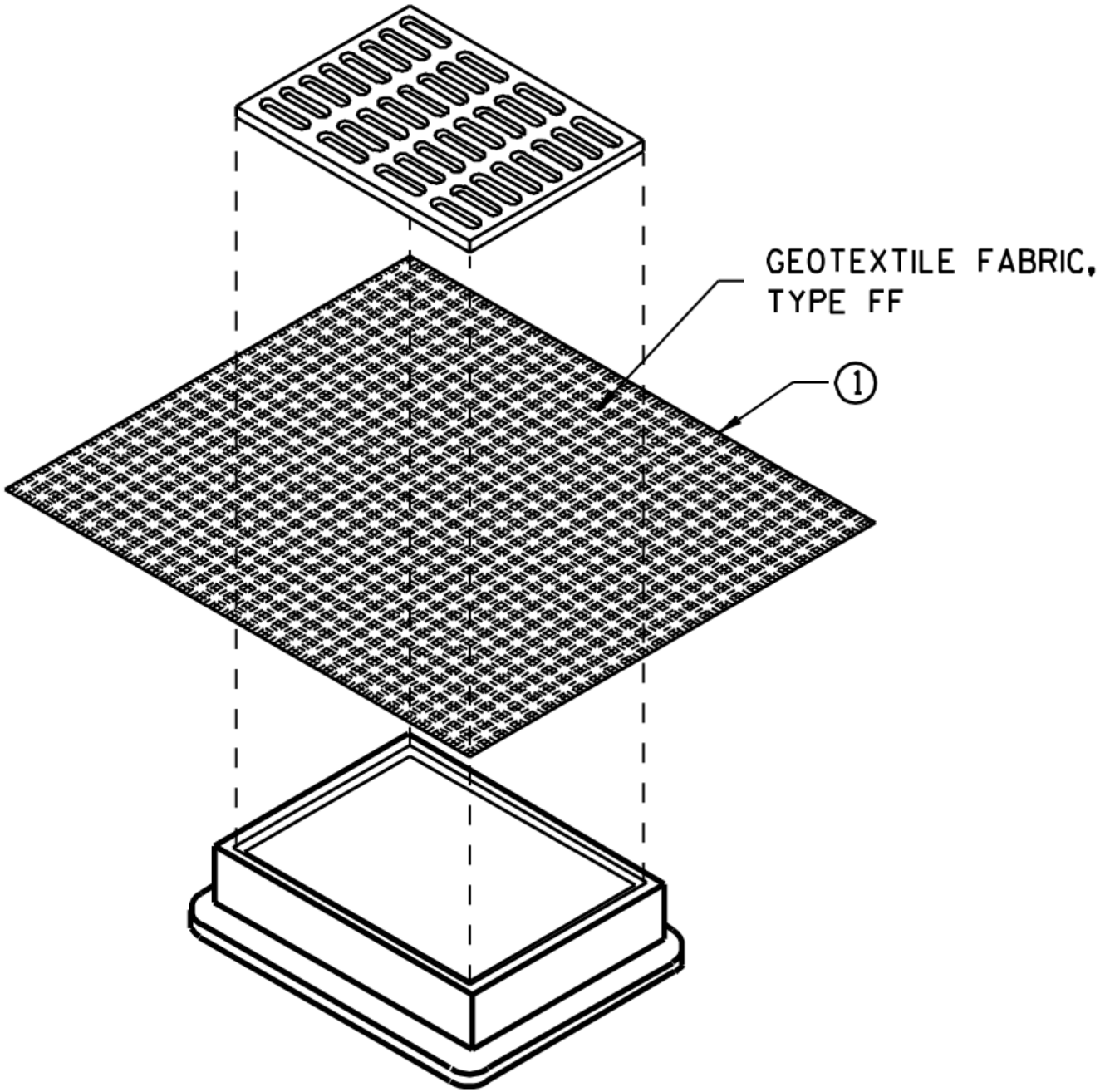
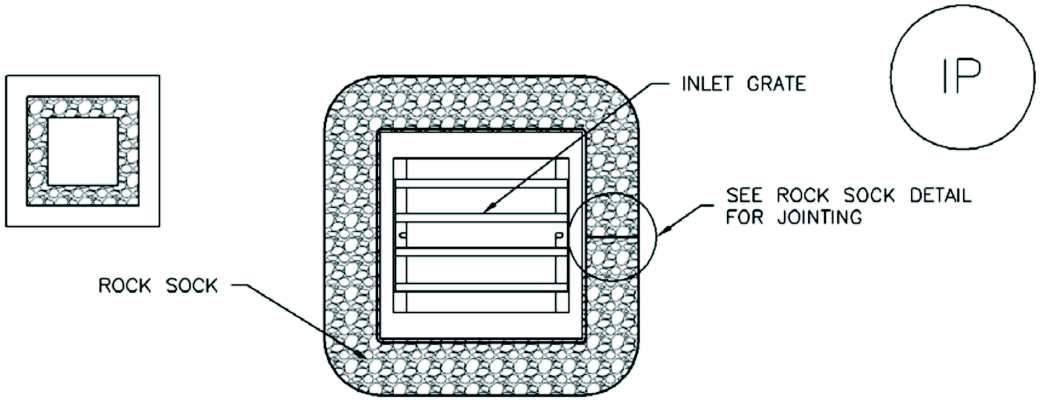


INLET PROTECTION, TYPE B
(WITHOUT CURB BOX)

(CAN BE INSTALLED IN ANY INLET WITHOUT A CURB BOX)



IP–3. ROCK SOCK SUMP/AREA INLET PROTECTION

ROCK SOCK SUMP/AREA INLET PROTECTION INSTALLATION NOTES

1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.

2. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF ROCK SOCKS FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: IP-7

Name/Description:
Inlet Protection - Dandy Curb Bag

Description, Purpose and Applicability:

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet.
The potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets will be considered when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and will be used in conjunction with other upgradient BMPs.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Protection will be installed at storm sewer inlets that are operable during construction.
To function effectively, inlet protection measures will be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs will also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.
Sediment accumulated in front of/upstream of the inlet protection shall be removed as necessary to maintain BMP effectiveness and reduce the potential of a discharge of sediment laden runoff.

Instances of this Control Measure (CM)

IP-7 - Inlet Protection - Dandy Curb Bag
There are no items to display

Attachments

Filename: D-CURB.pdf *(click to download original file)*

File is included after this page

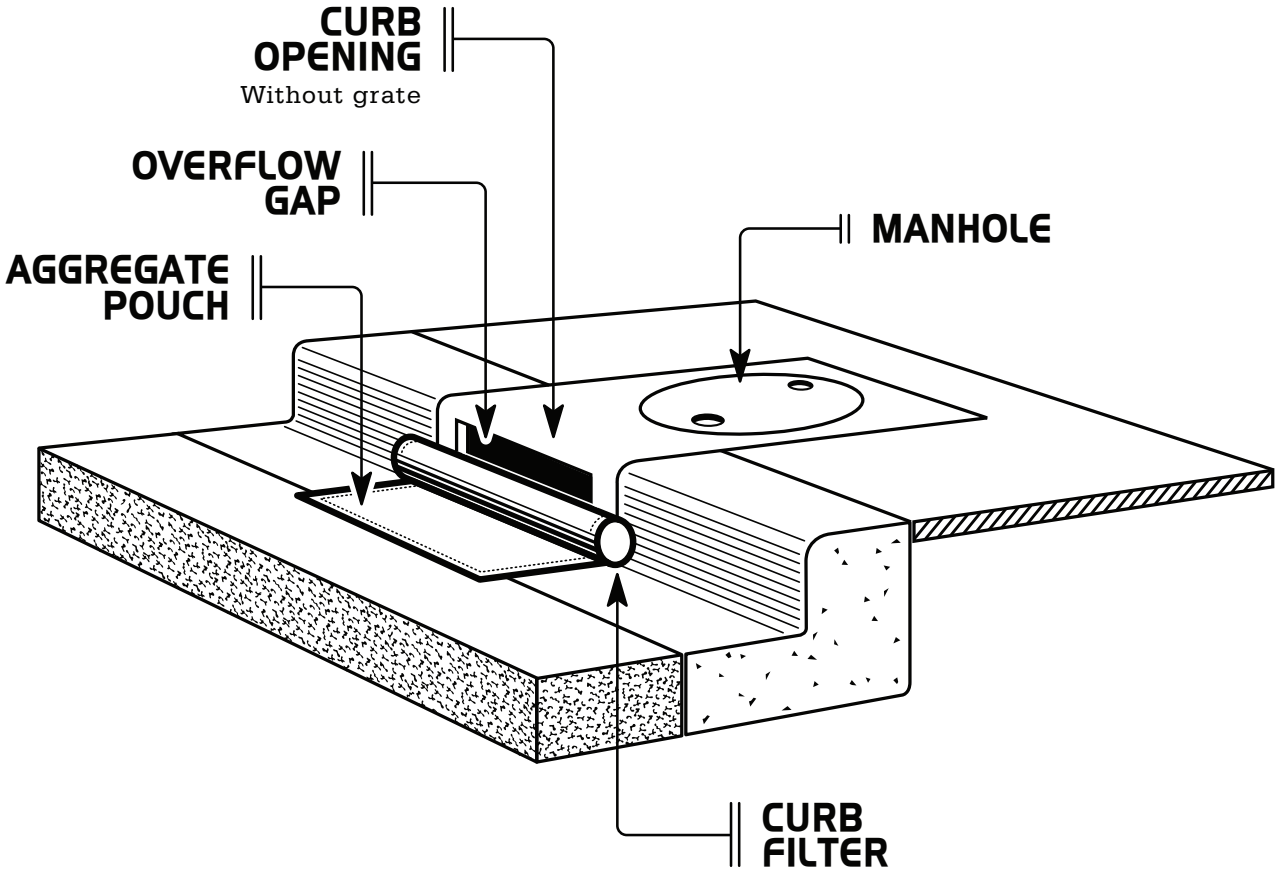
Description: Dandy Curb Bag Drawing
Filename: Dandy Curb Bag.pdf *(click to download original file)*

File is included after this page

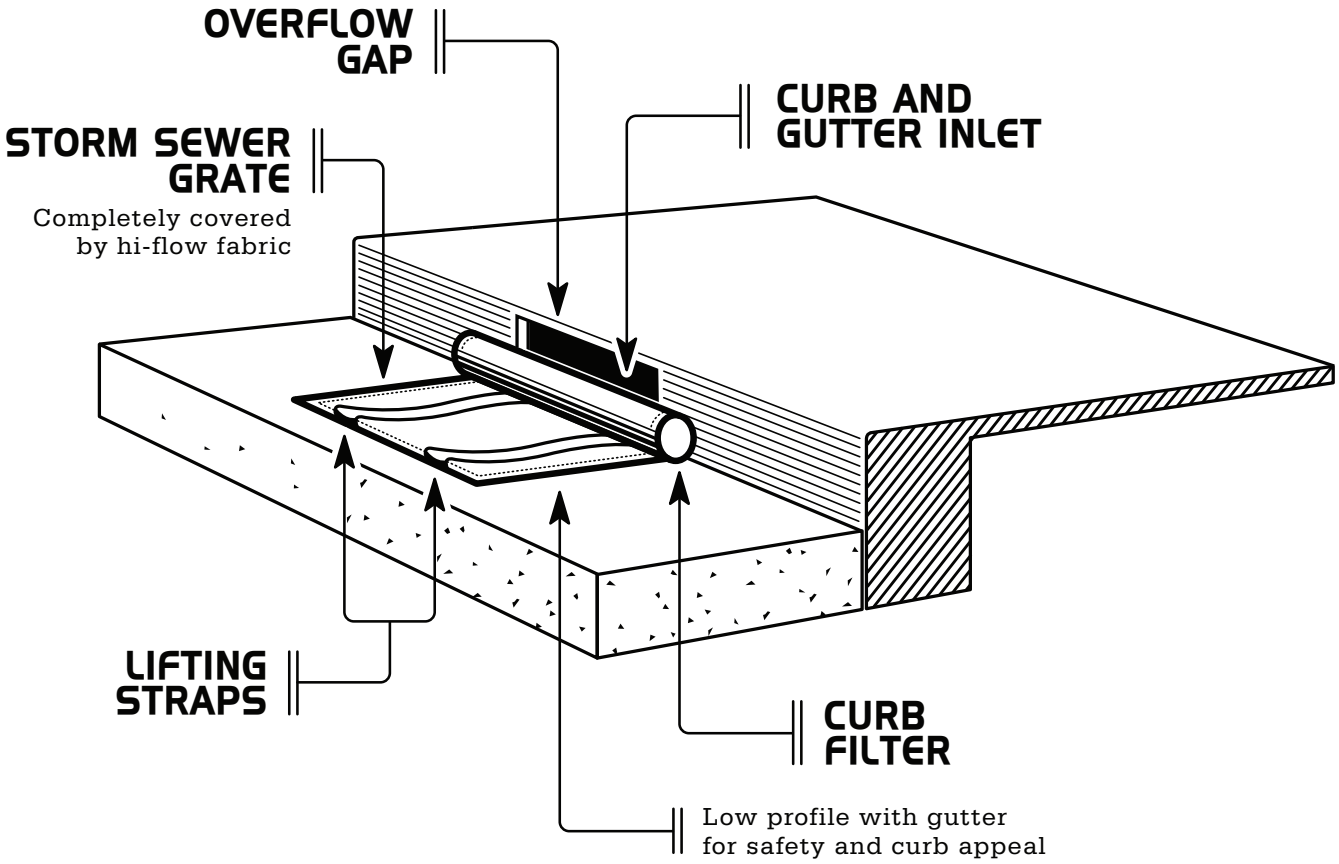
Description: Dandy Curb Bag Spec
Filename: dandy curb bag_spec (1).pdf *(click to download original file)*

File is included after this page

DANDY CURB™


CURB OPENING
Without grate
OVERFLOW GAP
AGGREGATE POUCH
MANHOLE
CURB FILTER

DANDY CURB BAG™



DANDY CURB BAG®
CURB AND GUTTER INLET/GRATE PROTECTION SYSTEM
GUIDE SPECIFICATION

PRODUCT:

DANDY CURB BAG®

MANUFACTURER:

Dandy Products, Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E-mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 **Description:**

1.1 Work covered under this item consists of installing a Dandy Curb Bag® curb and gutter inlet protection system. The purpose is to keep silt, sediment and construction debris out of the storm water system.

2.0 **Material:**

2.1 The Dandy Curb Bag® curb and gutter inlet protection unit shall be a **sewn in the U.S.A.** geotextile fabric unit enclosing a porous structure in the form of a cylindrical tube placed in front of and extending beyond the inlet opening on both sides and have a geotextile fabric envelope fitted to the individual grate(s)on the street side of the sewn unit for grate(s) to be inserted and to completely enclose the grate(s).

2.2 The Dandy Curb Bag® shall have lifting devices to allow manual inspection of the storm water system.

2.3 The Dandy Curb Bag® unit shall utilize an orange monofilament fabric that is manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 x 300
Grab Tensile Elongation	ASTM D 4632	%	40 x 25
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec^{1}	3.5

Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	gal/min/ft^2	250
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange[1]

[1]The color orange is a trademark of Dandy Products, Inc.
The property values listed above are effective October 2010 and are subject to change without notice.

3.0 **Installation:**

3.1 Place the empty Dandy Curb Bag® unit over the grate as the grate stands on end.

3.2 *For oil and sediment model; to install or replace absorbent, place absorbent pillow in pouch, on the bottom (below-grade side) of the unit.*

3.3 Tuck the enclosure flap inside to completely enclose the grate.

3.4 Holding the lifting devices, being careful not to damage the sewn fabric unit, insert the grate into its frame, street side edge first, then lower back edge with cylindrical tube into place. The cylindrical tube should be partially blocking the curb hood opening when installed properly.

4.0 **Maintenance:**

4.1 The contractor shall remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by engineer/inspector. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.

4.2 *For oil and sediment model; remove and replace absorbent when near saturation.*

5.0 **Method of Measurement:**

5.1 The quantity to be paid is for the actual number of Dandy Curb Bag® inlet protection units installed

6.0 **Basis of payment:**

6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the Dandy Curb Bag® inlet protection units.

6.2 Payment for the completed work will be made at the contract prices for:

ITEM	UNIT	DESCRIPTION
Dandy Curb Bag®	EA	Curb Inlet Protection Unit (#_____Inlet)

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: IP-8

Name/Description:
Inlet Protection - Area Inlet - Dandy Bag

Description, Purpose and Applicability:

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet.
The potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets will be considered when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and will be used in conjunction with other upgradient BMPs.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Protection will be installed at storm sewer inlets that are operable during construction.
To function effectively, inlet protection measures will be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs will also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.
Sediment accumulated in front of/upstream of the inlet protection shall be removed as necessary to maintain BMP effectiveness and reduce the potential of a discharge of sediment laden runoff.

Instances of this Control Measure (CM)

IP-8 - Inlet Protection - Area Inlet - Dandy Bag
There are no items to display

Attachments

Description: Dandy Bag Drawing
Filename: Dandy Bag Detail.pdf *(click to download original file)*
File is included after this page

Description: Dandy Bag Specs
Filename: dandybag_spec.pdf *(click to download original file)*
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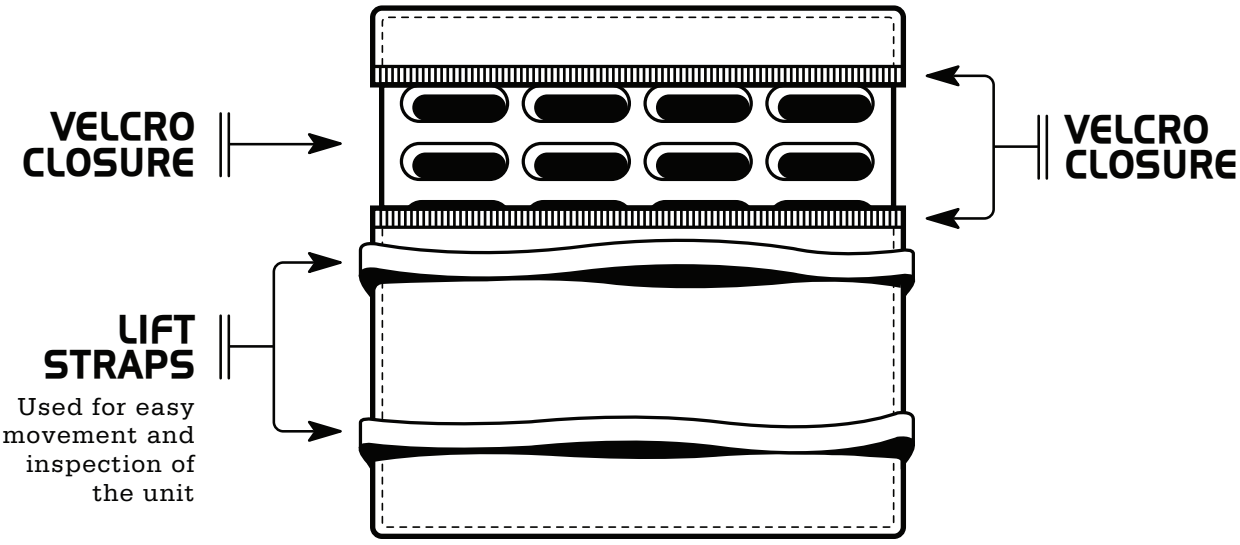
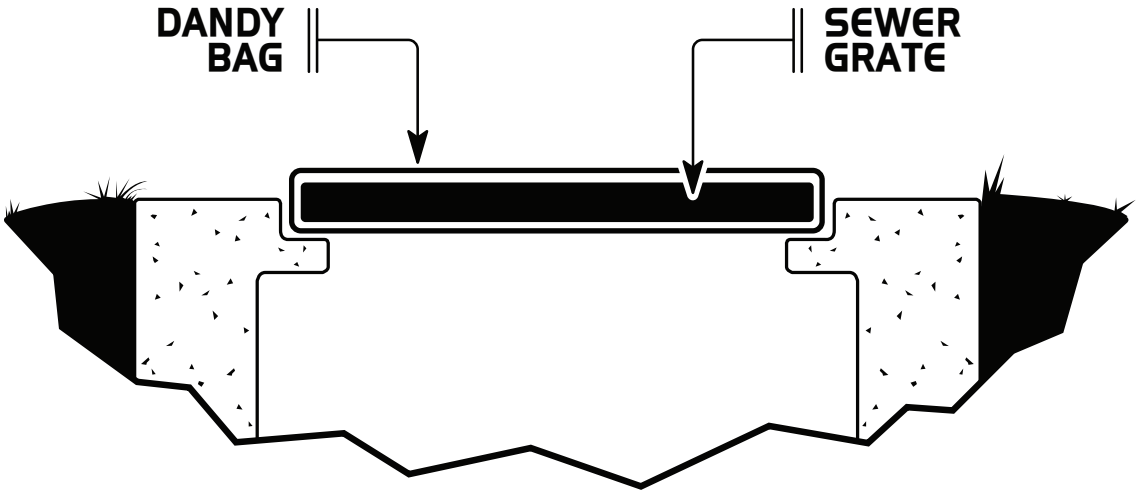
DANDY BAG®


VELCRO CLOSURE
VELCRO CLOSURE
LIFT STRAPS
Used for easy movement and inspection of the unit


DANDY BAG
SEWER GRATE

DANDY BAG®
INLET PROTECTION SYSTEM GUIDE SPECIFICATION

PRODUCT:

DANDY BAG®

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 **Description:**

1.1 Work covered under this item consists of installing a Dandy Bag® inlet protection system. The purpose is to keep silt, sediment and construction debris out of the storm water system.

2.0 **Material:**

2.1 The Dandy Bag® inlet protection unit shall be a **sewn in the U.S.A**. geotextile fabric unit fitted to the individual grate(s) and completely enclosing the grate(s).

2.2 The Dandy Bag® shall have lifting devises to allow manual inspection of the storm water system.

2.3 The Dandy Bag® unit shall utilize an orange monofilament fabric manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 X 300
Elongation	ASTM D 4632	%	40% X 25%
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec[1]	3.5
Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	gal/min/ft^2	250
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange[1]

[1]The color orange is a trademark of Dandy Products, Inc.
The property values listed above are effective October 2010 and are subject to change without notice.

3.**0 Installation:**

3.1 Place the empty Dandy Bag® over the grate as the grate stands on end.

3.2 For oil and sediment model; to install or replace absorbent, place absorbent pillow in pouch, on the bottom (below-grade side) of the unit.

3.3 Tuck the enclosure flap inside to completely enclose the grate.

3.4 Holding the lifting devises, insert the grate into the inlet being careful not to damage the Dandy Bag® unit.

4.0 **Maintenance:**

4.1 The contractor shall remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by engineer/inspector. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.

4.2 *For oil and sediment model; remove and replace absorbent when near saturation.*

5.0 **Method of Measurement:**

5.1 The quantity to be paid is for the actual number of Dandy Bag® inlet protection units installed

6.0 **Basis of Payment:**

6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the Dandy Bag® inlet protection units.

6.2 Payment for the completed work will be made at the contract prices for:

ITEM	UNIT	DESCRIPTION
Dandy Bag®	EA	Inlet Protection Unit (#_____Inlet)

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: IP-9

Name/Description:
Inlet Protection - Curb - Rock Bags only

Description, Purpose and Applicability:

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet.
The potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets will be considered when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and will be used in conjunction with other upgradient BMPs.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Protection will be installed at storm sewer inlets that are operable during construction.
To function effectively, inlet protection measures will be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs will also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.
Sediment accumulated in front of/upstream of the inlet protection shall be removed as necessary to maintain BMP effectiveness and reduce the potential of a discharge of sediment laden runoff.

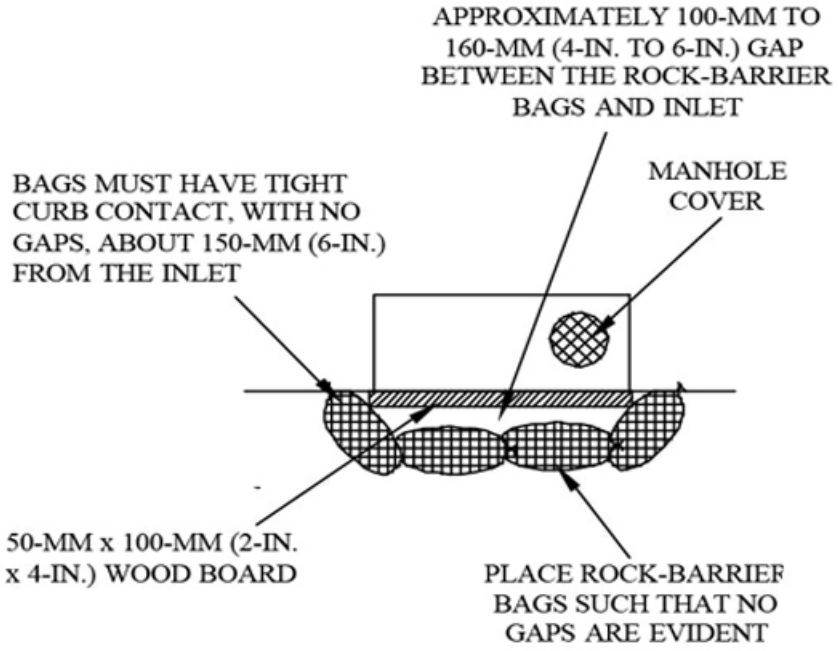
Instances of this Control Measure (CM)

IP-9 - Inlet Protection - Curb - Rock Bags only
There are no items to display

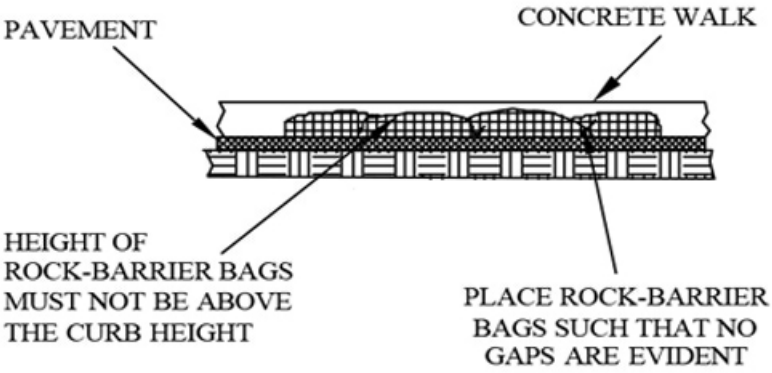
Attachments

Description: Curb Inlet Protection - Rock Bags only
Filename: Curb - Rock Bags only.pdf *(click to download original file)*

File is included after this page



PLAN VIEW



FRONT VIEW

NOTE: 25- TO 50-MM (1- TO 2-IN.) DIAMETER ROCK CONTAINED IN PERVIOUS BURLAP BAGS OR SYNTHETIC NET BAGS (3-MM MESH) AT LEAST 610-MM (24-IN.) LONG AND ABOUT 300-MM (12-IN.) WIDE. HOWEVER, THE BARRIER SHOULD NOT BE HIGHER THAN THE CURB OPENING [ABOUT 150-MM (6-IN.)].

THE BARRIER SHOULD NEVER BLOCK THE CURB OPENING.

1. ROCK BARRIERS CAN BE PLACED ON PAVEMENT OR BARE GROUND.
2. PLACE ROCK BARRIERS IN FRONT OF INLETS ONLY WHEN SUMP CONDITIONS EXIST.
3. THESE STRUCTURES MAY CAUSE ASPHALT DAMAGE DUE TO WATER SEEPAGE OR FREEZE/THAW CONDITIONS.

CURB INLET ROCK BARRIER

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: IP-10

Name/Description:
Inlet Protection - Culvert

Description, Purpose and Applicability:

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet.
The potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets will be considered when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and will be used in conjunction with other upgradient BMPs.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Protection will be installed at storm sewer inlets that are operable during construction.
To function effectively, inlet protection measures will be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs will also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.

Instances of this Control Measure (CM)

IP-10 - Inlet Protection - Culvert
There are no items to display

Attachments

Description: Culvert Inlet Protection
Filename: Culvert Inlet Protection.pdf *(click to download original file)*
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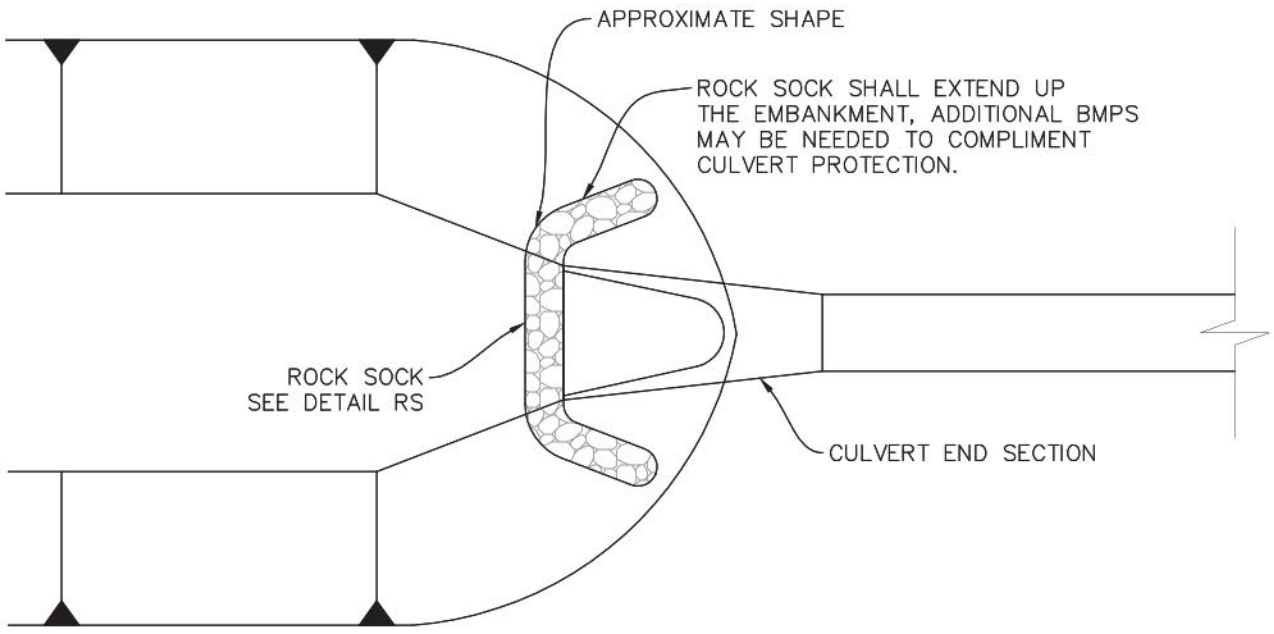
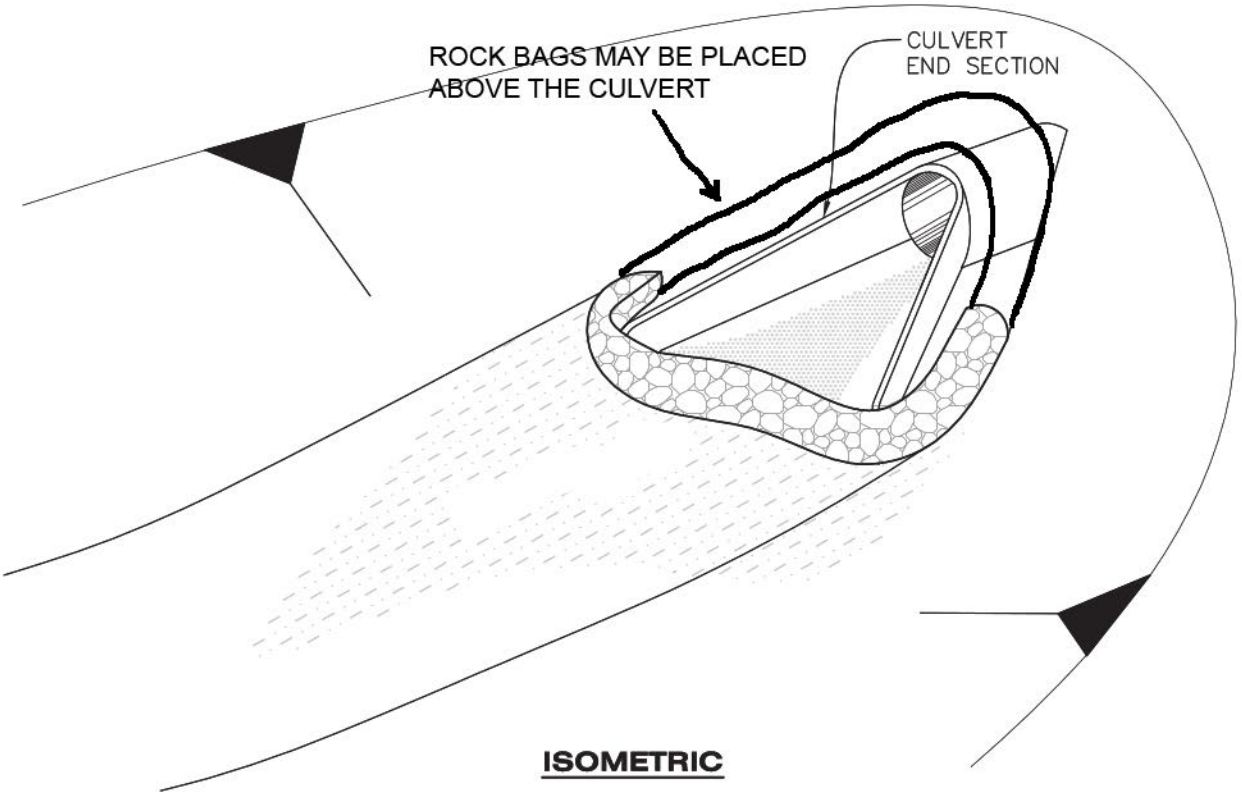


PLAN



ISOMETRIC

CP

CULVERT PROTECTION (INLET)

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: LF

Name/Description:
Landform

Description, Purpose and Applicability:

A landform is defined as any natural feature on the Earth's surface, which includes other minor landforms such as depressions, berms, mounds, hills, ridges, cliffs, valleys, etc. Landforms can be utilized as a control measure when the perimeter of the site is higher than the disturbed area and also can be used to divert, impound, and treat runoff, as long as it has been evaluated (volume of runoff, velocity, etc) to be adequate for the application on the construction site. Additional controls may be necessary to provide additional filtration of runoff.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

In most cases, maintenance will not be necessary, depending on the type of landform utilized on the project, but if the control is impacted by activities, runoff, or other circumstances that reduce its functionality, alternative measures will be implemented, as necessary. Sediment deposits or erosion of the landform will be removed when it impacts its effectiveness.

