

CITY OF MEQUON

STANDARD SPECIFICATIONS for LAND DEVELOPMENT

12th Edition
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ENGINEERING

11333 N. CEDARBURG ROAD MEQUON, WI 53092-1930 (262) 236-2934

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APPENDIX A

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Erosion and Stormwater Runoff Control Regulations

Wet Detention Basin D.N.R. Technical Standard 1001

Land Application of Anionic Polyacrylamide D.N.R. Technical Standard 1050

APPENDIX C

MMSD Rules and Regulations

Chapter 13 Surface Water and Storm Water

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Chapter 13 Surface Water and Storm Water Reviews

Storm Water Management Plan Submittal Checklist

APPENDIX G

Common Council of the City of Mequon Resolution 3695

CHAPTER 1

SURVEYING

1.0 GENERAL

1.0.1 Surveys shall conform to the provisions of Chapter 236 of the Wisconsin Statutes, AE-7 of the Wisconsin Administrative Code and all applicable ordinances of the City of Mequon.

1.1 HORIZONTAL AND VERTICAL CONTROL

1.1.1 Horizontal and vertical control shall be maintained throughout the entire project area from the staking of rough grading to final restoration.

1.1.2 Project horizontal and vertical control shall be based on the North American Datum of 1983, (2011 Adjustment) for horizontal and the North American Vertical Datum of 1988 for vertical. This specification is to be used for all grading, roadway and utility plans.

1.1.3 Second order precision shall be required for vertical control, and the following formula will be used in determining the second order of precision. $E = 0.035 \div \sqrt{M}$; where E = error and M = length of the line in miles.

1.1.4 Vertical control points shall be established at least every 800 feet and within 100 feet of proposed roadway. These control points will be established in accordance with Section 1.1.6, 1.1.7, 1.1.8 and 2.1.3 of these specifications.

1.1.5 When plans are submitted for approval to the City Engineer, the Project Engineer will also at this time submit a list of all permanent benchmarks, all temporary benchmarks, a description of their location and the basis or origin of the vertical control network and the error of closure for the entire network. This section must be complied with before the City of Mequon will schedule inspections.

1.1.6 All benchmarks shall be run in from one of the following listed in priority order.

- A. A U. S. Coastal and Geodetic survey monument.
- B. A U. S. Public land survey monument and its accompanying reference benchmark.
- C. A National Geodetic Survey monument.
- D. A City of Mequon GPS monument.

1.1.7 Permanent benchmarks shall be set only on the following objects:

- A. Concrete door stoops.
- B. Concrete headwalls.
- C. Existing permanent manhole rim (note: manhole must not be located in the general construction area, nor is it to be affected in any way by the project construction).

- D. Fire hydrants on marked flange bolt.
- 1.1.8 Temporary benchmarks may be set in the following objects.
- A. Trees 12 inches in diameter or greater - method of attachment indicating the temporary benchmark shall not damage the tree.
 - B. PK nails in pavement.
 - C. Iron pipe or rebar in soft surface/grass etc.
- 1.1.9 The error in latitude and departure closure for traverses shall be no greater than the ratio of one in 10,000 (1:10,000).

1.2 CONSTRUCTION STAKING

- 1.2.1 Roadways shall be staked for subgrade and for gravel grade.
- A. Staking and construction may be completed utilizing Global Positioning System (G.P.S.) Machine Controlled) equipment thereby eliminating the requirements of 1.2.1B below. If staking and construction is to be done using GPS, stationing shall still be staked in 50-foot increments. All laths set to locate the stationing shall also be clearly labeled with the finished centerline grade at each 50-foot station. Centerline and edge of shoulder or back of curb shall also be clearly located in the field to facilitate subgrade and gravel grade verification. City engineering personnel requested to perform the verification will not attempt to verify the grades if these locations are not clearly marked. Any time spent traveling to jobsite and determining that these locations are not marked properly will be billed to the developer.
 - B. Subgrade stakes shall be set to the subgrade elevation (blue tops). Gravel grade stakes shall be set to finished gravel grade elevation (red tops). Blue tops at edge of pavement. Red top edge of shoulder.
 - C. Subgrade and gravel grade staking shall meet the following conditions:
 1. Stakes shall be set along the centerline of the roadway and along the edge of shoulder when a rural cross-section is used. When a curb section is to be used, stakes shall be set along the centerline of the roadway and along a line running along the back of curb at an offset (subgrade). Subgrade at edge of shoulder gravel.
 2. Stakes shall be set at 50 feet and 100-foot stations.
 3. Stakes shall be set for vertical curves at a maximum of 50-foot intervals.
 4. Stakes shall be set for horizontal curves having a degree of curve greater than 30° at a maximum of 50-foot intervals.
 5. Stakes shall be set at points of curvature, points of tangency, and points on curve opposite the point of vertical intersection, for both horizontal and vertical curves.
 6. Stakes shall be set at the intersection point of roadways.
 7. Stakes shall be set at edge of pavement radius points by intersections.
 8. Lath shall be set next to all roadway stakes and shall have the station labeled with indelible magic marker.
 9. Stakes set for gravel grade shall be a minimum of 12 inches long.

- 1.2.2 Staking for sanitary sewer/watermain shall be centerline type or on an offset as requested by the contractor and approved by the City Engineer.
- 1.2.3 Staking for sanitary sewer/watermain mainline shall be done every 50 feet.
- 1.2.4 Manholes shall have stakes at the following locations:
 - A. Centerline of manhole.
 - B. Offset (determined by contractor and approved by the City Engineer - minimum 10.0 feet.
 - C. Straddle point, minimum 10.0 feet.
- 1.2.5 Laser points shall be set by the Project Surveyor. Laser points shall be set in an area that will not be disturbed by the project construction, and still be convenient to the contractor.
- 1.2.6 Catch basins, and hydrants shall have an offset stake (minimum offset five (5.0) feet).

1.3 MONUMENTS

- 1.3.1 Lot corner monuments (i.e., iron pipe, rebar) shall be pounded flush with existing ground, thus conforming with Wisconsin Statute 236.15 (1).
- 1.3.2 If a rebar is used to monument a lot corner it shall include a plastic or aluminum survey cap on top which bears the project surveyor's state registration number.
- 1.3.3 The Southeast Wisconsin Planning Commission (SEWRPC) shall be notified of any USPLSS corners that will be disturbed by construction within 30 days of the start of construction. Replacement monuments will then be installed by SEWRPC. This will be done at the Developer's expense.

CHAPTER 2

CONSTRUCTION PLAN REQUIREMENTS

2.0 GENERAL

2.0.1 Engineering Division approval of the construction plans is required.

- A. Engineering Division approval may also be conditioned upon regulatory permitting for erosion control, storm water and utility extension.
- B. Engineering Division approval may also require City Attorney review and approval of legal documents including easement declarations, development agreements and maintenance agreements.

2.1 PLAN FORMAT

2.1.1 Plans submitted for approval shall be on "D" size paper. The only exception is the master grading/drainage plan. The master grading/drainage plan shall not exceed a size of 30" x 36" and shall show the entire development, **including 200 feet into the surrounding area**. If additional sheets are required match lines shall be used. Plans shall be landscape orientation.

2.1.2 Plans shall be drawn to a recognized scale, i.e.: 1" = 40' or 1" = 50' horizontal and 1" = 4', 1" = 5' vertical, respectively.

2.1.3 Plans shall use coordinate system and datum defined in Section 1.0.

2.1.4 Title blocks are required on each plan page and shall include:

- A. "Drawn By"
- B. "Designed By"
- C. "Checked By"
- D. "Date"
- E. "Scale"
- F. "Revised"
- G. "Project Name"
- H. "Location of Project"
- I. "Type of Plan"

2.1.5 All plan sheets shall be signed and stamped by a registered P.E. in the State of Wisconsin. The design engineer shall bear the responsibility for the coordination of submitting all development plans for review.

2.1.6 A cover sheet is required for the plan set. The cover sheet shall include a drawing of the project area that shows the locations of the proposed improvements. Plan sheets shall be indexed.

- 2.1.7 Each cover sheet shall show the locations, elevations, and descriptions of the project benchmarks as established by the project surveyor.
- 2.1.8 Each plan sheet shall show a north arrow.
- 2.1.9 Plans shall be completed utilizing a program compatible with AutoCAD LT 2015 in DWG format.
- 2.1.10 Plans shall include a line type and symbol legend.
- 2.1.11 All changes in each sheet that are pertinent to each revision shall be enclosed in revision “clouds”.
 - A. The number of the revision shall be placed inside of a triangle, commonly known as a “delta”. Each revision delta shall be placed adjacent to the corresponding revision cloud(s) and included in the revision block of the revised sheet.
 - B. It is acceptable to have multiple clouds with the same revision delta on a sheet if all changes apply to that revision. It is acceptable to cloud an entire plan view area with a single revision cloud and delta, when a significant portion within the cloud has been revised or when clouding each revised item becomes impractical.
 - C. If an entire sheet is added to a plan set as a part of a revision, the sheet title and sheet number shall be clouded along with a delta.
 - D. Upon notification of Engineering Division approval of the plans, all clouds and deltas shall be removed, and a final “clean” version of the plan set submitted to be stamped approved.

2.2 SUBMITTAL REQUIREMENTS

- 2.2.1 One (1) full size (24"x36" or 22"x34") sets and one (1) reduced or ½-size (11"x17") set of all preliminary plans and one (1) PDF copy shall be submitted for initial review and corrections. Plans requiring state approval, along with support documents, shall be processed through the City. After City review and approval, watermain and well plans shall be processed through the DNR by the project engineer, sanitary sewer plans shall be processed through MMSD and DNR by the City and the storm water management plan shall be processed through MMSD by the City. Necessary reports, (i.e. hydrology, drainage system, etc.) shall be submitted with the plans to facilitate final construction plan approval.
- 2.2.2 Four (4) full size (24"x36" or 22"x34") sets and one (1) PDF of approved construction plans which meet all the requirements shall be submitted to the City and the appointed engineering firm at least three (3) working days prior to the preconstruction meeting. Failure to submit plans, including any other subsequent revised plan submittals, within the required time frame will result in the cancellation of the preconstruction meeting. These construction plans shall contain the following:
 - A. Sanitary Sewer System Plans
 - B. Water Distribution Plans
 - C. Storm Sewer/Sump Pump Collection System Plans
 - D. Roadway Plans

- E. Master Grading/Drainage Plans
- F. Stormwater Management Plan
- G. Erosion Control Plan
- H. Signage and Pavement Marking Plans
- I. Landscape Plan
- J. Street Tree Plan
- K. Detail Sheet

2.2.3 Three (3) bound, letter size (8.5"x11") sets and one (1) PDF of approved plans which meet all the requirements shall be submitted to the City and the appointed engineering firm for the following:

- A. Stormwater Management Plan Report
- B. Green Infrastructure Plan

Half-size or full-size exhibits shall be included in the approved plan submittal. Files submitted electronically shall adhere to MMSD naming convention of 2-letter municipality code(ME)_(date in mmddyyyy format)_(Projectname)_GI_Plan, e.g. *ME_12082022_DoeHome_SWMP*.

2.2.4 A minimum of three (3) working days shall be required for approval of any revisions or changes to previously approved plans. The approval shall be in writing from the City Engineer. No construction related to these proposed revisions or changes shall proceed prior to the approval of such revisions.

2.2.5 Preliminary proposed and existing grading plans (with plan view of preliminary sanitary sewer) shall be reviewed prior to all other preliminary construction plans being submitted. Complete detail on detention/retention objectives should be shown.

2.2.6 Failure to provide any of the above required information in the format requested WILL result in the immediate disapproval and return of the plans. This may result in removal of the item from any upcoming committee or commission agenda.

2.3 PUBLIC AND PRIVATE SANITARY SEWER SYSTEM PLANS

2.3.1 Each sanitary sewer plan and profile sheet shall show the following:

- A. Plan View
 1. Right-of-way and its width.
 2. Edge of pavement or face and back of curb and sidewalk where applicable.
 3. All easement limits and widths.
 4. Proposed or existing watermain, laterals and hydrants (existing-dashed, proposed-solid).
 5. Proposed and existing sanitary sewer, manholes and laterals.
 6. Dimensions showing offset from right-of-way to the sewer line and separation between the sanitary sewer and other utilities.
 7. Distance between manholes and between each sanitary sewer lateral.
 8. Length of each sanitary sewer lateral and length of any lateral risers.

9. Size of proposed sanitary sewer.
10. Lot lines, lot and block numbers and frontages.
11. Name of each roadway and any intersecting roadways in which the sanitary sewer will be located.
12. An estimate of all material quantities to be used in the construction of the sanitary sewer.
13. A note warning that underground utilities should be staked out by “Diggers Hotline”.
14. A north arrow.
15. A signed stamp of the design engineer.
16. A title block conforming to Section 2.1.4.
17. All culvert locations (proposed and existing).
18. Numbered manholes.
19. Material and size of any existing sewer.
20. Proposed or existing storm sewer and appurtenances (existing-dashed, proposed-solid).
21. All improvements are stationered.
22. All obstructions/appurtenances located within the project limits including but not limited to trees, signs, utilities, fences, light poles, structures, etc.

B. Profile View

1. Existing and proposed surface profiles over the sanitary sewer.
2. The proposed size and diameter of sanitary sewer manholes (inches) for existing and proposed.
3. Manhole numbers, rim and invert elevations.
4. Slope and size of sanitary sewer between each manhole.
5. The proposed watermain and its size (dashed).
6. Culverts and their inverts and sizes (proposed and existing).
7. Limits of granular, spoil, and/or slurry backfill.
8. Distance between manholes.
9. Material and size of any existing sewer to be tied into.
10. Material choices of new sanitary sewer.
11. Stationing.

2.4 WATER DISTRIBUTION PLANS

2.4.1 This design standard covers acceptable designs for watermain construction. Local, State, and Federal regulations supersede the requirements of this standard. Design parameters not included in this standard or that deviate from this standard must be approved by the City of Mequon Water Utility Planning Engineer (Engineer) prior to final submission. An “owner letter” will only be provided after Water Utility Planning Engineer has approved the watermain drawings. The owner letter is required before the WDNR will accept the submittal of watermain plans for their approval.

2.4.2 Design Plan Requirements

- A. Plan and profile drawings are required for all watermain designs.
- B. Watermain plan and profile drawings shall be 20, 40, or 50 scale.

- C. Each watermain design shall be tied to an alignment that is the center of right-of-way, center of easement, or property line.
- D. Plan and profile sheet shall show the designed offset from the alignment to the watermain at every 50-foot station and pipe deflection.

2.4.3 Watermain Location and Requirements

- A. Watermain in public right-of-way
 1. Watermain shall be located a minimum of six (6) feet outside pavement edge.
 2. Watermain shall be located in the north and east half of the public right-of-way at least five (5) feet from the right-of-way if required separations from other utilities, waterways, wetlands, drain fields, and other conflicts can be met.
 3. The centerline of the watermain shall not be closer than 20 feet from a building foundation.
- B. Watermain outside of public right-of-way
 1. The watermain shall be located at the center of a 20-foot easement.
 2. The centerline of the watermain shall not be closer than 20 feet from a building foundation.
- C. High points in a watermain must be located at hydrants or have an air release assembly installed.
- D. Watermain shall be located no closer than three (3) feet from gas, electric, communications, etc. utility lines.

2.4.4 Each watermain plan and profile sheet shall show the same information as the sanitary sewer plan and profile sheet and include the following:

- A. Plan View
 1. Dimensions showing separation between the watermain and sanitary sewer and other utilities.
 2. Size and material of proposed watermain.
 3. An estimate of all material quantities to be used in the construction of the watermain totaled on the last page.
- B. Profile View
 1. Existing and proposed surface profiles over the proposed watermain.
 2. Material, slope, diameter, and length of waterman between grade breaks, and fittings.
 3. The sanitary sewer and its size (dashed).
 4. Culverts and their inverts and sizes (proposed and existing).
 5. Limits of granular, spoil, and/or slurry backfill.
 6. Stationing.

2.5 STORM SEWER PLANS

2.5.1 Each storm sewer plan and profile sheet shall show the following:

A. Plan View

1. Right-of-way and its width.
2. Edge of pavement or face and back of curb and sidewalk.
3. All easement limits and widths.
4. Proposed or existing sanitary sewer and laterals (existing-dashed, proposed-solid).
5. Proposed or existing watermain and laterals (existing-dashed, proposed-solid).
6. Proposed size and diameter of manholes, storm sewer, catch basins, and junction boxes.
7. Dimensions showing offset from right-of-way to the storm sewer.
8. Length and size of storm sewer between catch basins and junction boxes.
9. An estimate of all material quantities to be used in the construction of the storm sewer.
10. Lot lines, lot and block numbers and frontages.
11. Name of each roadway and any intersecting roadways in which the storm sewer will be located.
12. A note warning that underground utilities should be staked out by “Diggers Hotline”.
13. A north arrow.
14. A title block conforming to Section 2.1.4.
15. Material and size of any existing storm sewer to be tied into.
16. Details of outfall or ditch inlet protection requirements such as rip-rap, end sections or headwalls as needed.
17. Location of sump pump collection system and construction elevations and details.
18. Pump house drain system.
19. Stationing.
20. All obstructions/appurtenances located within the project limits, including, but not limited to: trees, signs, utilities, fences, light poles, structures, etc.

B. Profile view

1. Existing and proposed surface profiles over the storm sewer.
2. The proposed size and diameter of manholes, storm sewer, catch basins, and junction boxes.
3. Distances, slope and size of storm sewer between catch basins and junction boxes.
4. Rim and invert elevations at catch basins and junction boxes.
5. Material and size of any existing storm sewer to be tied into.
6. Sanitary sewer (dashed).
7. Watermain (dashed).
8. Material choices of new storm sewer.
9. Stationing.

2.6 ROADWAY PLANS

2.6.1 Each roadway plan and profile sheet shall show the following:

A. General

1. A separate detail sheet shall be required for the roadway plans. This detail sheet shall show a typical roadway cross-section, a typical cul-de-sac cross-section, an “eyebrow” cross-section, and any sump pump drainage system details.
2. Specific cross-section(s) and details along with specifications must be shown if not supplied elsewhere in plan set.

B. Plan View

1. Right-of-way and its width.
2. Edge of pavement face and back of curb and sidewalk.
3. Stationing along the centerline of the roadway, including cul-de-sacs and “eyebrows”.
4. Width of pavement.
5. Lot lines, numbers and frontages.
6. Name of each roadway and any adjoining roadways.
7. All culvert locations and their sizes and invert elevations.
8. The limits of any areas which need special stabilization techniques.
9. Radii of all intersections (edge of pavement or back of curb).
10. An estimate of all material quantities to be used in the construction of the roadway.
11. A north arrow.
12. A title block conforming to Section 2.1.4.
13. Specific details of all existing roadways being connected to. Pavement, shoulders, ditches, curb alignment and grades shall be shown as needed to adequately make the transition.
14. All driveways within 100 feet of the proposed development.
15. All roadside ditch locations, flowline elevations at 100-foot intervals, and slope of the ditch including arrows showing the direction of flow.
16. All obstructions/appurtenances located within the project limits including but not limited to: trees, signs, utilities, fences, light poles, structures, etc.
17. Roadway signage location, signage type, and dimensions.
18. Sign pole installation materials and details.
19. Pavement marking color, material, orientation, location, and size.
20. Flange line elevations at even 50-foot station intervals for urban section roadways.
21. For cul-de-sacs, provide spot elevations to demonstrate the transition between the crown of the main road and superelevation of the cul-de-sac.
22. Slope Intercepts.

C. Profile View

1. Existing and proposed roadway profiles along centerline of roadway, cul-de-sacs, and “eyebrows”.

2. Stationing and final centerline grades at all 50-foot and 100-foot stations and at all grade breaks.
 3. Stationing and final centerline grades at all PC's, PT's PVI's, and POC's at PVI's for vertical and horizontal curves.
 4. All culverts with their sizes and inverts shown.
 5. Slope of the roadway between each grade break.
 6. Limits of any areas which need special stabilization techniques.
- D. Cross Sections
1. Cross sections shall be provided for all new roads and for improvements to existing roads.
 2. Cross section sheets shall follow all other plan sheets and shall be arranged in same general order as road plan sheets.
 3. Cross sections shall read up the sheet (lowest station at bottom). Two columns of sections may be placed on the same sheet provided sections do not overlap. Where two columns are used, lowest station at bottom of left column, highest station at top of right column.
 4. The following cross section information must be shown:
 - a. Sections shown at 50' stations, cross culverts, driveways, intersections, and quadrants of cul-de-sacs
 - b. Scale: 1" = 10' Horizontal and 1" = 5' Vertical, 1" background grid shown
 - c. Station indicated to the right of each section in bold
 - d. Right of way lines shown and labeled
 - e. Offset distances, left and right, noted at 10-foot intervals at bottom of each column only and extending 10 feet beyond right of way or 10 feet beyond limit of construction whichever is greater
 - f. Existing ground line shown in dashed line
 - g. Improvements shall be indicated with solid lines and clearly labeled
 - h. Final pavement elevation at the centerline of the street or roadway
 - i. Invert elevation of ditches and flowline elevation of the gutter
 - j. Slope intercepts shall be clearly labeled by station, elevation to the nearest 0.1foot, and offset distance (left or right) from the reference line
 - k. Any existing paving to be removed shown with cross hatching and labeled
 - l. Easements beyond right of way shown, labeled and dimensioned
 - m. Sidewalk (if required) shown

2.7 GRADING AND DRAINAGE PLANS

2.7.1 The Master Grading/Drainage Plan shall show the following:

- A. Subdivision boundary lines and all lot lines.
- B. Adjoining and inclusive roadways and their names.
- C. Contour lines at two- (2) foot intervals. These contour lines shall extend at least 200 feet into adjacent parcels, except when the adjacent topography is critical to the proposed development, then the contour lines shall extend 400 feet into adjacent parcels. The contours shall be adequate enough to assess the potential impact of the

proposed development on existing homes or businesses. Existing contour lines shall be dashed while proposed contour lines shall be solid.

- D. Limits of 100-year floodplain, wetlands and protective areas, and watercourses affected by the proposed development.
- E. Location and dimensions of stormwater drainage systems and natural drainage patterns on and immediately adjacent to the site for 200 feet.
- F. Locations and dimensions of existing utilities, structures, roads, highways, paving, lot lines and outlots.
- G. Existing culvert locations, invert elevations, and sizes within 200 feet of the proposed development.
- H. Existing and proposed culvert locations, invert elevations, sizes, and materials within the proposed development.
- I. Existing storm sewer locations, invert elevations, sizes, and materials within 200 feet of the proposed development.
- J. Existing or proposed storm sewer locations invert elevations, sizes, and materials within the proposed development.
- K. Existing and proposed sump pump discharge locations.
- L. Location of topsoil stockpile.
- M. A separate plan sheet showing erosion and sedimentation control measures and details.
- N. Typical building pad locations for each lot which incorporate setbacks and offsets and show finished yard grade elevations to the nearest tenth of a foot for each lot.
- O. A north arrow.
- P. A title block conforming to Section 2.1.4.
- Q. Proposed elevations at all property corners.
- R. Show all high points and low points with an elevation.
- S. Notes required to properly sequence the construction activities (i.e. erosion and grading which must be done ahead of other operations on site to manage storm water runoff).
- T. Specific details on all retention/detention basins, ponds, overflows, etc.
- U. Obstructions within the project limits including but not limited to: trees, landscaping, fences, structures, light poles, etc.
- V. Assumed added impervious surface per lot if part of a Storm Water Management Plan.

2.7.2 Driveway Culverts

- A. The Master Grading/Drainage Plan shall include a table or map identifying the driveway culvert size.
- B. If the specific driveway location is known, the inverts of the driveway culverts must be provided.

- C. If the specific driveway location is unknown, spot elevations shall be provided for the centerline of the ditch at each lot line.

2.7.3 Building Elevations

- A. The Master Grading/Drainage Plan shall indicate the proposed Top of Foundation and Finished Yard elevations.

2.8 EROSION CONTROL PLAN

As required by City of Mequon Code of Ordinances: Chapter 58 – Planning and Development Regulations, Article VIII. – Erosion and Stormwater Runoff Control

2.8.1 The erosion control plan shall show the following:

- A. Site boundaries and adjacent lands.
- B. A map showing existing topography of the proposed site and adjacent properties. Site contour interval may not exceed two (2) feet. Topographic contours shall be field surveyed.
- C. Vegetative cover and soil type.
- D. Limits of 100-year floodplain, and watercourses affected by the proposed development.
- E. Location and dimensions of stormwater drainage systems and natural drainage patterns on and immediately adjacent to the site for 200 feet.
- F. Locations and dimensions of existing; utilities, structures, roads, highways, paving, lot lines and outlots.
- G. Proposed conditions of the site shall include:
 - 1. Locations and dimensions of all proposed land disturbing activities, including finished topography.
 - 2. Location and dimensions of all temporary soil stockpiles.
 - 3. Location and dimensions of all construction site control measures necessary to meet the requirements of the City of Mequon erosion control ordinance. Construction details should be shown on the plan.
 - 4. Location, dimensions and description of all channels, pipes, structures, basins or reservoirs, or other conveyances proposed to carry runoff to the nearest adequate outlet, including applicable design assumptions and computations. The application, design discharge rate, in cubic feet per second, for each structure, pipe, channel, or conveyance. Design flow velocity for channels and outlets shall be indicated.
 - 5. Areas to be sodded or seeded and mulched or otherwise, stabilized with vegetation, describing type of final vegetative cover. Type and quality of mulch and method of anchoring shall be indicated, as well as seeding mixtures, rates, lime, and fertilizer application rate for temporary or permanent seeding.
 - 6. Schedule of anticipated starting and completion date of each land disturbing and land developing activity including the installation of construction site

- control measures needed to meet the requirements of the City of Mequon proposed erosion control ordinance.
7. Provisions for maintenance of the construction site control measures during construction.

2.9 STORMWATER MANAGEMENT PLAN

As required by City of Mequon Code of Ordinances: Chapter 58 – Planning and Development Regulations, Article VIII. – Erosion and Stormwater Runoff Control

- 2.9.1 Delineate drainage basins and specify acres of each basin. Basins shall be sub-divided as necessary to indicate direction of surface runoff to any on-site stormwater BMP's
- 2.9.2 Pre-settlement (new development) or existing conditions (redevelopment) and post development peak flows in cubic feet per second at each stormwater exit point.
- 2.9.3 Label basins by using letters and numbers, as necessary, cross reference in report.
- 2.9.4 Spillway/outfall structures, size, materials, and construction methods.
- 2.9.5 Flood routing for runoff greater than design capacity.
- 2.9.6 Flood stage elevation of 100-year, 24-hour storm event.
- 2.9.7 Accompanying the plan shall be a signed Engineering Report summarizing design assumptions, conclusions, calculations, and recommendations.
- 2.9.8 MMSD Chapter 13 Approval

A. Stormwater Management Plans shall contain the following:

1. Completed Chapter 13 Surface Water and Storm Water Reviews Storm Water Management Plan Submittal Checklist.
2. The final submittal shall include a Maintenance Plan and Responsible Party Designation, including:
 - i. Maintenance plan
 - ii. Identification of responsible party
 - iii. Funding source
 - iv. Signed letter

2.10 GREEN INFRASTRUCTURE PLAN

As required by City of Mequon Code of Ordinances: Chapter 58 – Planning and Development Regulations, Article VIII. – Erosion and Stormwater Runoff Control

- 2.10.1 Delineate drainage basins and specify area of each basin.
- 2.10.2 Label basins by using letters and numbers, as necessary, cross reference in report.

2.10.3 Spillway/outfall structures, size, materials, and construction methods.

2.10.4 Flood routing for runoff greater than design capacity.

2.11 SIGNAGE AND PAVEMENT MARKING PLAN

2.11.1 Each signage plan sheet shall show the following:

- A. Right-of-way and its width.
- B. Edge of pavement or face and back of curb and sidewalk where applicable.
- C. All easement limits and widths.
- D. Utility locations.
- E. Location of all existing and proposed roadway signs, pavement marking, and light poles.
- F. Size, type, and installation details of each sign.
- G. A north arrow.

2.12 LANDSCAPE PLAN

2.12.1 Refer to Appendix D.

2.13 STREET TREE PLAN

2.13.1 Refer to Appendix D.

2.14 PRELIMINARY PLAT

2.14.1 Two (2) copies of a preliminary plat shall be submitted with the other required preliminary plans for initial review.

2.14.2 Three (3) copies of an approved preliminary plat conforming to Section 236.11 (1)(a) of the Wisconsin Statutes shall be required at least three (3) days prior to the start of any construction. A digital file compatible with AutoCAD LT 2015 in DWG format shall also be submitted.

2.15 FINAL PLAT

2.15.1 The final plat will not be certified by the City until conditions of the development agreement are met.

2.15.2 One (1) full size 24" x 36" copy of the final plat on four (4) mil thick double matte mylar conforming to Section 236.25 (2)(c) and (d) of the Wisconsin Statutes shall be submitted to the City within 10 days of recording. Copies shall be a black line mylar. A digital file compatible with AutoCAD LT 2015 in DWG format shall also be submitted.

CHAPTER 3

ROADWAYS

3.0 GENERAL

- 3.0.1 Work performed shall conform to the latest editions of the Manual on Uniform Traffic Control Devices (MUTCD), “State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction”, hereinafter referred to as the “State Specifications” and the Standard Specifications for Land Development in the City of Mequon. Variations from the standards outlined below will be entertained on a case-by-case basis.
- 3.0.2 Work performed in areas affecting roadways must provide a safe and effective traffic control system during any and all times until construction of the improvements is complete, unless otherwise specified. Two lanes of traffic through the site must be maintained at all times unless otherwise approved in writing by the City.
- 3.0.3 All Contractors on City Contracts shall give notice of their intent to begin work on any street at least forty-eight (48) hours in advance. If it is necessary that a detour be used during the life of the project, then the City Engineer shall have at least seventy-two (72) hours notice. Saturdays, Sundays, and legal holidays shall not be included in the measuring of notice time. Further notice shall be given of any change in project scheduling following the original notification.

3.1 DESIGN

- 3.1.1 A geotechnical firm shall be retained by the Developer to test and evaluate existing conditions and subsurface soils in the area of the planned roadways to make recommendations for both the subgrade and the pavement structure required.
- 3.1.2 The Developer shall provide a pavement design prepared by a Wisconsin P.E. meeting both American Association of State Highway and Transportation Officials (AASHTO) and WisDOT design standards as well as complying with these specifications.
 - A. Pavement design shall be based both on the geotechnical report and the projected traffic loading for a 20-year design life.

