# Stormwater General Notes (to be Included with all Construction Drawings)

- All stormwater facility construction shall conform to the most recent version of City of Greeley Standard Details. Construction specifications for stormwater facilities not covered by the City's Standard Details shall be those in the most recent version of the CDOT Standard Specifications for Road and Bridge Construction or those published by the Mile High Flood District (MHFD). Details not covered by the City's Standard Details shall be those in the CDOT Miscellaneous Standard Plans (M-Standards) or those published by the MHFD or as approved by the City of Greeley.
- 2. City Standard Details are not to scale unless a scale is indicated.
- 3. Remove all debris from trenches, including soda cans, rags, pipe banding material, etc. before backfilling.
- 4. All rebar used for storm drainage structures shall be epoxy coated.
- 5. The Contractor must follow the requirements in the State Stormwater Permit including daily street and walkway sweeping and dust control, using water as a dust palliative where required. Costs for this work are included in the accepted total bid and no additional payment shall be made.
- 6. The Contractor is responsible for providing As-Constructed Record Drawings to the City of Greeley's Public Works Department in accordance with the City's Storm Drainage Design Criteria.
- 7. The Contractor is required to have a current City of Greeley Contractor's License to perform any work in public right-of-way or easements.
- 8. The Contractor is responsible for obtaining all required permits prior to commencement of any work.
- 9. The Contractor shall be solely and completely responsible for all construction-related conditions at and adjacent to the job site, including the safety of all persons and property, during the performance of the work at all times. Any City inspections completed during construction are not intended to evaluate the adequacy of the Contractor's safety measures in, on, or near the construction site.
- 10. Working hours shall be between 7:00 am and 6:00 pm on normal City of Greeley business days unless prior approval has been obtained from the City.
- 11. The Owner shall ensure that the size and type of all underground utilities in the area of the work are located and shown on the Construction Drawings. The Contractor shall notify all utility companies including, but not limited to, Atmos Energy, CenturyLink, Xcel Energy, Comcast, and the Greeley Water and Sewer Department, prior to commencing construction, to have all existing utilities field located.



## Seed Mixes

**Bluegrass Mix**. The Bluegrass Mix is not a native seed mix. It is intended for use in high traffic recreation areas such as parks. A permanent irrigation system is required where the bluegrass mix is used.

Species	Pounds per Acre Pure Live Seed (PLS)
Kentucky bluegrass, Moonlight	65.1
Kentucky bluegrass, Northstar	65.1
Kentucky bluegrass, Quantum Leap	65.1
Perennial ryegrass	21.7

**Low Grow Mix**. The Low Grow Mix is a native seed mix for unirrigated or native areas. It can be used in open areas where short grasses are desired. It shall be used on the sides of all paths or walkways for a minimum offset width of 8' on each side and for that same width along property lines abutting residential properties.

Species	Pounds per Acre Pure Live Seed (PLS)
Buffalo grass	8
Blue grama	6.5

Mature height ranges from 8" to 12".

**Slope Mix**. The Slope Mix is a native seed mix for unirrigated or native areas. It shall be used on all slopes and berms steeper than 5H:1V.

Species	Pounds Per Acre Pure Live Seed (PLS)
Side oats grama	4
Blue grama	4
Little bluestem	4
Sand dropseed	0.12
Streambank wheatgrass	8

Mature height ranges from 1' to 3'.

**Riparian Mix**. The Riparian Mix is a native seed mix for unirrigated or native areas. It shall be used along irrigation ditches and in areas that are frequently wet such as the lower banks of a vegetated open channel.

Species	Pounds Per Acre Pure Live Seed (PLS)
Switchgrass	6
Prairie cordgrass	5
Streambank wheatgrass	8

Mature height ranges from 3' to 6'.



Kevised: Call before you dig. **Pond Mix**. The Pond Mix is a native seed mix for unirrigated or native areas. It is to be used in and around detention facilities and in areas that are designed to hold water but may not be frequently wet.

Species	Pounds Per Acre Pure Live Seed (PLS)
Little bluestem	2
Yellow indian grass	2
Switchgrass	1
Blue grama	0.6
Side oats grama	3
Prairie sandreed	1.5
Western wheatgrass	4
Streambank wheatgrass	5

Mature height ranges from 3' to 6'.