Instances of this Control Measure (CM)

LF - Landform
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: LG

Name/Description:
Lowered Grade

Description, Purpose and Applicability:

The lowered grade, non-structural sediment control BMP is a trenched, lowered area installed and maintained along the back of curbs, sidewalks, hard surface cuts, or excavations. The purpose of the BMP is to "pond" or "pool" sediment-containing stormwater runoff, allowing the settling of suspended solids.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Typically this BMP will be implemented behind curbs, roads, or concrete paths. The accumulated sediment will be removed as necessary to ensure that the lowered grade functions effectively and it will be inspected at the required interval stated in the SWMP. Refer to the attached specification sheet for installation & maintenance parameters.

Instances of this Control Measure (CM)

LG - Lowered Grade
There are no items to display

Attachments

Description: Lowered Grade BMP - Minimum 4"D x 12"W
Filename: Lowered Grade Description.pdf *(click to download original file)*

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BMP Type:

Lowered Grade

Lowered Grade – Non-structural BMP

The lowered grade, non-structural sediment control BMP is a trenched, lowered area installed and maintained along the back of curbs, sidewalks, hard surface cuts, or excavations. The purpose of the BMP is to "pond" or "pool" sediment-containing stormwater runoff, allowing the settling of suspended solids. The BMP should be installed to a minimum depth of 4" and a minimum width of 12" with maintenance measures taking place once 50% of the BMP capacity is utilized. The lowered grade BMP should only be utilized along areas that have less than a 5% grade and will not be utilized to contain material stockpiles.

Example Photo:

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: OP

Name/Description:
Outlet Protection

Description, Purpose and Applicability:

Outlet protection helps to reduce erosion immediately downstream of a pipe, culvert, slope drain, rundown or other conveyance with concentrated, high-velocity flows.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

When feasible, outlet protection will be used when a conveyance discharges onto a disturbed area where there is potential for accelerated erosion due to concentrated flow. Outlet protection will be provided where the velocity at the culvert outlet exceeds the maximum permissible velocity of the material in the receiving channel.
The rock will be keyed in, around the entire perimeter of the apron, to a minimum depth of 6 inches for stability. The riprap will be extended to the height of the culvert or the normal flow depth of the downstream channel, whichever is less.
Additional erosion control measures such as vegetative lining, turf reinforcement mat and/or other channel lining methods may be required downstream of the outlet protection if the channel is susceptible to erosion.
Inspect apron for damage and displaced rocks. If rocks are missing or significantly displaced, repair or replace as necessary. If rocks are continuously missing or displaced, consider increasing the size of the riprap or deeper keying of the perimeter.
Remove sediment accumulated at the outlet before the outlet protection becomes buried and ineffective. When sediment accumulation is noted, check that upgradient BMPs, including inlet protection, are in effective operating condition.
Outlet protection may be removed once the pipe is no longer draining an upstream area, or once the downstream area has been sufficiently stabilized.

Instances of this Control Measure (CM)

OP - Outlet Protection
There are no items to display

Attachments

Filename: EC-08 Temporary Outlet Protection.pdf *(click to download original file)*

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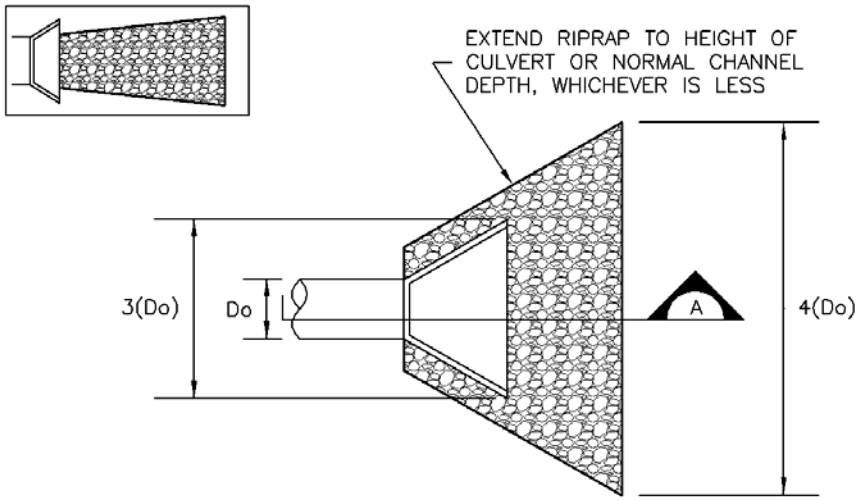
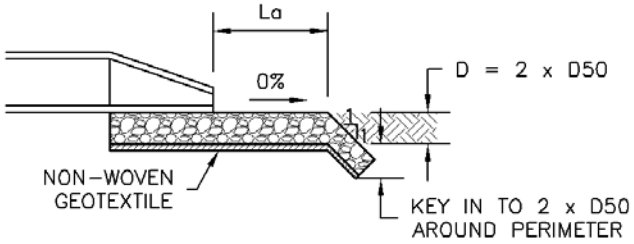


TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

OP-1. TEMPORARY OUTLET PROTECTION

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: RRL

Name/Description:
Recycled Rubber Log

Description, Purpose and Applicability:

This BMP is made of shredded recycled tires covered in a geotextile fabric to slow the velocity of stormwater runoff, causing sediment to settle out of the water. It can be placed in front of inlets, in flow lines as curb socks, or in low-flow concentrated channels as check dams.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

When used as inlet protection, it must be placed to ensure no gaps at the curb or between bags. Damaged bags will be repaired or replaced as soon as possible and will be inspected at the stated frequency in the SWMP.

Instances of this Control Measure (CM)

RRL - Recycled Rubber Log
There are no items to display

Attachments

Description: Big Red Log
Filename: Big-Red-Brochure.pdf *(click to download original file)*
File is included after this page

Description: Dandy Recycler
Filename: Recycler Data Sheet.pdf *(click to download original file)*
File is included after this page

SWP-CI "Big Red"

Curb Inlet Protector

By ASP Enterprises and Storm Water Products

Temporary and Reusable Solutions for Sediment Control

A.S.P. ENTERPRISES. INC.

Your GeoSource Distributor

- Reusable Curb Inlet Protection
- Environmentally Friendly
- Drops out sediment by dissipating the water energy

"Big Red" Filter Advantages:

- **Easy to Install**
- **Versatile for a variety of curb inlets**
- **Reusable and Extremely easy to clean**
- **Made from 90% Inert Recycled Materials**

The SWP-CI "Big Red" Filter is a **REUSABLE** inlet protector that keeps out sediment throughout the entire construction project. There are no pockets to fill, no velcro bags, no assembly etc. Simply place in front of the inlet, make sure it lays in the contour, and you are DONE!

Simple installation also translates into simple removal, cleanup and re-use at the next project or phase. Maintenance is simple as well by lifting the unit from the inlet, shaking the mud off of it, removing the sediment on the concrete, and placing the unit back. If it is severely filled with sediment, wash it out in a vegetated area and it is as good as new.

All of these features and benefits combine to make the SWP-CI "Big Red" curb inlet protector the **perfect choice** for all curb inlet applications. It comes in 54" long for single curb inlets and 104" lengths for double curb inlets.

- High Flow Rate
- Made of Durable High-Strength Geotextile
- Fully Reusable
- Made of Recycled Materials

SWP-CI "Big Red"

Curb Inlet Protector

By ASP Enterprises and Storm Water Products

A.S.P. ENTERPRISES. INC.
Your GeoSource Distributor

Specifications:

1. Infill Material: shredded recycled rubber tires
2. Weight: approx. 10 lbs per linear foot
3. Diameter: approx. 8"

Geotextile fabric made of durable high flow fabric with the following properties:

Property	Test Method	Units		Typical Value
Weight	ASTM D5261	oz/sq. yd		9.3
Grab Tensile Strength	ASTM D4632	lb	warp fill	250 290
Tear Strength (Trapezoid)	ASTM D4533	lb	warp fill	60 50
Burst	ASTM D3786	psi		440

(Efforts were made to determine flow rate-the fabric exceeded all capacities of the testing equipment)

SEDIMENT CONTROL SOLUTIONS FOR ALL STORMWATER SYSTEMS & DEWATERING PROJECTS

DANDY RECYCLER

DANDY PRODUCTS

High Strength Filtration Geotextile Filled with 100% Recycled Tire Chips

Available in lengths of 3', 4', 5', 6' & 8'
Seam Stitched inside and away from Stress Points
Durable Proven Dandy Geotextile
Competitively Priced Alternative to Weighted Wattles
Completely Reusable

You Can Depend on Dandy Products to Deliver!

Dandy Products, Inc.
1095 Harcourt Road, Mount Vernon, OH 43050
Customer Service: 800.591.2284 - Fax: 740.397.1946
www.dandyproducts.com

GEOTEXTILE
TYPICAL PROPERTY SHEET
ORANGE DANDY GEOTEXTILE

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Weight, oz/sy	ASTM D 5261	oz/yd^2	6.1	
Grab Tensile Strength	ASTM D 4632	lbs	365	200
Elongation	ASTM D 4632	%	24	10
Mullen Burst Strength	ASTM D 3786	psi	450	
Trapezoid Tear	ASTM D 4533	lbs	115	75
Puncture Strength	ASTM D 4833	lbs	90	
Apparent Opening Size (AOS)	ASTM D 4751	U.S. Sieve	40	
Permittivity	ASTM D 4491	sec^{-1}	2.1	
Permeability	ASTM D 4491	cm/sec	0.14	
Flow Rate	ASTM D 4491	$gal/min/ft^2$	145	

DISCLAIMER: Dandy Products warrants our products to be free from defects in material and workmanship when delivered to Dandy Product's customers and that our products meet our published specifications. you local Dandy Product Representative for detailed products specification and warranty information.

The information contained herein is furnished without charge or obligation and the recipient assumes all responsibility for its use. All properties listed herein are provided as information only and do not create any warranty.

You Can Depend on Dandy Products to Deliver!

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: RS

Name/Description:
Rock Sock

Description, Purpose and Applicability:

A rock sock is constructed of gravel that has been wrapped by wire mesh or a geotextile to form an elongated cylindrical filter. Rock socks are typically used either as a perimeter control or as part of inlet protection. When placed at angles in the curb line, rock socks are typically referred to as curb socks. Rock socks are intended to trap sediment from stormwater runoff that flows onto roadways as a result of construction activities.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Rock socks are susceptible to displacement and breaking due to vehicle traffic. Inspect rock socks for damage and repair or replace as necessary. Remove sediment by sweeping or vacuuming as needed to maintain the functionality of the BMP, typically when sediment has accumulated behind the rock sock to one-half of the sock's height. When placed in the gutter adjacent to a curb, rock socks should protrude no more than two feet from the curb in order for traffic to pass safely. If located in a high traffic area, place construction markers to alert drivers and street maintenance workers of their presence.

Instances of this Control Measure (CM)

RS - Rock Sock
There are no items to display

Attachments

Filename: RS.pdf *(click to download original file)*

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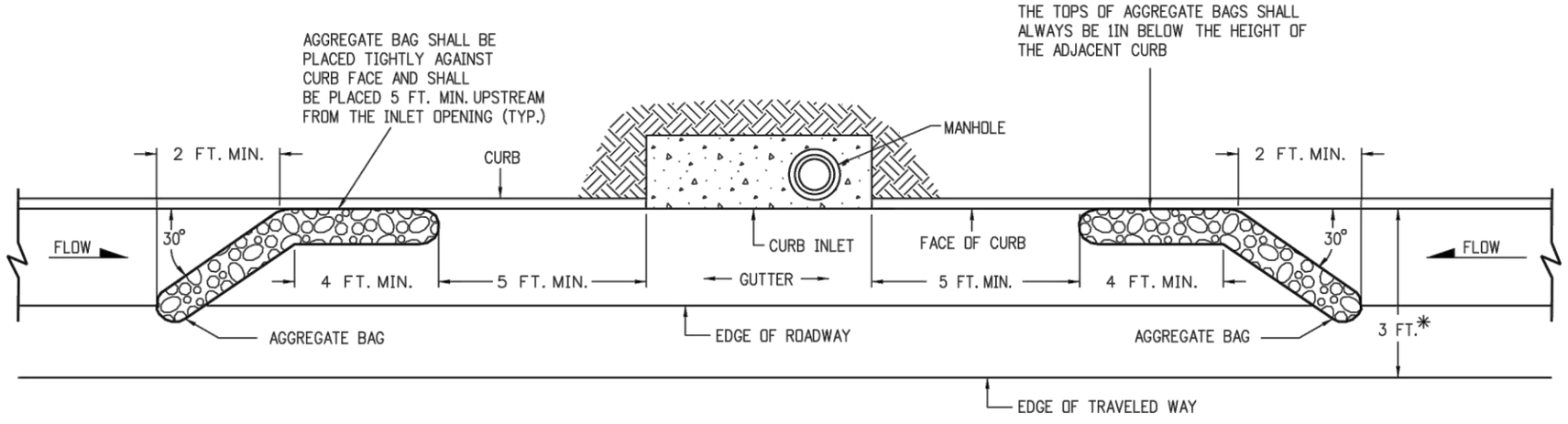
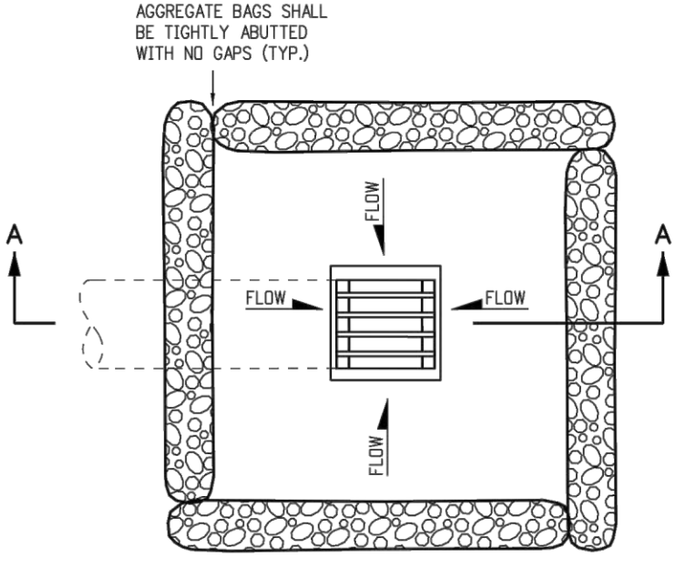


PLAN VIEW

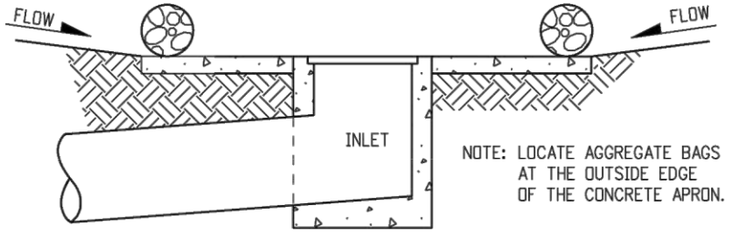
* NOTE: USE AGGREGATE BAGS ONLY WHEN THERE IS A MINIMUM CLEARANCE OF 3 FEET FROM THE EDGE OF THE TRAVELED WAY (INCLUDING CONDITIONS DURING DETOURS) TO THE FACE OF CURB.

LENGTH (L) OF INLET FT.	NUMBER OF AGGREGATE BAGS UPSTREAM OF INLET
0 - 5	1
6 - 10	2
L > 10	3

AGGREGATE BAGS AT STORM DRAIN INLET (TYPE I)



PLAN VIEW



SECTION A-A

AGGREGATE BAGS AT DROP INLET

AGGREGATE BAG APPLICATIONS

NOTE: THE PAY ITEM NUMBER FOR AGGREGATE BAG (LF) IS 208-00035

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SC

Name/Description:
Secondary Containment

Description, Purpose and Applicability:

Secondary containment will be utilized in the form of a spill pallet, trough unit, mobile pool, or bermed area to capture spills or leaks that may occur from construction chemicals and/or petroleum products.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Inspections will be consistent with the project stated frequency in the narrative and any standing water in the units will be disposed of appropriately.

Instances of this Control Measure (CM)

SC - Secondary Containment
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SF

Name/Description:
Silt Fence

Description, Purpose and Applicability:

Silt fence is a woven geotextile fabric attached to wooden posts and trenched into the ground. It is designed as a sediment barrier to intercept sheet flow runoff from disturbed areas.
A silt fence can be used where runoff is conveyed from a disturbed area as sheet flow. Silt fence is not designed to receive concentrated flow or to be used as a filter fabric.
- Down slope of a disturbed area to accept sheet flow.
- Along the perimeter of a receiving water such as a stream, pond or wetland.
- At the perimeter of a construction site.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Silt fence can be installed by stapling the fabric to the stakes, wrapping the fabric around the stakes (or having pre-made 'pockets' for the stakes, or for repairs, tie-wiring the fabric to the stake, which should be avoided, if possible, as it may cause tears/rips that may necessitate the fence to be replaced. Lathe may also be installed on the opposite side of the stakes, to 'sandwich' the fabric.

Silt fence should be installed along the contour of slopes so that it intercepts sheet flow. The maximum recommended tributary drainage area per 100 lineal feet of silt fence, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to silt fence installed along the contour. Silt fence installed for other uses, such as perimeter control, should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the silt fence.
Inspection of silt fence includes observing the material for tears or holes and checking for slumping fence and undercut areas bypassing flows. Repair of silt fence typically involves replacing the damaged section with a new section. Sediment accumulated behind silt fence should be removed, as needed to maintain BMP effectiveness, typically before it reaches a depth of 6 inches.

Instances of this Control Measure (CM)

SF - Silt Fence
There are no items to display

Attachments

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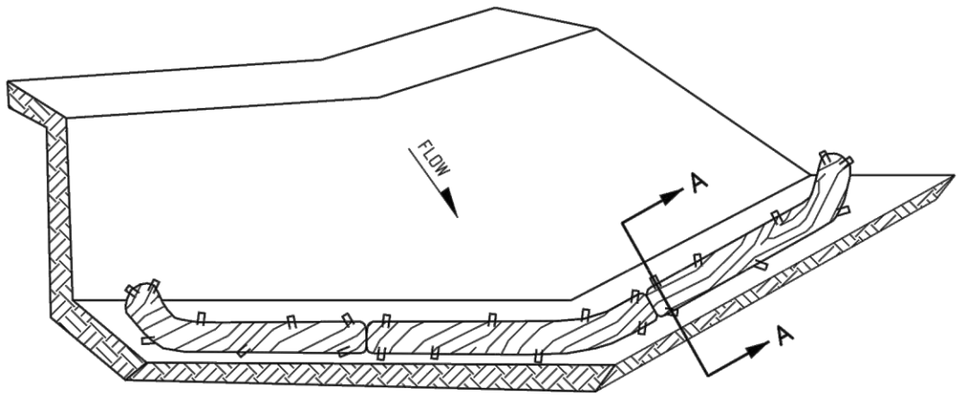
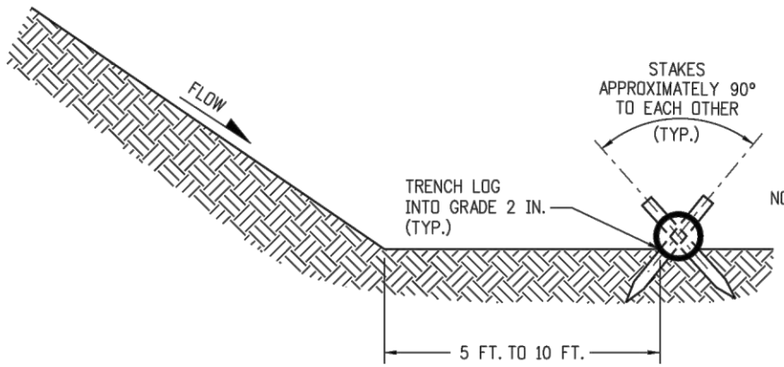


ISOMETRIC VIEW



NOTE: THE TOPS OF ALL STAKES SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE THE TOPS OF EROSION LOGS.

SECTION A-A

NOTES:

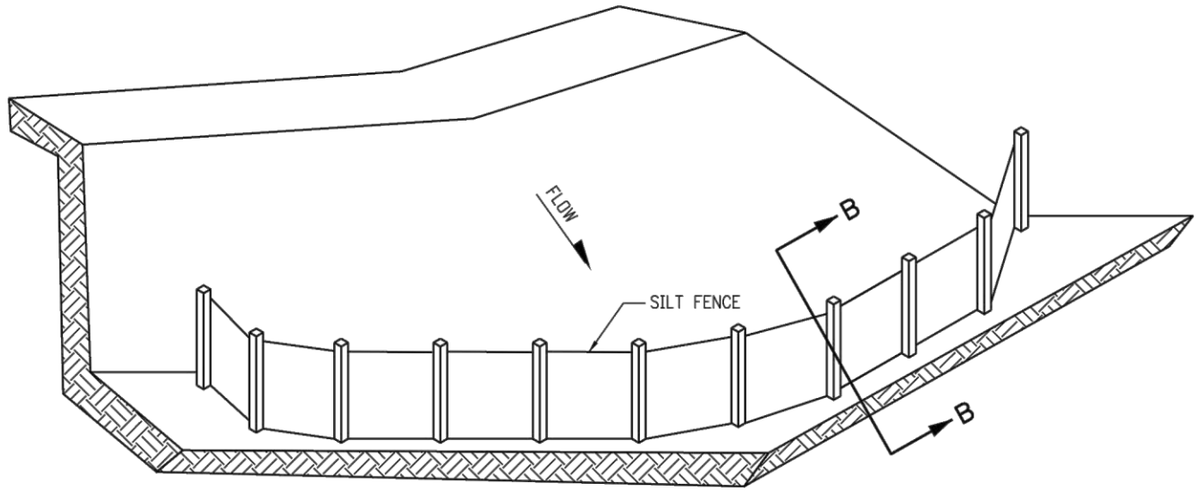
1. EROSION LOGS USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
2. EROSION LOGS SHALL BE PLACED ON THE CONTOUR WITH ENDS FLARED UP SLOPE.
3. SEE SHEET 2 OF 11 FOR JOINING LOGS DETAIL.

EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

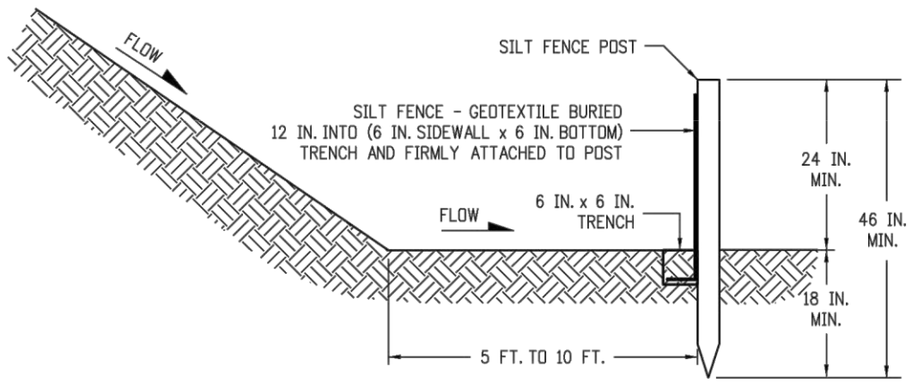
EROSION LOG TOE OF SLOPE PROTECTION

NOTES

1. SILT FENCE SHALL HAVE A MAXIMUM DRAINAGE AREA OF ONE-QUARTER ACRE PER 100 FEET OF SILT FENCE LENGTH; MAXIMUM SLOPE LENGTH BEHIND BARRIER IS 100 FEET.
2. SILT FENCE USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
3. SILT FENCE SHALL BE PLACED PARALLEL TO THE CONTOUR WITH ENDS FLARED UP SLOPE.
4. THE MAXIMUM LENGTH OF EROSION LOGS OR SILT FENCES WITHOUT A FLARED END TURNING UPSLOPE IS 150 FEET.



ISOMETRIC VIEW



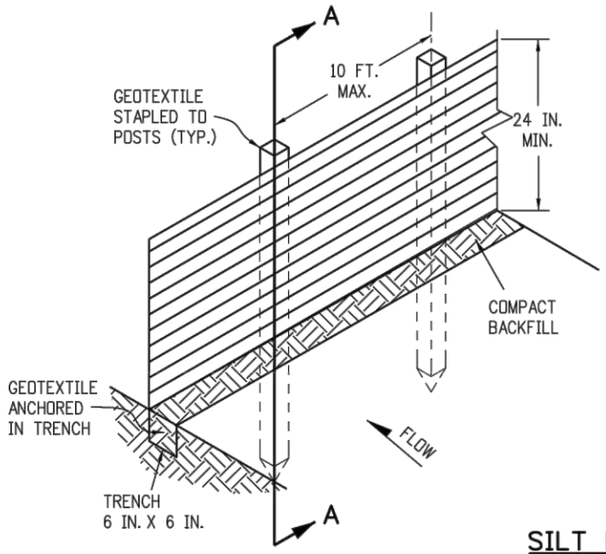
SECTION B-B

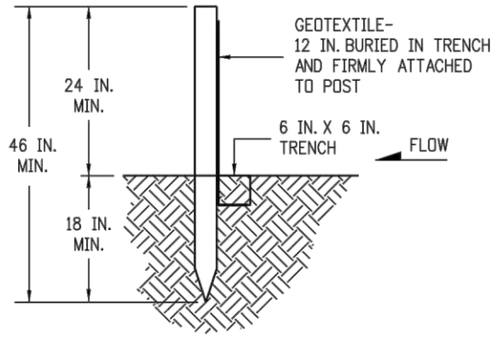
SILT FENCE TOE OF SLOPE PROTECTION

NOTE: THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.

SF

TOE OF SLOPE PROTECTION APPLICATIONS



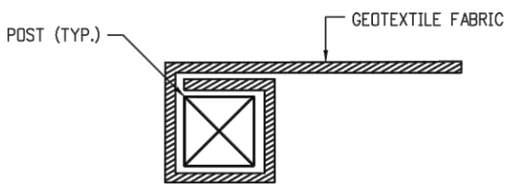


SECTION A-A

SILT FENCE

NOTES:

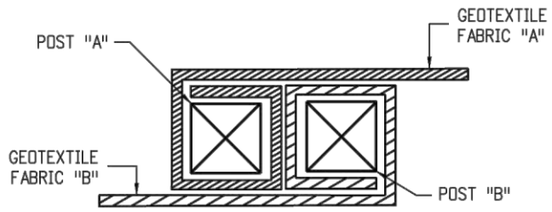
1. GEOTEXTILE SHALL BE ATTACHED TO WOOD POSTS WITH THREE OR MORE STAPLES PER POST. STAPLES SHALL BE HEAVY DUTY WIRE AND AT LEAST 1 INCH LONG.
2. WOOD POST SHALL BE 1 IN. X 1 IN. NOMINAL.
3. THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.
4. THE SILT FENCE SHALL BE PLACED ON THE CONTOUR (AT THE SAME ELEVATION ±6 IN.). THE ENDS SHALL BE FLARED UP SLOPE (MINIMUM ELEVATION GAIN OF 18 IN.).



END SECTION DETAIL (PLAN VIEW)

NOTE:

1. THE END OF THE SILT FENCE FABRIC SHALL BE WRAPPED APPROX. 6 INCHES AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.

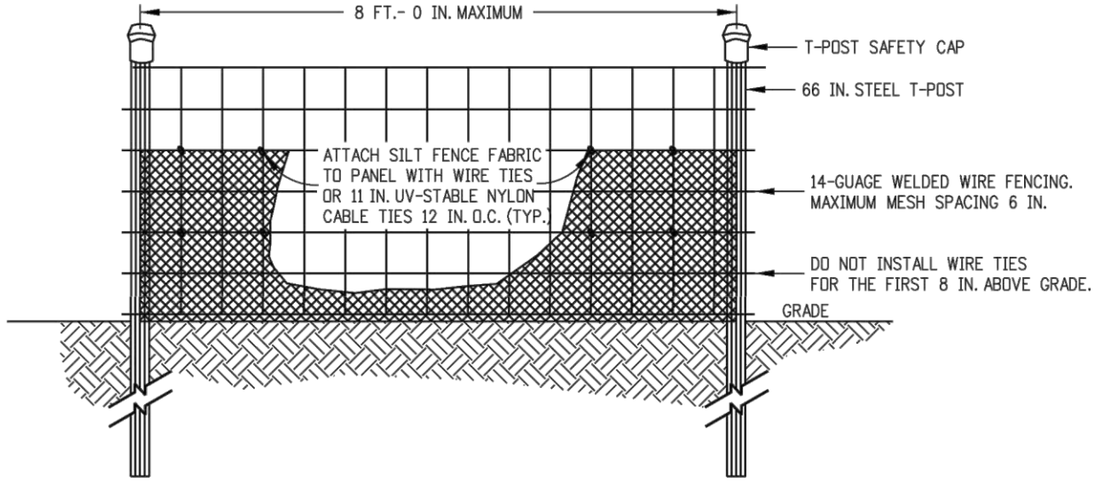


JOINING SECTION DETAIL (PLAN VIEW)

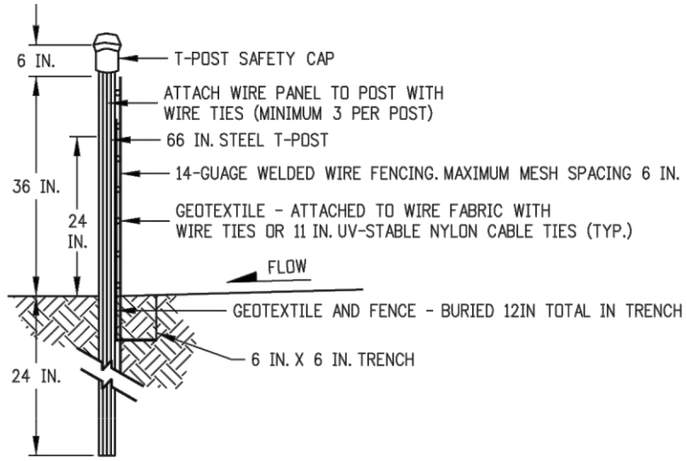
NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.

SF



ELEVATION VIEW



SIDE VIEW

NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A STEEL T-POST, THEN SECURED ALONG THE POST WITH WIRE TIES (MINIMUM 3 PER POST).
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.
3. SILT FENCES SHALL NOT BE USED FOR CHECK DAMS.
4. THE PAY ITEM NUMBER FOR SILT FENCE (REINFORCED) (LF) IS 208-00021.