3.2 ROAD GEOMETRY

- 3.2.1 Longitudinal grades of City owned roadways shall not exceed 10% on local roads and 6% on secondary and major streets. Longitudinal grades shall not be less than 0.5%.
- 3.2.2 Horizontal Curves. A minimum sight distance with clear visibility, measured along the centerline, shall be provided of at least 300 feet on major streets, 200 feet on secondary streets and 120 feet on all other streets.
- 3.2.3 Tangents. A tangent of at least 100 feet long shall be introduced between reverse curves on major and collector streets.

- 3.2.4 Vertical Curves. All crest vertical curves shall be designed in accordance with Exhibit 3-73 of AASHTO: A Policy on Geometric Design of Highways and Streets, latest version. All sag vertical curves shall be designed in accordance with Exhibit 3-75 of AASHTO: A Policy on Geometric Design of Highways and Streets, latest version.
- 3.2.5 Subdivision intersection radii shall be 25 feet to the back of curb for an urban section roadway and 30 feet to the pavement edge for rural section roadways.
- 3.2.6 For cul-de-sacs, provide spot elevations to demonstrate the transition between the crown of the main road and superelevation of the cul-de-sac.
- 3.2.7 Arterials, Collectors, and Intersections
- A. Any new construction of, extensions of, or connections to any arterial or connector streets and/or intersections shall be designed to appropriate AASHTO, WisDOT, Ozaukee County, and City of Mequon design standards.
 - B. The design of these improvements requires approval by the jurisdictional authority of the roadway the development is connecting to as well as the City of Mequon. Local residential street design falls under the standard cross-section design described below in Section 3.2.8.
- 3.2.8 Standard Cross-Sections
- A. Pavement width for standard residential streets shall be 22 feet. Conservation subdivision streets shall be 20 feet wide. See Appendix A, Fig. 1-3.
 - B. Roadside ditches for the standard residential streets without curb shall be located 23 feet from the road centerline and 64 feet from the center of any cul-de-sac. Roadside ditches for conservation subdivision streets shall be 21 feet from the road centerline and 63 feet from the center of any cul-de-sac. See Appendix A, Fig. 1-3
 - C. Roadway subgrade and pavement surface for all streets shall have a cross slope of 3% and a minimum 0.5% centerline profile gradient.
 - D. All new street entrances are subject to acceleration/deceleration lanes and bypass lane requirements per Figure 5 in Appendix A.
 - E. All new streets require an entrance island per Figure 4 in Appendix A.
- 3.2.9 Private Driveways and Roadways
- A. Private driveways can serve a maximum of four (4) lots and extend up to 500 feet in length.
 - B. Private roadways can serve a maximum of ten (10) lots and extend up to 1,000 feet in length.
 - C. A private roadway and shared private driveway shall have a minimum pavement width of 18 feet with two- (2) foot aggregate shoulders. A three- (3) foot clear zone, as defined by the State of Wisconsin, Department of Transportation's (WisDOT) Facility Development Manual (FDM), is required.
 - D. Private roadways shall follow City of Mequon public roadway standards for subgrade, base course and hot mix asphalt.

- E. Private roadways shall terminate with a cul-de-sac. The cul-de-sac shall have a radius of 52 feet. See Appendix A, Fig. 3.
- F. Private driveways and private roadways require shared access easement agreements to benefit all adjacent lots.
- G. All private driveways serving a single lot shall conform to City Ordinances.

3.2.10 Intersection Sight Distance (ISD), Vision Triangles, and Vision Corners

- A. Where new subdivision entrance roads intersect with existing city streets, county or state highways, or other existing roadways, vision corners consisting of the proper clear sight window for the intersection sight distance and the vision triangles meeting the requirements of the current WisDOT FDM.
- B. The clear sight window shall be designed based on the type of intersecting road and vehicles listed in FDM table 5.1 and intersection sight distances from FDM table 5.2.
- C. The dimensions of the vision triangles shall meet the design guidelines of FDM 11-10 Attachment 5.13.

3.3 **SUBGRADE**

3.3.1 Compaction

- A. The subgrade shall be rolled and compacted to meet a 95% modified proctor density.
- B. The City reserves the right to perform or have performed by an independent soils firm, nuclear density tests on areas of subgrade that appear suspect. If the tests prove compaction is acceptable, the City shall bear the cost of the soil testing. If the tests prove compaction was below acceptable standards, the area or areas in question shall be reworked and reinspected/retested. The developer shall then bear the cost of all testing performed.

3.3.2 Proof Roll

- A. Prior to the installation of stone, the subgrade shall pass a proof rolling with a fully loaded quad-axle dump truck acceptably loaded as approved by the City.
- B. Proof roll deflections up to one and one half (1½) inches deep may be corrected with the use of an appropriate geotextile fabric or geogrid between the subgrade and the base course. Deflections greater than 1½ inches shall result in a failed proof rolling and shall require other methods to resolve the problem.
- C. Deflections greater than one and one half (1½) inches will result in a failed proof roll.
 1. In the case of a failed proof roll, the geotechnical firm who performed the soils analysis shall be called upon to make recommendations as to the methods required to stabilize the subgrade.
 2. After stabilization, the failed areas will require a passing proof roll to be accepted.
 3. All costs associated with this work will be paid for by the Developer.

- D. Proof rolling shall be scheduled with the Engineering Division one day prior to accomplishment and shall not occur unless witnessed by a representative of the Engineering Division.
- E. The full thickness of roadway base course as detailed in the roadway typical section shall be placed upon the approved roadway subgrade within 24 hours of a proof roll. If any rain occurs within the 24-hour period after a passing proof roll, the roadway shall be proof rolled again at the engineer's discretion.

3.3.3 Grade Check

- A. The City requires an inspection and grade check of the subgrade before the stone base may be applied.
- B. The grade check is completed by the City of Mequon Engineering Division and will be billed to the Developer.
- C. Grade checking entails shooting grades along the proposed roadway centerline at 50-foot intervals, and along the proposed edge of pavement.
- D. A tolerance of ± 1 foot from the proposed subgrade elevations shall be allowed provided the minimum cross slope of subgrade is maintained.
- E. The project surveyor is responsible for the horizontal and vertical control for the entire project.
 1. If stakes are missing or the contractor feels that a wrong grade has been set on some of the subgrade stakes the contractor is to contact the project surveyor.
 2. The project surveyor is required to set subgrade stakes to the subgrade elevations for the contractor.
 3. These stakes are to be set along the centerline of road and along the edge of shoulder where there is no curb.
 4. If the street is to have curb, then stakes shall be set along the centerline of road and along a line running along the back of curb.
 5. If project surveying and construction is performed with GPS guided equipment negating the requirement of subgrade staking, finished centerline grades shall be clearly labeled on all stationing lath.
 6. Centerline and edge of shoulder or back of curb shall also be clearly located in the field to facilitate subgrade grade checks.
 7. City Engineering personnel requested to perform the grade check will not attempt to verify the grades if these locations are not clearly marked.
 8. Any time spent traveling to jobsite and determining that these locations are not marked properly will be billed to the Developer.
- F. The contractor responsible for the subgrade grading shall conform to the notification policy of the City of Mequon. (See Appendix E.)

3.3.4 Subgrade material shall be dry before the City will allow the gravel base to be applied.

3.4 BASE COURSE

3.4.1 Materials

- A. The base course for the roadway shall meet all the requirements in State Specifications, Section 305.
- B. Base material gradations and layer thicknesses are determined from the approved pavement design but shall have a minimum total required base thickness of 12 inches.
- C. A current sieve analysis for each grade, size or type of base material shall be submitted to the City prior to installation.
- D. Any nonconforming base material or base material arriving on site prior to the submittal of the sieve analysis shall be removed at the Developer's expense.
- E. The base material is to be installed and compacted in lifts as dictated by the approved pavement design.
- F. All closed-circuit television inspection of the sanitary sewer is to be completed before the top layer of aggregate base material is installed.

3.4.2 Compaction

- A. Base course material shall be compacted to 95% of the modified proctor.
- B. The City reserves the right to conduct compaction tests performed at random using a nuclear density meter to determine if compaction specifications have been achieved and if subsequent paving will be permitted.
 - 1. An independent firm selected by the Developer and approved by the City shall perform a modified proctor test on base course material taken from the job site. These test results shall be submitted to the City within 24 hours of sampling.
 - 2. All costs associated with the compaction testing shall be paid for by the developer.

3.4.3 Proof Roll

- A. Prior to HMA paving, the base course shall pass a proof rolling with a fully loaded quad-axle dump truck.
- B. If any areas show movement, deflection, or pumping, the proof roll will be considered to have failed, and paving will not be allowed.
- C. All costs associated with the work required to produce a passing base course proof roll will be paid for by the Developer.
- D. Proof rolling shall be scheduled with the Engineering Division one day prior to accomplishment and shall not occur unless witnessed by a representative of the Engineering Division.

3.4.4 Grade Check

- A. The City of Mequon requires inspection and grade check of the base course before the first layer of asphalt can be placed.
- B. This inspection and grade check is done by the City of Mequon Engineering Division and will be billed to the Developer. Provide the Engineering Division minimum of three (3) working day notice for grade checks.
- C. Grade checking entails shooting grades along the proposed roadway centerline, and along the edge of pavement. The tolerance for stone base elevations is ± 0.05 feet from the proposed elevations.
- D. The project surveyor is responsible for the horizontal and vertical control for the entire project.
 - 1. If stakes are missing or the contractor feels that a wrong grade has been set on some of the subgrade stakes the contractor is to contact the project surveyor.
 - 2. The project surveyor is required to set subgrade stakes to the subgrade elevations for the contractor.
 - 3. These stakes are to be set along the centerline of road and along the edge of shoulder where there is no curb.
 - 4. If the street is to have curb, then stakes shall be set along the centerline of road and along a line running along the back of curb.
 - 5. If project surveying and construction is performed with GPS guided equipment negating the requirement of subgrade staking, finished centerline grades shall be clearly labeled on all stationing lath.
 - 6. Centerline and edge of shoulder or back of curb shall also be clearly located in the field to facilitate stone base grade checks.
 - 7. City Engineering personnel requested to perform the grade check will not attempt to verify the grades if these locations are not clearly marked.
 - 8. Any time spent traveling to jobsite and determining that these locations are not marked properly will be billed to the Developer.

3.4.5 Shoulders

- A. The base course material shown in the approved pavement design shall extend out to the outside edge of the shoulder and extend from edge of shoulder toward ditch at no steeper than a 2:1 slope.
- B. After asphalt pavement is installed, the top layer of the shoulder shall be placed at a four percent (4%) slope away from the pavement with three quarter ($\frac{3}{4}$) inch dense graded base material for roads meeting the requirements of Section 305 of the State Specifications.
- C. Shoulder compaction shall conform to Section 305 of the State Specifications and shall have a smooth finish that is flush with the edge of pavement.

3.5 HOT MIX ASPHALT (HMA) PAVEMENT

3.5.1 General

- A. Work under this section shall, unless otherwise directed by the City Engineer or by these specifications, comply with Sections 450, 455, 460, and 465 of the “State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction”, hereinafter referred to as the “State Specifications”.

3.5.2 Notification

- A. The paving Contractor shall notify the City as per the notification policy of the City of Mequon prior to commencement of any HMA paving. (See Appendix E.)

3.5.3 Inspection

- A. The City requires an approved full-time City inspector located at the job site whenever any HMA pavement is being constructed.
- B. All costs associated with this inspection will be billed to the Developer.
- C. HMA pavement installed without city inspection will be rejected. Rejected pavement will require removal and replacement at the developer's expense, including cost of an additional grade check of the stone base prior to re-paving.

3.5.4 Upper and Lower Layers

- A. The total HMA pavement thicknesses shall be determined by the approved pavement design but shall have a minimum required total pavement thickness of four (4) inches.
- B. The City of Mequon requires a lower layer gradation of 19mm, and an upper layer gradation of 9.5mm. As such, the HMA paving layer thicknesses may have to be adjusted to meet both the approved pavement design total thickness and the minimum and/or maximum layer thicknesses allowed by State Specifications for each gradation being paved.

3.5.5 Centerline Joint

- A. Unless otherwise directed by the City Engineer, the contractor shall use a tapered and notched longitudinal centerline joint on the lower layer of paving. The joint shall conform to Procedure 14-10-10.9 of the State of Wisconsin, Department of Transportation's Facility Development Manual, or a City of Mequon approved equivalent.

3.5.6 Mixture Design

- A. A mixture design for each material being placed conforming to the requirements of State Specifications, Section 460, must be submitted to the City a minimum of three (3) working days prior to any paving being performed. If no mix design is submitted, paving will not be allowed.
- B. The mixture requirements for both the upper and lower layers shall meet the requirements for mixture type LT as shown in table 460-2 of the State Specifications, unless otherwise dictated by the approved pavement design or directed by the City Engineer.
- C. Asphaltic Binder shall be performance grade (PG) asphalt meeting the requirements of State Specifications, Section 455 and shall be grade PG 58-28, unless otherwise dictated by the approved pavement design or directed by the City Engineer.
- D. The gradation for the lower layer shall be nominal size 19.0 mm, and for the upper layer shall be nominal size 9.5 mm meeting the requirements found in the latest edition of State Specifications.

3.5.7 Compaction methods shall conform to State Specifications, Section 450. Compaction of all traffic lanes, paved shoulders, and paved bike lanes (upper and lower layers) shall meet minimum density requirements shown in table 460 of the State Specifications. Target maximum density shall be determined using the Maximum Density Method as described in State Specifications, Section 460.

A. The paving contractor shall provide, at the contractor’s expense, a nuclear density technician certified at level one (1) of the State of Wisconsin “Highway Technician Certification Program” to perform density testing. Density testing shall conform to the procedures of the State of Wisconsin, Department of Transportation’s “Construction and Materials Manual”. This testing shall be performed as soon as practical after compaction and before placement of subsequent layers. Density determinations shall be in accordance with State Specifications, Section 460.3.3.2, with the following exceptions:

1. A “lot” shall represent a maximum of 300 tons of a mixture placed within a single layer for each location. If any location/street is less than 300 tons, that street/location shall represent one lot.
2. The locations for the five (5) tests per lot shall be arbitrarily spaced throughout the length of the lot, and at varying offsets from the edge of pavement.
3. A penalty will be charged by the City of Mequon to the Developer for each 300-ton lot not meeting the target maximum density according to the following table:

PENALTY FOR DENSITIES BELOW MINIMUMS	
PERCENT LOT DENSITY BELOW SPECIFIED MINIMUM	PENALTIES (PER 300 TON LOT)
From 0.5 to 1.0 inclusive	2% CCP*
From 1.1 to 1.5 inclusive	5% CCP*
From 1.6 to 2.0 inclusive	9% CCP*
From 2.1 to 2.5 inclusive	15% CCP*
From 2.6 to 3.0 inclusive	30% CCP*

* - CCP (City Contract Price) – The CCP shall be determined from the previous year’s City of Mequon annual “Road Improvements” contract price per ton multiplied by 300 for each 300-ton lot of the upper or lower layer being paved. Four percent (4%) shall be added to this price for inflation.

If any of the individual tests for a particular lot is more than three percent (3%) below the minimum required density in State Specification Section 460, additional testing will be performed to determine the extent of the unacceptable material. The unacceptable area and tonnage will be determined by the City of Mequon in cooperation with the paving contractor’s nuclear density technician. The density of the remainder of that particular lot will be the average of the original passing tests for that lot.

Payment of the penalty or removal and replacement with acceptable pavement will be required before final plat will be recommended.

- 3.5.8 The City requires that any asphalt to be placed on a roadway in the City of Mequon arrive at the job site at a temperature within 20°F of the temperature recommended by the asphalt supplier. The inspector will periodically test the load temperature of the arriving trucks. Loads not falling within the guidelines for HMA temperatures will be rejected.

3.6 LATE SEASON HMA PAVING CRITERIA

3.6.1 HMA pavement upper layer installation shall not be permitted after October 15th.

3.6.2 HMA pavement lower layer installation shall not be permitted after November 15th.

- A. HMA pavement lower layer installed after November 1 shall require an escrow to be established equal to 125% of the total cost of the pavement installed. This escrow can be used to repair any pavement failures occurring before placement of the final HMA pavement upper layer which may have been caused by adverse conditions present during (late season) paving.
- B. Paving of HMA pavement lower layer shall not be permitted, regardless of date, unless air temperature is 32°F and rising at the start of paving operations and the stone base is not frozen. Paving of HMA pavement upper layer shall not be permitted, regardless of date, unless air temperature is 40°F or rising.

3.6.3 HMA paving shall not be permitted on wet or frozen gravel bases or in the rain.

3.7 ROADWAY DRAINAGE SYSTEM

3.7.1 Ditches

- A. Minimum flowline slope of one percent (1%).
- B. Located as per the standard residential cross-section of the City of Mequon. (See Figure 1, 2 and 3 in Appendix A)
- C. Minimum finished depth of 27 inches and a maximum finished depth of 39 inches, measured from the centerline. Any roadside ditches deeper than 39 inches shall include storm sewer.
- D. Restoration of ditches with a flowline gradient between 1% and 3% requires topsoil and seed restoration; between three percent (3%) and five percent (5%) requires sod/staked or stabilized.
- E. Side slopes of roadside ditches shall not be steeper than one (1) foot of rise to three (3) feet (3:1) of run.
- F. Any ditches along an existing roadway or existing drainageways within development shall be regraded to conform to the specifications found in this section.
- G. For subdivisions with an urban typical section a sump pump collection system in accordance with Figures 9 and 10 is required.

3.7.2 Crossroad culverts

- A. Minimum of 16 inches of cover as referenced from the centerline elevation of the finished road to the top of the pipe.

- B. Size designated in the approved grading and drainage plan excepting that in all cases the minimum culvert size shall be 15 inches in diameter.
 - C. Culvert endwalls, flared end sections or junction structures shall be required at all crossroad culverts or piped installations through or between home sites.
 - D. Riprap and Geotextile Fabric Type R or HR conforming to Section 645 of the State Specifications shall be required at outfalls where the flowline gradient exceeds five percent (5%) or 10 CFS.
- 3.7.3 All cul-de-sacs shall have a minimum 8-inch diameter storm sewer pipe with a 12-inch minimum catch basin installed to drain island to outside ditch or storm sewer system. (Location & materials determined by design engineer and approved by City of Mequon) See detail drawing Figure 3.

3.8 CONCRETE CURB AND GUTTER

- 3.8.1 Developments or subdivisions electing to use the standard residential cross-section with curb and gutter, shall use a mountable curb and gutter as detailed in Appendix A, Figure 6.
- 3.8.2 Cul-de-sacs or eyebrows shall have a landscaped island with curb and gutter as detailed in Figure 3, Appendix A. This is to prevent damage to and facilitate drainage to the outer edge of pavement.
- 3.8.3 Concrete curb construction shall conform to Section 601, 710 and 716 of the latest edition of The State of Wisconsin Standard Specifications for Highway and Structure Construction.
- 3.8.4 Concrete curb and gutter shall be allowed to cure a minimum of seven (7) days prior to backfilling and base course installation. After City acceptance, the contractor shall immediately backfill behind the curb to preclude any erosion or undermining.
- 3.8.5 The City requires three (3) test cylinders properly marked for every 1,000 linear feet to be taken during the course of the curb and gutter operations.
- A. The testing firm which has been hired by the developer, shall cast and pick up the cylinders at the project site, break the cylinders at the appropriate time as specified in the contract or in accordance with ASTM and submit a test report to the City.
 - B. If the cylinders break prior to the specified limit as specified in the contract or in accordance with ASTM, the corresponding section of curb and gutter shall be removed and replaced.
- 3.8.6 The City shall require an inspector for the placement of concrete curb and gutter. This shall include the inspection of the base under the curb and gutter, and a check of the alignment and grade of the curb and gutter.
- 3.8.7 New concrete curb and gutter shall be tied with two (2) #6 deformed 24-inch epoxy coated rebar to existing curb and gutter section.

3.9 CONCRETE SIDEWALK

- 3.9.1 Concrete sidewalk may be required in some circumstances and where required shall be constructed in accordance with Section 602, 710, and 716 of the State Specifications.

- 3.9.2 Concrete sidewalks shall be constructed five (5) feet wide and five (5) inches thick and to the line and grade shown on the plans unless otherwise directed by the City Engineer. Concrete sidewalks through driveways shall be seven (7) inches thick throughout the driveway opening. Ramps containing a detectable warning field shall be a minimum of seven (7) inches thick poured concrete.
- 3.9.3 One half inch (1/2") thick non-extruding expansion joint material extending the full depth of any adjacent concrete shall be installed as directed by the City Engineer. Expansion joints shall also be installed in a uniformly spaced manor with spacing not to exceed 75 feet. Expansion joint material shall also be installed at all locations where the sidewalk abuts a curb, building, utility structure, or any other structure.
- 3.9.4 All sidewalk shall be constructed in accordance with current Americans with Disabilities Act (ADA) requirements.
- 3.9.5 Detectable warning fields to be cast iron. Warning fields to be black powder coated in the Town Center District and yellow powder coated or natural in all other zoning districts.
- 3.9.6 All sidewalks shall be staked on a four (4) foot offset to the back of walk with hubs and cut/fill dimensions to the top/back of walk elevations.

3.10 HMA PAVEMENT BIKE & PEDESTRIAN PATH

- 3.10.1 HMA pavement bike and pedestrian paths shall conform to the Wisconsin Bicycle Facility Design Manual, current edition.
- 3.10.2 The subgrade for the full width of the path including the base shall be properly prepared in the same way as described for the roadway subgrade in Section 3.3. Any soft or spongy areas must be dug out and replaced with a suitable fill material.
- 3.10.3 The HMA pavement path shall be a minimum of three (3) inches thick and shall be type LT, 9.5 mm.
- 3.10.4 All bike and pedestrian paths shall be constructed in accordance with current Americans with Disabilities Act (ADA) requirements. The cross section shall be as detailed in Figure 12, Appendix A, or as approved by the City Engineer.

3.11 PAVEMENT REPAIR

- 3.11.1 Pavement repair for failed pavement, pavement damage and disturbance, or utility work in association with a Permit to Construct, Maintain or Repair Utilities within Highway Right-of-Way.
 - A. Installation Date
 - 1. April 15 – November 15: The resulting asphalt section shall be comprised of HMA conforming to Section 3.11.1H on three (3) inches of compacted Base Aggregate Dense three quarter (¾) inch on slurry backfill.
 - 2. November 16 – April 14: Pavement shall be replaced with eight (8) inches of high early strength concrete designed for cold weather conditions in

- accordance with WisDOT Standard Specifications Section 415.3.13. Concrete shall be placed on slurry backfill.
3. If a concrete patch is installed in accordance with Section 3.11.1A.2 after April 15 but no later than June 15, the concrete shall be removed and replaced with asphalt. An additional right-of-way permit is required for the replacement of the pavement patch.
- B. Pavement and curb and gutter shall be sawcut prior to removal. If more than half of the curb section between joints is impacted, the entire section between the joints shall be replaced. The areas of Pavement Repair shall be marked in the field for review and acceptance by the City. These areas shall be saw-cut prior to removing the pavement to provide a uniform joint to butt the new asphaltic concrete pavement repair material.
 - C. The Contractor shall remove and dispose of all the old asphalt pavement, and as much of the granular base as necessary, to provide for an asphalt patch with the same thickness as the surrounding asphalt pavement, or a minimum of four (4) inches, whichever is greater.
 - D. Pavement impacts within the travel lane warrants full-lane replacement to the road centerline. Pavement damage that crosses the centerline warrants full-width replacement of the roadway pavement.
 - E. Compaction – The Contractor shall compact the existing base material using ordinary compaction methods. After these patch areas have been prepared and inspected by the City, the Contractor shall clean and apply a tack coat to the vertical faces of the existing pavement. The patch areas shall be paved and compacted according to State Specifications, Section 450. The finished patches shall be co-planer with the existing pavement.
 - F. Where the impact to the pavement may consume multiple locations in close proximity (10 feet or less separation), the patch repair will encompass the impacted areas and the pavement between them.
 - G. Expansion, repairs, and replacement of existing private water utility infrastructure are subject to the bedding, cover and backfill requirements as outlined in Section 5.3 of the Standard Specifications for Land Development.
 - H. Materials
 1. The Asphaltic Concrete Pavement used for Pavement Repair shall conform to the requirement of State Specifications, Section 450, 455, and 460.
 2. The type and grade of asphalt used shall be based on traffic volume as listed below:
 - i. MT – Truck route or average daily traffic (ADT) of 3500 or more vehicles per day and main collector road or arterial road with an ADT of less than 3500.
 - ii. LT – Local residential streets.

- I. Grade – The aggregate gradation of the asphalt mixture shall be based on the layer and thickness being paved as listed below:
 - 1. 19mm – Lower layers between two and one quarter (2.25) inches and four (4.0) inches thick.
 - 2. 12.5mm – Lower layers between one and three quarters (1.75) inches and two and one quarter (2.25) inches thick or upper layers over two (2.0) inches thick.
 - 3. 9.5mm – Upper layers between one and one half (1.5) inches and two (2.0) inches thick.

- J. Tack Coat - The Tack Coat material shall meet the requirements of the State Specifications, Section 455.3.2.

- K. Construction
 - 1. After these patch areas have been prepared and inspected by the City, the Contractor shall clean and apply a tack coat to the vertical faces of the existing pavement.
 - 2. The patch areas shall be paved and compacted according to State Specifications, Section 450.
 - 3. The finished patches shall be co-planer with the existing pavement.

- L. Curb and gutter shall be replaced in kind with High Early eight (8) bag mix. Drill two (2) #6 deformed 24-inch epoxy coated rebar into existing curb and gutter section. See Figure 6.

- M. Inspection
 - 1. The City will require full time inspection of the pavement reparation.
 - 2. The City requires inspection of the marked area of repair prior to saw-cutting and requires full time inspection of the base compaction and asphalt paving.
 - 3. Provide the Engineering Division minimum of 24-hour notice for the inspection of the marked area, and minimum of three (3) working day notice for base compaction and paving inspection.

3.12 SIGNAGE AND PAVEMENT MARKING

- 3.12.1 All signs and posts shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), current edition.

- 3.12.2 Sign posts, foundations, and mountings shall be constructed to hold signs in a proper and permanent position.

- 3.12.3 Street signs shall be placed on a two and three eighths (2 3/8)-inch galvanized post with a no-spin anchor. All other signs shall be placed on a four by four (4x4)-inch post, unless otherwise directed by the City Engineer.

- 3.12.4 Signs shall be sized as indicated on the following table, or as approved by the City Engineer.

Sign Type	Designation	Size (width x height)
Stop	R1-1	30" x 30"
Yield	R1-2	30" x 30"
Speed Limit	R2-1	24" x 30"

Do Not Enter	R5-1	30" x 30"
No Right Turn	R3-1	24" x 24"
No Left Turn	R3-2	24" x 24"
No U Turn	R3-4	24" x 24"
End of Roadway Markers	OM4-1	18" x 18"
Street Sign	D3-1	9" or 6"

- 3.12.5 Street name signs shall be an upper-case letter followed by lower case letters or as directed by the City Engineer.
- A. Upper case letters shall be six (6) inches in height for nine (9)-inch signs and four (4)-inches in height for six (6)-inch signs, or as directed by the City Engineer.
 - B. Lower case letters shall be four and one-half (4.5) inches in height for nine (9)-inch signs and three (3) inches in height for six (6)-inch signs, or as directed by the City Engineer.
- 3.12.6 Street signs shall be high intensity prismatic, green in color with white lettering. Letters should be reflective vinyl stick on style.
- 3.12.7 Street signs shall include the directional designation. The developer is responsible for coordinating the directional designation with the Engineering Division.
- 3.12.8 Shop drawings of all street signs are required.
- 3.12.9 Pavement markings for crosswalks and stop bar spacing shall conform to WisDOT Facilities Development Manual (FDM).

CHAPTER 4

SANITARY SEWER

4.0 GENERAL

- 4.0.1 Work performed and materials supplied shall conform to the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin (Standard Specifications) and the City of Mequon's Standard Specifications for Land Development. Any additional requirements of the Milwaukee Metropolitan Sewerage District (MMSD) and Wisconsin Department of Natural Resources (WDNR) shall also apply.
- 4.0.2 A full-time inspector shall be located at the job site during construction of the sanitary sewer and laterals. The contractor responsible for the construction of the sanitary sewers and laterals is also responsible for notifying the City per the notification policy of the City of Mequon. (See Appendix E)
- 4.0.3 All sanitary sewer plans are required to be reviewed by the City and then submitted to MMSD and WDNR for review and approval, as applicable. MMSD submittals require a conformance letter from the Southeastern Wisconsin Regional Planning Commission (SEWRPC).
- 4.0.4 Sanitary sewer calculations must be submitted, for each new segment including flow, velocity and depth, with proposed sanitary sewer plans including plan, profile and system plan.
- 4.0.5 All sewers must be sized adequately to accommodate future tributary areas as directed by the City Engineer.
- 4.0.6 Open cutting the roadway is not permitted for sanitary sewer or lateral installation unless otherwise approved by the City Engineer. See Section 3.0 for traffic control requirements.
- 4.0.7 Public mains located within private property must be placed within an easement.
 - A. The City's standard width for sanitary sewer easements is 20 feet for a single utility, plus 10 feet for each additional utility within the easement. Reasonable access shall be provided.
 - B. No structures or trees will be permitted to be placed in utility easements. Unless avoidable: shrubs and plantings will be permitted in easement but not within a five (5)-foot radius of appurtenances. A landscaping plan and written explanation of why landscaping must be placed within easements needs to be submitted and addressed in the easement declaration agreement. Vehicular access must be provided to appurtenances.
 - C. Manholes shall be delineated with a post, as required by the Sanitary Sewer Utility.
- 4.0.8 Lift Stations are to be avoided. Coordinate with Engineering Division for specific design requirements regarding sanitary lift stations

4.1 MATERIALS

- 4.1.1 Sanitary sewer pipe materials for mainline and laterals shall be limited to PVC, reinforced concrete, or HDPE.
- 4.1.2 All manholes shall be precast reinforced concrete and have a minimum inside diameter of 48 inches. Minimum wall thickness shall be per Table No. 1 in File No. 12 of the Standard Specifications. Precast concrete manhole base, barrel risers, cone section and adjusting rings shall meet the requirements of ASTM C-478. Manhole external seals shall be provided for each manhole and shall be manufactured by Infi-Shield or Adaptor, Inc. Manholes shall be constructed per drawing File No. 12 of the Standard Specifications and vacuum tested in accordance with Section 3.7.6 of the Standard Specifications.
- 4.1.3 Material used to backfill any portion of the sanitary sewer system in an existing roadway shall be aggregate slurry backfill conforming to Section 8.43.8 of the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin.)

