

# INTERSTATE 25 / CIMARRON INTERCHANGE PROJECT

## AESTHETICS PLANS AND DETAILS

DRAFT  
MAY 22 2014

COVER

|            |   |
|------------|---|
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| File Name:   |      | Date:           | Comments | Init. |  1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298<br>Region 2 DW | No Revisions:    | Designer: KRS                                   | Structure Numbers | IM0252-423       |
| Horiz. Scale: As Noted Vert. Scale: As Noted   |      |                 |          |       |   | Revised:         | Detailer: JDA/AM                                |                   | 19039            |
| Unit Information Unit Leader Initials  |      |                 |          |       |   | Void:            |   | Subset Sheets:    | Sheet Number     |
|  associates inc. 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |      |                 |          |       |   |                  |   |                   |                  |

| ITEM                       | COLOR   |
|----------------------------|---|
| <b>I-25 OVER CIMARRON</b>  |   |
| ABUTMENT PANELS            | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 |
| DECORATIVE PANELS          | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 |
| PANEL CAP/DECORATIVE BANDS | 'BROWN' CONCRETE STAIN TO MATCH FEDERAL COLOR 30227 |
| GIRDERS (CONCRETE)         | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 |
| GIRDERS (STEEL)            | 'BEIGE' CONCRETE PAINT TO MATCH FEDERAL COLOR 33522 |
| BRIDGE RAIL - CONCRETE     | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 |
| BRIDGE RAIL - TYPE 10M     | GALVANIZED STEEL                                    |
| BRIDGE ORNAMENTAL RAIL     | POWDER COATED STEEL FEDERAL COLOR 37038             |
| STREET LIGHT POLE BASES    | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 |
| BRIDGE PIERS               | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 |

**NON- STANDARD BRIDGE**  
**CIMARRON OVER MONUMENT CREEK**

|  |   |
|--|---|
| DECORATIVE PANELS                              | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| PANEL CAP AND FOOTER                           | 'BROWN' CONCRETE STAIN TO MATCH FEDERAL COLOR 30227   |
| HAND-STAINED STONE COLUMNS, ABUTMENT MONUMENTS | 50 % 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522, 30% ' TAN' CONCRETE STAIN TO MATCH FEDERAL COLOR 33448, AND 20% 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 33711 |
| DECORATIVE BAND                                | 'BROWN' CONCRETE STAIN TO MATCH FEDERAL COLOR 30227   |
| HAND-STAINED STONE PIER CAP                    | 50 % 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522, 30% ' TAN' CONCRETE STAIN TO MATCH FEDERAL COLOR 33448, AND 20% 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 33711 |
| PIERS  | 'TAN' CONCRETE STAIN TO MATCH FEDERAL COLOR 33448   |
| GIRDERS (CONCRETE)                             | 'TAN' CONCRETE STAIN TO MATCH FEDERAL COLOR 33448   |
| GIRDERS (STEEL)                                | 'TAN' PAINT TO MATCH FEDERAL COLOR 33448  |
| BRIDGE RAIL - CONCRETE                         | 'GOLDEN TAN' CONCRETE STAIN TO MATCH FEDERAL COLOR 33711  |
| BRIDGE RAIL - TYPE 10M                         | GALVANIZED STEEL  |
| LIGHT POLE BASES                               | 'TAN' CONCRETE STAIN TO MATCH FEDERAL COLOR 33448   |

- NOTES:
- ALL COLORS SHALL HAVE A MOCK UP 10' X 10' PANEL APPROVED BEFORE COLORS ARE APPLIED TO ANY STRUCTURE
  - COLOR SELECTION BASED OFF THE I-25 THROUGH COLORADO SPRINGS AESTHETIC GUIDELINES.
  - STRUCTURAL CONCRETE COATING SHALL BE USED ON THE STRUCTURE AND WALL COPINGS
  - SILICONE ACRYLIC CONCRETE SEALER SHALL BE USED ON WALLS

| ITEM   | COLOR   |
|--|---|
| <b>RETAINING WALLS</b>   |   |
| CAST -IN -PLACE CONCRETE   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 OR 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313  |
| PRECAST CONCRETE FACING  | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 OR 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313  |
| DECORATIVE PANELS  | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| CONCRETE BLOCK FACING  | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 OR 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313  |
| FRACTURED FIN W/VERTICAL STRIPE (I-25)   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 OR 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313  |
| RANDOM ASHLAR WALLS (I-25)   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 OR 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313  |
| HAND-STAINED STONE WALLS   | 50 % 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522, 30% ' TAN' CONCRETE STAIN TO MATCH FEDERAL COLOR 33448, AND 20% 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 33711 |
| **SEE SHEETS 5.0 AND 5.1 FOR RETAINING WALL FINISH TYPE AND COLORS BY LOCATION |   |

| ITEM                      | COLOR   |
|---------------------------|---|
| <b>HIGHWAY GUARDRAIL</b>  |   |
| TYPE 10 GUARDRAIL         | GALVANIZED STEEL                                    |
| TYPE 3 (W-BEAM) GUARDRAIL | GALVANIZED STEEL                                    |
| MEDIAN BARRIER (TYPE 7 )  | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 |

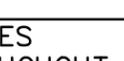
| ITEM                             | COLOR  |
|----------------------------------|--|
| <b>HIGHWAY LIGHTING</b>          |  |
| CURVED TAPERED DAVIT LIGHT POLES | SPUN ALUMINUM  |
| BREAKAWAY LIGHT POLE BASES       | SPUN ALUMINUM  |
| COBRA LUMINARIES                 | SPUN ALUMINUM  |
| I-25 ACORN LIGHTS                | TO MATCH AESTHETIC STYLE AND COLOR OF CIMARRON BRIDGE OVER RR/CONEJOS ST. PAINT TO MATCH FEDERAL COLOR 34108 |

| ITEM                           | COLOR                                |
|--------------------------------|--------------------------------------|
| <b>HIGHWAY SIGNAGE</b>         |                                      |
| SIGN STRUCTURES                | 'BROWN' TO MATCH FEDERAL COLOR 10075 |
| GROUND SIGN SUPPORTS           | 'BROWN' TO MATCH FEDERAL COLOR 10075 |
| BACK OF SIGNS                  | 'BROWN' TO MATCH FEDERAL COLOR 10075 |
| FRONT OF SIGNS                 | PER CDOT STANDARD                    |
| CATWALKS/WALKWAY GRATE(IF ANY) | 'BROWN' TO MATCH FEDERAL COLOR 10075 |

\*NOTE: SIGNS SHALL NOT BE MOUNTED ON ANY BRIDGE STRUCTURES.

| ITEM                        | COLOR                                    |
|-----------------------------|--|
| <b>TRAFFIC SIGNALS</b>      |  |
| TRAFFIC SIGNAL POLES        | 'DARK GREY' TO MATCH FEDERAL COLOR 26122 |
| TRAFFIC SIGNAL POLE BASES   | 'DARK GREY' TO MATCH FEDERAL COLOR 26122 |
| SIGNAL HOUSING              | 'DARK GREY' TO MATCH FEDERAL COLOR 26122 |
| ILLUMINATED SIGNS (IF USED) | 'DARK GREY' TO MATCH FEDERAL COLOR 26122 |

**COLOR SWATCHES**

|   |                              |
|---|------------------------------|
|  | GOLDEN TAN<br>FEDERAL #33711 |
|  | BEIGE<br>FEDERAL #33522      |
|  | TAN<br>FEDERAL #33448        |
|  | FLESH FEDERAL #30313         |
|  | BROWN FEDERAL #30227         |
|  | FEDERAL #37038               |
|  | FEDERAL #34108               |
|  | FEDERAL #10075               |
|  | FEDERAL #26122               |

|  |   |                  |  |                  |                   |                  |
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| File Name:                                   |   | Date:            | No Revisions:  | IM0252-423       |                   |                  |
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| Unit Information Unit Leader Initials        |   | Init.:           | Void:  | Detailer: JDA/AM | Subset Sheets:    | Sheet Number 1.1 |

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**CONCRETE STAINING SPECIFICATIONS**

**DESCRIPTION**

This work consists of staining all concrete on the project, including hand staining of rock formliners.

**MATERIALS**

The stain shall be an aqueous solution containing salts of iron and manganese and other trace elements including copper and zinc. Involving an artificially accelerated, multi-step oxidation process. The material shall contain no caustic or alkaline chemicals. The material shall be manufactured as a concentrate that can be diluted with potable water to achieve the desired color. The stain shall consist of a base and as many as 6 accent stains. The base stain shall be an organic based non-toxic iron oxide derivative that provides a spectrum of earth tones (brown, light browns, reddish browns). Color hardeners shall be used to achieve a wider variety of earth tones. Colors shall be such that alteration of the color and further color development after initial application can be accomplished.

**CONSTRUCTION REQUIREMENTS**

Prior to application of stain, test plots shall be set up in an inconspicuous location, as directed by the Engineer, to test several concentrations of stain. Parties involved in the approval of the staining shall be notified 5 days prior to applying the stain to the test area. For the hand stained rock formliners, test staining will ensure color compatibility with the characteristic rock. Stain shall be applied to a minimum of (2) 10-foot X 10-foot test locations. The accent stain shall be used to provide further accent and highlighting of the wall to blend it into the adjacent surrounding landscape. The stain colors shall be applied in a random fashion in order to create the appearance of real rock and to avoid blocks of adjacent rock 'faces' being stained the same color. Rock 'faces' shall be stained to avoid the appearance of sudden color changes within a single rock 'face', although the gradual change of hues/tones within rock 'faces' is encouraged. Grout lines shall be left unstained.

The accent stain shall be in accordance with the approved color samples. The stain shall be applied in accordance with the printed instructions of the stain material manufacturer. Caution shall be exercised to provide all necessary protection to the body during application as recommended by the manufacturer. A copy of such printed material shall be furnished to the Engineer prior to application of the material.

After application of the test stain, sites shall remain undisturbed and allowed to set color for a period of 30 days. After 30 days a determination shall be made to the concentrations of stain required on the project and for individual areas within the project. Concentrations of stain may need to be adjusted within the ranges approved to adjust to specific on site conditions. Written approval from the Engineer and CDOT is required.

Prior to applying the stain, all concrete surfaces shall be cleaned by high pressure washing with water. Staining shall be performed once the cleaning is complete and freed of soil or debris. The solution should be applied directly to a surface of the item being stained.

Do not apply stain if winds exceed 15 mph or stronger, with no anticipated precipitation in the forecast for 12 hours. Best results occur if stain is applied when temperatures are 70 degrees Fahrenheit or higher and if temperatures remain with a 10 degree margin for 30 days. If applying in cooler temperatures, allow stain to dry completely before surface becomes moist. Material shall be stored in an air tight container, in a cool dry space.

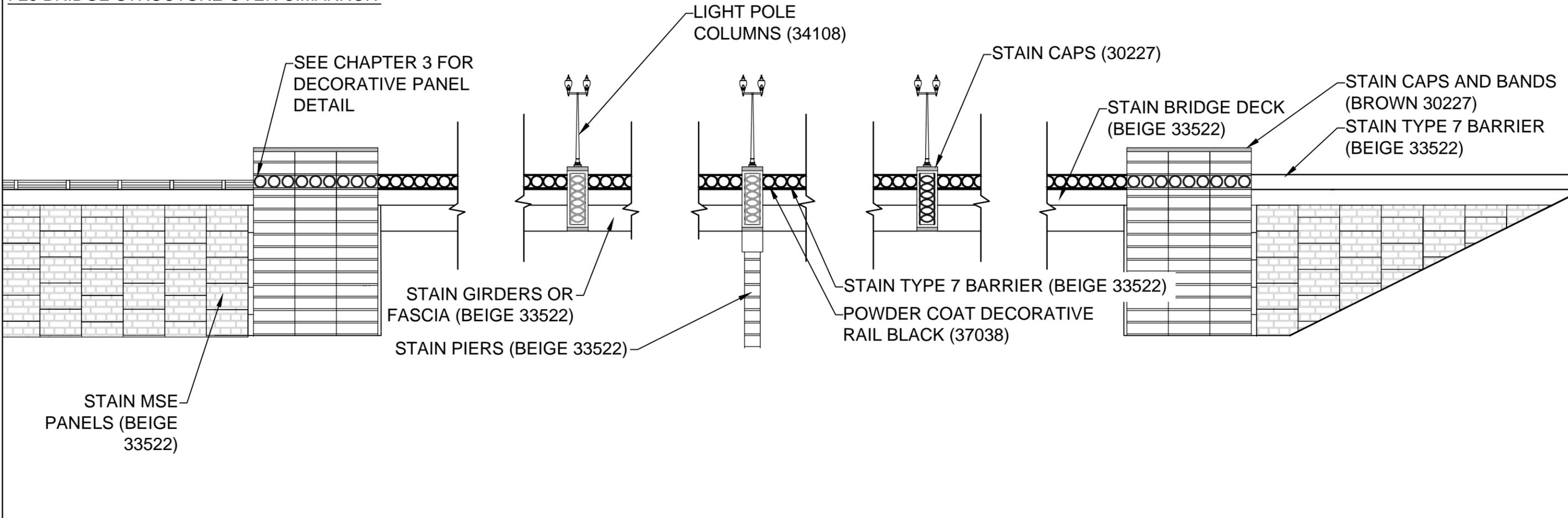


EXAMPLE OF DESIRED HAND-STAINED ROCK COLORATION

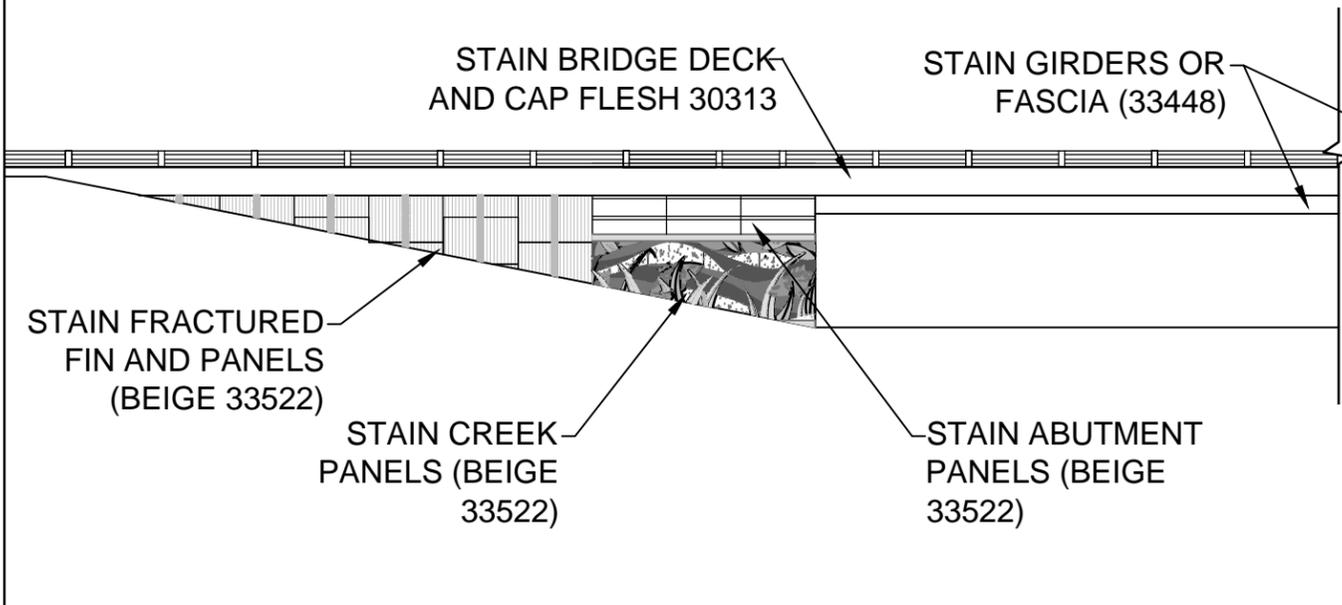
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|--|----------|--|--|---------------|-----------------|--|--|------------------|----------|-------|--|--|--|--|--|--|--|--|--|--|--|--|---------------------------------------|--|------------------|--|------------------|--|
| Sheet Revisions  |          |  |  |               |                 |  |  |                  |          |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                  |  |
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| File Name:   |          |  1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298   |  | No Revisions: |                 | COLORS AND FINISHES<br>CONCRETE STAINING<br>SPECIFICATIONS |  | IM0252-423       |          |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                  |  |
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| Unit Information Unit Leader Initials  |          | DW   |  | Void:         |                 | Detailer: JDA/AM   |  | Sheet Number 1.2 |          |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                  |  |
|  associates inc. 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |          |  |  |               |                 | Structure Numbers  |  |                  |          |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                  |  |
|  |          |  |  |               |                 | Subset Sheets:   |  |                  |          |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                  |  |

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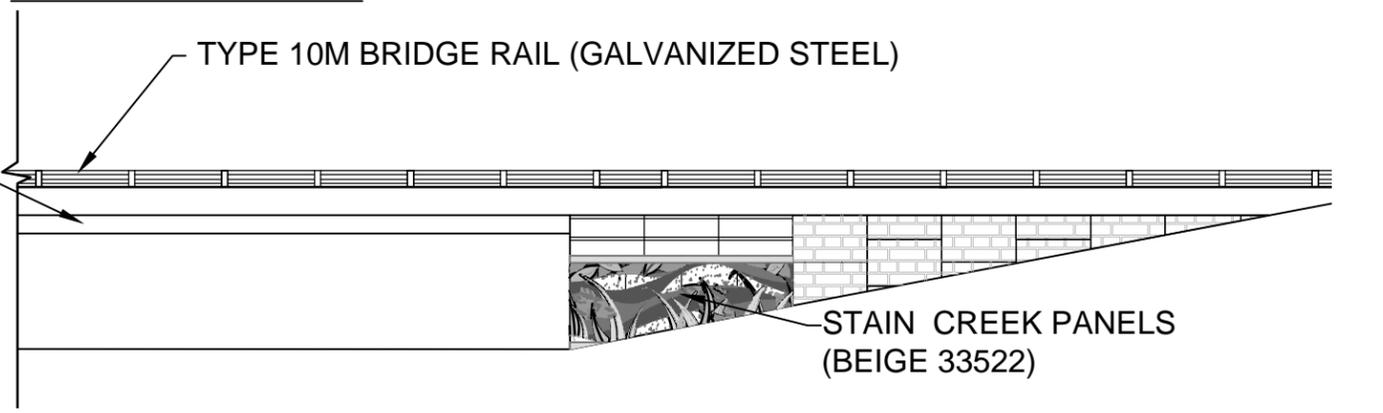
**I-25 BRIDGE STRUCTURE OVER CIMARRON**



**I-25 RAMP - WEST SIDE**



**I-25 RAMP - EAST SIDE**



- NOTES:**
1. STAIN ENTIRE GIRDER SPECIFIED COLOR
  2. SEE SHEET 5.0 FOR LOCATION MAP OF ABUTMENT AND RETAINING WALLS

|   |   |          |                  |                                |                   |                  |            |
|---|---|----------|------------------|--------------------------------|-------------------|------------------|------------|
| Print Date: 05-22-2014                          |   |          | DESIGN BUILD RFP | COLORS AND FINISHES            |                   | Project No./Code |            |
| File Name:                                      |   |          | No Revisions:    | STANDARD COLORS/TYPICAL BRIDGE |                   |                  | IM0252-423 |
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|   | 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201    FAX 770-7132 | Region 2 | DW               | Detailer: JDA/AM               | Subset Sheets:    | Sheet Number 1.3 |            |

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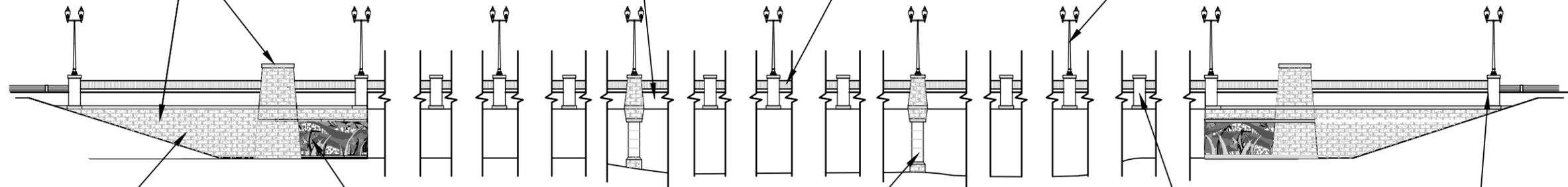
**CIMARRON BRIDGE OVER FOUNTAIN CREEK**

STAIN CAP AND BANDS (30227)

STAIN GIRDERS OR FASCIA (33448)

TYPE 7 BARRIER (33711)  
FRACTURED FIN FINISH

LIGHT POLE  
COLUMNS (34108)



SEE SHEET COLOR 1.1 FOR  
STAINS/COLORS OF  
HAND-STAINED STONE  
FORMLINER

STAIN DECORATIVE PANEL (33522)  
SEE COLOR 1.1 FOR MIX AND  
APPLICATION

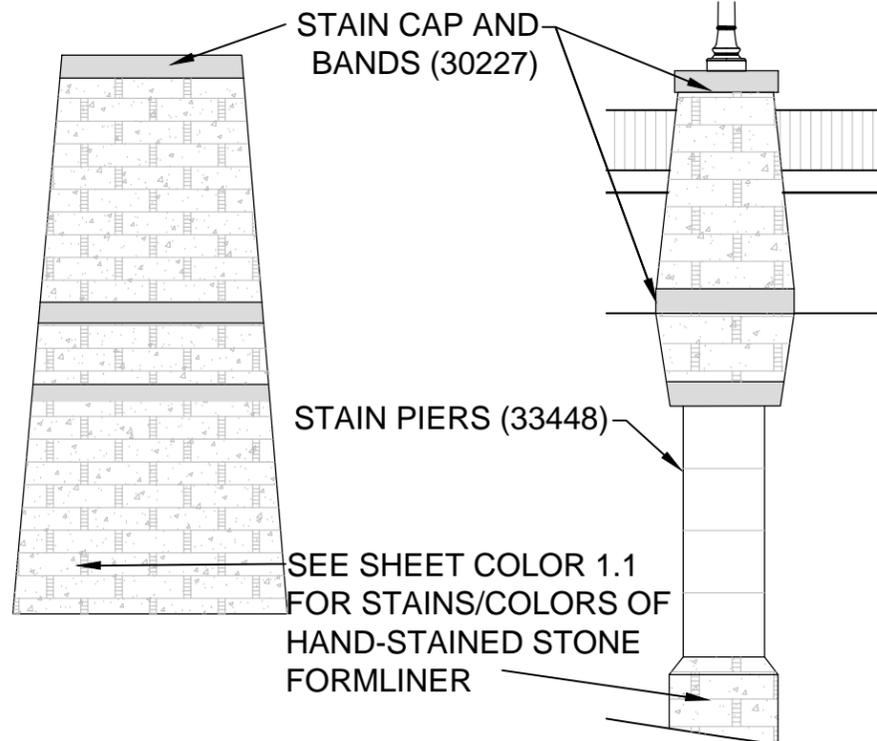
STAIN PIERS (33448)

COLUMNS WITHOUT LIGHT  
POLES:  
STAIN COLUMNS (33711) AND  
BAND (30227), TYP.  
SEE COLOR 1.1 FOR MIX AND  
APPLICATION

COLUMNS WITH LIGHT  
POLES:  
STAIN COLUMNS (33448)  
AND BAND (30227), TYP.  
SEE COLOR 1.1 FOR MIX  
AND APPLICATION

**DECORATIVE COLUMNS**

**PIER AND PEIR CAPS**

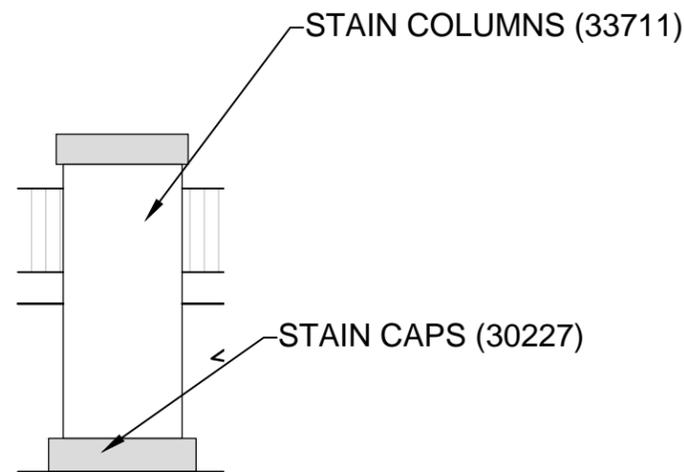


STAIN CAP AND  
BANDS (30227)

STAIN PIERS (33448)

SEE SHEET COLOR 1.1  
FOR STAINS/COLORS OF  
HAND-STAINED STONE  
FORMLINER

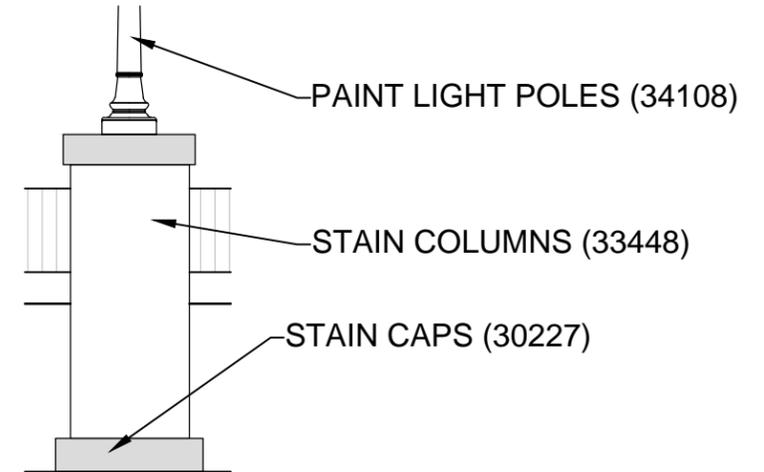
**DECORATIVE COLUMNS  
WITHOUT LIGHT POLES**



STAIN COLUMNS (33711)

STAIN CAPS (30227)

**DECORATIVE COLUMNS  
WITH LIGHT POLES**



PAINT LIGHT POLES (34108)

STAIN COLUMNS (33448)

STAIN CAPS (30227)

**NOTES:**

1. STAIN ENTIRE GIRDER 30227
2. COLOR THEME IS BASED ON INTERSTATE 25 IN COLORADO SPRINGS CORRIDOR IMPROVEMENTS ARCHITECTURAL DESIGN REQUIREMENTS

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Region 2

DW

DESIGN BUILD RFP

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COLORS AND FINISHES  
STANDARD COLORS/TYPICAL BRIDGE  
SECTION AESTHETICS

Designer: KRS

Detailer: JDA/AM

Structure

Numbers

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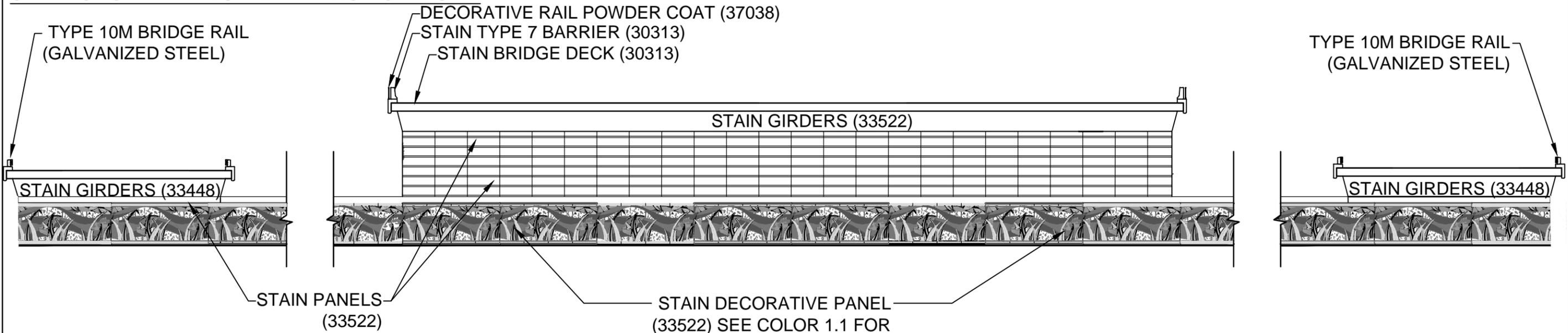
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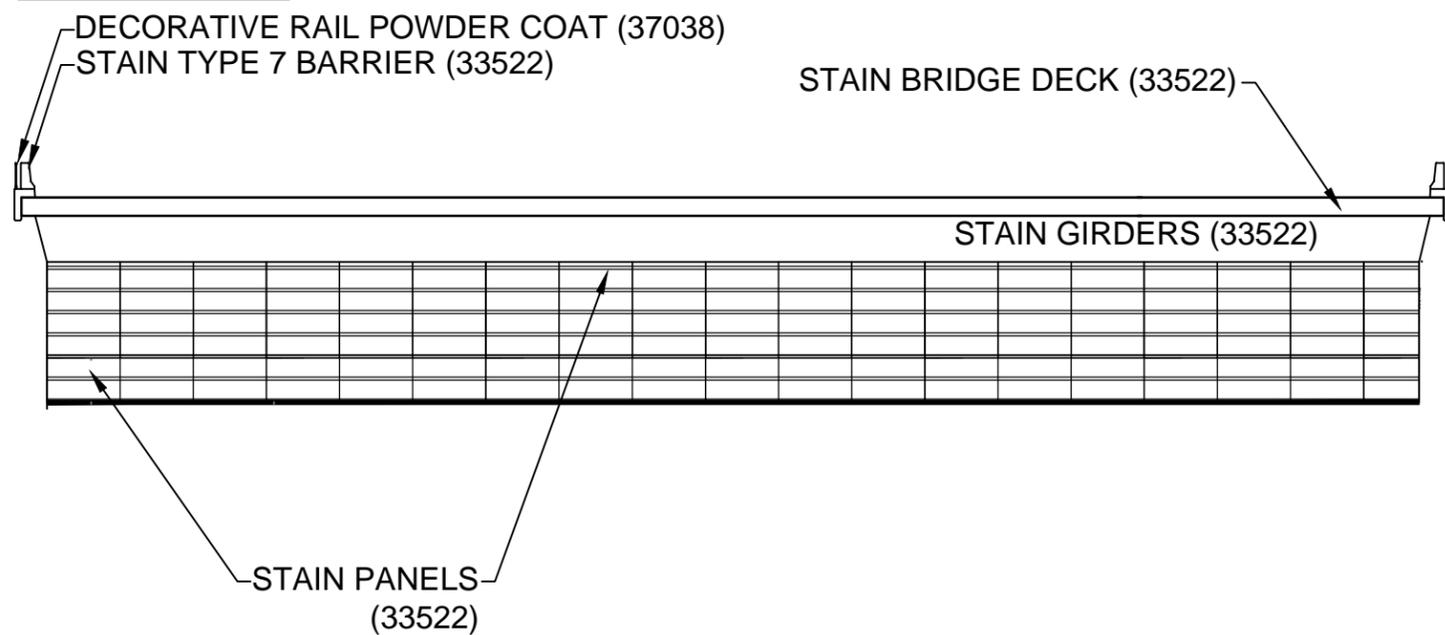
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Sheet Number 1.4

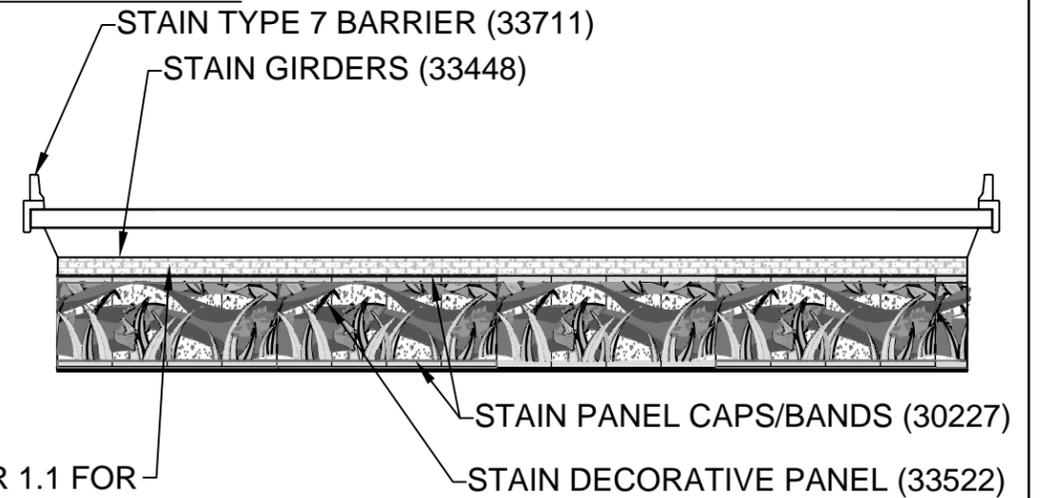
**I-25 BRIDGE STRUCTURE OVER CIMARRON  
CIMARRON ST. RAMP ABUTMENT WALLS NORTH SIDE**



**I-25 BRIDGE STRUCTURE OVER CIMARRON - SOUTH SIDE  
ABUTMENT WALL**



**CIMARRON BRIDGE STRUCTURE  
ABUTMENT WALL**



SEE SHEET COLOR 1.1 FOR STAINS/COLORS OF HAND-STAINED STONE FORMLINER

**NOTES:**

1. STAIN ENTIRE GIRDER WITH NOTED STAINS
2. COLOR THEME IS BASED ON I-25 IN COLORADO SPRINGS CORRIDOR IMPROVEMENTS ARCHITECTURAL DESIGN REQUIREMENTS

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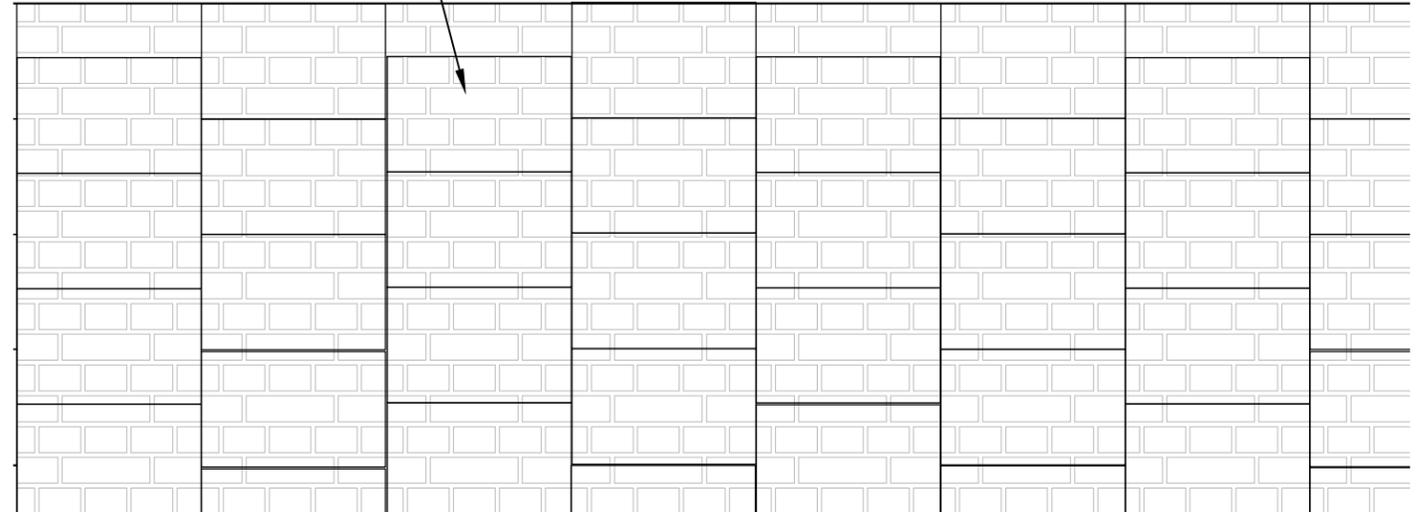
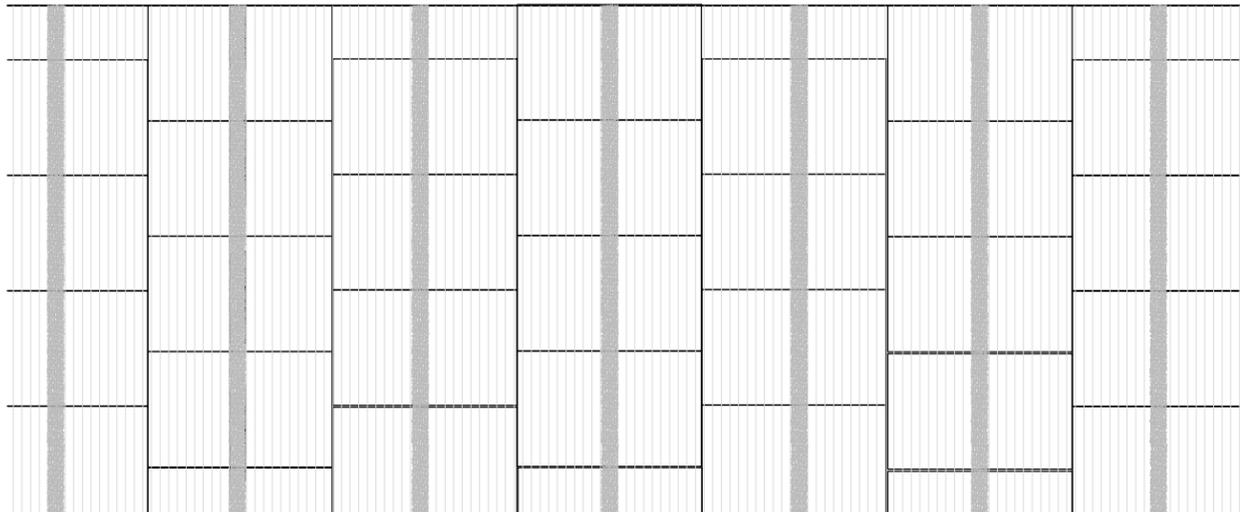
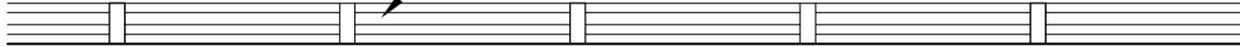
| COLORS AND FINISHES<br>STANDARD COLORS/TYPICAL BRIDGE<br>ELEVATION AESTHETICS |                   |
|---|-------------------|
| Designer: KRS   | Structure Numbers |
| Detailer: JDA/AM  | Subset Sheets:    |

Project No./Code  
 IM0252-423  
 19039  
 Sheet Number 1.5

I-25 RETAINING WALLS

GALVANIZED STEEL TYPE 10M BRIDGE RAIL OR TYPE 7 RAIL STAINED TO MATCH WALL. SEE CIVIL SHEETS (ROAD LAYOUT FOR LOCATIONS OF BARRIER TYPES

STAIN CAP AND WALL (FLESH 30313) OR (BEIGE 33522) SEE SHEET 5.1 FOR RETAINING WALL COLORS BY LOCATION



RETAINING WALL - WEST ELEVATION

RETAINING WALL- EAST ELEVATION

**NOTES:**

- ENTIRE RETAINING WALL REGARDLESS OF PANEL TYPE SHALL BE STAINED (FLESH 30313) OR (BEIGE 33522). SEE SHEET 5.1 FOR RETAINING WALL COLORS BY LOCATION.

Print Date: 05-22-2014

File Name:

Horiz. Scale: As Noted Vert. Scale: As Noted

Unit Information Unit Leader Initials

**JK** associates inc. 2953 South Peoria Street, Ste 101  
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Colorado Department of Transportation



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Region 2

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No Revisions:

Revised:

Void:

COLORS AND FINISHES  
STANDARD COLORS/TYPICAL BRIDGE  
SECTION AND WALL AESTHETICS

Designer: KRS

Detailer: JDA/AM

Structure

Numbers

Subset Sheets:

Project No./Code

IM0252-423

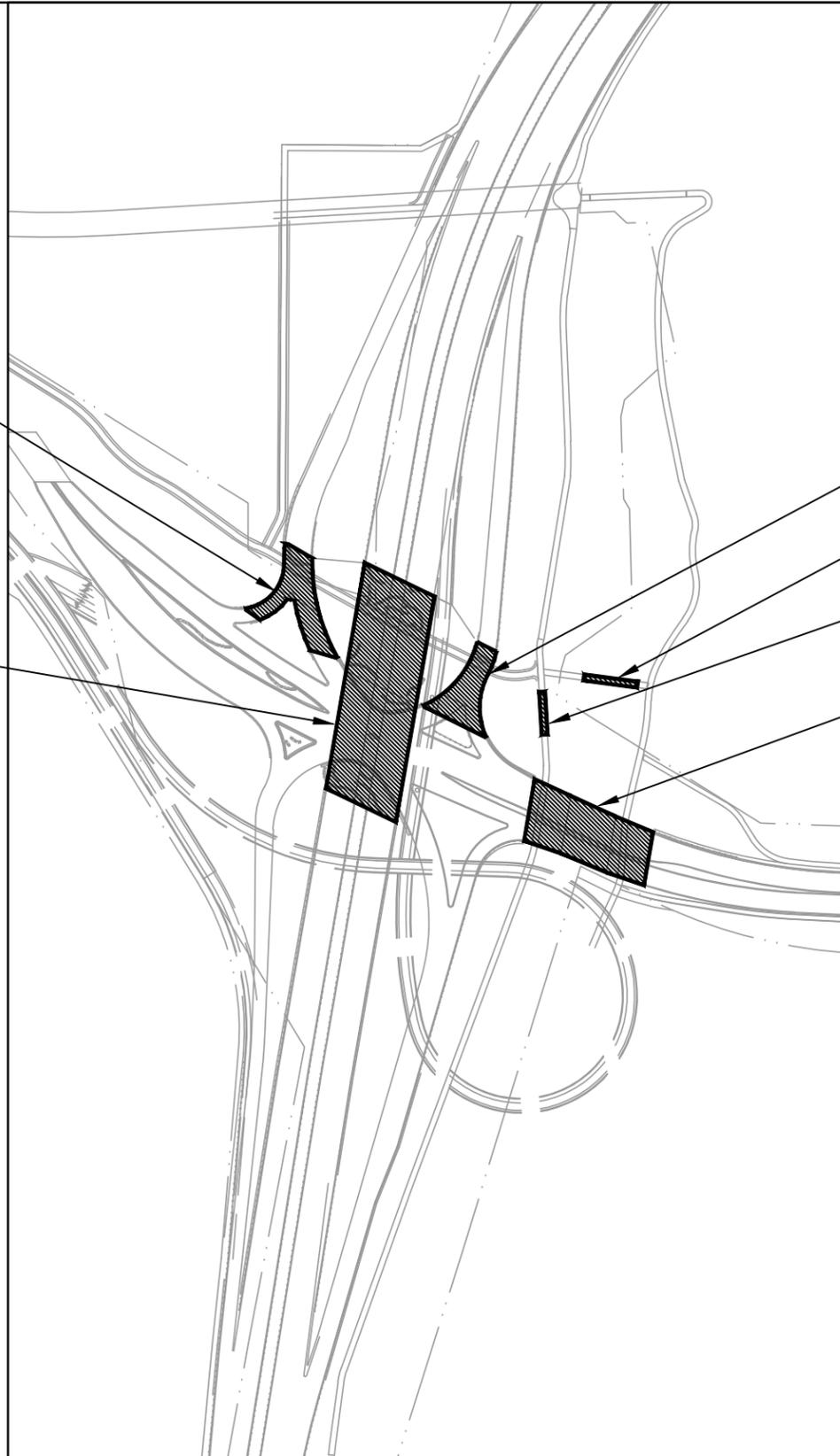
19039

Sheet Number 1.6

USE THIS BRIDGE LOCATIONS PLAN  
IN CONJUNCTION WITH THE ATTACHED  
PLAN SHEETS

I-25 RAMP OVER FOUNTAIN CREEK

I-25 BRIDGE OVER CIMARRON



I-25 RAMP OVER FOUNTAIN CREEK

PEDESTRIAN BRIDGE OVER MONUMENT CREEK

PEDESTRIAN BRIDGE OVER FOUNTAIN CREEK;  
RE-USE EXISTING BRIDGE OR REPLACE

CIMARRON BRIDGE OVER FOUNTAIN CREEK

Print Date: 05-22-2014

File Name:

Horiz. Scale: As Noted Vert. Scale: As Noted

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Void:

BRIDGE LOCATIONS

Designer: KRS

Detailer: JDA/AM

Structure Numbers

Subset Sheets:

Project No./Code

IM0252-423

19039

Sheet Number 2.0

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I-25 OVER CIMARRON BRIDGE:

ABUTMENTS

ABUTMENTS SHALL BE CONSTRUCTED OF CAST-IN-PLACE OR PRE-CAST CONCRETE WITH CUSTOM FORMLINER PANELS AS SHOWN IN THE ATTACHED PLANS, AND COVERED WITH PIGMENTED STAIN COATING. NON-CUSTOM FORMLINER PANELS SHALL ADHERE TO THE TYPES AND FINISHES SHOWN IN THE ATTACHED PLANS.

ALL WING WALLS AND ALL ABUTMENT WALLS SHALL BE VERTICAL. NO NEW SLOPE PAVING SHALL BE CONSTRUCTED AS PART OF THE CIMARRON / 1-25 PROJECT.

THE WING WALLS SHALL BE IN THE SAME PLANE AS THE BRIDGE RAIL. THE CONTRACTOR MAY CHOOSE TO CONSTRUCT THE ABUTMENT WALL AND WING WALLS AS A FACING FOR STRUCTURAL SUPPORT BEYOND. UNDER THIS OPTION THE APPEARANCE OF THESE WALLS SHALL NOT VARY FROM THESE REQUIREMENTS.

AESTHETIC PANELS MAY BE INSTALLED AFTER ABUTMENT AND WING WALL CONSTRUCTION IS COMPLETE.

DECORATIVE ABUTMENT AND WING WALL PANELS SHALL BE CONSTRUCTED AS DETAILED. SEE BRIDGES - ABUTMENT WALL PANELS. INSTALLATION METHODS MAY VARY. APPEARANCE OF THESE WALLS SHALL NOT VARY FROM THESE REQUIREMENTS.

PIERS AND PIER CAPS (APPLIES TO ALL BRIDGES)

PIERS SHALL BE CONSTRUCTED OF SMOOTH, CAST-IN-PLACE OR PRE-CAST CONCRETE COVERED WITH PIGMENTED STAIN COATING. PIERS SHOULD BE FINISHED SMOOTH AND ALL VOIDS FILLED BEFORE APPLYING STAIN. PIERS SHALL BE CONSISTENT WITH THE I-25 THROUGH COLORADO SPRINGS AESTHETIC GUIDELINES.

PIER CAPS WILL BE REQUIRED. WHERE POSSIBLE, PIER CAPS SHALL BE LOCATED IN THE SAME PLANE AS THE GIRDERS. THE OUTERMOST GIRDER ON EACH SIDE OF THE BRIDGE SHALL BE FLUSH WITH THE PIER CAPS.

GIRDER (APPLIES TO ALL BRIDGES)

GIRDER TYPES AT BRIDGE(S) SHALL BE DETERMINED BY THE CONTRACTOR ( CONC RETE OR STEEL). THE OUTSIDE FACE OF THE GIRDER OR FASCIA PANEL SHALL BE A SMOOTH, FLAT SURFACE. THE BOTTOMS OF GIRDERS SHALL BE LOCATED IN THE SAME HORIZONTAL PLANE AS THE BOTTOM OF THE FASCIA PANEL. GIRDERS SHALL BE LOCATED 18 INCHES BEHIND THE OUTSIDE CURB OF THE BRIDGE DECK.

ENTIRE GIRDER SHALL BE COATED WITH PIGMENTED STAIN IN A COLOR (30227) TO COORDINATE WITH COLORADO AVE BRIDGE AND THE I-25 THROUGH COLORADO SPRINGS AESTHETIC GUIDELINES..

BRIDGE RAIL

BRIDGE RAIL SHALL CONSIST OF A TYPE 7 BARRIER MOUNTED ON A CONCRETE CURB WITH A DECORATIVE STEEL RAILING ON THE OUTSIDE OF THE TYPE 7 BARRIER. THE DECORATIVE RAIL IS DETAILED IN THE ATTACHED PLANS. THE DECORATIVE RAIL SHALL ONLY BE INSTALLED ON THE WEST SIDE OF THE SOUTHBOUND BRIDGE AND THE EAST SIDE OF THE NORTHBOUND BRIDGE.

APPROACH RAIL SHALL CONSIST OF A TYPE 10M STEEL RAILS MOUNTED ON A CONCRETE CURB. THE CONCRETE SHALL BE SMOOTH AND COVERED WITH PIGMENTED STAIN COATING AND THE STEEL SHALL BE GALVANIZED. THE TYPE 10 M STEEL RAILS SHALL CONFORM TO CDOT STANDARDS.

CIMARRON OVER CREEK BRIDGE

ABUTMENTS SHALL BE CONSTRUCTED OF CAST-IN-PLACE OR PRE-CAST CONCRETE WITH CUSTOM FORMLINER PANELS AS SHOWN IN THE ATTACHED PLANS, AND COVERED WITH PIGMENTED STAIN COATING. NON-CUSTOM FORMLINER PANELS SHALL ADHERE TO THE TYPES AND FINISHES SHOWN IN THE ATTACHED PLANS.

HAND-STAINED STONE FORMLINER SHALL BE A RANDOM ASHLAR STYLE STONE TO MATCH THE CIMARRON BRIDGE OVER THE RAILROAD/CONEJOS STREET AS CLOSELY AS POSSIBLE. THE COLORS/STAINING OF THE CONCRETE SHALL NOT MATCH THE BRIDGE OVER THE RAILROAD. COLOR/STAINING SHALL BE DONE ACCORDING TO THE DETAILS AND NOTES IN THESE PLANS.

ALL WING WALLS AND ALL ABUTMENT WALLS SHALL BE VERTICAL. NO NEW SLOPE PAVING SHALL BE CONSTRUCTED AS PART OF THE CIMARRON / 1-25 PROJECT.

THE WING WALLS SHALL BE IN THE SAME PLANE AS THE BRIDGE RAIL. THE CONTRACTOR MAY CHOOSE TO CONSTRUCT THE ABUTMENT WALL AND WING WALLS AS A FACING FOR STRUCTURAL SUPPORT BEYOND. UNDER THIS OPTION THE APPEARANCE OF THESE WALLS SHALL NOT VARY FROM THESE REQUIREMENTS.

AESTHETIC PANELS MAY BE INSTALLED AFTER ABUTMENT AND WING WALL CONSTRUCTION IS COMPLETE.

DECORATIVE ABUTMENT AND WING WALL PANELS SHALL BE CONSTRUCTED AS DETAILED. SEE BRIDGES - ABUTMENT WALL PANELS. INSTALLATION METHODS MAY VARY. APPEARANCE OF THESE WALLS SHALL NOT VARY FROM THESE REQUIREMENTS.

PIERS AND PIER CAPS

CERTAIN ELEMENTS OF THE PIERS AND PIER CAPS SHALL REQUIRE HAND-STAINED STONE FORMLINER AS DETAILED ABOVE.

BRIDGE RAIL

BRIDGE RAIL SHALL CONSIST OF A TYPE 7 BARRIER WITH FRACTURED FIN FINISH ON THE SIDE FACING AWAY FROM THE ROADWAY MOUNTED ON A CONCRETE CURB.

APPROACH RAIL SHALL CONSIST OF A TYPE 10M STEEL RAILS MOUNTED ON A CONCRETE CURB. THE CONCRETE SHALL BE SMOOTH AND COVERED WITH PIGMENTED STAIN COATING AND THE STEEL SHALL BE GALVANIZED. THE TYPE 10 M STEEL RAILS SHALL CONFORM TO CDOT STANDARDS.

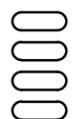
I-25 RAMP BRIDGES

BRIDGE RAIL

BRIDGE RAIL SHALL CONSIST OF A TYPE 10M STEEL RAILS MOUNTED ON A CONCRETE CURB. THE CONCRETE SHALL BE SMOOTH AND COVERED WITH PIGMENTED STAIN COATING AND THE STEEL SHALL BE GALVANIZED. THE TYPE 10 M STEEL RAILS SHALL CONFORM TO CDOT STANDARDS.

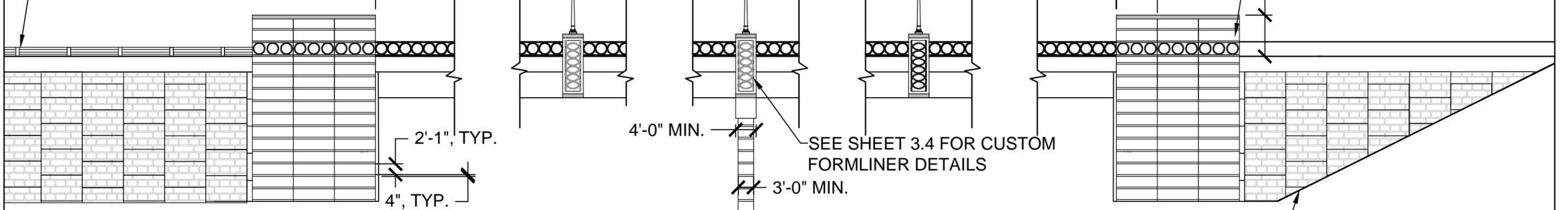
APPROVAL

ALL COLUMNS, ABUTMENTS, WING WALLS, GIRDERS, FASCIA PANELS, MEDIAN BARRIER AND PIER CAPS ARE SUBJECT TO APPROVAL.

