LOT 1 OF THE ROCK COMMERCE CENTER SUBDIVISION FILING NO. 1

PUBLIC IMPROVEMENT PLAN CONSTRUCTION DOCUMENTS

LOCATED IN THE SOUTHWEST QUARTER OF THE

oplicant will be required to submit a pavement design report for review upon approval of construction drawings. The avement design report is required to be approved prior to any roadway construction.

NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,

EL PASO COUNTY, STATE OF COLORADO.

PROJECT TEAM

OWNER / DEVELOPER

CENTRAL DEVELOPMENT, LLC 1600 S. ALBON ST., #200 DENVER. CO 80222 303.628.0200 voice CONTACT: JEREMY RECORDS

ARCHITECT

INTERGROUP ARCHITECTS 2000 W. LITTLETON BLVD. LITTLETON, CO 80120 303.407.1157 voice CONTACT: BILL SMITH, AIA

CIVIL ENGINEER

REDLAND 1500 W. CANAL CT. LITTLETON, CO 80120 720.283.6783 voice CONTACT: MARK CEVAAL, P.E. EMAIL: mcevaal@redland.com

LANDSCAPE ARCHITECT

STACKLOT 5369 S. CURTICE ST. LITTLETON, CO 80120 303.808.4523 voice CONTACT: STEVE WIENS EMAIL: steve@stacklot.com

LEGAL DESCRIPTION:

PARCEL B:

THAT PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE 6TH P.M. LYING EAST OF THE EAST LINE OF THAT TRACT CONVEYED TO THE STATE HIGHWAY DEPARTMENT BY QUITCLAIM DEED RECORDED SEPTEMBER 8, 1948 IN BOOK 1185, PAGE 458, ALSO DESCRIBED AS: THAT PART OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 11 SOUTH, RANGE 67 WEST OF THE P.M., COUNTY OF EL PASO, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID NORTHWEST QUARTER: THENCE EASTERLY ALONG THE SOUTHERLY LINE OF SAID NORTHWEST QUARTER A DISTANCE OF 996.04 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF INTERSTATE HIGHWAY 2 DESCRIBED IN THAT DEED TO THE STATE HIGHWAY DEPARTMENT RECORDED SEPTEMBER 1948 IN BOOK 1185 AT PAGE 458. WHICH POINT IS THE TRUE POINT OF THE BEGINNING O THE PARCEL TO BE DESCRIBED; THENCE ON A DEFLECTION ANGLE TO THE LEFT 95°08'20" ANI NORTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 95°00'36" AND ALONG SAID NORTHERLY LINE 441.95 FEET TO THE NORTHEAST CORNER OF SAID SOUTHWEST OUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 90°16'15" AND ALONG THE EASTERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 1329.88 FEET TO THE SOUTHEAST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THENCE ON A DEFLECTION ANGLE TO THE RIGHT 89°51'29" AND ALONG THE SOUTHERLY LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER A DISTANCE OF 319.15 FEET TO THE POINT OF BEGINNING.

igning and Striping Notes:

.All signs and pavement markings shall be in compliance with the current Manual on Uniform Traffic Control Devices (MUTCD).

.Removal of existing pavement markings shall be accomplished by a method that does not materially damage the pavement. The pavement narkings shall be removed to the extent that they will not be visible under day or night conditions. At no time will it be acceptable to paint over

B.Any deviation from the striping and signing plan shall be approved by El Paso County Planning and Community Development.

4.All signs shown on the signing and striping plan shall be new signs. Existing signs may remain or be reused if they meet current El Paso

.Street name and regulatory stop signs shall be on the same post at intersections. .All removed signs shall be disposed of in a proper manner by the contractor.

.All street name signs shall have "D" series letters, with local roadway signs being 4" upper-lower case lettering on 8" blank and non-local padway signs being 6" lettering, upper-lower case on 12" blank, with a white border that is not recessed. Multi-lane roadways with speed mits of 35 mph or higher shall have 8" upper-lower case lettering on 12" blank with a white border that is not recessed. The width of the on-recessed white borders shall match page 255 of the 2012 MUTCD "Standard Highway Signs". Signal pole mounted and overhead street

name signs shall be per MUTCD size standards. 3.All traffic signs shall have a minimum High Intensity Prismatic grade sheeting.

All local residential street signs shall be mounted on a 1.75" x 1.75" square tube sign post and stub post base. For other applications, refer o the CDOT Standard S-614-8 regarding use of the P2 tubular steel post slipbase design.

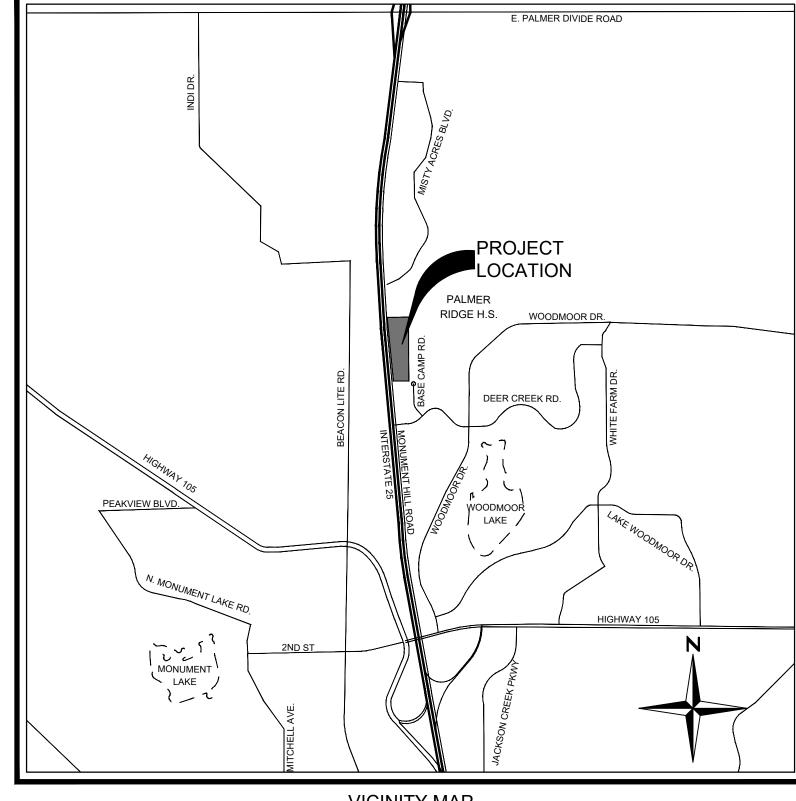
0.All signs shall be single sheet aluminum with 0.100" minimum thickness. 1.All limit lines/stop lines, crosswalk lines, pavement legends, and arrows shall be a minimum 125 mil thickness preformed thermoplastic avement markings with tapered leading edges per CDOT Standard S-627-1. Stop bars shall be 24" in width. Crosswalks lines shall be 24"

wide and a minimum of 9' long. 2. Word and symbol markings shall be the narrow type.

3.All longitudinal lines shall be a minimum 15mil thickness epoxy paint. All non-local residential roadways shall include both right and left edge line striping and any additional striping as required by CDOT S-627-1.

4. The contractor shall notify El Paso County Planning and Community Development (719) 520-6819 prior to and upon completion of signing

5. The contractor shall obtain a work in the right of way permit from the El Paso County Department of Public Works (DPW) prior to any ignage or striping work within an existing El Paso County roadway.



VICINITY MAP

BENCHMARK

NGS CONTROL POINT T 395 BEING A STANDARD NGS STEEL ROD IN A LOGO MONUMENT BOX LOCATED 20 MILES NORTH OF COLORADO SPRINGS ON THE EAST SIDE OF I-25, 1,200 FEET NORTH OF THE WEIGH STATION BUILDING, AND 20.5 FEET EAST OF THE EASTERLY EDGE OF OIL OF THE NORTHBOUND LANES OF

NAVD88. ELEV = 7111.32'

BASIS OF BEARINGS

BEARINGS SHOWN HEREON ARE REFERENCED TO THE SOUTHERLY BOUNDARY OF LOT 1, GREATER EUROPE MISSION SUBDIVISION FILING NO. 1, BEING MONUMENTED AS SHOWN HEREON, ASSUMED TO BEAR SOUTH 80°00'37" WEST, A DISTANCE OF 358.79 FEET.

lease be aware only one access will be allowed off of Monument Hill Road. Please revise esign to show only one access.

ps://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Stand

Sheet List Table		
Sheet Number	Sheet Title	
C1.0	COVER SHEET	
C1.1	REDLAND GENERAL NOTES	
C2.0	DEMOLITION PLAN	
C3.0	HORIZONTAL CONTROL PLAN	
C4.0	PLAN AND PROFLIE	
C5.0	GRADING PLAN	
C6.0	EROSION CONTROL PLAN	
C7.1	ROAD CROSS SECTIONS	
C7.2	ROAD CROSS SECTIONS	
C8.0	SIGNAGE AND STRIPING PLAN	
C9.1	SITE DETAILS	
C9.2	EROSION CONTROL DETAILS	
C9.3	EROSION CONTROL DETAILS	

nclude copied standard EPC notes

Standard Notes for El Paso County Construction Plans

1.All drainage and roadway construction shall meet the standards and specifications of the City of Colorado prings/El Paso County Drainage Criteria Manual, Volumes 1 and 2, and the El Paso County Engineering

2. Contractor shall be responsible for the notification and field notification of all existing utilities, whether shown on the plans or not, before beginning construction. Location of existing utilities shall be verified by the contractor prior to construction. Call 811 to contact the Utility Notification Center of Colorado (UNCC).

3.Contractor shall keep a copy of these approved plans, the Grading and Erosion Control Plan, the Stormwater Management Plan (SWMP), the soils and geotechnical report, and the appropriate design and construction andards and specifications at the job site at all times, including the following: a.El Paso County Engineering Criteria Manual (ECM)

b.City of Colorado Springs/El Paso County Drainage Criteria Manual, Volumes 1 and 2 .Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction .CDOT M & S Standards

.Notwithstanding anything depicted in these plans in words or graphic representation, all design and onstruction related to roads, storm drainage and erosion control shall conform to the standards and equirements of the most recent version of the relevant adopted El Paso County standards, including the Land Development Code, the Engineering Criteria Manual, the Drainage Criteria Manual, and the Drainage Criteria Manual Volume 2. Any deviations from regulations and standards must be requested, and approved, in writing. Any modifications necessary to meet criteria after-the-fact will be entirely the developer's responsibility to rectify

5.It is the design engineer's responsibility to accurately show existing conditions, both onsite and offsite, on the onstruction plans. Any modifications necessary due to conflicts, omissions, or changed conditions will be ntirely the developer's responsibility to rectify.

6.Contractor shall schedule a pre-construction meeting with El Paso County Planning and Community Development (PCD) – Inspections, prior to starting construction.

7.It is the contractor's responsibility to understand the requirements of all jurisdictional agencies and to obtain all equired permits, including but not limited to El Paso County Erosion and Stormwater Quality Control Permit ESQCP), Regional Building Floodplain Development Permit, U.S. Army Corps of Engineers-issued 401 and/or 404 permits, and county and state fugitive dust permits.

8. Contractor shall not deviate from the plans without first obtaining written approval from the design engineer and PCD. Contractor shall notify the design engineer immediately upon discovery of any errors or inconsistencies.

9.All storm drain pipe shall be Class III RCP unless otherwise noted and approved by PCD.

10. Contractor shall coordinate geotechnical testing per ECM standards. Pavement design shall be approved by El Paso County PCD prior to placement of curb and gutter and pavement.

11.All construction traffic must enter/exit the site at approved construction access points.

12. Sight visibility triangles as identified in the plans shall be provided at all intersections. Obstructions greater than 18 inches above flowline are not allowed within sight triangles.

13. Signing and striping shall comply with El Paso County DOT and MUTCD criteria. [If applicable, additional signing and striping notes will be provided.]