SILT FENCE (REINFORCED)

SILT FENCE APPLICATIONS

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SK

Name/Description:
Spill Kit

Description, Purpose and Applicability:

Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials may include some or all of the following, but are not be limited to: brooms, dust pans, mops, rags, gloves, goggles, absorbent powder / kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Inspections of the Spill Kit will be consistent with the project stated frequency in the narrative. Supplies will be replenished as they become depleted.

Instances of this Control Measure (CM)

SK - Spill Kit
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SMP

Name/Description:
Seed & Mulch - Permanent

Description, Purpose and Applicability:

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.

During what phase(s) of construction/activity will this control measure be implemented?

5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Please see attached BMP Description, Installation and Maintenance Specification Sheet - Urban Drainage and Flood Control District - Urban Storm Drainage Criteria Manual Volume 3.

Instances of this Control Measure (CM)

SMP - Seed & Mulch - Permanent
There are no items to display

Attachments

Description: EC-02 Temporary and Permanent Seeding - Urban Drainage and Flood Control District
Filename: EC-02 Temporary and Permanent Seeding.pdf *(click to download original file)*

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Filename: EC-04-Mulching.pdf *(click to download original file)*

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Temporary and Permanent Seeding (TS/PS) EC-2

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.

Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period (typically 30 days or longer), proactive stabilization measures should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

Typically, local governments have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selection of an appropriate seed mixture, use of appropriate seeding equipment to ensure proper coverage and density, and protection with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mix, soil preparations, and seeding and mulching recommendations that may be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality subsoils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms, rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period (typically 30 days or more), plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment.

If desired for wildlife habitat or landscape diversity, shrubs such as rubber rabbitbrush (*Chrysothamnus nauseosus*), fourwing saltbush (*Atriplex canescens*) and skunkbrush sumac (*Rhus trilobata*) could be added to the upland seedmixes at 0.25, 0.5 and 1 pound PLS/acre, respectively. In riparian zones, planting root stock of such species as American plum (*Prunus americana*), woods rose (*Rosa woodsii*), plains cottonwood (*Populus sargentii*), and willow (*Populus spp.*) may be considered. On non-topsoiled upland sites, a legume such as Ladak alfalfa at 1 pound PLS/acre can be included as a source of nitrogen for perennial grasses.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well. See Table TS/PS-3 for appropriate seeding dates.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] See Table TS/PS-3 for seeding dates. Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses

Common[a] Name	Botanical Name	Growth Season[b]	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Alakali Soil Seed Mix					
Alkali sacaton	*Sporobolus airoides*	Cool	Bunch	1,750,000	0.25
Basin wildrye	*Elymus cinereus*	Cool	Bunch	165,000	2.5
Sodar streambank wheatgrass	*Agropyron riparium 'Sodar'*	Cool	Sod	170,000	2.5
Jose tall wheatgrass	*Agropyron elongatum 'Jose'*	Cool	Bunch	79,000	7.0
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	5.5
Total					**17.75**
Fertile Loamy Soil Seed Mix					
Ephriam crested wheatgrass	*Agropyron cristatum 'Ephriam'*	Cool	Sod	175,000	2.0
Dural hard fescue	*Festuca ovina 'duriuscula'*	Cool	Bunch	565,000	1.0
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Sodar streambank wheatgrass	*Agropyron riparium 'Sodar'*	Cool	Sod	170,000	2.5
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	7.0
Total					**15.5**
High Water Table Soil Seed Mix					
Meadow foxtail	*Alopecurus pratensis*	Cool	Sod	900,000	0.5
Redtop	*Agrostis alba*	Warm	Open sod	5,000,000	0.25
Reed canarygrass	*Phalaris arundinacea*	Cool	Sod	68,000	0.5
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Pathfinder switchgrass	*Panicum virgatum 'Pathfinder'*	Warm	Sod	389,000	1.0
Alkar tall wheatgrass	*Agropyron elongatum 'Alkar'*	Cool	Bunch	79,000	5.5
Total					**10.75**
Transition Turf Seed Mix[c]					
Ruebens Canadian bluegrass	*Poa compressa 'Ruebens'*	Cool	Sod	2,500,000	0.5
Dural hard fescue	*Festuca ovina 'duriuscula'*	Cool	Bunch	565,000	1.0
Citation perennial ryegrass	*Lolium perenne 'Citation'*	Cool	Sod	247,000	3.0
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Total					**7.5**

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses (cont.)

Common Name	Botanical Name	Growth Season[b]	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Sandy Soil Seed Mix					
Blue grama	*Bouteloua gracilis*	Warm	Sod-forming bunchgrass	825,000	0.5
Camper little bluestem	*Schizachyrium scoparium 'Camper'*	Warm	Bunch	240,000	1.0
Prairie sandreed	*Calamovilfa longifolia*	Warm	Open sod	274,000	1.0
Sand dropseed	*Sporobolus cryptandrus*	Cool	Bunch	5,298,000	0.25
Vaughn sideoats grama	*Bouteloua curtipendula 'Vaughn'*	Warm	Sod	191,000	2.0
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	5.5
Total					**10.25**
Heavy Clay, Rocky Foothill Seed Mix					
Ephriam crested wheatgrass[d]	*Agropyron cristatum 'Ephriam'*	Cool	Sod	175,000	1.5
Oahe Intermediate wheatgrass	*Agropyron intermedium 'Oahe'*	Cool	Sod	115,000	5.5
Vaughn sideoats grama[e]	*Bouteloua curtipendula 'Vaughn'*	Warm	Sod	191,000	2.0
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	5.5
Total					**17.5**

[a] All of the above seeding mixes and rates are based on drill seeding followed by crimped straw mulch. These rates should be doubled if seed is broadcast and should be increased by 50 percent if the seeding is done using a Brillion Drill or is applied through hydraulic seeding. Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1. If hydraulic seeding is used, hydraulic mulching should be done as a separate operation.

[b] See Table TS/PS-3 for seeding dates.

[c] If site is to be irrigated, the transition turf seed rates should be doubled.

[d] Crested wheatgrass should not be used on slopes steeper than 6H to 1V.

[e] Can substitute 0.5 lbs PLS of blue grama for the 2.0 lbs PLS of Vaughn sideoats grama.

Table TS/PS-3. Seeding Dates for Annual and Perennial Grasses

	Annual Grasses (Numbers in table reference species in Table TS/PS-1)		Perennial Grasses	
Seeding Dates	**Warm**	**Cool**	**Warm**	**Cool**
January 1–March 15			✓	✓
March 16–April 30	4	1,2,3	✓	✓
May 1–May 15	4		✓	
May 16–June 30	4,5,6,7			
July 1–July 15	5,6,7			
July 16–August 31				
September 1–September 30		8,9,10,11		
October 1–December 31			✓	✓

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

Description

Mulching consists of evenly applying straw, hay, shredded wood mulch, rock, bark or compost to disturbed soils and securing the mulch by crimping, tackifiers, netting or other measures. Mulching helps reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff. Although often applied in conjunction with temporary or permanent seeding, it can also be used for temporary stabilization of areas that cannot be reseeded due to seasonal constraints.

Mulch can be applied either using standard mechanical dry application methods or using hydromulching equipment that hydraulically applies a slurry of water, wood fiber mulch, and often a tackifier.

Photograph MU-1. An area that was recently seeded, mulched, and crimped.

Appropriate Uses

Use mulch in conjunction with seeding to help protect the seedbed and stabilize the soil. Mulch can also be used as a temporary cover on low to mild slopes to help temporarily stabilize disturbed areas where growing season constraints prevent effective reseeding. Disturbed areas should be properly mulched and tacked, or seeded, mulched and tacked promptly after final grade is reached (typically within no longer than 14 days) on portions of the site not otherwise permanently stabilized.

Standard dry mulching is encouraged in most jurisdictions; however, hydromulching may not be allowed in certain jurisdictions or may not be allowed near waterways.

Do not apply mulch during windy conditions.

Design and Installation

Prior to mulching, surface-roughen areas by rolling with a crimping or punching type roller or by track walking. Track walking should only be used where other methods are impractical because track walking with heavy equipment typically compacts the soil.

A variety of mulches can be used effectively at construction sites. Consider the following:

Mulch	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

- Clean, weed-free and seed-free cereal grain straw should be applied evenly at a rate of 2 tons per acre and must be tacked or fastened by a method suitable for the condition of the site. Straw mulch must be anchored (and not merely placed) on the surface. This can be accomplished mechanically by crimping or with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is the recommended method for areas flatter than 3:1. Mechanical crimpers must be capable of tucking the long mulch fibers into the soil to a depth of 3 inches without cutting them. An agricultural disk, while not an ideal substitute, may work if the disk blades are dull or blunted and set vertically; however, the frame may have to be weighted to afford proper soil penetration.

- Grass hay may be used in place of straw; however, because hay is comprised of the entire plant including seed, mulching with hay may seed the site with non-native grass species which might in turn out-compete the native seed. Alternatively, native species of grass hay may be purchased, but can be difficult to find and are more expensive than straw. Purchasing and utilizing a certified weed-free straw is an easier and less costly mulching method. When using grass hay, follow the same guidelines as for straw (provided above).

- On small areas sheltered from the wind and heavy runoff, spraying a tackifier on the mulch is satisfactory for holding it in place. For steep slopes and special situations where greater control is needed, erosion control blankets anchored with stakes should be used instead of mulch.

- Hydraulic mulching consists of wood cellulose fibers mixed with water and a tackifying agent and should be applied at a rate of no less than 1,500 pounds per acre (1,425 lbs of fibers mixed with at least 75 lbs of tackifier) with a hydraulic mulcher. For steeper slopes, up to 2000 pounds per acre may be required for effective hydroseeding. Hydromulch typically requires up to 24 hours to dry; therefore, it should not be applied immediately prior to inclement weather. Application to roads, waterways and existing vegetation should be avoided.

- Erosion control mats, blankets, or nets are recommended to help stabilize steep slopes (generally 3:1 and steeper) and waterways. Depending on the product, these may be used alone or in conjunction with grass or straw mulch. Normally, use of these products will be restricted to relatively small areas. Biodegradable mats made of straw and jute, straw-coconut, coconut fiber, or excelsior can be used instead of mulch. (See the ECM/TRM BMP for more information.)

- Some tackifiers or binders may be used to anchor mulch. Check with the local jurisdiction for allowed tackifiers. Manufacturer's recommendations should be followed at all times. (See the Soil Binder BMP for more information on general types of tackifiers.)

- Rock can also be used as mulch. It provides protection of exposed soils to wind and water erosion and allows infiltration of precipitation. An aggregate base course can be spread on disturbed areas for temporary or permanent stabilization. The rock mulch layer should be thick enough to provide full coverage of exposed soil on the area it is applied.

Maintenance and Removal

After mulching, the bare ground surface should not be more than 10 percent exposed. Reapply mulch, as needed, to cover bare areas.

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SR

Name/Description:
Surface Roughening

Description, Purpose and Applicability:

Surface roughening is an erosion control practice that involves tracking, scarifying, imprinting, or tilling a disturbed area to provide temporary stabilization of disturbed areas. Surface roughening creates variations in the soil surface that help to minimize wind and water erosion. Depending on the technique used, surface roughening may also help establish conditions favorable to establishment of vegetation.
Surface roughening can be used to provide temporary stabilization of disturbed areas, such as when revegetation cannot be immediately established due to seasonal planting limitations.

During what phase(s) of construction/activity will this control measure be implemented?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Surface roughening should be performed either after final grading or to temporarily stabilize an area during active construction that may be inactive for a short time period. Surface roughening should create depressions 2 to 6 inches deep and approximately 6 inches apart. The surface of exposed soil can be roughened by a number of techniques and equipment. Horizontal grooves (running parallel to the contours of the land) can be made using tracks from equipment treads, stair-step grading, ripping, or tilling.
Care should be taken not to drive vehicles or equipment over areas that have been surface roughened.
Tire tracks will smooth the roughened surface and may cause runoff to collect into rills and gullies.
Because surface roughening is only a temporary control, additional treatments may be necessary to maintain the soil surface in a roughened condition.

Instances of this Control Measure (CM)

SR - Surface Roughening
There are no items to display

Attachments

Description: Surface Roughening Detail
Filename: SR Surface Roughening.pdf *(click to download original file)*

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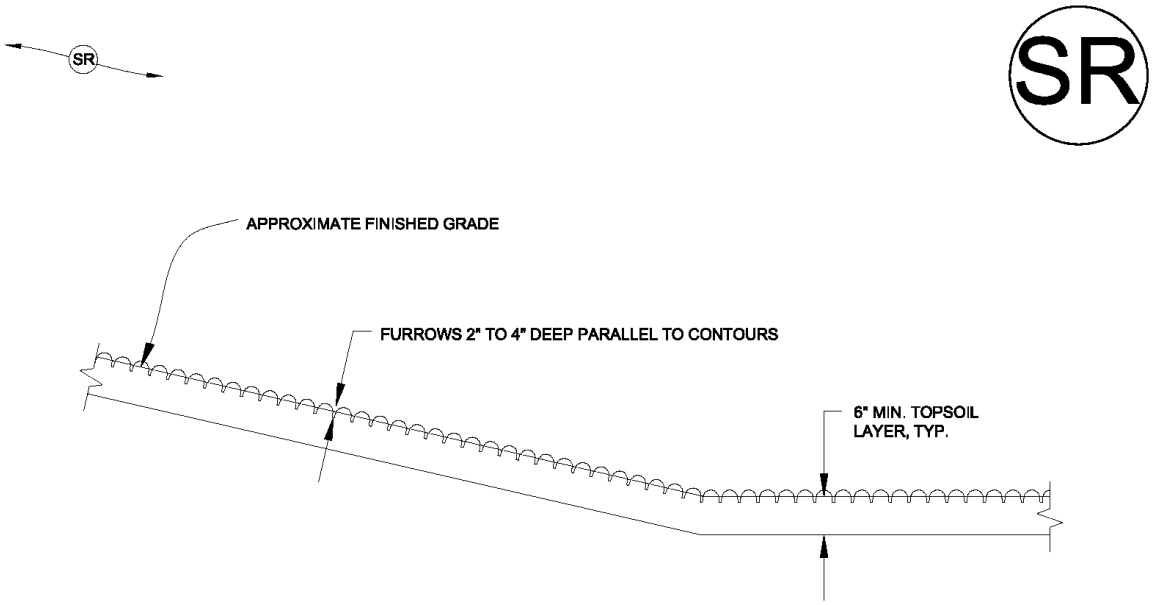

SECTION A

SURFACE ROUGHENING INSTALLATION NOTES

1. SURFACE ROUGHENING SHALL BE PROVIDED ON ALL FINISHED GRADES (SLOPES AND "FLAT" AREAS) WITHIN 2 DAYS OF COMPLETION OF FINISHED GRADE (FOR AREAS NOT RECEIVING TOPSOIL) OR WITHIN 2 DAYS OF TOPSOIL PLACEMENT.
2. AREAS WHERE BUILDING FOUNDATIONS, PAVEMENT, OR SOD ARE TO BE PLACED WITHIN 7-DAYS OF FINISHED GRADING DO NOT NEED TO BE SURFACE ROUGHENED.
3. DISTURBED SURFACES SHALL BE ROUGHENED USING RIPPING OR TILLING EQUIPMENT ON THE CONTOUR OR TRACKING UP AND DOWN A SLOPE USING EQUIPMENT TREADS.

SURFACE ROUGHENING MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT THE SURFACE ROUGHENING WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. VEHICLES AND EQUIPMENT SHALL GENERALLY BE CONFINED TO ACCESS DRIVES AND SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SURFACE ROUGHENED.
3. IN NON-TURF GRASS FINISHED AREAS, SEEDING AND MULCHING SHALL TAKE PLACE DIRECTLY OVER SURFACE ROUGHENED AREAS WITHOUT FIRST SMOOTHING OUT THE SURFACE.
4. IN AREAS NOT SEEDED AND MULCHED AFTER SURFACE ROUGHENING, SURFACES SHALL BE RE-ROUGHENED AS NECESSARY TO MAINTAIN GROOVE DEPTH AND SMOOTH OVER ANY RILL EROSION.

DETAIL BASED ON DETAILS PROVIDED BY DOUGLAS COUNTY, COLORADO

Figure C4-1—Surface Roughening

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SS

Name/Description:
Street Sweeping and Scraping

Description, Purpose and Applicability:

Street sweeping and vacuuming will be implemented, as necessary, to remove sediment that has been tracked onto roadways to reduce sediment transport into storm drain systems or a surface waterway.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Street sweeping/scraping or vacuuming will be conducted when there is noticeable sediment accumulation on roadways adjacent to the construction site. Typically, this will be concentrated at the entrance/exit to the construction site. If there is not a significant amount of sediment on the roadway and a mechanical sweeper is unavailable, sweeping may be conducted manually using a shovel and broom. The project will never wash accumulated sediment on roadways into storm drains.
- The paved roads will be inspected around the perimeter of the construction site on a daily basis and more frequently, as needed.
- Following street sweeping, the inlet protection will be checked that it wasn't during street sweeping.

Instances of this Control Measure (CM)

SS - Street Sweeping and Scraping
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SSA

Name/Description:
Stabilized Staging Area

Description, Purpose and Applicability:

A stabilized staging area is a clearly designated area where construction equipment and vehicles, stockpiles, waste bins, and other construction-related materials are stored. The contractor office trailer may also be located in this area.
Staging areas located in roadways due to space constraints may require special measures to avoid materials being washed into storm inlets.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

- Appropriate space will be provided to contain storage and provide for loading/unloading operations, as well as parking if necessary.
- A stabilized surface, either paved or covered, with 3-inch diameter aggregate or larger will be utilized and if feasible, will be connected to the VTC or stabilized entrance to the site/disturbed area.

Maintenance of stabilized staging areas includes maintaining the stable surface cover of gravel, repairing perimeter controls, and following good housekeeping practices.
When construction is complete, debris, unused stockpiles and materials will be recycled or properly disposed. In some cases, this will require disposal of contaminated soil from equipment leaks in an appropriate landfill. Staging areas will be permanently stabilized with vegetation or other surface cover planned for the development.

Instances of this Control Measure (CM)

SSA - Stabilized Staging Area
There are no items to display

Attachments

Filename: SM-06 Stabilized Staging Area.pdf *(click to download original file)*

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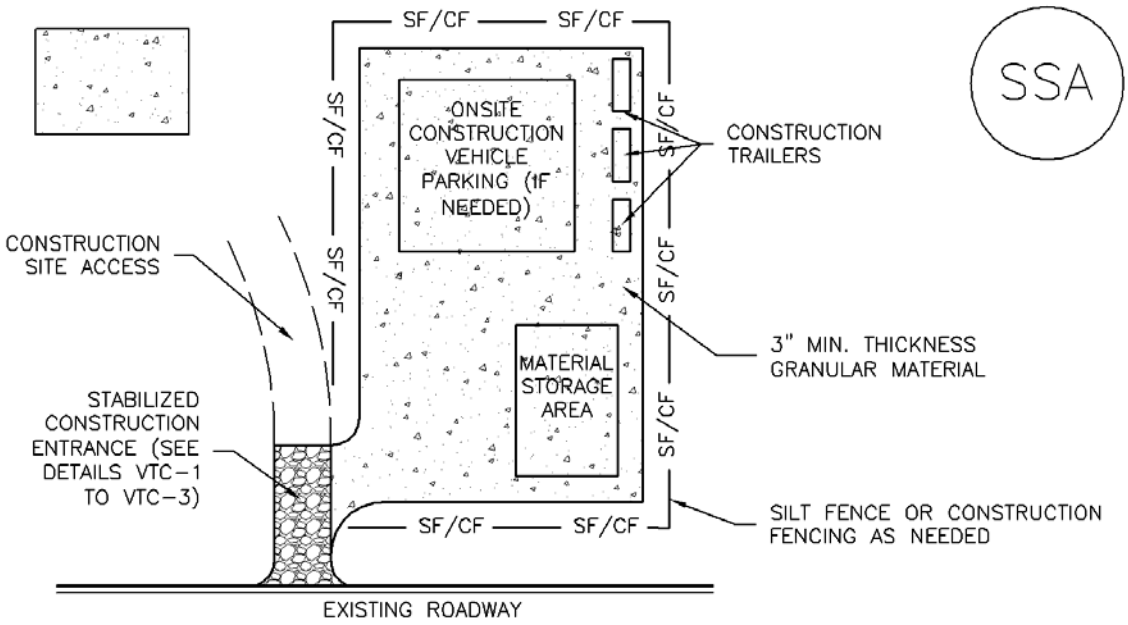

SSA–1. STABILIZED STAGING AREA

STABILIZED STAGING AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR
   –LOCATION OF STAGING AREA(S).
   –CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.

2. STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.

3. STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.

4. THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.

5. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

6. ADDITIONAL PERIMETER BMPs MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

STABILIZED STAGING AREA MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: ST

Name/Description:
Sediment Trap

Description, Purpose and Applicability:
Please see attached detail.

During what phase(s) of construction/activity will this control measure be implemented?
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*
Please see attached detail.

Instances of this Control Measure (CM)

ST - Sediment Trap
There are no items to display

Attachments

Filename: ST.pdf *(click to download original file)*
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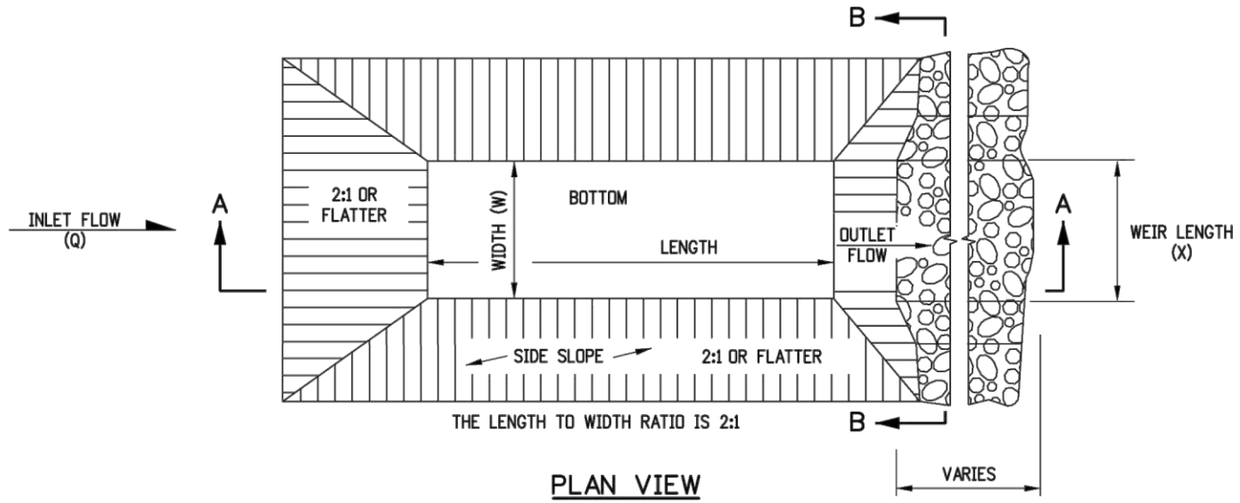
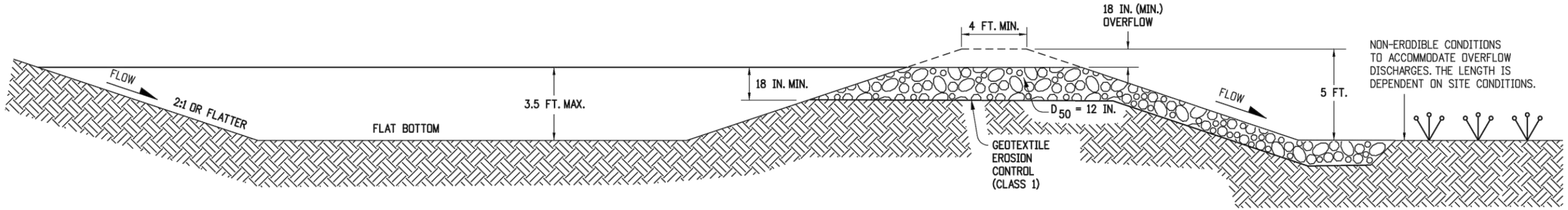


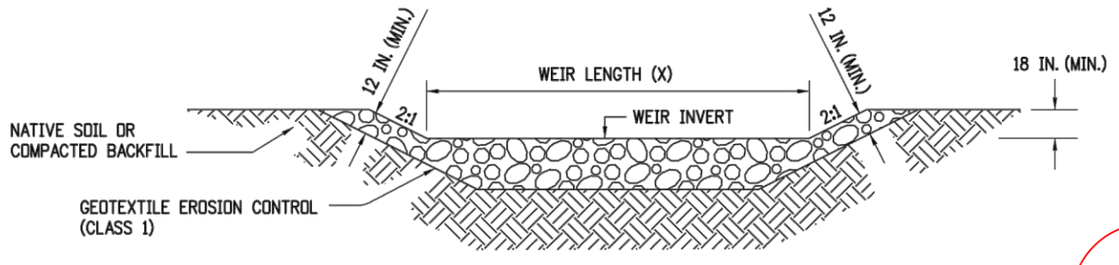
PLAN VIEW

NOTES

1. THE MAXIMUM DRAINAGE AREA IS 5 ACRES.
2. THE MAXIMUM STRUCTURE LIFE IS 2 YEARS.
3. THE STORAGE AREA IS 1800 CUBIC FEET PER ACRE.
4. THE MAXIMUM EMBANKMENT HEIGHT SHALL BE 5 FT. MEASURED ON THE DOWNSTREAM SIDE.
5. THE LENGTH/WIDTH RATIO MAY BE ADJUSTED TO MEET SITE CONDITIONS WHEN APPROVED BY THE ENGINEER.
6. WIDTH (W) OF SEDIMENT TRAP IS APPROXIMATELY EQUAL TO THE WEIR LENGTH (X).
7. SEDIMENT TRAP DESIGN SHALL BE APPROVED BY THE ENGINEER.
8. THE DOWN GRADE FROM WEIR SHALL BE STABLE AND NON-ERODIABLE.
9. THE PAY ITEM NUMBER FOR SEDIMENT TRAP (LF) IS 208-00033.



SECTION A-A



SECTION B-B

DRAINAGE AREA (ACRES)	WEIR LENGTH (FEET)
1	4
2	6
3	8
4	10
5	12

WEIR LENGTH TABLE

ST

SEDIMENT TRAP

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: SWM

Name/Description:
Sanitary Waste/Portable Toilet Management

Description, Purpose and Applicability:

Portable toilets will be present on the project and administrative and physical measures will be implemented to minimize the potential of septic/sanitary waste discharges from the project and into State waterways or storm sewer systems.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Portable toilets will be serviced on a regular basis, located away from stormwater conveyance systems, inlets and will be secured from tipping over.

Instances of this Control Measure (CM)

SWM - Sanitary Waste/Portable Toilet Management
There are no items to display

Attachments

There are no attachments to display

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: VTC-A

Name/Description:
Vehicle Tracking Control

Description, Purpose and Applicability:

Vehicle tracking controls provide stabilized construction site access where vehicles exit the site onto paved public roads. An effective vehicle tracking control helps remove sediment (mud or dirt) from vehicles, reducing tracking onto the paved surface.
A stabilized construction entrance or vehicle tracking control will be implemented where frequent heavy vehicle traffic exits the construction site onto a paved roadway, unless infeasible. An effective vehicle tracking control is particularly important during the following conditions:
- Wet weather periods when mud is easily tracked off site.
- During dry weather periods where dust is a concern.
- When poorly drained, clayey soils are present on site.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

The area will be inspected for degradation and aggregate or material used for a stabilized entrance/exit will be replaced as needed to ensure it functions effectively. If the area becomes clogged, excess sediment will be removed and disposed of, the rock pad ripped/roughened, or replaced material with a fresh layer of aggregate as necessary.

Sediment that is tracked onto the public right of way will be cleaned up daily or more frequently as needed.

Instances of this Control Measure (CM)

VTC-A - Vehicle Tracking Control
There are no items to display

Attachments

Filename: VTC.pdf *(click to download original file)*

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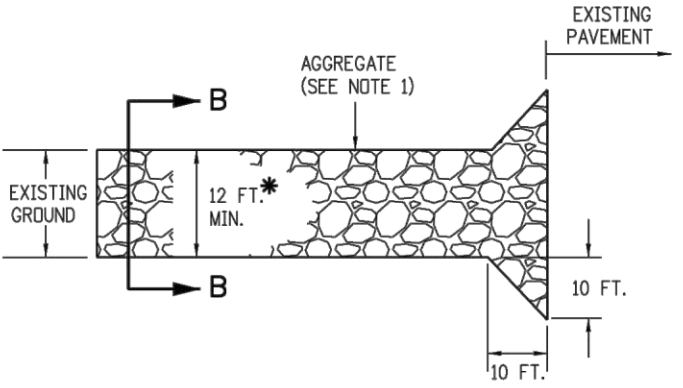
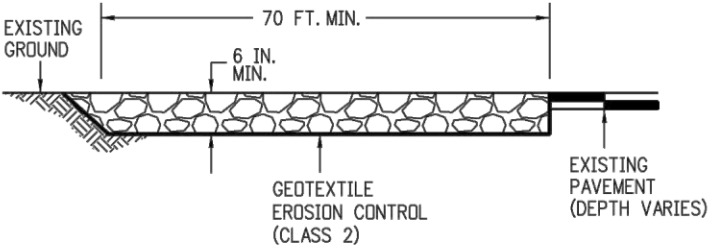
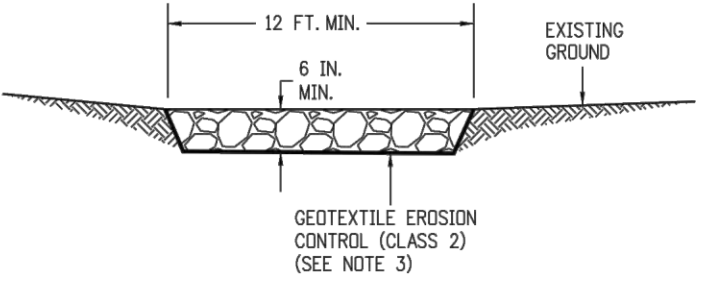


PLAN VIEW

* SHALL EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION.



ELEVATION SECTION



SECTION B-B

NOTES:

1. AGGREGATE SHALL CONFORM TO SUBSECTION 208.02 (I).
2. THE CONTRACTOR SHALL PROTECT CURB AND GUTTER THAT CROSSES THE ENTRANCE FROM DAMAGE, WHILE NOT BLOCKING FLOW OF WATER THRU STRUCTURE. PROTECTION OF THE CURB AND GUTTER SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
3. GEOTEXTILE SHALL CONFORM TO SUBSECTION 712.08.
4. ALL MATERIALS AND LABOR TO COMPLETE THE VEHICLE TRACKING PAD SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
5. THE PAY ITEM NUMBER FOR VEHICLE TRACKING PAD (EACH) IS 208-00070.

VEHICLE TRACKING PAD

USMS Control Measure (CM) Log and Site Map Key

Abbreviation: WD

Name/Description:
Wattle Dike / Sediment Control Log / Straw Wattle

Description, Purpose and Applicability:

A sediment control log is a linear roll made of natural materials such as straw, coconut fiber, or other fibrous material trenched into the ground and held with a wooden stake. Sediment control logs are also often referred to as "straw wattles." They are used as a sediment barrier to intercept sheet flow runoff from disturbed areas.
Sediment control logs may be used in the following applications to trap sediment:
- As perimeter control for stockpiles and the site.
- As part of inlet protection designs.
- As check dams in small drainage ditches. (Sediment control logs are not intended for use in channels with high flow velocities.)
- On disturbed slopes to shorten flow lengths (as an erosion control).
- As part of multi-layered perimeter control along a receiving water such as a stream, pond or wetland.

Sediment control logs work well in combination with other layers of erosion and sediment controls.

During what phase(s) of construction/activity will this control measure be implemented?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Inspection & Maintenance Requirements: *(Frequency to be inspected and when/how it will be maintained)*

Wherever feasible, sediment control logs will be installed along the contour to avoid concentrating flows. The maximum allowable tributary drainage area per 100 lineal feet of sediment control log, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to sediment control logs installed along the contour. When installed for other uses, such as perimeter control, it will be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the BMP.
Sediment control logs will eventually degrade. Accumulated sediment will be removed before the depth is one-half the height of the sediment log and damaged sections will be repaired, if possible, or replaced. Once the upstream area is stabilized, remove and properly dispose of the logs. Areas disturbed beneath the logs may need to be seeded and mulched. Sediment control logs that are biodegradable may occasionally be left in place (e.g., when logs are used in conjunction with erosion control blankets as permanent slope breaks). However, removal of sediment control logs after final stabilization is typically recommended when used in perimeter control, inlet protection and check dam applications.

