City of Watertown

Proposed City Council Agenda
City Hall, 23 2ND ST NE
Watertown, South Dakota
December 2, 2024, 5:30 PM

Page

1. CALL TO ORDER

2. PRAYER

3. PLEDGE OF ALLEGIANCE

4. ROLL CALL

5. ACTION TO APPROVE THE AGENDA

6. OPEN FORUM

7. CONSENT AGENDA

(a)	Approval of the minutes of the Council meeting held on November 18th, 2024. City Council - Nov 18 2024 - Minutes	4 - 9
(b)	Approval of a Business License to R&R Heating and Air as a Gasfitting Contractor ($250) and a transfer of Brad Fisher's Gasfitter License to R&R Heating and Air ($25). R&R Heating and Air	10 - 13
(c)	Approval of alcoholic beverage license renewals for calendar year 2025 (retail on-sale liquor, retail on-off sale wine and cider). Alcoholic Beverage Renewal	14 - 15
(d)	Application for a Special Event Retail License to Zeus Inc d/b/a Second Street Station for the Terex Holiday Party at the Codington County Extension Building, 1910 W Kemp Ave, W17' of Lot 60 & all of Lots 61-71 W110' of Lots 72-82 & all of Lots 83-93, Way's 4th Lake Drive Addn from 5:00 PM on Saturday, December 14th, 2024 until 1:00 AM on Sunday, December 15th, 2024. Second Street Station - Special Event License	16 - 20
(e)	Approval to write-off uncollectible Ambulance accounts receivable and remit to the collection agency for the month of October in the amount of $11,121.89. Noncollectable Ambulance Bills	21 - 22
(f)	Approval to Purchase State Bid products through Office Peeps for the Furniture, Fixtures and Equipment (FF&E) package for the Wells Fargo Renovation and Addition for City Hall, Project No. 2035, in the total amount of $514,960.58.	23 - 68

Quote Award for FF&E for New City Hall, Project No. 2035

(g) Approval of bills and payroll and authorization to pay

8. PRESENTATIONS & REPORTS

(a) 2024 Bridge Inspection Report to Council 69 - 71

2024 Bridge Inspection Report to Council

9. CONTRACTS & CHANGE ORDERS

(a) Approval of Change Order No. 2-Final for the 2024 Pickleball Facility, Project No. 2408, with Timmons Construction Inc., for an increase of $18,045.20 for a new contract price of $605,096.54. 72 - 76

Change Order No. 2-Final for Project No. 2408

10. ORDINANCE FIRST READINGS

(a) First Reading of Ordinance No. 24-22 to supplement the 2024 Budget for various Departments and Projects & State and Federal Grant Appropriations 77 - 80

Ordinance No. 24-22

11. PUBLIC HEARINGS & SECOND READINGS

(a) Application for a New Retail (on-off sale) Malt Beverage & SD Farm Wine License to MADJIK, LLC d/b/a Legends, 825 3rd St SW, Lots 1-7 Block 93 & Lots 1-8, Block 94 of the 5th Railway Addition to the Municipality of Watertown, Codington County, South Dakota. 81 - 97

1. Public Hearing
2. Council Action

MADJIK LLC dba Legends

12. OTHER BUSINESS

(a) Planning Commission & Board of Adjustment Appointments

(b) Approval of Resolution No. 24-33, Adoption of Revisions of the Engineering Design Standards. 98 - 437

Resolution No. 24-33

(c) Approval of Resolution No. 24-36, a Resolution Authorizing Signatures of Warrants and Attestation for the City of Watertown 438 - 441

Resolution No. 24-36

13. CITY COUNCIL MEMBER ANNOUNCEMENTS AND INTRODUCTION OF TOPICS FOR FUTURE DISCUSSION

14. CITY MANAGER REPORT

15. EXECUTIVE SESSION PURSUANT TO SDCL 1-25-2

16. ADJOURNMENT

Kristen Bobzien

Chief Financial Officer

The City of Watertown, South Dakota does not discriminate on the basis of race, color, national origin, sex, religion, age or disability in employment or the provision of services. ADA Compliance:

The City of Watertown fully subscribes to the provisions of the Americans with Disabilities Act. If you desire to attend this public meeting and are in need of special accommodations, please notify the City Finance Office 24 hours prior to the meeting so that appropriate auxiliary aids and services are available.

Watertown
City Council Meeting Minutes
November 18, 2024

The City Council met in regular session at 5:30 PM in the City Hall Council Chambers, 23 2ND ST NE. Mayor Ried Holien presiding.

Present upon roll call: Alderperson Buhler, Danforth, Jurrens, Schutte, Tupper and Mayor Holien. Absent: Alderperson Peters.

Mayor Holien added a Presentation by Terry Hoffman of City Transit to Presentations and Reports. Mayor Holien also added Authorization for the Finance Officer to issue Special Checks to the last item under Other Business.

Motion by Buhler, seconded by Danforth, to approve the agenda as amended. Items approved as part of the consent agenda: minutes of the Council meeting held on November 4th, 2024; business license to Hydro-Klean, LLC as a Liquid Waste Hauler ($100.00 plus $20.00 per vehicle); the renewal of alcoholic beverage license renewals for calendar year 2025 (package off-sale liquor, retail on-sale liquor, retail on-off sale wine and cider); application for a Special Event Retail License to The Shamrocks & Edelweiss Corp d/b/a Dempsey's Brewery Pub & Restaurant for the Carnegie Christmas Market, 27 1st Ave SE, E75' Lot 7 and E75' S1/2 Lot 6 Blk 9 Original Plat from 3:00 PM on Thursday, December 5th, 2024 until 5:00 PM on Sunday, December 8th, 2024; application for a Special Event Retail License to Reve LLC d/b/a Watertown Brewing Company for the Carnegie Christmas Market, 27 1st Ave SE, E75' Lot 7 and E75' S1/2 Lot 6 Blk 9 Original Plat from 5:00 PM on Thursday, December 5th, 2024 until 4:00 PM on Sunday, December 8th, 2024; Declaration of Surplus Property and authorization to sell at online auction or dispose of as junk; a Pyrotechnics or Open Flame Permit Application for Fireworks show display by Lew's Fireworks at Holiday Lighted Parade on November 29,2024; Pyrotechnics or Open Flame Permit Application for Fireworks show display by Logan McKeever at 1500 South Lake Drive on November 21, 2024; Change Order No. 1 (Final) for the 2024 Park & Recreation Fence Improvements, Project No. 2409-B to LT Companies Inc. for an Increase of $4,590.40 for a New Contract Amount of $160,574.74; Certificate of Completion for Calvin Industrial Park Second Addition, Installed by L L & Sons Excavating Inc, Clausen's Construction Inc, East River Contracting, Slip Rock Landscaping, Sentry, and Duininck Inc. on behalf of the Developer, Watertown Development Company. Motion Carried.

ALCOHOLIC BEVERAGES FOR 2025

PACKAGE (Off Sale) LIQUOR LICENSES:

1. 4 Amigos LLC, Cowboy Country Stores #1, 311 10th St NW, Lots 15-16 & 22-28, Lots 22-28, Blk 16, Davis Addition; vacated 10th St W right-of-way lying between S 1/2 of Blk 15 and S1/2 of Blk 16, Davis Addition; Lot 14, Blk 15, Davis Addition less that part of Lot 14 lying North and East of Hwy #20 right-of-way; and Lots 15-19, Blk 15, Davis Addition
2. 4 Amigos LLC, Cowboy Country Stores #3, 1400 4th St NE, W250' of the S250' of Lot #3 of Plat entitled Lots 1-5 of Northridge Addition to Watertown
3. Binde Enterprises, Inc., Highway 81 Liquors, 507 Arrow Ave, Lots 6-7, Blk 19, R. E. Pettigrew's Addn
4. Conda R. Williams, The Prop, 728 S Lake Drive, W6 rods of 2 less S40 rods & Lot 3 less 40 rods & less W450' of Lot 3 & less Forsberg Addn, 29-117-53
5. Dakota Butcher- Watertown, Inc., Dakota Butcher – Watertown Inc., 1330 9th Ave SW, Lot 1 West Laqua Addn
6. Discount Liquors Inc., Discount Liquors, 125 9th Ave SE, Lots 8-10 & Vacated Alley in Blk 7, Martin's Railway Addition

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7. Doris K. Wilkey, Kampeska Lodge & Liquor Store, 436 N Lake Drive, Outlots 8 & 14 in the SW Quarter of 9-117-53 less Section Line Right of Way, and Outlot 17 less Platted Parts, and Lot 14 of Plat of Part of Outlots 17 & 18 (Last Named Honska Ave) 9-117-53
8. Hy-Vee, Inc., Hy-Vee Wine & Spirits, 1341 9th Ave SE, Lots 36-39, Blk 8 of Gesley's Addn
9. TRP Inc., LT's Liquors, 1036 29th St SE, Lot 4 Rieffenberger 1st Addn

RETAIL (On Sale) LIQUOR LICENSES:

1. American Legion, Codington Co. Post 17, 1412 9th Ave SW, N396' of W215' of E365' of Govt Lot 3, 1-116-53
2. APO LLC, Sandy's Bar & Grill, 519 9th Ave SE, The West 34' of the East 90.7' of the South 8' of Lot 5 and the West 34' of the East 90.7' of Lots 6 and 7 all in Block G of Burchard's Addition to the City of Watertown, Codington County, South Dakota
3. Apple H20, LLC, Applebee's Neighborhood Grill & Bar, 2630 9th Ave SE, Lot 19 Less the S52.64' Endres Ind Addition
4. Biever Enterprise, Inc., Senor Max's, 1 300 9th Ave SE Unit 30, Suite 30 of Lots 1 & 2, Less Lot H1 Watertown Mall Associates an Ohio Limited Partnership Add
5. Bobby D's LLC, Bobby D's, 724 Stony Point Trail, That Portion of Government Lot 3 Lying South and West of Forsberg Addition; and the South 1557.05' of Government Lot 3, Less the South 40 Rods, Less Forsberg Addition, Less the East 325., all in Section 29, Township 117 North, Range 53 West of th E 5th P.M., Codington County, South Dakota; and the East 545' of the West 639' of the North 483' less the east 68' of the West 545' of the South 110' of the North 320'; and the East 52' of the West 691' of the North 130' all Described from the Original Platted Boundaries of Outlot "A" of the Plat Entitled, "Prairie Hills Development Second Addition to the Municipality of Watertown, in the County of Codington, South Dakota"; and the West 65' of Lot 1 of the Plat Entitled, "Prairie Hill Development Second Addition to the Municipality of Watertown, in the County of Codington, South Dakota"
6. Bracht Enterprises, Inc. Duffy's Bar, 22 Broadway St N, N25'8" of the S75' of Lots 11-14, Blk 4, Original Plat
7. City of Watertown, Danger Von Dempsey's ATY, 550 E Airport Drive, Lot 1 Watertown Airport First Subdivision to the Municipality of Watertown, Codington County, South Dakota
8. Cloud 9 Golf Course, Inc., Cloud 9 Golf Course, 625 20th Ave SE, OL6 of the SW ¼ Sec. 5-116-52 less Suite 1
9. Commonwealth Gaming & Holdings Corp, Deuces Casino 12, 137 5th St NE Ste 102, Wtn City Pettigrew's Addn, Haggar's Subdiv, Blk 20 ABC: Lots A & B, Blk 20, Pettigrews Addn
10. D&M Entertainment, Inc., Doc's Bar, 33 N Maple, Lots 1-4, Blk 4, Orig Plat Addn
11. LRC Hospitality LLC, Harry's, 16 W Kemp, Parcel I: E25' of Lot 14, Blk 8 of Wtn; & Lot 1 of Monks' Subd of Lots 12, 13 & 14, Blk 8 of Wtn. Parcel II: W25' of E50' of Lot 14, Blk 8 of Wtn & Lot 2 of Monks' Subdiv of Lots 12, 13, & 14, Blk 8 of Wtn.
12. MLGE, Inc., Willy's, 1401 9th Ave SW, Lot 1, Blk 1, Watertown Dev Addn
13. Number One Casino, Inc., Number One Casino, 1006 14th Street SE, W1/2 of Lots 10 & 11, Blk 1, East Acres Addn
14. Prairie Winds Golf Club, LLC, Prairie Winds Golf Club, 555 S Lake Drive, Suite A, Pt of Lot B & C, Pt E7' and SW ¼ less Rd to Co and OL1 & Country Club OL "A" 28-117-53
15. RBM1 LLC., 212 Casino and Smoke Shop, 1317 5th Ave SE, Lots 27-30, Block 8, Gresley's Second Addition to Watertown
16. Sandbar, LLC, The Sandbar, 100 N Lake Drive, Smith Outlot less SE 130'
17. TBN LLC, Lone Pine, 2647 10th Ave SE, E109' of Lot 2 of Wheel City Addition to the Municipality of Watertown, Codington County, South Dakota
18. Tommy's Lanes Inc., Tommy's Lanes Inc., 16 S Maple, Lot 11 & S1/2 of Lot 12, Blk 10, Original Plat Addn
19. Veterans of Foreign Wars, Frank H. Adams Post 750, 808 S Broadway, Lots 34-39, Blk 6 Martin's Railway Addn
20. W&P of Watertown LLC, Buffalo Wild Wings, 2700 9th Ave SE #100, Lot 2 of Endres Investment 8th Addition to Municipality of Watertown
21. Watertown Mavericks, LLC., Mavericks Steaks and Cocktails, 100 East Kemp Ave Suite B, W115' N1/2 & S10' N1/2 E50' Lot 12 & W65.22' N1/2 & W115' S1/2 Lot 13 & W65.22' Lot 14, Block 10, Original Plat & W50.75' E101.26' N25' Lot 13 & W50.75' E101.26' Lot 14, Block 10, Original Plat
22. Woody's Sports Bar LLC, Woody's Sports Bar LLC, 1612 9th Ave SW, E224' W397' N275' & E93' W397' S237.25' N512.25' of Govt Lot 3, City Lands
23. WR Capital I, LLC, Minerva's Restaurant & Bar, 1901 9th Ave SW, E510.5' W900' S720' less W251.5' N124' & less N98' S596' E64.62' W395' & less H-3 City Lands 36-117-53 & E259' of W900' of N250' of S970' SW1/4 & Ramkota Addn plus Lot 4 & W 93.3' of Lot 5 of Turbes Addn to the City of Watertown

RETAIL (On-Off Sale) WINE LICENSES:

1. Aldi Inc., Aldi Foods #111, 2822 8th Ave SE, Lot 4, Blck 1 of East Park 2nd Addition
2. Backroads Coffeehouse & Lunchboxx LLC, Backroads Coffeehouse & Lunchboxx LLC, 1519 4th St NE, Lot 9, North Grove Addition

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3. Casey's Retail Company, Casey's General Store #2455, 405 10th St SW, the North 40' of the East 150' of Lot 1 (Being that Portion of Lot 1 Lying Directly South of Lot 2 of Swifts Subd) of the Swift's Subdivision of the NE ¼ of the NW ¼ of the SE ¼ of Section 36, Township 117 North of Range 53, West of the 5th PM in Watertown, Codington County, South Dakota
4. Casey's Retail Company, Casey's General Store #2089, 185 4th St NE, Lots 1-3 less Lot H1 & N15' Lot 4 less H2 & S35' Lot 4 & E100' Lot 5 & N50' E100" Lot 6 less Lot H1 Block 75 3rd Railway Addition to the town of Watertown, in the County of Codington, South Dakota
5. Casey's Retail Company, Casey's General Store #2445, 20 19th St NE, Lot No 1 in Block No 1 of the Plat Entitled: Willow Creek Plaza First Addition to the Municipality of Watertown, in the County of Codington, South Dakota
6. City of Watertown, Cattail Crossing Golf Course, 351 S Lake Drive, W of the 5th P.M. Government Lot 1 Section 27, T117N R35W of the 5th P.M. less the following; That part of Watertown Water Co. Outlet 1 lying in Government Lot 1; Lot 1 of Lots 1 through 6, a Subdividion of "Watertown-Lake Kampeska Country Club Outlet #1" in Section 27 T117N R35W of the 5th P.M., Codington County, South Dakota; Lots 1 through 7 and Lot 2A of Haywoods Beach, a Subdivision of part of the Watertown Country Club Outlet 1 in Section 27 T117N R35W of the 5th P.M., Codington County, South Dakota; That part of Jackson Park lying in Government Lot 1.
7. Conda R. Williams, The Prop, 728 S Lake Drive, W6 rods of 2 less S40 rods & Lot 3 less 40 rods & less W450' of Lot 3 & less Forsberg Addn, 29-117-53
8. County Fair Foods of Watertown, County Fair Food Store of Watertown, 14 2nd St NE, OL A & Lots 8-14 & W5' Lot 7 Block 2 Original Plat & Dellman's OL & Lots 1-6 & E20' Lot 7 Block 2 Original Plat
9. Dakota Butcher – Watertown East Inc., Dakota Butcher, 1923 Willow Creek Drive, Suites 1 & 2, Suite 1, Lot 1, MarvinEd 2nd Addition, Suite 1
10. Dolgen Midwest LLC, Dollar General Store #25615, 1013 10th Ave NW, Lot 3 of West Watertown Facilities First Addition to the Municipality of Watertown, Codington County, South Dakota, according to the Recorded Plat Thereof
11. Dolgen Midwest LLC, Dollar General Store #21951, 3224 9th Ave SW, Lot 1A in Lot 1 in Block 1 of Isabella First Addition to the Municipality of Watertown, in the County of Codington, South Dakota
12. Dolgen Midwest, LLC, Dollar General Store #21569, 1010 4th St NE, Lot 1 Watertown Dollar General Addition
13. Downtown Sushi 18, Inc., Downtown Sushi 18 Inc., 18 N Broadway, Parcel I- The South 49 feet 4 inches of the West 2 feet of Lot 11, and the South 40 feet of Lots 13 and 14, all in Block 4, Original Plat of Watertown, Codington County, South Dakota, according to the recorded plat thereof, and Parcel II- The South 9.2 feet of the North 125 feet of Lots 13 and 14, in Block 4 of Watertown, Codington County, South Dakota
14. Guadalajara, Inc., Guadalajara Mexican Restaurant, 1509 9th Ave SE #1, Lots 4-7 Roby Subdivision
15. Hector Meza LLC, El Tapatio Family Mexican Restaurant, 717 9th Ave SE, Lots 16-21, Blk 28 Brocks Addn Suite 715
16. Hy-Vee Inc., Hy-Vee, 1320 9th Ave SE, Lot A Watertown Mall Associates Subd Lot 11 of the Plat Entitled: Watertwon Mall Associates on Ohio Limited Partnership Addition to the City of Watertown, located in the NE ¼ Section 5-T116N-R52W of the 5th P.M. Codington County, SD
17. Petrik Holdings LLC, Labbie's Sports Bar & Grill, 1414 9th Ave E Ste C&D, W108' Kranz & Devill OL A & Lot 13 & W108' Lot 14 Blk 1 West Acres Add
18. Raise The Bar LLC, Raise The Bar LLC, 806 Jenson Ave SE, S34' Lot 10 & All Lots 11-12 Block 1 of Davlin's Addition
19. Reve, LLC., Watertown Brewing Company, 113 E Kemp Ave, Lot 1 in John F. Brock's rearrangement of lots 23 and 24 of Block 3, Watertown, Codington County, South Dakota, according to the recorded plat thereof; and Lot 1 in the Vacated Alley Rearrangement in John F. Brock's rearrangement of Lots 23 and 24 in Block 3, Watertown, Cod Cty, SD according to the recorded plat thereof; and Lot 1 in Balsieger's rearrangement of Lot 25 in Blk 3, Watertown, Cod Cty, SD according to the recorded plat thereof
20. SS Retail LLC, Smoke Solutions, 517 9th St NE, Lots 6-7 & S8' Lot 5 in Block G and that part of Vacated 7th Avenue lying between Lot 7 in Block G & Lot 1 in Block H and Lots 1-2 in Block H of Burchards Addition
21. Stone Oil Co., Inc., The Grainery, I-29 & Hwy 212, Lot 1, Block 1 & N200' of S600' of W300', Blk 2, Fox Addn in SE 1/4, 34-117-52
22. The 19th Hole, Inc., The 19th Hole, 28 N Broadway, N65' Lot 11 Less 5'25' N65' W2' & S20' N40' Lots 12-14 Blk 4 Original Plat

Mayor Holien called for Open Forum. Glen Vilhauer, newly elected District 5 Senator, introduced himself to the City Council.

Terry Hoffman, Co-Executive Director of Community Transit, reported to the City Council that ridership has increased significantly within the Community, especially from those who require transportation to work. No action taken.

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Assistant City Manager, Heath VonEye, and Street Superintendent, Rob Beynon, provided a Street Facility Presentation to the City Council. No action taken.

This being the time scheduled for a public hearing on the application for a new Retail (on-off sale) Malt Beverage and SD Farm Wine license to Maria A. Rodriguez, d/b/a Taqueria "La Mexicana," 711 9th Ave SE, Lots 16-21 Blk 28 Brocks Addn Suite 711, the Mayor called for public comment. Hearing no comments from the public, motion by Buhler, seconded by Schutte, to approve the application as presented. Motion Carried.

This being the time scheduled for a public hearing on the application for a new Retail (on-off sale) Malt Beverage and SD Farm Wine license to The Village of Harmony Hill, Inc., d/b/a The Commons of Harmony Hill, 2527 Prairie Park Trail SE - Community Room, Prairie Vista Dining Room, Board Room on the Hill and Bene's Lounge, Community Room, Prairie Vista Dining, Board Room on the Hill and Bene's Lounge of Lot 1A Block 9 of Harmony Hill Second Addition to the Municipality of Watertown in the County of Codington, South Dakota, the Mayor called for public comment. Kathryn Jurrens of the Village of Harmony Hill spoke in favor of the license. Hearing no further comments from the public, motion by Buhler, seconded by Tupper, to approve the application as presented. Motion Carried.

This being the time scheduled for a public hearing on the application for a new Retail (on-off sale) Wine and Cider License to be effective 01/01/2025 for The Village of Harmony Hill, Inc., d/b/a The Commons of Harmony Hill, 2527 Prairie Park Trail SE - Community Room, Prairie Vista Dining Room, Board Room on the Hill and Bene's Lounge, Community Room, Prairie Vista Dining, Board Room on the Hill and Bene's Lounge of Lot 1A Block 9 of Harmony Hill Second Addition to the Municipality of Watertown in the County of Codington, South Dakota, the Mayor called for public comment. Kathryn Jurrens of the Village of Harmony Hill spoke in favor of the license. Hearing no further comments from the public, motion by Danforth, seconded by Schutte, to approve the application as presented. Motion Carried.

This being the time scheduled for a public hearing on a renewal of a Package (off-sale) Liquor License Renewal for 4 Amigos, LLC., Cowboy Country Stores #2, 504 9th Ave SE, Lots 9-11 Lying E of Hwy & All Vacated Alley, Lots 12-15 Lying E of Hwy, Lot 16 & Vacated Alley, Blk 4, Davlins Addn, the Mayor called for public comment. Hearing no comments from the public, motion by Tupper, seconded by Danforth, to approve the renewal as presented. Motion Carried.

This being the time scheduled for a public hearing on the application for a new Retail (on-off sale) Malt Beverage and SD Farm Wine license to Walgreen Co., d/b/a Walgreens #10007, 421 9th Ave SE, Lot 2 less Lot H1 Spies Brothers Addition, the Mayor called for public comment. Hearing no comments from the public, motion by Danforth, seconded by Jurrens, to approve the application as presented. Motion Carried.

This being the time scheduled for a public hearing on a new Retail (on-off sale) Wine and Cider license to Walgreen Co., d/b/a Walgreens #10007, 421 9th Ave SE, Lot 2 less Lot H1 Spies Brothers Addition, the Mayor called for public comment. Hearing no comments from the public, motion by Buhler, seconded by Jurrens, to approve the application as presented. Motion Carried.

This being the time scheduled for a public hearing on the application for a transfer of a Retail (on-off sale) Malt Beverage & SD Farm Wine License from City of Watertown, DBA Prairie Lakes Ice Arena, 3015 1st Ave NE, Lot

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2A Block 3 of the Lakes of Willow Creek First Addition to the Municipality of Watertown, in the County of Codington, South Dakota to City of Watertown, DBA Prairie Lakes Ice Arena, 3015 1st Ave NE, The West 270.12' of the East 310.12' of the South 322.21' of the North 377.79' of Lot 2A, Blk 3 of the Lakes of Willow Creek First Addition to the Municipality of Watertown, in the County of Codington, South Dakota and authorization for the Chief Financial Officer to issue a special check in the amount of $75.00 to the South Dakota Department of Revenue for the transfer fee, the Mayor called for public comment. Hearing no comments from the public, motion by Danforth, seconded by Buhler, to approve the transfer and special check as presented. Motion Carried.

This being the time scheduled for a public hearing on the application for a Retail (on-off sale) Wine and Cider License from City of Watertown, DBA Prairie Lakes Ice Arena, 3015 1st Ave NE, Lot 2A Block 3 of the Lakes of Willow Creek First Addition to the Municipality of Watertown, in the County of Codington, South Dakota to City of Watertown, DBA Prairie Lakes Ice Arena, 3015 1st Ave NE, The West 270.12' of the East 310.12' of the South 322.21' of the North 377.79' of Lot 2A, Blk 3 of the Lakes of Willow Creek First Addition to the Municipality of Watertown, in the County of Codington, South Dakota, the Mayor called for public comment. Hearing no comments from the public, motion by Tupper, seconded by Danforth, to approve the transfer as presented. Motion Carried.

Ordinance No. 24-25 for the 2025 City Budget Appropriation and the 2025 Enterprise Funds Budget was placed on its second reading and the title was read. Motion by Danforth, seconded by Tupper, to approve Ordinance No. 24-25 for the 2025 City Budget Appropriation and the 2025 Enterprise Funds Budget as presented. Motion Carried.

Motion by Schutte, seconded by Buhler, to approve Resolution No. 24-27 establishing fees for city licenses, permits, administration, memberships, user fees and other miscellaneous items. Motion Carried.

Motion by Tupper, seconded by Danforth, to approve Resolution No. 24-31, amending the rate schedule for the Wastewater Utility services for the City of Watertown, and setting an effective date of February 1, 2025. Motion Carried.

Motion by Buhler, seconded by Schutte, to approve Resolution No. 24-32 amending the Solid Waste Rate Schedule. Motion Carried.

Motion by Schutte, second by Jurrens, to authorize the Chief Financial Officer to issue special checks related to the Profit-Sharing Agreement with the Watertown Shamrocks. Motion Carried.

Mayor Holien encouraged the public to shop local this Holiday Season.

Mayor Holien announced that he will be appointing members of City Council to a Succession Plan Committee in order to formulate a plan for hiring a new City Manager.

City Manager Mack asked City Council to vote on their priorities before the upcoming Work Session Meeting to be held at noon on Friday, November, 22nd in the Public Works Conference Room.

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Motion by Tupper, seconded by Danforth, to go in to Executive Session for the purpose of discussing Personal and Contractual Matters. Motion Carried.

Motion by Schutte, seconded by Tupper, to adjourn until 5:30 PM on Monday, December 2nd, 2024. Motion Carried.

The City of Watertown, South Dakota does not discriminate on the basis of race, color, national origin, sex, religion, age, or disability in employment or the provision of service.

Dated at Watertown, South Dakota, November 18th, 2024.

ATTEST:

_____ _____

Kristen Bobzien, Chief Financial Officer Ried Holien, Mayor

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City Council

Agenda Item

Subject: Approval of a Business License to R&R Heating and Air as a Gasfitting Contractor ($250) and a transfer of Brad Fisher's Gasfitter License to R&R Heating and Air ($25).

Meeting: City Council - Dec 02 2024

From: Amanda Mack, City Manager

BACKGROUND INFORMATION:

The applicant has provided payment and adequate proof of insurance and bonding. Gasfitter applicant has passed the gasfitter exam administered by Watertown Municipal Utilities.

FINANCIAL CONSIDERATIONS:

Applicant has paid $250 to the City of Watertown for the Gasfitting Contractor license and $25 for the transfer of the Gasfitter license.

STAFF RECOMMENDATION / SUGGESTED MOTION:

I move to approve the Business License to R&R Heating and Air as a Gasfitting Contractor ($250) and a transfer of Brad Fisher's Gasfitter License to R&R Heating and Air ($25).

ATTACHMENT(S):

R&R Heating and Air

CITY OF WATERTOWN
FINANCE DEPARTMENT

Gasfitting Contractor & Gasfitter License Application

☒ New Application ☐ Renewal ☐ Add Additional Gasfitter(s) ☒ Transfer Licensed Gasfitter(s)

Licensing Year: 2024

Gasfitting Contractor License Information:

Business Name (as it will appear on license)	R+R Heating and Air
Applicant/Owner Name (as it will appear on license)	Brad Fisher
Business Address	1622 Northridge Dr.
City, State, Zip	Watertown, SD 57201
Phone Number	(605) 237-3276
Email Address	rrheatingandair2024@gmail.com
Insurance Company Name (copy of certificate req'd)	Acuity
Insurance Expiration Date	10/9/2025
Bond Company Name (copy of bond req'd)	
Bond Expiration Date	
License Fees (check made payable to City of Watertown)	Gasfitting Contractor: $250 first year/$75 renewal Gasfitter Fee: $75 per gasfitter/per year Transfer Licensed Gasfitter Fee: $25 per gasfitter

Supporting Gasfitter Licenses: (If more gasfitters are to be added, please attach additional information to this application)

Gasfitter #1 - Full Name Brad Fisher	Signature of Gasfitter #1:
Gasfitter #2 - Full Name	Signature of Gasfitter #2:
Gasfitter #3 - Full Name	Signature of Gasfitter #3:

Signature of Business Owner

10/18/2024
Date

TO BE COMPLETED BY CITY OF WATERTOWN

Fee Paid: _____

Receipt Number: _____ Dated: _____

License or Permit Number: _____

City Council Approved On _____

_____
City Manager

_____
Finance Officer

Submit completed application to: City Finance Office, Attn: Records/Licensing Manager, PO Box 910, Watertown SD 57201
Phone# (605) 882-6203 • Fax# (605) 882-6218 • licenses@watertownsd.us

ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 10/17/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
WORLD INSURANCE ASSOCIATES LLC 1820 DAKOTA AVE S PO BOX 1418 HURON SD 57350 Phone: .. Fax: ..	PHONE (A/C, No, Ext): Ext:	FAX (A/C, No):
	E-MAIL ADDRESS:	

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Acuity, A Mutual Insurance Company	14184
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
R&R HEATING & AIR LLC
1622 NORTHRIDGE DR
WATERTOWN SD 57201

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [X] LOC [ ] OTHER:			ZX4240	10/17/2024	10/17/2025	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $100,000 $5,000 Included $2,000,000 $2,000,000
A	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [X] HIRED AUTOS ONLY [X] NON-OWNED AUTOS ONLY			ZX4240	10/17/2024	10/17/2025	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000
	[ ] UMBRELLA LIAB [ ] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $						EACH OCCURRENCE AGGREGATE	
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					[ ] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

Proof of Insurance

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Effective Date: October 23rd, 2024

Western Surety Company

LICENSE AND PERMIT BOND

KNOW ALL PERSONS BY THESE PRESENTS: Bond No. 72684527

That we, R&R Heating and Air, LLC

of Watertown, State of SD, as Principal, and WESTERN SURETY COMPANY, a corporation duly licensed to do surety business in the State of South Dakota, as Surety, are held and firmly bound unto the City of Watertown, State of South Dakota, as Obligee, in the penal sum of Ten Thousand and 00/100 DOLLARS ($10,000.00), lawful money of the United States, to be paid to the Obligee, for which payment well and truly to be made, we bind ourselves and our legal representatives, firmly by these presents.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, That whereas, the Principal has been licensed SD Plumbing Contractor

_____ by the Obligee.

NOW THEREFORE, if the Principal shall faithfully perform the duties and in all things comply with the laws and ordinances, including all amendments thereto, pertaining to the license or permit applied for, then this obligation to be void, otherwise to remain in full force and effect until October 23rd, 2025, unless renewed by Continuation Certificate.

This bond may be terminated at any time by the Surety upon sending notice in writing, by First Class U.S. Mail, to the Obligee and to the Principal at the address last known to the Surety, and at the expiration of thirty-five (35) days from the mailing of said notice, this bond shall ipso facto terminate and the Surety shall thereupon be relieved from any liability for any acts or omissions of the Principal subsequent to said date. Regardless of the number of years this bond shall continue in force, the number of claims made against this bond, and the number of premiums which shall be payable or paid, the Surety's total limit of liability shall not be cumulative from year to year or period to period, and in no event shall the Surety's total liability for all claims exceed the amount set forth above. Any revision of the bond amount shall not be cumulative.

Dated this 24th day of October, 2024.

R&R Heating and Air, LLC
Principal

_____
Principal

WESTERN SURETY COMPANY

By _____
Larry Kasten, Vice President

Form 532-5-2023

City Council

Agenda Item

Subject: Approval of alcoholic beverage license renewals for calendar year 2025 (retail on-sale liquor, retail on-off sale wine and cider).

Meeting: City Council - Dec 02 2024

From: Amanda Mack, City Manager

BACKGROUND INFORMATION:
The list of below applicants have provided adequate renewal paperwork and payment. This is the second list of renewals and there are no violations on record for these applicants.

FINANCIAL CONSIDERATIONS:
Each licensee has paid appropriate renewal fees to the City of Watertown.

The renewal fees are:

1. Retail (on-sale) Liquor: $1,500.00 to the City of Watertown, plus $50.00 per Video Lottery Machine plus $50.00 for the Liquor Establishment License
2. Retail (on-off sale) Wine and Cider: $500.00 to the City of Watertown

STAFF RECOMMENDATION / SUGGESTED MOTION:
I move to approve the renewal of Approval of alcoholic beverage license renewals for calendar year 2025 (retail on-sale liquor, retail on-off sale wine and cider).

ATTACHMENT(S):
2025 Council List 2

ALCOHOLIC BEVERAGES FOR 2025

RETAIL (On Sale) LIQUOR LICENSES:

1. BMG Inc., Johnny Ringo's, 520 10th Street NW, N110' of Lots 11-13, N110' of E20' of Lot 14, Blk 3, Davis Addn
2. BPO Elks Lodge #838, Elks Lodge, 600 W Kemp, Parcel I: Lots 1-4, Coop Subdiv, part OL 4, Parcel II: Powerhouse Addn
3. The Shamrocks & Edelweiss Corp, Dempsey's Brewery, Pub & Restaurant, 127 N Broadway, Hurkes Addn to the City of Wtn, being formerly a portion of the NE1/4 of 31-117-52
4. Zeus, Inc., Second Street Station, 15 2nd St SW, Lots 1-2 less N97' & Lot 3 less N91' & all of Lot 14, Blk 34, Second Railway Addn

RETAIL (On-Off Sale) WINE LICENSES:

1. City of Watertown, Prairie Lakes Ice Arena Concessions, 3015 1st Ave NE, The West 270.12' of the East 310.12' of the South 322.21' of the North 377.79' of Lot 2A, Blk 3 of the Lakes of Willow Creek First Addition to the Municipality of Watertown, in the County of Codington , South Dakota
2. Hiro Sushi & Hibachi, Inc., Tokyo Sushi & Hibachi, 521 9th Ave SE, Lots 1-4 and vacated part Ave & Alley less Lots 1-2, Lot A, Block H, & S8' Lot 5 & all Lots 6-7 and vacated part Ave, Block G, all in Burchards Addition
3. Schwalm Corporation, The Lounge, 21 N Maple, Harper Belatti, Outlot Block 4, Original Plat
4. Walgreen Co., d/b/a Walgreens #10007, 421 9th Ave SE, Lot 2 less Lot H1 Spies Brothers Addition

City Council

Agenda Item

Subject: Application for a Special Event Retail License to Zeus Inc d/b/a Second Street Station for the Terex Holiday Party at the Codington County Extension Building, 1910 W Kemp Ave, W17' of Lot 60 & all of Lots 61-71 W110' of Lots 72-82 & all of Lots 83-93, Way's 4th Lake Drive Addn from 5:00 PM on Saturday, December 14th, 2024 until 1:00 AM on Sunday, December 15th, 2024.

Meeting: City Council - Dec 02 2024

From: Kristen Bobzien, Interim City Manager/Chief Financial Officer

BACKGROUND INFORMATION:

Event to be held at the Codington County Extension Building. Fee of $300 and proof of insurance has been provided for this special event license. According to SDCL 35-4-124, no public hearing is required for this license if the person applying for the license holds an on-sale alcoholic beverage license in the municipality.

FINANCIAL CONSIDERATIONS:

Applicant has paid licensing fees of $300.

STAFF RECOMMENDATION / SUGGESTED MOTION:

I move to approve the application for a Special Event Retail License to Zeus Inc d/b/a Second Street Station for the Terex Holiday Party at the Codington County Extension Building, 1910 W Kemp Ave, W17' of Lot 60 & all of Lots 61-71 W110' of Lots 72-82 & all of Lots 83-93, Way's 4th Lake Drive Addn from 5:00 PM on Saturday, December 14th, 2024 until 1:00 AM on Sunday, December 15th, 2024.

ATTACHMENT(S):

Second Street Station

CITY OF
WATERTOWN
FINANCE DEPARTMENT

Special Event & Weekly Seasonal Event Alcohol Beverage License Application

1. License Type(s) Requested

☐	Special Malt Beverage Retailers License
☐	Specail On-Sale Wine Retailers License
☒	Special On-Sale License
☐	Special Off-Sale Package Wine Dealers License
☐	Special Off-Sale Package Wine Dealers License – Donated Beverages
☐	Special Off-Sale Package Malt Beverage Dealers License – Donated Beverages
☐	Special Off-Sale Package Dealers License – Donated Beverages

2. Name and Description of Special Event Terex Holiday Party

3. Event Date(s) and times: Dec 14 - 5pm - 1am

(Licenses can be issued for a period of time to be established by the Council for a duration of a special event, but not to exceed fifteen (15) consecutive days)

4. Describe Event Location: Codington County Extention Building
Event Address: 1910 W Kemp Ave

5. Event Applicant and Applicant Address: 2nd St Station
Jenny Kasuske - 15[illegible]nd St SW

To apply for a Special Event License, you must be one of the following (please check one)
- If Civic, Charitable, Educational or Fraternal: please provide copy of 501(c)(3).

☐	Civic
☐	Charitable
☐	Educational
☐	Fraternal
☐	Veterans Organization
☐	Existing On-Off Sale Malt Beverage Licensee
☐	Existing On-Off Sale Wine Licensee
☒	Existing On-Sale Liquor Licensee

6. Event Coordinator's Name Jenny Kasuske
Email: 2ndstreetstation@midconetwork.com
Business Ph# 605 886-8304

7. Name of Entity Serving Alcohol *(if not applicant)*: 2nd St Zeus Inc

8. Method of alcohol consumption:

☒	Sold and consumed on site
☐	Sold/Auctioned and consumed off site *-for example, a winery basket at a silent auction*

9. Estimated number of Participants 500 - 600
Estimated number of Minors ?

Method in which applicants plan to prevent underage consumption: Carding Wristbands

***Thursday Night Live Applicants must use wrist bands as method to prevent underage consumption**

10. For outdoor events, please submit a drawing illustration of the event area, including stage/platforms, alcohol serving area(s), food serving facilities, garbage collection receptacles, restroom facilities and other amenities.

11. Post-event clean-up is required prior to vacating the area.

12. **Insurance Requirements**: Per City Ordinance, licensees shall maintain liability insurance in an amount of not less than One Million Dollars ($1,000,000) for bodily injury, death, disability, and property damage liability during the time the special alcoholic beverage license is in effect. **Licensee shall also maintain Liquor Liability insurance with a limit of not less than One Million Dollars ($1,000,000) for each occurrence, and if such insurance contains a general aggregate limit, the general aggregate limit shall apply separately or be no less than two times the occurrence limit.** The City shall be named as an additional insured on a primary, noncontributory basis for any liability arising directly or indirectly from the special alcoholic beverage license during the time such license is in effect. The licensee must also agree to indemnify and hold the City of Watertown, its officers, agents, and employees, harmless from and against any and all actions, suits, damages, liability or other proceedings that may arise as the result of the alleged negligence of the applicant and/or that is in any way connected or associated with the event(s) for which any special alcoholic beverage license is issued which do not solely arise from errors or omissions of the City of Watertown, its officers, agents, or employees. Please submit proof of insurance with your application.

13. **Fee:** For Special Event Alcoholic Beverage Licenses, a fee of $300 is required. For Special Weekly Seasonal Alcoholic Beverage Licenses, the fee is $50/per day of event at one location. If applicable, a $50 notice of public hearing fee must also be submitted by separate check. Fees are to be made payable to the City of Watertown and must be submitted with your application.

14. **Legal Notice:** For certain applicants, the City of Watertown is required by South Dakota state law to publish a legal notice in the local newspaper at least 7 days prior to City Council action. In order to make publication deadlines, we need your completed application at least 20 days prior to the City Council meeting.

15. **Public Hearing & Council Action**: A public hearing and City Council action is required on all special event alcohol licenses in which the applicant does not hold an existing alcoholic beverage license.

    A public hearing *is not* required if the applicant holds an existing alcoholic beverage license per SDCL 35-4-124. City Council action is required, however.

    The Watertown City Council meets the first and third Monday of each month. This application will be scheduled only after all required documents are submited to the Records & Licensing Manager and internal approvals are completed.

16. Miscellaneous Information for City Council Review:

    _____
    _____
    _____
    _____

17. **Certificate:** The undersigned applicant certifies under the penalties of perjury that all statements provided herin are true and correct; that the said applicant complies with all requiements for the Special Event Alcohol License in the City of Watertown, SD.

    _____ 11/26/24
    Signature Date

Submit completed application to: City Finance Office, Attn: Records/Licensing Manager, PO Box 910, Watertown SD 57201
Phone# (605) 882-6203 • Fax# (605) 882-6218 • licenses@watertownsd.us

To Be Completed by Records & Licensing Manager:

1. Notice of public hearing was published on _____ in the Watertown Public Opinion.
2. Public Hearing and/or Council action was held on _____.
   The Watertown City Council took action to
   _____ Approve
   _____ Disapprove license due to _____.

3. The following restrictions were imposed: _____
   _____
   _____.

4. Receipt Number _____

5. Special Event License Number _____

6. Mailed to applicant on _____.

7. Signature of City Manager: _____ Date _____

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 11/27/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Acrisure Midwest Partners Insurance Services LLC
Acrisure Midwest Trust
P.O. Box 736246
Chicago IL 60673-6246
License#: BR-1792609

CONTACT NAME:
PHONE (A/C, No, Ext): **FAX (A/C, No):**
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Midwest Family Mutual Insurance Company	23574
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
Zeus Inc dba Second Street Station, American Grille
DBA Second Street Station
15 2nd St SW
Watertown SD 57201
ZEUSINC-01

COVERAGES **CERTIFICATE NUMBER:** 1935532859 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY**			CPSD0560139031	6/1/2024	6/1/2025	EACH OCCURRENCE	$ 1,000,000
	CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 300,000
							MED EXP (Any one person)	$ 1,000
							PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$ 2,000,000
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	ANY AUTO						BODILY INJURY (Per person)	$
	OWNED AUTOS ONLY / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
A	**UMBRELLA LIAB** OCCUR			CPSD0560139031	6/1/2024	6/1/2025	EACH OCCURRENCE	$ 1,000,000
	X **EXCESS LIAB** CLAIMS-MADE						AGGREGATE	$ 1,000,000
	DED RETENTION $							$
A	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N			CPSD0560139031	6/1/2024	6/1/2025	X PER STATUTE OTH-ER	
	ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y **(Mandatory in NH)**	N / A					E.L. EACH ACCIDENT	$ 500,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 500,000
							E.L. DISEASE - POLICY LIMIT	$ 500,000
A	Liquor Liability			CPSD0560139031	6/1/2024	6/1/2025	Each Common Cause Aggregate	1,000,000 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Officers excluded from Workers Compensation Coverage:
Jennifer Kasuske
Jason Kasuske

CERTIFICATE HOLDER

Proof of Insurance ONLY
Contact 605-886-4361 to be added as a holder.
Watertown SD 57201

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

City Council

Agenda Item

Subject: Approval to write-off uncollectible Ambulance accounts receivable and remit to the collection agency for the month of October in the amount of $11,121.89.

Meeting: City Council - Dec 02 2024

From: Heath VonEye, Assistant City Manager/Public Works Director

BACKGROUND INFORMATION:
These ambulance accounts have been sent to the patient through the billing procedural process, and have been forwarded information that they will be sent to collections.

FINANCIAL CONSIDERATIONS:
This is the policy process with uncollected ambulance accounts.

STAFF RECOMMENDATION / SUGGESTED MOTION:
I move to approve the write-off uncollectible Ambulance accounts receivable and remit to the collection agency for the month of October in the amount of $11,121.89.

ATTACHMENT(S):
Ambulance collections for October 2024

CITY OF WATERTOWN SOUTH DAKOTA

GUARANTOR ID/ACCT NUMBER	LAST DATE OF SERVICE	TOTAL TO COLLECTION
ITWT006863	1/19/2022	$2,652.00
ITWT009370	4/30/2023	$800.10
ITWT009578	6/9/2023	$1,131.80
ITWT009976	8/16/2023	$727.21
ITWT009981	8/15/2023	$661.00
ITWT009990	8/20/2023	$304.90
ITWT010052	8/30/2023	$1,035.70
ITWT010353	10/17/2023	$1,094.50
ITWT010570	12/2/2023	$1,014.70
ITWT010807	1/10/2024	$301.08
ITWT010922	1/27/2024	$1,398.30
	Total	**$11,121.29**

City Council

Agenda Item

Subject: Approval to Purchase State Bid products through Office Peeps for the Furniture, Fixtures and Equipment (FF&E) package for the Wells Fargo Renovation and Addition for City Hall, Project No. 2035, in the total amount of $514,960.58.

Meeting: City Council - Dec 02 2024

From: Amanda Mack, City Manager

BACKGROUND INFORMATION:

This Award is to purchase products from the State Bid product list through Office Peeps for the Furniture, Fixtures and Equipment (FF&E) package provided to the City for the Wells Fargo Renovation and Addition for the City Hall project. The FF&E package includes desks, desk chairs, high density storage, file cabinets, shelving, tables, seating for City Council chambers, break room furniture, conference room furniture, and other furniture throughout. The FF&E package total is $514,960.58,which is less than the budgeted $640,000.00 for the project FF&E.

The IT Department will be purchasing computer arms for the 38 workstations in the building separately, which will also be covered under the FF&E budget.

FINANCIAL CONSIDERATIONS:

There is $640,000.00 budgeted in the Capital Improvement Fund, Account 505-45603-43202, to be used for the FF&E for the Wells Fargo Renovation and Addition for City Hall project. The estimated $121,239 remaining could be utilized in other costs associated with the City Hall project. Total overall project budget is $5,369,682.

OVERSIGHT / PROJECT RESPONSIBILITY:

Heath VonEye, Assistant City Manager/Public Works Director
Justin Petersen, City Engineer / Project Manager
Marci Lewno, Engineer I

STAFF RECOMMENDATION / SUGGESTED MOTION:

Staff recommends approval of these quote awards through the following motion:

I move to approve to Purchase State Bid products through Office Peeps for the Furniture, Fixtures and Equipment (FF&E) package for the Wells Fargo Renovation and Addition for City Hall, Project No. 2035, in the total amount of $514,960.58.

ATTACHMENT(S):

2035 F F&E Wtn City Hall Quote

OFFICE PEEPS

Furniture RFP

PROJECT:
Watertown City Hall

SUBMITTED BY:
Katie Woodard
Director of Interior Design

Lake Area Tech

Project Name Watertown City Hall
Project Location Watertown , SD **C1**

ITEM

TYPICAL:
ITEM DESCRIPTION: Office Desk Chair
MANUFACTURER: **Office Master**
STYLE NAME: Affirm
DESCRIPTION& DIMENSIONS: High Back Mesh, Synchro with Seat Depth Adjustment, height and width adjustable arms, back ratchet

FINISHES: Fabric Seat, Grade D
Mesh Back: Black, Frame: Black

LOCATIONS

PRODUCT IMAGE

Hickory, Cover Cloth, Momentum

PRICING

ITEM	QTY	UNIT PRICE		
Task Chair	9	$ 538.00		
			GRAND TOTAL	**$ 4,842.00**

COMMENTS:
12 year warranty

Project Name Watertown City Hall
Project Location Watertown , SD **C1-2**

ITEM

TYPICAL:
ITEM DESCRIPTION: Office Desk Chair
MANUFACTURER: **Office Master**
STYLE NAME: YS88
DESCRIPTION& DIMENSIONS: High Back Mesh, Multi-function with Seat Depth Adjustment, height and width adjustable arms, back ratchet

FINISHES: Fabric Seat, Grade D
Mesh Back: Black, Frame: Black

LOCATIONS

PRODUCT IMAGE

Hickory, Cover Cloth, Momentum

PRICING

ITEM	QTY	UNIT PRICE		
Task Chair	11	$ 546.00		
			GRAND TOTAL	**$ 6,006.00**

COMMENTS:
12 year warranty

Project Name Watertown City Hall
Project Location Watertown , SD **C1-3**

ITEM

TYPICAL:
ITEM DESCRIPTION: Office Desk Chair
MANUFACTURER: **Global Furniture Group**
STYLE NAME: Vion
DESCRIPTION& DIMENSIONS: Medium Back Mesh, Weight sensing synchro, adjustable arms

FINISHES: Fabric Seat, Grade 5
Mesh Back: Black, Frame: Black

LOCATIONS

PRODUCT IMAGE

Hickory, Cover Cloth, Momentum

PRICING

ITEM	QTY	UNIT PRICE		
Task Chair	2	$ 510.14		
			GRAND TOTAL	**$ 1,020.28**

COMMENTS:
Lifetime warranty, SD Contract #17516

Project Name Watertown City Hall
Project Location Watertown , SD **C1-4**

ITEM

TYPICAL:
ITEM DESCRIPTION: Office Desk Chair
MANUFACTURER: **SitOnIt**
STYLE NAME: Focus 2.0
DESCRIPTION& DIMENSIONS: High Back Mesh, black frame, black mesh, enhanced synchro with seat depth adjustment, adjustable arms

FINISHES: Fabric Seat, Grade 3
Mesh Back: Black, Frame: Black

LOCATIONS

PRODUCT IMAGE

Hickory, Cover Cloth, Momentum

PRICING

ITEM	QTY	UNIT PRICE		
Task Chair	9	$ 441.90		
			GRAND TOTAL	**$ 3,977.10**

COMMENTS:
Lifetime warranty, SD Contract #17513

Project Name Watertown City Hall
Project Location Watertown , SD **C1-5**

ITEM

TYPICAL:
ITEM DESCRIPTION: Office Desk Chair
MANUFACTURER: **SitOnIt**
STYLE NAME: Amplify
DESCRIPTION& DIMENSIONS: High Back Mesh, black frame, black mesh, enhanced synchro with seat depth adjustment, adjustable arms

FINISHES: Fabric Seat, Grade 3
Mesh Back: Black, Frame: Black

LOCATIONS

PRODUCT IMAGE

Hickory, Cover Cloth, Momentum

PRICING

ITEM	QTY	UNIT PRICE		
Task Chair	3	$ 457.20		
			GRAND TOTAL	**$ 1,371.60**

COMMENTS:
Lifetime warranty, SD Contract #17513

Project Name Watertown City Hall
Project Location Watertown , SD **C2**

ITEM

TYPICAL:
ITEM DESCRIPTION: Conference Chair
MANUFACTURER: **Global**
STYLE NAME: Luray
DESCRIPTION& DIMENSIONS: High Back, Swivel-tilt, fixed loop arms, aluminum base, carpet casters

FINISHES: Fabric: Novaro Genuine Leather, Bison, grade 6
Frame: Aluminum base/arms with black arm cap

LOCATIONS

Meeting 153

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Conference Chair	14	$ 1,016.60		
			GRAND TOTAL	**$ 14,232.40**

COMMENTS:

Lifetime warranty, SD Contract #17516

Project Name Watertown City Hall
Project Location Watertown , SD **C2**

ITEM

TYPICAL:
ITEM DESCRIPTION: Conference Chair
MANUFACTURER: **Global**
STYLE NAME: Luray
DESCRIPTION& DIMENSIONS: High Back, Swivel-tilt, fixed loop arms, aluminum base, carpet casters

FINISHES: Fabric Seat: Element, Tanzanite, COM
Frame: Aluminum base/arms with black arm cap

LOCATIONS

Meeting 108, Meeting 119, Meeting 154

PRODUCT IMAGE

Element Tanzanite

PRICING

ITEM	QTY	UNIT PRICE		
Conference Chair	24	$ 974.78		
		$ -		
			GRAND TOTAL	**$ 23,394.72**

COMMENTS:

Lifetime warranty, SD Contract #17516

Project Name Watertown City Hall
Project Location Watertown , SD **C3**

ITEM

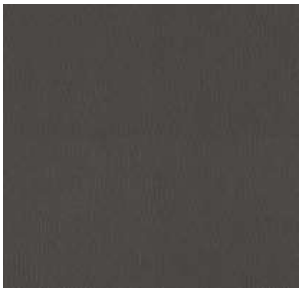
TYPICAL:
ITEM DESCRIPTION: Nesting Chair
MANUFACTURER: **Sit On It**
STYLE NAME: Movi Nester
DESCRIPTION& DIMENSIONS: Nesting chair, no arms, with bell glides.

FINISHES: Fabric Seat, up to grade 2, element charcoal
Frame: Black, Mesh:Black

LOCATIONS

Meeting 153

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Nesting Chair-no arms	66	$ 364.95		
			GRAND TOTAL	**$ 24,086.70**

COMMENTS:

Lifetime warranty, SD Contract #17513

Project Name Watertown City Hall
Project Location Watertown , SD **C4**

ITEM

TYPICAL:
ITEM DESCRIPTION: Office Side Chair
MANUFACTURER: **Sit On It**
STYLE NAME: Focus Side
DESCRIPTION& DIMENSIONS: Steel frame, 4 leg with arms and casters, mesh back, fabric seat

FINISHES: Fabric Seat, Grade 3 Cover Cloth, Hickory
Frame: Black, Mesh:Black

LOCATIONS

19,020,022
101 102 103 104 105 106 108 109 110 111 114 116 117 118 122 123 124

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Guest Chair	52	$ 296.10		
			GRAND TOTAL	**$ 15,397.20**

COMMENTS:

Lifetime warranty, SD Contract #17513

Project Name Watertown City Hall
Project Location Watertown , SD **C5**

ITEM

TYPICAL:
ITEM DESCRIPTION: Stool
MANUFACTURER: **Sit On It**
STYLE NAME: Rio Stool
DESCRIPTION& DIMENSIONS: Bar height, steel frame, plastic back, seat pad

FINISHES: Fabric Seat, Cover Cloth, Hickory
Frame: Black, Plastic: Black

LOCATIONS

Open Office 120

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE	C	
Stool	5	$ 256.50		
			GRAND TOTAL	**$ 1,282.50**

COMMENTS:

Lifetime warranty, SD Contract #17513

Project Name Watertown City Hall
Project Location Watertown , SD **C6**

ITEM

TYPICAL:
ITEM DESCRIPTION: Lounge Chair
MANUFACTURER: **JSI**
STYLE NAME: Arwyn
DESCRIPTION& DIMENSIONS: Upholstered lounge chair, wood legs

FINISHES: Fabric Seat, CF Stinson, Truss, Tiger Lily
Wood Frame: Maple, Mocha

LOCATIONS

Lobby 101, Open Office 102, Lower Level Breakroom

PRODUCT IMAGE

Material-CF Stinson, Truss, Tiger Lily

Maple, Mocha

PRICING

ITEM	QTY	UNIT PRICE		
Lounge Chair	10	$ 1,537.11		
			GRAND TOTAL	**$ 15,371.10**

COMMENTS:

JSI SD Contract#17527

Project Name Watertown City Hall
Project Location Watertown , SD **C7**

ITEM

TYPICAL:
ITEM DESCRIPTION: Nesting Chair
MANUFACTURER: **Sit On It**
STYLE NAME: Movi Nester
DESCRIPTION& DIMENSIONS: Nesting chair, arms, with hard floor/carpet casters

FINISHES: Fabric Seat, Cover Cloth, Hickory
Frame: Black, Mesh:Black

LOCATIONS

Lower Level Breakroom & Meeting Room 022A

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Nesting Chair-arms	56	$ 391.50		
			GRAND TOTAL	**$ 21,924.00**

COMMENTS:

Lifetime warranty, SD Contract #17513

Project Name Watertown City Hall
Project Location Watertown , SD **C8**

ITEM

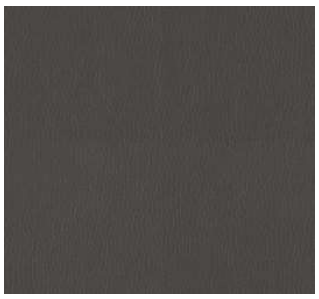
TYPICAL:
ITEM DESCRIPTION: Office Desk Chair
MANUFACTURER: **Sit On It**
STYLE NAME: Non-Stop Heavy Duty
DESCRIPTION& DIMENSIONS: Heavy duty chair, warranted 500lbs

FINISHES: Fabric Seat, Element-Charcoal
Black loop arms

LOCATIONS

152

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Task Chair	2	$ 1,190.25		
			GRAND TOTAL	**$ 2,380.50**

COMMENTS:

Lifetime warranty, SD Contract #17513

Project Name Watertown City Hall
Project Location Watertown , SD **D1**

ITEM

TYPICAL:

ITEM DESCRIPTION: Private Office, L-Shape Adjustable

MANUFACTURER: **AIS**

STYLE NAME: Calibrate Desk Line

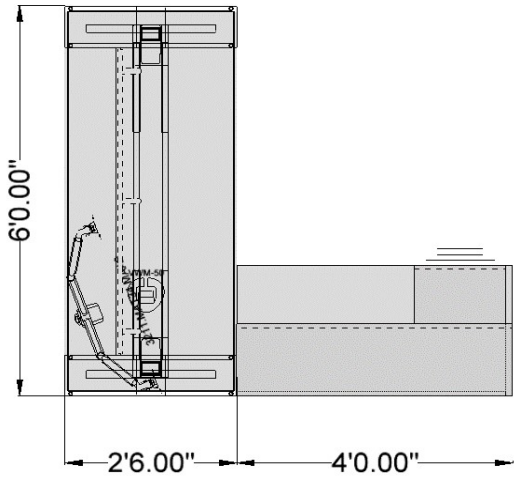
DESCRIPTION& DIMENSIONS: L-shape workstation, 72x30 front adj. , 48x24 return, full enclosure with bbf on return. 48x16 wall mounted overhead, laminate doors. (priced seperately). Wire Wire management, lockable storage. BBF-1'4"wide, 1'11"deep No monitor arm priced

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

19 020 022
103 104 105 106 107 122 123 124

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
L-shape workstation	11	$ 3,868.92		
			GRAND TOTAL	**$ 42,558.12**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **D2**

ITEM

TYPICAL:

ITEM DESCRIPTION: Private Office, Executive Floating Height Adj.

MANUFACTURER: **AIS**

STYLE NAME: Calibrate Desk Line

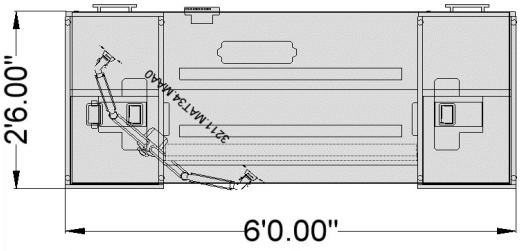
DESCRIPTION& DIMENSIONS: Straight 72x30 front adj., full enclosure with bbf & ff. Wire management, lockable storage, suspended modesty. No monitor arm priced
*original spec discontinued

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

109, 110

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Adjustable Station	2	$ 2,529.87		
			GRAND TOTAL	**$ 5,059.74**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **D3**

ITEM

TYPICAL:

ITEM DESCRIPTION: Private Office, Executive Floating Height Adj.

MANUFACTURER: **AIS**

STYLE NAME: Calibrate Desk Line

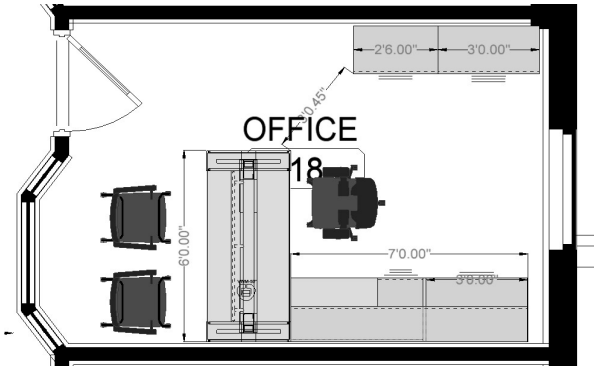
DESCRIPTION& DIMENSIONS: L-shape workstation, 72x30 front adj. , 48x24 return + 36"lateral, full enclosure with bbf on return. 84"x16 wall mounted overhead, laminate doors. (priced Wire management, lockable storage, additional 36" 3 drawer lateral and 30" 2 drawer lateral.

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

117,118

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Adjustable Station	2	$ 7,240.16		
			GRAND TOTAL	**$ 14,480.32**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **D4**

ITEM

TYPICAL:

ITEM DESCRIPTION: Private Office, Executive Floating Height Adj.

MANUFACTURER: **AIS**

STYLE NAME: Calibrate Desk Line

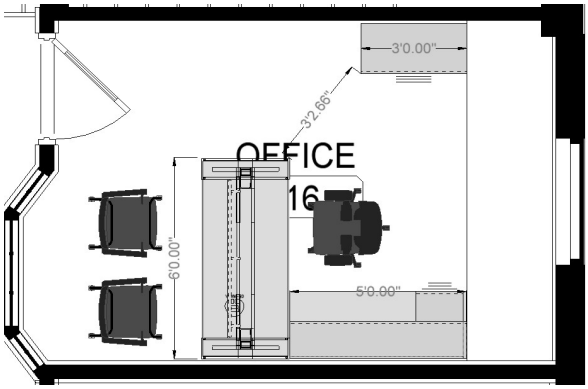
DESCRIPTION& DIMENSIONS: L-shape workstation, 72x30 front adj. , 60x24 return + bbf, full enclosure 60"x16 wall mounted overhead, laminate doors. Wire management lockable storage, additional 36" 3 drawer lateral

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

116

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Workstation	1	$ 5,326.69		
			GRAND TOTAL	**$ 5,326.69**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **D6**

ITEM

TYPICAL:

ITEM DESCRIPTION: Freestanding Workstation

MANUFACTURER: **AIS**

STYLE NAME: Calibrate Desk Line, corner cove station, box/box/file ped, mobile ped w/ cushion, lockable storage. No monitor arm priced

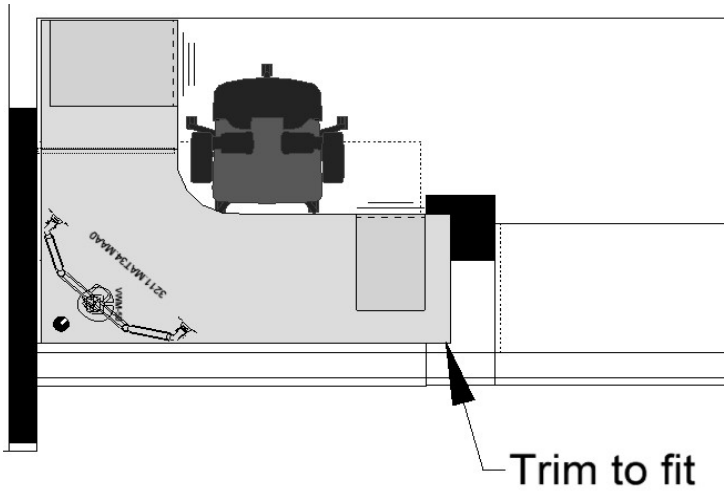
DESCRIPTION& DIMENSIONS:

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

017 Work Room

PRODUCT IMAGE



ped cushion

PRICING

ITEM	QTY	UNIT PRICE		
Freestanding Station	1	$ 2,227.46		
			GRAND TOTAL	**$ 2,227.46**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **102**

ITEM

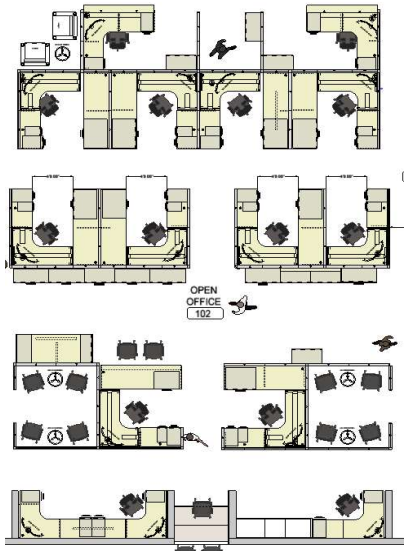
TYPICAL:
ITEM DESCRIPTION: Panel Workstations/Storage
MANUFACTURER: **AIS**
STYLE NAME: Matrix panels, Calibrate Storage, Surfaces
DESCRIPTION& DIMENSIONS: Panel workstations, glass stacker perimeter, power, adj. workstations with filing. Mobile peds with cushion, no monitor arms priced.

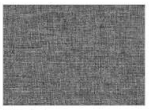
FINISHES: Dark Rum Cherry
Black L-Pull
Fabric: Panels- Fabric:Toffee, Metal: Light Tone, Ped Cushion-Birch Bark
Glass: Clear

LOCATIONS

Open Office 102

PRODUCT IMAGE





PRICING

ITEM	QTY	UNIT PRICE		
Panels, Storage, Stations	1	$ 122,746.03		
			GRAND TOTAL	**$ 122,746.03**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate AIS Matrix

Project Name Watertown City Hall
Project Location Watertown , SD **111**

ITEM

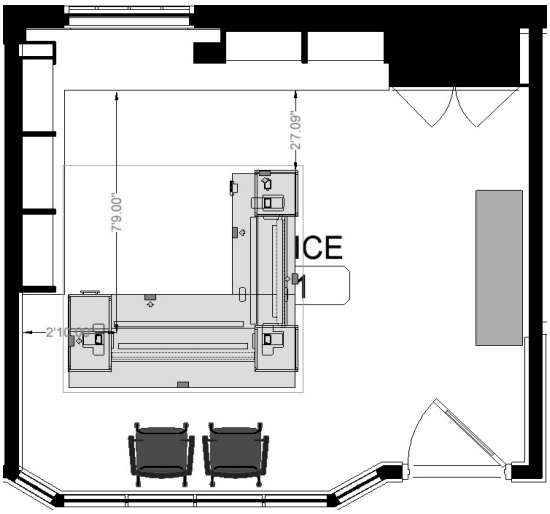
TYPICAL:
ITEM DESCRIPTION: Storage Cabinet
MANUFACTURER: **AIS**
STYLE NAME: Calibrate Desk Line
DESCRIPTION& DIMENSIONS: L-shape fully adjustable desk with BBF on main, return on left, no arm priced

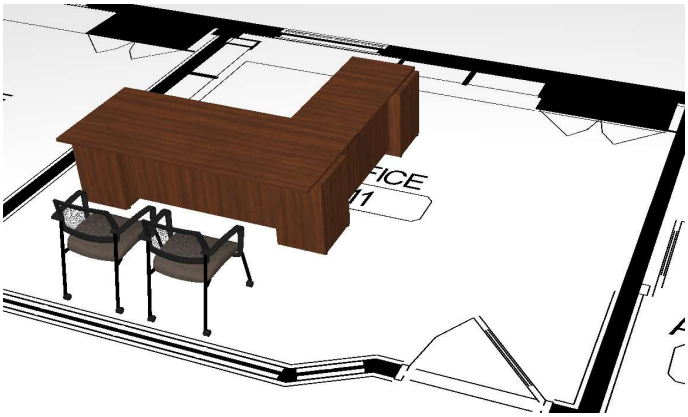
FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

City Manager 111

PRODUCT IMAGE





PRICING

ITEM	QTY	UNIT PRICE		
L-Shape Height Adj.	1	$ 3,504.27		
			GRAND TOTAL	**$ 3,504.27**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **114-Mngr**

ITEM

TYPICAL:

ITEM DESCRIPTION: Storage Cabinet

MANUFACTURER: **AIS**

STYLE NAME: Calibrate Desk Line

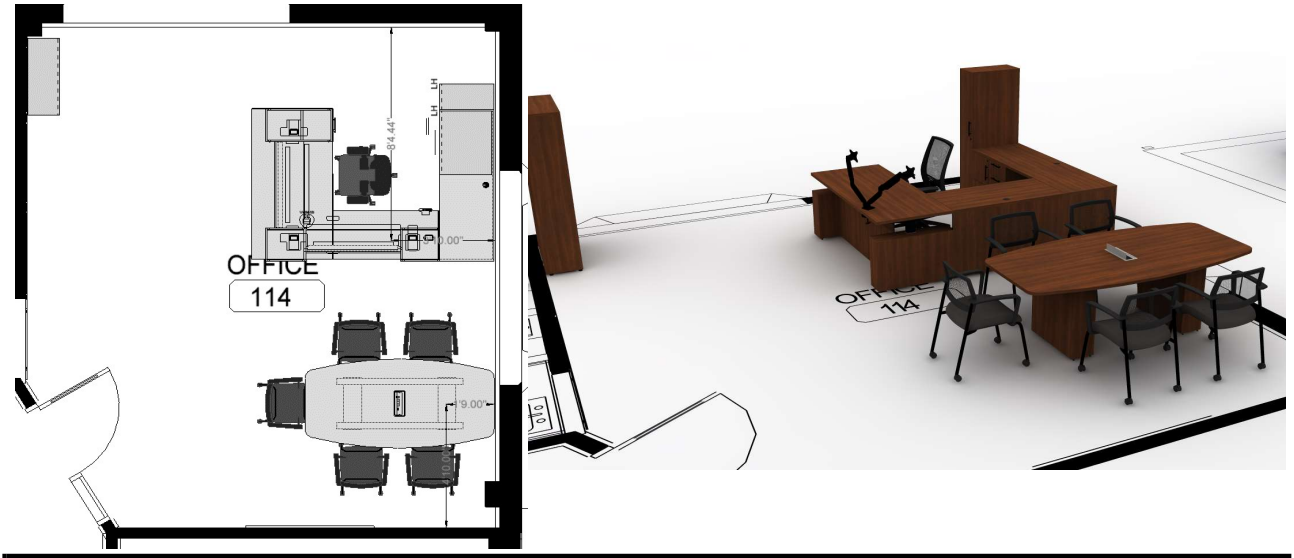
DESCRIPTION& DIMENSIONS: U-shape desk with credenza, storage, storage tower, bookcase. Tower 66"x12"x24". L-Shape adjustable surface. Desk chair tbd,
Guest chairs under C4, Table under T5. Workstation and storage priced below. No monitor arm priced

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

City Manager 114

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
D10	1	$ 4,780.80		
S3	1	$ 718.13		
S4	1	$ 581.87		
			GRAND TOTAL	**$ 6,080.80**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **120**

ITEM

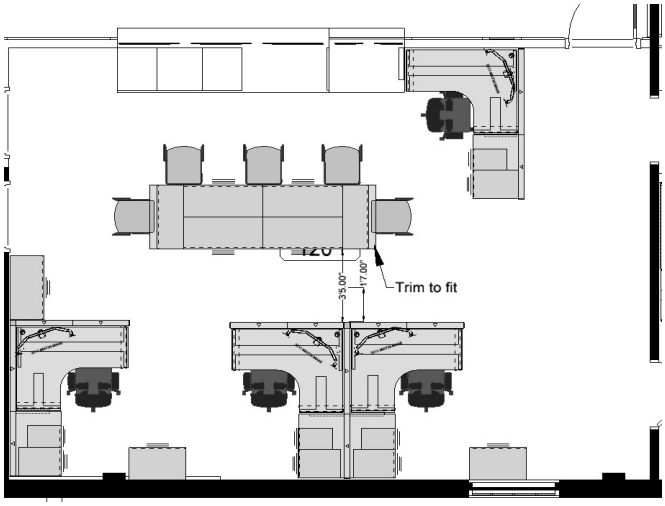
TYPICAL:
ITEM DESCRIPTION: Panel Workstations/Storage
MANUFACTURER: **AIS**
STYLE NAME: Matrix panels, Calibrate Storage, Surfaces
DESCRIPTION& DIMENSIONS: Panel workstations, power, adj. workstations with filing, seating priced seperately, no monitor arms priced

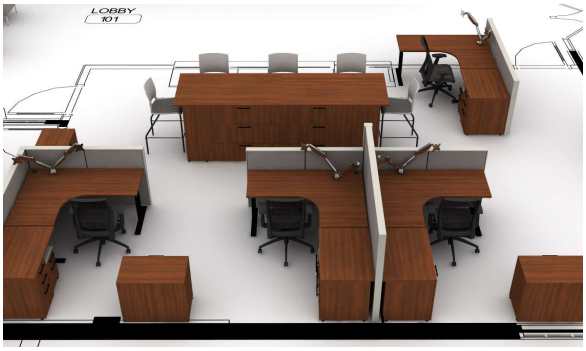
FINISHES: Dark Rum Cherry
Black L-Pull
Fabric: Panels- Fabric:Toffee, Metal:Light Tone

LOCATIONS

Open Office 120

PRODUCT IMAGE





PRICING

ITEM	QTY	UNIT PRICE		
Panels, Storage, Stations	1	$ 24,947.69		
			GRAND TOTAL	**$ 24,947.69**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate AIS Matrix

Project Name Watertown City Hall
Project Location Watertown , SD **S13**

ITEM

TYPICAL:
ITEM DESCRIPTION: Lateral File, 3H
MANUFACTURER: **AIS**
STYLE NAME: Calibrate cabinet
DESCRIPTION& DIMENSIONS: 28"high, 30"wide, 18"deep

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

Office 122 (x2), Office 123 (x2)

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Lateral File	4	$ 770.93		
			GRAND TOTAL	**$ 3,083.72**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **S13-2**

ITEM

TYPICAL:
ITEM DESCRIPTION: Lateral File, 3H
MANUFACTURER: **AIS**
STYLE NAME: Calibrate cabinet
DESCRIPTION& DIMENSIONS: 28"high, 42"wide, 24"deep

FINISHES: Dark Rum Cherry
Black L-Pull

LOCATIONS

Office 107

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Lateral File	1	$ 1,451.02		
			GRAND TOTAL	**$ 1,451.02**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **S14**

ITEM

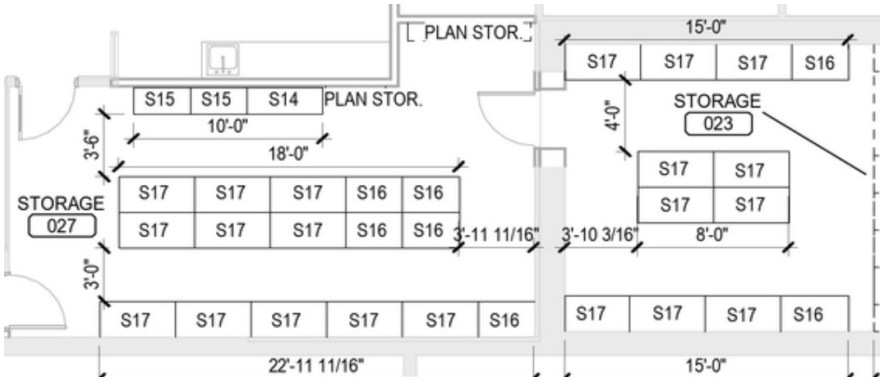
TYPICAL:
ITEM DESCRIPTION: Steel Shelving
MANUFACTURER: **Tennsco**
STYLE NAME: Z-Line
DESCRIPTION& DIMENSIONS: 72"high, 48"wide, 18"deep

FINISHES: medium gray

LOCATIONS

Storage 027 (x1)

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Steel shevling	1	$ 366.00		
			GRAND TOTAL	**$ 366.00**

COMMENTS:

Project Name Watertown City Hall
Project Location Watertown , SD **S15**

ITEM

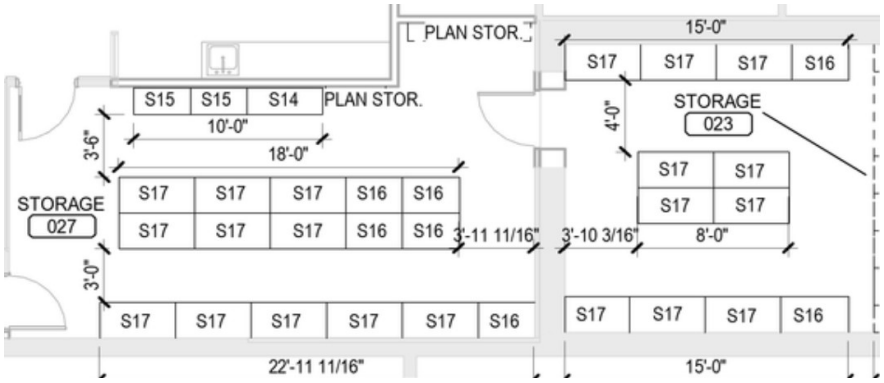
TYPICAL:
ITEM DESCRIPTION: Steel Shelving
MANUFACTURER: **Tennsco**
STYLE NAME: Z-Line
DESCRIPTION& DIMENSIONS: 72"high, 36"wide, 18"deep

FINISHES: medium gray

LOCATIONS

Storage 027 (x2)

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Steel shevling	2	$ 309.00		
			GRAND TOTAL	**$ 618.00**

COMMENTS:

Project Name Watertown City Hall
Project Location Watertown , SD **S16**

ITEM

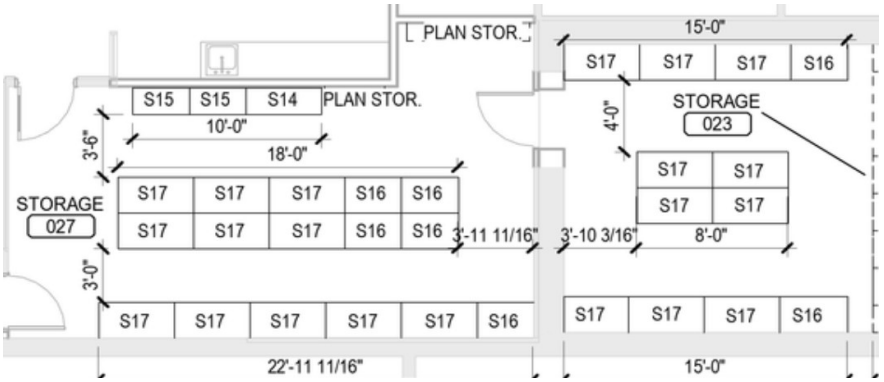
TYPICAL:
ITEM DESCRIPTION: Steel Shelving
MANUFACTURER: **Tennsco**
STYLE NAME: Z-Line
DESCRIPTION& DIMENSIONS: 72"high, 36"wide, 24"deep

FINISHES: medium gray

LOCATIONS

Storage 027 (x7)

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Steel shevling	7	$ 342.00		
			GRAND TOTAL	**$ 2,394.00**

COMMENTS:

Project Name Watertown City Hall
Project Location Watertown , SD **S17**

ITEM

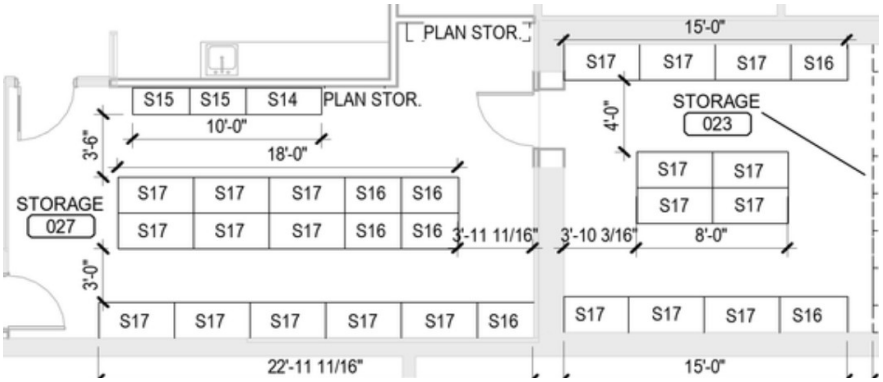
TYPICAL:
ITEM DESCRIPTION: Steel Shelving
MANUFACTURER: **Tennsco**
STYLE NAME: Z-Line
DESCRIPTION& DIMENSIONS: 72"high, 48"wide, 24"deep

FINISHES: medium gray

LOCATIONS

Storage 027 (x21)

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Steel shevling	21	$ 403.00		
			GRAND TOTAL	**$ 8,463.00**

COMMENTS:

Project Name Watertown City Hall
Project Location Watertown , SD **T2**

ITEM

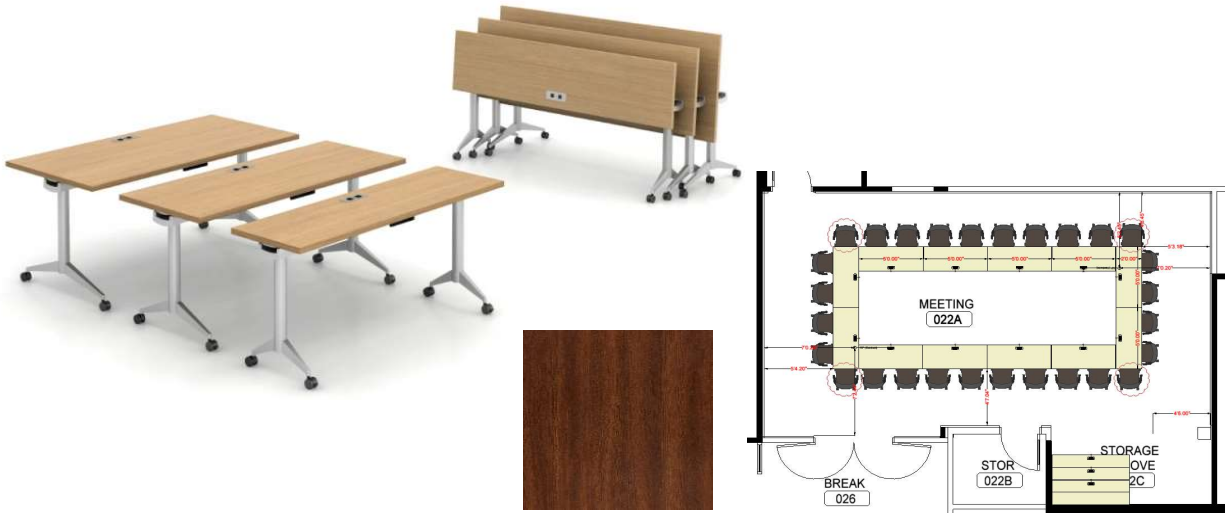
TYPICAL:
ITEM DESCRIPTION: Nesting Table with Casters
MANUFACTURER: **AIS**
STYLE NAME: Calibrate
DESCRIPTION& DIMENSIONS: Nesting table with casters, laminate top, powered, 2 with hdmi/data, 24x60. 2 floor infeeds

FINISHES: Laminate: Dark Rum Cherry
Base: Silver

LOCATIONS

Meeting 022A

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Nesting Table	15	$ 1,310.40		
			GRAND TOTAL	**$ 19,656.00**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **T3**

ITEM

TYPICAL:
ITEM DESCRIPTION: Executive Concrete Table
MANUFACTURER: **Artisan**
STYLE NAME: Concrete Custom, Map image transfer, Logo Design, Wood base
DESCRIPTION& DIMENSIONS: 4'x12'6", power location/option pending, wood base design as shown

FINISHES: Concrete: Light Gray with print overlay
Base Wood Stain: To Match

LOCATIONS

Meeting 154

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Concrete Table	1	$ 16,250.00		
			GRAND TOTAL	**$ 16,250.00**

COMMENTS:

Project Name Watertown City Hall
Project Location Watertown , SD **T4**

ITEM

TYPICAL:
ITEM DESCRIPTION: Nesting Table with Casters
MANUFACTURER: **AIS**
STYLE NAME: Calibrate
DESCRIPTION& DIMENSIONS: Square high pressure laminate, steel base. 36"square
*Using AIS gets to better discount tier

FINISHES: Laminate: Dark Rum Cherry
Base: Silver

LOCATIONS

Breakroom 006 (x4)

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Breakroom table	4	$ 460.80		
			GRAND TOTAL	**$ 1,843.20**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **T5**

ITEM

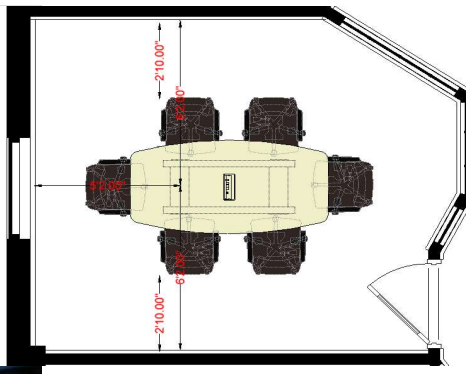
TYPICAL:
ITEM DESCRIPTION: Conference Table
MANUFACTURER: **AIS**
STYLE NAME: Calibrate
DESCRIPTION& DIMENSIONS: 42"x84"x30", high pressure laminate, central power with data/hdmi
*Spec says 36"deep, standard is 42"

FINISHES: Laminate: Dark Rum Cherry
Power Module: Black or Silver

LOCATIONS

Meeting 108, City Manager 114, Meeting 119

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Conference Table	3	$ 1,354.41		
			GRAND TOTAL	**$ 4,063.23**

COMMENTS:

AIS SD Contract#17499
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **T7**

ITEM

TYPICAL:
ITEM DESCRIPTION: Round Occasional Table
MANUFACTURER: **JSI**
STYLE NAME: Arwyn
DESCRIPTION& DIMENSIONS: 19"h, 18"round

FINISHES: Solid Surface: Pure White
Wood Base: Maple, Mocha

LOCATIONS

Open Office 102 (5), Lobby 101 (2), Breakroom (2)

PRODUCT IMAGE

PRICING

ITEM	QTY	UNIT PRICE		
Occasional Table	9	$ 816.86		
			GRAND TOTAL	**$ 7,351.74**

COMMENTS:

JSI SD Contract#17527
AIS Calibrate

Project Name Watertown City Hall
Project Location Watertown , SD **T8**

ITEM

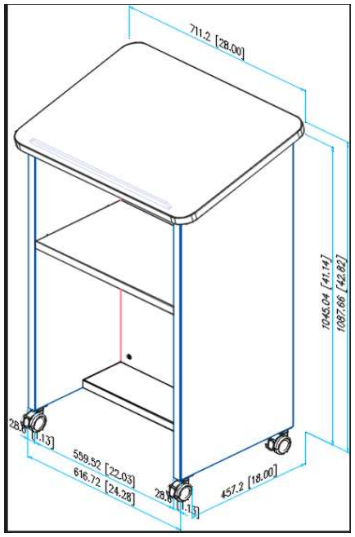
TYPICAL:
ITEM DESCRIPTION: Mobile Podium
MANUFACTURER: **AIS**
STYLE NAME: Calibrate Conference
DESCRIPTION& DIMENSIONS: Mobile Podium, open unit with shelf no power or data

FINISHES: Laminate: Dark Rum Cherry

LOCATIONS

Meeting 022A

PRODUCT IMAGE



PRICING

ITEM	QTY	UNIT PRICE		
Mobile Podium	1	$ 710.64		
			GRAND TOTAL	**$ 710.64**

COMMENTS:

JSI SD Contract#17527

Project Name Watertown City Hall
Project Location Watertown , SD **T9**

ITEM

TYPICAL:
ITEM DESCRIPTION: Stationary Podium
MANUFACTURER: **AIS**
STYLE NAME: Calibrate
DESCRIPTION& DIMENSIONS: 72"x30"x30" desk shell with power cutout, power data, hdmi. Desktop Podium, confirm location of power

FINISHES: Laminate: Dark Rum Cherry

LOCATIONS

Meeting 153

PRODUCT IMAGE

dark rum cherry

black desktop podium

PRICING

ITEM	QTY	UNIT PRICE		
Mobile Podium	1	$ 1,340.00		
			GRAND TOTAL	**$ 1,340.00**

COMMENTS:

AIS SD Contract#17499

Project Name Watertown City Hall
Project Location Watertown , SD **023-HD**

ITEM

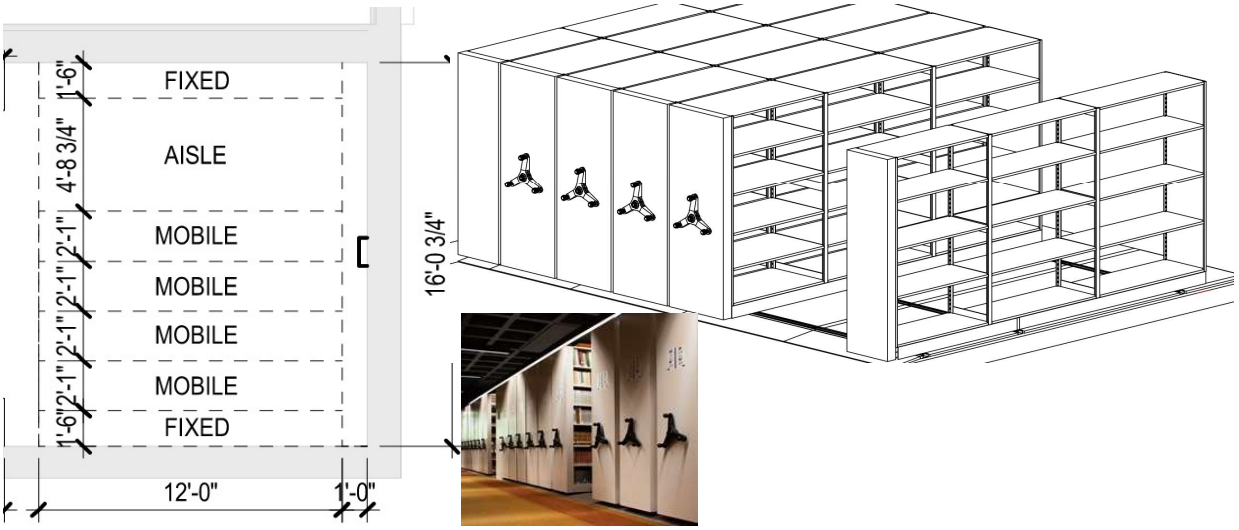
TYPICAL:
ITEM DESCRIPTION: High Density Storage
MANUFACTURER: **Safco**
STYLE NAME: Mobile 1000
DESCRIPTION& DIMENSIONS: High density mobile storage, installed on track, shelves

FINISHES: Black Metal

LOCATIONS

Storage 023

PRODUCT IMAGE

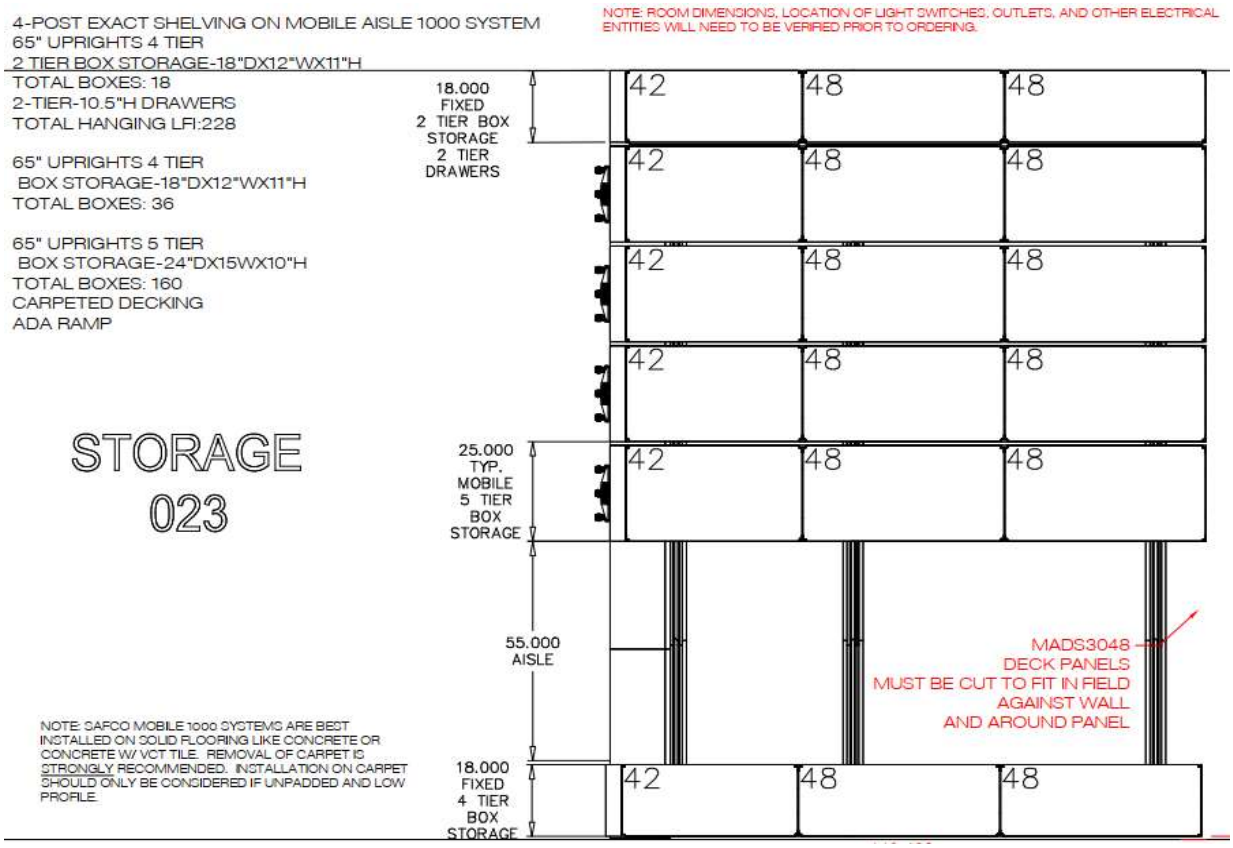


PRICING

ITEM	QTY	UNIT PRICE		
Mobile Shelving	1	$ 33,597.62		
			GRAND TOTAL	**$ 33,597.62**

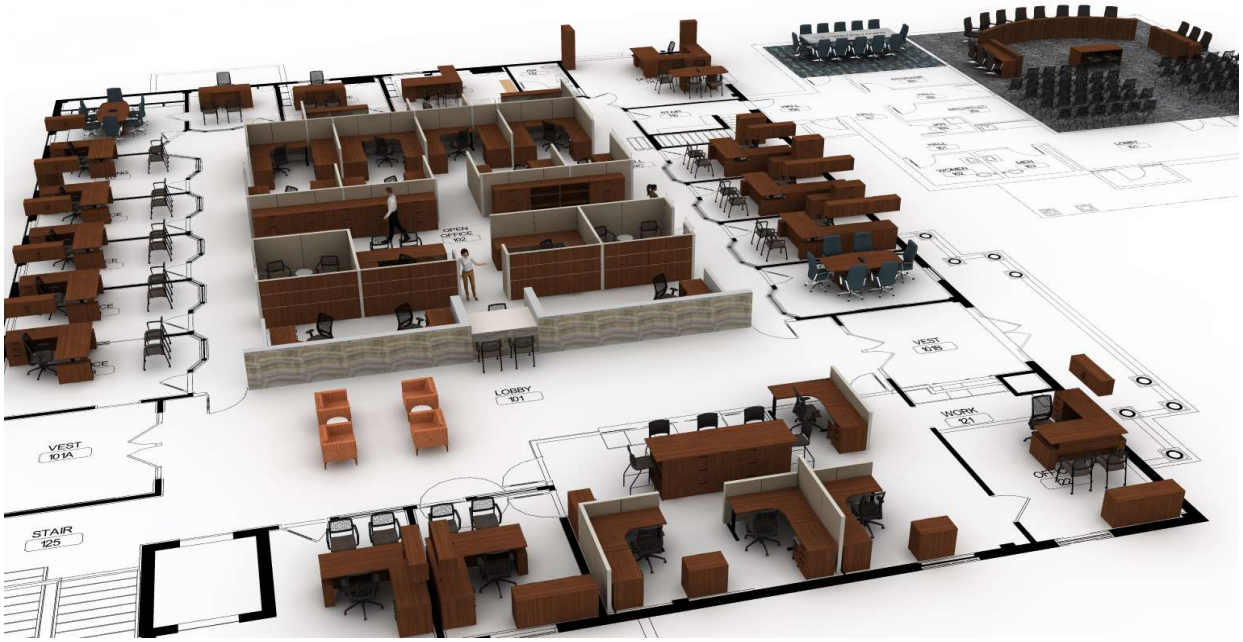
COMMENTS:

023-HD

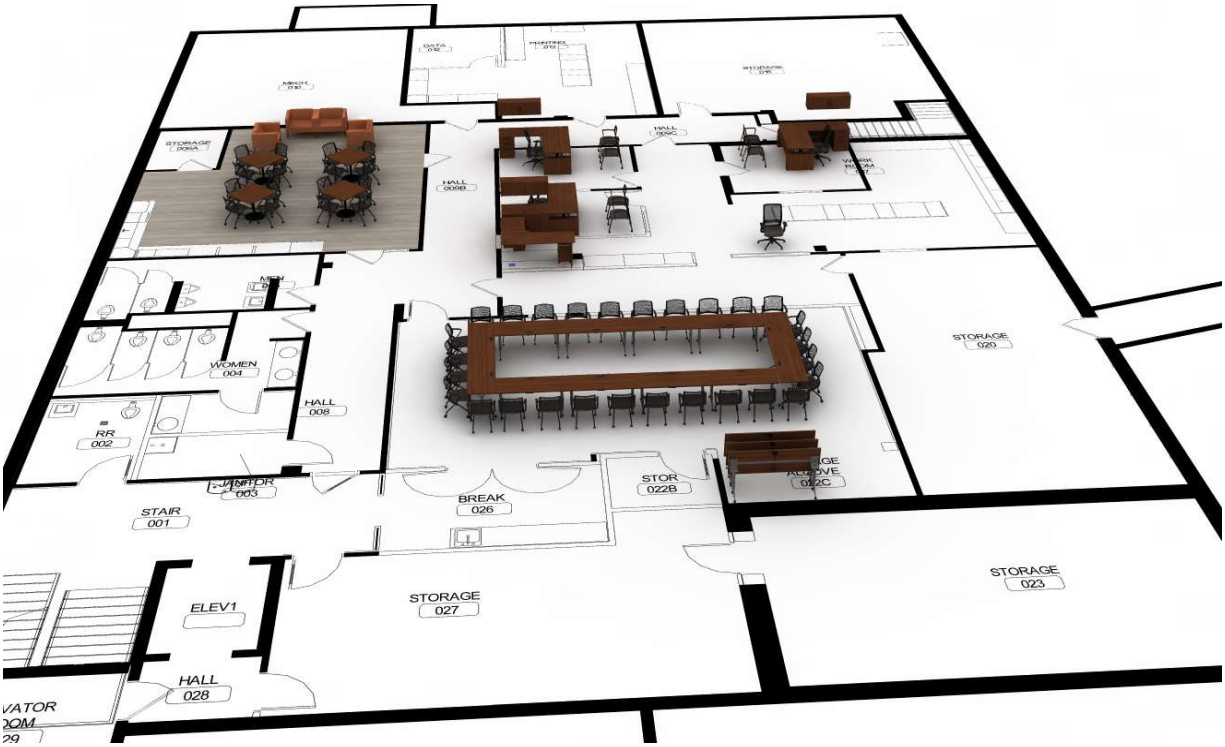

4-POST EXACT SHELVING ON MOBILE AISLE 1000 SYSTEM
65" UPRIGHTS 4 TIER
2 TIER BOX STORAGE-18"DX12"WX11"H
TOTAL BOXES: 18
2-TIER-10.5"H DRAWERS
TOTAL HANGING LFI:228
65" UPRIGHTS 4 TIER
BOX STORAGE-18"DX12"WX11"H
TOTAL BOXES: 36
65" UPRIGHTS 5 TIER
BOX STORAGE-24"DX15WX10"H
TOTAL BOXES: 160
CARPETED DECKING
ADA RAMP
NOTE: ROOM DIMENSIONS, LOCATION OF LIGHT SWITCHES, OUTLETS, AND OTHER ELECTRICAL ENTITIES WILL NEED TO BE VERIFIED PRIOR TO ORDERING.
STORAGE
023
18.000 FIXED 2 TIER BOX STORAGE 2 TIER DRAWERS
25.000 TYP. MOBILE 5 TIER BOX STORAGE
55.000 AISLE
18.000 FIXED 4 TIER BOX STORAGE
42
48
MADS3048 DECK PANELS MUST BE CUT TO FIT IN FIELD AGAINST WALL AND AROUND PANEL
NOTE: SAFCO MOBILE 1000 SYSTEMS ARE BEST INSTALLED ON SOLID FLOORING LIKE CONCRETE OR CONCRETE W/ VCT TILE. REMOVAL OF CARPET IS STRONGLY RECOMMENDED. INSTALLATION ON CARPET SHOULD ONLY BE CONSIDERED IF UNPADDED AND LOW PROFILE.