14. Contractor shall obtain any permits required by El Paso County DOT, including Work Within the Right-of-Way and Special Transport permits.

15. The limits of construction shall remain within the property line unless otherwise noted. The owner/developer shall obtain written permission and easements, where required, from adjoining property owner(s) prior to any off-site disturbance, grading, or construction.

ease include the construction drawing signature blocks. See the attached link for signature block

SUBDIVISION CENTER

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UMENT 0 10 TRUC: SHEET

SHEET

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Add "PCD File No. PPR2329

ENGINEER'S NOTES

- 1. PROJECT CONTROL/BENCHMARK:
- PRIMARY PROJECT BENCHMARK:

NGS CONTROL POINT T 395 BEING A STANDARD NGS STEEL ROD IN A LOGO MONUMENT BOX LOCATED 20 MILES NORTH OF COLORADO SPRINGS ON THE EAST SIDE OF I-25, 1,200 FEET NORTH OF THE WEIGH STATION BUILDING, AND 20.5 FEET EAST OF THE EASTERLY EDGE OF OIL OF THE NORTHBOUND LANES OF I-25.

NAVD88. ELEV = 7111.32'

ALL ELEVATIONS SHOWN ON THESE PLANS ARE REFERENCED TO THE PROJECT BENCHMARK. HORIZONTAL CONTROL, INCLUDING THE BASIS OF BEARING, SHALL BE IN ACCORDANCE WITH THE FINAL SUBDIVISION PLAT FOR THIS PROJECT.

- 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING THE PROJECT BENCHMARK AND OTHER SURVEY MONUMENTS AND SHALL HAVE A REGISTERED LAND SURVEYOR TIE OUT AND RESET ANY PROPERTY CORNERS OR SECTION CORNERS PLANNED TO BE DISTURBED BY CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ANY INADVERTENTLY DISTURBED OR DAMAGED MONUMENTS AND SHALL HAVE THEM REESTABLISHED AND REPLACED BY A REGISTERED LAND SURVEYOR.
- 3. THE CONTRACTOR SHALL COMPLY, AND PERFORM WORK IN ACCORDANCE, WITH THE REQUIREMENTS OF THE GEOTECHNICAL (SOILS) REPORT(S) PREPARED FOR THIS PROJECT. GEOTECHNICAL INFORMATION FOR THIS PROJECT IS BASED ON THE REPORT (add report title, date, and author). IN THE EVENT OF A DISCREPANCY BETWEEN THE GEOTECHNICAL REQUIREMENTS AND JURISDICTIONAL REQUIREMENTS, THE MORE STRINGENT REQUIREMENT SHALL BE FOLLOWED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND GEOTECHNICAL ENGINEER IN THE EVENT THAT A DISCREPANCY OCCURS.
- 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE SERVICES OF A QUALIFIED TESTING LABORATORY TO PERFORM ALL COMPACTION TESTING, ASPHALT TESTING, CONCRETE TESTING, AND ANY OTHER TESTING AS MAY BE REQUIRED TO COMPLETE THE WORK. TESTING RESULTS MUST BE SUBMITTED FOR ALL PHASES OF THIS PROJECT PER THE APPLICABLE GOVERNING AGENCIES REQUIREMENTS.
- THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE (1) SET OF "REDLINED" PRINTS OF THE CONSTRUCTION PLANS. THE "REDLINED" PRINTS SHALL BE KEPT CURRENT TO ACCURATELY REPRESENT THE DIMENSIONS AND LOCATIONS OF ALL WORK PERFORMED BY THE CONTRACTOR. THE CONTRACTOR MUST PRESENT THE "REDLINED" PRINTS TO THE ENGINEER (REDLAND) TIMELY UPON COMPLETION OF EACH PHASE OF THE WORK.
- 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF ANY PROBLEMS OR POTENTIAL PROBLEMS IN CONFORMING TO THE DESIGN LINE AND GRADE FOR ANY ELEMENT OF THE CONSTRUCTION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF SITE CONDITIONS THAT DIFFER FROM THOSE SHOWN ON THE APPROVED PLANS.
- IN THE EVENT THE CONTRACTOR ALLOWS, AUTHORIZES, APPROVES OR CONSTRUCTS ITEMS THAT DIFFER FROM THE APPROVED PLANS, SPECIFICATIONS OR OTHER CONTRACT DOCUMENTS, WITHOUT WRITTEN APPROVAL BY THE ENGINEER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LIABILITY ARISING FROM SUCH CHANGES.
- 8. THE CONTRACTOR SHALL PERFORM ALL WORK ACCORDING TO ALL CITY, COUNTY, STATE AND FEDERAL SAFETY AND HEALTH REGULATIONS. IN PARTICULAR, THE TRENCHING AND OPEN EXCAVATION OPERATIONS SHALL COMPLY WITH ALL CURRENT O.S.H.A. REGULATORY REQUIREMENTS.
- 9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, AND ANY OTHER NEEDED ACTION TO PROTECT THE LIFE, HEALTH AND SAFETY OF THE PUBLIC AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR.
- 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE JOB SITE CONDITIONS THROUGHOUT THE DURATION OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROTECTION OF PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED ONLY TO WORKING HOURS. THE CONTRACTOR SHALL DEFEND INDEMNIFY AND HOLD THE OWNER, THE ENGINEER AND THE GOVERNING JURISDICTION HARMLESS FOR ANY AND ALL LIABILITY, IN CONNECTION WITH THE PERFORMANCE OF WORK, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE ENGINEER OR THE GOVERNING JURISDICTION.
- 11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE, PASSABLE ACCESS TO PRIVATE PROPERTIES ADJACENT TO THE WORK THROUGHOUT THE PERIOD OF CONSTRUCTION.
- 12. THE TYPE, SIZE, LOCATION, AND NUMBER OF UNDERGROUND UTILITIES ARE APPROXIMATE WHERE SHOWN ON THE PLANS AND WERE TAKEN FROM RECORDS OF THE CONTROLLING AGENCIES AND/OR FROM MARKINGS IN THE FIELD BY AN AGENCY AND/OR UTILITY LOCATING CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR COMPLETENESS OR ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ALONG THE ROUTE OF THE WORK AND PARTICIPATE IN THE RESOLUTION OF ANY CONFLICTS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
- 13. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO FOR THE LOCATION OF UNDERGROUND GAS, ELECTRIC AND COMMUNICATION UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION (CALL 811 OR 1-800-922-1987). THE CONTRACTOR SHALL ALSO NOTIFY OTHER APPLICABLE UTILITY COMPANIES TO OBTAIN FIELD LOCATES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

ENGINEER'S NOTES (CONTD)

- 14. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES TO COORDINATE SCHEDULES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY RELOCATIONS WITH THE APPROPRIATE UTILITY COMPANY.
- 15. TEMPORARY EROSION CONTROL MEASURES SHALL BE PROVIDED BY THE CONTRACTOR DURING CONSTRUCTION AS IDENTIFIED IN THE EROSION CONTROL AND/OR STORMWATER MANAGEMENT PLANS. MAINTENANCE OF ONSITE DRAINAGE AND EROSION CONTROL FACILITIES DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE REMOVAL OF TEMPORARY EROSION CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. HOWEVER, REMOVALS SHALL NOT OCCUR UNTIL THE GOVERNING JURISDICTION HAS GIVEN APPROVAL TO REMOVE ANY OF THE MEASURES.
- 16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING NEARBY PUBLIC OR PRIVATE STREETS OF MUD AND DEBRIS, DUE TO CONSTRUCTION ACTIVITIES, ON A DAILY BASIS OR AS DIRECTED BY GOVERNING JURISDICTION PERSONNEL.
- 17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED EXISTING IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO, PAVEMENT, CURB AND GUTTER, SIDEWALK, LANDSCAPING, IRRIGATION, SIGNAGE, STRIPING, AND UTILITIES.
- 18. ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH THE STATE OF COLORADO PERMITTING PROCESS FOR "STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY." FOR INFORMATION, CONTACT THE COLORADO DEPARTMENT OF HEALTH, WATER QUALITY CONTROL DIVISION, WQCD-PE-B2, 4300 CHERRY DRIVE SOUTH, DENVER, COLORADO, 80246-1530, ATTENTION: PERMITS AND ENFORCEMENT SECTION. PHONE (303) 692-3590.
- 19. IF DEWATERING IS TO BE USED TO INSTALL UTILITIES OR CONSTRUCT IMPROVEMENTS, A STATE CONSTRUCTION DEWATERING DISCHARGE PERMIT IS REQUIRED IF DISCHARGE IS INTO A STORM SEWER, CHANNEL, IRRIGATION DITCH, OR ANY WATERS OF THE UNITED STATES.
- 20. THE CONTRACTOR SHALL HAVE IN HIS POSSESSION AT ALL TIMES THE APPROPRIATE EDITION OF THE GOVERNING JURISDICTION DESIGN AND CONSTRUCTION STANDARDS, ONE SET OF APPROVED CONSTRUCTION PLANS, THE STORMWATER MANAGEMENT PLAN, AND ALL REQUIRED PERMITS.
- 21. ALL STREET, SANITARY SEWER, STORM SEWER AND WATERLINE CONSTRUCTION SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE APPLICABLE GOVERNING LOCAL AGENCY CURRENT AT THE DATE OF CONSTRUCTION PLAN APPROVAL. FOR ELEMENTS OF WORK NOT COVERED BY LOCAL AGENCY STANDARDS AND SPECIFICATIONS, ALL CONSTRUCTION SHALL CONFORM TO THE APPROPRIATE EDITION OF THE STANDARDS AND SPECIFICATIONS OF THE COLORADO DEPARTMENT OF TRANSPORTATION, THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT, AND INDUSTRY STANDARDS AS APPLICABLE. REQUIREMENTS OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, THE ENVIRONMENTAL PROTECTION AGENCY AND THE U.S. ARMY CORPS OF ENGINEERS, SHALL ALSO BE FOLLOWED AS THEY RELATE TO THE WORK.
- 22. THE CONTRACTOR SHALL PROVIDE AND IMPLEMENT A "TRAFFIC CONTROL PLAN" RELATED TO ALL CONSTRUCTION ACTIVITIES FOR THIS PROJECT. ALL TRAFFIC CONTROL DEVICES, STRIPING, AND SIGNING SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
- 23. ALL STATIONING IS ON CENTERLINE UNLESS OTHERWISE NOTED. CENTERLINE, RIGHTS-OF-WAY (R.O.W.), PROPERTY LINE, AND EASEMENT DIMENSIONS ARE FOR REFERENCE ONLY. REFER TO THE FINAL SUBDIVISION PLAT FOR PROJECT HORIZONTAL CONTROL.
- 24. ALL ELEVATIONS IN PLAN VIEW ARE ALONG FLOWLINE UNLESS OTHERWISE NOTED. WHERE SHOWN, 'TC' REPRESENTS TOP-OF-CURB ELEVATION ALONG CURB AND GUTTER OR BACK-OF-WALK ELEVATION ALONG COMBINATION CURB, GUTTER AND WALK.
- 25. CROSS PANS ARE 8-FEET IN WIDTH UNLESS OTHERWISE NOTED.
- 26. WATER MAIN LENGTHS ARE FROM CENTER OF FITTING (EXCLUDING GATE VALVES)
 TO CENTER OF FITTING UNLESS OTHERWISE NOTED.
- 27. STORM AND SANITARY SEWER MAIN LENGTHS ARE FROM CENTER OF STRUCTURE/MANHOLE TO CENTER OF STRUCTURE/MANHOLE. SANITARY SEWER AND STORM SEWER MANHOLES ARE 4-FOOT DIAMETER UNLESS OTHERWISE NOTED.
- 28. STORM INLET STATIONING/OFFSET REFERENCE IS AT THE INTERSECTION OF FLOWLINE AND THE CENTER OF STRUCTURE.
- 29. STORM INLETS LOCATED ALONG CURB SHALL BE CONSTRUCTED WITH TOP OF BOX AT SAME GRADE AS EXTENDED TOP-OF-CURB GRADE, UNLESS OTHERWISE NOTED.
- 30. THE CLIENT, CONTRACTOR AND SUBCONTRACTOR SHOULD IMMEDIATELY NOTIFY THE CONSULTANT OF ANY CONDITIONS OF THE PROJECT THAT THEY BELIEVE DO NOT COMPLY WITH THE CURRENT STATE OF THE ADA AND/OR FHAA.

