Sioux Chief Manufacturing prepared the following guidelines to aid design professionals. Incorporate these guidelines into the appropriate project specification Section. Sioux Chief Manufacturing is not liable in any way for revisions or for the use of this Section by any end user. A qualified design professional should review and edit the document to suit project requirements.

Notes are included to assist the design professional in editing the specifications to suit project requirements and are not intended to be included in the final specification. These notes appear in blue text.

For more information or assistance, contact Sioux Chief Manufacturing.

Sioux Chief Manufacturing:

14940 Thunderbird Road,

Kansas City, MO 64147

Phone: (800) 821-3944

Website: [www.siouxchief.com](http://www.siouxchief.com)

Email: [specifications@siouxchief.com](mailto:specifications@siouxchief.com)

# SECTION 221400 - FACILITY STORM DRAINAGE

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

# **GENERAL**

## RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## SUMMARY

### Section Includes:

#### Area Drains.

#### Parking Drains.

#### Roof Drains.

##### Primary Roof Drains.

##### Overflow Roof Drains.

##### Large Capacity Roof Drains.

##### Combination Roof Drains.

##### Weir Roof Drains.

##### Green Roof Drains.

##### Promenade Roof Drains.

##### Scupper Roof Drains.

##### Downspout Nozzles.

#### Trench Drains.

##### Polymer Trench Drains

##### Pre-Cast Concrete Trench Drains.

##### Ductile Iron Trench Drains.

##### Aluminum Trench Drains.

##### Stainless Steel Trench Drains.

#### Roof flashing assemblies.

#### Flashing materials.

## Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

### Section 22 05 03 - Pipe, Pipe Fittings, Pipe Hangers and Valves.

### Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment.

### Section 22 05 53 - Identification for Plumbing Piping and Equipment.

### Section 22 07 19 - Plumbing Piping Insulation.

### Section 22 08 00 - Fire Stopping.

### Section 22 10 00 - Plumbing Piping and Valves.

### Section 22 14 23 - "Storm Drainage Piping Specialties" for storm drainage piping inside the building, drainage piping specialties, and drains.

### Section 22 40 00 - Plumbing Fixtures.

### Section 334100 "Storm Utility Drainage Piping" for storm draining piping and piping specialties outside the building.

## DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

### ABS: Acrylonitrile-butadiene-styrene plastic.

### HDPE: High-density polyethylene plastic.

## SUBMITTALS

* + - * 1. Submittals: Comply with Division 01.

Retain "Field quality-control reports" Paragraph below if Contractor is responsible for field quality-control testing and inspecting.

### Field quality-control reports.

* + - * 1. Product Data: Submit manufacturer’s product data, including installation instructions.
        2. Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.
        3. Warranty Documentation: Submit manufacturer’s standard warranty.
        4. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

### Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

## QUALITY ASSURANCE

### Roof drains shall be manufactured by a reputable manufacturer with a proven track record of quality and performance.

### All roof drains shall comply with applicable building codes and industry standards.

### Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

### Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

### Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

## COORDINATION

### Delivery Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

### Storage and Handling Requirements:

#### Store and handle materials in accordance with manufacturer’s instructions.

#### Keep materials in manufacturer’s original, unopened containers and packaging until installation.

#### Store materials in clean, dry area indoors.

#### Do not store materials directly on floor.

#### Protect materials and finish during storage, handling, and installation to prevent damage.

Retain first paragraph below if retaining base-mounting equipment.

### Coordinate size and location of roof penetrations.

# PRODUCTS

## Area Drains

### Cast Iron Area Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [832-DFSD9] [860-i Series] [860-R2i Series] [860-Q2i Series] [862-9iQ Series] [862-9iNQ Series] [862-9i Series] [862-9iN Series] [868-Ri Series] [868-Qi Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Cast Iron Area Drain Description:

Standard: ASME A112.6.3.