Furniture Plan

FIRST LEVEL



LOWER LEVEL



SUMMARY

ITEM	DESCIRPTION		QTY	EXTENDED PRICE
C1	Office Chair-OM Affirm		9	$4,842.00
C1-2	Office Chair-YS88		11	$6,006.00
C1-3	Office Chair-Vion		2	$1,020.28
C1-4	Office Chair-SOI Focus 2		9	$3,977.10
C1-5	Office Chair-SOI Amplify		3	$1,371.60
C2	Conference Chair-Bison		14	$14,232.40
C2	Conference Chair-Tanzanite		24	$23,394.72
C3	Nesting Chair, w/o arms, glides		66	$24,086.70
C4	Office Side Chair, with arms, casters		52	$15,397.20
C5	Stool		5	$1,282.50
C6	Lounge Chair		10	$15,371.10
C7	Nesting Chair, with arms, casters		56	$21,924.00
C8	Heavy Duty Desk Chair		2	$2,380.50
D1	Private Office Desk, L-Shape, Adj.		11	$41,277.83
D2	Private Office Desk, Rectangle, Adj.		2	$5,059.74
D3	Private Office Desk, Finance		2	$14,238.00
D4	Private Office Desk, Finance		1	$5,326.69
D6	Workstation, freestanding		1	$2,227.46
102-Open	All panels, stations, storage in 102		1	$122,746.03
111-Office	Private Office Desk, L-Shape, Adj.		1	$3,504.27
114-Office	Includes D10, S3, S4		1	$6,080.80
120-Open	All panels, stations, storage in 120		1	$24,947.69
S13	Lateral File, 2H in 122, 123		4	$3,083.72
S13-2	Lateral File, in 107		1	$1,451.02
S14	Steel Shelving, 48x18x72		1	$366.00
S15	Steel Shelving, 36x18x72		2	$618.00
S16	Steel Shelving, 36x24x72		7	$2,394.00
S17	Steel Shelving, 48x24x72		21	$8,463.00
T2	Nesting Table, 24x60, pwr		15	$19,656.00
T3	Executive Concrete Table		1	$16,250.00
T4	Breakroom table, 36"square, laminate		4	$1,843.20
T5	Conference Table, pwr		3	$4,063.23
T7	Round Occasional Table		9	$7,351.54
T8	Mobile Podium		1	$710.64
T9	Stationary Podium w/table		1	$1,340.00
023-HD	High Density Storage in 023		1	$33,597.62
ICE	Ice Maker		1	7,728.00
		TOTAL PRODUCT:		$469,610.58

Installation for Total Project		$42,850.00
Installation Per Diem for Entire Project	$	-
SALES TAX (0%)		
MISC. CHARGES (Design, Storage/Disposal, Project Management)		$2,500.00
TOTAL MISC COST:		$45,350.00
TOTAL PRODUCT + SERVICE + TAX		**$514,960.58**

50% down to process: **$257,480.29**

Katie Woodard — 11/18/2024

SIGNATURE **DATE**

SIGNATURE **DATE**

Attest:

DATE

OFFICE PEEPS INTERIORS

Terms & Conditions

Payment Terms: A 50% deposit is required with all orders and is due at the time of order. Buyer agrees to pay the remaining 50% net balance within 30 days after invoice. 100% payment at the time of the order requires no credit approval. Buyer agrees to pay a finance charge of 1.5% per month on the unpaid balance of each invoice for each month it is past due. This amount is equal to an annual finance charge of 18% on all delinquent invoices. Buyer additionally agrees to pay all expenses, including but not limited to reasonable attorney fees and court costs which Seller incurs by reason of Buyer's default on non-payment. Acceptance of delivery constitutes acceptance of the merchandise as delivered. No payment shall be withheld on any invoice because of partial delivery of the entire order.

Card Fee: All credit card transactions are subject to a 4% checkout fee. We accept Visa, Mastercard, and Discover payments.

Taxes: Any applicable sales tax will be added to the price at the time of invoicing.

Permits: Any applicable permits will be added to the price at the time of invoicing and the Buyer agrees to pay the same.

Freight: Vendor levied freight will be quoted when applicable but is subject to change due to changing costs.

Delivery and Installation: In the event that delivery and/or installation are required as a part of the proposal, the following provisions shall apply:

1. Condition of job site: The job site shall be clean, clear and free of debris prior to installation. Construction or other delays must be communicated as soon as possible to Office Peeps. We will attempt to accommodate client schedules; however, additional charges may apply as a result of additional storage and freight charges incurred by Office Peeps.

2. Job site service: Adequate facilities for off-loading, staging, moving and handling of merchandise shall be provided.

3. Special packaging or handling: If special packaging is required that is not contained in the specification, it will be subject to an extra charge to the Buyer.

4. Delivery during normal business hours: Delivery and installation will be made during normal working hours. Overtime work performed at the Buyer's request will be billed at 1.5 times the normal rate.

5. Damage: After arrival at the site, any loss or damage by weather, or trades, such as painting or plastering, by fire or other element shall be the responsibility of the Buyer, and the Buyer agrees to indemnify and hold Seller harmless from loss for such reasons.

6. Delays: Office Peeps is not responsible for delays in delivery due to conditions beyond our control.

Warranty and Limitation of Remedies: All warranties provided are those of the manufacturer. Office Peeps will submit vendor warranty claims on the Buyer's behalf and provide service if needed. Accidental and misuse of product may result in additional cost of replacement. Products older than a year may incur a labor fee if service is needed.

Warehousing and Storage: Merchandise is ordered to meet Buyer's installation schedule. If installation is delayed beyond the original date, the merchandise will be invoiced, and payment expected even though stored for future delivery. The labor portion, if any, will be invoiced upon completion of installation unless otherwise agreed upon. If storage time exceeds 30 days past the original agreed installation date, Office Peeps reserves the right to charge a 1.5% monthly storage fee based on the contracted price of the goods being stored.

Billing: All Merchandise will be billed immediately upon delivery unless otherwise provided herein. All direct shipments and C.O.M. charged from the factory to Buyer are billed immediately upon shipment notification from the supplier. All merchandise ordered is to be delivered upon receipt.

Acceptance: This proposal for the purchase of merchandise must be approved and submitted to Office Peeps within 15 days to ensure firm prices, unless otherwise agreed upon.

Cancellation charges: In the event that this proposal is approved and submitted by the Buyer to the Seller and becomes an order, it is understood and agreed that it cannot be cancelled or changed except by written mutual consent by the parties.

MERCHANDISE IS NOT RETURNABLE: All merchandise is special order, non-refundable. No merchandise may be returned unless for specific repair or damage issues.

Design: All provided design layouts, documents, suggestions and colors are the exclusive property of Office Peeps and use or distribution to another party is prohibited.

Buyer also acknowledges and authorizes Office Peeps to perform a credit check if account credit is requested.

Purchaser Signature & Date:

_____

City Council

Agenda Item

Subject: 2024 Bridge Inspection Report to Council

Meeting: City Council - Dec 02 2024

From: Amanda Mack, City Manager

BACKGROUND INFORMATION:
Civil Design, Inc. performed the annual bridge inspections for the City of Watertown and will provide an update to Council, as required by our agreements with the SDDOT for the bridge inspection funding. The City has eleven bridge structures that are inspected for structural safety, traffic safety, maintenance issues, and general condition. CDI performed an inspection in 2024 on six of these structures. A snapshot summary of their report and findings are attached. The City also receives a detailed and comprehensive report of the inspection for each structure. This information is used by staff to plan any maintenance, short or long-range repairs, and eventual replacement if necessary.

FINANCIAL CONSIDERATIONS:
N/A

OVERSIGHT / PROJECT RESPONSIBILITY:
Heath VonEye, Assistant City Manager/Public Works Director
Justin Petersen, City Engineer
Lucas Ammann, Engineer II

STAFF RECOMMENDATION / SUGGESTED MOTION:
N/A

ATTACHMENT(S):
2024 City of Watertown Bridge Inspection Summary
City of Watertown NBIS Inspection Map CDI 2024

City of Watertown
2024 Bridge Inspections Summary
PT NBIS(44) PCN 04N8

Re-inspections (6)
XX.X = Sufficiency Rating = 40.0 - 59.9
XX.X = Sufficiency Rating < 40.0

Inspector of Record: Chris Brozik, PE

Structure No.	Feature Carried	Feature Crossed	Inspection Date	Sufficiency Rating	Current Posting	Recommended Posting	Recommended Repairs
15-179-165	10th Ave	Big Sioux River	9/9/2024	100.0	Not Posted	No Load Posting Required	1. Repair bituminous surfacing in eastbound lane with areas of breakup and potholing. 2. Place fill at erosion behind NW, SW, and SE wingwalls and install Class B riprap over drainage fabric next to the wingwalls. 3. Repair minor erosion and undermining at SW sidewalk. 4. Armor NW embankment and stabilize erosion behind NW wingwall.
15-179-183	20th Ave S Bypass	Pelican Lake Channel	9/9/2024	100.0	Not Posted	No Load Posting Required	1. Install Type 3 Object Marker at all four (4) corners of the structure. 2. Inspection Frequency was adjusted from 48-month down to 24-month frequency due to overburden being less than 2.0' at roadway shoulder (SDDOT Inspection Frequency Requirement).
15-184-181	S Broadway	Big Sioux River	9/9/2024	97.0	Not Posted	No Load Posting Required	1. Install Type 3 Object Marker at all four (4) corners of the structure at guardrail ends. 2. Remove old fence panel just north of south bent and minor drift from under north span. 3. Monitor plumbness of the north and south Abutments.
15-184-186	20th Ave S Bypass	Pelican Lake Channel	9/9/2024	100.0	Not Posted	No Load Posting Required	1. Inspection Frequency was adjusted from 48-month down to 24-month frequency due to overburden being less than 2.0' at roadway shoulder (SDDOT Inspection Frequency Requirement). 2. Replace all four (4) faded Type 3 object markers.
15-202-190	20th Ave S Bypass	Willow Creek	9/9/2024	100.0	Not Posted	No Load Posting Required	1. Repair/replace SW approach guardrail end post that has impact damage. 2. Replace the SW object marker reflective sticker on SW approach guardrail. 3. Install 2nd SE approach delineator that is missing.
15-205-177	Willow Creek Drive	Willow Creek	9/9/2024	98.0	Not Posted	No Load Posting Required	1. Install Type 2 object markers at all four (4) corners of the structure. 2. Remove minor drift/debirs from in front of SW backwall.

City of Watertown

NBIS Bridge Inspection Map

CITY OF WATERTOWN SOUTH DAKOTA

Str. No. 15-141-139
Carries: N. Lake Dr.
Over: Unnamed Creek
Built: 1931
Sufficiency Rating: 78.6
Legal Loads
2023

Str. No. 15-179-165
Carries: 10th Ave. NW
Over: Big Sioux River
Built: 2012
Sufficiency Rating: 100.0
Legal Loads
2024

Str. No. 15-181-170
Carries: 3rd Ave. N.
Over: Big Sioux River
Built: 2022
Sufficiency Rating: 98.7
Legal Loads
2023

Str. No. 15-181-171
Carries: W. Kemp Ave.
Over: Big Sioux River
Built: 1935
Sufficiency Rating: 92.3
Legal Loads
2023

Str. No. 15-205-177
Carries: Willow Creek Dr.
Over: Willow Creek
Built: 2008
Sufficiency Rating: 98.0
Legal Loads
2024

Str. No. 15-181-175
Carries: 4th Ave. S.
Over: Big Sioux River
Built: 1977
Sufficiency Rating: 93.2
Legal Loads
2023

Str. No. 15-184-181
Carries: S. Broadway
Over: Big Sioux River
Built: 1962
Sufficiency Rating: 97.0
Legal Loads
2024

Str. No. 15-179-183
Carries: 20th Ave. S. Bypass
Over: Pelican Lake Channel
Built: 2012
Sufficiency Rating: 100.0
Legal Loads
2024

Str. No. 15-202-190
Carries: 20th Ave. S. Bypass
Over: Willow Creek
Built: 2010
Sufficiency Rating: 100.0
Legal Loads
2024

Str. No. 15-184-186
Carries: 20th Ave. S. Bypass
Over: Pelican Lake Channel
Built: 2012
Sufficiency Rating: 100.0
Legal Loads
2024

Str. No. 15-196-190
Carries: 20th Ave. S.
Over: Big Sioux River
Built: 2010
Sufficiency Rating: 94.5
Legal Loads
2023

Lake Kampeska
Watertown
Pelican Lake
20
81
14
212
29
N
3 mi

CIVIL DESIGN INC

City Council

Agenda Item

Subject: Approval of Change Order No. 2-Final for the 2024 Pickleball Facility, Project No. 2408, with Timmons Construction Inc., for an increase of $18,045.20 for a new contract price of $605,096.54.

Meeting: City Council - Dec 02 2024

From: Amanda Mack, City Manager

BACKGROUND INFORMATION:
Change Order No. 2-Final includes the final adjustment of quantities for the Pickleball Facility project, which includes increase of 4" concrete sidewalk, non-frost susceptible fill, aggregate base course, and inlet protection. A decrease in quantities of silt fence, concrete washout, and liquidated damages. These changes resulted in an increase of $18,045.20 for this project, increasing the total project cost to $605,096.54.

History:
On May 7, 2024, five (5) bids were received for the 2024 Pickleball Facility, Project No. 2408. Timmons Construction Inc. of Brookings, SD had the lowest bid of $526,280.02.

Change Order No. 1 was approved by City Council on August 19, 2024. This change order includes installations for electrical, water, and a fencing wind screen to the Pickleball Facility project. The electrical work includes two lights on the South courts and installing outlets and light switch at the shade structure. The water work will include installation of a 1" line from the watermain to a drinking fountain, also provided under this change order. The wind screen will cover the 8' perimeter fence as shown in the attached map. These changes resulted in an increase of $60,771.32 for this project, increasing the total project cost to $587,051.34.

The Pickleball Facility will be an 8-court complex located on the East side of the Prairie Lakes Wellness Center. It will include 8 courts, perimeter fencing, and a shade structure.

FINANCIAL CONSIDERATIONS:
The funding for this project has been budgeted in the Park & Recreation Capital Improvement Fund (CIP), account 212-45182-43951, in the amount of $450,000.00. With a total bid price of $526,280.02, increased to $605,096.54 with this change order.

Original Bid:	$526,280.02
Change Order #1:	$60,771.32
Change Order #2:	$18,045.20
New Contract Price:	$605,096.54

The cost of project is to be split between the City ($340,923.54) and Pickleball Association ($264,173.00).

OVERSIGHT / PROJECT RESPONSIBILITY:

Dusty Rodiek, Parks, Recreation & Forestry Director
Heath VonEye, Assistant City Manager/Public Works Director
Justin Petersen, City Engineer
Kraig Engen, Engineer Technician/Project Manager

STAFF RECOMMENDATION / SUGGESTED MOTION:

Staff recommends approval of the change order with the following motion:

I move to approve Change Order No. 2-Final for the 2024 Pickleball Facility, Project No. 2408, with Timmons Construction Inc., for an increase of $18,045.20 for a new contract price of $605,096.54.

ATTACHMENT(S):

Vicinity Map
Change Order No.2-Final


VICINITY MAP
PROJECT AREA
Prairie Lakes Wellness Center
19TH STREET NE
11TH STREET NE
Mount Hope Cemetery
14TH AVENUE NE
18TH AVENUE NE
US HWY 81

CHANGE ORDER NO.: 2-Final

Owner: City of Watertown, SD
Engineer:
Contractor: Timmons Construction Inc.
Project: 2024 Pickleball Facility
Contract Name: 2024 Pickleball Facility
Date Issued: November 18, 2024

Owner's Project No.: 2408
Engineer's Project No.: 2408
Contractor's Project No.:

Effective Date of Change Order: December 2, 2024

The Contract is modified as follows upon execution of this Change Order:

Description: **Add additional quantities of Base Course and Non-Frost Susceptible Fill.**

Attachments: **See attached summary of quantities.**

Change in Contract Price	Change in Contract Times
Original Contract Price: $ 526,280.02	Original Contract Times: Substantial Completion: October 4, 2024 Ready for final payment: November 1, 2024
[Increase] from previously approved Change Order No. 1 $ 60,771.32	**[Increase] [Decrease]** from previously approved Change Orders No.1 to No. **[Number of previous Change Order]**: Substantial Completion: N/A Ready for final payment: N/A
Contract Price prior to this Change Order: $ 587,051.34	Contract Times prior to this Change Order: Substantial Completion: October 4, 2024 Ready for final payment: November 1, 2024
Increase this Change Order: $ 18,045.20	**[Increase] [Decrease]** this Change Order: Substantial Completion: N/A Ready for final payment: N/A
Contract Price incorporating this Change Order: $ 605,096.54	Contract Times with all approved Change Orders: Substantial Completion: October 4, 2024 Ready for final payment: November 1, 2024

Recommended by Engineer (if required)	Accepted by Contractor
By: Kraig Engen	Brad Timmons (Nov 20, 2024 12:21 CST)
Title: Engineering Tech	President
Date: 11/20/2024	11/20/2024
Authorized by Owner	Approved by Funding Agency (if applicable)
By:	
Title:	
Date:	

Progress Estimate - Unit Price Work | **Contractor's Application for Payment**

Owner:	City of Watertown	**Owner's Project No.:**	2408
Engineer:	Kraig Engen	**Engineer's Project No.:**	2408
Contractor:	Timmons Construction Inc.	**Contractor's Project No.:**	
Project:	2024 Pickleball Facility		
Contract:	2024 Pickleball Facility		

Application No.: 4 **Application Period:** From 10/18/24 to 11/18/24 **Application Date:** 11/18/24

A	B	C	D	E	F	G	H	I	J	K	L
		Contract Information				Work Completed					
Bid Item No.	Description	Item Quantity	Units	Unit Price ($)	Value of Bid Item (C X E) ($)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) ($)	Materials Currently Stored (not in G) ($)	Work Completed and Materials Stored to Date (H + I) ($)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) ($)
	Original Contract										
1	Mobilization	Lump	Sum	$ 28,140.00	28,140.00	1.00	28,140.00	-	28,140.00	100%	-
2	Traffic Control, Miscellaneous	Lump	Sum	$ 2,625.00	2,625.00	1.00	2,625.00	-	2,625.00	100%	-
3	Install 4" Concrete Sidewalk	3,625	SF	$ 7.30	26,462.50	3,625.00	26,462.50	-	26,462.50	100%	-
4	Post-Tensioned Concrete Pavement	17,152	SF	$ 10.45	179,238.40	17,152.00	179,238.40	-	179,238.40	100%	-
5	Unclassified Excavation	1,905	CY	$ 16.50	31,432.50	1,905.00	31,432.50	-	31,432.50	100%	-
6	Woven Geotextile Fabric	1,906	SY	$ 5.50	10,483.00	1,906.00	10,483.00	-	10,483.00	100%	-
7	Non-Frost Susceptible Fill	2,573	Ton	$ 17.60	45,284.80	2,573.00	45,284.80	-	45,284.80	100%	-
8	Aggregate Base Course	533	Ton	$ 22.00	11,726.00	533.00	11,726.00	-	11,726.00	100%	-
9	Silt Fence	525	LF	$ 4.50	2,362.50	525.00	2,362.50	-	2,362.50	100%	-
10	Curb Inlet Protection	2	Each	$ 180.00	360.00	2.00	360.00	-	360.00	100%	-
11	Temporary Vehicle Tracking Control	1	Each	$ 2,310.00	2,310.00	1.00	2,310.00	-	2,310.00	100%	-
12	Temporary Concrete Washout	1	Each	$ 440.00	440.00	1.00	440.00	-	440.00	100%	-
13	Landscaping	Lump	Sum	$ 6,480.00	6,480.00	1.00	6,480.00	-	6,480.00	100%	-
14	4' Black Viynl Chain-link Fence	476	LF	$ 48.13	22,909.88	476.00	22,909.88	-	22,909.88	100%	-
15	8' Black Vinyl Chain-link Fence	748	LF	$ 67.38	50,400.24	748.00	50,400.24	-	50,400.24	100%	-
16	4'x4' Black Viynl Chain-link Gate	4	Each	$ 825.00	3,300.00	4.00	3,300.00	-	3,300.00	100%	-
17	4'x8' Black Viynl Chain-link Gate	4	Each	$ 1,303.50	5,214.00	4.00	5,214.00	-	5,214.00	100%	-
18	10'x16' Shade Structure	2	Each	$ 18,492.00	36,984.00	2.00	36,984.00	-	36,984.00	100%	-
19	Liquid Applied Acrylic Surfacing(2 Filler Layers, 2 Color	Lump	Sum	$ 39,044.40	39,044.40	1.00	39,044.40	-	39,044.40	100%	-
20	Court Markings and Striping	Lump	Sum	$ 2,880.00	2,880.00	1.00	2,880.00	-	2,880.00	100%	-
21	Netting System	8	Each	$ 2,275.35	18,202.80	8.00	18,202.80		18,202.80	100%	-
				Original Contract Totals	$ 526,280.02		$ 526,280.02	$ -	$ 526,280.02	100%	$ -
	Change Orders										
	Change Order No. 1										
22	Light Poles and Lights	Lump	Sum	$ 3,708.29	3,708.29	1.00	3,708.29		3,708.29	100%	-
23	Light Pole Bases	Lump	Sum	$ 2,757.87	2,757.87	1.00	2,757.87		2,757.87	100%	-
24	Boring	Lump	Sum	$ 7,803.86	7,803.86	1.00	7,803.86		7,803.86	100%	-
25	Materials	Lump	Sum	$ 4,735.94	4,735.94	1.00	4,735.94		4,735.94	100%	-
26	Labor	Lump	Sum	$ 4,744.81	4,744.81	1.00	4,744.81		4,744.81	100%	-
27	Connect to Existing Watermain	1	Each	$ 2,116.14	2,116.14	1.00	2,116.14		2,116.14	100%	-
28	1" Saddle and Corp	1	Each	$ 1,372.62	1,372.62	1.00	1,372.62		1,372.62	100%	-
29	1" Meter Pit	1	Each	$ 5,204.55	5,204.55	1.00	5,204.55		5,204.55	100%	-
30	1" Curb Stop	1	Each	$ 972.28	972.28	1.00	972.28		972.28	100%	-
31	1" Municipex Waterline	180	LF	$ 26.31	4,735.80	180.00	4,735.80		4,735.80	100%	-
32	Drinking Water Fountain(Furnish)	1	Each	$ 5,635.00	5,635.00	1.00	5,635.00		5,635.00	100%	-
33	8' High Perimeter Fence Wind Screen	748	LF	$ 18.92	14,152.16	748.00	14,152.16		14,152.16	100%	-
34	Encapsulated Post Tension System	Lump	Sum	$ 2,831.00	2,831.00	1.00	2,831.00		2,831.00	100%	-
				Change Order No.1 Total:	60,771.32		60,770.32		60,770.32	100%	
	Change Order No. 2-Final										
3	Install 4" Concrete Sidewalk	327	SF	$ 7.30	2,387.10	327.00	2,387.10	-	2,387.10	100%	-
7	Non-Frost Susceptible Fill	626	Ton	$ 17.60	11,017.60	626.00	11,017.60	-	11,017.60	100%	-
8	Aggregate Base Course	417	Ton	$ 22.00	9,174.00	417.00	9,174.00	-	9,174.00	100%	-
9	Silt Fence	-345	LF	$ 4.50	(1,552.50)	(345.00)	(1,552.50)	-	(1,552.50)	100%	-
10	Curb Inlet Protection	2	Each	$ 180.00	360.00	2.00	360.00	-	360.00	100%	-
12	Temporary Concrete Washout	-1	Each	$ 440.00	(440.00)	(1.00)	(440.00)	-	(440.00)	100%	-
35	Substantial Completion (Liquidated Damages)	4	Each	$ (725.00)	(2,900.00)	4.00	(2,900.00)		(2,900.00)	100%	-
				Change Order No.2-Final Total:	18,045.20		18,046.20		18,046.20	100%	
				Change Order Totals	$ 78,816.52		$ 78,816.52	$ -	$ 78,816.52	100%	$ -
	Original Contract and Change Orders										
				Project Totals	$ 605,096.54		$ 605,096.54	$ -	$ 605,096.54	100%	$ -

City Council

Agenda Item

Subject: First Reading of Ordinance No. 24-22 to supplement the 2024 Budget for various Departments and Projects & State and Federal Grant Appropriations

Meeting: City Council - Dec 02 2024

From: Kristen Bobzien, Interim City Manager/Chief Financial Officer

BACKGROUND INFORMATION:
NA

FINANCIAL CONSIDERATIONS:
NA

STAFF RECOMMENDATION / SUGGESTED MOTION:
First Reading, No Action.

ATTACHMENT(S):
Budget Supp Ordinance 2024 - #1

ORDINANCE NO. 24-22

AN ORDINANCE PROVIDING FOR A SUPPLEMENTAL APPROPRIATION FOR THE GENERAL FUND, BBB FUND, PARK & REC FUND, PLWC FUND, CAPITAL IMPROVEMENT SALES TAX FUND, TIF #5, #12, #13, #14, #15, #17, #19 & #20 FUNDS

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF WATERTOWN, SOUTH DAKOTA:

SECTION I.

That the Annual Appropriation Ordinance No. 23-25, approved and adopted on the 20th day of November, 2023 failed to provide sufficient funds necessary to enable the City of Watertown to conduct indispensable functions of government which require the incurring of liabilities or expenditures.

SECTION II.

That it is necessary to appropriate the additional amounts as follows:

General Fund (101):			
Finance Office (41530):			
Banking Services (42219)	$	35,000	
Contributions to External Organizations (41915):			
Watertown Community Band (45506)	$	12,250	
Watertown Cares (45711)	$	10,000	
Police Department (42100):			
Overtime Pay (41109)	$	13,730	
Equip. Maintenance (42501)	$	89,020	
Building Maintenance (42502)	$	19,800	
Repair to Vehicles (42506)	$	20,000	
DASH Program (42927)	$	58,010	
Fire Department (42220):			
Clerical & Oper. Salary (41101)	$	1,500	
Overtime Pay (41109)	$	2,400	
Insurance Premiums (42104)	$	4,000	
Equip. Maintenance (42501)	$	11,000	
Building Maintenance (42502)	$	14,600	
Safety Supplies (42627)	$	8,500	
Education & Outreach (42910)	$	2,500	
Machinery & Equipment (43600)	$	28,000	
Ambulance Department (42291):			
Clerical & Oper. Salary (41101)	$	3,500	
Overtime Pay (41109)	$	1,400	
Public Works Administration Department (43010):			
Travel Expense Personnel (42701)	$	2,500	
Cemetery (43700):			
Office Supplies (42600)	$	1,000	
Ag & Hort Supplies (42615)	$	7,500	
Reclaim Cemetery Lots (45201)	$	6,000	
Refunds & Reimbursements (45300)	$	1,500	
Mosquito Control Service (44132):			
Overtime Pay (41109)	$	2,900	
Mosquito Control Supplies (42230)	$	12,783	
Animal Control & Community Service (44143):			
Outside Contract Labor (42216)	$	10,000	
Forestry (45240):			
Insurance Premiums (42104)	$	4,013	
Equipment Maintenance (42501)	$	4,679	
Transfer Out (49300):			
Transfers Out - Rec Center (49314)	$	100,000	
Total from General Fund Unassigned Fund Balance			**$ 488,085**
Park & Recreation Fund (201):			
Supervision (45121):			
Supervision Salary (41100)			
Banking Services (42219)	$	40,000	
Computer Renewal/Maint. (42511)	$	1,000	
Phone-Monthly Service (42805)	$	700	
Golf Course (45125):			
Temporary Salaries (41102)	$	30,000	
Computer Renewal/Maint. (42511)	$	6,500	
Repair-Maintenance Shop (42515)	$	10,000	
Repair-Irrigation Equip (42521)	$	7,000	
Small Tools (42613)	$	3,000	
Ag & Hort Supplies (42615)	$	17,500	
Merchandise for Resale (42631)	$	10,000	
Refunds & Reimbursements (45300)	$	4,200	

Family Aquatic Center (45126):				
Temporary Salaries (41102)	$	8,900		
OASI-Employer Contributions (41200)	$	1,000		
Merchandise for Resale (42631)	$	13,000		
Natural Gas (42801)	$	3,200		
Ice Arena (45135):				
Insurance Premiums (42104)	$	75,000		
Consultant Services (42203)	$	15,000		
Merchandise for Resale (42631)	$	50,000		
Electricity (42802)	$	18,000		
Sewer (42804)	$	5,000		
Phone-Monthly Service (42805)	$	3,100		
Subs & Membership (42918)	$	3,000		
Refunds & Reimbursements (45300)	$	50,000		
Zoo (45134)				
Office Supplies (42600)	$	5,500		
Ag & Hort Supplies (42615)	$	2,500		
Chem., Drug & Lab Supplies (42619)	$	15,000		
Parks Systems (45142)				
Temporary Salaries (41102)	$	50,000		
Overtime Pay (41109)	$	2,000		
Insurance Premiums (42104)	$	1,500		
Equip. Maintenance (42501)	$	7,500		
Trail/Sidewalk Maintenance (42505)	$	3,900		
Rapairs to Vehicles (42506)	$	6,000		
Motor Fuel & Lubricants (42603)	$	6,500		
Ag & Hort Supplies (42615)	$	3,500		
Cleaning Service (42617)	$	4,500		
BBB Fund (203):				
City Promotion (49011):				
City Promotion (43435)	$	5,000		
4th of July (45631)	$	1,000		
Total from BBB Fund Unassigned Fund Balance			**$**	**6,000**
Prairie Lakes Wellness Center (204):				
Temporary Salaries (41102)	$	10,000		
Retirement & Pensions (41300)	$	2,000		
Insurance Premiums (42104)	$	3,500		
Bldg. Maintenance (42502)	$	11,000		
Banking Services (42219)	$	13,000		
Office Supplies (42600)	$	1,000		
Subsc. & Memberships (42918)	$	1,500		
Improvements to Buildings (43201)	$	130,000		
Debt Service-Principal (44100)	$	35,000		
Total from PLWC Fund Unassigned Fund Balance			**$**	**207,000**
Capital Improvement Sales Tax Fund (212):				
Public Safety Improvements (42085):				
Vehicles (42800)	$	13,500		
Fire Truck (43813)	$	195,000		
Storm Sewer/Flood Improvements (43280):				
Misc. Drainage Improvements (43902)	$	140,000		
Recreational Facility Improv. (45182):				
Walkway/Roadway (43705)	$	200,000		
Cemetery Improvements (43930)	$	42,000		
Tennis/Pickleball Court Improvements (43951)	$	155,100		
Golf Course Projects (43991)	$	12,000		
Total from Capital Improvement Fund Unassigned Fund Balance			**$**	**757,600**
Library Fines Fund (226):				
Current Expenditures (45506)				
Banking Services (42219	$	1,200		
Total from Library Fines Fund Unassigned Fund Balance			**$**	**-**
TIF #5 Fund (282):				
TIF Tax Revenue (39105):				
TIF Taxes Current (31810)	$	(235,000)		
Debt Service (49105):				
Interest (44101)	$	225,000		
Contributions (45720)	$	10,000		
Total from TIF #5 Fund Unassigned Fund Balance			**$**	**-**

TIF #12 Fund (289):			
TIF Tax Revenue (39112):	$	(6,500)	
TIF Taxes Current (31810)			
Debt Service (49112):			
Contributions (45720)	$	6,500	
Total from TIF #12 Fund Unassigned Fund Balance			**$** -
TIF #13 Fund (290):			
TIF Tax Revenue (39113):	$	(37,500)	
TIF Taxes Current (31810)			
Debt Service (49113):			
Contributions (45720)	$	37,500	
Total from TIF #13 Fund Unassigned Fund Balance			**$** -
TIF #14 Fund (291):			
TIF Tax Revenue (39114):	$	(231,000)	
TIF Taxes Current (31810)			
Debt Service (49114):			
Contributions (45720)	$	231,000	
Total from TIF #14 Fund Unassigned Fund Balance			**$** -
TIF #15 Fund (292):			
TIF Tax Revenue (39115):	$	(90,000)	
TIF Taxes Current (31810)			
Debt Service (49115):			
Contributions (45720)	$	90,000	
Total from TIF #15 Fund Unassigned Fund Balance			**$** -
TIF #17 Fund (294):			
TIF Tax Revenue (39117):	$	(100)	
TIF Taxes Current (31810)			
Debt Service (49117):			
Contributions (45720)	$	100	
Total from TIF #17 Fund Unassigned Fund Balance			**$** -
TIF #19 Fund (295):			
TIF Tax Revenue (39119):	$	(1,270)	
TIF Taxes Current (31810)			
Debt Service (49119):			
Contributions (45720)	$	1,270	
Total from TIF #19 Fund Unassigned Fund Balance			**$** -
TIF #20 Fund (296):			
TIF Tax Revenue (39120):	$	(8,000)	
TIF Taxes Current (31810)			
Debt Service (49120):			
Contributions (45720)	$	8,000	
Total from TIF #20 Fund Unassigned Fund Balance			**$** -

SECTION III.

Out of all the moneys belonging to the City of Watertown, South Dakota, on January 1, 2024, and in the hands of the Finance Officer of said City and out of all the moneys coming into the treasury of said City during the year 2024 that there be, and there is hereby appropriated by the City Council is hereby deemed necessary to for the fiscal year commencing January 1, 2024 and ending December 31, 2024, and the above sum of money which enable the city to conduct the indispensable functions of the government and to discharge a duty which is a lawful duty of the Municipality to discharge which required the incurring of liabilities and expenditures of funds for the purposes or objects for which no provision was made in the above mentioned Annual Appropriation for the purposes or objects for which no provision was made in the above mentioned Annual Appropriation Ordinance.

SECTION IV.

This Ordinance is declared to be for the supplement of the City Government and its existing public institutions and shall be in full force and effect from and after its passage and publication.

SECTION V.

All Ordinances or parts of ordinances in conflict herewith are hereby expressly repealed.

The above and foregoing Ordinance was moved for adoption by Alderperson , seconded by Alderperson , and upon voice vote motion carried, whereupon the Mayor declared the Ordinance duly passed and adopted.

Kristen Bobzien

First Reading: December 2, 2024
Second Reading: December 16, 2024

CITY OF WATERTOWN

ATTEST:

Ried Holien, Mayor

Kristen Bobzien
Finance Officer

City Council

Agenda Item

Subject: Application for a New Retail (on-off sale) Malt Beverage & SD Farm Wine License to MADJIK, LLC d/b/a Legends, 825 3rd St SW, Lots 1-7 Block 93 & Lots 1-8, Block 94 of the 5th Railway Addition to the Municipality of Watertown, Codington County, South Dakota.

Meeting: City Council - Dec 02 2024

From: Amanda Mack, City Manager

BACKGROUND INFORMATION:
Fees have been paid and a Notice of Hearing has been published on November 23rd, 2024.

The property received Conditional Use approval from the Board of Adjustment for a Bar or Tavern in the C-3 Highway Commercial District on November 7th, 2024 to allow for on-premise / on-sale alcohol licensing, sale and consumption.

The City Council approved a Family Entertainment Center Lease with MADJIK LLC on 09/03/2024. A copy of that lease is included in this agenda item.

FINANCIAL CONSIDERATIONS:
There are no major financial considerations for this item.

STAFF RECOMMENDATION / SUGGESTED MOTION:
I move to approve the application for a New Retail (on-off sale) Malt Beverage & SD Farm Wine License to MADJIK, LLC d/b/a Legends, 825 3rd St SW, Lots 1-7 Block 93 & Lots 1-8, Block 94 of the 5th Railway Addition to the Municipality of Watertown, Codington County, South Dakota.

ATTACHMENT(S):
MADJIK Malt Beverage Application
MADJIK LEASE

Date Received _____ License No. _____

Date Issued _____

Uniform Alcoholic Beverage License Application

A. Owner Name and Address

MADJIK LLC
825 3rd St SW
Watertown, SD 57201

Owner's Telephone #: 605-520-7654

B. Business Name and Address

Legends
825 3rd St SW
Watertown SD 57201

Business Telephone #: 605-882-6959

Place of business is located in a municipality? ☑ Yes ☐ No

County: Codington

Do you own or lease this property? ☐ Own ☑ Lease

Are real property taxes paid to date? ☑ Yes ☐ No

C. Indicate the class of license being applied for (submit separate application for each class of license).

- ☐ Retail (on-sale) Liquor
- ☐ Retail (on-sale) Liquor - Restaurant
- ☐ Convention Center (on-sale) Liquor
- ☐ Package (off-sale) Liquor
- ☐ Retail (on-off sale) Wine and Cider
- ☑ Retail (on-off sale) Malt Beverage & SD Farm Wine
- ☐ Package Delivery
- ☐ Hunting Preserve
- ☐ Other _____

Is this license in active use? ☐ Yes ☑ No

Do you or any officers, directors, partners, or stockholders hold any other alcohol retail, manufacturing, or wholesaler licenses?

☐ Yes ☑ No **If Yes, please list on the back page.**

D. Legal description of licensed premise:

Lots 1-7 Block 93 of 5th Railway Addition
Lots 1-8 Block 94 of 5th Railway Addition

Have you ever been convicted of a felony? ☐ Yes ☑ No

E. State Sales Tax Number 1041-7484-ST

F. New license ☑ Transfer? ($150) ☐ Re-issuance ☐

G. CERTIFICATE: The undersigned applicant certifies under the penalties of perjury that all statements provided herein are true and correct; that the said applicant complies with all of the statutory requirements for the class of license being applied for and in addition agrees to permit agents of the Department of Revenue access to the licensed premises and records as provided in SDCL 35-2-2.1, and agrees this application shall constitute a contract between applicant and the State of South Dakota entitling the same or any peace officers to inspect the premises, books and records at any time for the purpose of enforcing the provisions of Title 35 SDCL, as amended.

Date 11/15/2024 Print Name Kyle Wiesner Signature Kyle Wiesner

H. APPROVAL OF LOCAL GOVERNING BODY – Notice of hearing was published on 11/23/24. Public hearing on the application was held 12/2/2024, not less than SEVEN (7) days after official publication. The governing body by majority vote recommends the approval and granting of this license and certifies that requirements as to location and suitability of premises and applicant have been reviewed and conform to the requirements of local and South Dakota law.

Renewal - no public hearing held ☐

Amount of fee collected with application $ 350.00

Amount of fee retained $ 200.00

Forwarded with application $ 150.00

For Local Government Use

(Seal) _____
Mayor or Chairman

If disapproved, endorse reason thereon and return to applicant

Transferred (State Use)

From: _____

Sales tax approval _____ Date _____

STATE LIQUOR AUTHORITY:

APPROVAL_____ **REVIEW**_____

Please complete the reverse side if applicable

Company supplement information
(For corporate/partnership/LP/LLC applicants)

Name of corporation/partnership/LP LLC MADJIK LLC

Address of office and principal place of business of corporation/partnership/LP/LLC 825 3rd St SW Watertown, SD 57201

Are all managing officers of this corporation/partnership/LP/LLC of good moral character having never been convicted of a felony? ☑ Yes ☐ No

Name, title of office, occupation and address of each of the officers/owners of the corporation, partnership, LP or LLC:

Name	Office	Address	Occupation
Kyle Wiesner		1125 Konrady Dr Watertown, SD 57201	Engineer
CK Trailer Company, LLC		127 22nd St SW Watertown, SD 57201	Owner
Michelle and Dustin Sinner		6300 4th Ave SW Watertown, SD 57201	Owner

Name of any officers, directors, partners or stockholders of applicant having a financial interest or capital stock in any other alcoholic beverage license:

Name	Type of License, License Number, Financial Interest Held, and Address of Business Location

Where and with whom are all company records kept, such as charter, by-laws, minutes, accounts, notes payable, and notes and accounts receivable, etc?

825 3rd St SW with Ownership

With signature the applicant agrees to the following:

That the applicant company will comply with all provisions of ARSD chapter No. 64:75:02 of the Department of Revenue, relating to the transfer of stock and prior approval of the transfer of such stock by the Secretary of Revenue and violation of any of the provisions of said regulation or failure to comply therewith, whether by the undersigned corporation, partnership/LP/LLC or by any stockholder thereof, or by anyone interested in said company, shall constitute cause for revocation or suspension of any license issued pursuant to and in reliance on this application, or for refusal to renew such license upon expiration thereof.

We the undersigned officers and directors of the applicant company acknowledge that the within supplement application form is true and correct in every respect and that there exists no financial arrangement concerning this or any other alcoholic beverage license than that expressly set forth above. If company stock is to be transferred we ask for approval of such voluntary stock transfer.

Signature of Authorized Officer/Director/Partner — **Date**

Kyle Wies — 11/15/24

CITY OF WATERTOWN SOUTH DAKOTA

November 19, 2024

MAJIK, LLC
RE: Legends
825 3rd Street SW
Watertown, SD 57201

Property Address: 825 3rd Street SW, Watertown, SD 57201
Legal Description: Lots 1-7 Block 93 & Lots 1-8 Block 94 of 5th Railway Addition to the Municipality of Watertown, Codington County, South Dakota

To Whom It May Concern:

The property described above received Conditional Use approval from the Board of Adjustment for a Bar or Tavern in the C-3 Highway Commercial District, pursuant to §21.2803(3) on November 7th, 2024 to allow for on-premise/on-sale alcohol licensing, sale and consumption.

Respectfully,

Carla Heuer

Carla Heuer
Planner
Community Development, a Division of Public Works
City of Watertown

CC: Brandi Hanten, Community Development Manager
Heath VonEye, Assistant City Manager/ Public Works Director
Jennifer Collins, Records and Licensing Manager
Kristen Bobzien, Finance Officer
Kim Stricherz, Finance Officer II

FAMILY ENTERTAINMENT CENTER (FEC)
LEASE

THIS LEASE AGREEMENT, (this "Lease") is made as of Sept 17, 2024 (the "Effective Date") by and between the City of Watertown, through its Department of Parks, Recreation, and Forestry, with offices at 23 2nd Street NE, Watertown, SD 57201 ("CITY") and MADJIK LLC, a South Dakota limited liability company, whose address is 825 3rd Street SW, Watertown, South Dakota, 57201 ("LESSEE").

RECITALS

A. There currently exists a Family Entertainment Center (FEC) Lease dated April 15, 1996 together with any and all amendments thereto (the "Original Lease"). MADJIK LLC has entered into a purchase agreement with the current LESSEE for the business conducted under the name of Thunder Road of Watertown, Inc.

B. MADJIK LLC desires to enter into this Lease with the CITY to continue operations of the business conducted currently under the name of Thunder Road and any other ancillary services and activities as part of a family entertainment center.

C. The terms of the Original Lease will remain in force and effect as to the period ending on 11:59 P.M. prior to the Effective Date; which shall be as of the date of closing of the purchase by MADJIK LLC.

The terms contained in this Lease shall apply to and be effective with respect to the period from and after the Effective Date, without novation, replacement, or substitution of the Original Lease, and the leasehold estate of LESSEE shall mean the lease hold estate commencing under this Lease.

In consideration of the mutual covenants and agreements herein contained, LESSOR and LESSEE agree as follows:

1. LEASED PREMISES

The CITY leases to LESSEE and LESSEE takes and leases the real property described and shown on Exhibit A which is a portion and part of the following legal description:

Lots 1-7 Block 93 of 5th Railway Addition to the City of Watertown; and

Lots 1-8, Block 94 5th Railway Addition to the City of Watertown;

with a current address of 825 3rd Street SW, Watertown, South Dakota and referred to as the Family Entertainment Center ("FEC") currently being operated under the name Thunder Road. Said leased area shall hereinafter be referred to as the "Premises". LESSEE, agrees and accepts lease of the Premises subject to the conditions and covenants herein contained, for the term of years hereinafter specified.

2. OPERATING SEASON

For the purpose of this Lease, "operating season" shall mean the period of time in any calendar year commencing on the date when LESSEE shall open its facilities for use and enjoyment of the public and ending on the date when the LESSEE shall close its facilities to the public. The Parties agree that at a minimum the operating season will be from Memorial Day through Labor Day.

3. TERM OF LEASE

The initial term of the Lease will commence on Sept 17, 2024 and end on Sept 17, 2039 unless renewed under Section 4 for an additional term. The City owns and is leasing to LESSEE, the real estate and all buildings and appurtenances including, but not limited to, the ticket/concession building, maintenance/storage building, indoor entertainment center, go kart track and pit area, picnic shelter, parking lot, and miniature golf area.

4. OPTION TO RENEW

Upon completion of the fifteen (15) year initial term of this Lease, the LESSEE at its option, may renew this lease for an additional term of fifteen (15) years, upon similar terms, conditions and covenants contained herein. LESSEE's option to renew shall be exercised automatically, unless notice of intent to cancel is provided to the CITY in writing at least six (6) months prior to the termination of the 15-year initial term. The CITY may increase the lease rate as part of the renewal to be negotiated in good faith between the Parties.

5. PURPOSE AND IMPROVEMENTS

LESSEE shall provide for the operation and maintenance of the FEC and appurtenances, and the Premises shall be used only for such purposes unless consent to some other use is obtained from the CITY in writing.

A. *Optional Items and Services*. LESSEE has the option of developing any of the following: Bumper Boats, Batting Cages, and ancillary upgrades within the Premises. If LESSEE desires to pursue the development of additional concessions and alcohol sales or upgrades to the Premises, LESSEE will be required to first obtain permission of the CITY and submit plans and specifications for CITY approval.

B. *Non-discrimination*. The LESSEE agrees that the FEC provided for herein shall be equally available to all members of the public without discrimination. LESSEE agrees not to discriminate against any employee or applicant for employment, to be employed in the performance of this Lease with respect to his hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment because of race, sex, religion, or national origin.

6. RENT

LESSEE shall pay to the CITY as rent for the use of the Premises the following:

A. From all revenues related to the leased premises in this lease and for as long as the LESSEE is operating the FEC on the leased premises, the LESSEE shall pay the CITY five percent (5%) of its gross receipts for annual gross receipts of $500,000 or less.

B. LESSEE will pay the CITY two and a half percent (2.5%) of all annual gross receipts over $500,000.

Percentage payments due the CITY shall be based on gross receipts, exclusive of State and local sales taxes, and shall be paid monthly on or before the 15th day of the month, covering the receipts of the previous month and shall be accompanied by a verified statement showing receipts. Late or unpaid rents will bear a fee of 10% per month from the 1st day of each month until paid in full. Payment of rent will be in legal tender and submitted to the City of Watertown, Finance Office, 23 2nd Street NE, Watertown SD 57201.

7. POSSESSION AND MAINTENANCE

LESSEE agrees that all equipment used under this Lease shall be of good quality and shall be subject to the approval of the CITY. LESSEE shall have sole possession of and responsibility for maintenance of the Premises, including all improvements constructed thereon. The CITY shall have the right to inspect the Premises and to impose reasonable regulations to insure proper care, maintenance, and upkeep of the Premises. The degree of maintenance shall be in keeping with the standard of the CITY's park system. The CITY, through its Director of Parks, Recreation, and Forestry, will have the right to require that the Premises and improvements thereon meet general standards of other commercially owned and operated FECs.

A. *Maintenance and Repairs by CITY*. Lessor shall maintain the foundation, the exterior walls, and structural portions of the Premises (including load-bearing interior walls and columns), roof of the Premises, and the HVAC system in good repair; provided, however, that CITY shall not be required to make any repairs occasioned by the act, omission or negligence of Lessee, or Lessee's customers, invitees, agents, contractors, employees, servants, assignees, licensees or concessionaires. If the Premises should become in need of repairs required to be made by CITY hereunder, LESSEE shall give prompt written notice thereof to CITY. All maintenance and repairs by CITY is contingent upon available funds and approval, when necessary, of the CITY Council.

B. *Maintenance and Repairs by LESSEE*. The LESSEE shall be responsible for the reasonable repairs, maintenance, and general appearance of the area. LESSEE shall at all times keep and maintain the leased premises, together with any incidental or other equipment or appliances installed or used by LESSEE, in a good, safe and serviceable condition of repair and shall maintain all of the same, and the premises in and about them occupied by LESSEE, in a safe, clean and neat condition.

C. *Deficiencies in Maintenance and Repairs*. The CITY shall advise the LESSEE in writing of any deficiency in maintenance of the Premises. If the deficiency is not corrected by LESSEE within a reasonable and appropriate period, the matter shall be submitted to an administrative appeal under Title 7.22 of the Revised Ordinances of the City of Watertown and as further amended.

8. OPERATIONS

In its operation on the leased premises, LESSEE shall observe all applicable Federal, State and Municipal laws and shall take such actions as may be necessary for the protection of health, safety, and well-being of the public.

A. *Waste Disposal.* Trash and other wastes will be properly disposed of by LESSEE, and LESSEE will not permit the accumulation or storage of any waste or any other type of refuse to occur upon the leased premises. The LESSEE shall not permit garbage and other refuse to accumulate or to gather in or around the concession. All garbage and refuse shall be placed in garbage receptacles which will be provided by the LESSEE.

B. *Utilities.* LESSEE is responsible for payment of all utilities during the Lease Term in addition and separate from Rent and shall transfer utilities into the name of LESSEE during the Lease Term.

C. *Advertising.* For purposes of promoting the facility, the CITY may from time to time join with the LESSEE in dispensing promotional materials.

D. *Alcohol Sales.* LESSOR agrees that LESSEE shall be eligible to make application for issuance, or renewal, of a malt beverage license over and upon the above-described leased Premises, with the express acknowledgment that the approval of such license shall rest solely in the discretion of the Watertown City Council.

1. LESSEE may utilize the leasehold premises, during the period this Lease is in effect, for all lawful recreational purposes, including the operation of a concession providing licensed sale of malt beverages. LESSEE agrees, that notwithstanding the ability of a malt beverage license holder to sell and dispense malt beverages in a manner and at times permitted under state law, LESSEE agrees to voluntarily restrict the sale of malt beverages at the licensed facility in the following manner:

   a. No malt beverage shall be sold after 11:00 p.m. on any night; and
   b. No malt beverage will be sold for consumption off the licensed premises.
   c. LESSEE agrees that, at all dates and times when it is permitted to engage in malt beverage sales, it will prevent patrons from bringing onto the leased premises any alcoholic beverage which was not purchased from LESSEE's concession operation.

E. *Condition and Surrender of Property.* The Premises shall be in at least as good condition, ordinary wear and tear excepted, when surrendered at the end of the lease period as it was when first leased by the LESSEE.

F. *Equipment Provided by LESSEE.* The LESSEE shall, at his own cost and expense, furnish and maintain in good usable condition a sufficient amount of equipment as may be necessary to properly furnish the services herein provided for and in a manner acceptable to the Director of the Parks, Recreation & Forestry Department.

G. *Sanitation*. LESSEE shall keep the premises in a clean condition to comply with public health standards and shall be subject to inspection by the Watertown Health Department.

H. *Furnish of Labor, Material, and Services.* The LESSEE shall furnish all labor, materials, supplies, services and equipment necessary to maintain, in a clean, orderly and inviting condition satisfactory to the Director of the Parks, Recreation & Forestry Department, all premises used and occupied by the LESSEE in the operation of the concessions, activities, and alcohol sales, together with the area surrounding same as affected by said LESSEE. The CITY shall have the right at all times to examine and inspect the concessions, activity areas, for operational efficiency at any time that it deems necessary.

I. *Employees.* The LESSEE shall, at his own cost and expense, provide a sufficient number of employees to serve the public promptly and efficiently and in a safe manner, taking into due consideration the nature of the activity and having a sufficient number of employees and having the employees positioned and stationed in the right locations to allow the activity to be carried on in a safe manner.

J. *Pricing of Services to Public.* The CITY and LESSEE agree that the FEC will be patronized by people of all ages and by people or family groups having moderate or average incomes. Rates shall be reasonable for similar services in similar surrounding communities and prominently posted in the sales area (point of purchase) by the LESSEE.

K. *Sales Reports and Sales Tax Documentation.* Applicable sales tax may be charged on the sale of concession items. Percentage paid the Parks, Recreation & Forestry Department by the LESSEE will be on total gross sales which excludes State and local sales tax. LESSEE shall supply a point-of-sale system acceptable to the CITY for recording daily concessions, activities, and alcohol sales. The monthly sales reports will be due the fifteenth (15th) of the month following the opening of the concessions and by the fifteenth (15th) of each succeeding month of operation thereafter. The CITY reserves the right to audit the point-of-sale system at least once a month or any time that it deems necessary.

L. *Signs.* Hours of operation shall be posted on the Premises by the LESSEE for the public's information. Public signs for which the LESSEE is responsible must be appropriately located, accurate, attractive and well maintained. Signs of a permanent nature shall be prepared in a professional manner and in accordance with city ordinances related to signage.

M. *Ordinance, laws and regulations.* The LESSEE will abide by all applicable laws, rules, regulations, and ordinances of the United States, State of South Dakota, County of Codington, and CITY. It shall be the obligation of the LESSEE to apply for, pay for, and obtain all permits and licenses required by the various agencies (as enumerated above) to operate the concession, activity, sale of alcohol, and to sell the merchandise approved herein.

Q. *Accounting and reports.* The LESSEE will be required to submit on or before the 15th of April for the concession operation, a Financial Report on the season's operation on blanks furnished by the CITY. The LESSEE shall keep such books, records, and recording devices as directed by the CITY showing accurate and complete data on all receipts and disbursements in connection with the operation of all concessions, services, and alcohol sales provided for

herein. The CITY and its accounting and auditing officers shall have the right at reasonable times and places to examine and audit all of said books, records, and recording devices and to reexamine and reaudit same. The LESSEE shall render to the Director of the Parks, Recreation & Forestry Department on the fifteenth day of each and every month of operation during the term of the contract a detailed statement showing all total gross receipts in connection with the operation of said concessions, services, and alcohol sales during the preceding calendar month.

1. The term "total gross sales" as herein used shall be deemed to mean the total price paid to the LESSEE by persons purchasing the commodities or using the services provided for hereunder; provided that in computing said total gross sales there shall not be deducted from such total gross sales the amounts retained by or paid to the LESSEE's salesperson or employees as commission on sales of said commodities and services or any reductions whatsoever.

9. INDEMNIFICATION

The LESSEE agrees to perform and faithfully to observe and comply with all the conditions, regulations, and provisions prescribed herein and further to indemnify, save and keep harmless the CITY, its officers, agents, and employees of and from all liability, lien, judgment, costs, damages and expense of whatsoever kind, including costs and reasonable attorney's fees, which may in any way be suffered by the CITY or by any of its officers, agents, employees, or which may accrue against or be charged to or recovered from the CITY, to its said officer, agents, or employees by reason of or arising out of the operations of the FEC including all services, concessions, and alcohol sales herein provided for the privileges granted, as aforesaid, or for or on account of any act or thing done or suffered or omitted to be done under the authority, or supposed authority, of such grant. LESSEE shall, during the term hereof, or any part hereof, hold LESSOR harmless and indemnify it from any and all damages and demands that may result from all acts including third-party claims and negligence of LESSEE, including specifically, but not limited to, personal injury and property damage claims arising out of or incidental to the use, maintenance or operation by LESSEE or his employees or agents, of any of the structures, appliances, equipment or operations referred to in this Agreement.

10. LOSS AND LIABILITY OVER AND UPON THE LEASED PREMISES – INSURANCE.

During the term of this lease, LESSEE shall procure and keep in force, or shall where appropriate, require LESSEE's contractors and subcontractors to procure and keep in force, the following insurance:

A. *Workmen's compensation insurance.* LESSEE will maintain workmen's compensation insurance sufficient to meet State of South Dakota statutory requirements, including $100,000 employer's liability coverage, protecting all employees of LESSEE and require it for employees of its contractors or subcontractors during the term of this Lease.

B. *General commercial liability.* LESSEE shall keep and maintain both a general liability insurance policy and an alcohol liability insurance policy with a minimum amount of coverage of One Million Dollars ($1,000,000.00) for any one accident or occurrence. These policies shall name LESSOR, CITY of Watertown and their agent and employees, as an additional insured. A

certificate covering conditions described shall be filed at the CITY within thirty (30) days from the date of this Lease. Notice of certificate renewal is required prior to policy expiration, and a new certificate shall be filed within fifteen (15) days.

C. *LESSEE's property coverage.* LESSEE acknowledges that LESSOR maintains no policy or coverage over and upon any personal property, equipment, contents, or activity located or conducted on the Premises. In the event LESSEE elects to obtain insurance coverage for any property located or stored upon or within the leased premises, such coverage will be obtained at LESSEE's sole expense.

D. *Additional Insurance Required of LESSEE.* Any insurance required by any lender or third-party of LESSEE for improvements or purchases made by LESSEE shall be at LESSEE's sole expense. The CITY may require an increase in insurance limits be obtained by the operators of the FEC and based upon standard practices of municipalities.

E. *Notice of Cancelation or Change in Insurance.* LESSEE agrees that thirty (30) days' notice in writing shall be given the CITY in the event of cancelation, termination or material change of any insurance policy required hereunder. Insurance coverage cannot be canceled unless a thirty (30) day notice of cancellation is provided to the CITY.

11. IMPROVEMENTS.

A. *Improvements by CITY.* All capital improvements to be financed by the City will be agreed upon between the Parties and submitted through the budget process for City Council approval.

B. *Improvements by LESSEE.* The LESSEE will not make any alterations or improvements to the FEC, apart from trade fixtures, without the express written consent of the CITY. If the LESSEE or its officers, employees, agents alter or make improvements to the FEC without the CITY's consent, the CITY may require that:

1. The LESSEE, at its sole expense, remove such alteration or improvement and restore the FEC to its original condition; or

2. The CITY may remove such alteration or improvement and restore the FEC to its original condition. In such instance, the LESSEE will reimburse the CITY for the cost of such work.

3. The CITY may require the improvements, alterations, or fixtures installed by the LESSEE remain upon expiration of the Agreement and shall become the property of the City.

C. *Approval and compliance.* The plans for any improvements by the LESSEE will be provided to the City for approval. Any constructed improvements will be in accordance with all applicable City ordinances, building codes, and regulations.

D. *Improvements in Lieu of Rent.* The Parties agree that certain improvements may arise that cannot be supported by the CITY's budget. In those instances, the CITY may approve certain

improvements by LESSEE in lieu of rent or in partial payment of rent. Any agreement for certain improvements to be funded by LESSEE in lieu of rent will be in writing as an amendment to this Lease and executed by both parties. Such amendment will be approved and executed by the City Manager or designee, in consultation with the Director of Parks, Recreation, and Forestry.

12. ASSIGNMENT OF LEASE

Except as provided in this paragraph, this Lease will not be assigned in whole or in part, unless and until the CITY approves such assignment in writing, which approval shall not be unreasonably withheld. Upon written request by the CITY, the identity of the holder or holders to any mortgage, deed of trust or security instrument and all individuals, corporations, or parties having a financial interest as investors or shareholders with the LESSEE in this lease, shall be provided to the CITY by LESSEE. Total gross receipts derived from the operation of any sublease of the Premises or acts thereof pursuant to this section shall be included as leased premises related revenues and therefore gross receipts pursuant to Section 6.

13. PLEDGE OF LEASE

It is understood that in borrowing funds, LESSEE cannot place a mortgage on the Premises or the fixed improvements placed thereon. However, it is contemplated that LESSEE may be required to borrow funds for equipment, additional improvements, alterations, repairs or for other purposes. Accordingly, it is agreed that LESSEE shall at all times during the term of this lease have the right to grant rights of security in this Lease and the leasehold rights of LESSEE created by this Lease provided, however, that any such rights of security shall at all times be subject to, and the right, title and interest of the CITY as owner of the Premises and fixed improvements placed thereon and the right of the CITY to require the payment of all rentals due hereunder and the full and faithful performance of the covenants and conditions of this Lease by the LESSEE. Subject to any such rights of security, the CITY shall have a lien upon all personal property not duly exposed to sale, owned by LESSEE and used on the Premises to secure the payment of the rentals as they respectively come due hereunder. Documents reflecting such interest shall be executed at the request of the City.

At any time during the term of this Lease, LESSEE or anyone holding under LESSEE shall be in default of any of the covenants or conditions of this lease, then and in such event, before forfeiture is invoked by the CITY, the holder of any rights of security granted by LESSEE hereunder may make any and all payments and do and perform any and all acts and things which may be necessary or required to prevent a forfeiture of this Lease, and the party making such payments or performing such acts or things shall thereby and thereupon be subrogated to all rights of the LESSEE under this Lease.

The CITY agrees that, if requested in writing by the holder of any such rights of security, the CITY will send to the said holder at the address specified in such written request copies of all written notices or demands which the CITY may serve upon LESSEE or anyone holding under LESSEE under and pursuant to the terms of this Lease or otherwise.

It is understood, however, that the holder of such rights of security, shall in no way be liable to the CITY for the payment of any rent or for the performance of any other covenant or conditions under this Lease until such time as it shall acquire by conveyance from the LESSEE, or by the

foreclosure or other proceedings provided by law or by the terms of any written instrument, all the rights, title and interest of the LESSEE under this Lease: provided, however, that any party who shall acquire said rights, title and interest of LESSEE, as above provided, shall thereupon and thereby become liable for the full performance and all payments theretofore and thereafter required to be made by LESSEE under the covenants and conditions of this Lease, as fully and completely and to the same extent as the LESSEE itself would have been if it still had retained its right, title and interest hereunder.

14. CANCELATION AND FORFEITURE

In the event LESSEE shall be declared bankrupt according to law, or if any assignment shall be attempted to be made of this Lease for the benefit of creditors (other than as herein permitted) or if LESSEE shall abandon the leased premises or in the event rental due hereunder remains unpaid for thirty (30) days after notice of nonpayment given to LESSEE, then in any of said events, the CITY may declare the lease to be terminated and may enter into and upon the land covered by this lease or any part thereof and repossess the same (including any and all improvements and installed fixtures) and expel the LESSEE and those claiming under it and remove its effects, forcibly if necessary, without being deemed guilty of any manner of trespass and without prejudice to any other remedies which might otherwise be used for possession or for arrears of rent. In the event of a dispute as between the CITY and LESSEE regarding the amount of rental payments owed by the LESSEE to the CITY, any amount of rental payments which both parties agree to be due shall be paid forthwith, and total amount to be paid shall be determined by a qualified and recognized firm of certified public accountants mutually agreed upon by the CITY and LESSEE who has not been previously employed by either party audited the accounts or records in question. If such determination indicated the CITY's figures are most nearly correct, the cost of the audit shall be paid by LESSEE. If such determination indicates LESSEE'S figures to be most nearly correct, the cost of the audit shall be paid by the CITY, provided, however, that LESSEE shall pay the cost of audit if the figures, accounts and/or records furnished to the CITY by LESSEE are incorrect.

15. WAIVER OF DEFAULT

Any waiver by the CITY of any default or breach of this Lease shall not be construed to be a continuing waiver of such default or breach nor as a waiver or permission, express or implied, of any other or subsequent default or breach.

16. FORCE MAJEURE

If by reason of strike, lockout, war, rebellion, material or labor shortage clue to a national emergency, fire, flood, hurricane or other casualty, periods of excessive rain, or by any other matter not within its control, the CITY or LESSEE in good faith ad without fault or neglect on its part is prevented or delayed in the performance of any condition except as relates to rental payments or the maintenance of insurance which, under the terms of this Lease, it is required to do so perform within a specified period of time, the period of time equal to that of such delay or prevention, and the CITY or LESSEE, as the case may be, shall not be deemed to be in default if it diligently performs and completes such work or specified period of time as so extended.

17. EASEMENTS

This lease is subject to all easements across the Premises that are on record in the offices of the Register of Deeds of Codington County.

18. GENERAL CLAUSES

A. *Binding on Heirs and Assigns.* All references to the parties to this Lease and all covenants, conditions and agreements of this Lease shall apply to and be binding upon the CITY and LESSEE and their respective heirs, executors, administrators, legal representatives, successors and assigns (when assignment is made in accord with the provisions hereof) as if they were in each case fully named and stated. In this Lease both the CITY and LESSEE are referred to in the singular and neuter gender. However, such words and all other terms and words used in this Lease regardless of the number and gender in which they are used, shall be deemed and construed to include any other number (singular or plural) and any other gender, masculine, feminine or neuter, as the sense of the writing herein may require, the same as if such words had been fully properly written in the required number and gender.

B. *Notices.* All notices to the CITY shall be sent by certified or registered mail addressed to the DIRECTOR, Watertown Park and Recreation & Forestry, PO Box 910, Watertown, 57201, or at such other address as the CITY may in writing from time to time designate by written notice to the LESSEE with a copy to City Attorney, PO Box 910, Watertown, SD 57201. All notices to the LESSEE shall be sent by certified or registered mail addressed to the Registered Agent for MADJIK LLC, 1125 Konrady Drive NE, Watertown, SD 57201 or as further amended and on file with the South Dakota Secretary of State.

C. *Governing Law, Severability.* This lease is made under the applicable laws of the State of South Dakota and if any term, clause, provision, part or portion of this Lease shall be adjudged invalid or illegal for any reason, the validity of any other part or portion of this Lease shall not be affected thereby and invalid or illegal term, clause, provision, part or portion shall be deleted and ignored as if the same has not been written.

D. *Amendment.* This Lease may be altered, modified or amended only by written instruments signed by LESSEE and the CITY.

E. *Approval.* Unless specifically stated otherwise, wherever in this lease a provision is made for "approval" or "review and approval", such "approval" or "review and approval" it will be made by the Director of Parks, Recreation and Forestry, who is hereby designated as the representative of the CITY to whom all submissions requiring prior approval shall be made before construction or after action is initiated. Plans and specifications shall be stamped or note as "Approved" and shall become a part of this contract as a record of the constructed facility. This does not negate any approval by a division of the City granted with the authority to issue permits or licenses.

THE PARTIES AGREE THAT EACH HAS OBTAINED THE NECESSARY AUTHORIZATIONS TO EXECUTE THIS AGREEMENT AND BE BOUND BY THE TERMS CONTAINED HEREIN AS EVIDENCED BY THEIR SIGNATURES BELOW

LESSEE/MADJIK LLC

Kyle Wiesner, Authorized Member
and Registered Agent

LESSOR/CITY OF WATERTOWN

Amanda Mack, City Manager

ATTEST:

Kristen Bobzien
Finance Officer

(SEAL)

STATE OF SOUTH DAKOTA)
)SS:.
COUNTY OF CODINGTON)

On this the 17 day of September, 2024, before me, the undersigned officer, personally appeared Amanda Mack and Kristen Bobzien, who acknowledged themselves to be the City Manager and Finance Officer, respectively, of the City of Watertown, a municipal corporation, and that they as such City Manager and Finance Officer, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing the name of the City of Watertown City by themselves as City Manager and Finance Officer.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

(SEAL) JENNIFER L. COLLINS NOTARY PUBLIC SOUTH DAKOTA SEAL SEAL

Notary Public
My Commission Expires 8/11/2029

STATE OF SOUTH DAKOTA)
)SS:
COUNTY OF CODINGTON)

On this the 17 day of September 2024, before me, the undersigned officer, personally appeared Kyle Wiesner, known to me or satisfactorily proven to be the person whose name is subscribed to the within instrument and acknowledged that he is authorized to execute the same on behalf of MADJIK, LLC for the purposes therein contained.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

(SEAL) JENNIFER L. COLLINS NOTARY PUBLIC SOUTH DAKOTA SEAL SEAL

Notary Public
My Commission Expires: 8/11/2029

Codington County, SD

Codington County

Disclaimer: Map and parcel data are believed to be accurate, but accuracy is not guaranteed. This is not a legal document and should not be substituted for a title search,appraisal, survey, or for zoning verification.

Map Scale
1 inch = 188 feet
8/26/2024

City Council

Agenda Item

Subject: Approval of Resolution No. 24-33, Adoption of Revisions of the Engineering Design Standards.

Meeting: City Council - Dec 02 2024

From: Amanda Mack, City Manager

BACKGROUND INFORMATION:

The City adopted Engineering Design Standards in March 2020. The standards and criteria may be amended as industry standards and technologies evolve, and local observations, processes, and experience in the use of the standards trigger efficiencies or improvements. As outlined in the standards, the City Council, following recommendations of the City Engineer, shall consider revisions and/or amendments to these Engineering Design Standards.

The proposed revisions include:

Chapter 1 – General Provisions:

- 1.8 Amendment from “variations” to ‘deviations’.
- 1.10 Addition of language regarding mailbox placement.

Chapter 2 – Submittal, Review, and Approval Procedures

- 2.2 Removed the requirement for paper copies of submittals
- 2.3.2 Removed the requirement for paper copies of submittals

Chapter 3 – Permit Procedures and Requirements

- 3.1.1.2 Revised ‘Building Services Division’ to ‘Community Development Division’. Clarification of utility cut permits needing to be applied for separately.
- 3.1.6.2 Amendment of permit expiration date, which is currently the end of the calendar year; Staff proposes November 1 of each year to allow for temporary seeding to be completed prior to winter.
- 3.2.2 Addition of required density reports prior to patching street back to original condition.
- 3.3 Revision from City Council discretion to City Engineer discretion for issuing permit fees refunds.
- 3.8.3 Addition of language regarding utility projects in coordination with the City and a Third Party Utility Company.

Chapter 4 – Utility Locations and Easements

- 4.3.10 Addition of fire hydrant location standard.
- 4.5 Addition of language regarding the required width for utility easements based off of depth of utility.

Chapter 5 – Street Access and Parking Lot Criteria

- Table 5.1 Addition of language stating duplexes shall have shared driveways whenever possible.

- 5.2.4.2 Addition of crushed concrete to rural section of roadways
- Table 5.2 Revision from 8% max to 10% Max to match SDDOT Specifications

Chapter 7 – Grading

- 7.2.5 Revision of max slope to 4:1 from 3:1 for mowing purposes.

Chapter 8 – Street Design and Pavement Thickness

- 8.2.3.5 Revision of ROW width from 100' to 66' on minor collector roads unless intersecting a major collector or arterial, in which 80' is required.
- 8.2.3.7 Addition of private road width requirements.
- 8.3.1.1 Revision of minimum traffic lane width from 11' to 10'.
- Table 8.1 Revisions of minimum street widths with City Engineer acceptance of any varying widths.
- Figure 8.1-8.4 Update figures for revised street widths.
- 8.3.3.2 Revision of approval from City Council to City Engineer for diagonal or perpendicular parking in the downtown commercial district.
- 8.10.1.2 Addition of language stating any interruptions to sidewalk shall be limited to 30 days unless approved by the City Engineer.

Chapter 9 – Sanitary Sewers

- 9.4.1 Addition of Manning's Equation
- 9.4.6 Addition of language regarding insulating sewer pipe less than 7' in depth.
- 9.4.8.5 Addition of language regarding drop connections outside of manholes.

Chapter 11 – Drainage Improvements

- 11.4.6 Addition of language regarding edge drain material requirements.

Chapter 13 – Construction Plans

- 13.2 Removal of requirement for paper copy.
- 13.3 Removal of requirement for paper copy.
- 13.4 Addition of language stating plans are to be submitted through permitting software. Removal of requirement for paper copy.
- 13.5 Removal of requirement for paper copy.

Chapter 14 – Acceptance Procedures and Requirements

- Addition of Topic: Utility Acceptance prior to paving.
- 14.1 Addition of language stating all sanitary and storm sewer should be televised and accepted by the City prior to paving first lift.

Chapter 15 – Inspection and Testing

- 15.2 Addition of language requiring an electronic copy of all submittals/shop drawings.

FINANCIAL CONSIDERATIONS:

N/A

OVERSIGHT / PROJECT RESPONSIBILITY:

Heath VonEye, Assistant City Manager/Public Works Director
Justin Petersen, City Engineer
Caitlyn German, Engineer Technician

STAFF RECOMMENDATION / SUGGESTED MOTION:

Staff recommends approval of the Revised Engineering Design Standards with the following motion:

I move to approve Resolution No. 24-33, Adoption of Revisions of the Engineering Design Standards.

ATTACHMENT(S):

Resolution No 24-33 Engineering Design Standard Revisions

2024 EDS Updates V6

RESOLUTION NO. 24-33

RESOLUTION FOR THE ADOPTION OF REVISIONS TO THE ENGINEERING DESIGN STANDARDS

WHEREAS, the City of Watertown has adopted design standards to provide technical design criteria, construction guidelines, and excavation guidelines for government agencies, design professionals, contractors, private developers, and community groups involved in development;

WHEREAS, the Engineering Design standards are reviewed regularly for proposed revisions;

NOW, THEREFORE, **BE IT RESOLVED**, by the City Council of the City of Watertown, South Dakota, that the City hereby adopts and approves the revisions to the Engineering Design Standards.

Dated at Watertown, South Dakota this ____ day of _____, 2024.

The above and foregoing Resolution was moved for adoption by Alderperson _____, seconded by Alderperson _____, and upon roll call motion carried whereupon the Mayor declared the resolution to be duly passed and adopted.

I hereby certify that Resolution No. 24-33 was published in the Watertown Public Opinion, the official newspaper of said City, on the _____day of _____, 2024.

CITY OF WATERTOWN

_____
Ried Holien
Mayor

ATTEST:

_____
Kristen Bobzien
Finance Officer

City of Watertown

Engineering Design Standards for Public Improvements

Adopted: March 16, 2020

Amended: October 10, 2024

CITY OF WATERTOWN
PUBLIC WORKS - ENGINEERING

City of Watertown
23 2nd Street NE
PO Box 910
Watertown, SD 57201

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General Provisions

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General Provisions

Chapter 1

General Provisions

1.1 Short Title

These regulations, together with all future amendments, shall be known as the *City of Watertown Engineering Design Standards for Public Improvements* (hereinafter called Design Standards).

1.2 Jurisdiction

These Design Standards, along with the City of Watertown Standard Specifications (hereinafter referred to as Standard Specifications) and the City of Watertown Standard Plates (hereinafter referred to as Standard Plates), shall apply to all public improvements within the incorporated area of the City of Watertown except where superseded by federal or state requirements.

1.3 Amendments and Revisions

These standards and criteria may be amended as new technology is developed or experience gained in the use of these Design Standards. The City Council, following the recommendations of the City Engineer, shall consider revisions and/or amendments to these Design Standards.

1.4 Enforcement Responsibility

It shall be the duty of the City Engineer to enforce the provisions of these Design Standards.

1.5 Review Process

The City will review all submittals for compliance with the specific Design Standards. Acceptance by the City does not relieve the Owner, Design Professional, or Contractor from responsibility for ensuring that the calculations, plans, specifications, construction, and record drawings are in compliance with the Design Standards.

1.6 Prior Approval

These Design Standards shall not abrogate or annul: (a) any permits issued before the effective date of these Design Standards; (b) any construction plans approved before the effective date of these Design Standards; (c) any final plat documents that have been recommended for approval by the City of Watertown Planning Commission prior to the effective date of these standards; or (d) any easements or covenants already in effect.

1.7 Relationship to Other Standards

If special districts impose more stringent standards, this difference is not considered a conflict and the more stringent standard shall apply. If state or federal government imposes more stringent standards, criteria, or requirements, these shall be incorporated into these Design Standards in accordance with Section 1.3 of this Manual.

1.8 Deviations

Deviations from these Design Standards will be considered on a case-by-case basis by the City Engineer. The owner or their agent shall request a variance in writing along with a written explanation and technical data to support the reason for the request. The City Engineer shall provide written approval or denial of the request.

1.9 Private Facilities

If an owner of private street or utility facilities wishes to dedicate these facilities for public use and maintenance, the facilities must meet the standards set forth herein prior to being accepted by the City. Upon receiving written request that the City accept ownership of private facilities, the City Engineer will inspect all facilities and recommend acceptance through the Final Acceptance of Improvements – Acceptance Certificate process outlined in the City's Subdivision Regulations. Facilities shall only be accepted by action of the City Council by resolution to confirm or reject the Acceptance Certificate.

1.10 Mailbox Locations

It is the responsibility of the Developer, working with the City of Watertown and the United States Postal Service, to develop the necessary locations within the subdivision to provide for the delivery and collection of mail sent through the US Postal Service. When mailbox delivery and collection points are situated within a street right-of-way of the City of Watertown, the City exercises its right and responsibility to ensure that street rights-of-way are safe for pedestrian and traffic movement. The Developer is responsible for providing and installing the mailboxes at the delivery and collection points.

The City of Watertown, the Developer and the United States Postal Service share the responsibility in determining the location(s) for mail delivery and collection within a proposed subdivision. The City of Watertown will make the final determination based on the input from the Developer and the United States Postal Service. If mailbox locations are within a City right-of-way, the City Engineer shall make the final determination based upon roadway geometrics, the ability for vehicles and pedestrians to safely access the site and a review of sight distances to and from the site to enable appropriate caution measures so mail can be delivered and collected by Post Office employees and customers in a safe and secure manner.

The following site standards govern the selection of US Mail delivery and collection locations within a subdivision:

1. The site shall be of a length and width adequate to serve the number of mailboxes.
2. The site shall have reserved parking for a distance of thirty (30) feet along the curb in front of and centered on the mailboxes. The reserved parking is for use at the mail delivery and collection site only.
3. The Developer is responsible for obtaining and installing the mailboxes to be used at the delivery and collection location(s).
4. Mailboxes shall be approved by the United States Postal Service.
5. All mail delivery and collection sites are to have mailboxes installed behind the back of curb.
6. The mail delivery and collection area shall be lighted by a streetlight.

Chapter 2

Submittal, Review, and Approval Procedures

Chapter 2

Submittal, Review, and Approval Procedures

Chapter 2

Submittal, Review, and Approval Procedures

2.1 General

2.1.1 All capital improvement plans, private subdivision plans, reports, and related documents shall conform to the following submittal requirements, unless waived by the City Engineer**.** All plans shall conform to the current version of the City's CAD standards.

2.2 Submittal of Reports and Plans for Review

2.2.1 Submittal Format. Design Professionals or Owners seeking approval of reports, plans, and related documents shall submit one (1) ~~paper copy and one (1)~~ electronic copy (DWF or PDF format) to the Office of the City Engineer for review.

2.2.2 Application. Applicants seeking approval of any required design reports, plans, or related documents must submit the applicable application form related to their project. The application shall be accompanied by a submittal checklist completed by the applicant. Any omissions and deviations from Engineering Design Standards or Ordinances must be noted by the applicant on the application form along with justification for the omission(s) and deviation(s).

2.2.3 Conformance. Plans submitted shall be in conformance with Chapter 13. The plans shall include any special provisions. Reports submitted shall be in a typed, bound form in conformance with the requirements of the applicable chapters of these standards. If a report is required which is not provided for in these standards, the report shall include all data, references, and calculations as applicable.

2.3 Approval of Reports and Plans

2.3.1 Review Process. City Engineer's review of submitted plans will attempt to be completed in approximately ten (10) to fifteen (15) working days of receipt of a complete application. This time will vary due to the complexity of the project and/or workload of the review staff. If necessary, a review conference will be scheduled. The report and/or plans will be approved or returned for revisions as noted. Where the report and/or plans are returned for revisions, all revisions shall be made prior to resubmittal. After review is completed, comments will be compiled and forwarded to the Design Professional/owner.

2.3.2 Approval. Upon approval of reports, plans, and related documents, the following submittals are required: ~~one (1) paper copy and~~ two (2) electronic copies (one DWG format and one PDF format) shall be submitted to the office of the City Engineer. All final drawings, plans, specifications, reports, plats, or other architectural, engineering, or land surveying documents, papers, or diagrams involved in the practice of architecture, engineering, or land surveying shall be

dated and bear the signature and stamp or seal of the professional architect, professional engineer, or professional land surveyor who was responsible for the preparation thereof.

2.4 Revisions to Approved Plans

2.4.1 Initial Approval. Construction plans, specifications, and reports are considered approved for twenty-four (24) months. The required public improvements to sustain a proposed project shall also be referenced in the required Development Agreement with the City. If substantial construction has not been initiated during this time period, such reports automatically become void and must be updated to current criteria before any further permits can be issued. Upon written request, the City Engineer or a designee may grant a one-year extension to the construction plans, specifications, and/or drainage report, provided (a) the development plans, construction plans, and specifications substantially conform to current standards; and (b) the other conditions affecting the development site have not substantially changed or do not require a modification to accepted plans or specifications.

2.4.2 Amendments to Prior Approvals.

2.4.2.1 Whenever updates or revisions to previously approved construction plans, specifications, or reports are necessary, the design professional will submit an amendment application with updates or revisions through the normal document submittal process. This submittal shall meet the requirements of Section 2.2 of these Design Standards.

2.4.2.2 Requests for updates and revisions will be considered only if there are NO significant revisions to the previously approved Preliminary Plan or Commercial Site Plan. The City will review the proposed amendment(s) for compliance with current standards under normal review procedures.

Chapter 3
Permit Procedures and Requirements

Chapter 3
Permit Procedures and Requirements

Chapter 3

Permit Procedures and Requirements

3.1 Application Requirements and Procedures

3.1.1 Permit Application. A permit shall be required for any construction or installation within the public right-of-way or public easement for any substantial modification of existing construction or use. Application for such permits shall be made at the Office of the City Engineer**.**

3.1.1.1 No permit will be required for contracts let by the City of Watertown. In subdivision work, it will be the responsibility of the Owner's Contractor to obtain the necessary permits from the Office of the City Engineer.

3.1.1.2 Building permits which are issued by the Community Development ~~Building Services~~ Division of Public Works may include the Sidewalk and Driveway Permit and/or the ~~Excavation and~~ Grading Permit. Utility Cut permits must be applied for separately.

3.1.2 Types of Permits.

3.1.2.1 Driveway Approach, Curb & Gutter, and Sidewalk Permit, which governs construction of new and repair or replacement of existing driveway approaches, curb & gutter, and sidewalks within public right-of-way.

3.1.2.2 Street Cut for Utilities Permit, which governs the installation, removal, repair, or maintenance of utilities other than sanitary sewer, water, and storm sewer in public right-of-way or public easements.

3.1.2.3 Permit to Place Building Materials on Street, which governs the placing of building materials on streets, alleys, public sidewalks, public parking lots, or any public property.

3.1.2.4 Construction Permit, which governs the installation of public improvements within the public right-of-way and grading outside the street right-of-way in proposed subdivisions. This includes street grading, curb and gutter, roadway subbase, base and wearing surface, drainage and flood control facilities, water main and sanitary sewer installation, street lighting installation, and grading outside the street right-of-way.

3.1.2.5 Grading / Floodplain Development Permit, which governs grading in excess of 300 cubic yards outside the street right-of-way as defined by the Uniform Building Code (Chapter 7-Grading), grading as outlined in Title 5 of the Revised City Ordinances, and grading within a floodplain, when applicable. A Grading / Floodplain Development Permit is not required if a Building or Construction Permit has been issued; however, if the grading is within a floodplain, a separate Grading / Floodplain Development Permit is required.

3.1.2.6 Connection to Storm Sewer Permit, which governs the connection of a private storm sewer or sump pump discharge to a public storm sewer.

3.1.3 Letters of Responsibility. Those agencies set forth in Section 3.4.3 may obtain a permit under their Letter of Responsibility, Figure 3.1, or at their option, require the Contractor performing the work to obtain a permit in which event the Contractor would be required to furnish a performance bond as set forth in Section 3.4.1, thereby assuming full responsibility for the work performed. Except as set forth herein, the Contractor performing the work shall be the permittee.

3.1.4 Emergency Repairs. Permits shall apply to emergency repairs. However, a delay of 24 hours is granted, excluding weekends and holidays, following the beginning of such repair.

3.1.5 Issuance of Permits. Permits for work requiring licensing will be issued only to those licensed persons or corporations as kept on file with the City**.** Exceptions to this requirement are Driveway Approach, Curb & Gutter, and Sidewalk Permits issued for sidewalk installation where the property owner acquires the permit and performs the construction.