	PROPERTY LINE
	— R.O.W.
	LOT LINE
	EASEMENT LINE
	— SECTION LINE
	ROAD CENTERLINE
	EDGE OF PAVEMENT
	CURB AND GUTTER
	CONCRETE
- —X— — —X— -	— FENCE
<u> </u>	RETAINING WALL
►E —W— ———W— -	WATER LINE
——————————————————————————————————————	RAW WATER LINE
——————————————————————————————————————	NON-POTABLE WATER LINE
——————————————————————————————————————	IRRIGATION LINE
\$ -))	SANITARY SEWER
D ->	STORM SEWER
E E	ELECTRIC LINE
	GAS LINE
- <i>-T-</i> - <i>-T-</i>	TELEPHONE LINE
——————————————————————————————————————	FIBER OPTICS LINE
——— —OH— ——	OVERHEAD ELECTRIC LINE
	CABLE TELEVISION
5280	CONTOUR MAJOR
5281	
——————————————————————————————————————	
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——————————————————————————————————————	
——————————————————————————————————————	WATERS OF THE U.S.

FEMA	FEMA FLOOD PLAIN
——————————————————————————————————————	FLOOD HAZARD AREA DELINEATION
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PROPOSED LEGEND	
I NOI GOLD LLOLIND	
	PROPERTY LINE
	R.O.W.
	LOT LINE
	SETBACK
	EASEMENT
	ROAD CENTERLINE
	CURB AND GUTTER (CATCH)
	CURB AND GUTTER (SPILL)
	SIDEWALK
	STORM SEWER
	SANITARY SEWER
- — TD — — — —	TRENCH DRAIN
——w—	WATER LINE
IRR	IRRIGATION LINE
NP	NONPOTABLE WATER LINE
RW	RAW WATER LINE
©	MANHOLE w/ DIA. (FT.)
	INLET
	FLARED END SECTION
	WATER BEND
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⊕ .▼.	WATER CROSS WATER TEE
!	WATER TEE WATER REDUCER
*	WATER VALVE
I⊗I	
T	FIRE HYDRANT
]]	PLUG/CAP
ω Ε	SANITARY SEWER SERVICE (* INDICATES NON-TYPICAL LOCATION)
≥E 	WATER SERVICE (* INDICATES NON-TYPICAL LOCATION)
	UTILITY CROSSING
<u>4</u>	UNDERDRAIN w/ SIZE (IN.)
	RETAINING WALL
 5280 	CONTOUR MAJOR
5281	CONTOUR MINOR
_* -81.73	SPOT ELEVATION
,x -	SLOPE ARROW
	(4:1 MAX UNLESS NOTED OTHERWISE)

LIMITS OF CONSTRUCTION / SAWCUT

* * * * * * * PEDESTRIAN ACCESSIBLE ROUTE

OVER FLOW ARROW

	ATIONS
ABC ARV	AGGREGATE BASE COARSE AIR RELEASE VALVE
BB MH	BOX BASE MANHOLE
BC WITH	BUILDING CORNER
BFE	BASEMENT FLOOR ELEVATION
3.O.P.	BOTTOM OF PIPE (ELEVATION)
BW	BOTTOM OF WALL
CATV	CABLE TELEVISION
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
D.E.	DRAINAGE EASEMENT
DIA	DIAMETER
)IP	DUCTILE IRON PIPE
)W	DOMESTIC WATER
	EAST
C	END CURVE RETURN
G	EXISTING GRADE/GROUND
LEC	ELECTRIC OR ELECTRICAL
LEV	ELEVATION
OP	EDGE OF PAVEMENT
SMT	EASEMENT
X.	EXISTING
FE	FINISH FLOOR ELEVATION
-G	FINISH GRADE
īL .	FLOWLINE
M	FORCE MAIN
:0	FIBER OPTIC
G.E.	GAS EASEMENT
GB	GRADE BREAK
GFE	GARAGE FINISH FLOOR
SM	GAS METER
HDPE	HIGH DENSITY POLYETHYLENE PIPE
IP	HIGH POINT
BV	INLINE BUTTERFLY VALVE
NV	INVERT (ELEVATION)
RR	IRRIGATION
	LEFT
F	LINEAR FEET/FOOT
.P	LOW POINT
ЛАX	MAXIMUM
ΛΕ	MATCH EXISTING
ИН	MANHOLE
/IN	MINIMUM
<u> </u>	NORTH
PC	POINT ON CURVE
CC	POINT OF COMPOUND CURVE
PCR	POINT OF CURVE RETURN
PL	PROPERTY LINE
PRC	POINT OF REVERSE CURVE
PROP.	PROPOSED
PT	POINT OF TANGENCY
VC	POLYVINYL CHLORIDE PIPE
2014	RADIUS OR RIGHT
R.O.W.	RIGHT OF WAY
RCP 、	REINFORCED CONCRETE PIPE
3	SOUTH SIDEWALK, DRAINAGE, AND
,	
	MAINTENANCE EASEMENT
S.D.M.E.	SIDEWALK AND MAINTENANCE
S.D.M.E.	SIDEWALK AND MAINTENANCE EASEMENT
S.D.M.E. S.M.E. S.W.E.	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT
S.D.M.E. S.M.E. S.W.E.	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN
S.D.M.E. S.M.E. S.W.E. SD	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER
S.D.M.E. S.M.E. S.W.E. SD	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE
S.D.M.E. S.M.E. S.W.E. SSD SS SSMH	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION
S.D.M.E. S.M.E. S.W.E. SD SS SSMH STA	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER
S.D.M.E. S.M.E. S.W.E. SSW.E. SSSSSSSSSSSSSSSSSSSSSS	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER STORMWATER MANHOLE
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S.D.M.E. S.M.E. S.W.E. SSW.E. SSSMH STA STM STM MH SC SW SC SW SC SW SW SW SW SW	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER STORMWATER STORMWATER MANHOLE TOP BACK OF CURB TOP BACK OF WALK TOP OF CURB TOP OF FOUNDATION TOP OF PIPE (ELEVATION) TOP OF WALL
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S.D.M.E. S.M.E. S.W.E. S.W.E. SSSMH STA STM STM MH SC STM STM MH SC STM	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER STORMWATER STORMWATER MANHOLE TOP BACK OF CURB TOP OF CURB TOP OF FOUNDATION TOP OF PIPE (ELEVATION) TOP OF WALL TYPICAL UTILITY EASEMENT
S.D.M.E. S.M.E. S.W.E. S.W.E. SSSSSMH STA STM STM MH TBC TOF T.O.P. TW TYP J.E. //C	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER STORMWATER MANHOLE TOP BACK OF CURB TOP BACK OF WALK TOP OF CURB TOP OF FOUNDATION TOP OF PIPE (ELEVATION) TOP OF WALL TYPICAL UTILITY EASEMENT VERTICAL CURVE
S.D.M.E. S.M.E. S.W.E. S.W.E. SSSSSSSMH STA STM STM MH SC SCOP SCOP	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER STORMWATER MANHOLE TOP BACK OF CURB TOP BACK OF WALK TOP OF CURB TOP OF FOUNDATION TOP OF PIPE (ELEVATION) TOP OF WALL TYPICAL UTILITY EASEMENT VERTICAL CURVE WEST
S.D.M.E. S.M.E. S.W.E. S.W.E. SSWH STA STM STM MH STC TOF T.O.P. TW TYP J.E. //C	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER STORMWATER MANHOLE TOP BACK OF CURB TOP BACK OF WALK TOP OF CURB TOP OF FOUNDATION TOP OF PIPE (ELEVATION) TOP OF WALL TYPICAL UTILITY EASEMENT VERTICAL CURVE WEST WATERLINE
S.D.M.E. S.M.E. S.W.E. S.W.E. SSWH STA STM STM MH STC TOF T.O.P. TW TYP J.E. VC WM WV	SIDEWALK AND MAINTENANCE EASEMENT SIDEWALK EASEMENT STORM DRAIN SANITARY SEWER SANITARY SEWER MANHOLE STATION STORMWATER STORMWATER MANHOLE TOP BACK OF CURB TOP BACK OF WALK TOP OF CURB TOP OF FOUNDATION TOP OF PIPE (ELEVATION) TOP OF WALL TYPICAL UTILITY EASEMENT VERTICAL CURVE WEST