Cast Iron Area Drain Body:

Dimensions of Body or Sump: <Insert dimensions>

Body Material: Cast Iron.

Connection Type: No Hub.

Connection Size: Same as connected drainage piping.

Cast Iron Area Drain Top Grate:

Top Strainer or Grate Material: [Ductile Iron] [Nickel Bronze Veneer].

Top Strainer or Grate Shape: [Round “R”] [Square “Q”]

Dimensions of Top Strainer or Grate: [9 inch] [12 inch] [16 inch].

Top Loading Classification: [Heavy Duty] [Extra Heavy-Duty] [Special Duty].

Vandel Proof: [Required] [Not Required].

Cast Iron Area Drain Options:

Sediment Bucket or Debris Basket: [Required] [Not required].

Adjustable Extension: [Required] [Not Required].

Threaded Adjustable Extension: [Required] [Not Required].

Clamping Device: [Required] [Not Required].

Anchor Flange: [Required] [Not required].

Side Outlet: [Required] [Not Required].

### Polymer Area Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [860-AZ Series] [860-Ai Series] [860-PZ Series] [860-Pi Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Polymer Area Drain Description:

Standard: ASME A112.6.3-2001.

Polymer Area Drain Body:

Dimensions of Body or Sump: <Insert dimensions>

Body Material: [ABS] [PVC].

Connection Type: No Hub.

Connection Size: Same as connected drainage piping.

Polymer Area Drain Top Grate:

Top Grate Material: [Cast Iron] [Stainless Steel] [ABS] [PVC].

Top Grate Shape: Round.

Dimensions of Top Grate: 9 inch.

Top Loading Classification: [Medium Duty] [Heavy Duty] [Extra Heavy-Duty].

Vandel Proof: [Required] [Not Required].

Polymer Area Drain Options:

Sediment Bucket or Debris Basket: [Required] [Not required].

Clamping Device: [Required] [Not Required].

Side Outlet: [Required] [Not Required].

### Decorative Area Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [832-DNR Series] [832-DSR Series] [860-Z Series] [860-N Series] [860-R2iN Series] [860-Q2iN Series] [868-RiN Series] [868-QiN Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Decorative Area Drain Description:

Standard: ASME A112.6.3.

Decorative Area Drain Body:

Dimensions of Body or Sump: <Insert dimensions>

Body Material: Cast Iron.

Connection Type: No Hub.

Connection Size: Same as connected drainage piping.

Decorative Area Drain Top Grate:

Top Grate Material: [Nickel Bronze] [Stainless Steel].

Top Grate Shape: [Round “R”] [Square “Q”]

Dimensions of Top Grate: [9 inch] [12 inch] [16 inch].

Top Loading Classification: [Light Duty] [Heavy Duty]

Vandel Proof: [Required] [Not Required].

Decorative Area Drain Options:

Sediment Bucket or Debris Basket: [Required] [Not required].

Adjustable Extension: [Required] [Not Required].

Threaded Adjustable Extension: [Required] [Not Required].

Clamping Device: [Required] [Not Required].

Anchor Flange: [Required] [Not required].

Side Outlet: [Required] [Not Required].

## Parking Garage Drains

### Parking Garage Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [832-DFSD9] [860-iV Series] [860-R2iX Series] [860-Q2iX Series] [868-R6i Series] [868-Q6i Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Parking Drain Description:

Standard: ASME A112.6.3.

Parking Drain Body:

Dimensions of Body or Sump: <Insert dimensions>

Body Material: Cast Iron.

Connection Type: No Hub.

Connection Size: Same as connected drainage piping.

Parking Drain Grate:

Top Grate Material: Ductile Iron.

Top Grate Shape: [Round “R”] [Square “Q”]

Dimensions of Top Grate: [9 inch] [12 inch] [16 inch].

Top Loading Classification: [Extra Heavy-Duty] [Special Duty].

Vandel Proof: Required.

Parking Drain Options:

Sediment Bucket or Debris Basket: [Required] [Not required].