Instances of this Control Measure (CM)

WD - Wattle Dike / Sediment Control Log / Straw Wattle
There are no items to display

Attachments

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Filename: WD2.pdf *(click to download original file)*

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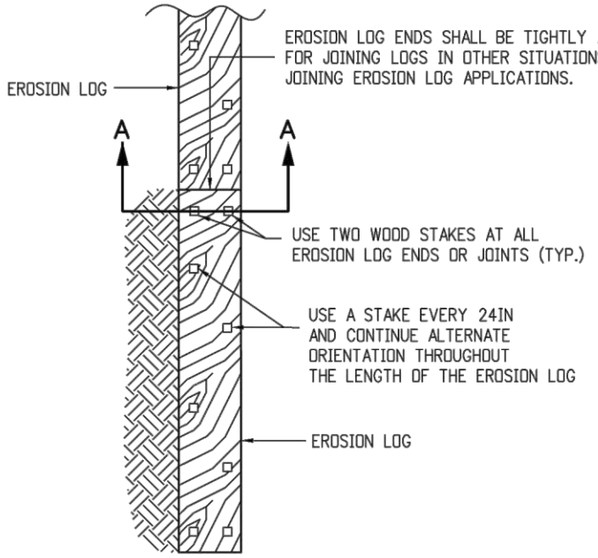
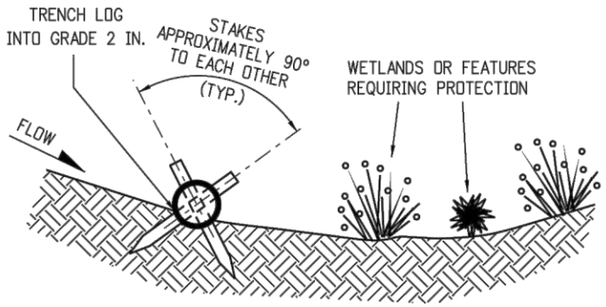


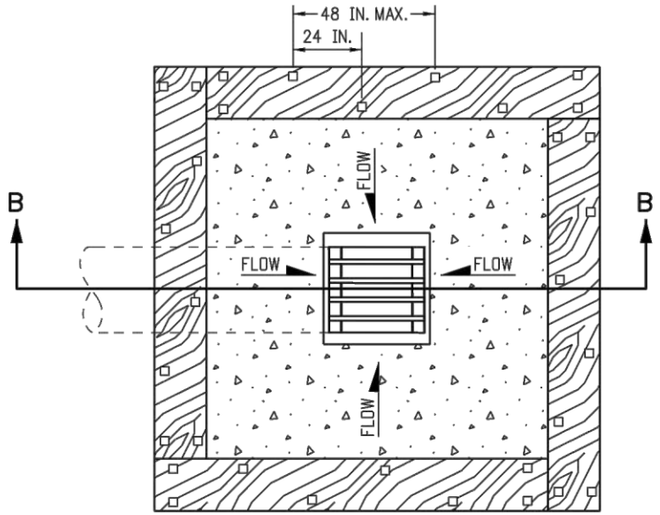
PLAN VIEW



SECTION A-A

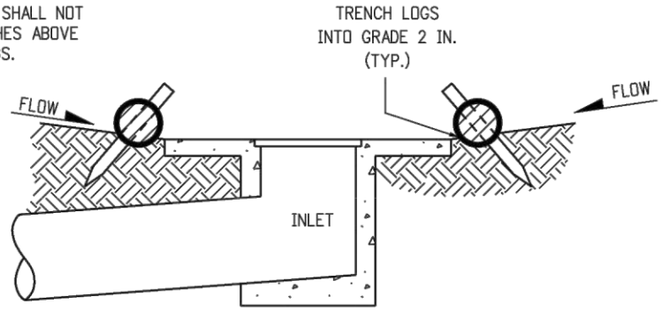
TYPICAL STAKE INSTALLATION

EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)



PLAN VIEW

NOTE: THE TOPS OF ALL STAKES SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE THE TOPS OF EROSION LOGS.



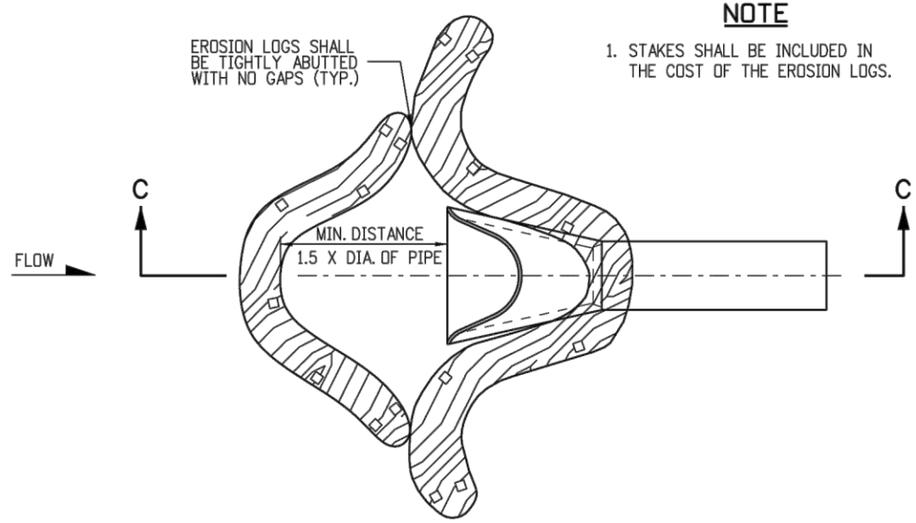
SECTION B-B

NOTE: LOCATE EROSION LOGS AT THE OUTSIDE EDGE OF THE CONCRETE APRON.

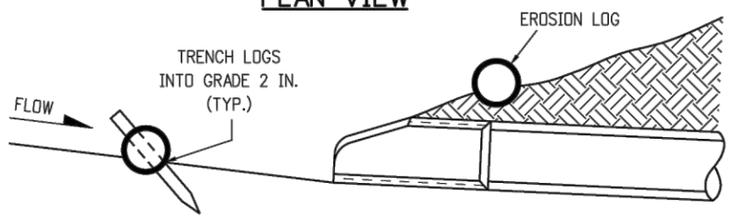
EROSION LOG FILTER AT DROP INLET

NOTE

1. STAKES SHALL BE INCLUDED IN THE COST OF THE EROSION LOGS.



PLAN VIEW

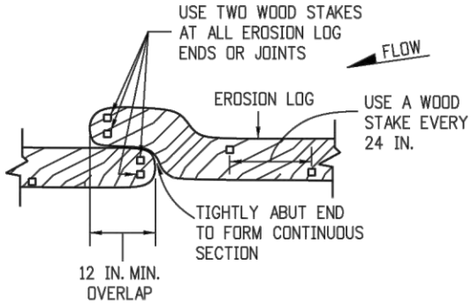


SECTION C-C

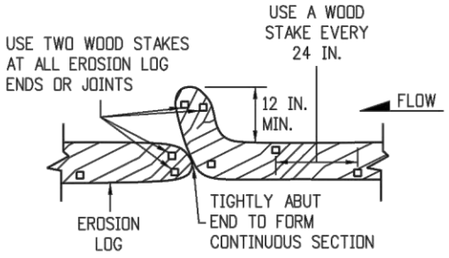
(NOT ALL LOGS SHOWN)

NOTE: TOP OF STAKE SHALL NOT EXTEND PAST TOP OF EROSION LOG MORE THAN 2 IN.

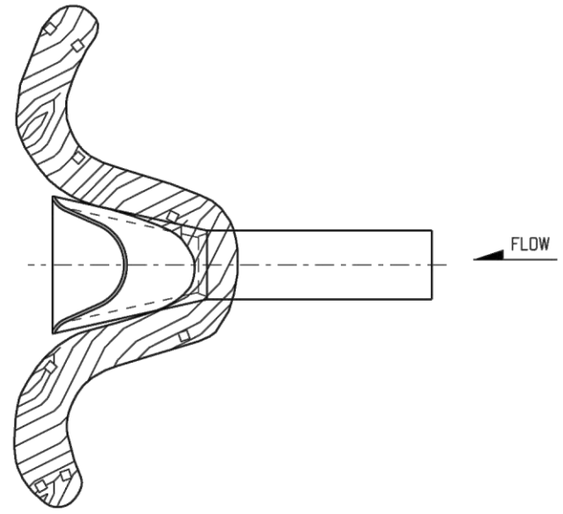
EROSION LOG CULVERT INLET PROTECTION



OVERLAP JOINING DETAIL



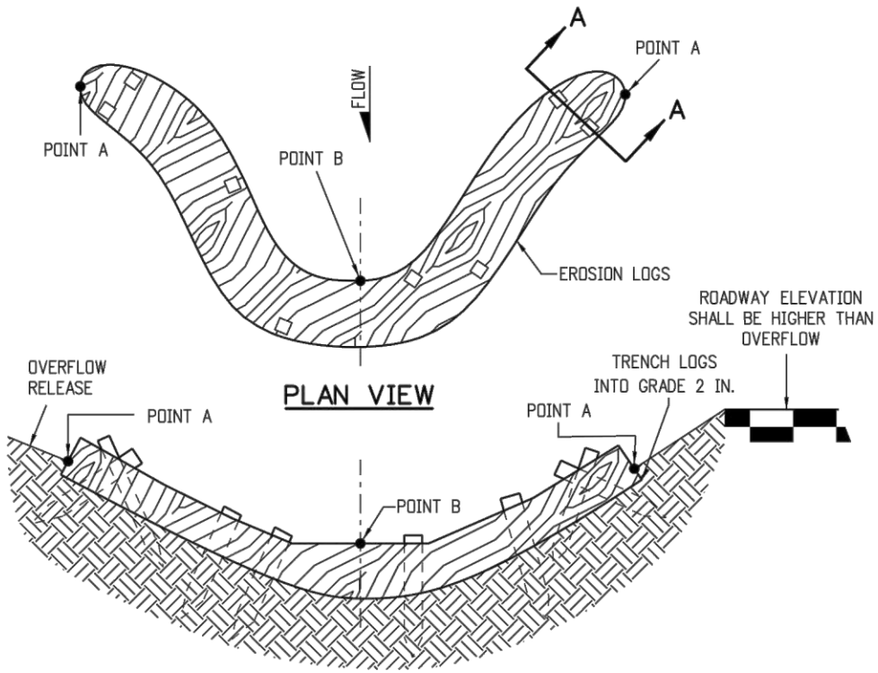
J-HOOK JOINING DETAIL



EROSION LOG CULVERT OUTLET PROTECTION

JOINING EROSION LOG APPLICATIONS

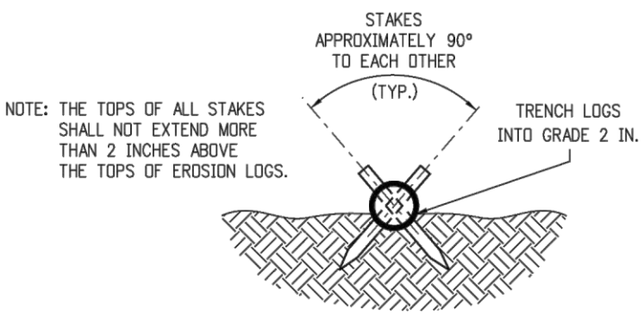
EROSION LOG APPLICATIONS



PLAN VIEW

ELEVATION

NOTE: POINTS "A" SHALL BE A MINIMUM 4 IN. HIGHER THAN POINT "B".

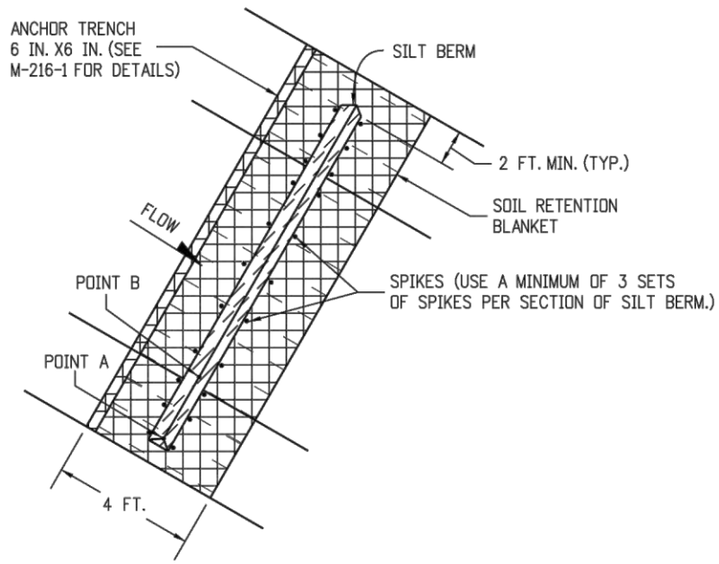


SECTION A-A

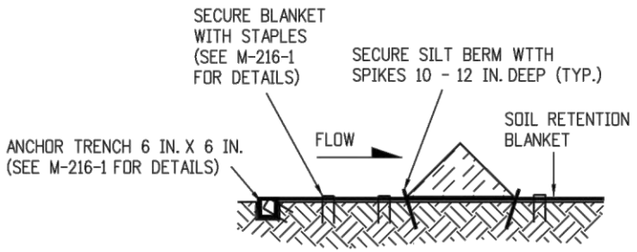
NOTES:

1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.
3. V-SHAPED TEMPORARY DITCHES SHALL NOT BE USED. DITCHES SHAL BE GRADED IN A PARABOLIC OR TRAPEZOIDAL SHAPE.

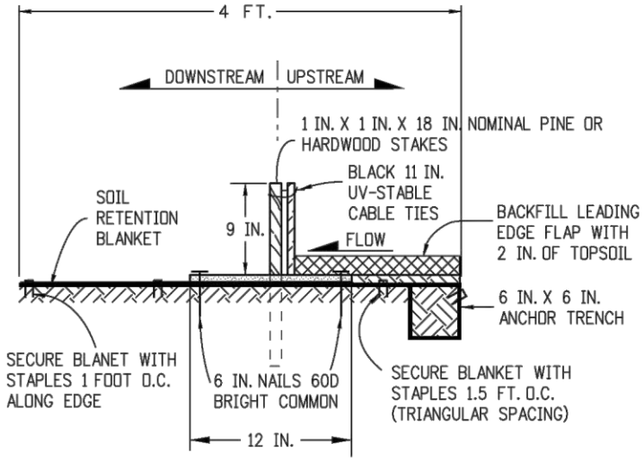
EROSION LOG INSTALLATION



PLAN VIEW



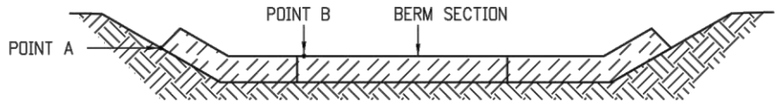
SILT BERM (1) SECTION VIEW



NOTES:

1. MINIMUM 4 NAILS PER SEGMENT (UPSTREAM).
2. MINIMUM 2 NAILS PER SEGMENT (DOWNSTREAM).
3. MINIMUM 2 WOOD STAKES PER SEGMENT.

SILT BERM (2) SECTION VIEW



POINT "A" SHALL BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE BERM AND NOT AROUND THE ENDS.

FRONT VIEW

NOTES

1. ANCHOR SOIL RETENTION BLANKET INTO TRENCH WITH 8 INCHES MIN. STAPLES PLACED AT 1 FOOT INTERVALS ALONG EDGE.
2. FILL AND COMPACT TRENCH.
3. SECTIONS OF THE SILT BERM SHALL BE OVERLAPPED WITH NO GAPS.
4. FOR SLOPE AND CHANNEL SPACING SEE THE "SECTION VIEW ALONG DITCH FLOWLINE" DETAIL ON SHEET 11 OF 11.
5. SOIL RETENTION BLANKET SHALL ALWAYS BE REQUIRED.
6. THE PAY ITEM NUMBER FOR SILT BERM (LF) IS 208-00004.

SILT BERM INSTALLATION

WD

DRAINAGE DITCH APPLICATIONS

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: CC

Name/Description:
Construction Chemicals

Description and Evaluation:

Form oil, concrete cure, solvents, paints, damp-proofing compounds, epoxies, drywall taping compound are materials that are expected to be on-site during construction. BMPs including proper location, cover, containment and proper disposal will be employed.

During what phase(s) of construction/activity will this pollution source be expected on the project?

4. Impervious Surfaces, Vertical/Building Construction

Instances of this Pollution Source (PS)

CC - Construction Chemicals
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: CP

Name/Description:
Construction Parking

Description and Evaluation:

Parking of construction equipment and vehicles will occur on the project. Traffic restrictions will be implemented as necessary to keep vehicles in designated, as necessary. Whenever possible, stabilized areas will be provided to park and to minimize tracking sediment from disturbed areas onto pavement. Leaks from vehicles will be addressed immediately or as soon as possible.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

CP - Construction Parking
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: CSC

Name/Description:
Concrete Saw-Cutting

Description and Evaluation:

Concrete saw-cutting operations will occur on the project using both dry & wet methods. Dry saw-cutting will be vacuumed as the activity is taking place and wet-cutting residue will be scraped and disposed of in the concrete washout unit on-site.

During what phase(s) of construction/activity will this pollution source be expected on the project?

3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction

Instances of this Pollution Source (PS)

CSC - Concrete Saw-Cutting
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: CWW

Name/Description:
Concrete Wash Waste

Description and Evaluation:

Concrete is planned for use in paving and building foundation construction. Uncured cement-based materials can be highly caustic and detrimental to water quality if allowed to mix with surface water runoff or other discharges from the site. Structural and non-structural BMPs will be employed as necessary to contain any concrete wash waste in designated and maintained areas on the site. Concrete equipment washing will not be allowed on the site except at designated locations.

During what phase(s) of construction/activity will this pollution source be expected on the project?

4. Impervious Surfaces, Vertical/Building Construction

Instances of this Pollution Source (PS)

CWW - Concrete Wash Waste
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: DSF

Name/Description:
Disturbed Soil Flat

Description and Evaluation:

Disturbed areas will have a sediment and/or an erosion control in place to treat/contain the runoff prior to discharging from the project. Soil erosion control measures for all slopes, channels, ditches, or any disturbed land area shall be completed as soon as phasing allows. Temporary stabilization measures, such as surface roughening may be implemented if there is no other way to reduce the amount of sediment laden runoff discharging from the project.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

DSF - Disturbed Soil Flat
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: EM

Name/Description:
Equipment Cleaning/Fueling/Maint.

Description and Evaluation:

Equipment Maintenance may occur on equipment that need servicing in designated areas or where the piece of equipment has stopped working. Any potential pollutants, such as hydraulic fluid, grease, etc. that are used during the repair process will be kept on a mobile vehicle or in adequate containment when not in use. Fueling operations will be performed by a mobile unit, away from conveyance systems and inlets whenever possible. If any spills or leaks occur during the fueling process, they will be contained until they can be properly be cleaned up, per the spill response procedures outlined in the SWPPP/SWMP.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

EM - Equipment Cleaning/Fueling/Maint.
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: FD

Name/Description:
Fugitive Dust

Description and Evaluation:

Fugitive dust may occur during grading operations and after the existing vegetation has been disturbed. To minimize the transport of fugitive dust, a water hose or similar method will be implemented as necessary.

During what phase(s) of construction/activity will this pollution source be expected on the project?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation

Instances of this Pollution Source (PS)

FD - Fugitive Dust
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: FN

Name/Description:
Fertilizers & Nutrients

Description and Evaluation:

Fertilizers, including soil amendments, are rich in nitrates and other chemicals such as phosphorus that can be detrimental to surface water quality in higher than normal concentrations. Fertilizers will be stored in areas that are physically contained or fully covered, away from stormwater conveyances and where they are protected from accidental discharges. Soil amendment stockpiles will be covered or contained and located away from stormwater conveyances. Soil amendments and other fertilizers will be applied to the soil in quantities that allow for the complete mixing with the soil by the end of each work day.

During what phase(s) of construction/activity will this pollution source be expected on the project?

5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

FN - Fertilizers & Nutrients
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: GWD

Name/Description:
Groundwater Dewatering to Land

Description and Evaluation:
See attachment - Low Risk Discharge Guidance: Discharges Of Uncontaminated Groundwater To Land

During what phase(s) of construction/activity will this pollution source be expected on the project?
3. Utility Installation

Instances of this Pollution Source (PS)

GWD - Groundwater Dewatering to Land
There are no items to display

Attachments

Description: Guidance Policy - Groundwater Discharges to Land
Filename: lrg-groundwater-2017.pdf *(click to download original file)*
File is included after this page

Low Risk Discharge Guidance
Discharges of Uncontaminated Groundwater to Land

Originally Issued September 2009
Revised August 8, 2017

Table of Contents

Scope and Purpose of Modification

This revised guidance document is effective August 4, 2017. In addition to organizational and editorial revisions, the following substantive modifications were made:

- Additional information was added regarding determining if the discharge is uncontaminated. Refer to the Criteria section.
- Removed the reference to solid waste permitting in the background and discussion portion of the document. Uncontaminated groundwater would typically not be regulated as a solid waste, and therefore the discussion was not likely to be applicable to discharges covered by this guidance. However, it remains the responsible parties' obligation to ensure compliance with other applicable laws and regulations, including solid waste requirements.
- The requirement that the discharge be returned to the same aquifer that it was drawn from was added. This is consistent with the intent of the original version, as identified by the examples of covered discharges provided: construction dewatering, subterranean or foundation dewatering, uncontaminated vault dewatering, and utility work.

Background and Discussion

This discharge policy guidance has been developed in accordance with WQP-27, Low Risk Discharges Policy. This guidance is only applicable to discharges meeting the low risk discharge criteria and conditions identified below. **Refer to the Alternative Disposal Options section at the end of this document for additional information for discharges that do not meet the criteria and conditions of this guidance.**

The division has issued general permits for point source discharges of groundwater to land, as identified in the Alternative Disposal Options section. However, for the category of point source discharges that meet the criteria and conditions outlined in this document, the division has determined it is appropriate to manage the discharges through the development of guidance instead of through pursuing permit coverage. When the criteria and provisions of this guidance are met, the division will not actively pursue permitting or enforcement for discharges of groundwater to land, unless on a case-by-case basis, the division finds that a discharge has resulted in an adverse impact to the quality of any state waters receiving the discharge.

Discharges of uncontaminated groundwater to land that are typically associated with short term or intermittent

discharges are not expected to contain pollutants in concentrations that are toxic, or in concentrations that would cause or contribute to a violation of a water quality standard for ground water. A large number of these types of discharges occur state-wide every year, which requires a resource-intensive effort to permit without a resulting general benefit to environmental quality in the vast majority of situations.

Discharges of uncontaminated groundwater to land that may be covered under this guidance document when all the provisions in the document are adhered to may include, but are not limited to: construction dewatering, subterranean or foundation dewatering, uncontaminated vault dewatering, and utility work.

Criteria, Conditions, and Control Measures

- **Definitions**
  - **Control Measures:** are any best management practice or other method used to prevent or reduce the discharge of pollutants to waters of the state.

- **Low Risk Discharge Criteria**

  This guidance is applicable to point source discharges that meet the following criteria and that meet the conditions listed in the next section. Refer to the Alternative Disposal Options section for guidance on addressing water not meeting these criteria.

  - The source of the discharge must solely be uncontaminated groundwater or uncontaminated groundwater combined with stormwater. Refer to the guidance in the Control Measure section below for information on identifying potentially contaminated groundwater.
  - To be considered uncontaminated, the source ground water must not contain pollutants in concentrations that exceed water quality standards for groundwater applicable to the receiving groundwater. For ground water for which standards have not already been assigned in Regulation 42, Site-Specific Water Quality Classifications and Standards for Ground Water (5 CCR 1002-42), pollutants shall not exceed the criteria set forth in Tables 1 through 4 of "The Basic Standards for Ground Water," in Regulation 41, The Basic Standards for Ground Water (5 CCR 1002-41). This guidance does not include consideration of criteria for groundwater based on existing ambient quality as of January 31, 1994, as set forth in Regulation No. 41.5.C.6.b.i(A). Because a site-specific evaluation and determination is necessary for application of such criteria, the division has determined that consideration of this allowance is not appropriate under this guidance. The source groundwater must be from the same aquifer that the water will be returned to. Specifically, this guidance is not applicable to discharges from deep wells that draw water from confined aquifers which will often have substantially different water quality compositions than the shallower unconfined aquifers to which the water will be discharged.
  - The discharge must be to land. Point source discharges to surface waters of the state, storm sewers, or other drainage conveyance systems are not covered by this guidance.

- **Conditions**

  The following conditions must be met by anyone discharging wastewater in accordance with this guidance:

  - **Prohibition of pollutants in the discharge:**
    - No chemicals may be added.
    - If the discharge is from vaults or similar structures, the discharge cannot be contaminated by process materials used, stored, or conveyed in the structures, or by introduced surface water runoff from outside environments that may contain oil, grease, and corrosives.
    - A visible sheen must not be evident in the source water or discharge.
  - **Exclusion of Process Discharges:**
    - The groundwater shall not be used in any additional processes. Processes include, but are not limited to, any type of washing, heat exchange, or manufacturing.
  - **Controlling the discharge:**
    - The groundwater discharge cannot leave the operational control of the entity administering the land application. The owner of the property where the discharge is occurring must have prior knowledge and grant permission for the land application.
    - Land application must be conducted at a rate and location that does not allow for any runoff into state waters or other drainage conveyance systems, including but not limited to streets, curb and

gutter, inlets, borrow ditches, open channels etc. If the land application is to agricultural land, it must not reach or have the potential to reach an agricultural ditch. Discharges to drainage conveyance systems as described above are a discharge to surface water that require a discharge permit and are not covered under this guidance document.

- Land application must be conducted at a rate that does not allow for any ponding of the groundwater on the surface, unless the ponding is a result of implementing control measures that are designed to reduce flow velocity. If the control measures used result in ponding, the land application must be done in an area with a constructed containment, such as an excavation or bermed area with no designed outfall. The constructed containment shall prevent the discharge of the ponding water offsite as runoff.

❖ **Compliance with construction stormwater discharge permits:** If the discharge is located at a facility covered by a CDPS General Permit for Stormwater Discharge Associated with Construction Activities, the requirements in that permit associated with the discharge of groundwater must be complied with, including identification in the Stormwater Management Plan.

❖ **Controlling erosion:** The discharge shall not cause erosion of a land surface that could cause pollution of the receiving water. Signs of visible erosion that have the potential to cause pollution without downstream controls measures implemented include the formation of rills or gullies on the land surface. Energy dissipation devices designed to protect downstream areas from erosion by reducing velocity of flow (such as hose attachments and erosion controls) may be necessary to prevent erosion.

❖ **Controlling pollutant potential of deposited sediment:** Control measures shall be implemented to prevent any sediment deposited during land application from being transported by stormwater runoff to surface waters or other conveyances.

❖ **Additional Requirements and Property Rights:**

- All discharges must comply with the lawful requirements of federal agencies, municipalities, counties, drainage districts, ditch owners, and other local agencies regarding any discharges to storm drain systems, conveyances, ditches or other water courses under their jurisdiction.
- The guidance included in this document in no way reduces the existing authority of the owner of a storm sewer, ditch owner, or other local agency, from prohibiting or placing additional conditions on the discharge.
- The discharge shall not result in flooding of neighboring property, streets, gutters or storm sewers. The discharge must be diverted from building foundations or other areas that may be damaged from ground settling or swelling.

➢ **Implementation of Control Measures**

Control measures should be implemented as necessary to meet the conditions above, by anyone discharging in accordance with this guidance. The following control measures have been developed by the division to help ensure that the discharge will not negatively affect water quality. Refer to the Alternative Disposal Options section for guidance where these control measures cannot be implemented.

❖ **Identifying potentially contaminated groundwater:** It the groundwater is located within 1 mile of a landfill, abandoned landfill, mine or mine tailing area, a Leaking Underground Storage Tank (LUST), Brownfield site, or other area of contamination, there is an increased likelihood that groundwater contamination exists. In those cases additional work is appropriate to determine if your dewatering area is in an area of contamination. The following is a list of contamination and plume resources and is helpful when determining if your dewatering area is in an area of contamination, however the list is not all inclusive and in some cases site-specific characterization of groundwater may be necessary.

CDPHE Environmental Cleanup Web Page (refer to the resources under "sites and facilities"):
https://www.colorado.gov/pacific/cdphe/categories/services-and-information/environment/environmental-cleanup#sites

EPA Cleanups in My Community Maps and Lists:
https://www.epa.gov/cleanups/cleanups-my-community

- All control measures used to meet the provisions of this guidance document must be selected, installed, implemented and maintained according to good engineering, hydrologic and pollution control practices. These control measures must be adequately designed to provide control for all potential pollutant sources associated with the discharge of uncontaminated groundwater to land.

- The discharge should be routed in such a way that it will not contact petroleum products/waste, a visible sheen must not be evident in the discharge.

- To minimize potential for creating stormwater pollution sources, control measures (such as a filter bag or similar filtration device) should be used to remove sediment/solids prior to land application.

Alternative Disposal Options

Water that does not meet the criteria of this guidance or that cannot be discharged in a manner that meets the conditions of this guidance must be either authorized by a Colorado Discharge Permit System (CDPS) discharge permit issued by the division or disposed of through an alternative means.

The Water Quality Control Division has general permits available for discharges to surface water and/or land associated with construction dewatering, subterranean structure/foundation dewatering, and the remediation of groundwater. Obtaining coverage one of these permits will likely be the most efficient solution for discharges that do not meet the criteria and conditions of this guidance.

For discharges associated with construction projects, guidance on determining the appropriate permit and applying in included in the Application Guidance Document for these general permits, available on the division's construction sector permitting page: https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits

Discharges from subterranean structures (basement, foundation, footer drains, etc.) are covered by the Subterranean Dewatering or Well Development general permit. The application and other information for this general permit can be found on the commerce and industry sector permitting page: https://www.colorado.gov/pacific/cdphe/clean-water-commerce-and-industry-permitting

For more information, contact the Water Quality Control Division's Permitting Section or Clean Water Compliance Unit, at (303) 692-3517.

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: HWS

Name/Description:
Hand Washing Station

Description and Evaluation:

Water from handwashing stations will be managed so it does not runoff off the site or into groundwater, as it may contain sediment, chemicals, and detergents. The handwashing water will be drained on-site into contained areas such as a lined pit or approved concrete washout area. If the station is a self-contained unit provided by a supplier, such as the port-a-let company, the unit will be serviced (pumped out) when the toilets are cleaned.

The handwashing water may also be drained into enclosed equipment such as a bucket with a lid or IBC Tote and then it will be dumped into the sanitary sewer or concrete washout area.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

HWS - Hand Washing Station
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: LUO

Name/Description:
Loading & Unloading Operations

Description and Evaluation:

Materials spilled or leaked during loading and unloading can be carried away in stormwater runoff. As a result, many different pollutants can be introduced into the storm drain system, including sediment, nutrients, trash, organic material, trace metals, and an assortment of other pollutants. So, a spill kit will be kept on site for any liquid spills/leaks that may occur and any solid material/trash or sediment that is spilled or leaked will be cleaned up as soon as possible.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

LUO - Loading & Unloading Operations
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: MS

Name/Description:
Material Storage

Description and Evaluation:

Construction materials often have the potential to change the chemical nature of stormwater. They must be properly labeled and stored when not in use in a manner that prevents contact with stormwater. All open containers of said construction materials will be stored away from stormwater conveyances, off the ground and under cover when not in active use and at the end of each work day. All containers, whether open or not, will be stored in designated areas where the likelihood of accidental discharge is minimized.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

MS - Material Storage
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: P

Name/Description:
Petroleum-based Products

Description and Evaluation:

Petroleum products that are present on the site for vehicle and a variety of equipment operation and maintenance will be stored in tightly sealed containers which are clearly labeled and provided secondary cover or secondary containment when not actively managed.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

P - Petroleum-based Products
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: PT

Name/Description:
Portable Toilet

Description and Evaluation:

Sanitary wastes are a source for bacteria and viruses. They will be contained in portable units designed for construction site use. Portable units will be place in areas away from stormwater conveyances and will be secured from accidental tipping. Portable units will be service regularly per the suppliers recommended schedule.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

PT - Portable Toilet
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: S

Name/Description:
Stockpile

Description and Evaluation:

Stockpiling of soil, sand, pea gravel, and other materials during construction is expected to occur throughout construction in various locations. Erodible stockpiles will be protected by perimeter containment controls if in close proximity to stormwater conveyances. Containment methods will be implemented as necessary to ensure that resulting runoff from the piles is adequately treated prior to discharging from the site.

During what phase(s) of construction/activity will this pollution source be expected on the project?