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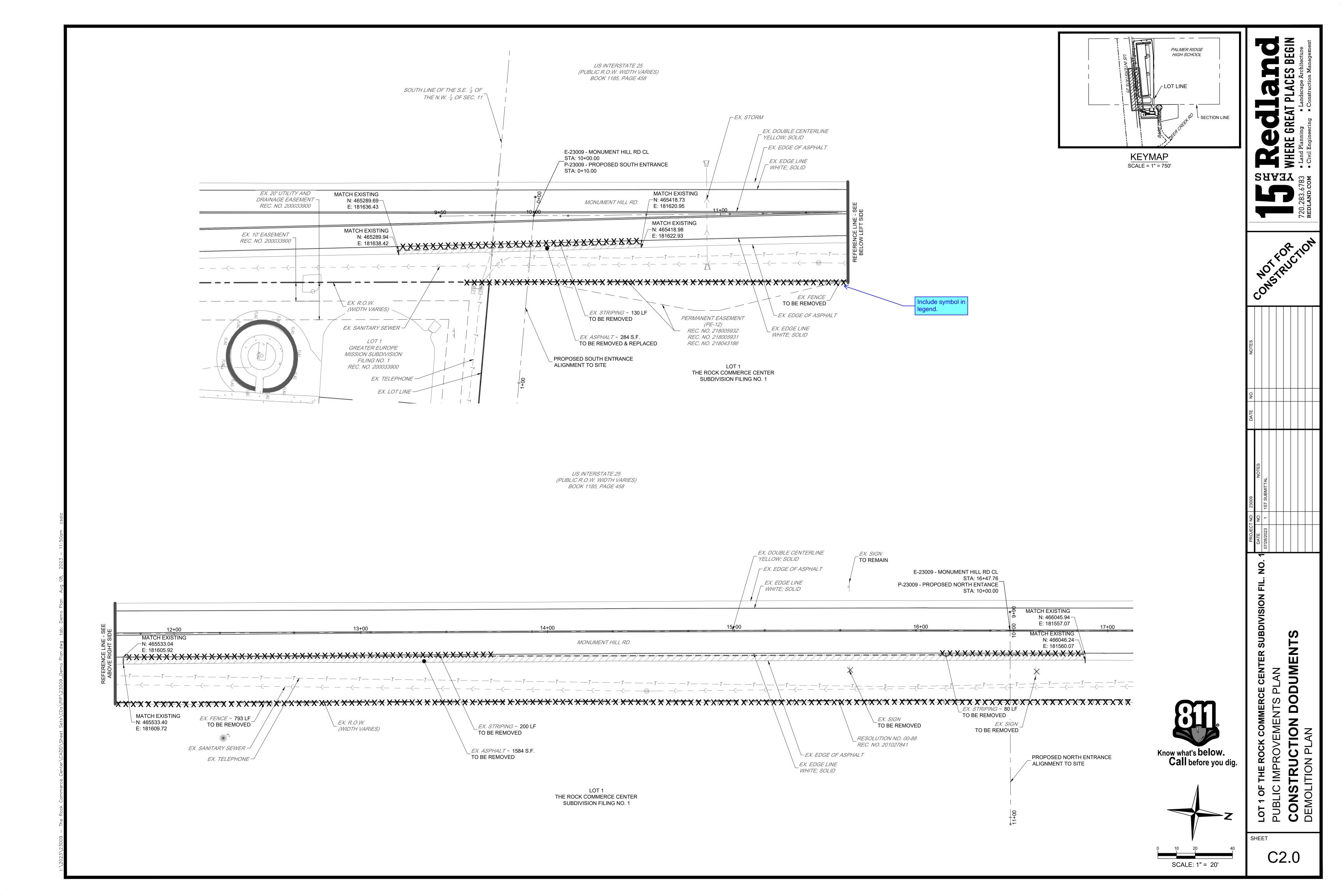
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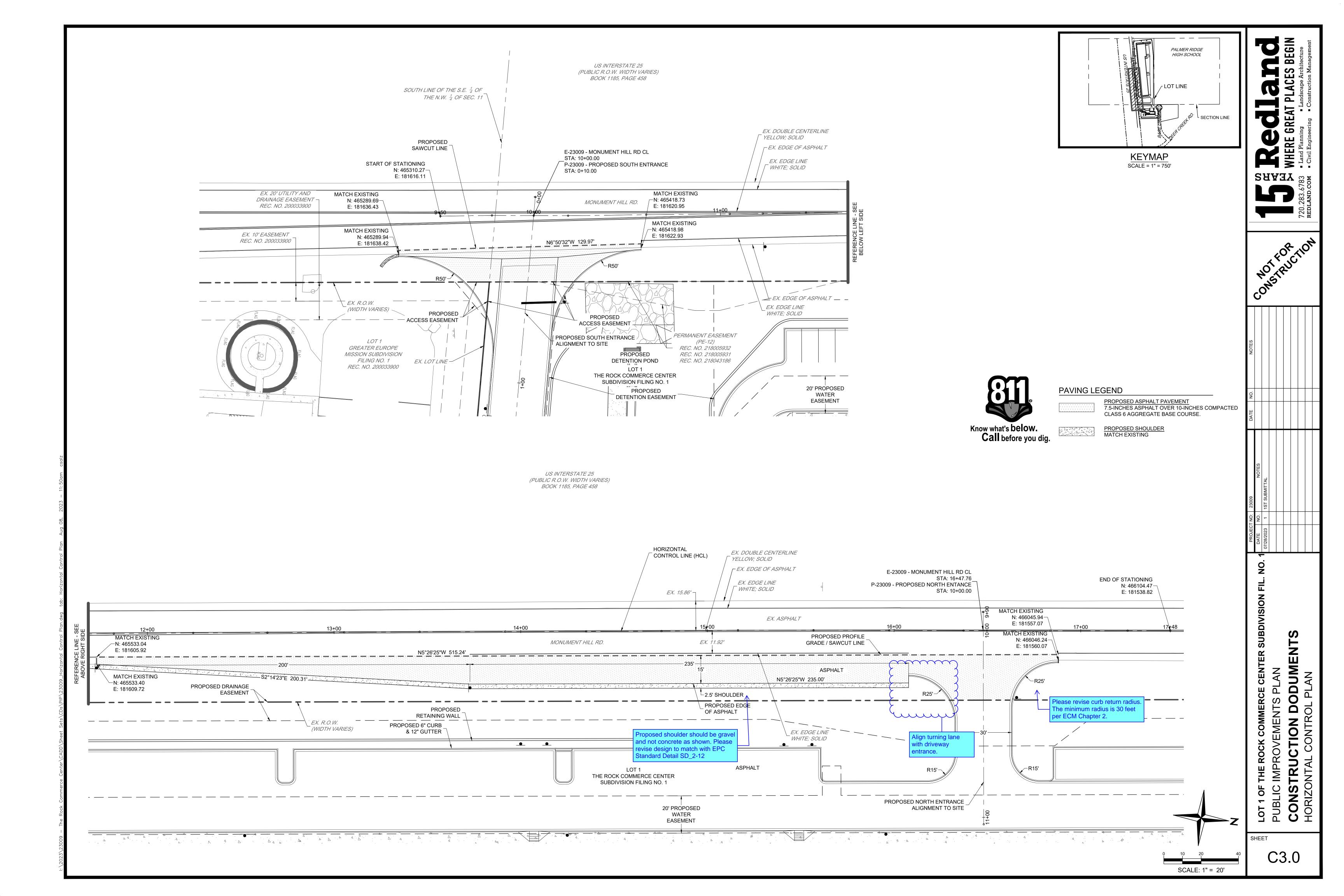
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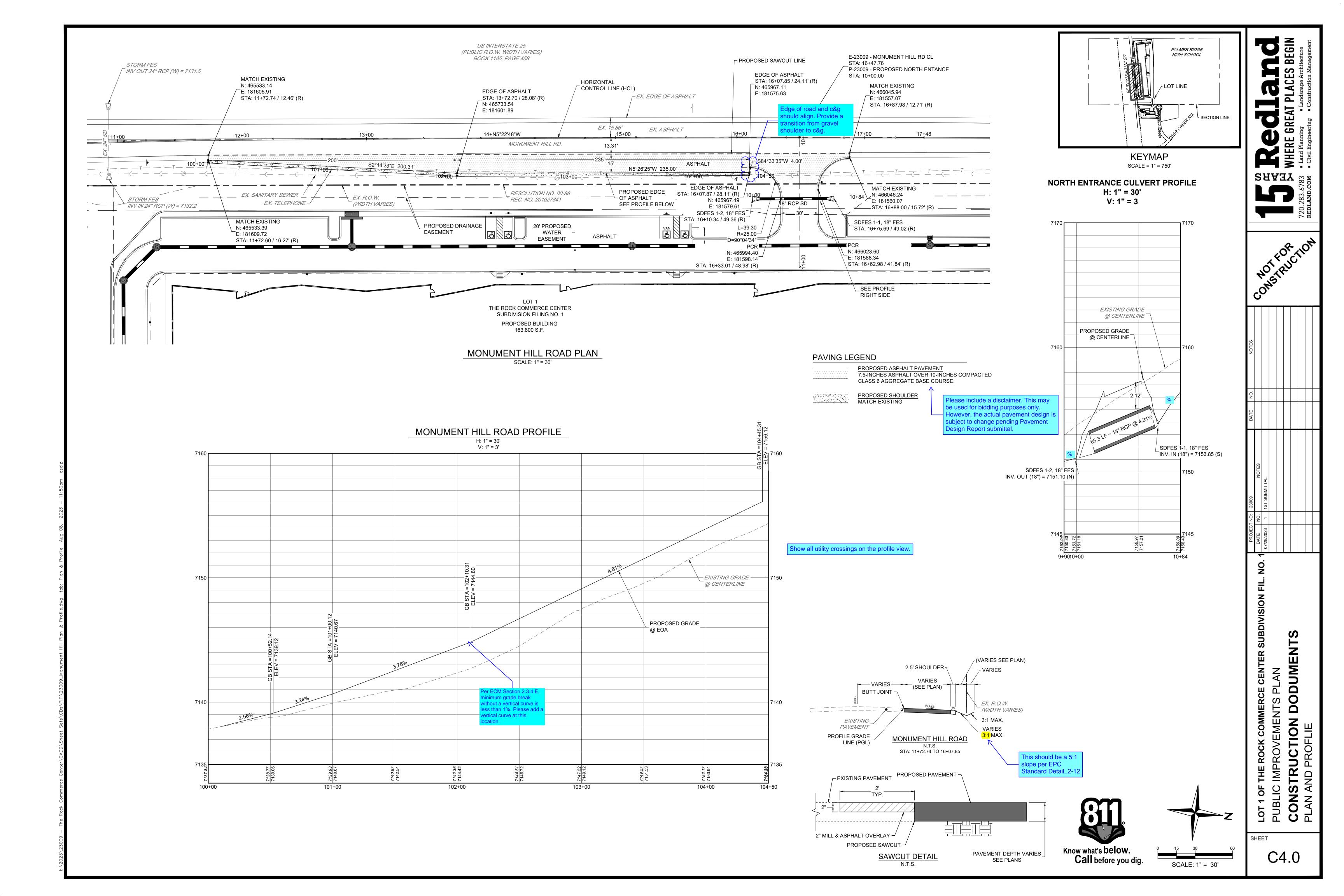