3.1.6 Time Limits.

3.1.6.1 All permits requiring excavation within the paved portion of a city street will become void on November 1. All pavement restoration requirements of section 3.7 shall be completed by this time. Upon written request, extensions to existing permits may be made on a case-by-case basis by the City Engineer. Permits requiring excavation within the paved portion of the street will be issued on an emergency basis only between November 1 and April 1 of the following year.

24

3.1.6.2 Grading permits shall expire ~~at the end of the calendar year~~November 1st, unless approved by the City Engineer. All site restoration and temporary seeding must be complete by this time. All sites must be prepared for winter/spring weather.

3.1.6.3 Construction permits shall expire after 24 months of issuance.

3.1.6.4 Extensions for any permits shall be as outlined in the Revised City Ordinances.

3.1.7 Cancellation.

3.1.7.1 Failure of the applicant to comply with any of the terms and conditions of the permit shall be sufficient cause for cancellation of the permit and may result in removal of the utilities, approaches, or other facility by the City at the applicant's expense.

3.1.7.2 The permit, the privileges granted herein, and the obligations of the applicant created thereby shall be binding upon the successors and assigns of the applicant.

3.2 Permit Standards and Conditions

This Section describes the requirements for plans and other information necessary for approval of a permit application.

3.2.1 Permit Approval. Permits are issued subject to the approval of City, county, state, or other governmental agencies having either joint supervision over the section of road, or authority to regulate land use by means of zoning and/or building regulations. It shall be the applicant's responsibility to determine the necessity of and to obtain any such easements and approvals which may be required.

3.2.2 Street Restoration. Granting of a permit is based upon replacement or restoration of the street and right-of-way to its original condition or to a condition satisfactory to the City Engineer, by the applicant. Density tests must be performed by the permit holder prior to repaving of the street and the results submitted to the City.

3.2.3 Landscaping. The permit holder shall be responsible for the restoration of landscaped areas between the property line and adjacent public roadways.

3.2.4 Relocating Utilities. The applicant shall be responsible for relocating or adjusting any utility facilities located in the street right-of-way as required to accommodate the approach or other facility applied for. Construction of the utility, road approach, or other facility by the applicant, his agent or Contractor, will be permitted only after the applicant has furnished the City Engineer evidence that satisfactory arrangements for said relocation or adjustment has been made with the Owner of the affected utility facility.

3.2.5 Permit Release. Applicant must pay required fees and provide insurance and bonding, as required, prior to release of the permit.

3.3 Refunds

Refunds may be made on any permit fee only at the discretion of the City ~~Council~~Engineer**.**

3.4 Bonds and Insurance

3.4.1 Bonds. Bonds are required for work as listed in the Revised Ordinances of the City of Watertown**,** South Dakota.

3.4.2 Inadequate Bond. Any permit determined to be without an adequate bond as required shall be subject to immediate revocation by the City.

3.4.3 Letters of Responsibility. Governmental agencies, other than the City of Watertown**,** special districts, cooperative utilities, and investor-owned electric, gas, and communications utilities, may provide a Letter of Responsibility in lieu of posting the required performance bond. Subject Letter of Responsibility shall be in the format of Figure 3.1.

3.4.4 Other Forms of Security. It shall be acceptable to the City to receive cash deposits, certified checks, or similar security in lieu of a performance bond. Bonds shall be filed in the Office of the City Engineer.

3.4.5 Liability Insurance. The applicant shall obtain and carry for the period of time required for the complete installation of facilities authorized by the permit, including the repair and restoration of the road facilities, and also during such future periods of time when operations are performed involving the repair, relocation, or removal of said facilities authorized by the permit, a liability and property damage insurance policy or policies. Coverage shall be provided against any claim, demand, suit, or action for property damage, personal injury, or death resulting from any activities of the applicant, his officers, employees, agents, or contractors in connection with the construction, installation, repair, or removal of the said facilities authorized by the permit. The said policy or policies shall include as named insured: the City of Watertown**,** its City Council, its officers, agents, and employees, except as to claims against the applicant, for personal injury to any members of the City Council or its officers, agents, and employees, or damage to any of its or their property. The said insurance shall provide coverage as set forth by City ordinance. The said insurance policy or policies shall be in any insurance company duly authorized and licensed to do business in the state of South Dakota. The applicant and/or its Contractor's insurer shall endeavor to give the City Engineer ten (10) days' written notice in advance of any cancellation of insurance required in the terms of these general provisions.

3.4.6 Certificate of Self-Insurance. Government agencies other than the City of Watertown**,** and public utilities, may provide a Certificate of Self-Insurance as shown in Figure 3.2 in lieu of any insurance policy or policies required under Section 3.4.5. Such Certificate shall be approved by the City Attorney and filed in the Office of the City Engineer prior to the issuance of any permit.

3.5 Construction Specifications

All backfill material, compaction, and resurfacing of any excavation made in the City right-of-way will be done in accordance with the Standard Specifications and Standard Plates on file in the Office of the City Engineer.

3.6 Traffic Control

3.6.1 Street Closure. Traffic must be provided with a minimum lane width of ten (10) feet in the construction area. Any plan for traffic control during construction that indicates a complete closure of an arterial or collector street must show detour routes and must be approved by the City Engineer prior to issuance of a permit. Normally, only one side of the local street may be blocked at any given time. When a local street is closed to traffic, the City Engineer or a designee must be notified 48 hours in advance.

3.6.2 Signing. Construction signing must be used and shall be maintained by the responsible Contractor. All traffic control devices must be in accordance with the *Manual on Uniform Traffic Control Devices*, latest edition.

3.7 Restoring Pavements

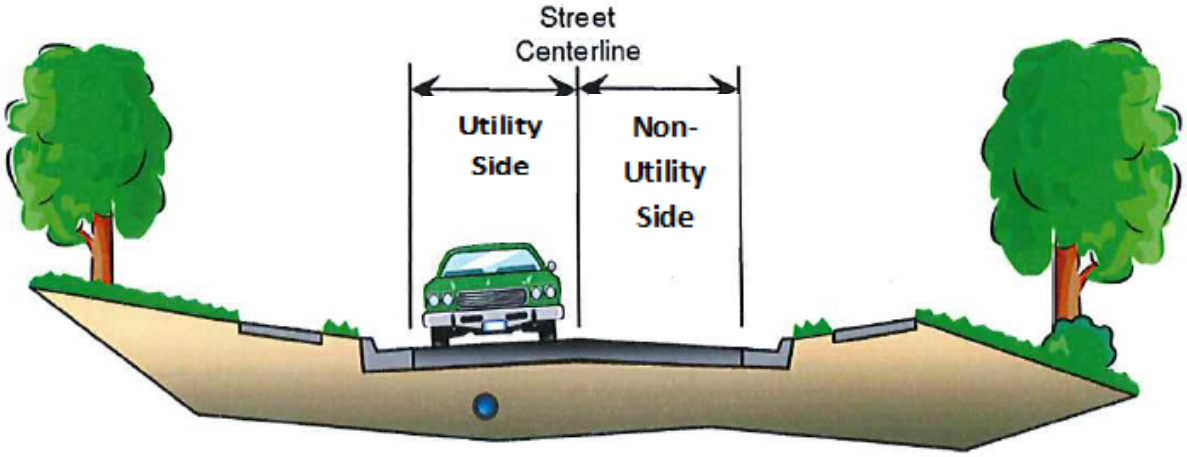
All persons, corporations, governmental agencies, special districts, utility companies who having obtained a permit and made a cut in a public right-of-way shall repair such pavements or surfacing to the original condition. If such pavements or surfacing are not restored and maintained as to the original condition, notice thereof in writing by first-class mail shall be given the permittee, who shall put the same in good condition within a maximum of five~~three~~ (5~~3~~) days. If the permittee fails after notice given to restore and maintain such pavements or the surface thereof, the City may make the necessary repairs and such permittee shall pay the costs thereof, and until paid no other permit shall be issued.

3.8 Utility Installations

3.8.1 Underground. All utility lines shall be installed at depths as illustrated in Chapter 4, Figures 4.1-4.6 of these Design Standards. Exceptions may be granted by the City where warranted and upon prior written request and approval.

3.8.2 Overhead. Minimum ground clearances shall conform to the National Electric Safety Code Standards, latest edition.

3.8.3 City and Utility Coordination. Whenever possible, water main and utilty replacement should be coordinated with reconstruction projects. For the purposes of this policy, the utility side (US) and the non-utility side (NUS) of the street are shown below.



When the utility work is not part of an overlay or reconstruct project, the Utility shall remove asphalt on the entire half-street of the utility side. The Utility will be responsible for:

- 100% of removals on the utility side, including milling and saw cutting.
- 100% of unclassified excavation, select fill, geotextile fabric, gravel, asphalt, and other items needed to replace the street on the utility side to City standards.
- 100% of curb and gutter, sidewalk, and other concrete (in accordance to City standards) needed to remove for any utility work.
- 100% of Compaction Testing on utility side. Densities and Proof Roll approved by Engineer.
- 100% of Mobilization, Erosion Control, Traffic Control, Dewatering, and other items.

When the utility work is part of an overlay or reconstruct project:

- The Utility will pay for all removals, unclassified excavation, curb and gutter, sidewalk, concrete, and compaction testing on the utility side.
- The City will pay for all removals and installation on the non-utility side, including but not limited to pavement, unclassified excavation, curb and gutter, sidewalk, concrete, and compaction testing.
- The Utility and City will cost share Mobilization, Erosion Control, Traffic Control, Dewatering, and other items based off the percentage of cost for the City and Utility portions.

Unless agreed to by the City, the typical process for combined Utility and City street projects will be:

1. Utility will send the City Engineer the plans and specifications for the Utility project, which will be added to the City street plans and specifications and bid as one project.
2. There will be a separate Bid Schedule for the Utility portion of the project. The Bid will be awarded to one Contractor based on the lowest combined bid price of all the Bid Schedules.
3. The Contractor would enter into one (1) Three-Party Contract with the City and with the Utility also as a party. (ie Utility, City, and Contractor would all sign one agreement).
    a) The City will approve the Bid Award at a City Council meeting.
    b) Utility will approve the Bid Award as needed for their procedure.
4. The Contractor will submit one (1) pay app to the City by the 10th each month.

a) The Contractor will submit quantities related to the Utility –with Utility assistance. Utility will review the Pay Application by the 15th to confirm the quantities are correct.

b) The Engineer will submit the Pay Application to Finance and will submit the total for payment for the utility side portion to the Utility by the 18th of the month.

c) The Contractor would then be paid by the City and the Utility separately.

5. Utility will provide inspection of the utility installation.

6. If there is a utility disruption, the Contractor will contact the Utility to notify the appropriate homeowners.

7. The City will hire the testing agency to confirm all densities. Any costs associated with utility side density tests would also be pro-rated and included in the invoicing process.

3.9 Fees

Fees shall be assessed for permits and inspection at the time of issuance of the permit in accordance with the fee schedule in force.

Figure 3.1

Letter of Responsibility

Office of City Engineer
City Hall
23 2nd Str. N.E.
Box 910
Watertown, SD 57201

THIS IS TO CERTIFY THAT _____
(Name of Agency)

Does agree that, in lieu of posting the required performance bond, the following practices will be adhered to:

1. That no street cuts, in any Watertown street, highway, or other right-of-way for any purposes will be made without having secured the proper Street Cut Permit or Construction Permit.
2. That any street cut made by the above will be backfilled and compacted in accordance with the current requirements of Watertown**,** and the surface restored to a condition equal to or better than that condition which existed prior to the making of the cut.
3. The responsibility for the maintenance of the restored cuts shall rest with the above for a period of one year after the cut has been filled and resurfaced.
4. That, in the event repairs are not made or maintained to the satisfaction of the City Engineer or his designated representative, necessary repairs shall be made by the City at the expense of the above-named organization.

Subscribed to this _____ day of _____, _____.

_____

By: _____
Signature of Authorized Agent

_____
Title

NOTE: This document is to be filed in the Office of the City Engineer**.**

Figure 3.2

Certificate of Self-Insurance

Office of the City Engineer
City Hall
23 2nd Str. NE
Box 910
Watertown, SD 57201

THIS IS TO CERTIFY THAT _____,
a _____, in lieu of providing the insurance policy required under Section 3.4.5 of the Engineering Design Standards for Public Improvements of the City of Watertown**,** South Dakota, is wholly self-insured or is self-insured to cover the deductible limit of _____ as expressed by Policy No. _____ issued by _____ for combined bodily injury and property damage liability. It is further certified that reserves in support of the self-insurance program are adequate to provide coverage at the levels required of insurance policies in Section 3.4.6.

Subscribed to this _____ day of _____, _____.

_____

By: _____
Signature of Authorized Agent

_____
Title

NOTE: This document is to be filed in the Office of the City Engineer.

Chapter 4
Utility Locations and City Utility Easements

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Utility Locations and City Utility Easements

4.1 Purpose of Standard Locations

4.1.1 Conflicts. It is necessary to provide adequate space for utilities in a manner that will minimize conflicts between using the public right-of-way for transportation purposes and utility purposes. When street grades, alignments, or widths are changed, utilities are usually required to relocate. Oftentimes standard locations are inapplicable and unobtainable in street areas where existing utilities are seriously crowded and where it would not be feasible to expect major or dramatic reorientation of the underground. The location criteria must be practical and applicable in new developments, in urban relocation work, and in cases where overhead facilities are being converted into underground structures and plans.

4.1.2 Relocations. Utilities are not expected to revise existing facilities as to location or depth solely or primarily for the purpose of creating uniformity. However, when new or relocation work is undertaken, uniformity should be sought. It is acknowledged that the present locations may not be amendable, but there should be consideration for uniform utility locations for the future.

4.2 Plans Required

4.2.1 Construction Approval. Any utility or other facility constructed in City right-of-way shall have construction plans submitted and approved in accordance with requirements in these Design Standards and Title 24 of the Revised Ordinances of the City of Watertown, SD. No Construction Permit shall be issued for construction of new utilities or extension of existing facilities (except service taps or laterals to individual properties) without prior construction plan approval by the City Engineer.

4.2.2 Conformance. The applicant's completed facility shall be in conformance with the approved drawings or sketches referred to above, and in Chapter 2, unless a special variance has been requested and approved by the City.

4.3 Location Requirements

All utilities located within the public right-of-way shall be in accordance with Figures 4.1.)

(1) Utilities already existing in non-standard locations may be replaced in the same location when permitted by the City Engineer.

(2) Gravity lines shall take preference as to horizontal and vertical alignment over non-gravity systems and pressure systems.

(3) Consideration will be given to the use of utility easements adjacent to the public right-of-way and to the use of alleys and medians.

(4) In the event of a conflict, or if a particular utility requires more than one system be installed in the right-of-way, the alternate location may be used when permitted by the City Engineer.

(5) Utilities shown are primarily for local distribution and collection. Large diameter lines may make it necessary to modify utility locations.

(6) Storm sewer may be placed on either side of the street. Any storm sewer 48 inches or larger in diameter shall be reviewed on a case-by-case basis.

(7) Street trees placed between the curb and street side of sidewalk must not interfere with underground or overhead utilities.

(8) Normally street lights will be placed on the same side of the street as the electric utility.

(9) Street lights shall not be located closer than five (5) feet horizontally to fire hydrants.

24 (10) Fire hydrants shall not be located closer than three (3) feet to any back of curb or sidewalk.

4.4 Street Cuts

The City of Watertown requires a Construction Permit or a Street Cut for Utilities Permit prior to any construction. All utility permits where work will be done in the street pavement or in the right-of-way and would require a lane closure, must be approved by the City Engineer. All proposed permits shall be submitted a minimum of 48 hours prior to construction and be accompanied by a traffic control plan.

4.5 City Utility Easements

Utility easements shall be obtained for all utilities located on private and public property. In addition, temporary easements may be required for construction.

Utility easements shall be accessible for City maintenance vehicles to drive on to maintain the utility. All manholes and other appurtenances shall be accessible to City maintenance vehicles. If determined necessary by the City Engineer, the area over a utility shall be benched to provide an access trail along the line.

Easements for sanitary sewer, storm sewer, drainage, water main, and power shall be obtained when the utilities are to be constructed outside of the street right-of-way (ROW) on private property. Sanitary sewer, storm sewer, and drainage easements shall have a minimum width of 20 feet. Additional width may be required by the City Engineer to ensure proper access for City maintenance equipment, and to consider adequate
24 area for excavation and access to deep utilities. The required easement width may be widened up to 30 feet based off the depth of excavation meeting the Occupational Safety and Health Administration (OSHA) standard of 1½-width:1 depth with a 20 foot maximum depth of sewer allowed for benching. When City utilities are to be located a

djacent to one another, the minimum separation distance between the utilities shall be 10 feet. Water main, gas, and power shall have a minimum easement width as required by Watertown Municipal Utilities.

Easements shall be labeled specifically for the utility in which it is describing; for example:

Sanitary Sewer Easement
Storm Sewer Easement
Drainage Easement
Water Main Easement

“Easement for Sanitary Sewer, Storm Sewer, and/or Drainage form” shall be used where the City utility is to be constructed on private property.

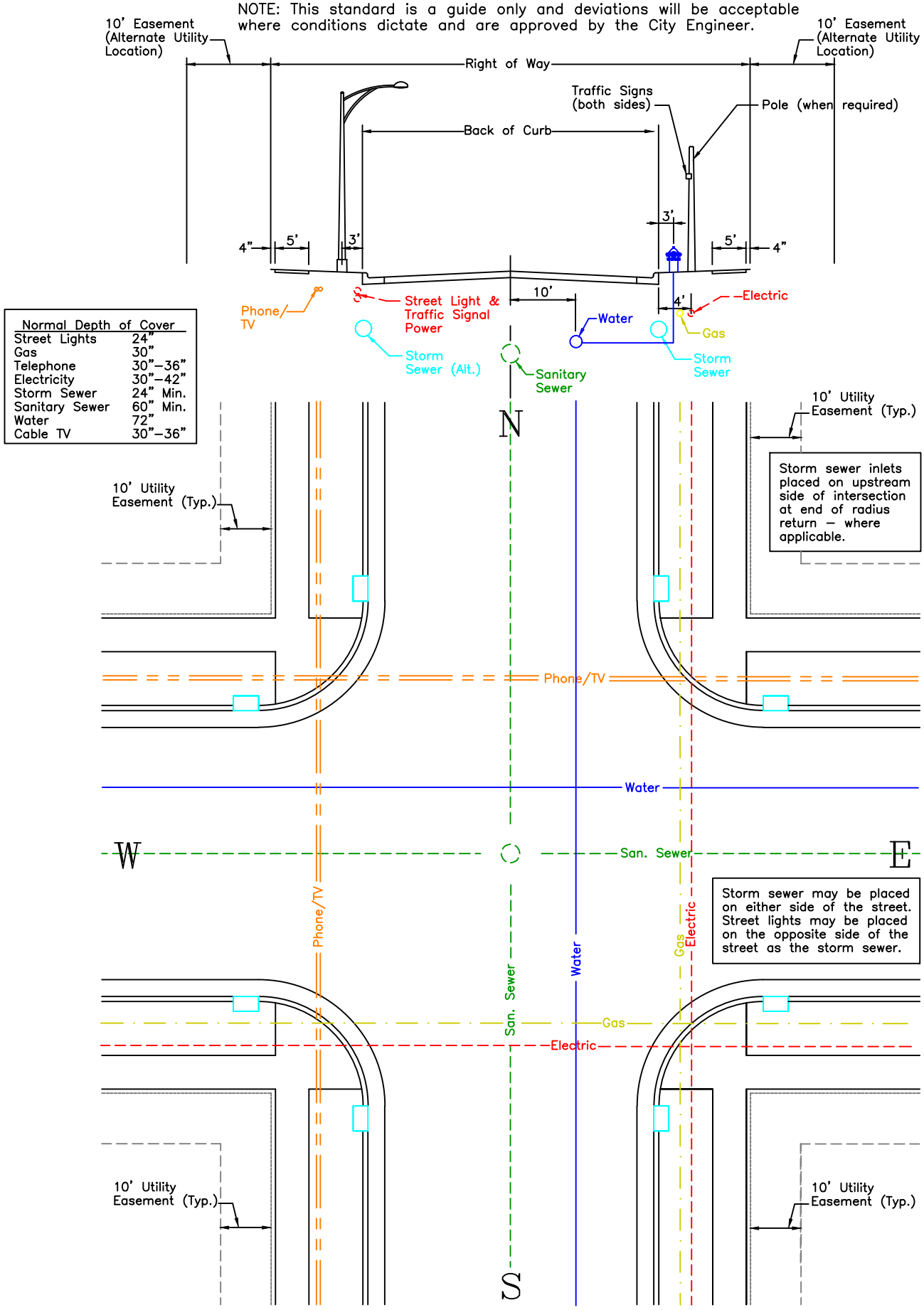
“Temporary Construction Easement for Sanitary Sewer, Storm Sewer, and/or Drainage form” shall be used with the appropriate description inserted when a temporary easement is required during construction.

The most current versions of the utility easement forms shall be used and obtained from the office of the City Engineer.

24 The City Engineer shall approve all utility and drainage easements.

Figure 4.1
Standard Utility Locations

NOTE: This standard is a guide only and deviations will be acceptable where conditions dictate and are approved by the City Engineer.



– Not to Scale –

Chapter 5
Street Access and Parking Lot Criteria

Chapter 5
Street Access and Parking Lot Criteria

Chapter 5

Street Access and Parking Lot Criteria

5.1 Traffic Studies

5.1.1 Responsibilities for Traffic Report

5.1.1.1 Traffic impact reports may be required by the City in order to adequately assess the impact of a proposal on the existing and/or planned street system. The primary responsibility for assessing the traffic impacts associated with a proposed development will rest with the developer with the City serving in a review capacity.

5.1.1.2 Unless waived by the City Engineer, a written report meeting the City guidelines will be required for a nonresidential development proposal when trip generation during the peak hour is expected to exceed 100 vehicles, or any residential development with 150 or more dwelling units.

5.1.1.3 Preparation of the report shall be the responsibility of the developer and must be prepared by a licensed design professional with experience in transportation planning. Upon submission of a draft traffic report, the City will review the study data sources, methods, and findings. Comments will be provided in a written form. The developer and his engineer will then have an opportunity to incorporate necessary revisions prior to submitting a final report. All reports must be reviewed by the City Engineer before acceptance.

5.1.1.4 All previous traffic reports relating to the development that are more than two years old must be updated, unless it is determined that conditions have not changed enough to warrant an update.

5.1.1.5 Traffic reports will be required if the trip generation and dwelling unit criteria as noted in Section 5.1.1.2 are exceeded for the following submittals:

a. For a rezoning application or Conditional Use Permit.

b. For a Preliminary Plan or Commercial Site Plan if the property has already been rezoned for the proposed use and no traffic report was required for the rezoning.

c. Prior to issuance of a building permit, if the property has already been zoned and platted, and no previous traffic report less than two years old exists.

d. Additional access off an arterial street to an existing use is being requested.

e. The developer will be required to submit a new traffic report if, after submitting the original traffic report, the land use intensity and traffic generation area increased by more than 15 percent.

5.1.1.6 Where access points are not defined or a site plan is not available at the time the traffic report is prepared, additional traffic work may be required when a site plan becomes available or the access points are defined.

5.1.1.7 The developer will be notified at the preplanning or concept plan stage if a traffic report will be required, provided sufficient information is available for the City to determine whether the trip generation and dwelling unit criteria have been met. If insufficient information is available but the property appears to involve a sufficiently intense land use, the applicant will be informed that a traffic report is required.

5.1.2 Traffic Report Format

Traffic consultants are encouraged to discuss projects with the City prior to starting the study. Topics for possible discussion at such meetings might include directional distribution of traffic, definition of the study area, intersections requiring critical lane analysis, and methods for projecting build-out volume. This should provide a firm base of cooperation and communication between the City, the owner or developer, and his consultant in creating traffic characteristics that are in the best interest of the total community. Specific requirements will vary depending on the site location. However, all traffic reports shall contain, as a minimum, the following information:

5.1.2.1 Introduction.

5.1.2.1.1 Land Use, Site, and Study Area Boundaries. A brief description of the size of the land parcel, general terrain features, the location within the jurisdiction and the region shall be included in this section. In addition, the roadways that afford access to the site, and are included in the study area, shall be identified.

The exact limits of the study area shall be based on engineering judgment, and an understanding of existing traffic conditions at the site. In all instances, however, the study area limits shall be mutually agreed upon by the developer, his design professional, and the City. These limits will usually result from initial discussion with staff. A vicinity map that shows the site, in relation to the surrounding transportation system, shall be included.

5.1.2.1.2 Existing and Proposed Site Uses. The existing and proposed uses of the site shall be identified in terms of the various zoning categories of the City. In addition, the specific use for which the request is made should be identified if known, since a number of uses may be permitted under the existing zoning ordinances.

5.1.2.1.3 Existing and Proposed Uses in Vicinity of the Site. A complete description of the existing land uses in the vicinity of the site, as well as their current zoning and use, shall be included.

The developer should also state the proposed uses for vacant adjacent land in order that any proposed transition in uses is identified. This latter item is especially important where large tracts of undeveloped and/or underdeveloped land are in the vicinity of the site, and within the prescribed study area. Generally much of this information can be obtained from the initial meetings with the City.

5.1.2.1.4 Existing and Proposed Roadways and Intersections. Within the study area, the developer must describe existing roadways and intersections (geometrics and traffic signal control) as well as improvements contemplated by government agencies. This would include the nature of the improvement project, its extent, implementation schedule, and the agency or funding source responsible.

5.1.2.2 Trip Generation and Design Hour Volumes.

5.1.2.2.1 A summary table listing each type of land use, the size involved, the average trip generation rates used (total daily traffic and a.m./p.m. peaks), and the resultant total trips generated shall be provided.

5.1.2.2.2 Trip generation will be calculated from the latest data contained within the *Institute of Transportation Engineers' Trip Generation Manual* (latest edition) or National Cooperative Highway Research Program (NCHRP) Report No. 187. In the event that data is not available for the proposed land use, the City must approve estimated rates prior to acceptance.

5.1.2.2.3 Site design hour volumes approximating the peak hour volume used to determine public improvements will be estimated by one of the following methods which are listed in order of preference:

a. Traffic volume counts for existing uses.

b. Peak hour trip generation rates as published in the *ITE Trip Generation Manual* (latest edition).

c. NCHRP Report No. 187, where justified.

5.1.2.3 Trip Distribution. The direction of approach for site-generated traffic will be presented in this section. The technical analysis steps, basic methods, and assumptions used in this work must be clearly stated.

5.1.2.4 Trip Assignment. This section will describe the utilization of study area roadways by site-generated traffic. The anticipated site traffic volumes must be combined with existing and projected area traffic volumes in Section 5.1.2.5 to describe mainline and turning movement volumes for future conditions with the site developed as proposed. Internal trips in excess of 10 percent will require analytical support to demonstrate how the higher figures were derived. Nongenerated passerby traffic reductions in generation volumes may be

considered if applicable. All estimates of trip distribution, assignment, and modal split are subject to review and approval by the City.

5.1.2.5 Existing and Projected Traffic Volumes.

5.1.2.5.1 Graphics should show:

a. a.m. peak hour site traffic (in and out) including turning movements.

b. p.m. peak hour site traffic (in and out) including turning movements.

c. a.m. peak hour total including site (in and out) and through traffic including turning movements for current conditions and 20-year projections or build-out.

d. p.m. peak hour total including site (in and out) and through traffic including turning movements for current conditions and 20-year projections or build-out.

5.1.2.5.2 All raw traffic count data (including hourly ADT and peak hour turning movements) and analysis worksheets shall be provided in the appendices. Computer techniques and the associated printouts can be used as part of the report.

5.1.2.5.3 Build-out projections shall include major vacant properties around the proposed development as defined by the City. Volume projections for background traffic growth will be provided by the City, or a method for determining their volume will be recommended by the City.

5.1.2.5.4 All total daily traffic counts should be actual machine counts and not based on factored peak hour sampling. Latest available machine counts from the South Dakota Department of Transportation (SDDOT), the City, and other agencies may be acceptable if not more than two years old.

5.1.2.5.5 All traffic will be assigned to existing and planned facilities in a manner consistent with existing traffic patterns and approved by the City.

5.1.2.6 Capacity Analysis. A capacity analysis will be conducted for the street intersections at driveways for the proposed development. Within the limits of the previously defined study area, capacity analyses will also be conducted for street intersections. The a.m., p.m., and any other possible peak period will be tested to determine which will be analyzed. Pedestrian movements should also be considered in the evaluation. Capacity calculations should also include an analysis for 20-year projections or build-out conditions. Capacity analysis will be calculated in accordance with the procedures outlined in *The Highway Capacity Manual*, TRB Special Report No. 209.

5.1.2.7 Traffic Signals.

5.1.2.7.1 The need for new traffic signals shall be checked using the warrants in the *Manual on Uniform Traffic Control Devices*, latest edition. Traffic progression is of paramount importance. Generally a spacing of one-half mile for all signal-controlled intersections should be maintained. This spacing is usually desirable to achieve good speed, capacity, and optimum signal progression.

5.1.2.7.2 To provide flexibility for existing conditions and ensure optimum two-way signal progression, an approved traffic engineering analysis will be made to properly locate all proposed connecting access approaches that may require signalization. An optimum two-way progression pattern will be established between two public intersections that bracket the proposed approach as chosen by the City. These bracketing intersections should be about one mile apart, and be existing, or possible future signal locations.

5.1.2.7.3 The progression pattern calculation must use a cycle length of between 50 and 120 seconds, and a travel speed of 40 mph, unless existing signal systems and speed limits govern usable cycle lengths and travel speeds. A desirable bandwidth of 50 percent must be used where existing conditions allow. Where intersections have no signals presently, but are expected to have signals, a 60 percent mainline, 40 percent cross street cycle split should be assumed. The green time allowed to the cross street will be considered no less than the time which is required for a pedestrian to cross the mainline at 4 feet per second. Those intersections which would reduce the optimum bandwidth if a traffic signal were installed will remain unsignalized and have turning movements limited by driveway design or median islands.

5.1.2.8 Level of Service. Level of Service C during the peak hour will be the design objective. The design year will be approximately 20 years following construction or at build-out of the area. Levels of service are defined in *The Highway Capacity Manual*.

5.1.2.9 Traffic Accidents. Traffic accident data for affected street corridors may be required for the study. Where this is necessary, estimates of increased or decreased accident potential shall be evaluated for the development.

5.1.2.10 Recommendations. In the event that analysis indicates unsatisfactory levels of service on study area roadways, a description of proposed improvements to remedy deficiencies shall be included. These proposals would not include committed projects by the City or the SDDOT. In general, the recommendation section should include:

5.1.2.10.1 Proposed Recommended Improvements. This section shall describe the location, nature, and extent of proposed improvements to assure sufficient roadway capacity.

5.1.2.10.2 Volume/Capacity Analysis at Critical Points. Another iteration of the volume/capacity analysis will be described, which demonstrates the anticipated results of making these improvements.

5.1.2.10.3 Levels of Service at Critical Points. As a result of the revised volume/capacity analysis presented in the previous section, levels of service for the highway system with improvements will be presented.

5.1.2.11 Conclusion. The last chapter of the report must be a clear, concise description of the study findings. It is anticipated that this concluding chapter will serve as an executive summary.

5.1.2.12 Revisions to Traffic Report. Revisions to the traffic report must be provided as required by the City Engineer. The need to require revisions will be based on the completeness of the traffic report, the thoroughness of the impact evaluation, and the compatibility of the study with the proposed access and development plan.

5.2 Access Control

5.2.1 General Access

Access in newly developing areas will follow these provisions. In areas being redeveloped, access will be determined as to the best fit based on traffic safety, existing conditions, future street improvements, and property development along with other considerations as appropriate.

A Driveway Approach, Curb & Gutter, and Sidewalk Permit must be obtained from the City for any public or private access constructed to a public street. Access to streets or highways within the city limits under the jurisdiction of the South Dakota Department of Transportation (SDDOT) are also governed by requirements of the SDDOT. In addition to obtaining a permit from the City, a permit from the Watertown Area Engineer of the SDDOT must be obtained. Access shall be limited as dictated by these City of Watertown Design Standards. Any discrepancy between the SDDOT and the City of Watertown regarding precedence of access design standards shall be jointly coordinated, reviewed, and approved.

Fire department access to all buildings shall be provided and maintained during construction and upon completion of all improvements. Fire department access shall meet all requirements outlined in currently adopted version of the International Fire Code, Section 503.

5.2.2 Definition of Terms for Access Control

Several terms are used herein which have a distinct meaning. For the purpose of clarity, the definitions of some of these terms are listed below.

5.2.2.1 Width of Curb Opening (W)—The width of curb opening measured at the throat of the driveway from the edge of pavement to the edge of pavement.

5.2.2.2 Property Line (P)—The distance measured along the property line from the nearest edge of the driveway to the property line.

5.2.2.3 Corner Clearance (C)—At an intersecting street the distance measured along the curb line from the end of the corner radius to the nearest edge of the curb opening.

5.2.2.4 Distance Between Double Drives (D)—The distance measured along the curb line between the radii.

5.2.2.5 Frontage—The distance along the street right-of-way line of a single property or development within the property lines. Corner property at an intersection would have a separate frontage along each street.

5.2.2.6 Residential—Property used primarily for residential purposes such as single-family, two-family, and multifamily units.

5.2.2.6.1 Single-Family (SF) Residential—Single, detached family dwelling units or double bungalows or duplexes.

5.2.2.6.2 Multifamily (MF) Residential—Three or more attached dwelling units including townhouses, condominiums, and apartments.

5.2.3 Basic Principles for Curb Openings and Driveways

5.2.3.1 Arterial and Collector Street Access

5.2.3.1.1 Private residential access directly to arterial or collector streets shall be permitted only when the property in question has no other reasonable access to the general street system, or when denial of direct access to the arterial or collector and alternative access to another roadway would cause traffic operation and safety problems as shown in a Traffic Report. Any access to arterials or collectors must adhere to City street standards as described in Chapter 8.

5.2.3.2 General Access

5.2.3.2.1 High Volume Access. In general, when trip generation served by the driveway exceeds 100 vehicles per hour during the peak hour or the driveway accesses an arterial street, returns using a standard street return radius as set forth in Table 5.1 and Figure 5.1 will be required.

5.2.3.2.2 Access Points. Access will not be approved for parking or loading areas that require backing maneuvers onto or from a public street right-of-way except for single-family or duplex residential uses on local and minor collector streets.

Table 5.1
Driveway Dimensions
(All Dimensions in Feet)

	Dimension Reference (See Figure 5.1)	Functional Classification of Street and Zoning								
		Local			Collector			Arterial		
		Resid-ential	Com-mercial	Indus-trial	Resid-ential[7]	Com-mercial	Indus-trial	Resid-ential[7]	Com-mercial	Indus-trial
Width[1]	W									
Minimum		12	15	20	12	15	20	15	15	20
Maximum		36[2]	36	40	36	36	40	36	36	40
Right-turn Radius	R									
Minimum		5	10	15	10	15	25	25	25	30
Maximum[3]		15	20	30	25	50	50	30	50	50
Minimum Spacing[4]										
From Property Line	P	0	R	R	0	R	R	R	R	R
From Street Corner	C	20	40	40	140	140	140	175	175	175
Between Driveways	D	20[5]	25	25	50	75	75	NA	250	250
Angle[6]	A	45°	70°	70°	45°	70°	70°			

[1] The minimum width of commercial driveways is intended to apply to one-way operation. In high pedestrian activity areas, such as in a central business district or in the same block with an auditorium, school, or library, the maximum basic width should be 36 feet. The width shown applies to rural routes and most City streets including neighborhood business, residential, and industrial streets. The City Engineer may approve wider driveways where appropriate.

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[2] Maximum width on bulb of cul-de-sac shall be 24 feet. Driveways for duplexes shall be shared whenever possible. Maximum opening for adjacent shared driveways ~~of duplexes~~ shall not exceed 48 feet combined width.

[3] On the side of a driveway exposed to entry or exit by right-turning vehicles. In high pedestrian activity areas, the radii should be half the values shown. The maximum radii for major generator driveways shall be designed in accordance with *A Policy on Geometric Design of Highways and Streets*, published by AASHTO, latest edition.

[4] Measured along the curb or edge of pavement from the roadway end of the curb radius. In high pedestrian activity areas, the minimum spacing between driveways should be 5 feet at the discretion of the City Engineer.

[5] Minimum space between driveways may be reduced to 3 feet on one side of driveway on local streets only at the discretion of the City Engineer.

[6] Minimum acute angle measured from edge of pavement, and generally based on one-way operation. For two-way driveways, and in high pedestrian activity areas, the minimum angle should be 80 degrees.

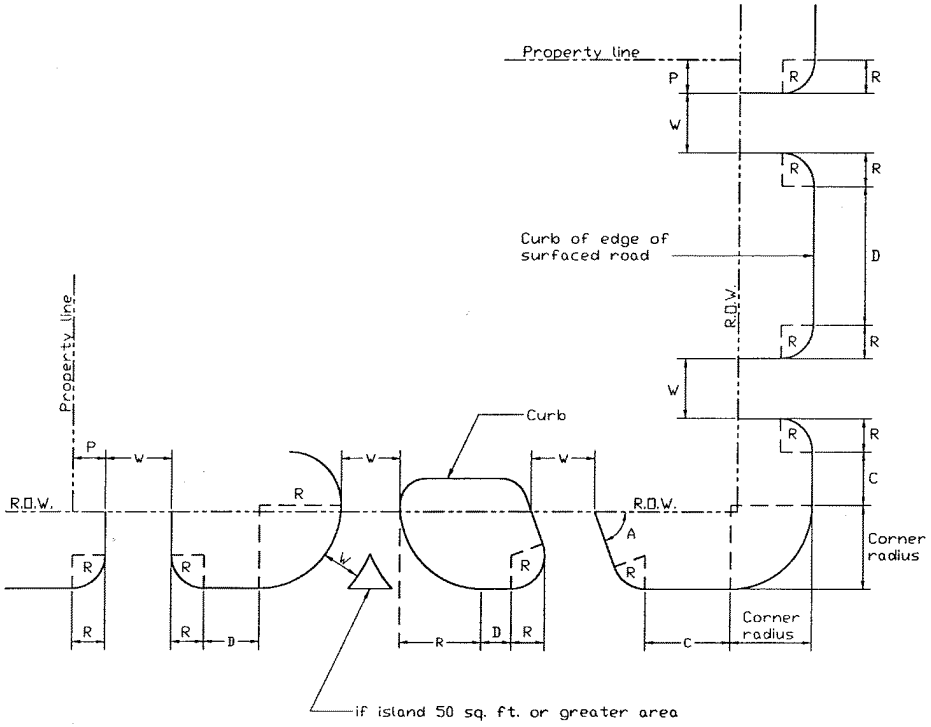
[7] See section 5.2.3.1.1.

Notes:

1. Driveway spacing length from signalized intersections shall be individually determined taking into consideration signal cycle length, traffic volumes, lane tapers and vehicle stacking lengths.
2. The City Engineer may require larger driveway spacing from what is listed above if the street geometrics and traffic volumes warrant larger spacing.
3. The maximum driveway width for residential driveways will be reduced as needed on residential lots to provide a minimum of twenty (20) feet of continuous curb frontage for parking.

Figure 5.1

Driveway Dimensions



5.2.3.2.3 Standards. Every property that accesses the street shall have a driveway. Driveways shall be constructed in accordance with the City of Watertown Standard Plates.

5.2.3.2.4 Existing and Future Demands. The opening or driveway width shall be adequate to handle properly the anticipated traffic volume and character of traffic, as well as being within the limits specified for the type of property development. The controls established for curb openings and driveways shall apply to existing streets as well as new streets that may be developed in the future.

5.2.3.2.5 Utility Conflicts. Any adjustments which must be made to utility poles, street light standards, fire hydrants, catch basins or inlets, traffic signs and signals, or other public improvements or installations which are necessary as the result of the curb openings or driveways shall be accomplished without any cost to the City.

5.2.3.2.6 Access Signs. Driveway approaches, whereby the driveway is to serve as an entrance only or as an exit only, shall be appropriately signed by, and at the expense of, the property owner subject to approval of City. Sign location, height, and legend must be in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD).

5.2.3.2.7 Abandoned Driveways. Any curb opening or driveway which has been abandoned shall be removed and the street restored by the property owner.

5.2.4 General Requirements

5.2.4.1 Number of Openings.

5.2.4.1.1 Single-Family Residential—In general, each single-family residential property shall be limited to one access point. However, where houses are located on corner lots or have extra wide frontage, more than one access point may be permitted. Applicable zoning setback requirements must be followed.

5.2.4.1.2 Multi-Family Residential—In general, access shall be determined by information provided by the owner/developer in a Traffic Impact Report and/or by comments generated during the City's review and acceptance of that report.

5.2.4.1.3 Commercial/Industrial—In general, access to commercial and industrial property shall be limited to the requirements as set forth in Chapter 8 of the Engineering Design Standards and shall be based on the street classification described by the Major Street Plan that is kept in the Office of the City Engineer**.** For commercial/industrial property located on a corner of an arterial street, access may be restricted to a side street only. Access may also be restricted if use of such access would be precluded by existing left turn lanes or other traffic control devices.

5.2.4.2 Access Surface. Driveways shall be paved with concrete or asphalt from the street surface to the structure. Structures with minimal use will be allowed to have grass as access; however, no gravel surfaces will be allowed. When access is to a road with gravel surfacing, a gravel driveway may be allowed with a waiver of right to protest the requirement to have a paved surface at such time as the road is paved. When access is to a road with a paved rural section, crushed concrete or recycled asphalt may be allowed with a waiver of right to protest the requirement to have a paved surface at such time as the road is modified to an urban section.

5.2.4.3 Access to Roadways with Rural Section. Private drive access to local, collector, or arterial streets that have a rural section shall be constructed to meet the following requirements:

5.2.4.3.1 The private drive shall extend from right-of-way line to the edge of the existing driving surface and shall be constructed in conformance with section 5.2.~~4~~3.2 of these Engineering Design Standards.

5.2.4.3.2 Access shall be governed by the driveway criteria.

5.2.4.3.3 A culvert properly sized for the ditch flow shall be installed at the established roadside ditch flowline beneath the private drive access.

Minimum size for the culvert shall be 15 inches. Culverts shall be reinforced concrete pipe, corrugated metal pipe, or polyethylene or PVC pipe. Culverts shall have a precast concrete-sloped end section or cast-in-place concrete headwall. A Corrugated Metal Flared End can be used with the approval of the City Engineer. If a cast-in-place headwall is built, it shall have a maximum slope of 4:1 on any exposed face. No vertical headwalls will be allowed.

5.2.4.3.4 A sketch plan of the installation must be submitted with the access permit application. No construction permit will be issued until the access and its construction plan or sketch are approved by the Office of the City Engineer**.**

5.2.4.4 Amount of Curb Opening Permitted. Driveway width shall comply with Table 5.1.

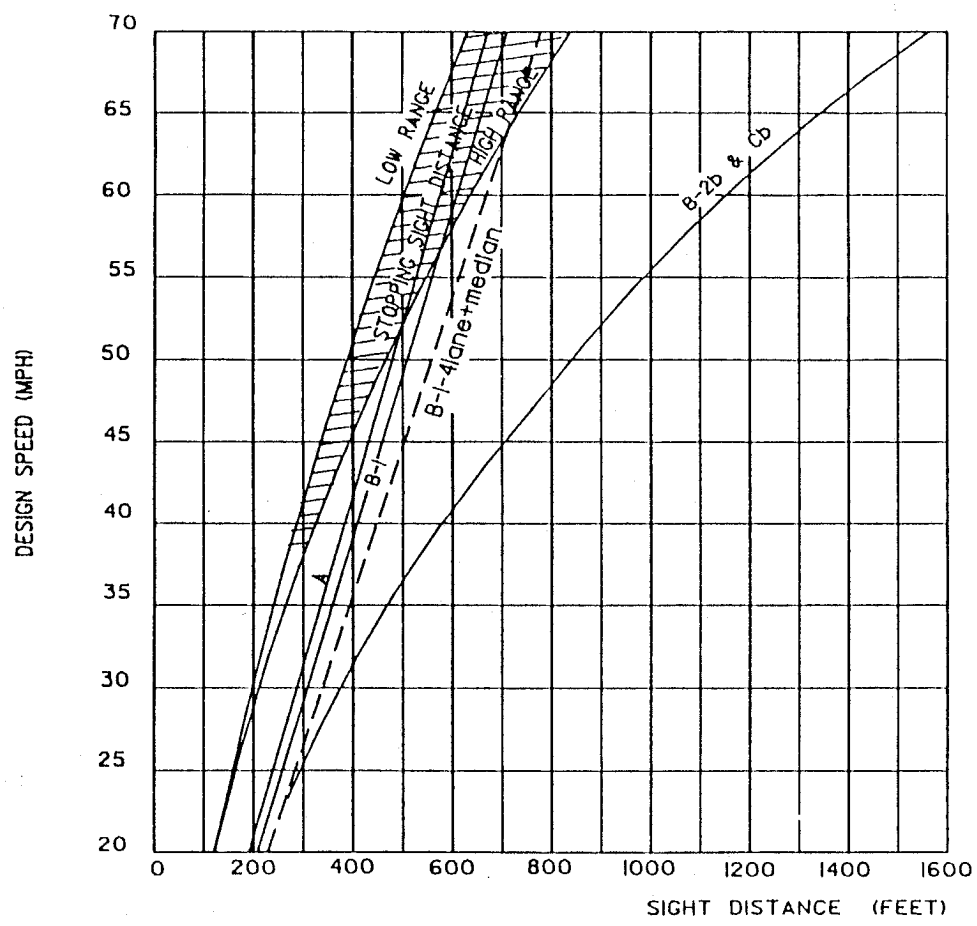
5.2.4.5 Mutual Access. On commercial, industrial, and multi-family developments, mutual use of access to streets is encouraged and may be necessary to meet driveway spacing requirements. Where used, mutual access will comply with City ordinance and will be shown on plans for approval prior to construction or change of use.

5.3 Access Design

5.3.1 Driveway Spacing

Where lots are large enough, the center of driveways not in alignment will normally be offset a minimum of 150 feet for all commercial/multifamily properties. Greater distances may be required if left-turn storage lanes require such on arterial streets. Minimum sight distance shall be provided at all access points as shown in Figure 5.2, which applies to both city street and driveway intersections.

Figure. 5.2: Intersection Distance at At-Grade Intersection



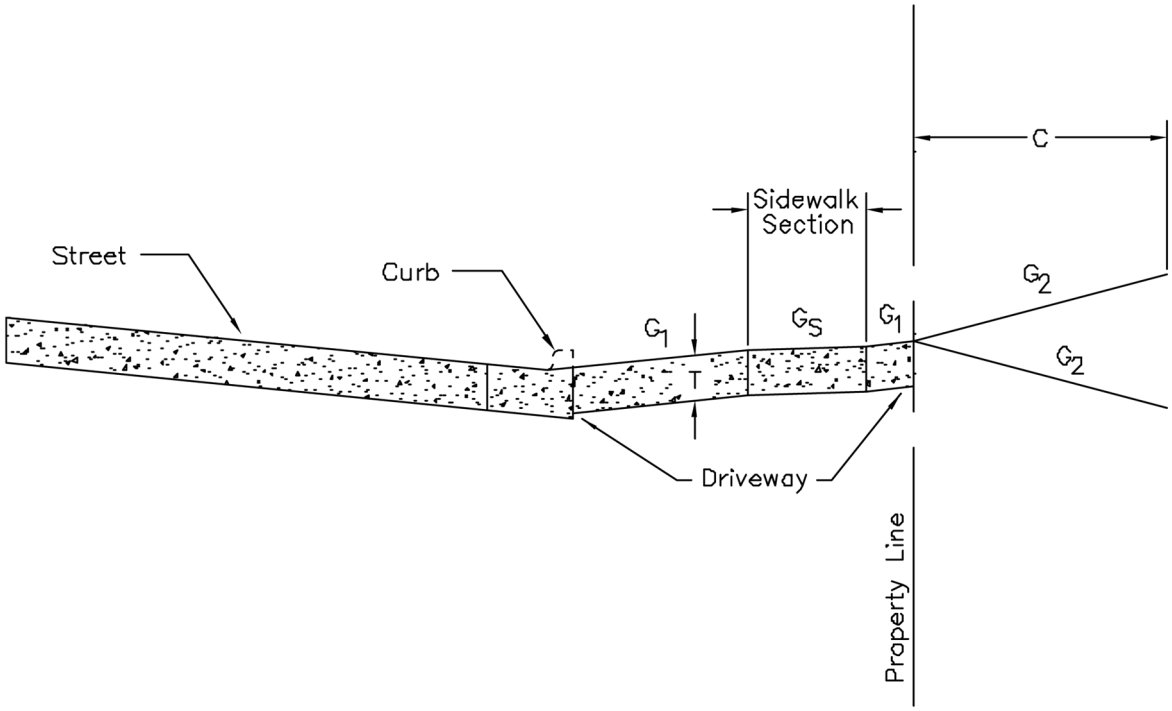
A - SIGHT DISTANCE FOR P VEHICLE CROSSING TWO-LANE HIGHWAY FROM STOP (SEE DIAGRAM).
B-l- SIGHT DISTANCE FOR P VEHICLE TURNING LEFT INTO TWO-LANE HIGHWAY ACROSS P VEHICLE APPROACHING FROM LEFT (SEE DIAGRAM).
B-l-4 Lane+median SIGHT DISTANCE FOR P VEHICLE TURNING LEFT INTO FOUR-LANE HIGHWAY ACROSS P VEHICLE APPROACHING FROM LEFT (SEE DIAGRAM).
B-2b- SIGHT DISTANCE FOR P VEHICLE TO TURN LEFT INTO TWO-LANE HIGHWAY AND ATTAIN 85% OF DESIGN SPEED WITHOUT BEING OVERTAKEN BY A VEHICLE APPROACHING FROM THE RIGHT REDUCING SPEED FROM DESIGN SPEED TO 85% OF DESIGN SPEED (SEE DIAGRAM).
Cb- SIGHT DISTANCE FOR P VEHICLE TO TURN RIGHT INTO TWO-LANE HIGHWAY AND ATTAIN 85% OF DESIGN SPEED WITHOUT BEING OVERTAKEN BY A VEHICLE APPROACHING FROM THE LEFT AND REDUCING FROM DESIGN SPEED TO 85% OF DESIGN SPEED.

5.3.2 Driveway Design

Driveway section details are shown in Figure 5.3 with design requirements listed in Table 5.2.

Figure 5.3

Driveway Grades



*All sidewalk grades (Gs) shall be less than 2.0%.

Table 5.2

Type of Driveway	Minimum Thickness	Grade (G1)		Grade (G2)		Control Distance (C)
		Min.	Max.	Min.	Max.	
Low Volume Residential	6"	+5.0%	+10~~8~~.0%	±0. 5%	±13%	20'
Low Volume Commercial/ Industrial	7"	±0.5%	±6%	±0. 5%	± 6%	40'
High Volume	7"	±0.5%	±3%	±0. 5%	± 3%	40'

The following sketches are the recommended minimum design for limited movement driveways. Acceleration and deceleration lanes may be required to be incorporated into the designs. The islands are raised with vertical curb. The ends of the islands should typically be provided with 2-foot radii.

Figure 5.4: Right-In, Right-Out Driveway Designs

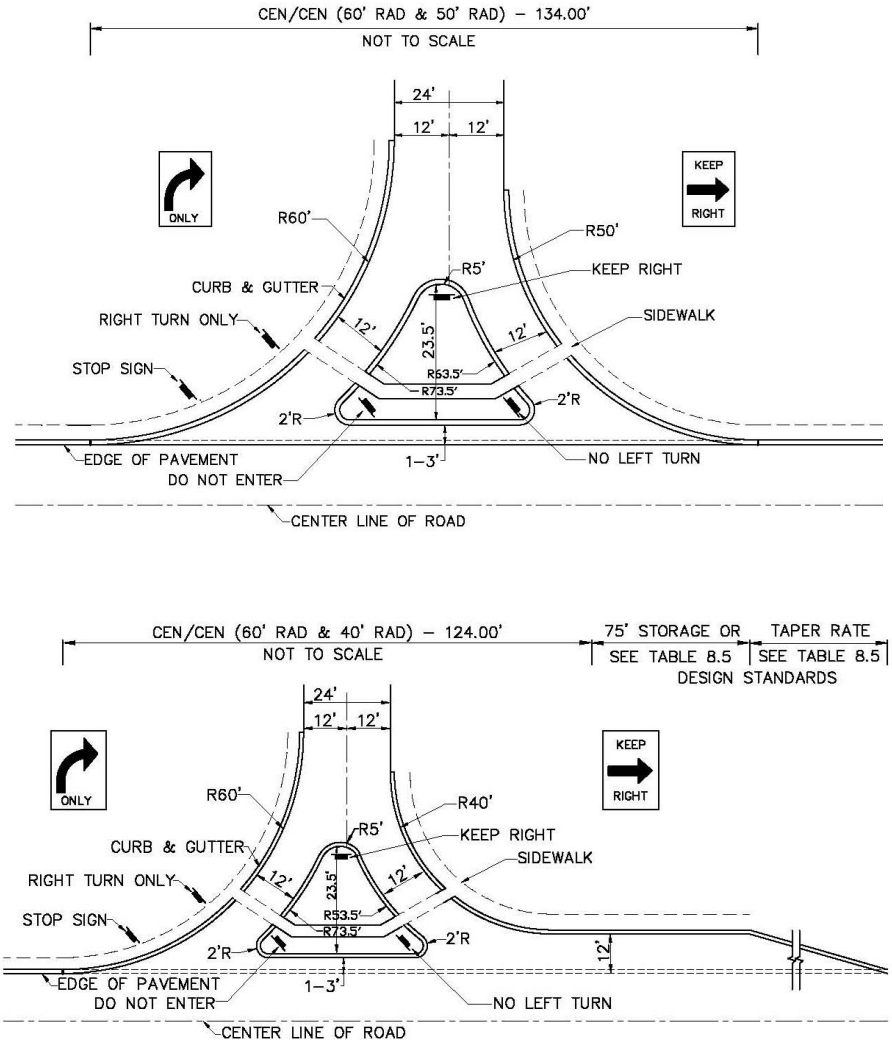


Figure 5.5: Right-In, Right-Out, Left-In Driveway Design

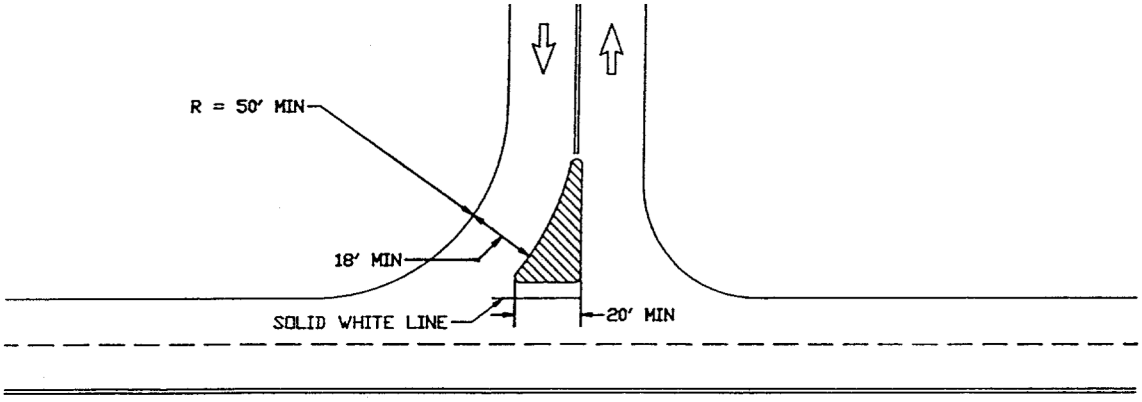


Figure 5.6: Right-In, Right-Out, Left-Out Driveway Design

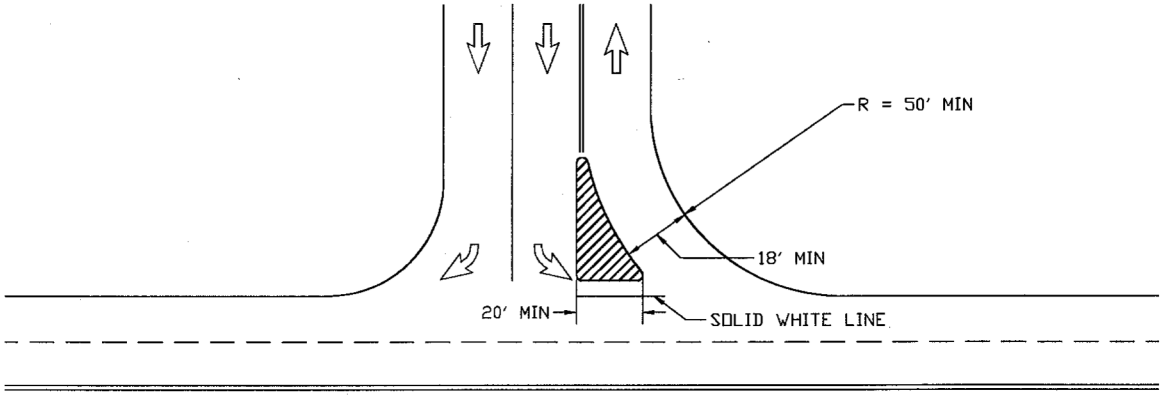


Figure 5.7: Driveway Design with Median Divider

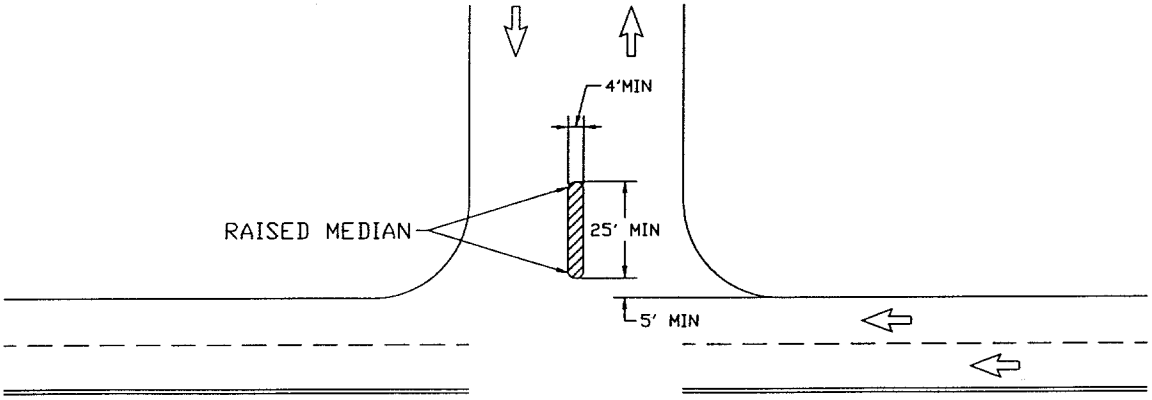
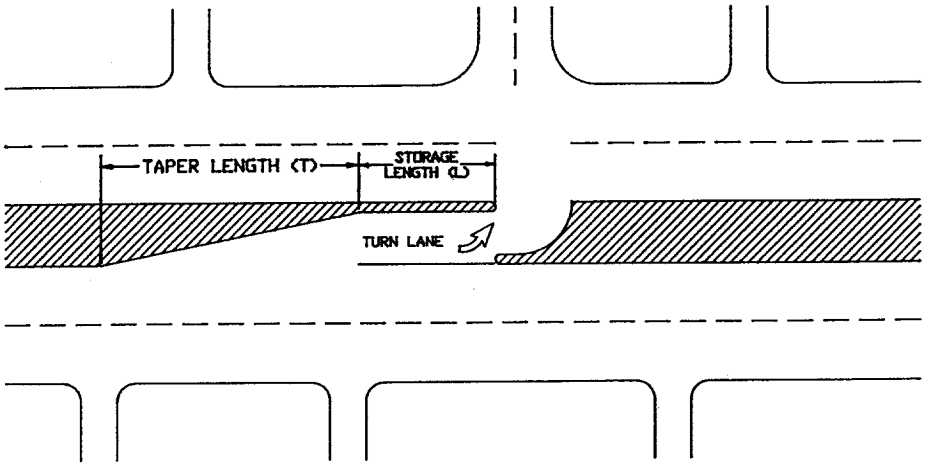


Figure 5.8: Median Design to Restrict Existing Left Turns



5.4 Off-Street Parking Area

5.4.1 General. The following guidelines regarding the design of off-street parking areas shall be followed.

5.4.2 Minimum Stall Dimensions. The minimum stall width shall be 9 feet and the minimum stall depth shall be 18 feet for diagonal parking. The minimum stall width shall be 10 feet and the minimum stall depth shall be 20 feet for parallel parking.

5.4.3 Compact Vehicles. A maximum of 10 percent of total required parking stalls may be designated specifically for compact vehicles. When an area is designed for compact vehicles only, the area shall be adequately signed to inform drivers of the exclusion.

5.4.4 Parking Dimensions. Minimum module depths shall be as shown on Figure 5.9 and in Table 5.3.

5.4.5 Backing Into Street Not Allowed. The spaces shall be so arranged so that no vehicle will be required to be backed into the street in order to exit the lot except for single-family or duplex dwelling units.

5.4.6 Backing Over Sidewalk Not Allowed. The spaces shall be so arranged so that no vehicle will be required to be backed over a public sidewalk in order to exit the stall.

Figure 5.9
Parking Layout

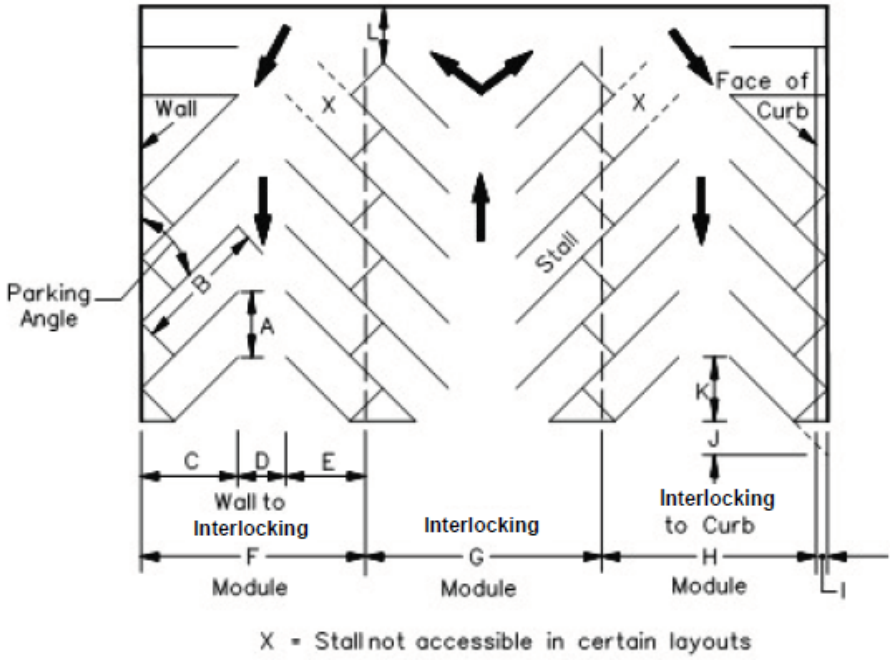


Table 5.3					
Minimum Parking Lot Design Requirements					
(9 ft. stall width - 18 ft. stall depth)					
Parking angle (Degrees)		45	60	75	90
Stall width, Parallel to aisle	A	12.7	10.4	9.3	9.0
Stall length of line	B	27.0	23.2	20.4	18.0
Stall depth to wall	C	19.1	20.1	19.7	18.0
Aisle width	D	12.0	16.0	23.0	26.0
Stall width (Interlocking)	E	15.9	17.8	18.6	18.0
Module (Wall to interlock)	F	47.0	53.9	61.3	62.0
Module (Interlocking)	G	43.8	51.7	60.1	62.0
Module (Interlock to curb)	H	45.0	51.6	58.8	59.5
Bumper overhang (Typical)	I	2.0	2.3	2.5	2.5
Offset	J	6.4	2.6	0.6	0.0
Setback	K	12.7	9.0	4.7	0.0
Cross aisle, one-way	L	14.0	14.0	14.0	14.0
Cross aisle, two-way	L	24.0	24.0	24.0	24.0

Chapter 6
Geotechnical Exploration and Report

Chapter 6
Geotechnical Exploration and Report

Chapter 6

Geotechnical Exploration and Report

6.1 General

The geotechnical exploration and report shall determine any special geotechnical conditions and make recommendations regarding the special conditions, grading, foundations, and pavement.

6.2 When Required

Soils reports are required for all public road improvement projects. For public improvement projects, the determination as to when soils reports will not be required will be determined on an individual, case-by-case basis by the City Engineer.

6.3 Soil Exploration

6.3.1 General. When geotechnical explorations are required, all sampling and testing of the soil shall be performed in accordance with the appropriate AASHTO (American Association of State Highway and Transportation Officials) and ASTM (American Society for Testing and Materials) designations.

6.3.2 Sampling. Representative samples of the soils shall be obtained by drilling shallow penetration soil borings along the route of the existing or proposed public right-of-way.

6.3.2.1 Borings shall extend to a minimum depth of 5.0 feet below the proposed subgrade foundation, or 2.0 feet below the flow line elevation of any pipe or conduit. Every third boring, or a minimum of one boring, shall be of sufficient depth, or a minimum of 10 feet, for monitoring of the ground water elevation.

6.3.2.2 Borings will be performed at close enough intervals to determine the boundaries of each significant soil type present.

6.3.2.3 A random technique shall be used to select sampling locations.

6.3.2.4 Spacing of the borings will vary with the uniformity of the soil profile and the topography. The maximum interval between soil borings may not exceed 400 feet.

6.3.2.5 Where the original ground line is to be covered with fill material, 5-foot depth borings are necessary to determine the character of the support.

6.3.2.6 Where drainage areas are crossed or boggy areas are encountered, the spacing of the borings shall be at closer intervals in order to determine the boundaries of the “soft” area. At these “weak” areas, the depth of the borings may also have to be increased in order to determine if and to what depth

improved subgrade material will be required to provide uniform support for the construction.

6.3.2.7 Representative samples from the borings shall be collected for submittal to a soils testing laboratory for evaluation.

6.3.2.8 A boring log shall be maintained for each soils boring performed. The boring log shall contain a complete record of the soil material observed.

6.3.3 Testing.

6.3.3.1 The tests required are those for identification and classification purposes. These tests include a standard sieve and hydrometer analysis (ASTM D422 of AASHTO T-88) and Atterburg Limits (ASTM D4318 or AASHTO T-89 and 90). The test results are used to give a soil a descriptive name and letter symbol (in accordance with the Unified Soils Classification System) indicating its principle characteristics. Based on the test results, similar soil types can be placed into several major groups.

6.3.3.2 These major groups shall be plotted on a profile sheet to determine their limits. The profile sheet is used with the laboratory data in selecting what soil types further testing should be performed on. Additional testing includes the moisture-density relationship (AASHTO T-99 or T-180) and California Bearing Ratio (MIL STD 621 Method 101 or ASTM D1883). The moisture-density relationship determines the maximum dry density and optimum moisture content for that particular soil. The CBR test is performed at 95 percent of the maximum dry density and at the optimum moisture content. The results of the CBR test determine the relative bearing value of the subgrade and is used in the pavement thickness design. A minimum of a three-point curve will be utilized for the CBR testing with a five-point curve preferred. If the various soil type areas are not large enough to justify separate pavement designs, a single design shall be made on the worst soil type.

6.4 Report

6.4.1 General. The report shall identify any geotechnical special conditions found in the exploration and recommendations to ameliorate the special conditions along with grading, foundations, and subgrade and pavement requirements. The recommendations may be divided into three parts: geotechnical special conditions, grading and foundation, and subgrade and pavement.

6.4.2 Special Geotechnical Conditions. The special conditions portion of the report shall consider ground water, frost susceptibility, erosion potential, soils creep, landsliding, expansive soils, soil corrositivity, and any other special geotechnical conditions the Geotechnical Engineer becomes aware of.

6.4.3 Grading and Foundation. The grading and foundation portion shall include data regarding the distribution and engineering characteristics of the various soil

materials, data about groundwater levels, recommendations about the need for mitigation measures for special geotechnical conditions, grading criteria, foundation design criteria, and any other information the Geotechnical Engineer considers pertinent.

6.4.4 Subgrade and Pavement. The subgrade and pavement portion shall include data regarding the distribution of various subgrade materials and design tests (such as CBR, R-value, and/or plate bearing) to be made. Where soils are susceptible to erosion, recommendations shall be made for preventing the undermining of pavements. The pavement design may be included in this report or prepared and submitted separately by the Engineer responsible for preparation of the construction plans and contract documents.

Chapter 7
Grading

Chapter 7
Grading

Chapter 7
Grading

7.1 General

7.1.1 All proposed developments shall be graded such that storm water runoff is conducted away from proposed building sites to swales constructed in drainage easements along lot lines, to public rights-of-way, or to another approved drainage course.

7.1.2 No filling will be allowed in any areas of land within a proposed subdivision or other type of development which lies either wholly or in part within the flood plain of a river, stream, creek, or lake unless under the terms of a permit granted by the U.S. Corps of Engineers and/or the City of Watertown where applicable.

7.2 Grading Requirements for Subdivisions

7.2.1 The longitudinal slope along a rear yard drainage easement shall be not less than 1.0 percent but not so great as to cause erosion.

7.2.2 All grade point elevations shall be shown for each lot at the property corners and at the low and high points along the property lines.

7.2.3 The general direction of overland drainage in the rear yard shall be indicated on each lot by an arrow.

7.2.4 High and low street grade points, slope direction (by arrow), and the location of all inlets and drainage ditches shall be shown on the grading plan.

24 **7.2.5** A maximum slope of 4~~3~~ feet horizontal to 1 foot vertical shall not be exceeded for all terracing. The toe of the slope shall be located outside of drainage easements and natural drainage ways unless adequate drainage is provided.

7.2.6 Grading plans shall be drawn to a scale of 1 inch = 100 feet (1" = 100') or larger.

7.2.7 Grading plans shall include details of typical lot grading and drainage patterns intended to be used.

7.2.8 The grading plans shall show the contours with intervals of 1 foot for land with a slope of 1 percent or less, intervals of 2 feet for a slope between 1 and 1.1 and 9 and 9.9 percent and contours of 5 feet for land with a slope exceeding 10 percent.

7.2.9 All elevations shall be on the North American Vertical Datum of 1988 (NAVD 88).

7.2.10 Drainage patterns other than those shown in standard details may be used and will be acceptable for review. Details of the typical lot drainage pattern shall be shown on the grading plan with all grade control points identified.

7.2.11 In general, for streets with ditches and no curbs, elevation of the front lot line shall be at least 6 inches above the centerline of the road.

7.2.12 All nonconforming lots with drainage patterns other than those in standard details shall be noted on the grading plan.

7.2.13 Storm sewers and inlets shall be placed in rear yard swales at low (sump) points where front to rear grading is used.

7.2.14 Drainage swales shall be constructed entirely within the easements.

7.2.15 The grading plan shall show the minimum ground elevation adjacent to buildings for each lot.

Chapter 8
Street Design and Pavement Thickness

Chapter 8

Street Design and Pavement Thickness

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Street Design and Pavement Thickness

8.1 General

8.1.1 This chapter sets forth the design and technical criteria to be used in the preparation of all roadway plans. Where design information is not provided herein, *"A Policy on Geometric Design of Highways and Streets"* (AASHTO Standards) as published by AASHTO most current edition (English units) shall be used.

8.2 Access Management

8.2.1 Access

8.2.1.1 Access Defined. Access is defined as any connection, driveway, street, turnout, or other means of providing for the movement of vehicles to or from the public roadway system. Access is further defined as any full movement access, right in right out movement, or partial movement access.

Access Management is defined by the Transportation Research Board National Access Management Manual as the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It also involved the roadway design applications, such as median treatments and auxiliary lanes and the appropriate spacing of traffic signals. The purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system. The contemporary practice of access management extends to concept of access design and location control to all roadways- not just limited access highways, streets, or interstates.

Access management principals and history can be reviewed in the Access Management Manual published by the Transportation Research Board. The City of Watertown implements access management principals. Using access management techniques can reduce the crash rate on a roadway section roughly in half while keeping the traffic flowing.

The City Engineer may initiate an access management plan or corridor study that would supersede the design standards for access along an arterial or major collector street. Preparation of the study shall be the responsibility of the City of Watertown**,** South Dakota Department of Transportation, and/or private individuals, or jointly prepared. However, the study must be prepared by a licensed design professional engineer with experience in transportation

planning. The access plan or corridor study shall be approved by the City Council and/or South Dakota Department of Transportation.

Access planning that has not been identified in any type of study in existing development areas will be considered on a case by case basis. Retrofit techniques will adhere to best access management practices as identified in the Transportation Research Board National Access Management Manual.

8.2.2 Spacing of Direct and Indirect Access, Angle of Intersection, and Offsets.

8.2.2.1 Spacing. For collectors and local streets in a subdivision, four-legged intersections will normally be spaced at least 300 feet apart.

8.2.2.2 Angle of Intersection. Proposed streets and driveways must intersect one another at 90° angles or as close to 90° as topography permits (no less than 80°).

8.2.2.3 Offsets. When “T” intersections are used, the center lines of the streets not in alignment must normally be offset a minimum of 150 feet on local streets, and 300 feet on nonresidential local, and collector streets.

8.2.3 Functional Street Classification.

8.2.3.1 Major Street Plan. The functional street classification of the City’s street network is shown on the Major Street Plan kept in the Office of the City Engineer. The functional classification is a system used to group public roadways into classes according to their purpose in moving vehicles and providing access to the public.

8.2.3.2 Major Arterial. A major arterial street is a general term denoting a roadway designed or operating with the following characteristics:

A. Defined as a primary roadway intended to serve regional traffic, where access is carefully controlled; generally roadways of regional importance, intended to serve high volumes of traffic traveling relatively long distances and at higher speeds.

B. Anticipated traffic volumes in excess of 15,000 vehicles per day within the corridor. Posted speed limits of greater than or equal to 40 miles per hour.

C. Designed to accommodate through traffic, intersecting with Minor Arterial and Collector Streets only. Intersections with local streets and access from adjacent properties shall not be allowed except for existing lots with no other method of access. The number of intersections will normally not be spaced less than one-half mile.

("T" intersections will be considered an intersection for half-mile spacing purposes.)

D. Continuous for several miles through the urban area and are typically on section line right-of-ways. Right-of-way is 120 feet in width.

E. Provides continuity for rural arterials which intercept the urban boundary.

F. Traffic control devices provided to enhance through traffic primarily by signal control and/or limited access. Right turn lane and/or acceleration/deceleration lanes should be considered at the arterial/collector street intersections.

G. No on-street parking will be allowed.

8.2.3.3 Minor Arterial. A minor arterial street is a general term denoting a roadway designed or operating with the following characteristics:

A. Defined as a major roadway intended primarily to serve through traffic, where access is carefully controlled; generally roadways of community importance, intended to serve moderate to high volumes of traffic traveling relatively long distances and at high speeds.

B. Anticipated traffic volumes in excess of 10,000 vehicles per day within the corridor. Posted speed limit of greater than or equal to 35 miles per hour.

C. Designed to accommodate through traffic and serve adjacent major developments. Intersections with local streets will not be allowed. Development access will use shared driveways and be encouraged to utilize collector streets. The number of intersections will normally not be spaced less than one-quarter mile. ("T" intersections will be considered an intersection for spacing purposes.)

D. Continuous for several miles and are typically on section line right-of-ways. Right-of-way is typically 100-120 feet in width.

E. Provides continuity for rural arterials which intercept the urban boundary.

F. Traffic control devices provided to enhance through traffic primarily by signal control. Right turn lanes and/or acceleration/deceleration lanes should be considered at the collector street intersections or high traffic generators.

G. No on-street parking will be allowed.

8.2.3.4 Major Collector. A major collector street is a general term denoting a roadway designed or operating with the following characteristics:

A. Defined as roadways intended to serve moderate volumes of traffic from local roads to arterials

B. Anticipated traffic volume generally greater than 5,000 vehicles per day. Posted speed limit of greater than or equal to 30 miles per hour.

C. Continuous for two or more miles and typically, but not limited to, located on the 1/2 mile location of a section. Right-of-way is 80 feet. A traffic impact study may determine if there is extra width required to handle a development's traffic.

D. Designed to handle traffic volumes loading from and onto local, other collector, and arterial roadways.

E. Traffic control is provided generally by signs.

F. On-street parking may be allowed.

G. Access locations will not be allowed within 300 feet from the intersection with an arterial street.

H. Generally, serves predominantly multi family residential, commercial, and/or industrial uses.

I. Major collectors could transition into minor collectors if approved by the City Engineer.

8.2.3.5 Minor Collector. A minor collector street is a general term denoting a roadway designed or operating with the following characteristics:

A. Defined as roadways intended to move traffic from local roads to arterials.

B. Anticipated traffic volume generally less than 5,000 vehicles per day. Posted speed limits of greater than or equal to 25 miles per hour.

C. Continuous for less than two miles and should be designed to not promote through traffic in residential areas and generally located on the 1/4 and 3/4 points along a section line.

D. Designed to handle traffic volumes loading from and onto local, other collector, and arterial roadways.

E. Generally, adjacent land use is predominantly residential.

F. On-street parking may be allowed.

24 G. Right-of-way width is 6680 feet. When minor collectors intersect with major collectors or arterials, the right-of-way is required to be 80 feet within a minimum of 300 feet from the centerline of the major collector or arterial street right-of-way.

H. Traffic control is by signage or rules for uncontrolled intersections.

8.2.3.6 Local Street. A local street is a general term denoting a roadway designed or operating with the following characteristics:

A. Posted speed limit not in excess of 25 miles per hour.

B. No criteria for traffic volumes.

C. Limited continuity.

D. Designed for ease of access to adjacent developments.

E. Traffic control is by signage or rules for uncontrolled intersections.

F. On-street parking permitted.

G. Does not intersect with an arterial street.

H. Right-of-way is 66 feet.

24 H. **8.2.3.7 Private Road Width.** Any private road must be a minimum of 28 feet wide from back of curb to back of curb and a minimum of 40 feet public access easement is required.

8.3 Roadway Design and Technical Criteria

The City of Watertown has adopted a Major Street Plan based on traffic volumes, land use, and expected growth. This Street Plan designates streets as local, minor, and major collector, minor and principal arterial. The highway design speed shall be used to establish features such as superelevation rate, critical length of grade, vertical and horizontal curves, intersections, etc. See Table 8.1 for design standards for each of these street classifications. See Figures 8.1, 8.2, and 8.3 for Typical Street Sections. The typical street sections shall be used as the basis for design, unless an alternate section is approved by the City Engineer.

8.3.1 Traffic Lane Widths.

8.3.1.1 The minimum traffic lane width shall be 10~~1~~ feet. For arterial streets and streets with anticipated truck traffic count in excess of 3 percent of the total traffic count, the lane width shall be 12 feet.

8.3.1.2 In the design of local streets, the number of lanes for moving traffic will be a secondary consideration.

Table 8.1
Minimum Street Design Criteria

Design Elements	Local			Collector		Arterial	
	Residential Cul-de-sac*	Residential	Commercial Industrial	Minor	Major	Minor	Major
24-hour Volumes (vpd)	500 or less	2000 or less	2500 or less	<5000	>5000	10,000	15,000
Design Speed (mph)	—	—	—	35	40	45	50
Driving Lanes	—	—	2	2	2-4	4	4 or more
Right-of-Way (ft.)	66	66	66	66	80	100 +	120 +
24 Roadway Width (ft.) (1)	37'4"~~9'4"~~	37'4"~~9'4"~~	40'41'4"	40'41'4"	40'41'4"	~~41'4"-53'4"~~40'-51'	65 or more
- (One Side Parking)(2)	33'4"	33'4"	NA	35'4"	NA	NA	NA65 or more
- (No Parking)(2)	27'4"	27'4"	NA	--	NA	NA	NA
- Rural (~~3~~2)	22	22	24	32	40	40	—
Cul-de-sac Right-of Way Radius	65						
Cul-de-sac Roadway Radius	51'4"						
Lane Width (ft.)	~~11~~10	~~11~~10	11	12	12	12	12
24 Sidewalk (~~4~~3)	5' detached	5' detached	5' detached	5' detached	5' detached	5' detached	5' detached
Curb & Gutter	6" vertical	6" vertical	6" vertical	6" vertical	6" vertical	6" vertical	6" vertical
Min.-Max. Grade (%)	0.5-8.0	0.5-8.0	0.5-7.0	0.5-7.0	0.5-7.0	0.5-6.0	0.5-6.0
Curb Return Radii (ft.)							
- intersect local	13.5	13.5	13.5	20	20	--	--
- intersect collector	20	20	20	25	25	30	30
- intersect arterial				30	30	35	35
Horizontal Curve Radius (ft.)	150	150	300	AASHTO Standards			
Vertical Alignment Control	AASHTO Standards						
Grade at Intersection (%)							
- intersect local	3	3	3	—	—	—	—
- intersect collector	2	2	2	2	2	—	—
- intersect arterial				2	2	2	2

24

(1) All dimensions are measured to back of curb.

(2) Must be approved by City Engineer.

(~~3~~2) Rural Minor Collectors shall have 4' paved shoulders and Major Collectors shall have 8' paved shoulders. Rural sections do not allow parking, except upon approval by the City Engineer, in which case parking lanes shall be a minimum of 8' wide. Rural sections may require additional drainage easement.

(~~4~~3) Where sidewalk is attached to curb, sidewalk shall be one foot wider. Sidewalks that are being constructed or replaced adjacent to existing sidewalks may be the same width as the adjacent sidewalks with the approval of the City Engineer. Rural street sections should have a 5' detached sidewalk or 10' detached pathway on one side with access points at least every 500 feet.

*Nonresidential cul-de-sac dimensions may differ

Figure 8.1: Typical 65' Major Arterial Street Section

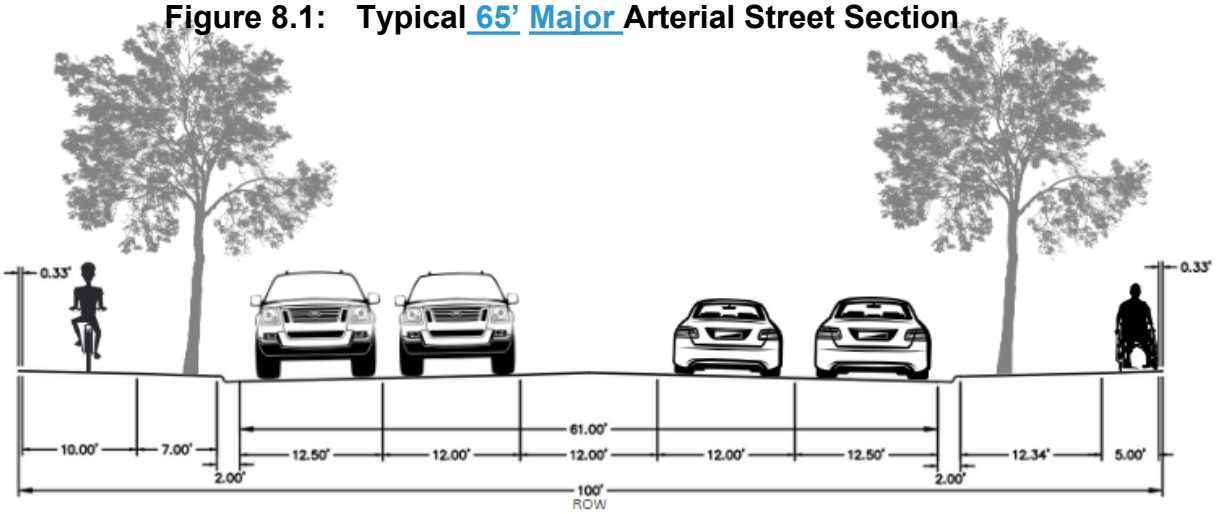

Figure 8.2: Typical 40' ~~Major~~ Collector and Commercial Street Section

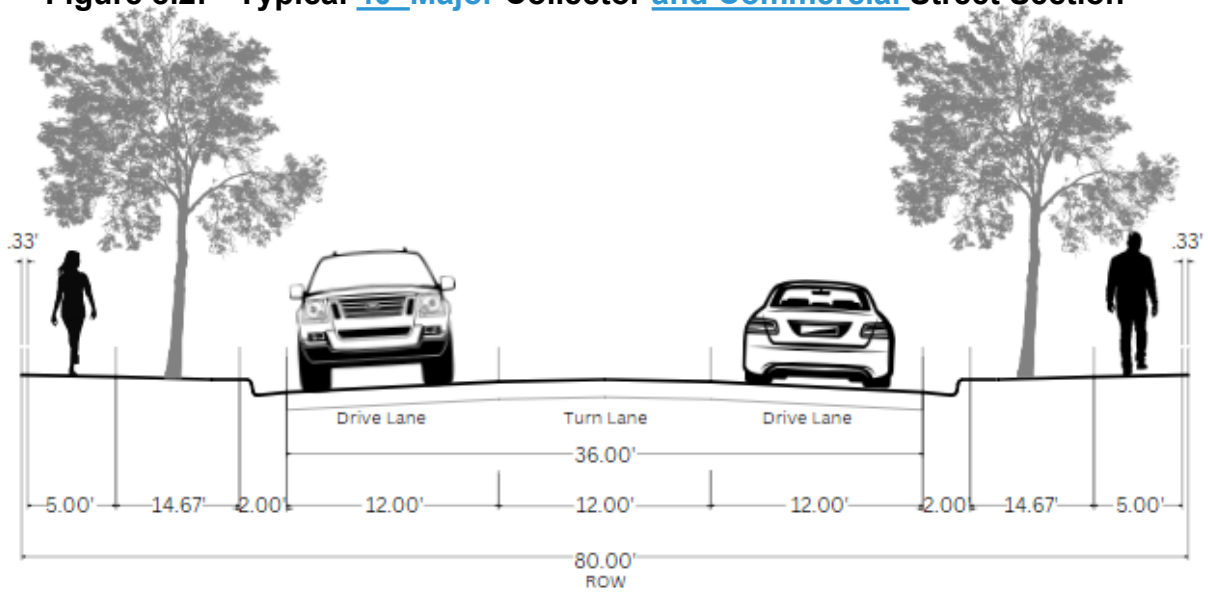

Figure 8.3: Typical 37'4" Local Residential Street Section

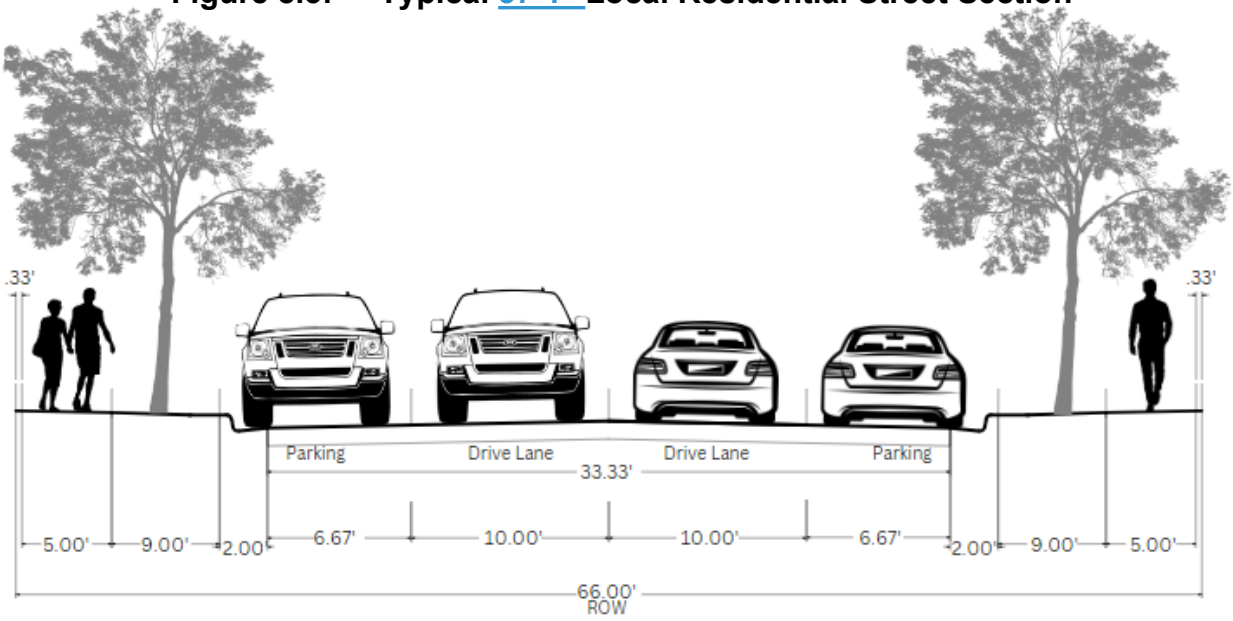

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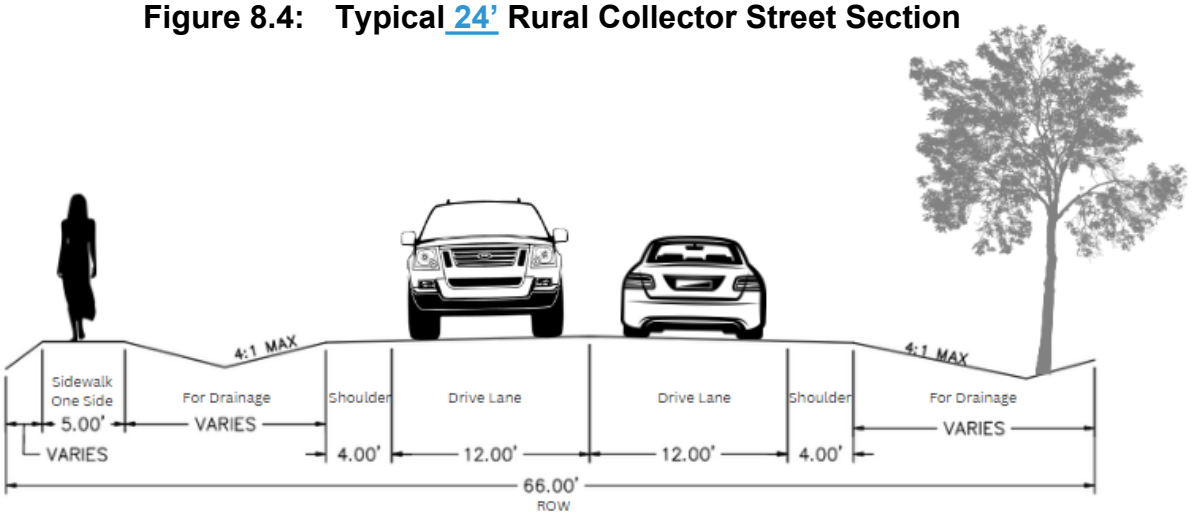
Figure 8.4: Typical 24' Rural Collector Street Section



8.3.2 Separate Turning Lanes.

8.3.2.1 Separate turning lanes may be constructed on arterial and collector streets but will, as a rule, not be found on local streets.