Adjustable Extension: [Required] [Not Required].

Threaded Adjustable Extension: [Required] [Not Required].

Clamping Device: [Required] [Not Required].

Anchor Flange: [Required] [Not required].

Side Outlet: [Required] [Not Required].

## Roof Drains

### Cast Iron Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-52 Series] [868-i Series] [868-iM Series] [868-12 Series] [868-82 Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Polymer Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-A Series] [868-P Series] [867-A Series] [867-P Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Cast Iron Overflow Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-52W Series] [868-52H Series] [868-iW Series] [868-istp2 Series] [868-12W Series] [868-82W Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Polymer Overflow Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-AW Series] [868-PW Series] [868-ASTP2 Series] [868-PSTP2 Series] [867-ASTP2 Series] [867-PSTP2 Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Large Capacity Cast Iron Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-20 Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Combination Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-D12 Series] [868-D52 Series] [868-D8 Series] [867-Di Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Weir Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-F52 Series] [868-F12 Series] [868-M12 Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Planter Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [867-L Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

### Roof Drain Description:

#### Standard: ASME A112.6.4.

#### Roof Drain Body:

##### Body Material: [Cast Iron] [PVC] [ABS].

##### Dimension of Body: Nominal: [20 inch] [15 inch] [11 inch] [10 inch] [8 inch].

##### Outlet Connection Type: No-Hub.

##### Connection Size: Same as connected drainage piping.

#### Roof Drain Dome:

##### Dome Material: [Cast Iron] [Aluminum] [ABS].

##### Vandel Resistant Dome [Required] [Not Required].

#### Roof Drain Accessories:

##### Sump Receiver: [Required] [Not Required].

##### Top Mount Sump Receiver: [Required] [Not Required].

##### Under Deck Clamp: [Required] [Not Required].

##### Adjustable Extension Assembly: [Required] [Not Required].

##### Water Dam: [2’] [Not Required].

##### Internal Water Dam: [2”] [4”] [Not Required].

##### 90 deg. Outlet: [Required] [Not Required].

##### Stainless Steel Perforated Extensions: [2”] [4”] [6”] [Not Required].

##### Stainless Steel Perforated Gravel Guard: [2”] [4”] [Not Required].

##### Stainless Steel Mesh Dome Cover: [Required] [Not Required].

### Promenade Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-R6i Series] [868-Q6i Series] [868-R6iN Series] [868-Q6iN Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Promenade Roof Drain Description:

##### Standard: ASME A112.6.4.

##### Promenade Roof Drain Body:

###### Body Material: Cast Iron.

###### Dimension of Body: Nominal: [16 inch].

###### Outlet Connection Type: No-Hub.

###### Connection Size: Same as connected drainage piping

##### Promenade Roof Drain Top Grate & Frame:

###### Top Grate and Frame Material: [Ductile Iron] [Ductile Iron with Nickel Bronze Veneer].

###### Top Grate and Frame Shape: [Round [Square].

###### Vandel Resistant Grate: [Required [Not Required].

##### Promenade Roof Drain Options:

###### Sump Receiver: [Required [Not Required].

###### Top Mount Sump Receiver: [Required [Not Required].

###### Under Deck Clamp: [Required [Not Required].

###### Adjustable Extension Assembly: [Required] [Not Required].

###### Threaded Extension Assembly: [Required] [Not Required].

###### Extra Heavy-Duty Grate: [Required] [Not Required].

###### Stainless Steel Perforated Extensions: [2”] [4”] [6”] [Not Required].

### Scupper Roof Drain: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-SA Series] [868-SF Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Scupper Roof Drain Description:

##### Standard: ASME A112.6.4.

##### Scupper Roof Drain Body:

###### Body Material: [Cast Iron].

###### Dimension of Body: Nominal: [7-inch X 7-inch] <Insert description and dimensions>.

###### Outlet Connection Type: No-Hub.

###### Connection Size: Same as connected drainage piping <Insert description>

##### Scupper Roof Drain Top Grate & Frame:

###### Top Grate and Frame Material: Aluminum.

###### Top Grate and Frame Shape: [Angled] [Flush].

###### Vandel Resistant Grate: [Required] [Not Required].

### Downspout Nozzles: <Insert drawing designation if any>:

#### Basis-of-Design Product: Subject to compliance with requirements, provide Sioux Chief Manufacturing [868-N Series] [868-N(\_)S Series]:

##### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Downspout Nozzles Description:

##### Standard: ASME A112.6.4.

##### Body Material: [Nickel Bronze] [Stainless-Steel].

##### Dimension of Body: Nominal: 7-inch X 7-inch.

##### Connection Type: FiP Threaded.

##### Connection Size: Same as connected drainage piping.

##### Bird Screen: [Required [Not Required].

## Trench Drainage Systems:

Copy paragraphs below and re-edit for each product.

Insert drawing designation for each product required. Use these designations on Drawings to identify each product.

### Polymer Trench Drain

#### HPDE 6”, Integral Slope Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-S Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### HDPE Low Profile Trench Drain Description:

###### Channel:

Channel Material: HPDE.

Construction Cover: Required.

Slope: Integral 0.75% Slope.

Channel Width: 6” O.D with 4.5” i.D.

Depth: <Specify any depth restrictions>.

Outlet Type: [Integral Bottom Outlet] [End Outlet].

Outlet Size: 4 inch.

The Heavy-duty Frame should be used in H20 & Class C and above applications. Stainless Steel Edge Rails should only be used with Stainless steel grates.

###### Heavy Duty Frame: [Ductile Iron] [Ductile Iron with Stainless Steel Edge Guards] [Not Required].

###### Grate Locking System: Stainless Steel Anchors.

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating, Grate ADA & Heel Proof requirements.

###### Grate Type:

[SLOTTED DIAGONAL, DUCTILE IRON, CLASS C, ADA HEEL PROOF GRATE].

[CROSS-SLOT, DUCTILE IRON, CLASS C, ADA GRATE].

[SLOTTED, DUCTILE IRON WITH FRAME, CLASS D Grate].

[Cross-Slot, Ductile Iron, Class F Grate].

[PERFORATED, STAINLESS, CLASS A, ADA, HEEL PROOF Grate].

[SLOTTED, STAINLESS, CLASS A GRATE].

[SLOTTED DIAGONAL, STAINLESS, CLASS A, ADA, HEEL PROOF].

[SLOTTED REINFORCED, STAINLESS, CLASS C GRATE].

[BRICK SLOT, STAINLESS, CLASS C GRATE].

[BRICK SLOT STAINLESS, CLASS C GRATE].

[SLOTTED, POLYPROPYLENE, CLASS A, ADA, HEEL PROOF GRATE].

[SLOTTED, HDPE, CLASS A GRATE].

[PERFORATED GALVANIZED, CLASS A, ADA, HEEL PROOF GRATE].

[SLOTTED GALVANIZED, CLASS A GRATE].

[SLOTTED REINFORCED GALVANIZED, CLASS C GRATE].

#### HPDE 6”, Low Profile Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-NS Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### HDPE Low Profile Trench Drain Description:

###### Channel:

Channel Material: HPDE.

Construction Cover: Required.

Slope: Neutral.

Channel Width: 6” O.D with 4.5” i.D.

Channel Depth: 3.5 inch.

Outlet Type: [Integral Bottom Outlet] [End Outlet].

Outlet Size: 4 inch.

The Heavy-duty Frame should be used in H20 & Class C and above applications. Stainless Steel Edge Rails should only be used with Stainless steel grates.

###### Heavy Duty Frame: [Ductile Iron] [Ductile Iron with Stainless Steel Edge Guards] [Not Required].

###### Grate Locking System: Stainless Steel Anchors.

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating, Grate ADA & Heel Proof requirements.