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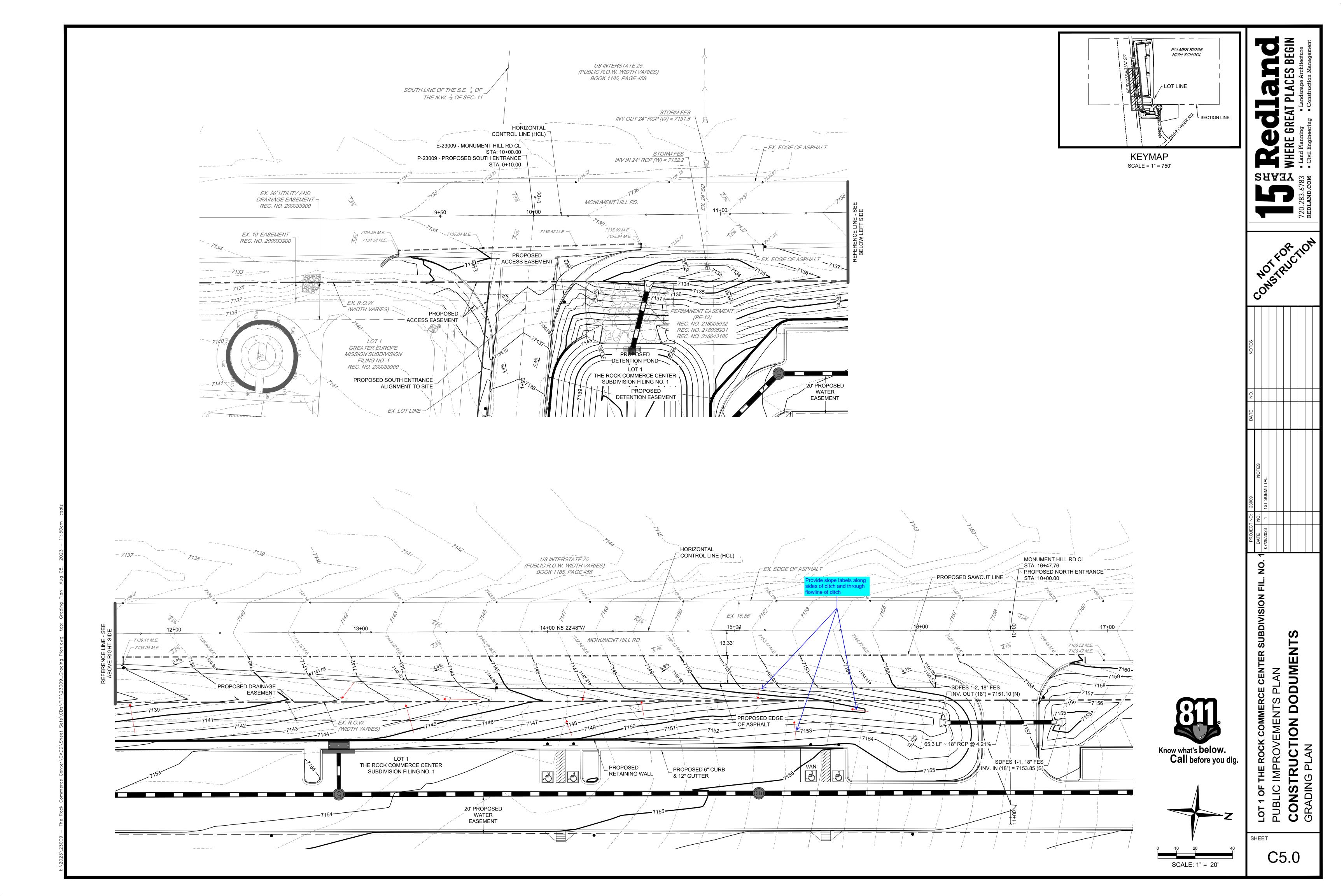
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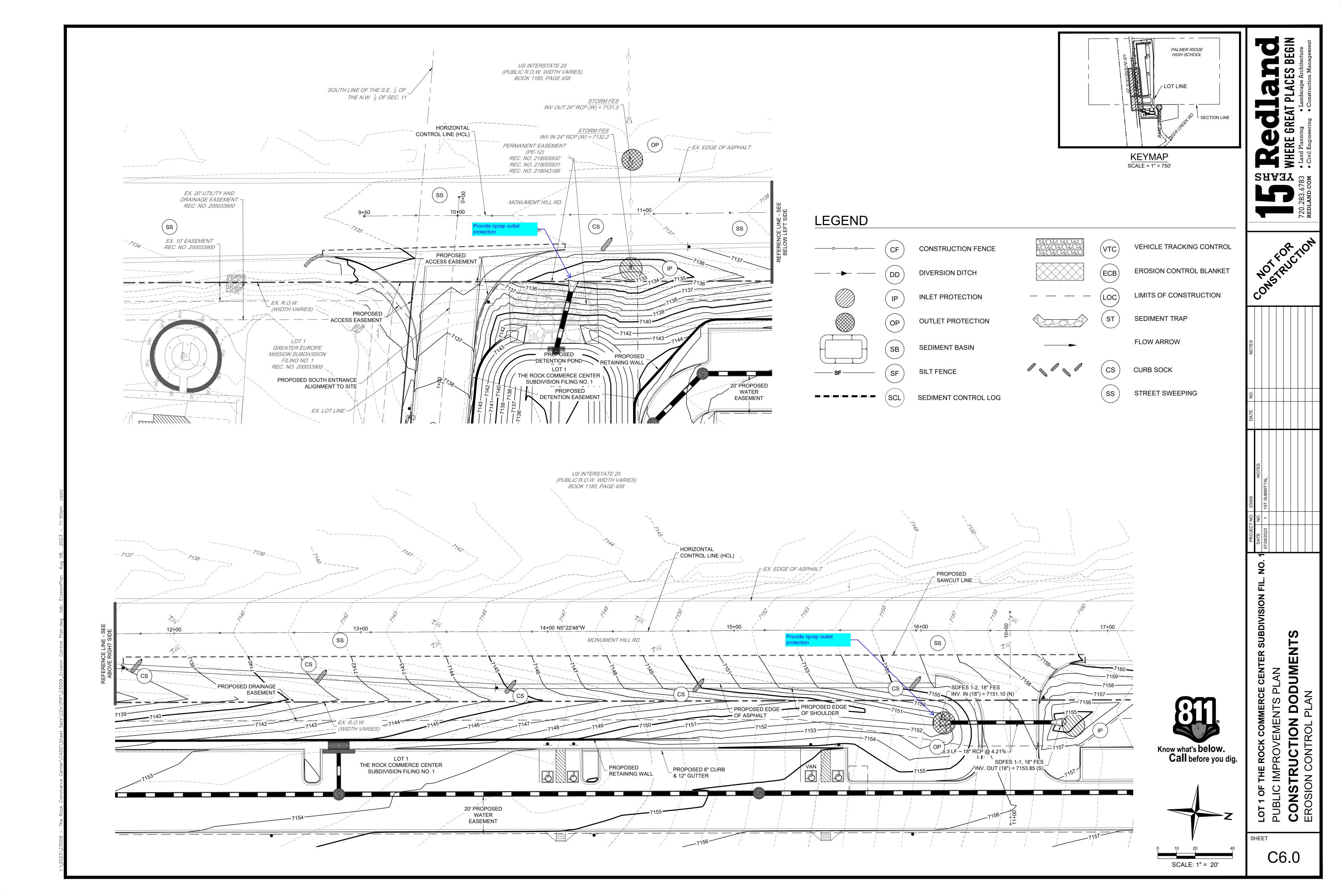
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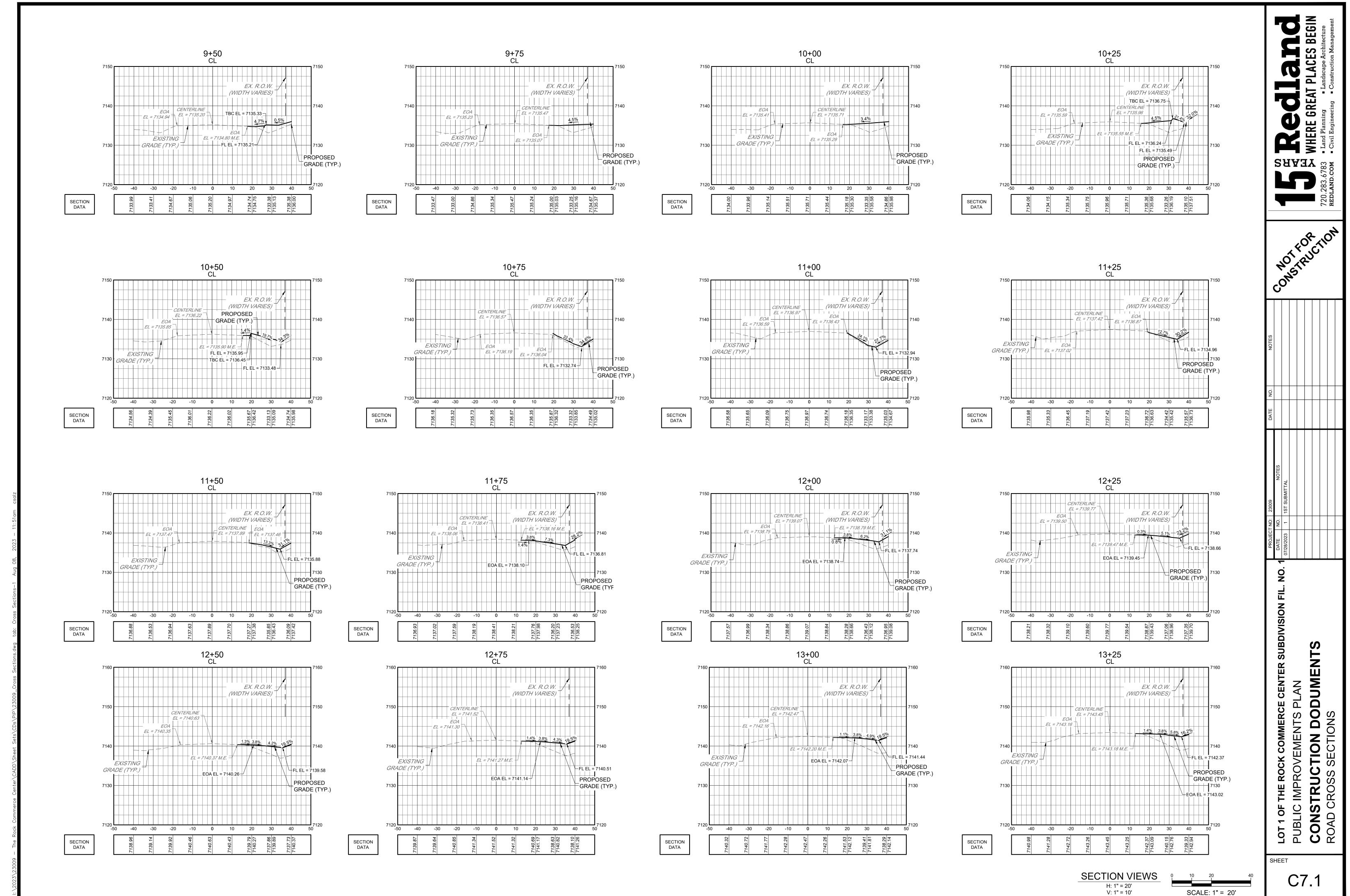