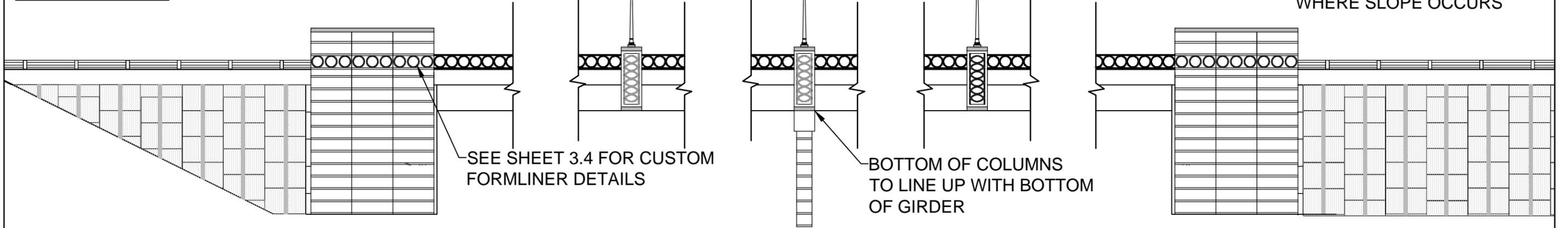
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| Print Date: 05-22-2014   |  | Sheet Revisions |           |       |  Colorado Department of Transportation<br>1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298<br>Region 2 DW | DESIGN BUILD RFP |                  | BRIDGES GENERAL DESCRIPTION |                  | Project No./Code |
| File Name:   |   | Date:           | Comments: | Init. |  | No Revisions:    |                  |                             | IM0252-423       |                  |
| Horiz. Scale: As Noted Vert. Scale: As Noted   |   |                 |           |       |  | Revised:         | Designer: KRS    | Structure Numbers           | 19039            |                  |
| Unit Information Unit Leader Initials  |   |                 |           |       |  | Void:            | Detailer: JDA/AM | Subset Sheets:              | Sheet Number 3.0 |                  |
|  2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |   |                 |           |       |  |                  |                  |                             |                  |                  |

**I-25 BRIDGE STRUCTURE AT CIMARRON ST.  
EAST ELEVATION**

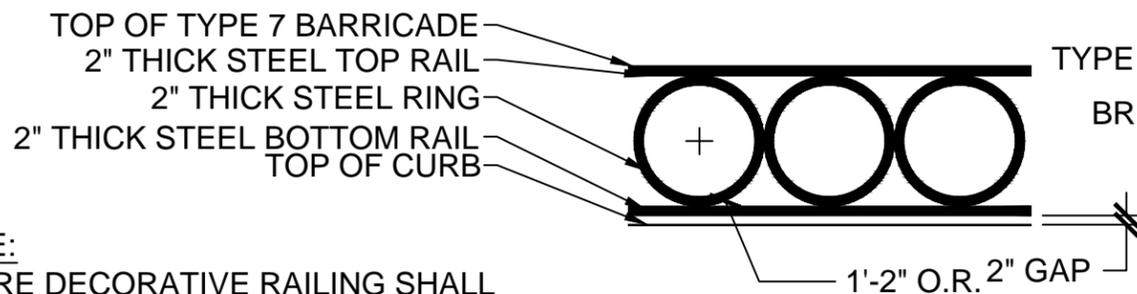
CONTINUE TYPE 10 BRIDGE RAIL OVER RETAINING WALL (WHERE APPLICABLE TRANSITION TO TYPE 7 (FLESH 30313))



**I-25 BRIDGE STRUCTURE AT CIMARRON ST.  
WEST ELEVATION**

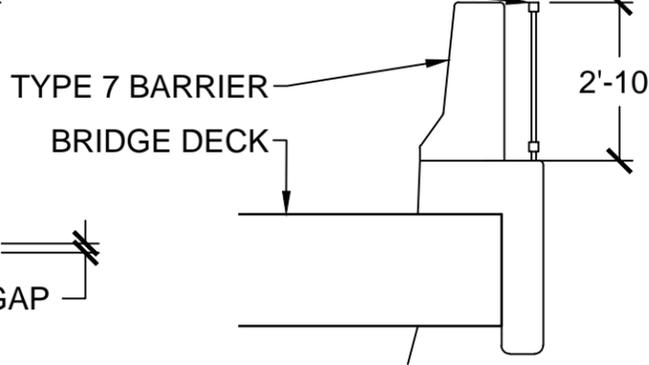


**DECORATIVE RAIL DETAIL**

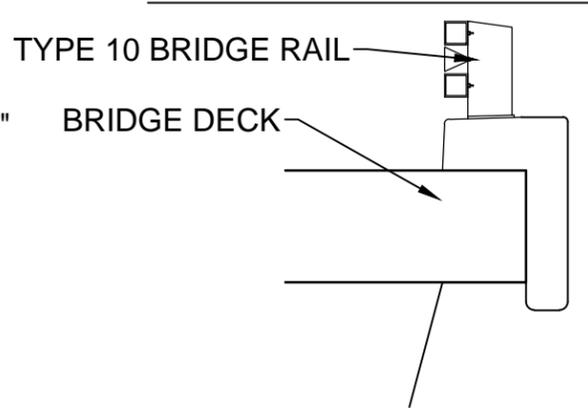


**NOTE:**  
ENTIRE DECORATIVE RAILING SHALL BE POWDER COATED FEDERAL COLOR 37038

**BRIDGE DECK AND CURB DETAIL**

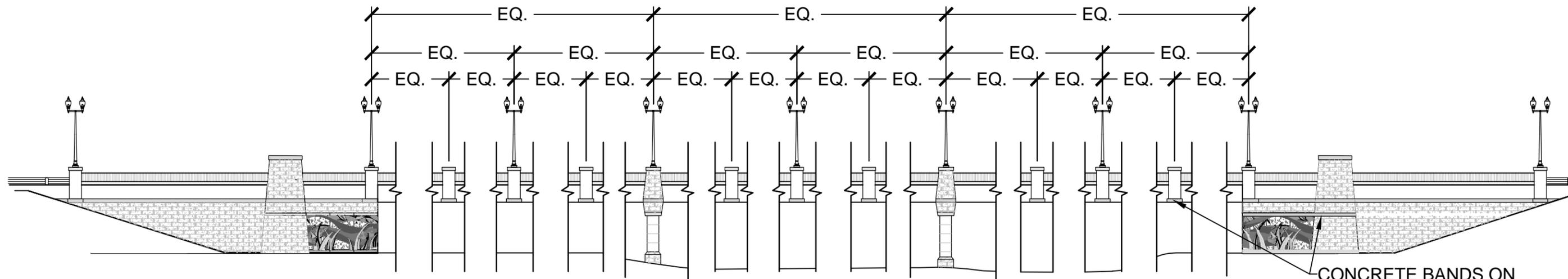


**RAMP/WALL AND CURB DETAIL**



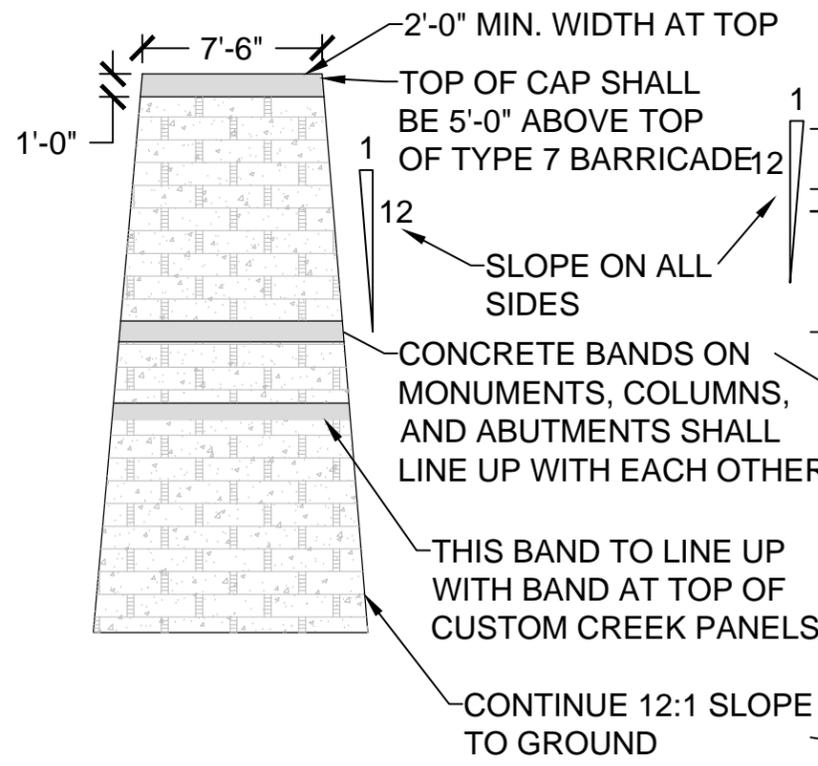
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| File Name:             |  | Date:  | Comments: | Init. | 1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298 |  | No Revisions:    |  | IM0252-423                    |  | 19039             |                  |  |
| Horiz. Scale: As Noted |  | Vert. Scale: As Noted  |           |       | Region 2   |  | Revised:         |  | Designer: KRS                 |  | Structure Numbers |                  |  |
| Unit Information       |  | Unit Leader Initials   |           |       | DW   |  | Void:            |  | Detailer: JDA/AM              |  | Subset Sheets:    |                  |  |
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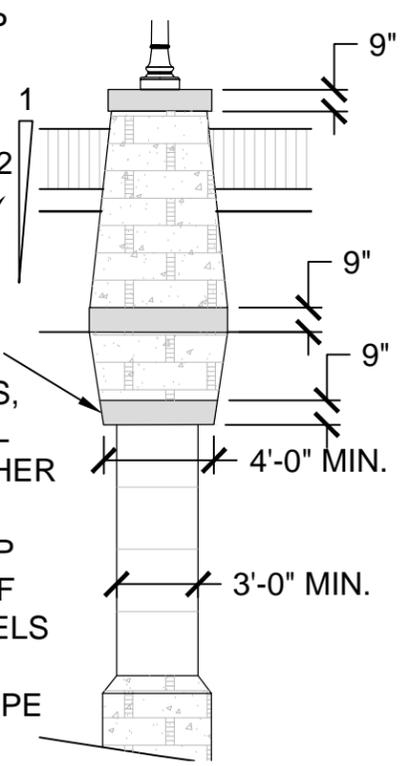


CONCRETE BANDS ON MONUMENTS, COLUMNS, AND ABUTMENTS SHALL LINE UP WITH EACH OTHER

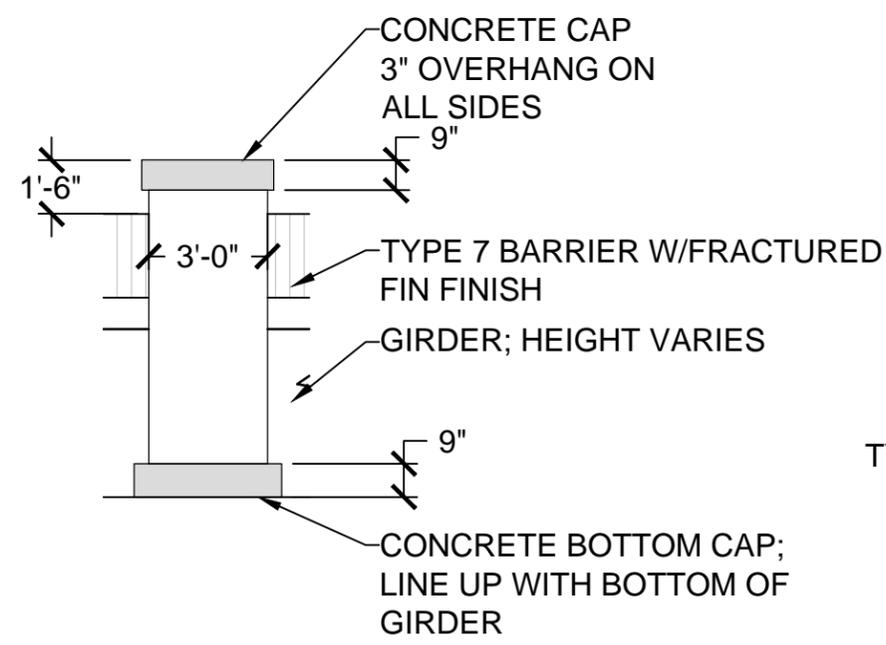
DECORATIVE COLUMNS



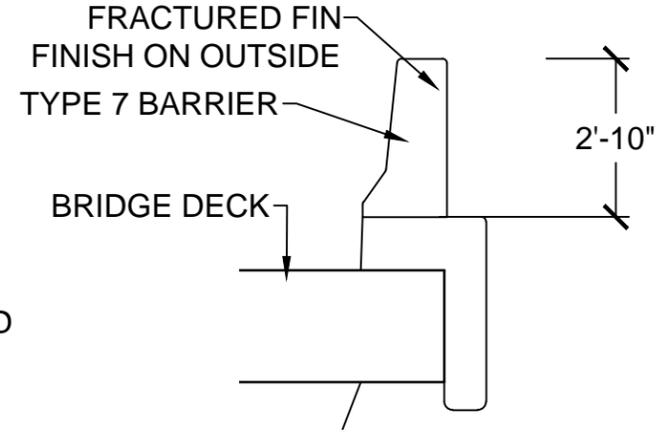
PIER AND PEIR CAPS



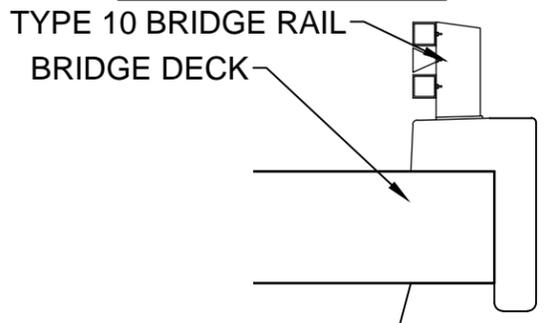
LIGHT POLE BASE AND DECORATIVE COLUMNS



BRIDGE DECK AND CURB DETAIL



TYPE 10 RAIL DETAIL



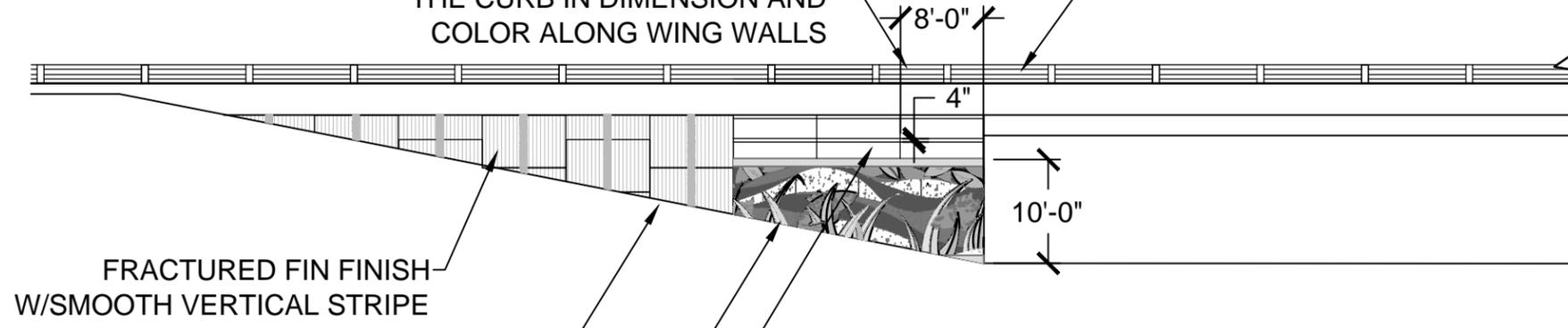
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| Print Date: 05-22-2014   |  | Sheet Revisions |           |        | Colorado Department of Transportation  |  | DESIGN BUILD RFP |  | BRIDGES                      |                | Project No./Code  |                  |
| File Name:   |  | Date:           | Comments: | Init.: | 1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298 |  | No Revisions:    |  | CIMARRON OVER FOUNTAIN CREEK |                | IM0252-423        |                  |
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**RAMPS- WEST ELEVATION**

GALVANIZED STEEL TYPE 10M BRIDGE RAIL

CONTINUE APPEARANCE OF THE CURB IN DIMENSION AND COLOR ALONG WING WALLS



FRACTURED FIN FINISH W/SMOOTH VERTICAL STRIPE

3:1 MAXIMUM SLOPE ALONG ABUTMENT WALLS WHERE SLOPES OCCUR

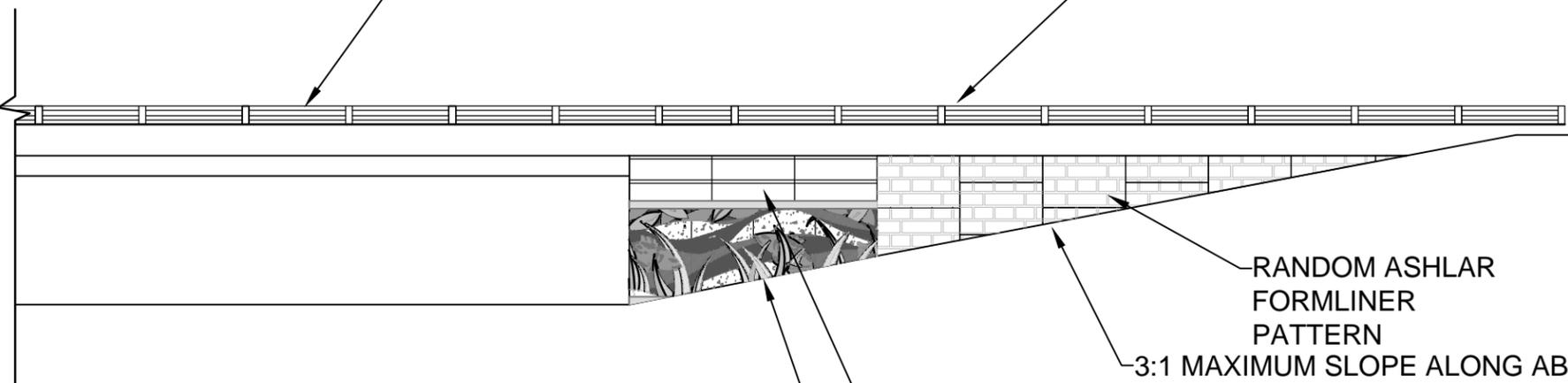
CREEK FORMLINER PANELS

HORIZONTAL ABUTMENT PANELS TO MATCH PANELS ON I25 BRIDGE

**RAMPS- EAST ELEVATION**

GALVANIZED STEEL TYPE 10M BRIDGE RAIL

CONTINUE APPEARANCE OF THE CURB IN DIMENSION AND COLOR ALONG WING WALLS



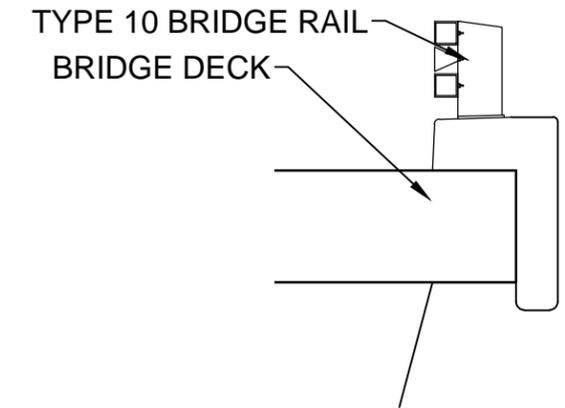
RANDOM ASHLAR FORMLINER PATTERN

3:1 MAXIMUM SLOPE ALONG ABUTMENT WALLS WHERE SLOPES OCCUR

HORIZONTAL ABUTMENT PANELS TO MATCH PANELS ON I25 BRIDGE

CREEK FORMLINER PANELS

**RAMP/WALL AND CURB DETAIL**



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BRIDGES

I-25 RAMPS OVER FOUNTAIN CREEK

Designer: KRS

Detailer: JDA/AM

Structure Numbers

Subset Sheets:

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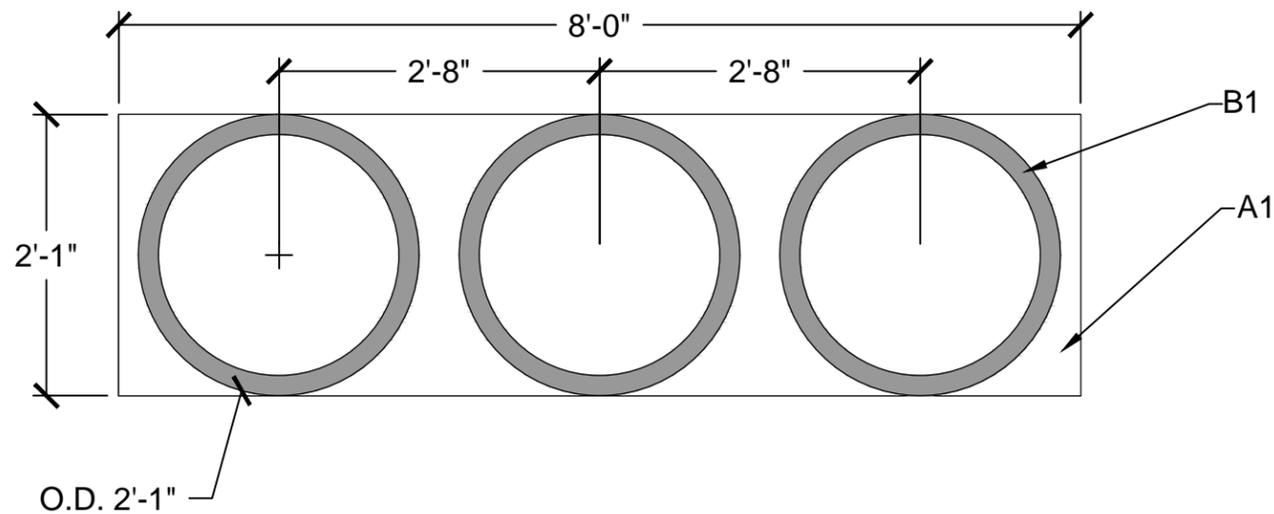
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Sheet Number 3.3

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**ABUTMENT MONUMENT PANEL**



**NOTES:**

1. CIRCLE PATTERNS SHOWN SHALL BE USED ON BOTH INSIDE AND OUTSIDE WALLS OF THE ABUTMENT MONUMENTS (ABOVE THE BRIDGE/ROADWAY DECK OF I-25).
2. CIRCLE PATTERNS SHOWN FOR DECORATIVE COLUMNS SHALL BE USED ON ALL FOUR (4) SIDES OF EVERY COLUMN ON THE I-25 OVER CIMARRON BRIDGE STRUCTURE.
3. CONCRETE BANDS/CAPS SHALL EXTEND AROUND ALL FOUR (4) SIDES OF THE ABUTMENT MONUMENTS AND THE DECORATIVE COLUMNS

**CIRCLES PANEL SECTION**

ALL AREAS LABELED B1 SHALL BE RECESSED 1" FROM PANEL FACE AND SHALL HAVE A LIGHT SAND-BLASTED FINISH ALL AREAS LABELED B2 SHALL HAVE A MEDIUM SAND-BLASTED FINISH

ALL AREAS LABELED C1 SHALL BE RECESSED 2" FROM PANEL FACE AND SHALL HAVE HEAVY SAND-BLASTED FINISH WITH EXPOSED AGGREGATE, ALL AREAS LABELED C2 SHALL BE RECESSED 2" FROM PANEL FACE AND SHALL HAVE A MEDIUM SAND-BLASTED FINISH. AREAS LABELED C3 SHALL BE RECESSED 2" FROM PANEL FACE AND SHALL HAVE A BUSHAMMERED FINISH

ALL AREAS LABELED D SHALL BE RECESSED 3" FROM PANEL FACE AND SHALL HAVE A BROOM FINISH

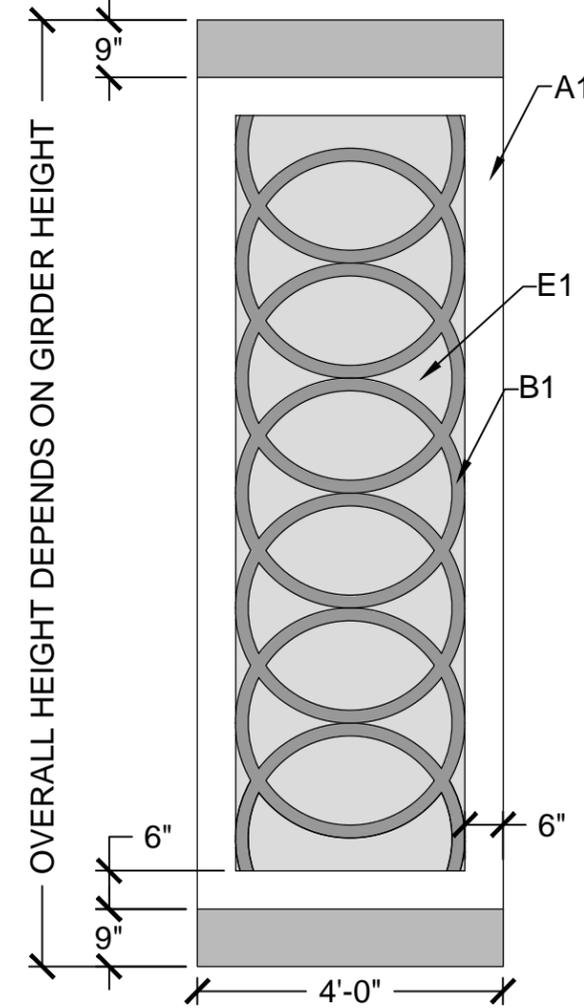
ALL AREAS LABELED E1 SHALL BE RECESSED 4" FROM PANEL FACE AND SHALL HAVE A MEDIUM SAND-BLASTED FINISH. ALL AREAS LABELED E12 SHALL BE RECESSED 4" FROM PANEL FACE AND SHALL HAVE A SMOOTH FINISH

ALL AREAS LABELED A1 SHALL BE FLUSH WITH PANEL FACE AND SHALL HAVE A SMOOTH FINISH AREAS LABELED A2 SHALL HAVE A LIGHT-SANDBLASTED FINISH



NOTE: WALL PANEL FORMS SHALL BE HAND TOOLED TO CREATE SMOOTH, ROUNDED EDGES AND A SOFT APPEARANCE .

**DECORATIVE COLUMNS**



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Region 2

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 Void:

BRIDGES

FORMLINER DESIGN/LAYOUT:  
**CIRCLE PANELS; I25 OVER CIMARRON**  
 Designer: KRS Structure Numbers  
 Detailer: JDA/AM Subset Sheets:

Project No./Code

IM0252-423  
 19039  
 Sheet Number 3.4

**CREEKSIDE PANEL SECTION**

ALL AREAS LABELED A1 SHALL BE FLUSH WITH PANEL FACE AND SHALL HAVE A SMOOTH FINISH. ALL AREAS LABELED A2 SHALL BE FLUSH WITH PANEL FACE AND SHALL HAVE A 45 DEGREE BROOM FINISH. ALL AREAS LABELED A3 SHALL BE FLUSH WITH PANEL FACE AND SHALL HAVE AN EXPOSED AGGREGATE FINISH.

ALL AREAS LABELED B SHALL BE RECESSED 1" FROM PANEL FACE AND SHALL HAVE A LIGHT SAND-BLASTED FINISH

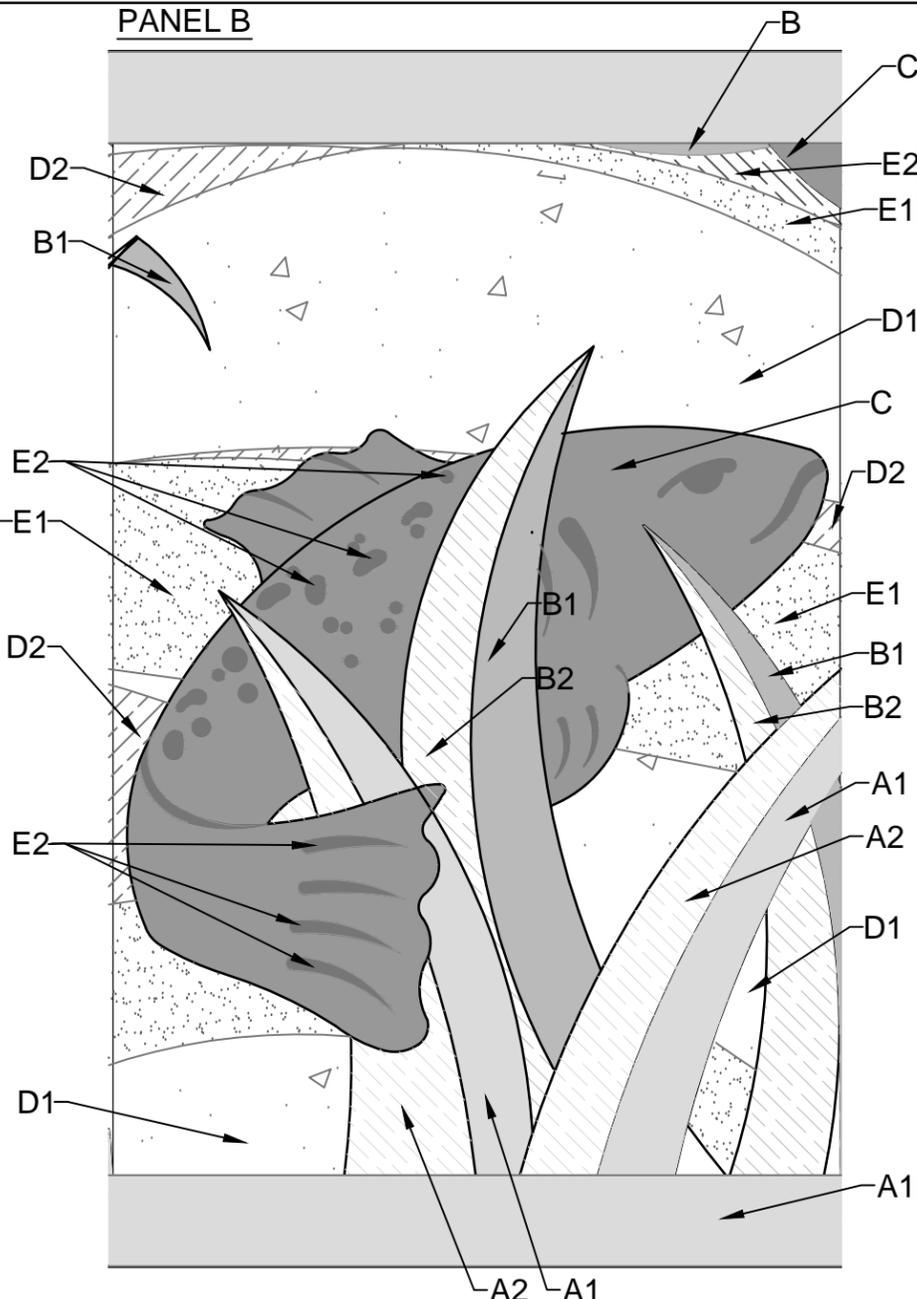
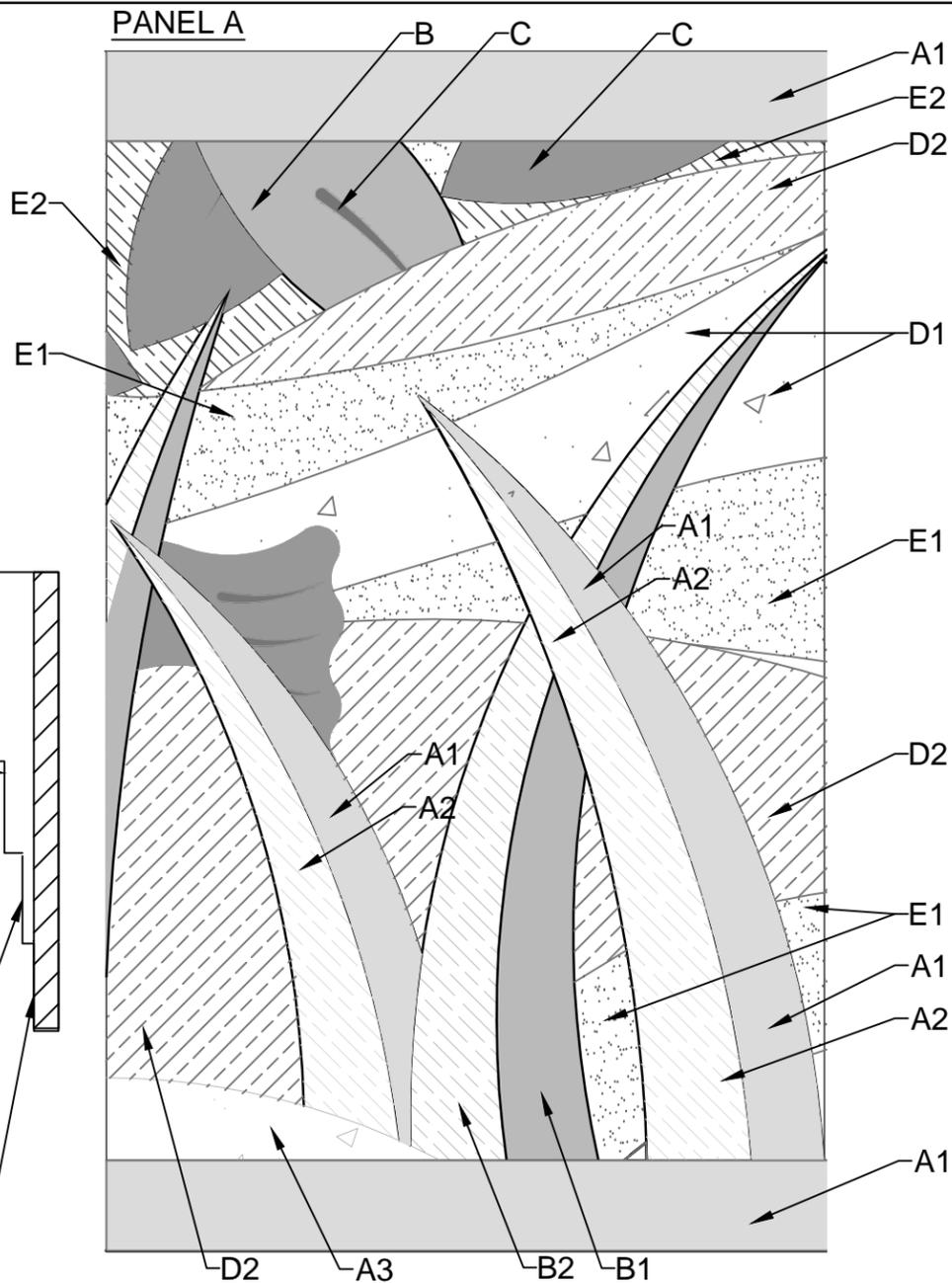
ALL AREAS LABELED C SHALL BE RECESSED 2" FROM PANEL FACE AND SHALL HAVE A LIGHT SAND BLAST FINISH

ALL AREAS LABELED D1 SHALL BE RECESSED 3" FROM PANEL FACE AND SHALL HAVE AN EXPOSED AGGREGATE FINISH.

ALL AREAS LABELED D2 SHALL BE RECESSED 3" FROM PANEL FACE AND SHALL HAVE A 45 DEGREE BROOM FINISH

ALL AREAS LABELED E1 OR NOT LABELED SHALL BE RECESSED 4" FROM PANEL FACE AND SHALL HAVE A MEDIUM SAND-BLASTED FINISH

ALL AREAS LABELED E2 OR NOT LABELED SHALL BE RECESSED 4" FROM PANEL FACE AND SHALL HAVE A BROOM FINISH



NOTE: WALL PANEL FORMS SHALL BE HAND TOOLED TO CREATE SMOOTH, ROUNDED EDGES AND A SOFT APPEARANCE .

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 No Revisions:  
 Revised:  
 Void:

BRIDGES  
 ABUTMENT WALL DESIGN/LAYOUT:  
 PEDESTRIAN; CIMARRON OVER CREEK  
 Designer: KRS  
 Detailer: JDA/AM  
 Structure Numbers  
 Subset Sheets:

Project No./Code  
 IM0252-423  
 19039  
 Sheet Number 3.5

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**CREEKSIDE PANEL SECTION**

ALL AREAS LABELED A1 SHALL BE FLUSH WITH PANEL FACE AND SHALL HAVE A SMOOTH FINISH. ALL AREAS LABELED A2 SHALL BE FLUSH WITH PANEL FACE AND SHALL HAVE A 45 DEGREE BROOM FINISH. ALL AREAS LABELED A3 SHALL BE FLUSH WITH PANEL FACE AND SHALL HAVE AN EXPOSED AGGREGATE FINISH.

ALL AREAS LABELED B SHALL BE RECESSED 1" FROM PANEL FACE AND SHALL HAVE A LIGHT SAND-BLASTED FINISH

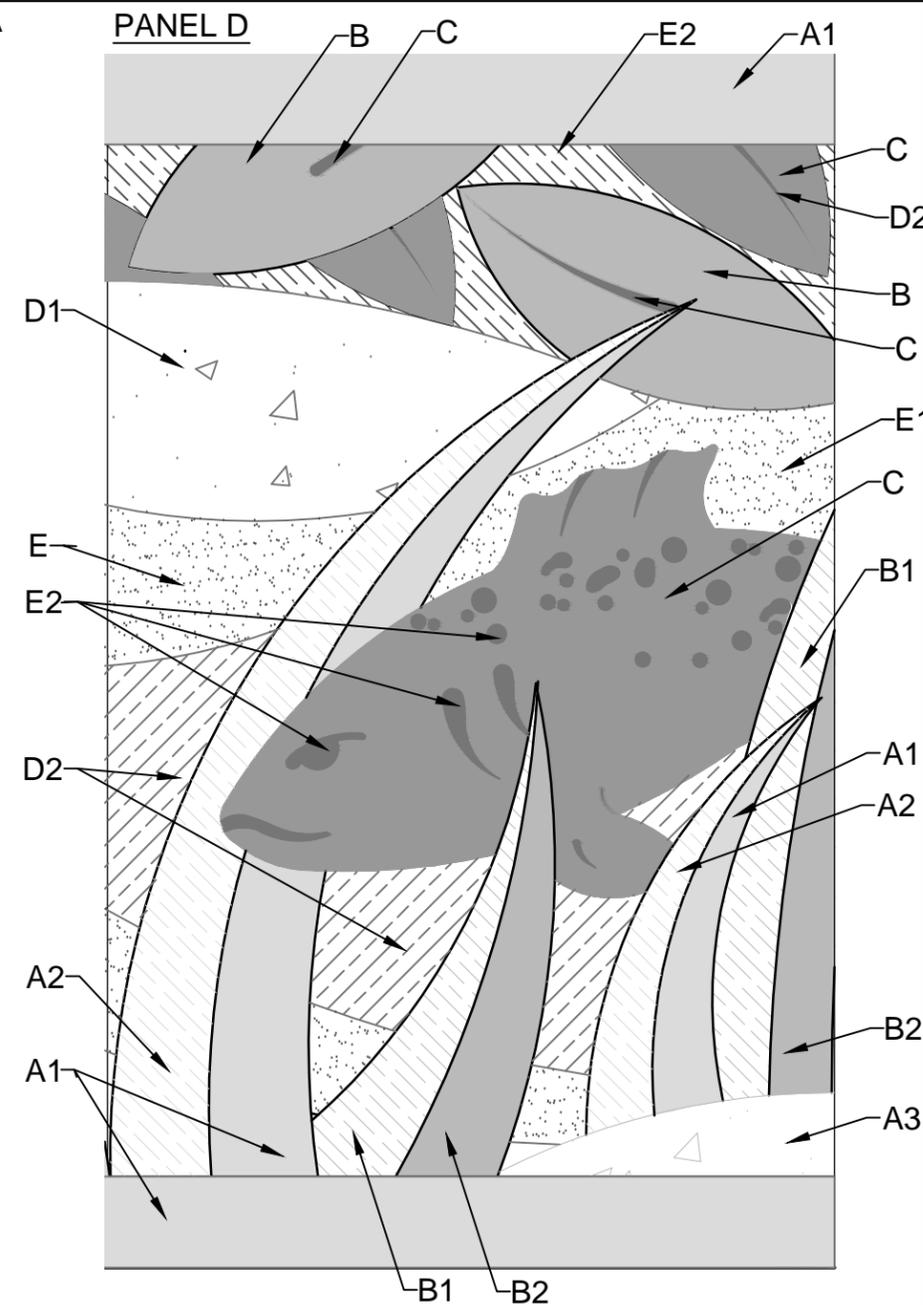
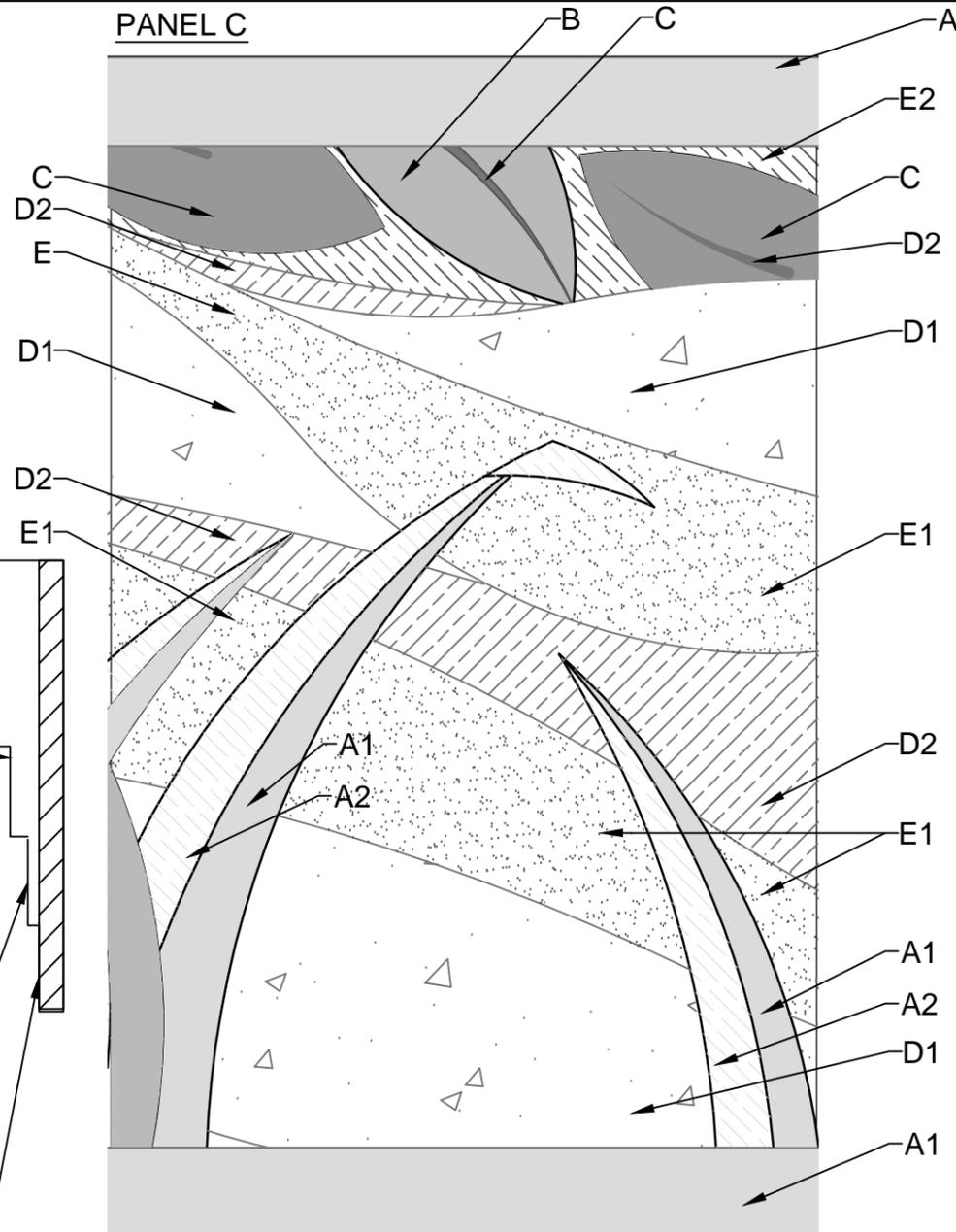
ALL AREAS LABELED C SHALL BE RECESSED 2" FROM PANEL FACE AND SHALL HAVE A LIGHT SAND BLAST FINISH

ALL AREAS LABELED D1 SHALL BE RECESSED 3" FROM PANEL FACE AND SHALL HAVE AN EXPOSED AGGREGATE FINISH.

ALL AREAS LABELED D2 SHALL BE RECESSED 3" FROM PANEL FACE AND SHALL HAVE A 45 DEGREE BROOM FINISH

ALL AREAS LABELED E1 OR NOT LABELED SHALL BE RECESSED 4" FROM PANEL FACE AND SHALL HAVE A MEDIUM SAND-BLASTED FINISH

ALL AREAS LABELED E2 OR NOT LABELED SHALL BE RECESSED 4" FROM PANEL FACE AND SHALL HAVE A BROOM FINISH



NOTE: WALL PANEL FORMS SHALL BE HAND TOOLED TO CREATE SMOOTH, ROUNDED EDGES AND A SOFT APPEARANCE .

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Region 2

DW

DESIGN BUILD RFP

No Revisions:  
 Revised:  
 Void:

BRIDGES

ABUTMENT WALL DESIGN/LAYOUT:  
 PEDESTRIAN; CIMARRON OVER CREEK

Designer: KRS  
 Detailer: JDA/AM

Structure Numbers  
 Subset Sheets:

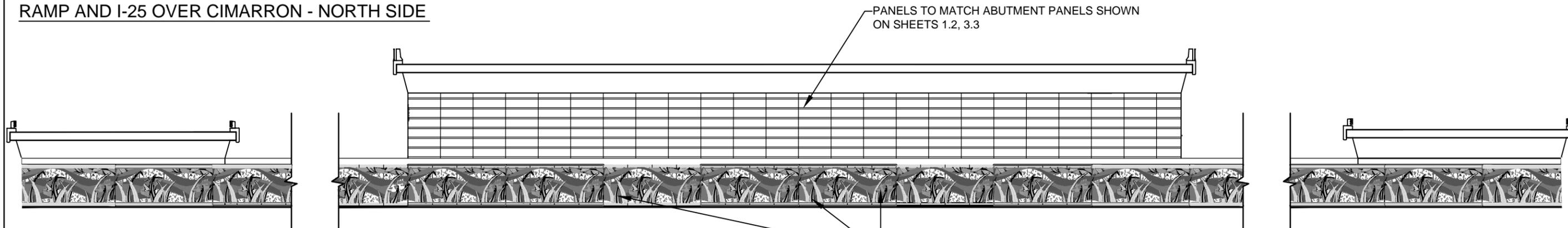
Project No./Code

IM0252-423

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Sheet Number 3.6

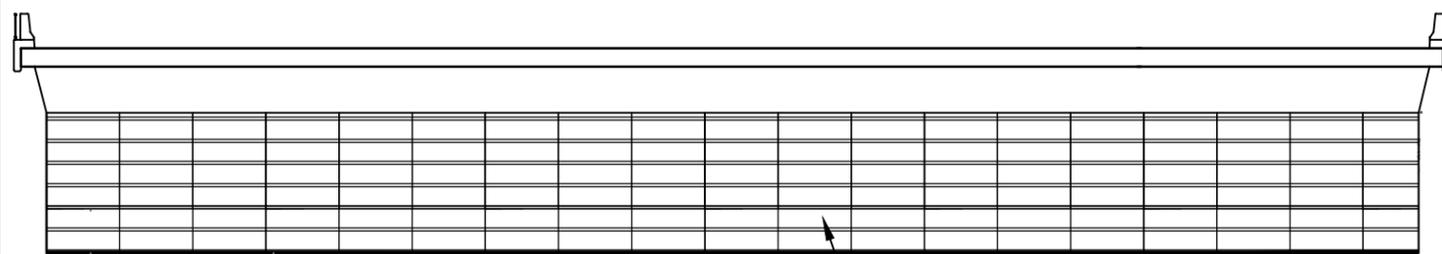
**RAMP AND I-25 OVER CIMARRON - NORTH SIDE**



NOTE:  
 DISTANCE ABOVE 10' CREEKSIDE CUSTOM  
 PANELS VARIES WITH GIRDER DEPTH.  
 CUSTOM PANELS BASE TO BE FLUSH WITH  
 GRADE UNDER ABUTMENTS.

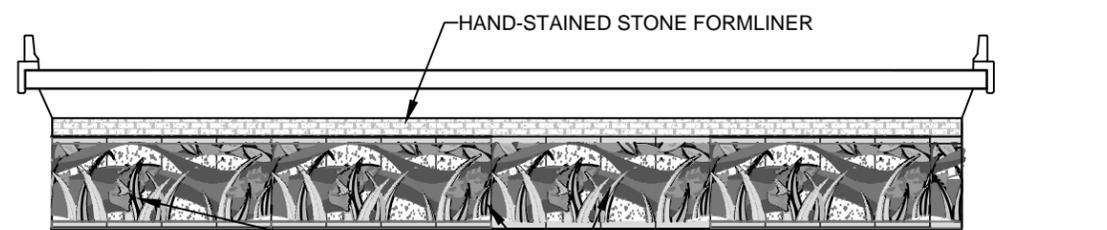
NOTE:  
 1. BASE OF 10' CREEKSIDE PANEL SHALL BE  
 FLUSH WITH GRADE UNDER ABUTMENT.

**I-25 OVER CIMARRON - SOUTH SIDE**



PANELS TO MATCH ABUTMENT PANELS SHOWN  
 ON SHEETS 1.2, 3.3

**CIMARRON OVER FOUNTAIN CREEK**



CUSTOM FORMLINER PANEL SEE DETAIL 3.4 AND 3.5

NOTE:  
 DISTANCE ABOVE 10' CREEKSIDE CUSTOM  
 PANELS VARIES WITH GIRDER DEPTH. CUSTOM  
 PANELS BASE TO BE FLUSH WITH GRADE  
 UNDER ABUTMENTS.

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BRIDGES  
 ABUTMENT WALL ELEVATIONS

Designer: KRS  
 Detailer: JDA/AM

Structure  
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 Subset Sheets:

Project No./Code

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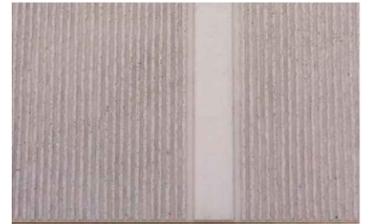
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**NOTES:**

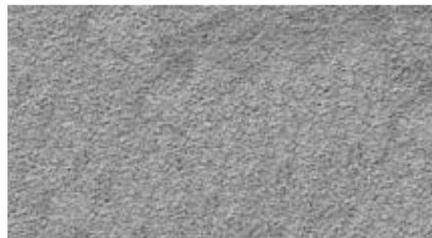
1. CREEKSIDE PANEL: SHALL HAVE A FINISHED SIZE OF 10' HIGH BY 5' WIDE OR AS MARKED. BASE OF PANELS SHALL BE LOCATED AT GROUND LEVEL, HEIGHT ABOVE MAY VARY. GRAPHIC FORM LINER DEPTHS ARE MEASURED FROM PANEL/REVEAL FACE (TYP.).
2. CIRCLES ABUTMENT PANEL: SHALL HAVE A FINISHED SIZE OF 2'-1" HIGH BY 8' WIDE OR AS MARKED. PANELS SHALL BE VERTICALLY LOCATED TO LINE UP HORIZONTALLY WITH THE CIRCLE PATTERN DECORATIVE RAILING. GRAPHIC FORM LINER DEPTHS ARE MEASURED FROM PANEL/REVEAL FACE (TYP.)
3. CIRCLES COLUMN PANEL: FINISHED SIZE SHALL DEPEND ON HEIGHT OF GIRDER AS MARKED. GRAPHIC FORM LINER DEPTHS ARE MEASURED FROM PANEL/REVEAL FACE (TYP.)
4. ALL FORMLINER EDGES ARE TO BE TAPERED 10-15 DEGREES MINIMUM AND HAND TOOLED FOR A SMOOTH APPEARANCE. A SAMPLE TEST PANEL SHALL BE CREATED AND IS SUBJECT TO APPROVAL.
5. PANELS ARE TO BE STAINED AS DESCRIBED IN CHAPTER 1 OF THIS DOCUMENT.
6. FORM LINER MANUFACTURER SHALL HAVE A MINIMUM OF 5 YEARS IN BUSINESS AND PROVIDE EXAMPLES OF SIMILAR WORK.

FRACTURED FIN



FRACTURED FIN TO MATCH EXISTING AT COLORADO AVE.

LIGHT SAND-BLAST FINISH



HEAVY SAND-BLAST FINISH



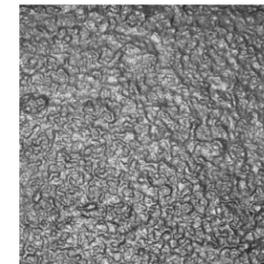
BROOM FINISH



MEDIUM SAND-BLAST



BUSHAMMER FINISH



HAND-STAINED STONE FORMLINER



ASHLAR PATTERN TO MATCH EXISTING ON CIMARRON BRIDGE OVER RR. COLORS SPECIFIED SHEET 1.1

ASHLAR PATTERN



ASHLAR PATTERN TO MATCH EXISTING MSE PANELS AT COLORADO AVE.

TOOLING EXAMPLES AND NOTES:

FORM PANELS SHALL BE HAND TOOLED. SECTION SHOWN ON THESE DRAWINGS ARE FOR INFORMATIONAL PURPOSES ONLY TO CONVEY THE DESIRED DEPTH OF THE PANEL.

AN ARTIST SHALL BE INVOLVED WITH THE CREATION OF THE FORMLINER. ANY 'BOXY' SHAPES WILL NOT BE ACCEPTED. SAMPLE TEST PANELS SHALL BE CREATED AND SHOW SUFFICIENT AREA TO DEMONSTRATE THE QUALITY OF THE TOOLING PROCESS AND BE SUBJECT TO APPROVAL.

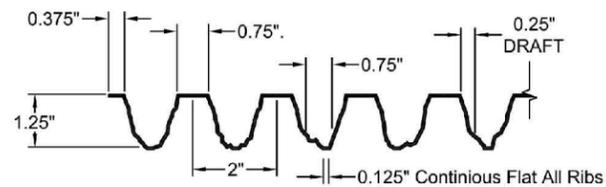
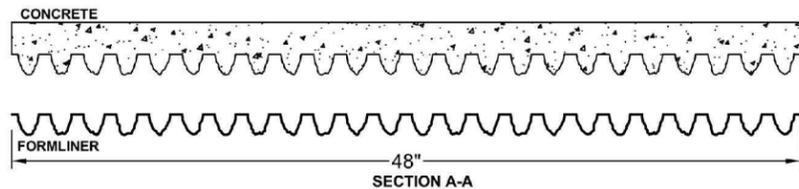
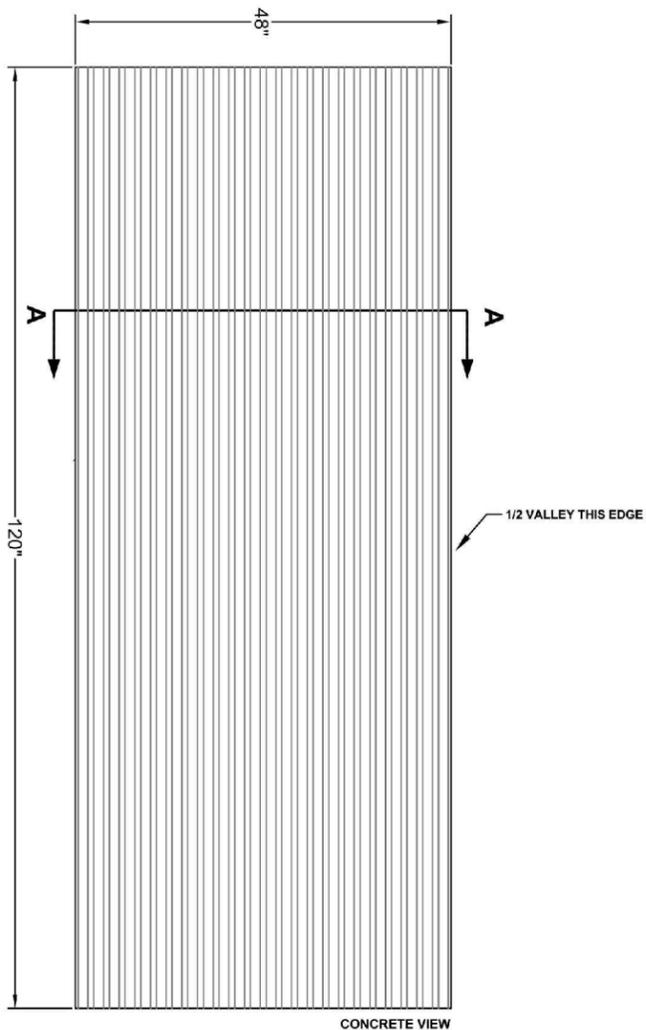
CUSTOM FORMLINER DESIGN FINISHES



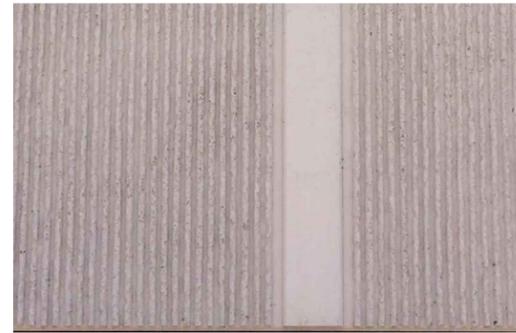
SMOOTH, HAND-TOOLED EDGES SHALL DEFINE THE STYLE OF THE CUSTOM PANELS

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| File Name:   |  | Date:                  | Comments: | Init. |  | No Revisions:           | <b>ABUTMENT WALL FORMLINER</b> |                    | <b>NOTES AND DETAILS</b> |                  | IM0252-423       |  |
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**FRACTURED FIN FINISH**



**FRACTURED FIN FINISH**



**RANDOM ASHLAR FINISH**

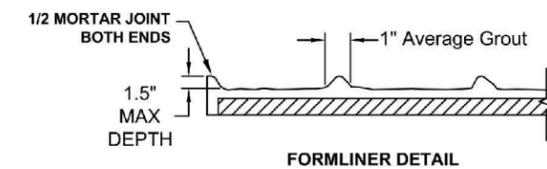
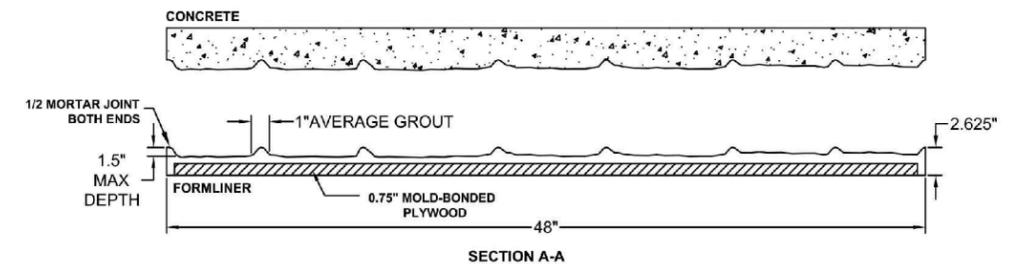
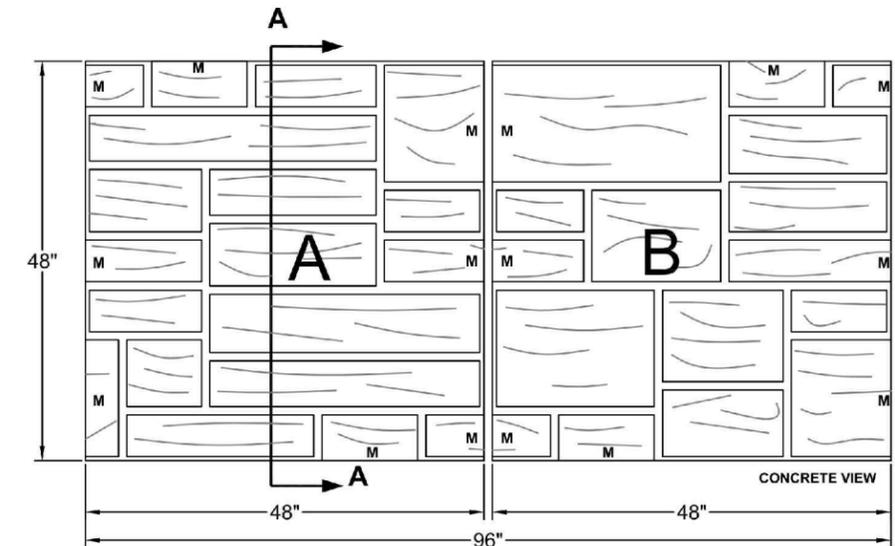


**RANDOM ASHLAR TO MATCH COLORADO AVE. AND ADHERE TO I-25 THROUGH COLORADO SPRINGS DESIGN GUIDELINES**

**NOTE;**

1. RANDOM ASHLAR SHALL BE ON EAST SIDE OF I-25 RETAINING WALLS TO MATCH COLORADO AVE. AND ADHERE TO I-25 THROUGH COLORADO SPRINGS DESIGN GUIDELINES.
2. FRACTURED FINISH WITH SOLID VERTICAL STRIPE DETAIL SHALL BE ON WEST SIDE OF I-25 RETAINING WALLS TO MATCH COLORADO AVE. AND ADHERE TO I-25 THROUGH COLORADO SPRINGS DESIGN GUIDELINES

**RANDOM ASHLAR FINISH**



**Stone & Rock**  
**Part Size:** (A) 48" W x 48" H  
 (B) 48" W x 48" H  
 60" W x 30" H  
**Max Depth:** 1.50"  
**Stone Sizes:** 7"- 34.5" W  
 5"- 14" H  
 M= Match point  
 Part "A" aligns with part "B" at a single match point on opposite sides

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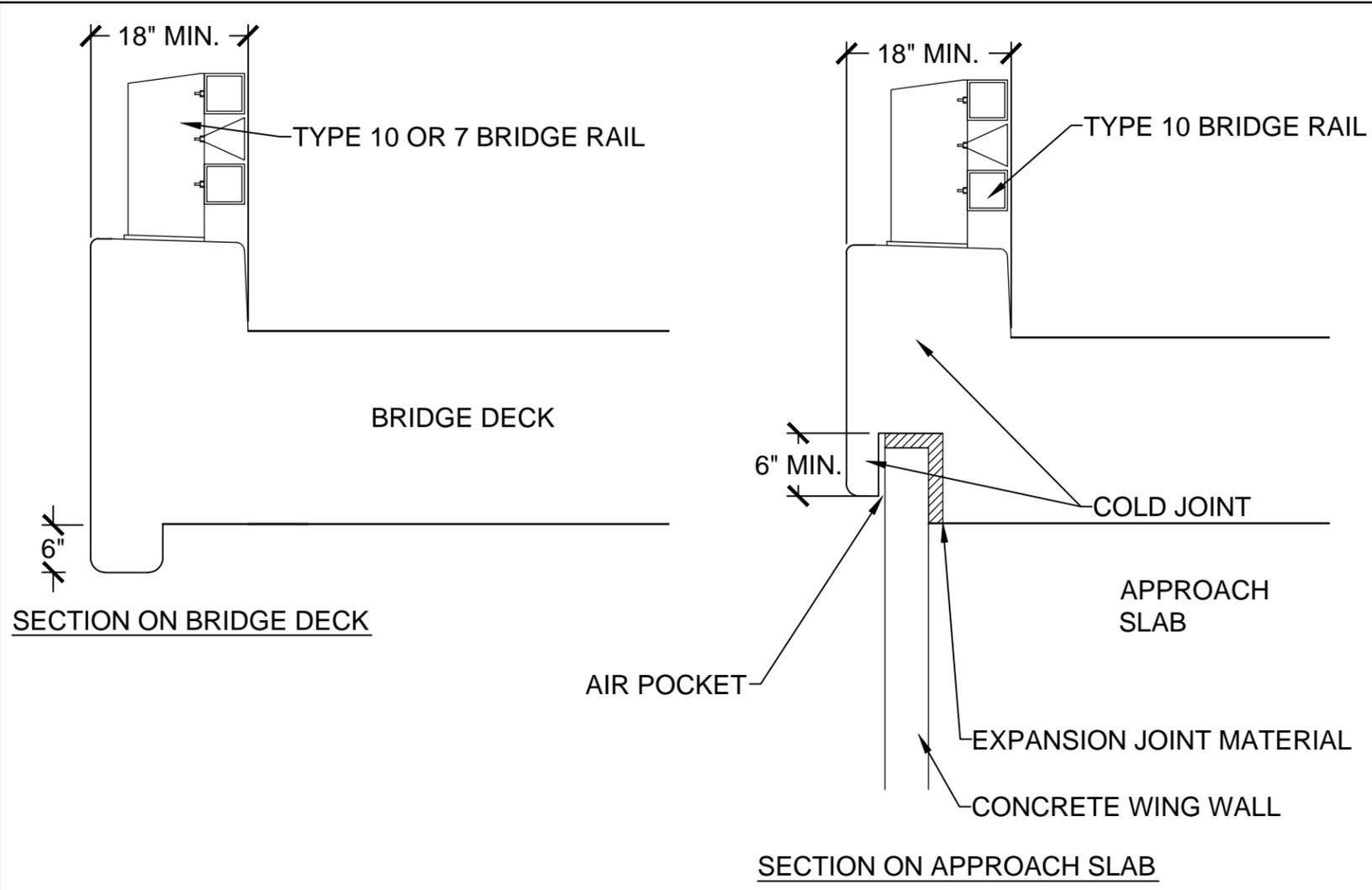
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| BRIDGES                 |                   |
| ABUTMENT WALL FORMLINER |                   |
| NOTES AND DETAILS       |                   |
| Designer: KRS           | Structure Numbers |
| Detailer: JDA/AM        | Subset Sheets:    |

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| Project No./Code |
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| 19039            |
| Sheet Number 3.9 |



**BRIDGE RAILS**  
**I-25 OVER CIMARRON**  
 BRIDGE RAIL SHALL CONSIST OF A TYPE 7 CONCRETE BARRIER WITH DECORATIVE STEEL RAILING ON THE OUTSIDE OF THE BRIDGE AS SHOWN IN ATTACHED PLANS. BRIDGE APPROACHES SHALL CONSIST OF A TYPE 10M STEEL RAIL ON A CONCRETE CURB. ALL CONCRETE SHALL BE SMOOTH AND COVERED WITH A PIGMENTED STAIN COATING AND ALL STEEL SHALL BE GALVANIZED.