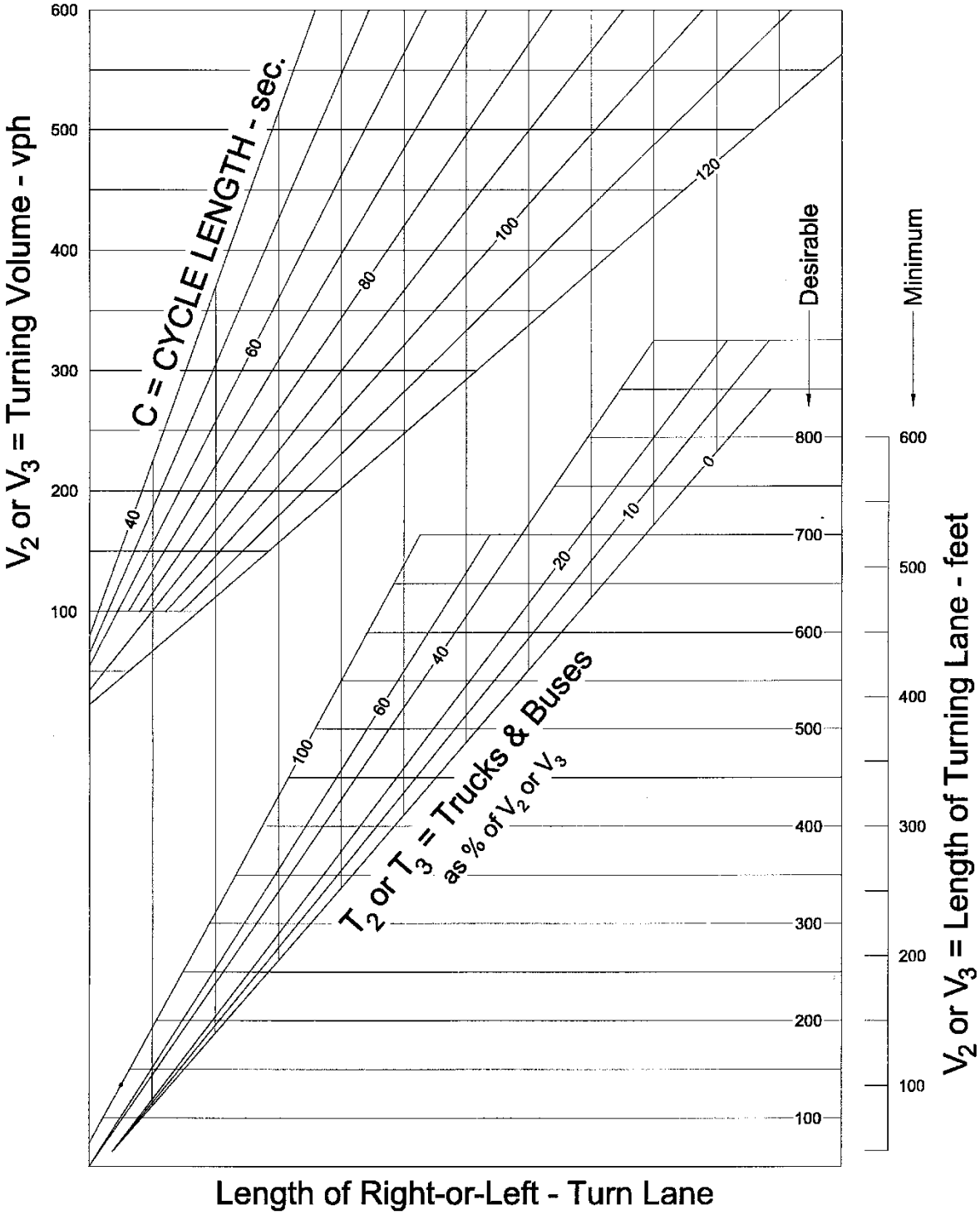
8.3.2.2 Where separate turning lanes are constructed on the basis of a capacity analysis at the intersection, a width of 12 feet will be used for arterial streets where truck traffic is involved and 11 feet in width for other streets.

8.3.2.3 A directional median or ¾ turn or partial opening is allowed in a median section and allows for right in, right out, and left in and/or u-turn movements. The left out movement is prohibited. This directional median opening improves safety at intersections and has been proven to reduce crash rates.

8.3.2.4 Left-turn Lane Storage Lengths for New Facilities.

8.3.2.4.1 Left-turn lane storage design at both signalized and unsignalized intersections for proposed street design plans may be determined from use of a traffic analysis software or Figure 8.54. New streets will use the desirable lengths. Minimum design lengths will only be permitted under constraints imposed by geometrics of existing streets. Lengths of dual left-turn lanes shall be independently designed.

Figure 8.5: Design of Left-Turn Storage Length Volume-Based Nomograph For At-Grade Signalized Intersections



8.3.3 Parking.

8.3.3.1 Parking lanes will not be allowed on arterial streets. Parking lanes may not be allowed on major collector streets.

8.3.3.2 No diagonal or perpendicular parking will be allowed on any City street except in the downtown commercial district or as approved by the City Engineer~~Council~~.

8.3.3.3 Where on-street parking is provided, the parallel lane width shall be a minimum of eight (8) feet, which would include the gutter pan.

8.3.4 Medians.

8.3.4.1 A median is a physical barrier that separates traffic traveling in opposite directions. Medians should be constructed on arterial streets with four or six lanes of through travel. Medians should be constructed at arterial to arterial intersections to provide for more capacity, safety, and improve the operations of the roadway.

Median openings are normally designated at collector street intersections. These intersections are normally at each quarter mile location intersecting the arterial street. These openings may be full movement intersections that provide both left in and left out maneuvers. These openings also may be controlled by a traffic signal.

8.3.4.2 Full median breaks shall not be allowed closer than 1,000 feet from an arterial to arterial intersection, unless an approved exception by the City Engineer.

8.3.4.3 The median width to accommodate a left turn lane is typically 16 feet. The minimum width of a median may be 4 feet back of curb to back of curb.

8.3.4.4 Medians and boulevards are not typically desired on local streets. However, when permitted, the median or boulevard shall conform to the same design standards as set forth for arterial streets.

8.3.4.5 Median design may include an irrigation system and landscaping plan to enhance the street corridor. A median landscape design plan shall be approved by the City Engineer. The plan shall include type of groundcover, trees, low shrubbery, and or other vegetation which will be approved by the City Engineer. If the median width is less than 6 feet wide, other treatments may be explored, for example colored and/or stamped concrete, concrete pavers. Asphalt is not considered an acceptable paving material for medians. The slopes across a median should be at a minimum 1% from

back of curb to the middle of the median to allow for proper drainage off of the median.

8.3.4.6 U turns at arterial and collector street intersections may be considered and approved if acceptable right-of-way width is acquired and/or dedicated. U turns will be allowed at traffic signalized and unsignalized intersections where it is signed appropriately.

In addition, constructing front or rear service road from a collector street to intersect the arterial street at the traffic signalized intersection should be explored to compliment U turn accessibility.

8.3.4.7 Splash guards may be designed in the median. The minimum splash guard width shall be 18 inches.

8.3.5: Roundabouts. Roundabouts are considered a form of traffic control. Roundabouts shall be considered as two types: (a) modern roundabouts and (b) mini-roundabouts.

Purpose. The roundabout is a traffic control device in lieu of a multiway stop or a traffic signal. Roundabouts may assist in improving the performance of intersections that have the following characteristics:

a. High number of accidents

b. High delays

c. 4 legs or more or usual geometry

d. Frequent U-turns

e. High left-turn movements

8.3.5.1 Modern Roundabouts. Modern roundabouts shall be specially designed to the need on high traffic volume streets and used to improve traffic flow.

1. Design Basis. The design shall be in accordance with the *Federal Highway Administration (FHWA), Roundabouts: an Informational Guide, Publication No. FHWA-RD-00-067*, or other design criteria approved by the City Engineer. Each design shall have a peer review.

2. Design Vehicle. Modern roundabouts shall be designed to accommodate Wheel Base (WB)-67 trucks.

3. Roadway Width. The circulatory roadway width shall be a minimum of 1.2 times the width of the widest entering roadway. This width may

include the apron when approved by the City Engineer. Truck aprons with a minimum width of 8 feet shall be provided on the perimeter of the central island.

Each roadway section shall be analyzed to conditions that are available to that particular intersection. Such items as available Right-of-Way (ROW), special or existing features, and number of lanes and roadway width entering the intersection shall be a consideration in determining the width of the roundabout roadway.

4. Design Entry Speed. Maximum design entry speed for urban roundabout shall not exceed 25 mph. Maximum design entry speed for rural roundabout shall not exceed 30 mph.

5. All modern roundabouts landscaping plans need to be approved by the City Engineer.

8.3.5.2 Mini-Roundabouts. Mini-roundabouts may be allowed in a neighborhood setting to improve intersection characteristics. Mini-roundabouts may be designed in conditions where a maximum of 1 lane may be entering per approach. The center median of a mini-roundabout may be designed so that the median may be mountable in some cases.

1. Design Basis. The design shall be performed in accordance with the *FHWA, Roundabouts: an Informational Guide, Publication No. FHWA-RD-00-067*, or other design criteria approved by the City Engineer. Each design shall have a peer review.

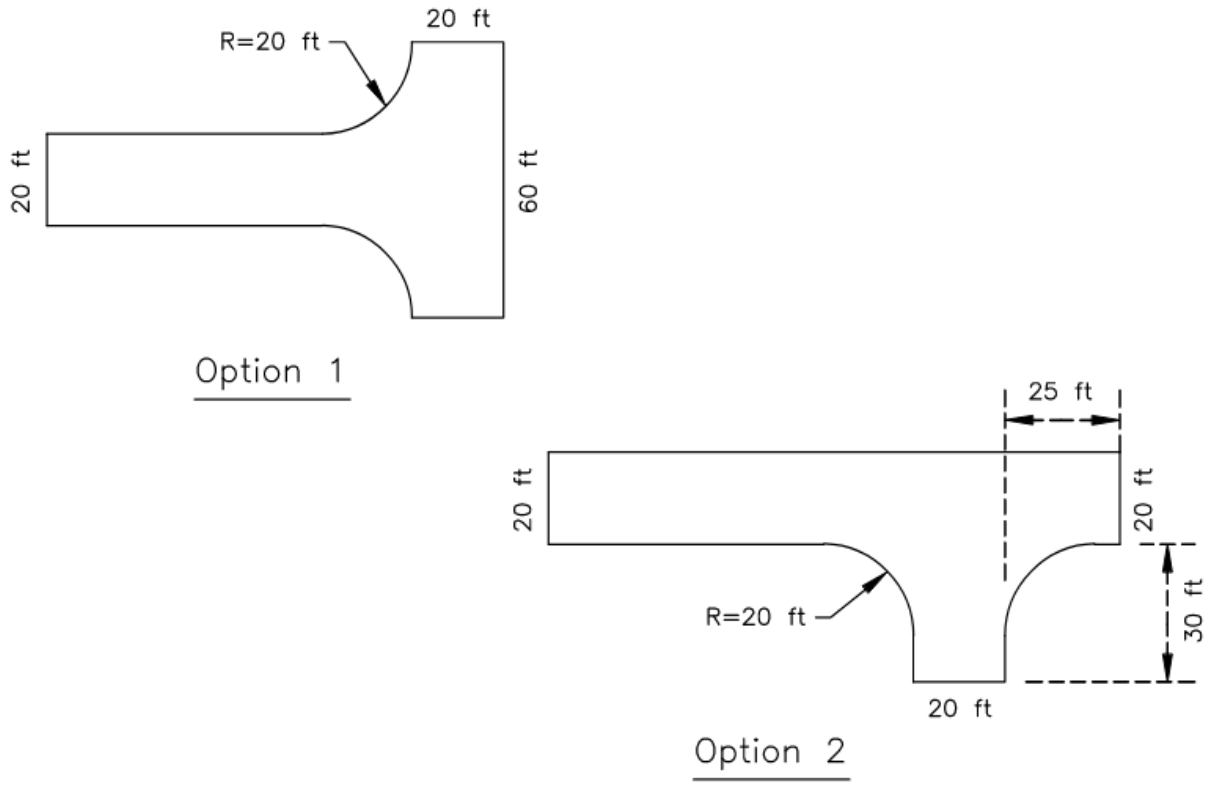
2. Design Vehicle. Mini roundabouts shall be designed to accommodate WB-50 vehicles. Consideration to emergency vehicles must also be explored with the City during design.

3. Roadway Width. Each roadway section shall be analyzed to conditions that are available to that particular intersection. Such items as available right-of-way, special or existing features, and roadway width entering the intersection shall be a consideration in determining the width of the mini-roundabout.

4. All mini-roundabouts landscaping plans need to be approved by the City Engineer.

8.3.5.3 Turn Arounds. Turnarounds are required at the end of dead-end streets. See Figure 8.6 for typical turnaround detail

Figure 8.6: Typical Turnarounds



8.3.6 Traffic Calming. Traffic calming is the process by which vehicular speeds and volumes on local streets are reduced to acceptable levels. This is achieved through the installation of approved devices such as traffic circles, flares, and center islands. Traffic calming serves the purpose of reducing cut-through traffic, truck traffic, excessive speeding, noise, vibration, air pollution, and accidents in an attempt to provide a safer environment for motorists and pedestrians.

Traffic calming is limited to residential streets with a posted speed limit of 25 mph.

Traffic calming devices may be installed if the traffic volume exceeds, or is projected to exceed, 1,000 vehicles per day; and if the 85th percentile speed of traffic exceeds, or is reasonably expected to exceed, 30 mph.

Traffic calming devices shall be designed to accommodate emergency vehicles that may use the local street. All final construction plans are to be approved by the City Engineer.

Landscaping agreements for the continued care of vegetation within traffic circles and center islands shall be considered with adjacent property owners and determined on a case by case basis.

8.3.6.1 Flares. A flare is a roadway narrowing used to achieve speed reductions. Flares are usually coupled with sidewalks and serve to make streets more pedestrian friendly by reducing the amount of roadway the pedestrian is exposed to. They also draw motorists' attention to pedestrians via the raised peninsulas.

1. Street Characteristics: Flares may be installed on streets that have on-street parking. Flares can be located at street intersections or mid-block.

2. Pedestrian Generators: Flares should be considered on streets adjacent to pedestrian generators such as schools, parks, and bike paths.

3. Width of Flares: Flares shall be constructed so that driving lanes are no less than 10 feet wide.

8.3.6.2 Center Islands. Center Islands are raised islands located at the centerline of a street that narrows the travel lanes at that location. When used in conjunction with sidewalks, center islands can provide a refuge area for pedestrians to wait while traffic passes. Center islands can be located near intersections or mid-block.

1. Street Characteristics: Center islands may be used downstream of intersections to reduce the speed of turning vehicles. Center islands may also be used on curves to reduce vehicle speeds and prevent motorists from driving into the path of oncoming vehicles.

2. Length of Center Islands: Center islands should be constructed in short interruptions rather than as a long median that channelizes and separates opposing flows. Island lengths shall be between 25 feet and 75 feet.

3. Width of Center Islands: Center islands shall be constructed such that the driving lane, excluding drainage gutter, is limited to 11 feet in each direction.

4. Pedestrian Characteristics: Center Islands may be required to accommodate pedestrians.

8.4 Sidewalks

8.4.1 General Standards and Location. Sidewalks shall be constructed on both sides of all roadways unless specifically waived by the City Council. Any sidewalk design standard listed in this section that is unable to be met is required to be waived by the City Council**.** Generally, the sidewalks shall be located four (4) inches from the property line within the street right-of-way.

8.4.2 Sidewalk Curb Ramps. State law requires that curb ramps be installed at all intersections and at certain mid-block locations for all new construction or reconstruction of curb and sidewalk. Curb ramps shall be constructed in accordance with the City of Watertown Standard Plates. Curb ramps may be shown at all curb returns or called out by a general note on the development plans, but must be shown (located) at all “T” intersections. Whenever referencing a curb ramp, specify the City of Watertown Standard Plates to be used to construct that ramp.

8.4.3 Sidewalk Curb Ramp Landing. The minimum dimensions for a landing shall be 60” by 60”. A landing shall not have a grade exceeding 2% in any direction. If a landing is at a signalized intersection and has pedestrian push buttons the horizontal distance between the edge of the landing and the push button location shall not exceed 10”.

8.4.4 Sidewalk Width. Minimum sidewalk width shall be as shown in table 8.1. In areas where high pedestrian traffic is anticipated by the City Engineer’s Office it may be necessary to install wider sidewalks to allow for an adequate level of service.

8.4.5 Sidewalk Cross Slopes. The maximum cross slope for a sidewalk is 2%. This includes where sidewalks cross driveways. The minimum cross slope is 1%.

8.4.6 Sidewalk Grade. All grades on a sidewalk shall meet the current Americans with Disabilities Act standards.

8.4.7 Sidewalk Surface. A sidewalk shall have an accessible vibration free route that is at least 60” wide. The number of surface variations such as junction boxes, grates, decorative pavers, etc. in the accessible vibration free route should be minimized. If grates are present the openings should run perpendicular to the traveled way, with less than a 1/2” wide openings.

8.4.8 Sidewalk Vertical Clearance. Sidewalks which go under a roadway or structure shall have a minimum clearance of 8’ from the top of the sidewalk to the lowest part of the structure.

8.5 Bicycle Paths

8.5.1 General. The current AASHTO *Guide for the Development of Bicycle Facilities* shall be used as a design guide for the design of bicycle paths. A bicycle path, also referred to as a shared use path, is defined as a bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Bike paths may also be used by pedestrians, skaters, wheelchair users, runners, and other non-motorized users.

8.5.2 Bicycle Path Width. A bicycle path should have a preferred minimum of a 10’ wide area of travel. Under special circumstances the City Engineer may allow a narrower path.

8.5.3 Bicycle Path Cross Slopes. The maximum cross slope for a bicycle path is 2%. The minimum cross slope is 1%.

8.5.4 Bicycle Path Grade. All grades on a bicycle path shall meet the current Americans with Disabilities Act standards.

8.5.5 Bicycle Path Vertical Clearance. Bicycle paths which go under a roadway or structure shall have a minimum clearance of 8’ from the top of the path to the lowest part of the structure.

8.5.6 Bicycle Path Surfacing. As directed by the City Engineer.

8.5.7 Paved Bicycle Path Surface. A paved bicycle path shall have an accessible vibration free route that is at least 60” wide. The number of surface variations such as junction boxes, grates, decorative pavers, etc. in the accessible vibration free route shall be minimized. If grates are present the openings should run perpendicular to the traveled way, with less than 1/2” wide openings.

8.6 Drainage

Drainage systems shall be designed in accordance with Chapter 11—Drainage Improvements. Development plans, including the drainage report, shall be considered as part of the street design and will be required for concurrent review with the street construction plans. Safe conveyance of traffic is the major function of streets; the storm drainage function of the street must therefore be designed to the limits set forth in Chapter 11—Drainage Improvements.

8.6.1 Valley Gutters. Valley gutters shall be constructed in accordance with the City of Watertown Standard Plates. Valley gutters are not permitted across arterial streets and are discouraged across collector streets. Valley gutters are not allowed on streets with storm sewer systems.

8.6.2 Inlets. Inlets shall be located to intercept the curb flow at the point curb flow capacity is exceeded by the storm runoff. Refer to Chapter 11—Drainage Improvements for curb capacity. Inlets shall also be installed to intercept cross-pavement flows at points of transition in superelevation. Due to the presence of curb ramps, inlets are not allowed in the curb return, but will be located at the tangent points of the curb returns. In general, inlets shall be placed on the upstream side of the intersection so as to intercept the water before it reaches the pedestrian crosswalk.

8.6.3 Cross-slope. Except at intersections or where superelevation is required, streets, in general, shall be level from top of curb to top of curb (or flowline to flowline) and shall have a one and one-half (1.5) percent to three (3) percent crown as measured from centerline to lip of gutter, or lip of median gutter to lip of outside curb on roadways with medians. Where the crownpoint is not centered in the street, the crownpoint can be no further out than the quarter point of the street.

8.6.4 Temporary Erosion Control. Temporary erosion control is required at the ends of all roadways that are not completed due to project phasing, subdivision boundaries, etc., in accordance with Chapter 12 - Erosion and Sediment Control and with the Subdivision Ordinance of the City of Watertown**.**

8.6.5 Sidewalk. Storm water from concentrated points of discharge shall not be allowed to flow over sidewalks, but shall drain to the roadway by use of storm sewers. Sidewalk chases will not be allowed unless specifically approved by the City Engineer. If permitted, sidewalk chase sections shall not be located within the driveway.

8.6.6 Edge Drains. Edge drains shall be constructed on all new or reconstructed roadways. Edge drains are required to provide adequate subgrade drainage for protection of the pavement materials. The requirement for edge drains may be waived by the City Engineer, if the subgrade soils provide adequate drainage or if there is no available location for the discharge of the water from the edge drains. Edge drains shall be installed behind the curb. Where reconstruction does not include curb & gutter replacement, edge drains may be installed adjacent to the curb & gutter in the roadway. See standard plates for construction details.

8.7 Horizontal Alignment

8.7.1 Horizontal Curves. Any angular break in horizontal alignment of more than two (2) degrees shall require a horizontal curve (Table 8.1).

8.7.2 Curb Return Radius. Minimum curb return radius shall be as shown in Table 8.1. Where truck traffic is significant, curb return radii shall be provided in accordance with AASHTO standards.

8.7.3 Construction Signs and Barricades. Design and construction shall comply with the requirements of the *Manual on Uniform Traffic Control Devices*, latest edition. Details shall be shown on the construction drawings, and installation shall be provided by the contractor and/or owner.

8.7.4 Superelevation. The use of superelevation is discouraged for all streets. However, where superelevation is required for curves, arterial streets and collector streets, horizontal curve radius and superelevation shall be in accordance with the recommendations of the AASHTO standards. Superelevation shall not be used on local roadways. All roadway designs utilizing superelevation are subject to review and acceptance by the City Engineer.

8.7.5 Spiral Curves. Spiral curves shall not be used on streets within the City (State highways excluded) except upon written acceptance of the City Engineer.

8.7.6 Cul-de-sacs. The following criteria shall be used for the horizontal geometry of cul-de-sac turnarounds.

(1)	Minimum property line radius:	(see Table 8.1)
(2)	Minimum back of curb radius:	(see Table 8.1)
(3)	Maximum length of cul-de-sac measured along centerline, between the radius point of the turnaround and the R.O.W. line of the abutting street	500.0 feet

8.7.8 Transition Length. If lanes are added, deleted, or adjusted, it will be necessary to construct a transition section for the safe conveyance of traffic. The following formula shall be applied to the taper or lane change necessary for this transition:

$$L=WS^2/60$$

where:

L = Length of transition in feet
W = Width of offset in feet
S = Speed limit or 85th percentile speed

8.8 Vertical Alignment

8.8.1 Changing Grades. The use of grade breaks, in lieu of vertical curves, is not encouraged. However, if a grade break is necessary and the algebraic difference in grade does not exceed eight tenths (0.008 ft/ft) of a percent, the grade break will be permitted.

8.8.2 Vertical Curves. Design controls for vertical alignment must be in accordance with AASHTO standards. When the algebraic difference in grade (A) is at or exceeds eight-tenths (0.008 ft/ft) of a percent, a vertical curve is to be used. All vertical curves shall be labeled, in the profile, with length of curve (L) and K (defined as L/A).

8.8.3 Intersections. The following criteria shall apply at intersections.

8.8.3.1 The grade of the "through" street shall take precedence at intersections. At intersections of roadways with the same classification, the more important roadway, as determined by the City Engineer, shall have this precedence.

8.8.3.2 The elevation at the end of curb return on the through street is always set by the grade of the through street in conjunction with normal pavement cross-slope.

8.8.3.3 Carrying the crown of the side street into the through street is not permitted.

8.8.3.4 Dipping the flowline to the extent that the lip of gutter is dipped is not permitted, except as specified by Standard Plates concerning curb opening inlets. Tipping an inlet for the benefit of drainage is also not permitted.

8.8.3.5 A more detailed review shall be performed for arterial-arterial intersection to maximize drivability.

8.8.3.6 Flowline profiles and pavement cross-slopes shall be shown through an intersection until a normal cross-section is obtained. Elevations on a 15-foot grid shall be shown on a plan view drawing. This information shall be submitted using a scale of 1" = 20' horizontally and 1" = 2' vertically.

8.8.3.7 Parabolic or curved crowns are not allowed. In no case shall the pavement cross-slope at intersections exceed the grade of the through street.

8.8.3.8 The rate of change in pavement cross-slope, when warping side streets at intersections, shall not exceed one (1) percent every twenty-five (25) feet horizontally on a local roadway, one (1) percent every thirty-seven and one-half (37.5) feet horizontally on a collector roadway, or one (1) percent every fifty six and one-half (56.5) feet horizontally on arterial roadways.

8.8.4 Curb Returns. Minimum fall around curb returns shall be one-half of one (0.5) percent.

8.8.5 Connection with Existing Roadways

8.8.5.1 Existing grade(s) shall be shown for a sufficient distance to assure that horizontal and vertical curve requirements are being or can be met with field verified as-builts showing stations and elevations at twenty-five (25) foot intervals. In the case of connection with an existing intersection, these as-builts are to be shown within a one hundred (100) foot radius of the intersection. This information shall be included in the plan and profile that shows that proposed roadway. Limits and characteristics of the existing improvement are the primary concern in the plan view. Such characteristics include horizontal alignment, offset intersections, limits of the improvements, etc.

8.8.5.2 Previously approved designs for the existing improvement are not an acceptable means of establishing existing grades; however, they are to be referenced on the construction plan where they occur.

8.8.5.3 The basis of the as-built elevations shall be the same as the design elevations (both flowline or both top of curb, etc.) when possible.

8.9 Off-Site Design

The design grade, and existing ground at that design grade, of all roadways that dead end due to project phasing, subdivision boundaries, etc., shall be continued, in the same plan and profile as the proposed design, for at least three hundred (300) feet or to its intersection with another roadway. This limit shall be extended to six hundred (600) feet when arterial roadways are being designed.

8.10 Construction Traffic Control

8.10.1 Pedestrian Traffic

8.10.1.1 Every precaution shall be taken to ensure that construction work does not interfere with the movement of pedestrian traffic, which shall be maintained on the sidewalk at all times and flagmen provided for guidance as necessary.

8.10.1.2 Where an excavation interrupts the continuity of the sidewalk, the Contractor shall provide suitable bridge or deck facilities, to be supplemented by the use of such proper devices and measures as prescribed in the *Manual on Uniform Traffic Control Devices*, latest edition, for the safe and uninterrupted movement of pedestrian traffic. The edges or ends of the pedestrian bridge or decking shall be beveled or chamfered to a thin edge to prevent tripping. All interruptions shall be limited to 30 days, unless approved by the City Engineer.

8.10.1.3 Temporary diversion walkways shall be hard surfaced and electric lighting shall be provided and kept continuously burning during hours of darkness, when required by the City Engineer.

8.10.1.4 Unless otherwise authorized by the City Engineer, pedestrians shall not be channeled to walk on the traveled portion of a roadway.

8.10.1.5 Under certain conditions, it may be necessary to divert pedestrians to the sidewalk on the opposite side of the street. Such crossings shall only be made at intersections or marked pedestrian crossovers.

8.10.1.6 Facilities satisfactory to the City Engineer shall be provided for pedestrians crossing at corners, pedestrian crossovers, and public transportation stops.

8.10.2 Vehicular Traffic.

8.10.2.1 Construction work zone traffic shall be controlled by signs, barricades, detours, etc., which are designed and installed in accordance with the *Manual on Uniform Traffic Control Devices*, latest edition. A traffic control plan shall be submitted to and approved by the City Engineer, or designated agent, prior to start of any construction.

8.10.2.2 For construction of new facilities, traffic control should strive to keep the motorist from entering the facility. The primary means to accomplish this are by use of temporary barricades, located in advance of the construction area and with appropriate signing. New construction shall not be opened to traffic, and the construction traffic control removed, without the approval of the City Engineer.

8.10.2.3 The details of the traffic control plan must be shown on a map. For minor projects or local roadways, a neat sketch of the roadways and the proposed control devices will suffice. For major projects or major roadways, the traffic control plan shall be superimposed on as-builts, construction plan drawings, or other detailed map.

8.10.2.4 The *Manual on Uniform Traffic Control Devices*, latest edition, shall be the basis upon which the traffic control plan is designed, in concert with proper, prudent, and safe engineering practice. All necessary signing, striping, coning, barricading, flagging, etc., shall be shown on the plan.

8.10.2.5 Any plan for traffic control during construction that indicates a complete closure of an arterial or collector street must show detour routes and must be approved by the City Engineer. Requirements as to rerouting of traffic, signing, time of closure, and length of closure will be determined on a case-by-case basis. When a local street is to be closed to traffic, the City

Engineer, Police, and Fire Department must be notified, preferably 24 hours in advance.

8.10.2.6 Directional access on roadways may be restricted (minimum travel lane width in construction area is ten [10] feet), but proper controls including flagging must be indicated. Removal of on-street parking shall be considered, and noted where applicable.

8.11 Speed Change Lanes

The design of the arterial street system depends upon the proper control of access to developments. The location and design of access points must minimize traffic hazards and interference to through-traffic movements. In order to ensure proper access control, the following standards for deceleration lanes have been established.

8.11.1 Where Required. Speed change lanes may be required along segments of arterial or collector streets if the proposed development constitutes a potential for creating a traffic hazard or unnecessarily impedes through-traffic movements as determined by the Traffic Impact Report or the City Engineer. A high volume access must be provided with a turning or speed change lane to allow the driver to maneuver out of the main travel lanes before slowing down. Speed change lanes and left-turn lanes must be provided in the center or median of the road for left-turning traffic at a high volume access. If such lanes cannot be provided, left turns will be restricted.

8.11.1.1 Speed change lane for right-turning movements will be required according to Table 8.2:

Table 8.2: Volume Warrants For Speed Change Lanes For Right-Turning Movements

POSTED SPEED OF STREET IN MPH					
	Less than 25	26 to 40	41 to 50	51 or greater	For
If the design hour volume of the high-way lanes will exceed	500 1400	400 1200	200 800	150 600	2-lane streets 4 or more lanes
and the designated volume of the access approach will exceed	50 70	40 60	20 40	15 25	2-lane streets 4 or more lanes

For streets with four or more through travel lanes, design hour volumes shall be measured only in the direction of the access approach.

8.11.1.2 For left-turning movements, speed change lanes will be required according to Table 8.3:

Table 8.3: Volume Warrants For Speed Change Lanes For Left-Turning Movements

POSTED SPEED OF STREET IN MPH					
	Less than 25	26 to 40	41 to 50	51 or greater	For
When design hour volume of the high-way will exceed	500 1000	400 900	200 600	150 400	2-lane streets 4 or more lanes
and the left-turning design hour volume into the access approach will exceed	50 70	40 60	20 40	15 25	2-lane streets 4 or more lanes

For streets with four or more through travel lanes, design hour volumes shall be measured only in the direction of the median speed change lane.

8.11.1.3 For both tables, where the existing street design hour volume is below the values in the tables, a 20-year prediction shall be made and compared to the table.

8.11.1.4 Where public safety so requires, due to specific site conditions, such as sight distance, a turn lane may be required even though the warrants in Tables 8.2 and 8.3 are not met. Where the design hour volume of the street is twice the street design hour volume in Tables 8.2 and 8.3, the City may require a minimum speed change lane for any access approach.

8.11.2 Speed Change Lane Design

8.11.2.1 On highway arterial and collector streets in the City, the design of acceleration/deceleration lanes shall meet the minimum requirements as shown in Tables 8.4 and 8.5, providing sufficient off-site right-of-way is available. These absolute minimum requirements were developed recognizing the severe limitations that currently exist on right-of-way availability for most of the urban street network. Where grades are significant, modifications to these lengths will be required by the City. If off-site right-of-way is insufficient, lanes will be designed to maximize the use of available right-of-way at the time that construction plans receive final approval.

Table 8.4: Acceleration Lane and Taper Lengths

(1) SPEED (MPH)	LANE LENGTH		TAPER LENGTH
	Stop Condition	From 15 mph(2)	
30	150'	125'	120'
35	175'	150'	150'
40	250'	200'	180'
45	300'	250'	180'

(1) 85th percentile speed.
(2) Assumes vehicles start at 15 miles per hour.

Table 8.5: Deceleration Lane and Taper Lengths

SPEED (MPH)	LANE LENGTH		TAPER LENGTH
	15 mph Turn*	Stop Condition	
30	100'	125'	120'
35	125'	150'	150'
40	175'	225'	180'
45	200'	250'	180'

* Assumes vehicle turns at speed of 15 mph at the end of the deceleration lane.

8.11.3 Exemptions. Requests for exemption from the requirements for a deceleration lane shall be based upon a traffic engineering study that presents trip generation data for the proposed development in terms of impacts upon through-traffic flows. Such requests shall be reviewed by the City Engineer and may be approved, except that such an approval cannot be granted if through-traffic would be impeded more than three (3) percent of the total time or more than five (5) percent of the time during peak traffic flow periods or if other unique circumstances warrant special design considerations.

8.12 Pavement Thickness

Design of pavement thickness for collector and arterial streets and local streets in industrial and commercial zoned areas shall be based on *AASHTO Guide for Design of Pavement Structures*, latest edition. Pavement design shall be based on an inherent reliability of 75 percent. For traffic conditions where the equivalent 18 kip/single axle loading is less than 1,000,000, the low-volume road design method may be used. Recommendations and subgrade properties developed by the Geotechnical Exploration Report shall be used in the design of the pavement structure.

8.12.1 Industrial, Collector, and Arterial Streets must be designed for pavement thickness on an individual street-by-street basis. However, in no event may the pavement thickness be less than that specified in Table 8.6. Local Residential and Commercial Streets need not be designed on an individual basis, but must meet the minimum pavement thickness as set forth in Table 8.6.

8.12.2 Minimum compressive strength for Portland Cement concrete paving shall be 4000 psi at 28 days.

8.12.3 Traffic Data. Where traffic data is available, actual counts shall be used along with projections of traffic growth in determining the pavement design. If traffic data is not available, Table 8.7 may be used to provide data for the pavement design. Traffic data for all arterial streets will be determined by the City Engineer.

Table 8.6
Minimum Pavement Thickness Requirements

	Local Residential Streets	Commercial, Industrial & Collector Streets	Arterial Streets
Portland Cement Concrete	6"	8"	8"
Aggregate Base	6"	8"	12"
Asphaltic Concrete	4"	6"	6"
Aggregate Base	12"	12"	12"

Table 8.7
Traffic Volumes

Street Classification	ADT (2 way)	No. of Lots	18-kip ESAL Traffic	AASHTO Traffic Level
Cul-de-sacs and Local Residential	200	20-30	10,000-50,000	Low
Local, Local Multi-Family, or Commercial	300-700	60-140	50,000-300,000	Low
Local Industrial	200-700		400,000-600,000	Medium
Collector	7,000		400,000-1,000,000	High
Arterial	To be determined by the City Engineer			

8.13 Rural Street Standards

Rural streets, including local, collector, and arterials, shall conform to the current edition of the AASHTO *Policy on Geometric Design of Highway and Streets.* Reference should be made to the current edition of the AASHTO *Roadside Design Guide* where high fills, right-of-way restrictions, watercourses, or other issues render a design where recoverable slopes are not practical. All rural street locations will be approved by the City Engineer, and limited to those locations allowed by zoning district or other land use or subdivision regulation guidelines.

Where bicycle facilities are included as part of the design, reference should be made to the current edition of the AASHTO *Guide for the Development of Bicycle Facilities.*

8.14 Rural Subdivision Road Standards

8.14.1 Subdivisions outside of the City limits and within the extraterritorial platting jurisdiction shall comply with these requirements. Other Sub-Divisions within the City Limits may use these standards if consistent with adjoining sub-divisions and densities are less than one house per acre.

8.14.2 Access shall be determined by street classification. Roadway serving the subdivision must be hard surfaced as approved by the City Engineer.

8.14.3 Driveways shall be hard surfaced and comply with Figure 5.3 of the Engineering Design Standards.

8.14.4 Minimum width of the driving surface shall be as shown in Table 8.1 and the minimum pavement thickness shall be as shown in Table 8.6. Ditches shall have a maximum 4:1 side slope. Additional lanes may be required for higher traffic roadways as determined by the City Engineer.

8.14.5 A plan and profile for connection to existing trunk sanitary sewer and its extension upstream is required. Where trunk sewers cross roadways the ultimate roadway grade shall be called out.

8.14.6 An access road agreement or other arrangements for maintenance of detention ponds and/or BMP facilities shall be provided by association or other perpetual contract.

8.14.7 Culverts in the street right-of-way shall comply with county requirements. Flared end sections or slope concrete headwalls are required on all culverts within the road right-of-way.

8.14.8 The size of culverts shall be determined by a drainage study for the entire subdivision.

8.14.9 The City Engineer will be responsible for accepting final street and drainage plans and coordination of road access and approach permits with County, Township, and SDDOT officials.

8.14.10 Traffic control signs and street name signs shall be properly posted. Street names shall be approved by the City Engineer.

Chapter 9
Sanitary Sewers

Chapter 9
Sanitary Sewers

Chapter 9

Sanitary Sewers

9.1 General Requirements

9.1.1 **Design.** The design for sanitary facilities shall be in conformance with the following.

1. "Recommended Standards for Wastewater Facilities Great Lakes-Upper Mississippi River Board of State Public Health and Environmental Managers." Edition (Ten State Standards) most current version.
2. Requirements and Standards of the South Dakota Department of Agriculture and Natural Resources.
3. City of Watertown Design Standards, Standard Specifications, and Standard Plates.
4. South Dakota State Plumbing Code.
5. Uniform Plumbing Code of International Association of Plumbing and Mechanical Officials.
6. Conflict—In case of a conflict between the above design standards, the most restrictive requirement shall apply.

9.1.2 **Construction Standards.** Construction standards shall be the most recent revision of the City of Watertown Standard Specifications and Standard Plates together with the latest addenda. All details, materials, and sewer appurtenances shall conform to these standards.

9.2 Plan Submittals. See Chapter 13 for Submittal requirements.

9.3 Determination of Flow

9.3.1 **Lateral Sewers.**

1. Discharge (Q_A) Average Daily Flow

   Equation 1: Area x Area Density x Unit Density x Rate = Average Daily Flow

   Equation 2: Number of Units x Unit Density x Rate = Average Daily Flow. Density for multiple dwelling units shall be not less than 2.5 persons/unit. Density for single family dwelling units shall be not less than 3.5 persons per unit.

2. Discharge (Q_P) Peak Lateral Sewer Flow

   Average Daily Flow x 400%—Peak Lateral Sewer Flow

3. Design Density and Rate—(See paragraph 9.3.5)

9.3.2 **Trunk Sewers.**

1. Discharge (Q_A) Average Daily Flow

   Equation 1: Area x Area Density x Unit Density x Rate = Average Daily Flow

   Equation 2: Number of Units x Unit Density x Rate = Average Daily Flow

2. Discharge (Q_P) Peak Trunk Flow

   Average Daily Flow x 250% = Peak Trunk Sewer Flow

3. Design Density and Rate—(See paragraph 9.3.5)

9.3.3 **Area.** Gross area shall be used in determining design flows and shall include streets and alleys but exclude parks, school grounds, and similar dedicated open space.

9.3.4 **Special Design Densities.** Special design densities shall be subject to approval by the City Engineer based on methodology provided by the design professional.

9.3.5 **Density Design Table.**

Land Use	Area Density	Unit Density	Rate*
Low Density Residential	4 units/acre	3 people/unit	100 gpcd
Med. Density Residential	8 units/acre	2 people/unit	100 gpcd
High Density Residential	16 units/acre	2 people/unit	100 gpcd
Office & Institutional	Special Design Density—dependent on water use		
Commercial	Special Design Density—dependent on water use		
Industrial	Special Design Density—dependent on water use		

*gpcd—gallons per capita per day

9.4 Facility Design

9.4.1 **Capacity of Pipe.** The Manning Equation shall be used to determine pipe capacities. The design Manning's "n" for all Pipe Materials:

"n" = 0.013

$$Q = VA = \left(\frac{1.49}{n}\right) AR^{\frac{2}{3}} \sqrt{S} \quad [U.S.]$$

9.4.2 **Velocity within Pipe.**

Min. at peak flow = 2 feet per second (fps)

Max. at peak flow = 14 feet per second (fps)

9.4.3 **Approved Pipe Materials.** Refer to Standard Specifications.

9.4.4 **Force Main Minimum and Maximum Velocity.**

The minimum force main velocity shall be 2 feet per second.

Suction and discharging piping for lift stations shall be sized so that the maximum velocities do not exceed 5 feet per second and 8 feet per second, respectively.

Dual force mains will be required if the initial force main velocities cannot meet the minimum velocity standards or if odor problems are anticipated.

9.4.5 **Size of Sewer Pipe.** No gravity sanitary sewer to be maintained by the City shall be less than 8-inch diameter. Minimum size of building sanitary sewer stub-outs shall be 4-inch diameter. All sanitary sewer services other than single-family residential units (example: commercial, industrial, office, multifamily, etc.) shall be a minimum of 6-inch diameter. No private lateral sewer shall be less than 6 inches in diameter; however, 8-inch diameter sewers are recommended. Six-inch diameter pipe may be used as private laterals where there are relatively low flows, a small number of people to be served, future extensions are not anticipated, and the sewer is capable of handling the design flows. The justification for using the 6-inch pipe shall be provided by the design professional in writing. The possibility of cleaning problems shall be identified by the design professional and accepted by the development.

9.4.6 **Depth of Sewer.** Gravity sewers shall have a minimum depth of seven (7) feet unless approved by the City Engineer. ~~where practical.~~ They shall be deep enough to serve all basements, designed with a 2 percent grade on building sewers (absolute minimum of 1 percent). They should be ~~well~~ below the frost line at all points and lower than any water lines placed in

the same street. Insulation shall be required above the sanitary sewer where the dimension from the finished grade elevation to the top of the pipe is ~~5~~ 7 feet or less (see the Standard Plates for pipe insulation details). Risers on service stub-outs shall be provided for sewers greater than 12 feet deep as measured at the building line (see the Standard Plates for riser details). Maximum depth of sewer shall not exceed the depth recommended by the pipe manufacturer.

9.4.7 **Alignment of Sewers.** Sewers shall be straight between manholes. The pipe manufacturer's recommended maximum deflection may not be exceeded. All sanitary sewers on curved streets shall be located in the center of the street. Where it is not possible to maintain the centerline location on a curved street (ex: road centerline radius of curvature less than 200 feet), the sanitary sewer shall be located as close to the centerline as possible and at a distance of at least 10 feet from the back of curb.

9.4.8 **Physical Requirements.**

1. **Minimum Manhole Diameter**. 48 inches

2. **Maximum Manhole Spacing.** The maximum manhole spacing for all sanitary sewers shall be 400 feet.

   Note: Exceptions will be permitted within a development; however, said exceptions shall not be for more than 5 percent of the manholes in the development. Said exceptions shall not exceed 50 feet.

3. **Minimum Grade.** All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second, based on Manning's formula using an "n" value of 0.013. Based on an "n" value of 0.013, the following are the minimum slopes which should be provided; however, slopes greater that these are desirable:

Nominal Sewer Size	Minimum Slope (ft./100 ft.)
8 inch	0.40
10 inch	0.28
12 inch	0.22
15 inch	0.15
18 inch	0.12
21 inch	0.10
24 inch	0.08
27 inch	0.067
30 inch	0.058
36 inch	0.046

4. **Minimum Manhole Drop**

   Same pipe size—0.10 feet

   Change in pipe size—match 0.8 depth point of all lines as a minimum, and match tops of pipes whenever possible.

5. **Maximum Manhole Drop**

   Without drop connection—2 feet as measured from invert to invert~~.~~ ~~Where drop is less than 2 feet~~ and the invert should be filleted to prevent solids deposition. If drop is greater than 2 feet, outside drop connections shall be utilized unless approved by the City Engineer.

6. **Manhole Covers, Manhole External Frame Seals, and Manhole Markers.** For approved types of manhole covers, refer to Standard Specifications. If the possibility of surface runoff cannot be avoided, a solid manhole cover, having an integral self-sealing type gasket that can be bolted closed, must be used.

   Manhole external frame seals shall be required on all manholes where the possibility of surface water entering exists. A note shall be added to the construction plans to indicate where and what type is to be installed.

   Steel delineator posts and markers shall be used in areas outside of the dedicated street right-of-way and areas designated by the City Engineer. (see the supplemental standard specifications and standard plates).

   Maximum height of rings on manholes shall be 17-inches.

7. **Access to Manholes Outside of the Street Right-of-Way.** Manholes outside the street right-of-way shall be subject to the acceptance of the City Engineer. Manholes must be located in areas which allow direct access by maintenance vehicles. Manholes must be surrounded by a hard surface of sufficient size to provide access for Jetting and Televising Vehicles.

8. **Industrial Sewer Monitoring Facility.**

   Any new building constructed or proposed to be constructed that may be occupied by a facility that may meet the definition of a Significant Industrial User (SIU) in Watertown Ordinance 17.0101 shall install a sewer monitoring facility on each connection to the sanitary sewer. The monitoring facility shall be situated outside of the building on the user's premises and shall receive the discharge from the entire facility. At a minimum, the sewer monitoring facility shall continuously monitor the flow rate and be able to facilitate grab and composite

monitoring of the discharge. The sewer monitoring facility shall be approved by the Wastewater Superintendent.

9. **Crossings.** Sanitary sewer crossings of storm sewers shall have no less than 6 inches of clearance. Special structural support and insulation will be required if there is less than 18 inches clearance (see the Standard Plates for insulation details). The minimum horizontal clearance shall be 2 feet. Clearance refers to the distance from the outside of the sewer pipe to the outside of the storm sewer pipe.

   Sanitary sewer crossings of other utilities shall be done in accordance with Ten States Standards, State of South Dakota standards, and Supplemental Standard Specifications and Standard Plates.

10. **Standard Plates.** See Supplemental Standard Specifications and Standard Plates for such details as manholes, drop connections, risers, and other appurtenances.

11. “Dead end” manholes on line segments shall be extended beyond the midpoint of the last serviced lot.

12. Sanitary sewer lines ending at development phase boundaries that do not terminate with a manhole shall be ended with a bell end section of pipe and watertight plug. A one foot or less section of pipe with a glued-on cap inserted into the bell end of the pipe will be allowable as a watertight plug. Couplings will not be allowed for this type of connection unless there is a change in pipe material.

13. Private sewer service clean-outs will not be allowed in the public right-of-way. All clean-outs shall be protected with approved cover protection (see Standard Plates).

14. Manholes located at the end of cul-de-sacs shall be located 5 to 10 feet from the back of curb and gutter.

9.4.9 Sewer Services.

9.4.9.1 Connections to Manholes.

Individual services may not be connected into manholes unless permitted by the City Engineer. Permitted service connections shall enter the manholes at the inverts.

9.4.9.2 Regular Services.

1. Each structure shall be served by a separate service line connected to a public or private sanitary lateral sewer. The service should be perpendicular to the lateral sewer line in the public right-of-way. Single-family attached housing

(twin homes, duplexes, etc.) will be required to have separate services for each living unit. The service for each living unit shall not be located under the property of the adjacent living unit.

2. Sewer services must meet all the requirements of the Supplemental Standard Specifications and Standard Plates.

3. All platted lots of a proposed subdivision are to front on and have a separate sewer service to a public sanitary sewer main without crossing any adjacent properties. Additional sewer services will be required for each additional principal structure on a given lot.

4. Residential service lines shall be constructed to the property line as a part of the street construction project.

5. Sewer services across one lot to provide service to an adjacent lot in a proposed subdivision may be approved, provided that all of the following conditions are met:

   a. Proposed subdivision does not exceed two lots.

   b. A private utility easement 20 feet in width is provided across the burdened lot (to be occupied by sewer service only).

   c. The City Engineer determines that a sewer main extension will not be necessary to perpetuate the system and in all likelihood no future development of abutting properties will benefit from a main extension.

6. A shut-off valve should be placed on sanitary sewer lines and services that are in the floodway.

9.4.10 **Sewage Lift Stations.** The Standard City Specifications and Standard Details for sewage lift stations shall be used for all stations unless a separate design is determined necessary by the City Engineer. Example specifications and drawings can be obtained from the City Engineer's Office for reference. Lift stations shall be submersible lift stations with separate valve manholes. No sanitary sewage shall be allowed to be discharged into a newly constructed lift station wet well until final completion is made and notification is made by the City accepting operation responsibilities.

9.4.10.1 **Specific Equipment Required.** The sewage lift station shall be supplied with, but not be limited to, the following specific items:

- Separate Wet Well and Valve Manhole
- Wet Well shall be coated with an approved Interior Wet Well High Performance Coating System
- A minimum of two submersible non-clog wastewater pumps, each having a capacity sufficient to pump the peak design flow.
- A Guide Rail System for removal and replacement of pumps without entering Wet Well.
- Sealed Mercury Float Switches to send signals to Pump Control System at specific liquid levels.
- Exterior Power Board with the following:
  - Main Disconnect
  - Manual Transfer Switch and Emergency Generator Receptacle
  - Motor Starters and Overcurrent Protection
  - Pump Control Panel and Control System to operate pumps in a specified sequence, in response to variations in the liquid level. Output from the Pump Controller shall be sent via standard equipment provided by existing telemetry system supplier to the Watertown Wastewater Treatment Facility for monitoring purposes. The minimum conditions to be monitored shall be as follows:
    - Pump(s) Run
    - Low Alarm
    - High Alarm
    - Pump(s) Fail Overload
    - Pump(s) Fail Over-temp
    - Pump(s) Fail Seal Fail
    - Power Fail
    - Loss of Signal

9.4.10.2 **Wet Well Design.** The wet well design shall be coordinated with pump sizing in order to avoid frequent on/off cycling of the pumps. To prevent septicity, inflow into the wet well without pumping should not exceed approximately 30 minutes.

Cycle time is the total time between starts of an individual pump and can be determined by comparing the volume between the “on” and “off” levels in the wet well with the pump capacity. Cycle time is computed as follows:

Where:

CT = V/(D-Q) + V/Q

CT = Cycle Time (minutes)

V = Wet Well Volume between On and Off Levels (gallons)

D = Rated Pump Capacity (gallons per minute) and

Q = Wet Well Inflow (gallons per minute)

With a given wet well volume and pumps of uniform pumping rate, minimum cycle time will occur when the rate of inflow is equal to one-half of the discharge rate of the individual pump under consideration and the formula for cycle time simplifies to CT = 2V/Q = 4V/D. An effective wet well volume of at least 2.5 times the discharge rate of the pump is required.

The operating volume of the wet well shall be designed to provide the following maximum motor starting times at the design pumping rates.

Motor Size, hp	Maximum Motor Starting Times
0–25	6 starts per hour
26–35	5 starts per hour
36–60	4 starts per hour

9.4.10.3 **Pump Design.** The operating speed of the pumps shall not exceed 1,800 rpm. The test sphere minimum diameter shall be no less than 3 inches in diameter. The minimum discharge diameter shall be no less than 4 inches.

9.4.10.4 **Power Supply.** The power supply shall be 240 or 208 volt, 60 Hz, 3-phase.

9.4.10.5 **Access to the Lift Station.** An access to the lift station will be required and shall be shown on the construction drawings. The access shall meet minimum thickness and materials standards for streets. The surfacing used shall be asphalt or concrete.

9.4.10.9 **Odor Control.** Odor control shall be provided at the lift station and/or the force main discharge when required by the City Engineer.

Chapter 10
Water Mains

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Water Mains

Chapter 10

Water Mains

10.1 General

Public water main facilities within the City of Watertown are owned and operated by the Watertown Municipal Utilities. All installations of new water mains and connections to existing water mains shall be coordinated with the Watertown Municipal Utilities.

10.1.1 Design: The design for water main facilities shall be in conformance with the Watertown Municipal Utilities Water Department Polices and design standards and the most current edition of the following standards:

1. *Recommended Standards for Water Works*, Great Lakes—Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten State Standards).

2. Requirements and Standards of the South Dakota Department of Environment and Natural Resources.

3. American Water Works Association Standards.

4. South Dakota Plumbing Code.

5. Uniform Plumbing Code.

6. International Fire Code and referenced NFPA Standards.

10.1.2 Construction Standards. Construction standards shall be in conformance with the Watertown Municipal Utilities Water Department Polices.

10.1.3 Where a conflict occurs between the above standards, the most restrictive requirement shall apply.

Chapter 11

Drainage Improvements

Drainage Improvements

Chapter 11

Drainage Improvements

11.1 Introduction

The City of Watertown, with the assistance of CH2MHill, has prepared a “Post-Construction Stormwater Best Management Practices Manual” (PCS Manual) as a guide for developing a post-construction stormwater management plan that incorporates best management practices (BMP’s) appropriate for the City of Watertown.

All construction activities shall be in conformance with the City of Watertown’s “Post-Construction Stormwater Best Management Practices Manual”. A copy of the manual has been included as an Appendix to this chapter.

The PCS Manual details the requirements of the City of Watertown’s Post-Construction Stormwater Management in New Development and Redevelopment Program and provides the resources necessary for meeting those requirements.

When considering the applicability of the requirements in the City of Watertown’s Post-Construction Stormwater Management in New Development and Redevelopment Program, gravel surfaces constructed prior to the adoption of the Post-Construction Stormwater and Erosion and Sediment Control Best Management Practices Manuals (April 2008) shall be considered impervious.

In addition to the information in the PCS Manual the following supplemental sections shall be included as part of this chapter of the Engineering Design Standards.

11.2 Storm Drainage Plans

11.2.1 Concept Drainage Plan

In addition to the requirements for Preliminary and Final Plans in Section 2 of the PCS Manual, a Concept Drainage Plan shall be submitted as part of the Development Sketch Plan.

The purpose of the Concept Drainage Plan is to identify any proposed drainage concerns regarding the development. Approximate flow paths and existing conditions will be provided. The Concept Drainage Plan will provide information in accordance with any Master Drainage Plans performed by the City.

11.3 Design Storm Calculations

11.3.1. Introduction

Presented in this section are the criteria and methodology for determining the storm runoff design peaks and volumes to be used in the City of Watertown for the preparation of storm drainage studies, plans, and facility design.

11.3.2. Design Frequencies

The residential, commercial, and industrial design storm return frequency shall not be less than 5 years for the minor storm and 100 years for the major storm

11.3.3. Design Rainfall

The design rainfall depths and intensities to be used for the Watertown area shall be based on the values shown in Exhibit 1 (PCS Manual).

11.3.4. Rational Method

The Rational Method of calculating storm water runoff is generally acceptable for highly impervious sites less than 100 acres in size; however, it may not be considered an adequate design tool for sizing large drainage systems. All composite runoff coefficients shall be based on the values shown in Exhibit 2 (PCS Manual). The slopes listed for the semi-pervious surfaces are the proposed finished slope of the tributary area.

The Rational Method is based upon the following formula:

$$Q = CIA \qquad \text{(Equation 1)}$$

Where:

Q = Peak Discharge (cfs),
C = Runoff Coefficient,
I = Rainfall Intensity (inches/hour), and
A = Drainage Area (acres).

When using the Rational formula, an assumption is made that the maximum rate of flow is produced by a constant rainfall which is maintained for a time equal to the period of concentration of flow at the point under consideration. Theoretically, this is the time of concentration, T_c, which is the time required for the surface runoff from

the most remote part of the drainage basin to reach the point being considered.

However in practice, the concentration time, T_c, is an empirical value that results in acceptable peak flow estimates.

11.3.5. Time of Concentration and Travel Time

As discussed in this Section, T_c, the time of concentration, is the time it requires for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within the watershed.

Travel time, T_t, is the time it takes water to travel from one location to another in a watershed.

In the application of the Rational Method, the time of concentration must be estimated so that the average rainfall rate of a corresponding duration can be determined from the Watertown Rainfall Depths and Intensities Chart (Exhibit 1 - PCS Manual).

Water travels across a watershed as sheet flow, shallow concentrated flow, open channel flow, or some combination of these. The type that occurs is a function of the conveyance system and is best determined by field inspection. The minimum time of concentration shall be 15 minutes.

a. Sheet Flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 11.1 provides Manning's n values for sheet flow for various surface conditions.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overton and Meadows 1976) to compute T_t:

$$T_t = \frac{0.007\ (nL)^{0.8}}{(P_2)^{0.5}\ S^{0.4}} \qquad \text{(Equation 2)}$$

Where:

T = travel time (hr),
N = Manning's roughness coefficient, Table 11.1,
L = flow length (ft),
P_2 = Two-year, 24-hour rainfall (in) = 2.4 inch for our area, and
S = slope of hydraulic grade line (land slope, ft/ft).

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time.

Limitations

- Manning's kinematic solution should not be used for sheet flow longer than 300 feet. Equation 2 was developed for use with the four standard rainfall intensity-duration relationships.
- South Dakota is a Type II intensity-duration relationship, as defined by the Soil Conservation Service (SCS).
- In watersheds with storm sewers, carefully identify the appropriate hydraulic flow path to estimate T_C. Storm sewers generally handle only a small portion of a large event. The rest of the peak flow travels by streets, lawns, and so on, to the outlet. Consult a standard hydraulics textbook to determine average velocity in pipes for either pressure or non-pressure flow.
- The minimum T_t used in Technical Release-55 (TR-55) Urban Hydrology for Small Watersheds is 0.1 hr (6 minutes).

Table 11.1
Roughness Coefficients (Manning's n) for Sheet Flow

Surface Description	n[1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤ 20%	0.06
Residue cover > 20%	0.17
Grass:[2]	
Short grass prairie	0.15
Dense grasses	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods:[3]	
Light underbrush	0.40
Dense underbrush	0.80

[1] The n values are a composite of information compiled by Engman (1986).

[2] Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

[3] When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

b. Shallow Concentrated Flow

After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from Figure 11.1 (Appendix) in which average velocity is a function of watercourse slope and type of channel. Tillage can affect the direction of shallow concentrated flow.

After determining average velocity from Figure 11.1 (Appendix), use the following equation to estimate travel time for the shallow concentrated flow segment:

$$T_t = \frac{L}{3600\ V} \qquad \text{(Equation 3)}$$

Where:

T_t = travel time (hr),
L = flow length (ft),
V = average velocity (ft./sec.), and
3600 = conversion factor from seconds to hours.

c. Open Channel Flow

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bank-full elevation.

Manning's equation is:

$$V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n} \qquad \text{(Equation 4)}$$

Where:

V = average velocity (ft/s),
r = hydraulic radius (ft) and is equal to a/p_w,
a = cross sectional flow area (ft^2),
p_w = wetted perimeter (ft),
s = slope of the hydraulic grade line (channel slope, ft/ft), and
n = Manning's roughness coefficient for open channel flow.

Manning's n values for open channel flow can be obtained from standard hydraulic textbooks. After average velocity is computed using Equation 4, T_t for the channel segment can be estimated using Equation 3.

11.3.6. Rainfall Intensity (I)

The intensity (I), is the average rainfall rate in inches per hour for the period of maximum rainfall of a given frequency having a duration equal to the time of concentration. After the design storm frequency has been selected, the rainfall intensity shall be obtained from the Watertown Rainfall Depths and Intensities Chart (Exhibit 1 - PCS Manual) using the time of concentration calculated above.

11.3.7. Runoff Coefficient (C)

The runoff coefficient (C) represents the integrated effects of infiltration, evaporation, retention, flow routing, and interception, all of which effect the time distribution and peak rate of runoff. All composite runoff coefficients shall be based on the values shown in Exhibit 2 (PCS Manual). The values are presented for different surface characteristics as well as for different aggregate land uses. The coefficient for various surface areas can be used to develop a composite value for a different land use.

11.4 Storm Sewers

11.4.1 Design Flow

For areas smaller than 100 acres, the Rational Formula is acceptable to compute runoff. For areas larger than 100 acres, the Soil Conservation Service method or other acceptable computer applications shall be used.

11.4.2 Material and Installation

All construction shall be in accordance with the approved Standard Specifications and Standard Plates for drainage improvements.

11.4.3 Location of Storm Sewers

1. All public storm sewers shall be installed in the public easement or right-of-way. Storm sewer shall be placed as shown in Chapter 4. If storm sewer pipe is placed on back lot lines or otherwise placed across private property, a drainage easement is required provided the pipe is utilized to drain public storm water. If the storm sewer pipe is to be used for private storm water runoff, no easement is required on the property where the drainage is being collected.

a. Placement

Storm sewer must be extended to the far edge of the platted subdivision to be serviced, regardless of where the inlets are placed.

b. Easements

1. All easements must be mutually exclusive for the City of Watertown**.** Easements shall be identified as public utility and drainage easements. Final Drainage Plans shall identify the type of easement.

2. All drainage easements must be a minimum of 20 feet wide, additional width for access may be required. The pipe shall be placed only along the center of the easement, unless approved by the City Engineer.

3. No landscaping except grass may be placed in the easement.

4. No permanent structure may be placed in the easement.

11.4.4 Size

No public storm sewer shall be less than 15 inches in diameter. Trunk storm sewers must be a minimum of 18 inches in diameter.

All changes in pipe size must occur at a manhole, inlet, or junction box.

11.4.5 Depth

The minimum allowable sewer depth of cover shall be 18 inches.

11.4.6 Pipe

Storm Sewer pipes shall be sized to carry a five-year flow. Hydraulics of the sewer shall be analyzed. The hydraulic gradient shall remain below the gutter or ground surface elevation to prevent overflow.

Storm sewer pipe shall be reinforced concrete unless otherwise approved by the City Engineer. In certain cases the designer may wish to specify one type of pipe for a certain purpose, in which case no alternate should be given. The “class” of reinforced concrete pipe shall be shown on the plans.

24 Edge drain material shall be perforated PVC pipe with filter fabric sock. See Standard Plate for detail.

Storm sewer pipe made of other materials such as polyethylene may be approved by the City Engineer for private development storm sewer or storm sewer to be installed outside the public right-of-way.

Coefficients of roughness, “n,” for use in the Manning formula as listed below shall normally be used:

Type of Pipe	n
Concrete	0.013
Polyethylene	0.010

11.4.7 Velocity

The minimum allowable velocity in a storm sewer shall be 3 feet per second (fps). The maximum velocity shall be 15 fps.

11.4.8 Pipe Strength

Pipe specified shall meet AASHTO HS-20 loadings.

11.4.9 Alignment

Sewer shall be installed with a straight alignment between structures with the following exception: In locations where layouts are such that a straight alignment is not practical, sewers may be curved. The curvature must be concentric with the curvature of the street. The pipe manufacturer’s recommended maximum deflection angle shall not be exceeded. Storm sewer bends will be shown as required. The City Engineer may require a structure instead of a bend.

11.4.10 Separation

1. Storm sewer crossings of the water main will be performed in accordance with the Standard Specifications. Water main will be installed at least ten 10 feet horizontally from any storm sewer.

   Crossings of water main and storm sewer will have a minimum of 18 inches clearance between the outside surface of the pipes.

2. Storm sewer crossings of sanitary sewer shall be performed in accordance with the Standard Specifications.

   Sanitary sewer shall be installed at least 2 feet horizontally from any storm sewer.

Crossings of sanitary sewer and storm sewer will have a minimum of 6 inches clearance between the outside surface of the pipe. Special structural support and insulation will be required if there is less than 18 inches clearance (see the Standard Plates for insulation details).

11.4.11 Ground Water Barriers

When there exists a possibility that ground water may be diverted and follow the path of the new sewer, ground water barriers shall be constructed in adequate numbers to prevent ground water migration along sewer trenches.

11.5 Storm Sewer Appurtenances

11.5.1 Junction Boxes

1. Location

Structures shall be installed at the upper end of each line, at changes in grade, size, curvature or alignment. The maximum spacing for structures shall be 400 feet for sewers 15 inches in diameter or less; 450 feet for sewers 18 inches and 21 inches in diameter; and 500 feet for sewers 24 inches in diameter and larger.

Trunk storm sewer is defined as any storm sewer 18 inches in diameter or larger that is used to convey storm water from two or more inlets.

Lateral storm sewer is defined as the storm sewer that connects to the trunk sewer system. Minimum lateral storm sewer pipe shall be 24 1~~5~~2 inches in diameter.

Pipe Tee-Sections may be used to connect a lateral storm sewer to the trunk storm sewer when the lateral length between the Tee-Section and a structure is 75 feet or less.

Field connections to connect a lateral system to the existing trunk storm sewer system, as described in the previous paragraph, will only be permitted if conditions prohibit the installation of a structure, as determined by the City Engineer.

Structures must be located in areas which allow direct access by maintenance vehicles.

Bends may be used along the trunk system between structures when curvature alignment requires the bend and the maximum spacing between structures has not been exceeded. The City Engineer may require a structure instead of a bend.

For 18-inch-diameter storm sewer, the maximum total bend or curvature allowed is 22.5 degrees. For 24-inch-diameter storm sewer and larger, the maximum single bend allowed is 45 degrees. If more than one bend is required due to alignment curvature, the maximum angle per bend is 7.5 degrees. Maximum total curvature is 90 degrees for 24-inch RCP and larger.

2. Flow Channels

When there is an increase in sewer size of a smaller sewer connected with a larger one, the invert of the smaller sewer must be raised to maintain the same energy gradient. An approximate method of doing this is to place the 0.8 depth point of both sewers at the same elevation or to match the crown of the pipe. Structures that have a direction change of flow shall have a minimum 0.1-foot drop between the inverts.

Drop manholes shall be avoided whenever possible.

11.5.2 Outlets

1. Where a storm sewer discharges into a natural channel or irrigation ditch, an outlet structure shall be provided that will blend the storm sewer discharge into the natural channel flow in such a way as to prevent erosion of the bed or banks of the channel.

2. When the discharge velocity is low, or subcritical, the outlet structure may be one of the following:

    a. Flared end section
    b. Head wall
    c. Wing walls

3. If the discharge velocity is high, or supercritical, prevention of erosion of the natural channel bed or banks in the vicinity of the outlet may require an energy dissipating structure.

4. All outlets shall have an apron consisting of one of the following:

    a. Rip rap with geotextile fabric base
    b. Concrete anchor mat
    c. Concrete slab
    d. Other approved methods

11.5.3 Inlets

1. Introduction

A storm inlet is an opening into a storm sewer system for the entrance of surface storm runoff. There are three types of inlets: curb opening, grated, and combination. In addition, inlets may be further classified as being on a continuous grade or in a sump. The term “continuous grade” refers to an inlet so located that the grade of the street has a continuous slope past the inlet and therefore ponding does not occur at the inlet. The sump condition exists whenever water is restricted to the inlet area because the inlet is located at a low point. A sump condition can occur at a change in grade of the street from positive to negative or due to the crown slope of a cross street when the inlet is located at an intersection.

2. Inlet Standards

Acceptable inlets for public streets shall be Type I curb opening or Type II combination. Curb opening inlets shall be used at true sumps or at sumps formed by crown slope of cross section at the intersection. Either curb opening type or combination inlets may be used on continuous grade. Grated inlets may be used for parking areas and open fields or other applications subject to approval by the City Engineer.

Reduction factors shall be applied to the theoretical calculated capacity of inlets based upon their type and function. The reduction factors compensate for effects which decrease the capacity of the inlet such as debris plugging, pavement overlaying, and in variations of design assumptions.

The allowable capacity of an inlet shall be determined by applying the applicable reduction factor from Table 11.2 to the theoretical capacity as presented in the following sections.

The size of outlet pipes from storm water inlets shall be based upon the theoretical capacity of the inlet, but shall not be less than 12 inches in diameter.

Table 11.2
Reduction Factors to Apply to Inlets

Condition	Inlet Type	% of Theoretical Capacity Allowed
Sump	Grated	50%
Sump	Combination	65%
Continuous Grade	Deflector	75%
Continuous Grade	Longitudinal Bar Grate Incorporating recessed Transverse bars	60%
Continuous Grade	Combination	110% of that listed For type of grate utilized
Sump or Continuous Grade	Curb Opening	
	L = 3’	80%
	L = 6’	88%
	L = 8’	90%
	L = 10’	92%
	L = 15’	95%

3. Curb Opening Inlet Hydraulics

A curb opening inlet may operate under two different conditions of flow: (1) free flow conditions under which a free water surface is continuous into the inlet, or (2) submerged conditions, in which the inlet functions as an orifice. The continuous grade design procedures described herein assume that the inlets will be designed to operate under the free flow condition, since the gutter flow depth required to submerge the inlet is greater than the allowable street capacity.

The inlet dimensions evaluated herein are the standards used for Type I and II inlets.

4. Sump Condition

Presented in Figure 11.2 (Appendix) is a capacity nomograph for sump condition with a gutter depression at the inlet. This chart is an adaptation of a Bureau of Public Roads chart and is applicable to both the free flow and the submerged cases.

5. Continuous Grade

For the “continuous grade” condition, the capacity of the inlet is dependent upon many factors including gutter slope, depth of flow in the gutter, height and length of curb opening, street cross slope, and the amount of depression at the inlet. In addition, all of the gutter flow will not be intercepted and some flow will continue past the inlet area (“bypass”). The amount of bypass must be included in the downstream drainage facility evaluation as well as in the design of the inlet.

Inlet size and spacing is dependent upon the allowable use of streets for handling storm runoff. Section 11.86, of this chapter will address pavement encroachment and provide criteria for the maximum width of spread (W) as addressed below.

When the allowable pavement encroachment has been determined, the theoretical gutter capacity for a particular encroachment can be determined by the use of Figure 11.3 (Appendix). To further simplify computations, Figure 11.4 (Appendix) is provided to enable direct determinations for various street sections. Figure 11.3 (Appendix) as well as the charts for inlet capacity provided in the Appendix of these standards will assist the designer in solving for the capacity of an inlet on a continuous grade. The procedure for properly sizing and determining inlet spacing is as follows:

a. After the design has determined a total runoff discharge (Q) flowing upstream of the inlet, enter Figure 11.4 (Appendix) for design Q and extend a vertical line down to intersect with the longitudinal gutter slope (S_o). Extend a horizontal line from the point to the cross slope (S_x) of the street being studied and extend a vertical line down from this point to the width of spread (W). The depth of flow (D) at the curb may also be determined if the vertical line intersecting the cross slope (S_x) on the lower portion of the graph is extended horizontally to intercept the depth at the curb.

b. Select the appropriate capacity chart from the Appendix for the type of inlet (Type I or II), street cross slope (S_x) and longitudinal gutter slope (S_o).

c. Type I inlets: Enter the chart for the inlet length selected. Extend a vertical line up to intersect the curve for the width of spread (W) determined in Step 1 and extend a horizontal line from this point to the inlet intercept ratio (Qi/Q).

   Type II inlets: Enter the chart for the width of spread (W) determined in Step 1. Extend a horizontal line across to intersect

the line for the longitudinal gutter slope (S_o) and extend a vertical line from this point to the inlet intercept ratios (Qi/Q).

d. Multiply the inlet intercept ratio (Qi/Q) determined in Step 3 times the total discharge (Q) carried by the gutter, yields the quantity of water being intercepted by the inlet (Qi). For Type I inlets, the designer may want to repeat Steps 3 and 4 for other lengths of inlets.

After the theoretical capacity has been determined as outlined above, capacity reduction factors must be applied as listed in Table 11.2. The designer will need to choose which type of inlet is most effective based upon both hydraulic and economic considerations.

6. Capacity of Grated Inlets in Sump

As previously noted, grated inlets may be used for parking areas and open fields or other areas subject to approval by the City Engineer. The design procedure presented in the following section is based upon the assumption that the grated inlet is clear from debris and is operating at its maximum efficiency.

For a grated inlet operating under sump conditions, the reduction factors of Table 11.2 shall be applied.

Under sump conditions a grated inlet acts essentially as a series of orifices. Design charts indicate that the application of the orifice formula to the clear opening of the inlets gives satisfactory capacities for a clean inlet. Figure 11.5 (Appendix) shows the results of the tests. The head used shall be determined by the allowable depth of ponding for the installation at the design storm frequency.

11.6 Culverts

11.6.1 General

Culverts may be of any shape and construction as required by existing topographic features; provided, however, the size, location and type of construction of culverts shall be subject to acceptance by the City Engineer

Culverts within the major drainageways, as outlined in the Watertown Storm Water Master Drainage Plan, that are under arterials or railroads shall have sufficient capacity to pass all of the runoff from the 100-year storm considering 20 percent of the inlet plugged, for pipes under 48-inch diameter.

For all other streets, culverts must be designed to convey a minimum of 10-year flow with no street overtopping and must be large enough so that the 100-year flow over the top of the road does not exceed 18 inches in depth above the invert of the gutter.

11.6.2 Design Criteria

1. The following design criteria shall be utilized for all culvert design:

    a. The culvert including inlet and outlet structures shall properly take care of storm water flow, bed-load, and debris at all stages of flow.

    b. **Inlets**. Culvert inlets shall be designed to minimize entrance and friction losses. Inlets shall be provided with either flared-end sections or head walls with wing walls. Projecting ends will not be acceptable. For large structures, provisions shall be made to resist possible structural failure due to hydrostatic uplift forces.

    c. **Outlets**. Culvert outlets shall be designed to avoid sedimentation, undermining of the culvert, or erosion of the downstream channel. Outlets shall be provided with either flared-end sections or headwalls, with wingwalls. Projecting outlets will not be acceptable. Additional outlet control in the form of riprap, channel shaping, dissipation structure, etc., may be required where excessively high discharge velocities occur. All structural outlet velocity dissipaters shall be underlain with a suitable filter fabric to protect against scour.

    d. **Slopes**. Culvert slopes shall be such that neither silting nor excessive velocities and scour occur. Generally, the minimum slope of culverts shall be limited to 0.50 percent.

    e. **Hydraulic Design**. Culverts shall be analyzed to determine whether discharge is controlled by inlet or outlet conditions for both the initial storm discharge and the major storm discharge. The value of the roughness coefficient (n) used shall not be less than those specified by documentation of the culvert manufacturer. Computations for selected culvert sizes shall be submitted for review.

    f. **Minimum Allowable Size**. The required size of the culvert shall be based upon adequate hydraulic design analysis. In no case, however, will approval be made for round culverts with less than 18 inches inside diameter, or for arched or oval shaped culverts with span-rise dimensions less than 24 inches x 18 inches nominal.

Culverts 15 inches or greater in diameter may be used for single-family residential access drives.

The minimum height of a reinforced box culvert should be 3 feet to facilitate cleanout and allow removal of forms during construction.

g. **Multiple Culvert Installation**. Where physical conditions dictate, multiple culvert installations will be acceptable, provided the minimum size of any culvert to be used shall not be less than the requirements set forth above.

h. **Structural Design**. The structural design of culverts shall conform to those methods and criteria recommended by the manufacturer of a specific type of culvert dependent upon the type of bedding, the method of installation, and the load.

24 i. **Trash and Debris Deflector**. When, ~~in the opinion of~~determined by the City Engineer, debris accumulation for a particular drainageway appears to pose a significant probability of culvert plugging, trash racks or debris deflectors will be required.

11.7 Open Channel Flow, Major Drainageway

11.7.1 General

Major drainageways are the main corridors for storm water flow through developments and all other drainageways are considered as lateral drainageways.

See Figure 11.6A, 11.6B, 11.6C, and 11.6D (Appendices) for design standards for channel construction.

All channels will be designed with the 5-year storm frequency and the 100-year storm frequency considered.

Channels shall be designed in such a manner that flows at the critical depth and supercritical flows are avoided.

If increased flows are proposed for any channel, protection as required shall be provided for a natural channel. Channel protection will be designed to withstand forces that attempt to overtop the channel banks, deteriorate the channel lining, erode soils beneath the channel lining and erode unlined areas of the channel.

Open channels conveying storm water shall be designed using the Tractive Force Procedure*. The permissible shear stress, T_d, is the force required to

initiate movement of channel lining material. Normal depths in the channel are calculated using Manning's equation. Manning's roughness coefficients for different ranges of depth are provided in Figure 11.6B. The coefficient of roughness generally decreases with increasing flow depth.

Shear stress, T, at normal depth, is computed for the lining by the following equation:

$$T = yds \qquad \text{(Equation 5a)}$$

Where:

T = shear stress in lb/ft^2
y = unit weight of water, 62.4 lbs/ft^3
d = flow depth in feet
s = channel gradient in ft/ft

If the permissible shear stress, T_d, given in Figure 11.6C and 11.6D, is greater than the computed shear stress, T, the chosen channel liner is considered acceptable. If the computed shear stress is too great, select a liner with a higher permissible shear stress and repeat the calculations for normal depth and shear stress. In some cases, it may be necessary to alter the channel dimensions to reduce the shear stress.

All channels shall be designed with proper and adequate erosion control features. When required, drops or check dams shall be installed to control water surface profile slope.

Grass-lined channels or side slopes of concrete-lined channels will be seeded with a mixture as set forth in these Design Standards.

Lateral drainageways without a low flow storm sewer will only be permitted with the acceptance of the City Engineer.

For channels that cross a roadway and overflow the street section within design standards, it is acceptable to provide an easement for the 12-foot access strip along the backwater area. The remaining channel dedication will be per ordinance.

11.8 Street Flow Capacity

11.8.1 General

The criteria set forth herein will be used in analyzing and approving the adequacy of streets as a function of the drainage system. Both the minor and 100-year storm runoff must be considered and calculations showing such runoff at critical sections shall be submitted. Street, curb and gutter, valley gutters, and curb cuts shall conform to the Standard Specifications.

11.8.2 Street Capacity for Minor Storms

Pavement encroachment for the minor design storm shall not exceed the limitations set forth in the following table:

Allowable Pavement Encroachment and Depth of Flow for Minor Storm Runoff

Street Classification	Maximum Encroachment*
Local	No curb overtopping. Flow may spread to crown of street.
Collector	No curb overtopping. Flow spread must leave the equivalent of one 10-foot driving lane clear of water (one lane for two-lane street, two lanes for four-lane street).
Arterials	No curb overtopping. Flow spread must leave the equivalent of two 10-foot driving lanes clear of water; one lane in each direction.
Freeways	No encroachment is allowed on any traffic lane.

*Where no curbing exists, encroachment shall not extend past property lines.

The storm sewer system shall commence at the point where the maximum allowable encroachment occurs. All residential and commercial storm sewers systems shall be designed for the five-year storm event. All industrial storm sewer systems shall be designed for the two-year storm event.

When the allowable pavement encroachment has been determined, the theoretical gutter carrying capacity for a particular encroachment shall be computed using the Modified Manning's Formula for flow in a triangular channel as shown in Figure 11.3 (Appendix). To simplify computations, graphs for particular street shapes may be used as shown on Figure 11.5 (Appendix). An "n" value of 0.015 shall be used unless special considerations exist.

11.8.3 Street Capacity for Major Storms

The allowable depth of flow and inundated area for the major design storm shall not exceed the limitations set forth in the following table:

Allowable Depth of Flow and Inundated Area for 100-Year Storm Runoff

Street Classification	Allowable Depth and Inundated Areas
Local and Collector	Residential dwellings, public, commercial, and industrial buildings shall not be inundated at the ground line. Depth of water at the street crown shall not exceed 6 inches to allow operation of emergency vehicles.The depth of water over the gutter flow line shall not exceed 18 inches.
Arterial and Freeway	Residential dwellings, public, commercial, and industrial buildings shall not be inundated at the ground line. Depth of water at the street crown shall not exceed 6 inches to allow operation of emergency vehicles. The depth of water over the gutter flow line shall not exceed 18 inches.

11.8.4 Cross Street Flow

Cross street flow can occur by two separate means. One is runoff which has been flowing in a gutter and then flows across the street to the opposite gutter or inlet. The second case is flow from some external source, such as a drainageway or conduit, which will flow across the crown of the street when the conduit capacity beneath the street is exceeded. The maximum allowable cross street flow depth based on the worst condition shall not exceed the limitation stipulated in the following table.

Allowable Cross Street Flow

Street Classification	Minor Storm Runoff	100-Year Design Storm Runoff
Local	6-inch depth at crown or in the valley gutter	18 inches of depth above gutter flow line
Collector	Depth of flow shall not exceed 6 inches above gutter flow line	18 inches of depth above gutter flow line
Arterial	None	6 inches or less over crown
Freeway	None	6 inches or less over crown

11.8.5 Capacity Calculations

All theoretical flow capacities shall be reduced by the appropriate reduction factors as shown in Figure 11.7 (Appendix) to obtain allowable flow capacities.

11.8.6 Drainage Tract Requirements

All backward draining cul-de-sacs and sump streets are required to have a minimum 20-foot-wide drainage easement shown on the plat for the purpose of conveying drainage. The easement shall meet the applicable requirements for storm sewer easements.

11.9 Detention Storage

11.9.1 General

Detention ponds shall be designed and constructed at those locations identified by the City Engineer. The use of onsite detention is permitted at those locations where the onsite drainage system cannot be tied into an existing drainage system.

Onsite detention may be used if the development cannot provide adequate storm sewer systems to achieve the required storm sewer standards.

Parking lots which serve as detention storage ponds must not have a storage depth of more than 1 foot. It is recommended that notification signs be installed in parking lots which serve as detention ponds. The signs shall be permanent and high quality, meeting the SDDOT Specifications for Traffic Signs.

11.9.2 Design Storm

Detention ponds along major drainageways as identified in the City Master Drainage Plan shall be designed for a 100-year design flow.

Other detention ponds shall be designed such that the 5-year return storm is conveyed through the principal outlet assembly and the 100-year return storm is conveyed through the overflow assembly.

11.9.3 Release Methods

Intermittent ponds shall drain completely.

Careful consideration must be given to the discharge of the surface release as to the elimination of erosion potential, and the capacity of the downstream surface water course. The release structure shall be designed to withstand the forces caused by the structure being overtopped during a larger than design storm.

A stage (foot) versus release rate (cfs) curve must be provided for the release structure.

11.9.4 Maximum Release Rate

The detention pond volumes and release rate shall be designed to accommodate runoff generated by the development and post-developed upstream properties.

The release rate from the detention pond cannot exceed predevelopment rates for the 5-year and 100-year return storm when discharge is conveyed onto undeveloped property unless City-owned conveyance structures of adequate size are contiguous and downstream of the proposed discharge points.

11.9.5 Maintenance Requirements

Detention ponds and similar areas, not required as a necessary part of the major drainage system as outlined in the City Master Drainage Plan, may be accepted by the City for maintenance only if such land provides another useful public service such as a public park or wildlife area.

All detention areas shall have a 30-foot-wide access to a public right-of-way if they are not located adjacent to a public right-of-way.

Detention pond properties greater than two acres in size where discharge is generated from publicly maintained infrastructure may be considered for

dedication to the City during preliminary plan approval. The ponds must have a maintenance bench providing access to all pond areas. The bench shall be 12’ wide with a cross slope no greater than 10%. If the bench is located along a future recreational trail, the maximum cross slope may be reduced to meet trail requirements. Property delineation markers shall be installed upon dedication of the property in locations specified by City. All other detention ponds shall be privately maintained.

11.9.6 Adjacent Property Elevations

The property corner elevation of properties abutting a detention pond shall be 1 foot above the 100-year design storm.

Recommended minimum ground elevations for homes abutting or affected by the detention pond shall be 2 feet above the overflow elevation. Recommended minimum ground elevation for homes abutting or affected by detention ponds will be a minimum of 4 feet above the 100-year pond high water elevation if an overflow system is not available or at an elevation that provides an additional 50 percent storage.