4.2 MANHOLES

- 4.2.1 All existing manholes shall be denoted with the City of Mequon manhole numbers from the Engineering Division.
- 4.2.2 All manholes situated in cul-de-sacs shall be located within the roadway pavement.
- 4.2.3 Manhole steps shall not be located in chimney section.
- 4.2.4 Manhole rim elevations shall be set to one eighth (1/8) inch below finished asphalt surface elevation.
- 4.2.5 Manhole frames and covers supplied by the contractor shall be Neenah R-1661 with machine horizontal bearing surfaces. No pick holes or vent holes will be allowed in the cover.
- 4.2.6 Chimney
 - A. A maximum of two (2) feet and a minimum of two (2) inches of chimney section shall be allowed, as measured from the manhole rim to the precast section of the manhole.
 - B. Manhole chimneys shall be constructed using high-density polyethylene (HDPE) riser rings. These should be installed per manufacturer's specifications with a butyl rope sealant between each ring and between the top ring and the frame. Concrete riser rings may be substituted with the approval of the City Engineer. Concrete riser rings shall be installed using PenngROUT mortar or approved equivalent. The mortar shall be placed between the cone section and the first riser ring, between each riser ring, and between the last riser ring and the manhole frame. This material shall be applied in a layer of at least one quarter (1/4) inch thick.
- 4.2.7 Seals
 - A. All manhole barrel joints shall have Mac Wrap or approved equivalent installed according to manufacturer's specifications.

- B. All manholes shall be constructed with an Infi-shield or Adaptor Inc. external seal or approved equivalent extending from the frame to cone and shall be installed in the presence of a City inspector according to manufacturer's specifications.

4.2.8 Construction

- A. Manhole construction, complete with frame and cover, and backfilling shall be completed within three (3) working days after the sewer mainline is installed.
- B. Manholes shall be inspected after all paving operations are complete. Any manhole frame or chimney section that has moved from its original position or has been damaged shall be reconstructed.
- C. Manholes shall be vacuum tested in accordance with section 3.7.6 of the Standard Specifications for Sewer and Water Construction in Wisconsin, latest edition.

4.3 MAINLINE

- 4.3.1 The Engineering Division maintains record drawings for the public system. Please contact the Engineering Division for mainline and public lateral location information.
- 4.3.2 When starting a sewer project, the new incoming line into the existing manhole shall be plugged, or if constructing a new manhole over an existing line, the pipe shall not be broken out until the project is completed.
- 4.3.3 Material used to backfill sanitary sewer trenches located in a proposed roadway shall conform to Crushed Road Gravel Table 39 Sec. 8.43.7 as specified in the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin.
- 4.3.4 Trenches located in a roadway shall be compacted to 95% of standard proctor maximum dry density. The first lift of backfill over the pipe shall be 18 inches thick with subsequent lifts being no more than 12 inches in thickness.
- 4.3.5 The flushing of trenches will not be permitted after September 1 if the roadway is to be completed prior to November 15. No flooding of trenches located in an off roadway area, that have spoil backfill, will be permitted. The use of frozen spoil materials for trench backfill, will not be permitted under any conditions.
- 4.3.6 The trench shall be kept free of visible water during any backfilling or compaction work.
- 4.3.7 Sand will not be allowed as bedding material for sanitary sewer.
- 4.3.8 Existing manholes that do not have an opening for the new sanitary sewer shall have an opening cored from the inside in the existing manhole to accommodate the new sanitary sewer.
- 4.3.9 Trench consolidation achieved by flushing will require a 10-day waiting period before deflection testing may be performed.
- 4.3.10 Manholes shall typically be placed in centerline of right-of-way or easement at intervals of 400 feet or less, unless otherwise approved by the City Engineer. Manhole placement shall minimize the quantity of manhole structures.

- 4.3.11 Sewer depth shall be designed to accommodate gravity flow from the lowest part of all buildings. Residential basements shall have an assumed minimum depth of 10 feet from finished floor elevation to the basement floor elevation. Also, 1.8 feet should be used for the depth from the basement floor to the sewer lateral to accommodate for clearing the footing depth.
- 4.3.12 Mainline sewer shall be designed to provide a minimum velocity of two (2) feet/sec at 50 % full with a minimum slope:
- A. 0.0045 ft./ft. for 8" PVC
 - B. 0.0033ft./ft. for 10" PVC
 - C. 0.0027 ft./ft. for 12" PVC.
- 4.3.13 Tracer wire is required. Contractor to install insulated #10-gauge solid copper wire along mainline installations. Tracer wire shall conform to Chapter 2.11.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition. Open trench installations the wire should be laid along the main, attached with tape at intervals of 10 feet
- 4.3.14 All force main bends shall be restrained with mega lugs and concrete buttress.
- 4.3.15 Inside drops over two (2) feet may be allowed with the use of a dropbowl and stainless-steel mounting brackets. Discharge shall be at flowline of manhole without obstructing the line.

4.4 LATERALS

- 4.4.1 It is the responsibility of the property owner to confirm the location and condition of the existing public lateral. In some locations, televising may be the only feasible means to determine the location and condition of the existing public lateral. Televising costs are the responsibility of the property owner.
- 4.4.2 Existing public laterals must be lined with an approved product prior to connection. Exceptions will only be considered if the existing public lateral is PVC or the Engineering Division approves the condition as satisfactory. Televising and witnessing is required to determine the existing condition.
- 4.4.3 All laterals shall follow the locating requirements of the Wisconsin Administrative Code SPS382.30 11(h). For private interceptor sewers, pipes shall have a tracer wire attached, from the mainline to the property line. The tracer wire shall be daylighted at the property line using a VALVCO cathodic protection tracer wire box conforming to ASTM A-48 unless otherwise approved by the City Engineer. Laterals shall be six (6) inches in diameter and installed at a quarter inch per foot (2%) gradient. A mapleheart shall be installed at the end of all laterals, and the top 12 inches shall be painted orange upon completion of the lateral installation. All laterals shall end 1.0' beyond property line. All laterals with less than six (6.0) feet of cover material, shall be insulated with 2' X 8' X 2" thick planks of extruded polystyrene overlapped at breaks or seams by a one (1) foot minimum.
- 4.4.4

- 4.4.5 If open cutting the roadway is required, a Permit to Construct, Maintain or Repair Utilities within Highway Right-of-Way application must be filed with the Engineering Division for work within the right-of-way.
- A. Lateral trench shall be backfilled with No. 2 slurry mix in accordance with the Standard Specifications.
 - B. The Contractor must contact the Engineering Division a minimum of three (3) days prior to lateral work and inspection will be required.
 - C. A pavement patch must be installed over the utility trench in accordance with Section 3.11 of the City of Mequon Standard Specifications for Land Development.
 - D. In addition to the Permit to Construct, Maintain or Repair Utilities within Highway Right-of-Way form, the following must be submitted to the Engineering Division prior to construction:
 - 1. Schedule of construction, including any requirements for lane closures.
 - 2. Road bond, escrow, or letter of credit. Please contact the Engineering Division for amount requirements.
 - 3. Traffic control plan in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), current edition.
 - 4. Proof of notification to all affected residents and businesses a minimum of three (3) days prior to the proposed open cut.
 - E. Modifications to this policy require written approval from the Engineering Division prior to implementation.
- 4.4.6 For a private interceptor, or a shared building sewer lateral, an easement agreement is necessary for operation, maintenance and access. Transmit a drawing or exhibit that displays the location of this easement for the private interceptor prior to a Certified Survey Map is recorded and/or the issuance of a plumbing permit.

4.5 LATERAL ABANDONMENT

- 4.5.1 All sewer lateral abandonments shall occur in the public right of way. Public laterals shall be televised by the property owner prior to abandonment and witnessed by the City Engineering Division.
- A. If the Engineering Division determines that the public lateral is suitable for future connection, the property owner is responsible for cutting the lateral and installing a cleanout at the property line. The Contractor shall provide lateral location information to the Engineering Department to update its record drawings.
 - B. If the Engineering Division determines that the public lateral is not suitable for future connection, the property owner is responsible for following the terms of the lateral abandonment permit:
 - 1. If a riser is installed, a patch must be installed at the lateral connection at the mainline consisting of a cure in place material at the size of the existing main.
 - 2. The public lateral shall be grouted and abandoned in place.
 - 3. The Contractor shall provide lateral location information to the Engineering Division to update its record drawings.

- C. Modifications to this policy require written approval from the Engineering Division prior to implementation.

4.6 TESTING

4.6.1 Prior to acceptance, the City of Mequon will perform closed circuit television inspection of all sanitary sewer mains installed. The contractor shall be required to repair all visible damage and leaks in the sanitary sewer mains. This procedure is in addition to any testing, such as leakage or deflection testing, required by the Standard Specifications for Sewer and Water Construction in Wisconsin and/or MMSD, including but not limited to:

- A. Mandrel Test
- B. Low Pressure Air Test for Mains
- C. Vacuum Testing of Sanitary Manholes
- D. Low Pressure Air Exfiltration Test for Building Sewer Laterals

4.6.2 All costs associated with televising will be the responsibility of the developer.

CHAPTER 5

WATER DISTRIBUTION SYSTEM

5.0 GENERAL

- 5.0.1 A Water Services Agreement is required for the extension of public watermain.
- 5.0.2 Work performed and materials supplied shall conform to the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin (Standard Specifications), and the City of Mequon's Standard Specifications for Land Development.
- 5.0.3 A full-time inspector shall be located at the job site during construction of the watermain and laterals. The contractor responsible for the construction of the sanitary sewers and laterals is also responsible for notifying the City per the notification policy of the City of Mequon. (See Appendix E)
- 5.0.4 All public watermain plans are required to be reviewed and approved by the City.
- 5.0.5 All watermain shall be a minimum of eight (8) inches in diameter.
- 5.0.6 Open cutting the roadway is not permitted for watermain or water service installation unless otherwise approved by the City Engineer. See Section 3.0 for traffic control requirements.

5.1 PIPE MATERIALS

5.1.1 Polyvinyl Chloride (PVC) Pipe

- A. Polyvinyl chloride (PVC) pipe must conform to AWWA C900 and C905 specifications with a class of DR-18. Pipe shall have push-on joints with flexible elastomeric ring gasket in accordance with AWWA D-1869.
- B. PVC pipe shall meet the requirements of Chapter 8.20.0 of Standard Specifications for Sewer and Water Construction in Wisconsin.
- C. PVC pipe shall be blue in color.

5.1.2 High Density Polyethylene (HDPE) Pipe

- A. Where specified by construction plans or Design Engineer, HDPE pipe shall be used.
- B. HDPE watermain pipe shall conform to AWWA C-906 standards and shall have 3 equally spaced blue stripes or a solid blue color-coded exterior surface.
- C. All HDPE watermain pipe shall be Ductile Iron Pipe Size (DIPS) and shall have a DR-11 for sizes four (4) inches through six (6) inches and a DR-13.5 for sizes eight (8) inches and larger.
- D. Materials used for the manufacture of high-density polyethylene pipe and fittings shall comply with all requirements ASTM D3350 and have a PPI recommended designation of PE4710. The molecular weight category shall be extra high (250,000

to 1,500,000) as per the Gel Permeation Chromatography determination procedure with a typical value of 330,000.

5.1.3 Ductile Iron (DI) Pipe

- A. Where specified by construction plans or Design Engineer, DI pipe shall be used.
- B. Unless otherwise specified, all DI pipe shall be Class 52 conforming to AWWA C-515, ANSI A21.51, and Chapter 8.18.0 of Standard Specifications.
- C. All DI pipe shall be encased with a polyethylene film in accordance with Chapter 4.4.4 and Chapter 8.21.0 of Standard Specifications.

5.2 **TRACER WIRE**

- 5.2.1 Contractor to install insulated #10-gauge solid copper wire along PVC and HDPE pipe installations. Tracer wire shall conform to Chapter 2.11.0 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition. Open trench installations the wire should be laid along the main, attached with tape at 10-foot intervals.
- 5.2.2 A loop of tracer wire shall be run to the surface at all hydrants, with a Valvco tracer wire terminal box (or approved equal). The box shall be located behind the hydrant with at least two (2) feet of wire inside the box.
- 5.2.3 Two (2) tracer wires shall be installed with any trenchless installation methodology.
- 5.2.4 The wires can be spliced together using a corrosion proof wire connector.

5.3 **BEDDING, COVER, & BACKFILL**

- 5.3.1 Pipe Bedding, cover, and backfill materials shall conform to Chapter 8.43.0 of Standard Specifications; however, sand may typically be approved as an alternate for HDPE pipe bedding.
- 5.3.2 Bedding
 - A. All materials used for bedding, shall conform to Chapter 4.3.3 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition. Primary and secondary backfill should be installed to at least 90 percent Standard Proctor Density, or as specified by the Engineer.
 - B. Bedding material shall consist of 3/8-inch Crushed Chips meeting the requirements of Chapter 8.43.2 of Standard Specifications.
 - C. Backfill immediately after pipe is laid. Restrain pipe as necessary to prevent pipe movement during backfilling operations.
- 5.3.3 Backfill
 - A. Backfill requirements shall conform to Chapter 2.6.0 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
 - B. All materials used for bedding, shall conform to Chapter 4.3.3 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition. Primary

and secondary backfill should be installed to at least 90 percent Standard Proctor Density, or as specified by the Engineer.

- C. Backfill requirements shall conform to Chapter 2.6.0 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
- D. Graded Aggregate backfill material shall meet the requirements of Chapter 8.43.7 of Standard Specifications.
- E. Spoil backfill shall meet the requirements of Chapter 8.43.5 of Standard Specifications. Suitable material shall be free of rubbish, trees, stumps, branches, frozen material, concrete or bituminous chunks. Spoil backfill can be used outside of pavement locations and whereas designated on the plans by the Engineer.
- F. Backfill within Pipe Zone
 - 1. Backfill immediately after pipe is laid. Restrain pipe as necessary to prevent pipe movement during backfilling operations.
 - 2. Place material completely under pipe haunches and hand tamp along the pipe haunches with a shovel.
- G. Backfill above Pipe Zone
 - 1. Aggregate Slurry Backfill shall be used above the pipe zone under pavement and within five (5) feet of pavement edge. Slurry shall meet the requirements of Chapter 8.43.8 of Standard Specifications. Aggregate slurry shall consist of No.1 and No.2 coarse aggregate, and Class C concrete mix with cement deleted.
 - 2. Granular backfill material shall be used above the pipe zone under driveways, and sidewalks or as noted on the plans. Granular backfill material shall meet the requirements of Chapter 8.43.4 of Standard Specifications.
 - 3. Place in uniform depths. Initial layer shall be 24 inches and subsequent layers shall not exceed 18 inches before compaction. Complete compaction of each layer before placing material for the succeeding layer.
 - 4. Compact each layer by mechanical means until it meets the requirements of Chapter 2.6.14 (b) of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
 - 5. Any deficiency in quality and quantity of backfill material (caused by shrinkage of settlement) shall be supplied at no additional cost to the City.

5.4 WATERMAIN TRENCH

- 5.4.1 Trench width shall be in accordance with Chapter 4.2.1 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
- 5.4.2 Trench bottom must be construction to line and grade as specified by the Engineer. Contractor must conform to Chapters 4.3.2 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition when preparing trench.

5.5 DEWATERING

- 5.5.1 Dewater the ground as necessary to excavate the trench and install the watermain. All pipe and appurtenances shall be laid in a dry condition prior to backfilling. Maintain groundwater level a minimum of 12 inches below pipe invert.

- 5.5.2 Measure the flow rate from the dewatering pumps at the beginning of the dewatering operation(s) and once a week thereafter. Keep a daily log of hours pumped.
- 5.5.3 A dewatering permit is required for all dewatering wells installed or operated for a single or aggregate pumping rate would exceed 70 gallons per minute (gpm). Contractor can obtain a permit from:

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
PRIVATE WATER SUPPLY SECTION
P.O. BOX 7921
MADISON, WI 53707

5.6 DUCTILE IRON WATERMAIN FITTINGS

- 5.6.1 All watermain fittings shall conform to AWWA C-110, C-153 DI compact fittings and Chapter 8.22 of Standard Specifications.
- 5.6.2 Ductile iron compact fittings shall be rated at 350 psi.
- 5.6.3 All fitting shall be mechanical joint, unless otherwise specified.
- 5.6.4 Mechanical joints shall be made with "CorBLUE" nuts and bolts, or approved corrosion resistant equivalents which conform to AWWA C-111.
- 5.6.5 All mechanical joints shall be restrained with EBAA Iron "Megalug" restraint devices for the particular type of pipe (PVC, HDPE, DI) or equal.
- 5.6.6 Restraining distances for all mechanical joints shall be determined by the design engineer in accordance with Chapter File 47A of Standard Specifications. Restraint harness shall be EBAA Iron series 2800 or approved equal.
- 5.6.7 All fittings shall be encased with two wraps of polyethylene film in accordance with Chapter 4.4.4 and Chapter 8.21.0 of Standard Specifications.

5.7 HDPE WATERMAIN FITTINGS

- 5.7.1 Mechanical joint (MJ) adapters shall be used for joining HDPE watermain to a fitting, or valve to prevent pipe pull out.
- 5.7.2 All fabricated HDPE fitting must be individually approved by the engineer.
- 5.7.3 Electrofusion couplings shall be Friatec electrofusion couplings. Electrofusion couplings will only be allowed if approved by the Utility Engineer.
- 5.7.4 Stiffeners for pipe four (4) inches and larger shall be Cascade brand drive-in stiffeners or approved equal.

5.8 WATERMAIN FITTING INSTALLATION

- 5.8.1 Watermain fittings shall conform to Chapter 4.7.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

- 5.8.2 Install watermain fittings in accordance with AWWA C600.
- 5.8.3 Double wrap all watermain fittings according to Chapter 4.4.4, Polyethylene Wrap, (8 mil and taped securely to pipe) of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.

5.9 THRUST RESTRAINTS

5.9.1 Megalugs (Mechanical Joints)

- A. Megalugs shall be used at all bends, tees, reducers, and dead ends to restrain the required lengths of pipe against potential thrust forces in the pipeline.
- B. Retaining gland restraints shall be used in lieu of concrete block buttresses. Restraining distances for all mechanical joints shall be determined by the design engineer in accordance with supplier's recommendations and Chapter File 47A of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.9.2 Concrete Buttresses / Thrust Blocks

- A. Concrete buttress will only be allowed when restraining fittings at connections to the existing main. Thrust blocks shall conform to File numbers 44, 44A, 45,46, and 47 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition and AWWA C-600-99.
- B. Concrete thrust blocks shall be used to anchor HDPE water that has been directionally drilled. Thrust blocks shall be designed by the design engineer and installed according to manufacturer’s recommendations.

5.10 TAPPING SLEEVE

- 5.10.1 All live taps shall be done with stainless steel tapping sleeves and mechanical joint flanged tapping valves.
- 5.10.2 Tapping sleeves shall be Smith-Blair series 663 or approved equal. Tapping sleeves shall have a stainless steel test plug. No dissimilar metals will be allowed.
- 5.10.3 The outside diameter of the pipe being tapped, the size of the outlet pipe (branch or tap service line), and the working pressure should be specified to assure that the sleeve will be satisfactory.
- 5.10.4 Tapping sleeves shall not be placed closer than four (4) feet from the bell end of the pipe, fittings, or additional taps.
- 5.10.5 Tapping sleeves should be assembled and installed according to the instructions provided by the manufacturer.
- 5.10.6 Tapping sleeves for DI or PVC shall be all stainless steel, including a stainless steel test plug. Tapping saddles on HDPE pipe shall be heat or electrofusion branch saddles.

5.11 WATERMAIN VALVES

5.11.1 Watermain Valve Location and Requirements

- A. Each tee shall have two valves located five (5) feet from the tee in the apparent downstream directions. The apparent downstream directions are the opposite of the high pressure or apparent normal source direction.
- B. Each cross shall have three valves located five (5) feet from the cross in the apparent downstream directions.
- C. Unless otherwise approved valves shall be located five (5) feet from hydrant tees or watermain intersections. Valves may be moved a short distance to be placed outside of pavement.

5.11.2 Valves 4 inches to 12 inches

- A. Shall be resilient wedge seal (R/W), open to the left, conforming to the requirements of AWWA C-509, C-515 not allowed. Valves shall be Mueller Model A-2360 or approved equal.
- B. Valves shall have mechanical joints conforming to AWWA C-111 on both ends, except for tapping valves.
- C. Valves shall have a two (2) inch stainless steel operating nut.
- D. Valves shall meet the requirements of Chapter 8.27.0 of Standard Specifications.

5.11.3 Valves 14 inches and larger

- A. Shall be butterfly valves conforming to AWWA C-504 for Class 150B.
- B. Valves shall have mechanical joints conforming to AWWA C-111 on both ends.
- C. Valves shall have a Buna N Rubber seat that is bubble tight and a ductile iron disk with stainless steel seating surface. 304, 18-8 Stainless steel shafts with stainless steel disc pins.
- D. Valves shall have a two (2) inch stainless steel operating nut.
- E. Operator shall be worm gear type for underground service, Limitorque 90° Worm Gear or equal.
- F. Butterfly valves shall meet the requirements of Chapter 8.28.0 of Standard Specifications.

5.11.4 Valve Boxes

- A. Valve Boxes shall be 5¼ inch diameter, three-piece screw type box adjustable for 7–15-foot depth of cover. Boxes shall be Clow series F-2494 or approved equal and meet the requirements of Chapter 8.29.0 of Standard Specifications
- B. Gate valves will require valve boxes with #6 base.
- C. Covers shall be marked "WATER" and shall be Stay Put type.
- D. All gate valve boxes shall be installed with the 6 Base Multifit Adaptor as manufactured by Adaptor Inc. or an approved equal.

- E. All butterfly valves will require the Butterfly Valve Adaptor as manufactured by Adaptor Inc. or an approved equal.

5.11.5 Installation

- A. All watermain valves shall meet the requirements of Chapter 4.8.0 “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
- B. Gate and Resilient Wedge Valves
 1. Gate and resilient wedge valves shall conform to AWWA C-500 for gate valves and C-509 for resilient wedge valves.
 2. Valve shall be suitable for direct burial type installation on distribution mains.
 3. Valves shall be supported on an eight (8)-inch concrete block.
 4. Install valve box adapter prior to setting the valve box.
 5. Wrap valves according to Chapter 4.4.4, Polyethylene Wrap, (8 mils) of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition
- C. Butterfly Valves
 1. Butterfly valves shall conform to AWWA C-504.
 2. Butterfly valves shall be supported on an eight (8)-inch concrete block
 3. Wrap valves according to Chapter 4.4.4, Polyethylene Wrap, (8 mils) of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition
- D. Valve Box
 1. Maintain valve box centered and plumb over the operating nut of the valve.
 2. Approved bedding materials shall be tamped in place from a point above the main to a point six (6) inches above the bottom of the valve box base to prevent the valve box from shifting.
 3. Set top of valve box flush with the existing surface to provide 12 inches of upward adjustment.
 4. Wrap gate valves according to Chapter 4.4.4, Polyethylene Wrap (8 mils) of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.

5.12 **FIRE HYDRANTS**

5.12.1 Fire Hydrants shall conform to AWWA C-502 for Dry Barrel Fire Hydrants.

5.12.2 Fire Hydrants shall meet the requirements of Chapter 8.26.0 of Standard Specifications.

5.12.3 Material/Manufacturer Specifications

- A. Fire hydrants shall be Waterous Pacer or Mueller Centurion break flange type.
- B. Hydrant tees shall be Clow F012117 mechanical joint anchoring tees or approved equal.
- C. Hydrant Leads shall be 6-inch DI (class 52) pipe, meeting the requirements of AWWA C-151.

- D. Hydrant Branch piping material meeting the requirements of Chapter 4.6.3 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
- E. Crushed stone as specified in Chapter 8.43.6 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition, shall be placed below the base to at least six (6) inches above the drain hole in the hydrant stem.

5.12.4 Operational Specifications

- A. Hydrants shall have one 4½ inch and two 2½ inch nozzles.
- B. Hydrants shall open counterclockwise and be painted bright red.

5.12.5 Hydrant Locations and Requirements

- A. The designed location of hydrants must take into account regulations, serviceability, cost, and the following guidelines.
- B. Hydrant spacing shall conform to the following table:

Zoning	Maximum Hydrant Spacing
Commercial	300 feet
Residential	500 feet

- C. Hydrants in locations with curb shall be placed 2½ feet behind the back of curb.
- D. Hydrants in location without curb shall be placed two (2) feet from the right-of-way. Hydrants shall not be placed in the center of the ditchline.
- E. Hydrants shall be a minimum of 30 feet from any building wall.
- F. There shall be a hydrant within 150 feet of any private fire department connection as required by the Fire Department. The ownership of this hydrant (public vs private) shall be determined on a case-by-case basis.
- G. Hydrant lengths shall be sized for the specific installation. No hydrant extensions will be allowed without prior approval. Hydrant nozzles shall be 18 inches to 21 inches above grade at bury line.

5.12.6 Installation Requirements

- A. Hydrants shall conform to Chapter 4.8.0 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
- B. Each hydrant shall be installed with a flexible hydrant marker that is bolted to the top of the hydrant.
- C. After each hydrant has been set, place around the base of the hydrant one (1) inch clean washed stone, three (3) feet in diameter around the hydrant and one (1) foot above the drain holes. Filter fabric shall be placed above the washed stone
- D. Hydrants shall be solidly buttressed against the trench wall with the use of hardwood blocking.
- E. Hydrants shall be set on eight (8)-inch concrete block and the centerline of the hydrant, when set, shall be vertical.

- F. Wrap hydrant assembly according to Chapter 4.4.4, Polyethylene Wrap, (8 mil and taped securely to pipe) of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition, to the bottom of the breakaway flange.

5.13 WATER SERVICE LATERAL

5.13.1 Water services

- A. Service laterals shall be HDPE, PE 4710, SDR 9 (pressure rating 200 psi) pipe meeting the requirements of AWWA C-901 unless otherwise specified on plan or directed by the engineer.
- B. Residential service laterals shall be minimum 1-1/4 inch diameter. The City of Mequon reserves the right to approve a different diameter water lateral if project engineer submits design calculations showing a different diameter water service will meet the requirements of PSC 185.82 and the Department of Commerce (Comm82.40).
- C. Unless master metered, each unit shall have a separate service and meter.
- D. Tapping saddles shall be stainless steel and used for all service taps. Tapping saddles on HDPE pipe shall be heat or electrofusion branch saddles.
- E. Corporation stops shall be AY McDonald 74701BQ or approved equal and meet the requirements of Chapter 8.30.0 of Standard Specifications.
- F. Curb stops shall be AY McDonald 76104Q or approved equal and shall meet the requirements of Chapter 8.31.0 of Standard Specifications.
- G. Curb boxes shall be Ford Minneapolis Pattern base, or approved equal and meet the requirements of Chapter 8.25.0 of Standard Specifications
- H. Pipe stiffeners must be used at all mechanical connections.
- I. Water services two (2) inches and smaller shall not be tapped or connected before watermain testing and disinfection procedures have been completed satisfactorily.

5.13.2 Water services four (4) inches and larger

- A. Curb stops for four (4) inches and larger services shall conform to the watermain valve specification.
- B. Unless otherwise approved, the service tee shall be an anchor tee.
- C. Tapping sleeves for DI or PVC shall be all stainless steel, including a stainless steel test plug. Tapping saddles on HDPE pipe shall be heat or electrofusion branch saddles.

5.13.3 Ductile Iron Main

- A. General
 - 1. All pipe services and connections are made in accordance with Chapter 5.5.0 of the Standard Specifications for Sewer & Water Construction in Wisconsin and AWWA C600-93.
 - 2. Water service connections are designated as saddle tapping or tapping sleeve and valves. Water service piping is designated as either tap service or branch service.

- B. Saddle Tapping for ductile iron pipe requires that the following conditions are met:
1. Saddle tapping may be used on all class and size pipes; however, the outlet line must be a maximum two (2) inch diameter. (Tap service line).
 2. Saddle sleeve edges shall not be placed closer than 12 inches from the bell end of the pipe, fittings, or additional taps.
 3. Tap service lines shall have a minimum horizontal separation of 18 inches from a parallel building sewer line.
 4. Branch service lines shall have a minimum horizontal separation of 24 inches from a parallel building sewer line.
 5. Water service piping shall have a minimum cover of six (6) feet from the established street grade. The curb stop of the tap water service or the gate valve of the branch service shall have a minimum cover of six (6) feet and a maximum cover of six and one half (6½) feet from the established street grade.
 6. The following procedure should be followed when installing a saddle tap:
 - i. The service clamp or saddle shall be evenly tightened on the pipe. The inlet side of the corporation stop shall be screwed into the saddle threads and the stop valve shall then be opened.
 - ii. The drilling machine shall be attached to the corporation stop's outlet threads.
 - iii. After the hole has been cut, the cutter shall then be withdrawn, the corporation stop closed, and the drilling machine removed from the pipe. If leakage occurs, the corp stop should be tightened.
- C. Tap Service Piping
1. Tap service piping shall include all pipe two (2) inches in diameter or smaller.
 2. The components of a tap service are the: service tee or corporation stop, pipe, curb stop with a whip to the surface at the lot line, and service box.
 3. The standard water service shall have a minimum internal diameter that is in accordance with the Wisconsin Administration Code, and with the curb stop located as specified by the Engineer.
 4. Pipe from the service tee to curb stop shall be of one continuous length unless fittings are specified by the Engineer.
- D. Branch Service Piping
1. Branch service piping shall include all water piping three (3) inches in diameter or larger.
 2. The components of a branch service are: a tapping sleeve and valve or a 3-way branch, a valve, a valve box and extension of pipe extending to the lot line at which point the end will be plugged or capped.
- E. Service Connection to Watermain
1. The minimum distance between a corporation stop and any mechanical fitting is a distance of one (1) foot.
 2. The minimum distance from any fitting, or another tap on either side of the main to a tapping valve is a distance of four (4) feet.