**CIMARRON OVER FOUNTAIN CREEK**  
 BRIDGE RAIL SHALL CONSIST OF A TYPE 7 CONCRETE BARRIER WITH FRACTURED FIN FINISH ON THE OUTSIDE OF THE BRIDGE AS SHOWN IN ATTACHED PLANS. BRIDGE APPROACHES SHALL CONSIST OF A TYPE 10M STEEL RAIL ON A CONCRETE CURB. ALL CONCRETE SHALL BE SMOOTH AND COVERED WITH A PIGMENTED STAIN COATING AND ALL STEEL SHALL BE GALVANIZED.

**RAMP BRIDGES**  
 BRIDGE RAIL SHALL CONSIST OF A TYPE 10M STEEL RAIL ON A CONCRETE CURB. THE CONCRETE SHALL BE SMOOTH AND COVERED WITH A PIGMENTED STAIN COATING AND THE STEEL SHALL BE GALVANIZED.

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| File Name:   |  | Date:           | Comments: | Init.: |  | No Revisions:    | Designer: KRS  | Structure Numbers                              | IM0252-423        |                  |
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**PEDESTRIAN BRIDGES:**

1. PEDESTRIAN BRIDGES SHALL BE PRE-MANUFACTURED STRUCTURES.
2. PEDESTRIAN BRIDGES SHALL HAVE A MINIMUM CLEAR WIDTH OF 10'-0"
3. PEDESTRIAN BRIDGES SHALL HAVE METAL RUB RAILS.
4. PEDESTRIAN BRIDGES SHALL INCLUDE APPROACH RAILS.
  - 4.1. APPROACH RAILS SHALL BE MOUNTED IN/ON BRIDGE ABUTMENTS.
  - 4.2. APPROACH RAILS SHALL BE METAL TO MATCH BRIDGE RAILS.
5. THERE SHALL BE NO WOOD ON THE PEDESTRIAN BRIDGES OTHER THAN THE DECK BOARDS.
6. THE EXISTING BRIDGE OVER FOUNTAIN CREEK MAY BE RE-SET AND RE-USED AS LONG AS IT MEETS ALL NECESSARY SAFETY AND ENGINEERING REQUIREMENTS (THE EXISTING BRIDGE WOULD LIKELY REQUIRE LENGTHENING). THIS BRIDGE MAY ALSO BE REPLACED WITH A NEW BRIDGE THAT MEETS THE REQUIREMENTS IN THESE PLANS AND THE TECHNICAL REQUIREMENTS.
7. SEE PHOTOS ON THIS SHEET FOR EXAMPLES OF EXISTING BRIDGES; NEW BRIDGES SHALL AESTHETICALLY MATCH THESE BRIDGES AND MUST ADHERE TO ALL REQUIREMENTS LISTED IN THIS PLANS.

**APPROVAL**

ALL PEDESTRIAN BRIDGE ELEMENTS ARE SUBJECT TO APPROVAL.



EXAMPLE OF ACCEPTABLE APPROACH RAILS



EXAMPLES OF EXISTING BRIDGES ON PROJECT SITE

|  |  |                        |          |       |  |                         |                  |   |                   |                  |                   |  |
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| File Name:   |  | Date:                  | Comments | Init. |  | No Revisions:           | Designer: KRS    |   |                   | IM0252-423       |                   |  |
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HIGHWAY LIGHTING SHALL BE ALUMINUM HIGH MAST LIGHTING

THE POLES SHALL BE CONSTRUCTED OF METAL AND BE OF A CARVED ONE-PIECE TAPERED DAVIT STYLE. POLES SHALL BE 35' TALL. THE ARMS SHALL BE INTEGRAL WITH THE POLE. THE POLE SHALL HAVE A FULL BASE COVER. ALL LIGHTING AND LIGHT POLES SHALL BE THE SAME STYLE AND MANUFACTURE THROUGHOUT THE PROJECT.

ALL HIGHWAY LIGHTING SHALL BE IN COMPLIANCE WITH COLORADO SPRINGS UTILITIES AND CITY OF COLORADO SPRINGS STANDARDS.

THE LUMINARIES SHALL BE COBRA STYLE, WITH HOUSING CONSTRUCTED OF ALUMINUM.

THE POLES, ARMS AND LUMINARIES SHALL BE GALVANIZED AND THEN POWDER COATED IN ACCORDANCE WITH COLOR SELECTIONS IN CHAPTER 1. THE PAINT SHALL BE DURABLE AND SUITABLE FOR APPLICATION ON METAL.

AESTHETIC I-25 LIGHTING SHALL BE ACORN STYLE LIGHTS TO MATCH LIGHTS ON THE EXISTING CIMARRON BRIDGE OVER THE RAILROAD/CONEJOS ST.

ALL AESTHETIC I-25 LIGHTING SHALL BE IN COMPLIANCE WITH COLORADO SPRINGS UTILITIES AND CITY OF COLORADO SPRINGS STANDARDS.

CIMARRON BRIDGE LIGHTING SHALL BE ACORN STYLE LIGHTS TO MATCH LIGHTS ON THE EXISTING CIMARRON BRIDGE OVER THE RAILROAD/CONEJOS ST.

ALL CIMARRON BRIDGE LIGHTING SHALL BE IN COMPLIANCE WITH COLORADO SPRINGS UTILITIES AND CITY OF COLORADO SPRINGS STANDARDS.

LIGHTING UNDER BRIDGES

DOWNLIGHTS SHALL BE INSTALLED UNDER THE CIMARRON BRIDGE OVER FOUNTAIN CREEK AND UNDER ALL RAMP BRIDGES.

THESE LIGHTS SHALL ADEQUATELY LIGHT TRAILS AND CUSTOM FORMLINER PANELS.

LIGHTING UNDER BRIDGES, CONT.

ALL LIGHTING UNDER BRIDGES SHALL BE IN COMPLIANCE WITH COLORADO SPRINGS UTILITIES AND CITY OF COLORADO SPRINGS STANDARDS.

ARCHITECTURAL LIGHTING

I-25 BRIDGE MONUMENTS ON ALL FOUR CORNERS OF THE BRIDGE SHALL BE UP LIGHTED WITH LIGHTS HIDDEN IN THE LANDSCAPE.

THE CIMARRON BRIDGE OVER FOUNTAIN CREEK SHALL RECEIVE EIGHT (8) SCONCE LIGHTS. THESE SHALL BE ROUND IN SHAPE AND SHALL BE MOUNTED ON THE BRIDGE MONUMENTS AND BRIDGE ABUTMENTS AS SHOWN IN THE ILLUSTRATION BELOW.

ALL ARCHITECTURAL LIGHTING SHALL BE IN COMPLIANCE WITH COLORADO SPRINGS UTILITIES AND CITY OF COLORADO SPRINGS STANDARDS.

SEE BOOK 2 TECHNICAL REQUIREMENTS FOR ADDITIONAL REQUIREMENTS AND INFORMATION ON LIGHTING.

|  |  |                 |          |       |   |  |                  |  |                              |  |                   |  |                  |  |
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**RETAINING WALLS FACING:**

SEE THE FOLLOWING TABLE FOR RETAINING WALL FACING TYPES:

| WALL | FACING TYPE  |
|------|--|
| W1-A | FRACTURED FIN W/VERTICAL STRIPE                            |
| W1-B | FRACTURED FIN W/VERTICAL STRIPE                            |
| W2   | FRACTURED FIN W/VERTICAL STRIPE                            |
| W4   | FRACTURED FIN W/VERTICAL STRIPE                            |
| W5   | FRACTURED FIN W/VERTICAL STRIPE                            |
| E1-A | RANDOM ASHLAR FORMLINER                                    |
| E1-B | RANDOM ASHLAR FORMLINER                                    |
| E2   | RANDOM ASHLAR FORMLINER                                    |
| E3-A | RANDOM ASHLAR FORMLINER                                    |
| E3-B | RANDOM ASHLAR FORMLINER                                    |
| E4   | RANDOM ASHLAR FORMLINER                                    |
| W5-A | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| E3-C | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| E1-C | CREEK PANELS BELOW WITH HAND-STAINED STONE FORMLINER ABOVE |
| N1   | CREEK PANELS BELOW WITH HAND-STAINED STONE FORMLINER ABOVE |
| S1   | HAND-STAINED STONE FORMLINER TO MATCH CIMARRON BRIDGE      |
| S2   | HAND-STAINED STONE FORMLINER TO MATCH CIMARRON BRIDGE      |

SEE THE FOLLOWING PLAN SHEETS FOR DETAILS OF EACH FACING TYPE.

**RETAINING WALL SUPPORT STRUCTURE**

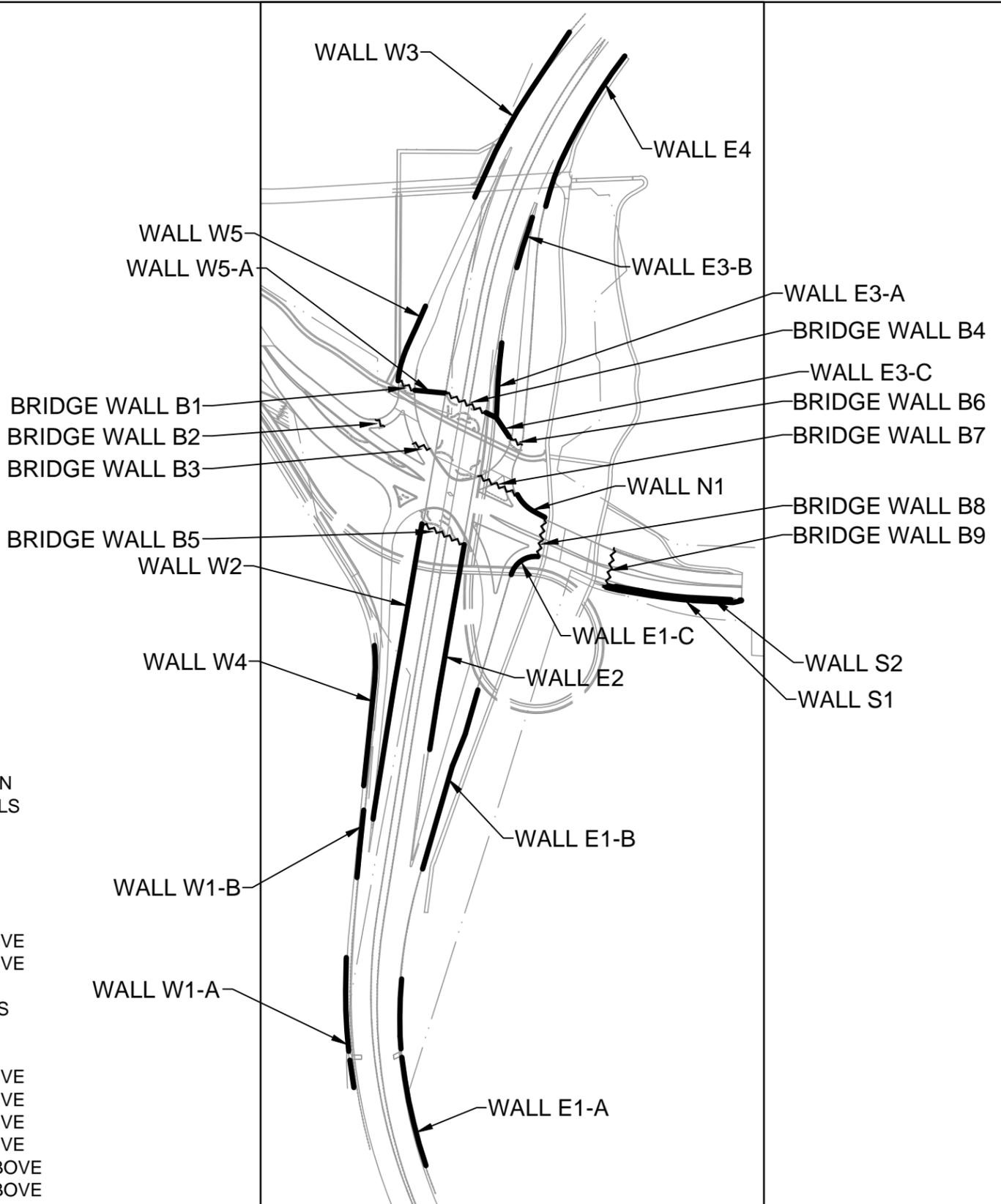
THE SUPPORT STRUCTURE (RETAINING THE EARTH) CAN BE ANY STANDARD CONVENTIONAL TYPE WALL, CAST-IN-PLACE WALL, MECHANICAL STABILIZED EARTH, SHEET PILING, CONCRETE CAISSON, H-PILES, ETC.

**BRIDGE ABUTMENTS AND BRIDGE WING WALLS**

ADDITIONAL INFORMATION ON COLORS AND FINISHES, PARTICULARLY FOR BRIDGE ABUTMENT WALLS CAN BE FOUND IN THE BRIDGE SECTION AND COLORS SECTION. WHERE RETAINING WALLS MEET BRIDGE ABUTMENTS AND/OR WING WALLS, COMMON FACING TYPES SHALL FLOW IN AN UNINTERRUPTED PATTERN FROM RETAINING WALLS TO BRIDGE STRUCTURAL FEATURES.

SEE THE FOLLOWING TABLE FOR BRIDGE ABUTMENT WALL FACING TYPES:

| BRIDGE WALL | FACING TYPE  |
|-------------|--|
| B1          | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| B2          | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| B3          | CREEK PANELS BELOW IF SPACE BELOW BRIDGE ALLOWS FOR DECORATIVE CREEK PANELS WITH HORIZONTAL ABUTMENT PANELS ABOVE. IF SPACE DOES NOT ALLOW FOR CREEK PANELS, ENTIRE ABUTMENT WALL SHALL BE HORIZONTAL ABUTMENT PANELS. |
| B4          | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| B5          | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| B6          | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| B7          | CREEK PANELS BELOW WITH HORIZONTAL ABUTMENT PANELS ABOVE   |
| B8          | CREEK PANELS BELOW WITH HAND-STAINED STONE FORMLINER ABOVE   |
| B9          | CREEK PANELS BELOW WITH HAND-STAINED STONE FORMLINER ABOVE   |



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Colorado Department of Transportation  
 1480 QUAIL LAKE LOOP, SUITE A  
 COLORADO SPRINGS, CO 80906  
 Phone: 719-634-2323 FAX: 719-227-3298  
 Region 2 DW

DESIGN BUILD RFP  
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RETAINING WALLS LOCATIONS AND NOTES  
 Designer: KRS  
 Detailer: JDA/AM  
 Structure Numbers  
 Subset Sheets:

Project No./Code  
 IM0252-423  
 19039  
 Sheet Number 5.0

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**RETAINING WALLS COLORS:**

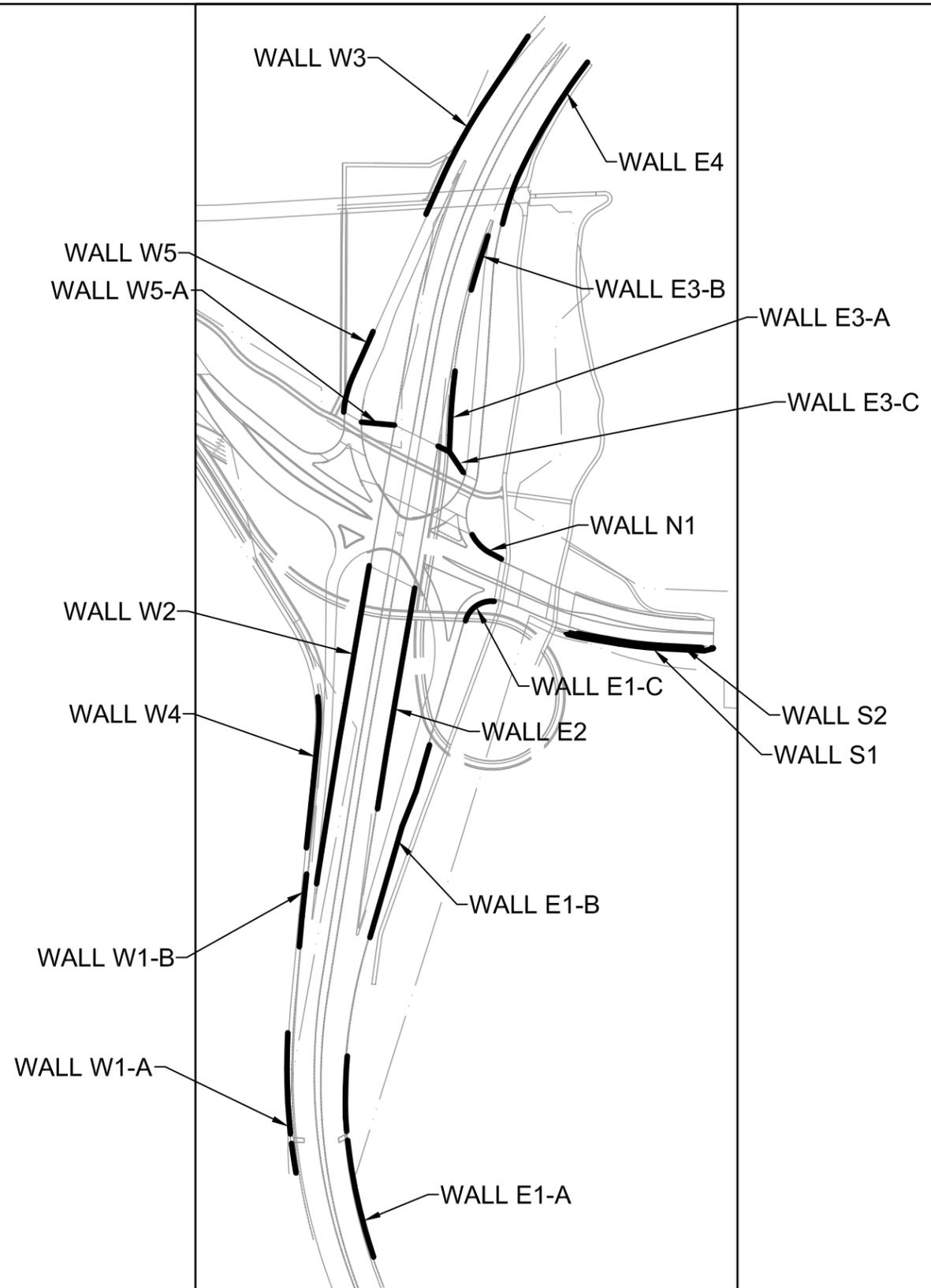
SEE THE FOLLOWING TABLE FOR RETAINING WALL COLORS:

| WALL | FACING TYPE   |
|------|---|
| W1-A | 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313   |
| W1-B | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| W2   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| W4   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| W5   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| E1-A | 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313   |
| E1-B | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| E2   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| E3-A | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| E3-B | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| E4   | 'FLESH' CONCRETE STAIN TO MATCH FEDERAL COLOR 30313   |
| W5-A | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| E3-C | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522   |
| E1-C | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 ON CREEK PANELS;SEE SHEETS 1.1 AND 1.2 FOR DETAILS AND COLORS ON HAND-STAINED STONE FORMLINER |
| N1   | 'BEIGE' CONCRETE STAIN TO MATCH FEDERAL COLOR 33522 ON CREEK PANELS;SEE SHEETS 1.1 AND 1.2 FOR DETAILS AND COLORS ON HAND-STAINED STONE FORMLINER |
| S1   | SEE SHEETS 1.1 AND 1.2 FOR DETAILS AND COLORS ON HAND-STAINED STONE FORMLINER   |
| S2   | SEE SHEETS 1.1 AND 1.2 FOR DETAILS AND COLORS ON HAND-STAINED STONE FORMLINER   |

SEE COLORS SECTION FOR ADDITIONAL INFORMATION ON COLOR PALETTES AND REQUIREMENTS

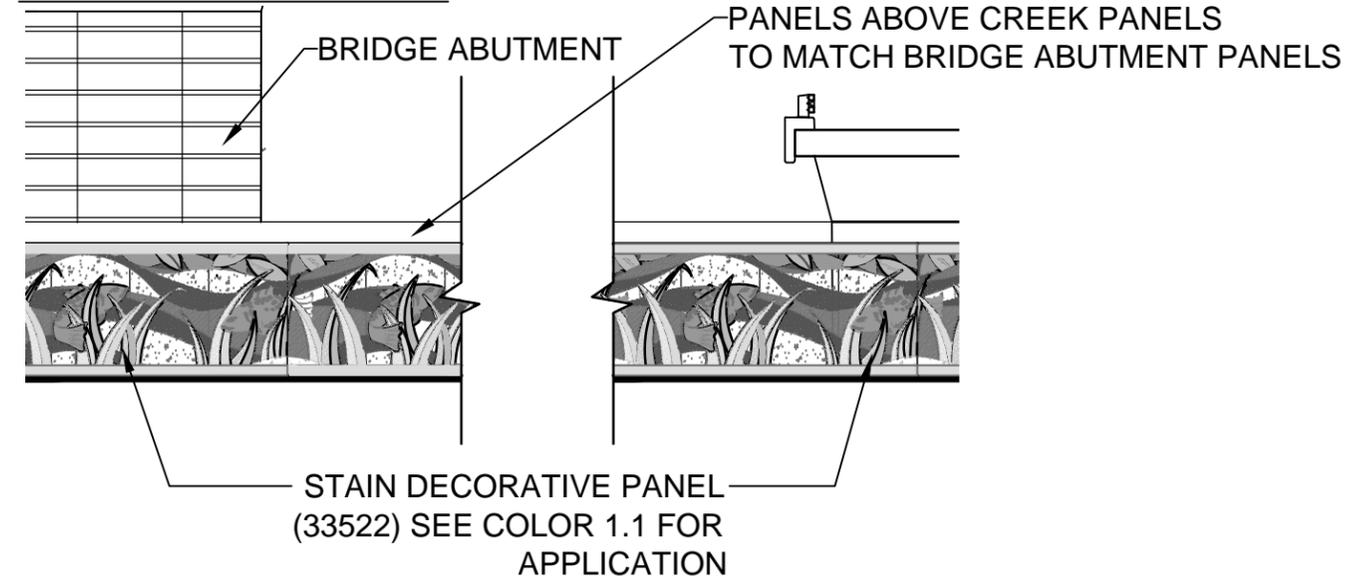
**BRIDGE ABUTMENTS AND BRIDGE WING WALLS**

COLORS FOR BRIDGE ABUTMENT WALLS CAN BE FOUND IN THE COLORS SECTION.

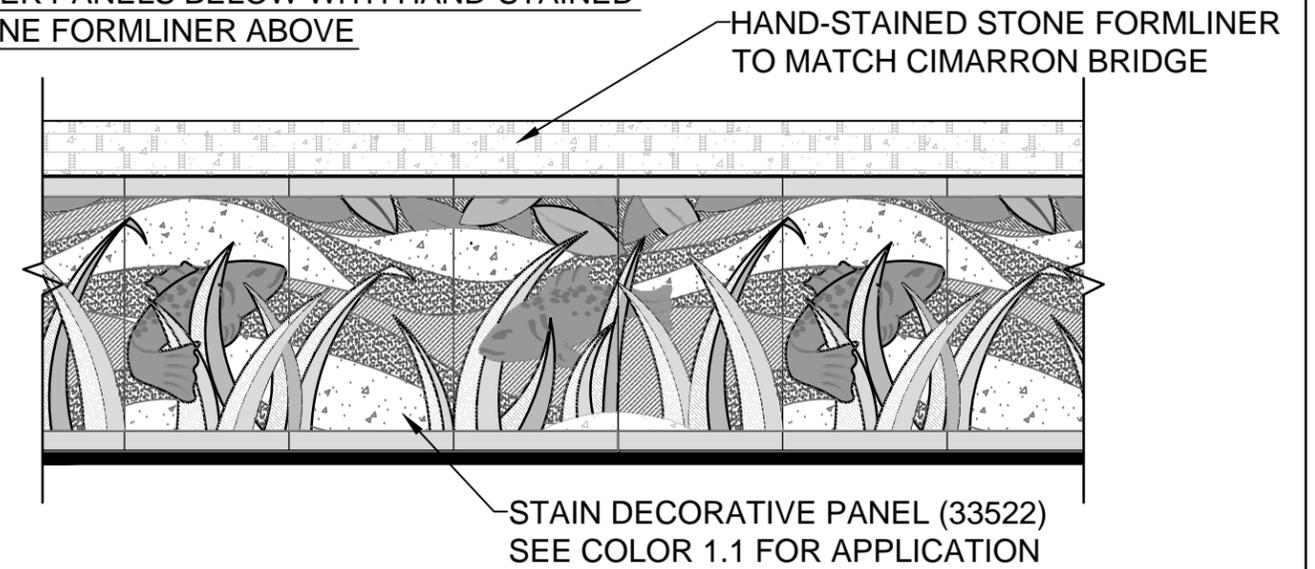


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| File Name:   |  | Date:                  | Comments | Init. |  1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298<br><b>Region 2</b> <span style="float: right;"><b>DW</b></span> |  | No Revisions:           |  | Designer: KRS<br>Detailer: JDA/AM          |  | IM0252-423              |  |
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| Unit Information    Unit Leader Initials   |  |                        |          |       |  |  | Void:                   |  | Subset Sheets:                             |  | Sheet Number 5.1        |  |
|  associates inc.    2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201    FAX 770-7132 |  |                        |          |       |  |  |                         |  |  |  |                         |  |

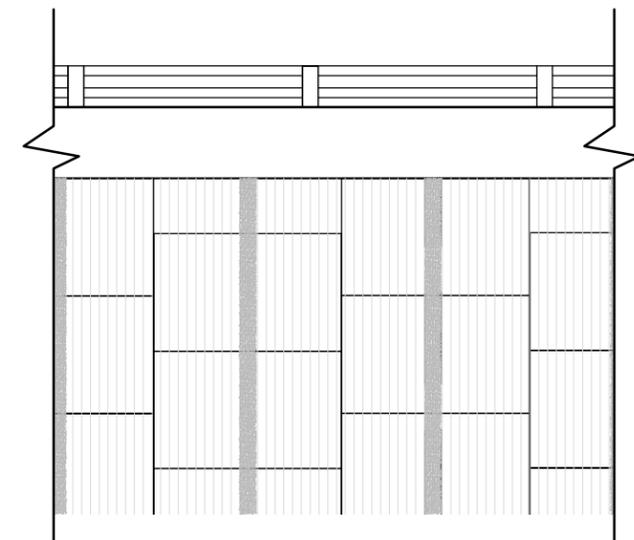
**CREEK PANELS BELOW WITH ABUTMENT PANELS ABOVE**



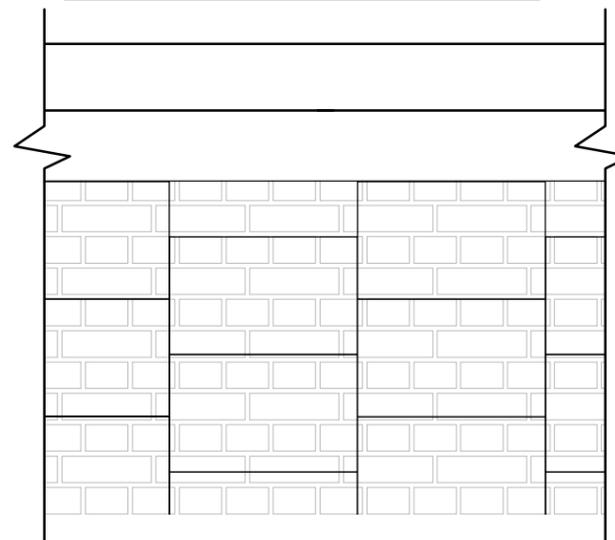
**CREEK PANELS BELOW WITH HAND-STAINED STONE FORMLINER ABOVE**



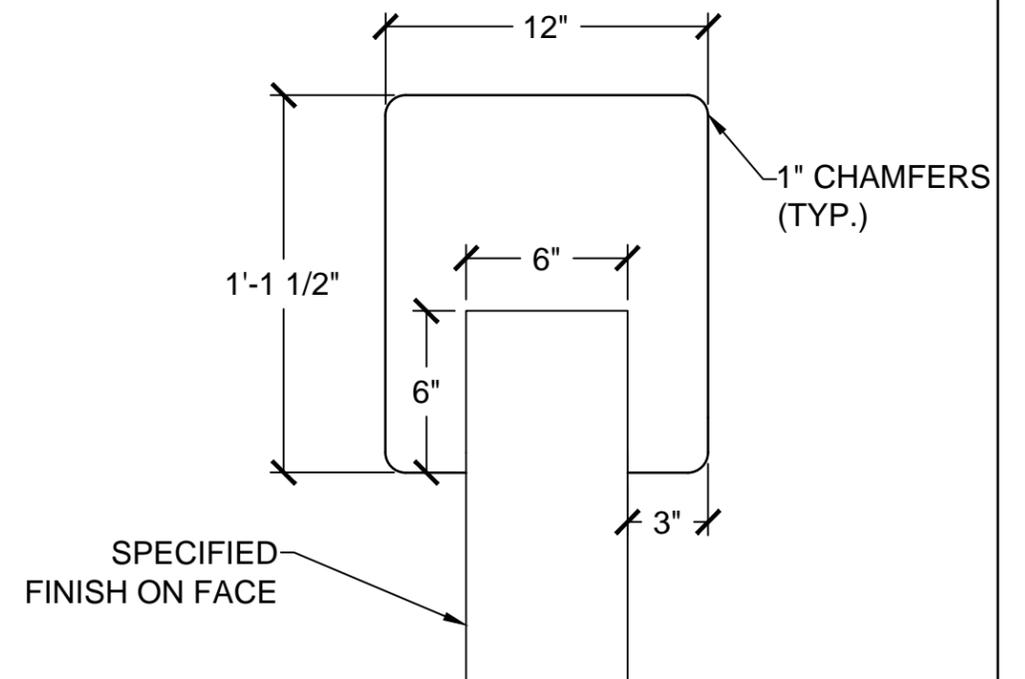
**FRACTURED FIN W/VERTICAL STRIPE**



**RANDOM ASHLAR FORMLINER**



**RETAINING WALL (NON-HIGHWAY) CAP**



**NOTE: THIS DETAIL ONLY APPLIES TO WALLS THAT ARE NOT TIED INTO MSE WALLS THAT SUPPORT ROADWAYS**

**NOTES:**

1. FRACTURED FIN W/VERTICAL STRIPE FINISH AND RANDOM ASHLAR FORMLINER FINISH SHALL MATCH EXISTING RETAINING WALL PANELS ON I-25 NORTH OF CIMARRON.
2. SEE SHEETS 3.9, 3.10 FOR ADDITIONAL INFORMATION AND DETAILS ON WALL FINISHES AND WALL CAPS FOR WALLS THAT TIE INTO MSE WALLS SUPPORTING ROADWAYS

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Phone: 719-634-2323 FAX: 719-227-3298

Region 2

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DESIGN BUILD RFP

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**RETAINING WALLS  
DETAILS**

Designer: KRS

Detailer: JDA/AM

Structure Numbers

Subset Sheets:

Project No./Code

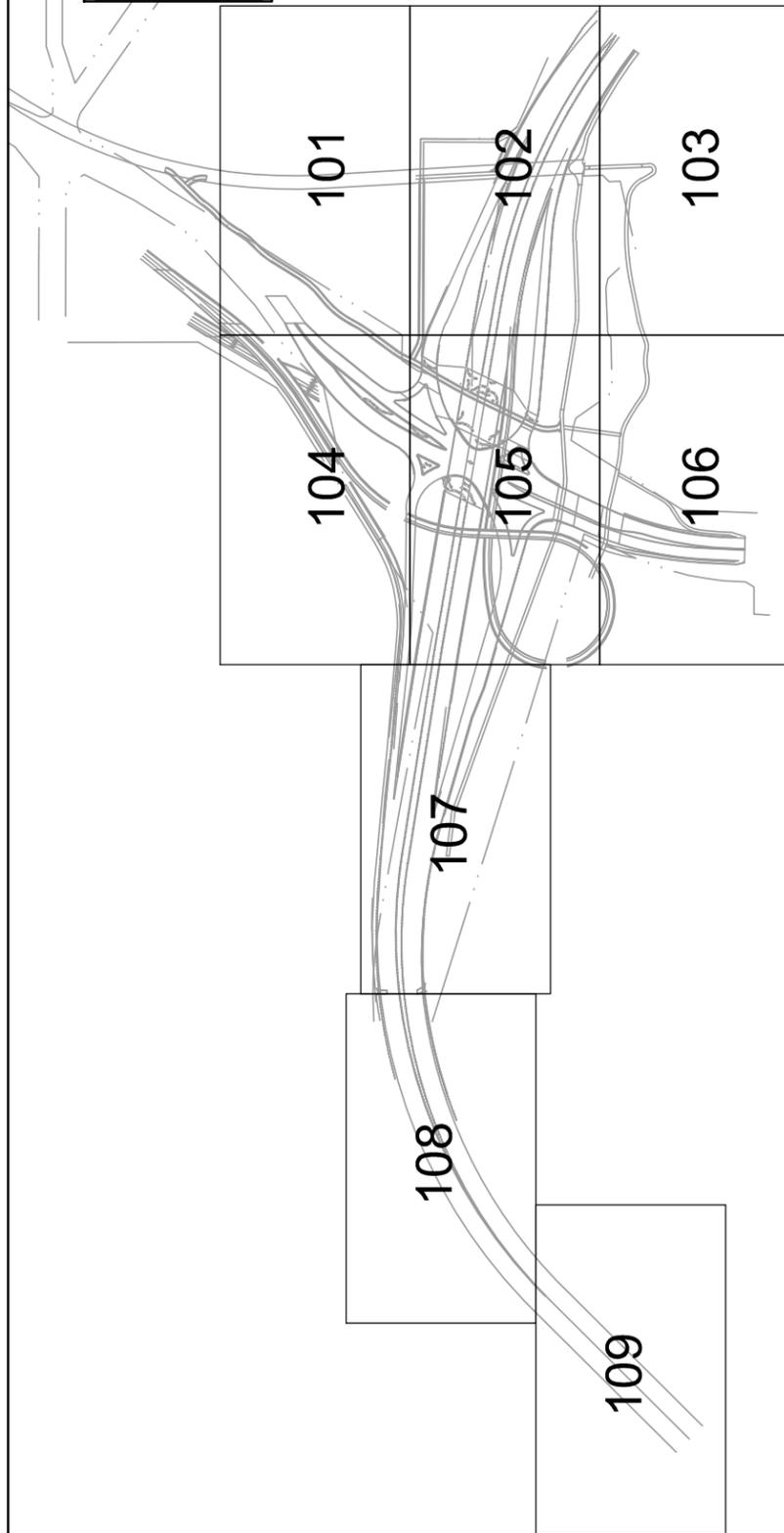
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SHEET INDEX



# CHAPTER 8 - LANDSCAPE DEMOLITION PLANS AND SPECIFICATIONS

**NOTES:**

1. AREAS SHOWN AS CLEAR AND GRUB ARE ANTICIPATED TO BE IMPACTED HEAVILY BY CONSTRUCTION AND SHALL THEREFORE BE COMPLETELY CLEARED OF ALL VEGETATION. THIS INCLUDES GRINDING/REMOVAL OF STUMPS OF ALL REMOVED TREES.
2. IF THE CONTRACTOR FEELS THAT ANY AREAS SHOWN AS CLEAR AND GRUB WILL NOT BE HEAVILY IMPACTED BY CONSTRUCTION, CONTRACTOR SHALL GIVE NOTIFICATION TO CDOT AND THE ENGINEER FOR REVIEW/APPROVAL. UPON APPROVAL, CONTRACTOR SHALL LEAVE EXISTING VEGETATION STANDING AND IN GOOD HEALTH.
3. EAST OF INTERSTATE 25, THE LIMITS OF CLEARING/GRUBBING SHALL BE DELINEATED BY THE WEST EDGE OF THE PEDESTRIAN TRAIL, EXCEPT AS SHOWN DIFFERENTLY IN THESE PLANS.
4. SOME OF THE CLEAR AND GRUB AREAS CONTAIN LARGE TREES. IT IS THE CONTRACTORS RESPONSIBILITY TO COMPLETELY REMOVE THESE TREES AND GRIND/REMOVE THE STUMPS.
5. ANY COTTONWOODS THAT ARE IN GOOD HEALTH AND THAT CAN BE PRESERVED SHALL REMAIN. IF THEY ARE WITHIN THE PROPOSED 80' TRAPEZOIDAL CHANNEL ALONG FOUNTAIN CREEK, AN ISLAND MUST BE FORMED TO PRESERVE THE TREE AND ROOT MASS, AND HYDRAULIC MODELING MUST BE COMPLETED TO SHOW ANY HYDRAULIC CHANGES CAUSED BY THE ISLAND. FINAL HYDRAULIC MODEL SHALL BE APPROVED BY THE ENGINEER.
6. AREAS ALONG FOUNTAIN/MONUMENT CREEKS THAT ARE SHOWN AS SELECTIVE PRUNING/THINNING SHALL BE TREATED AS FOLLOWS:
  - 6.6. ALL TREES TO BE REMOVED SHALL BE FLAGGED. CDOT AND THE ENGINEER SHALL APPROVE ALL FLAGGED TREES PRIOR TO REMOVAL.
  - 6.7. ALL SIBERIAN ELM TREES SHALL BE FLAGGED FOR REMOVAL.
  - 6.8. ALL INVASIVE AND NOXIOUS WEED PLANT SPECIES SHALL BE FLAGGED FOR REMOVAL.
  - 6.9. AREAS WITH EXCESSIVE UNDERGROWTH MAY REQUIRE REMOVAL/THINNING IN ORDER TO ACHIEVE THE DESIRED AESTHETIC SHOWN IN THE LANDSCAPE PLANTING PLANS. THESE AREAS SHALL BE FLAGGED AND APPROVED BY CDOT AND THE ENGINEER.
  - 6.10. ALL TREES TO REMAIN SHALL BE PRUNED TO REMOVE ANY DEAD OR DYING BRANCHES, AS WELL AS ANY BRANCHES THAT POSE A THREAT TO PEDESTRIANS OR VEHICLES.
7. ANY AREAS THAT ARE CLEARED AND GRUBBED (INCLUDING ANY ADDITIONAL AREAS NOT SHOWN ON THESE PLANS) SHALL BE REVEGETATED WITH NATIVE SEED. SEE LANDSCAPE PLANTING PLANS (CHAPTER 10) FOR SEED MIX.

|   |  |
|---|--|
|  | CLEAR AND GRUB:<br>SOME AREAS CONTAIN LARGE TREES<br>IN ADDITION TO SHRUBS AND GRASSES                             |
|  | SELECTIVE PRUNING/TREE THINNING<br>REMOVE ALL INVASIVES; SEE NOTES<br>SHEET D100 FOR PRUNING/REMOVAL<br>GUIDELINES |

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Region 2

DW

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CHAPTER 8  
LANDSCAPE DEMOLITION

Designer: KRS

Detailer: JDA/AM

Structure

Numbers

Subset Sheets:

Project No./Code

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**SECTION 02230 SITE CLEARING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
  1. Examination of the site.
  2. Marshalling and access.
  3. Protecting existing trees and vegetation to remain.
  4. Removing trees and other vegetation.
  5. Clearing and grubbing.
  6. Topsoil stripping.
  7. Removing above-grade site improvements.
  8. Disconnecting, capping or sealing, and abandoning site utilities in place.
  9. Disconnecting, capping or sealing, and removing site utilities.
- B. Related Sections include the following:
  1. Division 2 Section 02231 "Tree Protection and Trimming" in Chapter 8 for protecting trees remaining on-site that are affected by site operations.
  2. Division 2 Section 02300 "Earthwork" in Chapter 8 for soil materials, excavating, backfilling, and site grading.
  3. Division 2 Section 02900 "Landscaping" in Chapter 10 for finish grading, including placing and preparing topsoil for lawns and planting.

**1.3 DEFINITIONS**

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than ¾ inches in diameter, and free of weeds, roots and other deleterious materials.

**1.4 MATERIALS OWNERSHIP**

- A. Except for materials to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

**1.5 SUBMITTALS**

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings according to Division 1 Section "Contract Close-out."
  1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.
- C. An approved traffic control plan and all environmental permits as required by local and state agencies.

**1.6 QUALITY ASSURANCE**

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

**1.7 PROJECT CONDITIONS**

- A. The Contractor shall visit, inspect and thoroughly become familiar with the site and the scope of work. The Contractor will judge conditions that will exist when carrying out the contract. The Contractor shall meet with the Owner's Representative to determine the point of access and marshaling area to be utilized to perform this work. No gasoline, oil concrete or other material shall be dumped anywhere on site.
- B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
  3. When working in the City Right of Way, submit an approved traffic control plan to Owner's Representative.
- C. Improvements on Adjoining Property: Authority for performing indicated removal and alteration work on property adjoining Owner's property will be obtained by owner before award of Contract.
- D. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- E. Notify utility locator service for area where Project is located before site clearing.

**PART 2-PRODUCTS**

**2.1 SOIL MATERIALS**

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."
  1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

**PART 3-EXECUTION**

**3.1 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Submit a storm water control plan and fugitive dust permit as required by local and state agencies.
- C. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Locate and clearly flag trees and vegetation to remain or to be relocated.
- E. Refer to City of Colorado Springs stormwater management manual.
- F. Protect existing site improvements both in and outside of construction zone.

- 1. Restore damaged improvements both on and off the site to their original condition, as acceptable to Owner.

**3.2 TREE PROTECTION**

- A. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
  1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
  2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.
- B. Do not excavate within drip line of trees, unless otherwise indicated.
- C. Refer to the related plans as indicated, and/or consult with the City Forester or the Designee assigned to the project.
- D. Furnish all labor, material, tools, land equipment necessary to complete the work indicated on drawings and as required herein.
- E. Existing trees to remain shall be protected at all times during the Contract period, by using fencing (i.e., snow fencing, or chain link fencing with metal staking). Tree protection fencing shall be maintained by the Contractor during construction. The Protection area to be fenced (2') outside the dripline of the tree unless otherwise required by the Owner's Representative. No equipment shall be parked, driven or material stockpiled within the dripline area of the existing trees to remain. No gasoline, oil, chemicals, concrete or other material shall be dumped anywhere on site. Where vehicle or equipment traffic if necessary in the protection area of a tree, the soil shall be protected from compaction by (6"-10") layer of wood chip mulch.
- F. Any trees damaged during construction shall be promptly reported to the Owner's Representative, who shall contact the City Forester or the Designee for an assessment of damages. The contractor will be responsible for repair or replacement to the satisfaction of the City Forester or the Designee.
- G. Tree roots are to be clean cut when necessary using proper equipment, i.e. loppers or concrete saw. The Contractor shall submit with the Bid the cost to implement proper boring under roots.
- H. The City Forester or the Designee will be informed of all construction projects, especially when trees are involved.
- I. The City Forester or the Designee will survey the site to set and determine what the contractor needs to do before construction begins. The Contractor shall set up tree protection devices.
- J. The City Forester or the Designee shall be informed of:
  1. Soil grade changes adjacent to trees.
  2. Probable trenching through roots.
  3. Location of stored heavy equipment.
  4. Paths heavy equipment will take during construction project, to avoid root compaction and root breakage.
- K. The City Forester or the Designee shall be notified during the project design phase, to aid in tree protection during the primary phase.
  1. When equipment must be used in close proximity of the trunk, the entire tree trunk shall be protected by banding large 2"x4" wooden boards to avoid direct contact. The soil shall be protected from compaction with a 6-10" layer of wood chip mulch.
  2. The Forestry Division will conduct all pruning if limb elevation is needed to avoid equipment contact.
  3. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
- L. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
  1. Cover exposed roots with burlap and water regularly.
  2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
  3. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
- M. Rehabilitate or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.
  1. Employ a qualified arborist, as approved by the City Forester or the Designee, to submit details of proposed rehabilitation for the damage to trees and shrubs.
  2. The Contractor will replace trees that cannot be rehabilitated and restored to full-growth status, as determined by the qualified arborist and the City Forester or the Designee

**3.3 UTILITIES**

- A. Contractor will coordinate for disconnecting and sealing indicated utilities that serve existing structures before site clearing with Owner's Representative.
  1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
  1. Owner will arrange to shut off indicated utilities when requested by Contractor.
  2. Arrange to shut off indicated utilities with utility companies.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or other unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Owner's Representative written permission.
- D. Excavate for and remove underground utilities indicated to be removed.

**3.4 CLEARING AND GRUBBING**

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
  1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
  3. Completely remove or grind stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.

- 4. Use only hand methods for grubbing within drip line of remaining trees.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

- 1. Place fill material in horizontal layers not exceeding 8-inch loose depth, and compact each layer to a density equal to adjacent original ground.

**3.5 TOPSOIL STRIPPING**

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
  1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Comply with fugitive dust permit.
  1. Do not stockpile topsoil within drip line of remaining trees.
  2. Dispose of excess topsoil as specified for waste material disposal.

**3.6 SITE IMPROVEMENTS**

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
  1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

**3.7 DISPOSAL**

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property. All associated costs and fees are the responsibility of the contractor.

**END OF SECTION 02230 SITE CLEARING (REVISED 2013)**

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| <p>TK associates inc.<br/>2953 South Peoria Street, Ste 101<br/>Aurora, Colorado 80014<br/>303-770-7201 FAX 770-7132</p> |  |                        |          | Region 2  | DW                      |               |   |                   |                         |  |

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**SECTION 02300 EARTHWORK, CONT.**

hammering, ripping, or blasting, when permitted:

1. Excavation of Footing, Trenches, and Pits: Late-model, track-mounted hydraulic excavator, equipped with a 42-inch wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lbf and stick-crowd force of not less than 18,700 lbf; measured according to SAE J-1179.
  2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 45,000-lbf breakout force; measured according to SAE J-732.
- I. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material ¾ cu. yd. or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches.
  - J. Scarify: Preparation of an existing grade or subgrade by uniformly and mechanically breaking up the soils to a predetermined depth.
  - K. Structures: Buildings, footings, foundation, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, other man-made stationary features constructed above or below the ground surface.
  - L. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.
  - M. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
  - N. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

**1.5 SUBMITTALS**

- A. Product Data: For the following:
  1. Each type of plastic warning tape.
  2. Drainage fabric.
  3. Separation fabric.
- B. Samples: For the following:
  4. 30-lb samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources.
  5. 12-by-12-inch sample of drainage fabric.
  6. 12-by-12-inch sample of separation fabric.
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
  1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
  2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.
  3. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.
- D. Blasting plan approved by authorities having jurisdiction, for record purposes.

**QUALITY ASSURANCE**

- A. Comply with applicable requirements of NFPA 495, "Explosive Materials Code."
- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
  1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
  2. Seismographic monitoring services during blasting operations.
- C. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- D. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

**1.6 PROJECT CONDITIONS**

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner's Representative and then only after arranging to provide temporary utility services according to requirements indicated:
  1. Notify Owner's Representative not less than two working days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without written permission from Owner's Representative.
  3. Contact utility-locator services for area where Project is located, at least 48 hours prior to commencing excavating. Call 1-800-922-1987 for all utility locations, including TV cable.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

**PART 2 - PRODUCTS**

**2.1 SOIL MATERIALS**

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups, MH, CH, OL, OH, and PT, or a combination of these group symbols.
- D. Backfill and Fill: Satisfactory soil materials.
- E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a ¾ inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

- H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- I. Drainage Fill: Washed, uniformly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- J. Filter Material: Uniformly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

**2.2 ACCESSORIES**

- A. Warning Tape: Acid-and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:
  1. Red: Electric.
  2. Yellow: Gas, oil, steam, and dangerous materials.
  3. Orange: Telephone and other communications.
  4. Blue: Water systems.
  5. Green: Sewer systems.
- B. Detectable Warning Tape: Acid-and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
  1. Red: Electric.
  2. Yellow: Gas, oil, steam, and dangerous materials.
  3. Orange: Telephone and other communications.
  4. Blue: Water systems.
  5. Green: Sewer systems.
- C. Drainage Fabric: Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D4759 and referenced standard test methods:
  1. Grab Tensile Strength: 120 lbf; ASTM D 4632.
  2. Tear Strength: 50 lbf; ASTM D 4533
  3. Puncture Resistance: 70 lbf; ASTM D4833
  4. Water Flow Rate: 135 gpm per sq. ft.; ASTM D 4491.
  5. Apparent Opening Size: No. 70; ASTM D4751
- D. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D4759 and referenced standard test methods.
  1. Grab Tensile Strength: 200 lbf; ASTM D 4632
  2. Tear Strength: 75 lbf; ASTM D 4533.
  3. Puncture Resistance: 90 lbf; ASTM D 4833.
  4. Water Flow Rate: 4 gpm per sq. ft.; ASTM D 4491.
  5. Apparent Opening Size: No. 30; ASTM D 4751.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

**3.2 DE-WATERING**

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  1. Obtain de-watering permit if required.
  2. Reroute surface water runoff away from excavation areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
  3. Install a de-watering system to keep subgrades dry and convey ground water away from excavations. Maintain until de-watering is no longer required.

**3.3 EXPLOSIVES**

- A. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.
  1. Do not damage adjacent structures, property, or site improvements or weaken the bearing capacity of rock subgrade when using explosives.

**3.4 SURVEYING AND GRADE STAKING**

- A. Before earthwork operations are started, the site shall be completely staked out by the Contractor for the work of this section for the approval of the Owner's Representative. Surveying and staking is to be done by a City approved licensed surveyor.
- B. Grade stakes shall be set where spot elevations are shown on drawings as well as breaks in grade, along drainage swales and as otherwise required, to complete the work of this section to the elevations shown on the drawings or as modified in the field by the Owner's Representative.
- C. Maintain all benchmarks and other reference points; if disturbed or destroyed, notify the Owner's Representative and replace as directed.
- D. All surveys to consist of (50') foot grids with spot elevations unless otherwise specified.

- E. Rough Grade: Refer to Section 3.17 Rough Grading.
- F. Blue Tops: Refer to Section 3.19 Blue Topping.

**3.5 EXCAVATION, GENERAL**

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, an obstructions.
  1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Classified Excavation: Excavation to subgrade elevations classified as earth and rock. Rock excavation will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.
  1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
    - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
  2. Rock excavation includes removal and disposal of rock.
    - a. Do not excavate rock until it has been classified and cross-sectioned by Owner's Representative.
- C. Protection, Shoring and Bracing.
  1. In the event that existing utilities, structures, or underground water is encountered or exposed during the execution of this work, the Contractor shall notify the Owner's Representative immediately for procedures to follow.
  2. Install and maintain shoring, bracing and safety fencing or safety tape as required to keep structures, sidewalks, drives and streets safe to life, limb and property at all time. Provide shoring and bracing as required to stabilize earth slopes.
  3. Provide necessary decking, guards, fences, or planking to maintain safe pedestrian and vehicular traffic on and adjacent to the site.
  4. Keep public streets and existing paved areas clean at all times.

**3.6 EXCAVATION FOR STRUCTURES**

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance form structures for placing and removing concrete form work, for installing services and other construction, and for inspections.
  1. Excavations for footing and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
  2. Pile Foundations: Stop excavations from 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
  3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.
  4. Compliance with City of Colorado Springs grading and erosion control plan as per drainage criteria manual, (manual can be obtained from the City of Colorado Springs Engineering Division).

| Print Date: 05-22-2014   |          | <table border="1"> <thead> <tr> <th colspan="3">Sheet Revisions</th> </tr> <tr> <th>Date:</th> <th>Comments</th> <th>Init.</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> |  |  | Sheet Revisions |  |                  | Date: | Comments          | Init. |  |  |  |  |  |  |  |  |  |  |  |  | Colorado Department of Transportation |  | DESIGN BUILD RFP |  | CHAPTER 8<br>LANDSCAPE DEMOLITION |  | Project No./Code |  |
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| Sheet Revisions  |          |  |  |  |                 |  |                  |       |                   |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                   |  |                  |  |
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| File Name:   |          |  1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298   |  |  | No Revisions:   |  | Designer: KRS    |       | IM0252-423        |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                   |  |                  |  |
| Horiz. Scale: As Noted    Vert. Scale: As Noted  |          | Region 2   |  |  | Revised:        |  | Detailer: JDA/AM |       | 19039             |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                   |  |                  |  |
| Unit Information    Unit Leader Initials   |          | DW   |  |  | Void:           |  | Subset Sheets:   |       | Sheet Number D004 |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                   |  |                  |  |
|  associates inc.    2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201    FAX 770-7132 |          |  |  |  |                 |  |                  |       |                   |       |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                   |  |                  |  |

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**SECTION 02300 EARTHWORK, CONT.**

**3.7 EXCAVATION FOR POND LINERS, COURTS, ARTIFICIAL TURF FIELDS, WALKS AND PAVEMENTS**

A. Excavate surfaces under pond liners, courts, artificial turf fields, walks and pavements to indicated cross sections, elevations, and grades.

**3.8 EXCAVATION FOR UTILITY TRENCHES**

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- Beyond building perimeter, excavate trenches to allow installation of tops of pipe in accordance with local requirements.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- Clearance: 12 inches on each side of pipe or conduit.
  - Clearance: As indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
- For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
  - For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
  - Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
- Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

**3.9 APPROVAL OF SUBGRADE**

- A. Notify Owner's Representative when excavations have reached required subgrade.
- B. If Owner's Representative determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulator water, or construction activities, as directed by Owner's Representative.

**3.10 UNAUTHORIZED EXCAVATION**

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footings by extending bottom, without altering top elevation. Lean concrete fill may be used when approved by Owner's Representative.
- Fill unauthorized excavations under other construction or utility pipe as directed by Owner's Representative.

**3.11 STORAGE OF SOIL MATERIALS**

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Conform to fugitive dust permit.
- Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

**3.12 BACKFILL**

- A. Place and compact backfill excavations promptly, but not before completing the following:
- Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
  - Surveying locations of underground utilities for record documents.
  - Inspecting and testing underground utilities.
  - Removing concrete formwork.
  - Removing trash and debris.
  - Removing temporary shoring and bracing, and sheeting.
  - Installing permanent or temporary horizontal bracing on horizontally supported walls.

**3.13 UTILITY TRENCH BACKFILL**

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings.

- C. Place compact initial backfill of subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.
- Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- D. Coordinate backfilling with utilities testing.
- E. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- F. Place and compact final backfill of satisfactory soil material to final subgrade.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

**3.14 FILL**

- A. Preparation: In areas requiring fill, all stripping operations shall be completed before backfilling has begun. Place fill and backfill on reasonably dry soil. No fill shall be placed on wet ground. Fill shall be laced in eight inch (8") lifts in compacted depth under pavements or concrete and ten inch (10") lifts compacted depth under planted, turfed or other areas. Each layer shall be compacted to a firm surface by sheepfoot rollers or pneumatic rollers. Fill and backfill shall be compacted to 85% density under areas to be turned or planted and 95% density under all pavements and improvements. Density tests shall be modified Proctor Test taken at optimum moisture content.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations as follows:
- Under grass and planted areas, use satisfactory soil material, in no more than 10" lifts.
  - Under walks and pavements, use satisfactory soil material, in no more than 8" lifts.
  - Under steps and ramps, use engineered fill.
  - Under building slabs, use engineered fill.
  - Under footing and foundations, use engineered fill.
- D. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

**3.15 MOISTURE CONTROL**

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
- Do not place backfill of fill material on surfaces that are muddy, frozen, or contain frost or ice.
  - Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percents and is too wet to compact to specified dry unit weight.

**3.16 COMPACTION OF BACKFILLS AND FILLS**

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according ASTM D 1557:
- D. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
- Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.
  - Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 92 percent.
  - Under Turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.

**3.17 ROUGH GRADING**

- A. General: Uniformly grade all areas covered by the project, including excavated and fill sections. The finished surface shall be smooth, within a 1/10 of a foot compacted and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade grade operations. The final surface shall be not more than (.1) feet above or below the established grade or approved cross section.
- Provide a smooth transition between adjacent existing grades and new grades.
  - Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
- Turf or Unpaved Areas: Plus or minus 1/10 of an inch.
  - Walks: Plus or minus 1/10 of an inch.
  - Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.
- D. Contractor to provide survey to verify grades, to include swales, to satisfaction of Owner's Representative.
- E. The Owner's Representative shall approve final rough grade, prior to Contractor proceeding with any permanent site

improvements.

**3.18 FINISH GRADING**

- A. Upon completion of construction, all areas which have been excavated, filled, or otherwise disturbed shall be covered with earth to a depth required to bring finished grade to the elevation indicated on drawings. This shall include the depth of topsoil.
- B. Topsoil shall be placed to provide a minimum depth of four inches (4") in all areas to receive, sod or as otherwise indicated.
- C. Topsoil shall be graded and dragged to prevent irregularities and depressions in which water will be retained.

**3.19 BLUE TOPPING**

- A. Provide blue top staking at 50 foot grids in all disturbed areas to receive imported topsoil and sodded turfgrass, to be done for all areas 5% or less, as well as under all areas to receive asphalt pavement.