#### Notes

 Seed mixes can be adjusted to meet site conditions including soil salinity or other conditions that might impede the successful establishment of the standard species with the approval of the City's Natural Areas Group.

# Seed Mixes

Detail 1-2



- 1. Trench backfill above bedding material shall be per Detail No. S-30 in the City of Greeley Design Criteria Construction Specifications Manual Volume 1 - Streets.
- 2. Minimum cover over pipe, H, shall be 1'-0" measured from bottom of asphalt or top of concrete pavement.
- 3. Consolidate the bedding w/ shovel slicing & tamping.
- 4. Backfill the pipe with bedding to the spring line.
- 5. Consolidate the bedding w/ shovel slicing & tamping evenly on both sides of pipe.
- 6. Place a 12" min layer of 1-1/2" to 3" crushed rock, or as required to provide a stable subgrade if groundwater is encountered or if required by the Engineer. Place Class 1 non-woven filter fabric over the crushed rock foundation before placing bedding.

### **Bedding Material**

Bedding shall be CDOT No. 57 or No. 67 coarse aggregate.



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Standard Storm Drain Bedding Reinforced Concrete Pipe (RCP) Detail 6-6A



- Trench backfill above bedding material shall be per Detail No. S-30 in the City of Greeley Design Criteria Construction Specifications Manual Volume 1 - Streets.
- 2. Min cover, H, shall be 2'-0" to bottom of asphalt or concrete pavement.
- 3. Do not use mechanical compaction equipment until pipe has been backfilled to 12" over the top of pipe.
- 4. Place bedding in 6" lifts on stabilized subgrade.
- 5. Consolidate each bedding lift w/ shovel slicing & tamping to 95% AASHTO T180 min relative compaction.
- Place a 12" min layer of 1-1/2" to 3" crushed rock, or as required to provide a stable subgrade if groundwater is encountered or if required by the Engineer. Place Class 1 non-woven filter fabric over the crushed rock foundation before placing bedding.
- 9. Prevent migration of native fines into backfill material.
- 10. Multiple pipe installations shall be in accordance with CDOT Standard Detail M-603-4 for AASHTO M330 pipe.

# **Bedding Material**

Bedding shall be CDOT Class 1 compacted structure backfill. Provide documentation of backfill material to Engineer.

Pipe D	Max H
12"	20'
15"	21'
18"	22'
24"	16'
30"	19'
36"	14'
42"	15'
48"	14'
60"	14'



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1: <u>----</u> 1: <u>----</u> Standard Storm Drain Bedding Polypropylene Pipe (PP) Detail 6-6B



#### <u>Notes</u>

- Trench backfill above bedding material shall be per Detail No. S-30 in the City of Greeley Design Criteria Construction Specifications Manual Volume 1 - Streets.
- 2. Min cover, H, shall be 2'-0" or 1D, whichever is greater, to bottom of asphalt or concrete pavement.
- 3. Do not use mechanical compaction equipment until pipe has been backfilled to 12" over the top of pipe.
- 4. Place bedding in 6" lifts on stabilized subgrade.
- 5. Consolidate each bedding lift w/ shovel slicing & tamping to 95% AASHTO T180 min relative compaction.
- 6. Place a 12" min layer of 1-1/2" to 3" crushed rock, or as required to provide a stable subgrade if groundwater is encountered or if required by the Engineer. Place filter fabric over the crushed rock foundation before placing bedding.
- 9. Prevent migration of native fines into backfill material.

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10. Multiple pipe installations shall be in accordance with CDOT Standard Detail M-603-4 for AASHTO M294 pipe.