###### Grate Type:

[SLOTTED DIAGONAL, DUCTILE IRON, CLASS C, ADA HEEL PROOF GRATE].

[CROSS-SLOT, DUCTILE IRON, CLASS C, ADA GRATE].

[SLOTTED, DUCTILE IRON WITH FRAME, CLASS D Grate].

[Cross-Slot, Ductile Iron, Class F Grate].

[PERFORATED, STAINLESS, CLASS A, ADA, HEEL PROOF Grate].

[SLOTTED, STAINLESS, CLASS A GRATE].

[SLOTTED DIAGONAL, STAINLESS, CLASS A, ADA, HEEL PROOF].

[SLOTTED REINFORCED, STAINLESS, CLASS C GRATE].

[BRICK SLOT, STAINLESS, CLASS C GRATE].

[BRICK SLOT STAINLESS, CLASS C GRATE].

[SLOTTED, POLYPROPYLENE, CLASS A, ADA, HEEL PROOF GRATE].

[SLOTTED, HDPE, CLASS A GRATE].

[PERFORATED GALVANIZED, CLASS A, ADA, HEEL PROOF GRATE].

[SLOTTED GALVANIZED, CLASS A GRATE].

[SLOTTED REINFORCED GALVANIZED, CLASS C GRATE].

#### HPDE 15”, Graded Slope Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-TN Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### HDPE Graded Trench Drain Description:

###### Channel:

Channel Material: HPDE.

Channel Width: 15” O.D with 11.89” i.D.

Outlet Type: [Integral Bottom Outlet] [End Outlet].

Outlet Size: 8 inch.

The Heavy-duty Frame should be used in H20 & Class C and above applications. Stainless Steel Edge Rails should only be used with Stainless steel grates.

###### Heavy Duty Frame: Ductile Iron.

###### Grate Locking System: Stainless Steel Anchors.

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating, Grate ADA & Heel Proof requirements.

###### Grate Type:

[SLOTTED, DUCTILE IRON CLASS D GRATE].

[SLOTTED, DUCTILE IRON CLASS F GRATE].

#### HPDE In-Line Catch Basin <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-FC Series] [865-TNCB Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### HPDE In-Line Catch Basin Description:

###### Body:

Channel Material: HPDE.

Body Width: Width should match the trench channel.

Body Depth: [23.75 inch] [33.5 inch for HPDE 15” system].

Outlet Type: Side Outlet.

Outlet Size: [4 inch] [6 inch].

The Heavy-duty Frame should be used in H20 & Class C and above applications. Stainless Steel Edge Rails should only be used with Stainless steel grates.

###### Heavy Duty Frame: [Match Trench Drain System] [Ductile Iron] [Ductile Iron with Stainless Steel Edge Guards] [Not Required].

###### Grate Locking System: Stainless Steel Anchors.

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating, Grate ADA & Heel Proof requirements.

###### Grate Type:

[MATCH TRENCH DRAIN SYSTEM].

[SLOTTED DIAGONAL, DUCTILE IRON, CLASS C, ADA HEEL PROOF GRATE].

[CROSS-SLOT, DUCTILE IRON, CLASS C, ADA GRATE].

[SLOTTED, DUCTILE IRON WITH FRAME, CLASS D Grate].

[Cross-Slot, Ductile Iron, Class F Grate].

[PERFORATED, STAINLESS, CLASS A, ADA, HEEL PROOF Grate].

[SLOTTED, STAINLESS, CLASS A GRATE].

[SLOTTED DIAGONAL, STAINLESS, CLASS A, ADA, HEEL PROOF].

[SLOTTED REINFORCED, STAINLESS, CLASS C GRATE].

[BRICK SLOT, STAINLESS, CLASS C GRATE].

[BRICK SLOT STAINLESS, CLASS C GRATE].