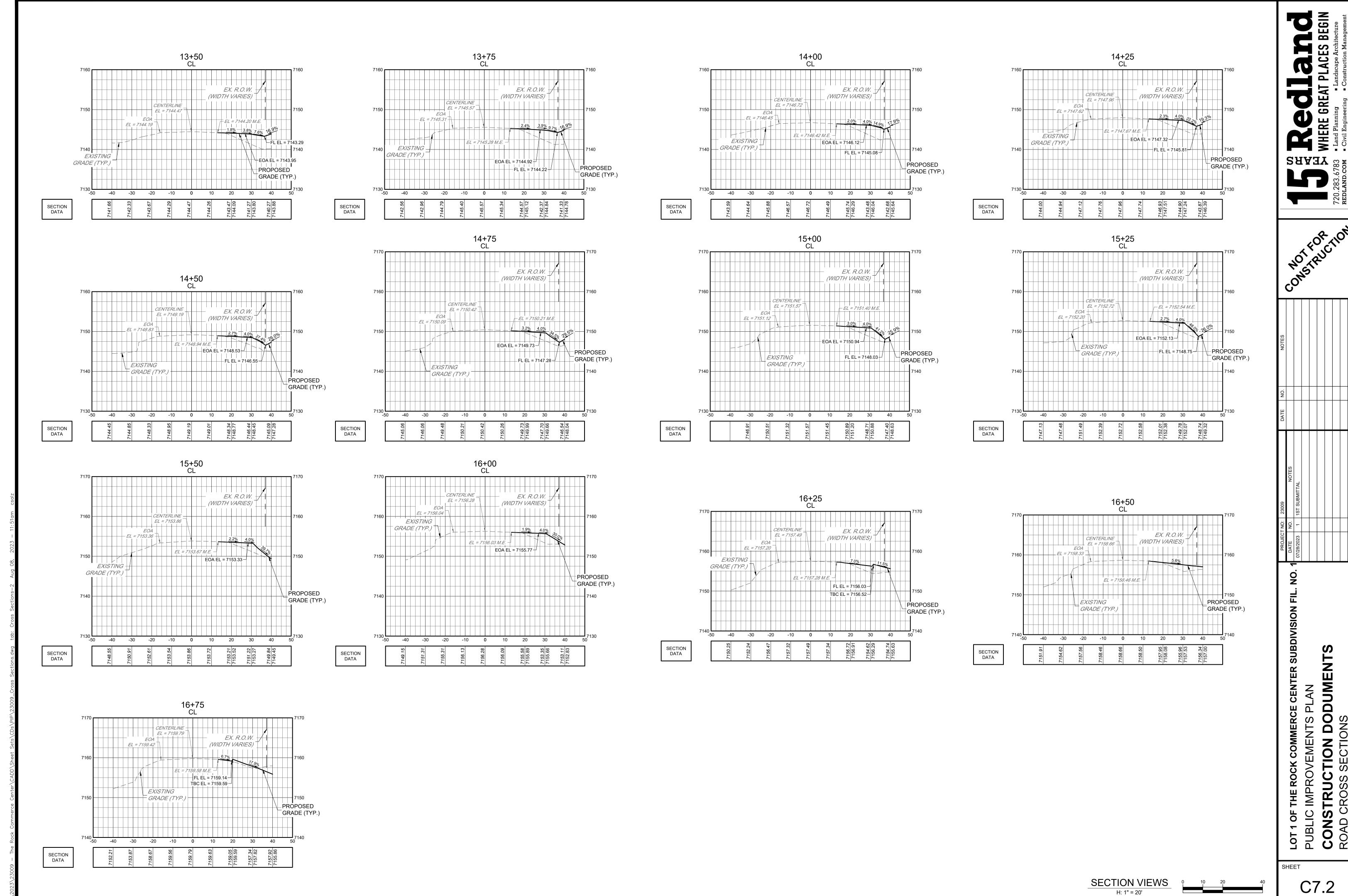




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ONSTRUCTION DODUMENTS
OAD CROSS SECTIONS S S

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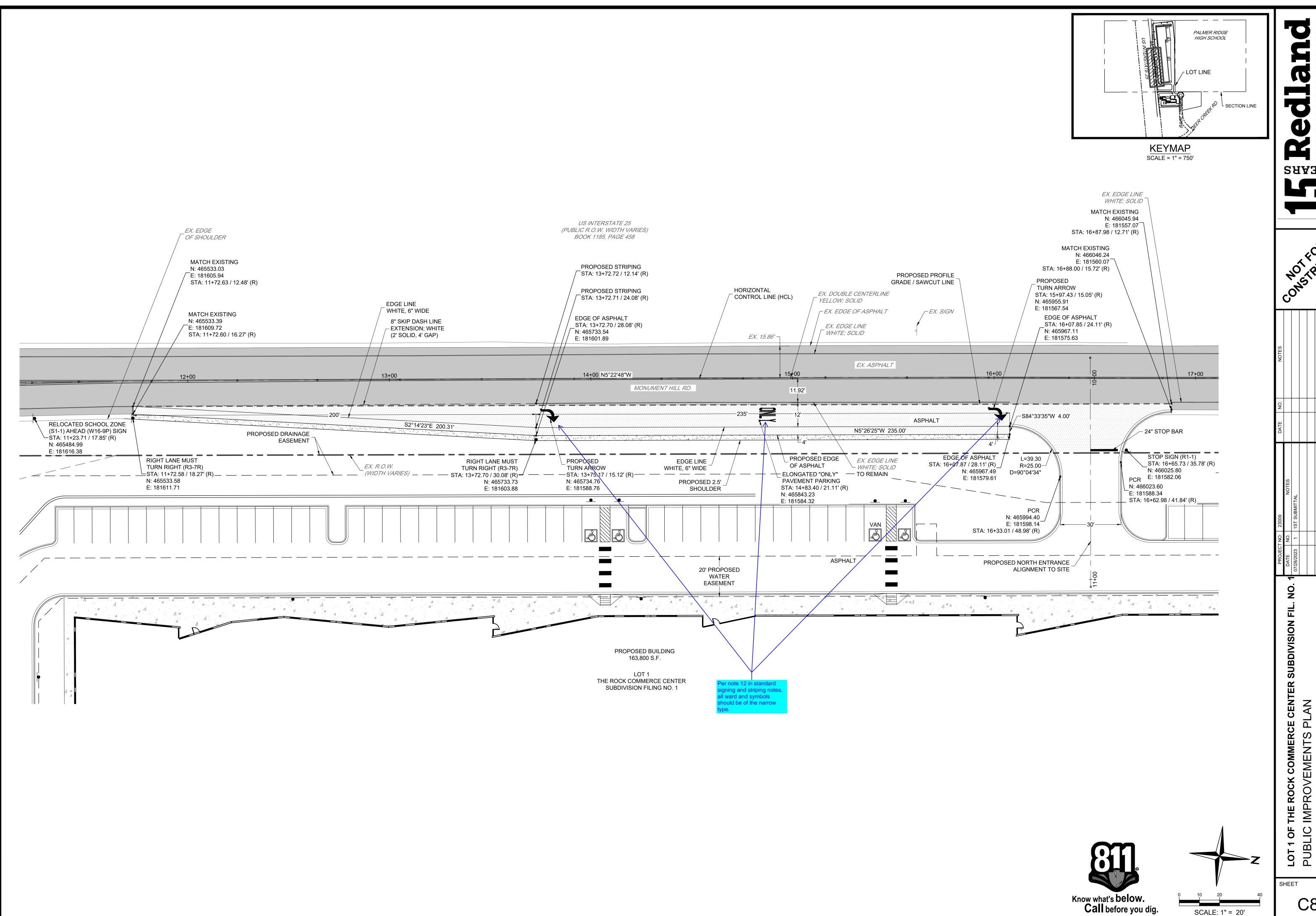


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V: 1" = 10'

DODUMENTS

CONSTRUCTION ROAD CROSS SECTION



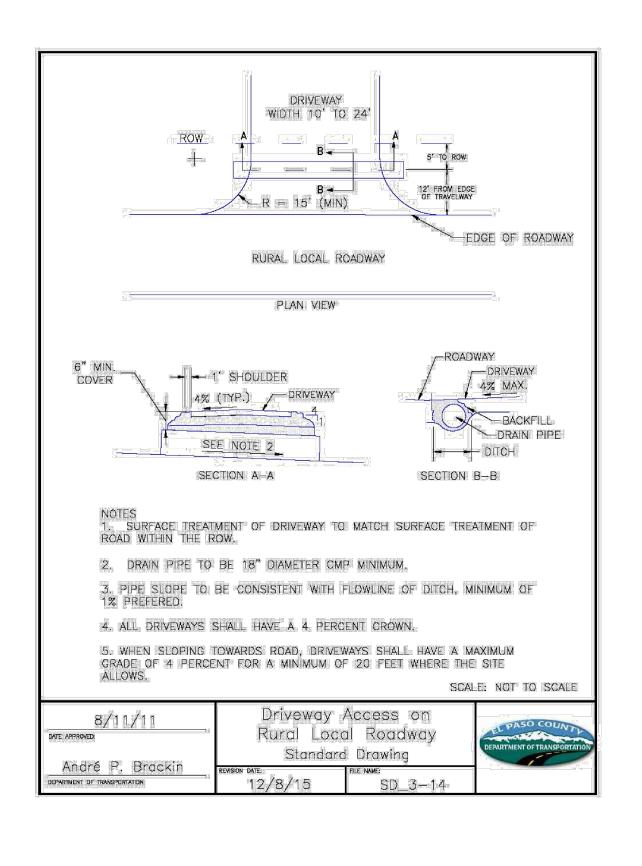
CONSTRUCTION DODUMENTS SIGNAGE AND STRIPING PLAN

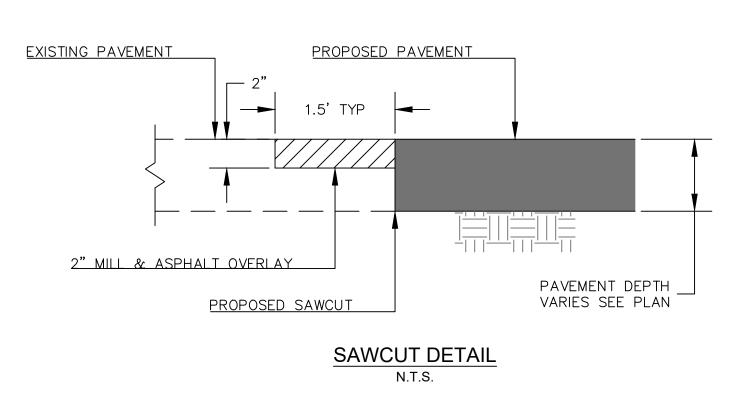
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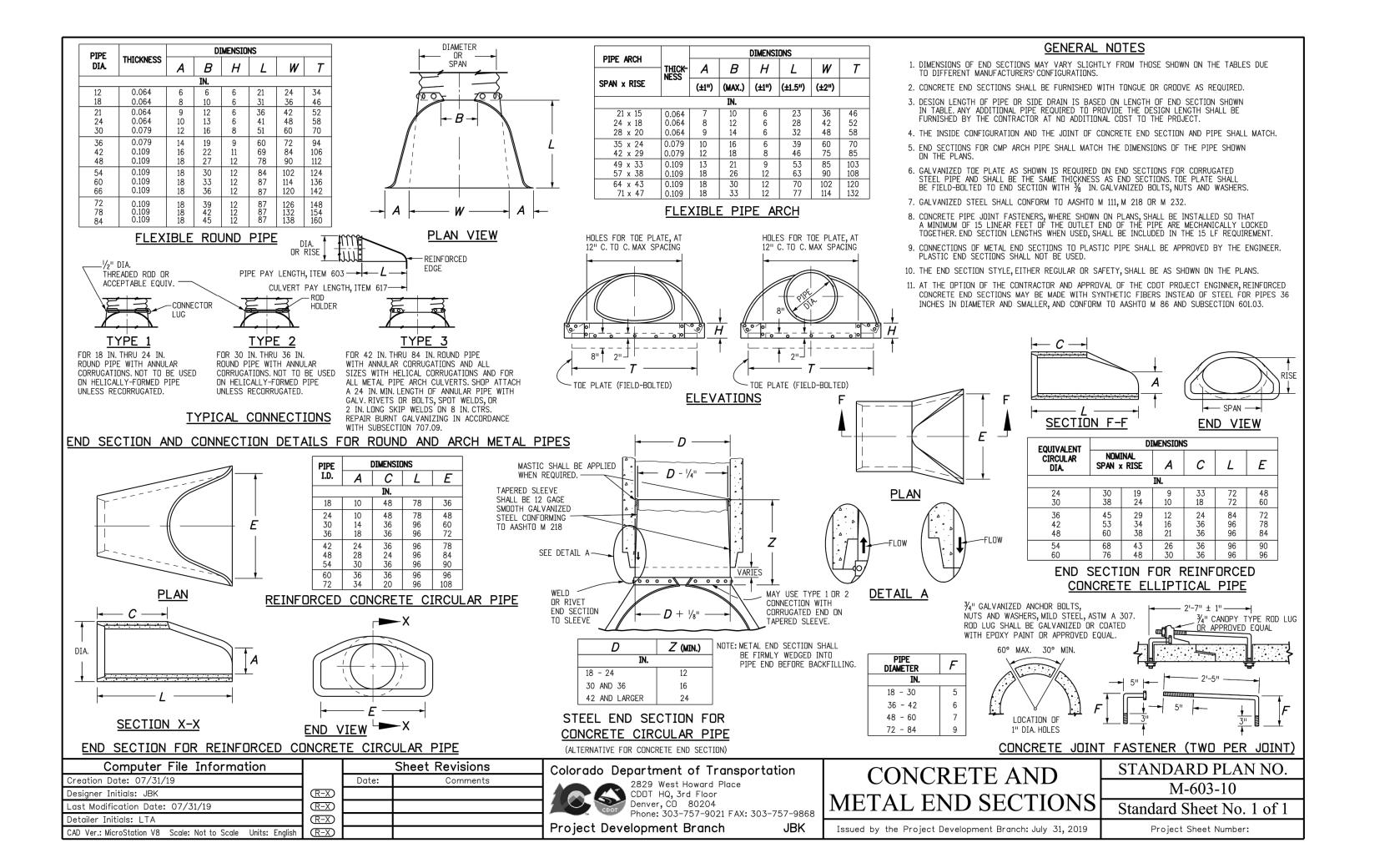
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Photograph IP-1. Inlet protection for a curb opening inlet.

Inlet Protection

Site/Material Management | No

Erosion Control

ediment Control

(various forms)

sediment or temporary stockpile areas to contribute sediment to inlets 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 <u>not</u> a stand-alone BMP and should be used in conjunction with

To function effectively, inlet protection measures must be installed to ensure that flows do not bypass the

inlet protection and enter the storm drain without treatment. However, designs must also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.

When selecting the type of inlet protection, consider factors such as type of inlet (e.g., curb or area, sump or on-grade conditions), traffic, anticipated flows, ability to secure the BMP properly, safety and other

along a roadway, as opposed to silt fence or sediment control logs, which cannot be properly secured in a

Several inlet protection designs are provided in the Design Details. Additionally, a variety of proprietary

proprietary products are used, design details and installation procedures from the manufacturer must be

followed. Regardless of the type of inlet protection selected, inlet protection is most effective when combined with other BMPs such as curb socks and check dams. Inlet protection is often the last barrier

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products are available for inlet protection that may be approved for use by local governments. If

site-specific conditions. For example, block and rock socks will be better suited to a curb and gutter

curb and gutter setting, but are effective area inlet protection measures.

before runoff enters the storm sewer or receiving water.