F. Alignment, Position, and Grade

1. The minimum vertical clearance between the water service and a building sanitary sewer shall be 12 inches if the water service is above, and 18 inches if the water service is below.
2. Water service piping crossing above or below conduits or other structures shall have a minimum clearance of three (3) inches.
3. Tap service lines shall have a minimum horizontal separation of 18 inches from a parallel building sewer line.
4. Branch service lines shall have a minimum horizontal separation of 24 inches from a parallel building sewer line.
5. Water service piping shall have a minimum cover of six (6) feet from the established street grade. The curb stop of the tap water service or the gate valve of the branch service shall have a minimum cover of six (6) feet and a maximum cover of six and one half (6½) feet from the established street grade.

5.13.4 PVC Main

A. General Requirements

1. All pipe services and connections are made in accordance with Chapter 5.5.0 of the Standard Specifications for Sewer & Water Construction in Wisconsin and AWWA C605-94.
2. Water service connections are designated as either saddle tapping, or tapping sleeve and valves. Water service piping is designated as either tap service or branch service.

B. Saddle Tapping: Saddle tapping requires that the following conditions are met:

1. Saddle tapping may be used on all class and size pipes; however, the outlet line must be a maximum two (2) inch diameter. (Tap service line).
2. All service clamps or saddles used on PVC shall be manufactured specifically for PVC. The clamp bearing area shall be a minimum two (2) inch width for taps up to 1 inch, and a minimum three (3) inch width for taps one and one quarter (1¼) inches to two (2) inches.
3. Saddle sleeves shall not be placed closer than one (1) foot from the bell end of the pipe, fittings, or additional taps
4. The following procedure should be followed when installing a saddle tap:
 - i. The service clamp or saddle shall be evenly tightened on the pipe. The inlet side of the main stop or corporation stop shall be screwed into the saddle threads. The main-stop valve shall then be opened.
 - ii. All tapping should be done in accordance with instructions of the machine manufacturer.
 - iii. After the hole has been cut, the cutter shall then be withdrawn, the corp stop closed, and the drilling machine removed from the pipe. If leakage occurs, the corp stop should be tightened.

C. Tapping Sleeves and Valves Tapping sleeves and valves are required for connections other than those described in Section 350.2 and 350.3.

1. The outside diameter of the pipe being tapped, the size of the outlet pipe (branch or tap service line), and the working pressure should be specified to assure that the sleeve will be satisfactory.
 2. Tapping sleeves shall not be placed closer than four (4) feet from the bell end of the pipe, fittings, or additional taps.
 3. Tapping sleeves should be well supported, independent of the pipe during tapping. The support used should be left in place.
 4. Tapping sleeves should be assembled and installed according to the instructions provided by the manufacturer.
- D. Tap Service Piping
1. Tap service piping shall include all pipe two (2) inches in diameter or smaller.
 2. The components of a tap service are the: service tee or corporation stop, pipe, curb stop with a whip to the surface at the lot line, and service box.
 3. The standard water service shall have a minimum internal diameter that is in accordance with the Wisconsin Administration Code, and with the curb stop located as specified by the Engineer.
 4. Pipe from the service tee to curb stop shall be of one continuous length unless fittings are specified by the Engineer.
- E. Branch Service Piping
1. Branch service piping shall include all water piping three (3) inches in diameter or larger.
 2. The components of a branch service are: a tapping sleeve and valve or a 3-way branch, a valve, a valve box and extension of pipe extending to the lot line at which point the end will be plugged or capped.
- F. Service Connection to Watermain
1. The minimum distance between a saddled corporation stop and a mechanical fitting is a distance of one (1) foot.
 2. The minimum distance from any fitting, or another tap on either side of the main to a tapping valve is a distance of four (4) feet.
- G. Alignment, Position, and Grade
1. The minimum vertical clearance between the water service and a building sanitary sewer shall be 12 inches if the water service is above, and 18 inches if the water service is below.
 2. Water service piping crossing above or below conduits or other structures shall have a minimum clearance of 3 inches.
 3. Tap service lines shall have a minimum horizontal separation of 18 inches from a parallel building sewer line.
 4. Branch service lines shall have a minimum horizontal separation of 24 inches from a parallel building sewer line.
 5. Water service piping shall have a minimum cover of six (6) feet from the established street grade to building. The curb stop of the tap water service or the gate valve of the branch service shall have a minimum cover of six (6) feet and a maximum cover of six and one half (6½) feet from the established street grade.

5.13.5 Setting Water Service Box

- A. Water service box shall be centered over the curb stop and shall be brought to proper grade.
- B. Where the bench does not affect a firm support for the service box blocking, such support shall be furnished by the use of a two (2)-inch by six (6)-inch plank placed across the building sanitary sewer trench and firmly supported in each bank.
- C. The service box shall be plumbed and braced so it will remain vertical throughout the backfilling.
- D. Sufficient excavation shall be made for the service box installation to insure proper setting and backfilling around the service box

5.14 CASING PIPE

5.14.1 Steel casing pipe wall thickness shall meet the requirements of File No. 49 of Standard Specifications and conform to the following:

- A. All pipe shall conform to all applicable requirements of AWWA C200-86 and AWWA M11, and if fabricated shall be constructed of A36 steel with a minimum yield point of 36 ksi; or if manufactured shall conform to Grade B with a minimum yield point of 35 ksi.
- B. Steel casing pipe wall thickness shall conform to the following schedule:

CASING DIAMETER MINIMUM WALL THICKNESS Casing Diameter (in.)	Casing Thickness (in.)
6 – 12	0.250
14 – 18	0.3125
20 – 30	0.500
32 – 48	0.6250

- C. All casing pipe to be joined with 360-degree welds in accordance with ANSI/AWWA C206 It shall be mill primed and coated with bituminous based coating before installation. Where coating is damaged during installation, it shall be repaired and replaced by thorough brushing or scraping to sound material and applying two coats of the coating material.
- D. It may be shipped in random lengths between 18 and 22 feet and shall have one (1) end cut square and one (1) end beveled.
- E. Watermain installed in a casing pipe shall be restrained, wood blocking is not allowed.
- F. Casing Spacers: The casing spacers shall have a bolt on shell made in two sections. All metal components shall be Type 304 (18-8) Stainless Steel. It shall have an elastomeric liner to isolate the shell from the carrier pipe. It shall have runners attached to the shell and be designed to provide a minimum of 0.75 inches clearance between the carrier pipe's greatest outside diameter and the casing pipe's inside diameter. The chock runners shall be beveled with high abrasion resistance and a

low friction coefficient. Spacers shall be attached to the pipe within 12 inches on each side of the pipe joint and at the center of each pipe. The end spacer shall be within 12 inches of the end of the casing pipe. Acceptable manufacturers and models are: PSI S8G-2 and PSI S12G-2, Power Seal #4810, Cascade CCS series and Advance Products & Systems Model SSI, or approved equal.

- G. End Seals: End seals shall be made of synthetic rubber, conical shape, pull-on or wrap-around style with Type 304 stainless steel bands.

5.15 INSULATION

5.15.1 Watermain insulation shall meet the requirements of Chapter 8.50.0 of Standard Specifications.

5.15.2 Watermain insulation for buried application shall be extruded polystyrene in two (2) inch thickness overlapped at breaks or seams by a one (1) foot minimum.

5.15.3 Water pipe insulation for station piping shall be closed cell polystyrene designated for the purpose or wrap and tape with minimum four (4) layers of FoamSeal Owens Corning sill plate gasket insulation 1/4" x 3-1/2" wide, or equal.

5.16 PIPE INSTALLATION

5.16.1 General Requirements

- A. Installation of PVC, HDPE, and DI, watermain shall conform to Chapter 4.3.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
 - 1. PVC watermain shall conform to Chapter 4.6.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
 - 2. DI watermain shall conform to Chapter 4.4.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
 - 3. Directionally Drilled HDPE watermain and services shall conform to Chapter 6.4.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
- B. When installation operations are interrupted, or terminated at the end of the day, pipe ends shall be sealed temporarily to prevent the entry of water, debris, small animals, or similar types of contamination.
- C. Particular attention shall be paid to keeping the interior of the pipe clean as it is being stored on site and installed. Remove any foreign matter or dirt from the inside of pipe.
- D. Wrap all ductile iron pipe and fittings according to Chapter 4.4.4 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.16.2 Obstruction in Line or Grade

- A. Whenever it becomes necessary to lay a watermain over, under, or around a known obstruction, the adjustment procedure will conform to Chapter 4.3.10 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition

5.16.3 Existing Watermains

- A. The uncovering of existing watermains shall be in accordance with Chapter 4.2.2 “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
- B. Before excavation of trenches is started, Contractor shall expose the end of the existing watermain to which the new main is to be connected. This will permit adjustments in line and/or grade to avoid the use of an extra fitting.
- C. The exposed end of the existing main must be protected and blocked by the Contractor to prevent blowing out of the plug or cap at the end of the main.
- D. The contractor shall repair all breaks on the existing water main which may occur as the Contractor is working in the vicinity (50-foot radius) of the break, during normal work hours. The Contractor shall be responsible for furnishing and installing repair clamps or other repair material and shall do all the work required to complete the repair and restore service. The cost of such repairs shall be considered incidental.

5.16.4 Clearance

- A. All acceptable clearances and exceptions are found in the Wisconsin Administrative Code Section NR811.67-811.78. Watermains passing through contaminated soils or groundwater must be approved on a case-by-case basis.

5.16.5 Pipe/Joint Deflection

- A. Pipe / Joint deflection shall conform to manufacturer’s recommendations.

5.17 METER STANDARDS

5.17.1 Scope

- A. This design standard covers acceptable designs for watermain construction. Local, State, and Federal regulations supersede the requirements of this standard. Design parameters not included in this standard or that deviate from this standard must be approved by the City of Mequon Water Utility Planning Engineer (Engineer) prior to final submittal for permit approval.

5.17.2 Meter Set Design Requirements

- A. Meter size calculations, provided to the Water Utility Engineer, are required prior to meter delivery.
- B. Meter sizing for new construction will be based on fixture counts and maximum design flow calculated from the plumbing code. The design maximum flow will be less than the upper limit of the typical operating range of the meter size selected as specified by AWWA standards. Pressure and flow requirements for the new construction’s plumbing fixture will be accounted for in sizing the water lateral and internal plumbing.
- C. Meter sizing for existing buildings converting from a private well without an existing service lateral will be based on fixture counts and maximum design flow calculated from the plumbing code. The design maximum flow will be less than the upper limit of the typical operating range of the meter size selected as specified by

AWWA standards. Pressure and flow requirements for the existing building's plumbing fixtures will be accounted for in sizing the water lateral. If pressure and flow requirements are not met by adjusting the service lateral size, increasing meter size will be considered at the request of the building owner.

- D. All meter sets shall be located within three (3) feet of the service piping entrance to the building and within four (4) feet of the floor.
- E. Meter sets shall have minimum of three (3) feet clearance around the meter set except the exterior wall the meter set may be mounted to.
- F. Meter sets shall be accessible without using any tools or damaging any surrounding material.
- G. There shall be no valves or tees in the service piping or connected to the service piping prior to meter inlet valve.
- H. Meter set outlet valves shall be full port ball valves.
- I. Meters will be delivered to the site by the Water Utility and installed by the plumber.
- J. Water to a plumbing system may be turned on by the plumber for one hour to wet test the plumbing system without a meter installed. The curb stop and meter inlet valve must remain in the off position until the meter is installed, except for the wet test. No pipe or meter jumper shall remain in the meter set prior to meter installation.
- K. A meter will be delivered to the site only after Water Utility confirms all applicable standards and rules have been met. The Water Utility will give notice that the plumbing system may be turned on.
 - 1. Although all standards and rules apply to every service connection, the following are key requirements specifically investigated at the time of meter delivery.
 - i. A service application must be signed.
 - ii. Prior to activation of water service, the water system must be inspected by the activator and all cross-connections must be eliminated.
 - iii. Curb stop and box must be accessible, operable, and adjusted to the correct elevation.
 - iv. The Water Utility must own the watermain the service is connected to, or the privately owned watermain must meet requirements of this specification.

5.17.3 Meter Set

- A. Meters one (1) inch and smaller.
 - 1. Meter sets shall have a full port ball valve as the meter inlet valve.
 - 2. Swivels shall be used on the inlet and outlet of the meter horn.
 - 3. A meter horn with a meter spread of seven and one half (7½) inches shall be installed for meters less than one (1) inch, and 10-3/4 inches for one (1) inch meters.
- B. Meters one and one half (1½) inch and larger

1. A meter by-pass shall be provided for all meters one and one half (1½) inch and larger with a single full port valve on the by-pass and two isolation valves on the meter run.
2. Meter sets for one and one half (1½) inch and larger meters shall have a plug test port designed into the meter set piping equal to the outlet size of the meter. The test port shall be a tee with a NPT threaded plug.
3. For meters one and one half (1½) inch and larger, contact Water Services for the correct meter spread prior to constructing
4. A strainer shall be installed between the meter inlet valve and the meter.
5. The meter and strainer shall be installed using flanged joints.

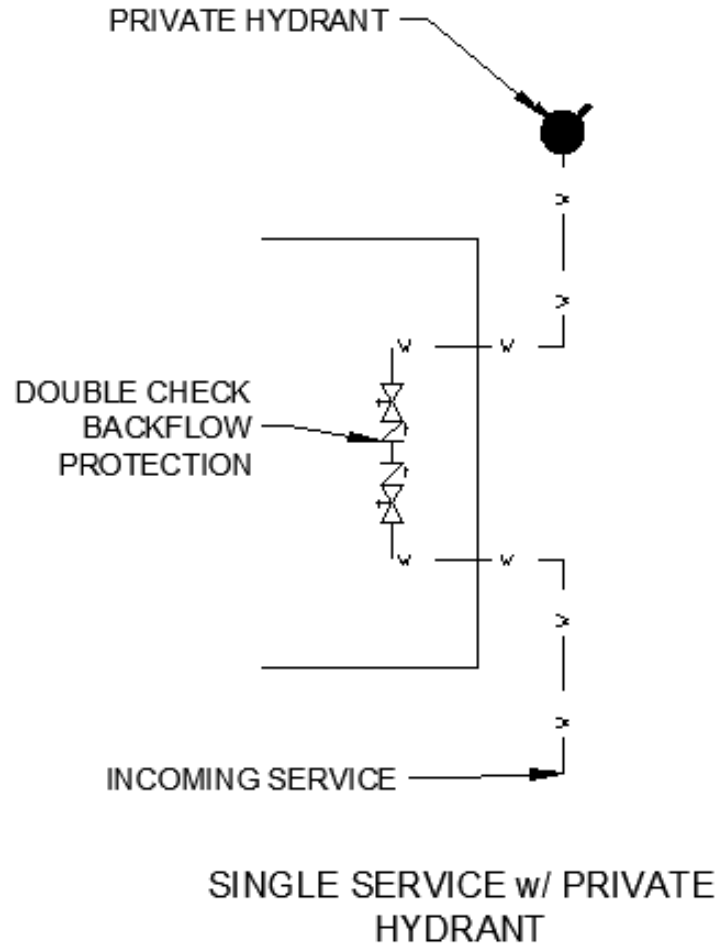
5.18 INTERNAL PRIVATE FIRE PROTECTION

- 5.18.1 At a minimum, double check backflow protection must be provided for all private fire protection.
- 5.18.2 The fire line may tee off upstream from the meter for domestic water supply. A double detector check meter assembly is required whenever the fire line is upstream of the meter for domestic water supply.
- 5.18.3 Private fire protection rate shall apply if the fire protection line is downstream of the meter for domestic water supply. Private fire protection rate shall be determined by the diameter of the backflow prevention.
- 5.18.4 Written testing notice of the backflow prevention device must be provided to the Water Utility each calendar year not to exceed 15 months.

5.19 EXTERNAL PRIVATE FIRE PROTECTION

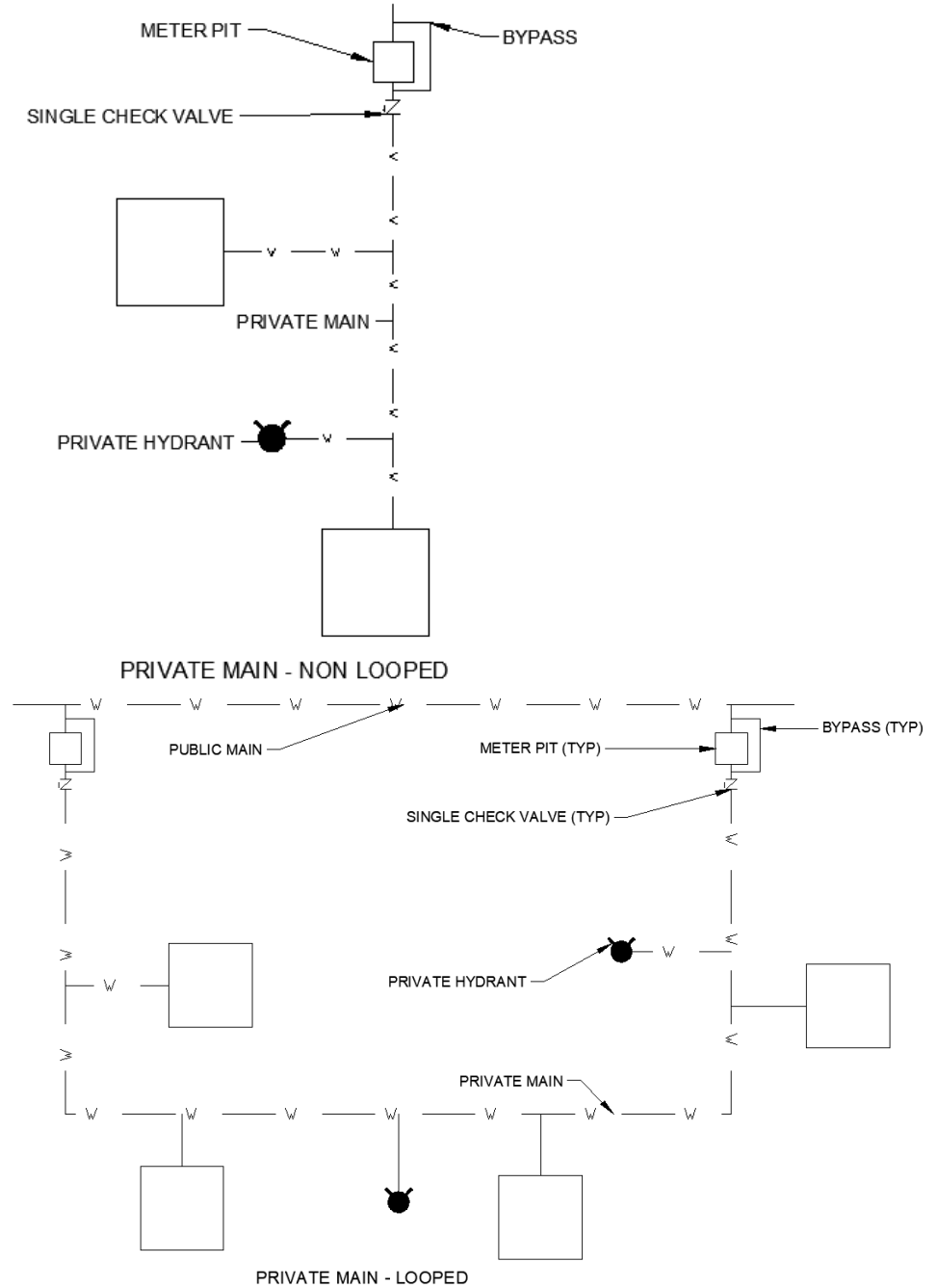
5.19.1 Privately owned external fire system must conform to one of the following categories:

A. Building Division



1. Double Check backflow protection must be provided. Double Check meter assembly is also required.

B. Common Private Fire / Service



1. At a minimum, single check backflow protection must be provided for external fire protection systems.
2. The large meter on a compound meter must be designed to handle internal and external fire demands.
3. Private systems with only one connection to the Water Service system must have a by-pass equal to the meter run.

5.19.2 Written testing notice of the backflow prevention device, system maintenance, and flushing gallons must be provided to the Water Utility each calendar year.

5.20 FIRE CISTERNS

(Subdivisions without public water or Community Water System need to have Fire Chief review.)

- 5.20.1 Fire protection improvements shall require the installation of a fire cistern or cisterns determined by and meeting the Fire Chief's approval.
- 5.20.2 A 30,000 gallon fire cistern (see Figure 11 in Appendix A) shall be installed within a 1,000 foot hose radius from a residence. This may require more than one cistern per development.
- 5.20.3 All cisterns shall have a dry hydrant connection which is to be located no more than 10 feet from the edge of pavement. The dry hydrant shall be a Kochek Model No. Kocdhf-611 or equivalent as approved by the Fire Chief. All cisterns require separate drain and fill connections.
- 5.20.4 All fire cisterns shall be located in a public road right-of-way.
- 5.20.5 All fire cistern installation locations shall be approved by the Fire Chief.

5.21 TESTING & DISINFECTION

5.21.1 General Requirements

- A. Hydrostatic testing should be made in accordance with Chapter 4.15.0 "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
- B. Disinfection testing should be made in accordance with Chapter 4.16.0 "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition and AWWA C-651.

5.21.2 Hydrostatic Testing

- A. Pressure and leakage testing shall be in accordance with the latest edition of AWWA Standards.
- B. Pressure testing of the installed pipe shall be completed under Owner's supervision.
- C. Following examination of exposed parts of the system ("wet-hand" test); the test pressure will be increased to 150 psi read at the point of lowest elevation on the main for duration of one hour. There should be no noticeable pressure drop in the test section.
- D. If it is found unnecessary to add water during the duration of the pressure test, the Engineer may waive the leakage test.
- E. If leakage test is not waived, test shall be in accordance with Chapter 4.15.3 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
- F. If testing HDPE pipe, follow manufacturers recommended procedure.

5.21.3 Disinfection Testing

- A. All new, cleaned or repaired watermains shall be disinfected in accordance with A.W.W.A. Standard C651 and Wisconsin Administrative Code NR 811.73.

- B. The new watermain can remain disconnected from the existing main until disinfection and final bacteriological tests have been completed. The water required for hydrostatic testing, disinfection, and flushing would be supplied through a temporary connection controlled by a control valve at a hydrant that is separated from the existing water system.
- C. If approved by the City, the new watermain can be connected to the existing main during construction for disinfection purposes. Contractor will submit to the City, backflow protection procedure to keep contaminated water from entering the existing main. Utility staff must be present during any flushing or filling of the new watermain to ensure existing customers are protected.
- D. Methods of Chlorination
 - 1. Tablet - Hypochlorite tablets can be used during construction in accordance with Chapter 4.3.12 of “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.
 - 2. Continuous feed - This method consists of placing calcium hypochlorite granules in the main during construction, completely filling the main to remove all air pockets, flushing the completed main to remove particulates, and filling the main with potable water. Chlorine concentration should be tested at regular intervals downstream of where the water is added to verify the minimum free chlorine residual does not drop below 25 mg/l.
 - 3. Slug - The procedure is similar to the continuous-feed method except the dose of chlorine fed at a constant rate increases the concentration to 100mg/L. The chlorinated water slowly flows through the pipe for at least 3 hours, exposing all interior surfaces to the high concentration. Valves and hydrants should be treated with this water also. During the three (3) hour period, the water should have a residual of 50 mg/L free chlorine or more.
- E. Flushing
 - 1. The flushing velocity in mains shall be greater than two and one half (2.5) ft/s. The following table gives the flow rates required to produce the flushing velocity in some typical pipe sizes:

Required flow and openings to flush pipelines (40 psi residual pressure in main)*

Pipe Diameter (inches)	Flow required to produce 2.5 ft./s in main (gpm)	Tap Size (inches)			Number of 2-1/2 inch hydrant outlets
		1	1-1/2	2	
4	100	1	--	--	1
6	200	--	1	--	1
8	400	--	2	1	1
10	600	--	3	2	1
12	900	--	--	3	2
16	1,600	--	--	4	2

*With a 40 psi pressure in the main and the hydrant flowing to atmosphere, a 2½ hydrant outlet will discharge approximately 1000 gpm; and a 4½ hydrant outlet will discharge approximately 2500 gpm

- F. Bacteriological Test

1. After final flushing and before the new watermain is connected to the distribution system, two (2) consecutive sets of acceptable samples, taken 18 hours apart, shall be collected from the main in the presence of water utility staff. A set is made up from groups of samples collected every 1,000 feet of new main, groups of samples taken at each branch, and a group of samples taken at the end of the line.
2. All samples shall be collected in sterile bottles treated with sodium thiosulfate as required by the Standard Methods for the Examination of Water and Wastewater. A suggested combination blow off and sampling tap is useful for mains up to eight (8) inches in diameter. A corporation cock may be installed on the main with a copper-tube gooseneck assembly. No hose or hydrant shall be used to collect samples.
3. All samples shall be tested for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater, and shall be void of coliform organisms.
4. If trench water or excessive quantities of dirt and debris have entered the new main during construction, bacteriological samples may be taken at marked intervals of 200 feet. Any water left in the main for 16 hours or more must be tested for bacterial contamination.

CHAPTER 6

GRADING AND DRAINAGE

6.0 SUBDIVISION GRADING

- 6.0.1 Construction lot pads shall be graded 12 inches to 18 inches below finished yard grade. Construction lot pad elevation shall be determined by the developer/engineer based on the amount of basement spoil to be generated by each house.
- 6.0.2 Fill areas shall be compacted in one (1) foot lifts to 95% of the modified proctor. A soil testing firm, selected by the City, paid by the developer shall check compaction during the entire filling operation. At the end of the filling operation the soil testing firm shall submit a final certification report to the City Engineering Division.
- 6.0.3 No topsoil shall be removed from the site without prior approval by the City Engineer.
- 6.0.4 Organic material shall be removed and stockpiled prior to placing structural fill.
- 6.0.5 The minimum depth of topsoil shall be four (4) inches.
- 6.0.6 Filling operations requiring three or more feet of fill (measured from structural material below topsoil) shall require construction observation during placement.
- 6.0.7 Excavated basement spoil material shall not be placed any closer than 10 feet to lot corner or lot lines.

6.1 EROSION CONTROL

- 6.1.1 Grading and erosion control shall conform to the latest edition of the Storm Water Management Technical Standards, distributed by the Wisconsin Department of Natural Resources Bureau of Water Resources Management. (Appendix B.)
- 6.1.2 An approved City of Mequon erosion control permit must be obtained through the Engineering Division prior to any land disturbing activities.

6.2 DITCH GRADING

- 6.2.1 Grass ditches shall have a minimum flowline gradient of 1% and a maximum of 5%. Less than 1% requires special design considerations and prior approval by the Engineering Division.
- 6.2.2 Restoration of ditches with a flowline gradient between 1% and 3% requires topsoil and seed restoration; greater than 3% requires erosion mat or other stabilization.
- 6.2.3 Roadside ditches shall be a minimum of 27 inches deep and a maximum of 39 inches deep as referenced from the centerline elevation of the finished road. Ditches greater than 39 inches deep shall be piped.

- 6.2.4 Crossroad culverts shall be designed to provide a minimum of 16 inches of cover as referenced from the centerline elevation of the finished road to the top of the pipe.
- 6.2.5 Side slopes of roadside ditches shall be graded no steeper than three (3) feet horizontally to one foot of rise (3:1). Back slopes of roadside ditches and side slopes of other ditches shall be graded no steeper than three (3) feet horizontally to one (1) foot of rise (3:1).
- 6.2.6 Roadside ditches and culverts, or storm sewer, shall be sized to convey a 25-year-24 hour post developed storm event. Calculations shall be provided with construction plans.
- 6.2.7 Crossroad culvert drainage systems shall be sized to convey a 50-year-24 hour post developed storm event. Calculations shall be provided with construction plans.
- 6.2.8 Off road drainage ways affecting the buildable area of any lot or greater than 36 inches deep between home sites shall be piped.
- 6.2.9 Existing ditches fronting on existing roadways or existing drainage ways within proposed developments shall be regraded to conform to these specifications. This requirement may be waived by the City Engineer.
- 6.2.10 All cul-de-sacs shall have an eight (8) inch minimum storm sewer pipe with a 12-inch minimum catch basin installed to drain island to outside ditch or storm sewer system. The location and materials shall be determined by design engineer and approved by City of Mequon. See detail drawing Figure 3.

6.3 PUBLIC AND PRIVATE STORM SEWER

- 6.3.1 Materials and installation shall conform to the latest edition of the Standard Specifications for Sewer and Water Construction.
- 6.3.2 The minimum design storm for all conduits shall be NOAA Atlas 14 10-year, 24-hour event with a rainfall duration equal to the minimum time of concentration or five (5) minutes, whichever is greater. Storm Sewer sizing calculations including hydraulic grade line must be submitted with the Construction Plan set. Hydraulic grade line shall be at least one (1) foot below the top of the storm structures. See WisDOT Facilities Design Manual (FDM) 13-25 for sizing procedure and guidelines.
- 6.3.3 Inlet capacity calculations are required with the construction plans. No clogging factor shall be used in paved areas, 25% clogging factor should be used in grassed swales and wooded areas.
- 6.3.4 Storm sewers to have a minimum cover of 18 inches.
- 6.3.5 All public storm sewer pipe must have a minimum diameter of 12 inches with the exception of island drains. Any pipes collecting private surface drainage shall be sized in accordance with current SPS 382 design requirements.
- 6.3.6 Manholes and catch basins shall be designed and constructed to allow easy access for maintenance and cleaning. Easy access is defined as any structure conforming to File No. 29 of the latest edition of the Standard Specifications for Sewer and Water Construction.

6.3.7 Catch Basins

- A. Catch Basins at intersections shall be one (1) foot from the end of curb and gutter radius.
- B. Catch Basin spacing – maximum of 300 feet from crest of hill or previous inlet structure to limit the maximum travel distance to 300 feet.
- C. Catch Basins shall be located on the upstream side of the radii, upstream of sidewalks/bike paths, and low points of an intersection.
- D. Minimum 18-inch sump.
- E. Catch Basin frames installed with 30-inch mountable curb and gutter will be Neenah R3501-R or equivalent and shall be set two (2) inches below finished road grade in development with sanitary sewer. When the asphalt surface is applied, the inlets shall be raised to finish grade. (See Figure 7, Appendix A.)