[SLOTTED, POLYPROPYLENE, CLASS A, ADA, HEEL PROOF GRATE].

[SLOTTED, HDPE, CLASS A GRATE].

[PERFORATED GALVANIZED, CLASS A, ADA, HEEL PROOF GRATE].

[SLOTTED GALVANIZED, CLASS A GRATE].

[SLOTTED REINFORCED GALVANIZED, CLASS C GRATE].

[SLOTTED, DUCTILE IRON CLASS D GRATE].

[SLOTTED, DUCTILE IRON CLASS F GRATE].

### Pre-Cast Concrete Trench Drain

#### Pre-Cast Concrete Graded Slope Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-M4N Series] [865-M6N Series] [865-M8N Series] [865-M12PN Series] [865-M16PN Series]

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Pre-Cast Concrete Low Profile Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-M4LP Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### Pre-Cast Concrete Trench Drain Description:

###### Channel:

Channel Material: Pre-Cast Concrete.

Compressive strength: C35/45 and DIN EN 206

Frost and de-icing salt resistant: DIN EN 1433 Class +R

Fire Rating: A2 -non-combustible, no smoke, no burning drip per DIN 4102.

Thermal expansion/contraction: 1 x 10 -6 mm/Kelvin\*

Maximum water penetration depth: 8 mm watertight per DIN EN 143.

Channel Width: [6” O.D with 3.94” i.D.] [8” O.D with 5.91” i.D.] [10” O.D with 7.87” i.D.] [15” O.D with 11.89” i.D.] [19” O.D with 15.75” i.D.].

Depth: <Specify Channel height and any depth restrictions>.

Outlet Type: [End Outlet Section] [Bottom Outlet Section].

Outlet Size: [4 inch] [6 inch] [8 inch].

###### Integral Edge Rails: Ductile iron with HDPE inserts per ASTM A536 70-50-05.

###### Grate Locking System: [Boltless] [F1].

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating & Grate ADA requirements.

###### Grate Type:

[Slotted, Ductile Iron, Class C, ADA Grate].

[Slotted, Ductile Iron, Class C, Grate].

[Longitudinal Slotted, Ductile Iron, Class D, ADA Grate].

[High Flow, Ductile Iron, Class E, Grate].

[Longitudinal Slotted, Ductile Iron, Class E, ADA Grate].

[Longitudinal Slotted, Ductile Iron, Class F, ADA Grate].

#### Pre-Cast Concrete In-Line Catch Basin <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-M4CB Series] [865-M6CB Series] [865-M8CB Series] [865-M12PCB Series] [865-M16PCB Series]

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### Pre-Cast Concrete In-Line Catch Basin Description:

###### Body:

Channel Material: Pre-Cast Concrete.

Compressive strength: C35/45 and DIN EN 206

Frost and de-icing salt resistant: DIN EN 1433 Class +R

Fire Rating: A2 -non-combustible, no smoke, no burning drip per DIN 4102.

Thermal expansion/contraction: 1 x 10 -6 mm/Kelvin\*

Maximum water penetration depth: 8 mm watertight per DIN EN 1433.

Body Width: Width should match the trench channel.

Outlet Type: Side Outlet.

Outlet Size: [6 inch] [8 inch].

###### Integral Edge Rails: Ductile iron with HDPE inserts per ASTM A536 70-50-05.

###### Grate Locking System: [Boltless] [F1].

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating & Grate ADA requirements.

###### Grate Type:

[Slotted, Ductile Iron, Class C, ADA Grate].

[Slotted, Ductile Iron, Class C, Grate].

[Longitudinal Slotted, Ductile Iron, Class D, ADA Grate].

[High Flow, Ductile Iron, Class E, Grate].

[Longitudinal Slotted, Ductile Iron, Class E, ADA Grate].

[Longitudinal Slotted, Ductile Iron, Class F, ADA Grate].