Design details with notes are provided for these forms of inlet

IP-1. Block and Rock Sock Inlet Protection for Sump or On-grade

IP-2. Curb (Rock) Socks Upstream of Inlet Protection, On-grade

Inlet Protection (IP)

CIP-1. Culvert Inlet Protection

IP-5. Over-excavation Inlet Protection

Propriety inlet protection devices should be installed in accordance with manufacturer specifications.

More information is provided below on selecting inlet protection for sump and on-grade locations.

Inlets Located in a Sump

When applying inlet protection in sump conditions, it is important that the inlet continue to function during larger runoff events. For curb inlets, the maximum height of the protective barrier should be lower than the top of the curb opening to allow overflow into the inlet during larger storms without excessive localized flooding. If the inlet protection height is greater than the curb elevation, particularly if the filter becomes clogged with sediment, runoff will not enter the inlet and may bypass it, possibly causing localized flooding, public safety issues, and downstream erosion and damage from bypassed flows.

Area inlets located in a sump setting can be protected through the use of silt fence, concrete block and rock socks (on paved surfaces), sediment control logs/straw wattles embedded in the adjacent soil and stacked around the area inlet (on pervious surfaces), over-excavation around the inlet, and proprietary products providing equivalent functions.

Inlets Located on a Slope

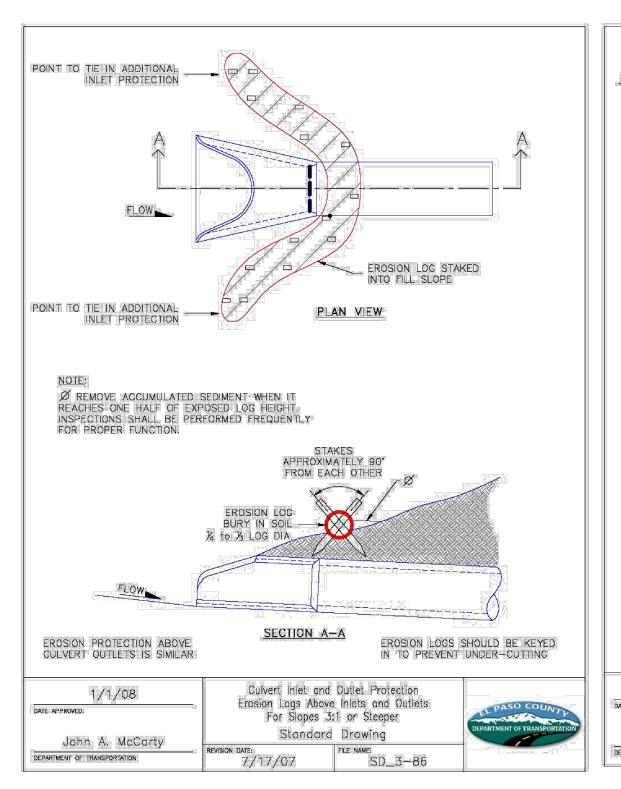
For curb and gutter inlets on paved sloping streets, block and rock sock inlet protection is recommended in conjunction with curb socks in the gutter leading to the inlet. For inlets located along unpaved roads, also see the Check Dam Fact Sheet.

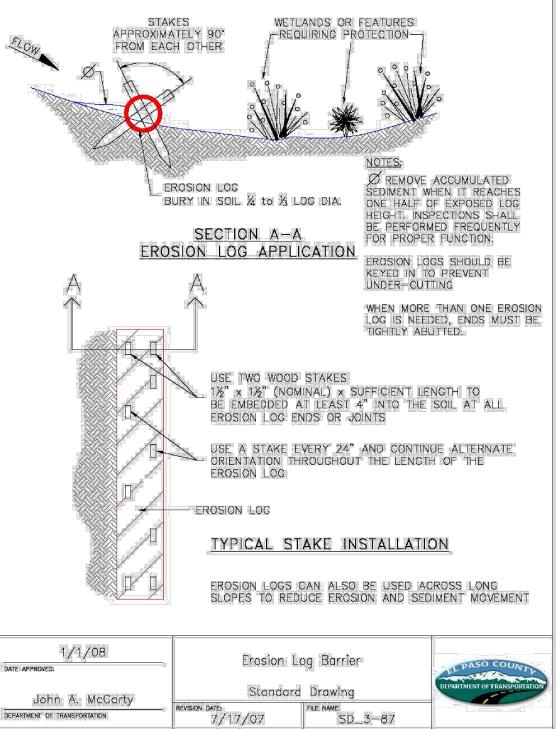
Maintenance and Removal

Inspect inlet protection frequently. Inspection and maintenance guidance includes:

- Inspect for tears that can result in sediment directly entering the inlet, as well as result in the contents of the BMP (e.g., gravel) washing into the inlet.
- Check for improper installation resulting in untreated flows bypassing the BMP and directly entering the inlet or bypassing to an unprotected downstream inlet. For example, silt fence that has not been properly trenched around the inlet can result in flows under the silt fence and directly into the inlet.
- Look for displaced BMPs that are no longer protecting the inlet. Displacement may occur following larger storm events that wash away or reposition the inlet protection. Traffic or equipment may also crush or displace the BMP.
- Monitor sediment accumulation upgradient of the inlet protection.

IP-2	Urban Drainage and Flood Control District	August
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Description

Inlet protection consists of permeable

filter runoff and remove sediment prior to entering a storm drain inlet. Inlet

protection can be constructed from rock socks, sediment control logs, silt fence,

block and rock socks, or other materials approved by the local jurisdiction.

Area inlets can also be protected by

over-excavating around the inlet to

Install protection at storm sewer inlets

that are operable during construction.

Consider the potential for tracked-out

Design and Installation

form a sediment trap.

Appropriate Uses

other upgradient BMPs.

August 2013

barriers installed around an inlet to

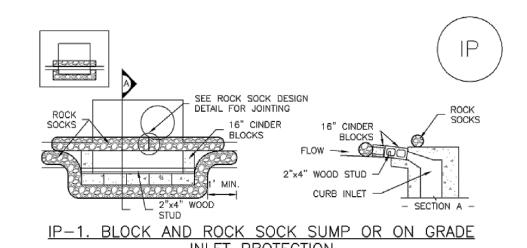
Inlet Protection (IP)

reached final stabilization.

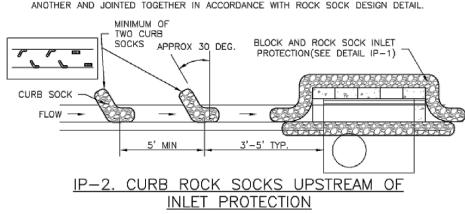
 Remove sediment accumulation from the area upstream of the inlet protection, as needed to maintain BMP effectiveness, typically when it reaches no more than half the storage capacity of the inlet protection. For silt fence, remove sediment when it accumulates to a depth of no more than 6 inches. Remove sediment accumulation from the area upstream of the inlet protection as needed to maintain the functionality of the BMP.

 Propriety inlet protection devices should be inspected and maintained in accordance with manufacturer specifications. If proprietary inlet insert devices are used, sediment should be removed in a timely manner to prevent devices from breaking and spilling sediment into the storm drain. Inlet protection must be removed and properly disposed of when the drainage area for the inlet has

Inlet Protection (IP)



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.



CURB ROCK SOCK INLET PROTECTION INSTALLATION NOTES

- 1. SEE ROCK SOCK DESIGN DETAIL INSTALLATION REQUIREMENTS. 2. PLACEMENT OF THE SOCK SHALL BE APPROXIMATELY 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.
- 3. SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED A MINIMUM OF 5 FEET APART.
- 4. AT LEAST TWO CURB SOCKS IN SERIES ARE REQUIRED UPSTREAM OF ON-GRADE INLETS.

SILT FENCE INLET PROTECTION INSTALLATION NOTES 1. SEE SILT FENCE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS. 2. POSTS SHALL BE PLACED AT EACH CORNER OF THE INLET AND AROUND THE EDGES AT A MAXIMUM SPACING OF 3 FEET. 3. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF SILT FENCE FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.

IP-4. SILT FENCE FOR SUMP INLET PROTECTION

IP-3. ROCK SOCK SUMP/AREA INLET PROTECTION

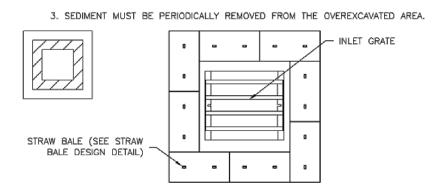
2. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF ROCK SOCKS FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.

SILT FENCE (SEE SILT FENCE DESIGN DETAIL)

Inlet Protection (IP)

IP-5. OVEREXCAVATION INLET PROTECTION OVEREXCAVATION INLET PROTECTION INSTALLATION NOTES 1. THIS FORM OF INLET PROTECTION IS PRIMARILY APPLICABLE FOR SITES THAT HAVE NOT YET REACHED FINAL GRADE AND SHOULD BE USED ONLY FOR INLETS WITH A RELATIVELY

2. WHEN USING FOR CONCENTRATED FLOWS, SHAPE BASIN IN 2:1 RATIO WITH LENGTH ORIENTED TOWARDS DIRECTION OF FLOW.



IP-6. STRAW BALE FOR SUMP INLET PROTECTION

STRAW BALE BARRIER INLET PROTECTION INSTALLATION NOTES 1. SEE STRAW BALE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS. 2. BALES SHALL BE PLACED IN A SINGLE ROW AROUND THE INLET WITH ENDS OF BALES TIGHTLY ABUTTING ONE ANOTHER.

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EXTEND RIPRAP TO HEIGHT OF

- CULVERT OR NORMAL CHANNI DEPTH, WHICHEVER IS LESS

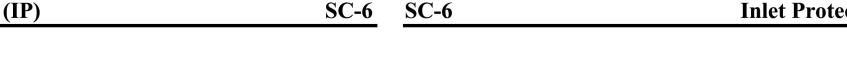
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sweeping technologies to clean their urban streets: traditional mechanical sweepers that utilize a broom and conveyor belt, vacuum-assisted sweepers, and regenerative-air sweepers (those that blast air onto LOT

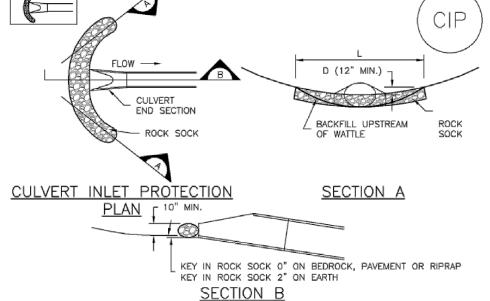
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SC-5

IP-8



CIP-1. CULVERT INLET PROTECTION CULVERT INLET PROTECTION INSTALLATION NOTES

- -LOCATION OF CULVERT INLET PROTECTION.
- 2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING
- CULVERT INLET PROTECTION 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
- 4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS 1/2 THE HEIGHT OF THE ROCK SOCK.
- 5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION. (DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)
- 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.

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GENERAL INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR: -LOCATION OF INLET PROTECTION. -TYPE OF INLET PROTECTION (IP.1, IP.2, IP.3, IP.4, IP.5, IP.6)

2. INLET PROTECTION SHALL BE INSTALLED PROMPTLY AFTER INLET CONSTRUCTION OR PAVING IS COMPLETE (TYPICALLY WITHIN 48 HOURS). IF A RAINFALL/RUNOFF EVENT IS FORECAST, INSTALL INLET PROTECTION PRIOR TO ONSET OF EVENT.

DIFFERENCES ARE NOTED. INLET PROTECTION 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.

3. MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS.

CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN

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. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED AS NECESSARY TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN STORAGE VOLUME REACHES 50% OF CAPACITY, A DEPTH OF 6" WHEN SILT FENCE IS USED, OR 14 OF THE HEIGHT FOR

5. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED, UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.