6.3.8 Manholes

- A. Manhole spacing shall not exceed 400 feet.
- B. Storm sewer manholes shall have a minimum 18-inch sump.

6.3.9 End walls, flared end sections, or junction structures shall be required at crossroad culverts and piped installations through or between lots. Riprap shall be required at outfalls with an incoming flow gradient of 5% or more or a peak flow of 10CFS or greater. Rip Rap and/or energy dissipation calculations shall be provided with construction plans.

6.3.10 No plastic end walls will be allowed.

6.4 **SUMP PUMP DRAINS**

- 6.4.1 New developments shall provide proper facilities for future sump pump discharge pipes from each structure per plumbing ordinance Section 10-115.
- 6.4.2 Sump pump collector systems are defined as a front roadside ditch, or a storm sewer with connections, or a collector pipe leading to an approved drainage way.
- 6.4.3 Sump pump lines shall be a minimum four (4) inches diameter smooth walled PVC pipe.
- 6.4.4 Sump pump collectors shall be a minimum six (6) inch diameter smooth walled PVC pipe. No corrugated pipe less than 12" shall be allowed. Sump pump collector pipe shall not be allowed under roadway pavement.
- 6.4.5 Installation shall conform to Figures 9 and 10 located in Appendix A, and shall be inspected and approved by the Engineering Department.
- 6.4.6 Where installations cross platted lots, easements shall be provided on the recorded plat. These must not conflict with other public utilities or private easements.
- 6.4.7 Clean outs shall be provided at least every 100 feet on pipe sizes 10 inches or less; catch basins or equivalent shall be provided on systems 12 inches or larger to accommodate pipe thawing or cleaning equipment.

6.5 ON SITE STORMWATER DETENTION

6.5.1 Dry Ponds

- A. All basin side slopes must not exceed 3:1.
- B. The basin bottom must be sloped at least 1% towards the outlet orifice.
- C. The basin shall have a reinforced emergency spillway and a minimum one (1) foot of freeboard from the 100-year flood elevation.

6.5.2 Wet Ponds

- A. Refer to Appendix B.

CHAPTER 7

FILLING, EXCAVATING, AND BERMS

7.0 GENERAL

- 7.0.1 No person, firm or corporation shall transfer to dump or place upon any lands, public or private, solid fill within the limits of the City of Mequon without first obtaining a permit in compliance with Engineering Division policies and specifications. Filling and excavation shall be in compliance with article VIII, Section 58-671 to 58-678, of the Mequon Code of Ordinances.
- 7.0.2 Preservation of topography. No change in topography of any land shall be permitted which would result in increasing any portion of the slope to a ratio steeper than one and one-half (1½) feet horizontal to one (1) foot vertical within a distance of five (5) feet from an adjoining property line, except with the written consent of the abutting property owner(s) and approval by the city engineer.

7.1 LAND DISTURBING ACTIVITIES

- 7.1.1 The construction of berms, earth moving, grading, land disturbing activities and filling shall comply with article VIII, Section 58-674, erosion and storm water run-off control regulation.
- 7.1.2 The applicant must complete and file with the City an Erosion Control Permit Application, an Application for Filling, Excavating, Berm Construction or Grading, and provide construction plans.
- 7.1.3 Plans must be submitted in compliance with the City of Mequon's Standard Specifications for Land Development – Chapter 2.
- 7.1.4 An application which limits fill to less than 1,000 cubic yards may be approved by staff. Land disturbing activities requiring fill in excess of 1,000 cubic yards shall submit a plan to the Planning Commission for review and approval.
- 7.1.5 The city engineer may waive the permit requirement at his/ her discretion wherein the permit application seeks approval for less than 25 cubic yards of fill and the city engineer is reasonably satisfied that there is no significant likelihood of adverse impact on drainage affecting adjoining properties.
- 7.1.6 All land disturbing activities shall comply with the Construction Site Erosion and Sediment Control Standards developed by the Wisconsin Department of Natural Resources.
- 7.1.7 If land disturbance exceeds one (1) acre, a permittee under this section shall obtain a Water Resources Application for Project Permit (WRAPP, or NOI) from the WDNR.
- 7.1.8 The applicant is responsible for obtaining any permit or approval required for the project by local zoning ordinances, WDNR, or by the U.S. Corps of Engineers before starting the project.

- 7.1.9 A permittee under this section shall notify the Engineering Division before starting any land disturbing activity and again not more than five (5) calendar days after the project is complete.
- 7.1.10 Permit closure inspections shall indicate that the amount of fill or excavation was placed in accordance with the permit. Contact the City of Mequon Engineering Division within five (5) calendar days of completion for closure inspection. Final documentation of permitted activities to be provided to the City no more than 10 calendar days after final completion. Permit is closures are based on the following:
- A. 0-250 C.Y. – Visual inspection by City Staff
 - B. 251-1,000 C.Y. –Material volume certification (i.e. truck tickets) provided by the applicant and reviewed by City staff
 - C. Greater Than 1,000 C.Y. – Record drawings prepared by a Professional Land Surveyor in the State of Wisconsin. Drawings shall conform to the Standard Specifications for Land Development Grading Record Drawings (Section 8.4).

7.2 BERMS

- 7.2.1 Construction of a berm(s) shall require a Filling, Excavating, and Berms Permit from the Engineering Division. The City's Landscape Architect consultant may also be required to review more extensive plans.
- 7.2.2 No berm/land disturbing activity shall be permitted that by reason of noise, dust, odor, appearance, or other objectionable factors, creates a nuisance or a substantial adverse effect upon the property value or reasonable enjoyment of surrounding property.
- 7.2.3 The construction of the berm shall not adversely affect drainage of surrounding properties.
- 7.2.4 Single family residential subdivision restrictions may be more restrictive. If a single-family residential subdivision has restrictions on the construction of berms, the subdivision must approve or conditionally approve the berm plan and acknowledge their approval to the engineering department prior to any city approval. The City of Mequon does not enforce single family residential subdivision covenants and restrictions regarding the construction, landscaping, or maintenance of berms.
- 7.2.5 Berm requirements shall also apply to modifications to any existing berms.
- 7.2.6 The construction of earth berms shall be permitted subject to the following:
- A. Berm(s) shall not exceed four and one-half (4½) feet in vertical height. The nearest toe of the berm shall be located at least 10 feet from a side or rear lot line and five (5) feet from the road right-of-way. The offset requirements from a side or rear lot line may be waived in the case of the joint construction of a berm by adjacent property owners. An earth berm exceeding four and one-half (4½) feet in vertical height shall be permitted only after approval of the Planning Commission.
 - B. All berms shall be constructed such that the width of the base of the berm shall be no less than three (3) times the vertical height of a berm. The vertical height of a berm shall be measured from an average of the existing ground grades on either side of the berm.

- C. All berms shall be constructed such that the side-slopes shall be graded no steeper than four (4) feet horizontal to one (1) foot vertical. The vertical height of a berm shall be measured from an average of the adjacent preconstruction ground elevations on either side of the berm to the top of the berm. Berms shall also be designed to provide a natural appearance, with a serpentine and undulating grade.
- D. A cover growth of City approved plant material or mulching, containing no noxious weeds, shall be immediately established over the entire land disturbed area to prevent erosion or unsightly conditions.
 - 1. Ground covers shall be planted and spaced to result in total coverage of the majority of the required landscape area within three (3) months. Ground cover plants other than grasses must be at least the four (4) inch pot size and must be planted at a rate of one per 12 inches on center, in triangular spacing.
 - 2. Landscape plantings shall be spaced randomly to help visually break up the continuous line of the berm.
 - 3. Prairie Landscaping. The use of prairie, wet meadow sedge, wildflower and tall grass prairie ground covers on berms shall require a narrative that includes:
 - 4. The seed source
 - 5. The seed mixture
 - 6. The proposed nurse crop
 - 7. The planting timeline
 - 8. The maintenance requirements for years 1-5

7.3 RECREATIONAL AND AESTHETIC PONDS

- 7.3.1 Construction of a recreational or aesthetic pond shall require a permit from the Engineering Division.
- 7.3.2 The property owner shall submit a pond plan that identifies maximum pond size, maintenance plan, pond depth, and pond overflow point, placement of excavated material, erosion control devices and final grading for Engineering Division review and approval.
- 7.3.3 For ponds that serve as a stormwater management facility the design shall follow MMSD, WDNR and City of Mequon standards.
- 7.3.4 The construction of new recreational or aesthetic ponds or enlargement of existing recreational or aesthetic ponds shall be subject to the following:
 - A. A minimum four (4) foot wide safety shelf with a maximum depth of 12 inches shall be constructed.
 - B. The slopes leading to the pond edge shall be landscaped with materials which provide adequate traction for foot traffic, avoiding slippage above the permanent waterline.
 - C. The pond normal water level shall be set back no less than 30 feet from the property line. The Planning Commission has the authority to require reasonable conditions including increased setbacks or offsets. The offset requirements may be reduced or waived by staff or the Planning Commission in the case of the joint construction of a pond by adjacent property owners.

- D. The outside pond slope shall be no steeper than five (5) feet horizontal to one (1) foot vertical above the normal water level and three (3) feet horizontal to one (1) foot vertical below the safety shelf.
- E. The area of the pond at the normal water level shall be no greater than 20% of the total lot area.
- F. All recreational and aesthetic ponds shall have a landscape plan.

7.4 RETAINING WALLS

- 7.4.1 Retaining walls are structures that are constructed to support almost vertical (steeper than 70 degrees) or vertical slopes of earth masses.
- 7.4.2 The construction of retaining walls shall be subject to the following:
 - A. Retaining walls shall have a minimum offset of three (3) feet from an adjoining lot line and five (5) feet from a street right-of-way or the fall height of the wall whichever is greater. This offset may be increased by the city engineer if the physical conditions of a property, such as drainage or trees, require a larger offset.
 - B. Retaining walls more than three (3) feet in height require retaining wall design and certification by a State of Wisconsin Professional Structural Engineer.

CHAPTER 8

RECORD DRAWINGS

8.0 GENERAL

8.0.1 The City shall be provided with electronic files of all record drawings. These files must be compatible with AutoCAD LT 2015 in DWG format or match City of Mequon Geographic System Geodatabase format. The file shall be in North American Datum of 1983 for horizontal control and the North American Vertical Datum of 1988 for vertical control.

A. The electronic files shall include:

1. Lot lines and ROW (from design)
2. Sanitary sewer alignment, structures, laterals, and elevations based on post-construction field survey
3. Water distribution alignment, structures, and laterals based on post-construction field survey
4. Storm sewer alignment, structures, laterals, sumps and elevations based on post-construction field survey
5. Dimensions, pipe length, slopes, fittings and Stormwater BMPs
6. Edge of pavement, including roadway, sidewalk, and paths (from design)
7. Centerline alignment including roadway, sidewalk, and paths (from design)

B. The electronic files shall match the City of Mequon Geodatabase format for:

1. Sanitary Sewer System
2. Water Distribution System
3. Storm Drainage System
4. Roadway, Sidewalk, and Path Alignments

8.1 SANITARY SEWER RECORD DRAWINGS

8.1.1 As-built plans must comply with MMSD Rules.

8.1.2 Sanitary sewer record drawings to include the following:

A. Title Block

1. MMSD File Number
2. MMSD Plan Approval Date
3. Name of road(s) facilities are located in
4. Where in that road they are located (i.e. From / To)
5. Name of Contractor that built facilities
6. Date of Construction
7. Drawn by, Checked by and Scale
8. Engineer's Stamp

B. General Notes

1. Name of Development in upper right-hand corner
 2. External manhole seals extending from casting to cone
 3. Main line size and material
 4. Lateral size and material
- C. New work shall be shown in bold font and lineweight
- D. Length of lateral from the main line
- E. Approximate depth and elevation of lateral at lot line and height for risers
- F. Adjoining as built file numbers
- G. City of Mequon manhole numbers to be provided by City staff
- H. Post-construction field survey elevations
1. Manhole rims
 2. Pipe inverts
 3. Depth of bends and/or fittings for force mains
- I. Two ties to the end of every lateral. Ties must be to an above ground reference point.
- J. Distance from a manhole to a lateral should be labeled on the same side as the lateral itself. The overall distance between manholes should be in parenthesis. This can be located on either side of the main line.
- K. Other criteria
1. Paper size should be 12" x 36"
 2. Page breaks should always be at manholes, never between manholes
 3. Only sanitary sewer main line, laterals and manholes described on that page should be in bold line weights. Connecting main line and manholes should be in standard line weights.

8.2 WATER DISTRIBUTION SYSTEM RECORD DRAWINGS

8.2.1 Watermain record drawings to include the following information:

- A. Title Block
1. Name of road(s) facilities are located in
 2. Where in that road they are located (i.e. From / To)
 3. Name of Contractor that built facilities
 4. Date of Construction
 5. Drawn by, Checked by and Scale
 6. Engineer's Stamp
- B. General notes
1. Name of Development in upper right-hand corner
 2. Main line size, and material
 3. Lateral location, size, and material
 4. Watermain fitting, valve, and hydrant invert elevation

5. Distance from ROW centerline to the watermain
 6. Distance along the main from a fitting, valve, grade break, hydrant lead, to the next fitting, valve, grade break, or hydrant lead.
 7. Lot Number, Parcel ID and/or Address of Water Service
- C. City of Mequon valve, hydrant, and structure numbers
- 8.2.2 A full-time inspector shall be located at the job site during construction of the watermain and laterals. The contractor responsible for the construction of the water distribution system and water service laterals is also responsible for notifying the City per the notification policy of the City of Mequon. (See Appendix E)
- 8.2.3 All water distribution system record drawings are required to be reviewed and approved by the City.
- 8.3.4 Other criteria
1. Paper size should be 12" x36"
 2. Limit page breaks between hydrants
 3. Show stationing for a reference line

8.3 STORM SEWER RECORD DRAWINGS

- 8.3.1 Storm sewer record drawings shall include the following:
- A. The plan shall consist of a system plan at a 1"=100' scale.
 - B. All appurtenances relating to storm sewer.
 - C. Mainline type, size and length.
 - D. Sump line type, size, cleanouts and lateral locations.
 - E. Catch basins, manholes, type of construction.
 - F. Rim elevations and invert elevations at all manholes/catch basins.
 - G. Subdivision lot numbers consistent with final plat.
 - H. Edge of pavement, right-of-way.
 - I. Street name.
 - J. Name of contractor, date construction was complete.
 - K. Name of inspector, firm.
 - L. Subdivision name.
 - M. Storm sewer easements and widths.

8.4 GRADING AND DRAINAGE RECORD DRAWINGS

- 8.4.1 After finished grading is accomplished, a grading record drawing shall be accomplished to verify conformance with the approved grading plan. The drawing shall consist of the following:

- A. Use approved grading plan as the base sheet. Denote "Grading Certification" in bold letters at the top and specify the firm doing the as-built. Cross out the name of the design firm if different than firm doing the grading certification.
- B. Spot elevations in the center of all lot pads or main building corners (for commercial properties) to the nearest tenth of a foot.
- C. Spot elevations at all property corners to the nearest tenth of a foot.
- D. Storm sewer pipe and culvert invert elevations to the nearest hundredth of a foot.
- E. Storm sewer structure rim elevations to the nearest hundredth of a foot.
- F. Edge of pavement or curb and gutter top of curb and flange elevations at every even station, including all high and low points, to the nearest hundredth of a foot.
- G. Typical ditch cross section at every even station, including all high and low points, edge of pavement, shoulder, ditch flowline, and top of backslope, to the nearest tenth of a foot.
- H. Berm elevations, top of bank and toe of slope, to the nearest tenth of a foot.
- I. Spot elevations at all high and low points to the nearest tenth of a foot.

APPENDIX A

Detail Drawings

Figure 1-Typical Residential Street Cross-Sections

Figure 2-Residential Street Cross-Sections (Conservation Subdivisions)

Figure 3-Typical Residential Street Cul-de-sacs

Figure 4-Entrance Island

Figure 5-Acceleration /Deceleration Lanes & Intersection Bypass Lane

Figure 6-Concrete Curb and Gutter

Figure 7-Curb Inlets

Figure 8-Temporary Asphalt curb wedging

Figure 9-Sump Collector Clean Out

Figure 10-Sump Line

Figure 11-Fire Cistern Detail

Figure 12-Bike Path

Figure 13-Riprap Flume

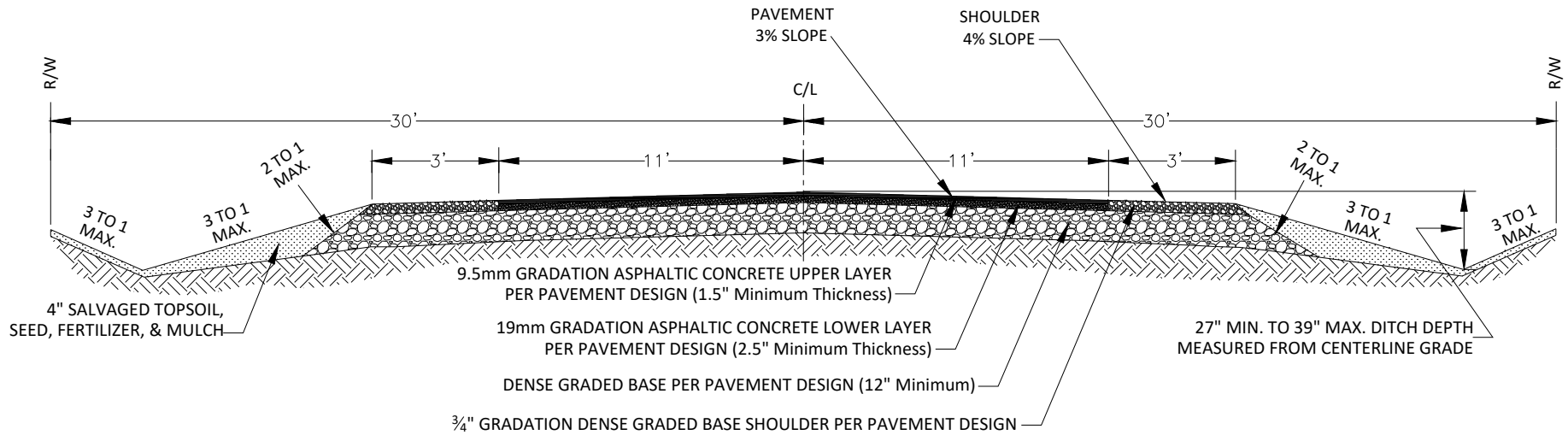
Figure 14-Sediment Basin with Standpipe (5 Acres or more)

Figure 15-Sediment Trap with Standpipe (Less than 5 Acres)

FIGURE 1

STANDARD RESIDENTIAL STREET CROSS SECTIONS

OPEN DITCH SECTION



CURB & GUTTER SECTION

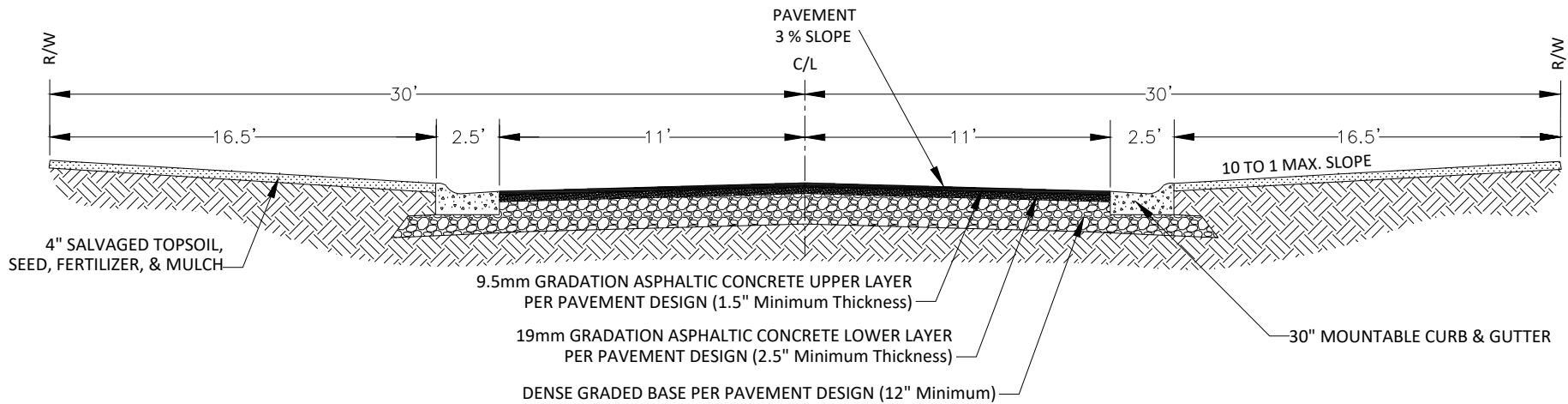


FIGURE 2

RESIDENTIAL STREET CROSS SECTION CONSERVATION SUBDIVISION

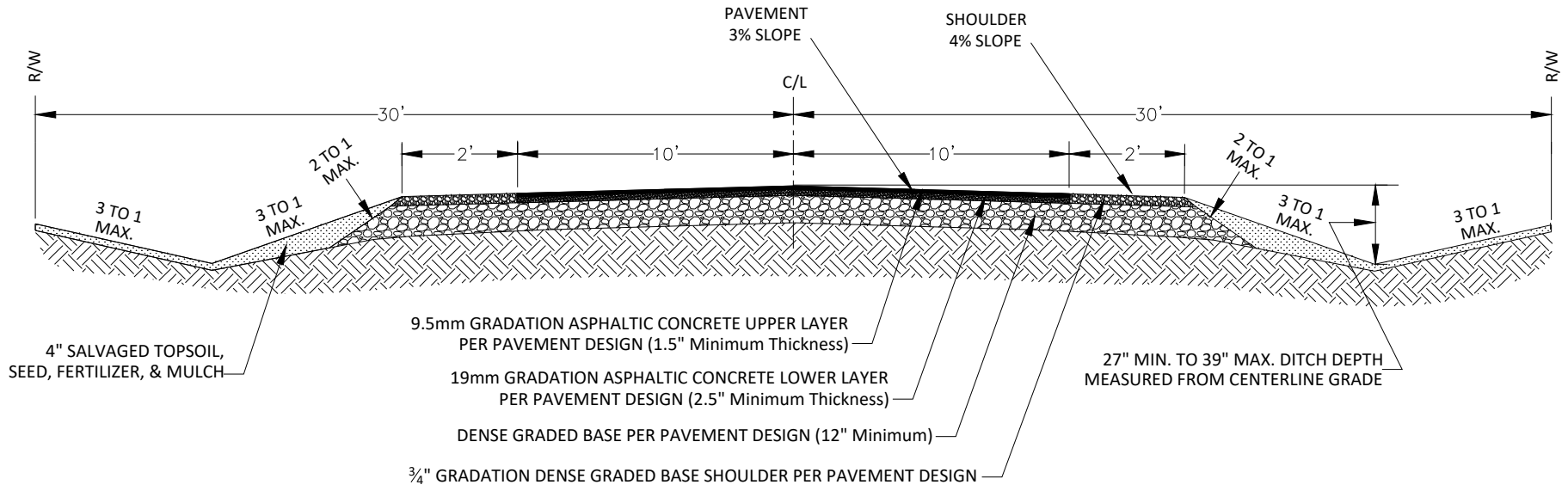
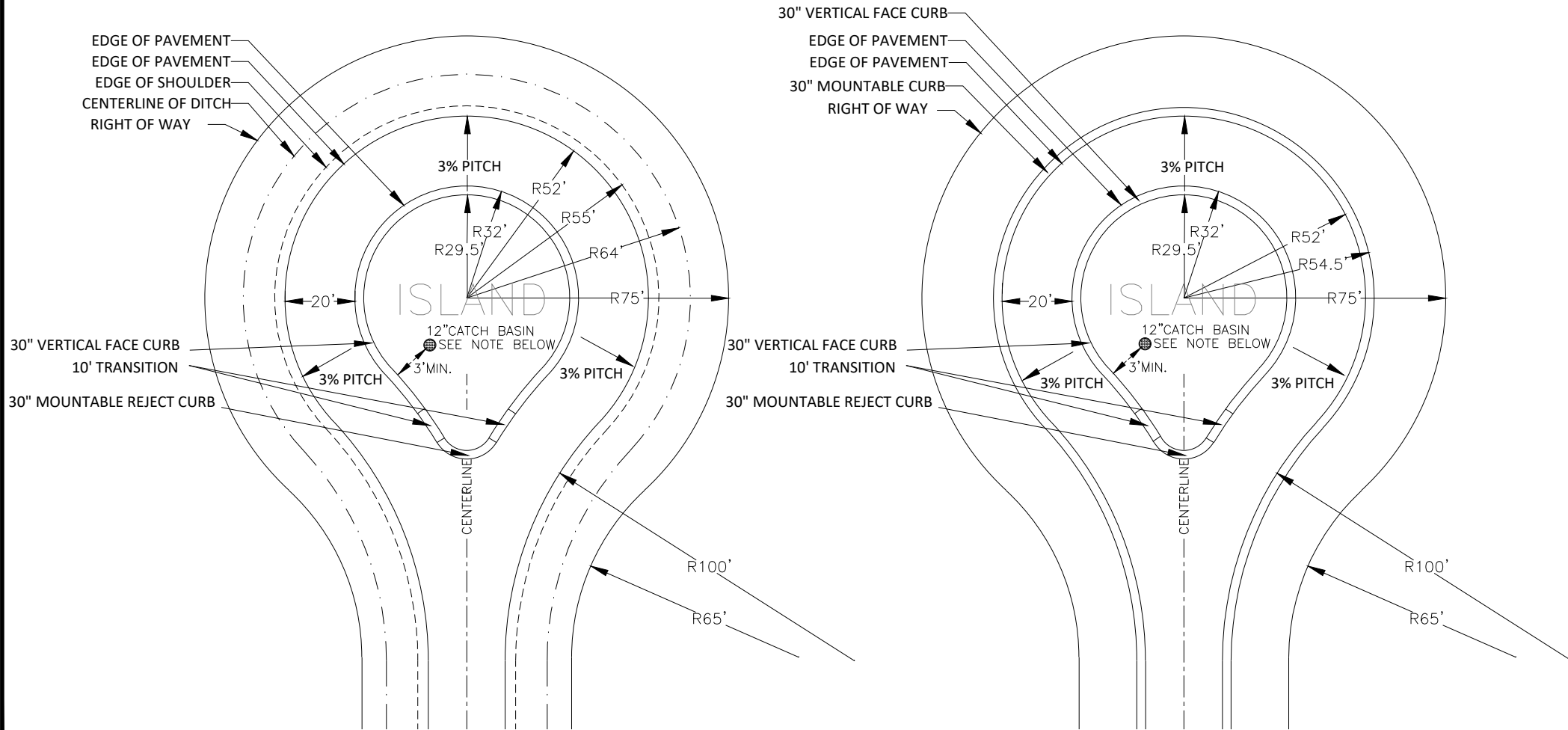


FIGURE 3

TYPICAL RESIDENTIAL STREET CUL DE SAC

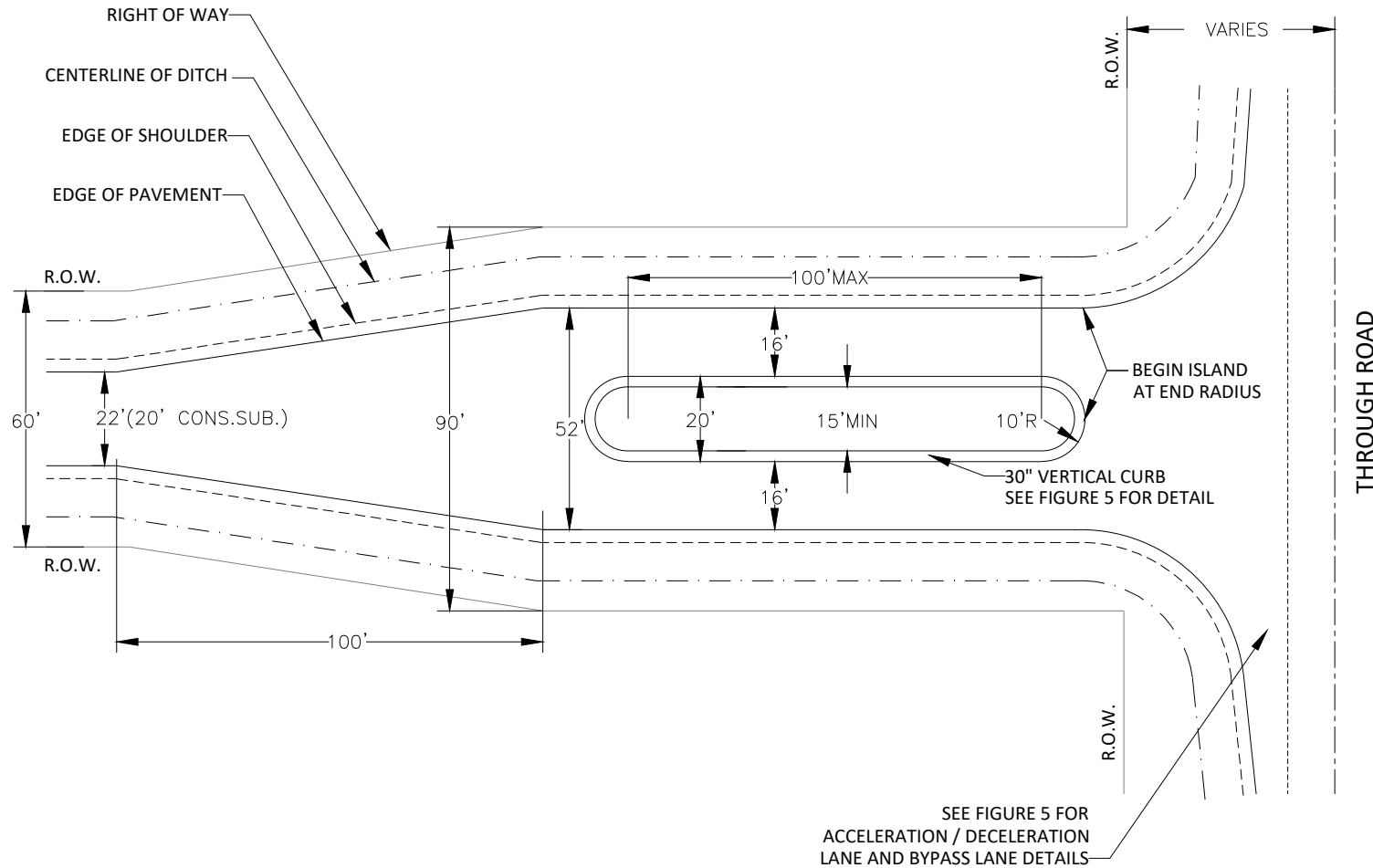
WITH OUTSIDE SHOULDERS AND DITCHES

WITH OUTSIDE CURB AND GUTTER



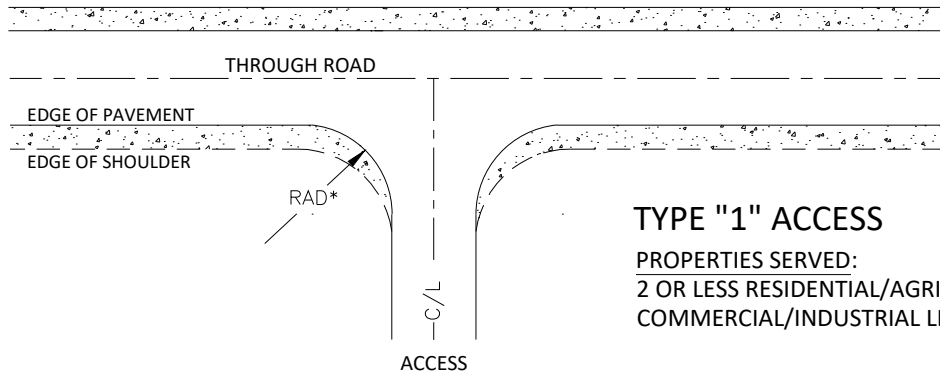
NOTE: All cul de sacs shall have vertical face curb & gutter in island.
 An 8"(min.) storm sewer pipe with a 12"(min.) catch basin shall be installed under cul de sac
 to drain island to outside ditch or storm sewer system.(Location determined by design engineer.)