**3.20 SUBSURFACE DRAINAGE**

- A. Drainage Piping: Drainage pipe is specified in Division 2 Section "Foundation Drainage Systems."
- B. Subsurface Drain: Place a layer of drainage fabric around perimeter of drainage trench as indicated. Place a 6-inch course of filter material on drainage fabric to support drainage pipe. Encase drainage pipe in a minimum of 12 inches of filter material and wrap in drainage fabric, overlapping sides and ends at least 6 inches.
- Compact each course of filter material to 95 percent of maximum dry unit weight according to ASTM D 698.
- C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade. Overlay drainage backfill with one layer of drainage fabric, overlapping sides and ends at least 6 inches.
- Compact each course of filter material to 95 percent of maximum dry density according to ASTM D 698.
  - Place and compact impervious fill material over drainage backfill to final subgrade.

**3.21 SUBBASE AND BASE COURSES**

- A. Under pavements and walks, place subbase course on prepared subgrade and as follows: If indicated on drawings.
- Place base course material over subbase.
  - Compact sub base and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
  - Shape subbase and base to required crown elevations and cross-slope grades.
  - When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
  - When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

**3.22 DRAINAGE COURSE**

- A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
- Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
  - When compacted thickness of drainage course is 6 inches or less, place materials in a single layer.
  - When compacted thickness of drainage course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

**3.23 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing. A sufficient number of density tests of the backfill and subgrade may be ordered by the Owner's Representative to determine that the backfill and subgrade complies with the appropriate Subsection of this Section.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Owner's Representative.
- D. Testing agency with test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2992, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
- Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sp. ft. or less of paved area or building slab, but in no case fewer than three tests.
  - Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
  - Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.

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| Print Date: 05-22-2014   |  | <b>Sheet Revisions</b> |          |       | Colorado Department of Transportation  |  | DESIGN BUILD RFP |  | <b>CHAPTER 8<br/>LANDSCAPE DEMOLITION</b> |  |                   | Project No./Code |                   |  |
| File Name:   |  | Date:                  | Comments | Init. |  1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298 |  | No Revisions:    |  | Designer: KRS                             |  | Structure Numbers |                  | IM0252-423        |  |
| Horiz. Scale: As Noted Vert. Scale: As Noted   |  |                        |          |       |  |  | Revised:         |  |   |  |                   |                  | Detailer: JDA/AM  |  |
| Unit Information   |  |                        |          |       |  |  | Void:            |  |   |  | Subset Sheets:    |                  | Sheet Number D005 |  |
| Unit Leader Initials   |  |                        |          |       |  |  |                  |  |   |  |                   |                  |                   |  |
|  2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |  |                        |          |       | Region 2 DW  |  |                  |  |   |  |                   |                  |                   |  |

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**SECTION 02300 EARTHWORK, CONT.**

- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained. These tests shall be made by an approved testing laboratory and paid for by the City on a first time basis only.
- F. Owner's Representative shall approve final rough grade.

**3.24 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Owner's Representative; reshape and re-compact.
- C. Where settling occurs before contract period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

**3.25 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property. All associated costs and fees will be the responsibility of the contractor.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner's Representative.

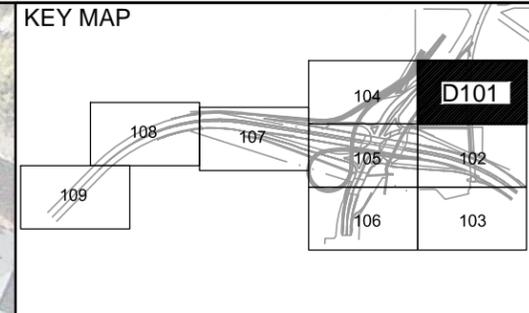
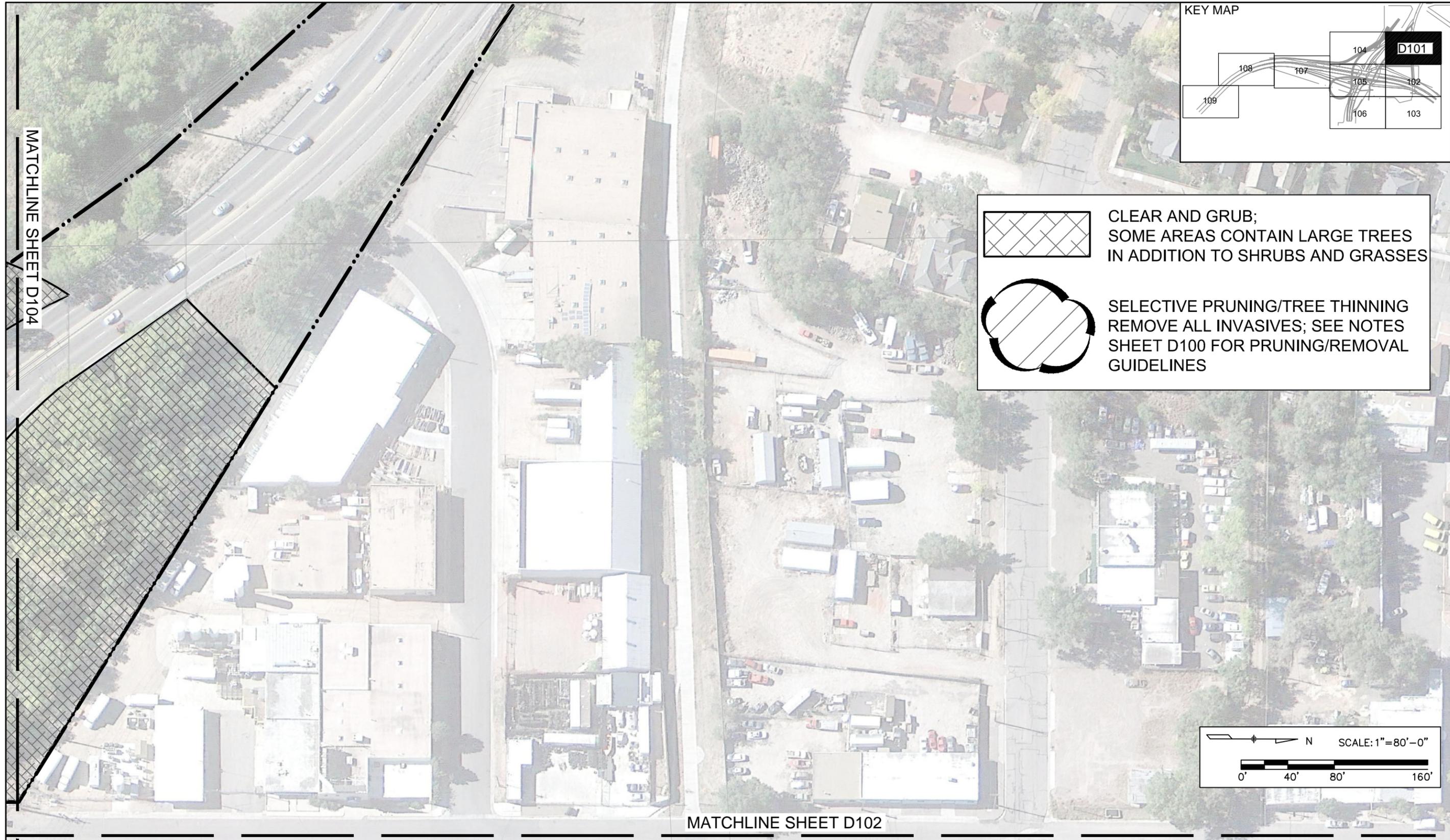
**3.26 SCARIFY EXISTING GRADE AND SUBGRADE**

- A. Prepare an existing grade or subgrade by uniformly and mechanically breaking up the soils to the depth shown on the construction plans, geotechnical report, or as directed by the owner's representative.
- B. Testing of the subgrade moisture content will be at the discretion and direction of the owner's representative. The moisture content will be adjusted to 2% of the optimum prior to final grade and compaction.
- C. The subgrade will be compacted to compliance with the recommendations of the geotechnical report, construction plans, and City of Colorado Springs Engineering Standards.
- D. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property. All associated costs and fees will be the responsibility of the contractor.
- E. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner's Representative.

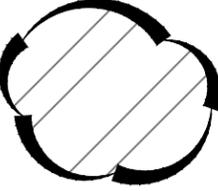
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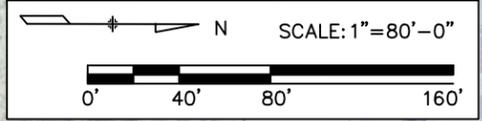
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| Print Date: 05-22-2014   |  | <b>Sheet Revisions</b> |          |       |  Colorado Department of Transportation<br>1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298<br>Region 2 DW |                  | <b>DESIGN BUILD RFP</b> |                   | <b>CHAPTER 8<br/>LANDSCAPE DEMOLITION</b> |                | <b>Project No./Code</b> |                   |
| File Name:   |  | Date:                  | Comments | Init. |  |                  | No Revisions:           |                   |   | IM0252-423     |                         |                   |
| Horiz. Scale: As Noted    Vert. Scale: As Noted  |  |                        |          |       | Revised:   | Designer: KRS    |                         | Structure Numbers |   | 19039          |                         |                   |
| Unit Information    Unit Leader Initials   |  |                        |          |       | Void:  | Detailer: JDA/AM |                         |                   |   | Subset Sheets: |                         | Sheet Number D006 |
|  associates inc.    2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201    FAX 770-7132 |  |                        |          |       |  |                  |                         |                   |   |                |                         |                   |

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 CLEAR AND GRUB;  
SOME AREAS CONTAIN LARGE TREES  
IN ADDITION TO SHRUBS AND GRASSES

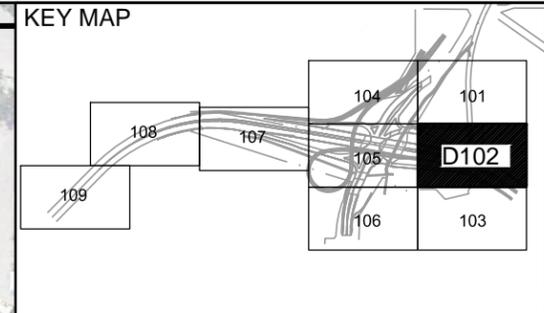
 SELECTIVE PRUNING/TREE THINNING  
REMOVE ALL INVASIVES; SEE NOTES  
SHEET D100 FOR PRUNING/REMOVAL  
GUIDELINES



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| Unit Information      Unit Leader Initials      |  |  |  |                  |   |                |   |  associates inc.      2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201    FAX 770-7132 |  |                   |                  |  |

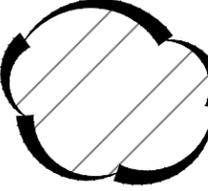
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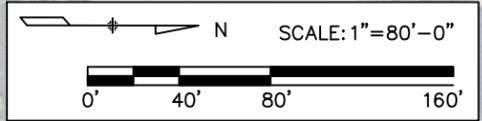
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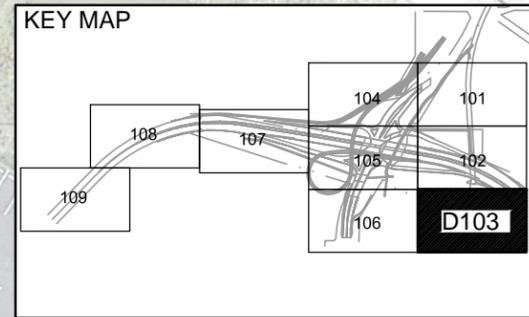
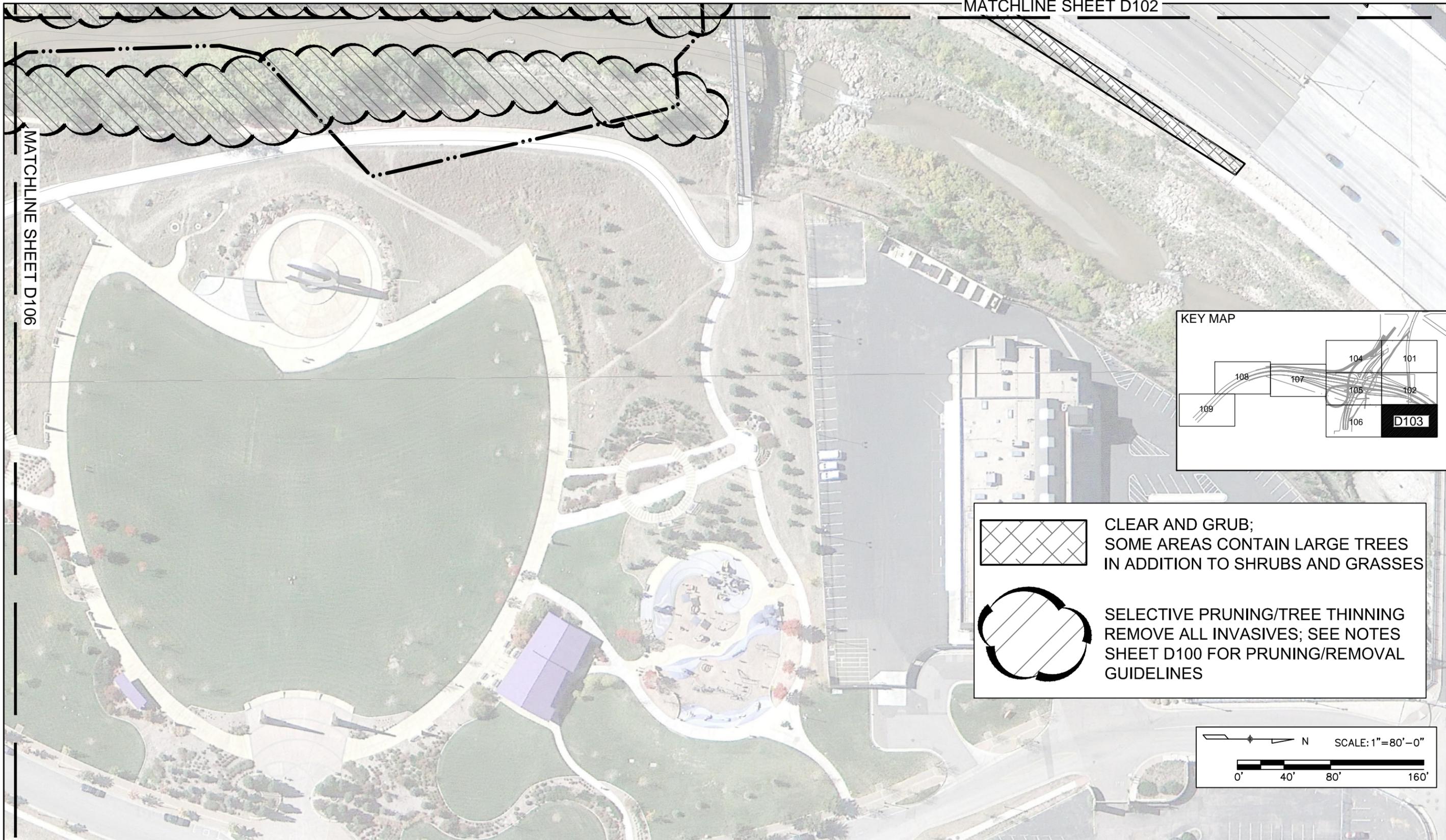
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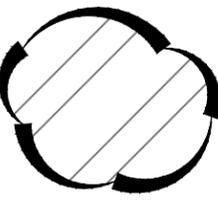
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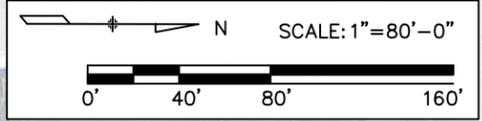
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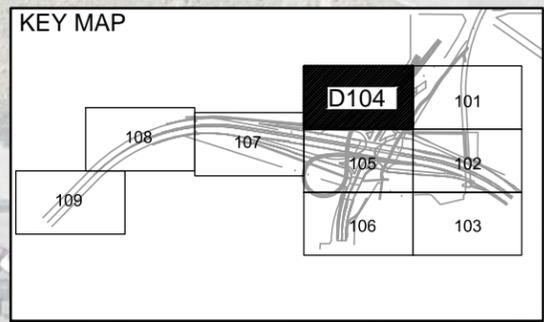
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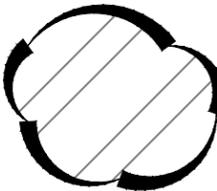
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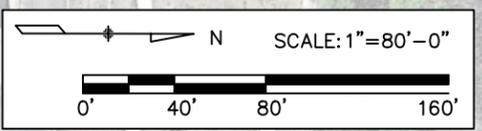
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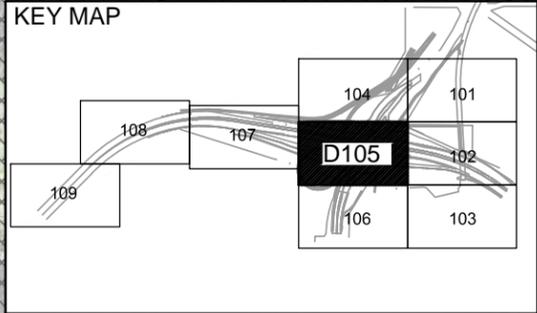
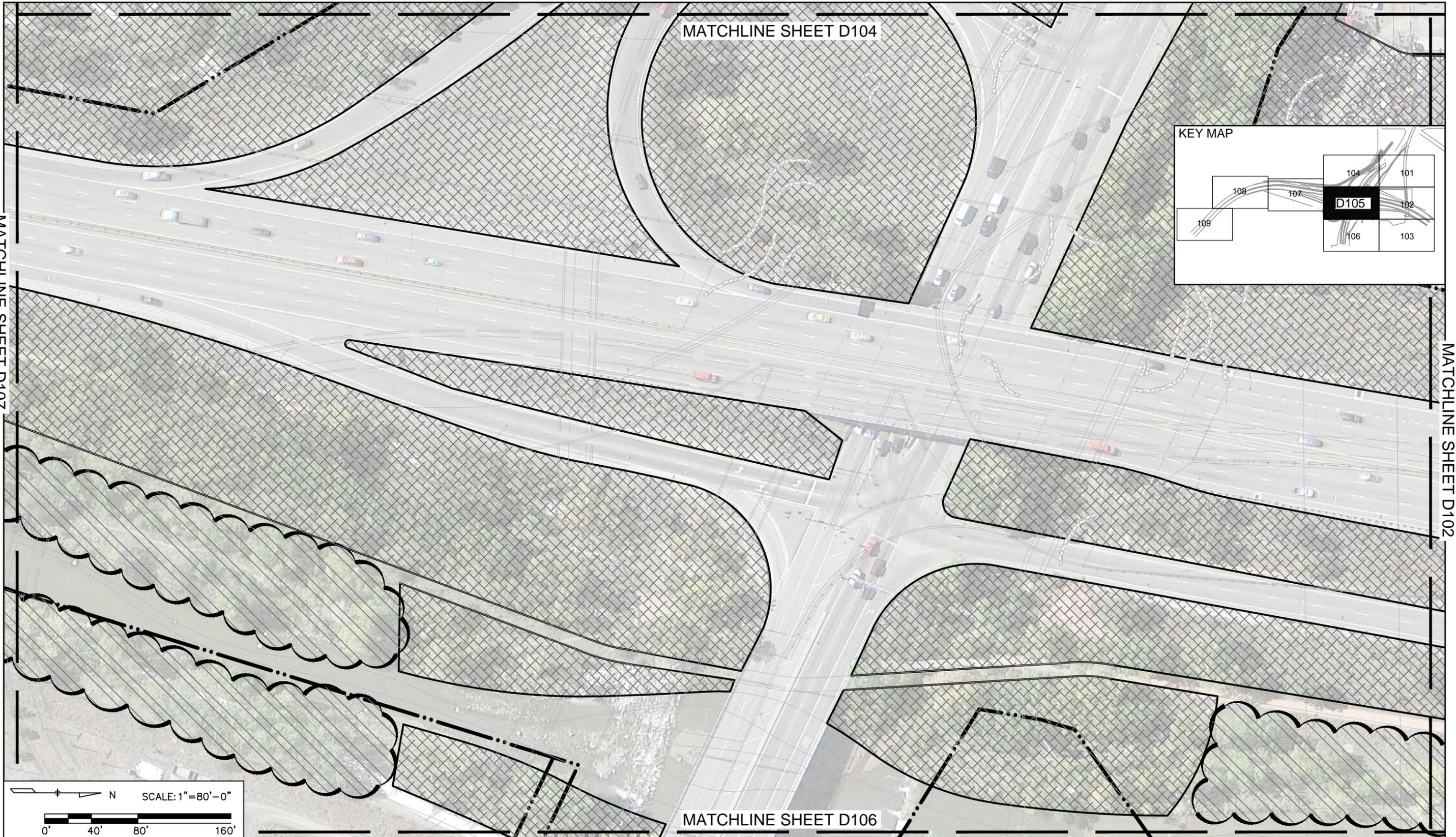
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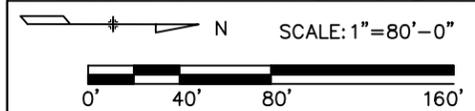
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|  associates inc. 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |  |                 |          |       |  |  |                  |  | Subset Sheets:                    |  |                   |  |

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| <small>2953 South Peoria Street, Ste 101<br/>Aurora, Colorado 80014<br/>303-770-7201 FAX 770-7132</small> |                       |

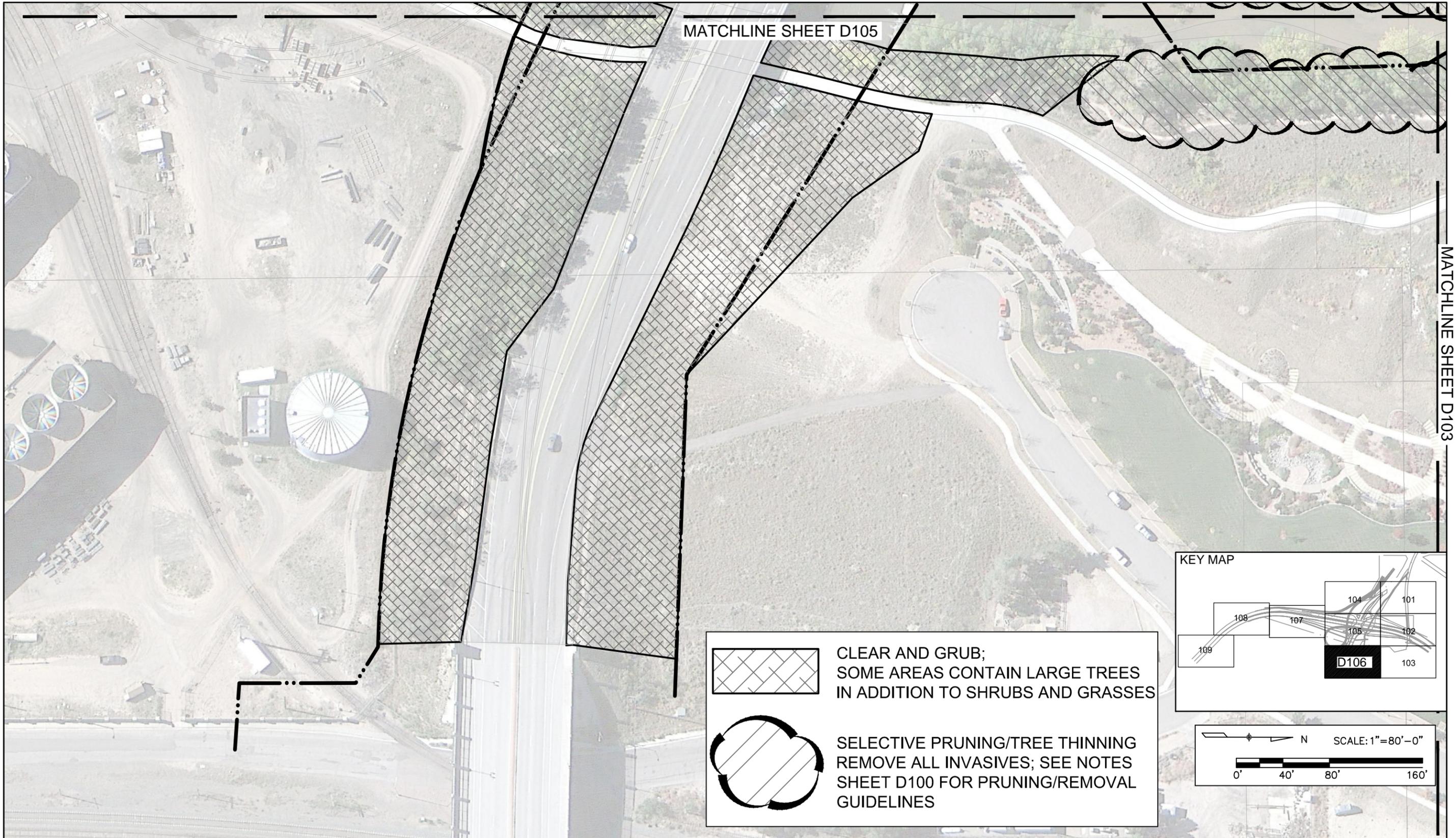
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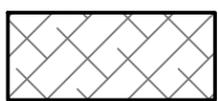
Colorado Department of Transportation  
 1480 QUAIL LAKE LOOP, SUITE A  
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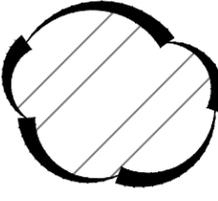
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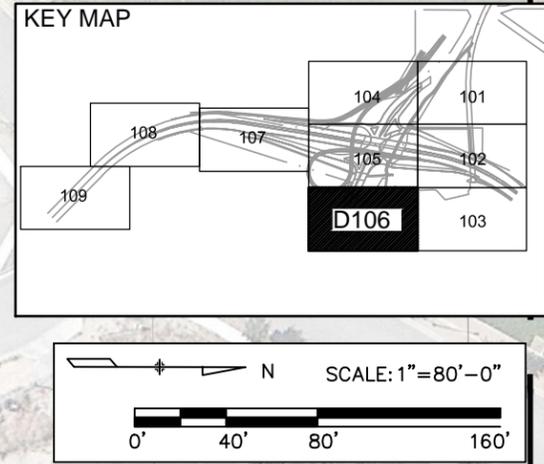
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 Designer: KRS  
 Detailer: JDA/AM  
 Structure Numbers  
 Subset Sheets:

Project No./Code  
 IM0252-423  
 19039  
 Sheet Number D105



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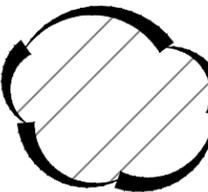


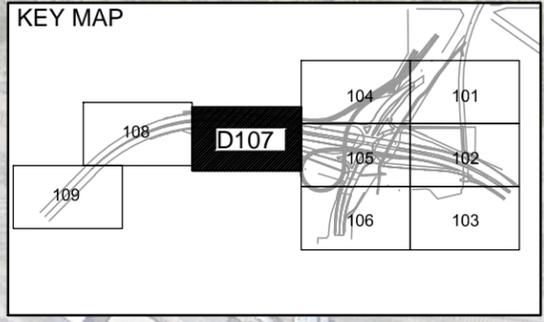
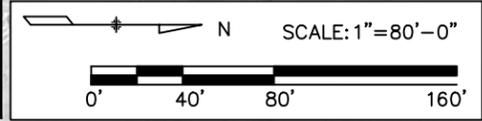
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|  associates inc.    2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201    FAX 770-7132 | Region 2  | DW              |          |       |   |  |                  |                                   |                   |                  |

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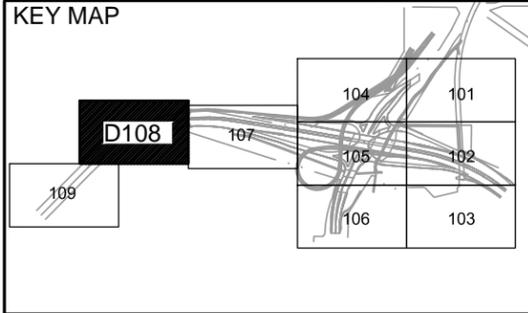
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|  associates inc.<br><small>2953 South Peoria Street, Ste 101<br/>Aurora, Colorado 80014<br/>303-770-7201 FAX 770-7132</small> |          |  |  |  |                 |               |  |                   |          |       |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                   |  |                  |  |

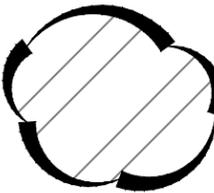
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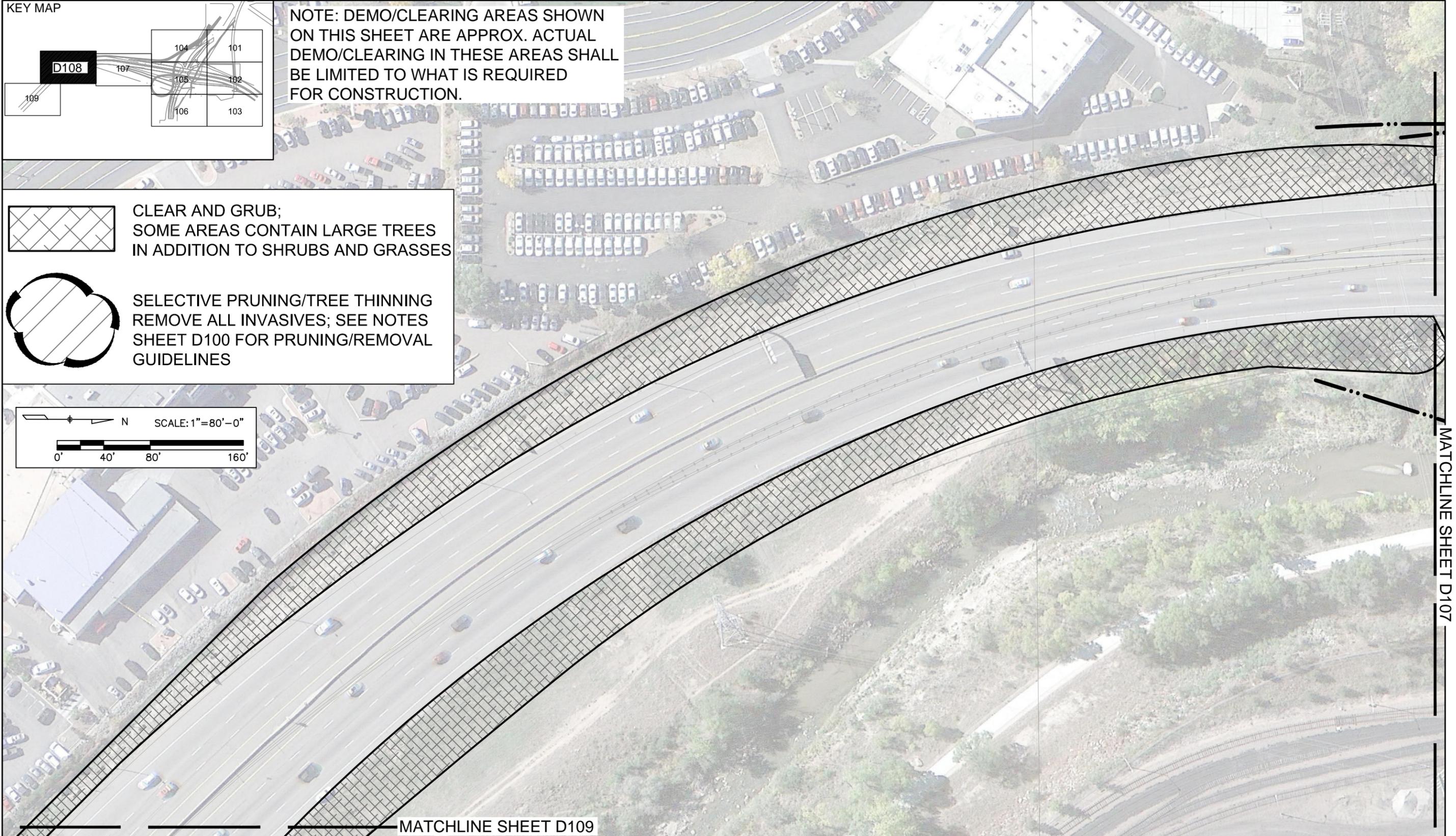
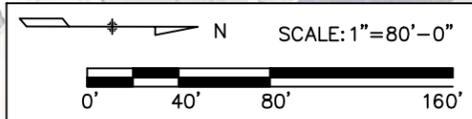
NOTE: DEMO/CLEARING AREAS SHOWN ON THIS SHEET ARE APPROX. ACTUAL DEMO/CLEARING IN THESE AREAS SHALL BE LIMITED TO WHAT IS REQUIRED FOR CONSTRUCTION.



CLEAR AND GRUB;  
SOME AREAS CONTAIN LARGE TREES  
IN ADDITION TO SHRUBS AND GRASSES



SELECTIVE PRUNING/TREE THINNING  
REMOVE ALL INVASIVES; SEE NOTES  
SHEET D100 FOR PRUNING/REMOVAL  
GUIDELINES



MATCHLINE SHEET D107

MATCHLINE SHEET D109

Print Date: 05-22-2014

File Name:  
Horiz. Scale: As Noted    Vert. Scale: As Noted  
Unit Information    Unit Leader Initials

**JK** associates inc.    2953 South Peoria Street, Ste 101  
Aurora, Colorado 80014  
303-770-7201    FAX 770-7132

| Sheet Revisions |          |       |
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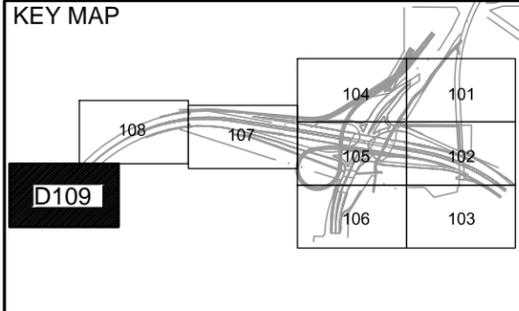
Colorado Department of Transportation  
 1480 QUAIL LAKE LOOP, SUITE A  
 COLORADO SPRINGS, CO 80906  
 Phone: 719-634-2323 FAX: 719-227-3298  
 Region 2    DW

DESIGN BUILD RFP  
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 Revised:  
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CHAPTER 8  
 LANDSCAPE DEMOLITION  
 Designer: KRS  
 Detailer: JDA/AM  
 Structure Numbers  
 Subset Sheets:

Project No./Code  
 IM0252-423  
 19039  
 Sheet Number D108

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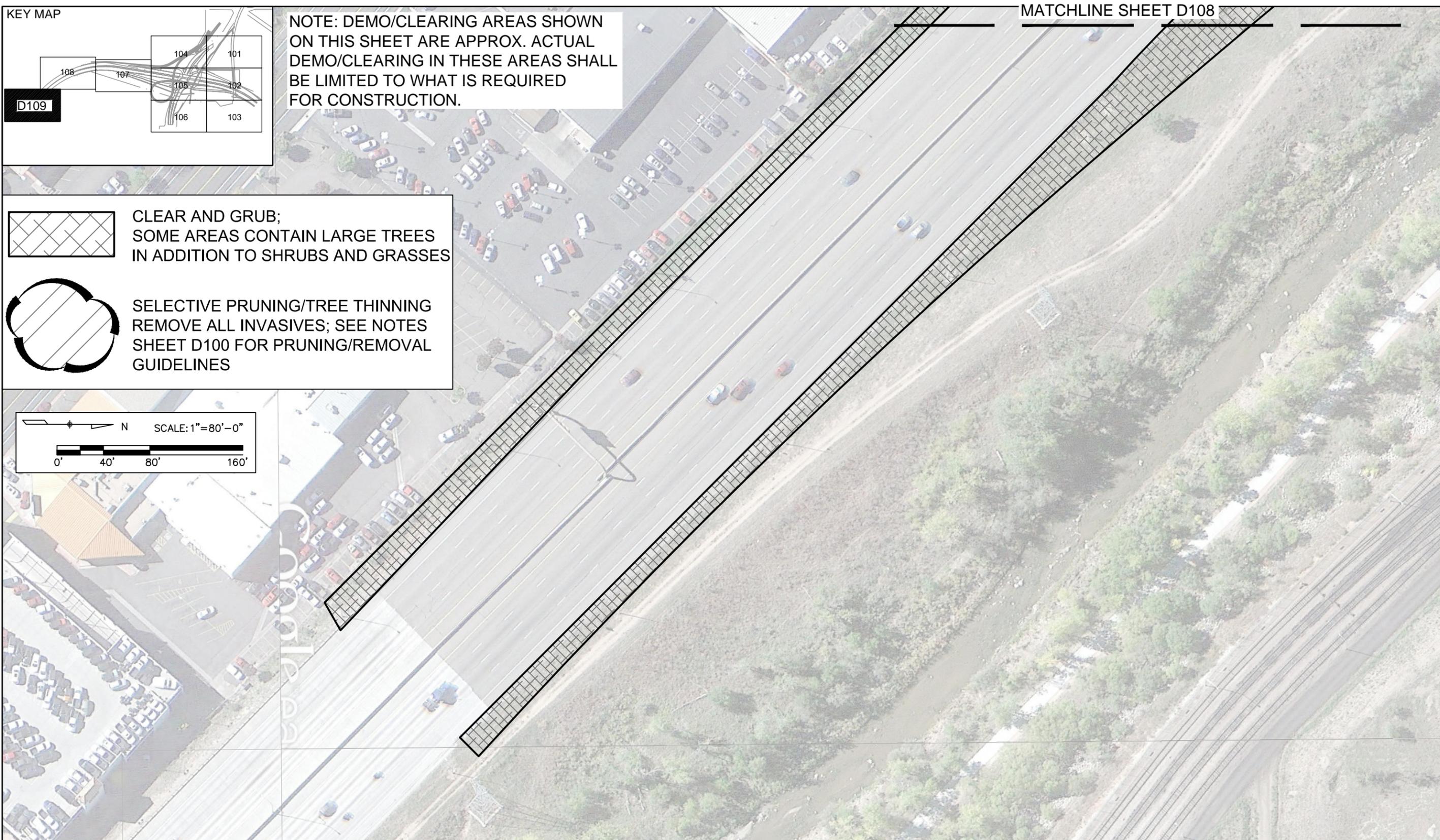
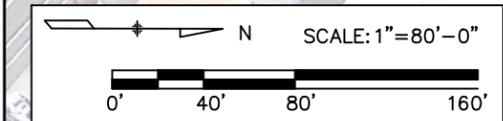


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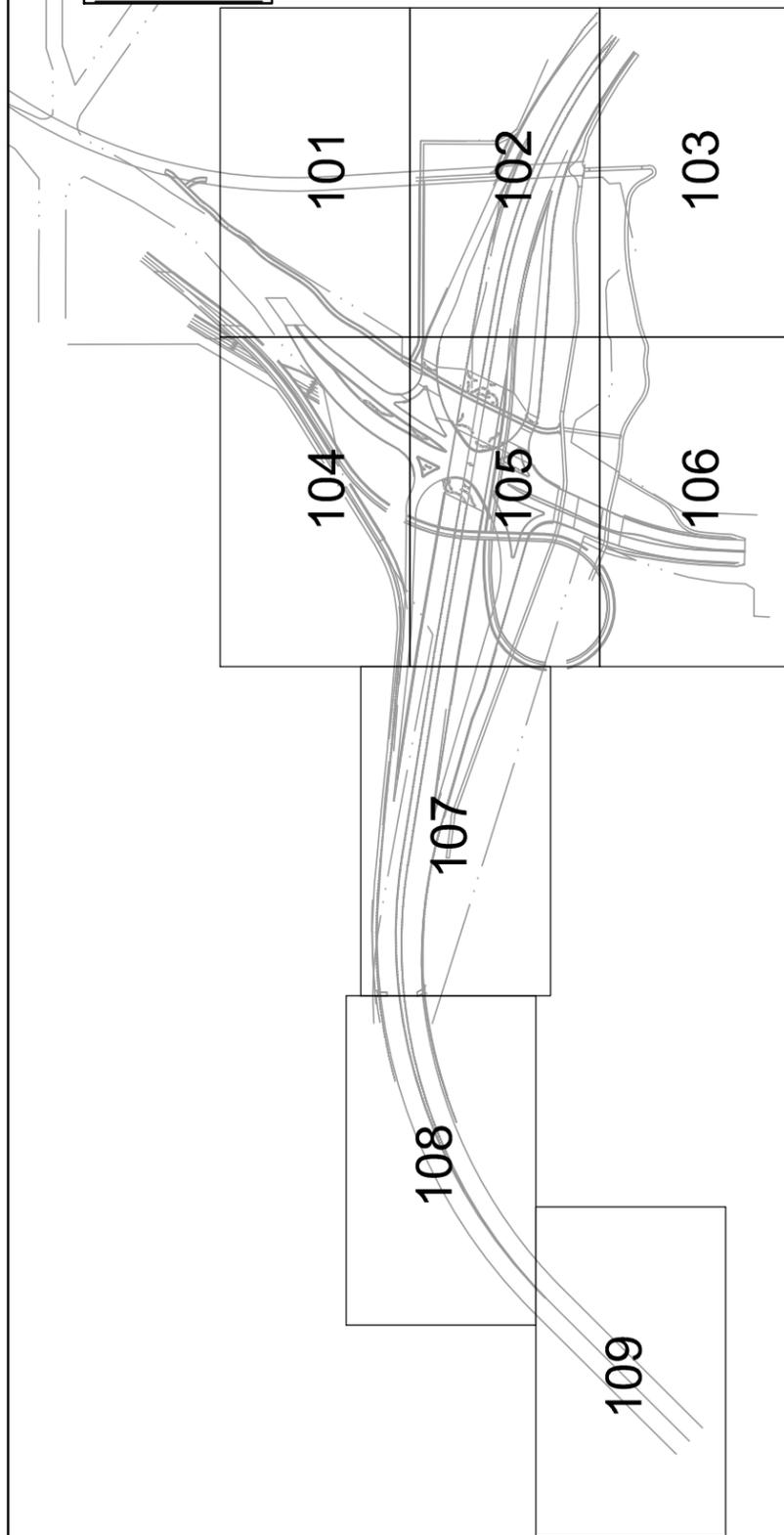
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| Print Date: 05-22-2014   | Sheet Revisions |          |       | Colorado Department of Transportation   | DESIGN BUILD RFP | CHAPTER 8<br>LANDSCAPE DEMOLITION |                   | Project No./Code  |
| File Name:   | Date:           | Comments | Init. | 1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298<br>Region 2 DW | No Revisions:    | Designer: KRS<br>Detailer: JDA/AM |                   | IM0252-423        |
| Horiz. Scale: As Noted Vert. Scale: As Noted   |                 |          |       |   | Revised:         |                                   |                   | Structure Numbers |
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| associates inc. 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |                 |          |       |   |                  |                                   |                   |                   |

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SHEET INDEX



# CHAPTER 9 - SEEDING/ROCK MULCH/SITWORK PLANS AND SPECIFICATIONS

**NOTES:**

1. ALL AREAS DISTURBED WITHIN THE CONSTRUCTION LIMITS SHALL BE SEEDED.
2. ALL AREAS DISTURBED AS A RESULT OF DEMOLITION SHALL BE RESEEDED. THESE AREAS MAY OR MAY NOT BE INCLUDED IN THE CONSTRUCTION LIMITS.
3. ALL SEEDING EFFORTS INCLUDING EQUIPMENT SHALL REMAIN OUTSIDE OF THE RAILROAD RIGHT-OF-WAY.
4. 1 QUART BAG SAMPLES OF ROCK MULCHES SHALL BE SUBMITTED FOR APPROVAL TO CDOT PRIOR TO MATERIALS ARRIVING ON SITE.
5. POTENTIAL WATER QUALITY POND AREAS ARE SHOWN; FINAL LOCATION AND SIZE OF WATER QUALITY PONDS SHALL DEPEND ON FINAL GRADING AND SITE PLANS.

|  |   |
|--|---|
|  | UNMOWED NATIVE SEED   |
|  | MOWED NATIVE SEED   |
|  | FOUNTAIN CREEK CHANNEL<br>SEE CREEK CHANNEL DETAILS AND NOTES |
|  | 1 1/2" ROCK MULCH - GREY OR TAN HUES; NO PEA GRAVEL           |
|  | 6-12" COBBLE; WHITES AND GREYS                                |
|  | GREY STABILIZED CRUSHER FINES                                 |
|  | CONCRETE, SMOOTH OR BROOM FIN<br>STAINED FEDERAL COLOR 33448  |

Print Date: 05-22-2014

File Name:  
 Horiz. Scale: As Noted    Vert. Scale: As Noted  
 Unit Information    Unit Leader Initials

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| CHAPTER 9<br>SEEDING/ROCK MULCH |                   |
| Designer: KRS                   | Structure Numbers |
| Detailer: JDA/AM                | Subset Sheets:    |

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| 19039              |
| Sheet Number LS001 |

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**SECTION 02920 - SEEDING AND SODDING SPECIFICATIONS**

**PART 1 - GENERAL**

**1.1 Related Documents**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
  1. Seeding.
  2. Sodding.
  3. Plugging.
  4. Meadow grasses and wildflowers.
  5. Sod renovation.
- B. Related Sections include the following:
  1. Division 2 Section 02300 "Site Clearing" in Chapter 8 for topsoil stripping and stockpiling.
  2. Division 2 Section 02230 "Earthwork" in Chapter 8 for excavation, filling and backfilling, and rough grading.

**1.3 DEFINITIONS**

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  1. Certification of each seed mixture for turf grass sod, identifying source, including name and telephone number of supplier.
- C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.
- D. Qualification Data: For landscape installer.
- E. Material Test Reports: For existing surface soil and imported topsoil
- F. Maintenance Instructions: Upon completion of all sodding operations, the Contractor shall notify the Owner's Representative to inspect the work. Upon inspection, if all work is acceptable, the Owner's Representative shall record that date and shall issue a "Conditional Acceptance" letter which shall state that the Contractor shall maintain all sodded areas as specified according to the following length of time. As indicated in section 1.8.

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: All work specified herein shall be performed under the direct supervision of a Superintendent thoroughly familiar with the work of this section who shall be at the project site for the duration of the work in this section.
  1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Installer Qualifications: All work specified herein shall be performed under the direct supervision of a Superintendent thoroughly familiar with the work of this section who shall be at the project site for the duration of the work in this section.
  1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- C. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- D. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
  1. Report suitability of topsoil for Sod growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

**1.6 DELIVER, STORAGE, AND HANDLING**

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."

**1.7 SCHEDULING**

- A. Planting Restrictions: Plant during one of the following periods unless otherwise approved by Owner's Representative. Coordinate plating periods with maintenance periods to provide required maintenance from date of Substantial Completion.
  1. Sodding: April 15th-October 15th.
  2. Seeding: March 1st-September 15th.
  3. Irrigated Native Seeding: March 1st-September 15th.
  4. Non Irrigated Native Seeding: November 1st-May 15th.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit. No sodding shall take place when the site is wet or during freezing temperatures.

**1.8 TURF MAINTENANCE**

- A. Begin maintenance immediately after each area is planted and continue until acceptable Sod is established, but for not less than the following periods:
  1. Seeded Turf: 60 days from date of Substantial Completion.
  2. Native Seeding: 60 days from date of Substantial Completion.
  3. Sodded Turf: 30 days from date of Substantial Completion.
- B. A period of 30 calendar days minimum, which shall be referred to as the "Sod Maintenance Period." At the end of this period, the sodded areas shall be given "Final Acceptance" if the sod is in a healthy condition and of a normal green color, with no bare areas larger than six (6) square inches. Mowing of sod should occur (3) days before "Final Acceptance." If sod is installed in late October, a "Final Acceptance" for sod will not be issued, until the following spring.
- C. At the end of the maintenance period, the Owner's Representative shall, within five (5) calendar days, inspect the work, and if the work is acceptable, he shall issue a Final Acceptance Sod Work" letter which shall relieve the Contractor from further obligations for Sod work only. Final acceptance of Sod work may be given independently of final acceptance of all work under this contract.
- D. The maintenance period for this work shall begin immediately after each area is sodded and shall continue in accordance with the following requirements:
  1. Minor vandalism or other damage to the sodded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractor shall be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. If such damage is deemed to be major by the Owner's Representative, any work necessary to repair the seeded or sodded area to an acceptable condition shall be paid for by the Owner under the provisions of "extra work" stated in the General Conditions, if such work is authorized by the Owner's Representative.
  2. Acts of God: Minor damage to the sodded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major damage caused by flood, hail, storm, wind, or large rain storm, and through no fault of the Contractor to protect his work, shall immediately be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. Major damage shall be repaired by the Contractor and paid for by the Owner, if such work is authorized by the Owner's Representative.
    - a. When full maintenance period has not elapsed before end of planting season, or is Sod is not fully established, continue maintenance during next planting season.
- E. Maintain and establish Sod by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Rolls, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf.
  1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.
- F. Watering: Provide and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep Sod uniformly moist.
  1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay our temporary watering system to avoid walking over muddy or newly planted areas.
  2. Water Sod at a minimum rate of 11/2" to 2" per week.
- G. The Contractor shall be responsible for watering and mowing of the sodded areas only until Final Acceptance. The bluegrass sod shall be maintained at a height of three inches (3") and of four inches (4"). If grass exceeds four inches (4") in height before mowing, no more than (1/3) of top growth shall be cut off at anyone time. All clippings shall be removed from site. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowing to maintain consistent grass height. Sufficient water shall be applied during the maintenance period to maintain the sod in a healthy condition, allowing it to knit together and develop a deep root system. Care should be given to avoid standing surface water, or erosion from over watering. Failure of the irrigation system shall not relieve the Contractor from applying water required during this period.

**1.9 NATIVE SEEDING MAINTENANCE**

- A. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 60 days from date of Substantial Completion. The maintenance period for this work shall begin immediately after all areas are seeded and shall continue in accordance with the following requirements:
  1. All seeded areas shall have suitable signs erected at important points, notifying the public to keep off.
- B. Minor vandalism or other damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractor shall be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. If such damage is deemed to be major by the Owner's Representative, any work necessary to repair the seeded area to an acceptable condition shall be paid for by the Owner under the provision of "extra work" stated in the General Conditions, if such work is authorized by the Owner's Representative.
- C. Acts of God: Minor damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major damage caused by flood, hail storm, wind or large rain storm, and through no fault of the Contractor to protect his work, shall immediately be brought to the attention of the Owner's Representative who will be the site judge as to the extent of such damage. Major damage shall be repaired by the Contractor and paid for by the Owner under the provisions of City of Colorado Springs Engineering Division Standard Specifications Section 100.23 "Changed Conditions", if such work is authorized by the Owner's Representative.
- D. The Contractor shall be responsible for watering and mowing the seeded areas only until final Acceptance. Mowing shall be conducted at a maximum of six inches (6"), and mowed down to four inches (4").
- E. Upon completion of all seeding operations, the Contractor will notify the Owner's Representative to inspect the work. Upon inspection, if all work is acceptable, the Owner's Representative shall record that date and shall issue a "Conditional Acceptance" letter which shall state that the Contractor shall maintain all seeded areas as specified according to the following length of time.
- F. Period of 60 calendar days minimum, which shall be referred to as the "Seeded Area Maintenance Period". AT the end of this period, the seeded areas shall be given "Final Acceptance" if the seed has germinated and there are no bare areas larger than six (6) square inches in diameter shall be re-seeded. AT the end of the maintenance period, the Owner's Representative shall, within five (5) calendar days, inspect the work, and if the work is acceptable, he shall relieve the Contractor from further obligations for seeding work only. Final acceptance of seeding work may be given independently of final acceptance of all work under this contract.

- G. Maintain and establish meadow by watering, weeding, mowing, trimming, replanting, and other operations. Roll, regrade and replant bare or eroded areas and remulch.
- H. Watering: Provide and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep meadow uniformly moist.
  1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
  2. Water meadow at a minimum rate of 1/2 inch per week for 8 weeks after planting

**PART 2 - PRODUCTS**

**2.1 SEED**

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: State-certified seed of grass species, as follows:
- C. Seed Species: As specified on drawings.

**2.2 TURFGRASS SOD**

- A. Turfgrass Sod: Blended Kentucky Bluegrass.

**2.3 NATIVE GRASSES AND WILDFLOWERS**

- A. Wildflower Seed: Fresh, clean, dry, new seed, mixed species as follows:
- B. Native Grass Seed: Fresh, clean, dry, new seed, mixed species as follows:
- C. Wildflower and Native Grass Seed: Fresh, clean, dry, new seed, mixed species as follows:
- D. Seed Carrier: Inert material, sharp clean sand or perlite, mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

**2.4 TOPSOIL**

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4-percent organic material content; free of stones 3/4 inch or larger in any dimension and other extraneous materials harmful to plant growth.
  1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
  2. Topsoil Source: Import topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs or marshes.
  3. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

|  |  |                        |          |       |  |  |                  |  |                                 |  |                    |                  |                  |  |
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|  associates inc.<br><small>2953 South Peoria Street, Ste 101<br/>Aurora, Colorado 80014<br/>303-770-7201 FAX 770-7132</small> |  |                        |          |       |  |  | Region 2         |  | DW                              |  |                    |                  |                  |  |

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**SECTION 02920 - SEEDING AND SODDING SPECIFICATIONS, CONT.**

**2.5 ORGANIC SOIL AMENDMENTS**

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
  1. Organic Matter Content: 50 percent of dry weight.
  2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated compostable mixed solid waste.
- B. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
- C. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil or toxic materials.
  1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with at least 0.15 lb. of ammonium nitrate or 0.25 lb. of ammonium sulfate per cubic foot of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

**2.6 PLANTING ACCESSORIES**

- A. Selective herbicides: EPA registered and approved, of type recommended by manufacturer for application.

**2.7 FERTILIZER**

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of ureaformaldehyde, phosphorous, and potassium in the following composition:
  1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
  2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 30 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
  1. Composition: 25 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
  2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

**2.8 MULCHES**

- A. Straw Mulch: Provide air-dry, clean, mildew-and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Peat Mulch: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
- C. Peat Mulch: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
  1. Organic Matter Content: 50 percent of dry weight.
  2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
- G. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

**2.9 EROSION-CONTROL MATERIALS**

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, a minimum of 0.92 lb./sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

**2.10 PLANTING SOIL MIX**

- A. Planting Soil Mix: As specified on drawings.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine areas to receive Turf and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations. Reference tree planting schematic for exclusion of sod within tree planting well.
  1. Protect adjacent and adjoining areas from hydroseeding overspray.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Stop all sod at the edge of the tree well.

**3.3 SOD PREPARATION**

- A. Limit Sod subgrade preparation to areas to be planted within forty eight hours. Installation of sod shall not be undertaken until adjacent site improvements and pavement is complete. No trucking or moving of equipment or materials will be permitted upon completed sod.
- B. All irrigation heads, valve boxers, drain valves and quick couplers shall be flagged prior to sodding operations.
- C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than ¼ inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
  1. Apply fertilizer directly to finish grade, prior to sodding.
  2. Thoroughly blend planting soil mix before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
    - a. Delay mixing fertilizer with planting soil if planting will not proceed within three days.
  3. Spread planting soil mix to a depth of 4 inches, but not less than required to meet finish grades natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
    - a. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil mix.
- D. Unchanged Subgrades: If Turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
  1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
  2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
    - a. Apply fertilizer directly to finish grade, prior to sodding.
  3. Remove stones larger than ¼ inches in any dimension and sticks, roots, trash, and other extraneous matter.
  4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- E. Finish Grading: Finished grading and preparation of the entire sodded or seeded bed areas shall be achieved by disc-harrow or other approved method to a depth of six-inches (6"), or determined by Owner's Representative), fine ranking and/or light dragging until the surface is smooth, friable, and of uniform fine texture and compaction, having no lumps or stones over ¾" inch. No sod shall be laid on any area which has not been so prepared. Obtain the Owner's Representative's approval of prepared areas prior to sodding. A depth of one-inch (1") shall be maintained along sidewalk, before sod is installed.
- F. Finish grades shall be as indicated on the drawing, subject to minor adjustments, as may be directed by the Owner's Representative. Tops and toes of slopes shall be rounded, and the necessary swales for the run-off of surface water shall be carefully maintained with sufficient slope.
- G. Moisten prepared Sod areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- H. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

**3.4 SEEDING**

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
  1. Do not use wet seed or seed that is moldy or otherwise damaged.
- B. Sow seed at the rate: As specified on drawings.
- C. Rake seed lightly into top 1/4 inch topsoil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 3:1 or greater with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with slopes not exceeding 3:1 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.
  1. Anchor straw mulch by crimping into topsoil with suitable mechanical equipment.
  2. Bond straw mulch by spraying with asphalt emulsion at the rate of 10 to 13 gal. /1000 sq. ft.

Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or strained areas.

**3.5 HYDROSEEDING**

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
  1. Mix slurry with non-asphaltic tackifier.
  2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.
  3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at a minimum rate of 500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb. /acre.

**3.6 SODDING**

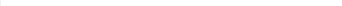
- A. Laying Sod: Lay sod within 24 hours of harvesting. Sod shall be laid on a firm moist bed with tight joints so that no voids occur under or between strips. All ends should be tucked and unrolled. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Any depressions or mounds occurring after sodding shall be corrected prior to acceptance of work. No sod shall be laid on a frozen bed or installed on Fridays. No sod shall be laid within the tree planting well.
- B. Sod shall be blended Kentucky Bluegrass turf, approved by owner and supplied from a single approved source. Sod shall be one inch (1") minimum thick dense and free of weeds and stones. All sod shall be inspected and approved by the Owner's Representative at the time of delivery. Sod shall be sufficiently moist so that the soil will adhere to the roots when handled. Delivered sod shall contain no more than five (5) percent broken rolls. Sod that has become moldy, withered, or yellow from storage or drying, or does not meet minimum thickness requirements may be rejected at the time of planting. Sod out for more than 24 hours from the time of cutting shall not be used.
- C. As soon as sod has been laid, it shall be watered and rolled using a Jackson Sod Roller, True Temper Model 12LR with 240# of water approved equals, so that the sod makes a tight bond to the sod bed. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
  1. Lay sod across angle of slopes exceeding 3:1.
  2. Anchor sod on slopes exceeding 4:1 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- D. Saturate sod with fine water spray within two hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

**3.7 SOD RENOVATION**

- A. Renovate existing sod damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
  1. Re-establish sod where settlement or washouts occur or where minor regrading is required.
- B. Remove sod and vegetation from diseased or unsatisfactory sod areas: do not bury in soil.
- C. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
- D. Mow, dethatch, core aerate, and rake existing turf.
- E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- G. Till ripped, bare and compacted areas thoroughly to a soil depth of 6 inches.
- H. Apply soil amendments and initial fertilizers required for establishing new Turf and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.
- I. Apply sod as required for new Turf.
- J. Water newly planted areas and keep moist until new sod is established.

**3.8 SATISFACTORY TURF**

- A. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established free of weeds and surface irregularities. The maintenance period for this work shall begin immediately after all areas are seeded and shall continue in accordance with the following requirements.
- B. All seeded areas shall have suitable signs erected at important points, notifying the public to keep off. Minor vandalism or other damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractor shall be brought to the attention of the Owner's Representative who will be the sole judge as the extent of such damage. If such damage is deemed to be major by the Owner's Representative, any work necessary to repair the seeded area to an acceptable condition shall be paid for by the Owner under the provision of "extra work" stated in the General Conditions, if such work is authorized by the Owner's Representative.

