

# CITY OF ALGONA

KING COUNTY

WASHINGTON

## PUBLIC WORKS STANDARDS



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# TABLE OF CONTENTS

## CHAPTER 1 – INTRODUCTION

|     |                     |     |
|-----|---------------------|-----|
| 1.1 | APPLICABILITY ..... | 1-1 |
| 1.2 | DEFINITIONS .....   | 1-2 |
| 1.3 | AUTHORITY .....     | 1-4 |

## CHAPTER 2 – PERMITS

|     |                      |     |
|-----|----------------------|-----|
| 2.1 | PERMIT PROCESS ..... | 2-1 |
| 2.2 | DEVIATIONS.....      | 2-1 |

## CHAPTER 3 – PUBLIC WORKS CONSIDERATIONS

|     |  |     |
|-----|--|-----|
| 3.1 | BONDING .....  | 3-1 |
| 3.2 | HOLD HARMLESS CLAUSE .....                                       | 3-1 |
| 3.3 | DEVELOPER’S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE ..... | 3-2 |
| 3.4 | COMPENSATION AND EMPLOYER’S LIABILITY INSURANCE.....             | 3-5 |
| 3.5 | NON-INTERFERENCE .....   | 3-5 |
| 3.6 | WORK STANDARDS.....  | 3-5 |

## CHAPTER 4 – GENERAL REQUIREMENTS

|      |                                       |     |
|------|---------------------------------------|-----|
| 4.1  | SURVEY STAKING .....                  | 4-1 |
| 4.2  | EASEMENTS .....                       | 4-2 |
| 4.3  | UTILITY TRENCH EXCAVATION .....       | 4-2 |
| 4.4  | PIPE BEDDING .....                    | 4-3 |
| 4.5  | BACKFILLING.....                      | 4-3 |
| 4.6  | INSPECTION.....                       | 4-4 |
| 4.7  | RECORD DRAWINGS.....                  | 4-5 |
| 4.8  | DEVELOPER AGREEMENT REQUIREMENTS..... | 4-6 |
| 4.9  | ACCEPTANCE OF IMPROVEMENTS .....      | 4-6 |
| 4.10 | FINISHING AND CLEANUP.....            | 4-6 |
| 4.11 | FINAL ACCEPTANCE.....                 | 4-8 |

## CHAPTER 5 – STREET AND ASPHALT CONCRETE PATHS AND/OR BIKEWAYS STANDARDS

|      |                                    |      |
|------|------------------------------------|------|
| 5.1  | GENERAL CONSIDERATIONS .....       | 5-1  |
| 5.2  | STREETS.....                       | 5-1  |
| 5.3  | DESIGN STANDARDS .....             | 5-4  |
| 5.4  | STREET NAMES .....                 | 5-6  |
| 5.5  | SIGNING .....                      | 5-6  |
| 5.6  | STREET FRONTAGE IMPROVEMENTS ..... | 5-7  |
| 5.7  | OFFSITE IMPROVEMENTS .....         | 5-7  |
| 5.8  | DEAD ENDS.....                     | 5-7  |
| 5.9  | INTERSECTIONS.....                 | 5-8  |
| 5.10 | DRIVEWAYS.....                     | 5-8  |
| 5.11 | FIRE LANES.....                    | 5-12 |

|      |   |      |
|------|---|------|
| 5.12 | SIGHT OBSTRUCTIONS .....                                | 5-14 |
| 5.13 | SUBGRADE PREPARATION .....                              | 5-15 |
| 5.14 | CRUSHED SURFACING (BASE AND TOP COURSE) .....           | 5-16 |
| 5.15 | SURFACING REQUIREMENTS .....                            | 5-16 |
| 5.16 | TEMPORARY STREET PATCHING .....                         | 5-17 |
| 5.17 | TRENCH BACKFILL AND RESTORATION.....                    | 5-17 |
| 5.18 | MATERIAL AND CONSTRUCTION TESTING .....                 | 5-19 |
| 5.19 | SIDEWALKS, CURBS AND GUTTERS.....                       | 5-22 |
| 5.20 | ILLUMINATION .....                                      | 5-25 |
| 5.21 | SIGNALS.....  | 5-25 |
| 5.22 | ROADSIDE FEATURES.....                                  | 5-25 |
| 5.23 | PARKING LOTS.....                                       | 5-30 |
| 5.24 | UTILITIES .....   | 5-30 |
| 5.25 | ASPHALT CONCRETE PEDESTRIAN PATHS AND/OR BIKEWAYS ..... | 5-31 |

## **CHAPTER 6 – STORM DRAINAGE STANDARDS**

|     |                                       |     |
|-----|---------------------------------------|-----|
| 6.1 | GENERAL .....                         | 6-1 |
| 6.2 | DESIGN STANDARDS .....                | 6-1 |
| 6.3 | CONVEYANCE .....                      | 6-3 |
| 6.4 | CONNECTIONS.....                      | 6-4 |
| 6.5 | STREET PATCHING AND RESTORATION ..... | 6-4 |
| 6.6 | CLEANING AND TESTING.....             | 6-4 |
| 6.7 | INSPECTION.....                       | 6-4 |

## **CHAPTER 7 – SANITARY SEWER STANDARDS**

|      |  |      |
|------|--|------|
| 7.1  | GENERAL .....  | 7-1  |
| 7.2  | DESIGN STANDARDS .....   | 7-1  |
| 7.3  | GENERAL REQUIREMENTS .....                                       | 7-2  |
| 7.4  | MATERIALS.....   | 7-5  |
| 7.5  | TESTING GRAVITY SEWERS FOR ACCEPTANCE .....                      | 7-12 |
| 7.6  | VIDEO TAPING .....   | 7-17 |
| 7.7  | STATE HIGHWAY CROSSINGS.....                                     | 7-18 |
| 7.8  | STREET PATCHING AND RESTORATION .....                            | 7-18 |
| 7.9  | ADJUSTMENT OF NEW AND EXISTING UTILITY STRUCTURES TO GRADE ..... | 7-18 |
| 7.10 | SANITARY SEWER LIFT STATIONS .....                               | 7-20 |

## **CHAPTER 8 – WATER SYSTEM STANDARDS**

|     |   |      |
|-----|---|------|
| 8.1 | GENERAL .....                                   | 8-1  |
| 8.2 | DESIGN STANDARDS .....                          | 8-1  |
| 8.3 | CONSTRUCTION REQUIREMENTS.....                  | 8-4  |
| 8.4 | MATERIALS.....                                  | 8-7  |
| 8.5 | WATER PIPE TESTING AND DISINFECTION .....       | 8-16 |
| 8.6 | BACKFLOW PREVENTION AND SPRINKLER SYSTEMS ..... | 8-18 |
| 8.7 | SERVICE CONNECTIONS .....                       | 8-19 |
| 8.8 | 1-1/2 INCH AND LARGER METERS.....               | 8-20 |
| 8.9 | STATE HIGHWAY CROSSINGS.....                    | 8-20 |

|      |                                       |      |
|------|---------------------------------------|------|
| 8-10 | STREET PATCHING AND RESTORATION ..... | 8-21 |
|------|---------------------------------------|------|

**CHAPTER 9 – MISCELLANEOUS UTILITY SERVICES AND  
ADDITIONAL DEVELOPMENT REQUIREMENTS**

|     |                                     |     |
|-----|-------------------------------------|-----|
| 9.1 | GENERAL .....                       | 9-1 |
| 9.2 | UTILITY SERVICES .....              | 9-1 |
| 9.3 | STREET LIGHTING .....               | 9-1 |
| 9.4 | CABLE TELEVISION .....              | 9-1 |
| 9.5 | STREET NAME AND TRAFFIC SIGNS ..... | 9-1 |
| 9.6 | LANDSCAPING.....                    | 9-2 |
| 9.7 | EROSION CONTROL .....               | 9-2 |