FIGURE 4
ENTRANCE ISLAND



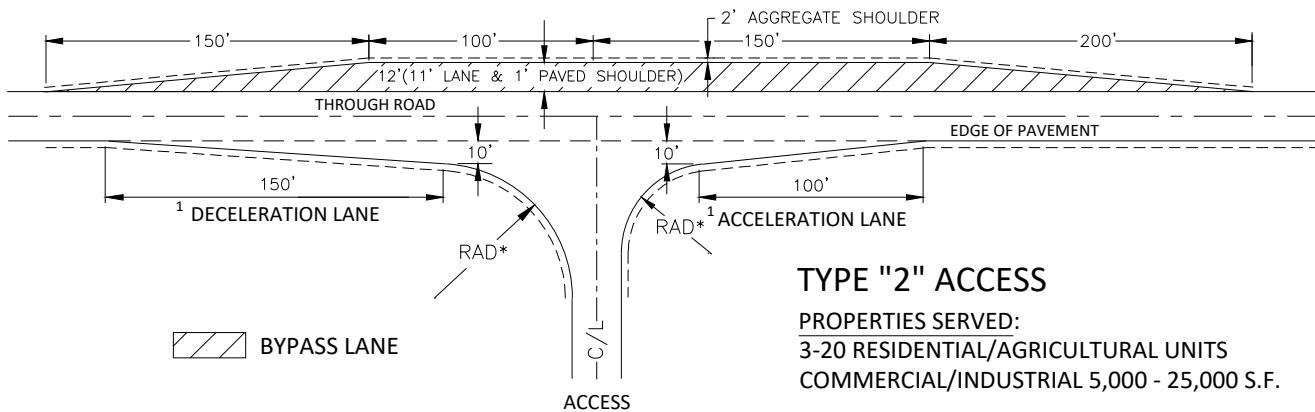
NOTE: THERE SHALL BE NO DRIVEWAY CUTS THROUGH ENTRANCE ISLAND

FIGURE 5



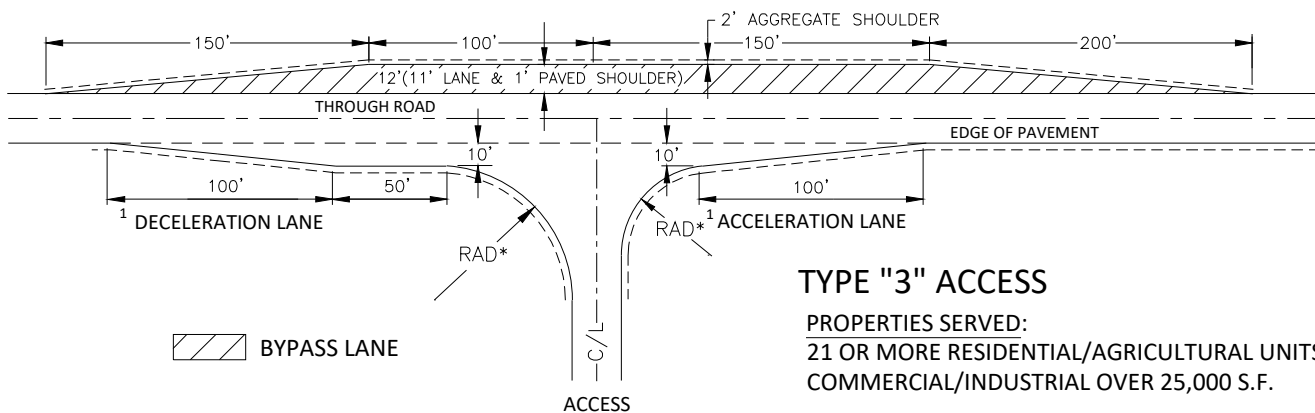
TYPE "1" ACCESS

PROPERTIES SERVED:
 2 OR LESS RESIDENTIAL/AGRICULTURAL UNITS
 COMMERCIAL/INDUSTRIAL LESS THAN 5,000 S.F.



TYPE "2" ACCESS

PROPERTIES SERVED:
 3-20 RESIDENTIAL/AGRICULTURAL UNITS
 COMMERCIAL/INDUSTRIAL 5,000 - 25,000 S.F.



TYPE "3" ACCESS

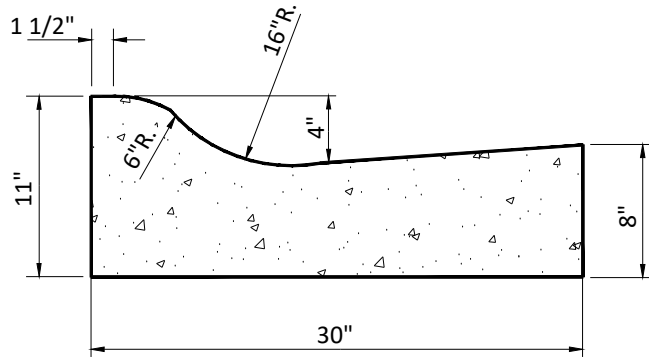
PROPERTIES SERVED:
 21 OR MORE RESIDENTIAL/AGRICULTURAL UNITS
 COMMERCIAL/INDUSTRIAL OVER 25,000 S.F.

* TO DETERMINE PAVEMENT RADII, SEE WISDOT FACILITIES DEVELOPMENT MANUAL, CHAPTER 16, FIGURE S.D.D. 9A 1-11A

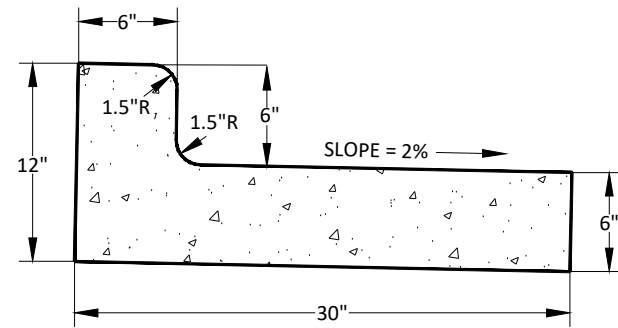
1. ACCELERATION AND DECELERATION LANES REQUIRED ON ALL CITY ROADS CLASSIFIED AS MINOR ARTERIAL OR HIGHER WHEN PEAK TRAFFIC DEMAND AND ACCESS LOCATION WARRANT.
2. BYPASS LANE REQUIRED WHEN THE A.D.T. OF THE THROUGH ROAD IS 1500 OR MORE, OR WHEN IN THE JUDGEMENT OF THE CITY ENGINEER, PEAK TRAFFIC VOLUME DEMAND AND/OR LOCATION OF ACCESS WARRANT.

FIGURE 6 CONCRETE CURB & GUTTER

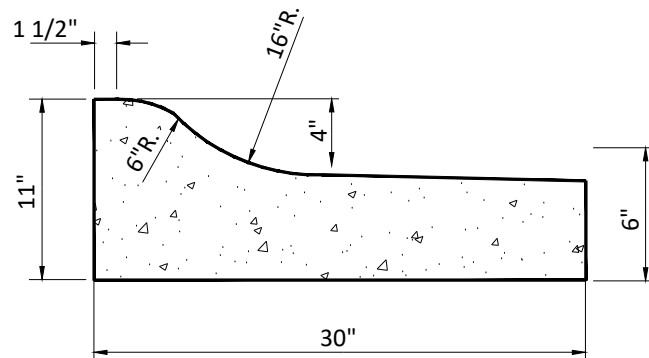
MOUNTABLE CURB SECTION



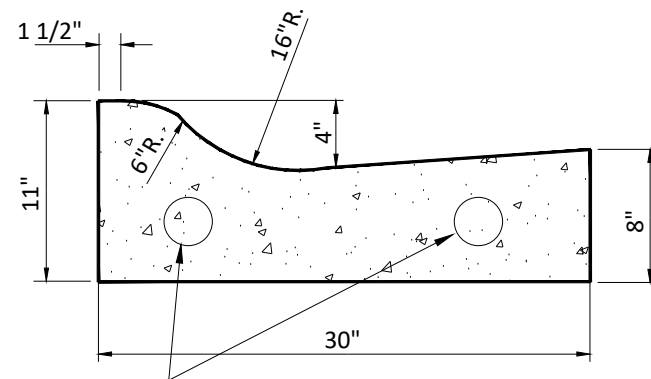
HIGH SIDE
VERTICAL FACE
ISLAND CURB SECTION



MOUNTABLE HIGH SIDE CURB SECTION



CURB & GUTTER REPAIR/REPLACE



TWO (2) #6 DEFORMED 24-INCH EPOXY COATED REBAR
ANCHORED INTO DRILLED HOLES WITH EPOXY TO EXISTING CURB & GUTTER

FIGURE 7
CURB INLETS

HEAVY DUTY INLET FOR MOUNTABLE CURB

NOTE: USE NEENAH CATALOG NO R-3501-R HEAVY DUTY
INLET FOR ROLL TYPE CURB OR EQUIVALENT.

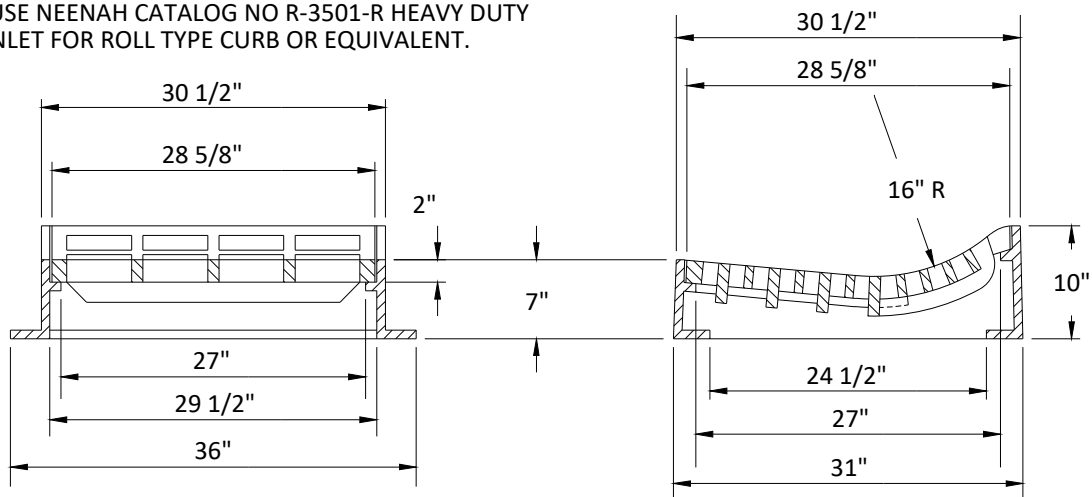


FIGURE 8
TEMPORARY ASPHALT CURB WEDGING

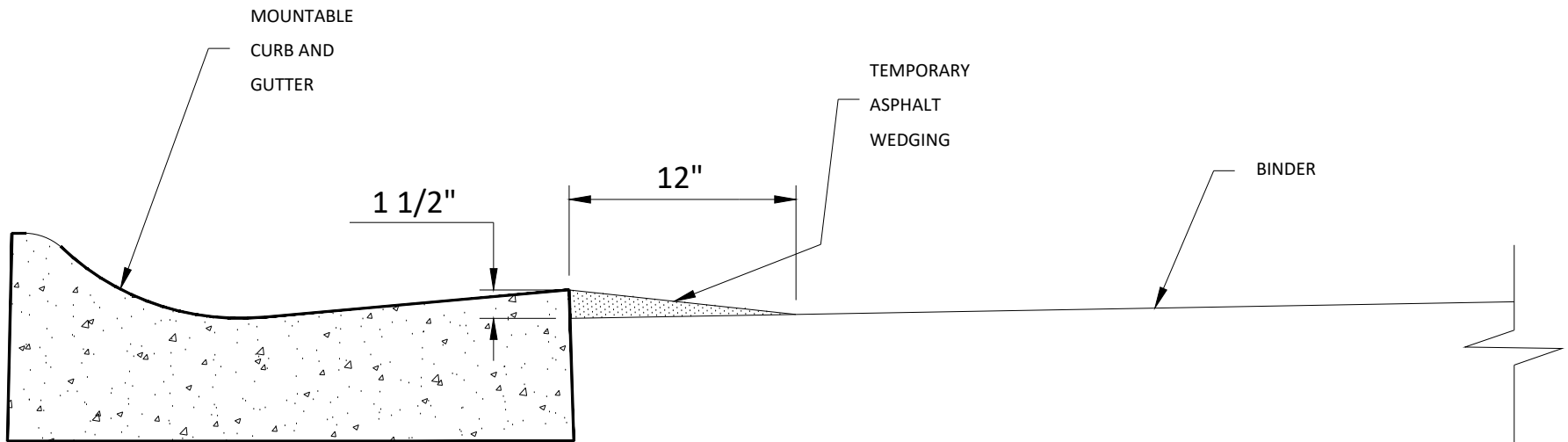


FIGURE 9
SUMP PUMP COLLECTOR CLEAN OUT

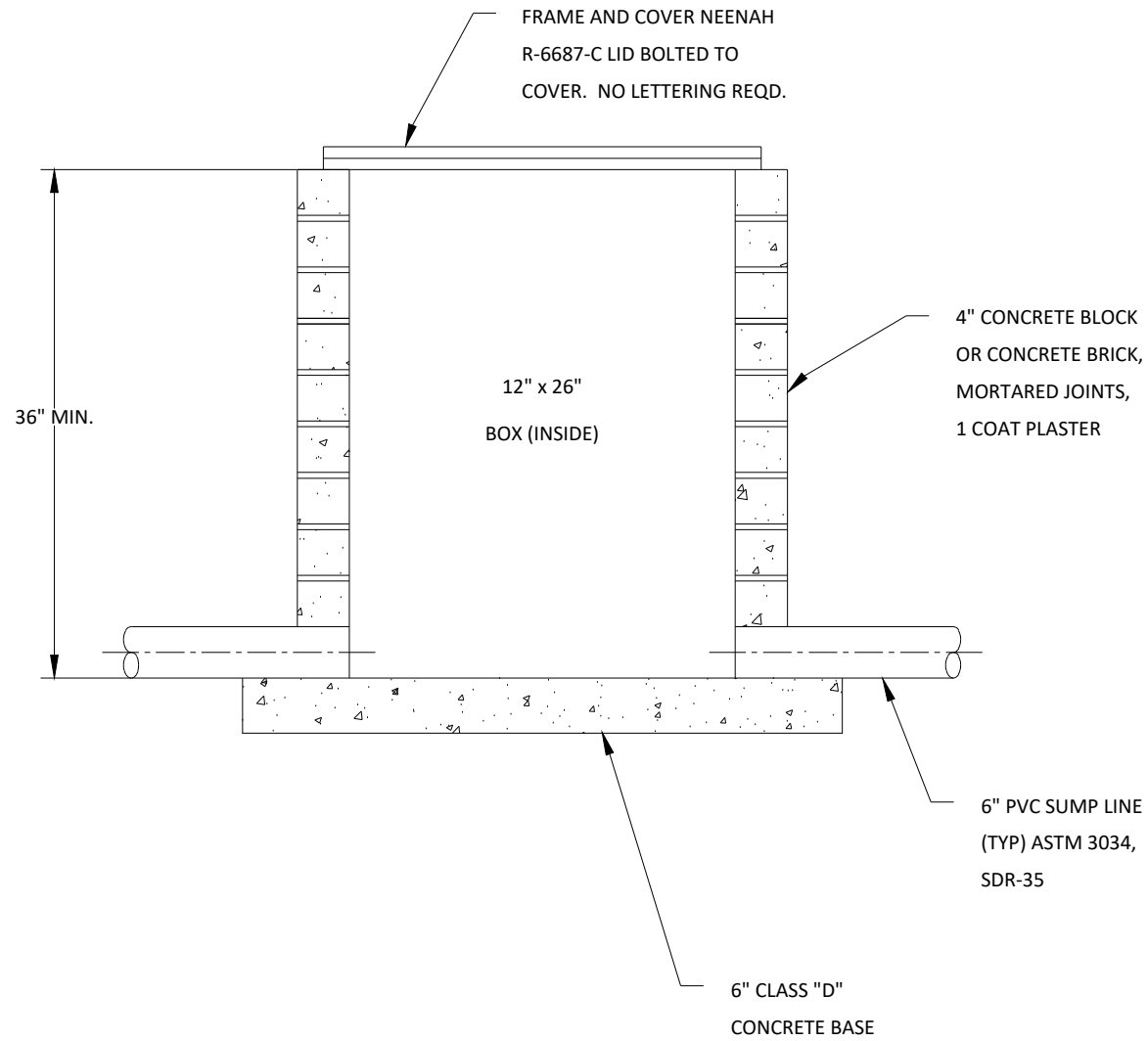
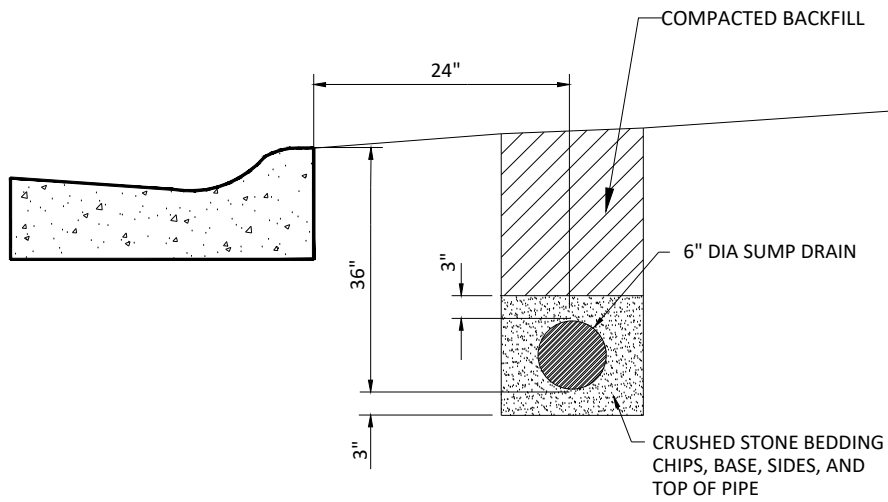


FIGURE 10
SUMP LINES

SUMP LINE TRENCH DETAIL



SUMP TEE DETAIL

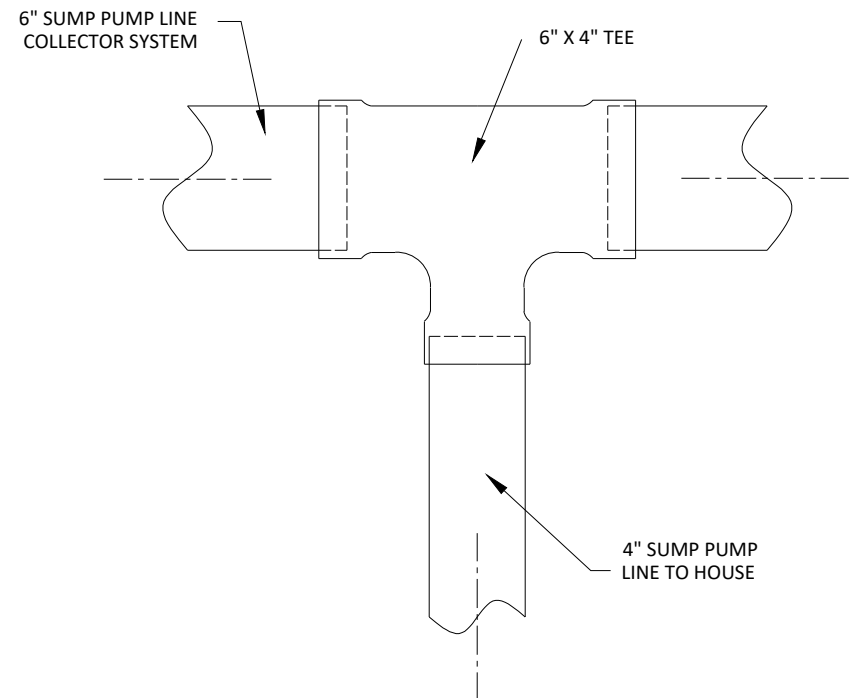
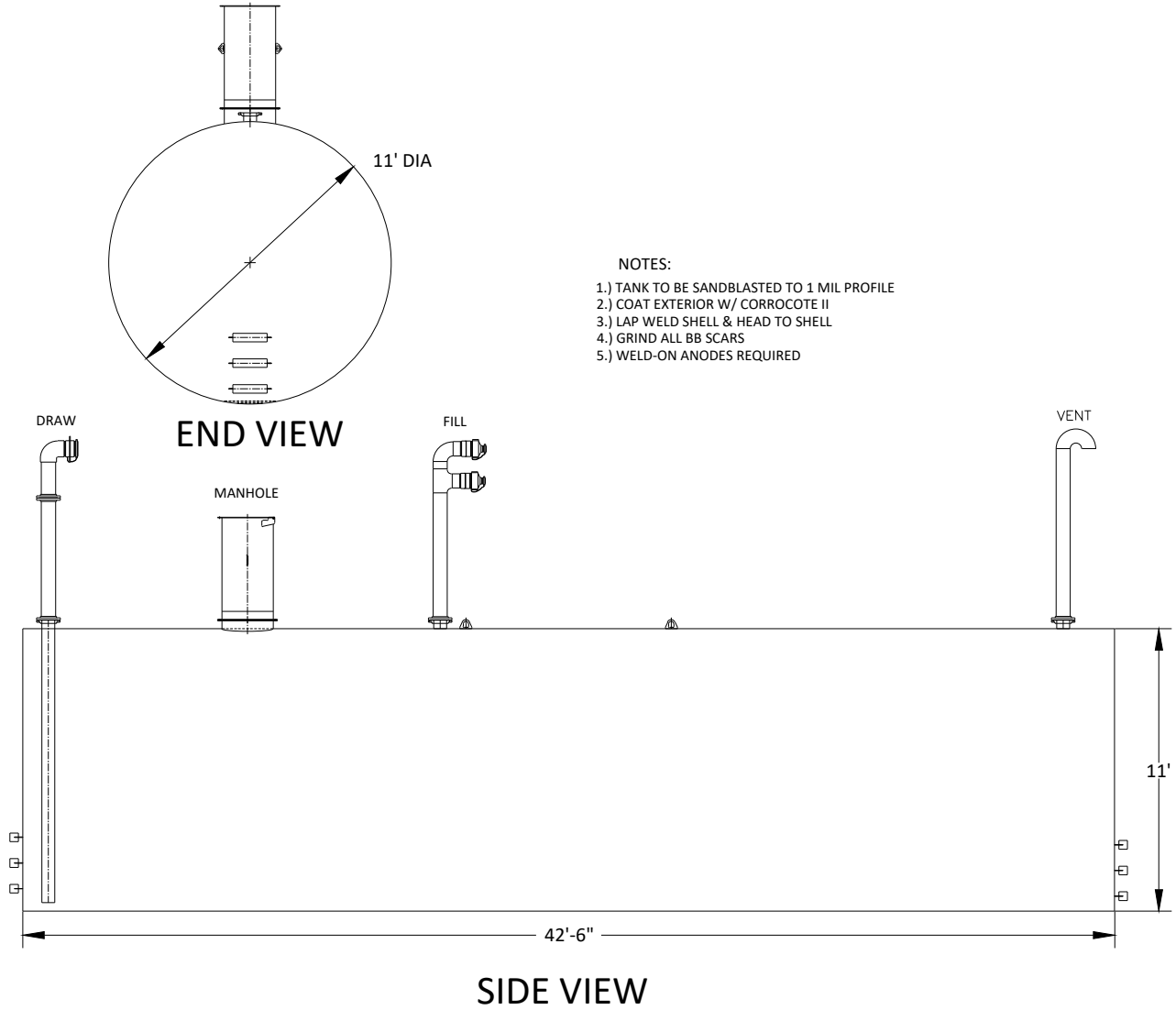


FIGURE 11

FIRE CISTERN DETAILS



11' DIA X 42'-6" 30,000 GAL SW H2O

FIGURE 12

BIKE & PEDESTRIAN PATH

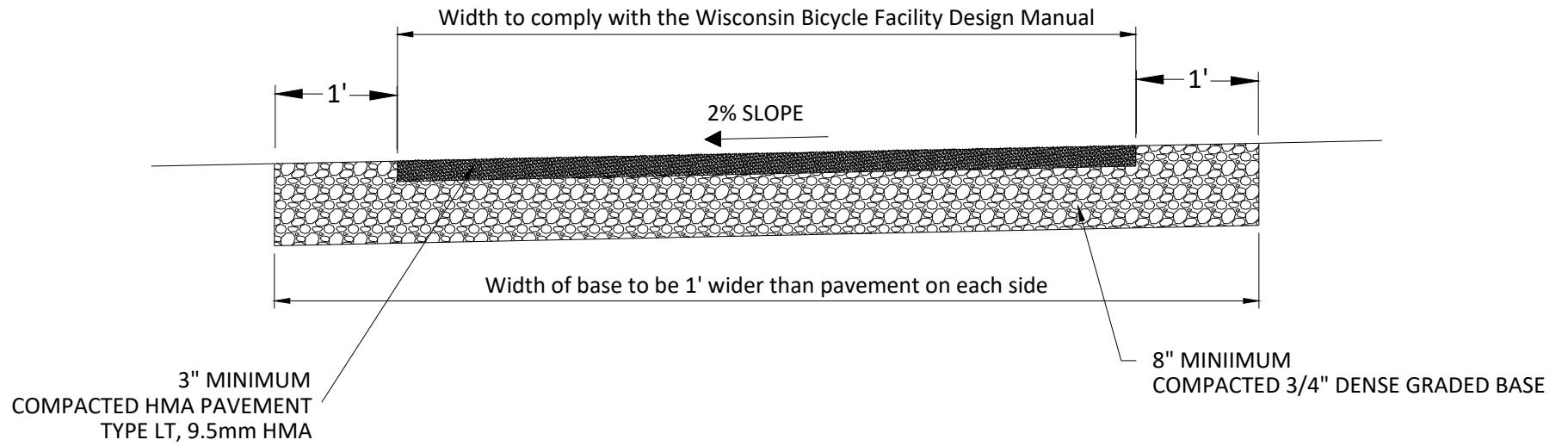
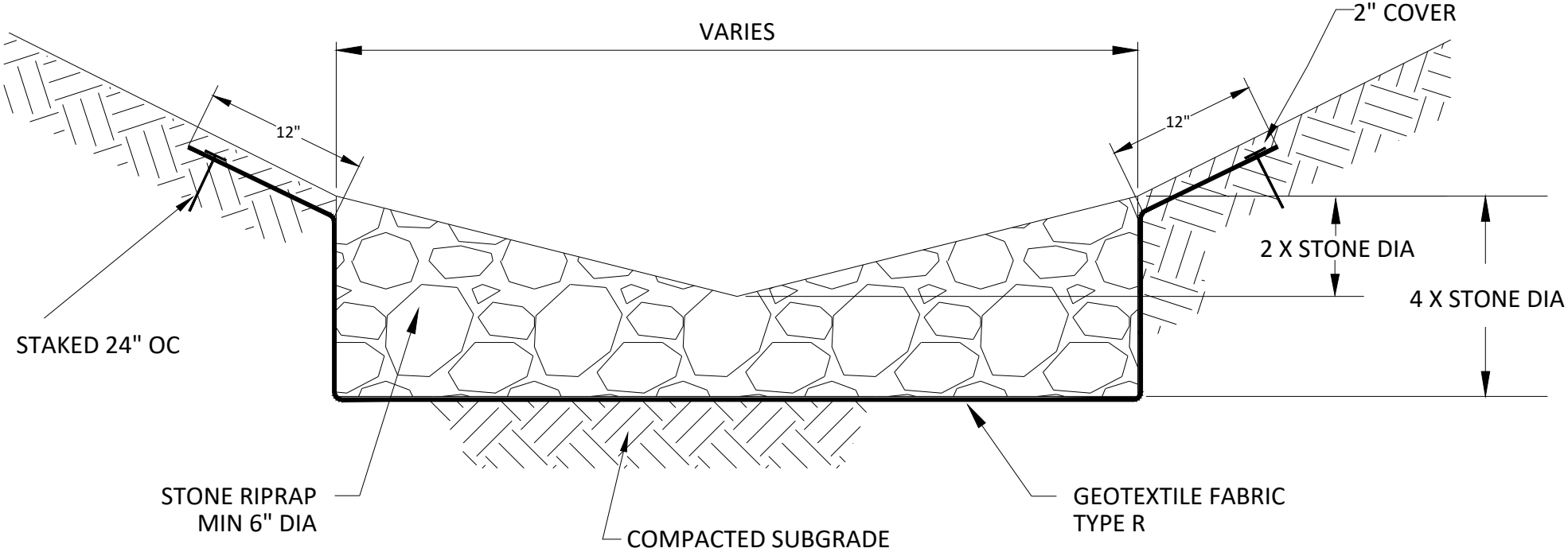


FIGURE 13
RIPRAP FLUME



NOTE: PROVIDE PLAN VIEW AND WIDTH OF FLUME BASED ON DISCHARGE RATE.