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| File Name:             |          |  1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298   |  | Region 2   |                 | DW             |  | No Revisions:     |          | IM0252-423         |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                 |  |  |                  |  |
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| Unit Information       |          |  2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132   |  |  1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298 |                 | Void:          |  | Detailer: JDA/AM  |          | Sheet Number LS003 |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |                  |  |                                 |  |  |                  |  |
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**SECTION 02920 - SEEDING AND SODDING SPECIFICATIONS, CONT.**

- C. Acts of God: Minor damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major damage caused by flood, hail storm, wind or large rain storm, and through no fault of the Contractor to protect his work, shall immediately be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. Major damage shall be repaired by the Contractor and paid for by the Owner, if such work is authorized by the Owner's Representative.
- D. The Contractor shall be responsible for watering and mowing the seeded areas only until Final Acceptance. Mowing shall be maintained at a height of three inches (3") and mowed only by equipment with sharp blades. Sod shall be mowed before grass reaches a height of four inches (4"). If grass exceeds four inches (4"). If grass exceeds four inches (4") in height before mowing, no more than (1/3) of top growth shall be cut off at any one time.
- E. Upon completion of all seeding operations, the Contractor will notify the Owner's Representative to inspect the work. Upon inspection, if all work is acceptable, the Owner's Representative shall record that date and shall issue a "Conditional Acceptance" letter which shall state that the Contractor shall maintain all seeded areas as specified according to the following length of time.
- F. Period of 60 calendar days minimum, which shall be referred to as the "Seeded Area Maintenance Period". At the end of this period, the seeded areas shall be given "Final Acceptance" if the seed has germinated and there are no bare areas larger than six (6) square inches. All bare areas larger than (6) square inches in diameter shall be re-seeded.
  - 1. At the end of the maintenance period, the Owner's Representative shall, within five (5) calendar days, inspect the work, and if the work is acceptable, he shall relieve the Contractor from further obligations for seeding work only. Final acceptance of seeding work may be given independently of final acceptance of all work under this contract.
- G. Satisfactory Sodded Turf: At the end of maintenance period, a healthy, well-rooted, even-colored, viable Sod has been established, free of weeds, open joints, bare areas, and surface irregularities.
- H. Re-establish Turf that does not comply with requirements and continue maintenance until Turf are satisfactory.

**3.9 NATIVE SEEDING**

- A. Method of Application: Refer to Detail Supplement or drawings.
- B. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
  - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
- C. Sowing rates vary with mix of species but are usually much lighter than turfgrass seed application rates. Revise to suit Project.
- D. Sow seed at the net rate of 6 oz. /1000 sq. ft.
- E. Brush seed into top 1/16 inch of topsoil, roll lightly, and water with fine spray.
- F. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 3/16 inch and roll to a smooth surface.
- G. Water newly planted areas and keep moist until meadow is established.

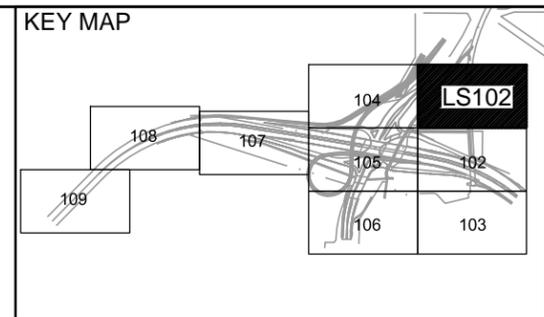
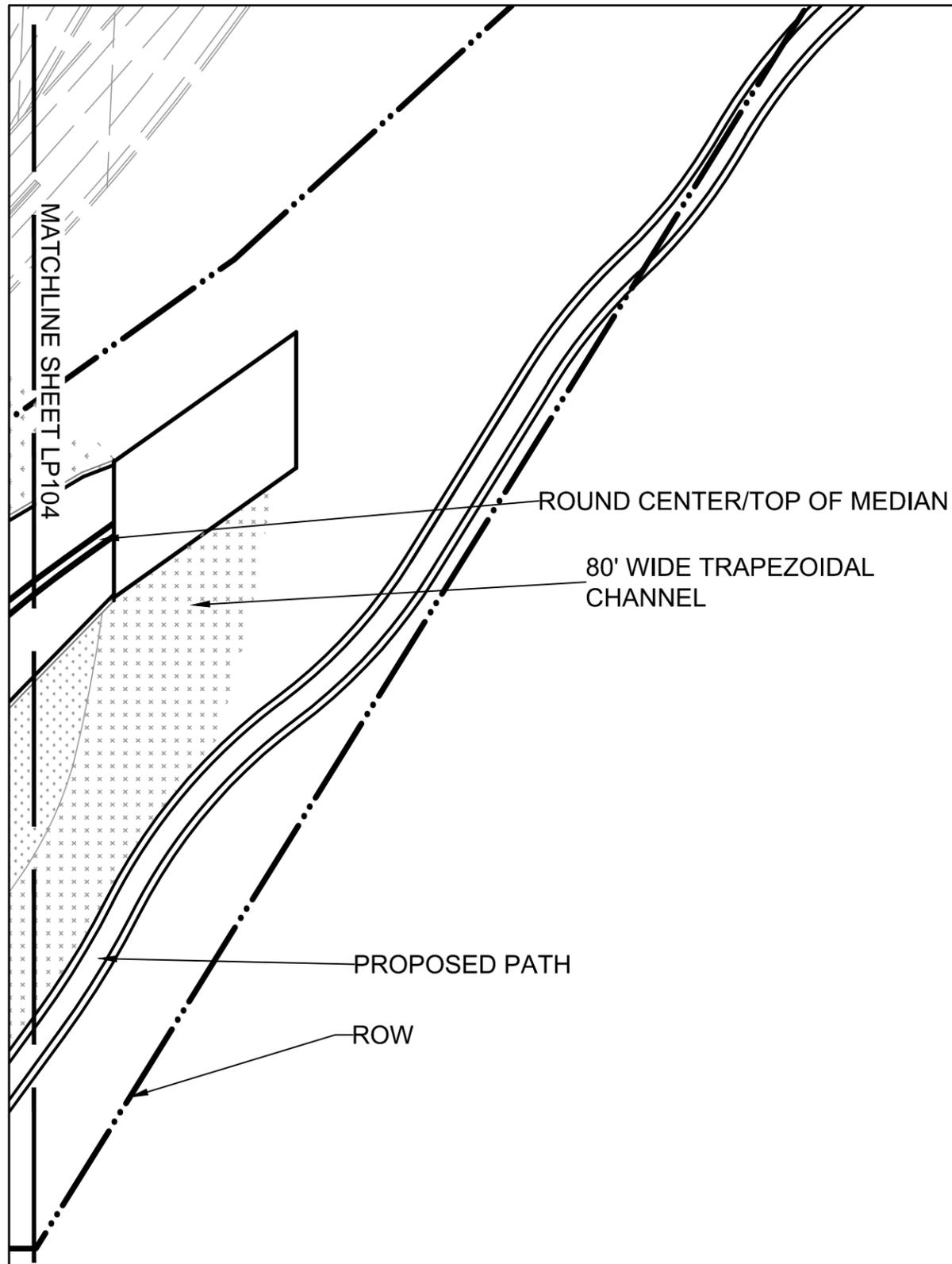
**3.10 CLEANUP AND PROTECTION**

- A. Promptly remove soil and debris created by Sod work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after Sod is established. Remove Erosion-control measures after grass establishment period.

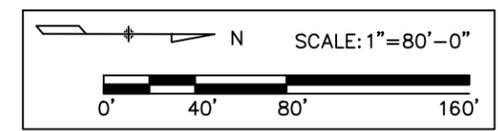
END OF SECTION 02920 - SEEDING AND SODDING (REVISED 2013)

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|  | UNMOWED NATIVE SEED  |
|  | MOWED NATIVE SEED  |
|  | FOUNTAIN CREEK CHANNEL<br>SEE CREEK CHANNEL DETAILS<br>AND NOTES |
|  | 1 1/2" ROCK MULCH - GREY OR<br>TAN HUES; NO PEA GRAVEL           |
|  | 6-12" COBBLE; WHITES AND GREYS                                   |
|  | GREY STABILIZED CRUSHER FINES                                    |
|  | CONCRETE, SMOOTH OR BROOM FINISH<br>STAINED FEDERAL COLOR 33448  |

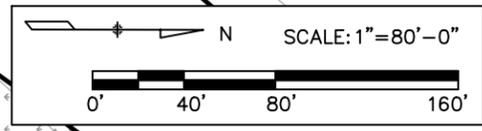
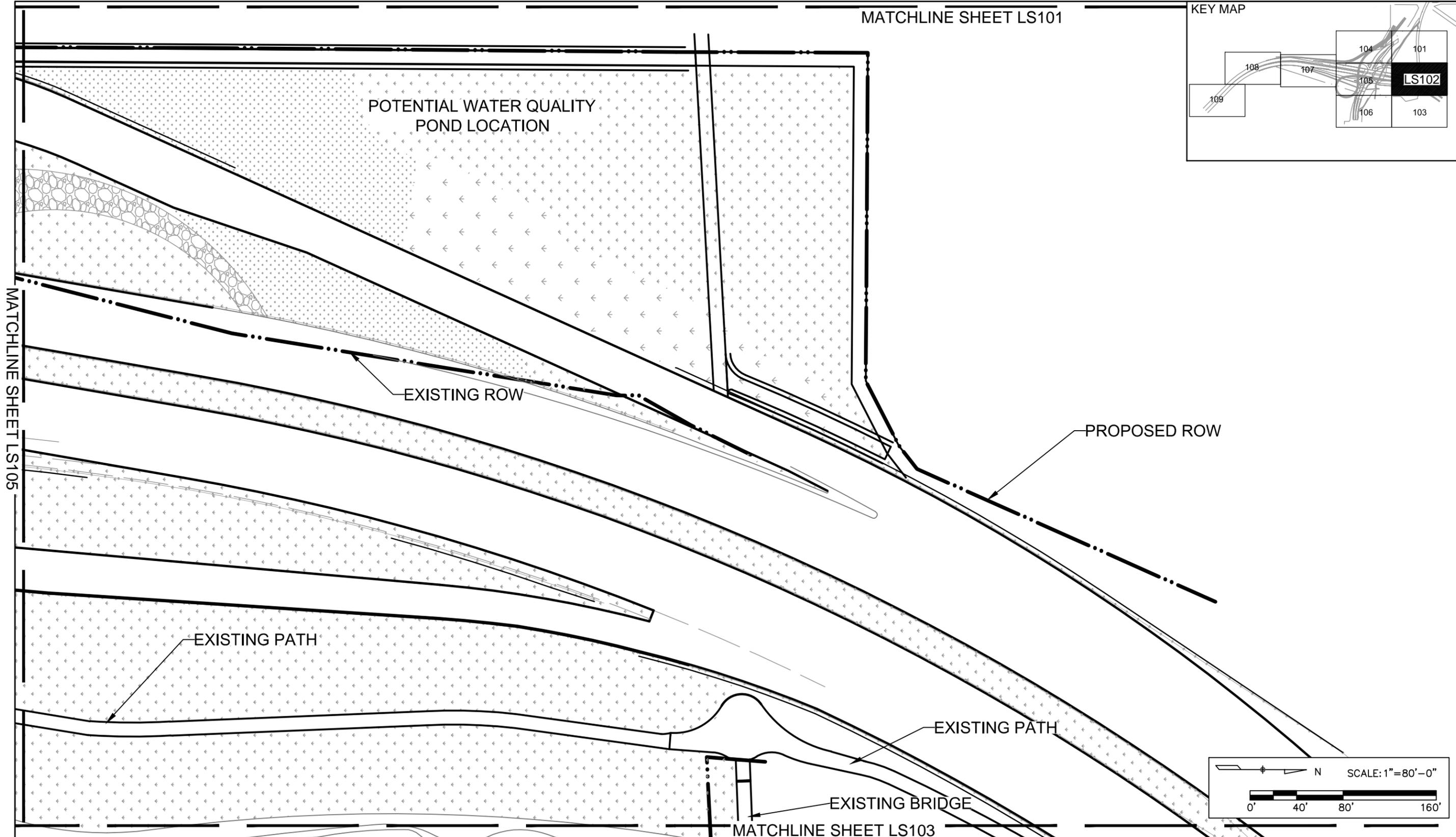
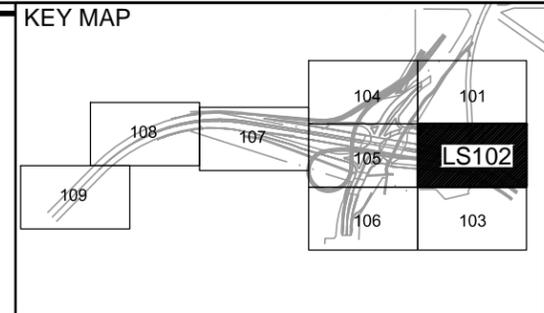


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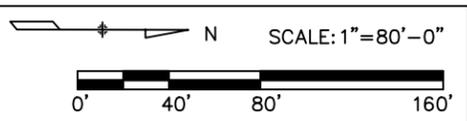
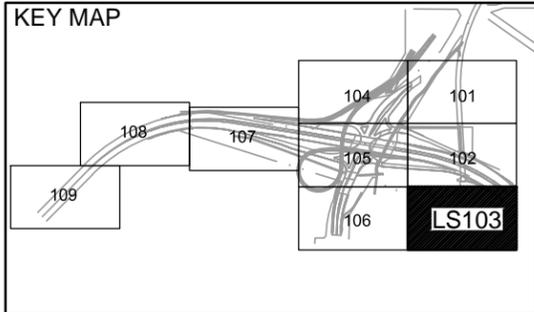
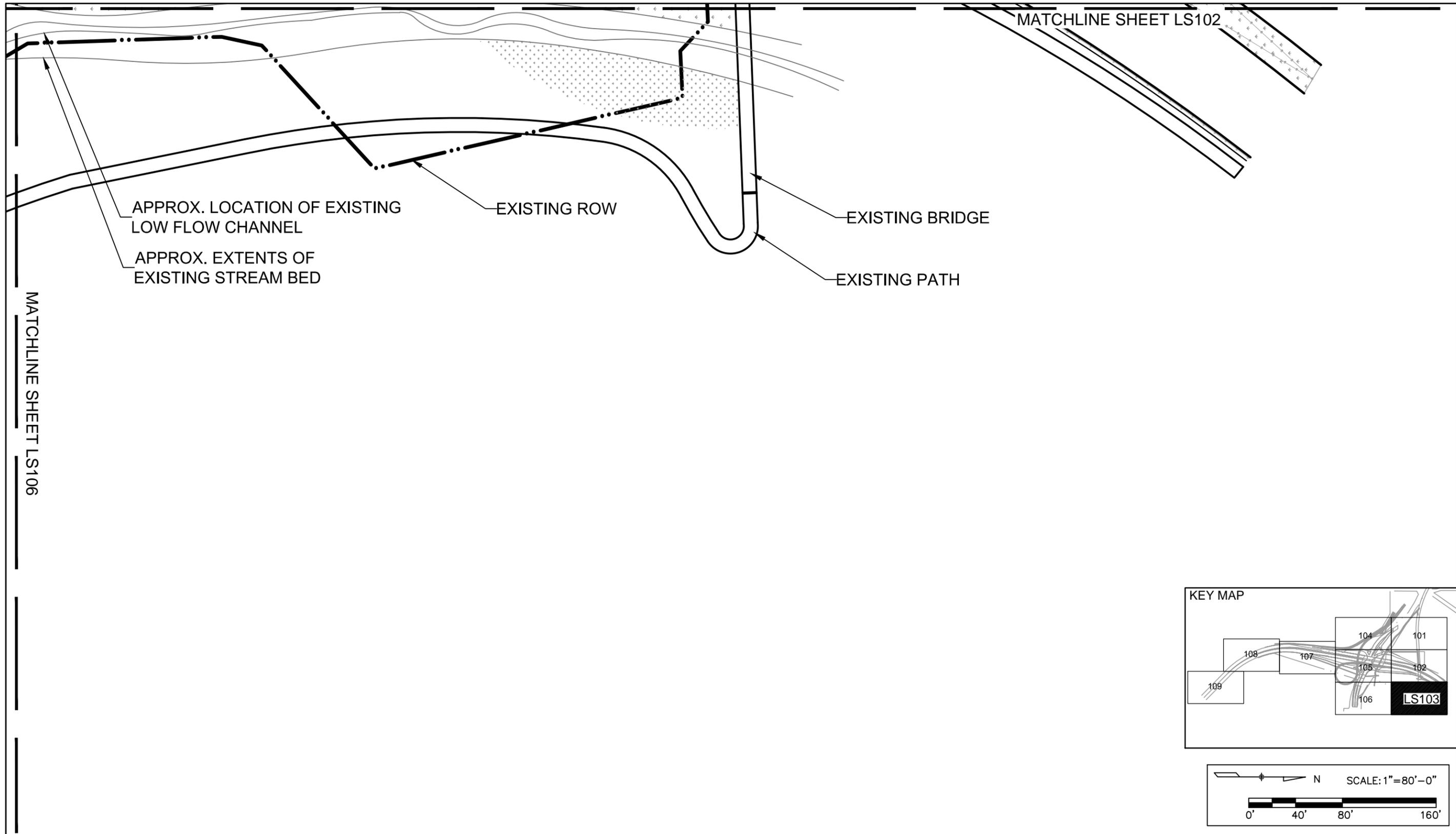
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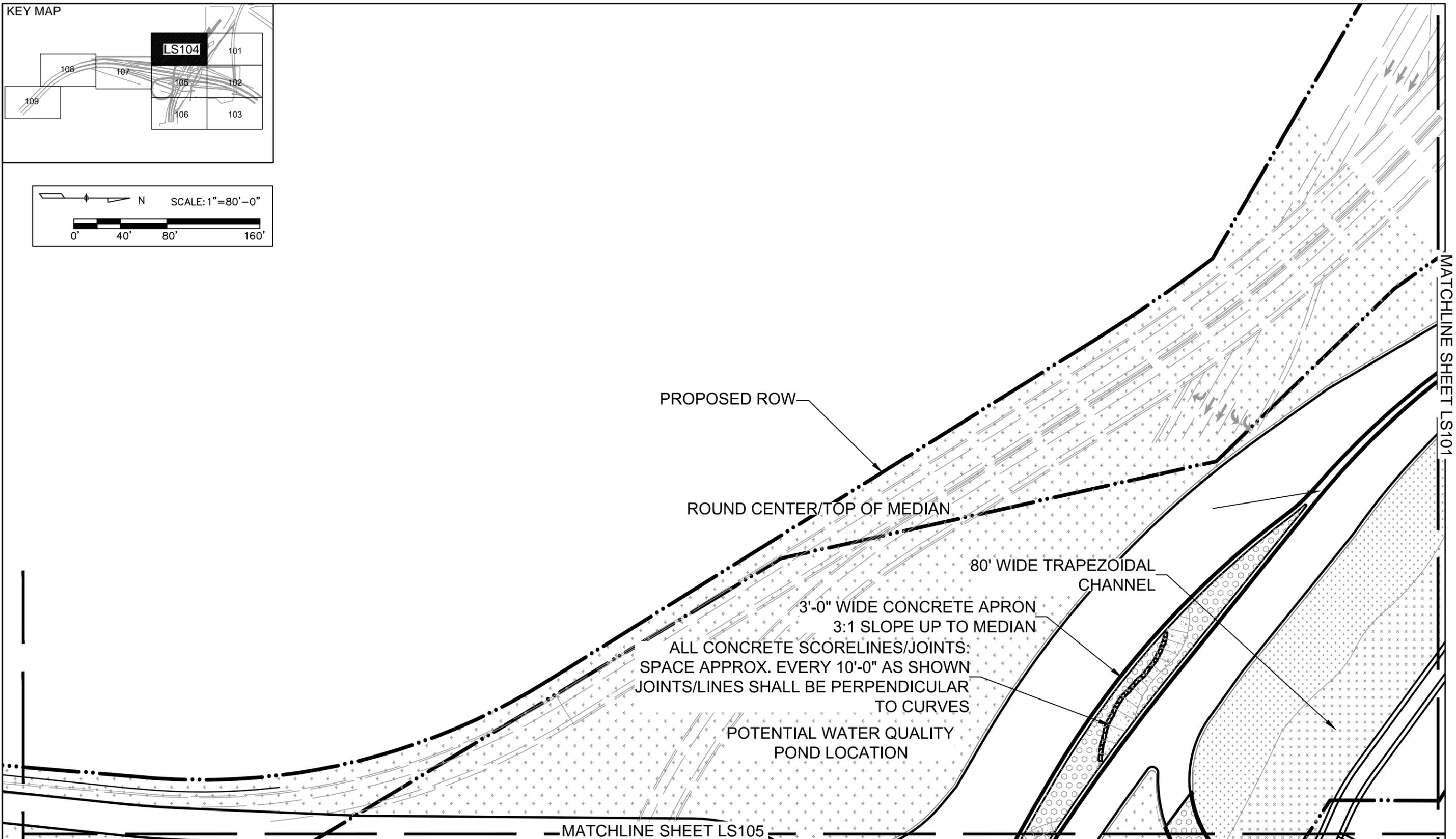
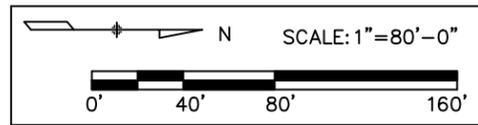
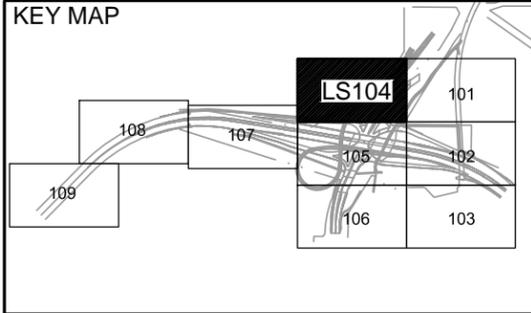
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Region 2

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CHAPTER 9  
SEEDING/ROCK MULCH

Designer: KRS

Detailer: JDA/AM

Structure Numbers

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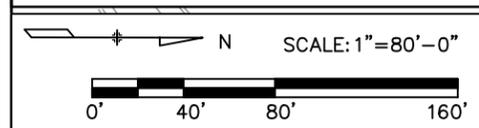
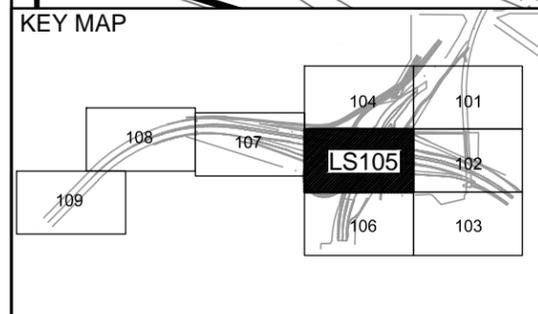
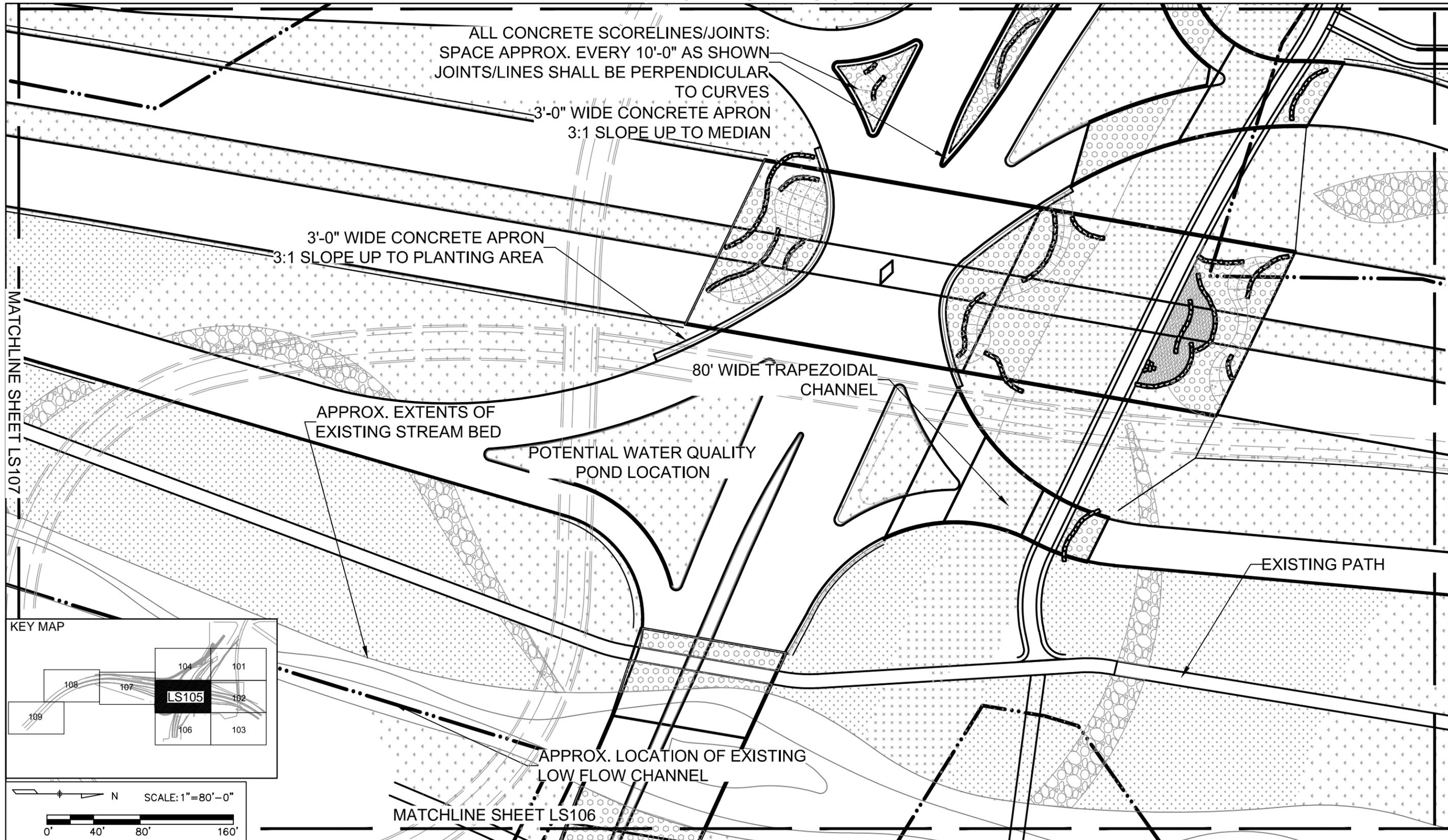
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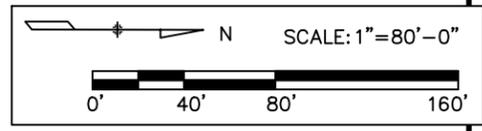
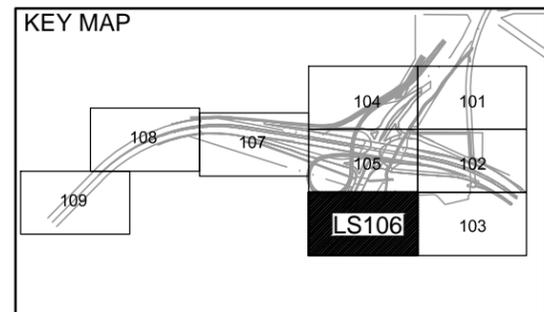
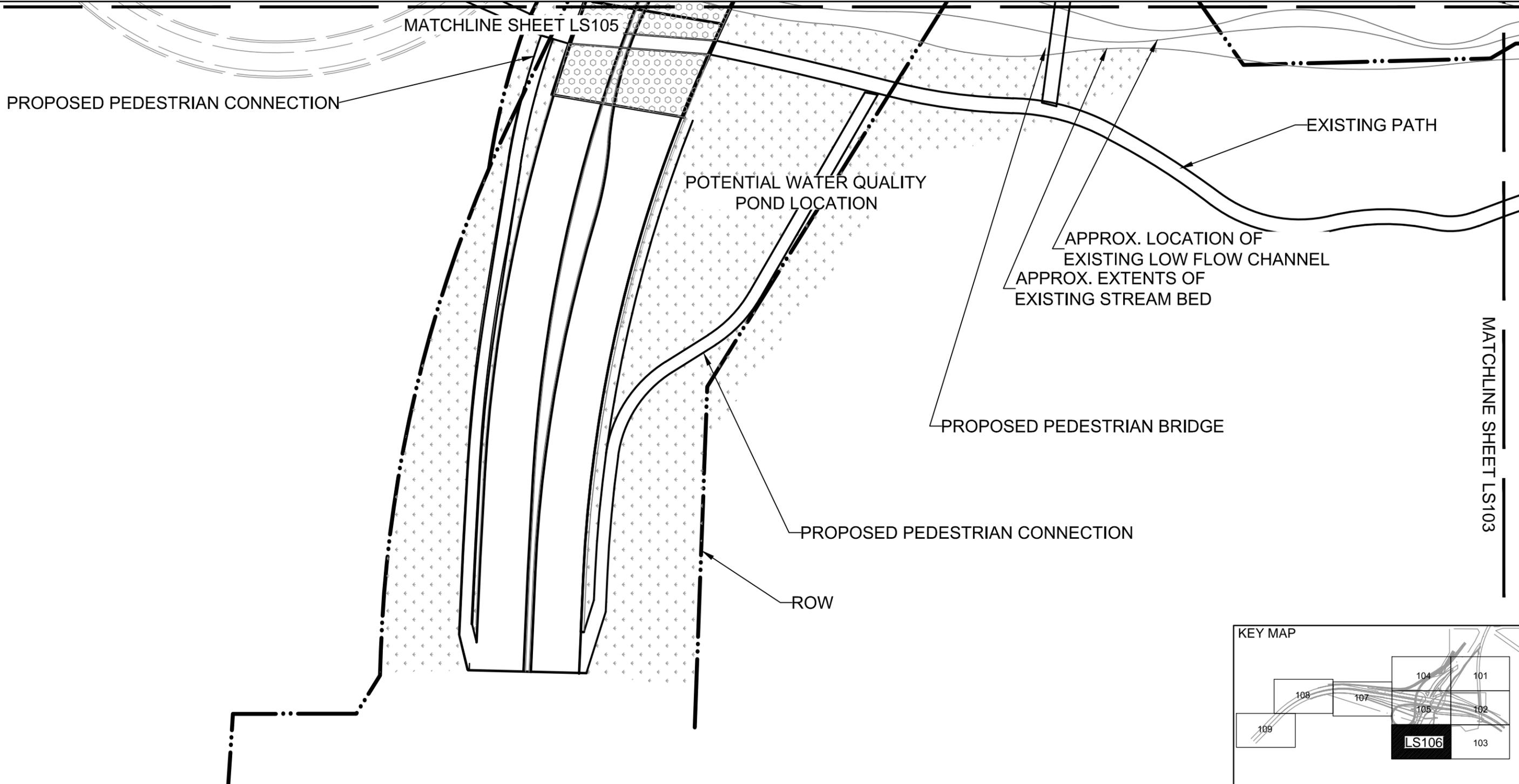
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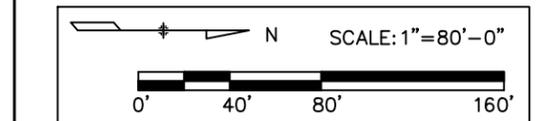
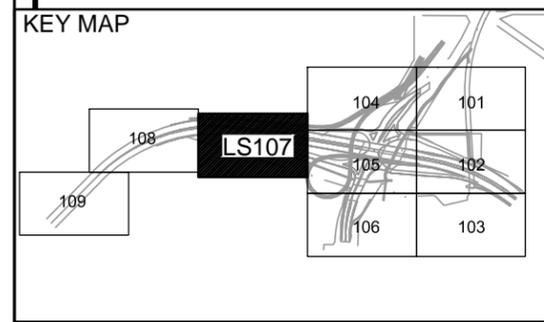
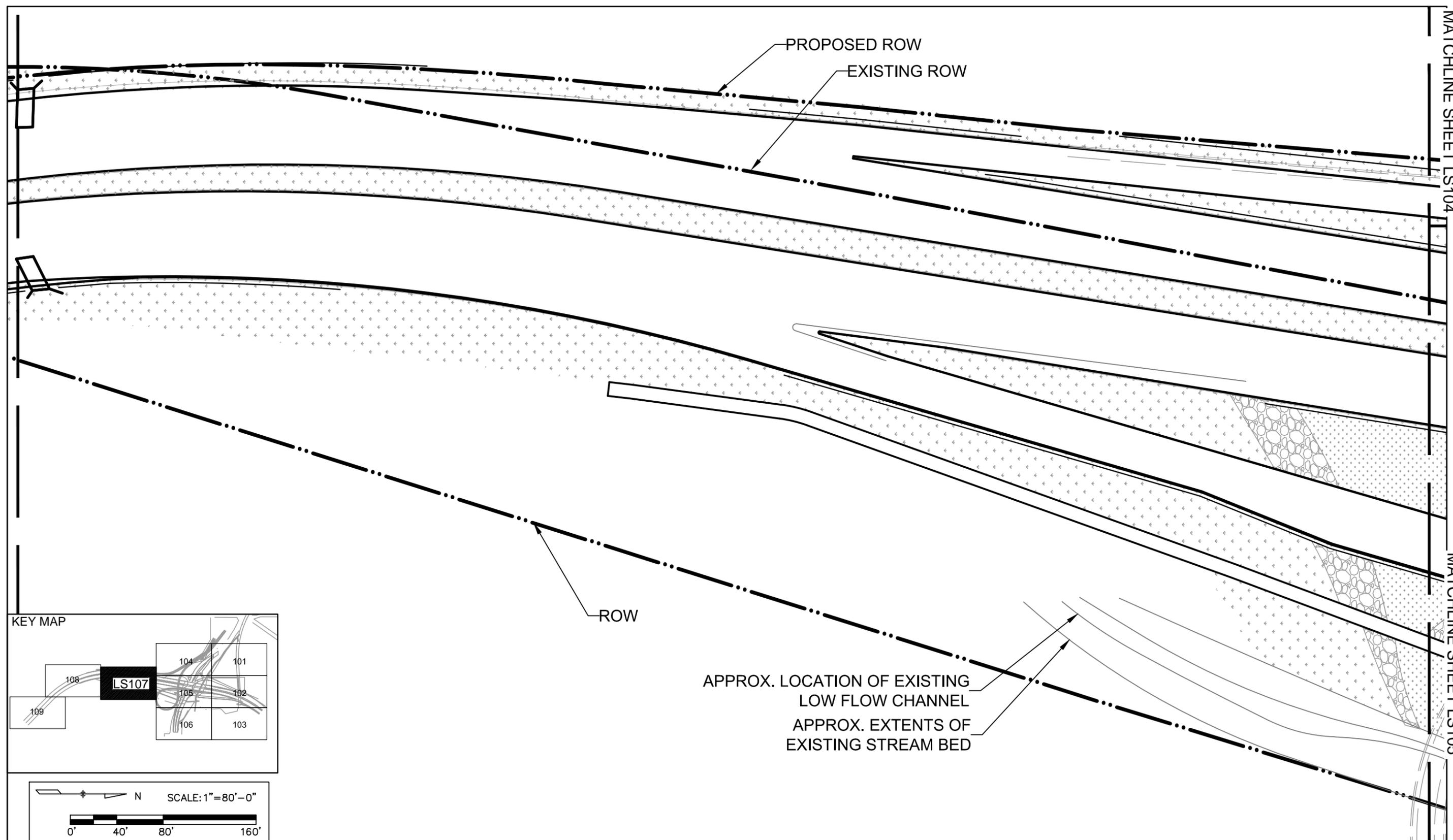


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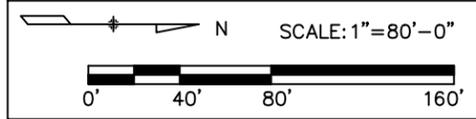
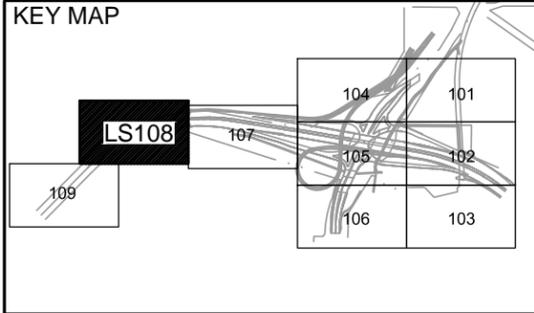
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APPROX. LOCATION OF EXISTING  
LOW FLOW CHANNEL  
APPROX. EXTENTS OF  
EXISTING STREAM BED

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APPROX. LIMITS OF REVEGETATION  
ALL DISTURBED AREAS MUST BE  
REVEGETATED

APPROX. LIMITS OF REVEGETATION  
ALL DISTURBED AREAS MUST BE  
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**CHAPTER 9  
SEEDING/ROCK MULCH**

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Structure

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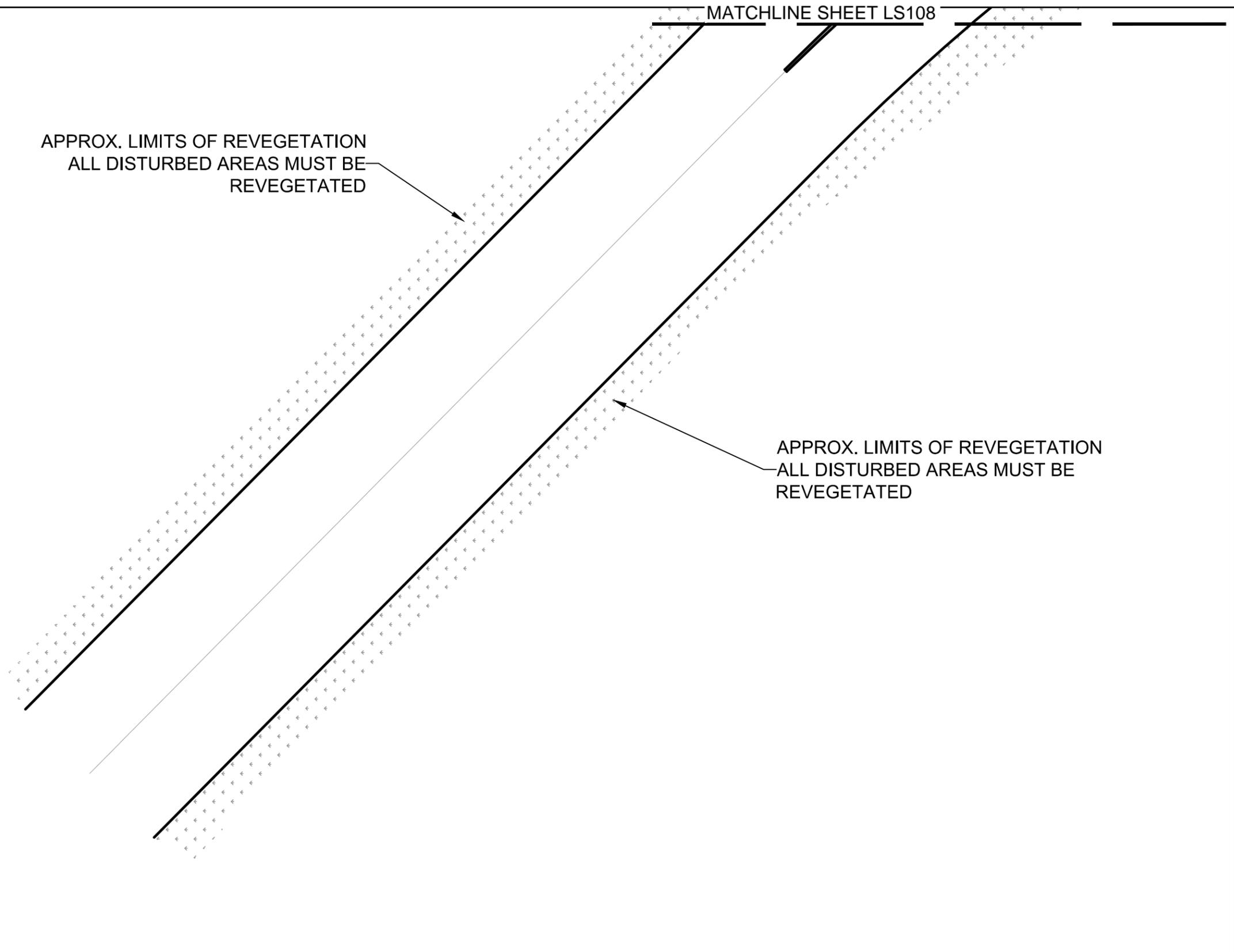
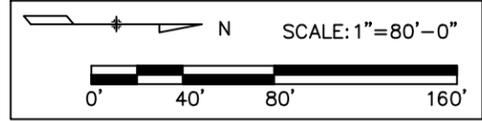
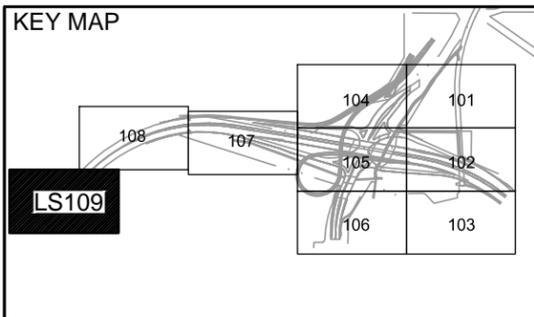
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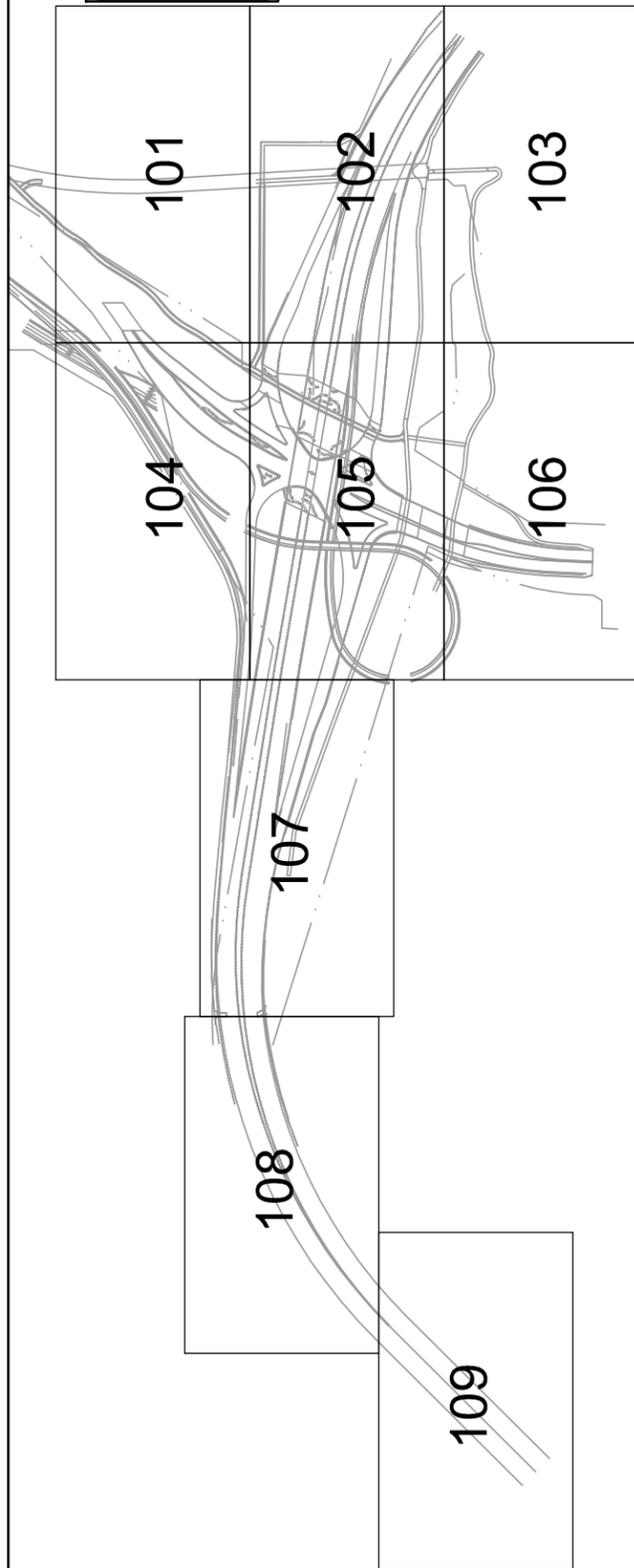
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# CHAPTER 10 - PLANTING PLANS AND SPECIFICATIONS

**NOTES:**

1. THE RIPARIAN AREAS SHOWN ON THESE PLANS SHOW THE APPROXIMATE LIMITS OF WHERE RIPARIAN PLANTS ARE TO BE PLACED. THESE PLANTS RELY ON WATER FOR THEIR SURVIVAL. THE LIMITS OF THESE AREAS ASSUME THAT THERE IS A WATER TABLE THAT WILL SUPPORT THESE PLANTS.
2. ALL DECIDUOUS TREES SHALL RECEIVE BEAVER PROTECTION AS SHOWN IN THESE PLANS.

| Large Shade Trees      |                               |                            |                       |
|------------------------|-------------------------------|----------------------------|-----------------------|
| (60) PO SA             | Populus sargentii             | Plains Cottonwood          | 2" B&B                |
| (24) CE OC             | Celtis Occidentalis           | Western Hackberry          | 2" B&B                |
| Shade/Ornamental Trees |                               |                            |                       |
| (66) AL IN             | Alnus incana tenuifolia       | Thinleaf Alder             | 2" B&B/6' MULTI-STEM* |
| (48) CR AM             | Crataegus ambigua             | Russian Hawthorn           | 2" B&B/6' MULTI-STEM* |
| (86) PO AN             | Populus angustifolia          | Narrowleaf Cottonwood      | 2" B&B                |
| Evergreen Trees        |                               |                            |                       |
| (72) PI PO             | Pinus ponderosa               | Ponderosa Pine             | 8' HT.                |
| (55) PI FL             | Pinus flexilis                | Limber Pine                | 8' HT.                |
| Deciduous Shrubs       |                               |                            |                       |
| (221) PR BE            | Prunus besseyii               | Western Sandcherry         | #5 CONT.              |
| (332) PR AM            | Prunus americana              | Native Plum                | #5 CONT.              |
| (431) CO ST            | Cornus stolonifera            | Redtwig Dogwood            | #5 CONT.              |
| (100) PR VI            | Prunus virginiana melanocarpa | Native Chokecherry         | #5 CONT.              |
| Grasses                |                               |                            |                       |
| (2016) SC SC           | Calamagrostis acutiflora      | K.F. Feather Reed Grass #1 | CONT.                 |
|                        |                               | 'Karl Forester'            |                       |

\*FOR THESE TREES, 65% SHALL BE MULTI-STEM AND 35% SINGLE STEM

- LARGE SHADE TREES
- SHADE/ORNAMENTAL TREES
- EVERGREEN TREES
- DECIDUOUS SHRUBS
- RIPARIAN WILLOWS
- ORNAMENTAL GRASSES
- LANDSCAPE BOULDERS
- UNMOWED NATIVE SEED
- MOWED NATIVE SEED
- FOUNTAIN CREEK CHANNEL SEE CREEK CHANNEL DETAILS AND NOTES
- 1 1/2" ROCK MULCH - GREY OR TAN HUES; NO PEA GRAVEL
- 6-12" COBBLE; WHITES AND GREYS
- GREY STABILIZED CRUSHER FINES
- CONCRETE, SMOOTH OR BROOM FINISH STAINED FEDERAL COLOR 33448

UPLAND SEED

| BOTANICAL NAME*                          | COMMON NAME              | LBS. PLS. PER ACRE |
|--|--------------------------|--------------------|
| Dalea purpureum                          | Purple Prairie Clover    | 0.90               |
| Penstemon strictus                       | Rocky Mountain Penstemon | 0.90               |
| Achnatherum hymenoides                   | Indian Ricegrass         | 1.8                |
| Bouteloua curtipendula                   | Sideoats Grama           | 3.6                |
| Bouteloua gracilis                       | Blue Grama               | 1.8                |
| Buchloe dactyloides                      | Buffalograss             | 1.8                |
| Calamovilfa longifolia                   | Prairie Sandreed         | 3.6                |
| Elymus lanceolatus lanceolatus 'Critana' | Thickspike Wheatgrass    | 5.4                |
| Nassella viridula                        | Green Needlegrass        | 3.6                |
| Pascopyrum smithii 'Arriba'              | Western Wheatgrass       | 9.0                |
| Sporobolus airoides                      | Alkali Sacaton           | 3.6                |
|  |                          | 36**               |

\*NOMENCLATURE FOLLOWS CITY OF COLORADO SPRINGS DRAINAGE CRITERIA MANUAL  
 \*\*RATES ARE FOR DRILLED; DOUBLE IF HAND-BROADCASTED

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**SECTION 02900 - LANDSCAPE**

**PART I - GENERAL**

**1.01 SCOPE OF WORK**

A. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT, MATERIAL, SUPPLIES, AND TRANSPORTATION FOR DELIVERY AND INSTALLATION OF PLANT MATERIAL INCLUDING LAYOUT AND STAKING, TAGGING, PLACEMENT, EXCAVATION, SOIL AMENDMENTS AND CHEMICALS, WRAPPING, STAKING, MULCHING, MAINTENANCE AND GUARANTEE FOR THE COMPLETION OF WORK SHOWN ON THE DRAWINGS, STATED IN THE SPECIFICATIONS, OR OTHERWISE REQUIRED. THIS WORK INCLUDES, BUT IS NOT LIMITED TO, SUB GRADE AND SOIL PREPARATION, PLANT MATERIAL, PLANTING PROCEDURES, MAINTENANCE AND GUARANTEE.

**1.02 QUALIFICATIONS**

**A. APPLICABLE STANDARDS:**

1. U.S. DEPARTMENT OF AGRICULTURE RULES AND REGULATIONS UNDER THE FEDERAL SEED ACT.
2. AMERICAN ASSOCIATION OF NURSERYMEN, CURRENT EDITION OF "AMERICAN STANDARD FOR NURSERY STOCK." PUBLISHED BY AMERICAN ASSOCIATION OF NURSERYMEN, INC., 635-636 SOUTHERN BUILDING, WASHINGTON D.C. AND/OR COLORADO NURSERY ACT, RULES AND REGULATIONS; WHICHEVER STANDARD IS GREATER.
3. CERTIFICATES OF INSPECTION FOR PLANTS: ALL NECESSARY STATE, FEDERAL AND OTHER INSPECTION CERTIFICATES SHALL ACCOMPANY THE INVOICE FOR EACH SHIPMENT OF PLANT MATERIALS AS MAY BE REQUIRED BY LAW, AND SHOWING SOURCE OF ORIGIN, CERTIFICATES SHALL BE FILED WITH THE LANDSCAPE ARCHITECT PRIOR TO HIS ACCEPTANCE OF THE MATERIAL.
4. ALL OTHER APPLICABLE FEDERAL AND COLORADO LAWS AS THEY APPLY TO PLANT MATERIALS.

**B. INSPECTION AND APPROVAL:**

1. ALL TREES SHALL BE INSPECTED AND APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO AND UPON DELIVERY. THE CONTRACTOR SHALL GIVE OWNER'S REPRESENTATIVE 36 HOURS PRIOR NOTICE WHEN THE PLANTS ARE READY FOR INSPECTION AT THE SUPPLIER AND UPON ON-SITE DELIVERY.
2. THE OWNER'S REPRESENTATIVE RESERVES THE RIGHT TO REJECT BEFORE DELIVERY, AND PRIOR TO FINAL ACCEPTANCE, ANY AND ALL MATERIALS IN WHICH THE OWNER'S REPRESENTATIVE'S OPINION FAIL TO MEET SPECIFICATIONS. INSPECTION OF MATERIALS IS PRIMARILY FOR QUALITY, SIZE AND VARIETY BUT OTHER REQUIREMENTS ARE NOT WAIVED EVEN THOUGH VISUAL INSPECTION RESULTS IN APPROVAL. PLANTS MAY BE INSPECTED WHERE AVAILABLE. HOWEVER, INSPECTION AT THE PLACES OF SUPPLY SHALL NOT PRECLUDE THE RIGHT OF REJECTION AT THE SITE. REJECTED MATERIALS SHALL BE PROMPTLY REMOVED FROM THE SITE WITHIN 24 HOURS.
3. THE CONTRACTOR SHALL SCHEDULE INSPECTION OF ALL PLANTS AT THE SUPPLIER TO BE COMPLETED IN ONE VISIT.

**1.03 SUBMITTALS**

**A. PROCUREMENT:**

1. WITHIN 10 DAYS AFTER THE NOTICE TO PROCEED ISSUED BY THE OWNER, THE CONTRACTOR SHALL FURNISH THE OWNER'S REPRESENTATIVE WITH COPIES OF THE SUPPLYING NURSERIES' CONFIRMATION FOR THE CONTRACTOR'S ORDERS FOR ALL PLANT MATERIAL REQUIRED BY THE PLANS AND SPECIFICATIONS. THE ENTERING OF A PROPOSAL AND EXECUTION OF A CONTACT SHALL BE EVIDENCE THAT THE MATERIAL IS AS SPECIFIED IN THE PLANS.

B. THE CONTRACTOR SHALL SUBMIT TO THE OWNER'S REPRESENTATIVE THEIR SUPPLIER SPECIFICATIONS FOR THE FOLLOWING PRODUCTS (3 WEEKS TO DELIVER):

1. COMMERCIAL FERTILIZER

2. INSECTICIDE, SYSTEMIC PRODUCT FOR TREES
3. TOPSOIL
4. ORGANIC AMENDMENT MATERIAL
5. TREE WRAPPING
6. TREE STAKES AND ACCESSORIES
7. SEED
8. LANDSCAPE EDGER
9. GRAVEL MULCH
10. PLANT MATERIAL - INCLUDING LOCATION OF NURSERY IN AND OUTSIDE OF COLORADO

C. THE CONTRACTOR SHALL SUBMIT TO THE OWNER'S REPRESENTATIVE SAMPLES OF THE FOLLOWING MATERIALS TO BE USED ON THE PROJECT (3 WEEKS PRIOR TO DELIVERY):

1. GRAVEL MULCH (ALL VARIETIES)
2. WOOD MULCH
3. ORGANIC AMENDMENT (COMPOST)
4. TOPSOIL

D. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE 24 HOURS IN ADVANCE OF PLANTING ANY MATERIAL TO ALLOW THE OWNER'S REPRESENTATIVE THE OPPORTUNITY TO EXAMINE PLANTING PITS BEFORE INSTALLATION OF MATERIAL.

**E. MAINTENANCE INSTRUCTIONS:**

1. AT COMPLETION OF THE WORK, FURNISH FOUR (4) COPIES OF WRITTEN MAINTENANCE INSTRUCTIONS TO OWNER FOR MAINTENANCE AND CARE OF ALL PLANTED AREAS THROUGHOUT THE YEAR.
- F. CONTRACTOR SHALL HAVE AN AGRICULTURAL SOILS TEST RUN ON ON-SITE TOPSOIL FOR DETERMINATION OF NUTRIENT ADDITIVES AND APPLICATION RATES. SUBMIT TEST RESULTS TO OWNER'S REPRESENTATIVE NOT LATER THAN TWO (2) WEEKS PRIOR TO ITS SCHEDULE USE.

**1.04 JOB CONDITIONS AND STANDARDS**

A. ALL PLANTING WORK SHALL BE PERFORMED UNDER THE DIRECT SUPERVISION OF A SUPERINTENDENT AND LABORERS THOROUGHLY EXPERIENCED WITH THE WORK OF THIS SECTION AND WHO SHALL BE AT THE PROJECT SITE FOR THE DURATION OF THE WORK OF THIS SECTION.

B. NO PLANTING WORK SHALL TAKE PLACE DURING INCLEMENT WEATHER OR WHEN THE GROUND CONDITIONS ARE, IN THE OPINION OF THE OWNER'S REPRESENTATIVE, NOT IN A CONDITION TO BE PROPERLY WORKED.

C. NO PLANTING WORK SHALL COMMENCE UNTIL THE ADJACENT SITE IMPROVEMENTS, DRAINAGE IMPROVEMENTS, PAVEMENTS, IRRIGATION INSTALLATION AND FINISH GRADING IS COMPLETED. THE IRRIGATION SYSTEM SHALL HAVE BEEN TESTED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE, AND BE IN OPERATING ORDER PRIOR TO ANY PLANTING.

D. ERECT BARRICADES, FENCING, HIRE TEMPORARY WATCHMEN OR WHATEVER IS DEEMED NECESSARY BY THE CONTRACTOR TO TOTALLY PROTECT THIS WORK.

E. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO PROTECT ALL EXISTING PLANT MATERIAL ON THE SITE, IF ANY, DURING CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL ALSO PROVIDE TEMPORARY MAINTENANCE FOR ALL EXISTING PLANT MATERIAL WITHIN THE CONTRACT LIMIT LINES THROUGHOUT THE CONSTRUCTION PERIOD. PROTECTION OF THE EXISTING PLANT MATERIAL SHALL BE APPROVED BY OWNER'S REPRESENTATIVE BEFORE GRADING OPERATIONS COMMENCE.

**PART II - PRODUCTS**

**2.01 GRAVEL MULCH**

A. PROVIDE 1-1/2" GRAY HUED NATURAL GRANITE GRAVEL IN ALL SLOPE AREAS AS INDICATED ON PLAN.  
1. MULCH SHALL BE FREE OF SEEDS, WEEDS, TWIGS AND BRANCHES.

**2.02 BARK OR WOOD MULCH**

A. PROVIDE DOUBLE SHREDED CEDAR MULCH IN ALL PERENNIAL BEDS AND TREE PITS IN GRASS AREAS, AS SHOWN ON DRAWINGS.

1. SHALL BE CLEAN AND FREE OF WEEDS, STICKS, DIRT, DUST AND OTHER DEBRIS
2. SHALL BE PLACED AT MINIMUM DEPTH OF 3"

**2.03 PRE-EMERGENT HERBICIDE**

A. PRE-EMERGENT HERBICIDE SHALL BE USED AND APPLIED AS PER MANUFACTURER'S RECOMMENDATIONS FOR WEED CONTROL IN ALL PLANTING/GRAVEL AREAS. PRE-EMERGENT HERBICIDE SHALL BE APPROVED BY OWNER'S REPRESENTATIVE.

**2.04 POST-EMERGENT HERBICIDE**

1. FOR ALL TURF PLANTING BEDS, PROVIDE A POST-EMERGENT HERBICIDE.
2. POST-EMERGENT HERBICIDE SHALL BE APPROVED BY OWNER'S REPRESENTATIVE.

**2.05 INSECTICIDE AND FUNGICIDE**

A. FOR ALL TREE PLANTINGS, PROVIDE SYSTEMIC INSECTICIDE.

1. SYSTEMIC INSECTICIDE SHALL BE APPLIED PER MANUFACTURER'S RECOMMENDATION AT TIME OF PLANTING OF TREES AND SHRUBS.
2. METHOD OF APPLICATION SHALL BE SOIL INJECTION OR SOIL DRENCH AS PER MANUFACTURER'S RECOMMENDATIONS. APPLY TREATMENT WITH WATER AND KEEP MOIST FOR 7 TO 10 DAYS.
3. INSECTICIDE AND FUNGICIDE SHALL BE APPROVED BY OWNER'S REPRESENTATIVE.