2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

S - Stockpile
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: SEE

Name/Description:
Site Entry/Exit

Description and Evaluation:

Site Entry and/or Exit points have the potential of tracking sediment off of the project and will be limited as much as possible. Controls, such as access restrictions or a BMP, such as a vehicle tracking control pad will be implemented whenever feasible to minimize the potential of tracking sediment onto paved surfaces or off the project.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

SEE - Site Entry/Exit
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: SWD

Name/Description:
Stormwater Dewatering

Description and Evaluation:

Stormwater dewatering may occur during the construction process; however any discharging of accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, will be effectively managed by appropriate controls. Typically a BMP will be placed on the suction end of the pump, with additional controls placed at the discharge point of the hose, to prevent scour and to remove as much sediment as is practicable that may be in the water, prior to discharging from the project. Visible floating solids and/or foam will not be discharged from the project and an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products, will be utilized if dewatering water is found to contain these materials.

During what phase(s) of construction/activity will this pollution source be expected on the project?

3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction

Instances of this Pollution Source (PS)

SWD - Stormwater Dewatering
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: SWT

Name/Description:
Solid Waste/Trash

Description and Evaluation:

Construction wastes such as litter, debris, and all other solid materials generated during, or as a result of, the construction process will be collected daily and disposed of in metal containers (dumpsters). These containers will be removed from the jobsite at 90% capacity and will be replaced with empty containers as needed. Containers being removed from the project will be covered before transporting. At no time will temporary dumping of construction waste on the ground be allowed unless all materials are then placed in the designated containers by the end of each workday.
Asphalt spoils/debris will be contained and/or cleaned up and disposed of appropriately.

During what phase(s) of construction/activity will this pollution source be expected on the project?

1. Existing Conditions/Site Mobilization
2. Clearing/Grubbing, Rough/Overlot Grading, Demolition
3. Utility Installation
4. Impervious Surfaces, Vertical/Building Construction
5. Final Grading/Stabilization

Instances of this Pollution Source (PS)

SWT - Solid Waste/Trash
There are no items to display

Attachments

There are no attachments to display

USMS Pollution Source (PS) Log and Site Map Key

Abbreviation: TC

Name/Description:
Tool Cleaning

Description and Evaluation:

Cleaning of tools that come into contact with potential pollutants, such as concrete, paint, gypsum products, etc. will be performed in either a designated location, with appropriate containment controls implemented or done off-site. All washwater will be directed into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation; and will be located as far away as possible from surface waters and stormwater inlets or conveyances. Any spills or leaks that may occur as a result of tool cleaning, will be done as soon as possible and the contaminated soil disposed of appropriately.

During what phase(s) of construction/activity will this pollution source be expected on the project?

4. Impervious Surfaces, Vertical/Building Construction

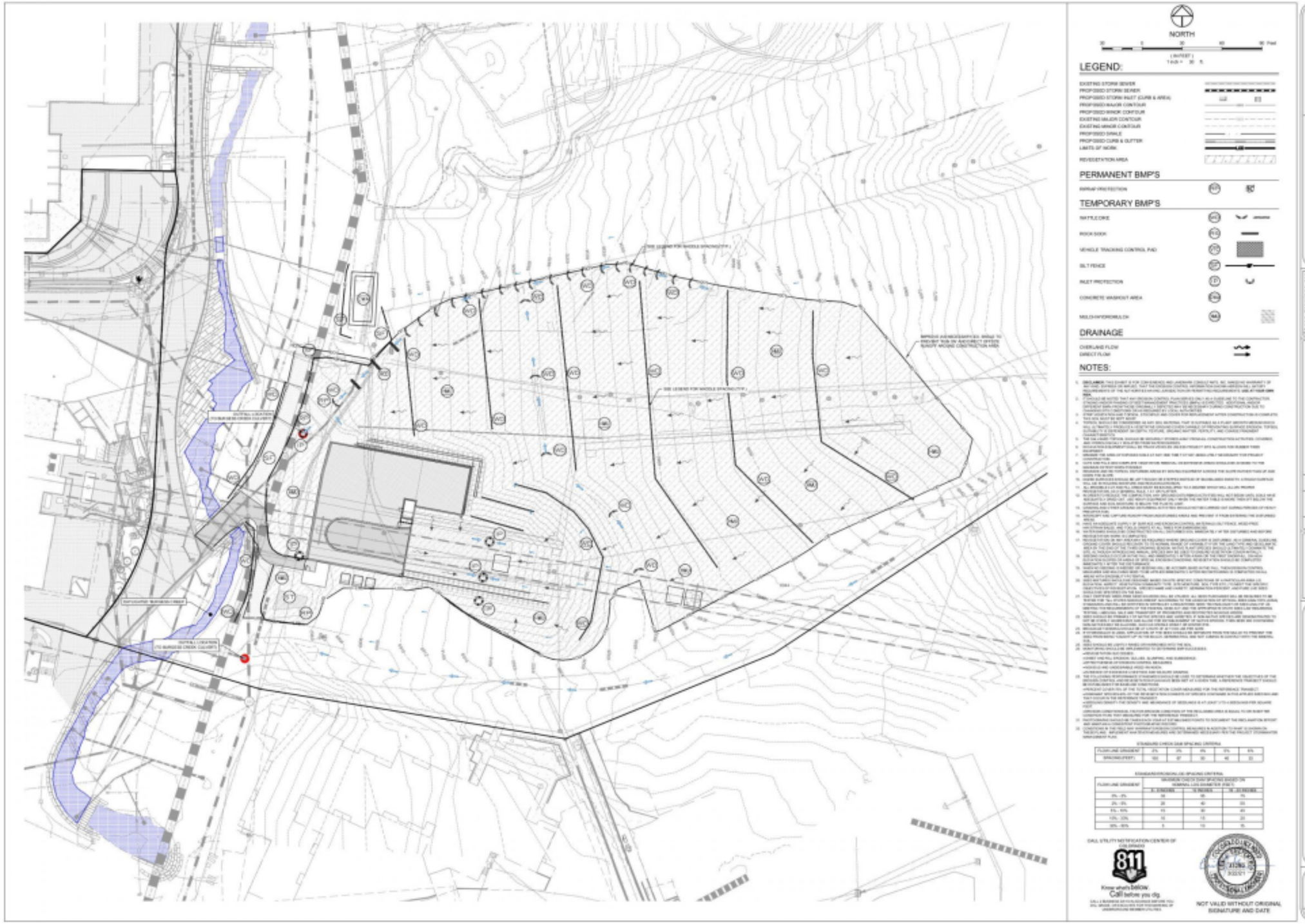
Instances of this Pollution Source (PS)

TC - Tool Cleaning
There are no items to display

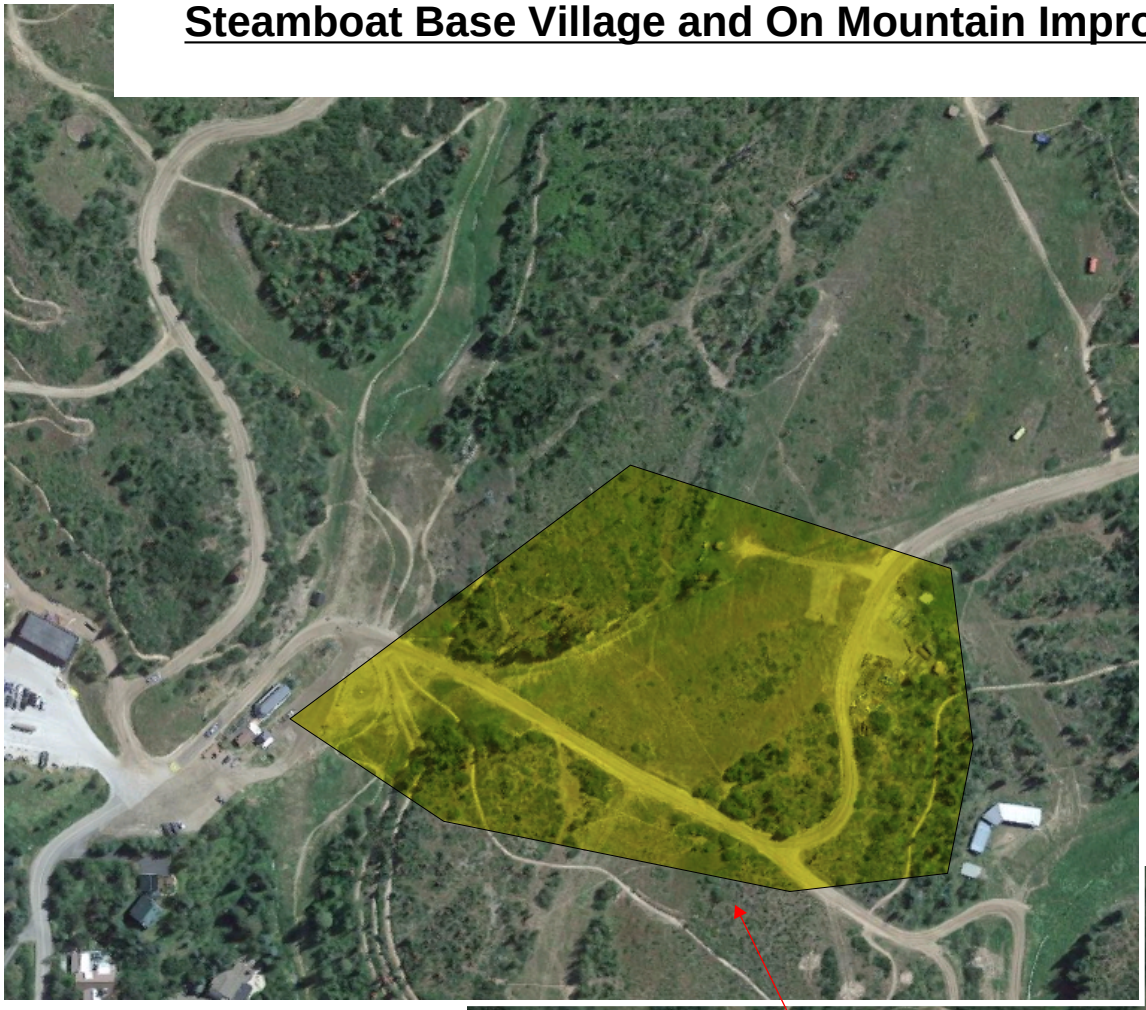
Attachments

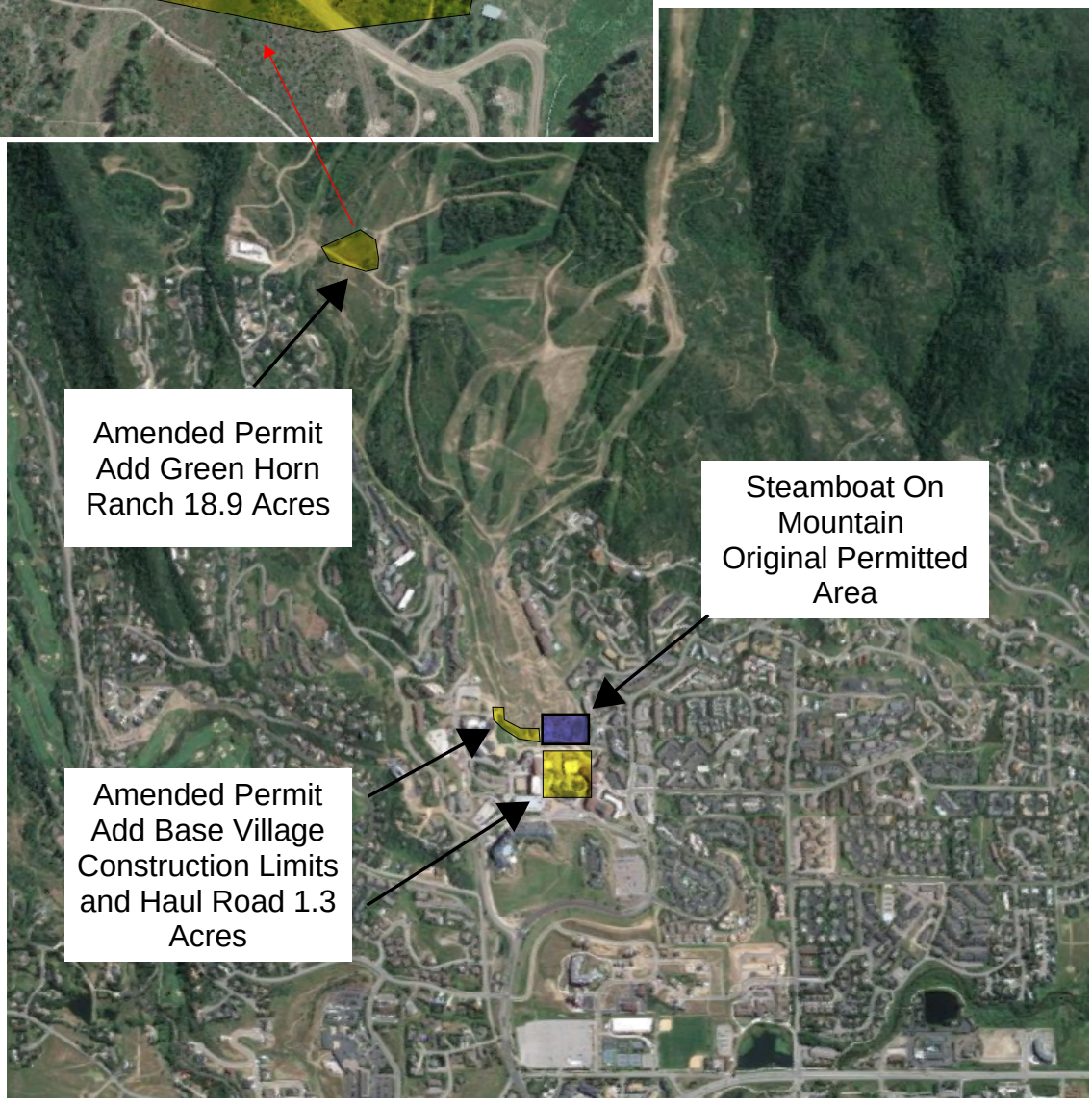
There are no attachments to display

7/1/2021 Added Greenhorn Ranch and Base Village Haul Route to the SWMP per attached site plan.


NORTH
LEGEND:
PERMANENT BMP'S
TEMPORARY BMP'S
DRAINAGE
NOTES:
811
Know what's below.
Call before you dig.
NOT VALID WITHOUT ORIGINAL SIGNATURE AND DATE
LANDMARK
CONSULTANTS, INC.
Steamboat Gondola Relocation
Erosion Control Exhibit
SHEET
C.600

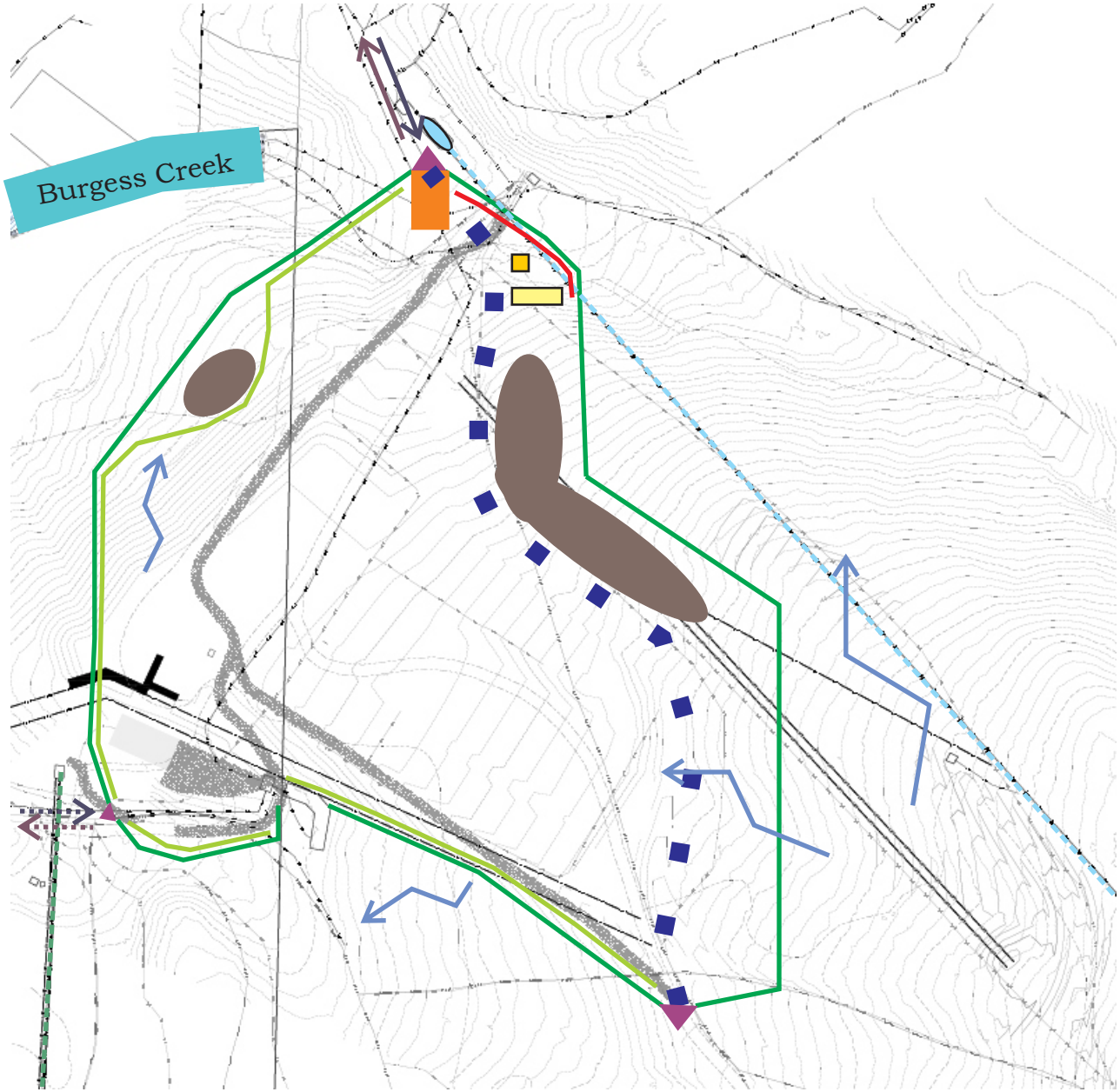
Steamboat Base Village and On Mountain Improvements





Amended Permit Request

Construction Site Management Plan for:
Greenhorn Ranch
Prepared by Betsy Wilbanks



N
W E
S

Not to Scale

Legend:

- Project Boundary and Construction Fence
- Restricted Access Gate
- Vehicle Tracking Control
- Temporary Access Road
- Primary Ingress
- Secondary Ingress
- Primary Egress
- Secondary Egress
- Wattles
- Brush Berm
- Stockpile
- Direction of Overland Flow
- Port-a-let
- Dumpster
- Thunderhead Lift
- Bashor Lift

RCRBD Record Set
T.A.
07/14/2021

Checklist for Grade and Fill Permit Applications

Routt County Regional Building Department

City of Steamboat Springs

This list is provided to help speed up your plan review by making sure the basic required information is shown on your submittal. **Plans will not be accepted if the required information is not shown or item marked as "N/A" is deemed applicable for this type of project**. Additional information may be required based on site-specific conditions or to address City development review comments. Please call the appropriate City department if you have any questions related to a specific requirement. The applicant is required to review and sign the affidavit on the bottom of this checklist, accepting responsibility for any incomplete submittal and thus possible result of a delayed review time. For additional information regarding a particular requirement, see the Routt County Building Department website.

City Water/Sewer- 871-8200 Fire Prevention- 879-7170 Engineering- 871-8200 Planning- 871-8258

Applicant Name: Josh Boh (PM Saunders) **Permit #: TB - ___ - _____**

(Please Print)

Important: *Any project required to submit Civil Construction Plans and/or Documents to Public Works must include the approved Civil Construction Plans (w/ approval block signed by departments) as part of the Building Permit submittal. See development approval conditions or contact Planning staff. If the Building Department verifies this has been attached, then only the CSMP and SWMP requirements need be verified.*

	Yes	No
Grade and Fill Permit has associated grading and drainage Civil Construction Documents on record with Public Works?		X

Site Plan Information	Check Yes	No	
North Arrow Indicator, Scale, and Benchmark	X		
Legal Description, Property Address, Owner's Name, Lot Size in Square Feet 4.4 acres within City of Steamboat, 14.5 on US Forest Service	X		
Location and Dimensions of all Roads On or Adjacent to the Subject Property. Show Location of Adjacent and Opposing Driveways.	X		
Location and Dimensions of Right-of –Way and all Easements- **No Landscaping or Structural Improvements in the ROW or Easement**	X		
Location and Dimension of Lot Lines and Setbacks	X		
Existing Water Bodies, Drainages, Floodplain (limit and elevation), or Wetland Areas	X		
Existing and Proposed Topography: Contour Lines at 2 foot Intervals (dashed lines for existing, solid for proposed); Source of Topography	Not per 2 foot but adequate scale to match magitude of project		
Slopes 2:1 or provide Earth Retainage Blankets or approved substitute			NA - Ski Terrain
No Retaining Walls greater than 4 ft height- This requires an engineered design on a **Building Permit.**	X		
Future Finish Floor Elevations for Structures (DO NOT SHOW STRUCTURE OR FOOTPRINT)	X		

Alignment and Pipe Type of ALL Existing and Proposed Utilities (Water, Sewer, Gas, Electric, Cable, Phone). The Plan must clearly identify changes in bury depth to all existing utilities.	X	
Show ALL Above Surface Public Appurtenances Identified in Relationship to any Proposed Improvement (i.e. Fire hydrants)	X	
Driveway or Access Location, Width, Grade.	X	
Culverts w/ Invert Elevations, Size, and Flared End Sections or Headwalls Indicated	NA	
Location, Dimensions, Elevations of Sidewalks, Parking Areas, and Paved areas.	X as nessesary	
Existing and Proposed Storm Water Systems (swales, ditches, culverts, etc.); Arrow showing proposed drainage direction.	X	
Extent of Soil Disturbance and Phasing Plan; Show all proposed Erosion & Sedimentation Control Measures; Plans should indicate the total expected disturbed area in acres (to include all excavation, soil stockpile, and project access areas)	X	
Details for any Permanent Storm Water Quality feature (i.e. % slope for grass buffers, level spreader designs, grass swale cross-sections, etc.)	X	
Add Note: All Disturbed Areas to be Re-vegetated	X	
Construction Site Management Plan (CSMP)- see additional checklist on City of Steamboat Springs Engineering documents website	X	
Stormwater Management Plan (SWMP) if area of disturbance is greater than 1 acre - see additional checklist on City of Steamboat Springs Engineering documents website	X	
Staff Review By:		

I Josh Boh accept responsibility for the accuracy and completeness of the contents of this Grade and Fill permit application and accept responsibility for any associated delays in City review due to incompleteness.

Applicant: _____ **Phone #:** 303-818-0126

(Applicant Signature)

City of Steamboat Springs

RCRBD Record Set
T.A.
07/14/2021

Construction Site Management Plan Checklist

Prior to the approval of a building/ROW permit, any commercial, multi-family, or applicable single family/duplex project must complete an approved Construction Site Management Plan (CSMP). Below are the required items to be included in the CSMP. Please check "yes" if the item is included, "no" if it is not, and "N/A" if not-applicable. Please provide an explanation for any "No" answers at the bottom of the checklist.

Project Name: *Green Horn Ranch* **Date:** *6/25/2021*

Estimated Construction Start Date: *7/12/2021* **End Date:** *11/1/2021*

Individual responsible for CSMP monitoring and compliance

Name: *Charlie MacArthur* **Phone # (local):** *970-879-6231*

	Yes	No	N/A
1. General			
a. CSMP is shown on the proposed site plan	*X Separate Attachment*		
b. Schedule Pre-Construction Meeting *(required only for commercial, industrial, and multifamily projects)*	*X Contractor has held precon meeting with Forest Service. Open to scheduling further meeting with City of Steamboat upon request*		
c. Right of Way permit (i.e. work or obstruction within ROW). *If required, describe below and include estimated start and stop dates.*			*X*
2. Erosion and Sedimentation Control Plan showing *see permit drawings sheets C600-C611*			
a. Topographic Information – including sufficient detail to characterize the site	*X*		
b. Areas and extent of soil disturbance (show any phasing)	*X*		
c. Location of all on site and adjacent water bodies, wetlands, drainages, and storm water systems	*X*		
d. Vehicle tracking control measures (vehicle track pad, vehicle wash station, etc.)	*X*		
e. Inlet protection	*X*		
f. Perimeter control measures (BMPs)	*X*		
g. Standard details for all proposed control measures	*X*		
3. Site Construction Facilities (Identify the following):			
a. Staging areas			*X*
b. Stockpile areas	*X*		
c. Dumpsters and trash receptacles	*X*		
d. Material recycling (wood, metal, plastics, etc.)			*X*
e. Sanitary facilities	*X*		
f. Loading/Unloading areas *Cut and fill is intended to be balanced*			*X*
g. Trailers and field offices (show access)			*X*
4. Parking:			
a. Location and number of onsite and any offsite stabilized parking areas			*X*
b. Is project located downtown or at ski resort base area? *If so, describe below where contractor parking will occur:* *within Project Boundary*	*X*		

5. External Traffic Control Plan showing:			
a. Show/label all traffic control devices (MUTCD compliant)			X
b. Site access points; show existing adjacent streets and driveways; identify any changes and associated signage	X		
c. Sidewalks and trails; identify any changes and associated signage	X		
d. Use of the public Right of Way (ROW) - generally not permitted (for constrained sites show any proposed use of ROW)			X
e. Crane use details, including but not limited to, ROW encroachment, swing radius, loading locations (Crane will require ROW permit from the City)			X
6. Internal Access Control showing			
a. Emergency access- 24' wide all weather surface for emergency access thru site (to be maintained at all times)	X		
7. CSMP Standard Notes:			
a. Standard CSMP notes included on the site plan or Civil Plan Sheets	X		
8. Dust Control			

Provide narrative describing efforts to reduce fugitive dust from construction activities:

Received permission from Mt. Werner Water to tap into fire hydrant near Steamboat Ski Maintenance building. Hydrant will be metered and protected. Spray as necessary on earthwork activities to control dust.

Provide explanation for any "No" or "N/A" answers:

Cut and fill work taking place on mountain to modify ski terrain. Temporary Access road will be maintained through site as shown on the CSMP. Contractor has fully coordinated with Steamboat Ski Resort to plan detours for mountain bike and hiking trails around area, these plans are shown on the last page of the CSMP.

Orange Snowfence will set the project boundary.

Site is balanced with cut and fill activities - traffic and delivereries will be minimized.

Thunderhead lot will be open for public use.

** **Plans shall be phased and updated as the project evolves and site conditions change.**

** **Please notify adjacent property owners prior to mobilization.**

** **Refer to chapter 36 of the Community Development Code for more information.**

City of Steamboat Springs

Large Site Stormwater Management Plan Checklist

Applicability: Prior to the issuance of a building permit or grade and fill permit for any "Applicable Construction Activities" the project must submit a Stormwater Management Plan (SWMP) to the Routt County Building Department as part of their development package. The City's Stormwater Staff shall review the SWMP to confirm that appropriate control measures for all stages of construction, including Final Stabilization, are included and that installation and implementation specifications are also included.

"Applicable Construction Activities" definition: construction activities that result in a land disturbance of greater than or equal to one acre or that is less than one acre, but is part of a larger common plan of development or sale that would disturb, or has disturbed since March 2, 2001, one acre or more, unless the disturbed areas have been finally stabilized.

This *Applicant Checklist for City Stormwater Management Plan(s) (SWMP)* is provided for applicants to ensure that the required information is included in the SWMP submittal. Additional information may be required based on site-specific conditions. The applicant is required to sign the affidavit on the bottom of the checklist, accepting responsibility for any incomplete submittal and thus possible result of a delayed review time. For additional information regarding a particular requirement, please contact the City's Stormwater Specialist at (970) 871-8236.

Project Name: Green Horn Ranch	**Building Permit #:** TBD
Applicant Name: Josh Boh (Saunders PM)	**CDPHE Construction Permit#:** TBD
Applicant Phone#: 303-818-0126	**Applicant Email:** j.boh@saundersinc.com

	Check Yes	No	N/A
1. General SWMP Information			
a. Project Name, Location, Owner, Operator, CDPHE Cert. No.	X		
b. Qualified Stormwater Manager	X		
c. Total area of ground disturbance (including staging and storage areas)	X		
d. Project description and construction activity	X		
e. Name of receiving water	X		
f. The proposed sequence of major activities and schedule (approximate dates)	X		
g. Description of the control measures for each stage of construction (e.g.: clearing, grading, utilities, vertical, final stabilization)	X		
h. Description of how the project will be phased	X		
i. A description and percent of existing vegetation	X		
j. A description of non-structural control measures	X		
2. Site Map			
a. Site maps identifying the control measures to be used during each stage of construction (e.g.: clearing, grading, utilities, vertical, final stabilization)	X		

b. Property boundaries	X		
c. Construction site boundaries including staging and borrow and fill areas	X		
d. Locations of structural and non-structural control measures	X		
e. Areas used for storage of soil	X		
f. Hazardous material storage areas, concrete washout, grout mixing stations, porta-lets	X		
g. Arrows depicting stormwater flow directions	X		
h. Receiving waters and drainages	X		
3. Potential Pollutant Assessment: ***At a minimum, structural and non-structural control measures shall be selected, described, and evaluated for each of the below potential pollution sources and activities.***			
a. Land disturbance and storage of soils	X		
b. Vehicle tracking	X		
c. Loading and unloading operations			X
d. Outdoor storage of construction site materials, building materials, fertilizers, and chemicals			X
e. Bulk storage of materials			X
f. Vehicle and equipment maintenance and fueling *Performed off maintenance truck*		X	
g. Significant dust or particulate generating processes	X		
h. Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, and oils		X	
i. Concrete truck/equipment washing, including the concrete truck chute and associated fixtures and equipment		X	
j. Dedicated asphalt and concrete batch plants		X	
k. Other areas or operations where spills can occur		X	
l. Other non-stormwater discharges including construction dewatering not covered under the Construction Dewatering Discharges general permit and wash water that may contribute pollutants to the Municipal Separate Storm Sewer (MS4)		X	
m. Installation and implementation specifications for all structural control measures selected for the above potential pollutants	X		
4. Final and Temporary Soil Stabilization			
a. Description of control measures used to achieve temporary and final stabilization of all disturbed areas at the site (e.g., hydro mulching, erosion control blankets, turf reinforcement mats, tracking)	X		
b. Approximate schedule for temporary and final stabilization control measures (disturbed areas need to be stabilized by November 1)	X		
c. Seed mix used for revegetation	TBD		

I *Josh Boh* **accept responsibility for the accuracy and completeness of the contents of this Stormwater Management Plan submittal and accept responsibility for any associated delays in City review due to incompleteness.**

Applicant Signature:  **Date:** *06/25/2021*

RCRBD Record Set
T.A.
07/14/2021

NorthWest Colorado Consultants, Inc.
Geotechnical / Environmental Engineering • Materials Testing

January 16, 2020

Steamboat Ski and Resort Corp.
Lance Miles
2305 Mt. Werner Circle
Steamboat Springs, CO 80487

Job Number: 19-11550

Subject: Geotechnical Investigation, Greenhorn Ranch/Wildblue, New Boulevard Road, Steamboat Ski Resort, Routt County, Colorado.

Lance,

As requested, NWCC, Inc. (NWCC) has prepared this Geotechnical Investigation report for the proposed construction of the New Boulevard Road to occur in the proposed Greenhorn Ranch area of the Steamboat Ski and Resort in Routt County, Colorado. The approximate location of the project site is shown in Figure #1.

The scope of our work included obtaining data from cursory observations made at the site, logging of nine (9) test pits, sampling of the soils and laboratory testing of the samples obtained. This report presents results of the investigation and grading recommendations.

Proposed Construction: Based on conversations with the client and review of the provided Bashor grading plans, NWCC understands that the proposed construction will consist of the following:

- Regrading and widening of the existing Boulevard Road.
- Relocation of a portion Boulevard Road further uphill in the area of the proposed ski lift.
- Regrading of the slopes for ski runs.

NWCC understands that grading will consist of a combination of cuts and fills on the order of 10 to 30 feet in depth.

Site Conditions: The project site is located south of Burgess Creek Road, near the existing Bashor and Thunderhead Express lifts at the Steamboat Ski Resort in Steamboat Springs, Colorado. Boulevard Road, an unpaved, two-track road, provides vehicle access in the summer and is a ski run in the winter. Several other ski runs, a terrain park and poma surface lift, also exist at the site.