APPENDIX

FIGURES

and

Best Management Practices Manual
Post-Construction Stormwater Best Management Practices
Prepared for City of Watertown

Figure 11.1
Average Velocities for Estimating
Travel Time for Shallow Concentrated Flow

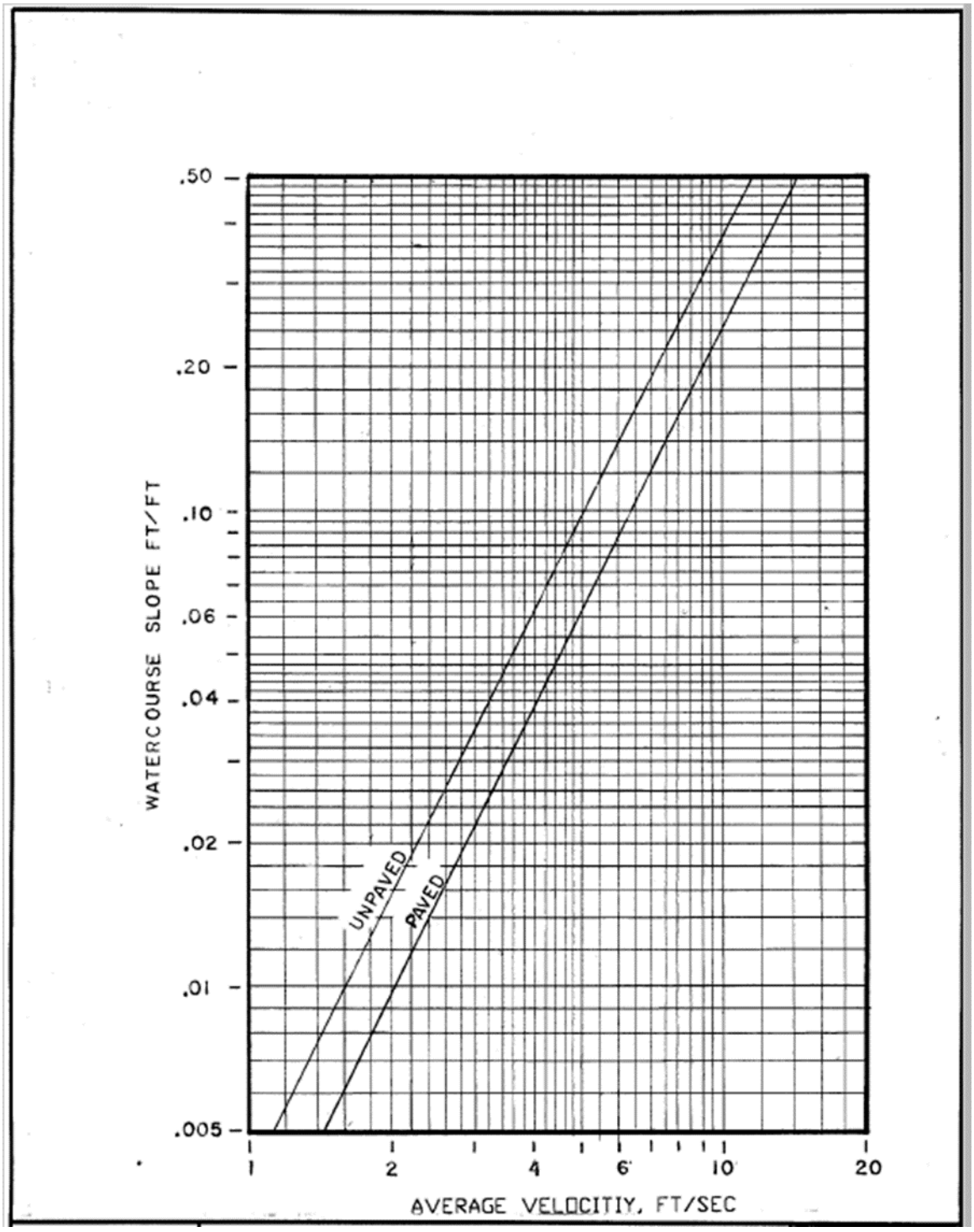


Figure 11.2
Capacity of Curb Opening Inlet
at Low Point in Grade

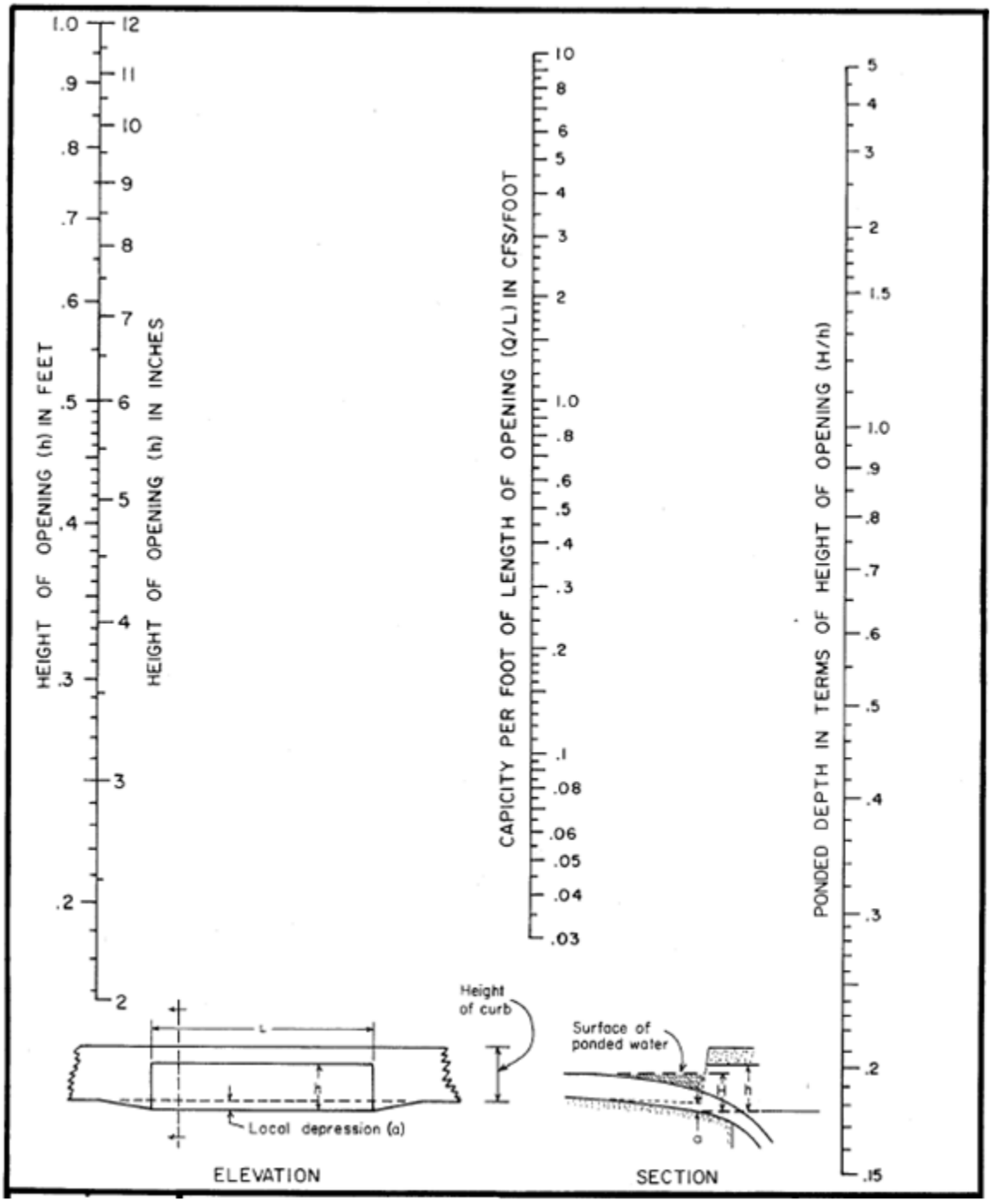


Figure 11.3
Nomograph for Flow
In Triangular Channels

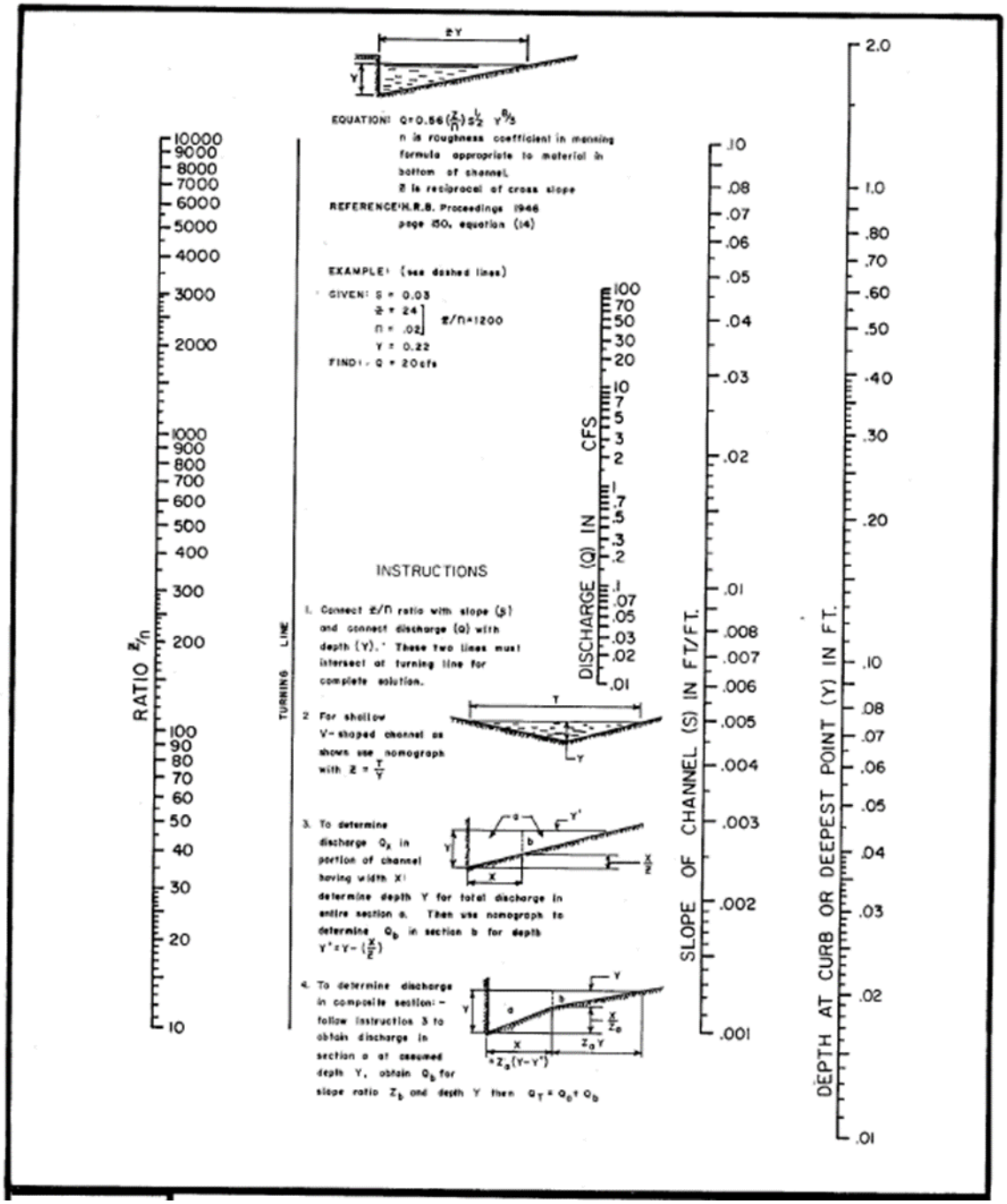


Figure 11.4
Flow Characteristic Curves

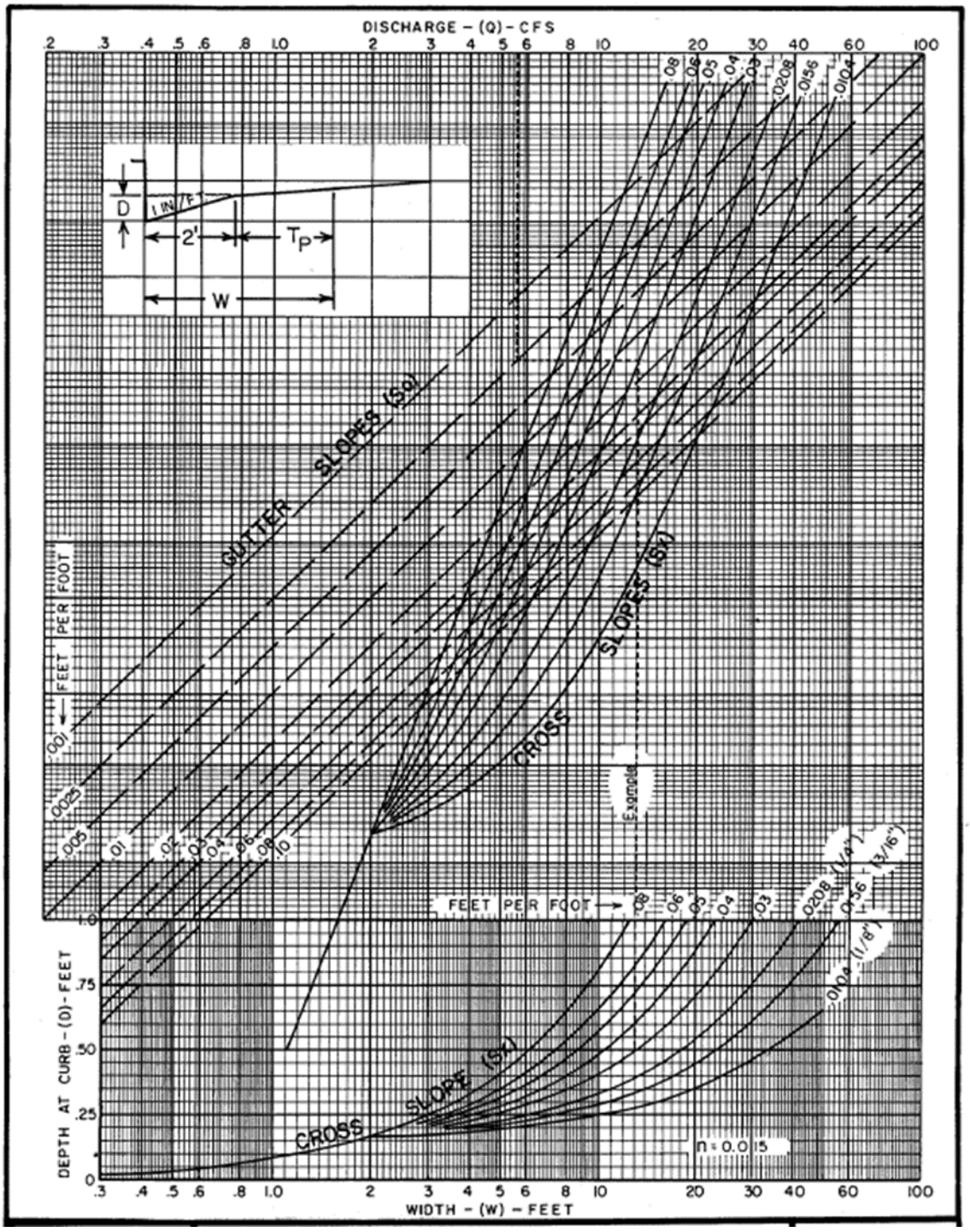


Figure 11.5
Capacity of a Grated Inlet
in Sump

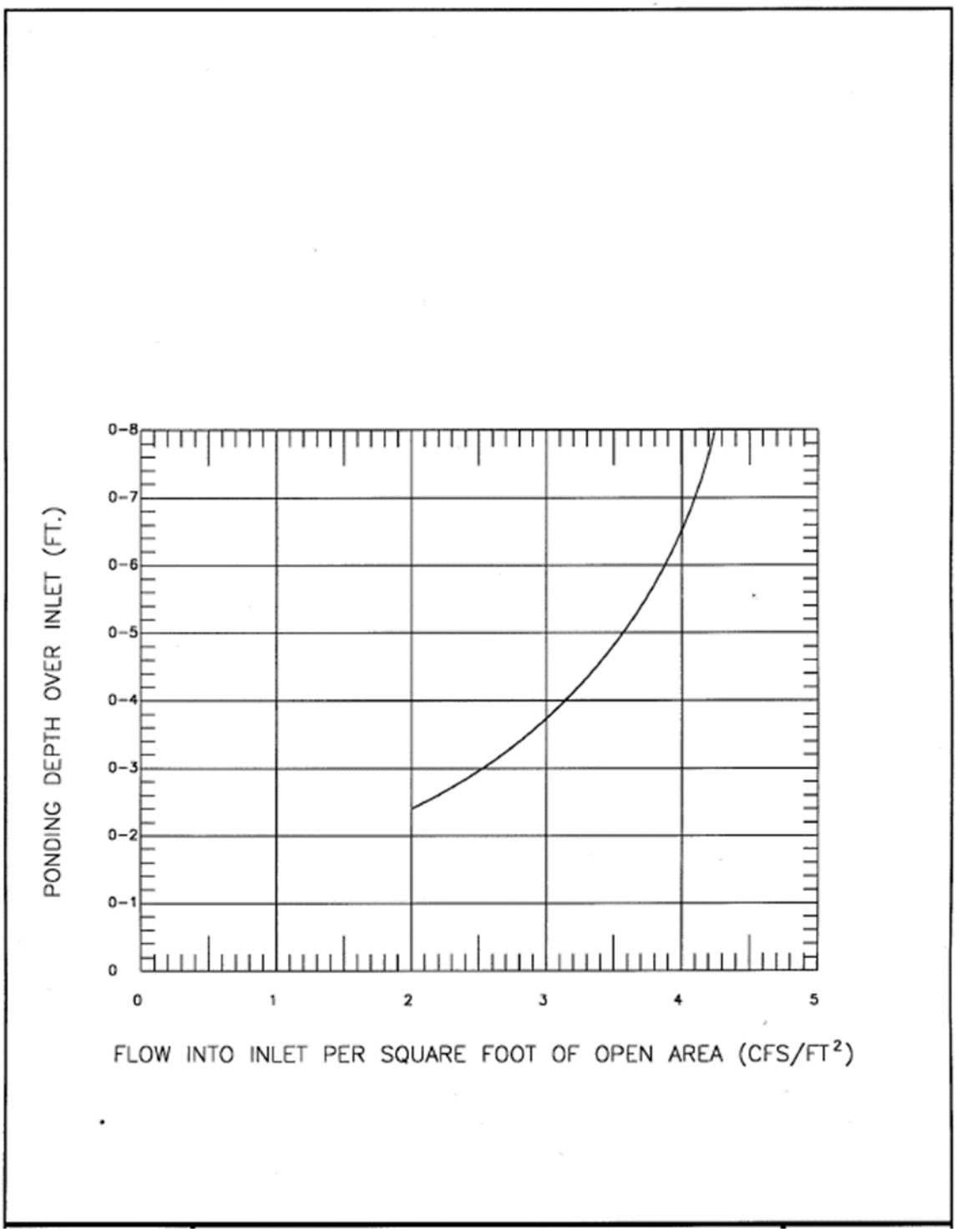


Figure 11.6A
Channel Design Criteria

DESIGN CRITERIA	RESIDENTIAL LATERAL WITH PIPE	NON-RESIDENTIAL LATERAL / CONCRETE CHANNEL	MAJOR DRAINWAY
GRASS SIDE SLOPES	4:1 OR FLATTER	4:1 OR FLATTER	4:1 OR FLATTER
FREE BOARD (100 YEAR STORM)	0.5 FOOT	0.5 FOOT	$H = 0.5+V^2/2g$ MIN. 1 FOOT
BOTTOM WIDTH MINIMUM	4 FOOT	6 FOOT	6 X DEPTH OF 100 Yr. FLOW
DEPTH (100 YEAR STORM)	MAX. 2 FOOT	MAX. 2 FOOT	PER MASTER DRAINAGE PLAN
SLOPE MINIMUM	1%	0.5%	0.2% - 0.6% (NATURAL)
LOW FLOW PIPE / CHANNEL	18" MIN. RESIDENTIAL & COMMERCIAL 2 YEAR INDUSTRIAL	2 YEAR CAPACITY CROSS-SLOPE 1/4" PER FOOT	N/A
RADIUS	N/A	N/A	2 X TOP WIDTH AND > 100 FEET CENTERLINE
VELOCITY	N/A	MIN. 2 FOOT/SEC. 5 YEAR	MIN. 2 FOOT/SEC. 5 YEAR

Figure 11.6B
Mannings "n" Values
For Channel Protection Critera

MANNINGS "n" VALUE FOR DEPTH RANGES			
LINING TYPE	DEPTH		
	0 - 0.5 FEET	0.5 - 2.0 FEET	> 2.0 FEET
WOVEN PAPER NET	0.016	0.015	0.015
JUTE NET	0.028	0.022	0.019
FIBERGLASS ROVING	0.028	0.021	0.019
STRAW WITH NET	0.065	0.033	0.025
CURLED WOOD MAT	0.066	0.035	0.028
SYNTHETIC MAT	0.036	0.025	0.021
GRAVEL RIPRAP (1" D50)	0.044	0.033	0.030
GRAVEL RIPRAP (2" D50)	0.066	0.041	0.034
GRAVEL RIPRAP (6" D50)	0.104	0.069	0.035
GRAVEL RIPRAP (12" D50)	N/A	0.078	0.040

Adapted from FHWA, HEC-15, APRIL 1993, page 37

Figure 11.6C
Allowable Shear Stress
For Channel Liners

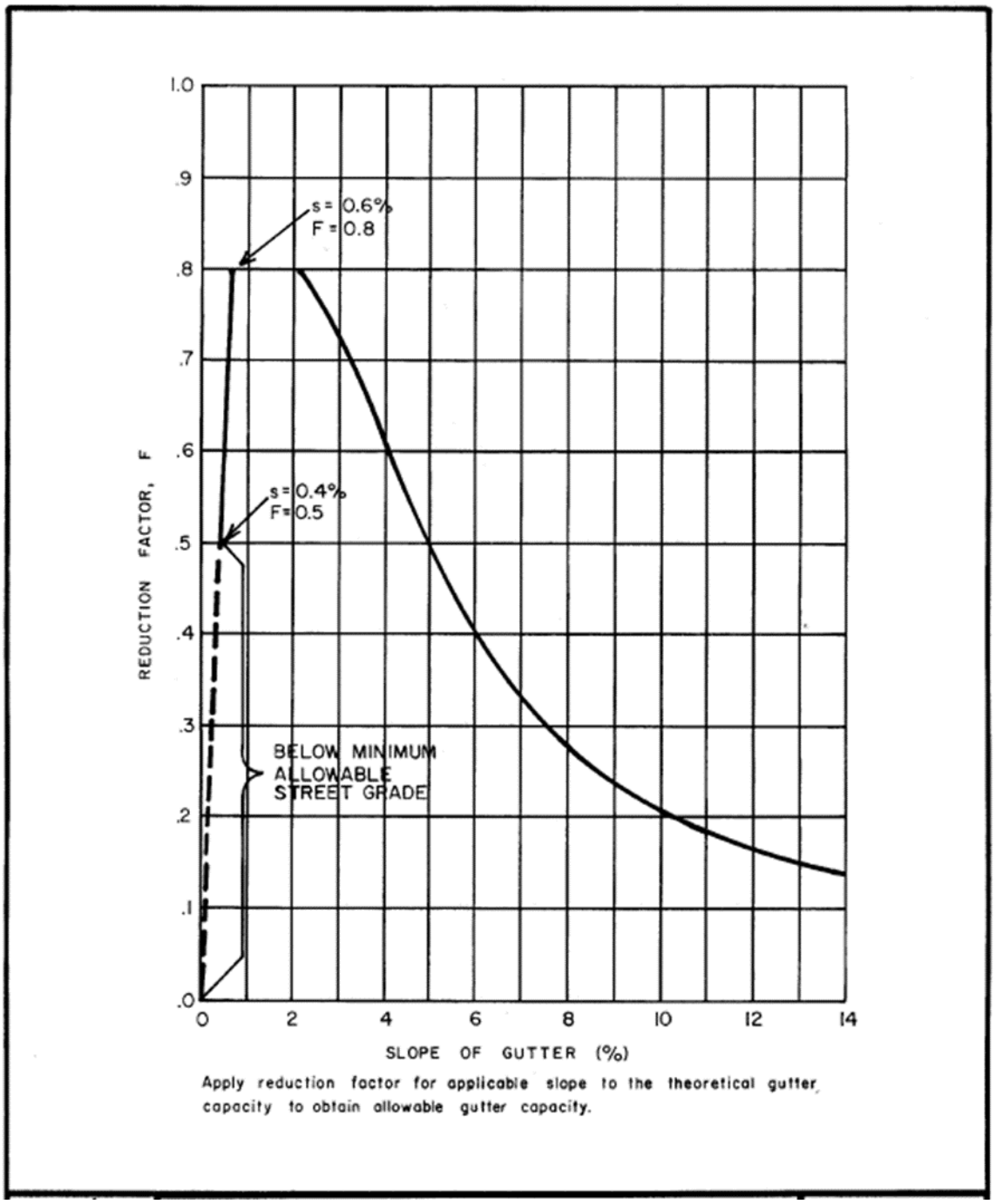
ALLOWABLE SHEAR STRESSES FOR CHANNEL LININGS		
LINING TYPE	COMMENTS	SHEAR STRESS, Td (Lbs/Square Foot)
WOVEN PAPER NET	SUBMITTED BY DESIGN ENGINEER	0.15
JUTE NET	SUBMITTED BY DESIGN ENGINEER	0.45
FIBERGLASS ROVING	SUBMITTED BY DESIGN ENGINEER, SINGLE	0.60
FIBERGLASS ROVING	SUBMITTED BY DESIGN ENGINEER, DOUBLE	0.85
STRAW WITH NET	SUBMITTED BY DESIGN ENGINEER	1.45
CURLED WOOD MAT	SUBMITTED BY DESIGN ENGINEER	1.55
SYNTHETIC MAT	SUBMITTED BY DESIGN ENGINEER	2.00
VEGETATIVE, CLASS A	WEEPING LOVEGRASS, YELLOW BLUESTEM	3.70
VEGETATIVE, CLASS B	BERMUDA, BLUE GRAMA, NATIVE GRASS MIXTURES	2.10
VEGETATIVE, CLASS C	BERMUDA, KENTUCKY BLUE, CENTIPEDE	1.00
VEGETATIVE, CLASS D	BERMUDA, BUFFALO, GRASS LEGUME	0.60
VEGETATIVE, CLASS E	BERMUDA	0.35
GRAVEL RIPRAP	D50 STONE SIZE = 1 INCH	0.33
GRAVEL RIPRAP	D50 STONE SIZE = 2 INCH	0.67
ROCK RIPRAP	D50 STONE SIZE = 6 INCH	2.00
ROCK RIPRAP	D50 STONE SIZE = 12 INCH	4.00

Adapted From FHWA, HEC-15, APRIL 1988, pages 35 and 36

Figure II.6D
Allowable Shear Stresses
For Outlet Protection

Lining Type	Comments	Shear Stress, Td (lbs / sq. ft.)
Rock Riprap	Class A	4.00
Rock Riprap	Class B	5.00
Rock Riprap	Class C	7.80

Figure 11.7
Reduction Factor for
Allowable Gutter Capacity



Best Management Practices Manual

Post-Construction Stormwater Best Management Practices Manual

Prepared for

City of Watertown

April 2008

Prepared by

CH2MHILL

Executive Summary

Purpose

The Watertown *Post-Construction Stormwater Best Management Practices Manual (Manual)* details the requirements of the City of Watertown's Post-Construction Storm Water Management in New Development and Redevelopment Program (Program) and provides the resources necessary to meet these requirements. The expected audience for this document is new or redevelopment site owners and their consultants.

Overview

This document provides resources to develop a post-construction stormwater management plan that incorporates best management practices (BMPs) appropriate for the City of Watertown. The following areas are discussed:

Applicability. The applicability of requirements outlined in this *Manual* is discussed.

Storm drainage plans. Requirements for analyzing a storm drainage system and submitting plans to the City are presented.

Storm sewers. General guidelines for storm sewers are presented.

Open channel flow/major drainage way. General guidelines for drainage ways are presented.

Best management practices. A three-step process for identifying and implementing post-construction BMPs is presented. The following structural BMPs are discussed:

- Grass buffer
- Grass swale
- Porous landscape detention
- Extended detention basin
- Constructed wetlands basin
- Retention pond

Maintenance plans. Guidelines for preparing a BMP maintenance plan and requirements for maintenance agreements are presented.

Contents

Attachments

Exhibits

Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ASTM	American Society for Testing and Materials
BMP	best management practice
cfs	cubic feet per second
DO	dissolved oxygen
FEMA	Federal Emergency Management Agency
fps	feet per second
HSPF	Hydrologic Simulation Program-Fortran
Manual	*Post-Construction Stormwater Best Management Practices Manual*
MBP	modular block porous pavement
MDCIA	minimizing directly connected impervious areas
MS4	municipal separate storm sewer systems
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
Program	City of Watertown's Post-Construction Stormwater Management in New Development and Redevelopment Program
SCS	Soil Conservation Service (now called Natural Resources Conservation Service)
SWMM	Storm Water Management Model
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WQCV	water quality capture volume

Definitions

Bioengineered Channel - Utilize vegetative components and other natural materials in combination with structural measures to stabilize existing channels in existing urban areas and areas undergoing urbanization; natural-like channels that are stable and resistant to erosion(UDFCD 2006).

Boatable Channel - Larger, natural, perennial waterways that are regularly used for boating and, because of their size and capacity, are subject to more comprehensive hydraulic analyses and considerations (UDFCD 2006).

Building – Any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property, and occupying more than 100 square feet of area (UDFCD 2006).

Channel – A natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

Channel with Manufactured Liners - Drainageway with artificial lining intended to protect the channel banks and bottom from erosion at higher velocities. These include gabions, interlocked concrete blocks, concrete revetment mats formed by injecting concrete into double layer fabric forms, and various types of synthetic fiber liners (UDFCD 2006).

Composite Channel - Drainage way with a distinct low-flow channel in the cross-section that is vegetated with a mixture of wetland and riparian species (UDFCD 2006).

Concrete-Lined Channel - High velocity drainage way that is lined with concrete; not recommended for use in urban areas (UDFCD 2006).

Detention – The temporary storage of storm runoff in a stormwater management practice with the goals of controlling peak discharge rates and providing gravity settling of pollutants.

Detention Basin – A structure designed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates.

Erosion and Sediment Control – A measure that prevents erosion or prevents eroded sediment from leaving the site.

Grading – Excavation or fill of material, including the resulting conditions thereof.

Grass-Lined Channel - Artificial channel with grass lining.; most frequently used and desirable channel types providing channel storage, lower velocities, and various multiple use benefits (UDFCD 2006).

Infiltration – The process of percolating stormwater into the subsoil.

Maintenance Agreement – A legally recorded document that provides for long-term maintenance of storm water management practices.

Major Drainage Way – A collection and conveyance channel that forms the cornerstone of an urban storm runoff system; may include natural and artificial channels, culverts, long underground conduits and outfalls, streets, property line drainage easements, and other.

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that discharges into waters of the State (as defined below), is designed or used for collecting or conveying stormwater, which is not a combined sewer, and which is not part of a Publicly Owned Treatment Works (POTW) as defined under Federal Regulations at 40 CFR 122.2.

Natural Channel - Channel carved or shaped by nature before urbanization occurs; generally have mild slopes and are reasonably stable (UDFCD 2006).

Owner – The legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

Pollutant – Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Pollution – Contaminants in the air, water, or soil that cause harm to human health or the environment.

Riprap-Lined Channel - Drainage way lined with riprap; compromise between grass-lined channels and concrete-lined channels; provides stability under erosive conditions (UDFCD 2006).

Site – A parcel of land or a contiguous combination thereof, where grading work is performed as a single unified operation.

Stable Channel - An alluvial channel in equilibrium with no significant change in channel cross section with time (UDFCD 2006).

Steady Flow – Flow of water in which conditions at any point in a stream remain constant with respect to time (UDFCD 2006).

Stormwater – Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

Stormwater Management – The use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, and/or peak flow discharge rates.

Stormwater Runoff – The portion of rainfall that does not infiltrate into the ground, and is drained into the stormwater drainage system or waters of the State.

Uniform Flow - The magnitude and direction of velocity in a stream are the same at all locations along the stream at a given time. If a channel is uniform and resistance and gravity forces are in exact balance, the water surface will be parallel to the bottom of the channel for uniform flow (UDFCD 2006).

Unsteady Flow – Flow conditions (e.g., depth) vary with time (UDFCD 2006).

Varied Flow – The discharge, depth, or other characteristics of the flow change along the course of the stream. For a steady flow condition, flow is termed rapidly varied if these characteristics change over a short distance. If characteristics change over a longer stretch of the channel for steady flow conditions, flow is termed gradually varied (UDFCD 2006).

1. Introduction

To meet the conditions of the City of Watertown's National Pollutant Discharge Elimination System (NPDES) Stormwater Phase II Permit, the City must, as stated in the South Dakota Phase II Municipal Guidance Manual, "develop, implement, and enforce measures to address stormwater runoff from new development and redevelopment projects that disturb at least 1 acre, including projects less than 1 acre that are part of a larger common plan of development or sale, that discharge into the MS4 [municipal separate storm sewer systems]." The Phase II Program is required by the Clean Water Act (Section 402, 33 U.S.C. Section 1342).

The standards described in this *Post-Construction Stormwater Best Management Practices Manual* (*Manual*) address the requirements listed in the City of Watertown's Post-Construction Stormwater Management in New Development and Redevelopment Program (Program). The Program must ensure that controls are in place that would prevent or minimize water quality impacts. Strategies developed and implemented must include:

- A combination of structural and non-structural BMPs [best management practices] that is appropriate for the community.
- Use of an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under state or local law.
- Requirements to ensure adequate long-term operation and maintenance of BMPs."

A variety of sources were used to prepare this Manual, including the City of Sioux Falls, South Dakota Chapter 11 Drainage Improvements, The South Dakota Department of Transportation Road Design Manual, Urban Drainage and Flood Control District (Denver, Colorado) Design Criteria Manual, and Washtenaw County, Michigan's Stormwater Rules.

1.1 Applicability

This *Manual* and its contents are applicable to all construction projects in the City of Watertown. Regional drainage master plans completed for watersheds within and near the City of Watertown must be consulted for additional water quantity requirements.

Water quality requirements outlined in this *Manual* are applicable to all sites that are greater than 1 acre in size. In the absence of additional requirements from a drainage master plan, water quantity detention requirements are applicable to those sites with greater than 1 acre of new impervious area. Sites that are 2 acres or less in total area and have less than 1 acre of new impervious surface will be considered to meet the water quality requirements outlined in this Manual if the site is graded appropriately to drain to pervious areas on the site.

This *Manual* also is applicable to land development activities that are smaller than the minimum applicability criteria set forth in the previous paragraph, but as part of a larger common plan of development, fall within the requirements even if multiple, separate, and distinct land development activities take place at different times or on different schedules.

2. Storm Drainage Plans

2.1 General

The following criteria shall be utilized in the analysis of the drainage system.

1. Runoff analysis shall evaluate the change in runoff volume and flow when comparing the pre-developed (or "historic") condition to the post-developed condition.

   The post-developed condition shall be based on proposed land use and shall take into consideration all contributing runoff from areas outside the study areas.

   The analysis of storm runoff from existing developed areas lying outside the study area shall be based on present land use and topographic features.

   The analysis of storm runoff from undeveloped areas lying outside the study area shall be based on planned land use and existing topographic features.

   Whenever the future land use of a specific undeveloped area cannot be accurately predicted, the average runoff coefficient to be used in said area shall not be less than 0.50 for the Rational Method runoff coefficient or an approved equivalent value for any other method.

   The pre-developed (or "historic") condition of a study area shall be described using an average runoff coefficient not more than 0.30 for the Rational Method, or an approved equivalent value for any other method.

2. The probable future flow pattern in undeveloped areas shall be based on existing natural topographic features (existing slopes, drainage ways, etc.).

3. Average land slopes in both developed and undeveloped areas may be used in computing runoff. However, for areas in which drainage patterns and slopes are established, actual slopes and patterns shall be utilized.

4. Flows and velocities which may occur at a design point when the upstream area is fully developed shall be considered. Drainage facilities shall be designed to assure flows and velocities will not cause erosion damage.

5. The use of onsite detention, detention within the development, or detention in a drainage basin of which the development is part may be required.

6. The changing of natural drainage way locations will not be approved unless such change is shown to protect against unreasonable hazard and liability, substantiated by thorough analysis.

7. The planning and design of drainage systems shall be such that problems are not transferred from one location to another. Outfall points shall be designed in such a manner that they will not create flooding hazards.

8. Localized flooding information shall include the area inundated by the major storm runoff.

9. Approval will not be made for any proposed building or construction of any type of structure including retaining walls, fences, etc., or the placement of any type of fill material, which will encroach on any utility or drainage easement or which will impair surface or subsurface drainage from surrounding areas.

2.2 Design Storm Provisions

Urban areas generally have two separate and distinct drainage systems. One is the minor system corresponding to the minor (or ordinary) storm recurring at regular intervals. The other is the major system corresponding to the major (or extraordinary storm). Since the effects and routing of storm water for the major storm may not be the same for the minor storm, all storm drainage plans submitted for approval shall be submitted in detail identifying the effects of both the minor storm and the major storm. Designs for water quality control through stream bank stabilization require that more frequent storm events must be addressed as well.

2.2.1 Minor Storm Provisions

The minor storm drainage system shall be designed to provide protection against regularly recurring damage, to reduce street maintenance costs, to provide an orderly urban drainage system, and to provide convenience to the urban residents. Storm sewer systems consisting of underground piping, natural drainage ways, and other required appurtenances shall be considered as part of the minor storm drainage system. The design storm return frequency shall not be less than 5 years for the minor storm. The design standards for the minor storm system are discussed in further detail in Section 3.

2.2.2 Major Storm Provisions

The major storm drainage system shall be designed to prevent major property damage or loss of life. The effects of the major storm on the minor drainage system shall be noted. The route of the major storm shall be noted to assure an outlet to a designated major drainage way is available. The design storm return frequency shall not be less than 100 years for the major storm. The design standards for the major storm system are discussed in further detail in Section 3. The design standards related to detention of the major storm are discussed in further detail in Section 5.

2.2.3 Water Quality Storm Provisions

The need for managing smaller storms is directly related to the effect of urbanization and the accompanying increase in impervious area, which affects surface water quality in two important ways. First, eroded soil and other pollutants that accumulate on impervious surfaces, such as metals, fertilizers, pesticides, oils and grease, are flushed off by the early stages of runoff, which then carries a shock loading of these pollutants into receiving waterways. Second, as impervious surface area increases and opportunities for infiltration are reduced, the frequency and duration of runoff events intensifies. As a result, streams adjust their capacities to convey the increased flows, leading to channel and bank erosion and the

destruction of aquatic habitat. To meet water quality requirements, the 2-year storm and the water quality capture volume (WQCV) must be detained to meet design criteria. The design standards related to water quality requirements are discussed in further detail in Section 5.

2.3 Design Storm Calculations

2.3.1 Introduction

Presented in this section are the criteria and methodology for determining storm runoff volumes in the City of Watertown for the preparation of storm drainage studies, plans, and facility design.

2.3.2 Design Rainfall

Rainfall depths and intensities to be used for the Watertown area are presented in Exhibit 1.

EXHIBIT 1
Watertown Rainfall Depths and Intensities

Time Interval	5 min		15 min		30 min		60 min		2 hour		24 hour	
	in/hr	in	In/hr	in	in/hr	in	in/hr	in	in/hr	In	in/hr	in
2 year	4.78	0.40	2.86	0.72	2.06	1.03	1.47	1.47	0.79	1.58	0.10	2.40
5 year	6.04	0.50	3.94	0.99	2.81	1.41	1.93	1.93	1.03	2.06	0.14	3.36
10 year	6.94	0.58	4.67	1.17	3.32	1.66	2.25	2.25	1.20	2.40	0.16	3.84
25 year	8.22	0.69	5.68	1.42	4.04	2.02	2.69	2.69	1.44	2.88	0.19	4.56
50 year	9.22	0.77	6.45	1.61	4.59	2.30	3.04	3.04	1.62	3.24	0.21	5.04
100 year	10.21	0.85	7.22	1.81	5.15	2.58	3.38	3.38	1.80	3.60	0.24	5.76

in = inches
in/hr = inches per hour
min = minutes
Source: National Weather Bureau

2.3.3 Rational Method

The Rational Method of calculating storm water runoff is generally acceptable for highly impervious sites less than 100 acres in size; however, it may not be considered an adequate design tool for sizing large drainage systems. All composite runoff coefficients shall be based on the values shown in Exhibit 2. The slopes listed for the semipervious surfaces are the proposed finished slope of the tributary area.

2.3.4 Other Hydrologic Methods

More precise methodologies for predicting runoff such as runoff hydrographs are widely available, and may be required by the City Engineer for sizing the drainage systems on large sites and/or smaller sites that are deemed potentially problematic. Acceptable alternative methods may include use of the following programs:

- U.S. Army Corps of Engineers (USACE) HEC-HMS (Hydrologic Modeling System) and HEC-1
- Natural Resources Conservation Service (NRCS) TR-20 and TR-55
- U.S. Environmental Protection Agency's (USEPA's) Storm Water Management Model (SWMM)
- Others as approved by the City Engineer

Unless a continuous simulation approach to drainage system hydrology is used, all design rainfall events will be based on the Soil Conservation Service (SCS, now called NRCS) Type II distribution. Computations of runoff hydrographs that do not rely on a continuous accounting of antecedent moisture conditions will assume a conservative wet antecedent moisture condition.

EXHIBIT 2
Runoff Coefficients for Rational Method

Type of Surface	Runoff Coefficient (C)[a]
Rural Areas	
Concrete or asphalt pavement	0.8 – 0.9
Gravel roadways or shoulders	0.4 – 0.6
Bare earth	0.2 – 0.9
Steep grassed areas (2:1)	0.5 – 0.7
Turf meadows	0.1 – 0.4
Forested areas	0.1 – 0.3
Cultivated fields	0.2 – 0.4
Urban Areas	
Flat residential, with about 30 percent of area impervious	0.4
Flat residential, with about 60 percent of area impervious	0.55
Moderately steep residential, with about 50 percent of area impervious	0.65
Moderately steep built-up area, with about 70 percent of area impervious	0.8
Flat commercial, with about 90 percent of area impervious	0.8

[a] For flat slopes or permeable soil, use the lower values. For steep slopes or impermeable soil, use the higher value.

Source: South Dakota Department of Transportation Road Design Manual, Chapter 11

2.3.5 NRCS (SCS) Curve Number Method

The NRCS (SCS) Curve Number Method is recommended for drainage systems draining areas greater than 100 acres. The US Department of Agriculture Natural Resources Conservation Service Technical Release 55 "Urban Hydrology for Small Watersheds" dated

June 1986 provides detailed guidance on SCS Curve Number Method calculations and should be used as a reference when performing such calculations.

2.4 Preliminary Drainage Plan

1. The developer shall submit a drainage plan for the drainage basin(s) of which the development is included as part of parcel development discussions with the City. Scale shall be appropriate to adequately display information on plans with additional sheets to show the entire development if necessary. An overall plan at a larger scale shall also be included if necessary to show the entire development on a single sheet.
2. The following information shall be included in the submittal:
    a. A drainage route map will be required. This map shall minimally show:
        i. how the drainage from the proposed development will be transmitted to the nearest major drainage way,
        ii. any existing structure(s) that may limit the flow en route to the major drainage way,
        iii. the drainage area upstream of the proposed development,
        iv. the estimate of flow and volume under current conditions presently draining onto and through the development, and
        v. the estimate of flow and volume under proposed conditions draining onto and through the development.
    b. Identification of existing stormwater management needs and drainage problems upstream and downstream of the development with proposed solutions.
    c. Identification of stormwater management needs and solutions within the development, as well as upstream and downstream of the development, to mitigate drainage impacts attributable to the proposed development.
    d. Identification of downstream and upstream regional stormwater facilities if applicable.
    e. General locations and size of inventoried and potential wetlands shall be identified.
    f. Any and all existing 100-year floodplains must be identified, as shown by Federal Emergency Management Agency (FEMA) maps. FEMA maps may be obtained from the FEMA Map Service Center, available online at: http://msc.fema.gov.
    g. Existing contours at contour intervals sufficient to determine the character and topography of the land, but in no case shall the contour intervals be more than one foot for land with a slope of one (1) percent or less, two feet for a slope between one and ten (10) percent, and five feet for land with a slope exceeding ten percent..
    h. Location and size of existing open channels, bridges, culverts, storm sewers, and ponding areas within the development.

i. Location of streets.

j. Identification of all drainage basins tributary to the development.

k. Drainage patterns within the proposed development.

l. Provide adequate information as to the effect of the drainage pattern on adjacent property. Provide survey data as required for adequate information. Identify the stormwater path to the major drainage way.

2.5 Final Drainage Plan

1. The Final Drainage Plan shall be a detailed plan of the proposed development phase. It shall include detailed data for all runoff within the proposed development phase, and detailed data for the design of all drainage structures within the development phase. This plan shall be submitted prior to receiving a building permit from the City.

2. Drawings and data (actual calculations are required with submittal) comprising the Final Drainage Plan shall include but not be limited to the following information. Scale shall be appropriate to adequately display information on plans with additional sheets to show the entire development if necessary. An overall plan at a larger scale shall also be included if necessary to show the entire development on a single sheet.

   a. Proposed contours at contour intervals sufficient to determine the character and topography of the land, but in no case shall the contour intervals be more than one foot for land with a slope of one (1) percent or less, two feet for a slope between one and ten (10) percent, and five feet for land with a slope exceeding ten percent.

   b. Arrows indicating flow directions for individual lots and drainage paths for minor and major storm events.

   c. Location and elevations of bench marks.

   d. Property lines.

   e. Recommended building pad elevations

   f. Streets, names, and grades.

   g. Existing drainage facilities and structures, including existing roadside ditches, drainage ways, gutter flow directions, culverts, etc. All pertinent information such as size, shape, slope, location, etc., also shall be included to facilitate review and approval of drainage plans. Flow areas will be delineated.

   h. Proposed storm sewers and open drainage ways, easement and right-of-way requirements, including proposed inlets, manholes, and culverts. Specific notes and design details concerning erosion control and energy dissipation, including but not limited to flow volume, discharge rate, velocity, and shear stress, shall be provided.

   i. Proposed outfall point for runoff from the development phase.

j. Routing and accumulative flows at various critical points for the minor and major storm runoff.

k. Streets in which 100-year storm flow is conveyed should be noted.

l. The 100-year flood level in all streets in which the curb is overtopped during the 100-year storm for sump condition or other critical points.

m. The 100-year flood elevations for major and lateral drainage ways.

n. Inlet flow data.

o. Pipe flow data.

p. All floodplains, identified by FEMA maps, within the proposed development phase.

q. Location and size of inventoried and potential wetlands.

r. Hydrological data for each drainage area, including the following:

    i. Areas

    ii. Runoff coefficients

    iii. Projected land uses and existing physical features of areas contributing runoff

    iv. Runoff (Q) (Note: This list of criteria assumes use of the Rational Method formula. If a different method is used, all relevant factors are to be enumerated.)

s. Major drainage ways, as follows:

    i. Alignments

    ii. Profiles including existing and proposed

    iii. "n" values (Manning)

    iv. Velocities

    v. Soils analysis with a discussion of the proposed channel erosion potential

    vi. Froude number

t. Design recommendations, including the following:

    i. Dikes

    ii. Filling low areas

    iii. Provision of easements

    iv. Recommendations against building in certain areas

    v. Provisions for onsite retention and detention

    vi. Other as appropriate for conditions

2.6 Existing Floodplain Map—Revisions

All submittals for floodplain revision must be reviewed and approved by FEMA or its authorized agent. The City will not take responsibility for time, scheduling, or cost involved in floodplain map revisions or letters of map amendments.

The developer is responsible for submitting all information to FEMA. Copies of all information sent to and correspondence with FEMA also must be sent to the City.

2.7 Review by Other Agencies

All open channel construction and existing drainage way modifications will be reviewed by the City. The developer must separately submit the plan for review by other applicable county, state, or federal agencies.

3. Storm Sewers

3.1 Design Flow Methods

For areas smaller than 100 acres, the Rational Method formula is acceptable to compute runoff. For areas larger than 100 acres, the SCS Method or other acceptable computer applications shall be used. (Refer to Section 2.3.4 for additional detail.)

3.2 Material and Installation

All construction shall be in accordance with the City of Watertown's Technical Specifications for the Construction of Storm Sewers and Standard Plates for drainage improvements.

3.3 Location of Storm Sewers

All public storm sewers shall be installed in the public easement or public right-of-way. If storm sewer pipe is placed on backlot lines or otherwise placed across private property, a drainage easement is required provided the pipe is used to drain public storm water. If the storm sewer pipe is to be used for private storm water runoff, no easement is required.

Placement

Storm sewer must be extended to the far edge of the platted subdivision to be serviced, regardless of where the inlets are placed if needed to service future development.

Easements

All easements must be mutually exclusive for the City of Watertown. Easements shall be identified as public utility and drainage easements. Final Drainage Plans shall identify the type of easement.

All drainage easements must be a minimum of 20 feet wide; additional width for access may be required. The pipe shall be placed only along the center of the easement, unless approved by the City Engineer.

No landscaping except grass may be placed in the easement.

No permanent structure may be placed in the easement.

3.4 Size of Storm Sewers

No public storm sewer shall be less than 15 inches in diameter. Trunk storm sewers must be a minimum of 18 inches in diameter.

All changes in pipe size must occur at a manhole, inlet, or junction box.

3.5 Minimum Allowable Depth

The minimum allowable sewer depth of cover shall be 18 inches.

3.6 Pipe Requirements

Pipes shall be sized to convey a 5-year flow. Hydraulics of the sewer shall be analyzed. To prevent overflow, the hydraulic gradient shall remain below the gutter or ground surface elevation.

Storm sewer pipe shall be reinforced concrete unless otherwise approved by the City Engineer. The "class" of reinforced concrete pipe shall be shown on the plans.

Storm sewer pipe made of other materials such as polyethylene may be approved by the City Engineer for private development storm sewer or storm sewer to be installed outside paved street section.

Coefficients of roughness, "n," for use in the Manning formula as listed below shall normally be used:

Type of pipe	"n"
Concrete	0.013
Polyethylene	0.010

3.7 Velocity Requirements

The minimum allowable velocity in a storm sewer shall be 3 feet per second (fps). The maximum velocity shall be 15 fps.

3.8 Pipe Strength Requirements

Pipe specified shall meet American Association of State Highway and Transportation Officials (AASHTO) HS-20 loadings.

3.9 Alignment

Sewers shall be installed with a straight alignment between structures with the following exceptions. In locations where layouts are such that a straight alignment is not practical, sewers may be curved. The curvature must be concentric with the curvature of the street. The pipe manufacturer's recommended maximum deflection angle shall not be exceeded. Storm sewer bends will be shown as required. The City Engineer may require a structure instead of a bend.

3.10 Separation

Storm sewer crossings of a water main or sanitary sewer will be performed in accordance with the City of Watertown General Requirements Specifications.

4. Open Channel Flow, Major Drainage Way

4.1 General

4.1.1 Design Flows

All channels will be designed with the 2-year, 5-year, and 100-year storm frequencies considered. The major drainage system, including residual floodplain, must be able to convey the flow from a fully urbanized watershed for the event with a 100-year recurrence interval without significant damage to the system. Methods for calculating design flows are described in Chapter 2 of this Manual.

4.1.2 Open Channel Flow

Major drainage systems will be designed based on steady and uniform flow conditions, unless it is determined that more detailed modeling/analysis is required. Manning's Equation will be used to describe the relationship between channel geometry, slope, roughness, and discharge for uniform flow:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

in which:

Q = discharge rate for design conditions (cfs)
n = Manning's roughness coefficient
A = cross-sectional area (ft^2)
R = hydraulic radius A/P (ft)
P = wetted perimeter (ft)
S = slope of the energy grade line (ft/ft)

Exhibit 3 provides guidance on values of roughness coefficients to use for channel design. Both maximum and minimum roughness coefficients shall be used for channel design to check for sufficient hydraulic capacity and channel lining stability, respectively.

EXHIBIT 3
Roughness Coefficients (Manning's n) for Channel Design

Channel Type	Roughness Coefficient (n)		
	Minimum	Typical	Maximum
I. Excavated or Dredged			
1. Earth, straight and uniform			
a. Gravel, uniform section, clean	0.022	0.025	0.030
b. With short grass, few weeds	0.022	0.027	0.033
2. Earth, winding and sluggish			
a. Grass, some weeds	0.025	0.030	0.033
b. Dense weeds or aquatic plants	0.030	0.035	0.040

EXHIBIT 3
Roughness Coefficients (Manning's n) for Channel Design

Channel Type	Roughness Coefficient (n)		
	Minimum	Typical	Maximum
c. Earthy bottom and rubble/riprap sides	0.028	0.030	0.035
3. Channels not maintained, weeds and brush uncut			
a. Dense weeds, high as flow depth	0.050	0.080	0.120
b. Clean bottom, brush on sides	0.040	0.050	0.080
II. Natural streams (top width at flood stage 100 ft)			
1. Streams on plain			
a. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
b. Clean, winding, some pools and shoals, some weeds and stones	0.035	0.045	0.050
c. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150
III. Lined or Built-Up Channels			
1. Concrete			
a. Trowel/float finish	0.011	0.015	0.016
b. Shotcrete	0.016	0.020	0.025
2. Gravel bottom with sides of:			
a. Formed concrete	0.017	0.020	0.025
b. Random stone in mortar	0.020	0.023	0.026
c. Dry rubble or riprap	0.023	0.033	0.036
3. Wetland Bottom Channels		See Exhibit 4	
4. Grass-Lined Channels and Swales		See Exhibit 5	

Source: Urban Drainage and Flood Control District

4.1.3 Flow Regime

Channels shall be designed in such a manner that critical and supercritical flows are avoided.

The Froude number, Fr, shall be used to define the flow regime: subcritical (Fr < 1), critical (Fr = 1), or supercritical (Fr > 1). The Froude number is given by:

$$Fr = \frac{V}{\sqrt{gd}}$$

in which:

V = mean cross-sectional velocity (ft/sec)
g = acceleration of gravity = 32.2 ft/sec^2
d = hydraulic depth (ft) = A/T, cross-sectional area/top width of free surface

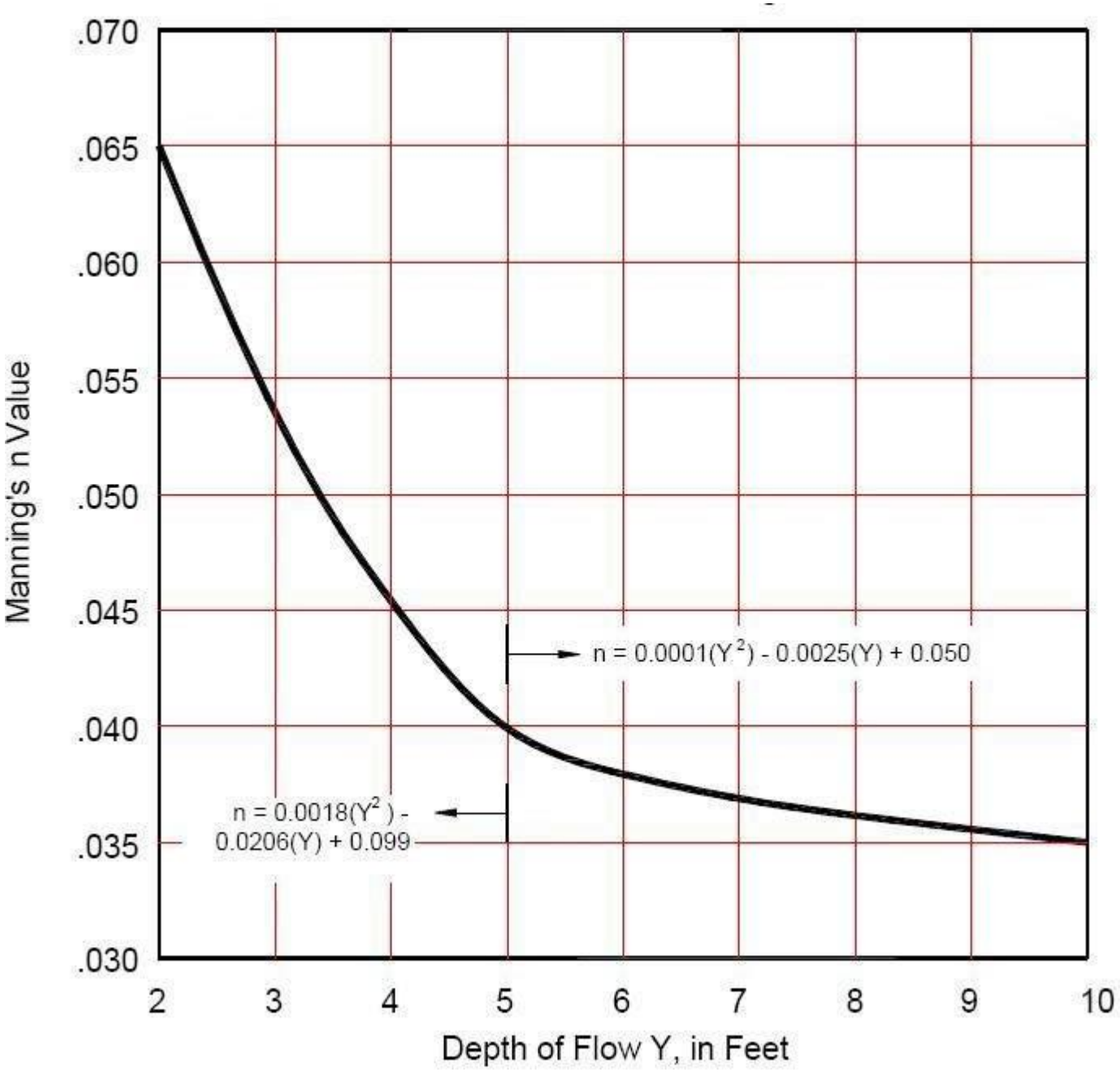
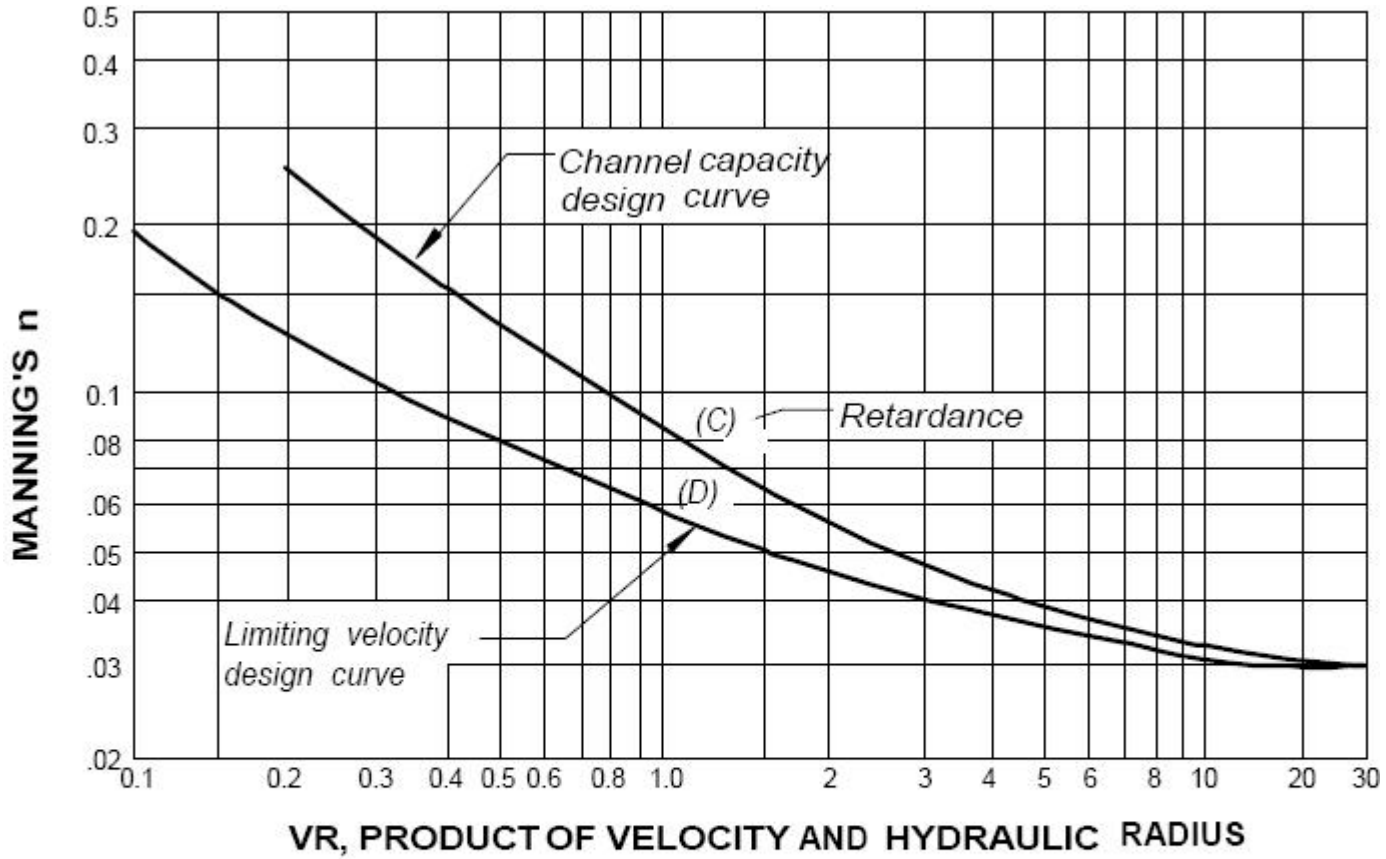


EXHIBIT 4
Manning's n vs. Depth for Low-Flow
Section in a Composite Channel
Watertown Post-Construction Manual



From "Handbook of Channel Design For Soil and Water Conservation,: U.S. Department of Agriculture, Soils Conservation Service, No. SCS-TP-61 March, 1947, Rev. June, 1954

EXHIBIT 5
Manning's n vs. VR for Two Retardances in Grass-Lined Channels
Watertown Post-Construction Manual

WB032008013MKE Exhibit_5_Manns_Depth_LowFlow_v1 03-21-08 sls

Subcritical Flow

Major drainage design should seek to create channels with subcritical flow regimes.

For all subcritical channels, check the Froude number using the minimum value of n. When performing hydraulic computations for grass-lined channels, the n values for the 0.1-foot to 1.5-feet flow depth range are generally suitable for calculating the wetted channel portion for the initial storm runoff. For major runoff computations, however, the greater than 3.0-feet depth values are more appropriate since flows will tend to lay the grass down to form a smoother bottom surface.

A concrete-lined channel should not be used for subcritical flows except in unusual circumstances where a narrow right-of-way exists.

A subcritical channel shall not be designed with a Froude number greater than 0.8 using the velocity and depth calculated with the lowest recommended range for Manning's n. When designing a concrete-lined channel for subcritical flow, use a Manning's n = 0.013 for capacity calculations and 0.011 to check whether the flow could become supercritical.

Critical Flow

Flows at Froude numbers between 0.8 and 1.2 are unstable and unpredictable and should be avoided. If the depth is found to be at or near critical, the shape or slope should be changed to achieve greater hydraulic stability.

Supercritical Flow

All channels carrying supercritical flow shall be lined with continuously reinforced concrete linings, both longitudinally and laterally. Requirements in Section 4.3.5 shall apply to concrete-lined channels.

4.2 Design Considerations

4.2.1 Design Velocity

Minimum and maximum velocities shall be considered in the design of major drainage systems.

Channels with high velocity flows shall utilize drop structures, suitable channel lining, check dams or other velocity controls to minimize erosion and maintain channel stability.

Flow velocities during the major design storm (100-year) must recognize the scour potential of the channel, whether natural, grassed, bioengineered, riprapped or concrete-lined. Average velocities need to be determined using backwater calculations, which account for water drawdowns at drops, expansions, contractions and other structural controls. Velocities must be kept sufficiently low to prevent excessive erosion in the channel. Flow velocities and Froude numbers should not exceed those given in Exhibit 6 for non-reinforced channel linings and, in general, velocities should not exceed 18 ft/sec for reinforced channel linings.

For estimating maximum velocities for erosive or hazard considerations or localized scour in a channel, relying only upon the HEC-2 or HEC-RAS outputs for the cross section is not

acceptable; a more detailed hydraulic analysis of the specific cross section, which accounts for variable velocities across the channel, is necessary.

EXHIBIT 6
Trapezoidal Channel DesignGuidance/Criteria

Design Item	Criteria for Various Types of Channel Lining			
	Grass: Erosive Soils	Grass: Erosion Resistant Soils	Riprap	Concrete
Maximum 100-yr velocity	5.0 ft/sec	7.0 ft/sec	12.0 ft/sec	18.0 ft/sec
Minimum Manning's n - stability check	0.030	0.030	0.030	0.010
Maximum Manning's n - stability check	0.035	0.035	0.040	0.013
Maximum Froude number	0.5	0.8	0.8	N/A
Maximum depth outside low-flow zone	5.0 ft	5.0 ft	N/A	N/A
Maximum channel longitudinal slope	0.6%	0.6%	1.0%	N/A
Maximum side slope	4H:1V	4H:1V	2.5H:1V	1.5H:1V [4]
Minimum centerline radius for a bend	2 x top width	2 x top width	2 x top width	2 x top width
Minimum freeboard [3]	1.0 ft [1]	1.0 ft [1]	2.0 ft [1]	2.0 ft [2]

[1] Suggested freeboard is 2.0 ft to the lowest adjacent habitable structure's lowest floor.
[2] For supercritical channels, use the freeboard recommended in Section 4.3.1.5 for final design.
[3] Add superelevation to the normal water surface to set freeboard at bends.
[4] Side slopes may be steeper if designed as a structurally reinforced wall to withstand soil and groundwater forces.

Source: Urban Drainage and Flood Control District

4.2.2 Design Depth

The maximum design depths of flow should account for the scour potential of the channel lining and the bank materials. The design depth for the 100-year flood event should not exceed 5.0 feet in areas of the channel cross section outside the low-flow channel area, and less depth is desirable for channel stability. Low-flow channel depth should be between 3.0 and 5.0 feet.

4.2.3 Design Slope

Channel Slope

The slope of a channel should not be so steep as to result in a Froude number greater than 0.5 or 0.8, depending on soil erodibility characteristics (see Exhibit 6), for the 100-year event. Slopes for channels with vegetative linings should not exceed 0.6% and should be less than 1% for channels with reinforced concrete linings. For steep-gradient drainageways, drop structures are necessary to meet slope criteria.

Side Slope

For grassed channels, channels with wetland bottoms, and bioengineered channels, side slopes should not be steeper than 4H:1V (See Exhibit 6). Under special conditions in areas of existing development (i.e., not new development) and where right-of-way is a problem, the slopes may be as steep as 3H:1V. Channels that require minimal slope maintenance such as concrete channels may have side slopes as steep as 1.5H:1V, although public safety issues must be taken into account. For riprap-lined channels, side slopes should not be steeper than 2.5H:1V.

Side slopes should be designed to accommodate maintenance and public safety. Side slopes steeper than 3H:1V are not recommended in residential areas or areas with frequent foot traffic. Fencing or railings may need to be considered if side slopes will be steeper than 3H:1V in these areas.

4.2.4 Curvature

Generally, the centerline curvature of the channel shall have a radius of at least twice the top width of the 100-year flow channel. Concrete channels that may experience supercritical flow conditions should not have any curvature.

Superelevation must also be considered with respect to curvature. For subcritical flows, superelevation can be estimated by:

$$\Delta y = \frac{V^2 T}{2 g r_C}$$

in which:

Δy = increase in water surface elevation above average elevation due to superelevation (ft)
V = mean flow velocity (ft/sec)
T = top width of the channel under design flow conditions (ft)
g = gravitational constant = 32.2 ft/sec^2
r_C = radius of curvature (ft)

4.2.5 Freeboard

The amount of residual freeboard that must be allowed depends on the type of channel and the location and elevation of structures adjacent to the channel. Exhibit 6 provides minimum guidelines for freeboard height.

In general, a minimum residual freeboard of 1 to 2 feet should be allowed between the water surface and top of bank. More specific freeboard requirements are discussed with relation to specific channel types in Section 4.3.

4.2.6 Erosion Control and Channel Lining

All channels shall be designed with proper and adequate erosion control features. When required, drops or check dams shall be installed to control water surface profile slope. Future urbanization shall be considered when considering erosion potential.

Riprap armoring shall be used as necessary for grassed, bioengineered, or wetland bottom channels.

Grade control structures should be spaced to limit channel degradation to what is expected to be the final stable longitudinal slope after full urbanization of the tributary watershed. Special consideration should be given to segments with constrictions and poorly vegetated areas.

Channel construction/improvement should be scheduled during dryer times in the year to reduce the risk of erosion from storm runoff. Temporary stabilization measures including seeding and mulching and erosion controls such as installation and maintenance of silt fencing should be used during construction of major drainage improvements to minimize erosion.

Watershed level erosion and sediment control is regulated at the federal, state, regional, and local levels, and is beyond the scope of this Manual.

Lining must be designed to withstand the various forces and actions that tend to overtop the bank, damage the lining, and cause erosion.

Natural-like channel linings are preferred; however, in some situations where right-of-way is limited within the constraints of an already-urbanized area, hard-lined channels (i.e., riprap or concrete) may be necessary to assure a stable drainageway. Hard-lined channels should not be used for new developments.

Natural-like channel linings should have gentle to mild slopes and should be constructed for residential areas and areas with public access.

Manufactured channel linings such as gabions, interlocked concrete blocks, synthetic linings, etc., should be used with caution, and each type of channel lining must be scrutinized for its merits, applicability, ability to meet other community needs, long term integrity, and maintenance needs and costs.

4.2.7 Riprap

The stone sizing for riprap used for channel lining shall be determined by the following:

$$\frac{V S^{0.17}}{d_{50}^{0.5}(G_S - 1)^{0.66}} = 4.5$$

in which:

V = mean channel velocity (ft/sec)
S = longitudinal channel slope (ft/ft)
d_{50} = mean rock size (ft)
G_S = specific gravity of stone (minimum = 2.65)

This equation is applicable for sizing riprap for channel lining; it is not intended for use in sizing riprap for culvert outlet protection. See section 3.X for sizing riprap for culvert outlet protection.

Exhibit 7 shall be used to determine the minimum size of rock type required. Exhibit 8 provides details of riprap classifications. Additional information is available in SDDOT specification 830 RIPRRAP.

EXHIBIT 7
Riprap Requirements for Channel Linings

$\frac{VS^{0.17}}{(G_s-1)^{0.66}}$ **	Riprap Class
<4	Class A (d_{50} = 0.95 feet)
≥4 and <4.6	Class B** (d_{50} = 1.3 feet)
≥4.6 and <5.6	Class C** (d_{50} = 1.8 feet)
≥5.6 to 6.4	Class D** (d_{50} = 2.25 feet)

* Applicable only for a Froude number of < 0.8 and side slopes no steeper than 2H:1V.

** Use Gs = 2.65 unless the source of rock and its density are known at time of design.

Source: Urban Drainage and Flood Control District and South Dakota Department of Transportation

EXHIBIT 8
Classification and Gradation of Riprap

Riprap Class	Rock Size in feet	Rock Size in Pounds	Percent of Riprap Smaller Than
A	1.30	200	100
	0.95	75	50
	0.4	5	15
B	1.80	500	100
	1.30	200	50
	0.40	5	15
C	2.25	1000	100
	1.80	500	50
	0.95	75	15
D	2.85	2000	100
	2.25	1000	50
	1.80	500	15
E	3.60	4000	100
	2.85	2000	50
	2.25	1000	15
F	4.50	8000	100
	3.60	4000	50
	2.85	2000	15

Based on a specific gravity of 2.65 and spherical shape
Source: South Dakota Department of Transportation

Rock-lined side slopes steeper than 2.5H:1V are considered unacceptable under any circumstances because of stability, safety, and maintenance considerations. Proper bedding

is required both along the side slopes and the channel bottom for a stable lining. The riprap blanket thickness should be at least 1.75 times d_{50} (at least 2.0 times d_{50} in sandy soils) and should extend up the side slopes at least 1 foot above the design water surface. At the upstream and downstream termination of a riprap lining, the thickness should be increased 50% for at least 3 feet to prevent undercutting.

Where only the channel sides are to be lined and the channel bottom remains unlined, additional riprap is needed to protect such lining. In this case, the riprap blanket should extend at least 3 feet below the channel thalweg (invert) in erosion resistant soils, and the thickness of the blanket below the existing channel bed should be increased to at least 3 times d_{50} to accommodate possible channel scour during higher flows. If the scour depth for the 100-year flow exceeds 3 feet, the depth of the riprap blanket should be increased accordingly. As an alternative, a thinner layer of riprap (i.e., 1.75 to 2.0 d_{50}) may be used in the toe provided it is extended to 5.0 feet below the channel bottom. For sandy soils, it will be necessary to extend the riprap toe to even greater depths (5-foot minimum) and site-specific scour calculations are recommended.

When riprap is used to protect a channel at transitions, it should extend upstream from the transition entrance at least 5 feet and downstream from the transition exit for a distance equal to at least 5 times the design flow depth.

Shear Stress

Flow induced shear stress should not exceed the permissible shear stress for the lining material. Shear stress will be calculated as the following:

$$\tau = \gamma RS$$

If the width is very large in relation to the depth, the maximum shear stress can be calculated as the following:

$$\tau_d = \gamma d S$$

in which:

τ = shear stress (lb/ft^2)
τ_d = maximum shear stress at normal depth (lb/ft^2)
τ_p = permissible shear stress (lb/ft^2)
γ = unit weight of water (62.4 lb/ft^3)
R = hydraulic radius A/P (ft)
d = maximum depth of flow (ft)
S = average bed slope or energy slope (ft/ft)

Determine the permissible shear stress, τ_p in lbs/ft^2 for the lining material. If $\tau_d < \tau_p$ then lining is acceptable.

4.2.8 Maintenance

Operation and maintenance including access shall be considered in design of all channels.

All major drainage channels shall be maintained to ensure that they are capable of conveying their design flow, such as the 100-year flow (as well as more frequently occurring flows) and to ensure that channels do not become a public nuisance and eyesore. This includes routine maintenance (i.e., mowing for weed control or annual or seasonal clean-outs), unscheduled maintenance (i.e., inspection and cleanout after large events) and restorative maintenance.

Native tall grasses shall be mowed three to six times per year or on a less frequent schedule, depending on the type of channel and setting.

A maintenance access platform with a minimum passage width of 12 feet shall be constructed along the entire length of all major drainageways except at drop structures, where a 20 foot maintenance platform shall be provided. The maintenance road should be surfaced with 6-inches of Class 2 road base or a 5-inch-thick concrete slab.

All maintenance activities are the responsibility of the property owner.

4.2.9 Public Safety

The channel shall be designed to protect from major flooding resulting in extensive property damage and loss of life. Specific safety practices shall be employed as needed.

For concrete channels, a 6-foot-high chain-link or comparable fence shall be installed to prevent access wherever the 100-year depth exceeds 3 feet. Appropriate numbers of gates, with top latch, shall be placed and staggered where a fence is required on both sides of the channel to permit good maintenance access. In addition, ladder-type steps shall be installed not more than 200 feet apart on alternating sides of the channel. A bottom rung shall be placed approximately 12 inches vertically above the channel invert.

4.3 Channel Design Criteria

4.3.1 Natural Channels

Whenever feasible, natural channels should be kept as near to natural conditions as possible by limiting modifications to those necessary to protect against the destabilizing hydrologic forces caused by urbanization.

The channel and overbank floodplain should have adequate capacity for the 100-year flood.

Outfalls into natural channels should be 2 feet above the channel invert to account for vegetation and sediment accumulation. The engineer should visit the site of any outfalls into natural drainageways to examine the actual ground surface condition.

4.3.2 Grass-Lined Channels

Unless otherwise specified, the design criteria shown in Exhibit 6 shall be used for grass-lined channels.

Bridge deck bottoms and sanitary sewers shall be considered when evaluating freeboard along the channel in urban areas. In general, a minimum freeboard of 1 to 2 feet should be allowed between the water surface and top of bank. A 3-foot freeboard should be used

along major streams where the potential for significant timber and other debris exists during a flood event. Superelevation shall be evaluated in addition to freeboard at curves.

For a given discharge, the bottom width shall be determined using the depth, velocity, and Froude number constraints described in Exhibit 6 and in previous sections.

Outfalls into grass-lined, major channels should be at least 1 foot (preferably 2 feet) above the channel invert with adequate erosion protection provided.

Riprap and other erosion prevention techniques shall be used at all structures within the channel.

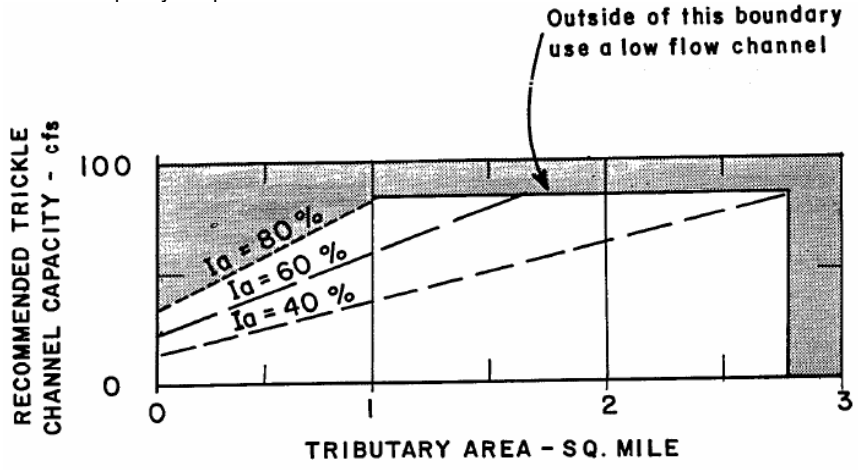
4.3.3 Trickle and Low-Flow Channels

When base flow is present or is anticipated as the drainage area develops, a trickle or low-flow channel shall be provided. A trickle channel with a porous bottom (i.e., unlined or riprapped) or a low-flow channel is required for all urban grass-lined channels.

Low flows must be carried in a trickle channel, a low-flow channel, or an underdrain pipe. The capacity of a trickle channel should be approximately 2.0% of the major (100-year) design flow for the fully developed condition assuming no upstream detention. If an underdrain pipe is used, it should be at least 24 inches in diameter, have access manholes at least every 200 feet, and have a slope so that a velocity of at least 3 ft/sec is maintained at ½ full pipe depth. Due to maintenance issues, underdrains are generally not recommended.

Exhibit 9 should be used to estimate the required capacity of a trickle flow channel based on the percent of impervious area, Ia. For flows exceeding the limits in Exhibit 9 or where a natural gulch or stream exists, a separate low-flow channel having stabilized banks should be used. A low-flow channel should have a minimum capacity of ⅓to ½ of the 2-year peak flow under the fully developed watershed conditions. To the extent practicable, a low-flow channel should be gently sloped and shallow to promote flow through the channel's vegetation.

EXHIBIT 9
Minimum Capacity Required For Trickle Channels



Note: I_a = tributary basin impervious area percentage using full basin development condition.

Source: Urban Drainage and Flood Control District

A soil-riprap mix should be used for low-flow channel lining to provide a stable, vegetated low-flow channel for grass-lined wetland bottom and bioengineered channels. Soil and riprap should be mixed prior to placement for the low-flow channels. Soil-riprap low-flow channels should have a cross slope of 1% to 2%. The longitudinal slope should be consistent with the channel type used.

4.3.4 Composite Channels

A channel with a stabilized low-flow section and an overflow section, or a composite channel, shall be used when the trickle flow channel capacity limits are exceeded. It shall be assumed that wetland and other flow-retarding vegetation will develop in the low-flow section over time.

Composite channels differ from smaller grass-lined channels by (1) the absence of an impermeable trickle channel, (2) gentler longitudinal slopes and wider bottom widths that encourage shallow, slow flows, (3) greater presence of hydrophytic vegetation along the channel's bottom and lower banks, and (4) non-applicability of the 1% to 2% cross-slope criterion. Another major difference is that a wetland bottom channel should be designed as a low-flow channel having a capacity to carry the 2-year flood peak, instead of the ⅓to ½ of the 2-year peak required for low flow channels.

Outfalls into conveyances with low-flow channels should be at least 2 feet above the low-flow channel invert.

A composite roughness coefficient (Manning's n) shall be used in uniform flow calculations.

A 1 to 2-foot drop structure should be provided immediately downstream of all crossings that require a culvert or bridge.

4.3.5 Concrete-Lined Channels

Concrete-lined channels are not recommended for general use unless hydraulic, topographic, or right-of-way constraints necessitate their use.

Concrete-lined channels conveying supercritical flows should follow practices outlined in the supercritical flow regime section.

There shall be no reduction of wetted area cross section at bridges or culverts. Freeboard shall be adequate to provide a suitable safety margin. Bridges or other structures crossing the channel must be anchored satisfactorily to withstand the full dynamic load that might be imposed upon the structure in the event of major trash plugging.

The concrete linings must be protected from hydrostatic uplift forces that are often created by a high water table or momentary inflow behind the lining from localized flooding. A perforated underdrain pipe, designed to be free draining, is required under the lining. Hydraulic jumps shall be avoided.

Construction inspection shall be performed to insure that the selected roughness is obtained for concrete linings. Because of field construction limitations, the designer should use a Manning's n roughness coefficient equal to 0.013 for a well-trowelled concrete finish. Other finishes should have proportionately larger n values assigned to them.

Freeboard above the design water surface shall not be less than that determined by the following equation or 2 feet:

$$H_{fb} = 2 + 0.025V(y_0)^{1/3} + \Delta y$$

in which:

H_{fb} = freeboard height (ft)
V = velocity of flow (ft/sec)
y_0 = depth of flow (ft)
Δy = increase in water surface elevation due to superelevation at bends (no bends allowed in supercritical channels)

All concrete lining shall be designed to withstand the anticipated hydrodynamic and hydrostatic forces, and the minimum thickness shall be no less than 7 inches for supercritical channels and no less than 5 inches for subcritical channels. A free draining granular bedding shall be provided under the concrete liner and shall be no less than 6-inches thick for channels with Froude number ≤ 0.7 and 9-inches thick for channels with Froude number ≥ 1.4.

Concrete joints must satisfy the following criteria: 1. Channels shall be constructed of continuously reinforced concrete without transverse joints; 2. Expansion/contraction joints shall be installed where new concrete lining is connected to a rigid structure or to existing concrete lining which is not continuously reinforced; 3. Longitudinal joints, where required, shall be constructed on the sidewalls at least 1 foot vertically above the channel invert; 4. All joints shall be designed to prevent differential movement; and 5. Construction joints are required for all cold joints and where the lining thickness changes. Reinforcement shall be continuous through the joint.

Longitudinal underdrains shall be provided along the channel bottom on 10-foot centers within a freedraining bedding under the channel lining, be free draining, and daylight at check drops (when applicable). A check valve or flap valve shall be provided at the outlet to prevent backflow into the drain. Appropriate numbers of weep holes and one-way valves shall be provided in vertical wall sections of the channel to relieve hydrostatic pressure.

Outfalls into concrete-lined channels should be at least 1 foot above the channel invert.

4.3.6 Riprap-Lined Channels

Channel linings constructed from soil riprap, grouted boulders, or wire-encased rock to control channel erosion may be considered on a case-by-case basis, or may be required as the case may be, for the following situations: (1) Where major flows such as the 100-year flood are found to produce channel velocities in excess of allowable non-eroding values (5 ft/sec for sandy soil conditions and 7 ft/sec in erosion resistant soils) or when main channel depth is greater than 5 feet; (2) Where channel side slopes must be steeper than 3H:1V; (3) For low-flow channels; and (4) Where rapid changes in channel geometry occur such as channel bends and transitions.

Riprap-lined channels should only be used for subcritical flow conditions where the Froude number is 0.8 or less. When used, it is recommended that all riprap outside frequent flow

zones have the voids filled with soil, the top of the rock covered with topsoil, and the surface revegetated with native grasses, namely, use soil riprap.

Basic requirements for riprap stone are as follows:

- Rock shall be hard, durable, angular in shape, and free from cracks, overburden, shale, and organic matter.
- Neither breadth nor thickness of a single stone should be less than one-third its length, and rounded stone should be avoided.
- The rock should sustain a loss of not more than 40% after 500 revolutions in an abrasion test (Los Angeles machine ASTM C-535-69) and should sustain a loss of not more than 10% after 12 cycles of freezing and thawing (AASHTO test 103 for ledge rock procedure A).
- Rock having a minimum specific gravity of 2.65 is preferred; however, in no case should rock have a specific gravity less than 2.50.

When grouted bouldering is used, the boulders should meet all the properties of rock for ordinary riprap, and rock of uniform size should be used. Grouted boulders should be placed directly on subbase without granular bedding. The top one-half of the boulders shall be left ungrouted and exposed. Weep holes should be provided at the toe of channel slopes and channel drops to reduce uplift forces on the grouted channel lining. Underdrains should be provided if water is expected to be present beneath the liner. Grouted boulders on the banks should be buried and vegetated with dry-land grasses and shrubs. At least 18 inches of soil must be used to cover grouted riprap for establishing dry-land vegetation.

If wire enclosed rock, or gabions, are used, they should be placed above the low-flow channel or 2-year water surface elevation. All flat mattresses must be filled with topsoil and then covered with a 6-inch layer of topsoil.

Bedding shall be properly designed to provide long-term stability of the riprap lining.

4.3.7 Bioengineered Channels

Bioengineered channels are applicable when channel designs are firmly grounded in engineering principles and the following conditions are met: (1) Hydrologic conditions are favorable for establishment and successful growth of vegetation; (2) Designs are conservative in nature, and bioengineered features are used to provide redundancy; (3) Maintenance responsibilities are clearly defined; (4) Adequate structural elements are provided for stable conveyance of the major runoff flow; and (5) Species are selected based on individual site characteristics.

5. Best Management Practices

For sites that are larger than 1 acre but have less than 1 acre of new impervious area, only the requirements of Section 5.1, Step 1 are required. For sites with greater than 1 acre of new impervious area, all requirements outlined in Section 5.1 are applicable.

5.1 Three-Step Process of Best Management Practices

The following process is recommended for selecting structural BMPs in newly developing and redeveloping urban areas:

1. Step 1—Employ Runoff Reduction Practices (applicable to all sites larger than 1 acre)

   To reduce runoff peaks and volumes from urbanizing areas, employ a practice generally called "minimizing directly connected impervious areas" (MDCIA). The principal behind MDCIA is two-fold: to reduce impervious areas and to route runoff from impervious surfaces over grassy areas to slow down runoff, promote infiltration, and reduce costs. The benefits are less runoff, less storm water pollution, and less cost for drainage infrastructure. There are several approaches to reduce the effective imperviousness of a development site:

   a. Reduced pavement area

      Creative site layout can reduce the extent of paved areas.

   b. Porous pavement

      The use of modular block porous pavement or reinforced turf in low traffic zones such as parking areas and low use service drives such as fire lanes can significantly reduce site imperviousness.

   c. Grass buffers

      Draining impervious areas over grass buffers slows down runoff and encourages infiltration, in effect reducing the impact of the impervious area.

   d. Grass swales

      The use of grass swales instead of storm sewers slows down runoff and promotes infiltration, also reducing effective imperviousness and detention.

      Two approaches for reducing imperviousness are structural BMPs and are described in detail in the following sections:

      5.2 Grass Buffer
      5.3 Grass Swale

2. Step 2—Provide Water Quality Capture Volume (applicable to all sites with greater than 1 acre of new impervious area)

A fundamental requirement for any site addressing storm water quality is to provide WQCV. One or more of four types of water quality basin BMPs, each draining slowly to provide for long-term settling of sediment particles, may be selected. Each of these BMPs are to be designed to treat a specified WQCV following the process described in detail in the following sections:

5.5 Porous Landscape Detention
5.6 Extended Detention Basin
5.7 Constructed Wetland Basin
5.8 Retention Pond

3. Step 3—Provide 2- and 100-Year Storage Volume (applicable to those sites with greater than 1 acre of new impervious area unless controlled through a regional drainage master plan)

   Storage also must be provided for the 100-year 24-hour storm. The use of onsite detention is required at those locations where storage for the 2- and 100-year storms is not provided by a regional facility.

   Providing storage for the 2-year storm is meant to reduce stream erosion downstream, while providing storage for the 100-year storm is meant to reduce the possibility of damaging floods downstream. Wherever possible, it is recommended that WQCV facilities be incorporated into storm water quantity detention facilities. For further guidance, see Section 5.4, Incorporating Storm Water Quantity Control into Water Quality Capture Basins.

5.2 Grass Buffer

5.2.1 Description

Grass buffer strips are an integral part of the MDCIA land development concept. They are uniformly graded and densely vegetated areas of turf grass. They require sheet flow to promote filtration, infiltration, and settling to reduce runoff pollutants. Grass buffers differ from grass swales as they are designed to accommodate overland sheet flow rather than concentrated or channelized flow. They can be used to remove sediment from runoff of impervious areas.

Whenever concentrated runoff occurs, it should be evenly distributed across the width of the buffer via a flow spreader. This may be a porous pavement strip or another type of structure used to achieve uniform sheet flow conditions. Grass buffers also can be combined with riparian zones in treating sheet flows and in stabilizing channel banks adjacent to major drainage ways and receiving waters. Grass buffers can be interspersed with shrubs and trees to improve their aesthetics and to provide shading.

5.2.2 General Application

Grass buffers are typically located adjacent to impervious areas. When used, they should be incorporated into site drainage, street drainage, and master drainage planning. Because their effectiveness depends on having an evenly distributed sheet flow over their surface, the size of the contributing area and the associated volume of runoff have to be limited. Flow can be directly accepted from an impervious area such as a parking lot or building roofs, provided the flow is distributed uniformly over the strip. Grass buffers provide only

marginal pollutant removal and require that follow-up structural BMPs be provided; however, they do help to reduce some of the runoff volume from small storms.

5.2.3 General Properties

General

The grass and other vegetation provide aesthetically pleasing green space, which can be incorporated into a development landscaping plan. Eventually, the grass strip next to the spreader or the pavement will accumulate sufficient sediment to block runoff. At that point, a portion of the grass buffer strip will need to be removed and replaced.

Physical Site Suitability

After final grading, the site should have a uniform slope and be capable of maintaining an even sheet flow throughout without concentrating runoff into shallow swales or rivulets. The allowable tributary area depends on the width, length, and the soil that lay under the grass buffer. Hydrologic Soil Groups A and B provide the best infiltration capacity, while Soil Groups C and D provide the best site stability. The swelling potential of underlying soil also should be taken into account in how the soil may affect adjacent structures and pavement when water is delivered to the grassed areas.

Pollutant Removal

Pollutant removal depends on many factors, such as soil permeability; site slope; the flow path length along the buffer; the characteristics of drainage area; runoff volumes and velocities; and the type of vegetation. The general pollutant removal of both particulate and soluble pollutants is projected to be low to moderate. Grass buffers rely primarily upon the settling and interception of solids and, to only a minor degree, on biological uptake and runoff infiltration.

5.2.4 Maintenance Requirements

Maintenance requirements for this BMP are listed in Exhibit 10.

EXHIBIT 10
Irrigated Grass Buffer Strip Maintenance Considerations

Required Action	Maintenance Objective	Frequency of Action
Lawn mowing	Maintain a dense grass cover at a recommended length of 2 to 4 inches. Collect and dispose of cuttings offsite or use a mulching mower.	Routine—as needed or recommended by inspection.
Lawn care	Use the minimum amounts of biodegradable, nontoxic fertilizers and herbicides needed to maintain dense grass cover, free of woods. Reseed and patch damaged areas.	As needed.
Irrigation	Adjust the timing sequence and water cover to maintain the required minimum soil moisture for dense grass growth. Do not over-water.	As needed.
Litter removal	Remove litter and debris to prevent gully development, enhance aesthetics, and prevent floatables from being washed offsite.	Routine—as needed by inspection.
Inspections	Inspect irrigation, turf grass density, flow distribution, gully development, and traces of pedestrian or vehicular traffic and request repair as needed.	Annually and after each major storm (that is, larger than 0.75 inch of precipitation).

EXHIBIT 10
Irrigated Grass Buffer Strip Maintenance Considerations

Required Action	Maintenance Objective	Frequency of Action
Turf replacement	To lower the turf below the surface of the adjacent pavement, use a level flow spreader so that sheet flow is not blocked and will not cause water to back up onto the upstream pavement.	As needed when water ponding becomes too high or too frequent a problem. The need for turf replacement will be higher if the pavement is sanded in winter to improve tire traction on ice. Otherwise, expect replacement once every 5 to 15 years.

Source: Urban Drainage and Flood Control District.

5.2.5 Design Considerations

Design of grass buffers is based primarily on maintaining sheet flow conditions across a uniformly graded, dense grass cover strip. When a grass buffer is used over unstable slopes, soils, or vegetation, rills and gullies will form that will disrupt sheet flow. The resultant short-circuiting will invalidate the intended water quality benefits. Grass buffers should be protected from excessive pedestrian or vehicular traffic that can damage the grass cover and affect even sheet flow distribution. A mixture of grass and trees may offer benefits for slope stability and improved aesthetics.

5.2.6 Design Procedure and Criteria

The following steps outline the grass buffer design procedure and criteria. See Attachment 1 for Standard Drawing 1, a schematic of the facility and its components.

1. Step 1—Design Discharge

   Determine the 2-year peak flow rate of the area draining to the grass buffer. Also, determine the flow control type: sheet or concentrated.

2. Step 2—Minimum Length

   Calculate the minimum length (normal to flow) of the grass buffer. The upstream flow needs to be uniformly distributed over this length. General guidance suggests that the hydraulic load should not exceed 0.05 cubic feet per second (cfs) per linear foot of buffer during a 2-year storm to maintain a sheet flow of less than 1 inch throughout dense grass that is at least 2 inches high. The minimum design length (normal to flow) is therefore calculated as:

$$L_G = \frac{Q_{2-year}}{0.05} \qquad \textbf{(Equation 1)}$$

   in which:

   Lg = Minimum design length (feet)
   $Q_{2\text{-year}}$ = Peak discharge to the grass buffers by a 2-year event (cfs)

   Longer lengths may be used.

3. Step 3—Minimum Width

   The minimum width (WG) (the distance along the sheet flow direction) of the grass buffer shall be determined by the following criteria for onsite and concentrated flow control conditions:

   - Sheet flow control (use the larger value)

     WG = 0.2LI or 8 feet **(Equation 2)**

     in which:

     LI = The length of flow path of the sheet flow over the upstream impervious surface (feet)

   - Concentrated flow control (use the larger value)

     WG = 0.15(At/Lt) or 8 feet **(Equation 3)**

     in which:

     At = The tributary area (square feet)
     Lt = The length of the tributary (normal to flow) upstream of the grass buffer (feet)

   A generally rectangular-shaped strip is preferred and should be free of gullies or rills that concentrate the overland flow.

4. Step 4—Maximum Slope

   Design slopes shall not exceed 4 percent.

5. Step 5—Flow Distribution

   Incorporate a device on the upstream end of the buffer to evenly distribute flows along the design length. Slotted curbing, modular block porous pavement (MBP), or other spreader devices can be used to apply flows. Concentrated flow supplied to the grass buffer must use a level spreader (or a similar concept) to evenly distribute flow onto the buffer.

6. Step 6—Vegetation

   Vegetate the grass buffer with dense turf to promote sedimentation and entrapment and to protect against erosion.

7. Step 7—Outflow Collection

   Provide a means for outflow collection. Most of the runoff during significant events will not be infiltrated and will require a collection and conveyance system.

5.3 Grass Swale

5.3.1 Description

A grass swale sedimentation facility is an integral part of the MDCIA development concept. They are densely vegetated drainage ways with low-pitched side slopes that collect and slowly convey runoff. Design of their longitudinal slope and cross section size forces the flow to be slow and shallow, thereby facilitating sedimentation while limiting erosion. Berms or check dams should be installed perpendicular to the flow as needed to slow it down and encourage settling and infiltration.

5.3.2 General Application

A grass swale can be located to collect overland flows from areas such as parking lots, buildings, residential yards, roadways, and grass buffer strips. They can be made a part of the plans to minimize a directly connected impervious area by using them as an alternative to a curb-and-gutter system, if approved by the City Engineer. A grass swale is set below adjacent ground level, and runoff enters the swales over grassy banks. The potential exists for wetland vegetation to become established if the swale experiences standing water or if there is a base flow. A site with a base flow should be managed as either a swale with an unlined trickle channel or as a wetland bottom channel, the latter providing an additional BMP to storm water runoff.

5.3.3 General Properties

General

A grass swale can be more aesthetically pleasing than concrete or rock-lined drainage systems. Although limited by the infiltration capacity of local soil, this BMP also can provide some reduction in runoff volumes from small storms. Dense grasses can reduce flow velocities and protect against erosion during larger storm events. Swales in residential and commercial settings also can be used to limit the extent of directly connected impervious areas.

Physical Site Suitability

A grass swale is practical only at sites with general ground slopes of less than 4 percent and are not practical for sites steeper than 6 percent. The longitudinal slopes of a grass swale should be kept to less than 1 percent, which often necessitates the use of grade control checks or drop structures. Where the general terrain slope exceeds 4 percent, a grass swale is often practical only on the upslope side of the adjacent street.

When soil with high permeability (for example, Class A or B) is available, the swale will infiltrate a portion of the runoff into the ground, but such soil is not required for effective application of this BMP. When Class C and D soils are present, the use of a sand/gravel underdrain is recommended.

Pollutant Removal

Removal rates reported in literature vary and fall into the low to medium range. Under good soil conditions and low-flow velocities, moderate removal of suspended solids and

associated other constituents can be expected. If soil conditions permit, infiltration can remove low to moderate loads of soluble pollutants when flow velocities are very low. As a result, small frequently occurring storms can benefit the most.

5.3.4 Maintenance Requirements

Maintenance considerations for this BMP are listed in Exhibit 11.

EXHIBIT 11
Grass-lined Swale Maintenance Considerations

Required Action	Maintenance Objective	Frequency of Action
Lawn mowing and lawn care	Maintain irrigated grass at 2 to 4 inches tall and non-irrigated native grass at 6 to 8 inches tall. Collect cuttings and dispose of them offsite or use a mulching mower.	Routine—as needed.
Debris and litter removal	Keep the area clean for aesthetic reasons, which also reduces floatables being flushed downstream.	Routine—as needed by inspection, but no less than two times per year.
Sediment removal	Remove accumulated sediment near culverts and in channels to maintain flow capacity. Replace the grass areas damaged in the process.	Routine—as needed by inspection. Estimate the need to remove sediment from 3 to 10 percent of total length per year, as determined by annual inspection.
Grass reseeding and mulching	Maintain a healthy dense grass in channel and side slope.	Nonroutine—as needed by annual inspection.
Inspections	Check the grass for uniformity of cover, sediment accumulation in the swale, and near culverts.	Routine—annual inspection is suggested.

Source: Urban Drainage and Flood Control District

5.3.5 Design Considerations and Criteria

Standard Drawing 2 (Attachment 1) shows trapezoidal and triangular swale configurations. A grass swale is sized to maintain a low velocity during small storms and to collect and convey larger runoff events, all for the projected fully developed land use conditions.

A healthy turf grass cover must be developed to foster dense vegetation. Permanent irrigation in some cases may be necessary. Judicious use of grass swales can replace both the curb-and-gutter systems and greatly reduce the storm sewer systems in the upper portions of each watershed when designed to convey the "initial storm" (for example, a 2- or 5-year storm) at slow velocities. However, if one or both sides of the grass swale are also to be used as a grass buffer, the design of the grass buffer has to follow the requirements of Section 5.2, Grass Buffers.

5.3.6 Design Procedure and Criteria

The following steps outline the grass swale design procedure and criteria.

1. Step 1—Design Discharge

   Determine the 2-year flow rate in the proposed grass swale.

2. Step 2—Swale Geometry

   Select geometry for the grass swale. The cross section should be trapezoidal or triangular. The side slopes shall be flatter than 4:1 (horizontal/vertical). The wider the wetted area of the swale, the slower the flow.

3. Step 3—Longitudinal Slope

   Maintain a longitudinal slope for the grass swale between 0.2 and 1.0 percent. If the longitudinal slope requirements cannot be satisfied with available terrain, grade control checks or small drop structures must be incorporated to maintain the required longitudinal slope. If the slope of the swale exceeds 0.5 percent, the swale must be vegetated with irrigated turf grass to establish the vegetation.

4. Step 4—Flow Velocity and Depth

   Calculate the velocity and depth of flow through the swale. Based on Manning's equation and a Manning's roughness coefficient of n=0.05, find the channel velocity and depth using the 2-year flow rate determined in Step 1.

5. Step 5—Maximum Flow Velocity

   Maximum flow velocity of the channel shall not exceed 1.5 fps, and the maximum flow depth shall not exceed 2 feet at the 2-year peak flow rate. If these conditions are not attained, repeat Steps 2 through 4, each time altering the depth and bottom width or longitudinal slopes until these criteria are satisfied.

6. Step 6—Vegetation

   Vegetate the grass swale with dense turf grass to promote sedimentation, filtration, and nutrient uptake, and to limit erosion through maintenance of low-flow velocities.

7. Step 7—Street and Driveway Crossings

   If applicable, small culverts at each street crossing and/or driveway crossing may be used to provide onsite storm water capture volume in a similar fashion to an extended detention basin (if adequate volume is available).

8. Step 8—Drainage and Flood Control

   Check the water surface during larger storms such as the 5-year through the 100-year event to assure that drainage from these larger events is being controlled without flooding critical areas.

5.4 Incorporating Stormwater Quantity Control into Water Quality Capture Basins

Wherever possible, it is recommended that WQCV facilities be incorporated into storm water quantity detention facilities. The extended detention basin, constructed wetland basin, and a retention pond are designed to easily incorporate storm water quantity control above the WQCV.