**2.06 TREE WRAP**

A. TREE WRAPPING MATERIAL SHALL BE OF FIRST QUALITY, 4-INCH WIDE, BITUMINOUS IMPREGNATED TAPE, CORRUGATED OR CREPE PAPER, BROWN IN COLOR, SPECIFICALLY MANUFACTURED FOR TREE WRAPPING. THE CONTRACTOR SHALL SUBMIT A SAMPLE FOR OWNER'S APPROVAL A MINIMUM OF 3 WEEKS PRIOR TO DELIVERY ON SITE.

**2.07 STAKING AND GUYING MATERIAL**

- A. WIRE SHALL BE 12 GAUGE, DOUBLE STRAND, PLIABLE GALVANIZED STEEL WIRE.
- B. NYLON WEBBING SHALL BE A SOFT, 8 TO 10 CM. WIDE STRIP WITH GROMMETS AT ENDS.
- C. STAKES SHALL BE 2" X 2" X 8' WOOD STAKES OR APPROVED EQUAL.

**2.08 FERTILIZER**

A. FERTILIZER SHALL BE DELIVERED TO THE SITE, MIXED AS SPECIFIED, IN THE ORIGINAL, UNOPENED STANDARD SIZE BAGS SHOWING WEIGHT, ANALYSIS AND NAME OF MANUFACTURER. CONTAINERS SHALL BEAR THE MANUFACTURER'S GUARANTEED STATEMENT OF ANALYSIS AND SHALL BE FURNISHED TO THE OWNER. STORE FERTILIZER IN A WEATHERPROOF PLACE AND IN SUCH A MANNER THAT IT SHALL BE KEPT DRY AND ITS EFFECTIVENESS SHALL NOT BE IMPAIRED.

B. SUPERPHOSPHATE: SOLUBLE MIXTURE OF TREATED MINERALS, 16% TO 20% AVAILABLE PHOSPHORIC ACID.

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**SECTION 02900 - LANDSCAPE, CONT.**

5. CONTRACTOR SHALL PLACE STAKES ACCORDING TO THE CONSTRUCTION DETAIL. THE CONTRACTOR SHALL RETURN TO THE SITE AND REMOVE STAKES ONE YEAR FROM PLANTING.

6. B. SPRAYING, WRAPPING, PRUNING, WATERING AND MULCHING:

1. ALL DECIDUOUS TREES SHALL BE WRAPPED BY THE CONTRACTOR BETWEEN NOVEMBER 1ST AND APRIL 15TH OF THE YEAR IN WHICH THEY ARE PLANTED. SPECIFIED TREE WRAP SHALL BE CUT IN A CONTINUOUS STRIP OF SUFFICIENT LENGTH TO WRAP THE TREE. THIS WRAPPING SHALL BEGIN AT THE GROUND LINE WITH OVERLAPPING WRAPS OF 1 1/2 INCHES TERMINATING ABOVE THE LOWEST MAIN BRANCH OF THE TREE. FINAL WRAP SHALL BE SECURED WITH TAPE IN A MINIMUM OF THREE PLACES. THE CONTRACTOR SHALL RETURN TO THE SITE THE FOLLOWING SPRING AND REMOVE THE WRAP ONCE THE DANGER OF FROST HAS PASSED. THE CONTRACTOR SHALL NOTIFY THE OWNER A MINIMUM OF 1 WEEK PRIOR TO WRAP REMOVAL.
2. AFTER INSPECTION, AND WITH THE APPROVAL OF THE OWNER, THE CONTRACTOR SHALL NEATLY PRUNE PLANTS AS NECESSARY TO REMOVE ONLY DEAD, INJURED, DISEASED OR CROSSING BRANCHES. ALL CUTS SHALL BE MADE JUST OUTSIDE OF THE FLARE OF THE BRANCH BASE, LEAVING A SLIGHT STUB. ALL PRUNING SHALL BE EXECUTED SO AS TO PRESERVE THE NATURAL FORM AND CHARACTER OF THE PLANT. THE CONTRACTOR SHALL RETURN TO THE SITE ONE YEAR FROM THE INSTALLATION OF THE PLANTS AND PRUNE ALL DEAD, DISEASED OR INJURED BRANCHES FROM THE PLANTS AS SPECIFIED ABOVE. THE CONTRACTOR SHALL NOTIFY THE OWNER 1 WEEK PRIOR TO COMMENCING THE PRUNING TASK.
3. AFTER WATERING ON DAY OF PLANTING, AND THROUGHOUT THE MAINTENANCE PERIOD UP TO FINAL ACCEPTANCE, THE CONTRACTOR SHALL ENSURE THAT THE PLANTS ARE NOT OVER OR UNDER WATERED BY ONLY WATERING WHEN THE CONTRACTOR'S ON-SITE TESTING OF SOIL MOISTURE INDICATES THE ROOT ZONE AT 4 INCH DEPTH HAS BEGUN TO DRY OUT.
4. SPECIFIED GRAVEL OR BARK MULCH SHALL BE PLACED IN ALL PLANTING BED, SHRUB AREAS AND AT THE BASE OF EACH TREE. THE MULCH SHALL BE SPREAD CAREFULLY AND EVENLY TO MINIMUM DEPTH OF THREE INCHES. THE MULCHED AREAS SHALL BE GRADED SO THAT THE TOP OF THE MULCH WILL BE FLUSH WITH THE TOP OF THE PAVEMENT, AND 1/2" INCH BELOW THE TOP OF THE CURB.
5. UNDERGROUND OBSTRUCTIONS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO ANY UNDERGROUND UTILITY, OR OTHER IMPROVEMENTS. IN THE EVENT A PIPE, LINE, ROCK FORMATION, OR OTHER OBSTRUCTION INTERFERES WITH THE PLANT LOCATION, THE CONTRACTOR SHALL NOTIFY THE OWNER TO RECEIVE A NEW PLANT LOCATION.

C. BACKFILL FOR TREES AND SHRUBS

1. ORGANIC SOIL AMENDMENT: 33% VOLUME OF BACKFILL.
2. PLANTING PIT EXCAVATED MATERIAL: 67% VOLUME OF BACKFILL.
3. FERTILIZER TABLETS: ONE 21 GRAM FERTILIZER TABLET FOR EACH 1/2" OF TREE TRUNK CALIPER AND ONE TABLET PER 12 INCHES HEIGHT, OR SPREAD (WHICHEVER IS GREATER) FOR EACH SHRUB.
4. INSECTICIDE: TREES: INSTALL 1.0 TO 1.4 LEVEL TEASPOONS PER ONE-INCH OF TRUNK DIAMETER (D.B.H., AT BREAST HEIGHT) MINIMUM ONE (1) TEASPOON PER 2" CALIPER TREE. SHRUBS: INSTALL 0.7 TO 1.4 LEVEL TEASPOONS PER ONE-FOOT OF HEIGHT OF SHRUB.

3.06 SOIL PREPARATION

A. SOIL PREPARATION AND MULCHING FOR ALL LANDSCAPE AREAS, INCLUDING SEED AND SOD AREAS:

1. FINISH GRADING SHALL BE PERFORMED TO FILL IN EROSION GULLIES ON SLOPES IDENTIFIED ON DRAWINGS. WHERE THE USE OF LARGE MACHINERY IS DIFFICULT, FINISHED GRADE SHALL BE WORKED WITH SMALLER EQUIPMENT OR BY HAND.
2. REMOVE ALL RUBBLE, STONE AND EXTRANEIOUS MATERIAL OVER TWO (2) INCHES IN DIAMETER FROM THE SITE.
3. FOR PLANTING AREAS, APPLY SHORT TERM HERBICIDE TO INHIBIT UNWANTED PLANT

GROWTH PRIOR TO SEEDING. APPLY IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION FOR THIS PURPOSE AND SUFFICIENTLY IN ADVANCE OF PLANTING TO AVOID DAMAGE TO NEW PLANTS AND GRASS. SHORT TERM HERBICIDE SHALL BE APPROVED BY THE OWNER'S REPRESENTATIVE.

4. SPREAD APPROVED TOPSOIL AND THE FOLLOWING AMENDMENTS TO THE AREAS SPECIFIED ON THE DRAWINGS. NO ROTOTILLING OR DISKING OF TOPSOIL DRESSING. SEEDING TO FOLLOW WITHIN 7 DAYS OF TOPSOIL APPLICATION.

- a. ORGANIC SOIL AMENDMENT: APPLY 3 CUBIC YARDS PER 1,000 SQUARE FEET.
  - b. COMMERCIAL FERTILIZER (18-46-0): APPLY 15 LBS OF AVAILABLE NITROGEN PER 1,000 SQUARE FEET.
  - c. SUBSTANTIATE QUANTITIES WITH DELIVERY TICKETS AND EMPTY MANUFACTURER BAGS ON A DAILY BASIS TO OWNER.
5. FINE GRADE TO RESTORE SMOOTH EVEN FINISH GRADES AND TO INSURE POSITIVE SURFACE DRAINAGE. NO PLANTING SHALL TAKE PLACE UNTIL OWNER ACCEPTS FINAL GRADE.
6. PROVIDE SOIL TEST OF FINISHED GRADE CONDITION TO LANDSCAPE ARCHITECT BEFORE PLANTING OR SEEDING OPERATIONS OCCUR.
7. MOISTEN PREPARED SOD/SEED AREAS BEFORE PLANTING IF SOIL IS DRY. WATER THOROUGHLY AND ALLOW SURFACE MOISTURE TO DRY BEFORE PLANTING LAWNS. DO NOT CREATE A MUDDY SOIL CONDITION.

3.07 INSTALLATION OF LANDSCAPE EDGER

A. CONTRACTOR SHALL INSTALL EDGING AS PER MANUFACTURER'S RECOMMENDATION. EDGING SHALL BE INSTALLED BETWEEN ALL PLANT BEDS AND SOD/SEEDED AREAS, OR AS SHOWN ON THE PLANS.

3.08 SCHEDULE

A. NO PLANTING WORK SHALL TAKE PLACE DURING FREEZING, EXCESSIVE WIND OR WET WETHER, OR WHEN CONDITIONS AR, IN THE OPINION OF THE OWNER, NOT IN A CONDITION TO BE PROPERLY WORKED. CONTRACTOR SHALL INCLUDE TIME IN HIS SCHEDULE FOR WORK STOPPAGE DUE TO INCLEMENT WEATHER OR GROUND CONDITIONS. INCLEMENT WEATHER OR GROUND CONDITIONS SHALL NOT BE CAUSE FOR AN EXTENSION OF PROJECT COMPLETION DATE UNLESS WRITTEN APPROVAL HAS BEEN OBTAINED FROM THE OWNER FOR EXTENSION OF THE PROJECT COMPLETION DATE.

B. NO PLANTING WORK SHALL COMMENCE UNTIL THE ADJACENT SITE IMPROVEMENTS, PAVEMENTS, UTILITY INSTALLATION AND FINISH GRADING IS COMPLETED. THE CONTRACTOR SHALL LIMIT HIS USE OF HEAVY EQUIPMENT ON PAVEMENTS AND PLANTED AREAS. IN ALL CASES, CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO EXISTING CONDITIONS.

3.09 CLEAN-UP

A. MATERIALS BROUGHT INTO THE PROJECT AREA SHALL BE NEATLY STOCKPILED UPON COMPLETION OF EACH PLANTING DAY. DEBRIS WILL BE REMOVED FROM THE PROJECT AREA AT COMPLETION OF EACH DAY'S WORK.

B. THE CONTRACTOR SHALL REMOVE FROM THE SITE, EQUIPMENT, EXCESS SOIL AND OTHER DEBRIS WHICH WAS REVEALED IN THE PLANTING PROCESS.

3.10 MAINTENANCE, ACCEPTANCE AND GUARANTEE

A. MAINTENANCE PERIOD SHALL BEGIN IMMEDIATELY AFTER EACH AREA IS PLANTED BASED ON THE FOLLOWING REQUIREMENTS:

1. ALL PLANTING SHALL BE PROTECTED AND MAINTAINED UNTIL FINAL ACCEPTANCE OF ALL

WORK. MAINTENANCE SHALL INCLUDE MOWING, WATERING, WEEDING, CULTIVATING, MULCHING, TIGHTENING AND REPAIRING OF GUYS, ADJUSTING METAL EDGER, REMOVAL OF DEAD BRANCHES, RESETTING PLANTS TO PROPER GRADE OR UPRIGHT POSITION, BARRICADING THE SITE AND OTHER NECESSARY OPERATIONS. THE CONTRACTOR SHALL PROVIDE ALL WATER AND EQUIPMENT NECESSARY FOR MAINTENANCE DURING THE DURATION OF THE CONTRACT. WATER IS AVAILABLE AT THE PLANTING SITE. AFTER FINAL ACCEPTANCE, MAINTENANCE BECOMES THE RESPONSIBILITY OF THE OWNER.

2. IF DURING THE DURATION OF THE CONTRACT PERIOD, BUT PRIOR TO THE FINAL ACCEPTANCE, ANY OF THE PLANTS DIE, OR IF THEY ARE, IN THE OPINION OF THE OWNER, IN AN UNHEALTHY OR UNSIGHTLY CONDITION OR IF THEY HAVE LOST THEIR NATURAL SHAPE DUE TO DEAD BRANCHES OR EXCESSIVE PRUNING OF BRANCHES, THEN THE CONTRACTOR SHALL REPLACE THE MATERIAL AT THE CONTRACTOR'S EXPENSE. THIS REPLACEMENT SHALL BE COMPLETED PRIOR TO FINAL ACCEPTANCE OF THE PROJECT AND SHALL NOT VOID THE TWO YEAR GUARANTEE.

3. VANDALISM, THEFT OR OTHER DAMAGE TO THE PLANTINGS OR RELATED WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL WORK RECEIVES FINAL ACCEPTANCE.

B. PRIOR TO FINAL ACCEPTANCE, THE CONTRACTOR SHALL FURNISH FOUR (4) COPIES OF WRITTEN MAINTENANCE INSTRUCTIONS TO OWNER FOR MAINTENANCE AND CARE OF ALL NEW PLANTED AREAS FOR THE FIRST THREE YEARS AFTER INSTALLATION. THESE INSTRUCTIONS SHALL INCLUDE BUT NOT BE LIMITED TO STAKING, PRUNING, INSECT AND DISEASE CONTROL AND FERTILIZING.

C. GUARANTEE:

1. FOR THE PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE OF ALL WORK, AND AT NO ADDITIONAL COST TO THE OWNER, THE CONTRACTOR SHALL REPLACE ANY PLANTS THAT HAVE DIED, ARE PARTIALLY DEAD, IF THEY ARE IN THE OPINION OF THE OWNER, IN AN UNHEALTHY OR UNSIGHTLY CONDITION, OR THEY HAVE LOST THEIR NATURAL SHAPE DUE TO DEAD BRANCHES OR EXCESSIVE PRUNING OF DEAD BRANCHES. INADEQUATE OR IMPROPER MAINTENANCE BY THE OWNER SHALL NOT BE CAUSE FOR REPLACEMENT BY THE CONTRACTOR PROVIDED THE CONTRACTOR SHALL HAVE SUBMITTED THROUGHOUT THE GUARANTEE PERIOD A BI-WEEKLY LETTER OF REPORT TO THE OWNER ON IMPROPER OR INADEQUATE MAINTENANCE PRACTICES AND RECOMMENDED REMEDIAL ACTIONS. THE CONTRACTOR SHALL APPLY A "NEW" TWO YEAR GUARANTY PERIOD TO EACH REPLACEMENT PLANT THAT IS INSTALLED. THE CONTRACTOR SHALL GUARANTY ALL PLANTS TO BE TRUE TO NAME AND TO MEET ALL CONDITIONS OF THESE SPECIFICATIONS. ANY PLANT THAT IS NOT TRUE TO NAME AS INDICATED BY LEAF, FLOWER FORM OR FRUITING CHARACTERISTICS REVEALED WITHIN GUARANTEED PERIOD SHALL BE REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. ALL REPLACEMENT PLANTING UNDER THE GUARANTEE PROVISION SHALL BE EXECUTED WITHIN ONE MONTH OF NOTICE TO REPLACE SUCH PLANTS. UPON OWNER'S WRITTEN APPROVAL, THE CONTRACTOR SHALL REPLACE REJECTED PLANTS AT A LATER DATE, MUTUALLY AGREED UPON, PROVIDED THAT THE CONTRACTOR REMOVES ALL REJECTED PLANTS WITHIN SEVEN (7) DAYS OF THE NOTICE TO REPLACE SUCH PLANTS. IF THE REJECTED PLANTS ARE NOT REMOVED WITHIN SEVEN (7) DAYS, THE OWNER MAY AT HIS OPTION REMOVE THESE PLANTS AND COST OF THE REMOVAL SHALL BE CHARGED TO THE CONTRACTOR. REPLACEMENT PLANTING IS TO BE IN ACCORDANCE WITH ORIGINAL SPECIFICATIONS AND ITS COST CONSIDERED TO BE INCLUDED IN THE BID PRICE. ALL AREAS DAMAGED BY TREE OR SHRUB PLANTING OR REPLACEMENT OPERATIONS ARE TO BE FULLY RESTORED TO THEIR ORIGINAL CONDITIONS AS SPECIFIED.

END OF SECTION 02900

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|  associates inc. 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |   |                 |          |       |   |                  |                        |                   |                    |

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**SECTION 02900 - LANDSCAPE, CONT.**

**SECTION 02923 - TOPSOIL**

**PART 1 - GENERAL**

**1.01 RELATED WORK:**

A. SECTION 02900 PLANTING AND LANDSCAPE

**1.02 SOURCE QUALITY CONTROL:**

- A. A TESTING LABORATORY APPROVED BY THE CITY OF PUEBLO AND PAID FOR BY THE CONTRACTOR WILL CARRY OUT AN INSPECTION AND TESTING OF SOIL MIXTURE.
- B. TEST SOIL FROM SOURCE FOR SAND, SILT AND CLAY, NPK, MG, SOLUBLE SALT CONTENT, PH VALUE, AND ORGANIC MATTER. TEST SOIL PRIOR TO TRANSPORTING TO SITE. A RANDOM SAMPLING OF MATERIAL BEING DELIVERED TO THE SITE WILL BE TESTED, AND THE CONTRACTOR WILL BE RESPONSIBLE TO REPLACE ALL MATERIAL THAT DOES NOT CONFORM TO THE ORIGINAL APPROVED SOIL SAMPLES AT HIS COST.
  - 1. SUBMIT 0.5 GALLON SAMPLE OF SOIL TO TESTING LABORATORY AND INDICATE PRESENT USE, INTENDED USE, TYPE OF SUBSOIL AND QUALITY OF DRAINAGE. PREPARE AND SHIP SAMPLE IN ACCORDANCE WITH TESTING LABORATORY REQUIREMENTS.
  - 2. SUBMIT TWO COPIES OF SOIL ANALYSIS AND RECOMMENDATIONS FOR CORRECTION TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO DELIVERING ANY TOPSOIL TO THE SITE.
  - 3. MAKE INITIAL TEXTURAL AMENDMENTS AND ALL FERTILITY AMENDMENTS TO IMPORTED SOIL MIXTURE IN ACCORDANCE WITH SOIL ANALYSIS RESULTS FOR A PERIOD UP TO AND INCLUDING THE MAINTENANCE PERIOD.

**1.03 SCHEDULING OF WORK:**

A. SCHEDULE PLACING OF SOIL AND FINISH GRADING TO PERMIT PLANTING OPERATIONS UNDER OPTIMUM CONDITIONS. COORDINATE OPERATIONS WITH IRRIGATION CONTRACTOR WHO WILL INSTALL AN AUTOMATIC IRRIGATION SYSTEM PRIOR TO THE INSTALLATION OF TOPSOIL AND PRIOR TO INSTALLATION OF THE PLANT MATERIAL.

**PART 2 - PRODUCTS**

**2.01 MATERIAL TOLERANCES:**

- A. CONTRACTOR IS TO PROVIDE TOPSOIL MIX THAT CONFORMS TO THE FOLLOWING TOLERANCES.
- B. TOPSOIL FOR ALL TREE, SHRUB, AND GROUND COVER PLANTING BEDS SHALL CONSIST OF THE FOLLOWING:
  - 1. 60% TO 70% SAND
  - 2. 10% MAX. SILT.
  - 3. 10% MAX. CLAY.
  - 4. MINIMUM 12% ORGANIC MATTER
  - 5. PH VALUE OF 5.0 TO 6.0.
  - 6. DRAINAGE MINIMUM OF 3/4 INCH/HR.
- C. ACCEPTABLE AMENDMENTS INCLUDE:
  - 1. COMPOSTED ORGANIC WOOD AND MANURE BASED PRODUCT WITH A CARBON TO NITROGEN RATIO BETWEEN 15:1 AND 30:1, WITH A PH OF 5 TO 6, SALT CONTENT BELOW 6 MMHOS/CM. OTHER MATERIALS SUCH AS MUSHROOM COMPOST, ETC. MAY BE CONSIDERED FOR APPROVAL.
  - 2. AMENDMENTS SHALL BE FREE OF OBJECTIONABLE ODOR, AND FREE FROM ALL VIABLE WEED SEEDS, FINELY SHREDDED TO PASS 70% THROUGH A 1/4 INCH MESH SCREEN.
- D. TOPSOIL FOR ALL LAWN AND MEADOW AREAS SHALL CONSIST OF THE FOLLOWING:
  - 1. 60% TO 80% ROUND SAND.
  - 2. 10% MAX. SILT.

- 3. 10% MAX. CLAY.
- 4. MINIMUM 5% ORGANIC MATTER
- 5. PH VALUE OF 6.0 TO 7.5.
- 6. DRAINAGE MINIMUM OF 3/4 INCH/HR.

**E. SAND:**

1. RIVER PUMP OR SCREENED QUARRY SAND WITH A PARTICLE SIZE BREAKDOWN AS FOLLOWS. PROVIDE SIEVE ANALYSIS FOR APPROVAL.

COARSE SAND15%MEDIUM SAND65%FINE SAND20%  
**F. COMPOST:**

- 1. WELL-DECOMPOSED, 2 YEAR OLD, ORGANIC WOOD AND MANURE BASED PRODUCT WITH A CARBON TO NITROGEN RATIO BETWEEN 15:1 AND 30:1, WITH A PH OF 5 TO 6, AND A SALT CONTENT BELOW 6 MMHOS/CM. OTHER MATERIALS SUCH AS A DECOMPOSED MUSHROOM OR VEGETABLE MATTER OF NATURAL OCCURRENCE MAY BE CONSIDERED FOR APPROVAL. SHEEP AND PEAT IS ACCEPTABLE.
- 2. SHREDDED PARTICLE MINIMUM SIZE: 1/4 - 1/2 INCH.

**G. FERTILIZER:**

1. ANALYSIS AND APPLICATION RATES IN ACCORDANCE WITH SOIL ANALYSIS RESULTS - SLOW RELEASE TYPE SULPHUR COATED UREA COMPLETE WITH MICRO NUTRIENTS.

**H. PEAT MOSS: (MOUNTAIN PEAT MOSS IS NOT ACCEPTABLE FOR USE ON THE PROJECT)**

- 1. DERIVED FROM PARTIALLY DECOMPOSED FIBROUS OR CELLULAR STEMS AND LEAVES OF SPECIES OF SPHAGNUM MOSSES.
- 2. ELASTIC AND HOMOGENOUS, BROWN IN COLOR.
- 3. FREE OF WOOD AND DELETERIOUS MATERIAL THAT COULD PROHIBIT GROWTH.
- 4. SHREDDED PARTICLE MINIMUM SIZE: 1/4".

I. DRAIN GRAVEL: 3/4" DIAMETER CLEAN ROUND DRAIN ROCK, FREE OF FINES.

**PART 3 - EXECUTION**

**3.01 PREPARATION OF SUBGRADE:**

A. GRADE SOIL, ELIMINATING UNEVEN AREAS AND LOW SPOTS, ENSURING POSITIVE DRAINAGE TOWARDS STORM DRAINS. REMOVE SOIL CONTAMINATED WITH TOXIC MATERIALS OR MATERIALS DETRIMENTAL TO GROWTH SUCH AS ASPHALT, CONCRETE AND DEBRIS WHICH HAS CONTAMINATED SUBGRADE SOIL. DISPOSE OF REMOVED MATERIALS LEGALLY OFF OF SITE. IF HAZARDOUS MATERIALS ARE DISCOVERED NOTIFY OWNER IMMEDIATELY.

B. CULTIVATE AREA SUBSOIL THAT IS TO RECEIVE TOPSOIL TO DEPTH OF 12" IN THOSE AREAS WHERE EQUIPMENT USED FOR HAULING AND SPREADING HAS COMPACTED SOIL. NO-TILL DRILL WILL EXECUTE THE SEEDING OF THE SITE. MINIMUM DISTURBANCE IS REQUIRED. ADDITIONAL CULTIVATION OF DISTURBED OR COMPACTED AREAS SHALL BE THE COST OF THE CONTRACTOR.

C. REMOVE SURFACE DEBRIS, ROOTS, VEGETATION BRANCHES AND STONES IN EXCESS OF 4" DIAMETER.

**3.02 SPREADING OF SOIL MIXTURE:**

A. COORDINATE EFFORTS WITH OTHER TRADES. UNDER NO CIRCUMSTANCES IS THE SOIL MIXTURE TO BE SPREAD IF OTHER TRADES ARE NOT COMPLETED WITH THEIR WORK, WHICH COULD CONTAMINATE OR COMPACT THE INSTALLED SOIL MIXTURE.

B. SPREAD SOIL AFTER LANDSCAPE ARCHITECT HAS INSPECTED AND PROVIDED WRITTEN APPROVAL OF SUBGRADE PREPARATION IN TERMS OF SLOPE, SCARIFICATION AND DEPTHS. DO NOT SPREAD SOIL IN A FROZEN OR SATURATED CONDITION.

C. SPREAD SOIL MIXTURE WITH ADEQUATE MOISTURE IN UNIFORM LAYERS OVER APPROVED SUBGRADE, WHERE PLANTING IS INDICATED.

D. FOR SOIL APPLICATION AROUND TREES SEE SECTION 02900

E. MANUALLY SPREAD SOIL MIXTURE AROUND TREES, SHRUBS AND OBSTACLES.

**3.03 FINISH GRADING OF SOIL MIXTURE:**

A. GRADE SOIL, ELIMINATING UNEVEN AREAS AND LOW SPOTS, ENSURING POSITIVE DRAINAGE AWAY FROM BUILDINGS AND TOWARDS STORM DRAINAGE SYSTEMS. REMOVE SOIL CONTAMINATED WITH TOXIC MATERIALS. REMOVE SURFACE DEBRIS, ROOTS, VEGETATION, BRANCHES, STONES IN EXCESS OF 2" DIAMETER, AND ALL EXTRANEIOUS MATERIAL. DISPOSE OF REMOVED MATERIALS. ELIMINATE ROUGH SPOTS AND LOW AREAS TO ENSURE POSITIVE DRAINAGE. PREPARE LOOSE FRIABLE BED BY MEANS OF HAND CULTIVATION AND SUBSEQUENT RAKING. FOLLOWING PLANTING, MULCH PLANTED SHRUB BEDS WITH A DEPTH OF 3" GRAVEL MULCH ON LANDSCAPE FABRIC AND RAKE SMOOTH.

END OF SECTION 02923

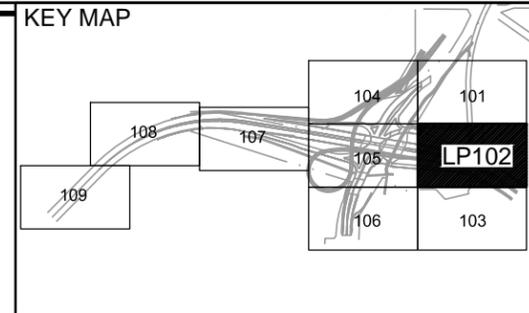
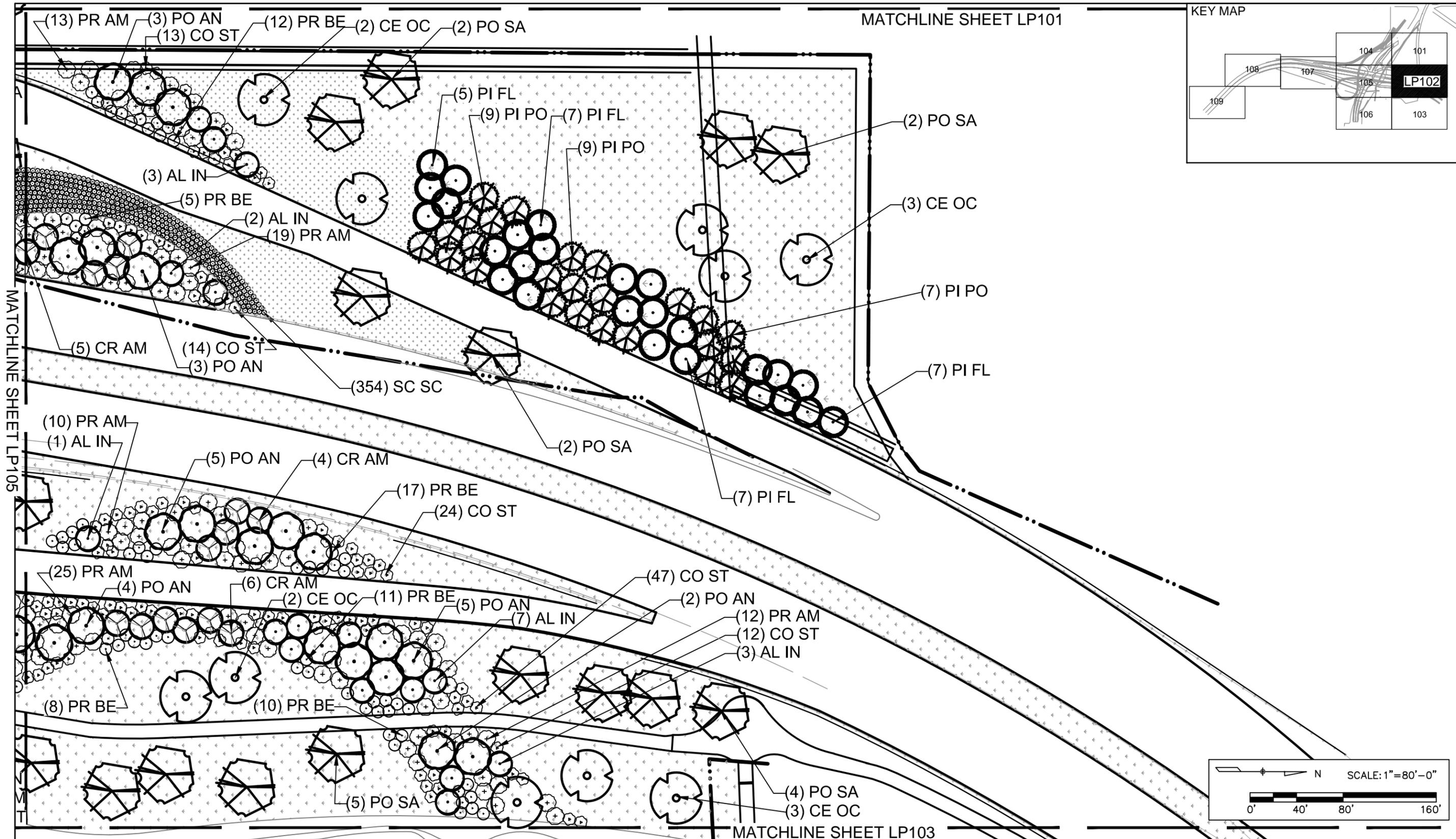
**ADDITIONAL SPECIFICATIONS**

THIS PROJECT SHALL ADHERE TO THE SPECIFICATIONS IN THIS PACKAGE AS WELL AS STANDARD SPECIFICATIONS FOR THE CITY OF COLORADO SPRINGS AND CDOT. SHOULD THERE BE A CONFLICT BETWEEN SPECIFICATIONS, THE MORE STRINGENT SPECIFICATION SHALL BE USED.

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|  associates inc. <small>2953 South Peoria Street, Ste 101<br/>Aurora, Colorado 80014<br/>303-770-7201 FAX 770-7132</small> |  |                        |          |       | Region 2   |  |                  |  |                        |  |                   |                  |                    |  |

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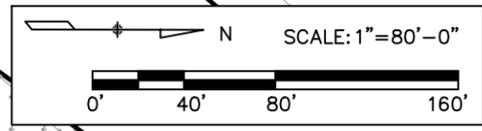




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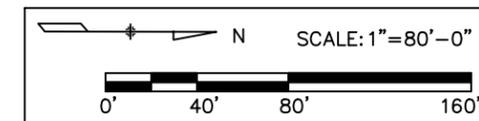
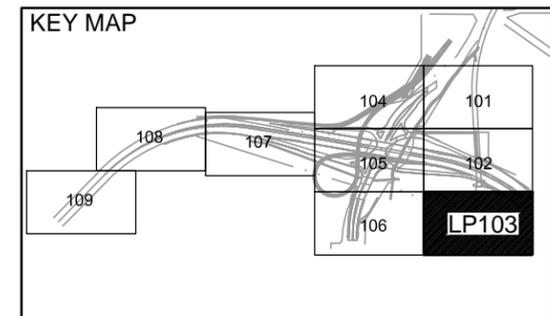
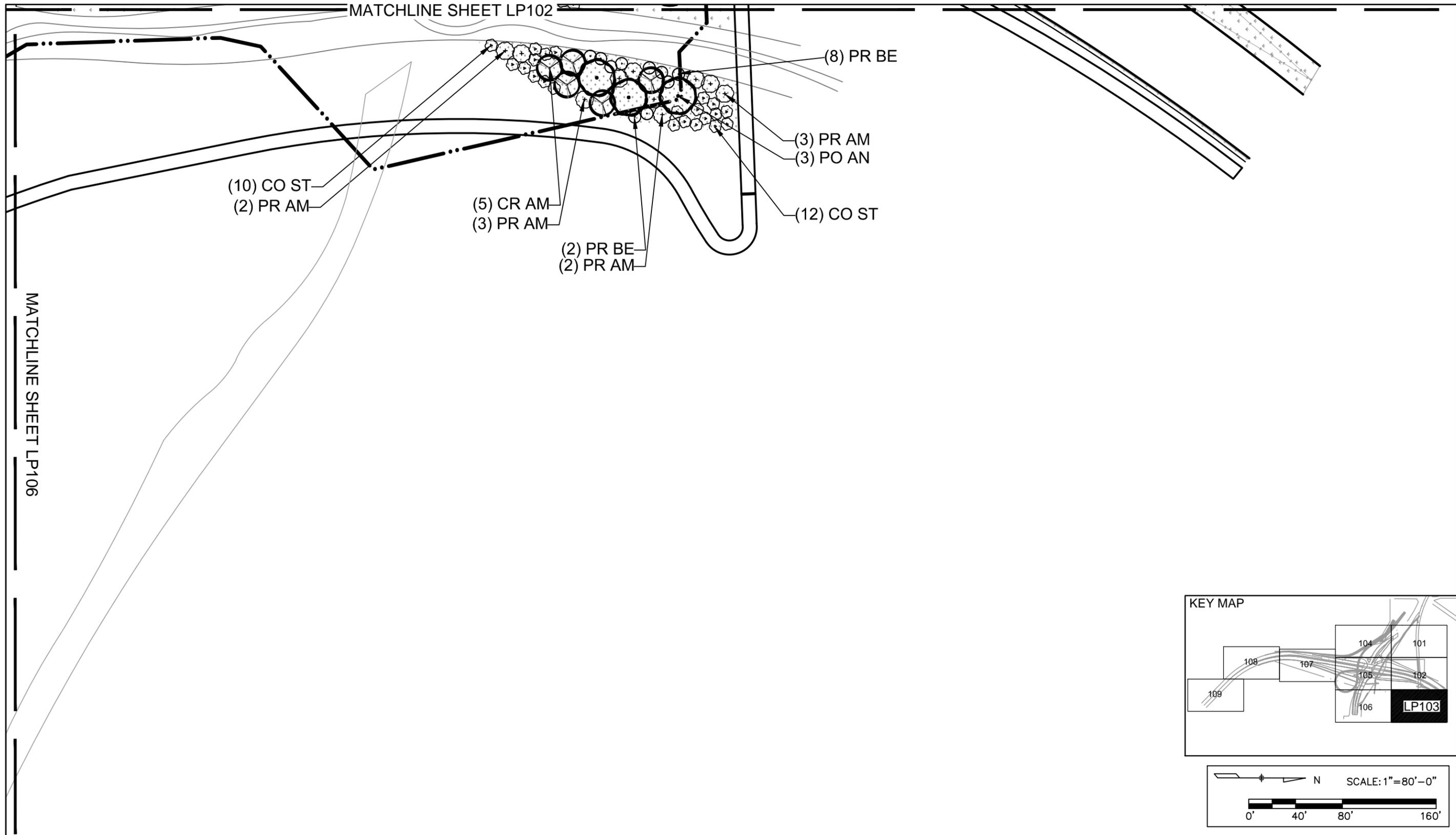
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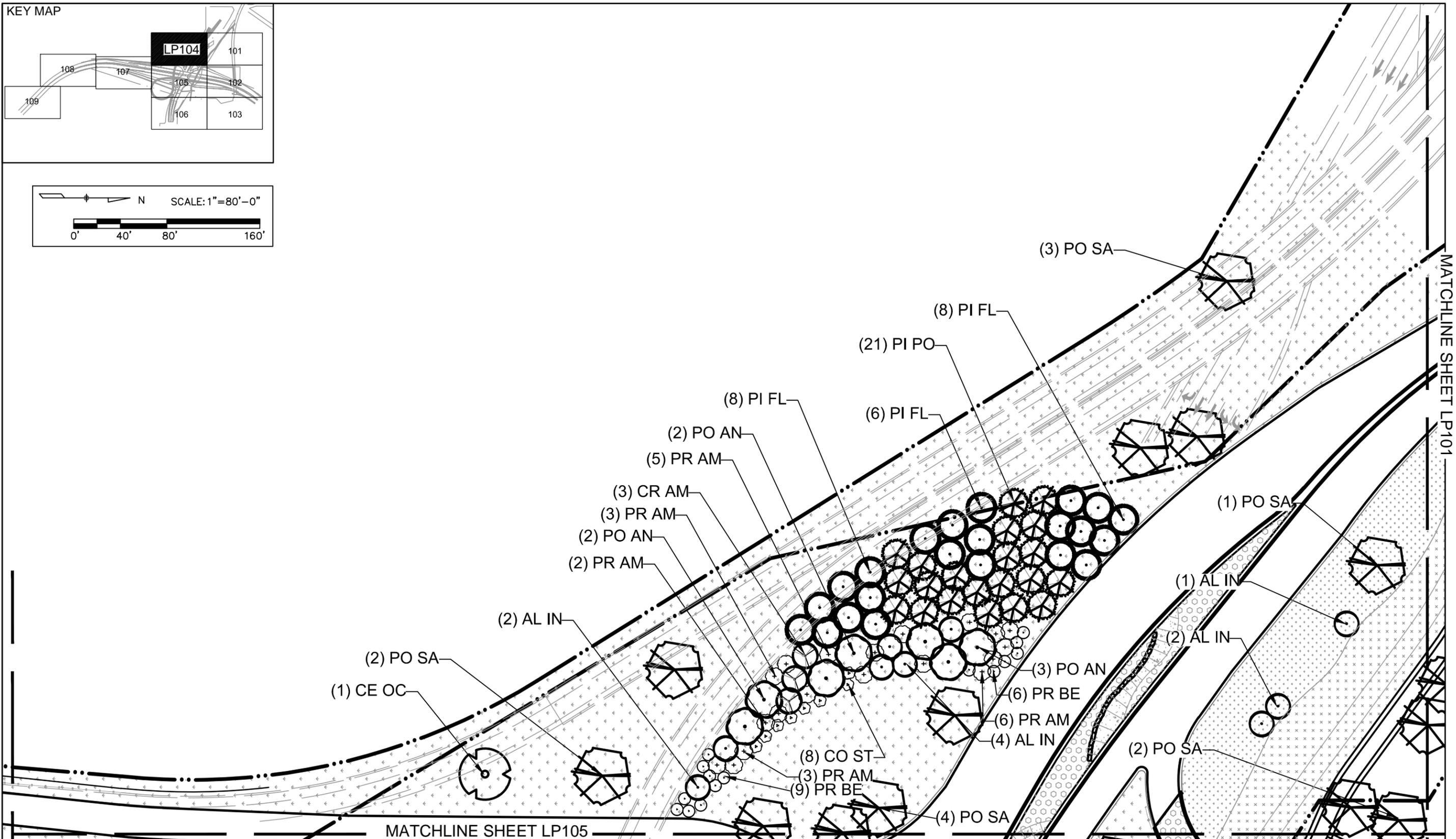
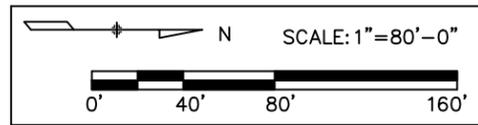
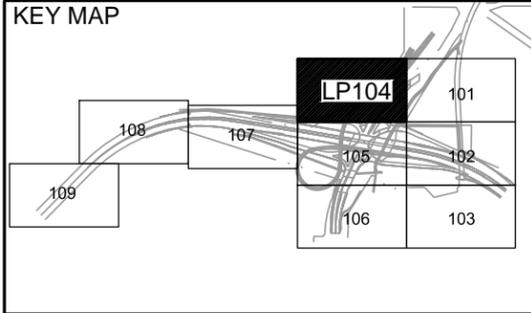
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| associates inc.<br><small>2953 South Peoria Street, Ste 101<br/>Aurora, Colorado 80014<br/>303-770-7201 FAX 770-7132</small> |  |                 |          |                                       |  |                  |               |                     |                   |                  |                    |

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| Horiz. Scale: As Noted Vert. Scale: As Noted   |  |                 |          |       |  | Revised:         | Designer: KRS    | Structure Numbers   | 19039              |                  |  |
| Unit Information Unit Leader Initials  |  |                 |          |       |  | Void:            | Detailer: JDA/AM | Subset Sheets:      | Sheet Number LP103 |                  |  |
| associates inc. 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |  |                 |          |       |  |                  |                  |                     |                    |                  |  |

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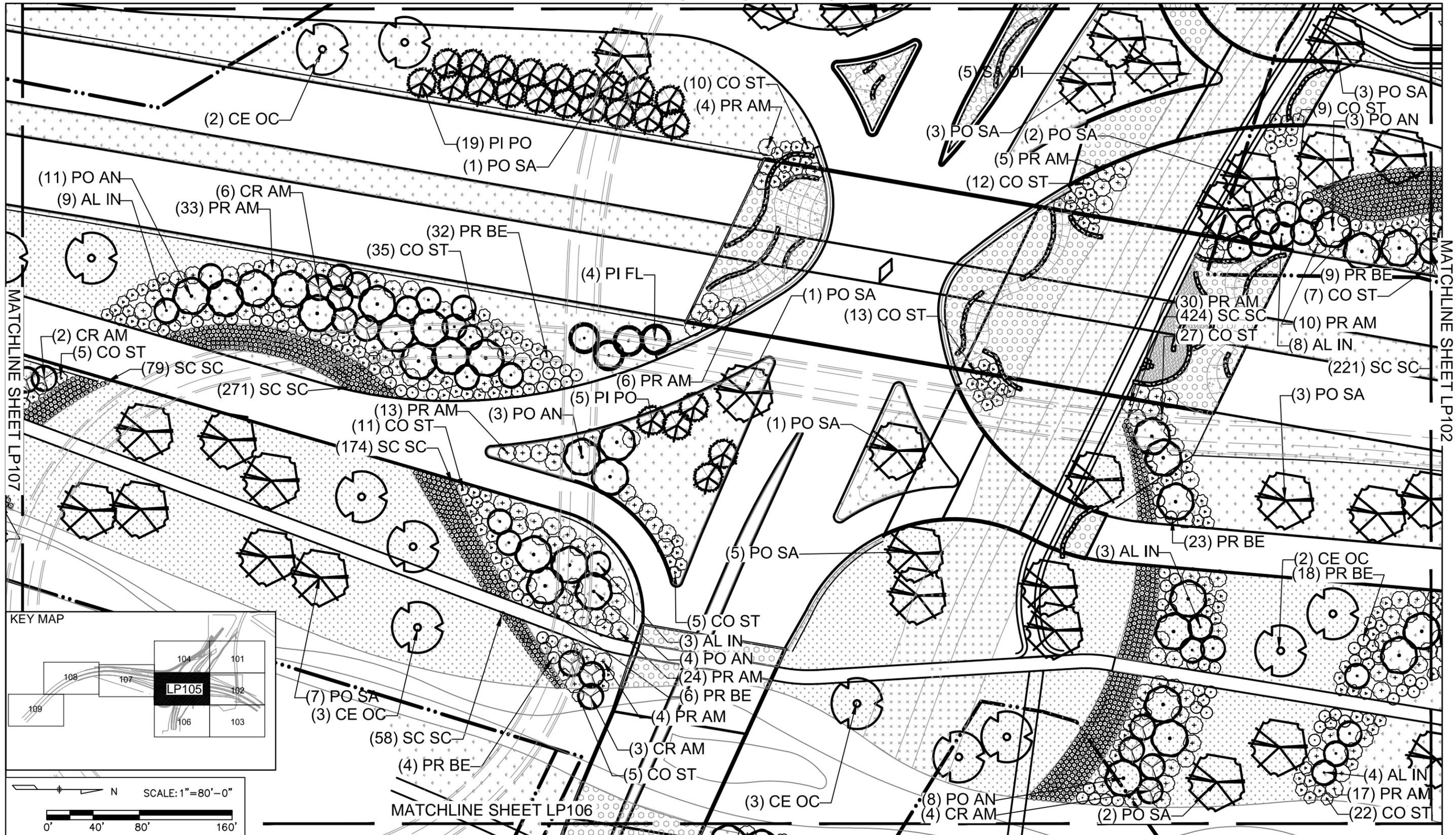
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**KEY MAP**

SCALE: 1" = 80'-0"

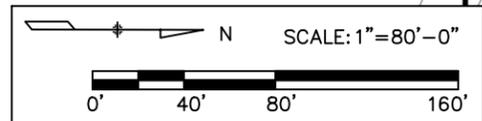
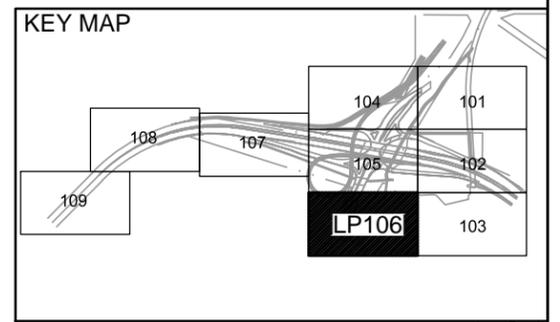
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| Horiz. Scale: As Noted Vert. Scale: As Noted   |  |                        |          |                                       | Region 2 DW  |                  | Revised:      |                     | Detailer: JDA/AM  |                  | 19039              |
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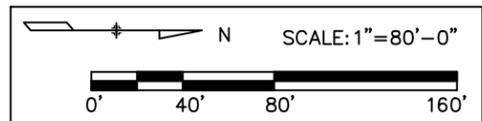
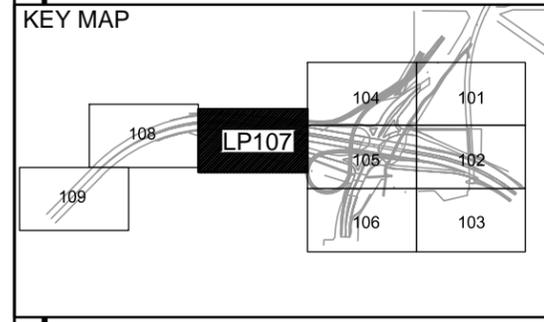
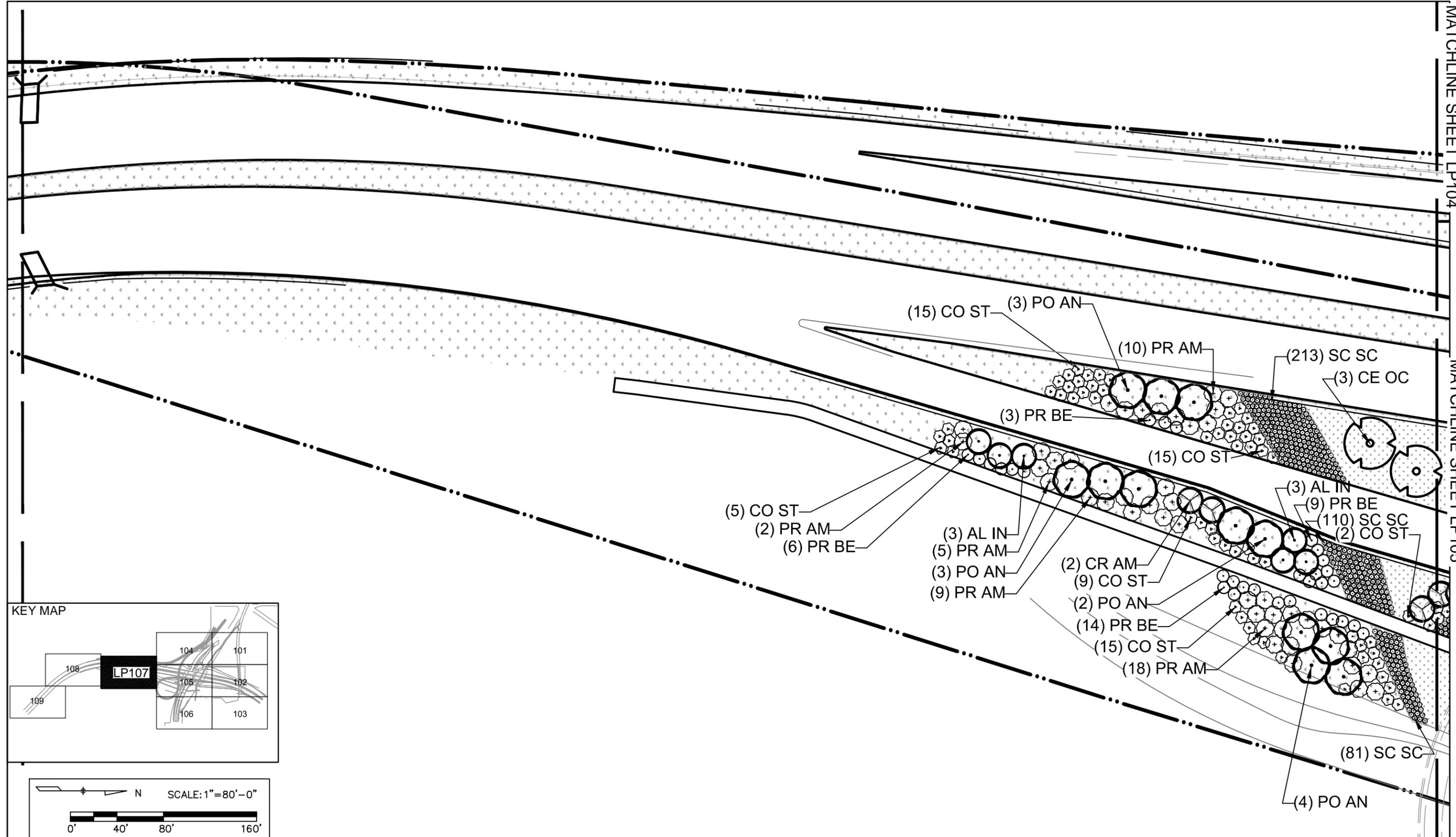
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 Detailer: JDA/AM  
 Structure Numbers  
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Region 2 DW

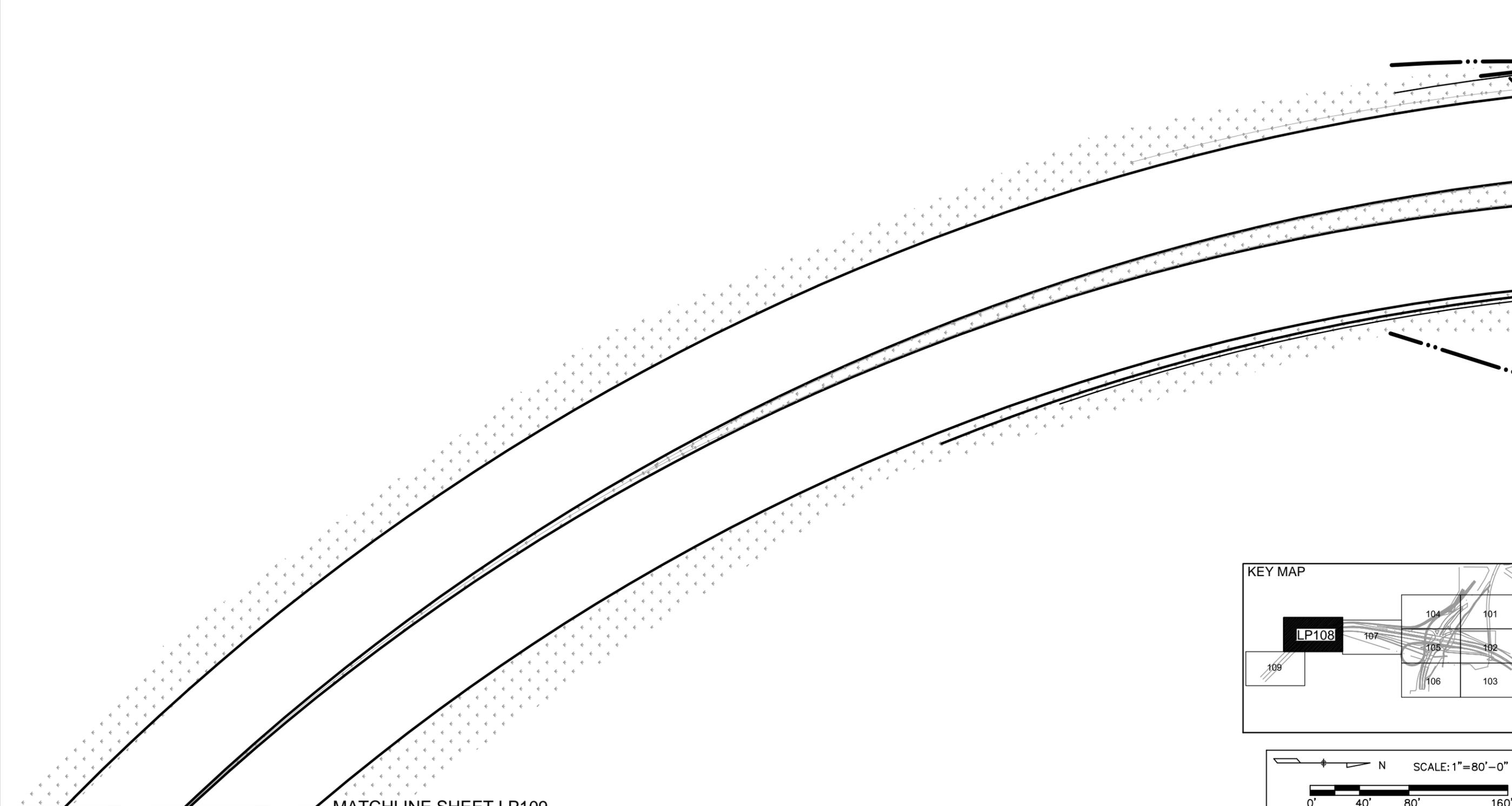
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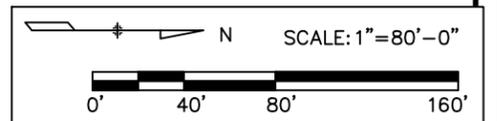
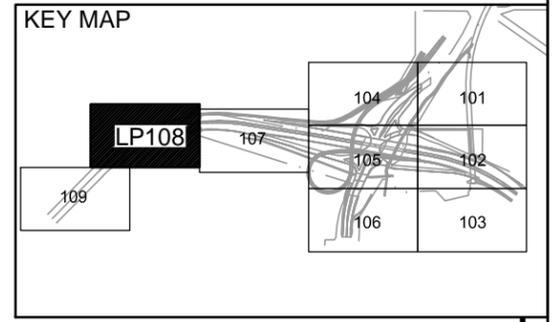
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MATCHLINE SHEET LP107

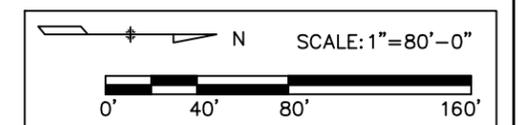
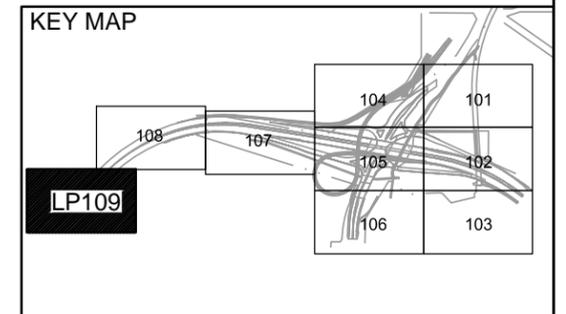
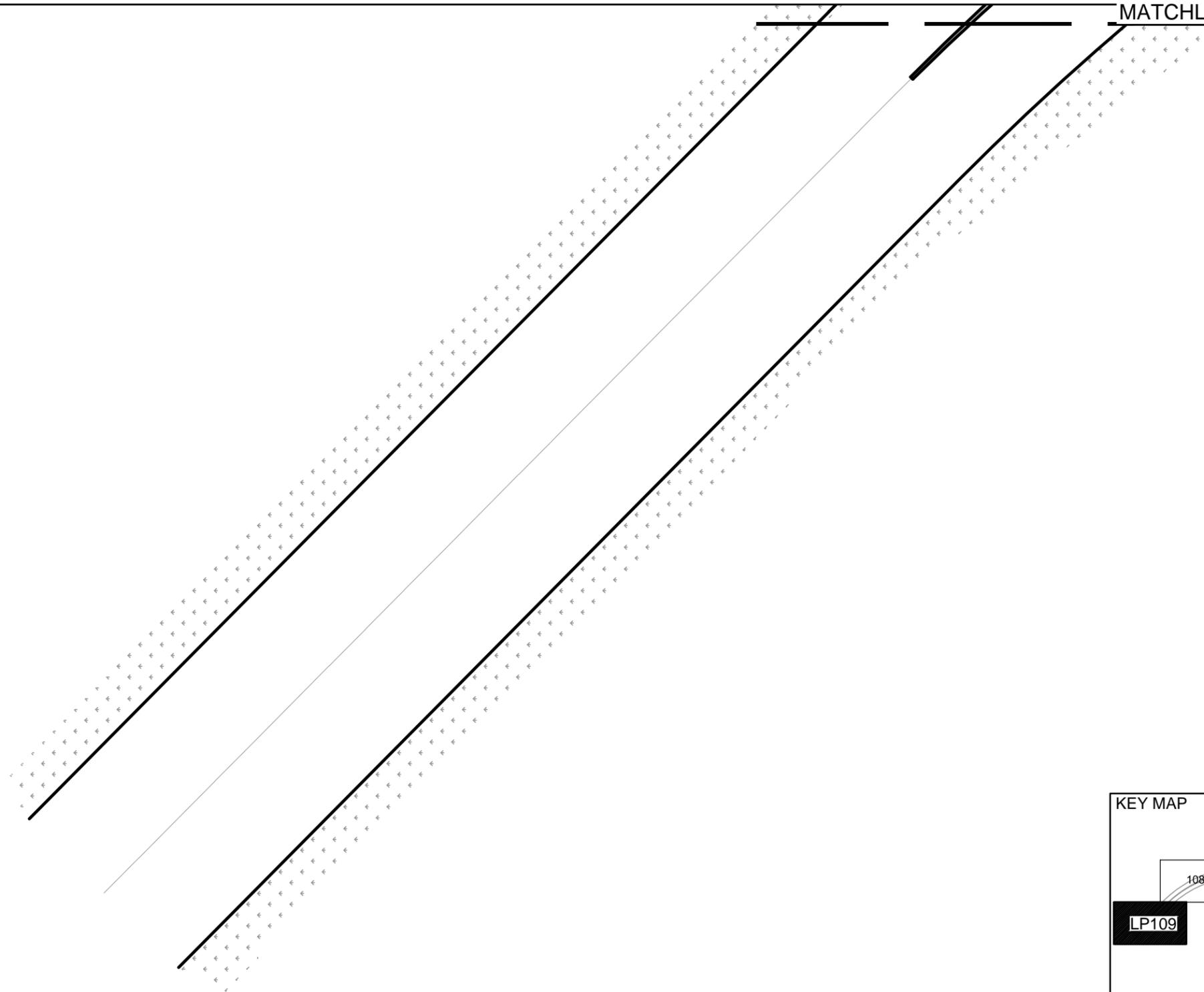


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|  associates inc.<br><small>2953 South Peoria Street, Ste 101<br/>Aurora, Colorado 80014<br/>303-770-7201 FAX 770-7132</small> |  |                 |          |       |  |  |                  |  | Subset Sheets:      |  |                    |  |

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## FOUNTAIN CREEK RESTORATION/RECONSTRUCTION NOTES:

- THESE NOTES AND DETAILS SHALL BE USED FOR THE STRETCH OF FOUNTAIN CREEK FROM THE CIMARRON BRIDGE OVER FOUNTAIN CREEK (TO THE WEST OF I25) TO THE CONFLUENCE WITH MONUMENT CREEK. THE AREA IS DEPICTED ON THE PLANTING PLANS (ATTACHED).