FIGURE 14

SEDIMENT BASIN WITH STANDPIPE

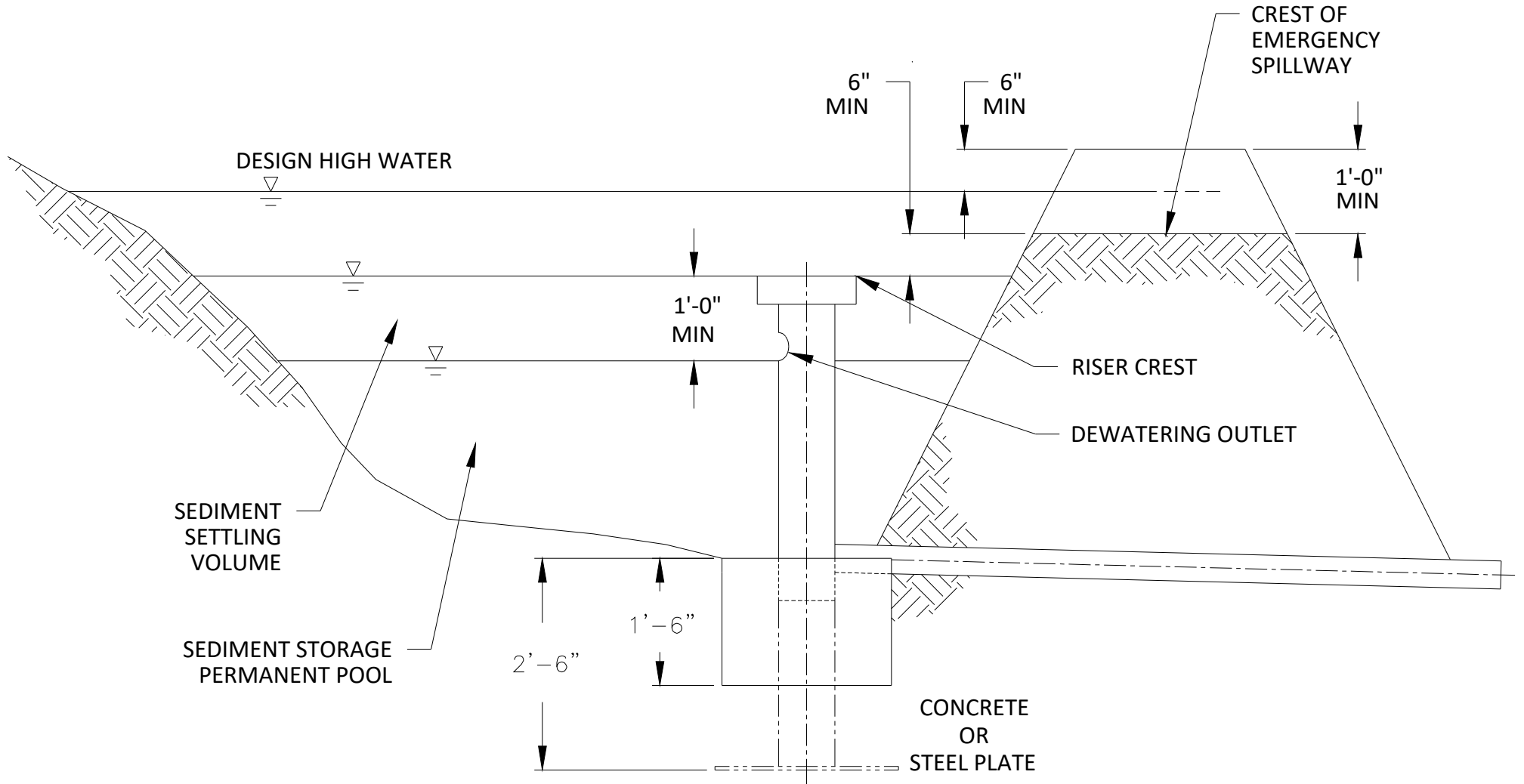
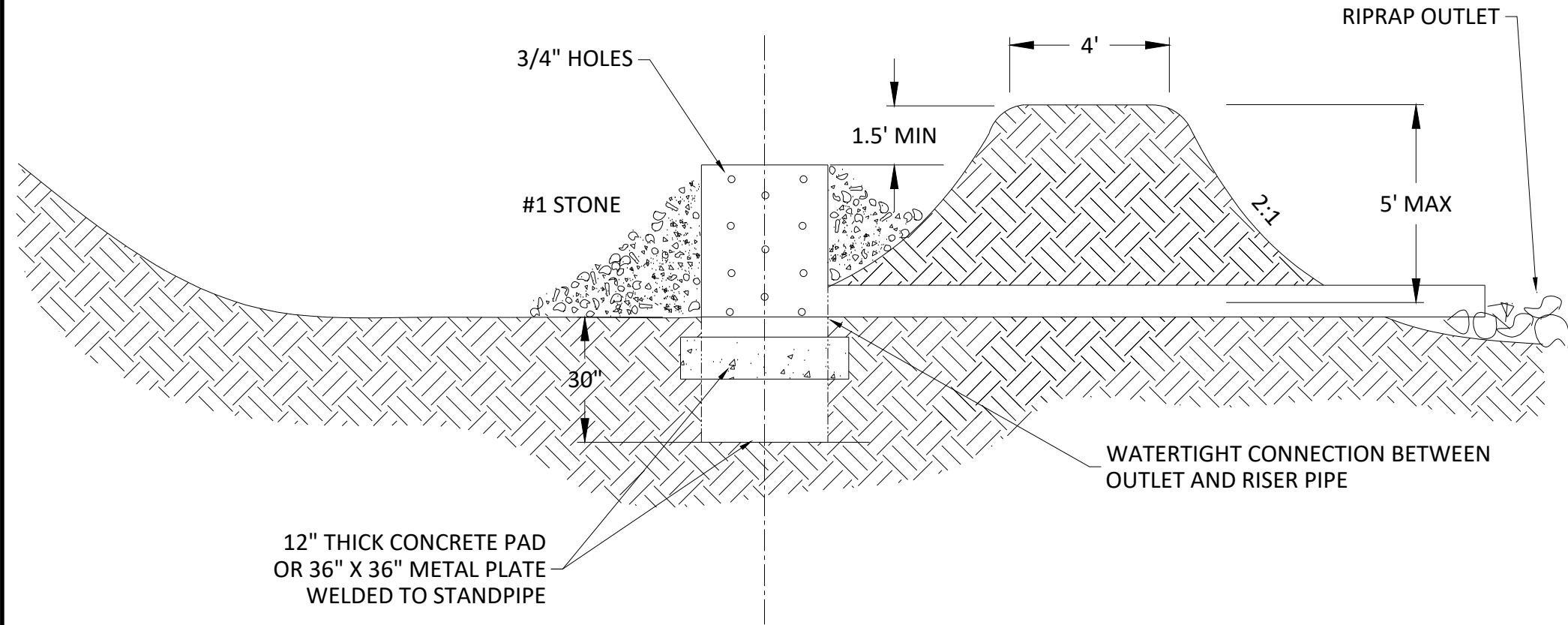


FIGURE 15
SEDIMENT TRAP WITH STANDPIPE
(maximum drainage area - 5 acres)



NOTE: STANDPIPE AND OUTLET PIPE SHALL BE CORRUGATED METAL

APPENDIX B

Erosion and Stormwater Runoff Control Regulations

The latest version of the City Of Mequon Erosion and Storm Water Runoff Control regulations can be found at the below link:

https://www.municode.com/library/wi/mequon/codes/code_of_ordinances?nodeId=PTIICOOR_CH58PLD ERE_ARTVIIIERSTRU

Wet Detention Basin D.N.R. Technical Standard 1001

The latest version of the WDNR Wet Detention Basin Technical Standard 1001 can be found at the below link:

<https://dnr.wisconsin.gov/sites/default/files/topic/Stormwater/1001WetDetentionPond.pdf>

Land Application of Anionic Polyacrylamide D.N.R. Technical Standard 1050

The latest version of the WDNR Land Application of Additives for Erosion Control D.N.R. Technical Standard 1050 can be found at the below link:

<https://dnr.wisconsin.gov/sites/default/files/topic/Stormwater/1050LandApplAdditives.pdf>

APPENDIX C

MMSD Rules and Regulations **Chapter 13 Surface Water and Storm Water**

The latest version of the MMSD Chapter 13 Surface Water and Storm Water Rules and Regulations can be found at the below link:

<https://www.mmsd.com/government-business/rules-regulations/rules>

APPENDIX D

Street Tree Planting and Tree Preservation Regulations

The Developer shall comply with the most current Ordinance as it pertains to submittal of landscape plans, removal of trees, and replacement landscaping and installation. The Ordinance is available in the Community Development Department at Mequon City Hall.

APPENDIX E

Notification Policy

Notification Policy

A. Preconstruction Meeting

A preconstruction meeting shall be held a minimum of five working days prior to the start of the development construction. All involved contracts, design engineers and/or surveyors shall attend. The owner(s) may attend at their option. A three-day notice shall be required to set a date for the meeting.

B. Sanitary Sewer and Water Utility

The City of Mequon Engineering Division shall be notified at least three working days prior to the start of any sanitary sewer or watermain construction. If a consulting firm is being used by the City for sanitary sewer or watermain inspection, then the contractor shall also notify the consulting firm, per their requirements.

C. Roadway and Asphalt-Paving Inspection

The City of Mequon Engineering Division shall be notified at least three working days prior to the required sub-grade or finished gravel grade inspection and grade check. Due to the increasing amount of construction in the City, the City will no longer guarantee same day inspections. Any restaking that is needed for the City to perform their inspections will result in a postponement of the inspection and a rescheduling of the inspection to the next available time. Prior to City inspections, the contractor shall have the project surveyor provide adequate horizontal and vertical control throughout the entire project area. This control will be maintained from the start of the project to the end of the project. The City of Mequon Engineering Division shall be notified at least three working days prior to the start of any asphalt paving.

D. General

The scheduling of inspections for Section B and C is done on a first come, first serve basis. The City of Mequon Engineering Division intends to enforce the three working day notification policy. The practice of one day notification to the Engineering Division will no longer be tolerated. If a contractor has encountered problems (i.e. weather, equipment, and schedule) and wants to call off an inspection he should do so as soon as possible. If an inspection has been scheduled and for some reason the contractor does not show up or isn't ready and does not call to cancel the appointment, the developer will be billed for a minimum of two (2) hours of time for a two-man survey crew, and another three working days notification for inspection may be required. The contractor that is responsible for the work that is to be inspected is responsible for the compliance of the three-day notification.

APPENDIX F

Chapter 13 Surface Water and Storm Water Reviews **Storm Water Management Plan Submittal Checklist**

The latest version of the MMSD Chapter 13 Rules and Surface Water and Storm Water Reviews Storm Water Management Plan Submittal Checklist can be found at the below link:

<https://www.mmsd.com/government-business/rules-regulations/rules>

APPENDIX G

DEVELOPMENT AGREEMENT TEMPLATE - RESOLUTION 3695

DEVELOPMENT AGREEMENT

Development Name

THIS DEVELOPMENT AGREEMENT (“Agreement”) is made as of _____, 20__, by _____ (the “Developer”) and the City of Mequon, a municipal corporation (the “City”).

RECITALS

A. The Developer desires to improve and develop the property described on the attached Exhibit A (the “Property”).

B. Wisconsin Statutes Section 236.13(2) and Sections 58-634(c) and 58-637 of the Mequon Code of Ordinances (the “Code”) provide that, as a condition of approval, the City shall require that the Developer make and install or have made and installed any reasonably necessary improvements.

C. This Agreement describes the Public Improvements, as defined below, that are necessary to complete the Developer’s proposed development on the Property (the “Development”), the Private Improvements, as defined below, and other terms and conditions of the Development.

D. The schedule for the City’s Public Works Department, and the City’s budget, do not provide for installation of the Public Improvements, and absent this Agreement, there would be a considerable delay in the installation of the Public Improvements.

E. The orderly, planned development of the Development will best promote the health, safety and general welfare of the community.

AGREEMENTS

NOW, THEREFORE, in consideration of the foregoing recitals and the following agreements, and for other good and valuable consideration, the receipt and sufficiency of which the parties acknowledge, the parties agree:

1. Improvements. As defined in this Agreement, the following terms and phrases have the following meanings:

“Improvements” means the Private Improvements and the Public Improvements.

“Private Improvements” means all improvements in the Development required by this Agreement other than the Public Improvements.

“Public Improvements” means all public streets, sidewalks, paths and required appurtenances to the foregoing, including without limitation street name signs, regulatory/public safety signs (speed limit signs, stop signs and so forth) and bollards; sanitary sewer facilities and water supply facilities that connect to the public sewer or public water systems, but in each instance only those portions up to and including stubs of laterals; street trees and any required landscaping in rights of way; street trees and other landscaping in easement areas dedicated to the City for that purpose, but only to the extent specified in such easements; items specified in the Plans, as defined below and approved by the City, as Public Improvements; and items specified in the Code or state statutes as Public Improvements.

2. Proposed Development Plan. The Development as proposed is depicted on the Developer’s proposed development plan.

[USE THE FOLLOWING PROVISIONS FOR SUBDIVISION PLATS]

The proposed development plan was granted Preliminary Plat approval by the Planning Commission on _____. The Preliminary Plat is an expression of approval or conditional approval of the layout submitted and is a guide to the preparation of the Final Plat which will be subject to further consideration by the Planning Commission at the time of its submission.

[USE THE FOLLOWING PROVISIONS FOR ALL OTHER APPROVALS]

The proposed development plan was granted approval or conditional approval by the Planning Commission on _____.

PLANS AND SPECIFICATIONS

3. Plans and Specifications. The Developer shall, at its expense, have plans and specifications (collectively, the “Plans”) prepared for the Improvements. The Plans shall include those plans that are customary in the industry for similar developments, including a site plan, grading, drainage and erosion control plans, stormwater drainage plans, landscaping and open space plans, street plans, utility plans and construction details, including those construction details described in this Agreement. The Plans shall be subject to review and approval of the City Engineer and any regulatory body or other staff person specified below. The Developer shall not commence the Improvements until the Plans are reviewed and approved.

4. Corrections to Plans. The City Engineer may, at any time prior to Final Plat approval, require changes to approved Plans for any of the Improvements to the extent such changes are necessary to correct oversights, omissions or errors, to compensate for changing site conditions or to complete fully the work in accordance with sound engineering practice. The Developer shall perform the work necessitated by any such change entirely at its expense without any claim for reimbursement.

5. Standards. The Plans and design of the Improvements shall comply with the requirements of the current edition of the City’s Standard Specifications for Land Development

and all applicable provisions of the Code and state and federal laws (each a “Regulation”) in place at the time of preliminary approval of the Plans and design. Additionally, the Plans shall satisfy the requirements set forth below. In the event of a conflict between the Standard Specifications and this Agreement, the terms of this Agreement shall control. In the event of a conflict between any Regulations, the more stringent requirement shall apply unless otherwise addressed within the Regulation.

6. Changes in Regulations. Should any Regulation change within two years of the preliminary approval, the Developer may choose which version of the Regulation to follow if material work on the applicable Improvement has commenced. Where work on an Improvement affected by the changed Regulation has not commenced, the Developer shall comply with the revised Regulation.

7. Grading, Drainage and Erosion Control Plans. The Developer shall submit grading, drainage and erosion control plans that:

(a) Indicate which lots are designed for full exposure and partial exposure and the lots that are limited to front load entry garage only.

(b) Show 2’ contours for both existing and proposed grades for building pads and any culverts and storm sewers.

(c) Indicate and detail the cross-section and profiles of all drainage ways and erosion protection.

(d) Show minimum setback and offset dimensions and building grades approved by the City.

(e) For all land disturbing activities, show existing contours at least 200’ into adjacent parcels.

(f) Show the location and dimension of all construction site management measures to control erosion and sedimentation.

(g) Include minimum elevations for the proposed top of principal building foundation walls based on proposed building envelopes shown on the approved specimen tree plan and approved finished yard grades.

8. Stormwater Drainage Plans. The Developer shall submit stormwater drainage plans that:

(a) Provide for a complete storm drainage system, including one or more detention basins and retention ponds, culverts, storm sewer and open ditches that are adequate to accommodate expected surface water flow within and through the Development and drain the surface water from and through the Development in accordance with the Code, Chapter 13 of the

Milwaukee Metropolitan Sewerage District (“MMSD”) rules, and the regulations of the Wisconsin Department of Natural Resources (the “DNR”), as may be applicable.

(b) Show all tributary areas to the proposed drainage system and downstream analysis, including all proposed and existing drainage structures in the drainage system area.

(c) Show drainage easements by dimension and detailed cross-section.

(d) Provide for erosion protection and minimum velocity design and restoration of all areas adjacent to existing and proposed roadways to conform to the approved roadway cross-section.

(e) Address all ditch slopes exceeding five percent (5%). Any such slope that is greater than 5 percent (5%) may only be approved after review and acceptance by the City Engineer. To the extent any such slope shall be greater than five percent (5%), additional analysis of the velocity of the flow and slope protection shall be provided, and such slope might not be approved.

(f) Show all roadside ditches and drainage easements with a minimum one percent (1%) slope. Any such slope that is less than one percent (1%) may only be approved after review and acceptance by the City Engineer. To the extent any such slope shall be less than one percent (1%), additional analysis of the velocity shall be provided, and such slope might not be approved.

(g) Provide on-site stormwater detention that complies, to the satisfaction of the City Engineer, with the City’s stormwater ordinances and MMSD Chapter 13 rules and regulations.

(h) Provide hydrologic calculations for the 2-, 10- and 100-year development conditions.

(i) Provide hydraulic calculations showing pond discharge rates under proposed conditions. Under proposed conditions, a retention pond must demonstrate that the 2-, 10- and 100-year discharge rate will be less than pre-settlement conditions.

(j) Show all sump pump discharge pipes discharging to a roadside ditch, storm sewer or other location approved by the City. For roadways with an urban section, a sump pump collection system shall be required.

(k) Include, if the storm sewer design includes underground piping, a set of utility plans showing all plan and profile views of sanitary water and storm sewer. Such plan shall be used and kept current during all phases of construction.

9. Landscaping, Open Space and Signage Plans.

(a) The Developer shall submit a street tree plan which shall conform to the City's street tree ordinance. The street tree plan shall be subject to review and approval of the Tree Board and Planning Commission.

(b) The Developer shall submit landscape plans for all entryways, open spaces, public street cul-de-sacs and detention basin and retention pond buffers. Such plans shall be designed by a licensed landscape architect and shall be subject to review and approval of the Planning Commission. The City may have a licensed landscape architect review the submitted landscaping and open space plans.

(c) Pedestrian and bike paths may be required by the City. If so, pedestrian and bike path plans shall address the public use of the paths and maintenance. Details of such paths shall be subject to review and approval of the City Engineer. The location and use of such paths shall be subject to review and approval of the Planning Commission. Any public access path shall be subject to a ten foot (10') wide pedestrian and bike path easement. An eight-foot (8') wide path shall be designed and constructed in accordance with the Department of Transportation (DOT) Bike Path Facilities Handbook.

(d) The Developer shall submit signage and entryway plans to the City. Such plans shall be subject to review and approval by the Planning Commission.

10. Street Plans.

(a) The Developer shall submit plans for all public and private roads, driveways and roadside sidewalks (if any). Such plans shall be subject to review and approval by the City Engineer and Fire Chief.

(b) Unless otherwise approved by the City, all public and private streets shall satisfy the following requirements:

(i) All new streets shall be constructed with a twelve-inch (12") road base consisting of twelve inches (12") of one and one-quarter inch (1¼") crushed stone base course. The initial surface shall consist of two and one-half inches (2½") of bituminous binder course. Streets and driveways shall be constructed to the City's typical cross-section. The final one and one-half inch (1½") asphalt surface course shall be applied following the construction of the binder course.

(ii) To the extent the Development will be constructed in phases, the plans shall show all cross connections being constructed in each phase. A temporary turnaround shall be shown on the plans for any street connecting into a future phase and for any street leading to any adjoining property.

(c) The plans shall show street name signs and regulatory/public safety signs (speed limit signs, stop signs and so forth) as required by the City Engineer. Street names shall be approved by the Planning Commission.

11. Sanitary Sewer System Plans.

[USE THE FOLLOWING PROVISIONS IF THE SYSTEM WILL BE PUBLIC]

The Development will have a public sanitary sewer system. The plans for the system shall:

(a) In addition to the City's Standard Specifications for Land Development, conform to the Standard Specifications for Sewer and Water Construction in Wisconsin and additional requirements of MMSD.

(b) Be designed to meet the ultimate needs of the Development in accordance with the City's sanitary sewer system plan.

(c) Show the installation of one sewer lateral from the sanitary sewer main to the limits of the sanitary sewer utility easement or road right-of-way for each property abutting the sanitary sewer main.

(d) Show all sanitary sewer lateral locations.

(e) Be designed so the public mainline shall meet the City's master plan for the area, in terms of depth and size, and be extended to the adjacent properties.

[USE THE FOLLOWING PROVISIONS IF THE SYSTEM WILL BE PRIVATE]

The Development will require a Private On-Site Waste Treatment System ("POWTS"). Plans shall include the location of soil borings and designated areas for the POWTS.

12. Water System Plans.

[USE THE FOLLOWING PROVISIONS IF THE SYSTEM WILL BE PUBLIC]

(a) Supply System. The plans shall satisfy the following requirements:

(i) The plans shall show a water supply and distribution system for the Development with mains, hydrants, valves and laterals for each lot.

(ii) All water mains to be installed in a City road right-of-way or easement shall be subject to review and approval of the City Engineer.

(iii) The City will determine the lateral locations to avoid removal of any specimen trees. The City shall approve all lateral locations.

(iv) The public mainline shall meet the City's master plan for the area, in terms of depth and size, and be extended to the adjacent properties.

(v) Easements shall be provided to adjacent residentially zoned properties for access for potential future connection.

(vi) The mainline water main shall meet Water Utility standards for ISO recommended fire flows of 2,500 gpm, which may require twelve-inch (12") pipe for the dead end main.

(vii) Dead end mains must be terminated with a public hydrant and phasing plans.

(b) Fire Protection.

(i) Water for fire protection will be supplied to the Development water system through the City of Mequon Water System.

(ii) All fire hydrant locations shall be subject to review and approval of the Fire Chief.

[USE THE FOLLOWING PROVISIONS IF THE SYSTEM WILL BE PRIVATE]

The Development will not be served by public water; instead, private wells will be installed. The type of and plans for a fire protection system shall be subject to review and approval of the Fire Chief.

13. Culverts Plan. The Developer shall submit a proposed driveway culvert size plan. Such plan may be included in one of the other plans.

CONSTRUCTION REQUIREMENTS

14. Construction of Improvements. The Developer shall construct or have constructed, at its expense, all of the Improvements.

15. General Standards; Strict Compliance with Plans. All construction shall conform to the City's Standard Specifications for Land Development, latest edition. Construction will strictly conform to the Plans. The City may require the Developer to replace all the Improvements that deviate from the Plans unless the Developer seeks and obtains prior written approval from the City for such deviations.

16. Direction by City Engineer. The Improvements shall be constructed in strict accordance with the requirements and direction of the City and the City Engineer or the City Engineer's authorized representative and shall be under and subject to constant inspection by the City Engineer or the City Engineer's representative.

17. Responsibility for the Improvements. The Developer shall be fully responsible for the Improvements, all appurtenances to the Improvements and the acts and omissions of its contractors, subcontractors, material suppliers, delivery services and agents. The Developer shall repair or replace, at the Developer's cost, any damage that occurs to the Improvements and appurtenances to the Improvements during the period of the construction of the Improvements and until certification by the City Engineer, approval of the Improvements, acceptance of dedication by the City and Final Plat approval.

18. Lien Waivers. As a condition of final certification by the City Engineer, and approval, acceptance and dedication of the Improvements by the City, the Developer shall provide to the City paid receipts and lien waivers from all contractors and material suppliers performing work or supplying materials for the installation of the Improvements.

19. No Lot Assessments for Improvements. The costs and value of the Improvements will become an integral value of the abutting property; therefore, the Developer shall not make any future lot assessment for the Improvements.

20. Additional Grading and Drainage Requirements. The Developer shall (a) rough grade as necessary to establish lot grades in accordance with future building grades, top-soiling, seeding and mulching as required, to all exposed ground surfaces to prevent erosion; (b) keep grading and filling to a minimum, including in individual building envelopes; and (c) spread and maintain topsoil, seed and mulch over all exposed ground surfaces to prevent erosion, including surfaces disturbed by utility contractors.

21. Wetlands. Wetland boundaries shall be identified and marked in the field and verified by the DNR. The wetlands and setbacks shall be identified on the plat. Wetland boundary markers shall be maintained, and setbacks observed, during all phases of land disturbance and construction. No wetland shall be filled without prior approval of the DNR.

22. Additional Erosion and Runoff Control Requirements.

(a) With respect to erosion and sedimentation control, the Developer shall install and construct the Improvements in compliance with the requirements of the Ozaukee County Land Conservation Guidelines (SCS) and the DNR's "Wisconsin Construction Site Best Management Practice Handbook," latest edition, requirements. Temporary stormwater quality measures during construction activities shall include, at a minimum, the installation of silt fence and temporary sediment basins.

(b) The Developer shall install the drainage system, including roads (unpaved, but with gravel surface), first. The swale and ditches shall be sodded or planted with fast growing grasses immediately after grade certification by the City or its designated agent. The City may request temporary mulching if ground is exposed for more than seven days. Straw, hay bales, check dams or silt fences shall be placed in the drainage system as sediment traps in accordance with established best management practices. The City will decide whether sod is appropriate and whether the sediment trap method to be used.

(c) The Developer may not commence land disturbing activities until all erosion control measures are installed and approved by the City. An erosion control permit must be approved which requires the Developer to construct in conformance with the City's erosion control ordinance.

(d) The Developer shall protect all exposed soils with mulches, temporary annual grasses or erosion matting.

(e) The Developer shall not pile or permit excavated soil to be piled near the drainage system. A topsoil stockpile area shall be identified and used, complete with appropriate erosion control measures.

(f) The Developer will periodically inspect the above-described systems and control measures, including after each rain event, and shall promptly maintain, repair and replace them to their originally approved condition.

23. Topsoil. Excess topsoil shall only be removed from the Development by means of end-loading (no screening allowed on site) and trucking from the site. The Developer shall not disrupt topsoil where it is unnecessary, and the final arbiter of necessity shall be the City.

24. Additional Stormwater Drainage Requirements. Stormwater facilities shall be installed before impervious surfaces.

25. Additional Street and Street Signage Requirements.

(a) Prior to the commencement of any construction activity, the Developer shall meet with City Engineering and Public Works staff to identify and agree to a specific "haul" route for all construction equipment and material supplies associated with the Development. The Developer shall agree to confine the movement of its construction equipment to the approved route unless approved otherwise by the City Engineer. The Developer shall provide the Street Wear Financial Guarantee, as defined below. The City shall videotape and perform a road evaluation of the agreed to haul route. This evaluation, known as a service condition rating or "SCR", shall be used as the base line for establishing the level of damage that occurs as a result of the Development. At the conclusion of the construction activity and prior to the recording of the Final Plat, the City will again videotape and perform a post development SCR of the Developer's "haul" route. The road evaluation is only applicable to that portion of the approved haul route that lies within the corporate limits of the City. Prior to the City acceptance of the Public Improvements, the Developer will repair the road or pay to the City the cost, as determined by the City, for the estimated repairs, including without limitation labor, material and costs regularly charged by the City for its staff's time for inspections, shouldering, streets, curbs, gutters, failures, base repairs, defects and utility adjustments.

(b) If the surface course of a street cannot be constructed prior to October 15, the Developer shall provide the Surface Completion Letter of Credit, as defined below.

(c) At the time of any extension of any street in the Development for which a temporary turnaround was constructed, the Developer shall remove the temporary turnaround and restore the area.

(d) The roadside sidewalk shall be installed at the time of street construction. Until Final Plat approval, the Developer shall maintain (including snow and ice removal) such roadside sidewalks and repair and replace them as necessary.

(e) The Developer shall provide and install street name signs and regulatory/public safety signs required by the Plans in the form required by the City.

26. Additional Utility Requirements.

(a) The Final Plat shall include easements for sanitary, drainage, gas, electric, sewer, water, phone, cable television, internet and other utilities for provision of services to and from the Development.

(b) All sanitary, water and drainage easements must be prepared separately for each lot or parcel and recorded at the Developer's expense. These documents shall be subject to review and approval of the City and shall be required at the time of Final Plat approval.

(c) The Developer shall provide proof of payment in full for installation of all required utilities prior to Final Plat approval.

(d) Underground utility installations shall be subject to review and approval by the City Engineer and shall be made without any street pavement removal, unless otherwise specifically approved by the City Engineer.

(e) **[USE THIS PROVISION IF THE WATER SYSTEM WILL BE PUBLIC]** The Developer and the City shall enter into a Water Services Agreement in form and content customarily required by the City prior to connection to the City's water system.

[USE THIS PROVISION IF THE WATER SYSTEM WILL BE PRIVATE] If the Fire Chief has required a cistern for fire protection, the Developer shall install the cistern pursuant to the requirements of the Fire Chief. If the Fire Chief has allowed deferral of installation, the Developer and the City shall establish the Fire Protection Escrow as described below.

27. Lot Pipe Certification. The Developer shall, prior to Final Plat approval, provide to the City a lot pipe certification stamped and signed by a professional land surveyor, registered in the State of Wisconsin. The form and content of the lot pipe certification shall be acceptable to the City Engineer.

MODEL HOMES

28. Model Homes.

(a) Subject to satisfaction of all other requirements for a building permit, the City will issue a building permit for _____ principal structures to be used as sales models prior to approval and recording of the Final Plat.