**LIST OF TABLES**

| <b><u>No.</u></b> | <b><u>Table</u></b>  | <b><u>Page</u></b> |
|-------------------|--|--------------------|
| 5-1               | Minimum Street Design Standards .....                                  | 5-5                |
| 5-2               | Design Values for Roads .....  | 5-6                |
| 5-3               | Road Classifications for the City of Algona .....                      | 5-6                |
| 5-4               | Maximum Residential Driveway Width .....                               | 5-11               |
| 5-5               | Testing and Sampling Frequency Guide.....                              | 5-20               |
| 8-1               | Water Main Thickness .....   | 8-2                |
| 8-2               | Calcium Hypochlorite (65% chlorine) Addition Per 100 Feet of Pipe..... | 8-4                |

**MISCELLANEOUS FORMS**

- Affidavit of No Liens
- Agreement for Inspection and Maintenance of Privately Maintained Storm Drainage Facilities
- Assignment of Funds in Lieu of Maintenance Bond
- Assignment of Fund in Lieu of Performance Bond
- Bill of Sale
- Development Agreement
- Easement
- Maintenance Bond
- Performance Bond
- Plan Checklist
- Surety Acknowledgement

**MISCELLANEOUS DETAILS**

- Roadway Details
- Water System Details
- Sanitary Sewer Details
- Storm Sewer & Miscellaneous Details



# CHAPTER 1

## INTRODUCTION

### 1.1 APPLICABILITY

These standards shall apply to all improvements within the public right-of-way and/or public easements, to all improvements required within the proposed public right-of-way of new subdivisions, for all improvements intended for ownership, operations or maintenance by the City and for all other improvements (on or offsite) for which the City Code requires approval from the City Administrator and/or City Planning Commission and/or the City Council. These standards are intended as guidelines for designers and developers in preparing their plans and for the City in reviewing plans. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used where practical. The developer/proponent is however cautioned that higher standards and/or additional studies and/or environmental mitigation measures may, and will, in all likelihood, be imposed by the City when developing on, in, near, adjacent, or tributary to sensitive areas to include, but not be limited to, steep embankments, creeks, ponds, lakes, certain wildlife habitat, unstable soils, etc.

Alternate design standards will be accepted when it can be shown, to the satisfaction of the City, that such alternate standards will provide a design equal to or superior to that specified. In evaluating the alternate design, the City shall consider appearance, durability, ease of maintenance, public safety and other appropriate factors. The City encourages the use of Low Impact Development design.

Any improvements not specifically covered herein by these Standards must meet or exceed the current version of the, State of Washington, Department of Transportation, Standard Specification for Road, Bridge & Municipal Construction, current amendments thereto and the Washington State Department of Transportation Standard Plans.

Where improvements are not covered by the Standard Specifications, Standard Plans, or these City standards, the City will be the sole judge in establishing appropriate standards. Where these standards conflict with any existing City ordinances or discrepancies exist within the body of this text, the higher “standards” shall be utilized as determined by the City.

Plans for major improvements in the public right-of-way or within public easements, or improvements to be “deeded” or “gifted” to the City, shall bear an approval signature from the City.

The Developer is expected to be fully informed regarding the nature, quality, and the extent of the work to be done, and, if in doubt, to secure specific instructions from the City.

The Developer shall submit calculations or other appropriate materials supporting the design of utilities, pavements and storm drainage facilities. The Developer shall submit calculations for structures and other designs when requested by the City Engineer and/or Building Official.

1. Exclusions:

- (1) See Chapter 12.05.020 of the Algona Municipal Code, “minor reconstruction.”

**1.2 DEFINITIONS**

- A. “City:” City of Algona, Washington, King County, a municipal corporation, existing under and by virtue of the laws of the State of Washington. Actions designated as taken by the City are the acts of the Council acting through the Mayor, or an approved designee.
- B. “City Planner” means the City’s duly appointed City Planner, or in his absence, the City Mayor.
- C. “Contract Documents:” The contract documents shall consist of the following and in case of conflicting provisions, the first mention shall have precedence:
  1. Developers Agreement
  2. City Public Works Standards
  3. Other Applicable City Code
  4. City Fill and Grade Permit
  5. WSDOE Stormwater Permit
  6. City Right-of-Way Use Permit
  7. Plans
  8. Standard Details (WSDOT Specifications)
  9. SEPA Determination (if required)

These documents shall form the Contract.

- D. “Contractor” means the Developer’s contractor or subcontractor.
- E. “Developer:” The party having an agreement with the City to cause the installation of certain improvements, to become a part of the City's utility



and/or roadway system upon completion and acceptance. The term shall also include the Developer's contractor employed to do the work or the Contractor's employees.

- F. "Development" means any improvement within the public right-of-way and/or public easements (existing or future), improvements intended for ownership, operations or maintenance by the City and all other improvements for which the Algona Municipal Code requires approval by the City. These improvements include, but are not limited to, the construction, reconstruction, conversion, structural alternation, relocation, enlargement, or changes in use of any structure, property, or any public utilities, or any project that will increase vehicle trips per day or any project which negatively impacts the service level, safety, or operational efficiency of serving roads.
- G. "Director" means the City's duly appointed Public Works Director, or in his absence, the City Mayor.
- H. "Driveway Approach" means that portion of the public right-of-way used for vehicular access to private property.
- I. "Engineer" means the City's Engineer, whether a staff engineer or consultant.
- J. "Maintenance Bond" means a bond furnished by the Developer and written by a corporate body qualified to write surety in the State of Washington, guaranteeing that the Developer will repair any defects found in the work within the time period as further identified herein.
- K. "Mayor" means mayor of the City of Algona or his/her authorized representative.
- L. "Performance Bond" means a bond furnished by the Developer and written by a corporate body qualified to write surety in the State of Washington, guaranteeing that the work will be completed in accordance with the plans and specifications.
- M. "Plans" mean drawings, including reproductions thereof, of the development as an extension to the City's utility or road network system, prepared by an Engineer licensed in the State of Washington.
- N. "Project Specifications" means the specifications specific to the project as designated by an Engineer licensed in the State of Washington for the prescribed work.

- O. “Public Works Supervisor” means the City's utilities superintendent, operations and maintenance supervisor, or Public Works Director.
- P. “Standard Specifications” means the most current edition of the Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction.

### 1.3 AUTHORITY

1. Authority of Mayor: The Mayor or his authorized representative shall have the authority to stop work whenever, in his/her opinion, a Stop Work Order is necessary to ensure compliance with the plans and specifications. The Mayor or representative shall have authority to reject work and materials which do not so conform and to decide questions which may arise in the execution of the work.
2. Authority of the Public Works Director: The Public Works Director or his/her authorized representative shall have the same authority, as the Mayor to stop work to determine the amount, quality, acceptability and fitness of the work, material and equipment, and to reject or condemn all work or material which does not conform to these Standards. The Public Works Director’s decision in all matters is the decision of the City, and can only be changed by the Mayor and Council.

The City has not so delegated, and the Public Works Director or his/her authorized representative(s) does (do) not purport to be a safety expert, is not so engaged in that capacity, and has neither the authority nor the responsibility to enforce construction safety laws, rules, regulations or procedures, or to order the stoppage of work for claimed violations thereof. The City inspector(s) are not responsible for the identification or enforcement of such laws, rules or regulations.

3. Payment for City Services: The Developer shall be responsible for promptly reimbursing the City for all costs and expenses incurred by the City in the pursuit of project submittal, review, approval, and construction. These costs include, but are not limited to, the utilization of staff and “other” outside consultants as may be necessitated to adequately review and inspect construction of the project(s). All legal, administrative, and engineering fees for project review, meetings, approvals, site visits, construction inspection, etc., shall be subject to prompt reimbursement. The Developer is cautioned that project approval (City acceptance) and occupancy permits will be denied until all bills are paid in full.