The following approach is suggested:

- Water quality: The full WQCV is to be provided according to the design procedures documented for the structural BMP.
- 2-year storm: The WQCV plus the full 2-year detention volume is to be provided.
- 100-year storm: The WQCV plus the full 100-year detention volume is to be provided.

5.4.1 Design Storm

Storm water quantity basins shall be designed for 2- and 100-year 24-hour design flows.

5.4.2 Release Methods

Careful consideration must be given to the discharge of the surface release as to the elimination of erosion potential and the capacity of the downstream surface water course. The release structure shall be designed to withstand the forces caused by the structure being overtopped during a larger-than-design storm.

The 100-year detention level is provided above the WQCV, and the outlet structure is designed to control two or more different releases. Standard Drawing 4 (Attachment 1) shows an example of a combined quality/quantity outlet structure.

5.4.3 Maximum Release Rate

The detention pond volumes and release rate shall be designed to accommodate runoff generated by the development and post-developed upstream properties. Runoff captured from the 2-year and the 100-year 24-hour storm must be released at a rate less than the pre-development peak rate.

5.4.4 Design Procedure

The following steps outline a calculation method that meets the minimum standards of the City of Watertown. Refer to Section 2.3, Design Storm Calculations, for additional approved calculation methods.

1. Step 1—Calculate Storage Volumes

   A conservative estimate of the design volume in acre-feet can be calculated by multiplying the 24-hour precipitation depth by the watershed area that is contributing runoff as follows:

$$Design\ Volume_{100\,year} = \left(\frac{5.76\ in}{12}\right) * C * Area \qquad \textbf{(Equation 4)}$$

   in which:

   Area = The watershed area tributary (acres)
   C = Post-development Rational Method Runoff Coefficient

$$Design\ Volume_{2\,year} = \left(\frac{2.40\ in}{12}\right) * C * Area \qquad \textbf{(Equation 5)}$$

in which:

Area = The watershed area tributary (acres)
C = Post-development Rational Method Runoff Coefficient

2. Step 2—Calculate Release Rates

Pre-development peak runoff rates can be calculated using the Rational Method as follows:

$$Maximum\ \text{Re}lease\ Rate_{100\,year} = 7.22\ {}^{in}\!/_{hr} * C * Area \qquad \textbf{(Equation 6)}$$

in which:

Area = The watershed area tributary (acres)
C = Pre-develoment Rational Method Runoff Coefficient

$$Maximum\ \text{Re}\ lease Rate_{2\,year} = 2.86\ {}^{in}\!/_{hr} * C * Area \qquad \textbf{(Equation 7)}$$

in which:

Area = The watershed area tributary (acres)
C = Pre-develoment Rational Method Runoff Coefficient

3. Step 3—Incorporate Water Quantity Volume into WQCV Basin

Using guidelines provided for the selected basin, size the basin to provide additional capacity for the 2- and 100-year storms.

4. Step 3—Outlet Design

Design a multiple-stage outlet to control the WQCV, 2-year, and 100-year storm volumes to the appropriate release rate.

5.4.5 Adjacent Property Elevations

The property corner elevation of properties abutting a basin shall be 1 foot above the 100-year design storm. Recommended minimum ground elevations for homes abutting or affected by the basin shall be 2 feet above the overflow elevation. The recommended minimum ground elevation for homes abutting or affected by basins will be a minimum of 4 feet above the 100-year pond high water elevation if an overflow system is not available or at an elevation that provides an additional 50 percent storage.

5.4.6 Parking Lots

Parking lots that serve as detention storage ponds must not have a storage depth of more than 1 foot. It is recommended that notification signs be installed in parking lots that serve as detention ponds. The signs shall be permanent and high quality, meeting requirements of the Manual on Uniform Traffic Control Devices.

5.5 Porous Landscape Detention

5.5.1 Description

Porous landscape detention consists of a low-lying vegetated area underlain by a sand bed with an underdrain pipe. A shallow surcharge zone exists above the porous landscape detention for temporary storage of the WQCV. During a storm, accumulated runoff ponds in the vegetated zone and gradually infiltrates into the underlying sand bed, filling the void spaces of the sand. The underdrain gradually dewaters the sand bed and discharges the runoff to a nearby channel, swale, or storm sewer. This BMP allows WQCV to be provided on a site that has little open area available for storm water detention.

5.5.2 General Application

Location

A porous landscape detention can be located in just about any of the open areas of a site. It is ideally suited for small installations such as:

- Parking lot islands
- Street medians or boulevards
- Roadside swale features
- Site entrance or buffer features

This BMP also may be implemented at a larger scale, serving as an infiltration basin for an entire site if desired, provided the WQCV and average depth requirements contained in this section are met.

Vegetation may consist of irrigated bluegrass or natural grasses with shrub and tree plantings if desired.

5.5.3 General Properties

General

A primary advantage of porous landscape detention is making it possible to provide WQCV on a site while reducing the impact on developable land. It works well with irrigated bluegrass, whereas experience has shown that conditions in the bottom of extended detention basins become too wet for bluegrass. A porous landscape detention provides a natural moisture source for vegetation, enabling "green areas" to exist with reduced irrigation.

The primary drawback of porous landscape detention is a potential for clogging if a moderate to high level of silts and clays is allowed to flow into the facility. Also, this BMP needs to be avoided close to building foundations or other areas where expansive soils are present, although an underdrain and impermeable liner can reduce some of this concern.

Physical Site Suitability

If an underdrain system is incorporated into this BMP, porous landscape detention is suited for about any site regardless of in situ soil type. If sandy soils are present, the facility can be installed without an underdrain (infiltration option); sandy subsoil is not a requirement.

This BMP has a relatively flat surface area and may be more difficult to incorporate into steeply sloping terrain.

Pollutant Removal

Although not tested to date in the Watertown area, the amount of pollutant removed by this BMP should be significant. In addition to settling, porous landscape detention provides for filtering, adsorption, and biological uptake of constituents in storm water.

5.5.4 Maintenance Requirements

Exhibit 12 shows the maintenance requirements for a porous landscape detention.

EXHIBIT 12
Porous Landscape Detention Maintenance Considerations

Required Action	Maintenance Objectives	Frequency
Lawn mowing and vegetative care	Occasional mowing of grasses and weed removal to limit unwanted vegetation. Maintain irrigated turf grass as 2 to 4 inches tall and non-irrigated native turf grasses at 4 to 6 inches.	Routine—depending on aesthetic requirements.
Debris and litter removal	Remove debris and litter from detention area to minimize clogging of the sand media.	Routine—depending on aesthetic requirements.
Landscaping removal and replacement	The sandy loam turf and landscaping layer will clog with time. This layer will need to be removed and replaced, along with all turf and other vegetation growing on the surface, to rehabilitate infiltration rates.	Every 5 to 10 years,; depending on infiltration rates, needed to drain the WQCV in 12 hours or less. May need to do it more frequently if exfiltration rates are too low to achieve this goal.
Inspections	Inspect detention area to determine if the sand media is allowing acceptable infiltration	Routine—biannual inspection of hydraulic performance.

Source: Urban Drainage and Flood Control District

5.5.5 Design Considerations

See Standard Drawing 3 (Attachment 1) for a typical cross section for porous landscape detention. When implemented using multiple small installations on a site, it is increasingly important to accurately account for each upstream drainage area tributary to each porous landscape detention site to make sure that each facility is properly sized and that all portions of the development site are directed to a porous landscape detention.

5.5.6 Design Procedure

The following steps outline the porous landscape detention design procedure and criteria.

1. Step 1—Basin Storage Volume

   Provide a storage volume based on a 12-hour drain time.

   Find the required storage volume (watershed inches of runoff). Using the tributary area imperviousness, determine the required WQCV (watershed inches of runoff) using Exhibit 13, based on the porous landscape detention 12-hour drain time.

Calculate the design volume in cubic feet as follows:

(Equation 8)

$$Design\ Volume = \left(\frac{WaterQualityCaptureVolume}{12} \right) * Area$$

in which:

Area = The watershed area tributary to the BMP (square feet)

- Surface area: Calculate the minimum required surface area as follows:

Surface Area = $\frac{\text{Design Volume in ft}^3}{d_{av}}$ **(Equation 9)**

in which:

d_{av} = average depth (feet) of the porous landscape detention basin.

- Base courses: Provide base courses as shown in Standard Drawing 3 (Attachment 1).

  Subbase: If expansive soils are a concern, install an impermeable membrane and place the base course on top of the membrane. If soil is not expansive, use geotextile fabric to line the entire basin bottom and walls.

  Average depth: Maintain the average WQCV depth between 6 and 12 inches. Average depth is defined as water volume divided by the water surface area.

2. Step 2—Sand-Peat Mix

Provide a minimum of a 12-inch-thick layer above the base course.

3. Step 3—Filter Layer

Provide a filter layer consisting of a thoroughly mixed American Society for Testing and Materials (ASTM) C-33 sand and peat for filtration and adsorption of constituents.

4. Step 4—Irrigated Vegetative

Provide a sandy loam turf layer above the sand-peat mix layer. This layer shall be no less than 6 inches thick, but a thicker layer is recommended to promote healthier vegetation.

5.6 Extended Detention Basin

5.6.1 Description

An extended detention basin is a sedimentation basin designed to totally drain dry over an extended time after storm water runoff ends. It is an adaptation of a detention basin used for flood control. The primary difference is in the outlet design. The extended detention basin uses a much smaller outlet that extends the draining time of the more frequently occurring runoff events to facilitate pollutant removal. The extended detention basin's drain time for the brim-full WQCV (that is, time to fully evacuate the design capture volume) of 40 hours is recommended to remove a significant portion of fine particulate pollutants found in urban storm water runoff.

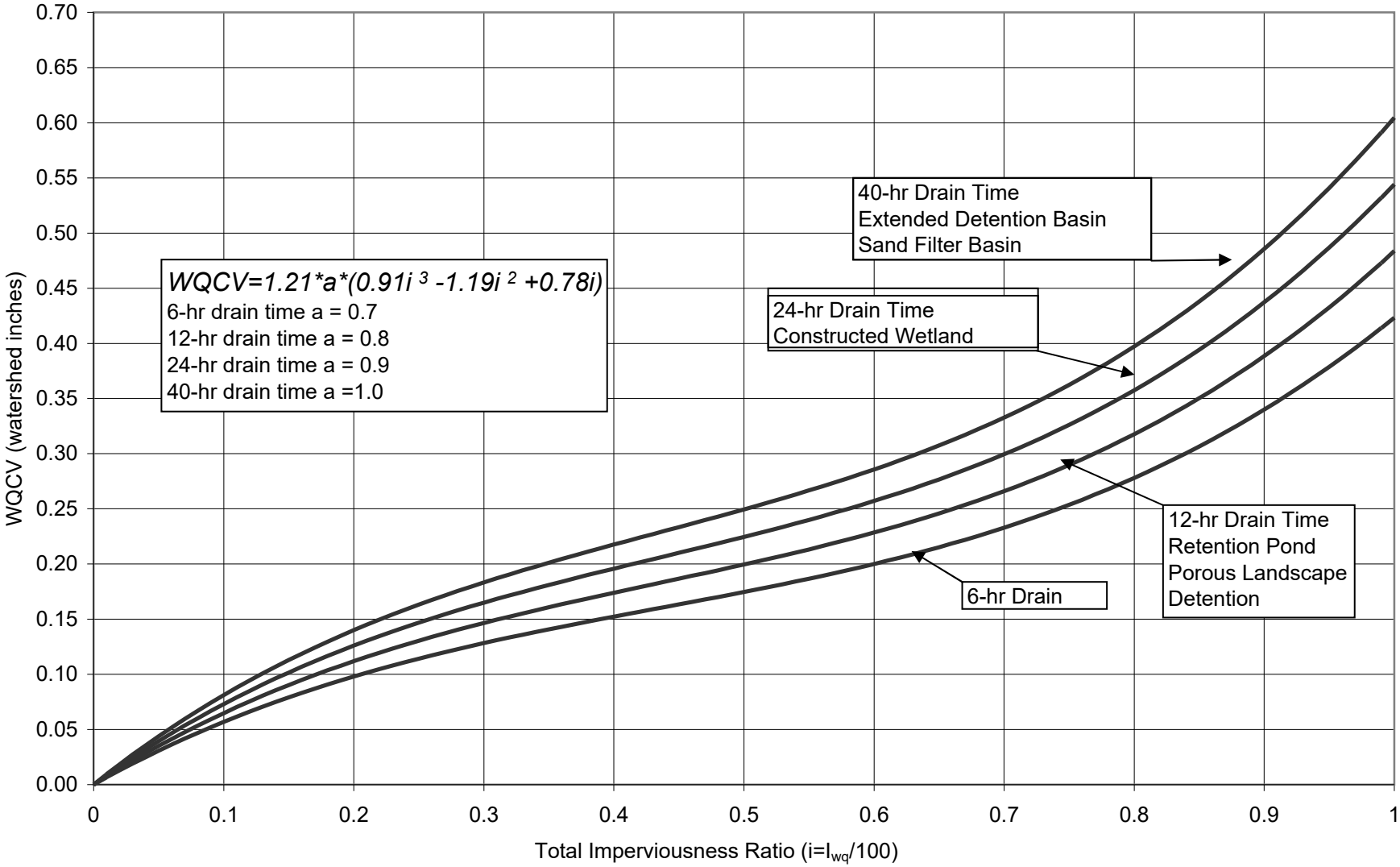


EXHIBIT 13
Water Quality Capture Volume,
80th Percentile Runoff Event
Watertown Post-Construction Manual

WB032008013MKE Exhibit_13_Water_Quality_Capture_Volume_v1 03-21-08 sls

CITY OF WATERTOWN SOUTH DAKOTA

Soluble pollutant removal can be somewhat enhanced by providing a small wetland marsh or ponding area in the basin's bottom to promote biological uptake. The basins are considered to be "dry" because they are designed not to have a significant permanent pool of water remaining between storm water runoff events. However, an extended detention basin may develop wetland vegetation and, sometimes, shallow pools in the bottom portions of the facilities**.**

5.6.2 General Application

An extended detention basin can be used to enhance storm water runoff quality and reduce peak storm water runoff rates. If these basins are constructed early in the development cycle, they also can be used to trap sediment from construction activities within the tributary drainage area. The accumulated sediment, however, will need to be removed after upstream land disturbances cease and before the basin is placed into final long-term use. Also, an extended detention basin can sometimes be retrofitted into existing flood control detention basins.

Extended detention basins can be used to improve the quality of urban runoff from roads, parking lots, residential neighborhoods, commercial areas, and industrial sites and are generally used for regional or follow-up treatment. They also can be used as an onsite BMP and work well in conjunction with other BMPs, such as upstream onsite source controls and downstream infiltration/filtration basins or wetland channels. If desired, a flood routing detention volume can be provided above the WQCV of the basin.

5.6.3 General Properties

General

An extended detention basin can be designed to provide other benefits such as recreation and open space opportunities in addition to reducing peak runoff rates and improving water quality. They are effective in removing particulate matter and associated heavy metals and other pollutants. As with other BMPs, safety issues need to be addressed through proper design.

Physical Site Suitability

Normally, the land required for an extended detention basin is about 0.5 to 2.0 percent of the total tributary development area. In high groundwater areas, instead consider the use of retention ponds to avoid many of the problems that can occur when the extended detention basin's bottom is located below the seasonal high water table. Soil maps should be consulted, and soil borings may be needed to establish design geotechnical parameters.

Pollutant Removal

Removal of suspended solids and metals can be moderate to high, and removal of nutrients is low to moderate. The removal of nutrients can be improved when a small shallow pool or wetland is included as part of the basin's bottom or the basin is followed by BMPs more efficient at removing soluble pollutants, such as a filtration system or constructed wetlands.

The major factor controlling the degree of pollutant removal is the emptying time provided by the outlet. The rate and degree of removal also will depend on influent particle sizes.

Metals, oil, grease, and some nutrients have a close affinity for suspended sediment and will be removed partially through sedimentation.

Aesthetics and Multiple Uses

Since an extended detention basin is designed to drain very slowly, its bottom and lower portions will be inundated frequently for extended periods of time. Grasses in this frequently inundated zone will tend to die off, with only the species that can survive the specific environment at each site prevailing. In addition, the bottom will be the depository of all the sediment that settles out in the basin. As a result, the bottom can be muddy and may have an undesirable appearance. To reduce this problem and to improve the basin's availability for other uses (such as open space, habitat, and passive recreation), the designer should provide a lower-stage basin as suggested in the Two-Stage Design procedure. As an alternative, a retention pond could be used, in which the settling occurs primarily within the permanent pool.

Design Considerations

Whenever desirable and feasible, incorporate the extended detention basin within a larger flood control basin. Whenever possible, try to provide for other urban uses such as passive recreation and wildlife habitat. If multiple uses are being contemplated, consider the multiple-stage detention basin to limit inundation of passive recreational areas to one or two occurrences a year. Generally, the area within the WQCV is not well suited for active recreation facilities such as ballparks, playing fields, and picnic areas. These are best located above the WQCV pool level. Standard Drawing 5 (Attachment 1) shows a representative layout of an extended detention basin.

Example perforated outlet and trash rack configurations are illustrated in Standard Drawings 4, 6, and 7 (Attachment 1). One or more perforated columns on a perforated orifice plate integrated into the front of the outlet can be used. Other types of outlets also may be used, provided they control the release of the WQCV in a manner consistent with the drain time requirements.

Although the soil types beneath the pond seldom prevent the use of this BMP, they should be considered during design. Any potential exfiltration capacity should be considered a short-term characteristic and ignored in the design of the WQCV because exfiltration will decrease over time as the soils clog with fine sediment and as the groundwater beneath the basin develops a mound that surfaces into the basin.

High groundwater should not preclude the use of an extended detention basin. Groundwater, however, should be considered during design and construction, and the outlet design must account for any upstream base flows that enter the basin or that may result from groundwater surfacing within the basin itself.

Stable, all-weather access to critical elements of the pond, such as the inflow area, outlet, spillway, and sediment collection areas, must be provided for maintenance purposes.

5.6.4 Maintenance Requirements

Maintenance requirements for the extended detention basin are provided in Exhibit 14.

EXHIBIT 14
Extended Detention Basin Maintenance Considerations

Required Action	Maintenance Objective	Frequency of Action
Lawn mowing and lawn care	Occasional mowing to limit unwanted vegetation. Maintain irrigated turf grass as 2 to 4 inches tall and non-irrigated native turf grasses at 4 to 6 inches.	Routine—depending on aesthetic requirements.
Debris and litter removal	Remove debris and litter from the entire pond to minimize outlet dogging and improve aesthetics.	Routine—including just before annual storm seasons (that is, April and May) and following significant rainfall events.
Erosion and sediment control	Repair and revegetate eroded areas in the basin and channels.	Nonroutine—periodic and repair as necessary based on inspection.
Structural	Repair pond inlets, outlets, forebays, low-flow channel liners, and energy dissipaters whenever damage is discovered.	Nonroutine—repair as needed based on regular inspections.
Inspections	Inspect basins to insure that the basin continues to function as initially intended. Examine the outlet for clogging, erosion, slumping, excessive sedimentation levels, overgrowth, embankment and spillway integrity, and damage to any structural element.	Routine—annual inspection of hydraulic and structural facilities. Also check for obvious problems during routine maintenance visits, especially for plugging of outlets.
Nuisance control	Address odor, insects, and overgrowth issues associated with stagnant or standing water in the bottom zone.	Nonroutine—handle as necessary per inspection or local complaints.
Sediment removal	Remove accumulated sediment from the forebay, micropool, and the bottom of the basin.	Nonroutine—performed when sediment accumulation occupies 20 percent of the WQCV. This may vary considerably, but expect to do this every 10 to 20 years, as necessary per inspection if no construction activities take place in the tributary watershed. More often if they do. The forebay and the micropool will require more frequent cleanout than other areas of the basin, such as every 1 or 2 years.

Source: Urban Drainage and Flood Control District

5.6.5 Design Procedure and Criteria

The following steps outline the design procedure and criteria for an extended detention basin.

1. Step 1—Detention Pond Storage Volume

   Provide a storage volume equal to 120 percent of the WQCV based on a 40-hour drain time, above the lowest outlet (that is, perforation) in the basin. The additional 20 percent of storage volume provides for sediment accumulation and the resultant loss in storage volume.

   Find the required storage volume (watershed inches of runoff). Determine the required WQCV (watershed inches of runoff) using Exhibit 13, based on the extended detention basin's 40-hour drain time. Calculate the design volume in acre-feet as follows:

(Equation 10)

$$Design\ Volume = \left(\frac{WaterQualityCaptureVolume}{12} \right) * Area * 1.2$$

In which:

Area	= The watershed area tributary to the extended detention pond (acres)
1.2 factor	= Multiplier of 1.2 to account for the additional 20 percent of required storage for sediment accumulation

2. Step 2—Outlet Control

   The outlet controls are to be designed to release the WQCV (that is, not the "design volume") over a 40-hour period, with no more than 50 percent of the WQCV being released in 12 hours. For a perforated outlet, calculate the required flow area and use Exhibit 15 to determine appropriate perforation dimensions. The total outlet area can be calculated by multiplying the area per row by the number of rows. The vertical spacing between hole centerlines should be 4 inches, and the lowest perforations should be set at the water surface elevation of the outlet micropool.

3. Step 3—Trash Rack

   Provide a trash rack of sufficient size to prevent clogging of the primary water quality outlet. Size the rack so as not to interfere with the hydraulic capacity of the outlet. Using the total outlet area and the selected perforation diameter (or height), Exhibit 16 will help to determine the minimum open area required for the trash rack. If a perforated vertical plate or riser is used, use one-half of the total outlet area to calculate the trash rack's size. This accounts for the variable inundation of the outlet orifices. The spacing of trash rack bars must be proportioned to the size of the smallest orifice protected. Standard Drawings 4, 6, and 7 (Attachment 1) illustrate a suggested standardized outlet design for smaller sites. Trash racks for the 2-year and 100-year outlet should be sized using the guidelines provided for the water quality outlet above.

4. Step 4—Basin Shape

   Shape the pond whenever possible with a gradual expansion from the inflow area and a gradual contraction toward the outlet, thereby minimizing short-circuiting. The basin length-to-width ratio between the inflow area and the outlet should be between 2:1 and 3:1, with the larger being preferred. It may be necessary to modify the inflow and outlet points using pipes, swales, or channels to accomplish this.

Orifice Plate Perforation Sizing

Circular Perforation Sizing

Chart may be applied to orifice plate or vertical pipe outlet.

Hole Dia (in) *	Hole Dia (in)	Min. S_c (in)**	Area per Row (sq in)		
			n=1	n=2	n=3
1/4	0.250	1	0.05	0.10	0.15
5/16	0.313	2	0.08	0.15	0.23
3/8	0.375	2	0.11	0.22	0.33
7/16	0.438	2	0.15	0.30	0.45
1/2	0.500	2	0.20	0.39	0.59
9/16	0.563	3	0.25	0.50	0.75
5/8	0.625	3	0.31	0.61	0.92
11/16	0.688	3	0.37	0.74	1.11
3/4	0.750	3	0.44	0.88	1.33
13/16	0.813	3	0.52	1.04	1.56
7/8	0.875	3	0.60	1.20	1.80
15/16	0.938	3	0.69	1.38	2.07
1	1.000	4	0.79	1.57	2.36
1 1/16	1.063	4	0.89	1.77	2.66
1 1/8	1.125	4	0.99	1.99	2.98
1 3/16	1.188	4	1.11	2.22	3.32
1 1/4	1.250	4	1.23	2.45	3.68
1 5/16	1.313	4	1.35	2.71	4.06
1 3/8	1.375	4	1.48	2.97	4.45
1 7/16	1.438	4	1.62	3.25	4.87
1 1/2	1.500	4	1.77	3.53	5.30
1 9/16	1.563	4	1.92	3.83	5.75
1 5/8	1.625	4	2.07	4.15	6.22
1 11/16	1.688	4	2.24	4.47	6.71
1 3/4	1.750	4	2.41	4.81	7.22
1 13/16	1.813	4	2.58	5.16	7.74
1 7/8	1.875	4	2.76	5.52	8.28
1 15/16	1.938	4	2.95	5.90	8.84
2	2.000	4	3.14	6.28	9.42
n = Number of columns of perforations					
Minimum steel plate thickness			1/4 "	5/16 "	3/8 "

* Designer may interpolate to the nearest 32nd inch to better match the required area, if desired.

** Minimum column hole centerline spacing

Rectangular Perforation Sizing

Only one column of rectangular perforations allowed.

Rectangular Height = 2 inches

$$\text{Rectangular Width (inches)} = \frac{\text{Required Area per Row (sq in)}}{2"}$$

Rectangular Hole Width	Min. Steel Thickness
5"	1/4 "
6"	1/4 "
7"	5/32 "
8"	5/16 "
9"	11/32 "
10"	3/8 "
>10"	1/2 "

EXHIBIT 15
WQCV Outlet Orifice
Perforation Sizing
Watertown Post-Construction Manual

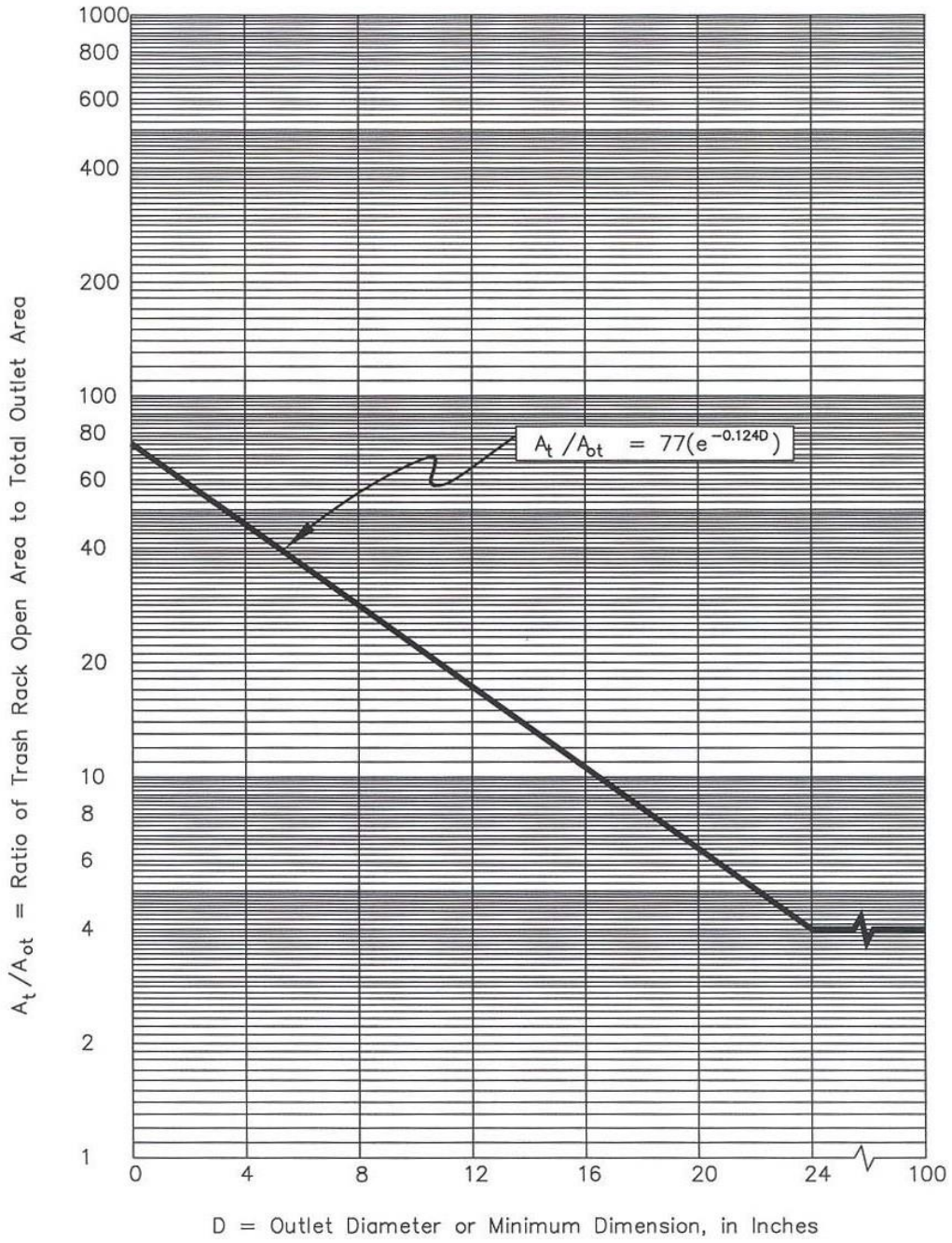


EXHIBIT 13
Minimum Trash Rack Open Area—
Extended Range
Watertown Post-Construction Manual

5. Step 5—Two-Stage Design

   A two-stage design with a pool that fills often with frequently occurring runoff minimizes standing water and sediment deposition in the remainder of the basin. The two stages are as follows:

   - Top Stage: The top stage should be 2 or more feet deep with its bottom sloped at 2 percent toward the low-flow channel.
   - Bottom Stage: The active storage basin of the bottom stage should be 1.5 to 3 feet deeper than the top stage and store 5 to 15 percent of the WQCV. Provide a micropool below the bottom active storage volume of the lower stage at the outlet point. The pool should be one-half the depth of the upper WQCV depth or 2.5 feet, whichever is larger.

6. Step 6—Low-Flow Channel

   A low-flow channel conveys low flows from the forebay to the bottom stage. Erosion protection should be provided where the low-flow channel enters the bottom stage. Lining the low-flow channel with riprap or other approved stabilization technique is recommended. Make it at least 9 inches deep; at a minimum provide capacity equal to twice the release capacity at the upstream forebay outlet.

7. Step 7—Basin Side Slopes

   Basin side slopes should be stable and gentle to facilitate maintenance and access. Side slopes shall be no steeper than 4:1.

8. Step 8—Dam Embankment

   The embankment should be designed not to fail during a 100-year or larger storm. Embankment slopes should be no steeper than 4:1, and planted with turf-forming grasses. Poorly compacted native soil should be excavated and replaced. Embankment soil should be compacted to at least 95 percent of its maximum density according to ASTM D698-70 (Modified Proctor). An emergency overflow channel through the embankment to convey the 100-year peak inflow rate should be provided.

9. Step 9—Vegetation

   Bottom vegetation provides erosion control and sediment entrapment. Pond bottom, berms, and side sloping areas may be planted with native grasses or with irrigated turf, depending on the local setting.

10. Step 10—Maintenance Access

    Paved access to the bottom, forebay, and outlet controls area shall be provided for maintenance vehicles and equipment. Maximum grades shall be 7 percent.

11. Step 11—Inflow Point

    Dissipate flow energy at the pond's inflow points to limit erosion and promote particle sedimentation.

12. Step 12—Forebay Design

    Provide the opportunity for larger particles to settle out in the inflow area, the area that has a solid surface bottom, to facilitate mechanical sediment removal. A rock berm should be constructed between the forebay and the main extended detention basin. The forebay volume of the permanent pool should be 5 to 10 percent of the design WQCV. A pipe throughout the berm to convey water to the extended detention basin should be offset from the inflow streamline to prevent short-circuiting and should be sized to drain the forebay volume in 5 minutes.

13. Step 13—Flood Storage

    Combining the water quality facility with a flood control facility is recommended. The 2- and 100-year or other floods may be detained above the WQCV. See Section 5.4, Incorporating Stormwater Quantity Control into WQCV Basins, for further guidance.

14. Step 14—Multiple Uses

    Whenever desirable and feasible, incorporate the extended detention basin within a larger flood control basin. Also, whenever possible, try to provide for other urban uses such as active or passive recreation and wildlife habitat. If multiple uses are being contemplated, use the multiple-stage detention basin to limit inundation of passive recreational areas to one or two occurrences a year. The area within the WQCV is not well suited for active recreation facilities such as ballparks, playing fields, and picnic areas. These recreational facilities are best located above the extended detention basin level.

5.7 Constructed Wetlands Basin

5.7.1 Description

A constructed wetlands basin is a shallow retention pond that requires a perennial base flow to permit the growth of rushes, willows, cattails, and reeds to slow down runoff and allow time for sedimentation, filtering, and biological uptake.

Constructed wetlands basins differ from "natural" wetlands as they are totally human artifacts that are built to enhance storm water quality. Sometimes, small wetlands that exist along ephemeral drainage ways could be enlarged and incorporated into the constructed wetland system. Such action, however, requires the approval of federal and state regulators.

5.7.2 General Application

A constructed wetlands basin can be used as a follow-up structural BMP in a watershed, or as a stand-alone onsite facility if the owner provides sufficient water to sustain the wetland. Flood control storage can be provided above the constructed wetlands basin's WQCV pool to act as a multi-use facility.

A constructed wetlands basin requires a net influx of water to maintain its vegetation and microorganisms. A complete water budget analysis is necessary to assure the adequacy of the base flow.

The basic formula for the water budget is as follows:

(Equation 11)

$$\Delta S / \Delta t = Q_i - Q_o$$

where:

$\Delta S / \Delta t$	= the change in storage volume per change in time
Qi	= the flow rate of water entering the wetland, vol/time
QO	= the flow rate of water leaving the wetland, vol/time

Equation 11 translates into the following equations where all values are given in consistent units of volume per unit time unless otherwise specified:

For water entering a wetland, the formula is:

(Equation 12)

Qi = P + Ri + Bi + GI

where:

P	= Direct precipitation on impoundment area
RI	= Storm water runoff from contributing drainage area
BI	= Base flow entering the wetlands
GI	= Seepage and springs from ground water sources

For water leaving, the formula is:

(Equation 13)

QO = E + T + RO + BO + GO

where:

E = Evaporation from surface
T = Transpiration from plants
RO = Storm water outflow
BO = Base flow leaving the wetlands
GO = Deep percolation below the root zone of the substrate

To assure adequate base flow using the water budget analysis, the value of all variables should be determined and the net influx of water (QI – QO) must be greater than the change in storage volume divided by change in storage time.

5.7.3 General Properties

General

A constructed wetlands basin offers several potential advantages, such as natural aesthetic qualities, wildlife habitat, erosion control, and pollutant removal. It also can provide an effective follow-up treatment to onsite and source control BMPs that rely on settling of larger sediment particles. In other words, it offers yet another effective structural BMP for larger tributary catchments.

The primary drawback of the constructed wetlands basin is the need for a continuous base flow to assure viable wetland growth. In addition, silt and scum can accumulate, and unless properly designed and built, can be flushed out during larger storms. In addition, in order

to maintain a healthy wetland growth, the surcharge depth for WQCV above the permanent water surface cannot exceed 2 feet.

Along with routine good housekeeping maintenance, occasional cleaning will be required when sediment accumulations become too large and affect performance. Periodic sediment removal also is needed for proper distribution of growth zones and of water movement within the wetland.

Physical Site Suitability

A perennial base flow is needed to sustain a wetland and should be determined using a water budget analysis. Loamy soils are needed in a wetland bottom to allow plants to take root. Exfiltration through a wetland bottom cannot be relied upon because either the bottom is covered by soils of low permeability or the groundwater is higher than the wetland's bottom. Also, wetland basins require a near-zero longitudinal slope, which can be provided using embankments.

Pollutant Removal

Reported removal efficiencies of constructed wetlands vary significantly. Primary variables influencing removal efficiencies include design, influent concentrations, hydrology, soils, climate, and maintenance. With periodic sediment removal and routine maintenance, removal efficiencies for sediments, organic matter, and metals can be moderate to high; for phosphorous, low to high; and for nitrogen, zero to moderate. Pollutants are removed primarily through sedimentation and entrapment, with some of the removal occurring through biological uptake by vegetation and microorganisms. Without a continuous dry-weather base flow, salts and algae can concentrate in the water column and can be released into the receiving water in higher levels at the beginning of a storm event as they are washed out.

Design Considerations

Standard Drawing 8 (Attachment 1) illustrates an idealized constructed wetlands basin. An analysis of the water budget is needed to show the net inflow of water is sufficient to meet all the projected losses (such as evaporation, evapotranspiration, and seepage for each season of operation). Insufficient inflow can cause the wetland to become saline or to die off.

5.7.4 Maintenance Requirements

Typical maintenance requirements for wetland BMPs include the items listed in Exhibit 17.

EXHIBIT 17
Constructed Wetlands Maintenance Considerations

Required Action	Maintenance Objective	Frequency of Action
Lawn mowing and lawn care	Mow occasionally to limit unwanted vegetation. Maintain irrigated turf grass at 2 to 4 inches tall and non-irrigated native turf grasses at 4 to 6 inches.	Routine—depending on aesthetic requirements.
Debris and litter removal	Remove debris and litter from entire pond to minimize outlet clogging and aesthetics. Include removal of floatable material from the pond's surface.	Routine —including just before annual storm seasons (that is, in April and May) and following significant rainfall events.

EXHIBIT 17
Constructed Wetlands Maintenance Considerations

Required Action	Maintenance Objective	Frequency of Action
Sediment removal	Remove accumulated sediment and muck along with much of the wetland growth. Re-establish growth zone depths and spatial distribution. Revegetate with original wetland species.	Nonroutine—every 10 to 20 years as needed by inspection if no construction activities take place in the tributary watershed. More often if they do. Expect to clean out forebay every 1 to 5 years.
Aquatic plant harvesting	Cut and remove plants growing in wetland (such as cattails and reeds) to remove nutrients permanently with manual work or specialized machinery.	Nonroutine until further evidence indicates such action would provide significant nutrient removal. In the meantime, perform this task once every 5 years or less frequently as needed to clean the wetland zone out.
Inspections	Observe inlet and outlet works for operability. Verify the structural integrity of all structural elements, slopes, and embankments.	Routine—at least once a year, preferably once during one rainfall event resulting in runoff.

Source: Urban Drainage and Flood Control District

5.7.5 Design Procedure and Criteria

The following steps outline the design procedure for a constructed wetlands basin.

1. Step 1—Basin Surcharge Storage Volume

   Provide a surcharge storage volume equal to the WQCV based on a 24-hour drain time, above the lowest outlet (that is, perforation) in the basin.

   Calculate the required WQCV.

   Find the required storage surcharge volume (watershed inches of runoff) above the permanent pool level. Determine the required storage (watershed inches of runoff) using Exhibit 13, based on the constructed wetland basin 24-hour drain time.

   Calculate the surcharge volume in acre-feet as follows:

(Equation 14)

$$Design\ \ Surcharge\ \ Volume = \left(\frac{WaterQualityCaptureVolume}{12} \right) * Area$$

   In which:

   Area = The tributary drainage area tributary to the constructed wetlands basin (acres).

2. Step 2—Wetland Pond Depth and Volume

   The volume of the permanent wetland pool shall be no less than 75 percent of the WQCV found in Step 1.

Proper distribution of wetland habitat is needed to establish a diverse ecology. Distribute pond area in accordance with Exhibit 18.

3. Step 3—Depth of Surcharge

   The surcharge depth of the WQCV above the permanent pool's WQCV water surface shall not exceed 2.0 feet.

4. Step 4—Outlet Control

   Provide outlet controls that limit WQCV depth to 2 feet or less. Use a water quality outlet that is capable of releasing the WQCV in no less than a 24-hour period.

   For a perforated outlet, calculate the required flow area and use Exhibit 15 to determine appropriate perforation dimensions. The total outlet area can be calculated by multiplying the area per row by the number of rows. The vertical spacing between hole centerlines should be 4 inches, and the lowest perforations should be set at the water surface elevation of the outlet micropool.

5. Step 5—Trash Rack

   Provide a trash rack of sufficient size to prevent clogging of the primary water quality outlet. Size the rack so as not to interfere with the hydraulic capacity of the outlet. Using the total outlet area and the selected perforation diameter (or height), Exhibit 16 will help to determine the minimum open area required for the trash rack. If a perforated vertical plate or riser is used, use one-half of the total outlet area to calculate the trash rack's size. This accounts for the variable inundation of the outlet orifices. The spacing of trash rack bars must be proportioned to the size of the smallest orifice protected. Standard Drawings 4, 6, and 7 (Attachment 1) illustrate a suggested standardized outlet design for smaller sites. Trash racks for the 2-year and 100-year outlet should be sized using the guidelines provided for the water quality outlet above.

6. Step 6—Basin Use

   Determine if flood storage or other uses will be provided for above the wetland surcharge storage or in a separate facility. Design for combined uses when they are to be provided.

7. Step 7—Basin Shape

   Shape the pond with a gradual expansion from the inflow and a gradual contraction to the outlet, thereby limiting short-circuiting. The basin length-to-width ratio between the inflow area and outlet should be 2:1 to 4:1, with 3:1 recommended. It may be necessary to modify the inflow area and outlet point using pipes, swales, or channels to accomplish this.

8. Step 8—Basin Side Slopes

   Basin side slopes are to be stable and gentle to facilitate maintenance and access needs. Side slopes should be no steeper than 4:1.

9. Step 9—Base Flow

   A net influx of water that exceeds all of the losses must be available throughout the year. The following equation and parameters can be used to estimate the net quantity of base flow available at a site:

   (Equation 15)

$$Q_{net} = Q_{Inflow} - Q_{Evap} - Q_{Seepage} - Q_{E.T.}$$

   Where:

QNet	= Net quantity of base flow (acre-feet/year)
QInflow	= Estimated base flow (acre-feet/year) (estimate by seasonal measurements and/or comparison to similar watersheds)
QEvap	= Loss attributed to evaporation less the precipitation (acre-feet/year) (computed for average water surface)
QSeepage	= Loss (or gain) attributed to seepage to groundwater (acre-feet/year)
QE.T.	= Loss attributed to plant evapotranspiration (computed for average plant area above water surface, not including the water surface)

10. Step 10—Inflow Area and Outlet Protection

    Provide a means to dissipate flow energy entering the basin to limit sediment resuspension. Outlets should be placed in an offbay that is at least 3 feet deep. The outlet should be protected from clogging by a skimmer shield that starts at the bottom of the permanent pool and extends above the maximum capture volume depth. Also, provide for a trash rack.

11. Step 11—Forebay Design

    Provide the opportunity for larger particles to settle out in an area that has a solid driving surface bottom for vehicles to facilitate sediment removal. The forebay volume of the permanent pool should be 5 to 10 percent of the design WQCV.

12. Step 12—Vegetation

    Cattails, sedges, reeds, and wetland grasses should be planted in the wetland bottom. Berms and side-sloping areas should be planted with native or irrigated turf-forming grasses. Initial establishment of the wetlands requires control of the water depth. After planting wetland species, the permanent pool should be kept at 3 to 4 inches to allow growth and to help establish the plants, after which the pool should be raised to its final operating level.

13. Step 13—Dam Embankment

    The embankment should be designed not to fail during a 100-year or larger storm. Embankment slopes should be no steeper than 4:1 and planted with turf-forming

grasses. Poorly compacted native soil should be excavated and replaced. Embankment soil should be compacted to at least 95 percent of its maximum density according to ASTM D698-70 (Modified Proctor). An emergency overflow channel through the embankment to convey the 100-year peak inflow rate should be provided.

14. Step 14—Maintenance Access

    Paved vehicle access to the forebay and outlet area must be provided for maintenance and removal of bottom sediments. Maximum grades shall not exceed 7 percent.

EXHIBIT 18
Wetland Pool Area Distribution

Components	Percent of Permanent Pool Surface Area (%)	Water Design Depth
Forebay, outlet, and free water surface areas	30 to 50	2 to 4 feet deep
Wetland zones with emergent vegetation	56 to 70	6 to 12 inches deep*

*One-third to one-half of this zone should be 6 inches deep.

Source: Urban Drainage and Flood Control District

5.8 Retention Pond

5.8.1 Description

A retention pond is a sedimentation facility that has a permanent pool of water that is replaced with storm water, in part or in total, during storm water runoff events. In addition, a temporary detention volume is provided above this permanent pool to capture storm water runoff and enhance sedimentation. Retention ponds are similar to extended detention basins because they are designed to capture in total, as a surcharge to the pond, runoff from frequently occurring storms. However, retention ponds differ from extended detention basins because the influent water mixes with the permanent pool water as it rises above the permanent pool level. The surcharge captured volume above the permanent pool is then released over 12 hours.

Retention ponds require a dry-weather base flow to maintain the permanent pool. They can be very effective in removing pollutants, and, under the proper conditions, can satisfy multiple objectives.

5.8.2 General Application

A retention pond can be used to improve the quality of urban runoff from roads, parking lots, residential neighborhoods, commercial areas, and industrial sites and is generally used as regional or follow-up treatment because of the base flow requirements. It can be used as an onsite BMP if the owner provides sufficient water to keep the pond full between storms. A retention pond works well in conjunction with other BMPs, such as upstream onsite source controls or downstream filter basins.

5.8.3 General Properties

General

A retention pond provides the following benefits:

- Moderate to high removal rates of many urban pollutants
- Wildlife habitat opportunities
- Recreation, aesthetics, and open space opportunities
- Part of a larger flood control basin

Their primary drawbacks include safety concerns; more difficult maintenance and sediment removal than for extended detention basins; floating litter, scum, and algal blooms; possible nuisance odors; and possible mosquito problems. Aquatic plant growth can be a factor in clogging outlet controls. The permanent pool can attract waterfowl, which can add to the nutrient load entering and leaving the pond.

Physical Site Suitability

Although site suitability concerns are similar to those stated for an extended detention basin, a retention pond has one primary difference—it requires sufficient continuous base flow to maintain the pool. A complete water budget under the projected urbanized watershed conditions should be performed to assure that the base flow will exceed evaporation, evapotranspiration, and seepage losses.

Pollutant Removal

A retention pond achieves moderate to high removal rates for particulate matter through sedimentation during and shortly after the runoff event. During a storm event, part or all of the permanent pool water is displaced and the pool becomes a mixture of the former pool water and new runoff. The period between storms allows biological uptake of soluble nutrients and metals from the water column in the permanent pool while also providing time for quiescent settling of fine sediment particles that remain in the pool after a storm. Some of the sediment can resuspend and soluble compounds can remobilize if a large storm event causes intense mixing or when unfavorable chemical conditions exist in the pool (such as low dissolved oxygen [DO] or pH). Also, algal growth and other biological activity can produce suspended solids and increased concentrations of certain forms of phosphates and nitrogen compounds in dry-weather base flow discharges from the pond.

Without a sufficient continuous base flow, a wet pond can concentrate levels of salts and algae between storm events through evaporation. Besides contributing to nuisance problems, the water quality of the pool is very important. A storm event will displace any concentrated pond water, and in some instances, can result in discharges of water with pollutant concentrations exceeding the inflow—exactly the opposite of the intent for providing this BMP.

Aesthetics and Multiple Uses

A retention pond offers improved aesthetics and multiple uses beyond those typically found at an extended detention basin. The bulk of the capture volume occurs as a surcharge above the permanent pool, with some of it occurring above the dry-weather bank areas. As a

result, most of the sediment deposits are left behind within the permanent pool zone, where they are not seen by the public. Also, the permanent pool offers some aquatic habitat and is a habitat for waterfowl. However, waterfowl can be a nuisance because of the fecal matter they deposit on the banks and in the pool.

5.8.4 Maintenance Requirements

Maintenance requirements for the retention pond are similar to those for the extended detention basin found in Exhibit 14.

5.8.5 Design Considerations

The required total basin design volume of a retention pond facility includes the volume needed for a permanent pool (greater than or equal to WQCV) plus a WQCV as a surcharge above the permanent pool. If desired, a flood routing detention volume can be provided above the WQCV.

Whenever desirable and feasible, incorporate the retention pond within a larger flood control basin. Also, whenever possible, try to provide for other urban uses such as active or passive recreation and wildlife habitat. Try to locate recreational areas to limit the frequency of inundation to one or two occurrences a year. Generally, the area within the WQCV is not well suited for active recreation facilities such as ballparks, playing fields, and picnic areas. These should be located above this pool level.

High exfiltration rates can initially make it difficult to maintain a permanent pool in a new retention pond, but the bottom can eventually seal with fine sediment and become relatively impermeable over time. It is best, however, to seal the bottom and the sides of a permanent pool if it is located on permeable soils and to leave the areas above the permanent pool unsealed to promote exfiltration of the storm water detained in the surcharge WQCV.

There are two primary differences in design between a retention pond and an extended detention basin:

- The retention pond requires a base flow to maintain and to flush a permanent pool.
- A retention pond is designed to empty the surcharge WQCV over a 12-hour period, instead of the longer 40 hours needed for an extended detention basin because the sediment removal process is more efficient when the outflow occurs above the bottom of the basin. Sediments become trapped below the outlet, and sedimentation continues in the pool after the captured surcharge volume is emptied.

Standard Drawing 9 (Attachment 1) shows a representative layout for a retention pond. Although flood storage has not been addressed in these recommendations for the same reasons mentioned under extended detention basins, it can be easily provided for above the surcharge WQCV. Embankment and safety design considerations for a retention pond are identical to those discussed for an extended detention basin, except more attention should be given to cutoff collars on the outlet pipe to safeguard against piping along the outlet.

The amount of construction activity within a basin, the erosion control measures implemented, and the size of the basin will influence the frequency of sediment removal

from the pond. It is estimated that accumulated sediment will need to be removed at 5- to 20-year intervals if there are no construction activities within the tributary catchment.

5.8.6 Design Procedure and Criteria

The following steps outline the design procedure and criteria for a retention pond.

1. Step 1—Basin Surcharge Storage Volume

   Find the required storage surcharge volume (watershed inches of runoff). Determine the required WQCV in watershed inches of runoff using Exhibit 13, based on the retention pond 12-hour drain time. The WQCV is the surcharge volume above the permanent pool. Calculate the design surcharge volume in acre-feet as follows:

   (Equation 16)

$$Design\ \ Surcharge\ \ Volume = \left(\frac{WaterQualityCaptureVolume_{I}}{12} \right) * Area$$

   In which:

   Water Quality Capture Volume = Water quality capture volume from Exhibit 13 in watershed inches

   Area = The drainage area tributary to the retention pond (acres)

2. Step 2—Permanent Pool

   The permanent pool provides storm water quality enhancement between storm water runoff events through biochemical processes and continuing sedimentation.

   Volume of the permanent pool:

$$Permanent\ Pool = 1.0\ to\ 1.5\ (WaterQualityCaptureVolume)$$

3. Step 3—Depth Zones

   The permanent pool shall have two depth zones:

   - A littoral zone 6 to 12 inches deep that is between 25 to 40 percent of the permanent pool surface area for aquatic plant growth along the perimeter of the permanent pool.
   - A deeper zone of 4 to 8 feet average depth in the remaining pond area to promote sedimentation and nutrient uptake by phytoplankton. The maximum depth in the pond shall not exceed 12 feet.

4. Step 4—Base Flow

   A net influx of water must be available through a perennial base flow and must exceed the losses. The following equation and parameters can be used to estimate the net quantity of base flow available at a site:

   (Equation 17)

QNet = QInflow – QEvap – QSeepage – QE.T.

In which:

Qnet	= Net quantity of base flow (acre-feet/year)
Qinflow	= Estimated base flow (acre-feet/year) (estimate by seasonal measurements and/or comparison to similar watersheds)
Qevap	= Loss because of evaporation less the precipitation (acre-feet/year) (computed for average water surface)
QSeepage	= Loss (or gain) because of seepage to groundwater (acre-feet/year)
QE.T.	= Loss because of plant evapotranspiration (additional loss through plant area above water surface not including the water surface)

5. Step 5—Outlet Control

   Provide outlet controls that limit WQCV depth to 2 feet or less. Use a water quality outlet that is capable of releasing the WQCV in no less than a 12-hour period.

   For a perforated outlet, calculate the required flow area and use Exhibit 15 to determine appropriate perforation dimensions. The total outlet area can be calculated by multiplying the area per row by the number of rows. The vertical spacing between hole centerlines should be 4 inches and the lowest perforations should be set at the water surface elevation of the outlet micropool.

6. Step 6—Trash Rack

   Provide a trash rack of sufficient size to prevent clogging of the primary water quality outlet. Size the rack so as not to interfere with the hydraulic capacity of the outlet. Using the total outlet area and the selected perforation diameter (or height), Exhibit 16 will help to determine the minimum open area required for the trash rack. If a perforated vertical plate or riser is used, use one-half of the total outlet area to calculate the trash rack's size. This accounts for the variable inundation of the outlet orifices. The spacing of trash rack bars must be proportioned to the size of the smallest orifice protected. Standard Drawings 4, 6, and 7 (Attachment 1) illustrate a suggested standardized outlet design for smaller sites. Trash racks for the 2-year and 100-year outlet should be sized using the guidelines provided for the water quality outlet above.

7. Step 7—Basin Slope

   Shape the pond with a gradual expansion from the inflow area and a gradual contraction toward the outlet, thereby limiting short-circuiting. The basin length-to-width ratio between the inflow area and outlet should be between 2:1 and 3:1, with the larger being preferred. It may be necessary to modify the inflow area and outlet point using pipes, swales, or channels to accomplish this.

8. Step 8—Basin Side Slopes

   Side slopes should be stable and sufficiently gentle to limit channel erosion and to facilitate maintenance. Side slopes above the permanent pool should be no steeper than 4:1. The littoral zone should be very flat (that is, 40:1 or flatter) with the depth ranging from 6 inches near the shore and extending to no more than 12 inches at the furthest point from the shore. The side slope below the littoral zone shall be 3:1 or flatter.

9. Step 9—Dam Embankment

   The embankment should be designed not to fail during a 100-year or larger storm. Embankment slopes should be no steeper than 4:1 and covered with turf-forming grasses to limit erosion. Poorly compacted native soil should be removed and replaced. Embankment soil should be compacted to 95 percent of its maximum density according to ASTM D698-70 (Modified Proctor). An emergency overflow channel through the embankment to convey the 100-year peak inflow rate should be provided.

10. Step 10—Vegetation

    Vegetation provides erosion control and enhances site stability. Berms and side-sloping areas should be planted with native turf-forming grasses or irrigated turf, depending on the local setting and proposed uses for the pond area. The shallow littoral bench should have a 4- to 6-inch organic topsoil layer and be vegetated with aquatic species.

11. Step 11—Maintenance Access

    Vehicle access to the basin bottom, forebay, and outlet area must be provided for maintenance and removal of bottom sediments. Maximum grades should not exceed 10 percent, and a stabilized, all-weather driving surface capable for use by maintenance equipment shall be provided. If conditions warrant, a gravel or hard surface shall be provided.

12. Step 12—Inflow Area

    Dissipate flow energy at the inflow area to limit erosion and to diffuse the inflow plume where it enters the pond.

13. Step 13—Forebay Design

    To provide an opportunity for larger particles to settle out, install an area that has a solid driving surface bottom to facilitate sediment removal. A berm consisting of a rock and topsoil mixture should be part of the littoral bench to create the forebay and have a minimum top width of 8 feet and side slopes no steeper than 4:1. The forebay volume of the permanent pool should be 5 to 10 percent of the design WQCV.

14. Step 14—Underdrains

    Provide underdrain trenches near the edge of the pond. The trenches should be no less than 12 inches wide, filled with ASTM C-33 sand to within 2 feet of the ponds permanent pool water surface, and with an underdrain pipe connected through a valve to the outlet. These underdrains will permit the pond to be dried out when it has to be cleaned out to restore volume lost due to sediment deposition.

5.9 Acknowledgement

The descriptions of the BMPs contained in this chapter were adapted from descriptions of BMPs found in the Urban Drainage and Flood Control District (Colorado) Drainage Criteria Manual Volume 3 and the City of Sioux Falls Chapter 11 Drainage Improvements.

6. Maintenance Plans

6.1 General

Maintenance plans shall be submitted with all construction plans and included in the subdivision agreement or master deed documents of all subdivisions. These plans shall include the following information:

- A copy of the final approved drainage plan for the development that delineates the facilities and all easements, maintenance access, and buffer areas.
- A detailed description of the procedure for both preventative and corrective maintenance activities. Preventative maintenance shall include periodic inspections, adjustments and replacements, and record keeping of operations and expenditures. Inspection and Maintenance Checklists for several types of Post-construction BMPs are included in Attachment 2, and may be used to track inspections and maintenance activity, as appropriate.
- The party responsible for performing each of the various maintenance activities described, which shall be recorded with final approved plans and plats.

6.2 Maintenance Agreement

Where applicable, the property owner shall submit evidence of a legally binding agreement with the City of Watertown for maintenance oversight of the BMP before final project approval is granted. The Agreement shall be recorded with the Codington County Register of Deeds contemporaneous with plat recording or issuance of a building permit. This agreement shall outline maintenance responsibilities as described in Section 5.1 and may require a maintenance easement to allow the City access to inspect the BMP(s) and my include the right to perform routine maintenance as necessary to ensure proper functioning of the storm water BMP.

The agreement shall specify the timeframe for action to address needed maintenance. If the BMP owner does not properly obtain City authority and perform the needed maintenance, the City can assess the costs against the property owner(s). The agreement shall meet all requirements of the City of Watertown Stormwater Best Management Practice Development Agreement form.

7. References

City of Sioux Falls, South Dakota. 2004. *Chapter 11 Drainage Improvements*.

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http://cfpub1.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5

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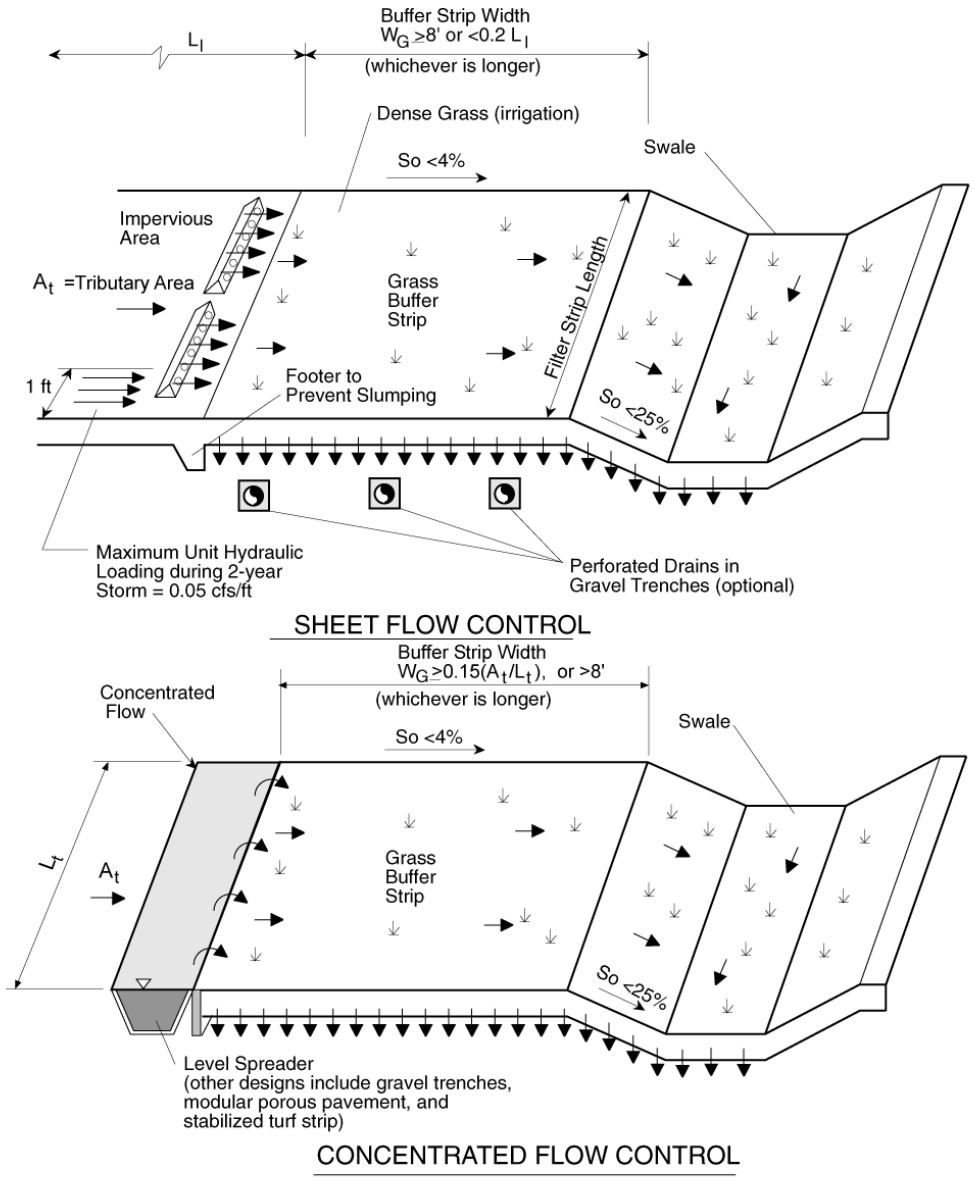
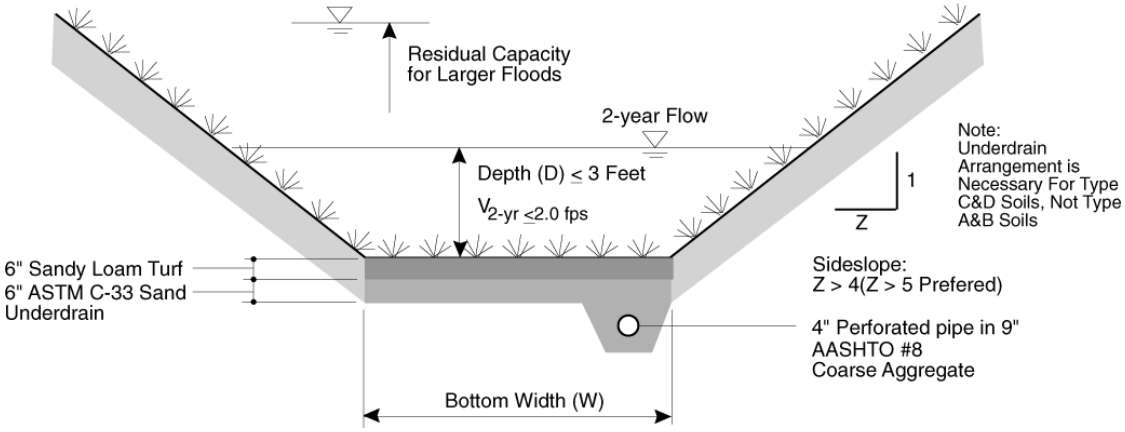
Attachment 1
Standard Drawings



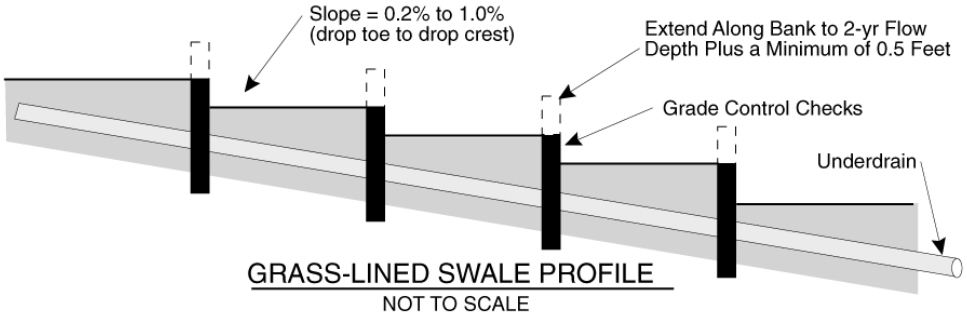
Note: Not to Scale

FIGURE GB-1
Applications of Grass Buffers

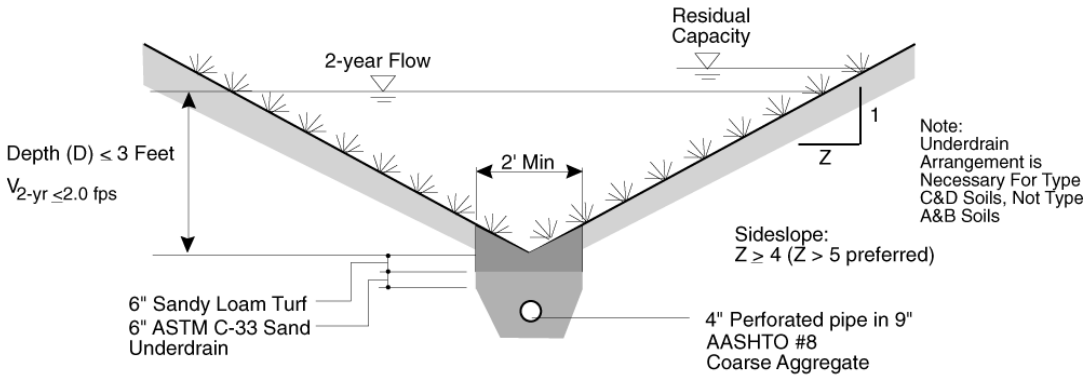
Standard Drawing 1



TRAPEZOIDAL GRASS-LINED SWALE SECTION
NOT TO SCALE



GRASS-LINED SWALE PROFILE
NOT TO SCALE



TRIANGULAR GRASS-LINED SWALE SECTION
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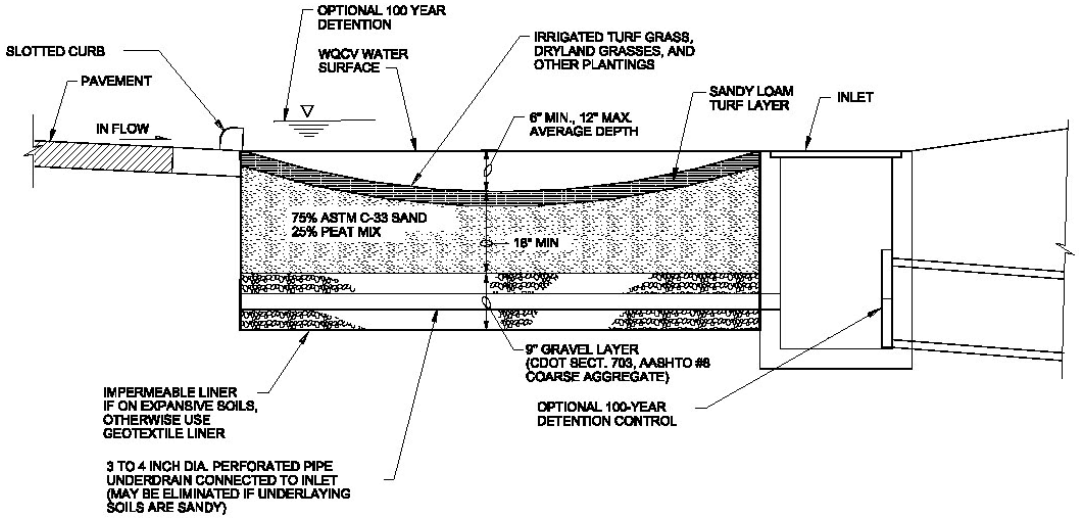
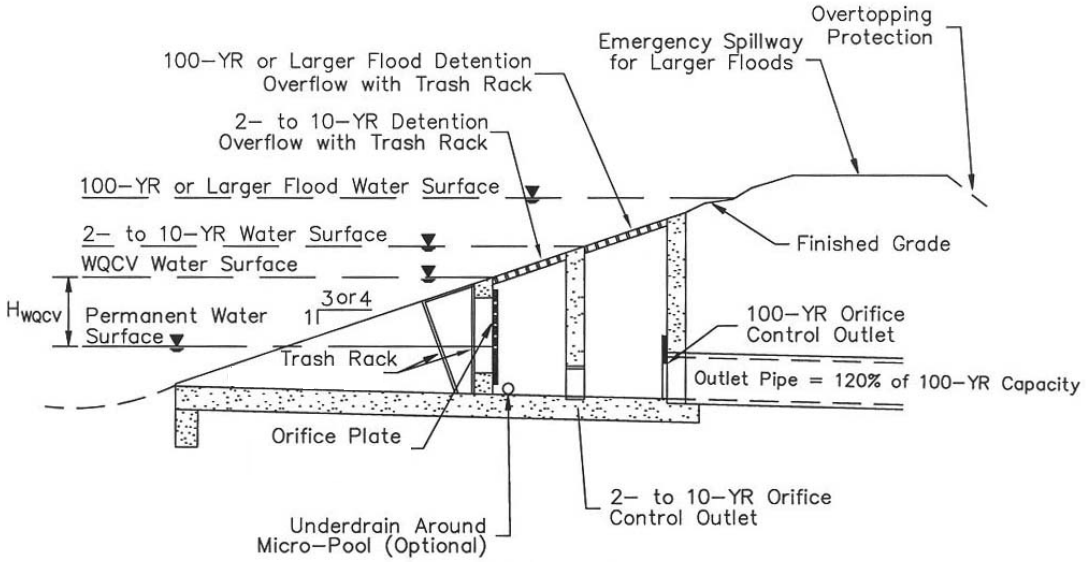
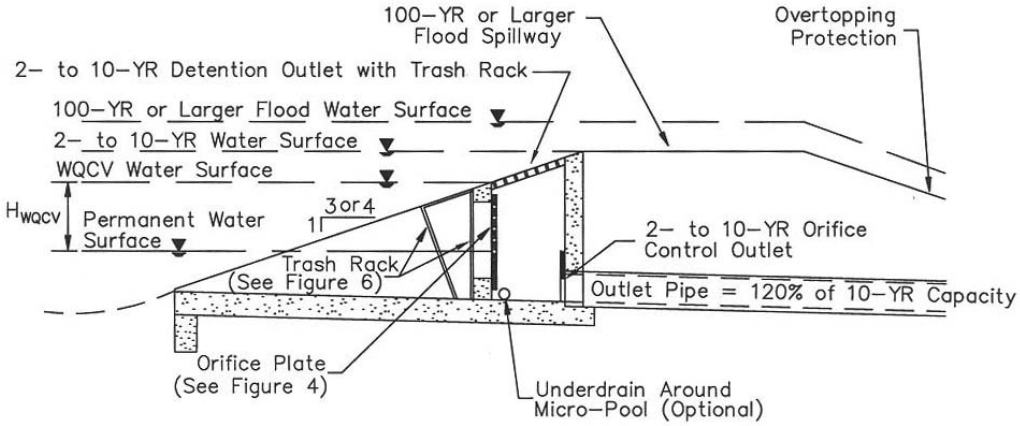
Standard Drawing 2
Profile and Sections of a Grass Swale



Standard Drawing 3
Porous Landscape Detention

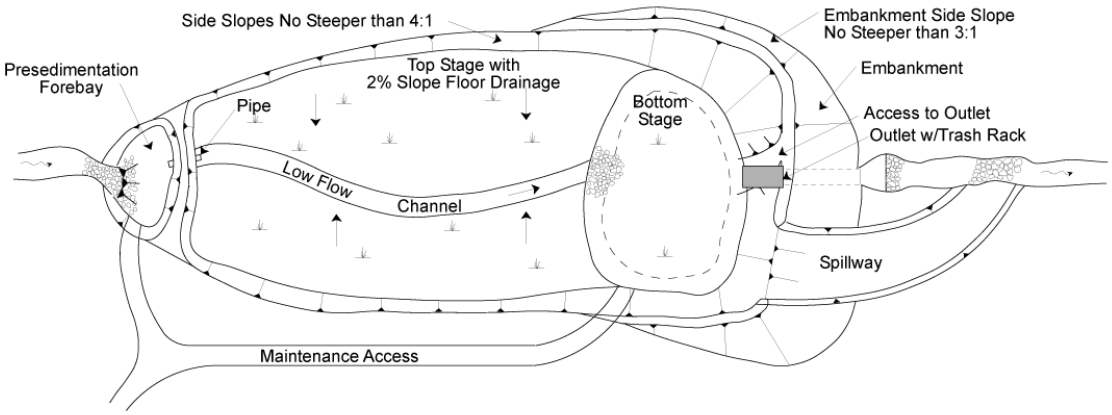


Drop Box Outlet Option

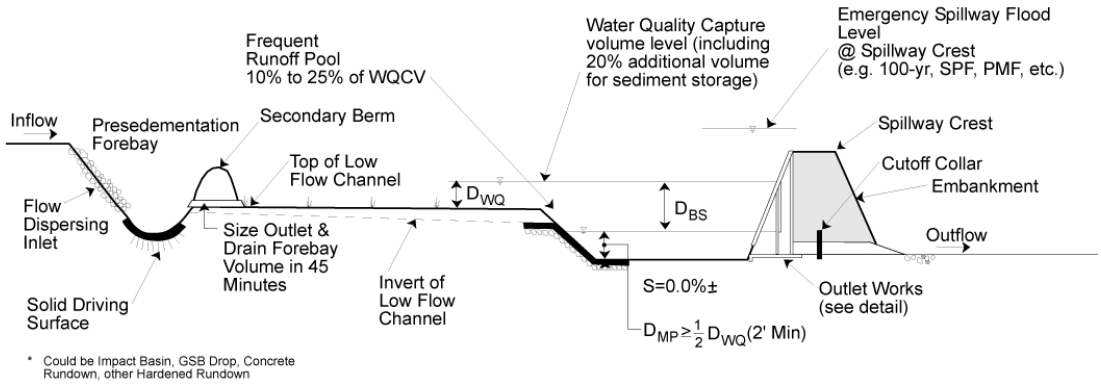


Overtopping Spillway Option

Standard Drawing 4
Typical WQCV Outlet Structure Profiles Including
2- to 10-year and 100-yr Detention



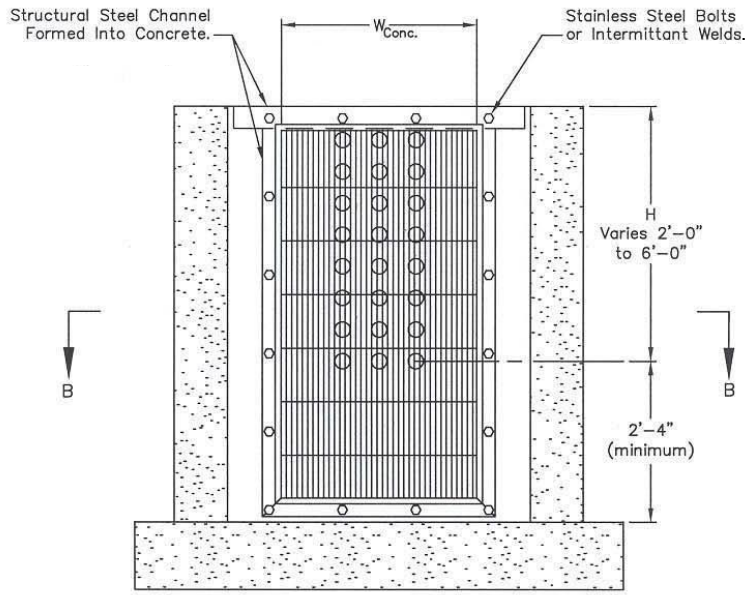
PLAN
NOT TO SCALE



SECTION
NOT TO SCALE

FIGURE EDB-1
Plan and Section of an Extended Detention Basin Sedimentation Facility

Standard Drawing 5
Plan and Section of an Extended
Detention Basin Sedimentation Facility
Watertown Post-Construction Manual



Elevation

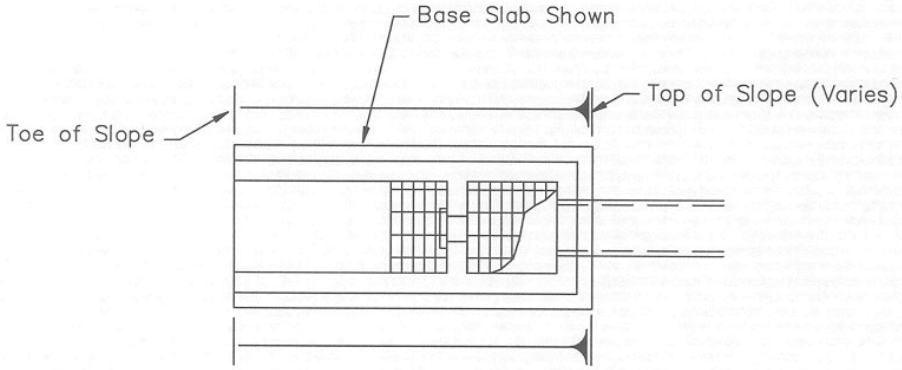
WQCV Trash Racks:

1. Well–screen trash racks shall be stainless steel and shall be attached by intermittant welds along the edge of the mounting frame.
2. Bar grate trash racks shall be aluminum and shall be bolted using stainless steel hardware.
3. Trash Rack widths are for specified trash rack material. Finer well–screen or mesh size than specified is acceptable, however, trash rack dimensions need to be adjusted for materials having a different open area/gross area ratio.
4. Structural design of trash rack shall be based on full hydrostatic head with zero head downstream of the rack.

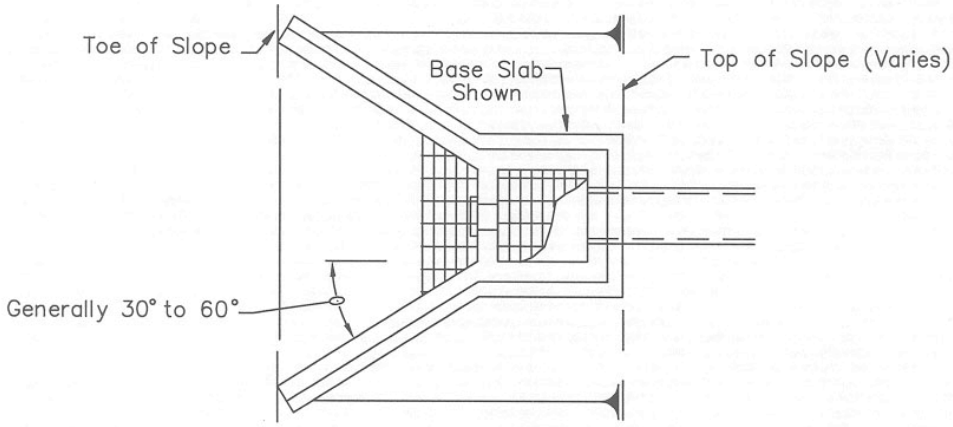
Overflow Trash Racks:

1. All trash racks shall be mounted using stainless steel hardware and provided with hinged and lockable or boltable access panels.
2. Trash racks shall be stainless steel, aluminum, or steel. Steel trash racks shall be hot dip galvanized and may be hot powder painted after galvanizing.
3. Trash Racks shall be designed such that the diagonal dimension of each opening is smaller than the diameter of the outlet pipe.
4. Structural design of trash rack shall be based on full hydrostatic head with zero head downstream of the rack.

Standard Drawing 6
Suggested WQCV Outlet
Standardized Trash Rack Design
Watertown Post-Construction Manual



Plan View–Straight Wingwall Option

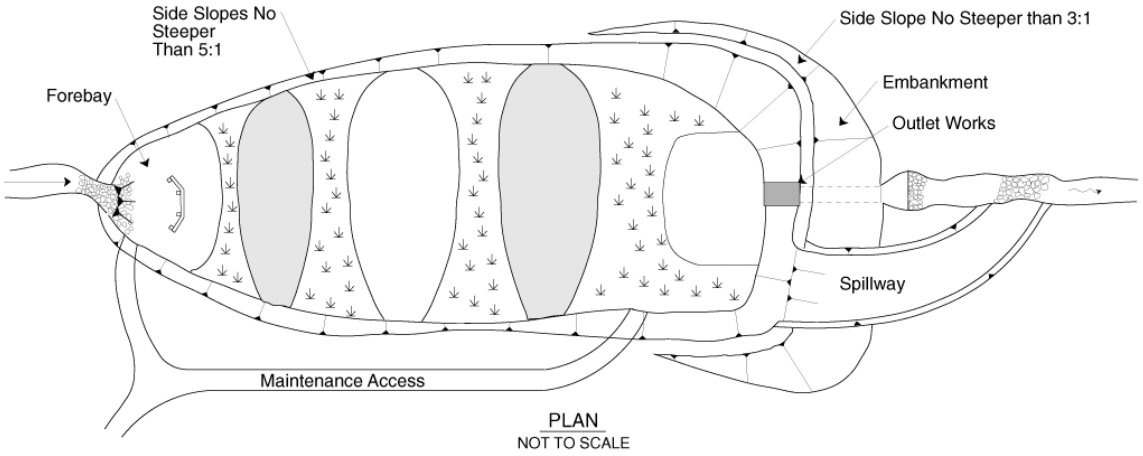


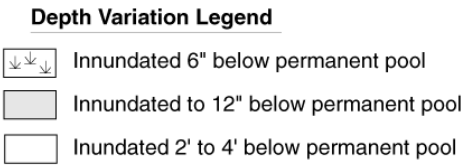
For either a Vertical or Adverse–Slope Trash Rack a handrail may be required.

Plan View–Flared Wingwall Option

Standard Drawing 7
Typical WQCV Outlet Structure
Wingwall Configurations
Watertown Post-Construction Manual

WB082006011MKE Typical_WQCV_Outlet_v1 8-31-06 cae





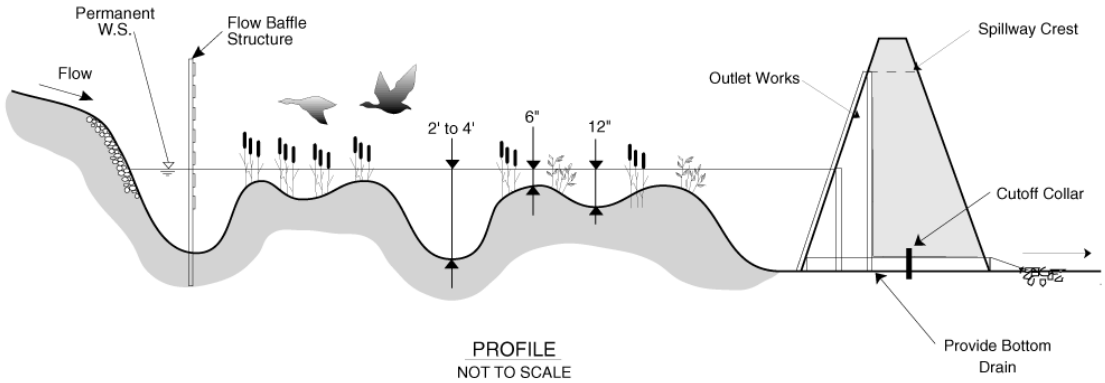


FIGURE CWB-1
Plan and Profile of a Constructed Wetland Basin Sedimentation Facility

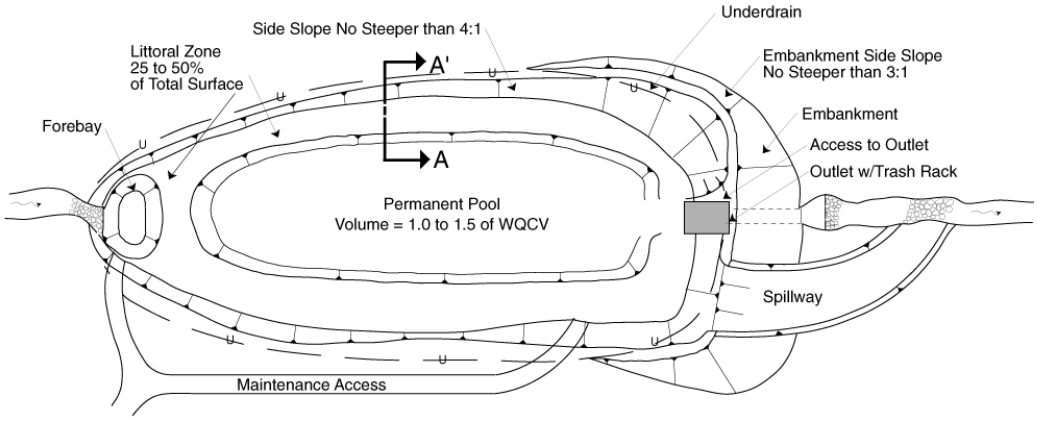


FIGURE RP-1
Plan and Section of a Wet Extended Detention Basin

Standard Drawing 9
Plan and Section of a Retention
Pond—Sedimentation Facility
Watertown Post-Construction Manual

Attachment 2

Maintenance and Inspection Forms

OPEN CHANNEL MAINTENANCE INSPECTION FORM

Facility Number:_____ Date:_____ Time:_____

Subdivision Name:_____ Watershed:_____

Weather:_____ Inspector(s):_____

Date of Last Rainfall:_____ Amount:_____ Inches Streets:_____

Mapbook Location:_____ GPS Coordinates:_____ Property Classification:

Residential 9 Government 9 Commercial 9 Other:_____

Type of Practice (as designed): Dry Swale 9 Wet Swale 9 Grass Channel 9

As-built Plan Available? Yes 9 No 9

Is Facility Inspectable? Yes 9 No 9 Why?_____ Comments Specific Location(s):_____

Scoring Breakdown:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor (potential for future problem exists)
2 = Routine Maintenance Required
3 = Immediate Repair Necessary
*** Use open space in each section to further explain scoring as needed**

1. Culverts						
Debris	N/A	N/I	0	1	2	3
Metal corrosion	N/A	N/I	0	1	2	3
Metal protective material	N/A	N/I	0	1	2	3
Metal misalignment or split seams / joints	N/A	N/I	0	1	2	3
Leaks	N/A	N/I	0	1	2	3
Concrete / masonry major spalling (exposed rebar)	N/A	N/I	0	1	2	3
Concrete / masonry minor spalling or parging (< 1")	N/A	N/I	0	1	2	3
Concrete / masonry joint failure	N/A	N/I	0	1	2	3
Concrete / masonry watertight	N/A	N/I	0	1	2	3
2. Soil / Filter Material						
Depth and material of layers	Depth:_____ Material:_____					
Test pit depth	Depth:_____					
Accumulation of debris and sediments	N/A	N/I	0	1	2	3
Accumulation of oil/ chemicals	N/A	N/I	0	1	2	3
Standing water			No		Yes	
Filter fabric	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
3. Underdrains						
Broken	N/A	N/I	0	1	2	3
Daylighted	N/A	N/I	0	1	2	3
Clogged	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3

OPEN CHANNEL MAINTENANCE INSPECTION FORM

4. Check Dams						
Is clear of debris and trash	N/A	N/I	0	1	2	3
Sediment build up > 25% of original WQv	N/A	N/I	0	1	2	3
Undermined / eroded	N/A	N/I	0	1	2	3
Wood condition	N/A	N/I	0	1	2	3
Pea gravel diaphragm at correct level	N/A	N/I	0	1	2	3
5. Vegetation						
Density	N/A	N/I	0	1	2	3
Evidence of die-off	N/A	N/I	0	1	2	3
6. Upland Characteristics						
Accumulation of debris and trash	N/A	N/I	0	1	2	3
Erosion	N/A	N/I	0	1	2	3
7. Special Structures						
Vehicular access	N/A	N/I	0	1	2	3
Accumulation sediment / trash	N/A	N/I	0	1	2	3
8. Miscellaneous						
Complaints from local residents	N/A	N/I	0	1	2	3
Pea gravel diaphragm at correct level	N/A	N/I	0	1	2	3
Public hazards	N/A	N/I	0	1	2	3
Mosquitoes	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

OPEN CHANNEL MAINTENANCE INSPECTION FORM

Overall Condition of Facility

Total number of concerns receiving a: **(1)_____- Need Monitoring**

(2) _____ - Routine Repair

(3) _____ - Immediate Repair Needed

Inspector's Summary

Pictures	**Clock/Degrees**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
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9.	
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12.	
13.	
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15.	