[INSTRUCTION FOR COMPLETING THE NUMBER OF STRUCTURES: The number of principal structures (models) allowed shall be determined pursuant to the following table:

Land Division	Model Homes		Land Division	Model Homes
1-10 lots	1		51-60 lots	6
11-20 lots	2		61-70 lots	7
21-30 lots	3		71-80 lots	8
31-40 lots	4		81-90 lots	9
41-50 lots	5		91 or more lots	10

*The City may consider a deviation in the number of model homes, up to 10% of the number of lots included in the land division (rounded to the nearest whole number), for special circumstances. Special circumstances must be presented and justified by the Developer at the time of application.

** If the development will be constructed in phases, with a separate development agreement for each phase, the total number of model homes pursuant to this Agreement shall be limited to the number of lots in the phase addressed by this Agreement.

(b) If the Developer is unable, despite reasonable efforts, as determined by the City in its sole discretion, to satisfy the paving requirements of Section 3.6 of the Standard Specifications for Land Development, the City will, upon application of the Developer and satisfaction of all other requirements for a building permit, issue a building permit for one model home prior to the installation of the binder course of asphalt in the adjacent dedicated public road or private access easement. The City shall not issue the building permit for such model home until stone base is installed and such stone base has successfully passed a proof roll. The stone base shall allow, as determined by the City in its sole discretion, access for inspections and emergency personnel. The City may cancel inspections if adequate access is not provided to inspections staff.

(c) The Developer shall not transfer title to any lot containing a model home until the Final Plat is approved and recorded as described below.

**ASSOCIATION; COVENANTS, CONDITIONS AND RESTRICTIONS;
ONGOING AGREEMENTS**

29. The Association. The Developer shall, prior to the sale of any property within the Development, create or cause to be created an entity (the "Association") with a perpetual existence under the laws of the State of Wisconsin to control and maintain the common areas and facilities of the Development and to assume the obligations of the Association set forth in this Agreement.

The Developer shall provide the City a description of the organization of the proposed Association, together with copies of its governing documents, including all documents governing ownership, maintenance and use restrictions for common facilities or common elements, including commonly owned outlots. Such documents shall be subject to review and approval of the City for consistency with the requirements of this Agreement. The Association shall be operating (with financial subsidization by the Developer, if necessary) before the sale of any part of the Development. All owners of any property in the Development, including the Developer, shall be members of the Association solely by virtue of such ownership and shall be jointly responsible for its obligations, which obligations shall be assessable as against such members. The Association shall have the power and authority to assess property owners for their proportionate share of costs associated with the responsibilities of the Association set forth in this Agreement. The governing documents for the Association shall confer legal authority on the Association to place a lien on the property of any member who falls delinquent in dues or assessments. Such dues and assessments shall be paid with accrued interest before the lien may be lifted. If at any time the Association does not exist or fails to satisfy its obligations, the owners of the Property shall be jointly and severally liable, with rights of contribution, for the Association's responsibilities under this Agreement and all agreements that run with the land that impose responsibilities on the Association.

30. Obligations of the Association. The Association shall be obligated to maintain in good condition and repair, and replace as necessary, all of the following, if any, that are required and approved as part of the Development: (a) roadside sidewalks (including snow and ice removal); (b) pedestrian and bike paths and appurtenances to such paths, including without limitation any signage and bollards; (c) monument and entrance signs; (d) roadside bollards; and (e) all landscaping and related elements (except those on private lots), including street trees, open areas and stormwater facilities. Such obligations shall be memorialized in one or more documents that shall be recorded against the Property. The documents memorializing such obligations shall specify that, if at any time the Association does not exist or fails to satisfy its obligations, all owners of the Property shall be jointly and severally liable, with rights of contribution, for such responsibilities. The documents memorializing such obligations shall be subject to review and approval of the City, and the provisions requiring the foregoing may not be amended without the prior written approval of the City.

31. Temporary Turnarounds. If any street constructed as part of the Development has a temporary turnaround for any future extension of the street beyond the Development, the Association shall remove such turnaround and restore the area in a manner acceptable to the City at the time the street is extended beyond the Development.

32. Stormwater Best Management Practices Maintenance Agreement. The Developer and the City shall enter into an agreement as described below to ensure that the Development's stormwater facilities are maintained to meet or exceed the standards to which they were constructed so that, in the future, the stormwater facilities continue to accommodate the appropriate volume and manage flow through and within the Development and meet applicable performance standards for storage and release. Accordingly, the following requirements are applicable to the Development:

(a) All stormwater drainage and storage facilities, including detention basins and ponds (whether one or more), shall be maintained and cared for by the Developer until such time as the Developer passes control of the stormwater elements of the Development and responsibility for maintenance of such stormwater elements to the Association, at which time such responsibility shall pass to the Association. In the event that the Developer transfers any portion of the Development prior to the construction, installation and approval of any required stormwater facilities, the Developer shall be released from responsibility for the installation and maintenance of the stormwater facilities only upon the City's approval, in its sole discretion, of the form of the successor in interest's assumption of the Developer's responsibilities under this Agreement; however, the transferee shall be jointly and severally responsible with the Developer until the completion of the construction, installation and approval of such facilities.

(b) The following minimum standards for future care and maintenance of the stormwater drainage and storage facilities, including detention basins and ponds (whether one or more), shall be adhered to by Developer and Developer's assigns and successors in interest:

(i) Provide normal and customary cleaning and maintenance to the detention basins and ponds (whether one or more) located in the Development including, but not be limited to: weed and algae control, dam stabilization, emergency overflow, outlet structure (including trash rack), dredging and biological control.

(ii) Dredging of the storm water facilities shall require permits and approvals under Wisconsin Statutes Section 30.20 to remove materials from the bed of a pond ultimately connected to Lake Michigan from the DNR.

(iii) All weed, algae and other biological control utilizing chemical treatments shall be made consistent with the regulatory requirements that apply to the use of EPA/State Registered Chemicals in detention basins and ponds or lakes and regulations of the DNR. With few exceptions, a permit must be filed with, and approved by, the DNR prior to chemical treatment. In certain circumstances, a representative of the DNR will monitor or supervise the chemical treatment. Developer should contact the DNR for additional information.

(iv) All detention basins and ponds shall be certified by a licensed professional engineer or land surveyor as a condition of Final Plat approval. To assure compliance with the approved plans, the Developer shall recertify the detention basins and ponds (whether one or more) as a condition of transferring ownership to the Association, but in no event shall such recertification occur later than five years after the approval of the Final Plat.

(v) Initial certification of the detention basins and pond (whether one or more) shall be submitted with an as-built record drawing.

(vi) All detention basins and ponds shall be inspected in compliance with the inspection report form supplied by the City. Any deficiencies shall be corrected immediately. A copy of the report form, including but not limited to photographs or diagrams of the deficiency and corrections with the certification shall be provided to the Association, and any other assigns

and successors in interest of the Developer, and shall be promptly submitted to the City Engineer for review and approval. Specific areas shall include, but not be limited to:

- Bio-retention facility
- Pond containment berms are stable and free of animal burrowing
- Detention storage volume
- Erosion
- Vegetative cover
- Sediment accumulation
- Trash rack/culvert functions
- Outlet flow
- High water level
- Water surface elevation at time of survey
- Normal pond water level
- Emergency overflow

(vii) To guarantee performance of all of the foregoing obligations concerning the private stormwater drainage and storage facilities, including detention basins and ponds, the Developer shall, in accordance with Section 58-677(b) of the Code, deposit a performance bond, letter of credit or cash deposit (the “Stormwater Guarantee”) to guarantee the good faith execution of the approved control plan and any permit conditions. The Stormwater Guarantee shall be in an amount equal to 125% of the estimated cost of construction and maintenance of the storm water management practices. The City will release the portion of the Stormwater Guarantee less any costs incurred by the City to complete installation of the facilities upon submission of a certification in accordance with Section 58-678(h) of the Code.

(viii) Not less than 90 days prior to the final expiration of the Developer’s Stormwater Guarantee obligations, or at such time as the Developer shall convey the outlots or common areas in or on which are located the stormwater drainage and storage facilities, including detention basins and ponds, to the Association or other assigns or successors in interest, whichever is later, the Developer shall have the detention basins and ponds recertified as described above.

(ix) At any time in the future, if, in the opinion of the City, either the Developer (in keeping with the limitations upon its responsibility as expressed in this Section), the Association or any other assigns or successors in interest, shall fail to install or maintain the stormwater drainage and storage facilities, including detention basins and ponds, the City, at its option, may give the Developer, the Association or other assigns or successors in interest, as may be interested, written notice requiring any or all of them within 30 days of the date of notice, to cure the failure and to maintain and to provide the required care. If the notified party fails to comply with the demands of the notice, the City shall have the right, but not the obligation, to perform the work necessary to correct the deficiency, and to charge the cost of such work, including administrative charges, to the Developer, the Association or other assigns and successors in interest, or any combination of them, by drawing upon the Stormwater Guarantee and/or by imposing such charge as a special charge for services pursuant to Wisconsin Statutes Section 66.0627. If such charge is not promptly paid by the party to whom the charges were invoiced, the charges shall constitute a lien and special charge on the applicable property (whether

one or more). The City may also draw on the Stormwater Guarantee upon the occurrence of an Event of Default, as defined below.

(x) The City Engineer has the authority to stop work, amend or alter remediation measures to the detention basins and ponds. Failure to comply will result in the issuance of a municipal citation with a forfeiture as prescribed by law, an action for injunction or mandatory injunction, or any combination of remedies. Each day a violation exists shall constitute a separate offense.

(xi) The Association shall be responsible for recertifying the detention basins and ponds as and when required under the Code, to correct all deficiencies in such facilities and to comply with all other provisions of the Code related to such facilities.

(xii) The agreement and all of its covenants are and shall be covenants running with the land, and shall encumber the Development, and shall bind the Developer and its heirs, personal representatives, successors and assigns, including without limitation the Association. The agreement shall specifically include this language and shall not be incorporated by reference. The agreement shall be recorded with the Ozaukee County Register of Deeds.

33. Additional Covenants, Conditions and Restrictions. Prior to Final Plat approval, the Developer shall record the following additional covenants, conditions and restrictions against the Property (the “Covenants”). The Covenants shall be subject to review and approval by the City. The Covenants shall:

(a) Prohibit, without the express written consent from the City Engineer and approval by the Planning Commission, future property owners from (a) removing any berms, landscaping or amenities installed on the Development as a condition of landscaping, open space, grading or drainage plans, and (b) placing landscape features, berms or plantings which disrupt flow of run-off in drainage ways or courses approved as a condition of the grading and drainage plans.

(b) Notify future lot owners of the obligations set forth below.

OBLIGATIONS OF BUILDER/LOT OWNER

34. Compliance with Grading Plan. Any person who constructs a building in the Development shall be responsible for siting the principal building and rough and fine grading the building pad to comply with the master grading plan.

35. Sump Pump Discharge and Roof Drainage Plan. Any person who constructs a building in the Development shall submit, at the time of architectural review and approval, a sump pump discharge and roof drainage plan in accordance with Storm Water Management Plan approved by the City Engineer.

36. Impact Fees. The City will assess impact fees pursuant to Sections 58-138 et seq. of the Code. Such impact fees shall be paid by the Developer or the purchaser of the lot prior to

obtaining a building permit. The City retains the right to amend and modify its impact fee ordinance, the methodology by which impact fees are calculated or the numerical component values of the impact fee calculation in the future. The impact fees payable shall be based upon the impact fee calculation in effect at the time of the issuance of any building permit.

[USE THE FOLLOWING PROVISION ONLY IF THERE WILL BE PUBLIC SEWER]

37. Sanitary Sewer Laterals. If the Development is served by public sewer, lateral locations shall not deviate from the approved plan unless first approved by the City.

[USE THE FOLLOWING PROVISION ONLY IF THE WATER SYSTEM WILL BE PRIVATE; DELETE (b) IF THE DEVELOPER WILL BE INSTALLING A CISTERN]

38. Private Water.

(a) The Development will be developed with private wells in accordance with NR812 and permitted through the DNR. The private wells shall be installed and maintained by the respective property owner. Through the permitting process, the well digger must follow proper procedures with respect to the draw down effect on adjacent wells.

(b) The Developer and City shall establish an escrow fund which shall be in the total amount of \$50,000 when fully funded (the "Fire Protection Escrow"). The Fire Protection Escrow shall be used for the installation of a fire cistern at the Development or as the City may otherwise decide to use the Escrow for fire protection purposes for the Development. At such time the owner of a lot in the Development applies for a building permit, in addition to all other fees and costs that are due, the owner shall pay \$(50,000/XX lots) to the City (the "Fire Protection Fee"). The Fire Protection Fee shall be deposited into the Fire Protection Escrow. The City may withdraw the funds from the Fire Protection Escrow and use the funds either, as determined by the City in its sole discretion, for a cistern or for other fire protection for the Development.

WARRANTIES AND INDEMNIFICATIONS

39. Warranty of the Public Improvements. All of the Public Improvements shall be warranted against defects due to faulty materials or workmanship which appear within one year from the date of the City's acceptance of the dedication, and Developer shall assign to the City applicable contractor warranties for the Public Improvements. If any defect should appear during the warranty period, the City shall first seek to enforce any applicable contractor warranty; however, the Developer guarantees the Public Improvements and shall indemnify the City to the extent of any default or failure of any contractor to honor the warranty. The Developer guarantees each repair or replacement performed pursuant to this paragraph for one year from completion. This warranty survives any provision of this Agreement that purports to discharge or release the Developer.

40. Environmental Indemnification. The Developer shall indemnify, defend and hold the City and its officers harmless from any and all claims, demands, causes of action, losses, damages, and liabilities asserted against the City or its officers, together with related costs and

expenses (including reasonable attorneys', consultants' and experts' fees, costs and expenses) that arise as a result of the presence or suspected presence in or on the real property dedicated or conveyed to the City by, under, pursuant to, or in connection with the Final Plat or this Agreement including, but not limited to street rights of way, of any toxic or hazardous substances arising from any activity occurring prior to the acceptance of dedication of the Public Improvements. Without limiting the generality of the foregoing, the indemnification by Developer shall include costs incurred in connection with any site investigation or any remedial, removal or restoration work required by any local, state, or federal agencies because of the presence or suspected presence of toxic or hazardous substances in, on or under the real property, whether in the soil, groundwater, air or any other receptor. The City will notify the Developer of the discovery of any contamination or of any facts or circumstances that reasonably indicate that such contamination may exist in, on or under the real property. Following notification to Developer that contamination may exist, the City shall make reasonable accommodations to allow the Developer to examine the real property and conduct such clean-up operations as may be required by appropriate local, state or federal agencies to comply with applicable laws. This indemnification survives any provision of this Agreement that purports to discharge or release the Developer.

41. Claims by Third Parties. The Developer shall indemnify, defend and hold the City and its officers harmless from any and all claims, demands, causes of action, losses, damages, and liabilities asserted against the City or its officers, together with related costs and expenses (including reasonable attorneys', consultants' and experts' fees, costs and expenses) brought in connection with any damage suffered by third parties, including personal injury or property loss, resulting from construction of the Improvements or development of the Development regardless of any asserted negligence of the City asserted in connection with inspection of work performed or materials supplied by or on behalf of the Developer or its contractors, subcontractors or agents. This indemnification survives any provision of this Agreement that purports to discharge or release the Developer.

42. Street Damage. The Developer shall be responsible for all damage done to streets within the City, street landscaping, street trees, curbs, utilities, light poles and other property of the City as a result of construction activities associated with the Development, including without limitation street damage as a result of excessive hauling operations or installation of the Improvements. This covenant survives any provision of this Agreement that purports to discharge or release the Developer.

FINANCIAL OBLIGATIONS

43. Costs Incurred by the City. The Developer will pay all reasonable costs incurred by the City in connection with the Development, including without limitation costs of attorneys, landscape architects, outside engineers and other consultants and costs regularly charged by the City for its staff's time and materials used in (a) reviewing and approving the Plans (including without limitation engineering and landscaping plans), (b) inspecting the construction and/or installation of the Improvements, (c) installing street signs, and (d) reviewing and approving record drawings for City files. The Developer will also pay any other costs that may be incurred by the City in connection with the installation of the Improvements. Costs will include the costs of labor, equipment, materials, engineering, inspection and overhead costs incidental to the Improvements.

The City will send invoices for the costs to the Developer periodically, as costs are incurred or as the Improvements are completed. The Developer will pay the City's invoices within 30 days after the date sent by the City. The City may, in its discretion, add a late payment charge of 1.5% per month, computed from the date of the original invoice until paid, for any amount not paid when due.

44. Special Assessments. No special assessments are contemplated in connection with the Development.

45. Streetlights. The Developer shall be responsible for the cost of installation of a WE-Energies LED standard streetlight mounted on a wooden pole or may provide an upgraded bronze FG Smooth pole and rectangular low fixture, as shall be approved by the City, at each main entrance to the Development. The City's Public Works Department shall arrange for the installation permit and coordinate the installation. The Developer shall pay for labor and materials within 30 days after being invoiced. After acceptance of dedication of the Public Improvements by the City, the City shall assume responsibility for the monthly energy costs and future maintenance for the streetlight(s).

46. Landscaping Completion Letter of Credit. If the City agrees to Final Plat approval despite landscaping and/or hardscape amenities, including the installation of required street trees, not being completed (the City shall not be obligated to grant Final Plat approval under such circumstances), the Developer shall provide to the City bids, contracts or other evidence sufficient, in the sole opinion of the City, to demonstrate the cost of completing such work, including the costs of labor and materials. The evidence of cost shall be subject to review and approval by the City. The Developer shall, prior to Final Plat approval, provide to the City a letter of credit in an amount equal to 125% of such costs. The letter of credit shall be issued by a local financial institution on the International Chamber of Commerce form or its equivalent. The form and content shall be acceptable to the City Attorney. The Developer shall pay all costs of completing the work, including with limitation labor, material and costs regularly charged by the City for its staff's time. If the work is not completed to the satisfaction of the City on or before June 30 of the year following Final Plat approval, or upon the occurrence of an Event of Default, as defined below, the City may draw on demand the full amount of the letter of credit to defray the costs of finishing the work. The City shall hold such funds and apply them as costs are incurred. The City shall refund the balance, if any, after the work is completed. If the funds are inadequate to defray the costs, the Developer shall owe the balance to the City.

47. Landscaping Survival Letter of Credit. The Developer shall, prior to Final Plat approval, provide to the City a letter of credit in an amount equal to 25% of the costs of labor and materials in installing landscaping and hardscape amenities (excluding street trees and any other landscaping that is a Public Improvement). Such costs shall be determined by the City based on its review of the Developer's contracts and paid receipts. The letter of credit shall insure the cost of labor and materials to replace landscaping that dies within three years of installation. The letter of credit shall be issued by a local financial institution on the International Chamber of Commerce form or its equivalent. The form and content shall be acceptable to the City Attorney. The Developer or its assign shall pay all costs of replacing any dead or dying landscaping. If the responsible person fails to replace such landscaping within 30 days of demand, or upon the

occurrence of an Event of Default, as defined below, the City may replace the landscaping and draw on the letter of credit on demand for the cost of the work, including without limitation labor, material and costs regularly charged by the City for its staff's time. If the letter of credit is inadequate to defray the costs, the Developer shall owe the balance to the City.

48. Street Tree Survival Guarantee. The Developer shall, prior to Final Plat approval, provide to the City a performance bond, letter of credit or cash deposit in an amount equal to 25% of the costs of labor and materials in installing street trees and any other landscaping that is a Public Improvement. Such costs shall be determined by the City based its review of the Developer's contracts and paid receipts or as otherwise required by Wisconsin Statutes Section 236.13. The letter of credit shall insure the cost of labor and materials to replace such landscaping that dies within 14 months of installation. The letter of credit shall be issued by a local financial institution on the International Chamber of Commerce form or its equivalent. The form and content shall be acceptable to the City Attorney. The Developer or its assign shall pay all costs of replacing any dead or dying landscaping. If the responsible person fails to replace such landscaping within 30 days of demand, or upon the occurrence of an Event of Default, as defined below, the City may replace the landscaping and draw on the letter of credit on demand for the cost of the work, including without limitation labor, material and costs regularly charged by the City for its staff's time. If the letter of credit is inadequate to defray the costs, the Developer shall owe the balance to the City.

49. Surface Completion Letter of Credit. If the surface course of a street cannot be constructed prior to October 15, the Developer shall provide to the City an estimate of the final surface cost, including the costs of inspections, shouldering, streets, curbs, gutters, failures, base repairs, defects and utility adjustments. The estimate shall be subject to review and approval by the City Engineer. The Developer shall, prior to October 15, provide to the City a letter of credit in the amount of the approved estimate. The letter of credit shall be issued by a local financial institution on the International Chamber of Commerce form or its equivalent. The form and content shall be acceptable to the City Attorney. The Developer shall pay all costs of completing the work. If the work is not completed to the satisfaction of the City on or before June 30 of the immediately following year, or upon the occurrence of an Event of Default, as defined below, the City may draw on demand the full amount of the Surface Completion Letter of Credit to defray the costs of finishing the work, including without limitation labor, material and costs regularly charged by the City for its staff's time. The City shall hold such funds and apply them as costs are incurred. The City shall refund the balance, if any, after the work is completed. If the funds are inadequate to defray the costs, the Developer shall owe the balance to the City.

50. Street Wear Financial Guarantee. Prior to commencement of any construction activity, the Developer shall provide to the City a performance bond, letter of credit or cash deposit in an amount equal to \$1,000 per lot or unit in the Development (the "Street Wear Financial Guarantee"). The Street Wear Financial Guarantee is to provide security for compensation to the City for wear and tear and accelerated deterioration of the City's streets as a result of infrastructure improvement associated with the hauling of stone and asphalt attributable to the Development. Wear and tear shall be determined as described above. The form and content of the Street Wear Financial Guarantee shall be acceptable to the City Attorney. If the Street Wear Financial Guarantee is in the form of a letter of credit, the requirements shall be substantially similar to the

requirements of other letters of credit provided in this Agreement. If the Developer does not make the repairs as and when required, but in any event on or before the 60th day after written demand from the City, or upon the occurrence of an Event of Default, as defined below, the City may draw on demand the full amount of the Street Wear Financial Guarantee to defray the costs of the street repairs, including without limitation labor, material and costs regularly charged by the City for its staff's time for inspections, shouldering, streets, curbs, gutters, failures, base repairs, defects and utility adjustments. The City shall hold such funds and apply them as costs are incurred. The City shall refund the balance, if any, after the work is completed. If the funds are inadequate to defray the costs, the Developer shall owe the balance to the City.

51. Stormwater Guarantee. The Developer shall provide the Stormwater Guarantee, as defined above, prior to the commencement of any construction activities. The form and content of the Stormwater Guarantee shall be acceptable to the City Attorney. If the Stormwater Guarantee is in the form of a letter of credit, the requirements shall be substantially similar to the requirements of other letters of credit provided in this Agreement.

52. Public Sanitary Sewer System Connection Charge. If the Developer is required to connect the Development to the public sanitary sewer system, the Developer shall pay to the City, in accordance with the requirements of Section 58-640 of the Code, a sewer connection charge of \$_____ (XX lots or units @ \$200 per lot or unit) prior to Final Plat approval.

53. Developer's Election. To the extent that any letter of credit required by this Agreement shall be determined to be for a public improvement, as that term is used in Wisconsin Statutes Section 236.13(2)(am), this Agreement constitutes the Developer's election to use a letter of credit under Wisconsin Statutes Section 236.13(2)(am)1m.a.

54. Maintenance of Guarantees. Unless otherwise specified in this Agreement or state statutes, letters of credit and other financial guarantees shall be maintained for the periods required by the Code. The Developer shall provide any renewal of any letter of credit to the City prior to its expiration. Failure to do so shall be an Event of Default without notice.

FINAL PLAT APPROVAL; DEDICATION; RELEASE

55. Final Plat Approval

(a) The Common Council shall grant Final Plat approval upon certification by the City Engineer that (i) all of the Improvements have been satisfactorily inspected by the City Engineer and the Department of Community Development which have found that the Improvements have been satisfactorily constructed, installed and completed in accordance with this Agreement; (ii) the Developer has satisfied its financial obligations, including providing required letters of credit and other guarantees; and (iii) the Developer has satisfied all other requirements of this Agreement and the Development and Final Plat meet the requirements of this Agreement, the Code and applicable state laws.

(b) The Common Council may, but shall not be required to, grant Final Plat approval despite certain of the Improvements not being completed provided escrows have been

established or guarantees provided that are adequate, as determined by the Common Council in its discretion, to ensure completion.

56. Dedication. Title to the Public Improvements, together with the land on which they are located, unless located within a dedicated easement, shall be dedicated and given in fee simple by the Developer to the City upon recording the Final Plat, as provided by Wisconsin law, and without recourse, and free and clear of all liens, claims and encumbrances. The lien waivers required above shall be a condition precedent of recording of the Final Plat. The Public Improvements shall have access from a dedicated street, where necessary.

57. Continuing Obligations through Dedication. The Developer shall not be released or discharged from its obligations under this Agreement until final inspection and certification of all the Improvements has been made by the City Engineer in writing, and the Improvements have been approved and their dedication accepted by the City.

DEFAULTS

58. Events of Default. The occurrence of any of the following shall constitute an “Event of Default”:

(a) Payments. The Developer fails to pay any amounts payable under this Agreement to the City when due.

(b) Non-Monetary. The Developer fails to observe or perform as and when required or breaches any of the covenants or agreements contained in this Agreement and, except as described below, such failure continues for 15 days after notice from the City of the failure (except as described for letters of credit). The City shall not be required to provide notice, or may shorten or eliminate the 15-day cure period, if the City determines in its discretion that the failure constitutes an imminent danger to health or safety or would constitute such an imminent danger in less than 15 days. The City may, in its sole discretion, provide in the notice for a cure period of longer than 15 days if the City determines that such longer cure period is warranted.

(c) Bankruptcy and Similar Actions. The Developer (i) is liquidated or ceases to exist; (ii) makes a general assignment for the benefit of creditors; (iii) admits in writing its, his or her inability to pay debts as they become due; (iv) files a petition by which it, he or she becomes the subject of bankruptcy or insolvency proceedings; (v) is adjudicated bankrupt or insolvent; (vi) files a petition seeking any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation; (vii) files an answer admitting or fails to contest the material allegations of a petition against it, him or her in any such proceeding; or (viii) seeks, consents to or acquiesces in the appointment of any trustee, receiver or liquidator for the Developer or the Development.

(d) Creditors’ Actions. Any involuntary proceeding is filed against the Developer that seeks any reorganization, bankruptcy, arrangement, composition, readjustments, liquidation, dissolution, receivership or similar relief under any present or future statute, law or regulation that is not dismissed within 30 days of the date filed.

59. Remedies. Upon the occurrence of an Event of Default, without notice other than that required above, the City may exercise any one or more of the following remedies without waiving any rights or remedies available to it:

- (a) Immediately suspend performance under this Agreement.
- (b) Issue a stop work order.
- (c) Issue citations to the extent the Event of Default constitutes a violation under any provision of the Code for which citations may be issued.
- (d) Withdraw or withhold occupancy permits for any structures in the Development.
- (e) Commence any legal or administrative action, in law or in equity, which may appear necessary or desirable to enforce performance and observance of any obligation, agreement or covenant of the Developer under this Agreement.
- (f) Perform or have performed any work, and have supplied any necessary equipment, goods, materials and services, to complete all or any part of the Developer's work, all at the Developer's cost.
- (g) Draw any letter of creditor and exercise the City's remedies under any other financial guarantee.
- (h) Exercise all other rights and remedies available to it at law or in equity.

60. Remedies Cumulative. The rights and remedies granted to the City under this Agreement are in addition to and cumulative of any other rights or remedies the City may have under the Code or state law. A delay or failure by the City in exercising any right or remedy shall not operate as a waiver of any such right or remedy or as an acquiescence of any default. No single or partial exercise of any right or remedy shall preclude any other or further exercise of a right or remedy or the exercise of any other right or remedy.

61. Attorneys' Fees. The Developer shall pay the City's costs of enforcement of this Agreement, including reasonable attorneys' fees and costs.

GENERAL PROVISIONS

62. Adequate Provision. Execution of this Agreement shall be accepted by the City as adequate provision for improvements within the meaning of Wisconsin Statutes Sections 236.01 236.13 and 236.45(1).

63. Assignment. No assignment of this Agreement by the Developer shall be effective without the prior written consent of the City, and no assignment without such consent shall relieve the Developer of its obligations under this Agreement.

64. Effect of Acceptance. This Agreement binds and inures to the benefit of the Developer and the City and their respective heirs, legal representatives, successors and assigns. Regardless of who prepared the original draft of this Agreement, both parties have had significant input into its terms and content and, accordingly, no presumption shall be made against the drafter.

65. Modifications. Neither this Agreement nor any provision of this Agreement may be waived, modified, amended, discharged or terminated except by an instrument in writing signed by the party against whom the enforcement of such waiver, modification, amendment, discharge or termination is sought, and then only to the extent set forth in such instrument. No waiver by either party of any failure or refusal to comply with its obligations shall be deemed a waiver of any other or subsequent failure or refusal to so comply.

66. Partial Invalidity. If any term or provision of this Agreement shall, to any extent, be invalid or unenforceable, the remainder of this Agreement shall not be affected, and each term and provision of this Agreement shall be valid and be enforced to the fullest extent permitted by law.

67. Headings. The headings in this Agreement are for convenience only and do not limit or expand the terms and conditions of this Agreement.

68. Governing Law. This Agreement shall be governed by and construed in accordance with the internal laws of the State of Wisconsin.

69. Requirement to Commence Construction. In accordance with Section 58-635(3)(e) of the Code, if the Developer fails to commence construction within two years of approval of this Agreement, this Agreement shall be null and void.

[SIGNATURE PAGES TO FOLLOW]

[DEVELOPER SIGNATURE PAGE TO DEVELOPMENT AGREEMENT]

By: _____
Name: _____
Title: _____

STATE OF WISCONSIN)
) SS
COUNTY)

The foregoing instrument was acknowledged before me on _____
_____, 20___, by _____, as _____ of _____.

Name: _____
Notary Public, Ozaukee County, Wisconsin
My Commission (expires) (is) _____

**EXHIBIT A
to the
DEVELOPMENT AGREEMENT
BETWEEN THE CITY OF MEQUON AND**

Development Name

Legal Description