## CHAPTER 2

### PERMITS

#### 2.1 PERMIT PROCESS

No person, firm or corporation shall commence development work, alteration or repair of any facility located either in the public right-of-way or a public easement without any necessary permit(s) first having been obtained from the City.

Any party requesting a permit shall file written application with the City. Such application will include as needed:

1. Right-of-Way Permit application;
2. Fill and Grade permit application;
3. Completed Bond Quantity Worksheet (for work in existing public right-of-way or public easements);
4. Construction Plans, including City Standard Details as appropriate;
5. Application Fee.

The City may require additional information when in its opinion such information is necessary to properly enforce the provisions of these Standards.

No permit shall be issued until the proposed development has been approved by the appropriate official. Adjudication of disagreements regarding approvals shall be made by the Mayor.

No construction plans shall be approved, nor a permit issued, where it appears that the proposed development, or any part thereof, conflicts with the provisions of these Standards or any other ordinance of the City of Algona, nor shall issuance of a permit be construed as a waiver of the Zoning Ordinance or other ordinance requirements impacting the development.

**A fee of an amount as designated by City code shall accompany all applications for permits.**

#### 2.2 DEVIATIONS

These Standards represent appropriate practice under most conditions, based on past experience in Algona and other jurisdictions. They are intended to provide facilities that are safe and appropriate for use in Algona. These Standards are not

intended to limit the introduction of new ideas. Situations will arise where alternatives to these Standards may better accommodate existing conditions, overcome adverse topography or allow for more cost-effective solutions without adversely affecting safety, operations, maintenance or aesthetics. As such deviations may be approved only under special circumstances, when such deviation is warranted by unique characteristics of the site or the applicant can clearly show that a deviation will result in an equal or superior product in a cost-effective manner.

Accordingly, requests for deviations from these Standards will be considered by the Mayor. Such requests must be submitted in writing and include supporting information demonstrating compliance with the following criteria:

- The deviation will achieve the intended result with a comparable or superior design and quality of improvement;
- The deviation will not adversely affect safety, or operations;
- The deviation will not adversely affect maintenance and its associated cost; and
- The deviation will not adversely affect aesthetic appearance.

The need for and timing of a deviation may not be predictable. Requests should be submitted as soon as the need becomes known. Deviations that affect engineering design, to the extent they are known, must be decided prior to submittal of construction plans. This will prevent wasted effort in the preparation of plans with non-standard features that cannot be approved. Any deviation request concerning a provision of the Uniform Fire Code requires concurrence by the Valley Regional Fire Authority. Documentation of concurrence by the Fire Authority must be submitted with the request.

The Mayor reserves the right to approve or deny a deviation from these Standards at any time, in the interest of public health, safety and welfare. In accordance with Algona Municipal Code, Title 14, the applicant may appeal an administrative determination of the Mayor denying a requested deviation from these Standards to a hearing examiner.

## CHAPTER 3

### PUBLIC WORKS CONSIDERATIONS

#### 3.1 BONDING

Developers and contractors or performing work within the public right-of-way or publicly owned easement(s) shall be prepared to satisfy the following these bonding requirements. The City will accept an assignment of funds as bonds.

- A. Furnishing a performance bond that shall be conditioned upon faithful completion of that portion of the work performed pursuant to the permit which will require completion by the City should the permittee or his contractor default. The amount of such bond shall be 150 percent of the amount estimated for work within the existing right-of-way. This performance bond shall be posted as a requirements for receiving a right-of-way permit.
- B. Furnishing a performance bond that shall be conditioned upon faithful completion of that portion of the work performed pursuant to the permit which will require completion by the City should the permittee or his contractor default. The amount of such bond shall be 150 percent of the value of the incomplete improvements that are to be dedicated to the City. The City engineer shall review and provide approval, as may be applicable of the submitted amount. The type of work covered in this bond may include, for example, the final lift of asphalt on a roadway. Bonding for the final lift would allow the developer to receive construction approval prior to completing the final work items.
- C. Furnishing a Maintenance Bond. All work shall be guaranteed by the Contractor for a 2-year period from the time of inspection and final approval of the construction by the City. The maintenance bond shall be equal to 15 percent of the total cost of the improvements.

#### 3.2 HOLD HARMLESS CLAUSE

The Developer shall indemnify and hold harmless the City and the City Engineer, and their agents and employees as specified in the Developer Agreement, from and against all claims damages, losses, and expenses, including attorney's fees, arising out of or resulting from the performance of the work, and shall, after reasonable notice, defend and pay the expense of defending any suit and will pay any judgment, provided that any such claim, damage, loss, or expense (1) is attributable to bodily injury, sickness, disease, or death, or to injury or destruction of tangible property (other than the work itself), including the loss of use resulting

therefrom, and (2) is caused in whole or in part by any negligent act or omission or by any other action giving rise to strict liability of the Developer, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

In any and all claims against the City or City Engineer, or any of their agents or employees, by any employee of the Developer, any contractor or subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this article shall not be limited in any way by any limitation on the amount or type of damages or compensation under workman's compensation acts, disability benefit acts, or other employee's benefit acts.

The obligations of the Developer under this article shall not include the sole negligence of the City or the City Engineer.

### **3.3 DEVELOPER'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE**

The Developer shall not commence work until he has furnished evidence (in duplicate copy) of insurance required hereunder, and such insurance has been approved by the City Attorney; nor shall the Developer allow any contractor or subcontractor to commence work on his contract or subcontract until the same insurance requirements have been complied with by such contractor or subcontractor. Approval of the insurance by the City Attorney shall not relieve or decrease the liability of the Developer thereby.

Companies writing the insurance under this article shall be licensed to do business in the State of Washington or be permitted to do business under the Surplus Line Law of the State of Washington.

The Developer shall maintain, during the life of the Contract, Comprehensive General and Automobile Liability Insurance, as detailed herein. The insurance shall include, as Additional Named Insured, the City and its Contractors. All insurance policies shall be endorsed to provide that the policy shall not be canceled or reduced in coverage until after 10 days prior written notice, as evidenced by return receipt of registered letter has been given to the City.

Comprehensive General Bodily Injury and Property Damage Insurance shall include:

- a. Premises and Operations;
- b. Developer's Protective Liability;
- c. Products Liability, including Completed Operations Coverage;

- d. Contractual Liability;
- e. Broad Form Property Damage.

Comprehensive Automobile Bodily Injury and Property Damage Insurance shall include:

- a. All owned automobiles;
- a. Non-owned automobiles;
- b. Hired automobiles.

The insurance coverage's listed above shall protect the Developer from claims for damages for bodily injury, including death resulting therefrom, as well as claims for property damage, which may arise from operations under this contract, whether such operations be by himself or by any subcontractor or by anyone directly employed by either of them, it being understood that it is the Developer's obligation to enforce the requirements of this article as respects any contractor or subcontractor.