### Ductile Iron Trench Drain

#### Ductile Iron Monolithic Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-HB4 Series] [865-HB6 Series] [865-HB8 Series] [865-HB12 Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### Ductile Iron Monolithic Trench Drain Description:

###### Channel:

Channel Material: Enamel-coated ductile iron per ASTM A536 70-50-05.

Channel Width: [5” O.D with 4.40” i.D.] [7” O.D with 6.61” i.D.] [9” O.D with 8.46” i.D.] [12.87” O.D with 11.80” i.D.].

Outlet Type: [End Outlet Section] [Bottom Outlet Section].

Outlet Size: Same Size as the Channel O.D.

###### Access Channel: A minimum of one access channel should be placed every 50ft or as code requires.

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating & Grate ADA requirements.

###### Grate Type:

[High Flow, Ductile Iron, Class F, Monolithic Grate].

[Longitudinal Slotted, Ductile Iron, Class F, ADA, Monolithic Grate].

#### Ductile Iron Monolithic In-Line Catch Basin <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-HB4CB Series] [865-HB6CB Series] [865-HB8CB Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### Ductile Iron Monolithic In-Line Catch Basin Description:

###### Body:

Channel Material: Enamel-coated ductile iron per ASTM A536 70-50-05.

Channel Width: Width should match the trench channel.

Outlet Type: Side Outlet.

Outlet Size: [6 inch] [8 inch for 865-HB8 Series].

Retain 1 of the below Subparagraph for “Grate Type” to identify a specific Grate material, Grate load rating & Grate ADA requirements.

###### Grate Type:

[High Flow, Ductile Iron, Class F, Removable Grate].

[Longitudinal Slotted, Ductile Iron, Class F, ADA, Removable Grate].

#### Ductile Iron Low Profile Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-HL Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### Ductile Iron Monolithic Trench Drain Description:

###### Channel:

Channel Material: Ductile Iron per ASTM A536 70-50-05.

Channel Width: 5”.

Outlet Type: [Bottom Outlet Section] [Curb Outlet Section].

Outlet Size: 4 inch.

Load Rating: Class F.

### Aluminum Trench Drain

#### Aluminum Low Profile Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-HLP Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

##### Aluminum Low Profile Trench Drain Description:

###### Channel:

Channel Material: Aluminum.

Channel Width: 5”.

Outlet Type: Bottom Outlet Section.

Outlet Size: 4 inch.

Load Rating: Class F.

ADA: Required.

### Stainless Steel Trench Drain

#### Stainless 6”, Graded Slope Trench Drain <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, Sioux Chief Manufacturing [865-NSS Series]:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

Retain subparagraph and associated subparagraphs below for ASME A112.3.1, stainless-steel channel drainage systems.

##### *Stainless* *6*”, Graded Slope Trench Drain:

###### Channel:

Channel: 304 Stainless with leveling Feet.

Connection Type: Flanged & Gasket Joints.

Slope: Neutral.

Channel Width: 6”.

Depth: 6”.

Outlet Type: [Bottom Outlet] [End Outlet].

Outlet Size: 4 inch.

###### Grate Locking System: Stainless Steel Anchors.

###### Grate Type:

###### [SLOTTED, 304 STAINLESS, CLASS A GRATE].

###### [SLOTTED ANGLED, 304 STAINLESS, CLASS A, ADA, HEEL PROOF GRATE].

###### [PERFORATED SQUARE, 304 STAINLESS, CLASS A, ADA, HEEL PROOF GRATE].

###### [PERFORATED SQUARE REINFORCED, 304 STAINLESS, CLASS B, ADA, HEEL PROOF GRATE].

###### [MESH, 316 STAINLESS, CLASS C, ADA, HEEL PROOF GRATE].

###### [LADDER GRATING, 304 STAINLESS, CLASS C GRATE].

###### [SLOTTED, 304 STAINLESS, CLASS C, GRATE].

## ROOF FLASHING ASSEMBLIES

Copy paragraph below and re-edit for each product.