N/A = Not Applicable
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0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

OPEN CHANNEL MAINTENANCE INSPECTION FORM

Sketches, If Necessary:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

BIORETENTION MAINTENANCE INSPECTION FORM

Facility Number:_____ Date:_____ Time:_____

Subdivision Name:_____ Watershed:_____

Weather:_____ Inspector(s):_____

Date of Last Rainfall:_____ Amount:_____ Inches Streets:_____

Mapbook Location:_____ GPS Coordinates:_____ Property Classification:

Residential 9 Government 9 Commercial 9 Other:_____

Confined 9 Unconfined 9 Barrel Size_____ As-built Plan Available? Yes 9 No 9

Is Facility Inspectable? Yes 9 No 9 Why?_____ Comments Specific Location(s):_____

Scoring Breakdown:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor (potential for future problem exists)
2 = Routine Maintenance Required
3 = Immediate Repair Necessary
*** Use open space in each section to further explain scoring as needed**

1. Outfall Channel(s) from Facility						
Woody growth within 5' of outfall barrel	N/A	N/I	0	1	2	3
Outfall channel functioning	N/A	N/I	0	1	2	3
Manholes, frames and covers	N/A	N/I	0	1	2	3
Released water undercutting outlet	N/A	N/I	0	1	2	3
Erosion	N/A	N/I	0	1	2	3
Displaced rip rap	N/A	N/I	0	1	2	3
Excessive sediment deposits	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
2. Outlet / Overflow Spillway						
Woody growth or unauthorized plantings	N/A	N/I	0	1	2	3
Erosion or back cutting	N/A	N/I	0	1	2	3
Soft or boggy areas	N/A	N/I	0	1	2	3
Obstructions / debris	N/A	N/I	0	1	2	3
3. Filter						
Existing as required			No		Yes	
Sediment accumulation > 1"			No		Yes	
Ponding more than 2 days after rain			No		Yes	
Vegetation	N/A	N/I	0	1	2	3
Depth & material of layers	Depth:_____				Material:_____	
Sediment accumulation in soil bed	N/A	N/I	0	1	2	3
Oil/ chemical accumulation on soil bed	N/A	N/I	0	1	2	3
Filter fabric	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
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2 = Routine Repairs Needed
3 = Immediate Repair Needed

BIORETENTION MAINTENANCE INSPECTION FORM

4. Underdrains							
Broken	N/A	N/I	0	1	2	3	
Daylighted	N/A	N/I	0	1	2	3	
Clogging	N/A	N/I	0	1	2	3	
5. Pretreatment							
Maintenance access	N/A	N/I	0	1	2	3	
Pretreatment a practice other than a stone diaphragm and/ or grass filter strip			No		Yes		Of so,_____(code)
Stone diaphragm level	N/A	N/I	0	1	2	3	
Stone diaphragm clogged with sediment/debris	N/A	N/I	0	1	2	3	
Grass filter strip erosion	N/A	N/I	0	1	2	3	
Evidence of short circuiting, rails/ gullies in filter strip			No		Yes		
Level spreader	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	
6. Upland Characteristics							
Excessive trash / debris	N/A	N/I	0	1	2	3	
Bare soil present	N/A	N/I	0	1	2	3	
Sand in parking lot	N/A	N/I	0	1	2	3	
7. Inflow Points							
Number of inflow pipes:_____	Direction: N		E		W	S	
Endwalls, headwalls, end sections	N/A	N/I	0	1	2	3	
Inlet/ outflow pipes	N/A	N/I	0	1	2	3	
Discharge undercutting outlet or displacing rip-rap	N/A	N/I	0	1	2	3	
Discharge water is causing outfall to erode	N/A	N/I	0	1	2	3	
Sediment accumulation	N/A	N/I	0	1	2	3	
8. Special Structures							
Manhole access (steps, ladders)	N/A	N/I	0	1	2	3	
Vehicular access	N/A	N/I	0	1	2	3	
Concrete/masonry condition	N/A	N/I	0	1	2	3	
Sediment / trash accumulation	N/A	N/I	0	1	2	3	
Manhole lockable nuts	N/A	N/I	0	1	2	3	
9. Miscellaneous							
Encroachment in facility area and/or easement area by buildings	N/A	N/I	0	1	2	3	
Complaints from local residents	N/A	N/I	0	1	2	3	
Graffiti	N/A	N/I	0	1	2	3	
Public hazards	N/A	N/I	0	1	2	3	
Were any pad locks cut and replaced			No		Yes		How many?_____
Other:	N/A	N/I	0	1	2	3	

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N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

BIORETENTION MAINTENANCE INSPECTION FORM

Overall Condition of Facility

Total number of concerns receiving a: **(1)_____- Need Monitoring**

(2) _____ - Routine Repair

(3) _____ - Immediate Repair Needed

Inspector's Summary

Pictures	**Clock/Degrees**
1.	
2.	
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BIORETENTION MAINTENANCE INSPECTION FORM

Sketches, If Necessary:

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2 = Routine Repairs Needed
3 = Immediate Repair Needed

POND / WETLAND MAINTENANCE INSPECTION FORM

Facility Number:_____ Date:_____ Time:_____

Subdivision Name:_____ Watershed:_____

Weather:_____ Inspector(s):_____

Date of Last Rainfall:_____ Amount:_____ Inches Streets:_____

Mapbook Location:_____ GPS Coordinates:_____ Property Classification:

Residential 9 Government 9 Commercial 9 Other:_____

Type of Practice: Wet Pond 9 Dry Pond 9 Micropool ED 9 Multiple Pond System 9 Pocket Pond 9

Shallow Wetland 9 Shallow ED 9 Pond/ Wetland 9 Pocket Wetland 9

Confined 9 Unconfined 9 Barrel Size_____ As-built Plan Available? Yes 9 No 9

Is Facility Inspectable? Yes 9 No 9 Why?_____ Comments Specific Location(s):_____

Scoring Breakdown:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor (potential for future problem exists)
2 = Routine Maintenance Required
3 = Immediate Repair Necessary
*** Use open space in each section to further explain scoring as needed**

1. Outfall Channel(s) from Pond						
Woody growth within 5' of outfall barrel	N/A	N/I	0	1	2	3
Outfall channel functioning	N/A	N/I	0	1	2	3
Manholes, Frames and Covers	N/A	N/I	0	1	2	3
Released water undercutting outlet	N/A	N/I	0	1	2	3
Erosion	N/A	N/I	0	1	2	3
Displaced rip rap	N/A	N/I	0	1	2	3
Excessive sediment deposits	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
2. Downstream Dam Bank						
Cracking, bulging, or sloughing of dam	N/A	N/I	0	1	2	3
Erosion and/or loss of dam material	N/A	N/I	0	1	2	3
Animal burrows	N/A	N/I	0	1	2	3
Soft spots or boggy areas	N/A	N/I	0	1	2	3
Woody growth or unauthorized plantings on dam	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
3. Upstream Dam Bank						
Cracking, bulging, or sloughing of dam	N/A	N/I	0	1	2	3
Erosion and/or loss of dam material	N/A	N/I	0	1	2	3
Animal Burrows	N/A	N/I	0	1	2	3
Soft spots or boggy areas	N/A	N/I	0	1	2	3
Woody growth or unauthorized plantings on dam	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3

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3 = Immediate Repair Needed

POND / WETLAND MAINTENANCE INSPECTION FORM

4. Emergency Spillway							
Woody growth or unauthorized plantings	N/A	N/I	0	1	2	3	
Erosion or back cutting	N/A	N/I	0	1	2	3	
Soft or boggy areas	N/A	N/I	0	1	2	3	
Obstructions / debris	N/A	N/I	0	1	2	3	

5. Principal Spillway Built to Plans							
# of Barrels:_____ Size:_____	RCP	CMP	PVC	STEEL	or	MASONRY	(Circle One)
Confined space entry permit required for entry into all riser and barrels			Entry Approved 9			Entry Denied 9	
Minor spalling or parging (<1”)	N/A	N/I	0	1	2	3	
Major spalling (exposed rebar)	N/A	N/I	0	1	2	3	
Joint failure	N/A	N/I	0	1	2	3	
Loss of joint material	N/A	N/I	0	1	2	3	
Leaking	N/A	N/I	0	1	2	3	
Corrosion	N/A	N/I	0	1	2	3	
Protective material deficient	N/A	N/I	0	1	2	3	
Misalignment or split seams / joints	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	

6. Riser Built to Plans							
Size:_____	CONC	CMP	or	MASONRY		(Circle One)	
Minor spalling or parging (<1”)	N/A	N/I	0	1	2	3	
Major spalling (exposed rebar)	N/A	N/I	0	1	2	3	
Joint failure	N/A	N/I	0	1	2	3	
Loss of joint material	N/A	N/I	0	1	2	3	
Leaking	N/A	N/I	0	1	2	3	
Manhole access and steps acceptable	N/A	N/I	0	1	2	3	
Corrosion	N/A	N/I	0	1	2	3	
Protective material deficient	N/A	N/I	0	1	2	3	
Misalignment or split seams / joints	N/A	N/I	0	1	2	3	
Anti-vortex device secure / acceptable	N/A	N/I	0	1	2	3	
Sediment Accumulation within riser	N/A	N/I	0	1	2	3	
Woody or vegetative growth within 25’ of riser	N/A	N/I	0	1	2	3	
Safety Rebar/pipes in place	N/A	N/I	0	1	2	3	
Safety Rebar/pipes corroded	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	

7. Low Flow Built to Plans							
Orifice and/or trash rack obstructed	N/A	N/I	0	1	2	3	
Trash Rack Corrosion	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	

8. Weir Trash Rack							
Structurally sound	N/A	N/I	0	1	2	3	
Debris removal necessary	N/A	N/I	0	1	2	3	
Corrosion	N/A	N/I	0	1	2	3	

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N/I = Not Investigated
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POND / WETLAND MAINTENANCE INSPECTION FORM

9. Control Valve(s) Built to Plans							
Size:_____ Type:_____							
Operation limited	N/A	N/I	0	1	2	3	
Exercised	N/A	N/I	0	1	2	3	
Leaks	N/A	N/I	0	1	2	3	
Chains & Locks	N/A	N/I	0	1	2	3	
Set to design opening	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	
10. Pond Drain Valve							
Operation limited	N/A	N/I	0	1	2	3	
Exercised	N/A	N/I	0	1	2	3	
Leaks	N/A	N/I	0	1	2	3	
Chained & locked correctly	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	
11. Toe & Chimney Drains Clear & Functioning	N/A	N/I	0	1	2	3	
12. Rip-Rap Pilot Channel (Micropool only)							
Sediment or debris build up	N/A	N/I	0	1	2	3	
Erosion/ Undermining	N/A	N/I	0	1	2	3	
13. Permanent Pool							
Visible pollution	N/A	N/I	0	1	2	3	
Shoreline and / or side slope erosion	N/A	N/I	0	1	2	3	
Aquatic bench inadequately vegetated	N/A	N/I	0	1	2	3	
Abnormally high or low water (pool) levels	N/A	N/I	0	1	2	3	
Sediment / debris accumulation	N/A	N/I	0	1	2	3	
Bathometric study recommended			No		Yes		
Other?	N/A	N/I	0	1	2	3	
14. Dry Storage							
Vegetation sparse	N/A	N/I	0	1	2	3	
Undesirable woody or vegetative growth	N/A	N/I	0	1	2	3	
Low flow channels obstructed	N/A	N/I	0	1	2	3	
Standing water or spots	N/A	N/I	0	1	2	3	
Sediment or debris accumulation	N/A	N/I	0	1	2	3	
Bathometric study recommended			No		Yes		
Other:	N/A	N/I	0	1	2	3	
15. Pretreatment							
Maintenance access	N/A	N/I	0	1	2	3	
Is pretreatment a practice other than a forebay			No		Yes		Of so,_____(code)
Dredging required			No		Yes		
Hard pad condition (Wet pond only)	N/A	N/I	0	1	2	3	
Fixed vertical sediment depth marker present			No		Yes		
Marker Reading_____							
Sediment accumulation	N/A	N/I	0	1	2	3	Estimated % full_____%

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

POND / WETLAND MAINTENANCE INSPECTION FORM

16. Inflow Points								
Number of inflow pipes:_____	Direction:		N		E		W	S
Endwalls, headwalls, end sections	N/A	N/I	0	1	2	3		
Outfall pipes	N/A	N/I	0	1	2	3		
Discharge undercutting outlet or displacing rip-rap	N/A	N/I	0	1	2	3		
Discharge water is causing outfall to erode	N/A	N/I	0	1	2	3		
Sediment accumulation	N/A	N/I	0	1	2	3		
17. Wet Pond Vegetation								
Invasive plants	N/A	N/I	0	1	2	3		
% cover_____								
Vegetation matches landscape design plan	N/A	N/I	0	1	2	3		
Planting needed	N/A	N/I	0	1	2	3		
Shore erosion	N/A	N/I	0	1	2	3		
Coverage needs improvement	N/A	N/I	0	1	2	3		
18. Pond Buffer								
Encroachment by structures	N/A	N/I	0	1	2	3		
Clearing of vegetation	N/A	N/I	0	1	2	3		
Planting needed	N/A	N/I	0	1	2	3		
Predominant vegetation types:	Forested 9		Shrubs 9		Meadow 9		Maintained Grass 9	Other:___
19. Special Structures								
Manhole access (steps, ladders)	N/A	N/I	0	1	2	3		
Vehicular access	N/A	N/I	0	1	2	3		
Concrete/masonry condition	N/A	N/I	0	1	2	3		
Trash racks	N/A	N/I	0	1	2	3		
Elbows	N/A	N/I	0	1	2	3		
Sediment / trash removal	N/A	N/I	0	1	2	3		
Manhole lockable nuts	N/A	N/I	0	1	2	3		
20. Miscellaneous								
Encroachment in pond area and/or easement area	N/A	N/I	0	1	2	3		
Fence condition	N/A	N/I	0	1	2	3		
Safety signs	N/A	N/I	0	1	2	3		
Complaints from local residents	N/A	N/I	0	1	2	3		
Graffiti	N/A	N/I	0	1	2	3		
Public hazards	N/A	N/I	0	1	2	3		
Were any pad locks cut and replaced			No		Yes		How Many?_____	

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

POND / WETLAND MAINTENANCE INSPECTION FORM

Overall Condition of Facility

Total number of concerns receiving a: **(1)_____- Need Monitoring**

(2) _____ - Routine Repair

(3) _____ - Immediate Repair Needed

Inspector's Summary

Pictures	Clock/Degrees	Prin. Spill. Barrel Joints	Clock/Degrees
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	
6.		6.	
7.		7.	
8.		8.	
9.		9.	
10.		10.	
11.		11.	
12.		12.	
13.		13.	
14.		14.	
15.		15.	

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

POND / WETLAND MAINTENANCE INSPECTION FORM

Sketches, If Necessary:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Chapter 12
Erosion and Sediment Control

Chapter 12
Erosion and Sediment Control
Table of Contents

Chapter 12
Erosion and Sediment Control

12.1 Introduction

The City of Watertown, with the assistance of CH2MHill, has prepared an “Erosion and Sediment Control Best Management Practices” manual as a guide for developing storm water pollution prevention plans for construction sites.

All construction activities shall be in conformance with the City of Watertown’s “Erosion and Sediment Control Best Management Practices” manual. A copy of the manual has been included as an Appendix to this chapter.

This manual outlines the requirements of the City of Watertown’s Construction Site Stormwater Runoff Control Program and provides resources helpful for meeting those requirements. It describes requirements related to erosion and sediment control for all construction sites and provides information useful for enacting appropriate erosion and sediment control. It breaks down construction sites into different categories and defines the different levels of requirements appropriate for each of the specific categories. The practices contained in this document shall be viewed as minimum requirements.

When considering the applicability of the requirements in the City of Watertown’s Post-Construction Stormwater Management in New Development and Redevelopment Program, gravel surfaces constructed prior to the adoption of the Post-Construction Stormwater and Erosion and Sediment Control Best Management Practices Manuals (April 2008) shall be considered impervious.

APPENDIX

Best Management Practices Manual
Erosion and Sediment Control Best Management Practices
Prepared for City of Watertown

Best Management Practices Manual

Erosion and Sediment Control Best Management Practices:

A Guide to Developing Stormwater Pollution Prevention Plans for Construction Sites

Prepared for

City of Watertown

April 2008

Prepared by

CH2MHILL

Executive Summary

Purpose

The Watertown Erosion and Sediment Control Best Management Practices Manual outlines requirements of the City of Watertown's Construction Site Stormwater Runoff Control Program and provides resources helpful to meeting these requirements. The expected audience for this document includes construction site owners, operators, and their consultants.

Overview

This document provides resources to develop a Stormwater Pollution Prevention Plan (SWPPP) for construction activity which incorporates best management practices (BMPs) appropriate for the City of Watertown. The following areas are discussed:

General Requirements

Erosion and Sediment Control BMP requirements are outlined based upon the size and type of construction project planned. A detailed outline of the necessary elements of a SWPPP for construction activity is provided, along with performance objectives for implementing BMPs.

Best Management Practices (BMPs)

BMPs are presented to aid the construction site owner in achieving appropriate levels of erosion control, sediment control, and drainageway protection. Good housekeeping practices and non-structural controls are included. A detailed description of each BMP is presented to aid owners in selecting the most beneficial combination of BMPs for their site. Detailed instructions are provided for implementing and installing individual BMPs.

Disposition of Temporary Measures, Inspections, and Maintenance

Guidelines to ensure adequate maintenance for installed BMPs are provided. These guidelines can be incorporated in the maintenance plan included in a SWPPP. Minimum requirements for inspection are also presented along with a schedule for discontinuing temporary measures.

Contents

Exhibits

Acronyms

BMP	best management practices
HazMat	hazardous materials
MS4	municipal separate storm sewer systems
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
SDCL	South Dakota Codified Law
SD DENR	South Dakota Department of Environment and Natural Resources
SDDOT	South Dakota Department of Transportation
SOP	standard operating procedure
SWD	surface water discharge
SWPPP	Stormwater Pollution Prevention Plan
USEPA	United States Environmental Protection Agency
PLS	pure live seed

1. Introduction and Background

In 1987, Congress amended the Clean Water Act to require implementation, in two phases, of a comprehensive national program for addressing stormwater discharges. The first phase of the program, commonly referred to as "Phase I," took effect on November 16, 1990. Under Phase I, the Environmental Protection Agency (EPA) established the permitting requirements for discharges of "stormwater associated with construction activity," which EPA included in its definition of "stormwater discharges associated with industrial activity." This definition included point source discharges from construction activities that disturb five or more acres of land. On December 8, 1999, EPA established Phase II of the Stormwater Regulations, which expanded the definition to include point source discharges from small construction activities that disturb between one and five acres of land. Phase II rules also require municipalities that operate municipal separate storm sewer systems (MS4) to obtain a permit.

To meet the conditions of the City of Watertown's National Pollutant Discharge Elimination System (NPDES) Stormwater Phase II Permit, the City must "develop, implement, and enforce requirements for construction activities to address pollutants in stormwater runoff to the MS4." The City's program includes requirements for all construction sites, with some variation in requirements based on site size and characteristics. The practices described in this manual address the requirements listed in the City of Watertown's Construction Site Stormwater Runoff Control Program (Program). The Program's Notice of Intent was updated in the City of Watertown's 2004 Stormwater Phase II Annual Report to the South Dakota Department of Environment and Natural Resources (SD DENR). The City's Program consists of the following:

> "The City shall require construction site operators to develop a plan for City review and to implement appropriate erosion and sediment control best management practices (BMPs). This may be best accomplished by including this requirement in the newly revised City ordinance. These BMPs include preventive controls, erosion controls, sediment controls, stabilization requirements, and materials handling practices. The City shall consider a focus on providing performance-based BMPs. In some situations, irrigation requirements may be necessary in order for effective stabilization to occur. The City shall develop an erosion and sediment control design criteria manual for contractors to follow and assist them in developing their BMP plans."

1.1 Impact of Construction Activities

Construction activities have the potential to produce many pollutants that may contaminate stormwater runoff. Pollutants such as sediment, pesticides, toxic chemicals, metals, and oil can contaminate stormwater and enter waters of the state. Clearing land of grass, trees, shrubs, rocks, and other ground cover can change natural water runoff patterns and increase erosion. Some construction activities require the use of toxic or hazardous materials, which contain metals and other materials that may be harmful to humans, fish, wildlife, and plants. When these materials are not properly handled or stored, the resulting leaks and spills can pollute stormwater and can impact drinking water sources and waters protected for recreation, aquatic life, and other beneficial uses. The intent of the stormwater

regulations is to improve and protect water quality by reducing or eliminating contaminants in stormwater. Stormwater runoff consists of rainwater and melted snow that runs off the land and directly, or indirectly by way of storm sewers, enters waters of the state, such as lakes, rivers, streams, wetlands, and ponds. The term "construction activity" includes point source discharges from areas undergoing operations such as clearing, grading, and excavation. Construction activities can include road building, construction of residential houses, office buildings, industrial sites, or demolition. It does not include agricultural activities or maintenance activities.

1.2 Objective of Erosion and Sediment Controls

Erosion controls provide the first line of defense in preventing off-site sedimentation and are designed to prevent erosion through protection and preservation of soil. Sediment controls are designed to remove sediment from runoff before the runoff is discharged from the site. The objectives for erosion and sediment control during construction include the following:

- Conduct all land disturbing activities in a manner that effectively reduces accelerated soil erosion and reduces sediment movement and deposition off-site.
- Schedule construction activities to minimize the total amount of soil exposed at any given time to reduce the period of accelerated soil erosion.
- Establish temporary or permanent vegetative cover on areas that have been disturbed as soon as possible after final grading is completed. Install pavement in areas that will be paved as soon as possible after final grading and base course construction is completed.
- Design and construct all temporary or permanent facilities for the conveyance of water around, through, or from the disturbed area to limit the flow of water to non-erosive velocities.
- Remove sediment caused by accelerated soil erosion from surface runoff water before it leaves the site.
- Stabilize the areas of land disturbance with final stabilization: permanent vegetative cover, pavement, or. stormwater quality control measures.
- Erosion and sediment controls must retain sediment on site to the best extent practicable

1.3 Acknowledgements

This *Erosion and Sediment Control Best Management Practices Manual (Manual)* has been developed based on models prepared by the Urban Drainage and Flood Control District of Denver, Colorado and for the City of Sioux Falls, South Dakota. Sources of other information that have also been included are the South Dakota General Permit for Stormwater Discharges Associated with Construction Activities, South Dakota Department of Transportation Erosion Control Manual, Illinois Urban Manual, Minnesota Pollution Control Agency Erosion Prevention and Sediment Control Manual, and City of Las Vegas Stormwater Pollution Guidance. Information from the various sources have been revised and adapted for inclusion in the Manual to meet the needs of the City of Watertown. A list of definitions is included in Attachment 1.

2. General Requirements of Construction Sites and Land Disturbing Activities

This Manual describes requirements related to erosion and sediment control for all construction sites and provides information useful to enacting appropriate erosion and sediment control. Construction sites have been broken down into categories, with different levels of requirements appropriate to each of the following specific categories:

- sites with disturbed area larger than one acre and not part of a subdivision or common plan of development,
- sites with disturbed area less than one acre and not part of a subdivision or common plan of development,
- sites with disturbed area less than one acre and part of a subdivision or common plan of development,
- sites with disturbed area larger than one acre and part of a subdivision or common plan of development,
- adjusted compliance for certain types of construction sites

Exhibit 1 lists each category with a description of its general requirements and a list of sections of this manual which contain descriptions of specific requirements relevant to each category.

EXHIBIT 1
General Requirements by Category of Construction Site

Category	General Requirements	Relevant Sections
Sites with disturbed area larger than one acre and not part of a subdivision or common plan of development	Must develop and submit a complete SWPPP including a SWPPP report and detailed drawings	Section 2.1 and Section 2.2
	Must implement erosion and sediment control measures as described in report and shown on drawings	
Sites with disturbed area less than one acre and not part of a subdivision or common plan of development	Must implement erosion and sediment control measures as necessary to ensure that sediment does not leave the site	Section 2.1 and Section 2.3.1
Sites with disturbed area less than one acre and part of a subdivision or common plan of development	Must implement erosion and sediment control measures following SWPPP developed for the entire subdivision or development and as necessary to ensure that sediment does not leave the site	Section 2.1 and Section 2.3.2
Sites with disturbed area larger than one acre and part of a subdivision or common plan of development	Must develop and submit an *abbreviated* SWPPP including an *abbreviated* report and plan and detailed drawings	Section 2.1 and Section 2.3.3

EXHIBIT 1
General Requirements by Category of Construction Site

Category	General Requirements	Relevant Sections
	Must implement erosion and sediment control measures as described in report and shown on drawings	
Adjusted Compliance (agriculture, utilities, sidewalks and driveways)	Must ensure that sediment does not leave the site	Section 2.1 and Section 2.4

The statements in this document are intended solely as supporting documentation to aid in complying with stormwater regulations. This document is **not** a substitute for reading the "General Permit for Stormwater Discharges Associated with Construction Activities" and understanding all its requirements as they apply to the facility or site. Submittal of a SWPPP to the City does not supersede the requirement of the property owner or designated representative (Owner) to also obtain any required permits from the State of South Dakota, including, but not limited to:

- Notice of Intent to discharge stormwater associated with construction activity greater than 1 acre to the South Dakota Department of the Environment and Natural Resources
- Army Corps of Engineers 401/404 Wetland and Stream Impact Permit

Nothing in these criteria limits the right of the City to impose additional or more stringent standards.

2.1 Requirements and Expectations of All Sites

Specific expectations of ALL construction sites and land disturbing activities minimally include:

- Conduct all land-disturbing and construction activities in a manner that effectively reduces accelerated soil erosion and reduces the movement and off-site deposition of sediment and other construction-related materials.
- Schedule construction activities to minimize the total amount of soil exposed at any given time and to minimize the period of soil exposure.
- Erosion and sediment controls must retain sediment on the site and prevent discharge of sediment and other construction-related materials to adjacent properties and streets.
- In the event sediment and other construction-related materials are discharged from the site, as soon as possible but no later than the end of the work day in which the discharge occurred, the discharged materials shall be recovered, the affected properties shall be returned to the condition prior to the discharge, and the affected streets shall be swept or broomed. Street cleaning can be accomplished by a number of methods including, but not limited to, the use of mechanical street sweepers, mechanical street vacuum equipment, power brooms, or manual push brooms.

- Designate an area of the site for concrete washout and concrete equipment cleaning with the objective of preventing the discharge of concrete washout water and concrete equipment wash water off-site to adjacent properties and streets.
- Install stabilized construction site entrance/exit point(s), and direct all traffic to the stabilized construction entrance/exit point(s), prior to the delivery of any construction equipment or building materials.
- Preserve or establish permanent or temporary vegetation of the boulevard area of the public right-of-way.
- Install access barriers and down-gradient perimeter erosion and sediment controls prior to the delivery of any construction equipment or building materials to protect vegetated boulevard areas and to direct construction traffic to the stabilized construction site entrance/exit.
- Permanent stabilization of the project with permanent vegetation and final hard surfacing shall be completed within the timeframe allowed by the associated building or grading permit.

In the case of infrastructure construction projects, final stabilization with permanent vegetation and final hard surfacing shall be completed as soon as possible following the substantial completion of infrastructure installation**.** Every effort shall be made to complete final stabilization of the project site prior to the end of the growing season and prior to the close of the construction season due to climatic conditions. Unusually wet or otherwise abnormal climatic conditions may be sufficient justification to delay final stabilization measures to the beginning of the following construction and growing season, but do not relieve the operator of the requirement and responsibility for implementing and maintaining temporary stabilization measures and sediment control best management practices.

2.2 SWPPP Requirements for Sites Greater than One Acre of Disturbed Area

A SWPPP consisting of 1) a written narrative report and 2) detailed drawing(s) must be developed by a Professional Engineer (PE), or a Certified Professional in Erosion and Sediment Control (CPESC), or a Certified Professional in Stormwater Quality (CPSWQ) and submitted to the appropriate Public Works staff for review and acceptance. A SWPPP prepared in conjunction with subdivision planning and platting shall be submitted to the Planning & Zoning Official or Urban Planner, a SWPPP prepared in conjunction with a building permit application shall be submitted to the Building Official, and a SWPPP prepared in conjunction with a permit application for grading and drainage shall be submitted to the City Engineer. An example narrative report is shown in Attachment 2.

If there is a transfer of ownership after the *SWPPP* has been developed and before construction has been completed, the City of Watertown Public Works Office must be notified using the Change of Authorization/Name Change form found in Attachment 3.

2.2.1 SWPPP Report

The SWPPP Report shall contain the following:

- **Name, address, and telephone number of the applicant**. The name, address, and telephone number of the Professional Engineer (PE), or Certified Professional in Erosion and Sediment Control (CPESC), or Certified Professional in Stormwater Quality (CPSWQ) responsible for preparation of the *SWPPP Report* shall also be included if different from the applicant.
- **Project location**. Street address or nearest intersection, and township, range, section, and quarter-section, or the latitude and longitude, of the approximate center of the project. A location map may be included.
- **Project description**. A brief description of the overall project and the type of construction activity, and a description of the intended sequence of activities that disturb soils for major portions of the site.
- **Existing site conditions**. A description of the existing topography, vegetation, and drainage including overland flow paths, streams, rivers, curb and gutter, and storm sewer pipes, drop inlets, catch basins, and outfalls; and identify any wetlands on the site.
- **Adjacent areas.** A description of neighboring areas which might be affected by the land disturbance.
- **Receiving Waters**. A description of the downstream receiving waters, MS4, or other conveyance that receives stormwater flow from the site.
- **Soils.** A brief description of the soils on the site including information on soil type and names, mapping unit, erodibility, permeability, hydrologic soil group, depth, texture, and soil structure. (This information may be obtained from the soil report for the site, or if not available, from soil reports for adjacent sites.)
- **Areas**. The total surface area (in acres) of the site, and the total area (in acres) that is expected to be disturbed by excavation, grading, grubbing, or other activities during the life of the project..
- **Erosion and Sediment control measures**. A description of the methods which will be used to control erosion and sediment on the site. Include an explanation of why each measure is considered appropriate and who is responsible for implementation. (See Sections 3, 4, and 5).
- **Nonstructural control measures**. A description of the methods which will be used to control stormwater pollution, erosion, sediment, and spills on the site. Descriptions shall include methods for controlling litter, construction debris, and construction chemicals. Description shall also include procedures for detecting and measures for removing any offsite accumulations of sediment that have escaped from the project site, such as provisions made for street sweeping. During the construction process, the Owner is responsible for maintaining all compliance documentation records. (See Section 6).
- **Time schedule.** A time schedule indicating the anticipated starting and completion time periods of the site grading and/or construction sequence, including week or date of completion. The schedule shall include the installation and removal time periods of erosion and sediment control measures, and the time of exposure of each area prior to

the completion of temporary erosion and sediment control measures. The schedule shall include weekly inspections by the Owner of erosion and sediment control structures.

- **Permanent stabilization**. A brief description, including specifications, of how the site will be stabilized after construction is completed. The stabilization plan must meet the revegetation requirements described in Section 3.2.
- **Stormwater management considerations**. Explain how stormwater runoff from and through the site will be handled during construction. Include sizing calculations for temporary sediment traps, sediment basins, and stormwater ponds. Provide a brief description of the post-construction stormwater quality control measures to be included as a part of the site development.
- **Maintenance**. A description of routine erosion and sediment control BMP maintenance shall be included.
- **Employee training**. Owner is responsible for training all employees, contractors, and subcontractors to follow the SWPPP prior to entering the work area. Documentation of such training, such as copies of handout materials and sign-in sheets, must be maintained. Training shall include but not be limited to:
  - Define limits of construction and the method and location of physical demarcations
  - Define location and limits of stockpile areas if required
  - Remove sediment and debris on property
  - Remove, recover, and properly dispose of any sediment and debris that has been washed downstream off property, has been tracked off property, or has otherwise escaped from property
  - Locate stabilized staging area and protection requirements as required
  - Restrict use of vehicles or equipment on and off of un-stabilized areas with entrance and egress through the lot's construction entrance
  - Locate Concrete Washout Area on lot or subdivision as required
  - Identify required structural and non-structural BMP(s) that must be installed before commencing construction and how they are to be maintained
- **The following note**. "This SWPPP Report and attached *Erosion and Sediment Control Detailed Drawing(s)* are intended to fulfill the requirements of the City of Watertown. I understand that additional erosion control measures may be needed if unforeseen erosion problems occur or if the measures described in the submitted plan do not function as intended. The requirements of this plan shall run with the land and be the obligation of the landowner until such time as the plan is properly completed, modified or voided."
- **Signature page and statement.** Signature page for Owner acknowledging the review and acceptance of responsibility, and a statement by the Professional Engineer (PE), Certified Professional in Erosion and Sediment Control (CPESC), Certified Professional

in Stormwater Quality (CPSWQ) acknowledging responsibility for the preparation of the SWPPP for properties greater than one acre of disturbed area.

2.2.2 Erosion and Sediment Control Detailed Drawing(s)

The *Erosion and Sediment Control Detailed Drawing(s)* shall be separate from the narrative report. The drawing(s) shall be prepared at a minimum scale of one (1) inch equals one hundred (100) feet and include the following:

- **Property line.** The property lines for the site where the work will be performed.
- **Existing topography.** Existing topography shall be on the state plane coordinate system. Topographic drawings shall indicate the vertical datum to which the elevations are referenced, and shall include contour intervals sufficient to determine the character and topography of the land, but in no case shall the contour intervals be more than one foot for land with a slope of one (1) percent or less, two feet for a slope between one and ten (10) percent, and five feet for land with a slope exceeding ten percent.
- **Existing Conditions.** Location of all existing structures, natural and hydrologic features on the land and adjacent to the site as required for the final drainage plan. The plan shall show the location of the street, right of way, storm sewer, channel, or other waters receiving storm runoff from the site. Any potential wetlands identified on inventory maps or observed shall be clearly shown.
- **Proposed topography.** Proposed topography after construction shall be on the state plane coordinate system. Design topographic drawings shall indicate the vertical datum to which the elevations are referenced, and shall include contour intervals sufficient to determine the character and topography of the land, but in no case shall the contour intervals be more than one foot for land with a slope of one (1) percent or less, two feet for a slope between one and ten (10) percent, and five feet for land with a slope exceeding ten percent. The map shall show elevations, dimensions (drawn to scale), location, extent, and the slope of all proposed grading.
- **Proposed Facilities.** Location of all proposed structures and development on the site.
- **Clearing and grading**. Location of areas that are to be cleared and graded.
- **Soil stockpiles**. Location of areas designated for topsoil and subsoil storage.
- **Storage areas**. Location of areas designated for equipment, fuel, lubricants, chemical, and waste storage.
- **Temporary Roads.** Location of temporary roads designated for use during the construction period.
- **Plans of all erosion and sediment control measures**. Show all structural and nonstructural erosion controls, paved areas, retaining walls, planting, temporary or permanent soil erosion control measures, or other features to be constructed. Show any nearby surface waters and the drainage outfall location of the site.
- **Drainage Area Map** showing the drainage area boundary of land tributary to the site.

- **Matrix of best management practices**. A table containing a list and brief description of best management practices to be used at the site. This can be created from Exhibit 2, Section 2.5 of this Manual.
- **Details.** Design details of sediment controls, temporary diversions, and any practices used that are not referenced in these criteria.

2.2.3 Acceptance of SWPPP

A SWPPP must be accepted prior to issuance of a Building Permit or an Excavation and Grading Permit, or approval and recording of a subdivision plat. Acceptance of the SWPPP does not imply acceptance or approval of Drainage Plans, Utility Plans, Street or Road Plans, Design of Retaining Walls, or any other aspect of site development.

2.3 Abbreviated Requirements for Small Sites

2.3.1 Sites Less Than One (1) Acre of Disturbed Area and Not Part of Larger Subdivision Development

Individual projects less than one (1) acre of disturbed area that are not part of a larger subdivision project are not required to submit a narrative report or plan, but are required to implement erosion control measures as necessary to ensure that sediment does not leave the site. Refer to Section 2.1 Requirements and Expectations of All Sites for a description of specific requirements and expectations.

If the City determines that any site regardless of size is contributing sediments or other pollutants to the MS4, it can require specific erosion and sediment control measures to be put in place or can take enforcement action.

2.3.2 Sites Less Than One (1) Acre of Disturbed Area and Part of Larger Subdivision Development (Minor Impact Construction Sites)

Individual lots involving less than one (1) acre of disturbed area in a subdivision or larger common plan of development shall not be considered separate construction projects, but rather as a part of the subdivision development as a whole. It will be the responsibility of the Owner and their contractors to conform to all requirements of the SWPPP for the subdivision. Subdivision SWPPPs must incorporate a separate narrative report and detail drawing(s) describing minimum erosion control measures of typical individual lots within the subdivision or larger common plan of development or sale. It is understood that the City of Watertown may require additional erosion control measures if unforeseen erosion problems occur or if the submitted SWPPP control measures do not function as intended.

Such individual lots will be classified as "minor impact construction sites" if all the following conditions are met:

- The individual lot has been sold or transferred to a new owner.
- The subdivision owner and developer has submitted a SWPPP and detailed drawings for the entire subdivision site.
- A notice of intent has been submitted and the subdivision has coverage under a South Dakota general permit for stormwater discharges associated with construction activity.

- A South Dakota stormwater permit for the subdivision is maintained for the subdivision until both of the following are met:
  - Substantial build-out of the property has been completed. The subdivision owner and developer shall determine whether to meet the 90 percent build-out standard by lot or acreage. The subdivision owner and developer shall maintain documentation verifying how this build-out standard has been met prior to submitting a notice of termination of the general permit for stormwater discharges associated with construction activity to the SD DENR.
  - Areas not built-out have been permanently stabilized.
- The subdivision or larger common plan of development or sale has been reviewed pursuant to the City's subdivision ordinance.

A "minor impact construction site" shall generally not be required to submit individual SWPPP Report or detailed drawings.

A "minor impact construction site" shall be required to take erosion control measures as necessary to ensure that sediment does not leave the site. If the City determines that any site regardless of size is contributing sediments or other pollutants to the MS4, then it can require specific erosion and sediment control measures to be put in place or can take enforcement action.

Throughout build-out, a subdivision owner and developer shall implement and maintain BMPs and conditions of the SWPPP to control erosion and sediment problems on all property that has not been sold to another party or does not meet the specific conditions listed in this section.

Throughout build-out, a minor impact construction site owner and contractor shall implement and maintain the subdivision and individual lot BMPs and conditions of the SWPPP to control erosion and sediment problems on the individual lot that they own or upon which they build.

If there is a transfer of ownership (including the sale of an individual lot within a subdivision from one owner to another) after the SWPPP has been developed and before construction has been completed, the City of Watertown must be notified using the Change of Authorization/Name Change form found in Attachment 3.

2.3.3 Sites Greater Than One (1) Acre of Disturbed Area and Part of Larger Subdivision Development

In the case of individual lots greater than one (1) acre and part of a larger subdivision, a SWPPP is required; however, an abbreviated form of the SWPPP is acceptable. The specifics of what is required in this case are described below.

Abbreviated SWPPP Report

A narrative report shall be required, and must describe how the following four requirements will be accomplished:

- Owner is responsible for training all employees, contractors, and subcontractors to follow the subdivision SWPPP prior to entering the work area. Training/discussions with subcontractors shall include but not be limited to:
  - Define limits of construction and the method and location of physical demarcations
  - Define location and limits of stockpile areas if required
  - Remove sediment and debris on property
  - Remove, recover, and properly dispose of any sediment and debris that has been washed downstream off property, has been tracked off property, or has otherwise escaped from the property
  - Locate stabilized staging area and protection requirements as required
  - Restrict use of vehicles or equipment on and off of un-stabilized areas with entrance and egress through the lot's construction entrance
  - Locate Concrete Washout Area on lot or subdivision as required
  - Identify required structural and non-structural BMP(s) that must be implemented prior to construction and maintained
- Any proposed structural BMP (i.e. silt fence, vehicle tracking) shall be inspected and maintained by the Owner weekly and after precipitation events (greater than one-half (0.5) inch), snowmelt, or any runoff that causes surface erosion, sediment transport or vehicle tracking of debris off of property
- Owner shall be responsible for implementing and maintaining the lot's structural BMPs located on his/her property and within the limits of construction
- Owner shall ensure that soil, landscape materials, rock or mulch are not stockpiled, stored, or placed on streets, sidewalks, or stormwater flow lines

Abbreviated Erosion and Sediment Control Detailed Drawing(s)

The *Erosion and Sediment Control Detailed Drawing(s)* shall be separate from the narrative report and demonstrate the typical minimum erosion control measures for a standard planted lot within the subdivision. The drawing(s) shall be prepared at a minimum scale of one (1) inch equals fifty (50) feet and include the following: Detail drawing(s) shall include the following:

- Subdivision Name
- Subdivision Location
- Limits of Construction. Limits of construction shall be at the property lines or no more than ten (10) feet beyond property lines with authorization by adjacent property owner. Authorized limits of construction must be physically demarcated on the property. At a minimum the limits of construction must be marked with at least a four foot high post with at least the top 12" painted or coated with an orange fluorescent color at the corners of each authorized limit line.
- Selected erosion and sediment control BMPs as described in this manual.

A SWPPP must be accepted prior to issuance of a Building Permit or an Excavation and Grading Permit, or approval and recording of a subdivision plat. Acceptance of the SWPPP does not imply acceptance or approval of drainage plans, utility plans, street or road plans, design of retaining walls, or any other aspect of site development.

2.4 Adjusted Compliance

Adjustments to standard compliance with the construction site erosion control planning process will be in the form of an exemption to the Owner from preparing a SWPPP and applying for a Building Permit or an Excavation and Grading Permit for any of the following; however, this allowance for adjusted compliance does not remove the responsibility of the Owner from controlling erosion of soil at each construction site through the use of the techniques described in this Manual:

- Agricultural use of land.
- A sidewalk or driveway.
- Underground utility construction if confined entirely to a hard-surfaced area provided that runoff and erosion from soil stockpiles are properly confined and will not enter the drainage system. (Underground utility construction that is not located under hard-surfaced roads, streets, or sidewalks will be subject to site-specific BMPs as described in this manual).

2.5 Matrix of Best Management Practices

Exhibit 2 lists best management practices contained in this manual and describes when they are applicable.

EXHIBIT 2
Matrix of Best Management Practices

Practice	Section	Category	Description/Applicability
Mulching	3.1	Erosion	Perform in conjunction with seeding or separately after 2 week exposure and when area cannot be seeded
Revegetation	3.2	Erosion	Temporary revegetation required after 2 weeks except when winter conditions do not allow; permanent revegetation required within one year
Soil Stockpiles	3.3	Erosion	Should follow revegetation requirements, and not be located near drainageways
Roads and Parking Lots	3.4	Erosion	Aggregate should be installed as soon as possible
Erosion Control Blanket	3.5	Erosion	Preformed protective blanket for use where protection is critical such as drainageways and steep slopes
Vehicle Tracking and Temporary Construction Entrances	4.1	Sediment	Stabilized area for designated entrance to site to prevent tracking of sediment from site
Filter Strip/Grass Buffer	4.2	Sediment	Buffer strips of natural vegetation for the base of a disturbed area, suitable for buffers along, but not in drainageway
Wattle/Fiber Roll	4.3	Sediment	Elongated tube of compacted straw, used at base of

EXHIBIT 2
Matrix of Best Management Practices

Practice	Section	Category	Description/Applicability
			disturbed area or as check structure in drainageway
Silt Fence	4.4	Sediment	Temporary sediment barrier for the base of a disturbed area
Rock Check Dams	4.5	Sediment	Small rock dam constructed across a grassed swale or road ditch
Temporary Sediment Traps	4.6	Sediment	A small, temporary ponding basin formed by construction of an embankment
Sediment Basins	4.7	Sediment	A large, temporary ponding basin formed by construction of an embankment
Working Within or Crossing a Waterway	5.1	Drainage	Practices, methods, and facilities to limit the impact of work conducted within or crossing a waterway
Outlet Protection	5.2	Drainage	Small check dams to reduce velocity at flow outlet points of other structures
Inlet Protection	5.3	Drainage	Temporary blocking of inlets to prevent sediment from entering storm drains
Concrete Wash Water	6.1	Nonstructural	Practices related to handling concrete wash water
Dust Control/Street Sweeping	6.2	Nonstructural	Practices to limit surface and air transport of pollutants
Spill Prevention and Response	6.3	Nonstructural	Practices to prevent spills and leaks
Planning and Scheduling	6.4	Nonstructural	Plan construction activities in ways to reduce exposure of potential pollutants

3. Erosion Control Best Management Practices

The planning for the installation of permanent or temporary soil erosion controls is needed in advance of all major soil disturbance activities on the construction site. After construction begins, soil surface stabilization shall be applied within 2 weeks to all disturbed areas that may not be at final grade but will remain dormant (undisturbed). Within 14 days after final grade is reached on any portion of the site, permanent or temporary soil surface stabilization shall be applied to disturbed areas and soil stockpiles. When the initiation of stabilization measures are stopped due to snow cover, stabilization measures shall be resumed as soon as possible.

Soil surface stabilization protects soil from the erosive forces of raindrop impact, flowing water, and wind. Erosion control practices include mulching, establishment of vegetative cover, and the early application of gravel base on areas to be paved. Stabilization measures to be used shall be appropriate for the time of year, site conditions, and estimated duration of use. Exhibit 3 lists the maximum time limits of land exposure for selection of erosion controls.

EXHIBIT 3
Maximum Time Limits of Land Exposure for Selection of Erosion Controls

Condition of Exposed Land	Maximum Allowable Period of Exposure
Disturbed earth without construction activity	14 days
Mulching (only allowed without seeding when weather does not allow seeding)	6 months
Temporary Revegetation	12 months
Soil Stockpile without Revegetation	2 months
Early Application of Road Base (prior to installment of pavement)	2 months

3.1 Mulching

All disturbed areas shall be seeded and/or mulched within 14 days after final grade is reached on any portion of the site not otherwise permanently stabilized (see Temporary Revegetation within Section 3.2), in accordance with these guidelines:

- Mulch shall be applied to protect newly seeded areas, or to provide temporary cover on disturbed areas which will not require temporary revegetation. Mulch also shall be applied to areas which cannot be seeded due to winter conditions. Mulch shall consist of clean, weed- and seed-free, long-stemmed grass hay (preferred) or cereal grain straw. Hay is preferred as it is less susceptible to removal by wind. Mulch shall be applied evenly at a rate of two (2) tons per acre. At least 50 percent of the mulch, by weight, shall be ten (10) inches or more in length.

  Mulch shall be anchored. This can be accomplished mechanically by crimping or with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is the recommended method for all areas equal to or flatter than 3:1. Mechanical crimpers shall be capable of tucking the long mulch fibers into the soil four (4) inches deep without cutting them. On small areas sheltered from the wind and from heavy runoff, spraying a tackifier on the mulch is satisfactory for holding it in place.

- **For steep slopes (steeper than 3:1) and other special situations:** Blankets, anchored with staples, may be required in addition to mulch. A blanket is straw mulch that has been woven and often times include a synthetic layer or net. For application of tackifiers near water bodies, the product must be acceptable to SD DENR.

  Hydraulic mulching shall be limited to those situations where it is too difficult to apply and anchor a mulch of long-stemmed grass hay or cereal straw; namely, slopes steeper than 3:1 or where access is limited. Wood cellulose fibers shall be mixed with water and a tackifying agent and applied at a rate of 1,500 pounds per acre with a hydraulic mulcher.

  Mats, blankets, and nets are available to help stabilize steep slopes and drainage channels. Depending on the product, these may be used alone or in conjunction with grass or straw mulch. Normally, use of these products will be restricted to relatively

small areas. Mats made of jute, coconut fiber, or various geosynthetic fibers can be used in addition to mulch. Plastic netting may be used to anchor mulch.

Note: Some synthetic tackifiers or binders may be used to anchor mulch. Caution shall be used to prevent the introduction of any potentially harmful material into the environment. Manufacturer's recommendations shall be followed at all times.

3.2 Revegetation

Temporary revegetation is required on all disturbed areas having a period of exposure prior to final stabilization of two (2) weeks or longer (see temporary revegetation below). Permanent revegetation is required on all disturbed areas and soil stockpiles (see Section 3.3) having a period of exposure of 1 year or longer, and the vegetative cover shall be established within one (1) year. Vegetation is not considered established until a ground cover is achieved which, in the opinion of the City, is sufficiently mature to control soil erosion and can survive severe weather conditions. Generally, vegetation will be considered satisfactory when growth has developed to the point that there are no single bare spots greater than three square feet in area.

3.2.1 Seedbed Preparation

Areas to be revegetated shall have soil conditions capable of supporting vegetation. Overlot grading will oftentimes bring to the surface subsoils that have low nutrient value, little organic matter content, few soil microorganisms, and conditions less conducive to infiltration of precipitation. Under certain conditions, soil amendments and treatments may be necessary to provide an adequate growth medium to sustain vegetation. Whenever possible, topsoil shall be salvaged for respreading on areas to be revegetated. The depth of soil stripping is determined by the depth of available topsoil.

At a minimum, the upper six (6) inches of topsoil shall be stripped and stockpiled, and respread to a thicker depth on surfaces not planned for buildings or impervious areas. If the surface is compacted, ripping of subsoils prior to topsoiling is recommended. Scarification will assist in placement of a stable topsoil layer on steeper slopes, and allow percolation and root penetration to greater depth.

Fertilizer can be added to improve nutrient levels necessary for plant growth. Other treatments, such as liming, can be used to adjust soil conditions as necessary with amendments. Soil testing is recommended to determine appropriate amendments required.

A suitable seedbed will enhance the success of revegetation efforts. The upper layer of soil shall be in a condition suitable for seeding at the proper depth and conducive to plant growth.

3.2.2 Temporary Revegetation

Temporary revegetation is required on all disturbed areas having a period of exposure prior to final stabilization of two (2) weeks or longer. All temporary seeding shall be protected with mulch. Temporary seedings of small grains like wheat, oats, barley should be mowed or tilled before seedheads mature, or volunteer seeds that fall to the ground will compete significantly with the permanent seeding that is applied later.

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped within two (2) weeks, plant an appropriate annual grass and mulch the planted areas. If seasonal arid conditions prevent vegetation from growing, the area shall be irrigated to allow vegetation to grow. If winter conditions prevent vegetation from growing, mulching should be practiced until temporary or permanent vegetation can be established.

For construction sites that include the construction of sidewalk, the "boulevard area" between the sidewalk and the roadway must have temporary or permanent vegetation installed within seven (7) calendar days of sidewalk installation.

Exhibit 4 lists the annual grasses generally suitable for the Watertown area. These are to be considered only as a general recommendation whenever specific design guidance for a particular site is not available.

EXHIBIT 4
Minimum Drill Seeding Rates for Annual Grasses

Species	Growth Season[a]	Pounds of Pure Live Seed (PLS)/acre[b]
Annual ryegrass	Cool	20
Cereal rye	Cool	30
Winter wheat/barley	Cool	30
Spring wheat/barley	Cool	30
Millet	Warm	20
Oats	Cool	60

Note: Drill seeding is performed using an implement that creates an opening (e.g, with disk openers) in the soil for seeding forages and small grains, with a relatively close row spacing. Drill seeding includes the use of small chains or other devices dragging behind to help cover the seeds. Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant material residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches. Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching shall be done as a separate operation to prevent the seeds from being encapsulated in the mulch.

[a]If irrigation water is applied in an appropriate manner, seeding dates for annual grasses can be extended throughout most of the growing season.

[b]Seeding rates shall be increased by 50 percent if seeding is done by hydraulic seeding or using a Brillion Drill; or doubled if seed is broadcast.

3.2.3 Permanent Revegetation

Permanent revegetation is required on all disturbed areas and soil stockpiles (see Section 3.3) having a period of exposure of 1 year or longer, and the vegetative cover shall be established within one (1) year. Vegetation is not considered established until a ground cover is achieved which, in the opinion of the City, is sufficiently mature to control soil erosion and can survive severe weather conditions. Generally, vegetation will be considered satisfactory when growth has developed to the point that vegetation has achieved 70 percent coverage over the entire previously disturbed area, and there are no single bare spots greater than three square feet in area.

To provide vegetative cover on disturbed areas not paved or built upon for a period of over one (1) year, or for an indeterminate length of time, a perennial grass mix shall be planted. Each site will have different characteristics, and a landscape professional should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific mix and for planning purposes, South Dakota Department of Transportation (SDDOT) Type B permanent seed mixture as listed in Exhibit 5 can be used. Alternative seed mixtures for various site conditions are listed in Attachment 4. The pure live seed (PLS) rates of application recommended in these tables are considered to be minimum rates for seed applied using proper drill-seeding equipment. All permanent seeding shall be protected with mulch, and where necessary, erosion blankets and tackifiers.

EXHIBIT 5
SDDOT Type B Permanent Seed Mixture

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	9.0
Switchgrass	Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer	5.0
Indiangrass	Holt, Tomahawk	1.0
Big Bluestem	Bison, Bonilla, Champ, Pawnee, Sunnyview	1.0
Slender Wheatgrass	Adanac, Pryor, Primar, Revenue	2.0
	Total	**18.0**

Source: SDDOT

The site shall be inspected by the Owner weekly and after storm events greater than one-half (0.5 inch) to ensure that required temporary and permanent vegetation is in place. Any area where required vegetation has been eroded or otherwise removed shall be replaced within 24 hours.

3.3 Soil Stockpiles

Soils stockpiles shall be seeded with a temporary or permanent grass cover within 2 months after completion of stockpile construction. Mulching is recommended to ensure vegetation establishment. Perimeter silt fence shall also be used. The site shall be inspected by the Owner weekly and after storm events greater than one-half (0.5-inches) to ensure that required soil stockpile stabilization is in place. Any area where required vegetation has been eroded or removed, or any measure removed, shall have that vegetation or measure replaced within 24 hours.

3.4 Roads and Parking Lots

Road cuts, road fills, and parking lot areas shall be paved as soon as possible in lieu of mulching. Early application of road base is suitable where a layer of coarse aggregate is specified for final road or parking lot construction. This practice may not be desirable in all instances and is not needed when final pavement construction will take place within 14 days of grading to final contours. All non-paved portions of road cut, fill, and parking lot

areas shall be seeded and mulched as soon as possible after final grading has occurred but in no case later than 14 days after grading has been completed.

3.5 Erosion Control Blanket

An erosion control blanket is a pre-formed protective blanket of straw or other plant residue, or plastic fibers formed into a mat typically with a plastic mesh on one or both sides. The purpose of using an erosion control blanket is to protect the soil surface from raindrop impacts and overland flow during the establishment of grass or other vegetation and to reduce evapotranspiration and retain moisture on seeded areas thus increasing the potential for germination and survival of the vegetation. Erosion control blanket material can biodegrade over time, however there are several manufacturers of synthetic blankets that do not degrade and provide permanent soil reinforcement. Erosion control blankets should be chosen so that they last long enough for the grass or other vegetation to become established.

Erosion control blankets shall be used where the protection of newly seeded areas is critical. This is especially important where flowing water may occur before the grass is established. The most common application for erosion control blankets is in the bottom of small channels and on steep embankments.

Erosion control blankets shall be installed after all topsoiling, fertilizing, liming, seeding, and mulching is completed. The blanket shall be in firm contact with the soil. It shall be anchored with the proper number, width, length, and spacing of fasteners per the manufacturer's recommendation.

On slopes and in small drains the blanket shall be unrolled upstream to downstream parallel to the direction of flow. The upstream end of each blanket shall be anchored in a minimum 6-inch deep anchor trench. These blankets, when laid side by side, shall overlap a minimum of 4 inches. When more than one blanket length is needed, the material shall be overlapped 12 inches over the downstream piece. All edges shall be stapled as per manufacturer's recommendation.

All erosion control blankets shall be inspected by the Owner weekly and after precipitation events greater than one-half (0.5) inches to check for damage due to water running under the blanket or if the blankets have been displaced. Where water has flowed under the blanket, more staples may be needed per given area or more frequent anchoring trenches installed within 24 hours. If significant erosion has occurred under the blanket then reseeding may be needed. Any erosion control blankets that have been displaced will need to be replaced and restapled within 24 hours.

Erosion control blankets shall be required as part of the site development plan. Plans and specifications for installing erosion control blankets shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum, the following information shall be included in the plan:

- Location of the erosion blanket
- Type of blanket
- Location and cross section of anchor trenches
- Installation procedure
- Inspection procedure
- Maintenance schedule

Standard Drawing 1 in Attachment 5 may be used in development of the plan sheet.

4. Sediment Control Best Management Practices

Sediment control will be site specific and can include:

- Vehicle tracking and temporary construction entrances
- Filter strips or grass buffers around the lower perimeter of the land disturbance
- Wattles or fiber rolls
- Silt Fence
- Rock Check Dam
- Temporary Sediment Trap
- Sediment basins
- Combination of any or all of these measures

All runoff leaving a disturbed area shall pass through a sediment control BMP before it exits the site and flows downstream. The installation of sediment control BMPs and sediment entrapment facilities shall begin before major land disturbance activities begin on a construction site. Sediment entrapment facilities are necessary to reduce sediment discharges to downstream properties and receiving waters. Sediment entrapment facilities are sediment control BMPs designed to capture the sediment, and include filter strips (grass buffers), wattles, silt fences, rock check dams, sediment traps, and sediment basins. The type of sediment entrapment facility to be used depends on the tributary area, basin slope and slope length of the upstream area. Exhibit 6 summarizes the recommended maximum tributary areas, slope lengths and slopes for four types of sediment entrapment facilities. Other technologies or approaches not listed may be used if accepted by the Public Works Office.

EXHIBIT 6
Sediment Entrapment Facility Properties

Sediment Control Facility	Maximum Tributary Drainage Areas (ac)	Maximum Tributary Slope Length (ft)	Maximum Tributary Slope Gradient
Filter Strips/Grass Buffers	n/a	50	6:1 (17%)
Wattles/Fiber Rolls	n/a	(see spacing requirements in Standard Drawing 3 within Attachment 5)	1:1 (100%)
Silt Fence	0.5 per 100 lineal ft	150	2:1 (50%)
Rock Check Dam	up to 10.0	n/a	n/a
Temporary Sediment Trap	up to 5.0	n/a	n/a
Sediment Basin	5.0 to 100.0	n/a	n/a

An established filter strip may be adequate for small sites, provided the 6:1 limits for tributary slope are not exceeded and the flow is not concentrated. Fiber rolls or silt fences may be used for somewhat larger areas depending on the upslope drainage area. When the tributary area is less than five (5) acres but greater than that allowed for silt fences, runoff shall be collected in diversion swales and routed through temporary sediment traps.

4.1 Vehicle Tracking and Temporary Construction Entrances

Wherever construction vehicles enter onto paved public roads, provisions shall be made to prevent the transport of sediment (mud and dirt) by vehicles tracking onto the paved surface.

For small sites (less than one (1) acre), there shall be a designated area where vehicles may enter and exit the site. This area shall be kept stabilized and any mud or debris tracked off-site by vehicles shall be cleaned up.

For sites greater than one (1) acre, a stabilized temporary construction site entrance shall be constructed. Whenever deemed necessary by the City, wash racks shall be installed to remove mud and dirt from the vehicle and its tires before it enters onto public roads.

A temporary construction entrance is a stone pad located where vehicles leave a construction site. The purpose of the stone pad is to provide an area where mud can be removed from tires before a vehicle leaves the site. The stone pad consists of clean rock (no fine materials) designed in such a way that vehicle tires will sink in slightly. This helps remove mud from the tires as the vehicle passes over the pad. If a wash rack is used, it provides an area where vehicle tires can be washed. Cattle guards may serve as a convenient and cost-effective wash rack.

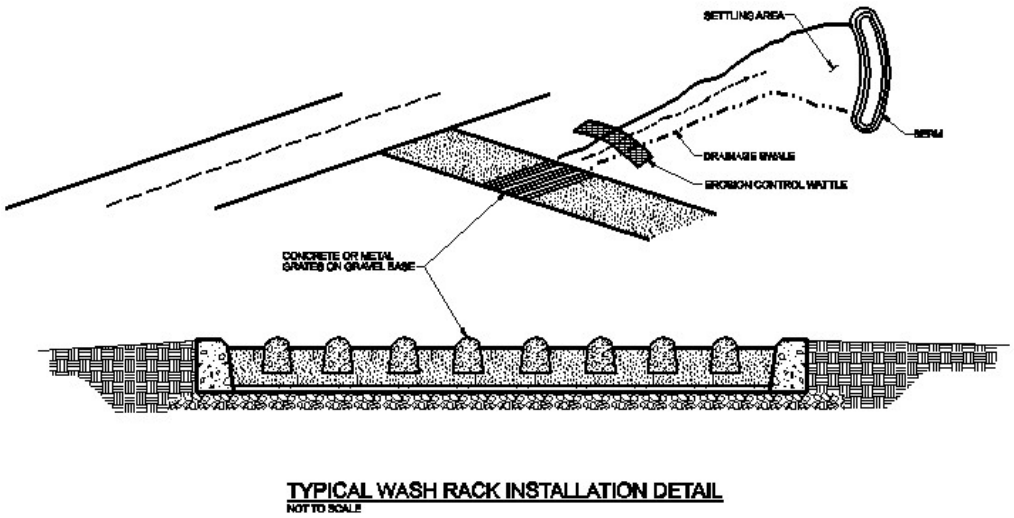
The effectiveness of temporary rock construction entrances for trapping sediment depends upon the length, depth of rock, frequency of use and maintenance, as well as the type of structure used. A newly installed rock construction entrance meeting the recommendations included here will be relatively effective for removing mud from tires before construction vehicles leave the site.

However, once the rock voids become clogged with mud, the practice will not serve its intended purpose until the rock is replaced.

The rock used for gravel pads should be a minimum 1- to 3-inch size, coarse aggregate. The aggregate should be placed in a layer at least 6 inches thick. Generally, larger aggregate is desired. The rock entrance should be at least 50 feet long; however, longer entrances may be required to adequately clean tires. Geotextile fabric may be needed under the rock to prevent migration of fine materials or mud from the underlying soil into the stone.

In some cases, the action of tires moving over a gravel pad may not adequately clean tires. In those cases, the tires may need to be washed with water before the vehicle leaves the site. A wash rack installed on the rock pad may make washing more convenient and effective. The wash rack would consist of a heavy grating over a lowered area. The grating may be a prefabricated rack, such as a cattle guard, or it may be constructed on-site of structural steel. The wash rack must be strong enough to support the vehicles that will cross it. Washing vehicle tires with pressurized water over a wash rack is very effective for removing mud and keeping the driving surface mud-free. Wash water will need to be directed to a suitable settling area and treated or recycled. Exhibit 7 shows a typical wash rack installation.

EXHIBIT 7
Typical Wash Rack Installation



Source: Minnesota Pollution Control Agency, *Protecting Water Quality in Urban Areas Manual, Chapter 6 Erosion Prevention and Sediment Control*

The rock pad needs occasional maintenance to prevent the tracking of mud onto paved roads. This may require periodic topdressing with additional rock or removal and reinstallation of the pad.

Construction entrance and exit areas must be inspected by the Owner weekly and after storm events greater than one-half (0.5 inch) to ensure that the entrance pad and wash rack remain in functional condition. The inspections shall also note where vehicle tracking may be carrying sediment off site. Any required repair or reinstallation of the pad shall be performed within 24 hours. Any sediment observed tracked off site shall be cleaned up immediately.

4.2 Filter Strips/Grass Buffers

Vegetated filter strips act to cause deposition of sediment within the area of vegetation. Buffer strips of natural vegetation can be left at the time of site grading or can be created by using sod. A dense ground cover is necessary or runoff will channelize within the area. A minimum width of 20 feet is recommended.

Grass buffers are uniformly graded and densely vegetated areas of turf grass. They require sheet flow to promote filtration, infiltration, and settling to reduce runoff pollutants. Grass buffers differ from grass swales as they are designed to accommodate overland sheet flow rather than concentrated or channelized flow. They can be used to remove larger sediment from runoff from impervious areas.

Whenever concentrated runoff occurs, it should be evenly distributed across the width of the buffer via a flow spreader. This may be a porous pavement strip or another type of structure used to achieve uniform sheet-flow conditions. Grass buffers can also be combined

with riparian zones in treating sheet flows and in stabilizing channel banks adjacent to major drainageways and receiving waters.

Design of grass buffers is based primarily on maintaining sheet-flow conditions across a uniformly graded, dense grass cover strip. When a grass buffer is used over unstable slopes, soils, or vegetation, rills and gullies will form that disrupt sheet flow. The resultant short-circuiting will negate the intended water quality benefits. Grass buffers should be protected from excessive pedestrian or vehicular traffic that can damage the grass cover and affect even sheet-flow distribution.

General guidance suggests that the hydraulic load should not exceed 0.05 cfs/linear foot of buffer during a 2-year storm to maintain a sheet flow of less than 1 inch throughout dense grass that is at least 2 inches high. The upstream flow shall be uniformly distributed over this length. The minimum design length (normal to flow) is therefore calculated as:

$$L_G = \frac{Q_{2-year}}{0.05}$$

In which:

L_g = *Minimum design length (feet)*

$Q_{2\text{-}year}$ = *Peak discharge supplied to the grass buffers by a 2-year storm event (cfs)*

Note: Longer lengths may be used.

The minimum width (W_G) (the distance along the sheet flow direction) of the grass buffer shall be determined by the following criteria for onsite and concentrated flow control conditions:

- Sheet Flow Control (use the larger value) of the following:

  $W_G = 0.2L_I$ or 8 feet

  In which:

  L_I = *The length of flow path of the sheet flow over the upstream impervious surface (feet)*

- Concentrated Flow Control (use the larger value)

  $W_G = 0.15(A_t/L_t)$ or 8 feet

  In which:

  A_t = *The tributary area (square feet)*

  L_t = *The length of the tributary (normal to flow) upstream of the grass buffer (feet)*

A rectangular strip is preferred and should be free of gullies or rills that concentrate the overland flow. Design slopes shall not exceed 4 percent.

Flow through the buffer shall be evenly distributed along the design length. Slotted curbing, log spreaders, or other spreader devices can be used to apply flows. Concentrated flow supplied to the grass buffer must use a level spreader (or a similar concept) to evenly

distribute flow onto the buffer. The grass buffer shall have a dense turf to promote sedimentation and entrapment and to protect against erosion.

Filter strip/grass buffer areas shall be inspected by the Owner weekly and after storm events greater than one-half (0.5-inches) to ensure that the filter strip/grass buffer is in functional condition and that sediment has not built up in the area. Any sediment that has built up in the area shall be removed within 24 hours. Any required repair or reinstallation of the filter strip/grass buffer shall occur within 24 hours.

Standard Drawing 2 in Attachment 5 may be used in development of the plan sheet.

4.3 Wattles/Fiber Rolls

A wattle is an elongated tube of straw, coconut fibers or other material for restraining sediment. It may be installed as a temporary barrier at the base of a disturbed area. Erosion control wattles are also employed as check structures in swales or waterways (See Section 5.1) and for inlet protection (See Section 5.2).

Attachment 5, Standard Drawing 3 shows proper installation of an erosion control wattle. Erosion control wattles shall be installed in trench along a land contour and perpendicular to the water flow in a ditch. The midpoint of the wattle must be lower than the endpoints of the wattle to ensure that water flows over the wattle and not around either side. The Contractor shall dig a 3 to 5 inch trench across the existing ditch, install the wattle tightly in the trench so that daylight cannot be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side as shown in Detail B of Attachment 5 Standard Drawing 3. Stakes shall have a top dimension of 1" x 2" or 2" x 2", and shall extend a minimum of 12 inches into the ground. Where installing running lengths of wattles, the Contractor shall butt the second wattle tightly against the first and shall not overlap the ends as shown in Detail B of Attachment 5 Standard Drawing 3.

The erosion control wattle shall be inspected by the Owner once every week and within 24 hours after every rainfall event of one-half (0.5) –inch precipitation or greater. Accumulated sediment shall be removed once every week or within 24 hours after every rainfall event of one-half (0.5) –inch precipitation or greater.

Standard Drawing 3 in Attachment 5 may be used in development of the plan sheet.

4.4 Silt Fence

A silt fence is a temporary sediment barrier made of a woven synthetic material stretched across and attached to supporting posts to filter runoff. A silt fence can be placed as a temporary barrier at the base of a disturbed area but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained. A silt fence should be used where the size of the drainage area is no more than one quarter acre per 100 feet of silt fence length, the maximum slope length behind the barrier is 100 feet and the maximum gradient behind the barrier is 50 percent (2:1). Properly installed silt fence shall be entrenched into the ground, and the sediment barrier shall stand above ground at a height of at least two (2) feet. Wooden stakes that are utilized for silt fence construction must have a diameter of 2 inches or more (or length and width of at least 2 inches if rectangular posts are used), and must have a minimum height of

5 feet (including the portion of the post driven into the ground). Metal stakes are also acceptable.

In most applications, silt fence is placed downslope from a construction site or newly disturbed area to prevent eroded soils from being transported offsite. If possible, silt fence should be installed before earth disturbing activities have begun. Location of the fabric is critical to its performance. Silt fences should be installed where it will capture sediment from the project before it leaves the project. Silt fence often acts like a temporary dam and therefore should not be placed too close to an outlet end of a pipe. The sediment can partially or completely plug these pipes. For this reason it is generally better to place silt fence at the inlet end of pipes. Silt fence will also catch snow. This should be considered when selecting the locations and performing maintenance.

After the silt fence has been installed, it will be necessary for the Contractor to perform some maintenance on the fabric. Large amounts of sediment may need to be removed from the upstream side of the silt fence. Silt fences shall be inspected by the Owner weekly and immediately after each rainfall of one-half (0.5) –inch or greater. Any required repairs or sediment removal shall be performed immediately. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Any fabric that frays or begins to decompose shall be replaced immediately.

Removal of the silt fence should not be done until other sufficient erosion control methods, such as permanent vegetation or structural BMPs such as detention ponds, are in place.

The use and installation of the silt fence should be completed according to Standard Drawings 4a through 4d included in the Attachment 5. The Low Flow Silt Fence Standards (Standard Drawings 4a and 4b) shall be used in applications controlling sediment in sheet flow (for flows of 20-70 gal/min/sqft (0.05 – 0.16 cfs/sq ft)), and the High Flow Silt Fence Standards (Standard Drawings 4c and 4d) shall be used in applications controlling sediment in concentrated flow, such as in inlet protection (for flows of 70-145 gal/min/sqft (0.16 – 0.33 cfs/sq ft)). The units in the flow specifications are flow per square foot of silt fence area.

Standard Drawings 4a through 4d in Attachment 5 may be used in development of the plan sheet.

4.5 Rock Check Dam

A rock check dam is small rock dam constructed across a grassed swale or road ditch. The purposes of using a rock check dam are to 1) reduce the velocity of concentrated stormwater flows thereby reducing erosion of the swale or ditch, 2) trap sediment generated from adjacent areas or the ditch itself and 3) increase infiltration when suitable soils are present. This practice, utilizing a combination of rock sizes, is limited to use in small grassed swales or open channels that **drain 10 acres or less**. It shall not be used in a perennial stream where protection of the flowing stream is the objective.

Some specific applications include:

- Temporary ditches or swales that, because of their short time of service, cannot receive a non-erodible lining but still need protection to reduce erosion

- Permanent ditches or swales that cannot receive a permanent non-erodible lining for an extended period of time
- Either temporary or permanent ditches or swales that need protection during the establishment of grass linings
- An aid in the sediment trapping strategy for an active construction site. This practice is not a substitute for major perimeter trapping measures such as Temporary Sediment Trap in Section 4.6.

When coarse aggregate is used in rock check dams, gradations in the 1- to 3-inch range are generally acceptable. The drainage area of a ditch or swale being protected shall not exceed 2 acres when coarse aggregate is used alone.

If the drainage area of a ditch or swale being protected exceeds 2 acres, then rock meeting SDDOT Class A rip-rap standards shall be added on the downstream side of the dam. The drainage area of a ditch or swale being protected shall not exceed 10 acres.

The maximum height of the rock check dam shall be 3.0 feet. The top of the rock check dam shall be a minimum of 1.0 feet below the top of the ditch or swale. The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the rock at the center of the downstream dam. The center of the rock check dam shall be at least 6 inches lower than the sides to prevent scour and subsequent failure of the structure.

The rock shall be spread into position in approximately horizontal layers not to exceed three (3) feet in thickness. It shall be placed in a manner to produce a reasonably homogeneous stable fill that contains no segregated pockets of large or small fragments or large unfilled spaces caused by bridging of the larger rock fragments. No compaction will be required beyond that resulting from the placing and spreading operations.

The rock check dams shall be placed such that the resultant ponding will not cause inconvenience or damage to adjacent areas or structures. For added stability, the base of the rock check dam should be keyed into the soil to a minimum depth of 6 inches.

Filter fabric may be used under the rock to provide a stable foundation and to facilitate removal of the rock.

Rock check dams are effective in reducing flow velocity and thereby the potential for channel erosion. It is usually better to establish a protective vegetative lining before flow is confined or to install a structural channel lining than to install rock check dams.

Rock check dams installed in grass-lined channels may kill the vegetative lining if submergence after rains is too long and/or siltation is excessive.

If temporary rock check dams are used in grass-lined channels that will be mowed, care should be taken to remove all the rock when the rock check dam is removed. This should include any rocks that have washed downstream.

Plans and specifications for installing rock check dams shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum include the following:

- Location where the practice will be installed
- Dimensions, elevations, and spacing between the dams
- Rock gradation and quality
- Fabric specification if used

All plans shall include installation, inspection, and maintenance schedules with the responsible person identified. Standard Drawings 5a and 5b in Attachment 5 may be used in development of the plan sheet.

Rock check dams shall be inspected by the Owner weekly and within 24 hours of one-half (0.5) -inches precipitation or more. If any erosion has taken place around or below the rock check dam or if rocks have been dislodged, repairs shall be made to prevent further damage. Sediment shall be removed once it has accumulated to one-half the height of the rock check dam. The center of the rock check dam shall also be inspected by the Owner weekly to ensure that the center of the dam is lower than the sides.

Unless they will be incorporated into a permanent stormwater management control, rock check dams must be removed when their useful life has been completed. In temporary ditches and swales, rock check dams should be removed and the ditch filled in when they are no longer needed. In permanent structures, rock check dams should be removed when a permanent lining can be installed. In the case of grass-lined ditches, rock check dams should be removed when the grass has matured sufficiently to protect the ditch or swale. The area beneath the rock check dams should be seeded and mulched immediately after they are removed.

For rock check dams that are made a part of a permanent stormwater management control, regular inspections should be made by the Owner to see if any erosion has occurred around or below the dam and if any rock has been dislodged. Immediately make all needed repairs to prevent further damage. If sediment trapping is to be a continuing function of the rock check dam, the sediment shall be removed when it has accumulated to one-half the depth of the rock check dam.

4.6 Temporary Sediment Traps

A sediment trap is a small, temporary ponding basin formed by construction of an embankment or excavated basin that is designed to fill with sediment. A sediment trap can be constructed by either excavating below grade or building an embankment across a swale. Excavated traps are less prone to failure than embankments. No pipe is used at the outlet, as in a sediment basin, and an open-channel spillway shall be included in the design. A minimum of 3,600 cubic feet of storage volume shall be provided for each tributary acre. The purpose of this practice is to detain sediment-laden runoff from small-disturbed areas for a sufficient period of time to allow the majority of sediment and other water-based debris to settle out.

Sediment traps should be considered when the following conditions are met:

- At the outlets of diversions, channels, slope drains, or other runoff conveyances that discharge sediment-laden water.
- Below areas that are 5 acres or less.

- Where access can be maintained for sediment removal and proper disposal.
- In the approach to a stormwater inlet located below a disturbed area as part of an inlet protection system.
- Structure life should be limited to 18 months.
- Where failure of the structure will not result in loss of life, damage to homes, commercial or industrial buildings, main highways or railroads; or in the use or service of public utilities.

Sediment trap designs shall provide for both sediment storage and detention storage.

The sediment storage shall be sized to store the estimated sediment load generated from the site over the duration of the construction period with a minimum storage equivalent to the volume of sediment generated in one year. For construction periods exceeding one year, the one-year sediment load and a sediment removal schedule may be substituted.

The detention storage shall be composed of equal volumes of "wet" and "dry" detention storage. Each shall be sized for the runoff from either a 2-year, 24-hour storm from the area draining into the basin under maximum runoff conditions during construction, or 134 cubic yards/acre based on the area draining into the basin, whichever is greater. Half of the detention storage shall be below the permeable fill.

When an embankment is used, ensure that embankments for temporary sediment traps do not exceed 5 feet in height measured at the centerline from the original ground surface to the top of the embankment. Additional freeboard may be added to the embankment height to allow flow through a designed bypass location. Construct embankments with a minimum top width of 5 feet and side slopes of 2:1 or flatter.

The design height of the embankment shall be increased by the amount needed to insure that after settlement the height of the dam equals or exceeds the design height. The height of the embankment shall be increased by 5 percent where the fill material is placed in lifts of 8 inches or less and compacted by heavy equipment traversing the fill. The height shall be increased by 10 percent when fill material is graded by a bulldozer.

The original ground under the embankment shall be scarified to a depth of 6 inches or more prior to placement of the fill material. Fill material shall not be placed over frozen ground. The earthen embankment shall be seeded with temporary or permanent vegetation in accordance with methods outlined in Section 3.2.

Where sediment pools are formed or enlarged by excavation, side slopes shall be 2:1 or flatter for safety.

The sediment trap spillway shall be constructed using a stone section of embankment located at the low point in the basin. The stone section serves two purposes: 1) the top section serves as a non-erosive spillway outlet for flood flow, and 2) the bottom section provides a means of dewatering the basin between runoff events.

A combination of coarse aggregate and riprap shall be used to provide for filtering/ detention as well as outlet stability. Construct the outlet using well-graded stones where 50 percent of the stones pass through a 9-inch sieve and the maximum stone size is 14 inches. A

1-foot thick layer of 1/2-inch rock should be placed on the inside face to reduce drainage flow rate.

The side slopes of the spillway shall be at least 21 inches thick. The crest of the spillway outlet shall be a minimum of 1.5 feet below the settled top of the embankment. Filter cloth or geotextile shall be placed between the soil and the riprap to prevent piping. An alternative would be to excavate a trench across the riprap foundation and up the sides to the height of the embankment.

The spillway weir shall be at least 4 feet long and sized to pass the peak discharge of the 10 year frequency, 24-hour duration storm without failure, overtopping of the basin or significant erosion. A maximum flow depth of 1 foot, a minimum freeboard of 0.5 feet, and maximum side slopes of 2:1 are required. Weir length may be selected from Exhibit 8.

EXHIBIT 8
Weir Lengths Required for Given Drainage Areas

Drainage Area (acres)	Minimum Weir Length (ft.)
1	4
2	6
3	8
4	10
5	12

The release rate of the basin shall be that rate required to achieve minimum detention times of at least 10 hours. The elevation of the permeable fill outlet shall be placed such that it only drains the dry detention storage.

Spillway bypasses shall be directed to natural, stable areas. Bypass outlets shall be located so that flow will not damage the embankment.

Discharges from both the principal and emergency spillways of a sediment trap must be conveyed to a natural waterway in a channel of adequate capacity and stability. Where this channel intersects with the natural waterway, the discharge shall be less than 1 1/2 feet per second or otherwise below the velocity which will initiate erosion or scour within the receiving waterway. Overflows to stormwater facilities must have adequate capacity to receive the discharge from the sediment trap.

Where an emergency spillway is utilized, the spillway crest elevation should be at least 1.5 feet below the settled top of the embankment with the emergency spillway crest being 0.5 feet below the top of the embankment.

Locations for sediment traps shall be selected during site evaluation. Natural drainage divides shall be noted and trap sites selected so that runoff from potential sediment-producing areas can easily be diverted into the traps.

Traps shall be made readily accessible for periodic sediment removal and other necessary maintenance. Locations for sediment disposal shall be part of trap site selection. Clearly designate all disposal areas on the plans.

In preparing plans for sediment traps, it is important to consider provisions to protect the embankment from failure from storm runoff that exceeds the design capacity. Consider non-erosive emergency spillway bypass areas, particularly if there could be severe consequences from failure. If a bypass is not possible and failure would have severe consequences, consider alternative sites.

Sediment trapping is achieved primarily by settling within a permanent pool formed by excavation, or by a combination of excavation and embankment. Sediment-trapping efficiency is a function of surface area and inflow rate. Installations that provide pools with large length to width ratios reduce short-circuiting and allow more of the pool surface area for settling.

The minimum length of flow through the trap should be 10 feet and the minimum length to width ratio should be 2:1. If site conditions permit a greater travel distance through the basin and greater length to width ratio the water quality benefit provided by the sediment trap will be enhanced. The average trap permanent pool depth should be a minimum of 3 feet to prevent re-suspension of sediments.

Another method of improving the trapping efficiency is to place geotextile fabric between the riprap and coarse aggregate. If this is done, timely maintenance is needed to ensure that the outlet does not clog with sediment.

Because well-planned sediment traps are key measures to preventing off-site sedimentation, they should be installed in the first stages of project development.

Plans and specifications for temporary sediment traps shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum include the following items:

- Location of the sediment traps.
- Size of basin including width, length and depth.
- Minimum cross section of embankment.
- Minimum profile through spillway.
- Location of emergency spillway, if used.
- Gradation and quality of rock.

All plans shall include the installation, inspection, and maintenance schedules with the responsible party identified. Standard Drawing 6 in Attachment 5 may be used in development of the plan sheet.

Temporary sediment traps shall be inspected by the Owner weekly and within 24 hours of a precipitation event greater than one-half (0.5) –inches. Sediment shall be removed so that the trap is restored to its original dimensions after the sediment has accumulated to one-half the design depth of the permanent pool.

The structure shall be checked for damage from erosion or piping. The depth of the spillway shall be checked to ensure it is a minimum of 1.5 feet below the low point of the embankment to slightly above design grade. Any riprap displaced from the spillway must be replaced immediately.

After all sediment-producing areas have been permanently stabilized, the structure and all unstable sediment shall be removed. The area shall be smoothed to blend with the adjoining areas and stabilized properly.

4.7 Sediment Basins

Areas draining more than five (5) acres shall be routed through a sediment basin. Sediment basins shall be designed to a minimum 3,600 cubic feet of volume per tributary acre.

If the site is to include a stormwater quality or flood detention basin, the permanent detention facility may be used as the temporary sediment basin, provided the outlets are modified upon completion for this purpose. Such permanent detention facilities shall be restored to design grades, volumes, and configurations after site development is completed and the project is finalized. The outlet from a sediment basin shall be designed to empty its volume in no less than 16 hours, that is to have an average outflow rate of 7.0 gallons/ minute/tributary acre, or less. The basin length shall be no less than twice the basin width. The inflow structures at the entrance of the basin shall be designed to dissipate inflow energy and to spread the flow so as to achieve uniform flow throughout the basin's width.

For drainage locations serving less than ten (10) acres, a sediment basin or a combination of sediment basin(s) and sediment traps providing storage for 3,600 cubic feet of storage per acre drained may be required along with silt fences or equivalent sediment controls on all sideslope and downslope boundaries of the construction area.

A sediment basin can be constructed by excavation or by erecting an earthen embankment across a low area or drainage swale. The basin can be either a temporary (up to 3 years) structure or a permanent stormwater control measure. Sediment basins can be designed to drain completely during dry periods, or they can be constructed so that a shallow, permanent pool of water remains between storm events. However, depending on the size of the basin constructed, the basin may be considered a wet pond and subject to additional regulation and permits.

Sediment basins are usually used for drainage areas of 5 to 100 acres. They can be temporary or permanent structures. Generally, sediment basins designed to be used for up to 3 years are described as temporary, while those designed for longer service are said to be permanent. Temporary sediment basins can be converted into permanent stormwater runoff management ponds, but they must meet all regulatory requirements for wet ponds.

Sediment basins are applicable in drainage areas where it is anticipated that other erosion controls, such as sediment traps, will not be sufficient to prevent off-site transport of sediment.

The potential sites for sediment basins should be investigated during the initial site evaluation. Basins should be constructed before any grading takes place within the drainage area. The design of the basin should be completed by a qualified Professional Engineer experienced in the design of dams.

Sediment basins with earthen embankments should be outfitted with a dewatering pipe and riser set just above the sediment removal cutoff level. The riser pipe should be located at the deepest point of the basin and extend no farther than 1 foot below the level of the earthen dam. A water-permeable cover should be placed over the primary dewatering riser pipe to prevent trash and debris from entering and clogging the spillway. To provide an additional path for water to enter the primary spillway, secondary dewatering holes can be drilled near

the base of the riser pipe, provided the holes are protected with gravel to prevent sediment from entering the spillway piping.

To ensure adequate drainage, the following equation can be used to approximate the total area of dewatering holes for a particular basin (Smolen et al., 1988):

$$A_o = (A_s \times (2h)) / (T \times C_d \times 20{,}428)$$

Where:

A_o *= total surface area of dewatering holes,* ft^2

A_s *= surface area of the basin,* ft^2

h = head of water above the hole, ft

C_d *= coefficient of contraction for an orifice, approximately 0.6*

T = detention time or time needed to dewater the basin, hours

In all cases, such structures should be designed by an appropriate professional based on local hydrologic, hydraulic, topographic, and sediment conditions.

Routine inspection and maintenance of sediment basins is essential to their continued effectiveness. Basins should be inspected by the Owner after each storm event to ensure proper drainage from the collection pool to determine the need for structural repairs. Erosion from the earthen embankment should be repaired immediately. Sediment basins must be located in an area that is easily accessible to maintenance crews for removal of accumulated sediment. Sediment should be removed from the basin when its storage capacity has reached approximately 50 percent. Trash and debris from around dewatering devices should be removed promptly after rainfall events.

The tributary drainage area of the proposed sediment basin shall not be more than 100 acres.

Sediment basins that impound 25 acre-feet of water or more require that a Location Notice be filed with SD DENR and may also require a Water Rights Permit from SD DENR. A structure is considered a dam by SD DENR if the height to the dam crest is greater than or equal to 25 feet and the storage at the dam crest (not at the spillway elevation) is greater than 15 acre feet or if the height to the dam crest is greater than 6 feet and the storage at the dam crest (not at the spillway elevation) is greater than or equal to 50 acre feet. The height of the dam is the difference in elevation between the natural bed of the watercourse or the lowest point on the toe of the dam, whichever is lower, and the crest elevation of the dam. Dams that meet this definition must follow specific SD DENR safety requirements. If there is any question as to whether a sediment basin may trigger these or other dam regulations, the Owner shall coordinate with SD DENR.

Standard Drawing 7 in Attachment 5 may be used in development of the plan sheet.

5. Drainageway Protection Best Management Practices

At times construction activities must occur adjacent to or within a drainageway. Whenever this occurs, bottom sediments will be disturbed and transported downstream. The goal of drainage protection is to minimize the movement of sediments resulting from construction

activities that take place within any drainageway. Temporary facilities can be installed to divert flowing water around such sediment-generating construction activities within drainageways.

5.1 Working Within or Crossing a Waterway

Whenever work occurs within a waterway, the following shall be considered as appropriate:

- Construction vehicles shall be kept out of a waterway to the maximum extent practicable. Where in-channel work is necessary, steps, such as temporary channel diversions, shall be taken to stabilize the work area during construction to control erosion. The channel (including bed and banks) shall be restabilized immediately after in-channel work is completed.
- Where an actively-flowing watercourse must be crossed regularly by construction vehicles, a temporary crossing shall be provided. Two primary methods are available: 1) a culverted crossing, and 2) a stream ford. A culverted crossing shall be designed to pass the 2-year design flow. A stream ford shall be lined with a minimum six (6) -inch thick layer of one-and-a-half- (1.5)-inch diameter rock. A permit is required for placement of fill in a waterway under Section 404 of the Clean Water Act. The Corps of Engineers Office in Pierre, South Dakota, shall be contacted about the requirements for obtaining a 404 permit.
- Whenever possible, construction in a waterway shall be sequenced to begin at the most downstream point and work progressively upstream installing required channel and grade control facilities.
- Work shall be completed in small segments, exposing as little of the channel at a time as possible.
- Where possible, all in-channel work shall be performed between September 15 and April 15.

5.2 Outlet Protection

The outlets of drains, culverts, sediment traps, and sediment basins shall be protected from erosion and scour. This may require the use of a rip rap apron at the outlet location.

Check dams or wattles can be used in ditches or swales and downstream of the outlets of temporary drains, culverts, sediment traps, and sediment basins. These devices reduce the velocity of concentrated flows and trap sediment eroded from the upstream ditch or swale.

Check dams may be used under the following conditions:

- In temporary or permanent swales that need protection during establishment of grass;
- In permanent swales that need protection prior to installation of a non-erodible lining;
- In temporary ditches or swales that need protection where construction of a non-erodible lining is not practicable.

Check dams providing outlet protection shall meet all requirements of Section 4.5.

5.3 Inlet Protection

All storm sewer inlets which are made operable during construction shall be protected to prevent sediment-laden runoff from entering the conveyance system without first being filtered or otherwise treated to remove sediment.

Inlets may be temporarily blocked to prevent sediment-laden runoff from entering storm sewers. Inlet protection measures shall be removed after upstream disturbed areas are stabilized.

Inlets may be protected using wattles, filter fabric, silt fence, or other similar methods. See Section 4.3 Erosion Control Wattles, Section 4.4 Silt Fence and Standard Drawings 3 and 4a through 4d in Attachment 5 for detailed examples.

Caution must be used in temporarily blocking inlets to ensure that localized flooding conditions do not develop.

6. Good Housekeeping and Non-structural Best Management Practices

6.1 Concrete Wash Water

The following standards apply to the mixing and handling of concrete on construction sites.

Both dry and wet materials should always be stored under cover and protected from rainfall and runoff. Dry materials shall be protected from wind. Bags of cement must be secured after they are open. Wind-blown cement powder should be kept away from gutters, storm drains, rainfall, and runoff. Employees should be trained to be aware of the impacts of improper disposal of concrete/mortar wastes and washwater.

Fresh concrete, mortar or plaster shall be mixed only for use during the same day. Small mixers shall be set up and operated on tarps or heavy plastic dropcloths. An on-site area shall be designated for dumping excess concrete. Random dumping around the site shall not be allowed. Washout shall never be disposed of into the street, storm drains, drainage ditches, or streams. Washout shall be directed to a containment pond, pit, or bermed area large enough for liquid and solid waste. Washout shall be pumped back into the mixer for reuse whenever possible.

Water collected in a pond, trap, or basin shall be allowed to evaporate or infiltrate into soil. Excess concrete shall be allowed to harden so it can be broken up and disposed of in trash.

During saw cutting operations, slurry must not be discharged to the storm drain system. Slurry shall be vacuumed and pumped to a holding tank for disposal or to a containment pond. When washing concrete to remove fine particles or expose the aggregate, discharge to the storm drain should be avoided by directing the water to a bermed or dirt area. Concrete sweepings from exposed aggregate shall not be washed into the street or storm drain. Aggregate sweepings shall be collected and returned to base stockpile or disposed of in the trash. When cleaning up after driveway or sidewalk construction, fine material shall be washed onto dirt or grassy areas, not down the driveway or into the street or storm drain.

Exposed stockpiles of mortar, sand, and other similar materials must be covered with plastic tarps to protect from rain. All materials should be stored as far away from creeks and storm drains as practical.

6.2 Dust Control / Street Sweeping

Use dust control measures to reduce the surface and air transport of dust and other pollutants. For paved areas, sweep, rather than wash dirt or debris from the surface. When land is disturbed, minimize dust transport by applying the following measures as appropriate:

- Vegetative Coverings: Temporary seeding and mulching may be applied to cover bare soil and to prevent wind erosion. The soil must be kept moist to establish cover.
- Barriers: Solid board fences or other materials can be used to control air currents and blown soil. Barriers placed at right angles to prevailing wind currents at intervals of about 15 times the barrier height are effective in controlling wind erosion.
- Irrigation: The site is sprinkled with water until the surface is wet and repeated as necessary. If this method is to be employed at a construction site, it is recommended that a temporary gravel rock entrance be created to prevent mud from spreading onto local streets.

6.3 Spill Prevention and Response

Spill prevention and response includes measures to be taken to ensure that spills do not result in water quality impacts. Spills and leaks together are one of the largest sources of stormwater pollutants and in most cases are avoidable.

The following preventative strategies are recommended where fluids are commonly present:

- Identify all equipment that may be exposed to stormwater, pollutants that may be generated, and possible sources of leaks or discharges.
- Perform regular maintenance of each piece of equipment to check for proper operation, leaks, malfunctions, and evidence of leaks or discharge (stains). Develop a procedure for spill reporting, clean up, and repair.
- Drain or replace motor oil or other automotive fluids in an area away from streams or storm or sanitary sewer inlets. Collect spent fluids and recycle or dispose of properly.
- In fueling areas, clean up spills with dry clean up methods (absorbents), and use damp cloths on gas pumps and damp mops on floors instead of a hose.

An important part of spill prevention is training. All Contractor employees shall be trained in spill prevention practices and adhere to them.

The best way to prevent pollutants from entering the storm drains is to prevent stormwater from contacting equipment or surfaces that may have oil, grease, or other pollutants. Some good activities to help prevent negative impacts on stormwater quality include:

- Properly dispose of stormwater that has collected in containment areas (may need permit if contaminated).
- Adopt effective housekeeping practices.
- Ensure adequate security to prevent vandalism.

It is important to identify potential spill areas and their drainage points to determine preventative measures and spill response actions. Areas and activities that are most vulnerable to spills include transportation facilities where vehicle spills could be a problem:

- Loading and unloading areas
- Storage areas
- Process activities
- Dust or particulate generating processes
- Waste disposal activities

In addition to these areas, evaluate spill potential in other areas (access roads, parking lots, power generating facilities, etc.). It is also important to estimate the possible spill volume and drainage paths.

Proper outdoor materials handling procedures include:

- For permanent and long-term (greater than 3 months) storage, keep bulk solid materials (including raw materials, sand, gravel, topsoil, compost, concrete, packing materials, and metal products) covered or protected from stormwater.
- Isolate and consolidate bulk materials from stormwater runoff by providing berms or other means to keep the material from migrating into drainage systems.
- When possible, store materials such as salt, hazardous materials, and other materials prone to leaching when exposed to stormwater on a paved surface.
- Locate material storage areas away from storm drains, ponds, and drainage ways.
- Hazardous materials must be stored according to federal, state, and local HazMat requirements.
- Adopt procedures that reduce the chance of spills or leaks during filling or transfer of materials.
- Substitute less or non-toxic materials for toxic materials.

Proper spill response procedures are as follows:

- Wipe up small spills with a shop rag, store shop rags in covered rag container, and dispose of properly (or take to professional cleaning service and inform them of the materials on the rag).
- Contain medium-sized spills with absorbents (kitty litter, sawdust, etc.) and use inflatable berms or absorbent rolls or "snakes" as temporary booms for the spill. Store

and dispose of absorbents properly. Wet/dry vacuums may also be used, but not for volatile fluids.

- For large spills, first contain the spill and plug storm drain inlets where the liquid may migrate offsite, then clean up the spill. Contact appropriate emergency response agency according to State and local requirements.

A **Spill Prevention Plan** identifies areas where spills can occur onsite, specifies materials handling procedures, storage requirements, and identifies spill cleanup procedures. The purpose of this plan is to establish standard operating procedures, and the necessary training to minimize the likelihood of accidental releases of pollutants that can contaminate stormwater runoff. Stormwater contamination assessment, flow diversion, record keeping, internal reporting, training, and preventative maintenance are associated BMPs that can be incorporated into a comprehensive Spill Prevention Plan.

A Spill Prevention Plan is applicable to facilities that transport, transfer, and store hazardous materials, petroleum products, and fertilizers that can contaminate stormwater runoff. A Spill Prevention Plan shall include the following information:

- A description of the facility including the nature of the facility activity, and general types and quantities of chemicals stored at the facility.
- A site plan showing the location of storage areas of chemicals, the location of storm drains, site drainage patterns, fire-fighting equipment and water source locations, and the location and description of any devices used to contain spills such as positive control valves.
- Notification procedures to be implemented in the event of a spill such as phone numbers of key personnel and appropriate regulatory agencies.
- Instructions regarding cleanup procedures.
- Designated personnel with overall spill response cleanup responsibility.
- Quick notification of the Watertown Fire Department for spills that cannot be handled by local site staff.

A summary of the plan shall be written and posted at appropriate points identifying the spill cleanup coordinators, location of cleanup kits, and phone numbers of regulatory agencies to be contacted in the event of a spill. Cleanup of spills shall begin immediately. No emulsifier or dispersant shall be used. In fueling areas, absorbent shall be packaged in small bags for easy use and small drums shall be available for storage of absorbent and/or used absorbent. Absorbent materials shall not be washed down the floor drain or into the storm sewer.

Emergency spill containment and cleanup kits shall be located at the facility site. The contents of the kit shall be appropriate to the type and quantities of chemicals or goods stored at the facility. The following procedures shall be followed when implementing an emergency spill cleanup plan:

- Key personnel shall receive formal training in plan execution with additional training to the people who are likely to be the first on the site. All employees shall have a basic knowledge of spill control procedures.

- A plan summary shall be posted at appropriate site locations. The summary shall include the identification of the spill cleanup coordinators, location of cleanup equipment, and phone numbers of site personnel and regulatory agencies to be contacted in the event of a spill.
- Perform the following notifications in the event of a spill:
  - Codington County Emergency Management (605) 882-6272
  - Watertown Fire Department 911
  - City of Watertown Public Works Director (605) 882-6204 x14
  - National Response Center (800) 424-8802
  - State and Federal Agencies as required by the material spilled
- Containment and cleanup of any spills shall begin immediately.
- Absorbents shall be readily used in fueling areas.