Comprehensive General and Automobile Liability Insurance shall provide coverage for both bodily injury and property damage, as follows:

- A. Comprehensive General and Automobile Bodily Injury Liability Insurance on an occurrence basis of not less than One Million dollars (\$1,000,000.00) for bodily injury, sickness or disease, including death resulting therefrom, sustained by each person; and for limits of not less than One Million Dollars (\$1,000,000.00) for each occurrence.
- B. Comprehensive General Property Damage Liability Insurance on an occurrence as is for limits of not less than One Million Dollars (\$1,000,000.00) for damage to or destruction of property, including loss of use thereof, arising from each occurrence, and in an amount of not less than One Million Dollars (\$1,000,000.00) in aggregate.
- C. Comprehensive Automobile Property Damage Liability Insurance on an occurrence basis for limits of not less than One Million Dollars (\$1,000,000.00) for damage to or destruction of property, including loss of use thereof, arising from each occurrence.
- D. Comprehensive Liability Insurance shall include the City and the as Additional Named Insured.
- E. Comprehensive General Property Damage Liability Insurance shall include liability coverage for damage to or destruction of property of other, including loss of use of property damaged or destroyed, and all other indirect and consequential damage for which liability exists in

connection with such damage to or destruction of property of others, and shall include coverage for:

- ("X") Injury to or destruction of any property arising out of blasting or explosion;
- ("C") Injury to or destruction of any property arising out of the collapse of/or structural injury to any building or structure due:
  - (1) to excavation, including borrowing, filling or backfilling in connection therewith, or tunneling, pile driving, coffer-dam work or caisson work, or
  - (2) to moving, shoring, underpinning, raising or demolition of any building or structure or removal or rebuilding of any structural support thereof.
- ("U")
  - 1. Injury to or destruction of wires, conduits, pipes, mains, sewers or other similar property or any apparatus in connection therewith, below the surface of the ground, if such injury or destruction is caused by and occurs during the use of mechanical equipment for the purpose of excavating or drilling, or
  - 2. Injury to or destruction of property at any time resulting therefrom.

There shall be included in the liability insurance, contractual coverage sufficiently broad to insure the provisions of "Hold Harmless Clause."

Nothing contained in these insurance requirements is to be construed as limiting the extent of the Developer's responsibility for payment of damages resulting from his operations under this Contract.

In the event the Developer is required to make corrections on the premises after the work has been inspected and accepted, he shall obtain, at his own expense, and prior to commencement of any corrective work, full insurance coverage, as specified herein.

The Developer shall furnish, upon request by the City, certified copies of the insurance policy or policies within two weeks of the City's request.



### **3.4 COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE**

The Developer shall maintain Workmen's Compensation Insurance or, as may be applicable, Maritime Workmen's Insurance, as required by state or federal statute for all of his employees to be engaged in work on the Project and, in case any such work is sublet, the Developer shall require the contractor or subcontractor similarly to provide Workmen's Compensation Insurance or Maritime Workmen's Insurance for all of the latter's employees to be engaged in such work.

In the event any class of employees engaged in work at the site of the Project is not covered under the Workmen's Compensation Insurance or Maritime Workmen's Insurance, as required by state and federal statute, the Developer shall maintain and shall cause each contractor or subcontractor to maintain Employer's Liability Insurance with a private insurance company for limits of at least One Hundred Thousand Dollars (\$100,000.00), each person, and Three Hundred Thousand Dollars (\$300,000.00), each accident, and furnish satisfactory evidence of same.

### **3.5 NON-INTERFERENCE**

The permittee shall be responsible for minimum interference with:

- Traffic Routing
- Fire Facility Clearance
- Adjoining Property
- Utility Facilities
- Natural Surface Drainage

Prior to construction, these items are to be discussed with the City Public Works Department, and/or City Fire and Police Departments and/or the City Building Inspector, and special provisions may be included in any applicable City Permit(s).

### **3.6 WORK STANDARDS**

All work performed pursuant to a permit issued shall be done in accordance with standards published in the Standard Specifications.

The following additional standards shall be applicable when pertinent, when specifically cited in these Standards or when required by state or federal funding authority:

- (a) Local Agency Guidelines, WSDOT, as amended.
- (b) Guidelines for Urban Arterial Program, WSDOT, as amended.
- (c) American Water Works Association Standards.

- (d) Design criteria of federal agencies including the Federal Housing Administration, Department of Housing and Urban Development, the Federal Highway Administration, the Department of Transportation, and the Environmental Protection Agency.
- (e) A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2011, or current edition when adopted by WSDOT.
- (f) Standard Specifications for Highway Bridges, adopted by AASHTO, current edition.
- (g) U.S. Department of Transportation Manual on Uniform Traffic Control Devices, "MUTCD", as amended and approved by Washington State Department of Transportation, current edition.
- (h) Guide for the Development of Bicycle Facilities, adopted by AASHTO, current edition.
- (i) Associated Rockery Contractors (ARC), Standard Rock Wall Construction Guidelines.
- (j) American Society for Testing and Materials (ASTM).
- (k) Illuminating Engineering Society of America (IES) National Standard Practices for Roadway Lighting, RP-8, Current Edition, as modified herein.
- (l) The WSDOT/APWA Standard Plans for Road and Bridge Construction, to be referred to as the "Standard Plans," current edition as amended.
- (m) WSDOT Design Manual, current edition as amended.
- (n) Institute of Transportation Engineers, Traffic Engineering Handbook, current edition.
- (o) Water System Design Manual, Washington Department of Health (2009).
- (p) Criteria for Sewage Works Design, Washington Department of Ecology (2008).
- (q) NSF/ANSI 61.

## CHAPTER 4

### GENERAL REQUIREMENTS

This Chapter presents information that is generally applicable to all work within the existing or proposed right-of-way or new development.

#### 4.1 SURVEY STAKING

All surveying and staking shall be performed by an engineering or surveying firm employed by the Developer, capable of performing such work and licensed in the State of Washington. The engineer or surveyor directing and/or performing such work shall be currently licensed by the State of Washington to perform said tasks. The survey work shall be referenced to NAVD 88 vertical datum and NAD 83/91 horizontal datum.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of utility systems shall be as follows:

- A. Stake centerline alignment every 25 feet with cuts and/or fills to bottom of trench.
- B. Stake location of all catch basins/manholes and other fixtures for grade and alignment.
- C. Stake location, size and depth of retention/detention facility.
- D. Stake finished grade of catch basin/manhole rim elevation and invert elevations of all pipes in catch basins, manholes, and those that daylight.

The minimum staking of streets shall be as follows:

- A. Stake centerline alignment every 25 feet (50 feet in tangent sections) with cuts and/or fills to subgrade.
- B. Stake top of ballast and top of crushed surfacing at centerline and edge of pavement every 25 feet.
- C. Stake top back of curb at a consistent offset for vertical and horizontal alignment.

The minimum staking of storm sewer systems shall be as follows:

- A. Stake centerline alignment every 25 feet with cuts and/or fills to the bottom of trench.
- B. Stake location of all catch basins/manholes and other fixtures for grade and alignment.
- C. Stake location, size, and depth of retention/detention facility.
- D. Stake finished grade of catch basin/manhole rim elevation and invert elevations of all pipe in catch basins, manholes, and those that daylight.

The minimum staking of water systems shall be as follows:

- A. Provide staking sufficient to satisfy the City.
- B. Stake locations of all proposed fire hydrant, blow-off, air-vac, valves, meters, etc.

#### **4.2 EASEMENTS**

All public utilities not within the right-of-way shall be located within an easement dedicated to the City. Easements for utilities shall be a minimum of 15-foot wide. Utility easements shall be graded and surfaced sufficient for maintenance access vehicles.

Easements for access shall be a minimum of 20-foot wide and shall be in accordance with AMC 20.12.060, the Uniform Fire Code or other applicable standards.

#### **4.3 UTILITY TRENCH EXCAVATION**

- A. Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits.
- B. Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 36 inches of cover over a water pipe and 48 inches over sanitary sewer pipe. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for

adequate working space as allowed by the governing agency and in compliance with all safety requirements of the prevailing agencies. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The Contractor shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.

- C. The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below storm line grade. Where materials are removed from below the pipeline grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.
- D. Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without specific written approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.
- E. The bedding course shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to facilitate the construction of pipe joints.

#### **4.4 PIPE BEDDING**

All utility pipes shall be bedded in conformance with the details in these Standards.

#### **4.5 BACKFILLING**

Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City. Selected material shall be placed and compacted around and under utility pipes by hand tools. Special precautions should be provided to protect the pipe to a point 12 inches above the crown of the pipe. The remaining backfill shall be compacted to 95 percent of the maximum density in traveled areas, 90 percent outside driveway, roadways, road prism, shoulders, parking or other traveled areas. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. All excess material shall be loaded and hauled to waste.