# **Bedding Material**

Bedding shall be CDOT Class 1 structure backfill. Provide documentation of backfill material to Engineer

Pipe D	Max H	Min Trench W
12"	17'	30"
15"	18'	34"
18"	17'	39"
24"	14'	48"
30"	14'	56"
36"	13'	64"
42"	11'	72"
48"	12'	80"
60"	12'	96"



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---------- Standard Storm Drain Bedding High Density Polyethylene (HDPE) Detail 6-6C



- 1. Cover shall be gray iron, manufactured per AASHTO M105-06/ASTM A48 Class 35B & conform to AASTHO M306-07. Cover diameter varies based on size of MH. See City Standard Details.
- 2. Cover shall be non-perforated, with lettering as shown, cast on the top of the lid for storm MHs.
- 3. Cover shall be bolted, if specified by the Public Works Department. Bolts shall be SS 3/8" dia hex bolts.
- 4. Material for rings & covers shall be gray or ductile cast iron conforming to CDOT-712.06.
- 5. This cover shall be used on all storm MHs & inlets. Covers reading "Storm Sewer" or "Sewer" are not acceptable.
- 6. Other foundries may produce this cover. The City must approve the product drawing and manufactured product as an approved equivalent prior to approval for installation.
- 7. All MH covers must have 1" pick slots. Hidden pick holes will not be acceptable.

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- 1. Standard ring shall be used for all flat top & eccentric cone top manholes.
- 2. Top flange ring shall be used for all inlets. See cover details for cover specifications.
- 3. All rings & covers shall be heavy duty, meeting the AASHTO M306-10 Proof Load criteria.
- 4. Manhole rings produced by other foundries may be accepted by the City as an approved equivalent.
- 5. Dimensions shown are nominal and shall include a 1/16" tolerance for cover fit.
- 6. Standard ring height is 8". Others may be approved if all other specifications & dimensions are met.
- 7. Reversible 4" frames are not required but may be accepted.
- 8. Frame diameter varies based on size of MH. See City Standard Details.



Standard Storm Manhole Frames and Rings Detail 6-8B









- 1. Type R inlets shall conform to the CDOT standard drawing & notes for Type R inlets except as noted herein.
- 2. All grates & frames shall be designed to withstand an HS-20 loading.
- 3. Use of a Type R is discouraged along drive over curbs.
- 4. Inlet structures shall not be constructed until the curb & gutter has been installed, or contractor stakes the curb & gutter for 100' on each side of inlet. Contractor must also stake inlet box corners.
- 5. Minimum rebar splice length shall be 10".
- 6. Add (4) #4 rebars-"L" shaped, equally spaced mid-depth into the concrete lid & wall & mid-depth into each sidewalk section poured next to the inlet (typ L=5') along both back and sides. 4 additional bars are required for each 5' of length added for double or triple inlet. Adjust for manhole.
- 7. Slope inlet floors toward pipes a min. of 2% so they will drain completely.
- 8. All rebar shall be epoxy coated.







### Inlet With Ditch Paving

#### Stamp Notes

- 1. Contractor shall imprint the plastic concrete w/stamp as shown.
- 2. Final impression shall be clear & legible & free of any aggregate & debris.



Section B-B Inlet For Use In Ditch On Grade Flow from One Direction

#### Notes

- 1. Type C inlets shall conform to the CDOT standard drawing & notes for Type C inlets except as noted herein.
- 2. Close mesh grate shall be used for pedestrian & bicycle areas. Follow CDOT Drawing M-604-10 to manufacture grate.
- 5. Refer to CDOT Drawing No M-604-10 for multiple additional details.
- 6. Minimum rebar splice length shall be 10".
- 7. Slope inlet floors toward pipes a min of 4%.
- 8. Concrete slope and ditch paving will be required when shown on plans.
- 9. All quantities shown are for estimating only. Additional may be required.

Reference: Colorado Department of Transportation Standard M-604-10. Refer to the latest M&S Standards.



 Grated Inlet
 Туре С
 Detail 7-2



- Notes
- 1. All Type 13 inlets, regardless of the installation, shall conform to the CDOT standard drawing & notes for Type 13 inlets except as noted herein.
- 2. All rebar shall be epoxy coated.
- 3. The notes on this sheet are applicable to all Type 13 City Standard Details, regardless of the location of the installation.
- 4. Inlet structures shall not be constructed until the curb & gutter has been installed, or contractor stakes the curb & gutter for 100' on each side of inlet. Contractor must also stake inlet box corners.
- 5. Minimum rebar splice length shall be 10".
- 6. See City of Greeley Design Criteria and Construction Specifications Volume I, Streets for curb, gutter, and sidewalk details.





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