### PATH OF THE LOW FLOW CHANNEL:

- THE LOW FLOW CHANNEL SHALL BE A CONSTANT 15'-0" WIDE.
- THE LOW FLOW CHANNEL SHALL UNDULATE WITHIN THE 80'-0" WIDE TRAPEZOIDAL CHANNEL TO MIMIC A NATURALLY OCCURRING ALLUVIAL STREAM BED. THE UNDULATIONS AND PATH OF THE LOW FLOW CHANNEL SHALL ADHERE TO THE FOLLOWING CRITERIA:
  - CURVE FREQUENCY: THERE SHALL BE 3 FULL CURVES WITHIN EVERY 600-700 LINEAL FEET.
  - EACH CURVE SHALL HAVE A RADIUS THAT CAN RANGE FROM 250-350'.
  - EACH CURVE SHALL HAVE A CHORD LENGTH THAT CAN RANGE FROM 200-350'.
  - ALL CURVES MUST CONNECT TANGENTIALLY TO CREATE A SMOOTH FLOWING CHANNEL.
  - CURVES CANNOT BE COMPRISED OF A SERIES OF STRAIGHT TANGENT LINES.
  - THE EDGE OF THE LOW FLOW CHANNEL MUST REMAIN A MINIMUM OF 10'-0" FROM THE TOE OF THE TRAPEZOIDAL CHANNEL.
  - THE GEOMETRY OF THE CURVES SHALL VARY TO AVOID REPITITION.

### LOW FLOW CHANNEL EDGE TREATMENTS:

- THE EDGE OF THE LOW FLOW CHANNEL SHALL RECEIVE THE FOLLOWING TREATMENTS:
  - BOULDER EDGE: THIS TREATMENT SHALL BE USED ON APPROX. 80% OF THE CHANNEL.
  - WILLOW FACINES: THIS TREATMENT SHALL BE USED ON APPROX. 20% OF THE CHANNEL.
- THE WILLOW FACINES TREATMENT SHALL BE USED PRIMARILY ON THE EDGES OF THE INSIDE OF THE CURVES OF THE CHANNEL.
- WILLOW STANDS/FACINES SHALL NOT CONTINUE FOR MORE THAN  $\frac{2}{3}$  OF THE CHORD LENGTH OF ANY CURVE. WILLOW STANDS/FACINES MAY BE USED IN POCKETS OR LARGER STRETCHES (UP TO  $\frac{2}{3}$  THE CHORD LENGTH OF THE CURVE). THE INTENT IS TO CREATE AREAS OF VEGETATED WILLOW EDGES WHILE STILL ALLOWING PHYSICAL AND VISUAL ACCESS TO THE CREEK.

### VEGETATION:

- ALL AREAS WITHIN THE 80'-0" TRAPEZOIDAL CHANNEL, BUT NOT WITHIN THE 15'-0" LOW FLOW CHANNEL, SHALL BE VEGETATED WITH RIPARIAN SEED AND WETLAND PLANTINGS AS OUTLINED BELOW.
- WHERE POSSIBLE, WETLAND PLANTING BENCHES SHALL BE INSTALLED ON THE INSIDE OF CURVES OF THE LOW FLOW CHANNEL. WETLAND PLANTING BENCHES SHALL BE GRADED TO A SLOPE LESS THAN THAT OF THE LOW FLOW CHANNEL TO ENCOURAGE RIPARIAN PLAN GROWTH.
- THE OUTSIDE EDGES OF WETLAND PLANTING BENCHES SHALL BE PLANTED WITH COYOTE WILLOW (*salix exigua*) STAKES TO FRAME VIEWS OF THE PLANTING BENCH. PUSSY WILLOW (*salix discolor*) MAY BE USED IN AREAS THAT WILL REMAIN SHADIER, SUCH AS AREAS CLOSER TO BRIDGE STRUCTURES.
- POCKETS OF WILLOW STAKES MAY BE USED WITHIN THE MAIN AREA OF THE PLANTING BENCHES, AS LONG AS THEY ARE IN POCKETS AND DO NOT USE MORE THAN 30% OF THE PLANTING BENCH AREA.
- WILLOW STANDS SHALL NOT CONTINUE FOR MORE THAN  $\frac{2}{3}$  OF THE CHORD LENGTH OF ANY CURVE. WILLOW STANDS MAY BE USED IN POCKETS OR LARGER STRETCHES (UP TO  $\frac{2}{3}$  THE CHORD LENGTH OF THE CURVE). THE INTENT IS TO CREATE AREAS OF VEGETATED WILLOW EDGES WHILE STILL ALLOWING PHYSICAL AND VISUAL ACCESS TO THE CREEK.
- FOR AREAS UNDERNEATH THE BRIDGE STRUCTURES, LARGE SANDSTONE BOULDERS SHALL BE USED INSTEAD OF VEGETATION WITHIN THE TRAPEZOIDAL CHANNEL.

### DROP STRUCTURES:

- THE PROJECT SHALL INCLUDE THREE (3) ROCK DROP STRUCTURES.
- EACH DROP STRUCTURE SHALL INCORPORATE APPROX. 9-12" OF VERTICAL DROP.
- TYPICAL DETAILS OF THE DROP STRUCTURES MAY BE FOUND ON THE FOLLOWING SHEETS.

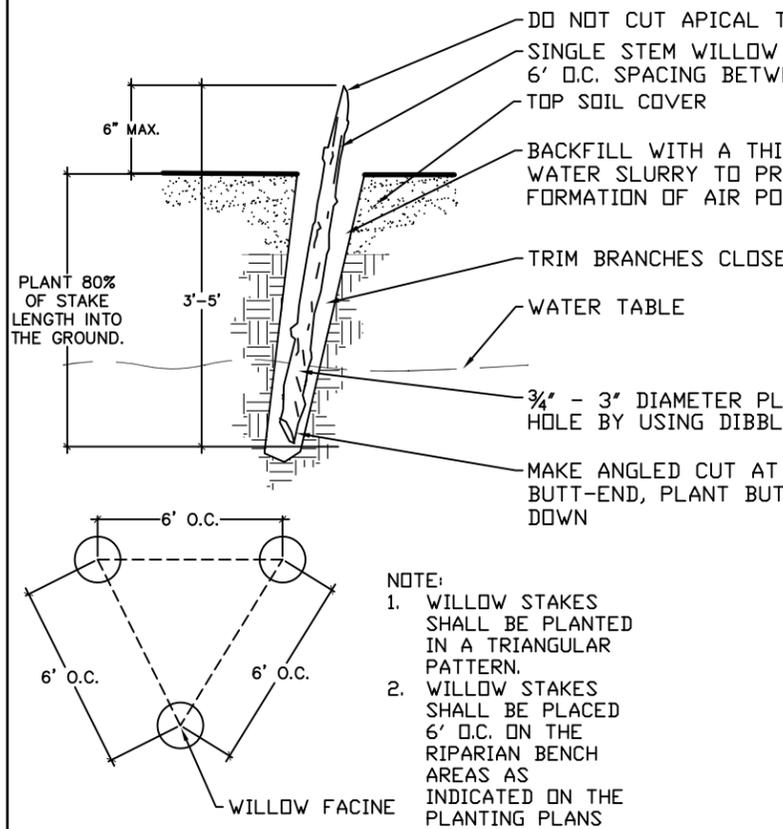
### RIPARIAN SEED

| BOTANICAL NAME*                           | COMMON NAME           | LBS. PLS. PER ACRE |
|---|-----------------------|--------------------|
| Andropogon gerardii                       | Big Bluestem Grass    | 0.90               |
| Becmannia syzigachne                      | American Sloughgrass  | 2.52               |
| Bouteloua curtipendula                    | Sideoats Grama        | 1.8                |
| Calamovilfa longifolia                    | Prairie Sandreed      | 3.6                |
| Elymus lanceolatus lanceolatus 'Critana'  | Thickspike Wheatgrass | 1.8                |
| Elymus lanceolatus Psammophijilus 'Sodar' | Streambank Wheatgrass | 5.4                |
| Glyceria striata                          | Fowl Mannagrass       | 2.57               |
| Juncus arcticus                           | Arctic/Baltic Rush    | 1.8                |
| Nassella viridula 'Lodorm'                | Green Needlegrass     | 0.90               |
| Panicum virgatum                          | Switchgrass           | 2.16               |
| Pascopyron smithii 'Arriba'               | Western Wheatgrass    | 5.4                |
| Poa palustris                             | Fowl Bluegrass        | 3.6                |
| Spartina pectinata                        | Prairie Cordgrass     | 1.8                |
| Sporobolus airoides                       | Alkali Sacaton        | 1.8                |
|   |                       | 36**               |

\*NOMENCLATURE FOLLOWS CITY OF COLORADO SPRINGS DRAINAGE CRITERIA MANUAL  
 \*\*RATES ARE FOR DRILLED; DOUBLE IF HAND-BROADCASTED

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| Horiz. Scale: As Noted    Vert. Scale: As Noted   |  |   |  | Designer: KRS       | Structure Numbers | 19039              |
| Unit Information    Unit Leader Initials  |  |   |  | Detailer: JDA/AM    | Subset Sheets:    | Sheet Number LP201 |
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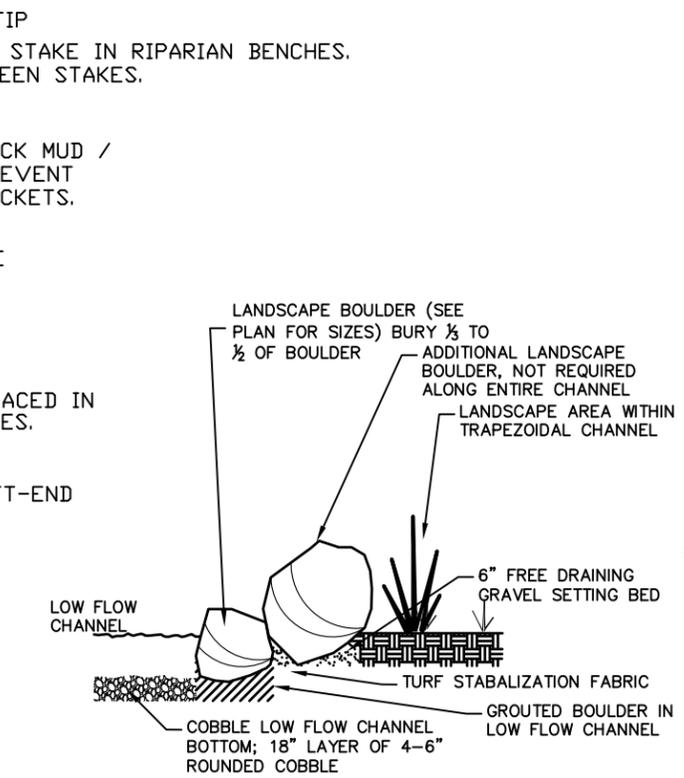


- NOTE:
1. WILLOW STAKES SHALL BE PLANTED IN A TRIANGULAR PATTERN.
  2. WILLOW STAKES SHALL BE PLACED 6' O.C. ON THE RIPARIAN BENCH AREAS AS INDICATED ON THE PLANTING PLANS

WILLOW CUTTING DETAIL

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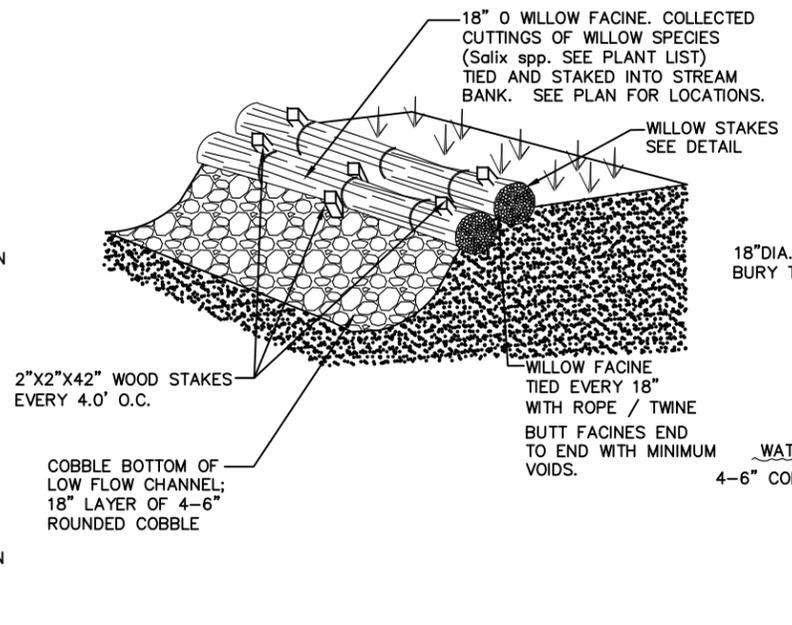
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CREEK CHANNEL EDGE-BOULDERS

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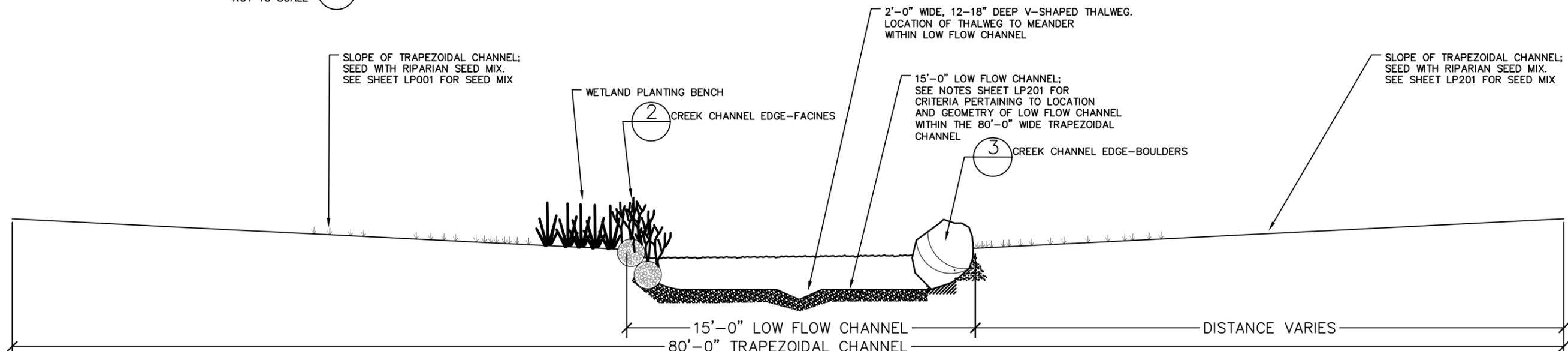
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CREEK CHANNEL EDGE-FACINES

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CREEK CHANNEL EDGE-FACINES

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4

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CHAPTER 10  
PLANTING

Designer: KRS

Detailer: JDA/AM

Structure Numbers

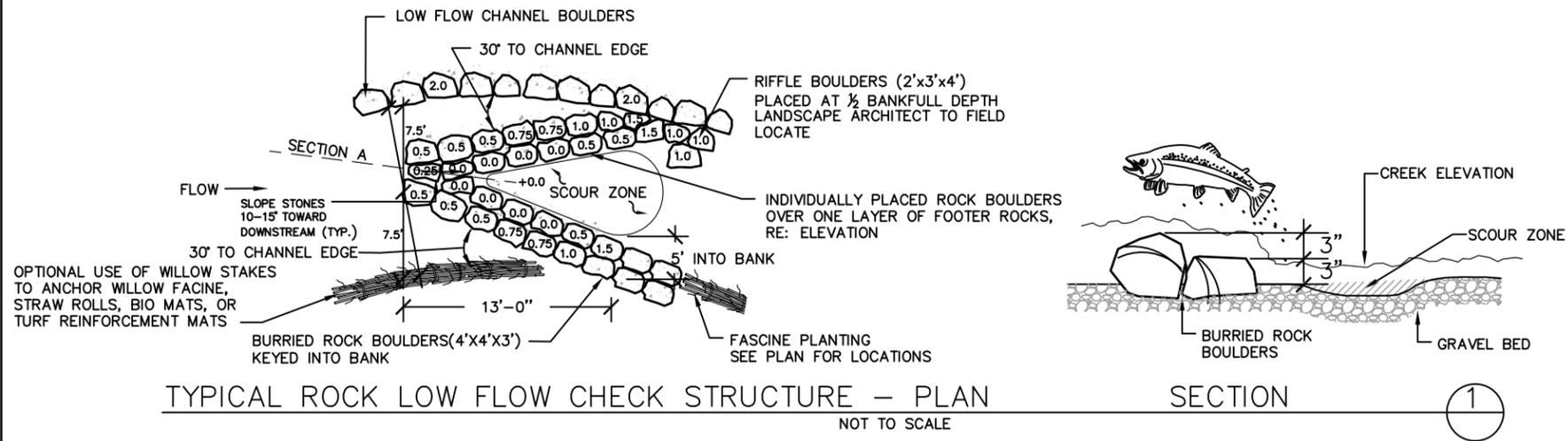
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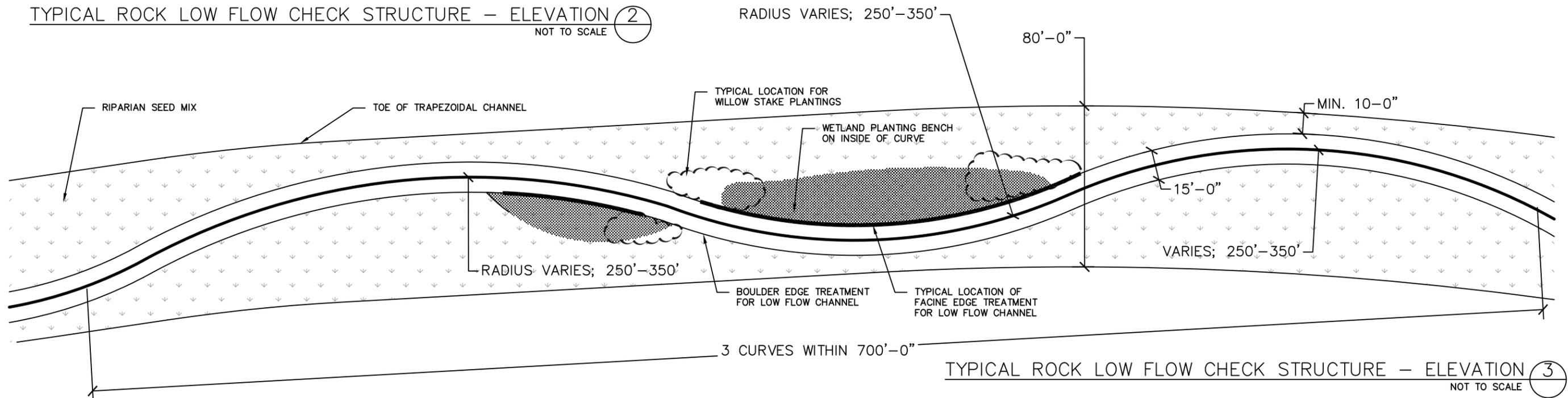
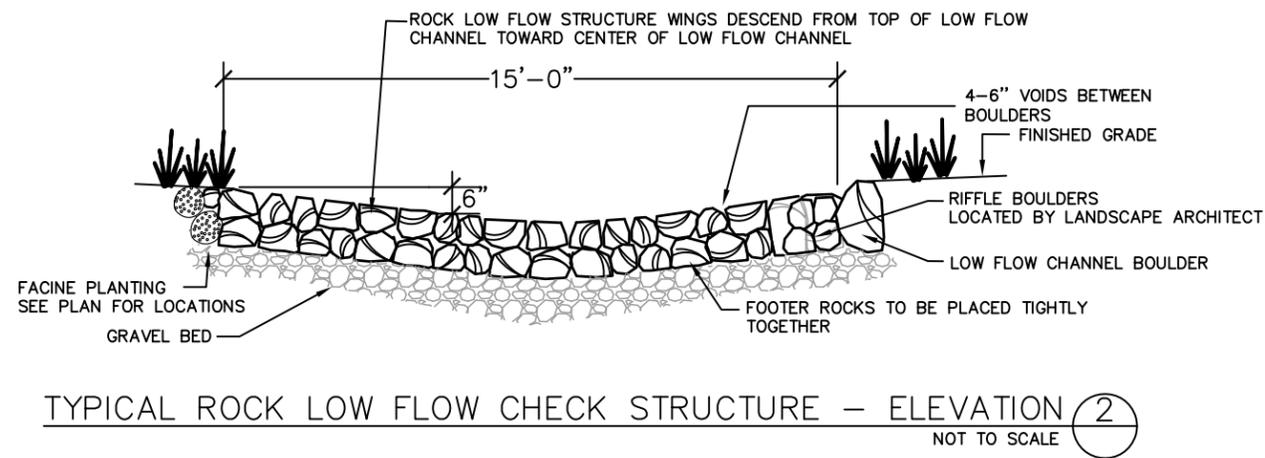
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ROCK LOW FLOW CHECK STRUCTURE – INSTALLED



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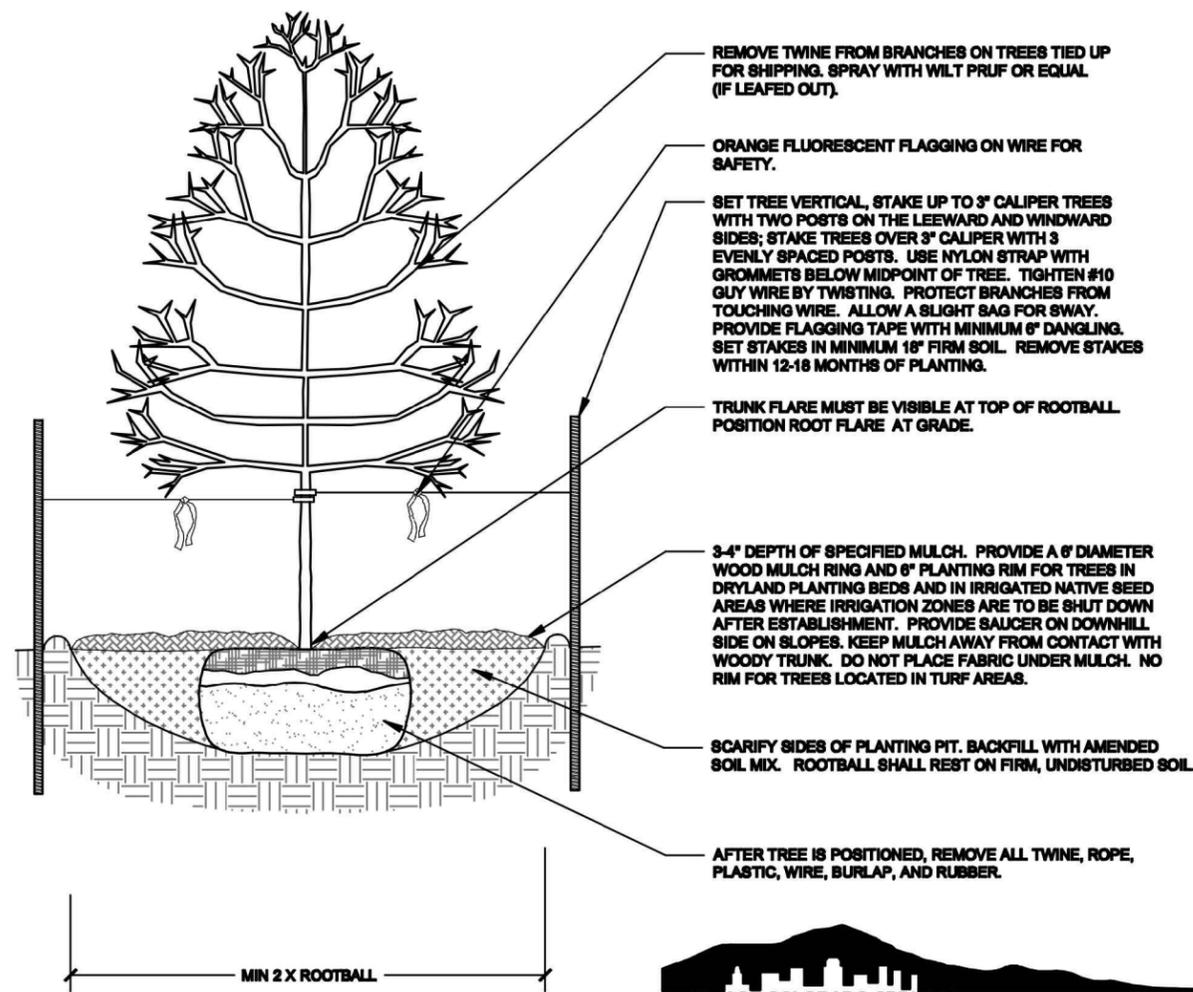
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| 19039              |
| Sheet Number LP203 |

**NOTES:**

1. MARK THE NORTH SIDE OF TREE IN THE NURSERY, AND ROTATE TREE TO FACE NORTH AT THE SITE WHENEVER POSSIBLE.
2. AT TIME OF PLANTING, DO NOT REMOVE OR CUT LEADER AND PRUNE ONLY DEAD OR BROKEN BRANCHES, CROSS OVER BRANCHES, AND WEAK OR NARROW CROTCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
3. STRUCTURAL PRUNING SHOULD NOT BEGIN UNTIL AFTER ESTABLISHMENT PERIOD, USUALLY TWO GROWING SEASONS.
4. KEEP PLANTS MOIST AND SHADED UNTIL PLANTING.
5. DO NOT FERTILIZE FOR AT LEAST ONE GROWING SEASON.
6. AMENDED BACKFILL SHALL BE 1/3 COMPOST (PREFERABLY CLASSIFIED) AND 2/3 NATIVE AND/OR IMPORTED TOPSOIL.
7. WRAP TRUNK ON EXPOSED SITES AND SPECIES WITH THIN BARK. USE ELECTRICAL OR DUCT TAPE, NOT TWINE.
8. COORDINATE WITH CITY FORESTRY FOR CURRENT INSECT AND DISEASE RECOMMENDATIONS PRIOR TO PLANTING.
9. DEEP WATER ALL PLANTS AT TIME OF PLANTING.



Rev: 11.13.08

Disclaimer: These planting details are for City review and approval process only and shall not be used for construction or bidding purposes.

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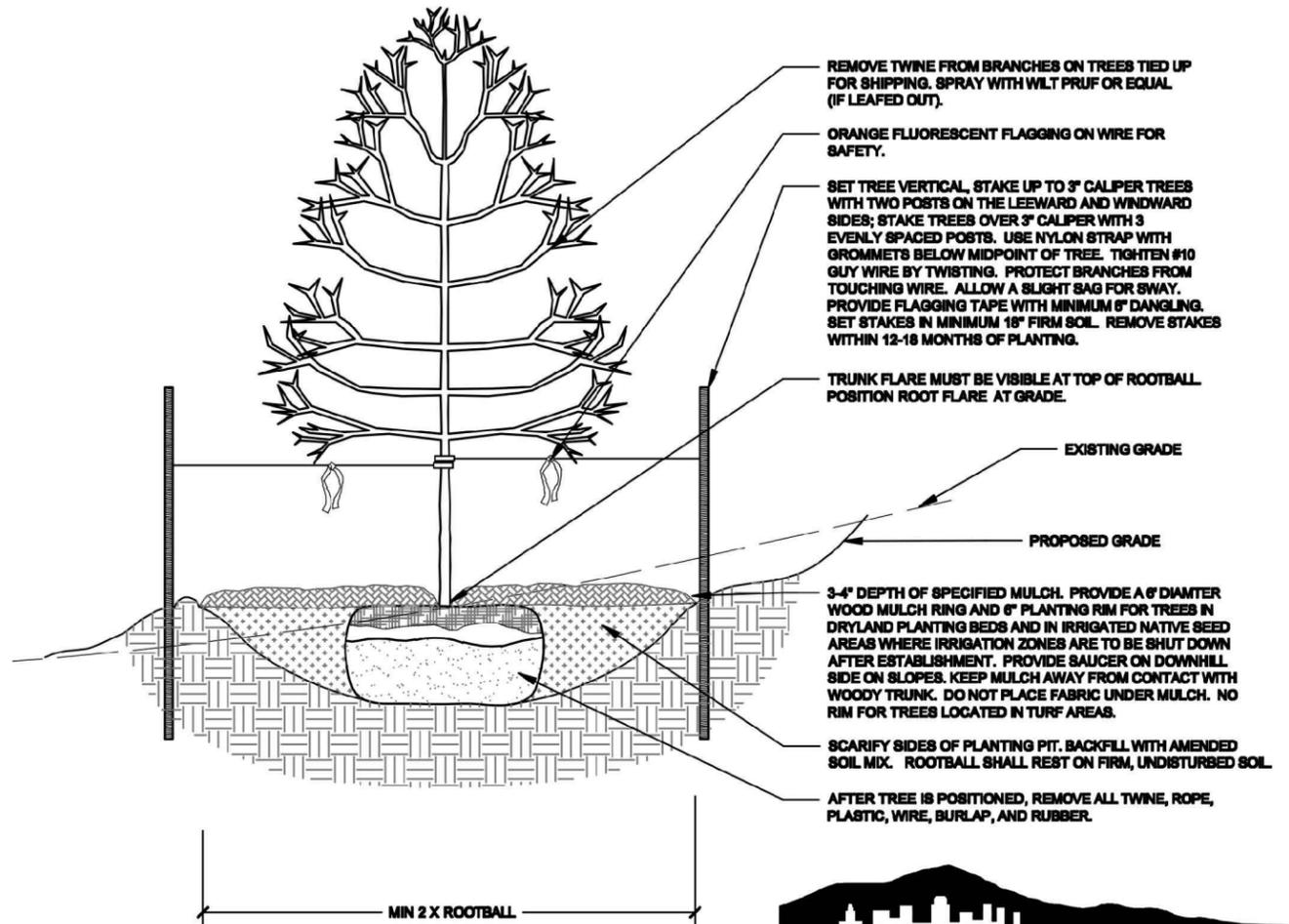
**DECIDUOUS TREE PLANTING DETAIL**

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SECTION

**NOTES:**

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2. AT TIME OF PLANTING, DO NOT REMOVE OR CUT LEADER AND PRUNE ONLY DEAD OR BROKEN BRANCHES, CROSS OVER BRANCHES, AND WEAK OR NARROW CROTCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
3. STRUCTURAL PRUNING SHOULD NOT BEGIN UNTIL AFTER ESTABLISHMENT PERIOD, USUALLY TWO GROWING SEASONS.
4. KEEP PLANTS MOIST AND SHADED UNTIL PLANTING.
5. DO NOT FERTILIZE FOR AT LEAST ONE GROWING SEASON.
6. AMENDED BACKFILL SHALL BE 1/3 COMPOST (PREFERABLY CLASSIFIED) AND 2/3 NATIVE AND/OR IMPORTED TOPSOIL.
7. WRAP TRUNK ON EXPOSED SITES AND SPECIES WITH THIN BARK. USE ELECTRICAL OR DUCT TAPE, NOT TWINE. OCTOBER 31 AND REMOVE MARCH 31 FOR THE PIKES PEAK REGION.
8. COORDINATE WITH CITY FORESTRY FOR CURRENT INSECT AND DISEASE RECOMMENDATIONS PRIOR TO PLANTING.
9. DEEP WATER ALL PLANTS AT TIME OF PLANTING.



Rev: 11.13.08

Disclaimer: These planting details are for City review and approval process only and shall not be used for construction or bidding purposes.

2

**DECIDUOUS TREE PLANTING ON SLOPES DETAIL**

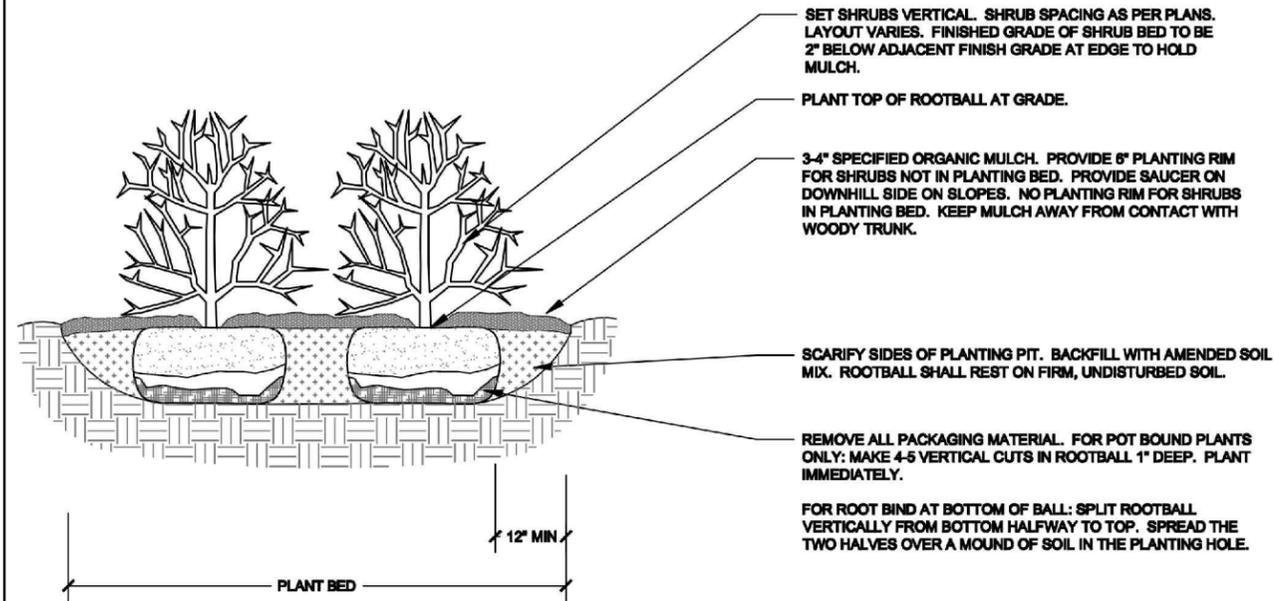
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SECTION

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| Print Date: 05-22-2014   | Sheet Revisions |           |       | Colorado Department of Transportation   | DESIGN BUILD RFP | CHAPTER 10 PLANTING |  | Project No./Code   |
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| Horiz. Scale: As Noted Vert. Scale: As Noted   |                 |           |       |   | Revised:         | Detailer: JDA/AM    |  | 19039              |
| Unit Information Unit Leader Initials  |                 |           |       |   | Void:            | Structure Numbers   |  | Sheet Number LP204 |
| associates inc. 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |                 |           |       |   |                  | Subset Sheets:      |  |                    |

**NOTES:**

1. PRUNE ONLY DEAD OR BROKEN BRANCHES AND WEAK OR NARROW CROTCHES.
2. KEEP PLANTS MOIST AND SHADED UNTIL PLANTING.
3. DO NOT FERTILIZE FOR AT LEAST ONE GROWING SEASON.
4. AMENDED BACKFILL SHALL BE 1/3 COMPOST (PREFERABLY CLASSIFIED) AND 2/3 NATIVE AND/OR IMPORTED TOPSOIL.
5. ALL SHRUBS IN ROCK AREAS TO RECEIVE SHREDDED MULCH RINGS.
6. DEEP WATER ALL PLANTS AT TIME OF PLANTING.

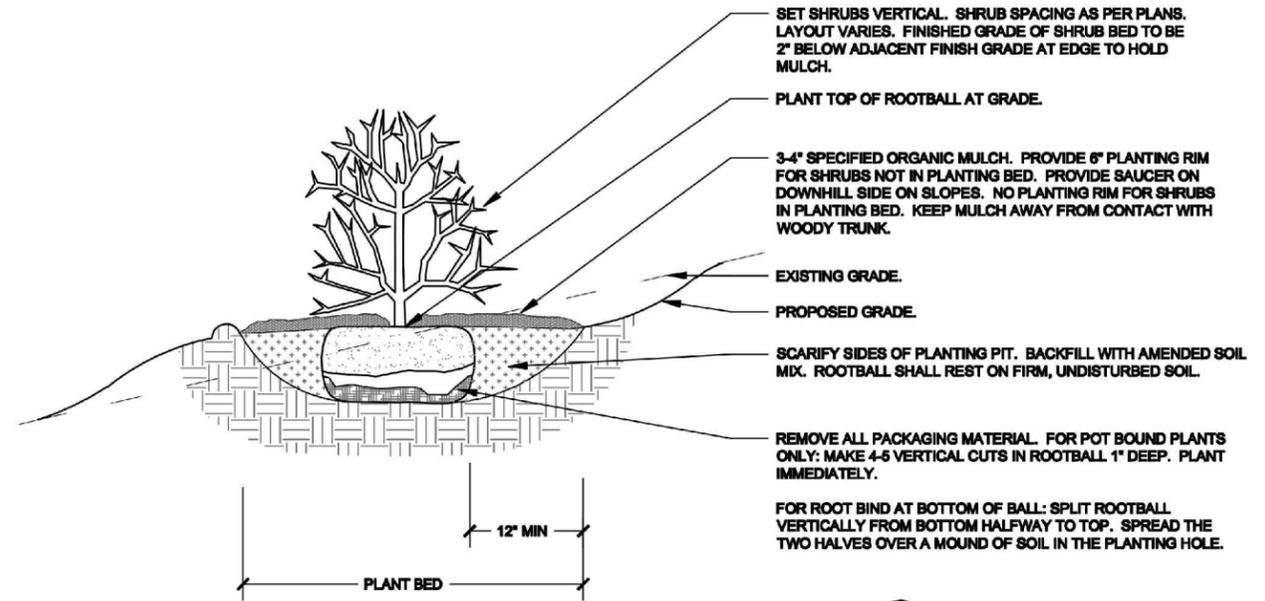


Rev: 11.13.08

1 **SHRUB PLANTING DETAIL**  
NOT TO SCALE SECTION

**NOTES:**

1. PRUNE ONLY DEAD OR BROKEN BRANCHES AND WEAK OR NARROW CROTCHES.
2. KEEP PLANTS MOIST AND SHADED UNTIL PLANTING.
3. DO NOT FERTILIZE FOR AT LEAST ONE GROWING SEASON.
4. AMENDED BACKFILL SHALL BE 1/3 COMPOST (PREFERABLY CLASSIFIED) AND 2/3 NATIVE AND/OR IMPORTED TOPSOIL.
5. ALL SHRUBS IN ROCK AREAS TO RECEIVE SHREDDED MULCH RINGS.
6. DEEP WATER ALL PLANTS AT TIME OF PLANTING.

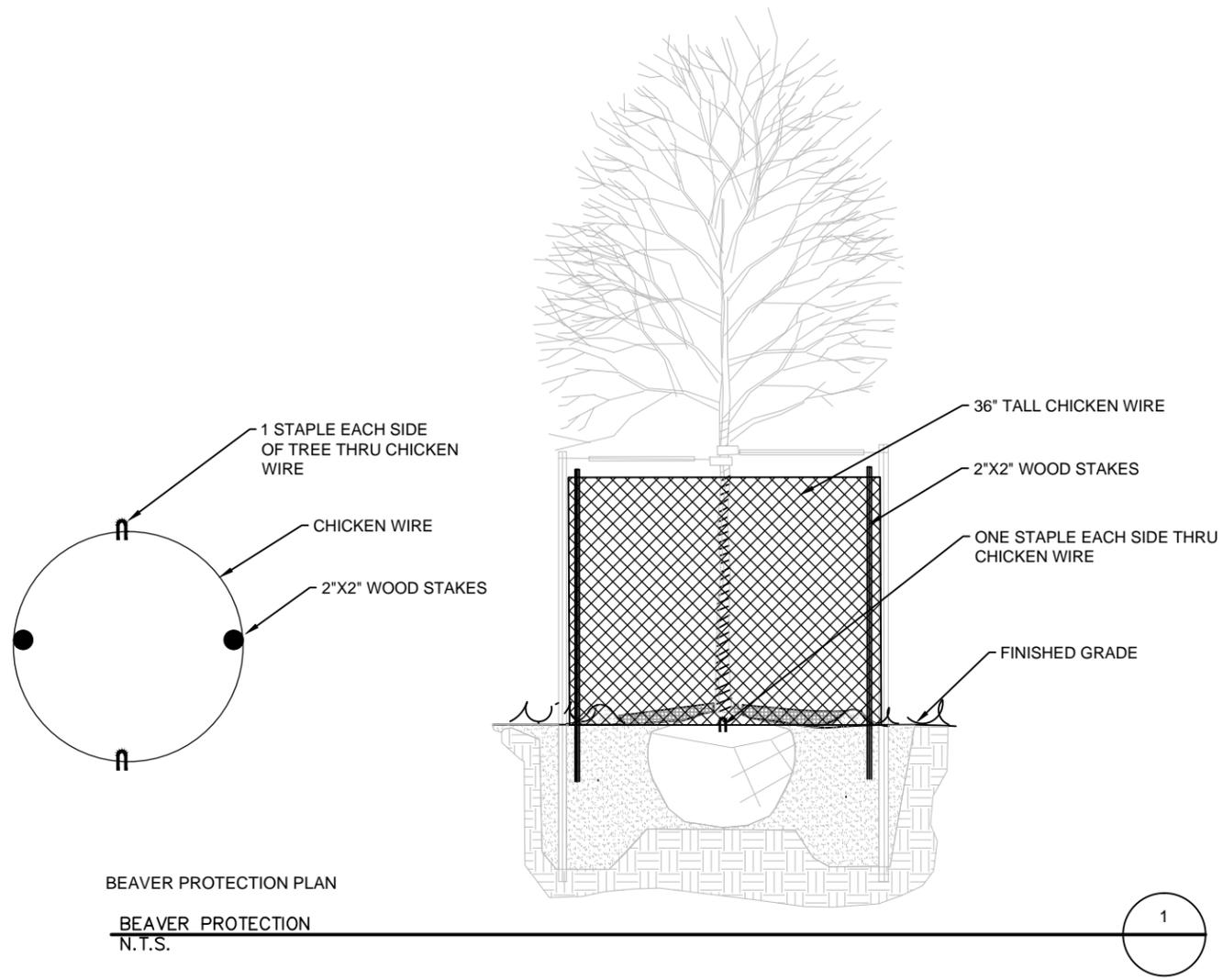


Rev: 11.13.08

2 **SHRUB PLANTING ON SLOPES DETAIL**  
NOT TO SCALE SECTION

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| Print Date: 05-22-2014   |  | Sheet Revisions |           |       | Colorado Department of Transportation<br>1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298<br>Region 2 DW | DESIGN BUILD RFP | CHAPTER 10 PLANTING               |                   | Project No./Code   |
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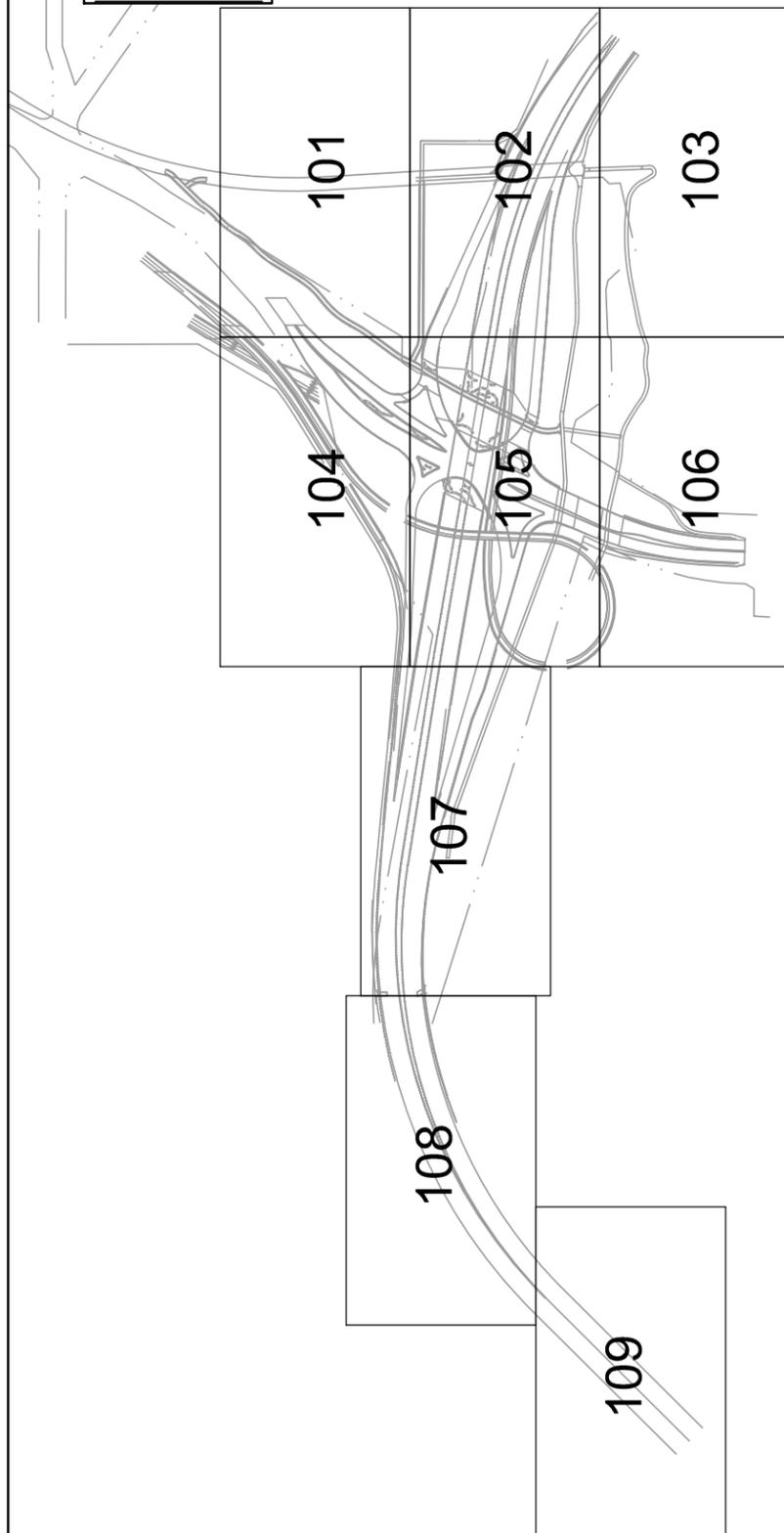
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 BEAVER PROTECTION  
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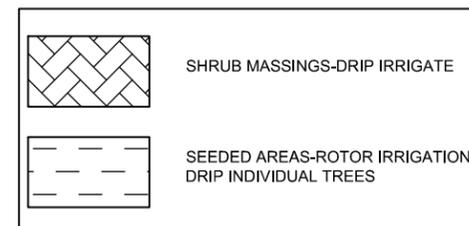
SHEET INDEX



# CHAPTER 11 - IRRIGATION PLANS AND SPECIFICATIONS

**NOTES:**

1. CONTRACTOR SHALL COORDINATE USE OF THE EXISTING WATER TAP AND NEW CONTROLLER CLOCK WITH THE CITY OF CITY OF COLORADO SPRINGS.
2. NON-POTABLE WATER TAP IS LOCATED ON THE EAST SIDE OF INTERSTATE 25, SOUTH OF CIMARRON ST.
3. IRRIGATION SYSTEM SHALL BE NON-POTABLE. ALL IRRIGATION SYSTEM COMPONENTS SHALL BE RATED AND DESIGNED FOR NON-POTABLE USE.
4. CONTRACTOR SHALL COORDINATE THE WORK FOR THE IRRIGATION TAP WITH COLORADO SPRINGS UTILITIES. CONTRACTOR IS RESPONSIBLE FOR ANY SAW CUT AND REMOVAL AND REPLACEMENT OF THE ASPHALT IN ROADWAY.
5. ANY CONNECTION, BACKFLOW, CONTROLLER COSTS FOR THE IRRIGATION SYSTEM SHALL BE INCLUDED IN THE "IRRIGATION SYSTEM" BID ITEM.
6. TAP FEES SHALL BE PAID FOR BY THE CONTRACTOR.
7. IRRIGATION ROTOR HEADS ALONG TRAILS SHALL BE LOCATED AT THE BACK OF WALK ALONG THE TRAIL. CONTRACTOR SHALL INSTALL ROTOR NOZZLES OR HEADS THAT MAXIMIZE THE IRRIGATED AREA WITH OUT OVER SPRAY ONTO THE TRAILS OR EXIT RAMPS.
8. ROTOR HEADS SHALL BE PLACED ALONG TRAIL AND A MINIMUM OF 3' OFF THE EDGE OF ROADWAY TO PROVIDE MAXIMUM COVERAGE OF NATIVE SEED
9. ALL TREES, SHRUBS AND ORNAMENTAL GRASSES SHALL HAVE SEPARATE DRIP IRRIGATION.
10. IRRIGATION SYSTEM SHALL BE NEW FROM THE POINT OF CONNECTION.
11. FOUNTAIN CREEK RIPARIAN AREAS (WITHIN THE 80' TRAPEZOIDAL CHANNEL) SHALL BE IRRIGATED BY ROTORS ALONG THE OUTER EDGE OF THE CHANNEL. ROTOR HEADS SHALL NOT BE PLACED WITHIN THE 80' CHANNEL. IRRIGATION WITHIN THE TRAPEZOIDAL CHANNEL IS NOT EXPECTED TO BE HEAD-TO-HEAD COVERAGE.
12. THE INTENT OF IRRIGATING THE NATIVE SEED AREAS IS TO PROVIDE ADEQUATE IRRIGATION FOR ESTABLISHMENT AND FOR SUPPLEMENTAL USE IN DROUGHT YEARS. IF THE CONTRACTOR CAN PROVIDE CONSIDERABLE COST SAVINGS TO THE PROJECT WHILE STILL PROVIDING ADEQUATE IRRIGATION FOR THESE PURPOSES WITHOUT PROVIDING HEAD-TO-HEAD COVERAGE, THIS MAY BE PROPOSED WITH APPROVAL FROM CDOT AND THE ENGINEER.
13. WHERE HEADS ARE TO BE PLACED AT THE TOE OF SLOPES, HEAD LOCATION SHALL ENSURE FULL 360 DEGREE SPRAY PATTERN BASED UPON TRAJECTORRY OF HEADS USED.



Print Date: 05-22-2014

File Name:  
 Horiz. Scale: As Noted    Vert. Scale: As Noted  
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**Sheet Revisions**

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Colorado Department of Transportation



1480 QUAIL LAKE LOOP, SUITE A  
 COLORADO SPRINGS, CO 80906  
 Phone: 719-634-2323    FAX: 719-227-3298

Region 2

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DESIGN BUILD RFP

No Revisions:  
 Revised:  
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CHAPTER 11  
 IRRIGATION

Designer: KRS    Structure Numbers  
 Detailer: JDA/AM    Subset Sheets:

Project No./Code

IM0252-423  
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# SECTION 02810 IRRIGATION SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section includes piping, valves, sprinklers, specialties, controls, and wiring for automatic-control irrigation system.
- B. Related Sections include the following:
- C. The work shall consist of installing a new underground irrigation system. Included as part of this contract will be provision and installation of all labor, equipment, tools and materials necessary for the construction of the irrigation system per specifications and drawings, including any miscellaneous incidental material required to result in a complete and operable system.
  - 1. Tap fees are the responsibility of this installer.
  - 2. Water development charges and water facility distribution charges are not within the scope of work, and will be paid by the Parks and Recreation Department.
  - 3. Installation of electric pedestal, electric meter and extension of secondary power in order to serve Controller is the responsibility of the Contractor. Owner's Representative will initiate meter service.
- D. Work under this section to include provision of all labor, material, permits, and services needed to complete the underground sprinkler system in accordance with the Drawings, General Notes, and Specifications.
  - 1. Provision and installation of incidental equipment of the wet tap and point of connection as required on the Drawings, including a meter pit per City of Colorado Springs Specifications.
  - 2. Provision and installation of subsurface sleeves as required on the irrigation Drawings.
  - 3. Boring beneath existing pavements, which are not to be cut.
  - 4. Saw cutting existing pavements and pavement restoration.
  - 5. Provision and installation of miscellaneous incidental equipment which may not be indicated on drawings but which are required to result in a complete and operable system.
  - 6. Irrigation lines shown on the drawings are diagrammatic. The Contractor shall establish locations of all sprinkler heads, valves, piping, wiring, etc. at the time of construction. Spacing of the sprinkler heads or quick-coupling valves are shown on the drawings and shall not be altered in any manner without the permission of the Owner's Representative.
  - 7. Preparation and provisions of professionally drafted reproducible Mylar full scale as-built Drawings.

### 1.3 DEFINITIONS

- A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.
- C. Irrigation Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under regulated distribution.
- D. The following are industry abbreviations for plastic materials:
  - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
  - 2. FRP: Fiberglass-reinforced plastic.
  - 3. PA: Polyamide (nylon) plastic.
  - 4. PE: Polyethylene plastic.
  - 5. PP: Polypropylene plastic.
  - 6. PTFE: Polytetrafluoroethylene plastic.
  - 7. PVC: Polyvinyl chloride plastic.
  - 8. TFE: Tetrafluoroethylene plastic.

### 1.4 PERFORMANCE REQUIREMENTS

- A. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. 100 percent water coverage must be maintained in areas where indicated.
- B. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties, unless otherwise indicated:
  - 1. Irrigation Main Piping: 200 psig
  - 2. Circuit Piping: 200 psig
  - 3. Drain Piping: 200 psig
- C. Field Verification: All sprinkler heads, control valve locations, and pipeline locations are to be flagged prior to commencing excavation.
- D. The services of a professional engineer may be retained at the irrigation contractor's expense to assist in accurate field dimensioning and precise location of sprinkler heads proposed or installation per the Drawings.
- E. Minor relocation of equipment, which facilitates the installation, may be made with Owner's approval. Changes shall be

made and documented on as-built Drawings.

- F. Parallel piping shall not be combined in common trenches.
- G. Sprinkler heads, which are adjacent to curbing and pavement, are to be installed no closer than one inch and not further than four inches away from curbing/pavement to accommodate turf-trimming operations.

### 1.5 SUBMITTALS

- A. Product Data: Include pressure ratings, rated capacities, and settings of selected models for the following:
  - 1. Water regulators.
  - 2. Water hammer arresters.
  - 3. General-duty valves.
  - 4. Specialty valves.
  - 5. Control-valve boxes.
  - 6. Sprinklers.
  - 7. Irrigation specialties.
  - 8. Controllers. Include wiring diagrams.
  - 9. Control cables. Include splice kits and conduit.
- B. Shop Drawings: Shop Drawings which clearly indicate changes proposed by the installer to pipe routing, sprinkler head placement, valve placement, zone sequencing, etc., which improve operation and serviceability of the system may be provided. The Owner's Representative must approve any deviations in layout prior to construction.
- C. Other submittals shall be made in accordance with the contract documents and Requirements at Substantial Completion under this Section.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For irrigation systems, to include in operation and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures Operation and Maintenance Data," include data for the following:
  - 1. Automatic-control valves.
  - 2. Sprinklers.
  - 3. Controllers.

### 1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with the following codes, ordinances, regulations, and standards in effect at time of installation:
  - 1. American Society for Testing and Materials (ASTM).
  - 2. National Plumbing Code (NPC).
  - 3. Federal Specifications (FS).
  - 4. Plastic Pipe Institute (PPI).
  - 5. National Electric Code (NEC).
  - 6. National Sanitation Code (NEC).
  - 7. All State and Local codes for cross connection of potable water systems.
  - 8. All cut-sheets, catalogs, and published data of the manufacturers whose equipment is scheduled for use under this contract.
- C. Failure to be familiar with any requirement shall not preclude installer's responsibility to abide by them.
- D. In the event of a conflict between requirements, the most stringent requirement will prevail in any case.
- E. Qualified personnel who have successfully completed comparable projects previously, and who are knowledgeable and familiar with irrigation system hydraulics shall perform all work under this Section.
- F. On-site personnel shall be capable of determining feasibility of proposed installations (with regard to hydraulics). Failure to be familiar with hydraulic feasibility will not preclude installer's responsibility of accidental or deliberate installation of incompatible equipment, pipe sizes, etc., which do not permit operation of system as intended by design.
- G. The installer shall field verify static pressure at the point of connection and determine its suitability prior to commencing any work downstream of the backflow preventer.
- H. Failure to test and verify adequate static pressure prior to constructing the sprinkler system shall not relieve the installer to provide the adequate operating pressure to provide coverage as intended by design.
- I. It is the installer's responsibility to report inadequate static pressure to the Owner's Representative and to correct the problem prior to commencing work downstream of the point of connection.
- J. All material for use under this Section to be new and previously unused.
- K. The installer shall be responsible for measuring and verifying accuracy of field dimensions versus drawing dimensions. All discrepancies shall be reported to the Owner's Representative and resolved prior to commencing work.
- L. Conflicts and/or discrepancies, which are not fully resolved by the installer prior to commencing work under this Section, shall be resolved in favor of the Owner after commencement of work.

### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

- B. Store plastic piping protected from direct sunlight. Support the pipe to prevent sagging and bNo PVC piping shall be stored on job site for longer than 90 days.