## 4.6 INSPECTION

### A. General

The City shall exercise full right of inspection of all excavating, construction, and other invasions of City right-of-way or public easements. The Public Works Supervisor shall be notified at least 2 working days or 48 hours, whichever is greater, prior to commencing any work in the City's right-of-way or public easements. The Mayor and/or his authorized representative is authorized to and may issue immediate Stop Work Orders in the event of noncompliance with this chapter and/or any of the terms and provisions of the permit or permits issued here under.

Timely notification by the Developer is essential for the City to verify through inspection that the work meets the standard. Failure to notify in time may oblige the City to arrange appropriate sampling and testing after-the-fact, with certification, by a professional engineer. Costs of such testing and certification shall be borne by the Developer. At the time that such action is directed by the Mayor, he/she may prohibit or limit further work on the development until all directed tests have been completed and corrections made to the satisfaction of the Engineer. If necessary the City may take further action as set forth in the Algona Municipal Code (AMC).

### B. Requirements for development inspection.

City staff or the City Engineer may inspect any and all road, drainage and utility construction, proposed or in progress. Unless otherwise instructed by the City, construction events, which require monitoring or inspection, are identified as follows:

- (1) Preconstruction Conference. Three working days' prior notice. Conference must precede the beginning of construction and include owner, contractor, design engineer, geotechnical engineer (as needed), utilities, and other parties affected. Plan approvals must be in hand prior to the conference.
- (2) Clearing and Temporary Erosion/Sedimentation Control. One working day's notice prior to initial site work involving drainage and installation of temporary water retention/detention and siltation control or the protection of proposed low impact development facilities. Such work to be in accordance with the Stormwater Management Manual adopted by the City and the approved plans.

- (3) Utility Installation. One working day's notice prior to trenching and underground utility installation such as sanitary sewer, storm sewer, water, gas, power, telephone, and TV lines.
- (4) Utility Backfill and Compaction. One working day's notice before backfill and compaction of underground utility trenches.
- (5) Subgrade Completion. One working day's notice at stage that underground utilities and roadway grading are complete, to include placement of gravel base if required. Inspection to include compaction tests and certifications.
- (6) Curb and Sidewalk Forming. One working day's notice to verify proper forming and preparation prior to pouring concrete.
- (7) Curb and Sidewalk Placement. One working day's notice to check placement of concrete.
- (8) Crushed Surfacing Placement. One working day's notice to check placement and compaction of crushed surfacing base course and top course.
- (9) Paving. Three working days notice in advance of paving with asphalt or Portland cement concrete.
- (10) Structural. Three working days notice prior to each critical stage such as placing foundation piling or footings, placement and assembly of major components, and completion of structure and approaches. Tests and certification requirements will be as directed by the City Engineer.

C. Final Inspection

Prior to final approval of construction, a visual inspection of the job site will be made by the City. Restoration of the area shall be complete with all improvements being restored to their original or superior condition.

#### 4.7 RECORD DRAWINGS

Permittees or their representatives who install systems within, on, or below the City's public rights-of-way or public easements shall furnish the City with accurate drawings, plans and profiles, showing the location and curvature of all underground structures installed, including existing facilities where encountered and abandoned installations. Horizontal locations of utilities are to be referenced to street centerlines, as marked by survey monuments, and shall be accurate to a tolerance of plus or minus one-half (1/2) foot. The depth of such structure may be referenced to the elevation of the finished street above said utility, with depths to the nearest one-tenth foot being shown at a minimum 50-foot interval along the location of said utility.

Such record drawings shall be submitted to the City within 30 calendar days after completion of the work or prior to final project approval (e.g., final plat or

occupancy) whichever comes first. Record drawings shall be stamped, signed and dated by an engineer currently licensed in the State of Washington.

Drawing Standards:

Minimum Scale – 1"=50' horizontal; 1"=5' vertical

Topographic Contours – 2 feet

Detail Scale – Larger as necessary

Record drawings shall be submitted on full size plan sheets (22" x 34") with a signature and data, which verifies the “finished” condition of the project. Electronic files in the most recent version of “AutoCAD,” and in PDF format, shall be provided to the City.

The drawings shall be referenced to NAVD 1988 and NAD 83/91 and shall include at a minimum two existing City utility features such as sanitary or storm sewer manholes, water valves or fire hydrants. Referencing to electrical features such as street lights, telephones or power poles is not acceptable.

#### **4.8 DEVELOPER AGREEMENT REQUIREMENTS**

All Contractors, land developers, or others, whether persons or entities, constructing curbs, gutters, storm-drainage systems, streets, water or sewer systems, or additions thereto, to be connected to the right-of-way, storm sewers, sanitary sewer lines and/or water lines of the City of Algona, shall, as a prerequisite to securing approval for the construction of such system, execute a Developer Agreement in the form set forth in the attached documents.

#### **4.9 ACCEPTANCE OF IMPROVEMENTS**

The City shall not accept developer constructed improvements incrementally. All aspects of the grading, road, and utility improvements must be complete, clean, inspected, and as-built drawings submitted, prior to City acceptance of improvements and release of performance sureties. Prior to acceptance, all improvements shall be in good working order, clean, and free of defects including removal of debris, vegetation, and sediment from new utilities. All dedications, easements, or other legal documentation shall be complete and recorded prior to final acceptance of the project improvements.

#### **4.10 FINISHING AND CLEANUP**

Before acceptance of utility system construction, all pipes, open ditches, manholes, catch basins, and other appurtenances shall be cleaned of all debris and foreign material. After all other work on this project is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk



areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections of a new roadway consistent with the original section, and as hereinafter specified.

Where all or portions of the utility is in undeveloped areas, the entire area which has been disturbed by the construction shall be shaped so that upon completion the area will present a uniform appearance, blending into the contour of the adjacent properties. All other requirements outlined previously shall be met.

Slopes, sidewalk areas, planting areas and roadway shall be smoothed and finished to the required cross section and grade by means of a grading machine insofar as it is possible to do so without damaging existing improvements, trees, shrubs, or low impact development (LID) facility locations. Machine dressing shall be supplemented by hand work to meet requirements outlined herein, to the satisfaction of the City.

Upon completion of the cleaning and dressing, the project shall appear uniform in all respects. All graded areas shall be true to line and grade. Where the existing surface is below sidewalk and curb, the area shall be filled and dressed out to the walk. Wherever fill material is required in the planting area, the finished grade shall be elevated to allow for final settlement, but nevertheless, the raised surface shall present a uniform appearance.

All rocks in excess of 1-inch diameter shall be removed from the entire construction area and shall be disposed of the same as required for other waste material. In no instance shall the rock be thrown onto private property. Overhang on slopes shall be removed and slopes dressed neatly so as to present a uniform, natural, well-sloped surface.

All excavated material at the outer lateral limits of the project shall be removed entirely. Trash of all kinds resulting from clearing and grubbing or grading operations shall be removed and not placed in areas adjacent to the project. Where machine operations have broken down brush and trees beyond the lateral limits of the project, the Developer and/or Contractor shall remove and dispose of same and restore said disturbed areas at his own expense.

All pavements and oil mat surfaces, whether new or old, shall be thoroughly cleaned. Existing improvements such as Portland cement concrete curbs, curb and gutters, walls, sidewalks, and other facilities shall be cleaned to the satisfaction of the City Inspector and/or City Engineer.

Castings for manholes, valves, lamp holes, vaults and other similar installations, which have been covered with the asphalt material, shall be cleaned to the satisfaction of the City.