Topography at the site is variable and generally slopes strongly to moderately down to the north. Previous site grading includes both cuts and fills of unknown depth. Several rock outcrops are visible along the existing Boulevard Road.

Vegetation at the site consists of deciduous bushes, grasses, pine trees and aspen trees.

Subsurface Conditions: To investigate subsurface conditions, nine (9) test pits were advanced at the site on October 8, 2019 with a CAT 336F trackhoe provided by the client. A site plan showing approximate test pit locations is presented in Figure #2.

Subsurface conditions encountered in the test pits were variable and generally consisted of a layer of natural topsoil and organic materials overlying natural sands and gravels, clays and sands and decomposed granite overlying crystalline or sandstone bedrock. The maximum depth excavated was 12 feet beneath the existing ground surface (bgs). Graphic logs of the exploratory test pits are presented in Figure #3, and associated Legend and Notes are presented in Figure #4.

A layer of natural topsoil and organic materials, approximately 4 to 10 inches in thickness, was encountered at the ground surface in all test pits. Sands and gravels were encountered beneath the topsoil and organic materials in Test Pits 1, 2 and 5, extending to depths ranging from 3 to 11 feet bgs. The sands and gravels were slightly silty to silty, fine to coarse grained with occasional cobbles and boulders, very low to non-plastic, medium dense to dense, slightly moist to dry and brown to gray in color. A sample of the sands and gravels classified as an SM soil in accordance with the Unified Soil Classification System (USCS).

Decomposed granite was encountered beneath the sands and gravels in Test Pits 2 and 5 and beneath the topsoil and organic materials in Test Pits 3, 4 and 6. The decomposed granite extended to the maximum depths excavated in Test Pits 2, 4, 5 and 6, and to a depth of 3 feet bgs in Test Pit 3. The decomposed granite was slightly silty to silty, fine to coarse grained with occasional cobble-sized granite fragments, very low to non-plastic, dense to very dense, moist and brown to dark gray in color. Samples of the decomposed granite classified as SM soils in accordance with the USCS. A standard Proctor test was conducted in accordance with ASTM D698 on a large disturbed sample of the decomposed granite to determine the remolded maximum density and optimum moisture content of these materials. The standard Proctor test results are shown in Figure #5.

Crystalline bedrock was encountered beneath the decomposed granite in Test Pit 3 and extended to a depth of 4 feet bgs, where refusal was encountered on the hard bedrock. The crystalline bedrock consisted of schist and gneissic granite, was fine to coarse-textured, non-plastic, slightly weathered to very hard, slightly moist, brown to reddish brown to gray to black and white in color.

Sands and clays were encountered beneath the topsoil and organic materials in Test Pits 7, 8 and 9, and extending to depths ranging from 2 ½ to 4 feet bgs. The sands and clays were slightly silty to silty, fine to coarse grained with occasional sandstone and schist bedrock fragments, low to moderately plastic, medium dense to stiff, slightly moist to moist and brown to tan in color. A sample of the sands and clays classified as an SC soil in accordance with the USCS.

Sandstone bedrock of the Brown's Park Formation was encountered beneath the sands and clays in Test Pits 7, 8 and 9 and extended to the maximum depths investigated in each test pit. The sandstone bedrock was silty to clayey, fine to coarse grained with occasional gravel-sized clasts, low to moderately plastic, weathered to hard and tan in color. Samples of the sandstone bedrock classified as SC soils in accordance with the USCS.

Groundwater was not encountered in the test pits at the time of the investigation. It should be noted that groundwater levels at the site are expected to fluctuate with seasonal changes in runoff and precipitation.

Site Grading Recommendations: Slopes on which construction is proposed could become unstable as a result of the proposed construction. Design and construction considerations must be addressed to avoid and/or limit the potential for slope instability at the site. Although a detailed slope stability analysis is beyond the scope of this report, some general guidelines are provided below for initial planning and design. Our office should review the construction plans as they are being prepared so that we can verify that our recommendations are being properly incorporated into the plans.

1. Overburden materials, decomposed granite and the upper 2 to 3 feet of sandstone bedrock materials can likely be excavated with large dozers with ripper teeth. However, deeper cuts in the sandstone bedrock materials and cuts into the crystalline bedrock materials will most likely require blasting or other rock-breaking techniques to remove these materials.

2. Temporary cuts for foundation construction should be constructed to OSHA standards for temporary excavations. Permanent, unretained cuts should be kept as shallow as possible and should not exceed a 1.5(Horizontal) to 1(Vertical) configuration for the overburden soils and decomposed granite. Cuts made into stable bedrock materials can potentially be made nearly vertical, depending on bedrock competency and potential for rock fall hazard. The risk of slope instability and rock fall will be significantly increased if groundwater seepage is encountered in the cuts. NWCC office should be notified immediately to evaluate the site, if seepage is encountered or deeper cuts are planned and determine if additional investigations and/or stabilization measures are warranted.

3. Excavating during periods of low runoff at the site can reduce potential slope instability during excavation. Excavations should not be attempted during the spring or early summer when seasonal runoff and groundwater levels are typically high.

4. Embankment fills should be constructed to a 2(Horizontal) to 1(Vertical) or flatter configuration.

5. The fill areas should be prepared by stripping any existing topsoil fill materials and/or natural topsoil and organics, and then scarification and recompaction of the exposed soils to at least 95% of the maximum standard Proctor density and within 2% of optimum moisture content, as determined by ASTM D698. The fills should be properly benched/keyed into the natural hillsides after all of the natural topsoil and organic materials and any topsoil fill materials have been removed.

6. The fill materials should consist of the on-site soils (exclusive of topsoil or organics) and be uniformly placed and compacted in 6 to 8-inch loose lifts to the minimum density value and moisture content range indicated above.

7. Proper surface drainage features should be provided around all permanent cuts and fills and steep natural slopes to direct surface runoff away from these areas. Cuts, fills and other stripped areas should be protected against erosion by revegetation or other methods. Areas of concentrated drainage should be avoided and may require the use of riprap for erosion control. NWCC recommends that a maximum of 4 inches of topsoil be placed over the new cut and fill slopes. It should be noted that the newly placed topsoil materials may slough/slide off the slopes during the spring runoff seasons until the root zone in the vegetated cover establishes.

8. A qualified engineer experienced in this area should prepare site grading and drainage plans. The contractor must provide a construction sequencing plan for excavation, wall construction and bracing and backfilling for the steeper and more sensitive portions of the site prior to starting the excavations or construction.

Limitations: The recommendations provide in this report are based on the subsurface conditions encountered at the site and our understanding of the proposed construction. NWCC believes this information gives a high degree of reliability for anticipating subsurface conditions; however, our recommendations are professional opinions and cannot control nature, nor can they assure the soils profiles beneath those or adjacent to those observed. No warranties expressed or implied are given on the content of this report.

This report is based on the investigation at the described sites and on the specific anticipated construction as stated herein. If either of these conditions is changed, the results would also most likely change. Therefore, we strongly recommend that our firm be contacted prior to finalizing the construction plans so that we can verify that our recommendations are being properly incorporated into the construction plans. Man-made or natural changes in the conditions of a property can also occur over time. In addition, changes in requirements due to state-of-the-art knowledge and/or legislation can occur. As a result, the findings of this report may become invalid due to these changes. Therefore, this report is subject to review and not considered valid after a period of 3 years or if conditions as stated above are altered.

It is the responsibility of the owner or their representative to ensure the information in this report is incorporated into the plans and/or specifications and construction of the project. It is advisable that a contractor familiar with construction details typically used to dealing with the local subsoils and climatic conditions be retained to build the structures.

If you have any questions regarding this report or if we may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.

Erika K. Hill, P.E.
Project Engineer

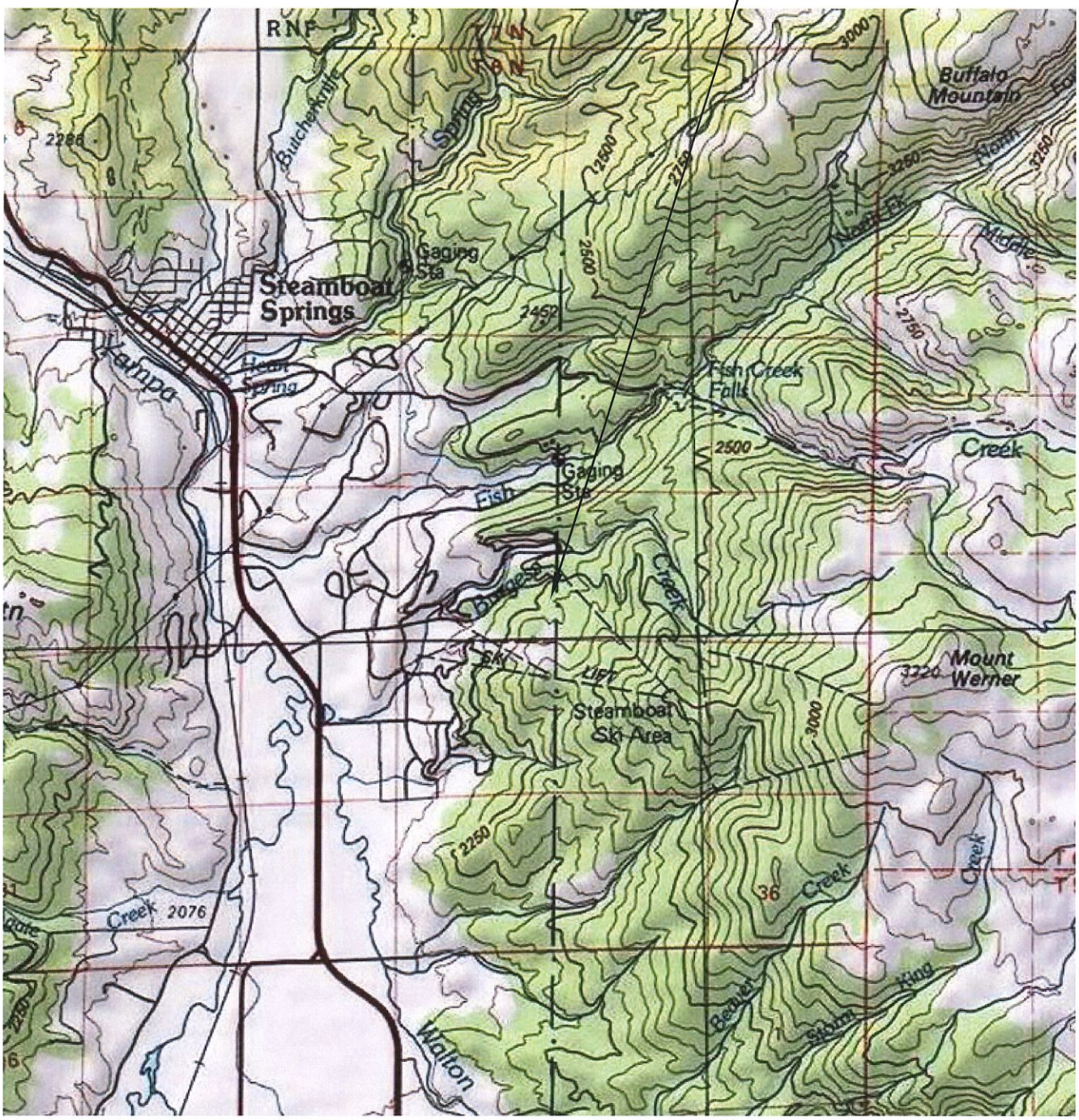
Reviewed by Brian D. Len, P.E.
Principal Engineer

COLORADO LICENSED
BRIAN D. LEN
25750
1/24/2020
PROFESSIONAL ENGINEER

N

NOT TO SCALE

PROJECT SITE



Title: VICINITY MAP		**Date:** 1/13/20
Job Name: Greenhorn Ranch/Wildblue–New Boulevard Road		**Job No.** 19–11550
Location: Steamboat Ski Resort, Steamboat Springs, CO		**Figure** #1

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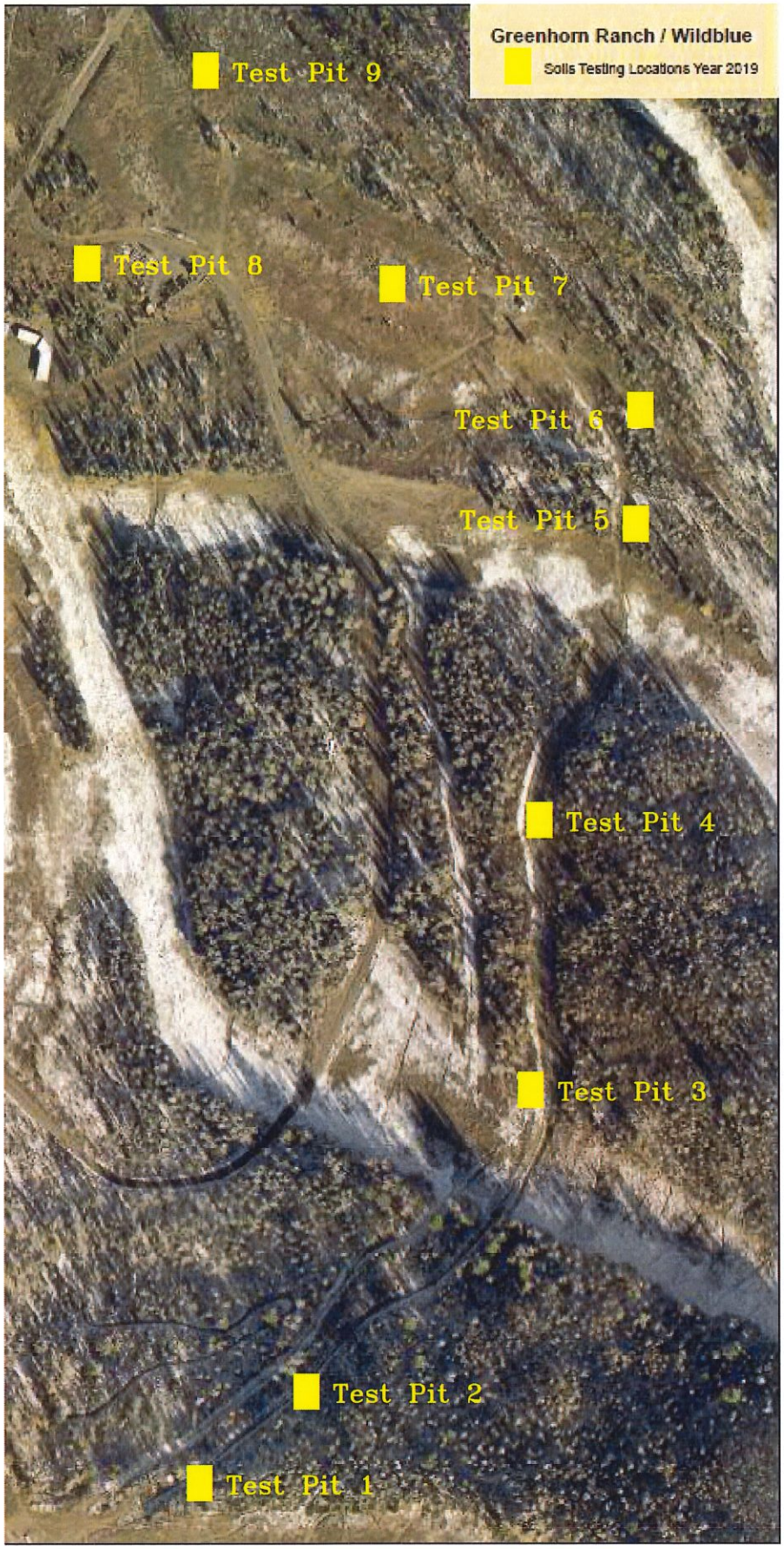
Steamboat Springs, Colorado 80487



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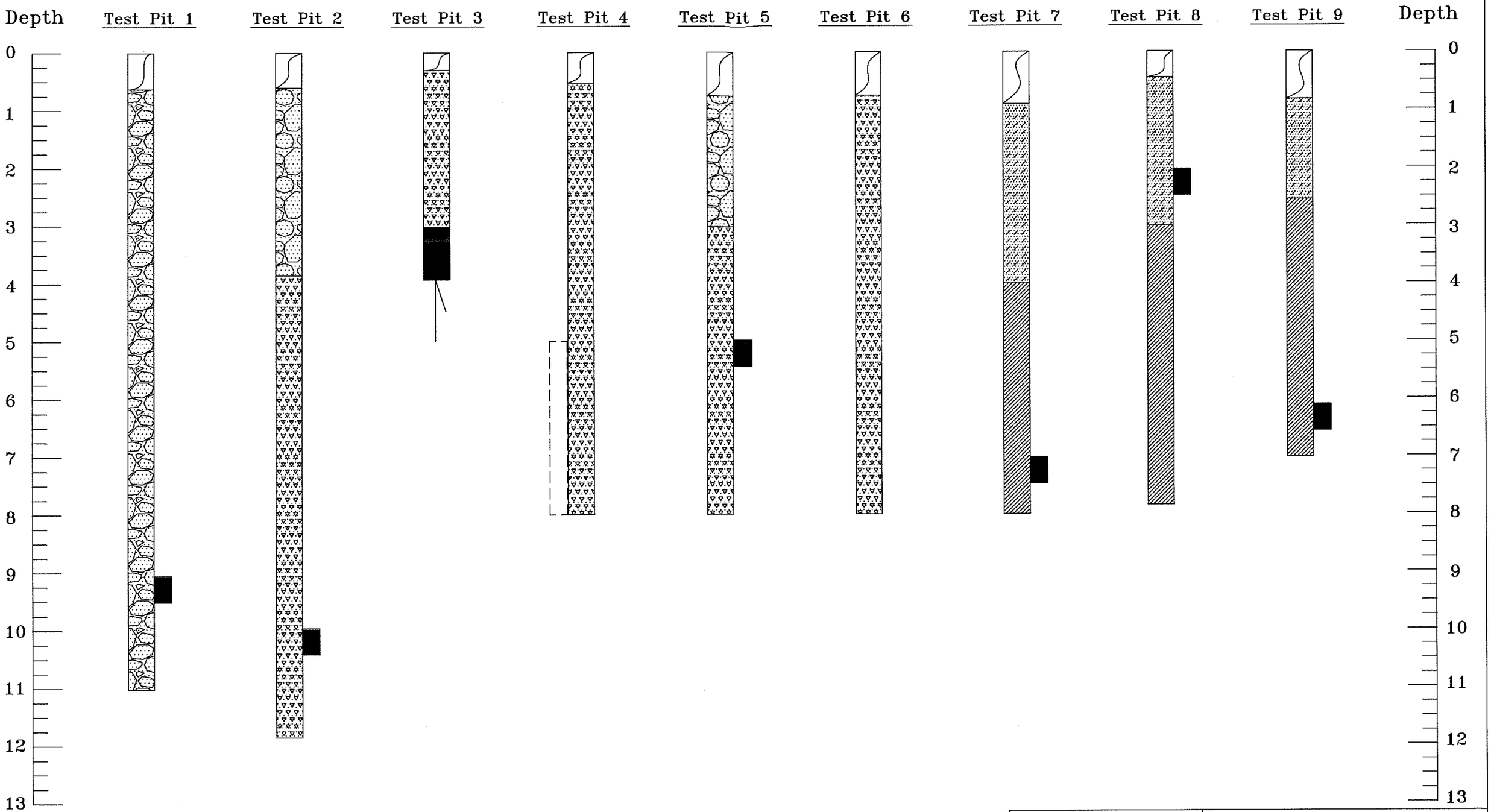
Title: SITE PLAN–LOCATION OF TEST PITS	**Date:** 1/13/20	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: Greenhorn Ranch/Wildblue–New Boulevard Road	**Job No.** 19–11550	(970)879-7888· Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Resort, Steamboat Springs, CO	**Figure** #2	



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Title: **Logs of Exploratory Test Pits**

Job Name: **Greenhorn Ranch/ The Wild Blue**

Location: **New Boulevard Road, Steamboat Ski Resort, Steamboat Springs, CO**

Job No.: 19-11550 | Date: 1/13/20 | Fig. #3

LEGEND:

NATURAL TOPSOIL AND ORGANICS: Silty and sandy, very low plastic, dry to moist and dark brown.

SANDS AND GRAVELS: Slightly silty to silty, fine to coarse grained with occasional cobbles and boulders, very low to non-plastic, medium dense to dense, slightly moist to dry and brown to gray.

DECOMPOSED GRANITE: Slightly silty to silty, fine to coarse grained with occasional cobbles, very low to non-plastic, dense to very dense, moist and brown to dark gray.

CRYSTALLINE BEDROCK: Schist and gneissic granite, fine to coarse-textured, non-plastic, slightly weathered to very hard, slightly moist, brown to reddish brown to gray to black and white.

SANDS AND CLAYS: Silty, fine to coarse grained with occasional sandstone and schist bedrock fragments, low to moderately plastic, medium dense to stiff, slightly moist to moist and brown to tan.

SANDSTONE BEDROCK: Browns Park Formation, silty to clayey, fine to coarse grained with occasional gravel-sized clasts, low to moderately plastic, weathered to hard and tan.

Small Disturbed Bag Sample

Large Disturbed Sample

Indicates trackhoe refusal on hard bedrock.

NOTES:

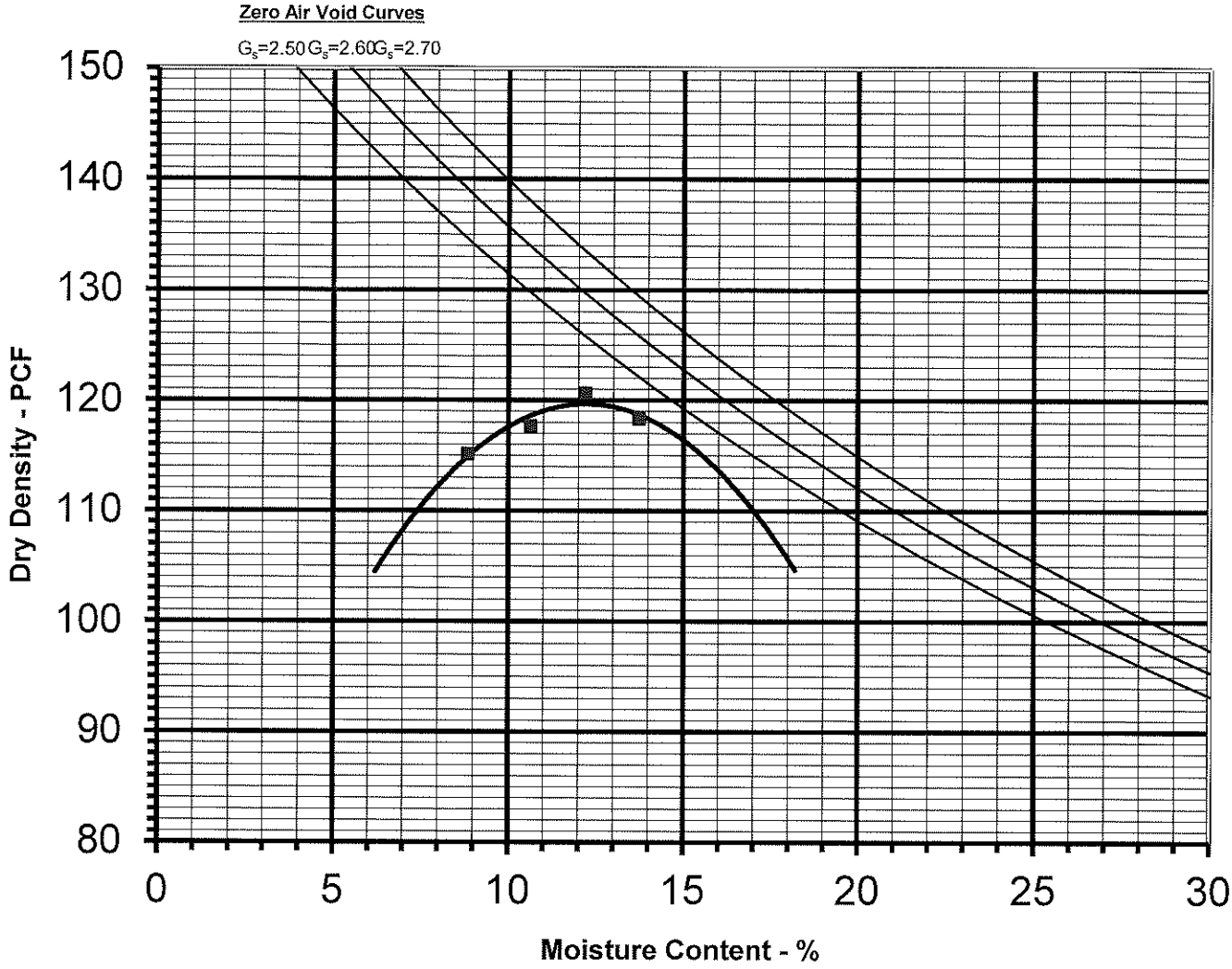
1) Test pits were excavated on October 8, 2019 with a CAT 336F trackhoe provided by the client.

2) Locations of the test pits were determined in the field by pacing from existing topographic features.

3) Elevations of the test pits were not measured and logs are drawn to the depths investigated.

4) The lines between materials shown on the logs represent the approximate boundaries between material types and transitions may be gradual.

Title: LEGEND AND NOTES	Date: 1/13/20	NWCC Northwest Colorado Consultants, Inc. Geotechnical / Environmental Engineering - Materials Testing (970)879-7888 Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80477
Job Name: Greenhorn Ranch/Wildblue-New Boulevard Road	Job No. 19-11550	
Location: Steamboat Ski Resort, Steamboat Springs, CO	Figure #4	



Job Name: Greenhorn Ranch/ Wildblue - New Boulevard Road				**PROCTOR TEST RESULTS**	
Sample Location: Test Pit 4 @ 5-8'					
Soil Description: Decomposed Granite - Silty Gravelly Sand				**Sample No.**: 1P	
Maximum Dry Density: 119.7 pcf		**Opt. Moisture Content**: 12.2 %		**Procedure**: ASTM D698	
Liquid Limit: 27 %		**Plasticity Index**: 2		**Date**: 7/22/2019	
Gravel: 14 %	**Sand**: 73 %	**Silt & Clay (-200)**: 13 %		**Job No**: 19-11550	**Figure #5**

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NWCC, Inc.

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS
NEW BOULEVARD ROAD

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	ATTERBERG LIMITS		GRADATION		PERCENT PASSING No. 200 SIEVE	UNCONFINED COMPRESSIVE STRENGTH (PSF)	SOIL or BEDROCK DESCRIPTION	UNIFIED SOIL CLASS.
TEST HOLE	DEPTH (feet)			LIQUID LIMIT (%)	PLASTICITY INDEX (%)	GRAVEL (%)	SAND (%)				
1	9	9.0		NV	NP	17	71	12		Silty Gravelly Sand	SM
2	10	5.5		25	2	35	56	9		Decomposed Granite: Slightly Silty Gravelly Sand	SM
4	5-8			27	2	14	73	13		Decomposed Granite: Silty Gravelly Sand	SM
5	6	5.4		24	2	7	76	17		Decomposed Granite: Slightly Gravelly Silty Sand	SM
7	7	10.8		29	8	3	65	32		Sandstone Bedrock	SC
8	2	10.0		33	15	4	62	34		Clayey Sand	SC
9	6	10.7		34	15	6	62	32		Sandstone Bedrock	SC

NV = No Value

NP = Non Plastic

JOB NUMBER: 19-11550

SUBSOIL AND FOUNDATION INVESTIGATION
THE WILD BLUE TERMINAL AND RESTAURANT
STEAMBOAT SKI RESORT
STEAMBOAT SPRINGS, COLORADO

Prepared by

NWCC, Inc.
2580 Copper Ridge Drive
Steamboat Springs, CO 80487

NorthWest Colorado Consultants, Inc.
Geotechnical / Environmental Engineering • Materials Testing

Prepared for

Steamboat Ski and Resort Corp.
Lance Miles
2305 Mt. Werner Circle
Steamboat Springs, CO 80487

NWCC Project NO. 19-11550

July 29, 2019

TABLE OF CONTENTS

List of Figures, Tables and Appendices.

1.0 CONCLUSIONS

Based on results of the field and laboratory investigations, NWCC, Inc. (NWCC) recommends the proposed structures be founded on footings placed on the natural sands and clays, sands and gravels, bedrock materials and/or properly compacted structural fill materials placed on the natural soils and bedrock materials.

2.0 PURPOSE AND SCOPE OF WORK

This report presents the results of the Subsoil and Foundation Investigation completed for the proposed Wild Blue Gondola Terminal and Restaurant, to be located south of Burgess Creek Road and within the Steamboat Ski Resort. The approximate location of the project site is shown in Figure #1.

The scope of our work included obtaining data from a visual inspection of the site; the excavation of eight (8) test pits; sampling of the soils and bedrock materials, and the laboratory testing of the samples obtained. This report summarizes the results of the field investigation and the laboratory test results, as well as our recommendations for foundation design, floor slabs, foundation walls and site grading based on our understanding of the proposed construction and the subsurface conditions encountered.

3.0 PROPOSED CONSTRUCTION

NWCC understands the proposed construction will consist of a restaurant/ski school building and gondola terminal/midway station. NWCC has assumed the lower levels of the buildings will be constructed with concrete slab-on-grade floor systems placed near or below the existing ground surface. We have assumed the loads generated by the proposed building structures will be moderate, typical of this type of commercial construction.

Site grading, roadway and utility construction will be required. NWCC understands that proposed cuts and fills for the site will be on the order of 5 to 15 feet or less and that the eastern portion of the site will be cut while the western portion will be filled.

4.0 SITE CONDITIONS

The project site is located south of Burgess Creek Road and north of the existing Bashor Lift Station at the Steamboat Ski Resort in Steamboat Springs, Colorado.

The site currently consists of vacant land with a bike trail running through it. Topography of the site generally slopes moderately to strongly down to the west on the order of 8 to 12 percent.

Vegetation at the site consists of deciduous bushes, grasses, wildflowers and occasional pine tree saplings and young aspen trees. It appears that numerous beetle-killed pine trees had been cut down at the site in the past.

5.0 FIELD INVESTIGATION

The field investigation was conducted on July 9, 2019. Eight (8) test pits were excavated at the approximate locations shown in Figure #2 using a CAT 320 E trackhoe provided by the client. Test pits were logged, and samples were obtained at the time of excavation by an engineer from NWCC. Graphic logs of the exploratory test pits are shown in Figure #3, and associated Legend and Notes are shown in Figure #4.

6.0 LABORATORY INVESTIGATION

Samples obtained from the test pits were examined and classified in the laboratory by the project engineer. Laboratory testing included standard index property tests including natural densities and moisture contents, dry unit weights, grain size analyses and Atterberg limits. Swell-consolidation testing was also conducted on relatively undisturbed samples of the probable foundation soils and bedrock materials. Swell-consolidation test results are shown in Figures #5 through #9 and the results are discussed in the following section. Standard Proctor Testing was conducted on a sample of probable materials to be used as fill and the results are shown in Figure #10. Results of the laboratory testing are summarized in the attached Table #1. Laboratory testing was conducted in general accordance with applicable ASTM specifications.

7.0 SUBSURFACE CONDITIONS

Subsurface conditions encountered in the test pits were variable and generally consisted of a layer of natural topsoil and organic materials overlying natural sands and clays or sands and gravels overlying sandstone or granite bedrock to the maximum depth investigated, 13 feet beneath existing ground surface (bgs).

A layer of natural topsoil and organic materials, ranging from approximately 12 to 18 inches in thickness, was encountered at the ground surface in all test pits. The natural topsoil and organic materials were silty and sandy, very low plastic, dry to moist and dark brown in color.

Sands and clays were encountered beneath the topsoil and organic materials in Test Pits 1, 5, 6, 7, and 8 and extended to 5, 12, 6, 9 and 5 feet bgs, respectively. The sands and clays were slightly silty to silty, fine to coarse grained with occasional sandstone and schist bedrock fragments, very low to low plastic, medium dense to stiff, slightly moist to moist and brown to tan in color. Samples of the sands and clays classified as CL, SC and SC-SM soils in accordance with the Unified Soil Classification System (USCS).

Sandstone bedrock was encountered beneath the sands and clays in Test Pits 1, 6, 7 and 8 and extended to the maximum depths investigated in each test pit. The sandstone bedrock was of the Browns Park Formation, was silty to clayey to very clayey, fine to coarse-grained with occasional gravel-sized clasts, low plastic, slightly weathered to hard and tan in color. Samples of the sandstone bedrock classified as CL-SC, SM and SC soils in accordance with the USCS.

Sands and gravels were encountered beneath the topsoil and organic materials in Test Pit 2 and extended to the maximum depth investigated, 13 feet bgs. The sands and gravels were slightly silty to silty, fine to coarse-grained with occasional cobbles, very low to non-plastic, dense to very dense, moist and brown in color. A sample of the sands and gravels classified as an SM soil in accordance with the USCS.