An inventory of cleanup materials shall be maintained onsite and strategically deployed based on the type and quantities of chemicals present.

6.4 Planning and Scheduling

When planning and scheduling construction activities, the following practices will serve to limit erosion and sediment pollution:

Existing vegetation should only be removed when necessary. When planning a project, consider leaving in place as much existing vegetation as possible. If possible, excavation, grading and paving operations should be planned for dry weather periods. Grading operations should be phased to limit the extent of disturbed areas and duration of exposure.

For the duration of a construction project, a specific area of the site should be set aside for material storage and equipment maintenance. This location should be as far away from storm drain inlets, ditches, or streams as possible.

Proper waste disposal must be practiced. If possible, recycle solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation. All waste that cannot be recycled shall be stored in dumpsters covered with tarps or plastic sheeting. Dumpsters must be emptied often enough to ensure that they do not overflow.

Material in excess of what is required to complete the project should not be stored on site. Construction site operators should conduct training sessions to educate employees about erosion and sediment control practices described in this manual. Weekly inspections of erosion control practices should be conducted by the Owner as described in this manual.

7. Disposal of Temporary Measures

All temporary erosion and sediment control measures shall be removed and disposed of within 30 days after final site stabilization is achieved or after the temporary measures are no longer needed, whichever occurs earliest, or as authorized by the Office of the City Engineer. For example, a site containing only one building shall have temporary erosion control measures removed after building construction is complete and final landscaping is

in place. Temporary erosion control measures shall be removed from a commercial construction site or residential subdivision only after streets are paved and all areas have achieved final stabilization. Trapped sediment and disturbed soil areas resulting from the disposal of temporary measures shall be returned to final plan grades and permanently stabilized to prevent further soil erosion.

The professional preparing the SWPPP shall submit, as part of the narrative report, a schedule of removal dates for temporary control measures. The schedule shall be consistent with key construction items such as street paving, final stabilization of disturbed areas, or installation of structural stormwater controls.

8. Maintenance

All temporary and permanent erosion and sediment control practices shall be maintained and repaired by the Owner during the construction phase as needed to ensure continued performance of their intended function. Some specific maintenance requirements are described in each BMPs' individual Section. All facilities shall be inspected by the Owner weekly and following each precipitation event (greater than one-half (0.5) –inches or snowmelt event that results in runoff.

The professional preparing the SWPPP shall submit, as part of the narrative report, a schedule of planned maintenance activities for temporary and permanent erosion and sediment control measures. The schedule shall be consistent with the level of maintenance required for the control measures proposed in the plan.

9. Inspections

The Owner shall ensure that qualified personnel such as the construction site superintendent or project manager inspect the site at least once every 7 calendar days and within 24 hours of the end of a storm of one-half (0.5) inch precipitation or greater to confirm plan compliance. Inspections are also required after snowmelt events resulting in runoff and any event or activity resulting in surface erosion, sediment transport, or vehicle tracking of debris off of property. Action to address any problem areas found during inspection must occur as soon as possible. Such sites will be considered as potential violations until addressed. The plan shall be revised and implemented in no case later than 7 calendar days following the inspection.

The inspection shall look for evidence of or the potential for pollutants entering the drainage system or leaving the site and shall include: disturbed areas of the construction site that have not been finally stabilize; areas used for storage of materials; structural and non structural control measures; and locations where vehicles enter or exit the site.

A report summarizing the areas inspected, name(s) and title(s) of personnel making the inspection, the date(s) of the inspection, major observations and corrective actions taken shall be made and retained as part of the plan for a least 3 years. Such reports shall identify any incidents of non-compliance. Where an inspection does not identify any incidents of non-compliance, the report shall contain a certification that the site is in compliance with the plan and permit. The Site Inspection Form in Attachment 6 may be used to conduct site investigations. Compliance documentation is the responsibility of the Owner.

10. Noncompliance

If the City determines that construction activities have occurred without a submitted SWPPP required as described in this Manual or that the required execution, maintenance, inspection of BMP measures as described in the submitted plan have not occurred to satisfaction of the City, then the Owner is subject to enforcement actions as allowed by the City of Watertown Ordinances. Enforcement actions may include:

- Withholding of grading or building permit or building inspections
- Warning letter/inspection report
- Letter of noncompliance
- Stop-work order
- Withholding of the Certificate of Occupancy
- Permit revocation by the City of Watertown and/or SD DENR
- Notice of violation and order with monetary fines
- Municipal summons

In addition, any person who violates a permit condition or makes any false statement, representation, or certification, may be subject to enforcement action under South Dakota Codified Law (SDCL), Chapter 34A-2.

11. References

City of Las Vegas, Nevada, *Stormwater Pollution - What You Should Know For...General Construction & Site Supervision*, 2005.

City of Sioux Falls, South Dakota, *Chapter 11 Drainage Improvements*, 2004.

City of Sioux Falls, South Dakota, *Chapter 12 Erosion Control*, 2004.

Minnesota Pollution Control Agency, *Protecting Water Quality in Urban Areas – A Manual: Chapter 6 Erosion Prevention and Sediment Control*, 2000.

Smolen, M.D., D.W. Miller, L.C. Wyatt, J. Lichthardt, and A.L. Lanier. 1988. *Erosion and Sediment Control Planning and Design Manual*. North Carolina Sedimentation Control Commission, North Carolina Department of Environment, Health, and Natural Resources, and Division of Land Resources Land Quality Section, Raleigh, NC.

South Dakota Department of Environment and Natural Resources, *General Permit for Stormwater Discharges Associated with Construction Activities*, 2002.

South Dakota Department of Transportation, *Erosion Control Manual*, 2004.

US Department of Agriculture Natural Resources Conservation Service and Illinois Environmental Protection Agency, *Illinois Urban Manual*, 2002.

US Environmental Protection Agency. Sediment Basin and Rock Check Dam Fact Sheet, http://cfpub.epa.gov/npdes/stormwater/menuofbmps/, 2006.

Attachment 1
List of Definitions

Attachment 1
List of Definitions

Best Management Practices (BMPs): schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the state. BMPs also include treatment requirements, operating procedures, and practices to control construction site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Control Measures: any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the state.

Erodibility: The susceptibility of a particular soil type to erosion by water or wind.

Erosion: The wearing away of the land surface by water, wind, ice or other geological agents, including the detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

Erosion Control Measures: Practices that slow or stop erosion.

Final Stabilization: either:

a. all soil disturbing activities at the site have been completed and a uniform perennial vegetative cover with a density of 70% of the native cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed; or

b. for individual lots in residential construction, that either: **1)** the permittee has completed final stabilization as specified in part (**a**) above, or **2)** the permittee has established temporary stabilization for an individual lot before the property owner assumes operational control of the property and the permittee informs the property owner of the need for, and benefits of, final stabilization; or

c. for construction projects on land used for agricultural purposes, final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to “waters of the state,” and areas which are not being returned to their pre-construction agricultural use must meet the final stabilization criteria in (**a**) or (**b**) above.

Land Disturbing Activity: Grading, cut, fill, stockpiling of dirt, removal of vegetation, or any other alteration or disturbance of the ambient land surface.

Larger Common Plan of Development or Sale: a contiguous area where multiple separate and distinct construction activities are planned to occur at different times on different schedules as a part of one plan.

Mapping Unit: Soil name and symbol given in the Soil Conservation Service Soil Survey for each soil type.

Operator: the owner, party, person, general contractor, corporation, or other entity that has operational control over a construction project. The operator is responsible for ensuring compliance with all conditions of the permit and with development and implementation of the “stormwater pollution prevention plan”.

Permanent: Installation of land-surface cover, or erosion and sediment control measures that will remain in place for a long period of time.

Pollutant: Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Point Source: any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Sedimentation: The process of solid materials, both inorganic (mineral) and organic, coming to rest on the earth’s surface either above or below sea level.

Sediment: Particulate solid material, either inorganic or organic, that will settle or be deposited in a liquid under the force of gravity.

Sediment Barrier: Straw bale barrier (dike) or a silt fence.

Sediment Basin: A depression, either excavated or formed by a dam, that holds water and debris and facilitates sedimentation of soil particles. Normally used for drainage areas equal to and greater than 5.0 acres.

Sediment Trap: A small depression that holds water and debris and facilitates sedimentation. Normally used for drainage areas less than 5.0 acres.

Stormwater: for the purpose of this manual, means stormwater runoff, snow melt runoff, or surface runoff and drainage associated with construction activity.

Stormwater Associated with Construction Activity: the stormwater runoff from construction activities including clearing, grading, and excavating, that result in the disturbance of five or more acres of total land area or which may be part of a larger common plan of development or sale if the larger common plan will ultimately disturb five or more acres of land.

Temporary: Installation of erosion or sediment control measures, either structural or nonstructural, that are planned to be removed or inactivated after a period of time.

Waters of the State: all waters within the jurisdiction of this state, including all streams, lakes, ponds, impounding reservoirs, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the state, but not waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA other than cooling ponds as defined in 40 C.F.R. § 423.11(m) (July 1, 1991).

Attachment 2
Example SWPPP Report

Example SWPPP Report

Prepared For:

Ajax Development Inc.
1234 A Street
Watertown, SD 57201
Phone: (605) 555-0000

Prepared By:

Acme Consultants, Inc.
43560 Square Feet Street
Watertown, SD 57201
Phone: (605) 555-1212

February 2008

I. Introduction

Name, Address, and Telephone Number

Owner:

Ajax Development, Inc.
1234 A Street
Watertown, SD 57201
Phone: (605) 555-0000

Erosion Control Consultant:

John Smith, P.E.
Acme Consultants, Inc.
43560 Square Feet Street
Watertown, SD 57201
Phone: (605) 555-1212

Project Location

The project is located at 100 B Street in the SW quarter of Section___,Township___, Range of the 6th principal meridian located in Codington County, South Dakota.

Project Description

The Project consists of the development of a 6.2 acre parcel with two office buildings. The project involves constructing two office buildings, two parking lots, an access road, a box culvert over Dry Creek and associated site utilities. The box culvert will be constructed first to provide access to the site. Following site grading, temporary vegetation and road base will be installed. Utility and building construction will then begin. Paving and landscaping will be the final phase of the project.

Existing Site Conditions

Most of the existing site is vegetated with native grass. The plant density is estimated to be 50 percent coverage of the ground surface. Cottonwood trees and other riparian vegetation are found adjacent to Dry Creek. The site drains to Dry Creek except the southeast portion which drains offsite to the southeast. About 0.2 acres of wetlands are found next to Dry Creek. The riparian and wetland vegetation will not be disturbed by the site development. The existing slopes on the site range from 2 percent to 19 percent adjacent to the creek.

Adjacent Areas

Land use in the vicinity is commercial. The land immediately to the south and east has been developed for commercial use. Areas to the north and west are undeveloped and vegetated with native grass. Dry Creek runs along the west border of the property. Sediment control measures will be taken to prevent damage to Dry Creek. Approximately 2 acres of grassland to the north contribute runoff to the construction area.

Receiving Waters

Runoff from the site discharges to Dry Creek which runs along the west border of the property and is presently a stable, gently flowing perennial stream.

Soils

The soil in the project area is mapped as Renwash loam, 0-2 percent slope. The upper 17 inches consists of dark gray loam. The subsoil consists of brown and grayish brown, gravelly loamy sand. Renwash soils are considered well-drained with permeability rates greater than 0.6 in/hr at the surface and 20 in/hr in the underlying gravelly material. The soil erodibility factor (K value) ranges from 0.28 at the surface to 0.1 in the subsoil. Renwash soils are classified in the B hydrologic soil group. Depth to the high water table is greater than 3.5 feet.

Areas

The total site surface area is 6.2 acres. The project will involve grading approximately 5.2 acres of the parcel. Approximately 1 acre of wetland and riparian property adjacent to Dry Creek will remain undisturbed.

Erosion and Sediment Control Measures

All listed measures will be the responsibility of the general contractor.

1. Soil Stockpiles: The upper 6 inches of topsoil will be stockpiled and re-spread on surfaces not planned for buildings or impervious areas. Soil stockpiles will be seeded with a temporary grass cover within 2 weeks of stockpile construction.
2. Roads and Parking Lots: Road cuts, road fills, and parking lot areas will be paved as soon as final grade is reached.
3. Mulching/Temporary Revegetation: All non-paved areas will be seeded within 14 days of final grading. Mulch shall be applied to protect newly seeded areas.
4. Sediment Basin: A sediment basin will be constructed in the southeast corner of the property. All water from disturbed areas will be directed to the basin before leaving the site. The contributing drainage area reaching the disturbed

site is approximately 7.2 acres, consisting of the disturbed 5.2 acres and 2 acres to the north of the site. Basin calculations are can be found at the end of this report.

5. Vehicle Tracking and Temporary Construction Entrance: A temporary gravel construction entrance will be installed near the northeast corner of the property. Geotextile fabric will be placed under the entrance.
6. Silt Fence: A silt fence will be constructed around the south boundary ofthe site and along the edge of the project area adjacent to Dry Creek. A buffer (>20 feet) will be maintained between the silt fence and Dry Creek.
7. Grass-Lined Channel: A grass-lined channel will intercept runoff before it reaches the silt fence and convey water to the sediment basin. An erosion control blanket will be installed in the channel bottom until grass is established. As slopes in the channel will be less than 2 percent, check dams or other velocity reduction practices will not be necessary.

Nonstructural Control Measures

Standard good housekeeping practices for management of concrete wash water and spill prevention will be employed. Dust control is not expected to be an issue due to the small area of exposure and the relatively short time of exposure (not to exceed 9 months). Should excessive dust be generated, it will be controlled by sprinkling.

Any sediment and debris that has been washed or tracked off the site will be removed. Solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation will be recycled when possible. All waste that cannot be recycled will be stored in dumpsters covered with tarps or plastic sheeting. Dumpsters will be emptied regularly to ensure that they do not overflow.

Time Schedule

The construction schedule is as follows:

Install Construction Entrance, Sediment Basin and Silt Fence Barriers:	September 15-September 30
Site Grading and Grass Swale Construction and Stabilization	September 30-October 15
Install Base Course and Mulch to all Exposed Soil Areas:	October 15-October 20
Utility and Building Construction:	October 20-April 1

Paving and Landscaping:	April 1-April 15
Removal of Erosion Control Measures:	April 15-April 20

The schedule will minimize the exposure of unprotected areas. The perimeter controls will be installed prior to site grading. Weekly inspections will be conducted by the Owner of erosion and sediment control structures. Inspections will begin during installation of control structures (approximately September 15) and continue through project completion.

Permanent Stabilization

Permanent landscaping will include bluegrass sod and trees and shrubs and will be maintained to ensure vegetative cover is sufficient to control soil erosion and survive severe weather. Temporary revegetation will be installed on all disturbed areas having a period of exposure prior to final stabilization of two (2) weeks or longer. The sediment basin will be converted to the site detention pond after sod is installed (refer to the site Drainage Report for the detention requirements).

Stormwater Management Considerations

Stormwater will sheet flow from the building areas toward the creek, then be intercepted and routed to a sediment basin via a grass swale during construction. The sediment basin outlet will release to Dry Creek. Post-development stormwater quality control will be provided by the detention pond and vegetated filter strip adjacent to Dry Creek.

Maintenance

All erosion and sediment control practices will be checked for stability and operation following every rainfall event greater than 0.5 inches but in no case less than once every 7 days. Any needed repairs will be made immediately to maintain all practices as designed and installed for their appropriate phase of the project. An inspection report shall be prepared and maintained as part of the plan for at least 3 years.

The sediment basin will be cleaned out when the level of sediment reaches 2.0 feet below the top of the riser. Gravel will be cleaned or replaced when the sediment pool no longer drains properly. Sediment will be removed from behind the silt fence when it becomes approximately 0.5 feet deep at the fence. The silt fence will be repaired as necessary to maintain a barrier.

All seeded areas will be fertilized and reseeded as necessary to maintain dense vegetative cover.

Employee Training

Training will be provided to all employees, contractors, and subcontractors to follow the Erosion and Sediment Control Plan before they are allowed to enter the work area.

This *SWPPP Report* and attached *Erosion and Sediment Control Detailed Drawing(s)* are intended to fulfill the requirements of the City of Watertown. I understand that additional erosion control measures may be needed if unforeseen erosion problems occur or if the measures described in the submitted plan do not function as intended. The requirements of this plan shall run with the land and be the obligation of the landowner until such time as the plan is properly completed, modified or voided.

I have reviewed this report and accompanying *Erosion and Sediment Control Detailed Drawings(s)* and accept responsibility for their contents.

_____
Owner

I have prepared this report and accompanying *Erosion and Sediment Control Detailed Drawings(s)* and accept responsibility for their contents.

_____
PE, CPESC, or SPSWQ (signature required for sites greater than 1 acre)

Calculations

Sediment Basin

Tributary Area = 7.2 acres
Required Volume = 3,600 ft^3/acre x 7.2 acres = 25,920 ft^3
Use a 54 ft. x 120 ft. x 4.0 ft. deep sediment basin

Sediment Basin Dewatering Holes

Surface Area of the basin = 6,480 ft^2
Head of water above the hole = 4 ft
Coefficient of contraction for orifice = 0.6
Detention Time = 16 hours
Total surface area of dewatering holes = (6,480 ft^2 x (2 x 4 ft)) / (16 hours x 0.6 x 20,428) = 0.26 ft^2 = 38 in^2

Attachment 3

City of Watertown
Change of Authorization/Name Change

CITY OF WATERTOWN

CHANGE OF AUTHORIZATION/NAME CHANGE

for a Stormwater Pollution Prevention Plan Submitted to the City of Watertown
Stormwater Phase II Construction Site Best Management Practices Program

Stormwater Pollution Prevention Plan Tracking Number:_____

Previous Company/Operator Name:_____

New Company/Operator Name: _____

Contact Person:_____

Mailing Address:_____

Email Address:_____

Facility Address:_____

Legal Location:_____

Storm Water Receiving Waters: _____

Municipal Storm Sewer/City: _____

Please include a brief description of activities conducted at the site:_____

_____

_____

_____

_____

_____

_____

Date transfer of permit responsibility, coverage and liability becomes effective*:_____

*Include the written agreement between the two facilities which includes this date.

Send to: City of Watertown
Office of Public Works
City Hall
23 Second Street NE
P.O. Box 910
Watertown, SD 57201-0910

**** NOTE: Any change in location and/or operation requires that the facility's Stormwater Pollution Prevention Plan be updated and revised to reflect all operational changes.**

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

South Dakota Codified Laws Section 1-40-27 provides:

"The secretary may reject an application for any permit filed pursuant to Titles 34A or 45, including any application by any concentrated swine feeding operation for authorization to operate under a general permit, upon making a specific finding that:

(1) The applicant is unsuited or unqualified to perform the obligations of a permit holder based upon a finding that the applicant, any officer, director, partner or resident general manager of the facility for which application has been made:

(a) Has intentionally misrepresented a material fact in applying for a permit;
(b) Has been convicted of a felony or other crime involving moral turpitude;
(c) Has habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage;
(d) Has had any permit revoked under the environmental laws of any state or the United States; or
(e) Has otherwise demonstrated through clear and convincing evidence of previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the permit holder; or

(2) The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.

All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification, consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26."

Pursuant to SDCL 1-40-27, I certify that I have read the forgoing provision of state law, and that I am not disqualified by reason of that provision from obtaining the permit for which application has been made.

NOTE: The Notice of Intent must be signed by the authorized chief elective, an executive officer or a corporate responsible official of the applicant, or by the applicant, if an individual.

I declare and affirm under the penalties of perjury that this certification has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

Name (print) _____

Title _____

Signature _____

Date _____

PLEASE ATTACH SHEET DISCLOSING ALL FACTS PERTAINING TO SDCL 1-40-27 (1) (a) THROUGH (e). ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION.

SDDENR must also be notified of change of ownership. SDDENR may be contacted at:

Department of Environment and Natural Resources
Surface Water Quality Program
523 East Capitol
Pierre, SD 57501-3181
1-800-SD-STORM

Attachment 4

Seed Mixtures for Various Site Conditions

EXHIBIT 1

Minimum Drill Seeding Rates for Perennial Grasses[a]

Seed Mix	Pounds of PLS/acre
SDDOT Type C Seed Mixture (Less than 5 acres)	
Western Wheatgrass (Flintlock, Rodan, Rosanna)	16.0
Slender Wheatgrass (Adanac, Pryor, Primar, Revenue)	2.0
Total	**18.0**
SDDOT Type G Seed Mixture (Steep grades, long backslopes, or erosive soils)	
Western Wheatgrass (Flintlock, Rodan, Rosanna)	9.0
Switchgrass (Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer)	5.0
Indiangrass (Holt, Tomahawk)	1.0
Big Bluestem (Bison, Bonilla, Champ, Pawnee, Sunnyview)	1.0
Oats or Winter Wheat	10.0
Total	**26.0**
Alkali Soil Seed Mix	
Alkar tall wheatgrass	28.0
Total	**28.0**
Fertile Loamy Soil Seed Mix (Option 1)	
Lincoln smooth brome	4.0
Bonilla big bluestem	4.0
Forestburg switchgrass	2.0
Pierre sideoats grama	4.0
Total	**14.0**
Fertile Loamy Soil Seed Mix (Option 2)	
Matua bromegrass	4.0
Western wheatgrass	4.0
Forestburg switchgrass	2.0
Pierre sideoats grama	4.0
Total	**14.0**
High Water Table Soil Seed Mix (Option 1)	
Garrison creeping foxtail	1.0
Reed canarygrass	1.0
Lincoln smooth brome	3.0
Forestburg switchgrass	1.0

EXHIBIT 1

Minimum Drill Seeding Rates for Perennial Grasses[a]

Seed Mix	Pounds of PLS/acre
Alkar tall wheatgrass	5.5
Total	**11.5**
High Water Table Soil Seed Mix (Option 2)	
Garrison creeping foxtail	5.75
Reed canarygrass	5.75
Total	**11.5**
Transition Turf Seed Mix (Option 1)	
Kentucky bluegrass	0.5
Durar hard fescue	1.0
Perennial ryegrass	3.0
Lincoln smooth brome	3.0
Total	**7.5**
Transition Turf Seed Mix (Option 2)	
Kentucky bluegrass	1.0
Seville perennial ryegrass	3.5
Matua bromegrass	3.0
Total	**7.5**
Sandy Soil Seed Mix (Option 1)	
Bonilla big bluestem	3.0
Pierre sideoats grama	3.0
Lincoln smooth brome	4.0
Forestburg switchgrass	1.0
Indian grass	1.0
Total	**12.0**
Sandy Soil Seed Mix (Option 2)	
Pennlawn red fescue	6.0
Hard fescue	3.0
Chewings fescue	3.0
Total	**12.0**
Heavy Clay, Rocky Foothill Seed Mix (Option 1)	
Alkar tall wheatgrass	9.0
Pierre sideoats grama	4.0

EXHIBIT 1

Minimum Drill Seeding Rates for Perennial Grasses[a]

Seed Mix	Pounds of PLS/acre
Lincoln smooth brome	5.0
Total	**18.0**
Heavy Clay, Rocky Foothill Seed Mix (Option 2)	
Alkar tall wheatgrass	9.0
Pierre sideoats grama	4.0
Matua bromegrass	5.0
Total	**18.0**

[a] All of the above seeding mixes and rates are based on drill seeding followed by crimped hay or straw mulch. These rates shall be doubled if seed is broadcast and shall be increased by 50 percent if the seeding is done using a Brillion Drill or is applied through hydraulic seeding. Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1. If hydraulic seeding is used, hydraulic mulching shall be done as a separate operation.

[b] If the site is to be irrigated, the transition turf seed rates shall be doubled.

To provide temporary erosion control between the seeding dates, utilize surface roughening (on the contour or perpendicular to prevailing winds) and apply a mulch as specified above.

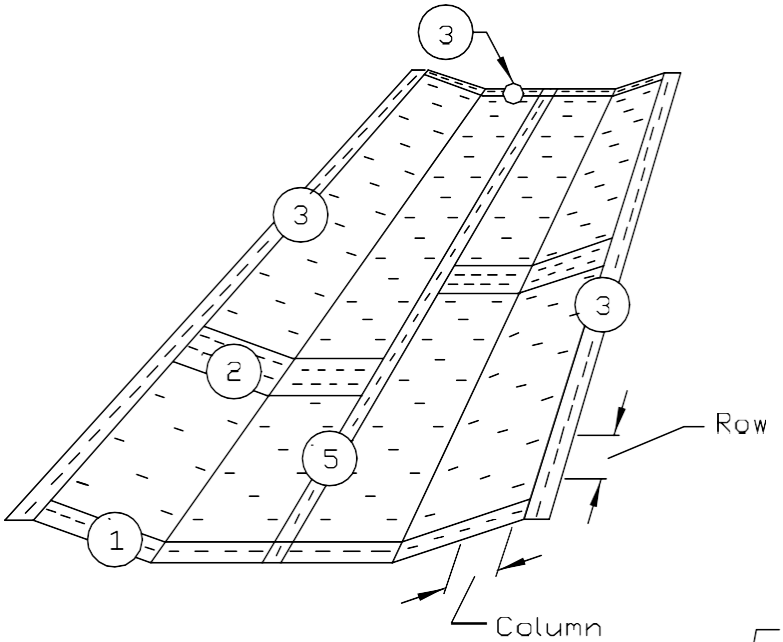
Perennial grasses can be seeded using a drill seeder in areas previously planted with a temporary grass cover. In this case, the annual grass may need to be mowed before perennial grasses are seeded. Broadcast seeding or hydroseeding shall not be done on areas that have a live crop of annual grasses without first reworking and preparing the topsoil.

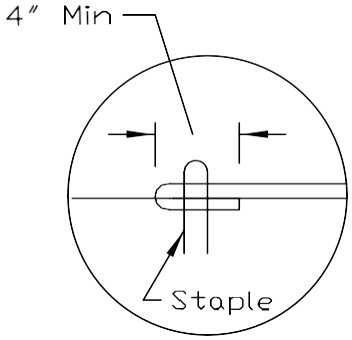
Seeding options are to be identified on the plan drawings.

Sources: Sioux Falls Chapter 12 Erosion Control Manual, SDDOT

Attachment 5
Standard Drawings

EROSION BLANKET PLAN





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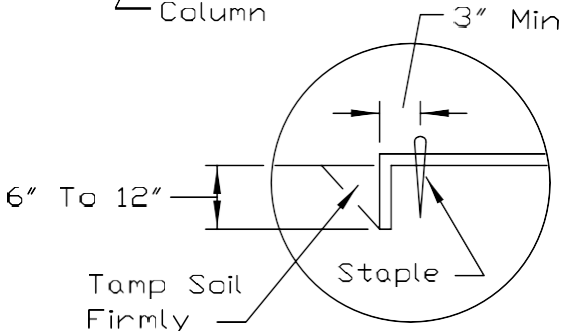

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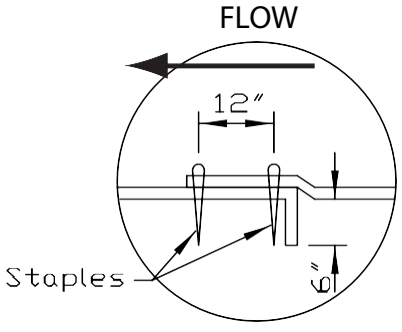
Excelsior Blanket
Erosion Control Paper

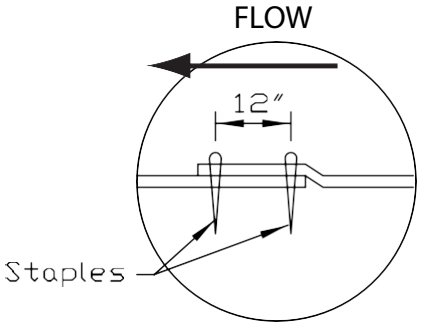
DETAIL 1



Junction Slot

Jute Mesh

Erosion Control Paper



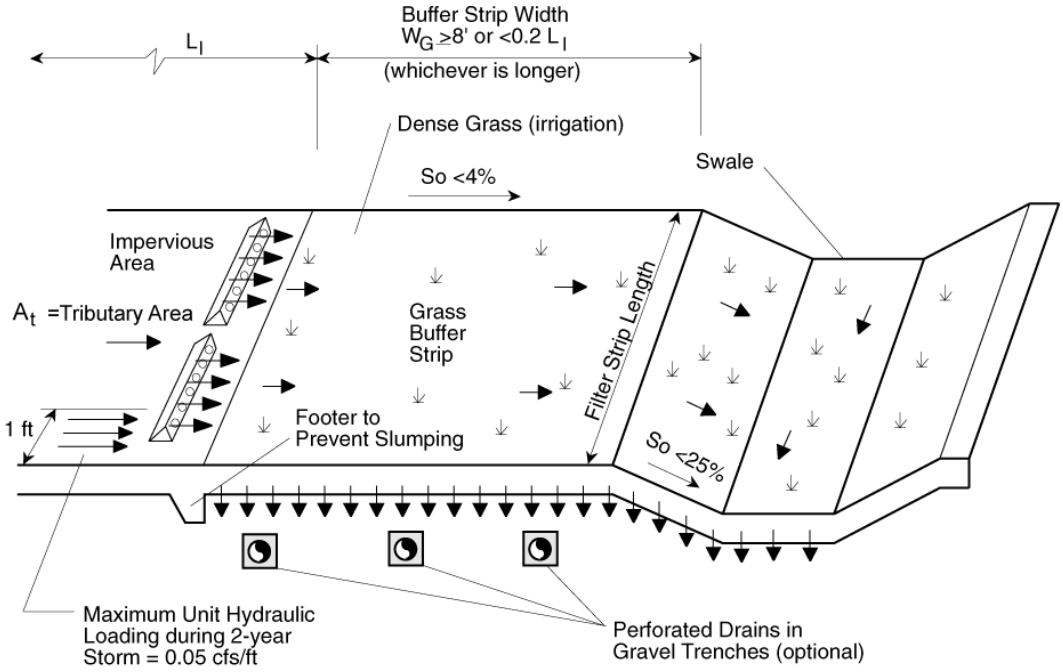
Junction Slot

Excelsior Blanket

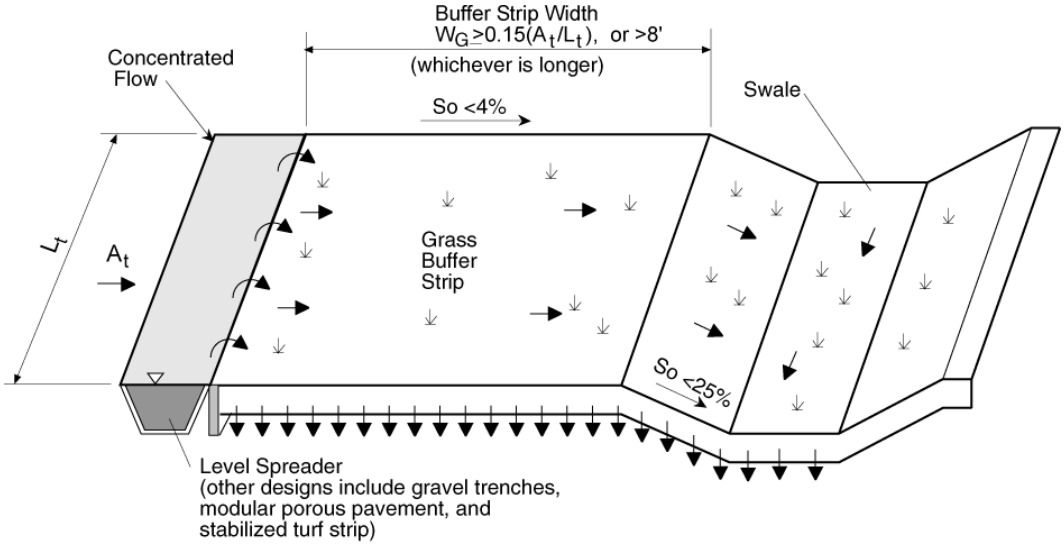
DETAIL 2

Source: Illinois Urban Manual

STANDARD DRAWING 1
Erosion Blanket Plan



SHEET FLOW CONTROL



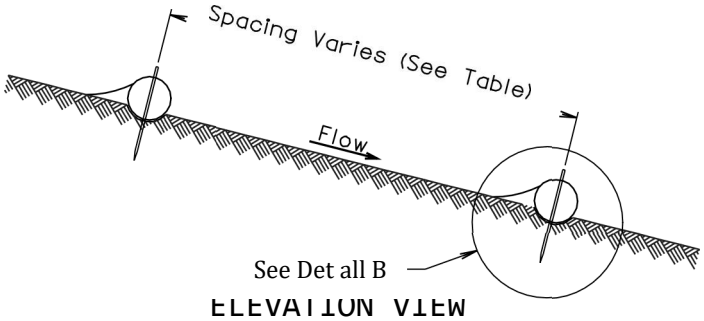
CONCENTRATED FLOW CONTROL

Note: Not to Scale

FIGURE GB 1

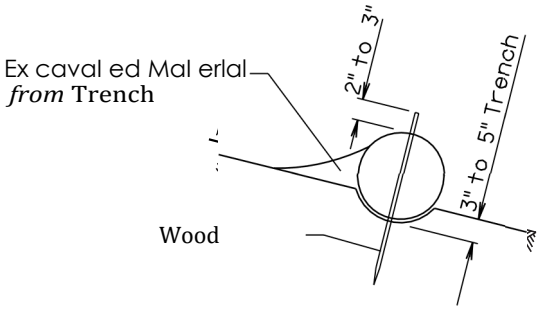
Source: City of Sioux Falls
Chapter 11 Drainage Improvements

STANDARD DRAWING 2
Applications of Grass Buffers

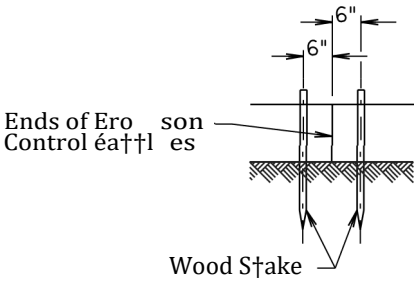


ELEVATION VIEW
CUT OR FILL SLOPE INSTALLATION

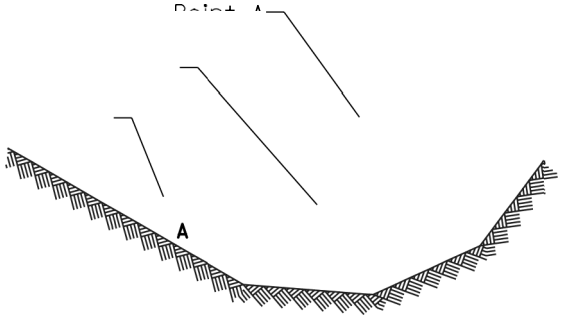
CUT OR FILL SLOPE INSTALLATION	
Slope	Spacing CFU
2:I	20
3:I	50
4:I	40



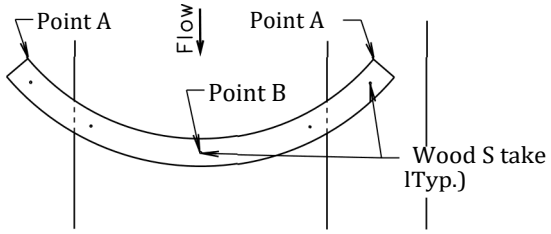
DETAIL 8
TYP ICAL OF ALL INSTALLAT IONS)



DETAIL C

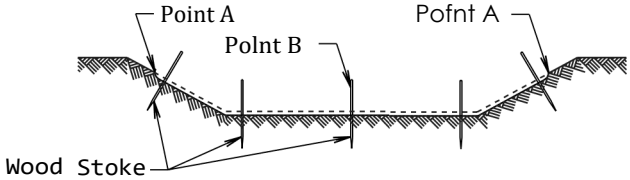


ISOMETRIC VIEW
DITCH INSTALLATION



PLAN VIEW
DITCH INSTALLATION

DITCH INSTALLATION	
Grode	Spocing (FT)
2	ISO
3%	I00
4%	T5
5%	50

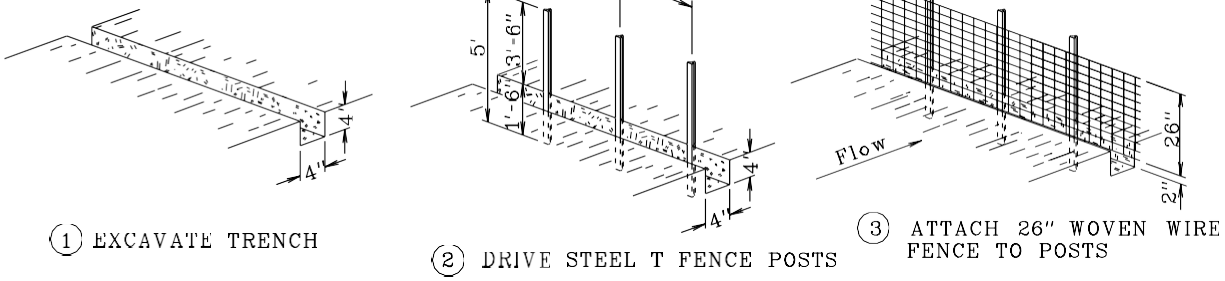


SECTION A—A

Source: SDDOT Erosion Control Standard Plates

STANDARD DRAWING 3
Erosion Control Wattle

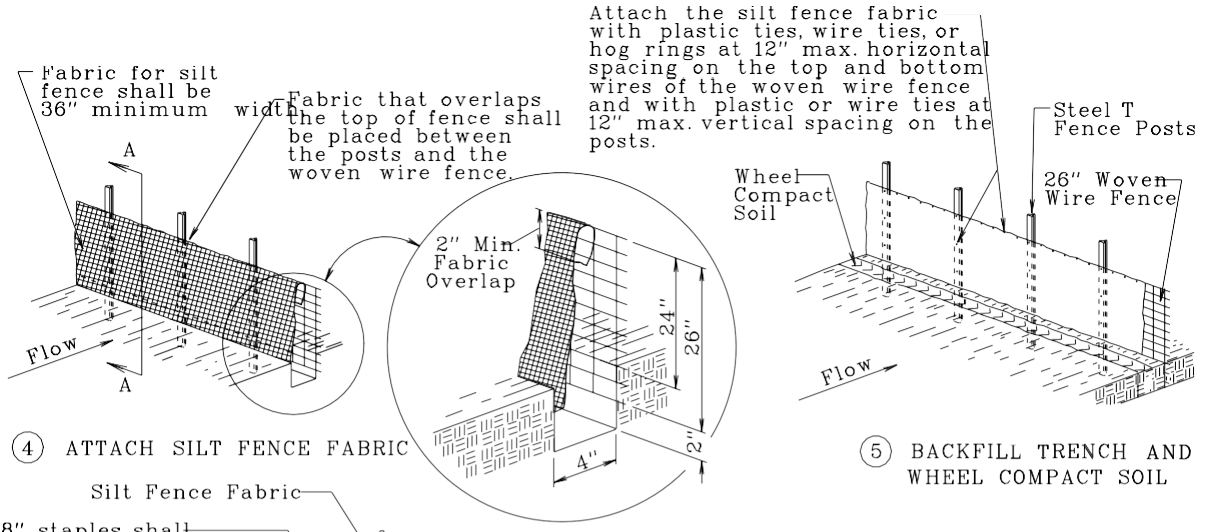
MANUAL LOW FLOW SILT FENCE INSTALLATION



(1) EXCAVATE TRENCH

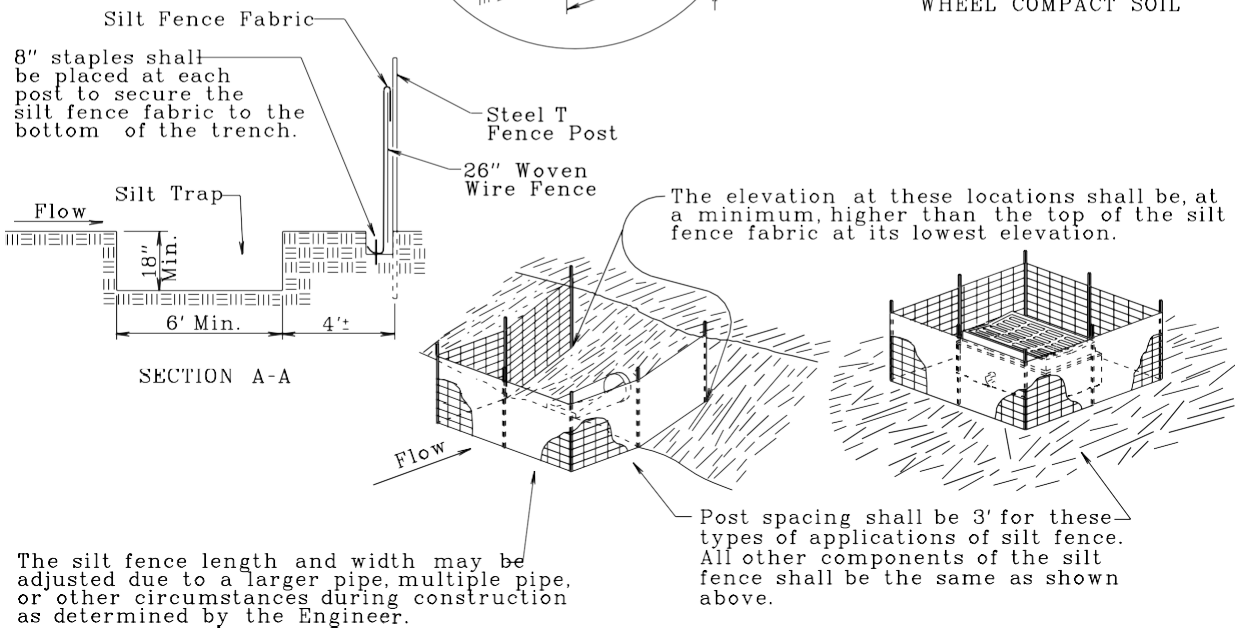
(2) DRIVE STEEL T FENCE POSTS

(3) ATTACH 26" WOVEN WIRE FENCE TO POSTS



(4) ATTACH SILT FENCE FABRIC

(5) BACKFILL TRENCH AND WHEEL COMPACT SOIL



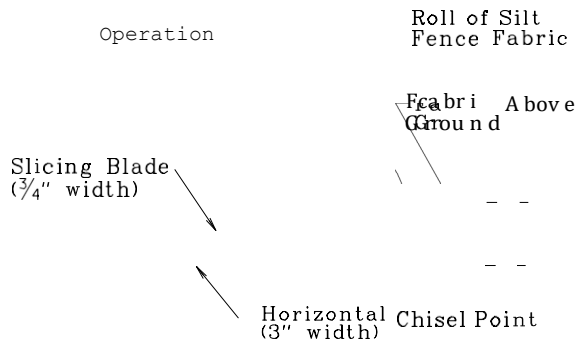
LOW FLOW SILT FENCE AND SILT TRAP

SHEET 1 OF 2

Source: SDDOT Erosion Control Standard Plates

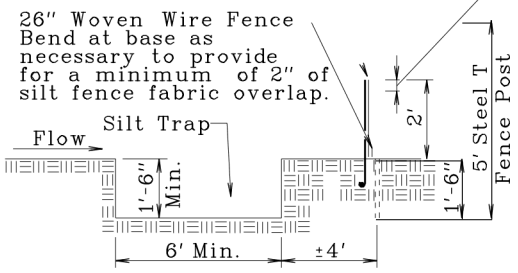
STANDARD DRAWING 4a
Low Flow Silt Fence 1 of 2

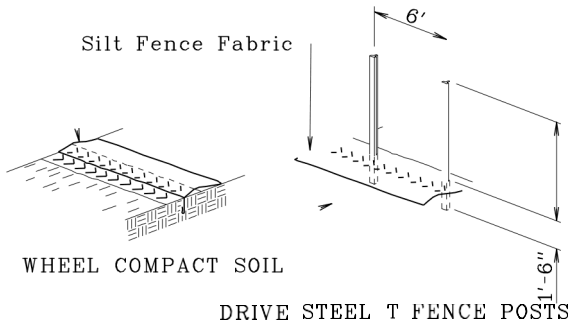
MACHINE SLICED LOW FLOW SILT FENCE INSTALLATION



(1) INSTALL SILT FENCE FABRIC BY MACHINE SLICING METHOD.

Silt fence fabric shall be overlapped a minimum of 2" at top of woven wire fence

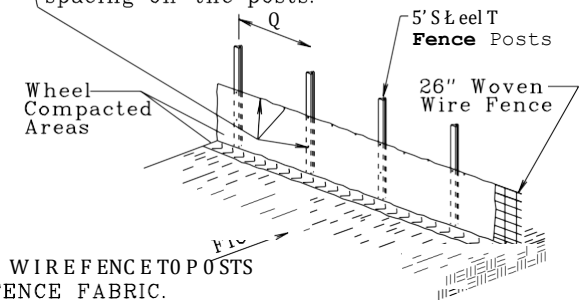




DRIVE STEEL T FENCE POSTS

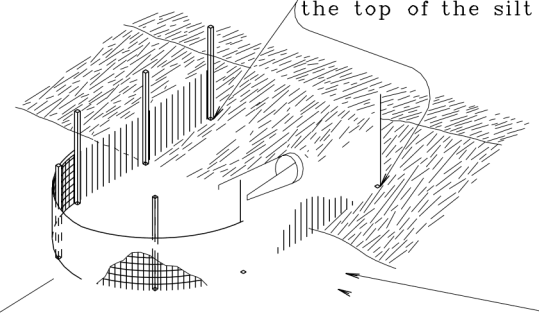
(2) WHEEL COMPACTS SOIL ABOVE SLICED IN PORTION OF FABRIC AND THEN DRIVE STEEL T FENCE POSTS.

Attach the silt fence fabric with plastic ties, wire ties, or hog rings at 12" max. horizontal spacing on the top and bottom wires of the woven wire fence and with plastic or wire ties at 12" max. vertical spacing on the posts.



ATTACH 26" WOVEN WIRE FENCE TO POSTS AND ATTACH SILT FENCE FABRIC.

The elevation at these locations shall be, at a minimum, higher than the top of the silt fence fabric at its lowest elevation.



The silt fence length and width may be adjusted due to a larger pipe, multiple pipe, or other circumstances during construction as determined by the Engineer.

The radius of the silt fence shall be the minimum capable by the slicing machine The post spacing shall be 3' for these types of applications of silt fence. All the other components of the silt fence shall be the same as shown above.

GENERAL NOTES:

A silt trap shall be provided when specified by a plan note. All costs for constructing the silt trap shall be incidental to the contract unit price per cubic yard for "Silt Trap".

If a trench can not be dug or the silt fence fabric can not be sliced in due to the type of earthen materiat (such as rock), then a row of 30 to 40 pound sandbags butted end to end shall be provided on top of the extra length of silt fence fabric to prevent underflow.

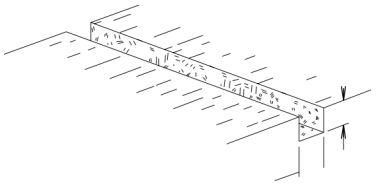
SHEET OF

2

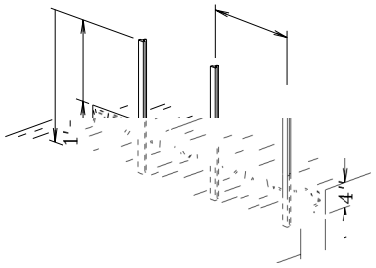
STANDARD DRAWING 4b
Low Flow Silt Fence 2 of 2

Source: SDDOT Erosion Control Standard Plates

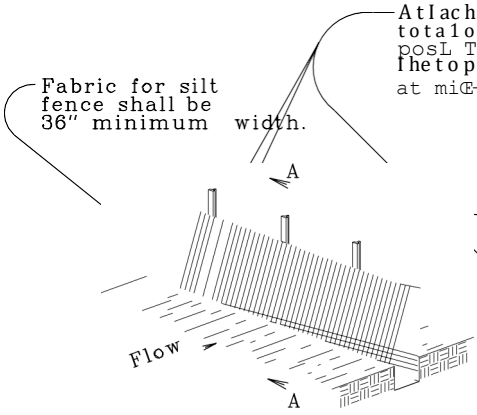
MANUAL HIGH FLOW SILT FENCE INSTALLATION



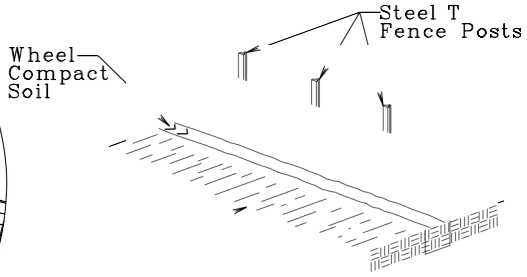
EXCAVATE TRENCH



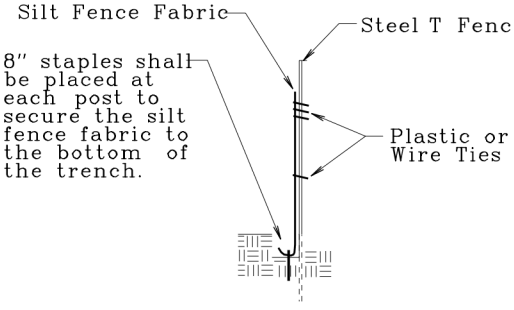
DRIVE STEEL T FENCE POSTS



3 ATTACH SILT FENCE FABRIC

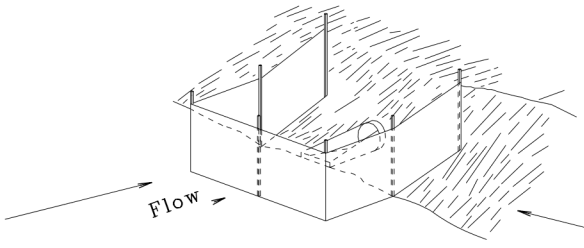


4 BACKFILL TRENCH AND WHEEL COMPACT SOIL

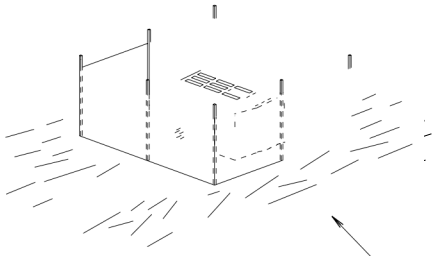


SECTION A-A

The elevation at these locations shall be, at a minimum, higher than the top of the silt fence fabric at its lowest elevation.



The silt fence length and width may be adjusted due to a larger pipe, multiple pipe, or other circumstances during construction as determined by the Engineer.



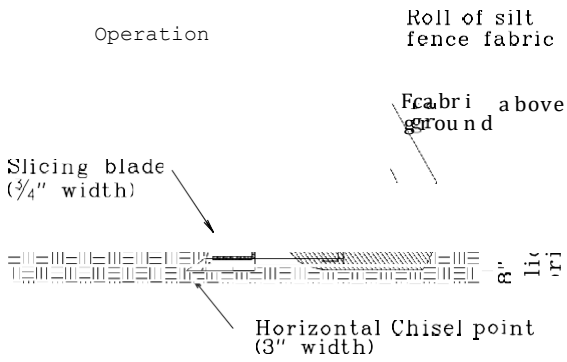
Post spacing shall be 3' for these types of applications of silt fence. All other components of the silt fence shall be the same as shown above.

SHEET 1 OF 2

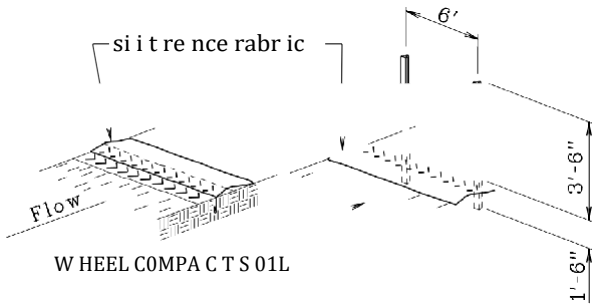
Source: SDDOT Erosion Control Standard Plates

STANDARD DRAWING 4c
High Flow Silt Fence 1 of 2

MACHINE SLICED HIGH FL0U SILT FENCE INSTALLAT10N



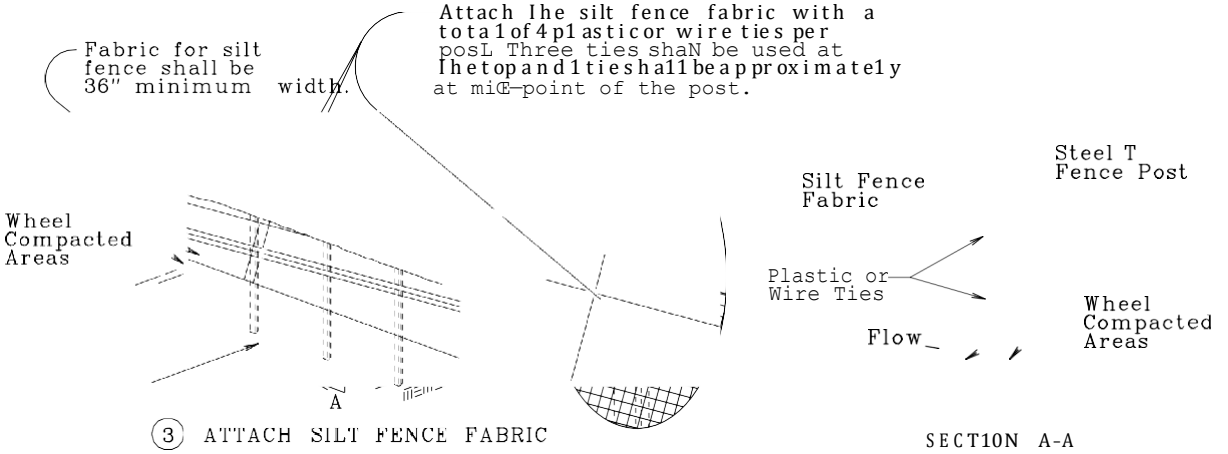
INSTALL SILT FENCE FABRIC BY MACHINE SLICING METHOD.



WHEEL COMPACTS 01L

DRIVE STEEL T FENCE POSTS

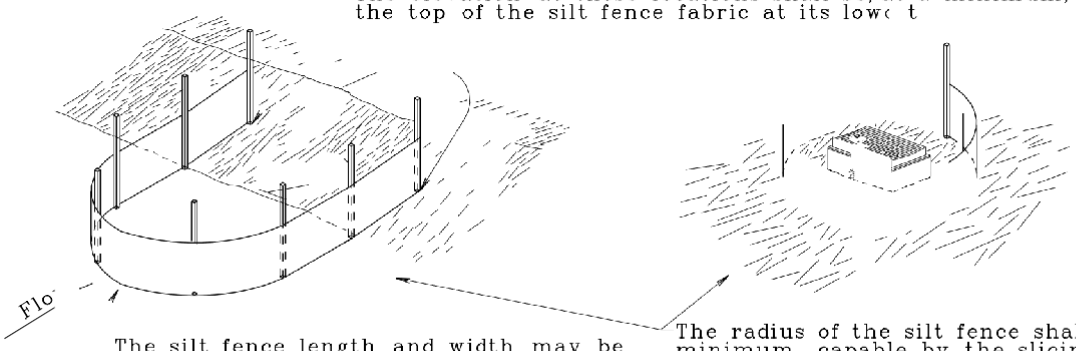
(2) WHEEL C0MPACTS 01L ABOVE SLICED IN PORTtoN or rAaRIC AND THEN DRIVE STEELTFENCEP0STS.



(3) ATTACH SILT FENCE FABRIC

SECT10N A-A

The elevation at these locations shall be, at a minimum, higher thar the top of the silt fence fabric at its lowc t



The silt fence length and width may be adjusted due to a larger pipe, multiple pipe, or other circumstances during construction as determined by the Engineer.

The radius of the silt fence shall be the minimum capable by the slicing machine. The post spacing shall be 3' for these types of applications of silt fence. All the other components of the silt fence shall be the same as shown above.

GENERAL NOTE:

Ifatrenchcannotbedugorthesi1Ifencefabriccannotbes1icedinduetothelype ofearthenmateriatísuchasrock),thenarowof30to40poundsandbagsbutIed end to end shal1 be providedontopofthe extra length of silt fence fabric to prevent underflow.

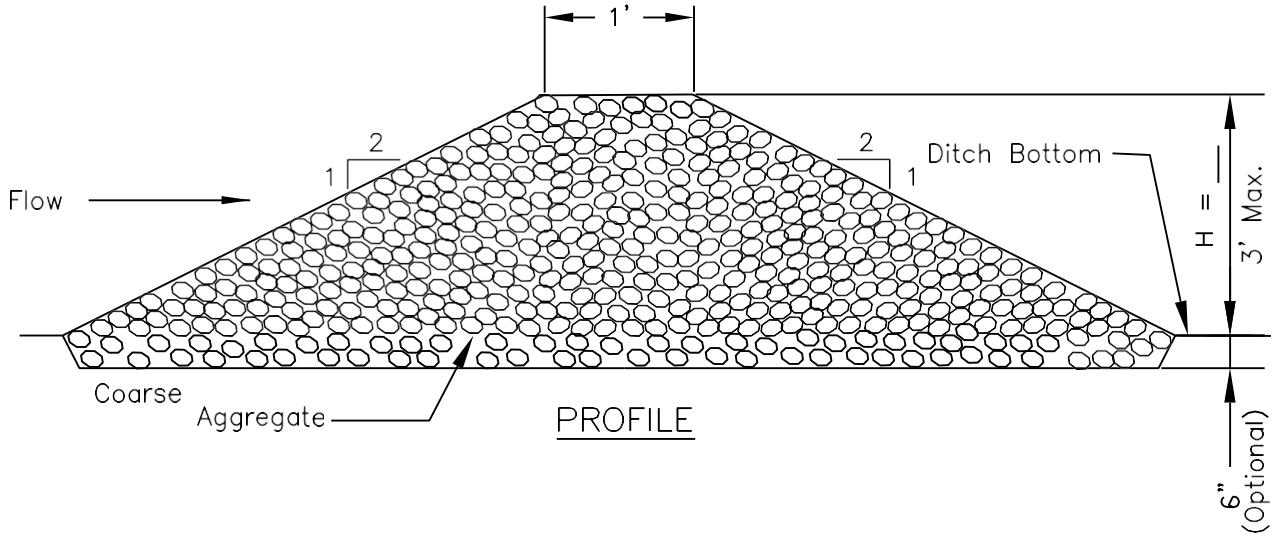
HIGH FLOW SILT FENCE

SHEET 2 OF 2

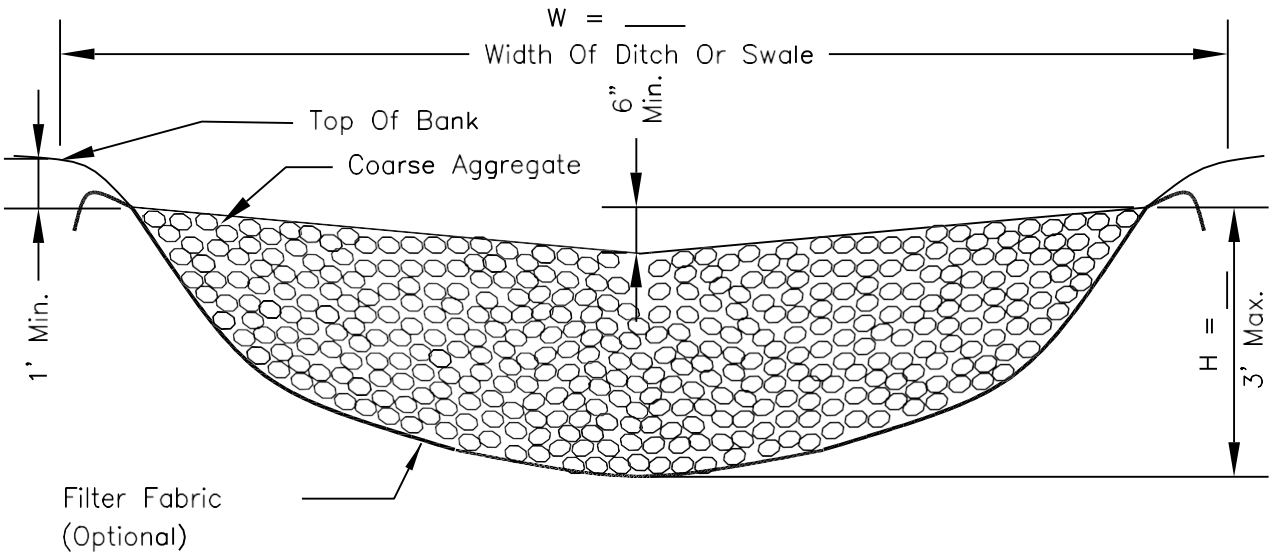
STANDARD DRAWING 4d
High Flow Silt Fence 2 of 2

Source: SDDOT Erosion Control Standard Plates

ROCK CHECK DA - COARSE AGGREGATE M



PROFILE



CROSS SECTION

NOTES:

1. For added stability, the base of the dam may be keyed 6 inches into the soil.
2. Drainage area to each dam shall be less than 2 acres.
3. Use Standard Drawing 5b for drainage areas of 2 to 10 acres.

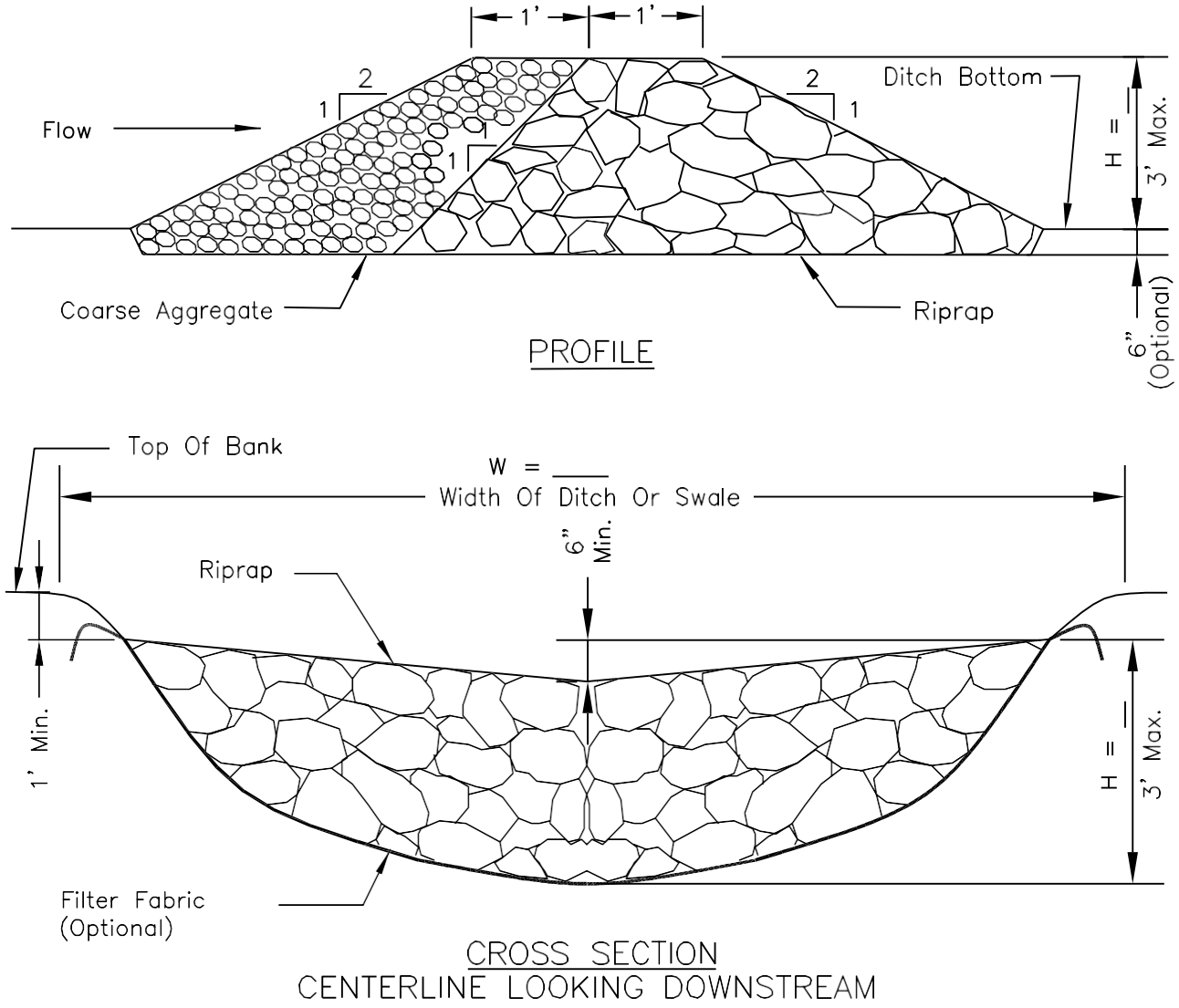
Source: Illinois Urban Manual

STANDARD DRAWING 5a
Rock Check Dam - Coarse Aggregate

CH2MHILL

ROCK CHECK DA - RIPRAP

M



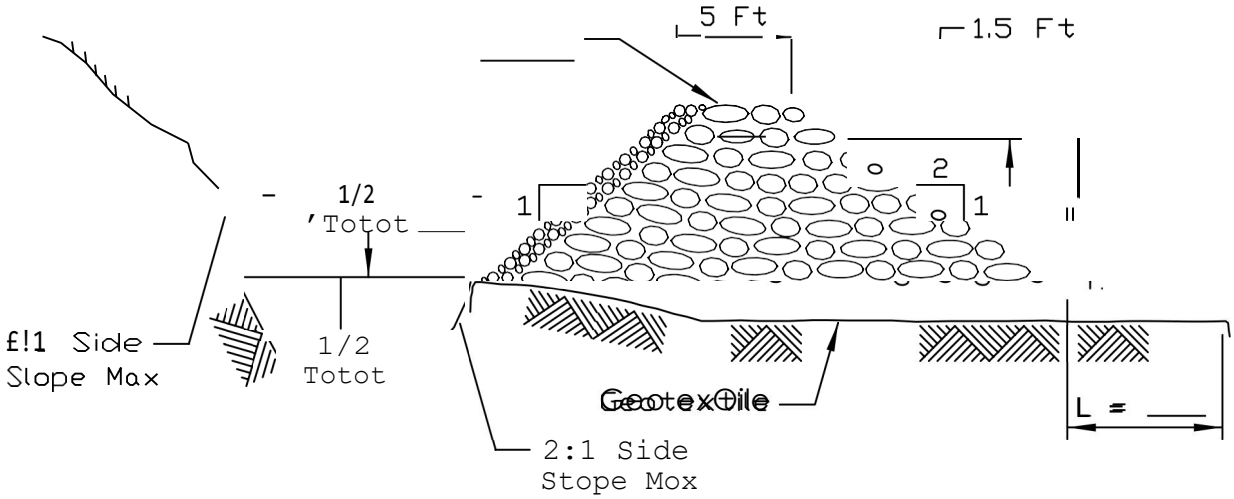
NOTES:

1. Riprap shall meet gradation requirements specified in *Erosion and Sediment Control Best Management Practices Manual.*
2. For added stability, the base of the dam may be keyed 6 inches into the soil.
3. Maximum drainage area to each dam is 10 acres.
4. Standard Drawing 5a may be used for drainage areas under 2 acres.

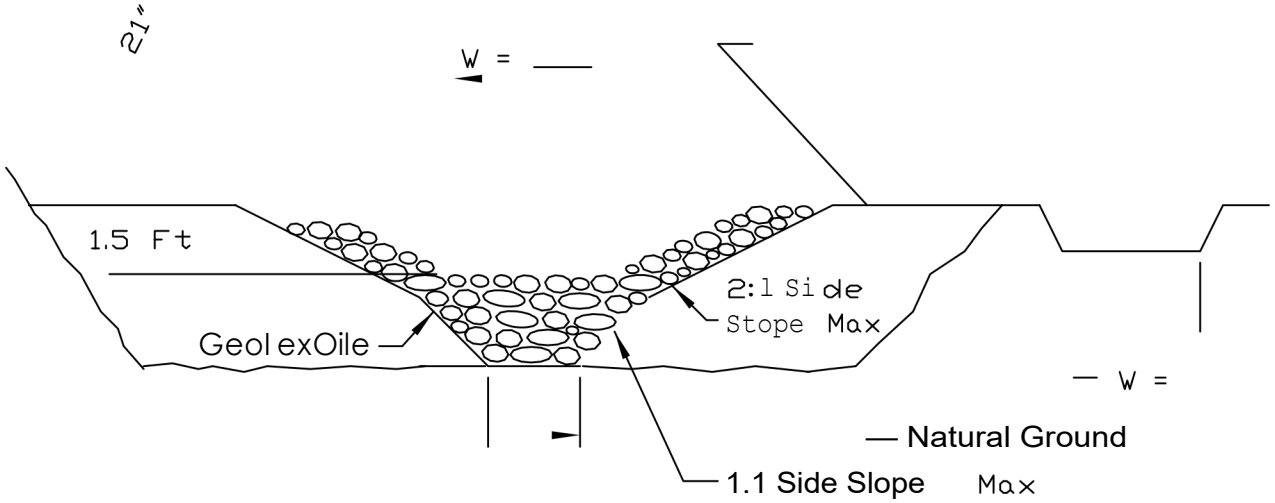
Source: Illinois Urban Manual

STANDARD DRAWING 5b
Rock Check Dam - Riprap

TEMPORARY SEDIMENT TRAP



CROSS SECTION

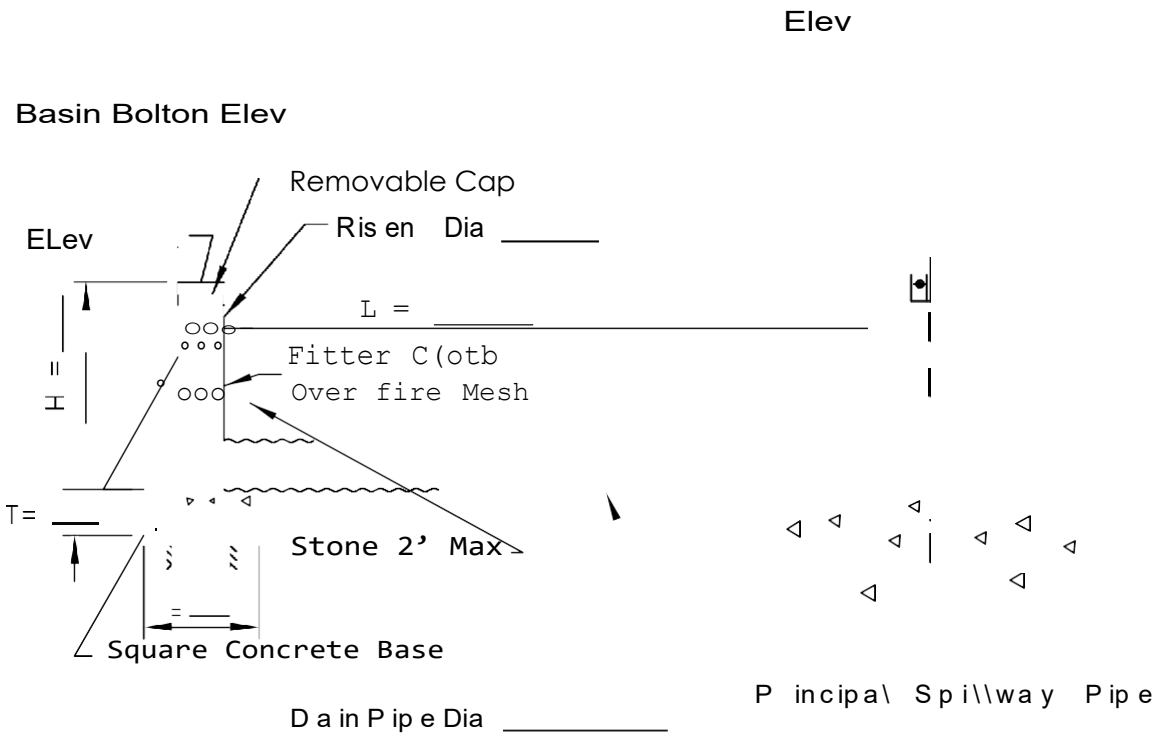


STONE SECTION

Source: Illinois Urban Manual

STANDARD DRAWING 6
Temporary Sediment Trap

SEDIMENT BASIN DEWATERING DEVICE



SECTION ON CENTERLINE

NOTES:

1. Slotted inlets shall be fabricated from corrugated metal or smooth steel.
2. Slots shall be cut cleanly and deburred. Ends of slots may be round or square.
3. Gravel filter, if used, shall be pit run sand and gravel with a maximum particle diameter of 2".
4. Fabricated or standard elbow; fabricated or standard tee with the pipe or plug in upstream end; or standard tee with one end embedded in concrete.
5. Thirty 1" diameter holes per foot of riser may be substituted for the 1"x 4" slots for 6" diameter risers.
6. Drain pipe shall be the same material and gauge as the principle spillway pipe.

Source: Illinois Urban Manual

STANDARD DRAWING 7
Sediment Basin Dewatering Device

Attachment 6

Site Inspection and Maintenance Form

Stormwater Pollution Prevention Plan for Construction Sites

SITE INSPECTION AND MAINTENANCE FORM

City of Watertown

SITE: _____

_____

NAME OF INSPECTOR: _____ **DATE:** _____

_____

TYPE OF INSPECTION: ☐ **WEEKLY** ☐ **AFTER RAINFALL EVENT** ☐ **OTHER**

APPROXIMATE RAINFALL DEPTH:

GENERAL SITE CONDITIONS AND VEGETATION

Inspection:

Area of site:					
	_____	_____	_____	_____	_____
Date last disturbed:					
	_____	_____	_____	_____	_____
Date of next disturbance:					
	_____	_____	_____	_____	_____
Type of Temporary or Permanent Stabilization:					
	_____	_____	_____	_____	_____
Condition of Stabilization or Vegetation BMPs:					
	_____	_____	_____	_____	_____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____ Date Performed: _____

SOIL STOCKPILES

Type of Material Stockpiled: _____ _____ _____ _____ _____

Location on Site: _____ _____ _____ _____ _____

Type of Temporary or Permanent Stabilization: _____ _____ _____ _____ _____

Condition of Stabilization or Vegetation BMPs: _____ _____ _____ _____ _____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform: _____ Date Performed: _____

EROSION CONTROL BLANKET

Date of Inspection: _____

Inspection:

Location of erosion control blanket? _____

Is the barrier in place and effective? _____

Is there evidence of water running under blanket or displacement? _____

_____

Is there any observed erosion? _____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform: _____ Date Performed: _____

CONSTRUCTION ENTRANCES/EXITS

Date of Inspection: _____

Location on Site:

_____ _____ _____ _____

Condition of Entrance or Exit Pad or Wash Rack:

_____ _____ _____ _____

Is there evidence of material tracked off site?_____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____Date Performed: _____

FILTER STRIPS/GRASS BUFFERS

Date of Inspection: _____

Inspection:

Location of filter strip/grass buffer?_____

Is area eroded?_____

Has sediment built up?_____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____ Date Performed: _____

WATTLE/FIBER ROLL

Date of Inspection: _____

Inspection:

Location of wattle/fiber roll?_____

Is area eroded?_____

Has sediment built up?_____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____ Date Performed: _____

SILT FENCE

Date of Inspection: _____

Inspection:

Location of silt fence?_____

Is the barrier in place and effective?_____

Is there evidence of washout or overtopping?_____

Is there evidence of undercutting or end-arounds?_____

Height of silt build up._____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____ Date Performed: _____

ROCK CHECK DAM

Date of Inspection: _____

Inspection:

Location of rock check dam?_____

Is the barrier in place and effective?_____

Is there evidence of erosion around or downstream of check dam?_____

_____

Has rock been dislodged?_____

Has sediment built up?_____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____ Date Performed: _____

SEDIMENT TRAP

Date of Inspection: _____

Inspection:

Location of sediment trap?_____

Is the barrier in place and effective?_____

Has rock been dislodged?_____

Height of sediment build-up, as percentage of permanent pool design depth?_____

_____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____ Date Performed: _____

SEDIMENT BASIN

Date of Inspection: _____

Inspection:

Location of sediment basin?_____

Is the barrier in place and effective?_____

Has rock been dislodged?_____

Height of sediment build-up, as percentage of permanent pool design depth?_____

_____

Maintenance to be performed: On or Before: _____

_____

_____

_____

_____

_____

Who to perform:_____ Date Performed: _____

ADDITIONAL COMMENTS

_____

_____

Signature:_____ Date: _____

Changes Required to the Soil Erosion and Sedimentation Control Plan

_____

_____

_____

_____

Reason for Changes:

_____

_____

_____

Chapter 13
Construction Plans

Chapter 13

Construction Plans

Chapter 13

Construction Plans

13.1 General

Detailed reproducible plans, prepared by or under the direct supervision with the signature, seal, and date of the licensed Professional Engineer in the State of South Dakota, shall be filed with the City Engineer for all work involved in public improvement contracts or private subdivisions resulting in public right-of-way dedication or construction of sanitary sewers, storm sewers, or drainage. Plans shall conform to the City of Watertown Engineering Design Standards and to the following requirements.

13.2 Concept Plan.

A concept plan shall be submitted to the City Engineer's Office to be distributed for review. The purpose of a concept plan is for the Ddeveloper to receive comments regarding general requirements, minimum standards of design and required improvements. This plan will aid the Ddeveloper in preparing a more readily accepted preliminary plan and prevent unnecessary costly revisions in the layout and development of the subdivision. ~~One hard copy of a concept plan shall be submitted, along with an electronic submittal.~~

The concept plan shall include all pertinent information as listed in Title 24, Subdivision of Land, of Revised Ordinances of the City of Watertown

13.3 Preliminary Plan.

A preliminary plan shall be submitted to the City Engineer's Office to be distributed for review. ~~One copy on 11"x17" paper and O~~one (1) electronic DWF or PDF file shall be submitted. Plan sheets shall be submitted at a maximum scale of 1-inch equal to 100-feet (1:100). The City Engineer shall review the preliminary plan and provide recommendations, along with recommendations from the Design Review Team, to the Plan Commission. Final approval shall be made by the Plan Commission within sixty (60) days following submittal. Copies of approved plans shall be submitted in accordance with Chapter 2 of the Engineering Design Standards.

The preliminary plan shall conform with the Engineering Design Standards and shall include all pertinent information as listed in Title 24, Subdivision of Land, of Revised Ordinances of the City of Watertown.

13.4 Construction Plan:

Construction plans shall be submitted ~~to the City Engineer's Office~~on the City permitting website to be distributed for review. ~~One copy on 11"x17" paper and O~~one (1) electronic ~~DWF or~~ PDF file shall be submitted. Plan sheets shall be submitted at a maximum scale of 1-inch equal to 40-feet (1:40). Final approval shall be made by the City Engineer within sixty (60) days following submittal. Copies of approved plans shall be submitted in accordance with Chapter 2 of the Engineering Design Standards.

Plans shall include all information from the preliminary plan as well as all pertinent information as listed in Title 24, Subdivision of Land, of Revised Ordinances of the City of Watertown.

13.5 Record Drawings:

The developer shall submit record drawings that illustrate the project as constructed in the field. Record drawings shall be submitted to the City Engineer's Office to be distributed for review. ~~One copy on 11"x17" paper, O~~one (1) electronic ~~DWF or~~ PDF file and one (1) electronic DWG file shall be submitted no later than 30 days after construction is substantially complete. On projects where city maintained utilities are to be installed, utility drawings shall be submitted within 30 days of their installation. Once construction is complete, all drawings shall be combined into a final set of record drawings and submitted as described above for approval.

Copies of approved plans shall be submitted in accordance with Chapter 2 of the Engineering Design Standards. Record drawings shall include all information from the construction plan as well as the following information:

Streets:

1. Significant modifications to the street layout or paving plan.

2. Modifications to typical sections. Note locations where geotextile fabric was installed.

Sanitary Sewer:

1. Spatially correct, as-built locations of constructed gravity sewers, force mains, manholes, lift stations, services and other sanitary sewer appurtenances.

2. As-built elevations for manhole rims and inverts.

3. Distance labels for all services from the downstream manhole to the connection point at the main line.

4. Dimension distances between mainline fittings and service fittings.

Drainage:

1. Spatially correct, as-built locations of constructed open channels, bridges, culverts, storm sewers, ponding structures and other storm sewer appurtenances.

2. As-built elevations for manhole rims and inverts, flared end sections, ponding structures, and overtopping elevations at critical locations.

Chapter 14

Acceptance Procedures and Requirements for Private Construction of Public Improvements

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Acceptance Procedures and Requirements for Private Construction of Public Improvements

14.1 Utility Acceptance **Prior to** Paving

It is recommended that sanitary sewer and storm sewer be televised and accepted by the City prior to the first lift as normal sequencing of construction.

Prior to paving the top lift, all sanitary sewer and storm sewer **must** be televised and accepted by the City. Any corrections needed for either sewer system will be made prior to paving as to not disturb the top lift. Any disturbance to the paving section for any reason will be the Developer's responsibility to repair.

14.21 Maintenance of Streets Under Development

For streets under construction, the City of Watertown will provide minimum maintenance and snow removal on gravel and asphalt streets to provide minimum vehicular passage and provide minimum street sweeping on asphalt streets. If there is any damage to manholes, valves, curb and gutter, valley gutters, or other appurtenances, repairs shall be done at the Ddeveloper's expense. Gravel streets will be allowed through one winter season only.

14.32 Completion of Final Lift on Street

No sooner than one year after the first lift has been applied or at any time when requested by the City of Watertown, the Ddeveloper shall place the final lift of asphalt on the street. Prior to this action, the Ddeveloper will notify the City and state its intentions. The City Engineer will inspect the improvements and make an inspection report to the Ddeveloper as to the necessary work needed for the project to meet City specifications. This inspection report will encompass all aspects of the water, sewer, storm sewer, curb and gutter, valley or any other part of the construction as provided for in the preliminary plan as approved. Adjustments or repairs will be the responsibility of the Ddeveloper and shall be made prior to the placement of the final lift.

14.43 Final Acceptance of Improvements

After the ddDeveloper deems that all the street and utility improvements have been completed and has placed the final lift of asphalt, the Ddeveloper will notify the City in writing that the street is completed. The City Engineer will then inspect all the improvements and inform the developer of any deficiencies. And those deficiencies shall be remedied by the Ddeveloper at t

he Ddeveloper's expense. Upon the recommendation of the City Engineer, the City will then issue a Certificate of Completion noting any deficiencies and setting a date as to when the one year warranty will end.

The Ddeveloper shall provide to the City As-Built drawings in DWGAutoCad and PDF format, as-built costs, test reports, and approved shop drawings for the project.

14.54 Developer's Warranty Responsibilities

The Ddeveloper shall warranty the water, sewer, storm sewer, curb and gutter, valley or any other part of the construction specified in the preliminary plan for a period of one year from the date as stated in the Certificate of Completion.

Prior to the end of the one-year warranty period the City Engineer will inspect the improvements and report his findings to the City Council. The City Council shall by resolution confirm or reject the Acceptance Certificate. If confirmed, the Ddeveloper's responsibility for the improvements ends, and the improvements become the responsibility of the City. If any portion is rejected, the Ddeveloper will repair or replace the rejected portion and a one-year warranty period will begin again on the rejected portion and the Ddeveloper shall again comply with the provisions as stated in this ordinance.

Chapter 15
Inspection and Testing

Chapter 15

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Inspection and Testing

15.1 General

In order to insure satisfactory completion and conformance with city standards, the City shall conduct inspections and require testing during construction. It is the responsibility of the contractor to abide by the proposed testing and inspection schedules set forth in this section and to notify the city when work is ready for inspection. In the event that the proposed schedules are not met, construction on the project shall cease until the items that are out of compliance are resolved.

All projects shall be constructed and tested in accordance with the City's Standard Specifications for Construction and the Engineering Design Standards.

15.2 Submittals:

The contractor shall submit shop drawings of all materials to be constructed to the City Engineer for approval. ~~Four (4)~~One (1) complete set~~s~~ of original drawings~~, plus~~ any number the Contractor wishes to maintain, and an electronic copy shall be submitted. One complete set of shop drawings and an electric copy shall include all submittals for the project. Each set shall be bound into a single document with a cover page attached listing the following information.

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1. Project Name
2. Submittal Date
3. Contact information for the Contractor

15.3 Testing Schedule:

The following tests shall be scheduled by the contractor and performed by a certified testing agency. All results shall be forwarded to the City Engineer. Tests shall be performed as detailed in the current version of the SDDOT Materials Manual or current ASTM Standards.

1. Asphalt Paving – Density tests shall be performed at the frequency of 1 per 900 lane feet per lift. Density tests shall be performed using the cut out (core) or nuclear gauge method. The nuclear gage method shall only be used for acceptance testing if it is

calibrated with cores as detailed in the Materials Manual. A standard density (Rice) test shall be performed once per project and when there is a change in the mix. Testing may be waived by the engineer when the total project quantity for asphalt is less than 500 tons.

2. PCC Concrete Streets – An air content test shall be performed on the first truck before pouring is begun. An air test, slump test, and at least four concrete cylinders (1 for an early break, 2 for 28 day breaks, and one backup) shall be made for every 150 cubic yards of pouring.

3. Sidewalks, Curb & Gutter, Concrete Fillets, Valley Gutters, Inlets, and other Miscellaneous Concrete – An air test, slump test and a strength test shall be performed for every 100 cubic yards of pouring. Additional strength tests should be run when needed to determine when concrete is ready to carry traffic.

4. Structural Concrete – Air tests, slump tests, and strength tests shall be run at the frequency specified by the current version of the SDDOT Materials Manual in the Minimum Sampling and Testing Requirements section.

5. Subgrade – Soil density and moisture content tests shall be performed on all pavement subgrade and roadway fills a minimum of one (1) per city block or every 600 feet, whichever is less, per four (4) feet of depth. A minimum of one (1) standard density and optimum moisture determination shall be made for the project and one (1) additional test for each change in the soil type.

6. Utility Trenches – Density tests on trench backfill shall be performed in accordance with the City's Standard Specifications for Construction. In general, a minimum of one density test and moisture content shall be made for every 500 lineal feet of trench per four (4) feet of depth. A minimum of one (1) standard density and optimum moisture determination shall be made for the project and one (1) additional test for each change in the backfill.

7. Base Course, Select Granular Backfill, Aggregates, and other Granular Materials – A minimum of one (1) gradation shall be run per project per type of material. Density tests shall be run on base course for roadways a minimum of one (1) per city block or every 600 feet, whichever is less. Testing may be waived by the engineer when the total project quantity for each type of material is less than 500 tons.

The engineer may at any time order additional testing above and beyond the minimum required. The contractor and supplier are encouraged to perform testing as needed to monitor their own quality control. This testing, however, will not be used in determining acceptance of the installed material. When testing will be destructive to the final product, such as coring asphalt pavement, approval must be obtained from the engineer prior to testing.

15.4 Inspection Schedule:

Listed below is a summary of inspections that shall require written documentation of approval from the City Engineer. The Contractor shall schedule all inspections with the City Engineer.

15.4.1 Streets:

1. Subgrade Stability: The contractor shall schedule an inspection with the City Engineer to inspect the subgrade stability. The inspection shall be completed once the subgrade has been compacted into place and prior to placing the base course. The contractor will be required to proof roll the subgrade with equipment approved by the Eengineer. Unstable areas shall be repaired by the contractor.

2. Base Course Stability: The contractor shall schedule an inspection with the City Engineer to inspect the base course stability. The inspection shall be completed once the base course has been compacted into place and prior to placing surfacing. The contractor will be required to proof roll the base course with equipment approved by the Engineer. Unstable areas shall be repaired by the contractor.

3. Bottom Lift Asphalt Stability: The contractor shall schedule an inspection with the City Engineer to inspect the stability of the bottom lift of asphalt. The inspection shall be completed prior to placement of the second lift. The Engineer shall visually inspect the bottom lift for any failures or depressions. In areas of failure and excessive depression the existing asphalt shall be removed, the underlying grade stabilized and new asphalt patched back into place. In areas of moderate depression, a leveling course shall be installed prior to placement of the second lift.

15.4.2 Sanitary Sewer: Newly constructed sanitary sewer systems shall be tested as described in the City's Standard Specifications for Sanitary Sewer Construction.

1. Pipe Inspection

2. Pipe Leakage

3. Manhole Leakage

4. Pipe Deflection Test

5. Television Inspection

15.4.3 Drainage: Newly constructed storm sewer systems shall be tested as described in the City's Standard Specifications for Storm Sewer Construction.

1. Pipe Inspection

2. Pipe Deflection Test

3. Television Inspection

15.4.4 Final Inspection: The City Engineer shall conduct a final inspection once all improvements are complete. If all work appears substantially complete, an acceptance letter shall be forwarded to the contractor. If needed a punch list of items to be repaired or completed shall be attached to the acceptance letter.

15.4.5 Warranty Inspections: The City Engineer shall conduct inspections as necessary throughout the warranty process. If needed a punch list of items to be repaired shall be generated and forwarded to the contractor. At the end of the warranty period, the City Engineer shall forward a letter documenting the expiration of the warranty.

City Council

Agenda Item

Subject: Approval of Resolution No. 24-36, a Resolution Authorizing Signatures of Warrants and Attestation for the City of Watertown

Meeting: City Council - Dec 02 2024

From: Kristen Bobzien, Interim City Manager/Chief Financial Officer

BACKGROUND INFORMATION:

As the Chief Financial Officer has been appointed the role of Interim City Manager, alternative staff must be authorized to perform signatories of Warrants and Attestation during the interim period. This Resolution authorizes the Assistant City Manager to sign all warrants for the payment of money and authorizes the Licensing and Records Manager to perform the attestation function of the city clerk which were previously conducted by the Chief Financial Officer. Also during the interim period, any contracts requiring countersignature, other than attestation, shall be performed by the Interim City Manager and the Assistant City Manager.

FINANCIAL CONSIDERATIONS:

There are no financial considerations for this item.

STAFF RECOMMENDATION / SUGGESTED MOTION:

I move to approve Resolution No. 24-36, a Resolution Authorizing Signatures of Warrants and Attestation for the City of Watertown

ATTACHMENT(S):

Resolution 24-36.Countersignatures+Attestation (002)

RESOLUTION NO.: 24-36

RESOLUTION AUTHORIZING SIGNATORIES OF WARRANTS AND ATTESTATION FOR THE CITY OF WATERTOWN

WHEREAS the City Council for the City of Watertown, pursuant to Section 5.08 of the Home Rule Charter, shall provide the procedures for administering the City's annual budget;

WHEREAS South Dakota Codified Law 9-14-17 the city finance officer shall draw and countersign all warrants on the treasury in pursuance of orders or resolutions of the governing body.

WHEREAS Section 3.04.11 of the Home Rule Charter for the City of Watertown and South Dakota Codified Law 9-10-15 the City Manager signs all warrants for the payment of money, and the same shall be countersigned by the finance officer, but no warrant shall be issued until the claim therefor has been approved by the governing body, except as may be otherwise provided by ordinance or resolution;

WHEREAS the City Finance Officer also attests and countersigns all contracts made on the City's behalf and certificates of work authorized by any committee of the governing body or by any municipal officer.

WHEREAS, on November 25 the City appointed the Chief Finance Officer to also assume the role of Interim City Manager; and

WHEREAS, the City Council of the City of Watertown hereby acknowledges that the need exists to preserve the financial and contractual integrity of the City by continuing to provide a mechanism for dual signature, attestation, and countersigning;

NOW, THEREFORE, BE IT RESOLVED by the City of Watertown that the following authorizations are given:

A. The Interim City Manager and the Assistant City Manager shall both sign all warrants for the payment of money;

B. City Licensing and Records Manager, shall perform the attestation functions of the city clerk which were previously conducted by the finance officer;

C. Any contracts requiring countersignature, other than attestation, shall be performed by the Interim City Manager and the Assistant City Manager.

This shall be the standing authorizations on behalf of the City of Watertown until such date as a City Manager is appointed and upon his or her effective start date of employment or upon further amendment by resolution of the City Council.

Adopted this 2nd day of December, 2024

CITY OF WATERTOWN

_____
Ried Holien, Mayor

ATTEST:

_____
Jennifer Collins
Records and Licensing Manager

(SEAL)