#### **4.11 FINAL ACCEPTANCE**

Prior to final inspection, all pipelines shall be flushed and cleaned and all debris removed, wastehauled and disposed in accordance with all regulations. A pipeline “cleaning ball” of the proper diameter for each size of pipe shall be flushed through all storm and sanitary sewer pipelines prior to final inspection. In addition, sanitary and storm sewer lines shall be “videotaped” in their entirety using a remote controlled camera. All water mains shall pass pressure and bacteriological testing.

The General Notes below shall be included or referenced on any plans submitted to the City for construction approval dealing with street design and/or utility installation.

## CHAPTER 5

# STREET AND ASPHALT CONCRETE PATHS AND/OR BIKEWAYS STANDARDS

### 5.1 GENERAL CONSIDERATIONS

#### A. General

The overall goal of this chapter is to encourage the uniform development of an integrated, fully accessible public transportation system that will facilitate present and future travel demand with minimal environmental impact to the community as a whole.

Development of properties on or tributary to substandard or unsafe (safety issues) roadways may, depending on the size and type of development, be cause for “off-site” improvements to the substandard or unsafe corridors, to include road drainage facilities. The Mayor shall determine when and if such conditions exist. At a minimum a 20-foot wide paved surface accessing the development will be required for offsite improvements as a condition of development.

When new development borders two or more roads with different classifications the development shall take access off the road with the lower classification. In the event that abutting roads have the same classification the access shall be determined based upon existing and projected future traffic so as to minimize impacts on traffic flow. Access onto high volume roads may be denied in the interest of traffic safety or operational requirements.

This chapter provides minimum street design standards as well as minimum design standards for “stand alone” pedestrian and/or bike trails/paths. Higher design and construction standards may be warranted due to localized design and construction parameters.

### 5.2 STREETS

#### A. General

All street design and construction must provide for the maximum traffic loading and capacity conditions anticipated based upon existing land use and zoning. The width and grade of the pavement must conform to specific standards set forth herein for safety and uniformity.

B. Design Standards

The design of streets and roads shall depend upon their type and usage. The design elements of streets shall conform to City standards as set forth herein.

The layout of streets shall provide for the continuation of existing arterial streets or for their proper projection when adjoining property is not subdivided. See Table 5-1 Minimum Street Design Standards in Section 5.3.

1. Grade. Street profile grade should conform closely to the natural contour of the land. In some cases, a different grade may be required by the Mayor. Unless otherwise approved by the City, the minimum profile grade shall be 0.7 percent. Local conditions may, in the opinion of the Mayor, require a lesser profile grade. Specific approval by the Mayor is required. Generally the, the minimum allowable profile grade shall be 0.5 percent. The maximum allowable grade shall be as further specified in the Table 5-1 Minimum Street Design Standards.
2. Width. The pavement and right-of-way width depend upon the street classification. Table 5-1 Minimum Street Design Standards show the minimum widths allowed.

Street widths shall be measured from face of vertical curb to face of vertical curb on streets with cement concrete curb and gutter, and from edge of asphalt to edge of asphalt for streets “approved” by the City without concrete vertical curb and gutter.

3. The developer may be required to retain a licensed geotechnical engineer to make soils tests and to provide engineering recommendations for design of the sub-base and roadway sections based on “in place” soils, depth of “free draining” structural materials, projected pavement loadings, roadway classification, average daily traffic volume, etc.
4. In special circumstances, as may be specifically approved/required by the Mayor and/or City Council, due to local conditions and/or geometric restrictions, paving widths or improvement standards may be required which are different than those specifically listed herein.

5. Streets and lots shall be placed in relationship to natural topography so that grading and filling and/or other alternations of existing condition is minimized.
6. The City intends to promote connectivity of roadways within the City. Therefore, if, in the opinion of the City, it is necessary to give access to, or permit future subdivision of adjoining land, streets shall be extended to the boundary of the subdivision and the resulting dead-end street shall be provided with a temporary cul-de-sac. The temporary cul-de-sac shall be appropriately signed as “temporary” and paved.
7. Alleys shall be prohibited except when approved by the City.
8. Streets shall be laid out with a minimum number of intersections with other arterial streets. No streets shall intersect at intervals closer than 125 feet, unless, in the judgment of the Mayor, an exception to this rule would be in the public interest and welfare.
9. Streets designed to have one end permanently closed shall be no longer than 400 feet.
10. Intersecting streets shall be laid out so that blocks between street lines are not more than 800 feet in length.
11. Streets shall be laid out so as to intersect as nearly as possible at right angles, and in any event, no street shall intersect with any other street at an angle of less than 60 degrees, without specific written City approval.
12. At a minimum, streets shall conform to all requirements of the latest edition of the Uniform Fire Code adopted by the City.
13. All street construction plans shall be submitted to the City and shall include the required information from the development checklist:

All public streets, sidewalks and alleys shall be designed to meet the needs of anticipated future development;

All topsoil, organic, and structurally unsuitable soils shall be removed as necessary beneath the proposed street section.

14. In addition to the above requirements, street design shall incorporate the following minimum requirements:
  - a. All new utility systems such as power, gas, cable TV and telephone shall be buried, except where topography or site conditions prohibit reasonable installation. Design and installation of the system shall be done by the franchised utility company. Design shall be submitted to the Mayor for review and approval prior to installation;
  - b. Street lighting shall be provided in accordance with Puget Sound Energy standards.

### **5.3 DESIGN STANDARDS**

City streets are divided into three major categories (Table 5-1) Function is the controlling element for classification and shall govern right-of-way, road width, and road geometrics. The proponent/developer shall request information on the functional classification of existing streets from the Mayor. New streets will be classified by the Mayor.

Generally speaking, the functional classifications of streets are defined as follows:

- Minor arterials are defined as streets serving or anticipated to serve in the future less than 14,000 average daily trips and provide service for trips of moderate length, serve geographic areas that are smaller than their higher arterial counterparts and offer connectivity to the higher arterial system.
- Collector arterial streets are defined as streets currently serving or anticipated to serve less than 2,600 average daily trips and serve a critical role in the roadway network by gathering traffic from local roads and funneling them to the arterial network.
- Local access streets are streets that do not fit the definitions above and are not intended for use in long distance travel. Local roads are to be designed to discourage through traffic.
- Alley is defined as a strip of land dedicated for public use which is 20 feet in width and which is intended to provide driveway access to adjacent properties. Alleys are not allowed except under special circumstances, and are intended only to serve the properties directly abutting them for non-commercial purposes only.

**TABLE 5-1**

**Minimum Street Design Standards**

| <b>Design Standard</b>           |                                  | <b>Minor Arterial</b>                               | <b>Collector Arterial</b>                           | <b>Local Access Street</b>                          | <b>Alley</b>  |
|----------------------------------|----------------------------------|---|---|---|---|
| Min. Right-of-Way                |                                  | 60 feet   | 50 feet   | 40 feet   | 25 feet <sup>(6)</sup>                              |
| Utility Easement <sup>1</sup>    |                                  | None  | 10 ft. min., can be split between both sides        | 10 ft. min., can be split between both sides        | None  |
| Min. Pavement Width <sup>2</sup> |                                  | 40 feet   | 30 feet   | 24 feet   | 20 feet   |
| Parking Lane                     |                                  | Both Sides  | One Side  | None  | None  |
| Min./Max. Grade                  |                                  | 0.7% - 8.0%   | 0.7% - 15%  | 0.7% - 15%  | 0.7% - 15%  |
| Curb                             |                                  | Vertical Cement Concrete Curb and Gutter both sides | Vertical Cement Concrete Curb and Gutter both sides | Vertical Cement Concrete Curb and Gutter both sides | One side if Cross Slope alley. None if "V" section. |
| Planter Strip <sup>(2)</sup>     |                                  | None  | None  | None  | None  |
| Sidewalk <sup>(2)(3)</sup>       |                                  | 6 feet min. both sides                              | 5 feet min. both sides                              | 5 feet min. both sides                              | None  |
| Cul-de-Sac Radius                |                                  | N/A   | N/A   | 50 foot paved bulb radius <sup>(4)</sup>            | N/S   |
| Intersection Curb Radius         | 30 feet                          | 30 feet   | 30 feet   | 25 feet   | 15 feet   |
| Design Speed                     | Per City Direction               | 30 mph  | 25 mph  | 25 mph  | 15 mph  |
| Stopping Site Distance           | Per City Direction               | 250 feet  | 200 feet  | 200 feet  | Per City Direction                                  |
| Access                           | Controlled. No Direct Lot Access | Residential and Commercial                          | Residential and Commercial                          | Residential and Commercial                          | Residential   |