6. WHEN INLET PROTECTION AT AREA INLETS IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED, OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD) 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.

NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF INLET PROTECTION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY PROPRIETARY INLET PROTECTION METHODS ON THE MARKET, UDFCD NEITHER ENDORSES NOR DISCOURAGES USE OF PROPRIETARY INLET PROTECTION; HOWEVER, IN THE EVENT PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWMP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN IN THE MANUFACTURER'S DETAILS.

NOTE: SOME MUNICIPALITIES DISCOURAGE OR PROHIBIT THE USE OF STRAW BALES FOR INLET PROTECTION. CHECK WITH LOCAL JURISDICTION TO DETERMINE IF STRAW BALE INLET PROTECTION IS ACCEPTABLE.

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Appropriate Uses	
Outlet protection should be used when a	
conveyance discharges onto a disturbed	
area where there is potential for accelerated erosion due to concentrated flow. Outlet	Photograph TOP-1. Riprap outlet protection.
protection should be provided where the vel	ocity at the culvert outlet exceeds the maximum p

Outlet Protection

Yes

Moderate

TOP-1

Erosion Control

Sediment Control

Site/Material Management

erosion due to concentrated flow. Outle protection should be provided where the permissible velocity of the material in the receiving channel.

Temporary Outlet Protection (TOP)

Note: This Fact Sheet and detail are for temporary outlet protection, outlets that are intended to be used for less than 2 years. For permanent, long-term outlet protection, see the Major Drainage chapter of

Design and Installation

Description

conveyance outlet.

Outlet protection helps to reduce erosion

immediately downstream of a pipe,

culvert, slope drain, rundown or other

conveyance with concentrated, high-

velocity flows. Typical outlet protection

consists of riprap or rock aprons at the

Design outlet protection to handle runoff from the largest drainage area that may be contributing runoff during construction (the drainage area may change as a result of grading). Key in rock, around the entire perimeter of the apron, to a minimum depth of 6 inches for stability. Extend riprap 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. See Design Detail OP-1 for additional information.

Maintenance and Removal

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.

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Outlet protection may be removed once the pipe is no longer draining an upstream area, or once the downstream area has been sufficiently stabilized. If the drainage pipe is permanent, outlet protection can be left in place; however, permanent outlet protection should be designed and constructed in accordance with the requirements of the

Major Drainage chapter of Volume 2. Urban Drainage and Flood Control District

NON-WOVEN **GEOTEXTILE** KEY IN TO 2 x D50 SECTION TABLE OP-1. TEMPORARY OUTLET PROTECTION

TOP-2 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

S-11

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES SEE PLAN VIEW FOR
 -LOCATION OF OUTLET PROTECTION. 2. DETAIL IS INTENDED FOR PIPES WITH SLOPE \leq 10%, ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES.

EROSION, AND PERFORM NECESSARY MAINTENANCE

3. TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED TEMPORARY OUTLET PROTECTION INSPECTION AND 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

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

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON 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 AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5	5	4
	5	10	6
12	5	10	4
	10	13	6
18	10	10	6
	20	16	9
	30	23	12
	40	26	16
24	30	16	9
	40	26	9
	50	26	12

TEMPORARY OUTLET PROTECTION PLAN

60 30 16 OP-1. TEMPORARY OUTLET PROTECTION

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Street Sweeping and Cleaning

area. Consider increasing sweeping frequency based on factors such as traffic volume, land use, field

Increase the sweeping frequency for streets with high pollutant loadings, especially in high traffic

Increase the sweeping frequency for streets in special problem areas such as special events, high

5. Maintain cleaning equipment in good working condition and purchase replacement equipment as

6. Operate sweepers at manufacturer recommended optimal speed levels to increase effectiveness.

8. Keep accurate logs of the number of curb-miles swept and the amount of waste collected.

Changes in Street Sweeper Technology (Source: Center for Watershed Protection 2002)

At one time, street sweepers were thought to have great potential to remove stormwater pollutants from

Street sweeping gradually fell out of favor, largely as a result of performance monitoring conducted as

sweepers were not very effective in reducing pollutant loads (USEPA, 1983). The primary reason for

the mediocre performance was that mechanical sweepers of that era were unable to pick up fine-grained

performance of sweepers is constrained by that portion of a street's stormwater pollutant load delivered

sediment particles that carry a substantial portion of the stormwater pollutant load. In addition, the

from outside street pavements (e.g., pollutants that wash onto the street from adjacent areas or are

considerably since the days of the NURP testing. Today, communities have a choice in three basic

directly deposited on the street by rainfall). Street sweeping technology, however, has evolved

urban street surfaces and were widely touted as a stormwater treatment practice in many communities.

part of the National Urban Runoff Program (NURP). These studies generally concluded that street

10. Do not store swept material along the side of the street or near a storm drain inlet.

needed. Old sweepers should be replaced with more technologically advanced sweepers (preferably

observations of sediment and trash accumulation, proximity to watercourses, etc. For example:

Conduct street sweeping prior to wetter seasons to remove accumulated sediments.

and industrial areas.

litter or erosion zones.

For more information, see

3. Perform street cleaning during dry weather if possible.

9. Dispose of street sweeping debris and dirt at a landfill.

4. Avoid wet cleaning the street; instead, utilize dry methods where possible.

7. Regularly inspect vehicles and equipment for leaks and repair promptly.

regenerative air sweepers) that maximize pollutant removal.

Rock Sock (RS)

August 2013

Description

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.

Appropriate Uses Rock socks can be used at the perimeter of a disturbed area to control localized

socks can also be used as perimeter controls. sediment loading. A benefit of rock socks as opposed to other perimeter controls is that they do not have to be trenched or staked into the

ground; therefore, they are often used on roadway construction projects where paved surfaces are present.

When rock socks are used as perimeter controls, the maximum recommended tributary drainage area per 100 lineal feet of rock socks is approximately 0.25 acres with disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. A rock sock design detail and notes are provided in Detail RS-1. Also see the Inlet Protection Fact Sheet for design and installation guidance when rock socks are used for inlet protection and in the curb line.

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

Maintenance and Removal

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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

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Once upstream stabilization is complete, rock socks and accumulated sediment should be removed and properly

he rock sock to one-half of the sock's	Rock Sock	
on is complete, rock socks and ould be removed and properly disposed.	Functions	
	Erosion Control	No
	Sediment Control	Yes
	Site/Material Management	No
Urban Drainage and Flood Control District		

Photograph RS-1. Rock socks placed at regular intervals in a curb line can help reduce sediment loading to storm sewer inlets. Rock

Use rock socks in inlet protection applications when the construction of a roadway is substantially complete and the roadway has been directly connected to a receiving storm system.

Design and Installation

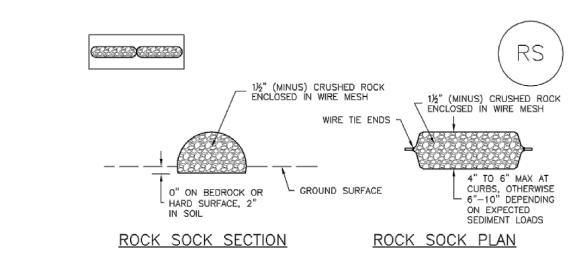
drivers and street maintenance workers of their presence.

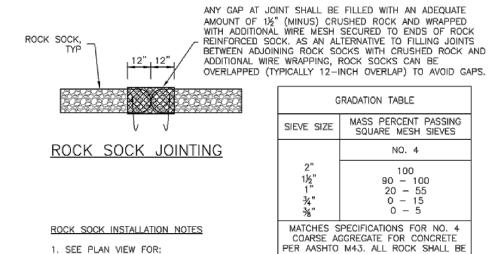
has accumulated behind the rock sock to one-half of the s

SC-5

RS-2

Rock Sock (RS)





PER AASHTO M43. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES. -LOCATION(S) OF ROCK SOCKS. 2. CRUSHED ROCK SHALL BE 11/2" (MINUS) IN SIZE WITH A FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON THIS SHEET (1/2" MINUS). 3. WIRE MESH SHALL BE FABRICATED OF 10 GAGE POULTRY MESH, OR EQUIVALENT, WITH A MAXIMUM OPENING OF 1/2", RECOMMENDED MINIMUM ROLL WIDTH OF 48" 4. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6" CENTERS ALONG ALL JOINTS AND AT 2" CENTERS ON ENDS OF SOCKS. 5. SOME MUNICIPALITIES MAY ALLOW THE USE OF FILTER FABRIC AS AN ALTERNATIVE TO WIRE MESH FOR THE ROCK ENCLOSURE. RS-1. ROCK SOCK PERIMETER CONTROL

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Rock Sock (RS)

ROCK SOCK 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

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

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

4. ROCK SOCKS SHALL BE REPLACED IF THEY BECOME HEAVILY SOILED, OR DAMAGED

STABILIZED AND APPROVED BY THE LOCAL JURISDICTION

IN THE MANUFACTURER'S DETAILS.

5. SEDIMENT ACCUMULATED UPSTREAM OF ROCK SOCKS SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 1/2 OF THE HEIGHT OF THE ROCK SOCK. 6. ROCK SOCKS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS

7. WHEN ROCK SOCKS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION. (DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF ROCK SOCK INSTALLATION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY OTHER SIMILAR PROPRIETARY PRODUCTS ON THE MARKET. UDFCD NEITHER NDORSES NOR DISCOURAGES USE OF PROPRIETARY PROTECTION PRODUCTS; HOWEVER, IN THE EVEN PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWMP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN

Description

Street Sweeping and Cleaning

Street sweeping uses mechanical pavemen cleaning practices to reduce sediment, litter and other debris washed into storm sewers by runoff. This can reduce pollutant loading to receiving waters and in some cases reduce clogging of storm sewers and prolong the life of infiltration oriented BMPs and reduce clogging of

outlet structures in detention BMPs.

Different designs are available with typical sweepers categorized as a broom and conveyor belt sweeper, wet or dry vacuum-assisted sweepers, and regenerative-air sweepers. The effectiveness of street sweeping is dependent upon particle loadings in the area being swept, street texture, moisture conditions, parked car management, equipment operating conditions and



lovember removed nearly 40,690 cubic yards of sediment/debris from Denver streets in 2009. Photo courtesy of Denver Public Works.

Appropriate Uses

frequency of cleaning (Pitt et al. 2004).

Street sweeping is an appropriate technique in urban areas where sediment and litter accumulation on streets is of concern for aesthetic, sanitary, water quality, and air quality reasons. From a pollutant loading perspective, street cleaning equipment can be most effective in areas where the surface to be cleaned is the major source of contaminants. These areas include freeways, large commercial parking lots, and paved storage areas (Pitt et al. 2004). Where significant sediment accumulation occurs on pervious surfaces tributary to infiltration BMPs, street sweeping may help to reduce clogging of infiltration media. In areas where construction activity is occurring, street sweeping should occur as part of construction site stormwater management plans. Vacuuming of permeable pavement systems is also considered a basic routine maintenance practice to maintain the BMP in effective operating condition. See the maintenance chapter for more information on permeable pavement systems. Not all sweepers are appropriate for this application.

Practice Guidelines¹

- 1. Post street sweeping schedules with signs and on local government websites so that cars are not parked on the street during designated sweeping days.
- 2. Sweeping frequency is dependent on local government budget, staffing, and equipment availability, but monthly sweeping during non-winter months is a common approach in the metro Denver urban

¹ Practice guidelines adapted from CASQA (2003) California Stormwater BMP Handbook, Practice SC-70 Road and Street

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SWC-1

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SWC-2 Urban Storm Drainage Criteria Manual Volume 3 Urban Storm Drainage Criteria Manual Volume 3

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the pavement to loosen sediment particles and vacuum them into a hopper).

http://www.cwp.org/Resource_Library/Center_Docs/PWP/ELC_PWP121.pdf