Crystalline bedrock was encountered beneath the topsoil and organics in Test Pits 3 and 4 and extended to the maximum depths investigated in each test pit. It should be noted that refusal on very hard crystalline bedrock was encountered at 7 feet bgs in Test Pit 4. The crystalline bedrock consisted of schist and gneissic granite, was fine to coarse-textured, non-plastic, weathered to very hard, slightly moist, brown to reddish brown to gray to black and white. Samples of the crystalline bedrock classified as SM and SM-GM soils in accordance with the USCS.

Swell-consolidation testing conducted on samples of the sands and clays indicate the materials tested will exhibit a low to nil swell potential and low consolidation when wetted under a constant load. The swell-consolidation test results are shown in Figures #5 through #9, and all the other test results are summarized in the attached Table 1. A summary of the swell test results is shown in Table A below.

TABLE A
SUMMARY OF SWELL TEST RESULTS

Soil Type	Consolidation	Range of Swell (%)			
	<0	Low 0 to <2	Moderate 2 to <4	High 4 to <6	Very High >6
	Number of Samples and Percent				
Natural Sands and Clays	1	4	0	0	0
Percent	20%	80%	0%	0%	0%

Groundwater seepage was not encountered in any of the test pits at the time of excavation and no signs of a seasonal high groundwater table were observed. It should be noted that the groundwater conditions at this site can be expected to fluctuate with precipitation and seasonal runoff.

Based on the subsurface conditions encountered at the site, the laboratory test results and our review of the available literature, NWCC recommends that a Site Class C be used for the foundation designs in accordance with Table 20.3-1 in Chapter 20 of ASCE 7-10.

8.0 FOUNDATION RECOMMENDATIONS

Based on the results of the field and laboratory investigations and our experience with similar projects, NWCC believes a safe and economical foundation system will consist of spread footings or individual pads with grade beams founded on the sands and clays, sands and gravels, underlying bedrock materials or on properly compacted structural fill materials overlying the sands and clays, sands and gravels or underlying bedrock materials.

The precautions and recommendations itemized below will not prevent the movement beneath the foundation if the underlying sands and clays or bedrock materials swell. However, they should reduce the amount of differential movement beneath the foundation system.

1) Footings placed on the undisturbed natural sands and clays, sands and gravels, bedrock materials or on properly compacted structural fill materials should be designed using an allowable soil bearing pressure of 3,000 psf. Based on the swell-potential of the natural sands and clays and sandstone bedrock materials, the footings should also be designed for a minimum dead load pressure of at least 600 psf.

2) Any topsoil and organic materials or loose and soft natural soils found beneath the footings should be removed and footings extended down to the natural sands and clays, sands and gravels or bedrock materials prior to structural fill or concrete placement. Structural fill materials must consist of a non-expansive granular soil approved by NWCC. Structural fill materials should be uniformly placed and compacted in 6 to 8 inch loose lifts and compacted to at least 100% of the maximum standard Proctor density and within 2% of the optimum moisture content determined in accordance with ASTM D698 or 80% of the maximum relative density if screened or washed gravels are used as structural fill. Structural fill materials should extend out from the edge of the footings on a 1(horizontal) to 1(vertical) or flatter slope.

3) Footings may have to be narrow or interrupted to maintain the minimum dead load. The foundation design should be closely checked to assure that it distributes the loads per the allowable pressures given.

4) Foundation walls should be designed and reinforced to span an unsupported distance of 10 feet or the length between pads, whichever is greater.

5) Footings or pads should be placed well enough below final backfill grades to protect them from frost heave. Forty-eight (48) inches is typical for this location considering normal snow cover and other winter factors.

6) Based on experience, we estimate the total settlement for footings and pads designed and constructed as discussed in this section will be approximately 1 inch. Additional bearing capacity values along with the associated settlements are presented in Figure #11.

7) We strongly recommend that the client retain NWCC to observe the foundation excavations when they are near completion to identify the bearing soils and confirm the recommendations in this report, as well as test the structural fill materials placed beneath the foundations for compaction.

9.0 FLOOR SLAB RECOMMENDATIONS

NWCC has assumed the proposed buildings will be constructed with concrete slab-on-grade floor systems placed near or below the existing ground surface. On-site soils, apart from the topsoil and organic materials, are capable of supporting slab-on-grade construction. However, floor slabs present a very difficult problem where swelling materials are present near floor slab elevation because sufficient dead load cannot be imposed on them to resist the uplift pressure generated when materials are wetted and expand.

If the client elects to construct concrete slab-on-grade floor systems, we recommend the following special design and construction precautions be followed so that the amount of movement in the floor slabs can be reduced if the sands and clays or sandstone bedrock materials become wetted and swell.

1) Floor slabs should be separated from all bearing walls, columns and their foundation supports with a positive slip joint. We recommend the use of ½-inch thick cellotex or impregnated felt.

2) Interior non-bearing partition walls resting on the floor slabs should be provided with a slip joint, preferably at the bottom, so that in the event the floor slab moves, this movement is not transmitted to the upper structure. This detail is also important for wallboard and doorframes and is shown in Figure #12.

3) A minimum 6-inch gravel layer should be provided beneath all floor slabs to act as a capillary break and to help distribute pressures. Prior to placing the gravel, the excavation should be shaped so that if water does get under the slab, it will flow to the low point of the excavation. In addition, all the topsoil and organic materials and any existing fill materials should be removed prior to placement of the underslab gravels or new structural fill materials.

4) Floor slabs should be provided with control joints placed a maximum of 10 to 12 feet on center in each direction, depending on slab configurations, to help control shrinkage cracking. The location of the joints should be carefully checked to assure that the natural, unavoidable cracking will be controlled. The depth of the control joints should be a minimum of ¼ the thickness of the slab.

5) Underslab soils should be kept as close as possible to their in-situ moisture content. Excessive wetting or drying of these soils prior to placement of the floor slab could result in differential movement after the slabs are constructed.

6) It has been our experience that the risk of floor slab movement can be reduced by removing at least 2 feet of the expansive materials and replacing them with a well compacted, non-expansive

fill. If this is done, or if fills are required to bring the underslab soils to the desired grade, the fill should consist of non-expansive, granular materials. The fill should be uniformly placed and compacted in 6 to 8-inch lifts to at least 95% of the maximum standard Proctor density at or near the optimum moisture content, as determined by ASTM D-698.

The above precautions and recommendations will not prevent floor slab movement in the event the sands and clays or sandstone bedrock materials beneath the floor slabs undergo moisture changes. However, they should reduce the amount of damage if such movement occurs. The only way to eliminate the risk of all floor slab movement is to construct a structural floor over a well-vented crawl space or void form materials.

10.0 PERIMETER DRAINAGE SYSTEM RECOMMENDATIONS

Any floor levels or crawl space areas constructed below the existing or finished ground surfaces and the foundations should be protected by underdrain systems to help reduce the problems associated with surface and subsurface drainage during high runoff periods.

Localized perched water or runoff can infiltrate the lower levels of the structures at the foundation levels. This water can be one of the primary causes of differential foundation and slab movement, especially where expansive soils and bedrock materials are encountered. Excessive moisture in crawl space areas or lower levels can also lead to rotting and mildewing of wooden structural members and the formation of mold and mold spores. Formation of mold and mold spores could have detrimental effects on the air quality in these areas, which in turn can lead to potential adverse health effects.

Drains should be located around entire perimeter of the lower levels and be placed and at least 12 inches below any floor slab or crawl space levels and at least 6 inches below the foundation voids and bottom of the footings. NWCC recommends the use of perforated PVC pipe for the drainpipe, which meets or exceeds ASTM D-3034/SDR 35 requirements, to minimize potential for pipe crushing during backfill operations. Holes in the drainpipe should be oriented down between 4 o'clock and 8 o'clock to promote rapid runoff of water. Drainpipes should be surrounded with at least 12 inches of free draining gravel and should be protected from contamination by a filter covering of Mirafi 140N subsurface drainage fabric or an equivalent product. Drains should have a minimum slope of 1/8 inch per foot and be daylighted at positive outfalls protected from freezing or be led to sumps from which water can be pumped. The use of interior laterals, multiple daylights or sumps may be required for the proposed structure. Caution should be taken when backfilling so as not to damage or disturb the installed underdrains. NWCC recommends the drainage systems include a cleanout every 100 feet, be protected against intrusion by animals at outfalls and be tested prior to backfilling. NWCC also recommends the client retain our firm to observe the underdrain systems during construction to verify that they are being installed in accordance with recommendations provided in this report and observe a flow test prior to backfilling the system.

Additionally, NWCC recommends an impervious barrier be constructed to keep water from infiltrating through the voided areas and/or under the foundation walls or footings. Barrier should be constructed of

an impervious material, which is approved by this office and placed below the perimeter drain and up against the sides of the foundation walls. A typical perimeter/underdrain detail is shown in Figure #13.

Placement of and impervious membrane and/or properly compacted clays in crawl space areas to the top of the footings or at least 12 inches above the top of the foundation voids or bottom of the foundation walls should help reduce the moisture problems in these areas.

11.0 FOUNDATIONS WALLS AND RETAINING STRUCTURE RECOMMENDATIONS

Foundation walls and retaining structures, which are laterally supported and can be expected to undergo only a moderate amount of deflection (at rest), may be designed for a lateral earth pressure computed on the basis of an equivalent fluid unit weight of 45 pcf for imported, free draining granular backfill and 55 pcf for the on-site soils and bedrock materials.

Cantilevered retaining structures on the site can be expected to deflect sufficiently to mobilize the full active earth pressure condition. Therefore, cantilevered structures may be designed for a lateral earth pressure computed based on an equivalent fluid unit weight of 35 pcf for imported, free draining granular backfill and 45 pcf for the on-site soils and bedrock materials.

Foundation walls and retaining structures should be designed for appropriate hydrostatic and surcharge pressures such as adjacent buildings, traffic and construction materials. An upward sloping backfill and/or natural slope will also increase the earth pressures on foundation walls and retaining structures.

NWCC recommends imported granular soils for backfilling foundation walls and retaining structures because their use results in lower lateral earth pressures. The imported granular materials should be placed to within 2 to 3 feet of the ground surface. Imported granular soils should be free draining and have less than 7 percent passing the No. 200 sieve. The granular soils behind foundation and retaining walls should be sloped from the base of the wall at an angle of at least 45 degrees from the vertical. The upper 2 to 3 feet of fill should be a relatively impervious soil or pavement structure to prevent surface water infiltration into the backfill.

Wall backfill should be carefully placed in uniform lifts and compacted to at least 95 % of the maximum standard Proctor density and within 2% of the optimum moisture content. Care should be taken not to overcompact the backfill since this could cause excessive lateral pressure on the walls. Some settlement of deep foundation wall backfill materials will occur even if the material is placed correctly.

12.0 SITE DRAINAGE RECOMMENDATIONS

Proper surface drainage at the site is of paramount importance for minimizing the infiltration of surface drainage into the wall backfill and bearing soils, which could result in increased wall pressures, differential foundation and slab movement. The following drainage precautions should be observed during construction and at all times after the structures have been completed:

1) Ground surface surrounding the structures should be sloped (minimum of 1.0 inch per foot) to drain away from the structures in all directions to a minimum of 10 feet. Ponding must be

avoided. If necessary, raising the top of foundation walls to achieve a better surface grade is advisable.

2) Non-structural backfill placed around the structures should be compacted to at least 95% of the maximum standard Proctor density at or near the optimum moisture content in order to minimize future settlement of the fill. Backfill should be placed immediately after the braced foundation walls are able to structurally support the fill. Puddling or sluicing must be avoided.

3) Top 2 to 3 feet of soil placed within 10 feet of the foundations should be impervious in nature to minimize infiltration of surface water into the wall backfill.

4) Roof downspouts and drains should discharge well beyond the limits of all backfill. Roof overhangs, which project two to three feet beyond the foundations, should be considered if gutters are not used.

5) Landscaping, which requires excessive watering and lawn sprinkler heads, should be located a minimum of 10 feet from the foundation walls of the structures.

6) Plastic membranes should not be used to cover the ground surface adjacent to foundation walls.

13.0 SITE GRADING RECOMMENDATIONS

Slopes on which the proposed structures and access roads are proposed could become unstable as a result of the proposed construction. Design and construction considerations must be addressed to avoid and/or limit the potential for slope instability at the site. Although a detailed slope stability analysis is beyond the scope of this report, some general guidelines are provided below for initial planning and design. Our office should review the construction plans as they are being prepared so that we can verify that our recommendations are being properly incorporated into the plans.

1) Slopes greater than 25 percent should be avoided whenever possible for construction of permanent roads and structures.

2) Temporary cuts for foundation construction should be constructed to OSHA standards for temporary excavations. Permanent, unretained cuts for roadways or building sites should be kept as shallow as possible and should not exceed a 3(Horizontal) to 1(Vertical) or flatter configuration for the topsoil and organic materials and a 2(Horizontal) to 1(Vertical) or flatter configuration for the underlying overburden soils and weathered bedrock materials. We recommend these cuts be limited to 10 feet in height or less unless stable bedrock is encountered. The risk of slope instability will be significantly increased if groundwater seepage is encountered in the cuts. NWCC office should be notified immediately to evaluate the site if seepage is encountered or deeper cuts are planned and assess whether additional investigations and/or stabilization measures are warranted.

3) Excavating during periods of low runoff at the site can reduce potential slope instability during excavation. Excavations should not be attempted during the spring or early summer when seasonal runoff and groundwater levels are typically high.

4) Fills up to 15 feet in height can be constructed at the site and should be constructed to a 2(Horizontal) to 1(Vertical) configuration. The fill areas should be prepared by stripping any existing fill materials and topsoil and organics, scarification and compaction to at least 95% of the maximum standard Proctor density and within 2% of optimum moisture content as determined by ASTM D698. The fills should be properly benched/keyed into the natural hillsides after the natural topsoil and organic materials have been removed. The fill materials should consist of the on-site soils (exclusive of topsoil, organics or clays) and be uniformly placed and compacted in 6 to 8-inch loose lifts to the minimum density value and moisture content range indicated above.

5) Proper surface drainage features should be provided around all permanent cuts and fills and steep natural slopes to direct surface runoff away from these areas. Cuts, fills and other stripped areas should be protected against erosion by revegetation or other methods. Areas of concentrated drainage should be avoided and may require the use of riprap for erosion control. NWCC recommends that a maximum of 4 inches of topsoil be placed over the new cut and fill slopes. It should be noted that the newly placed topsoil materials may slough/slide off the slopes during the spring runoff seasons until the root zone in the vegetated cover establishes.

6) A qualified engineer experienced in this area should prepare site grading and drainage plans. The contractor must provide a construction sequencing plan for excavation, wall construction and bracing and backfilling for the steeper and more sensitive portions of the site prior to starting the excavations or construction.

14.0 LIMITATIONS

The recommendations provided in this report are based on the subsurface conditions encountered in the test pits advanced across the project site and our understanding of the proposed construction. We believe that this information gives a high degree of reliability for anticipating the behavior of the proposed structures; however, our recommendations are professional opinions and cannot control nature, nor can they assure the soils profiles beneath those or adjacent to those observed. No warranties expressed or implied are given on the content of this report.

Expansive soils and bedrock materials were encountered at the site. These soils are stable at their natural moisture content but can shrink or swell with changes in moisture. The behavior of expansive soils and bedrock materials is not fully understood. The swell potential of any site can change erratically both in lateral and vertical extent. Moisture changes also occur erratically, resulting in conditions which cannot always be predicted. The recommendations presented in this report are based on the current state of the art for foundations and floor slabs on expansive soils and bedrock. The owner should be aware that there is a risk in construction on these types of soil. Performance of the structures will depend on following the recommendations and in proper maintenance after construction is complete. As water is the main

cause for volume change in these soils, it is necessary that the changes in moisture content be kept to a minimum. This requires judicious irrigation and providing positive surface drainage away from the structures. Any distress noted in the structures should be brought to the attention of this office.

This report is based on the investigation at the described site and on the specific anticipated construction as stated herein. If either of these conditions is changed, the results would also most likely change. Therefore, we strongly recommend that our firm be contacted prior to finalizing the construction plans so that we can verify that our recommendations are being properly incorporated into the construction plans. Man-made or natural changes in the conditions of a property can also occur over time. In addition, changes in requirements due to state-of-the-art knowledge and/or legislation do from time to time occur. As a result, the findings of this report may become invalid due to these changes. Therefore, this report is subject to review and not considered valid after a period of 3 years or if conditions as stated above are altered. It is the responsibility of the owner or his representative to ensure that the information in this report is incorporated into the plans and/or specifications and construction of the project. It is advisable that a contractor familiar with construction details typically used to dealing with the local subsoils and climatic conditions be retained to build the structures.

If you have any questions regarding this report or if we may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.

Erika K. Hill, E.I.T.
Project Engineer

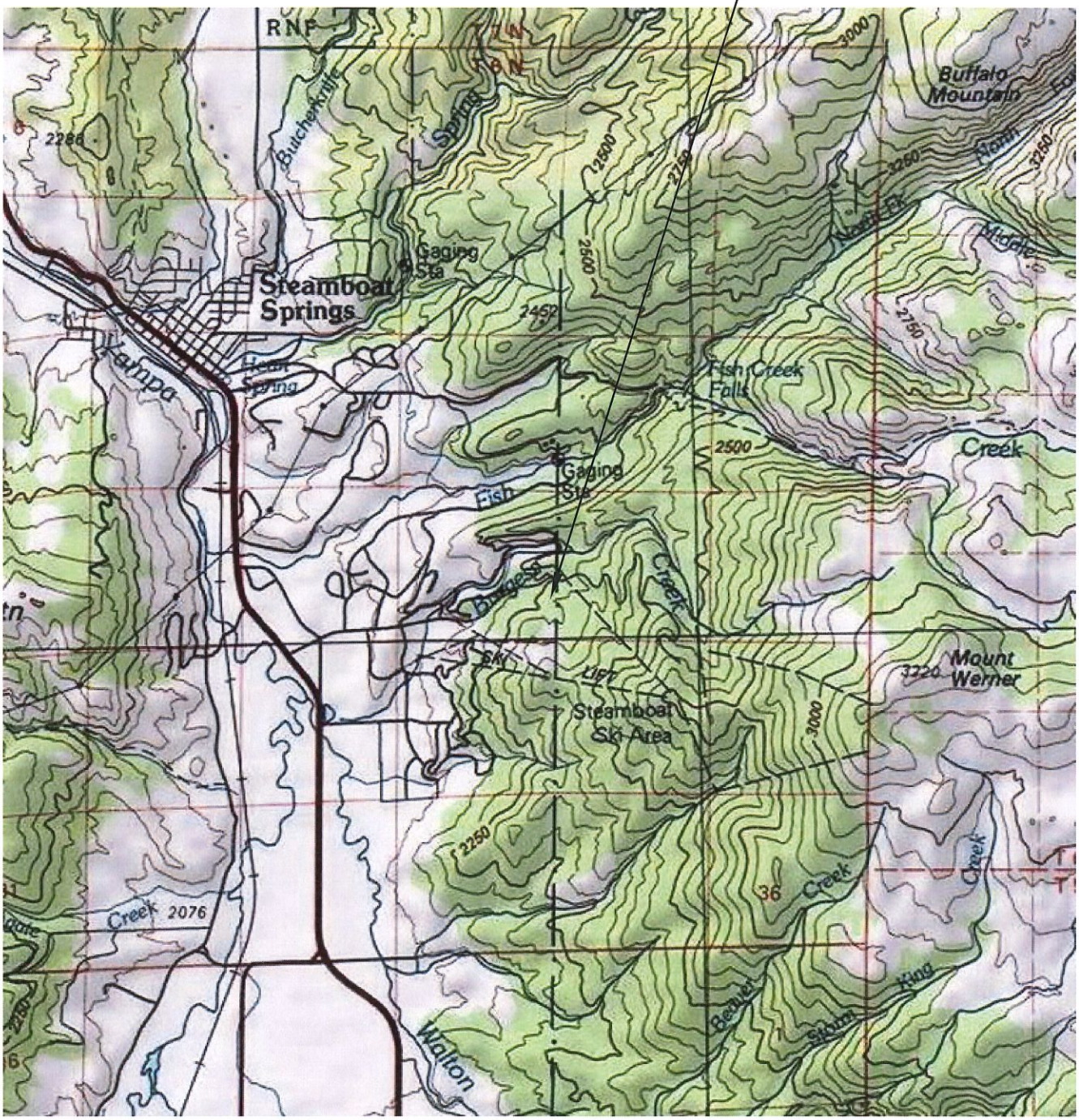
Reviewed by Brian D. Len, P.E.
Principal Engineer

COLORADO LICENSED
BRIAN D. LEN
25750
PROFESSIONAL ENGINEER
7/30/19

N

NOT TO SCALE

PROJECT SITE

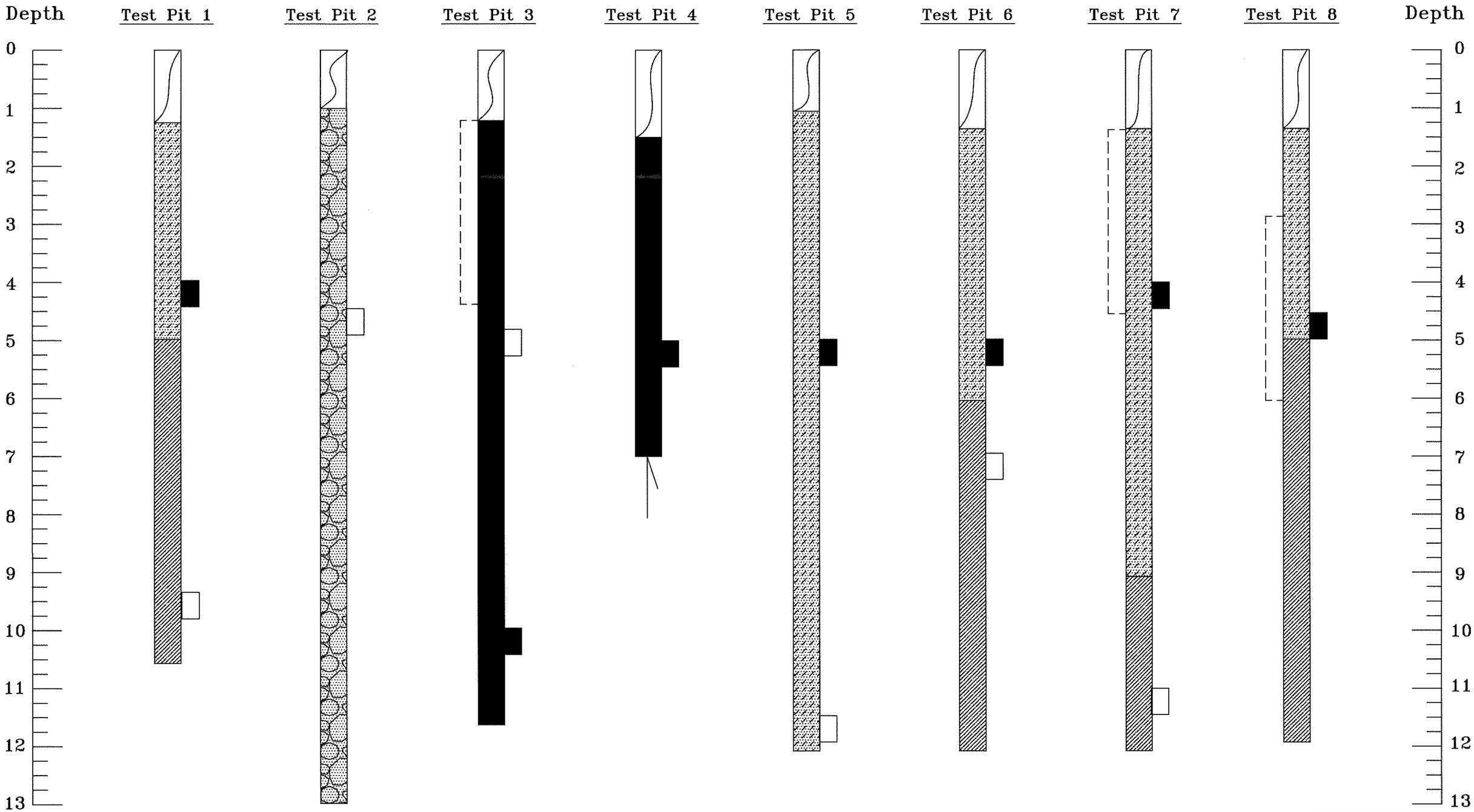


Title: VICINITY MAP	**Date:** 7/17/19	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: The Wild Blue Terminal and Restaurant	**Job No.** 19-11550	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Resort, Steamboat Springs, CO	**Figure** #1	

N

NOT TO SCALE

Title: SITE PLAN/LOCATION OF TEST PITS		**Date:** 7/17/19	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering - Materials Testing
Job Name: The Wild Blue Terminal and Restaurant		**Job No.** 19-11550	(970)879-7888 - Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
LOCATION: Steamboat Ski Resort, Steamboat Springs, CO		**Figure** #2	



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Title:
Logs of Exploratory Test Pits

Job Name:
The Wild Blue Terminal and Restaurant

Location:
Steamboat Ski Resort, Steamboat Springs, CO

Job No.: 19-11550 | Date: 7/23/19 | Fig. #3

LEGEND:

NATURAL TOPSOIL AND ORGANICS: Silty and sandy, very low plastic, dry to moist and dark brown.

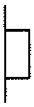
SANDS AND CLAYS: Slightly silty to silty, fine to coarse grained with occasional sandstone and schist bedrock fragments, very low to low plastic, medium dense to stiff, slightly moist to moist and brown to tan.

SANDSTONE BEDROCK: Browns Park Formation, silty to clayey to very clayey, fine to coarse grained with occasional gravel-sized clasts, low plastic, slightly weathered to hard and tan.

SANDS AND GRAVELS: Slightly silty to silty, fine to coarse grained with occasional cobbles, very low to non-plastic, dense to very dense, moist and brown.

CRYSTALLINE BEDROCK: Schist and gneissic granite, fine to coarse-textured, non-plastic, weathered to very hard, slightly moist, brown to reddish brown to gray to black and white.

California Liner Hand Drive Sample.



Small Disturbed Bag Sample

Large Disturbed Sample

Indicates trackhoe refusal on hard bedrock.

NOTES:

1) Test pits were excavated on July 9, 2019 with a CAT 320 E trackhoe provided by the client.

2) Locations of the test pits were determined in the field by pacing from existing topographic features.

3) Elevations of the test pits were not measured and logs are drawn to the depths investigated.

4) The lines between materials shown on the logs represent the approximate boundaries between material types and transitions may be gradual.

Title: LEGEND AND NOTES	Date: 7/22/19	NWCC Northwest Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
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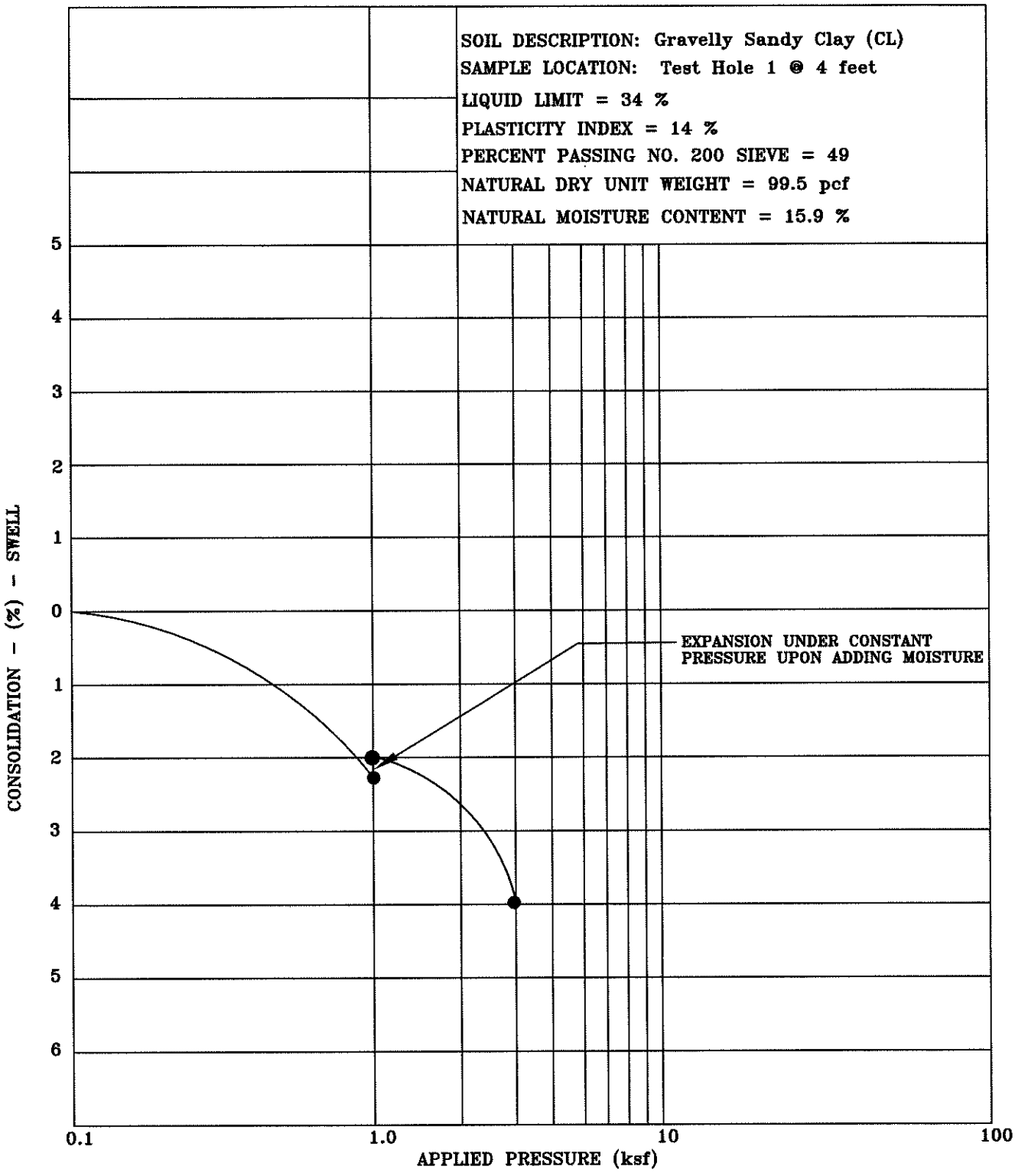
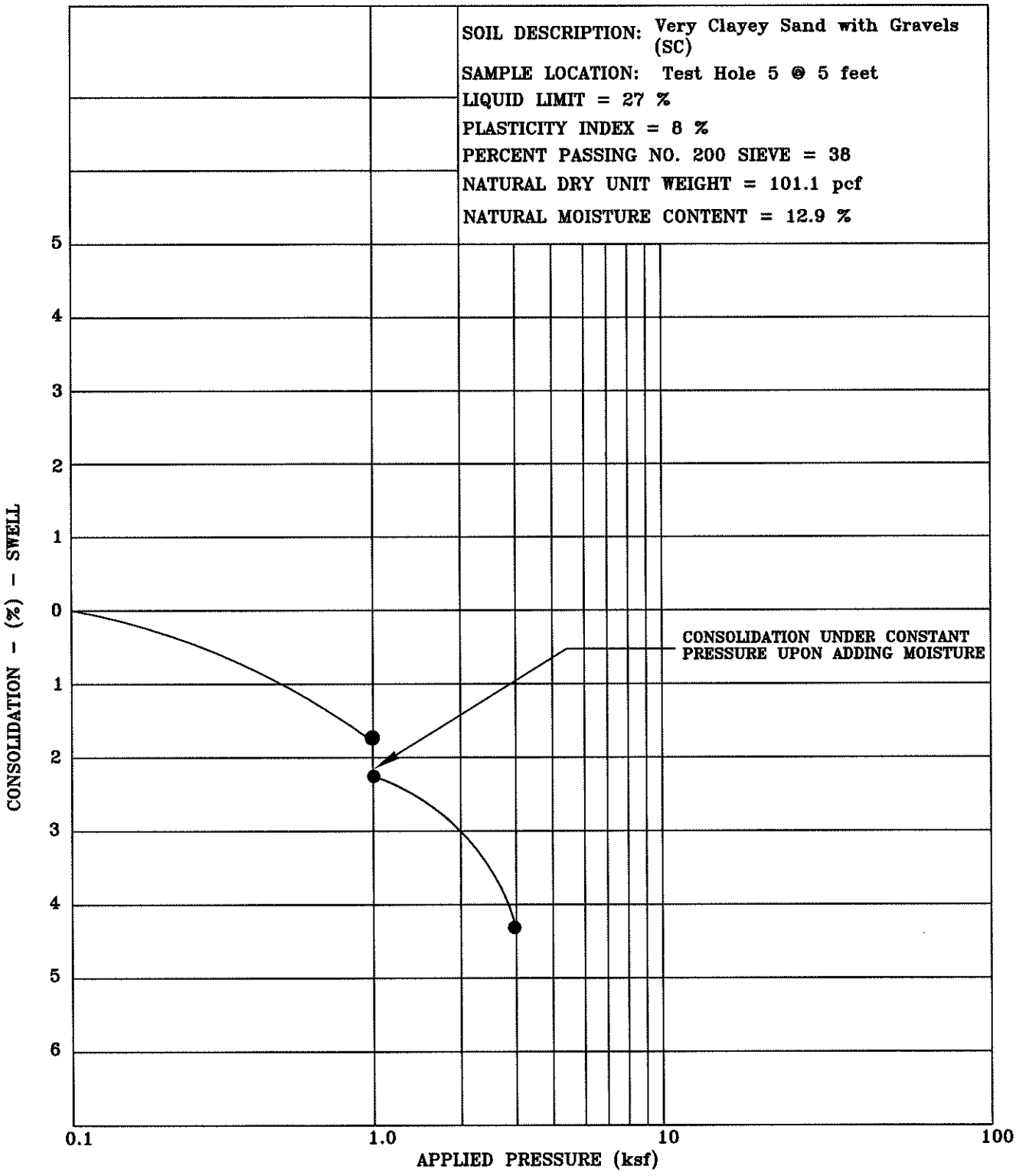
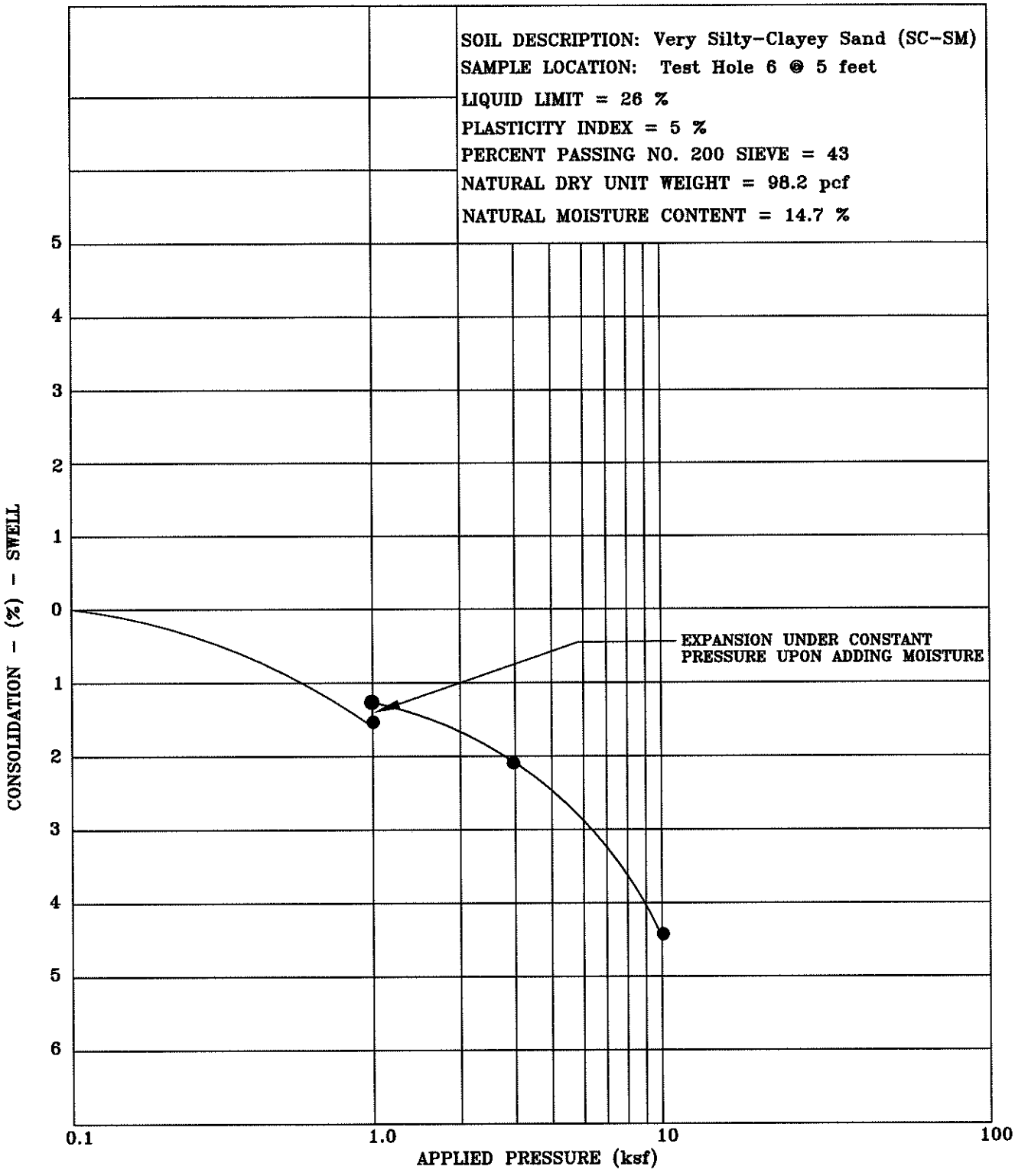
Location: Steamboat Ski Resort, Steamboat Springs, CO	Figure #4	