1. Utility Easement not associated with a City right-of-way shall be a minimum width of 15 feet and shall be 5 feet minimum if abutting and parallel to the right-of-way.
2. Alternate roadway, sidewalk and planter strip design may be considered by the City.
3. Sidewalk width measured from back of curb when curb and sidewalk contiguous.
4. Pavement cul-de-sac bulbs shall have a right-of-way extending 6 feet outside the face of curb.
5. Right-of-way requirements may be increased if additional lanes, pockets, transit lanes, bus loading zones, operational speed, bike lanes, utilities, schools or other factors are proposed and/or required by the City
6. Alleys less than 150 feet in total length may have a 20-foot right-of-way and a 15-foot-wide paved surface.

**TABLE 5-2**

**Design Values for Roads**

| <b>Design Speed</b>  | <b>20</b> | <b>25</b> | <b>30</b> | <b>35</b> | <b>40</b> |
|--|-----------|-----------|-----------|-----------|-----------|
| Horizontal Curvature for Normal Crown Section, Radius (ft) | 100       | 180       | 300       | 460       | 600       |
| Horizontal Curvature for 2% Superelevation, Radius (ft)    | N/A       | 155       | 250       | 375       | 540       |
| Horizontal Curvature for 4% Superelevation, Radius (ft)    | N/A       | 145       | 230       | 345       | 490       |
| Horizontal Curvature for 6% Superelevation, Radius (ft)    | N/A       | N/A       | 215       | 320       | 450       |
| Stopping Site Distance*                                    | 125       | 150       | 200       | 250       | 325       |
| Entering Site Distance                                     | 250       | 300       | 350       | 400       | 450       |
| Passing Site Distance for a 2-Lane Road                    |           | 1,100     | 1,300     | 1,500     | 1,650     |

\*If entering on a downgrade slope the stopping sight distances shall be increased for slopes greater than 3 percent.

Existing streets are classified as shown in Table 5-3

**TABLE 5-3**

**Road Classifications for the City of Algona**

| <b>Classification</b> | <b>Street</b>  |
|-----------------------|--|
| Minor Arterial        | West Valley Highway, 1 <sup>st</sup> Avenue, Ellingson Road, Pacific Avenue South, Boundary Boulevard, Algona Boulevard, |
| Collector Arterial    | Milwaukee Boulevard, Main Street, Celery Street  |
| Local Access Street   | All other roads not listed as an arterial or collector   |

**5.4 STREET NAMES**

The developer must check with the Mayor regarding the naming of streets. This should be done at the time the preliminary plat is submitted and again upon approval of the final plat. The Mayor or designee will ensure that the name assigned to a new street is consistent with policies of the City. The City Council shall approve all street names.

An address number will be assigned to all new buildings at the time the building permit is issued. It is then the owner’s responsibility to see that the house numbers are placed clearly and visibly at the main entrance to the property or at the principal place of ingress per city code AMC 12.16.

**5.5 SIGNING**

The developer is responsible for furnishing and providing all temporary and permanent traffic control signs and street designation signs. Traffic control signing shall comply with the provisions as established by the U.S. Department of Transportation Manual on Uniform Traffic Control devices (MUTCD). All signs,



including poles and hardware, shall be furnished and installed by the developer. Street designation signs shall display street names or grid numbers as applicable.

All residential, commercial and industrial ingress/egress areas shall be designated as fire lanes with appropriate pavement markings or signage.

## **5.6 STREET FRONTAGE IMPROVEMENTS**

- A. All industrial, commercial, or residential development shall install street frontage improvements at the time of construction unless specifically excluded from these Standards. Such improvements shall include concrete curb and gutter, concrete sidewalk, street storm drainage, street lighting system, utility installation and/or relocation, landscaping and irrigation, undergrounding aerial utilities and street pavement widening all per these Standards. Plans shall be prepared and signed by a registered engineer currently licensed in the State of Washington.
- B. All frontage improvements shall be made across the full frontage of the property. Corner lots shall provide for full frontage along both rights-of-way. Through lots shall provide for frontage on both ends of the property.
- C. All frontage improvements shall provide for a smooth transition to neighboring property.
- D. Frontage improvements shall include a 20 foot, minimum, paved surface.
- E. Storm drainage shall be installed as necessary to extend past the neighboring properties to prevent road runoff from impacting those properties.

## **5.7 OFFSITE IMPROVEMENTS**

Where a project is connected to an improved street by an unimproved right-of-way or gravel road within the right-of-way, offsite improvements shall be required. The offsite improvements shall be a minimum 20-foot road section with curb, gutter, and sidewalk on one side to serve proposed and potential future development, with associated storm drainage.

## **5.8 DEAD ENDS**

Where a street is dead ended, turn around provisions must be provided where the road is more than 150 feet in length. The Detail section of these Standards and Table 5-1, show the requirements for a cul-de-sac. The turn around may be a hammerhead as shown in the Detail Section of these Standards, only if preapproved by the local fire marshal and the Mayor. It shall be designed per Figure D103.1 in Appendix D of the International Fire Code or as provided in the

detail located within these City Standards.

## 5.9 INTERSECTIONS

- A. Traffic control will be as specified in the Manual on Uniform Traffic Control Devices (MUTCD) or as may be specifically modified by the Mayor as a result of appropriate traffic engineering studies.
- B. For reasons of traffic safety, a “T” intersection (three-legged) is preferable to the crossroad (four-legged) intersection for local access streets. For safe design, the following types of intersection features should be avoided:
  - 1. Intersections with more than four intersecting streets;
  - 2. “Y” type intersections where streets meet at acute angles;
- C. Spacing between adjacent intersecting streets, whether crossing or “T” should be as follows:

| When highest classification involved is: | Minimum centerline offset should be: |
|--|--------------------------------------|
| Minor Arterial                           | 300 feet                             |
| Collector Street                         | 300 feet                             |
| Local Access Street                      | 150 feet                             |

When different class streets intersect, the higher standard shall apply on curb radii. Deviations to this may be allowed at the direction of the Mayor.

- D. On sloping approaches at an intersection, landings shall be provided with grade not to exceed one foot difference in elevation for a distance of 30 feet approaching any arterial or collector or 20 feet approaching a local access street, measured from nearest right-of-way line (extended) of intersecting street.
- E. All intersections shall meet the sight distances as given in Tables 5-1 and 5-2.

## 5.10 DRIVEWAYS

- A. General
  - 1. Driveway approach details are located at the end of these Standards.