Insert drawing designation for each product required. Use these designations on Drawings to identify each product.

### Roof Flashing Assemblies <Insert drawing designation if any>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

#### Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed. Retain option and delete insert note if manufacturer's name and model number are indicated on Drawings.

##### Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:

###### Substitutions: [Under provisions of Division 01.] [Not permitted.]

#### Description: Manufactured assembly made of [4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch- (1.6-mm-)] [6.0-lb/sq. ft. (30-kg/sq. m), 0.0938-inch- (2.4-mm-)] thick, lead flashing collar and skirt extending at least [6 inches (150 mm)] [8 inches (200 mm)] [10 inches (250 mm)] from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

Retain one or more of three subparagraphs below. If retaining more than one, indicate location of each on Drawings.

### Open-Top Vent Cap: Without cap.

#### Low-Silhouette Vent Cap: With vandal-proof vent cap.

#### Extended Vent Cap: With field-installed, vandal-proof vent cap.

## FLASHING MATERIALS

Coordinate this article with Section 076200 "Sheet Metal Flashing and Trim" and Section 077200 "Roof Accessories."

Coordinate first two paragraphs and associated subparagraphs below with Section 076200 "Sheet Metal Flashing and Trim" if used on roofs.

### Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

### General Use: 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.

### Vent Pipe Flashing: 3.0-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.

### Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.

Coordinate first two paragraphs and associated subparagraphs below with Section 076200 "Sheet Metal Flashing and Trim" if used for drainage receptors.

### Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:

### General Applications: 12 oz./sq. ft. (3.7 kg/sq. m or 0.41-mm thickness).

### Vent Pipe Flashing: 8 oz./sq. ft. (2.5 kg/sq. m or 0.27-mm thickness).

### Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch (1.01-mm) minimum thickness, unless otherwise indicated. Include G90 (Z275) hot-dip galvanized, mill-phosphatized finish for painting if indicated.

### Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

### Fasteners: Metal compatible with material and substrate being fastened.

### Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

### Solder: ASTM B 32, lead-free alloy.

### Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

# EXECUTION

## INSTALLATION

### Install components in accordance with manufacturer's instructions and approved product data submittals.

### Location: Install roof drains at low points of the roof to ensure proper drainage.

### Install Area Parking and Trench drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

#### Position Area Parking and Trench drains for easy access and maintenance.

#### Set Area Parking and Trench drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:

##### Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.

##### Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.

##### Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.

#### Install Area & Parking flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.

Retain one of first two paragraphs below.

### Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

### Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.

### Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.

### Assemble and install ASME A112.3.1, stainless-steel channel drainage systems according to ASME A112.3.1. Install on support devices so that top will be flush with surface.

### Assemble non-ASME A112.3.1, stainless-steel channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.

### Assemble polymer trench drain system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.

## CONNECTIONS

Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified in piping systems. If Drawings are explicit enough, these requirements may be reduced or omitted.

### Drainage Piping: Connect roof drains to the appropriate drainage system using properly sized pipes and fittings.

## FLASHING INSTALLATION

Coordinate this article with Section 076200 "Sheet Metal Flashing and Trim."

#### Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:

##### Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.

##### Copper Sheets: Solder joints of copper sheets.

#### Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

##### Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.

##### Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.

##### Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.

#### Set flashing on floors and roofs in solid coating of bituminous cement.

#### Secure flashing into sleeve and specialty clamping ring or device.

Retain one or both paragraphs below.

#### Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 076200 "Sheet Metal Flashing and Trim."

#### Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

Coordinate paragraph below with Section 076200 "Sheet Metal Flashing and Trim."

#### Fabricate and install flashing and pans, sumps, and other drainage shapes.

## FIELD QUALITY CONTROL

### Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

### Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

## PROTECTION

### Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

### Place plugs in ends of uncompleted piping at end of each day or when work stops.

# END OF SECTION 221400 – FACILITY STORM DRAINAGE