### 1.8 PROJECT CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
- B. Notify Owner's Representative no fewer than two days in advance of proposed interruption of water service. Do not proceed with interruption of water service without Owner's Representative written permission.
- C. The installer shall be completely familiar with all job site conditions, which may affect the work prior to commencing any work under this Section.
- D. No work shall commence until unsatisfactory job site conditions have been brought to the Owner's Representative's attention or otherwise totally resolved.
- E. Should the installer fail to resolve job site conditions, which may negatively affect the work under this Section, he shall assume responsibility for subsequent additional work and costs to resolve unsatisfactory job site conditions.
- F. Prior to commencing any work under this Section, it will be this installer's responsibility for scheduling and coordinating the locations of all existing utilities on the job site which may affect the work.
- G. All known existing utilities shall be clearly indicated on field drawings, and shall be flagged or otherwise marked on the job site.
- H. Failure to locate existing utilities and provide adequate protection to them during the work shall not preclude responsibility for subsequent damage.
- I. Costs for repair to existing utilities because of failure to properly locate and protect utilities shall be this installer's responsibility. "Utility" shall include but may not be limited to gas, electric, sewer and water, telephone, cablevision lines and sprinkler lines.

### 1.9 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements as specified in Section 02751 Cement Concrete Pavement.

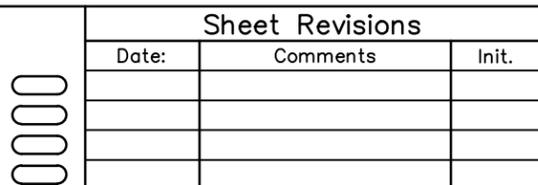
### 1.10 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. A minimum of (6), irrigation heads or 2% of amount installed.
  - 1. Spare sprinkler head bodies and nozzles of each type installed.
  - 2. Two spare valve keys for drain valves installed.
  - 3. Two spare quick coupling valve keys suitable for use with valves installed.
  - 4. Two spare swivel hose bibs suitable for use with quick coupling valves installed.
  - 5. Two spare locking valve cap keys.
- B. All spare equipment to be new and unused.
- C. All Spare equipment to be provided in a new, sealed cardboard plan tube clearly labeled with the job name and "Spare Irrigation Equipment". Valve keys may be securely taped to the outside of box.
- D. Mylar as-built drawing to be provided in a new sealed cardboard plan tube clearly labeled with the job name "Irrigation System As-Built".
- E. Provision of required spare equipment and closet material in format specified above is to occur at inspection for Substantial Completion.
- F. Failure to provide spare equipment and closet material in the format and at the time required will result in delay of Final Acceptance of all work provided and installed under this Section.
  - 1. Sprinkler Units: Equal to A minimum of (6), or 2% of amount installed for each type and size indicated, which ever is greater.
  - 2. Emitter Units: Equal to A minimum of (6), or 2% of amount installed for each type and size indicated, which ever is greater.
  - 3. Drip Tube Units: Equal to A minimum of (6), or 2% of amount installed for each type and size indicated, which ever is greater.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

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| Unit Information Unit Leader Initials   |  |  |          |       |   | Void:            | Detailer: JDA/AM         | Subset Sheets:    | Sheet Number LI002 |
|  associates inc. |  | 2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |          |       |   |                  |                          |                   |                    |

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## SECTION 02810 IRRIGATION SYSTEMS

### 2.2 PIPES, TUBES, AND FITTINGS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.
- B. Steel Pipe: ASTM A 53/A 53M, Schedule 40, Type S or E, Grade A or B, galvanized with threaded ends
- Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe with threaded ends.
  - Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface and female threaded ends.
  - Gray-Iron Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
  - Cast-Iron Flanges: ASME B16.1, Class 125.
  - Cast-Iron Flanged Fittings: ASME B16.1, Class 125 galvanized.
- C. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint, bell-and plain-spigot end.
- Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
    - Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- D. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint, bell- and plain-spigot end.
- Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
    - Gaskets: AWWA C111, rubber.
- E. Soft Copper Tube: ASTM B 88, Type K, water tube, annealed temper.
- Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings unless otherwise indicated.
  - Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
  - Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
- F. Hard Copper Tube: STM B 88, Type L.
- Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings unless otherwise indicated.
  - Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
  - Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends
- G. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 40.
- PVC Socket Fittings, Schedule 40: ASTM D 2466.
- H. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 80.
- PVC Socket Fittings: Schedule 80.
  - PVC Threaded Fittings: ASTM D2464.
- I. PVC, Pressure-Rated Pipe: ASTM D 2241, PVC 1120 compound, SDR 21.
- PVC Socket Fittings: Schedule 40
- J. PE, Controlled OD Pipe: ASTM F 771 and ASTM D 3035 PE 3408 compound, DR 9 and DR 11.
- PE Socket Fittings: ASTM D 2683.
  - PE Butt-Fusion Fittings: ASTM D3261
- K. PE, Controlled Pipe: ASTM F 771 and ASTM D 3035, PE 3408 compound, DR 9 and DR 11.
- Insert Fittings for PE Pipe: ASTM D 2609, PA or PP. Include bands or other fasteners.
- L. Transition Fittings: Basic Materials and Methods for transition fittings.
- M. Dielectric Fittings: Basic Materials and Methods for dielectric fittings.
- N. Furnish all equipment to complete the sprinkler system per the Drawings and Specification
- O. Acceptable manufacturers, including alternates, as per the Drawings.
- P. Piping:
- All PVC piping for all mainlines and lateral lines shall be of the size and classification stated on Drawings.
    - All piping shall be new and NSF approved.
  - All mainline PVC pipefittings shall be NSF approved Schedule 40. Unless otherwise indicated on the drawings.
    - BOE PVC Class 200 mainline pipe shall meet ASTM requirements 3" and larger mainline pipe to be ring-tite gasketed pipe.
    - BOE PVC Class 200 lateral pipelines shall meet ASTM requirements.
    - Solvent weld for PVC pipe shall meet ASTM requirements. Cement to be fast set or very fast set.
    - Teflon based pipe sealant shall be used on all threaded joints.
    - Pipe shall be homogeneous throughout, free from imperfections, cracks, or holes.
    - Pipe must be continuously and permanently marked with manufacturer's name or trademark, kind and size (IPS) of pipe, material, and manufacturer's lot number, schedule of type and NSF seal of approval.
  - Unless otherwise indicated on the Drawings, all sprinkler heads shall be installed on polyethylene swing riser pipe with spiral barb elbows or swing joints as required per the Drawings.
  - Copper pipe and fittings to be wrought and fastened with silver solder.
- Q. PVC sleeves to be Class 200 BOE of the size and length indicated on the Drawings. Low voltage wiring shall be run in separate sleeve from mainline or lateral sleeve. All hard surfaces, that have sleeves under them, shall be stamped with an "S" into the surface on each end of where the sleeve protrudes.
- Cast iron sleeves as called for shall be Class 125 of the size and length indicated on the Drawings.

### 2.3 CORROSION-PROTECTION ENCASEMENT FOR PIPING

- A. Encasement for Underground Metal Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch minimum thickness, tube or sheet.

### 2.4 GENERAL-DUTY VALVES

- A. AWWA, Cast-Iron Gate Valves: AWWA C509, resilient-seated nonrising-stem, gray- or ductile-iron body and bonnet gate valve; with bronze and stem nut.
- Minimum Working Pressure: 200 psig.
  - End Connections: Mechanical joint.
  - Interior Coating: Complying with AWWA C550.
- B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length

required for depth of burial of valve, plug with lettering "WATER," Bottom section with Base of size to fit over valve, and approximately 5-inch-diameter barrel.

- Operating Wrenches: Furnish total of one steel, tee-handle operating wrench with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
- C. MSS, Cast-Iron, Nonrising Stem Gate Valves: MSS SP-70, Type I, Class 125, with solid wedge and flanged ends. Include all bronze trim, cast-iron body, and hand wheel.
- D. Curb Valves: AWWA C800. As indicated on drawings.
- E. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," bottom section with base of size to fit over curb valve.
- Shutoff Rods: Furnish total of one steel, tee-handle shutoff rod(s) with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.
- F. Copper-Alloy Ball Valves: As indicated on drawings.
- G. Bronze Gates Valves: As indicated on drawings.
- H. Bronze Globe Valves: As indicated on drawings.
- I. PVC Ball Valves: As indicated on drawings.
- Material Option: MSS SP-122, of plastic other than PVC and suitable for potable water. Include threaded ends and pressure rating not less than 150 psig, unless otherwise indicated.

### 2.5 SPECIALTY VALVES

- A. Electric control valves shall be of the type, size and manufacturer indicated on the Drawings.
- B. Unless otherwise indicated on the Drawings, all control valves shall be installed in a globe configuration.
- C. Automatic Drain Valves: As indicated on drawings.
- D. Quick-Couplers: Factory-fabricated, bronze or brass, one-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASE B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key or as indicated on drawings.

### 2.6 PIPING SPECIALTIES

- A. Water Regulators:
- B. Water Hammer Arresters: As indicated on drawings.
- C. Pressure Gages: As indicated on drawings.

### 2.7 SPRINKLERS

- A. Description: Brass or plastic housing and corrosion-resistant interior parts designed for uniform coverage over entire spray area indicated, at available water pressure.
- Flush, Surface Sprinklers: Fixed pattern, with screw-type flow adjustment.
  - Bubblers: Fixed pattern, with screw-type flow adjustment.
  - Shrubbery Sprinklers: Fixed pattern, with screw-type flow adjustment.
  - Pop-up Spray Sprinklers: Fixed pattern, with screw-type flow adjustment and stainless-steel retraction spring.
  - Pop-up Rotary Sprinklers: Gear drive, full-circle and adjustable part-circle types.
  - Pop-up Rotary, Impact Sprinklers: Impact drive, full-circle and part-circle types.
  - Aboveground, Rotary, Impact Sprinklers: Impact drive full-circle and part-circle types.
- B. Pop up Heads:
- Sprinkler heads shall be of the type, size, and manufacturer indicated on the Drawings.
- Nozzle types and arcs to be provided shall be as indicated on the Drawings to satisfy the coverage requirements intended by the design.
  - Sprinkler nozzles installed on any single zone shall have matched rates of precipitation.
- C. Gear Driven Heads:
- All irrigation heads shall be of type, size and manufacturer as designated on drawings. All sprinklers to be installed shall be rubber-covered models, or the heads shall be capable of retracting below finished grade.

### 2.8 SPRINKLER SPECIALTIES

- A. Application Pressure Regulators: Brass or plastic housing, NPS 3/4, with corrosion-resistant internal parts, and capable of controlling outlet pressure to approximately 20 psig.
- B. Strainer/Filter Units: Brass or plastic housing, with corrosion-resistant internal parts, of size and capacity required for devices downstream from unit.
- C. Emitters: As indicated on drawings.
- D. Drip Tubes: As indicated on drawings.
- E. Other Equipment:
- Other equipment to be provided and installed, including but not limited to valves, gauges, pressure regulating valves needed to result in a complete and operable sprinkler system shall be provided and installed under this Section.
    - Installation of other equipment shall be as indicated on Drawings, and per manufacturer's recommendations.
- Water meter pits that are used for irrigation systems will use a 30-300 psi. range clay-valve water regulator.
    - Clay-valve 90-016-2" threaded.
    - Clay-valve 90-016-3" 150# flange.
    - Clay-valve 90-016-4" 150# flange.

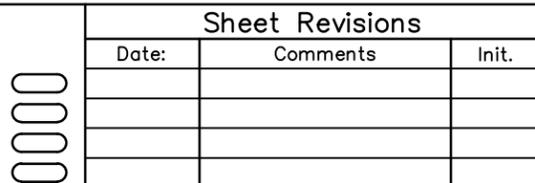
### 2.9 AUTOMATIC-CONTROL SYSTEM

- A. As indicated on drawings.
- B. Exterior Control Enclosures: As indicated on drawings.
- C. Interior Control Enclosures: NEMA 250, Type 12, drip proof, with locking cover and two matching keys.
- D. Wiring: UL 493, Type UF-B multiconductor, with solid-copper conductors and insulated cable; suitable for direct burial.
- Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
  - Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.
- E. Concrete Base: As indicated on drawings.
- F. Automatic controllers shall be of the size, type, and manufacturer indicated in the drawings.
- G. Pedestal or cabinet for the controller shall be of the same manufacturer or as indicated in the drawings.

- H. PVC conduit of adequate size shall be installed under this Section to enclose all control wiring from controller to master control valve and mainline location.
- I. The installer shall provide at least three sets of controller cabinet keys to the Owner's Representative at the time of Final Acceptance
- J. Provide and install type UF 600 volt stranded or solid copper, single conductor wire with PVC insulation and bearing UL approval for direct underground burial.

### 2.10 Backflow Preventer:

- A. Backflow preventer to be the type, size and manufacturer indicated on the Drawings, and shall be reduced pressure type rated for high hazard application.
- Provide and install concrete pad and protective enclosure for backflow preventer or as indicated on Drawings.
- B. The installer shall be responsible for coordinating and providing required point-of-connection, tap, meter pit, etc., as needed to complete all work under this Section.
- Permits, tap fees, and all related fees associated with cross connection needed to complete work under this Section are the installer's responsibility.
  - It is the installer's responsibility to schedule and perform backflow preventer tests that may be required as per local codes. Fees associated with any tests are the installer's responsibility.

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| Print Date: 05-22-2014   |  | Sheet Revisions |          | Colorado Department of Transportation<br> 1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298<br>Region 2 DW | DESIGN BUILD RFP | CHAPTER 11<br>IRRIGATION |                  | Project No./Code  |                    |
| File Name:   |  | Date:           | Comments |  | Init.            | No Revisions:            |                  |                   | IM0252-423         |
| Horiz. Scale: As Noted Vert. Scale: As Noted   |  |                 |          |  |                  | Revised:                 | Designer: KRS    | Structure Numbers | 19039              |
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|  2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |  |                 |          |  |                  |                          |                  |                   |                    |

## SECTION 02810 IRRIGATION SYSTEMS

### PART 3 - EXECUTION

#### 3.1 EARTHWORK

- A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.
- B. Install piping and wiring in sleeves under sidewalks, roadways, parking lots, and railroads as indicated on drawings.
  1. Install piping sleeves by boring or jacking under existing paving if possible.
- C. Provide minimum cover over top of underground piping according to the following:
  1. Irrigation Main Piping: Minimum depth of 24 inches below finished grade.
  2. Lateral Piping: **12 inches**.
  3. Drain Piping: **12 inches**
  4. Sleeves: **24 inches for main line and 12 inches for laterals**
  5. As indicated on drawings.
- D. Clean cuts shall be made on all severed tree roots greater than 2-inch diameter. If excavation is within drip line of a public tree, City Forestry and Owner's Representative shall be contacted whenever a tree root greater than 2" is encountered under drip line, work is not proceed until City Forester has made a recommendation. Trenches located within five feet of existing tree trunks are to be hand dug. Auguring may be required.
- E. This installer shall provide all necessary excavation required for proper installation of work under this Section.
- F. Mechanical trenchers used for excavation shall be capable of digging smooth, flat bottom trenches regardless of slope conditions.
- G. Sumps for manual drains and control valves shall be over-excavated to facilitate valve installation as shown on drawings.
- H. Sleeves crossing beneath roadways shall be installed to the depth of not less than twenty-four inches below finish grade from top of pipe.
- I. Concrete curbs above sleeve locations shall be painted or stamped with an "S" to permanently locate sleeve location on existing curbs.
- J. Mainline and lateral pipelines shall not be installed in common sleeves. Control wiring must be installed in a separate sleeve.
- K. Generally, piping under existing concrete or asphalt shall be installed by jacking, boring or hydraulic driving. Where any cutting or break of concrete or asphalt is necessary, it shall be removed and replaced by the Contractor. Permission to cut or break paved areas shall be obtained from the Owner's Representative.
- L. Trenches for irrigation lines shall be excavated of sufficient depth and width to permit proper handling and installation of the pipe and fittings, or the piping may be installed by trenchless technique, if approved by the Owner. The backfill shall be thoroughly compacted, and evened off with the adjacent soil level. Approved fill dirt or sand shall be used if soil condition is determined rocky by Owner's Representative. In rocky areas, the trenching depth shall be two inches (2") below normal trench depth to allow for this bedding. The fill dirt or sand shall be used in filling four inches (4") above the pipe. The remainder of the backfills shall contain no lumps or rocks larger than three inches (3"). The top six inches (6") of backfill shall be free of rocks larger than one (1"), and free from subsoil or trash. All trenches that are opened during any particular working day shall be backfilled the same day.
- M. In the event the installer is required to re-route pipe, relocate sprinkler heads, or deviate in any way from the Drawing as a result of encountering consolidated rock or debris, and additional material/labor is required to complete installation, the Owner Representative may issue a change order for additional material and labor costs.
- N. Consolidated material shall be defined as any obstruction occurring in an area normally scheduled to be excavated which runs ten feet or longer in any trench, or is greater than twenty-five square feet in area, both at depths less than thirty inches for irrigation pipelines.
- O. The installer shall provide a unit cost per linear foot for excavation through consolidated material in his bid to be used in determining change order value.
- P. Additional costs for excavating previously known consolidated material shall be the installer's responsibility.
- Q. Provide clean backfill soil free of colds and rocks greater than one inch in size, and debris that could puncture and damage pipelines and equipment installed under this Section.
- R. Clean sand may be provided and installed as bedding material beneath pipelines to facilitate installation.
- S. Backfilling to be done when pipelines are cool to avoid excessive contraction.
- T. Frozen or saturated soil is not to be used as backfill at any time.
- U. Open trenches and other excavations are to be backfilled with suitable material and compacted to not less than eighty five percent density modified in six inch lifts.
- V. Compaction shall only be done with a vibratory plate, jumping jack or trench flooding.
- W. After compaction, backfill shall be precisely flush with surrounding finish grades.
- X. The installer is responsible for the repair to damaged equipment, finish grades, undermined pavements, sod, mulches and underlayments, etc., from settling of one inch or more in any trench or excavation as a result of work under this Section for a period of not less than two years from date of Final Acceptance.

#### 3.2 PREPARATION

- A. Set stakes to identify locations of proposed irrigation system. Obtain Owner's Representative's approval before excavation.

#### 3.3 PIPING APPLICATIONS

- A. Install components having pressure rating equal to or greater than system operating pressure.
- B. Piping in control-valve boxes and above ground may be joined with flanges instead of joints indicated.
- C. Underground Irrigation Main Piping: As indicated on drawings.
- D. Lateral Piping: As indicated on drawings.
- E. Underground Branches and Offsets at Sprinklers and Devices: Schedule 40, PVC pipe; threaded PVC fittings; and threaded joints.
  1. Option: Plastic piping manufactured for this application may be used instead of pipe and fittings specified.
- F. Drain Piping: As indicated on drawings.
- G. Sleeves: Class 200, PVC pipe and socket fittings; and solvent-cemented joints.
- H. Transition Fittings: Use transition fittings for plastic-to-metal pipe connections according to the following:
  1. Couplings:
    - a. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.

- b. Underground Piping NPS 2 and Larger: AWWA transition coupling.
  2. Fittings: Underground Piping: Union with plastic end of same material as plastic piping.
  3. Transition fittings are specified in "Basic Materials and Methods."
- I. Dielectric Fittings: Use dielectric fittings for dissimilar-metal pipe connections according to the following:
    1. Underground Piping:
      - a. NPS 2 and Smaller: Dielectric couplings or dielectric nipples.
      - b. NPS 2-1/2 and Larger: Prohibited except in valve box.
    2. Piping in Valve Boxes or Vaults:
      - a. NPS 2 and Smaller: Dielectric unions.
      - b. NPS 2-1/2 to NPS 4 Dielectric flanges.
    3. Dielectric fittings are specified in "Basic Materials and Methods".

#### 3.4 VALVE APPLICATIONS

- A. Underground, Shutoff-Duty Valves: Use the following:
  1. NPS 2 and Smaller: Curb stop with tee head, curb-stop service box, and shutoff rod.
  2. NPS 3 and Larger: AWWA cast-iron gate valve with elastomeric gaskets and stem nut, valve box, and shutoff rod.
- B. Underground, Manual Control Valves: Bronze globe valve with control-valve box and valve key.
- C. Control Valves: As indicated on drawings.
- D. Drain Valves: As indicated on drawings.

#### 3.5 PIPING INSTALLATION

- A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved by Owner's Representative.
- B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
- C. Install piping free of sags and bends.
- D. Install groups of pipes parallel to each other, spaced a minimum of 6 inches to permit valve servicing.
- E. Install fittings for changes in direction and branch connections.
- F. Install dielectric fittings to connect piping of dissimilar metals.
- G. Lay piping on solid subbase, uniformly sloped without humps or depressions.
- H. Install ductile-iron piping according to AWWA C600.
- I. Install PVC piping in dry weather when temperature is above 40 degree F 5 degree C. Allow joints to cure at least 24 hours at temperatures above 40 degrees F 5 degree C before testing unless otherwise recommended by manufacturer.
- J. All installations are to be made in full accordance with the Drawings. Specifications, Local Codes and Ordinances, etc., with the most stringent requirement prevailing at all times in the event of conflict.
- K. Generally, no deviations from the layout of pipelines, sprinkler heads, control valves, point of connection, controller locations, or other scheduled installations will be considered or accepted by the Owner's Representative from that indicated on the Drawings.
- L. The irrigation installer is not authorized to make minor field adjustments in layout to facilitate minor changes in site layout without prior approval from Owner's Representative.
- M. No direct contact between any equipment installed under this Section and other utilities or structures is permitted.
- N. Open pipe ends are to be taped or plugged closed at all times to keep out dirt and debris during installation.
- O. All pipes are to be flushed with clean water to remove all dirt and debris prior to installing sprinkler heads.

#### 3.6 VALVE INSTALLATION

- A. Underground Gate Valves: Install in valve box that is flush with grade.
- B. Underground Curb Stops: Install in service box with top flush with grade.
- C. Underground, Manual Control Valves: Install in manual control-valve box.
- D. All electrical control valves, gate valves, and wire connections are to be housed in control valve boxes with lock-bolt-equipped covers equal to Ametek 10-170-001 and 10-173-134 or Carson 1419E.
  - Valve boxes shall be adequately sized to allow clearance around all valves for servicing and removal without excavation of box, and shall not bear on valve or system pipes.
  - Valve boxes and covers shall be green or black in color and purple for non-potable systems. Valve coverlid shall be etched with the corresponding valve number, controller zone, and stamped "Irrigation Control Valve".
  - Valves shall have a brass tag labeled with etched corresponding controller zone number, as recorded on the as-built Drawings.
- E. Drain Valves: Install in control valve box.
- F. Electric control valves are to be connected to mainline per the Drawing detail allowing clearance for servicing valve in valve box.
- G. Control valves are to be adjusted for optimum flow to provide coverage as intended by design.
- H. Quick coupling valves to be installed on PVC swing joint riser assemblies, and are to be installed plumb and one inch above adjacent finish grade or bed mulch.
- I. Quick coupling valves and boxes shown next to a control valve on the drawings shall not be installed in same control valve box as control valve. Quick Coupling will be installed in a 6" or 10" round box next to the control valve. As shown on drawings.
- J. Control valves and boxes to be installed above aggregate drainage sumps not less than two cubic feet in size.
  - Aggregate to be separated from soil with filter fabric equal to Mirafi or Trevira.
  - Aggregate sumps to be constructed prior to installation of control valve and box; do not attempt to fill valve boxes with aggregate.
  - Valve box interiors to be completely free of standing water, mud, or other debris at all times.
- K. Provide and install manufactured valve box extensions as needed to result in box cover being precisely one inch above adjacent finish grades, or flush with top of mulches.

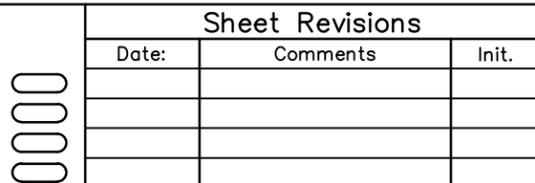
#### 3.7 SPRINKLER INSTALLATION/ALTERNATE EQUIPMENT

- A. Flush circuit piping with full head of water and install sprinklers after hydrostatic test is completed.
- B. Install sprinklers at manufacturer's recommended heights.
- C. Locate part-circle sprinklers to maintain a distance of 6 inches from walls and 2 inches from other boundaries, unless otherwise indicated.
- D. Generally, only the equipment appearing on the Drawings will be considered or accepted for installation. The Owner may approve alternate manufacturers for certain equipment.

- E. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Install shutoff valve on outlet.
- F. Water Hammer Arresters: As indicated on drawings.
- G. Swing pipe risers to be installed and adjusted to result in all sprinkler heads being flush a plumb with finish grades prior to backfilling around heads.
- H. No sprinkler head is to be pulled into a plumb and flush position after installing backfill.
- I. Backflow preventer to be installed per the Drawings and in full accordance with applicable State and Local code for backflow prevention.
- J. Unless indicated otherwise on the Drawings, all backflow preventers shall be reduced pressure type for high hazard service, equal to the 825Y series manufactured by Febco Backflow Prevention Assemblies.
- K. Other equipment, miscellaneous products, fittings, etc., which are not specifically indicated on the Drawings but which are required to result in a complete and operable system are to be provided and installed under this Section within the base contract sum.

#### 3.8 AUTOMATIC-CONTROL SYSTEM WIRING INSTALLATION

- A. Install control wiring in same trench as irrigation piping. Installer is responsible for sizing all wire in accordance with recognized practice, and shall clearly indicate changes in wire sizes on as-built Drawings. Install wiring in separate sleeve under paved areas if irrigation piping is installed in sleeve.
- B. All control wiring is to be installed in mainline trench when possible. All Main lines shall have a common white wire run with them.
- C. Wiring to be installed at a depth not less than twenty-four inches. Splices are to be made in valve boxes.
- D. No splices are to occur in any sleeve.
- E. Multiple wires in trenches are to be banded together at twenty foot intervals, and banded alongside all mainline piping with duct tape.
- F. Two yellow spare wires for system expansion shall be pulled to the end points of the mainline, labeled with indelible markings for corresponding controller zone, and installed in control valve boxes.
- G. All wire connections to be made with 6T Tan 20111 King wire connectors or approved equal. Wire connection and sealant to be made water-resistant. All splices to be made in a valve box.
- H. All wire splices and connections shall be left with sufficient "slack" so that the wire may be brought to the surface without disconnection.
- I. Installer shall furnish and install indelible wire markers at the end of each control wire and inside controller cabinet with corresponding controller zone number.

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| File Name:  |  | Date:           | Comments |  | Init.            | No Revisions:            |                  |                   | IM0252-423         |
| Horiz. Scale: As Noted Vert. Scale: As Noted  |  |                 |          |  |                  | Revised:                 | Designer: KRS    | Structure Numbers | 19039              |
| Unit Information Unit Leader Initials   |  |                 |          |  |                  | Void:                    | Detailer: JDA/AM |                   | Sheet Number LI004 |
|  associates inc.<br>2953 South Peoria Street, Ste 101<br>Aurora, Colorado 80014<br>303-770-7201 FAX 770-7132 |  |                 |          |  |                  |                          |                  |                   |                    |

**SECTION 02810 IRRIGATION SYSTEMS**

**3.9 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

**3.10 LABELING AND IDENTIFYING**

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
- B. Operational requirements: Indicate safety and emergency precautions, and warn of hazards and improper operations.

**3.11 FIELD QUALITY CONTROL/TESTING AND INSPECTION**

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After any electrical circuitry is energized, operate controllers and automatic control valves to confirm proper system operation.
- B. Remove and replace units and retest as specified above.
- C. After completion of all work under this Section, the installer shall activate the water source and pressurize the mainline to not less than 150 psi., or maximum available pressure if less than 150 psi.
- D. The mainline shall remain closed and pressurized for not less than twenty-four hours prior to preparation of the completed system.
- E. The installer shall request Owner's Representative to inspect point of connection, and all equipment installed on the mainline. Twenty-four hours notice must be given to Owner's Representative.
- F. Inspection at this time is mandatory and Owner's Representative upon successful completion of the pressure test will issue a certificate of approval.
- G. After all irrigation piping and risers are connected, and prior to installation of sprinkler heads, control valves shall be opened and a full head of water used to flush out the system. After the system is thoroughly flushed, risers shall be capped and the system pressure tested.
- H. At the conclusion of the pressure test, heads shall be installed and tested for operation in accordance with design requirements under normal operating pressure. Adjustments shall be made to eliminate back splash on any building, structures, or fences.
- I. After successful completion of the pressurized period and repair to any leaks, and when the system is operating at the pressure intended by design, the installer shall adjust and fine-tune all equipment for optimum performance and coverage as intended by design.
- J. When wind conditions are less than five mph, the installer shall adjust all sprinkler head nozzles to provide coverage to areas as intended by design. Over spray onto roadways shall be minimal.
- K. All sprinkler heads are to be fully adjusted to be plumb and flush prior to sodding, seeding, and mulching operations.
- L. The installer shall assume all liability for sod, seed, and mulch that is installed prior to adjustment, fine-tuning, and functional operation of the sprinkler system.
- M. The installer shall assume all liability for manually operating the sprinkler system and furnishing supplemental irrigation to sustain optimum condition of all landscaping should the system not be fully operable prior to installation of landscaping.
- N. After the installer has verified that all adjustments and fine-tuning have been adequately performed, the Owner's Representative shall be given two days notice that an inspection for Substantial Completion is requested.
- O. The entire installed system shall operate automatically via the controller through entire cycles prior to requesting an inspection.
- P. The Owner's Representative inspection for Substantial Completion shall include visually observing the operation of all work provide and installed under this Section.
- Q. Any installation, which does not comply entirely with any part of this Section, will be documented in a written punch list.
- R. All punch list items are to be corrected by the installer prior to re-inspection by Owner's Representative.
- S. Re-inspection for correction of punch list items for consideration of Final Acceptance will be made within five working days from date of Owner's Representative's first inspection and punch list
- T. The installer may be subject to liquidated damages as set forth in the City of Colorado Springs Standard Specifications for any additional inspections which must be made by Owner's Representative to verify complete correction of deficiencies subsequent to second inspection

**3.12 STARTUP SERVICE**

- A. Engage a service representative to perform startup service.
- B. Verify that controllers are installed and connected according to the Contract Documents.
- C. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.
- D. Complete startup checks according to manufacturer's written instructions.

**3.13 ADJUSTING/WINTERIZATION AND START-UP**

- A. Adjust settings of controllers.
- B. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

- C. The installer is responsible for initial programming of controller to operating sequence of all zones shall be per the Drawings.
- D. Unless otherwise approved by the Owner's Representative, the operating sequence of all zones shall be per the Drawings.
- E. During and up until Final Acceptance, the installer is responsible for making any adjustments that may be required to equipment installed under this Section.
- F. It shall be the contractor's responsibility to shut down and winterize the completed irrigation system on a date to be agreed upon by the Parks and Recreation Department and the contractor.
- G. It shall be the contractor's responsibility to activate the irrigation in the spring after the first winter on a date agreed upon by the Parks and Recreation Department and the contractor. Contractor shall verify the correct functioning of the system and repair any leaks at this time.

**3.14 CLEANING AND JOB SITE RESTORATION**

- A. Flush dirt and debris from piping before installing sprinklers and other devices.
- B. Prior to Final Acceptance, all areas on the job site in which work under this Section has occurred will be thoroughly cleaned of dirt, unused material, and the installer's installation equipment.
- C. Work by other trades, which is damaged or destroyed because of work under this Section, shall be fully restored by this installer as a condition of Final Acceptance.
- D. Damage caused by water from the sprinkler system because of incorrect adjustment and controller programming is this installer's responsibility.
- E. Sod, trim edges, mulches, pavements, and other existing work which is damaged as a result of work under this Section is to be completely restored as a condition of Final Acceptance of all work completed under this Section.

**3.15 DEMONSTRATION/ENACTMENT**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain controller and automatic control valves. Refer to Division 1 Section "Close Out Procedures Demonstration and Training."
- B. During the warranty period, the installer is responsible for all the following:

**02810 - IRRIGATION SYSTEMS (REVISED 2010)**

- 1. Winterization: Shut off all water sources to system, drain all pipelines, and provide air injection as required to prevent freeze damages to all equipment.
- 2. Activation: Turn on all water sources to system, charge all pipelines, repair damaged equipment not caused by vandalism, snow removal, or unauthorized winter-use of system, adjust and fine tune all equipment to provide optimum performance.
- 3. Controller programming: Program controller at frequencies deemed necessary to sustain and promote establishment of landscaping until time of Final Acceptance, shut down controller at winterization, re-program controller at time of activation
- 4. It is this installer's responsibility to perform seasonal service at the time he deems appropriate to protect his warranty interests.
- 5. The installer is responsible for damages caused to equipment installed under this Section as a result of his failure to provide seasonal maintenance at the appropriate times
- 6. The installer may be back charged if the services of others are employed to perform seasonal maintenance, as determined necessary by Owner's Representative.
- 7. During the warranty period, the installer is responsible for providing labor and material as needed to keep the system completely operable as intended by design.
- 8. Equipment, which fails to operate as intended by design, shall be repaired and/or replaced by the installer at his expense within twenty-four hours after Owner's notice.
- 9. Equipment, which is removed from the system for repair, shall be replaced immediately with equal equipment capable of providing uninterrupted operation of the system as intended by design.
- 10. Should at any time during the warranty period the installer fail to repair/replace equipment after being given reasonable notice from Owner to do so, he may be back charged for any costs incurred by the Owner for needed repairs which must be made by others.

**3.16 EXCLUSIONS FROM WARRANTY**

- A. The following do not constitute valid warranty claims:
- B. Vandalism to equipment.
- C. Damage to the installed system because of work performed by others in the work area after Final Acceptance.
- D. Unauthorized use of the system after installer's completion of winterization.

**3.17 REQUIREMENTS AT SUBSTANTIAL COMPLETION**

- A. At Owner's Representative's inspection for Substantial Completion the installer shall provide Owner's Representative with all of the following:
  - 1. Reproducible full-scale Mylar as-built drawing.

- 2. Blue line fifty percent reduction of the as-built drawing, enclosed in an envelope for installation inside the controller cabinet.
- 3. Black one inch size three-ringed binders, indexed and including the following type written data:
- 4. Warranty statement on installer's letterhead, including date of enactment, emergency contact name and phone number, and FAX telephone number if available.
- 5. Recommended routine and seasonal maintenance procedures.
- 6. Operating instructions for automatic controller.
- 7. Operating Schedule for the initial program entered into the controller at the time of inspection for Substantial Completion.
- 8. Copies of equipment warranties provided by manufacturers of products installed which are transferable to the Owner.
- 9. Statement of names and addresses of all local suppliers to the project from which replacement equipment can be obtained.
- 10. The owner's copy of the current cross connection control device test report.

**END OF SECTION 02810 - IRRIGATION SYSTEMS (REVISED 2013)**

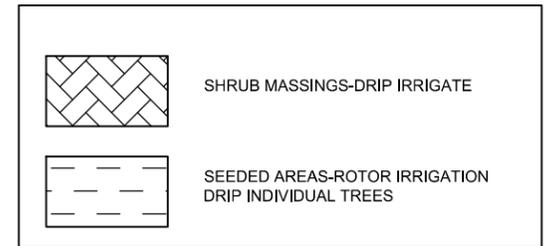
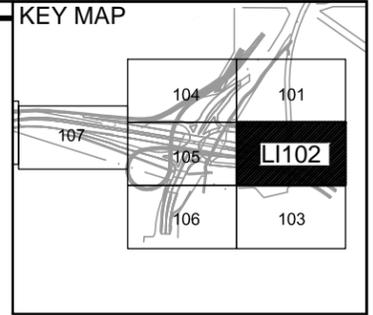
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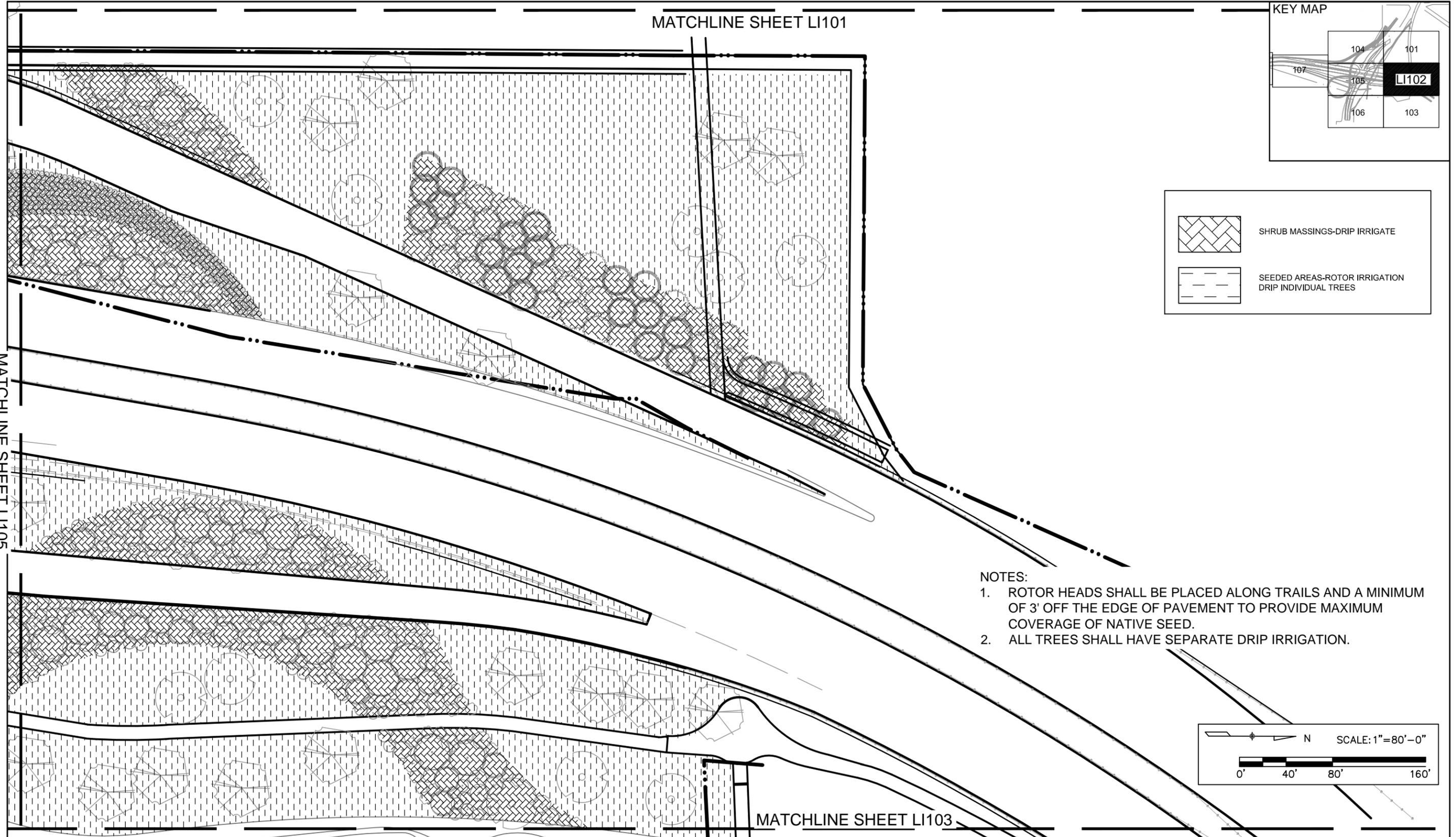


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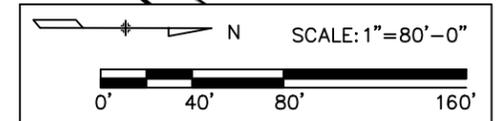
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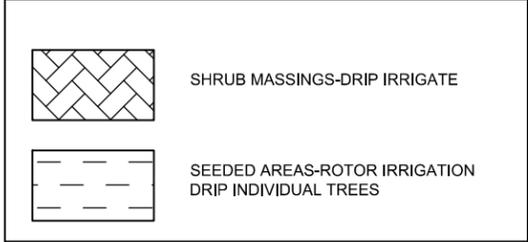
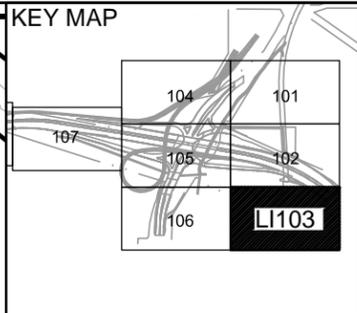
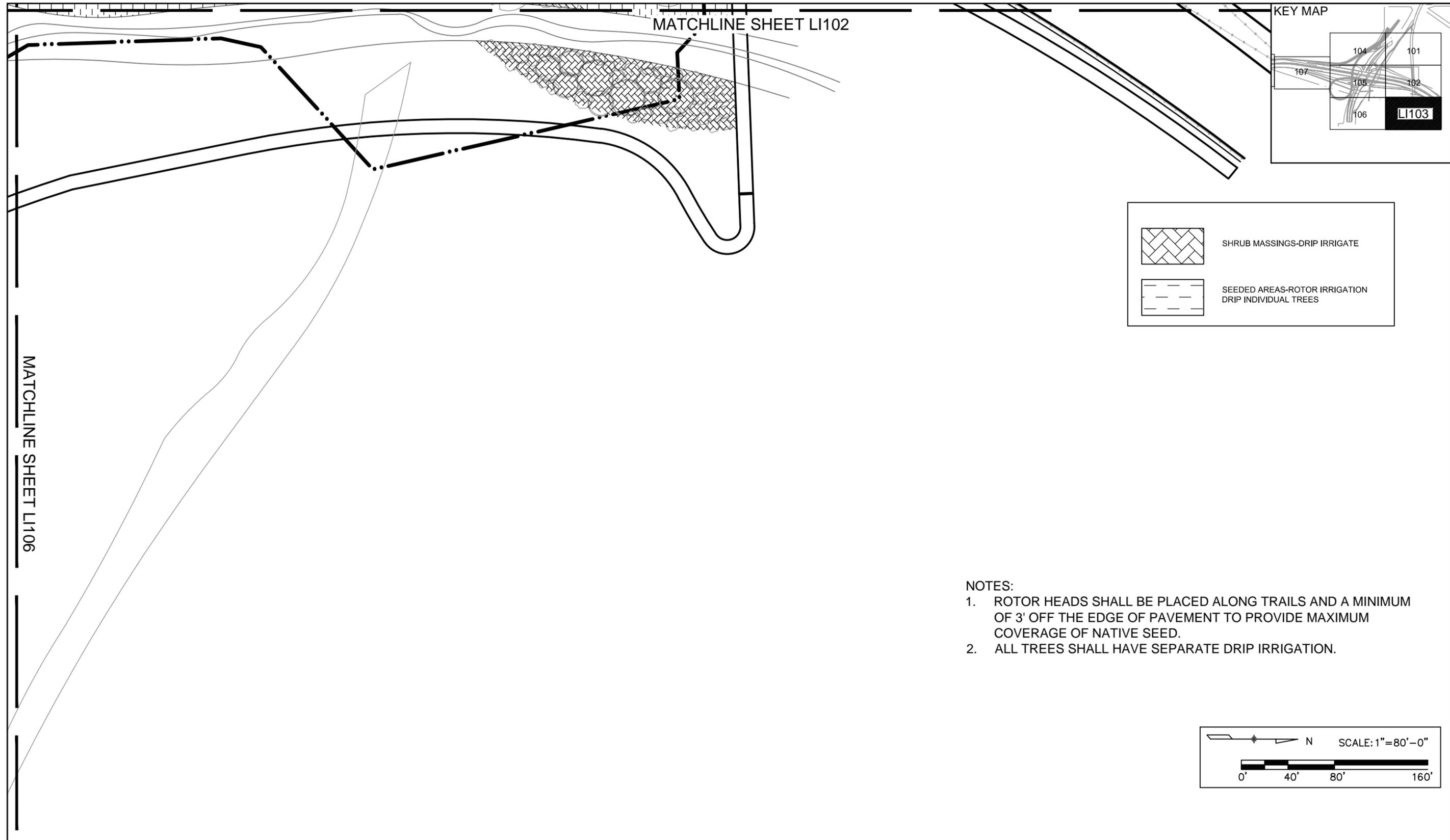
- NOTES:
1. ROTOR HEADS SHALL BE PLACED ALONG TRAILS AND A MINIMUM OF 3' OFF THE EDGE OF PAVEMENT TO PROVIDE MAXIMUM COVERAGE OF NATIVE SEED.
  2. ALL TREES SHALL HAVE SEPARATE DRIP IRRIGATION.



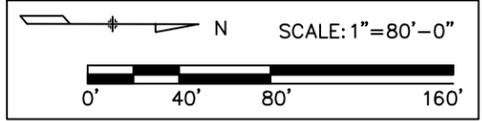
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| File Name:   |  | Date:           | Comments | Init.                                 | 1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298 |                  | No Revisions: | Designer: KRS         |  | IM0252-423         |  |
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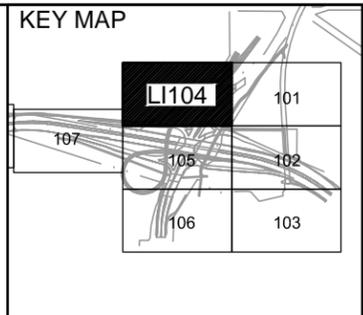
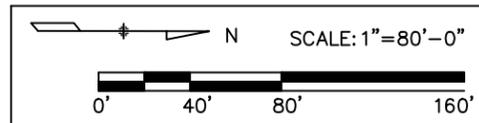
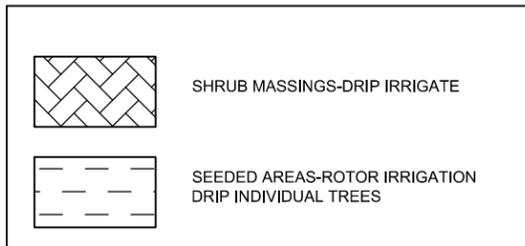


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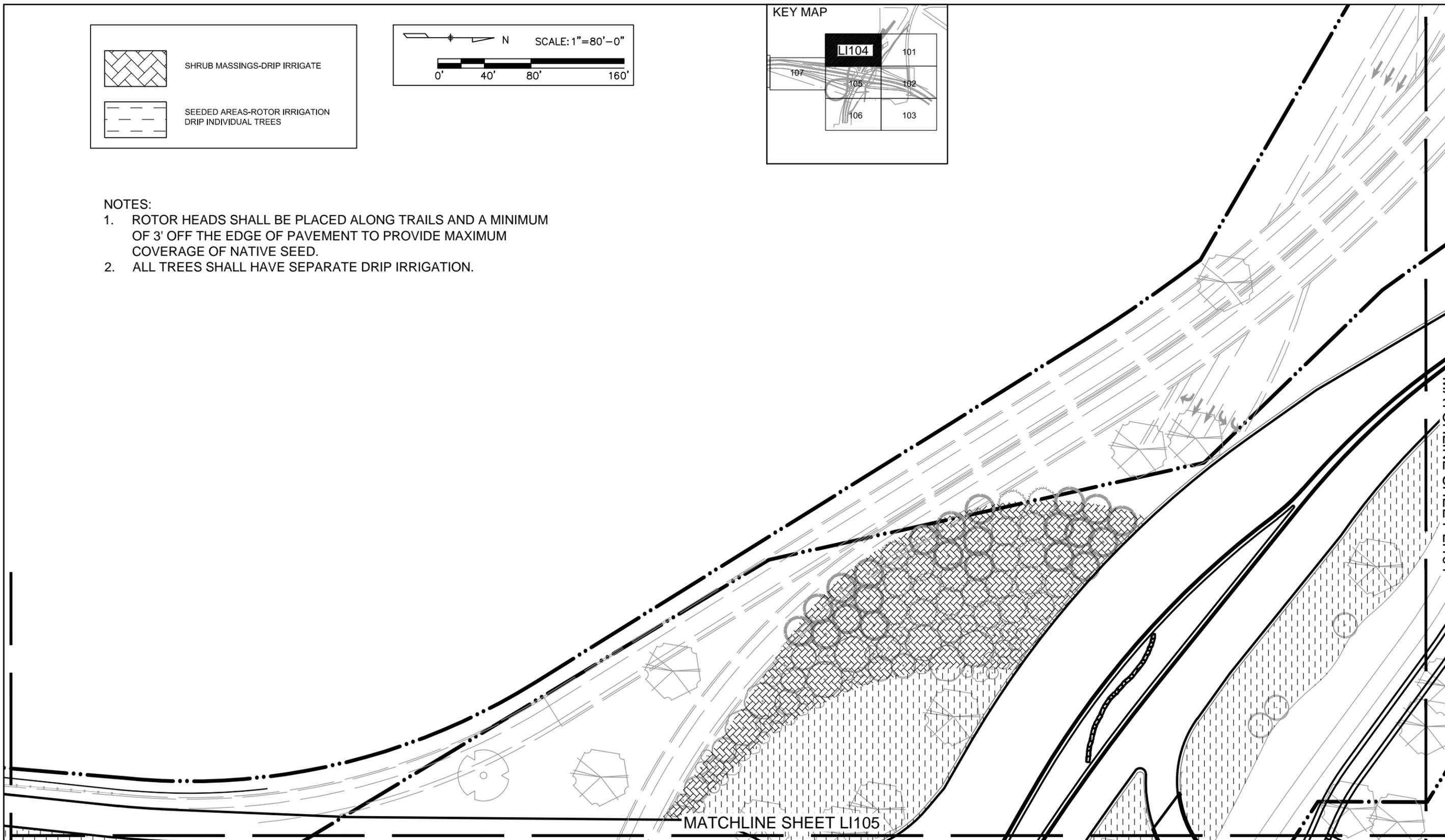
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2. ALL TREES SHALL HAVE SEPARATE DRIP IRRIGATION.



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| File Name:   |  | Date:      Comments      Init. | 1480 QUAIL LAKE LOOP, SUITE A<br>COLORADO SPRINGS, CO 80906<br>Phone: 719-634-2323 FAX: 719-227-3298 | No Revisions:           | Designer: KRS                    | IM0252-423              |
| Horiz. Scale: As Noted      Vert. Scale: As Noted  |  |                                | <b>Region 2</b> <b>DW</b>  | Revised:                | Detailer: JDA/AM                 | 19039                   |
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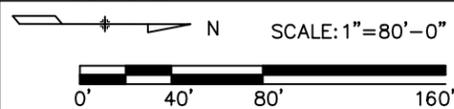
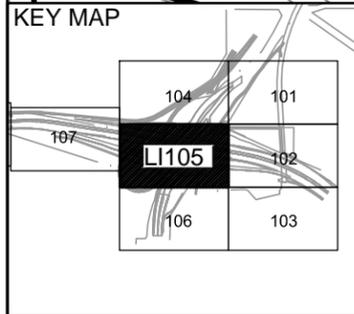
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|  | SHRUB MASSINGS-DRIP IRRIGATE                           |
|  | SEEDED AREAS-ROTOR IRRIGATION<br>DRIP INDIVIDUAL TREES |



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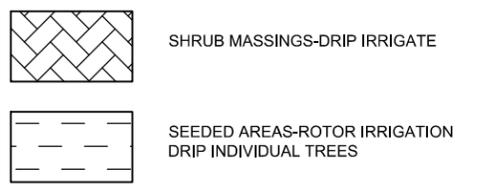
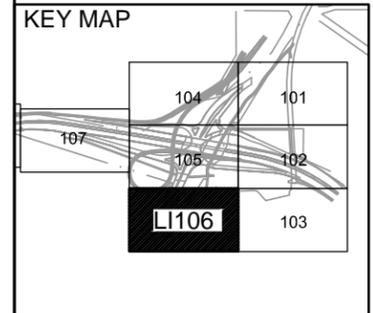
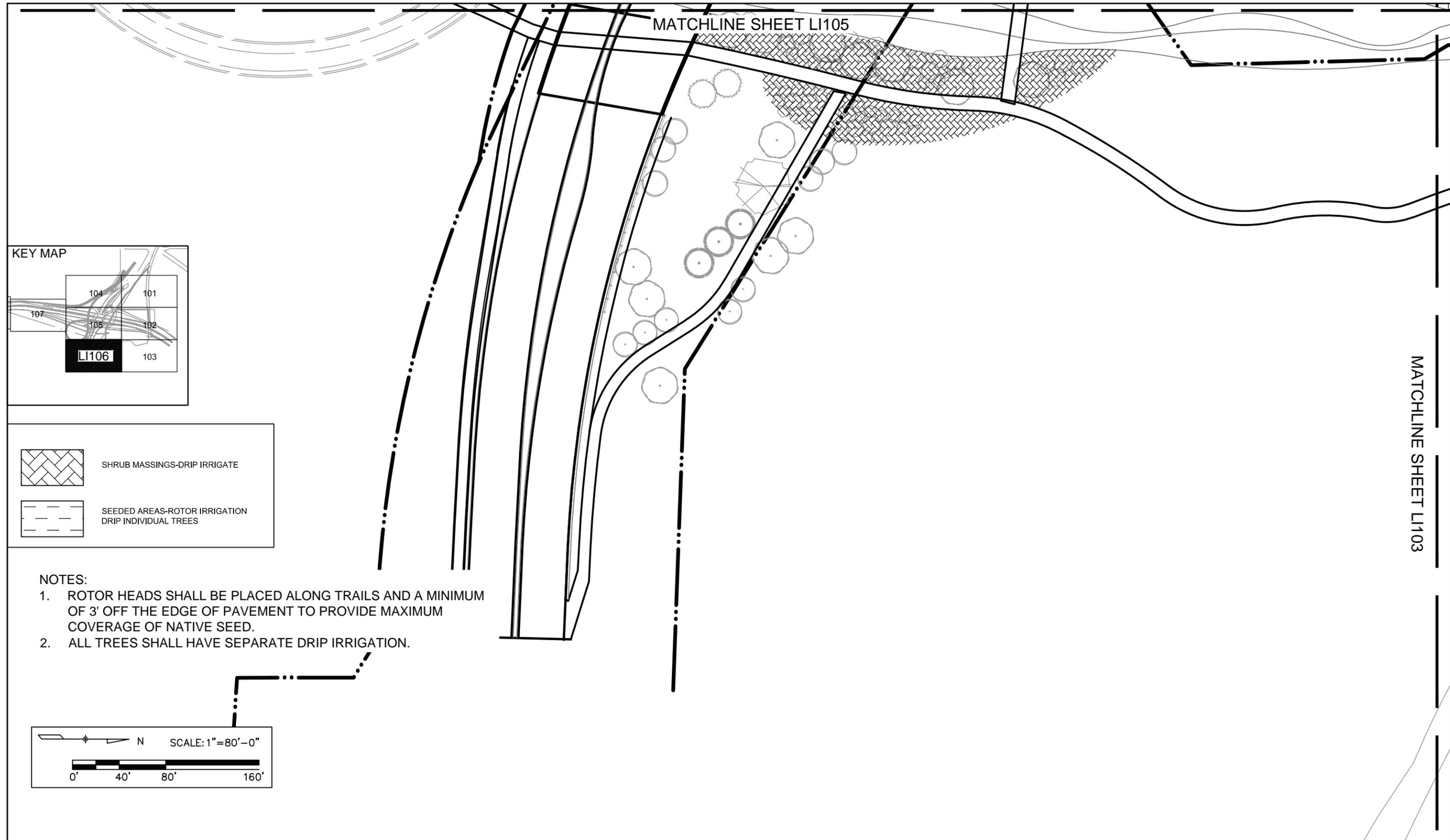
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IRRIGATION

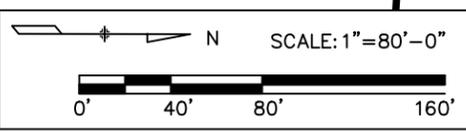
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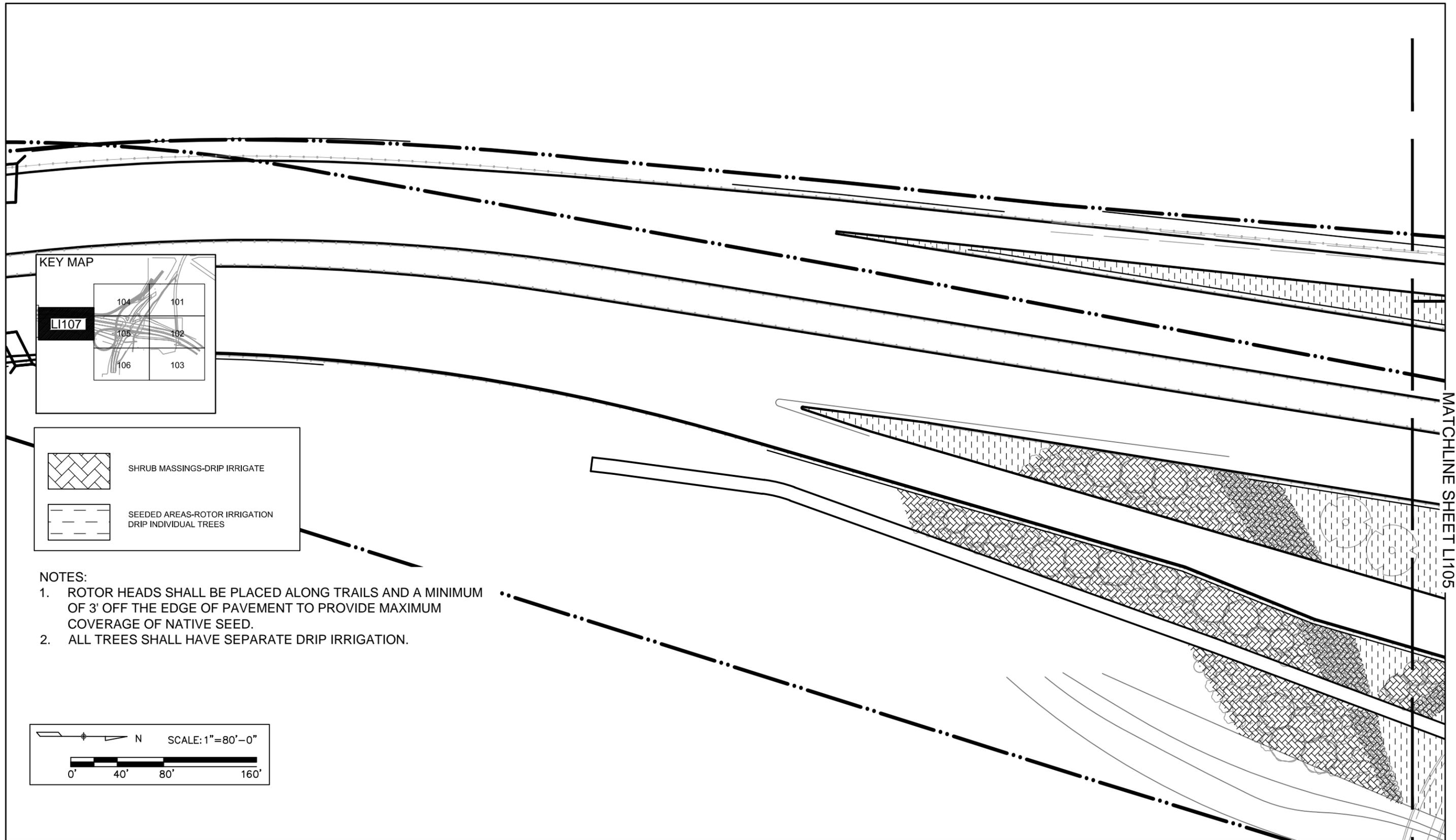


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