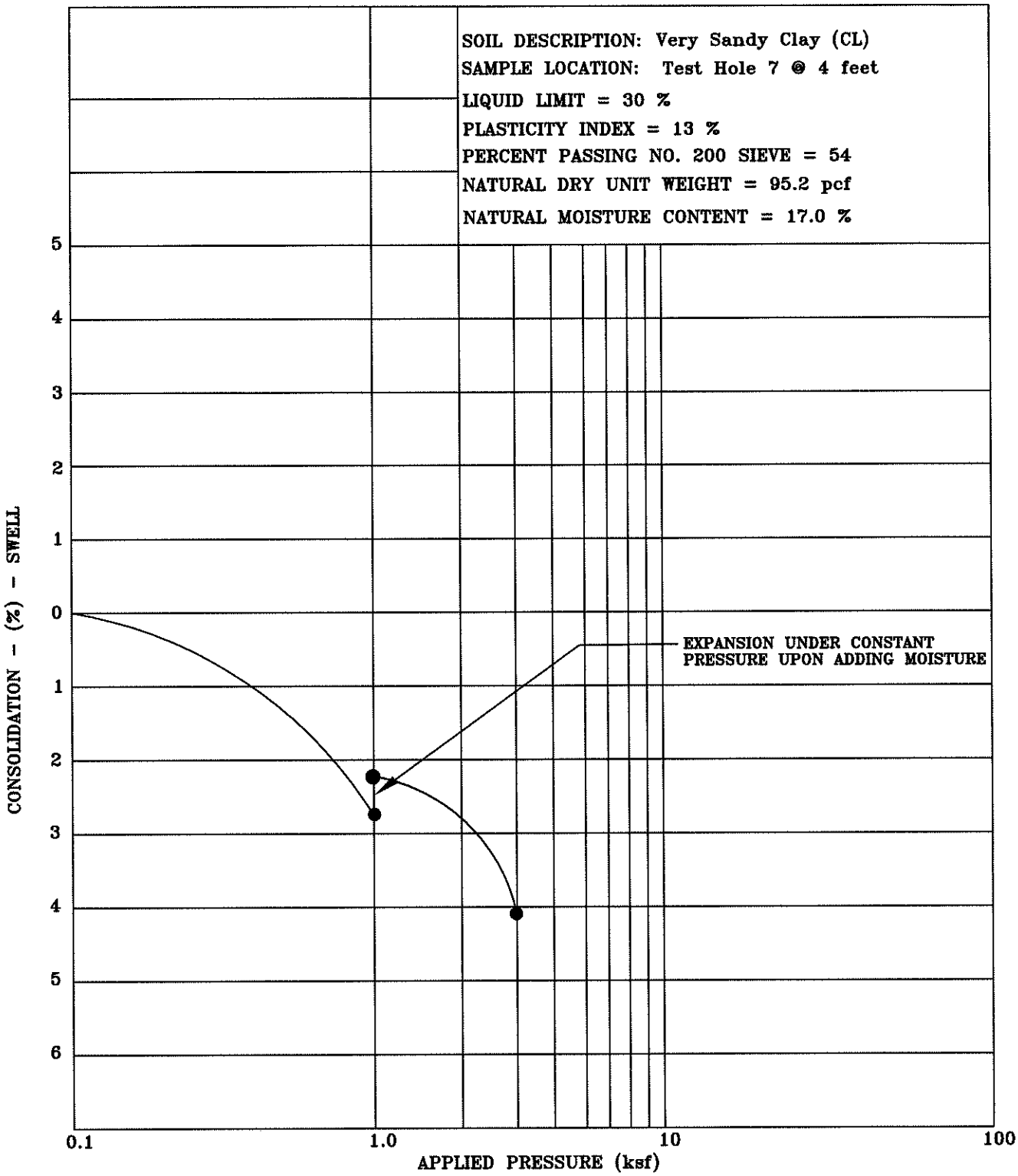
Title: SWELL–CONSOLIDATION TEST RESULTS		Date: 7/22/19	NWCC Northwest Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing (970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Job Name: The Wild Blue Terminal and Restaurant		Job No. 19–11550	
Location: Steamboat Ski Resort, Steamboat Springs, CO		Figure #5	



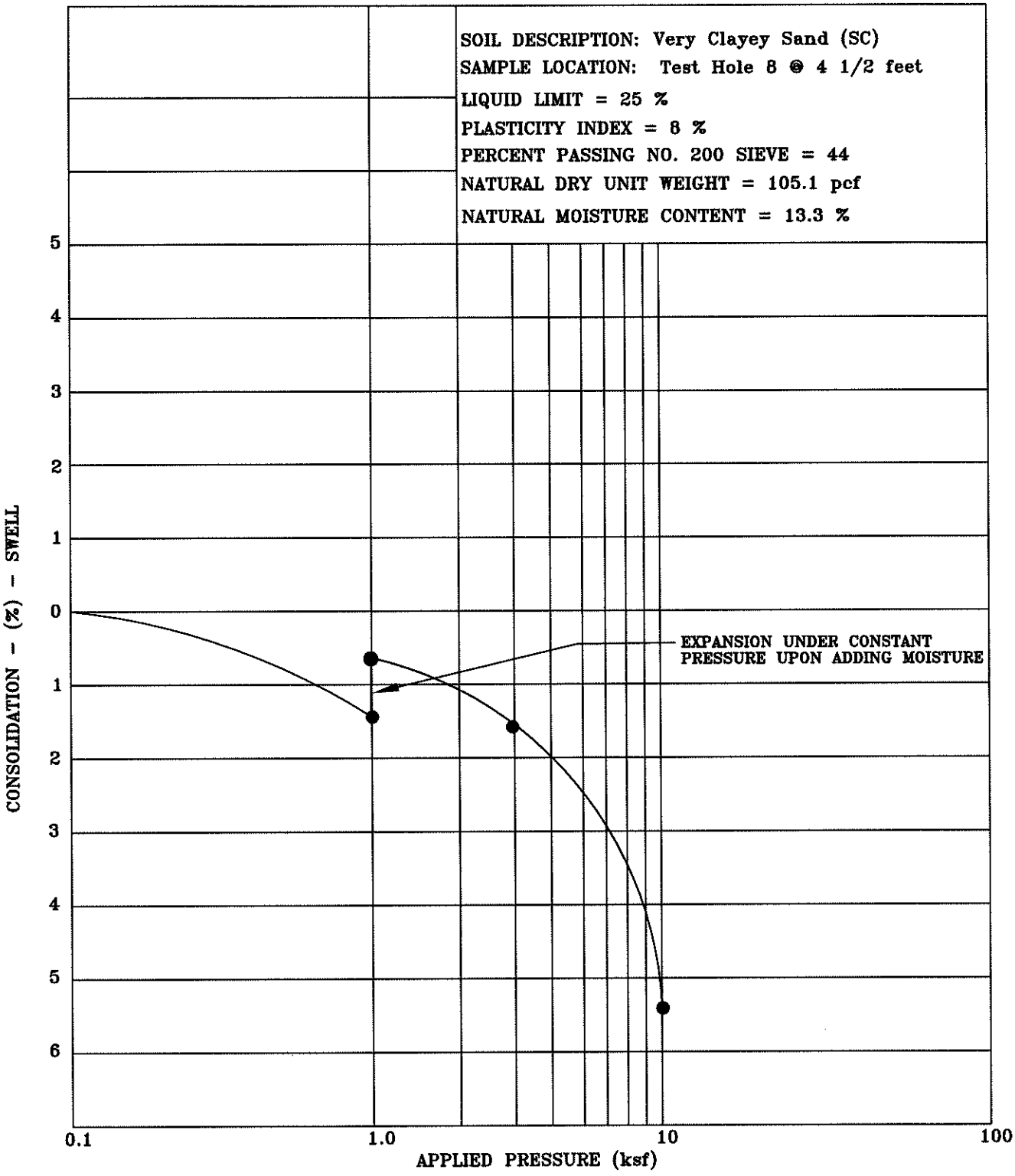
Title: SWELL–CONSOLIDATION TEST RESULTS		Date: 7/22/19	NWCC Northwest Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing (970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Job Name: The Wild Blue Terminal and Restaurant		Job No. 19–11550	
Location: Steamboat Ski Resort, Steamboat Springs, CO		Figure #6	



Title: SWELL-CONSOLIDATION TEST RESULTS		Date: 7/22/19	NWCC Northwest Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing (970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Job Name: The Wild Blue Terminal and Restaurant		Job No. 19-11550	
Location: Steamboat Ski Resort, Steamboat Springs, CO		Figure #7	



Title: SWELL–CONSOLIDATION TEST RESULTS		Date: 7/22/19	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering - Materials Testing
Job Name: The Wild Blue Terminal and Restaurant		Job No. 19-11550	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Resort, Steamboat Springs, CO		Figure #8	



Title: SWELL–CONSOLIDATION TEST RESULTS		Date: 7/22/19	
Job Name: The Wild Blue Terminal and Restaurant		Job No. 19–11550	
Location: Steamboat Ski Area, Steamboat Springs, CO		Figure #9	

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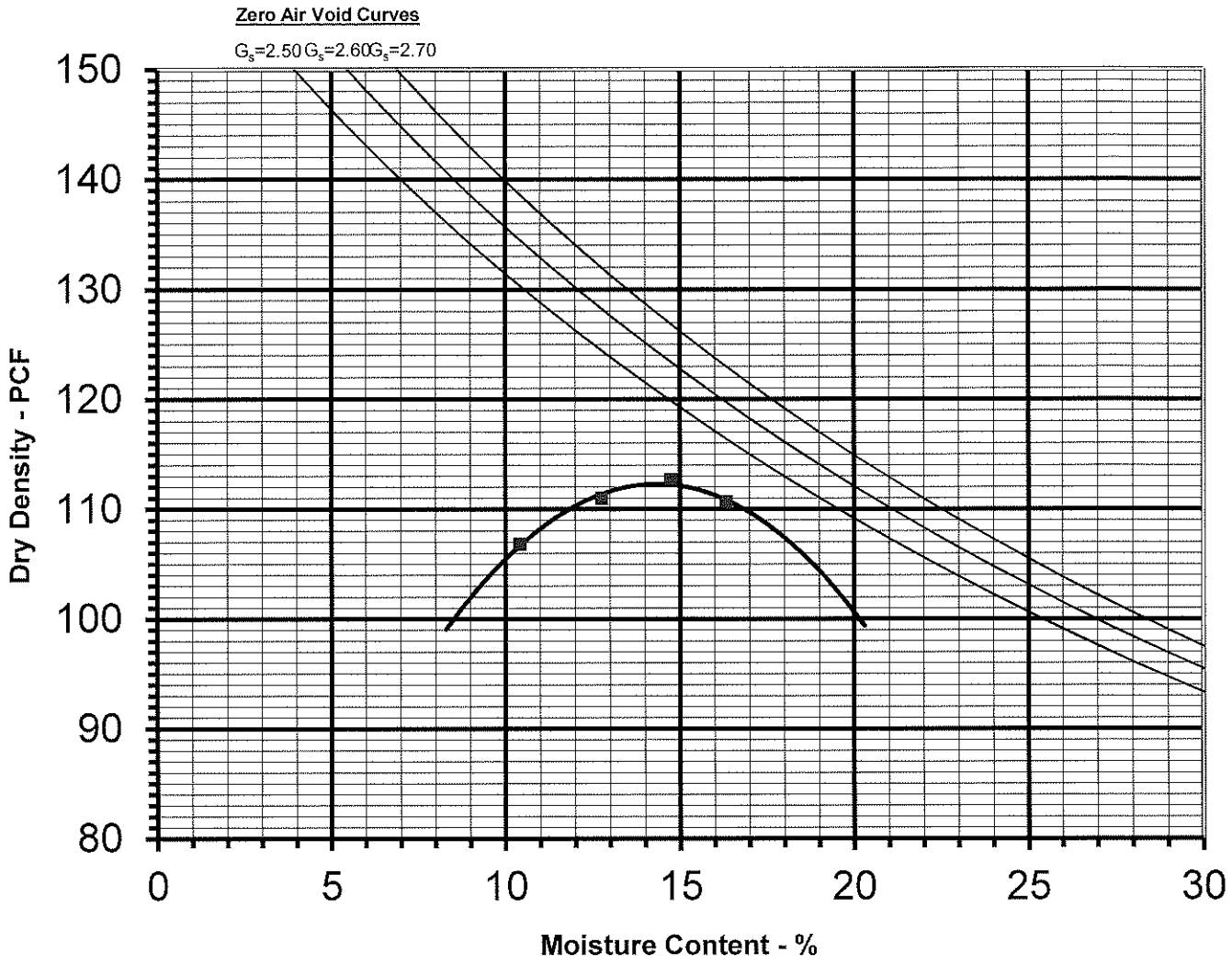

Job Name: The Wild Blue Terminal and Restaurant				**PROCTOR TEST RESULTS**	
Sample Location: Onsite Composite Sample					
Soil Description: Very Clayey Sand with Gravels (SC)				**Sample No.**: 1P	
Maximum Dry Density: 112.3 pcf		**Opt. Moisture Content**: 14.3 %		**Procedure**: ASTM D698	
Liquid Limit: 26 %		**Plasticity Index**: 7		**Date**: 7/22/2019	
Gravel: 4 %	**Sand**: 60 %	**Silt & Clay (-200)**: 36 %		**Job No**: 19-11550	**Figure #10**

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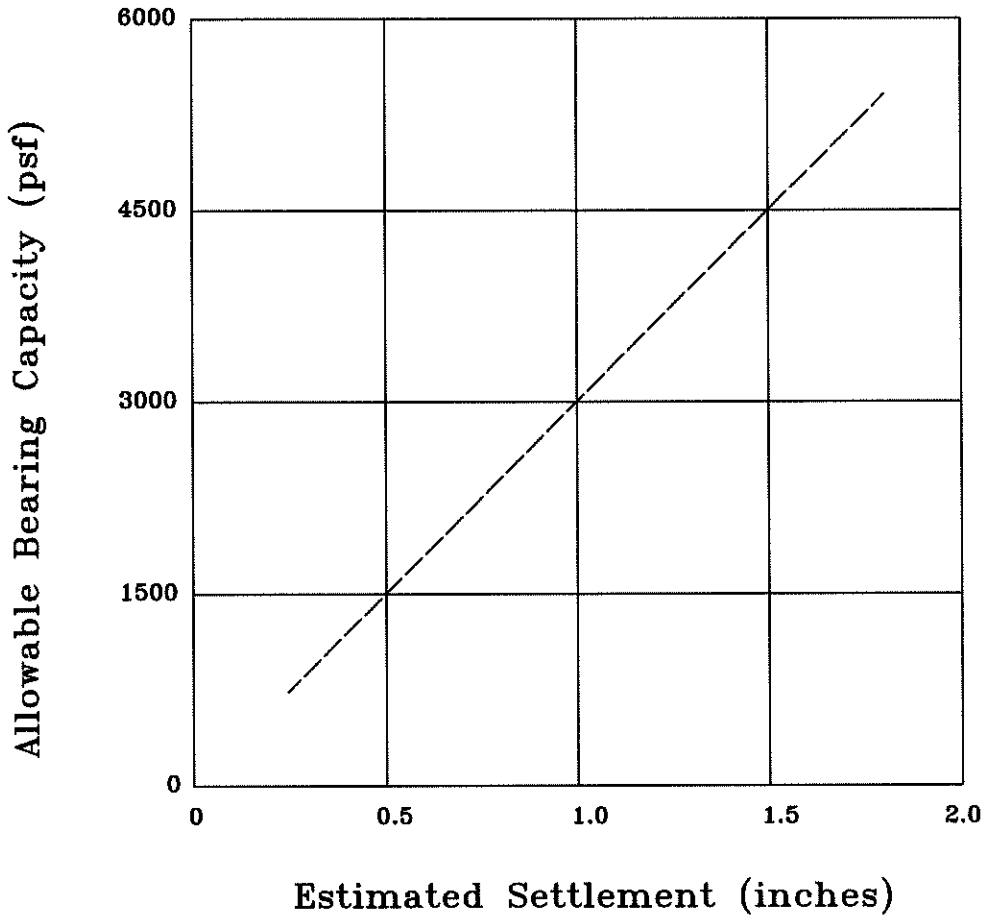
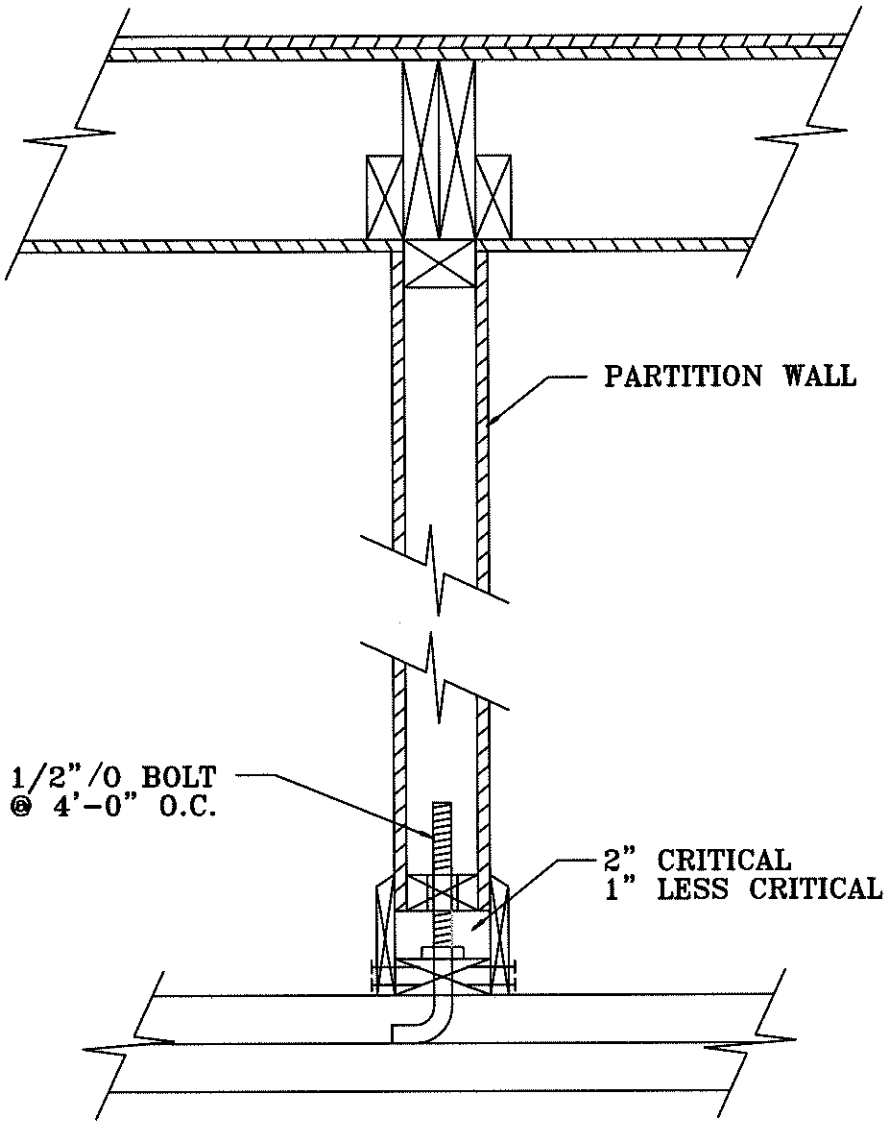


Note: These values are based on footing widths of 1 to 4 feet. If the footing width is to be greater than 4 feet in width, then we should be notified to re-evaluate these recommendations.

Title: BEARING CAPACITY CHART	**Date:** 7/22/19	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: The Wild Blue Terminal and Restaurant	**Job No.** 19-11550	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80477
Location: Steamboat Ski Resort, Steamboat Springs, CO	**Figure** #11	



Title: HUNG PARTITION WALL DETAIL		Date: 7/22/19
Job Name: The Wild Blue Terminal and Restaurant		Job No. 19-11550
Location: Steamboat Ski Resort, Steamboat Springs, CO		Figure #12

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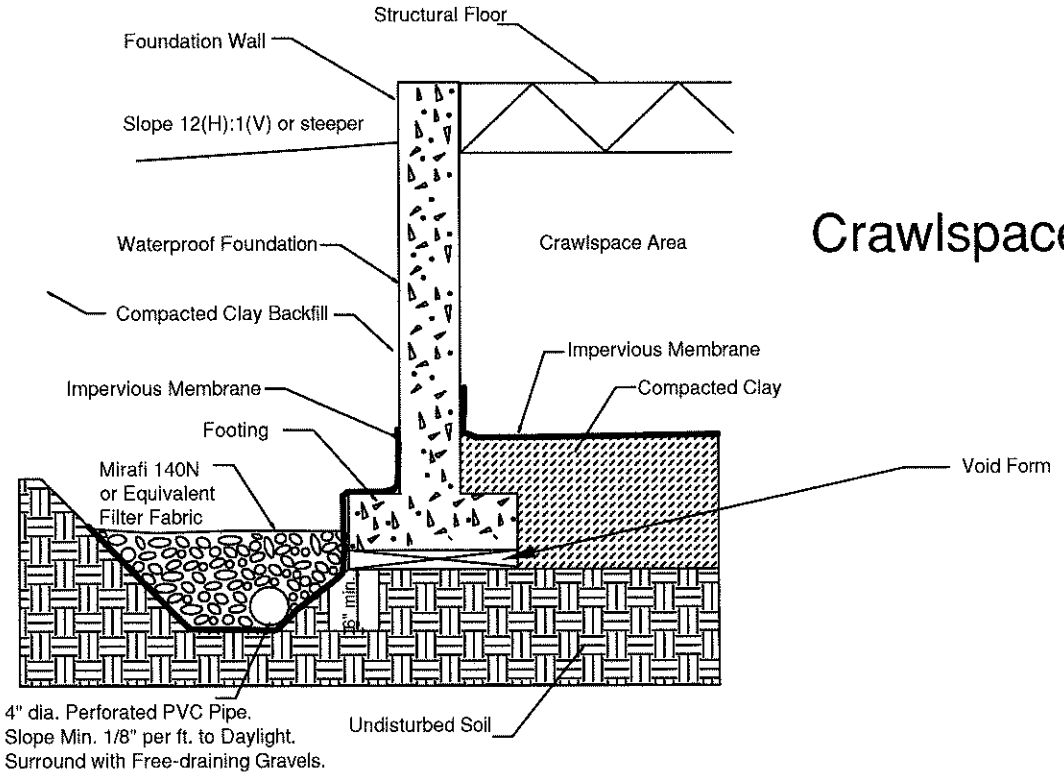
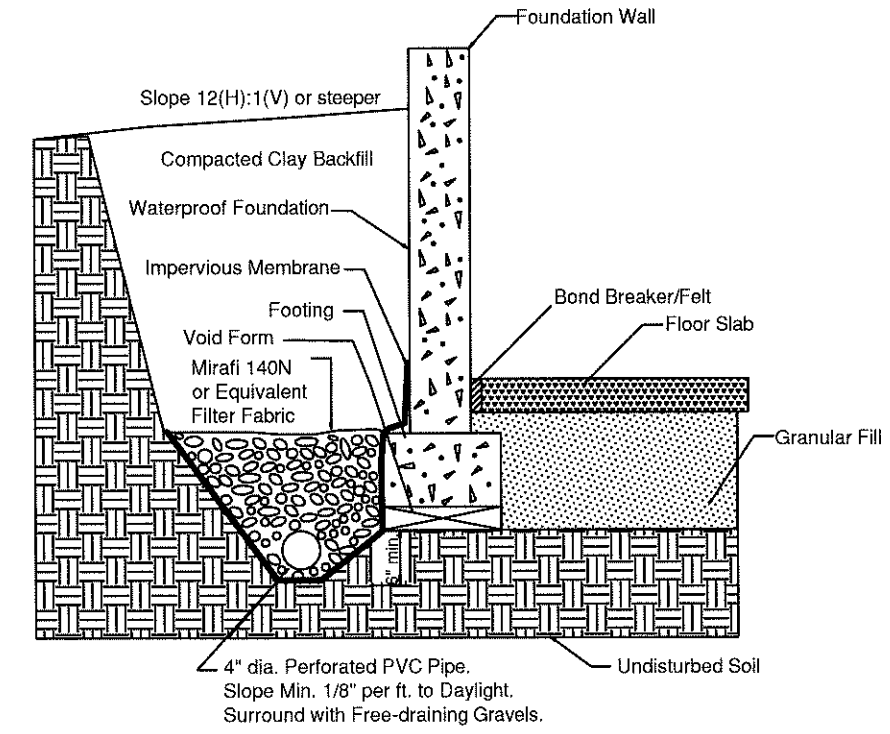


Crawlspace Area



Floor Slab

Title: PERIMETER/UNDERDRAIN DETAIL	**Date:** 7/22/19	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: The Wild Blue Terminal and Restaurant	**Job No.** 19-11550	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Resort, Steamboat Springs, CO	**Figure** #13	

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TABLE 1, PAGE 1 of 2

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	ATTERBERG LIMITS		GRADATION		PERCENT PASSING No. 200 SIEVE	UNCONFINED COMPRESSIVE STRENGTH (PSF)	SOIL or BEDROCK DESCRIPTION	UNIFIED SOIL CLASS.
TEST HOLE	DEPTH (feet)			LIQUID LIMIT (%)	PLASTICITY INDEX (%)	GRAVEL (%)	SAND (%)				
1	4	15.9	99.5	34	14	16	34	49		Gravelly Sandy Clay	CL
1	9 1/2	15.0		30	15	1	51	48		Sandstone–Claystone Bedrock	CL–SC
2	4 1/2	7.7		NV	NP	20	70	10		Gravelly Slightly Silty Sand	SM
3	5	7.1		NV	NP	0	83	17		Weathered Schist Bedrock	SM
3	10 1/2	8.2		NV	NP	18	71	11		Weathered Schist–Gneiss Bedrock	SM
4	5	6.4		24	3	44	45	9		Weathered Granite Bedrock	SM–GM

NV = No Value

NP = Non Plastic

JOB NUMBER: 19–11550

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TABLE 1, PAGE 2 of 2

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	ATTERBERG LIMITS		GRADATION		PERCENT PASSING No. 200 SIEVE	UNCONFINED COMPRESSIVE STRENGTH (PSF)	SOIL or BEDROCK DESCRIPTION	UNIFIED SOIL CLASS.
TEST HOLE	DEPTH (feet)			LIQUID LIMIT (%)	PLASTICITY INDEX (%)	GRAVEL (%)	SAND (%)				
5	5	12.9	101.1	27	8	7	55	38		Very Clayey Sand with Gravels	SC
6	5	14.7	98.2	26	5	0	57	43		Very Silty-Clayey Sand	SC-SM
6	7	13.4		25	3	0	67	33		Sandstone Bedrock	SM
7	4	17.0	95.2	30	13	0	46	54		Very Sandy Clay	CL
7	11	11.0		25	10	3	63	34		Sandstone Bedrock	SC
8	4 1/2	13.3	105.1	25	8	0	56	44		Very Clayey Sand	SC
1P	-	8.3		26	8	4	60	36		Very Clayey Sand with Gravels	SC

NV = No Value

NP = Non Plastic

JOB NUMBER: 19-11550