2. All driveways approaches shall be constructed of Concrete Cement, and shall be at least 6-inches thick, over a 4-inch crushed surfacing top course. Driveway approaches shall be subject to the same testing and inspection requirements as curb, gutter, and sidewalk construction. Driveway approaches shall be Class 4000 psi.
3. Joint-use driveways serving up to four adjacent parcels are encouraged. Where shared use extends onto private property an access easement shall be recorded for all parcels of land impacted. Joint-use driveways longer than 150 feet in length shall be a minimum of 22-feet paved width serving two houses or 26.5 feet serving three or more houses, and shall have a fire apparatus turn around designed per Figure D103.1 in Appendix D of the International Fire Code or as provided in the detail located within these City Standards. Commercial access easements shall be a minimum of 35 feet and industrial access easements shall be 41 feet minimum.
4. No commercial or industrial type driveway shall be constructed where backing onto the sidewalk or street is required.
5. No driveway approach shall extend into the street further than the face of the curb or edge of asphalt in the absence of a curb.
6. The angle between any driveway approach and the street shall be not less than 45°.
7. Generally, the two edges of each driveway approach shall be parallel.
8. Every driveway must provide access to a garage, carport, parking area or other structure on private property requiring the entrance of vehicles. No public curb shall be cut unless a driveway is installed.
9. Maintenance of driveway approaches shall be the responsibility of the owners whose property they serve.
10. No person shall begin work on the construction, alteration, repair or removal of any driveway approach or the paving of any parking strip on and/or adjacent to any street, alley or other public place in the City without first obtaining a right-of-way permit from the

City. Exceptions to permit requirements may be granted at the discretion of the Mayor.

11. Driveway connections to the access tract shall be configured such that vehicles backing out of the driveways complete their maneuvers within the access tract without entering another property.

12. Driveway Location

No driveway shall be located as to create a hazard to pedestrians, bicyclists or motorists or to invite or compel illegal or unsafe traffic movements.

No driveway shall be constructed in such a manner as to be a hazard to any existing street lighting standard, utility pole, traffic regulating device or fire hydrant. At a minimum, all portions of the driveway shall be located 5 feet from these and similar appurtenances and adjacent property lines for residential properties. Driveways shall be located 9 feet from the property line for commercial and industrial areas. The cost of relocating any such street structure when necessary to do so shall be paid by the developer. The relocation of any street structure shall be allowed with the specific written approval of the Owner of the structure involved.

13. All driveways, both in the public right-of-way and on private property, shall be completed with concrete, if serving one residence. If the driveway serves multiple residences, or is commercial, the driveway on private property shall be completed with asphalt or concrete.

Permeable concrete or asphalt are encouraged if site conditions are suitable.

14. Driveway Size and Number

- a. Except as otherwise provided, the width of any residential driveway shall not exceed 22 feet and not be less than 10 feet (exclusive of the radii of the returns, see Table 5-4). The Mayor may authorize additional residential driveway widths for three-car garages or for recreational vehicles.

**TABLE 5-4**

**Maximum Residential Driveway Width**

| <b>Property Frontage</b>           | <b>Maximum Driveway Width</b> |
|------------------------------------|-------------------------------|
| Less than 30'                      | 12'                           |
| Greater than 30' and less than 50' | 12' or 30 percent of Frontage |
| Greater than 50' and less than 75' | 18'                           |
| Greater than 75'                   | 22'                           |

- b. The total width of all driveways for any one ownership on a street shall not exceed 30 percent of that ownership along the street. Any driveway which has become abandoned or unused through a change of the conditions for which it was originally intended or which for any other reason has become unnecessary, shall be closed and the owner shall replace any such driveway curb-cut with a standard curb according to the City’s standards.
- c. The length of any driveway shall not exceed 150 feet, without approval of the Mayor.
- d. There shall not be more than two driveways on one street for any one unit of operation.

15. Driveway Slopes and Entry

Driveway slopes or grades shall not exceed eight percent unless otherwise authorized/approved by the Mayor in writing. The Mayor will consider authorizing driveway slopes exceeding eight percent, up to a maximum of twelve percent, if it is determined that:

- a. The driveway is the only economically and environmentally reasonable alternative.
- b. The driveway will not present a traffic, pedestrian, bicycle or safety hazard.
- c. The police and fire chief concur in allowing the increased driveway slope.
- d. The public health, safety and general welfare will not be adversely affected.
- e. Driveway access onto an arterial street shall be 150 feet, or as far as practicable, from an intersecting street except with written permission from the City. No driveway shall be located within 20 feet of a crosswalk.
- f. Within the limitations set forth above, access to arterial streets within the City shall be limited to one driveway for

- each tract of property separately owned, except that automobile service stations may be allowed two driveways.
- g. Driveways giving direct access onto arterials may be denied if alternate access is available. Deviations of these standards may be permitted by the Mayor.
16. Driveways may utilize the full width of narrow “pipe stem” parcels or easements if approved by the Mayor.
17. Commercial and Industrial Driveways

For commercial or industrial driveways with heavy traffic volumes or significant numbers of trucks, the Mayor may require construction of the access as a street intersection. This requirement will be based on traffic engineering analysis submitted by the applicant that considers, among other factors, intersection spacing, sight distance and traffic volumes. Street approaches and/or ingress and egress tapers may be required in industrial and commercially zoned areas as directed by the Mayor.

## 5.11 FIRE LANES

- A. Definitions. The following definitions shall apply in the interpretation and enforcement of this section:
- 1. “Fire lane” means that area within any public right-of-way, easement, or private property designated for the purpose of permitting fire trucks and other fire-fighting or emergency equipment to use, travel upon and park.
  - 2. “Park,” “parking,” “stop,” “stand” or “standing” means the halting of a vehicle, other than an emergency vehicle, whether occupied or not, except when necessary to avoid conflict with other traffic or in compliance with the directions of a police officer or fire official or traffic-control sign or signal.
  - 3. “Vehicle” means a machine propelled by power other than human power, designed to travel along the ground or rail by use of wheels, treads, runners or slides, and transport persons or property, or pull machinery, and shall include, without limitations, automobile, truck, trailer, motorcycle, tractor, buggy, wagon and locomotive.
- B. Requirements – Standards. When required by the fire department, hard-surfaced driving lanes shall be provided around facilities which by their size, location, design or contents warrant access which exceeds that normally provided by the proximity of city streets.

1. Lanes shall provide a minimum, unobstructed continuous width of 20 feet and a minimum vertical clearance of 13 feet, 6 inches.
  2. Fire lanes shall be either asphalt or reinforced concrete, or when specifically authorized by the fire department, compacted crushed rock may be used.
  3. Where fire lanes connect to city streets or parking lots, adequate clearances and turning radii shall be provided. All proposed plans must have fire department approval.
- C. Fire Lanes as Part of Driveways and/or Parking Areas. The fire department may require that areas specified for use as driveways or private thoroughfares shall not be used for parking. These areas, when specified, shall be marked or identified by one of the two means detailed in subsection E of this section.
- D. Parking in a Fire Lane Prohibited. Except when necessary to avoid conflict with other traffic, or in compliance with the direction of a police officer or fire official or traffic-control sign, signal or device, no person shall stop, stand or park a vehicle, whether occupied or not, in a designated fire lane. Vehicles parked in a fire lane are subject to immediate impoundment, in addition to other penalties.
- E. Fire Lane Identification. Lanes shall be identified by a four-inch-wide line or by painting of the curb in bright yellow color. Marking shall be by one of the following methods:
1. Fire lane signs (in accordance with the Washington State Highway Commission Sign Fabrication Manual M24-70 HT and the Manual of Uniform Traffic-Control Devices issued by the Federal Highway Administration), per illustration:



Lettering Specifications:

- 3" – Class C width
- 3" – Class B width
- 2" – Class C width
- 1/2" – Class C width

- a. Reflective in nature;
  - b. Red letters on white background;
  - c. Signs to be spaced 50 feet apart and posted on or immediately next to the curb, or on the building;
  - d. Signs to be no less than four feet from the ground.
2. Fire lane painting (where signs cannot be safely or securely posted, or where required additional to signs).
- a. Block letters 24 inches high, 12 inches wide and four-inch stroke stating "FIRE LANE – NO PARKING" shall be painted on the lane at 50-foot intervals in bright yellow color using paint that shall be suited for traffic markings.
- F. Existing Buildings. When the fire department determines that a hazard due to inaccessibility of fire apparatus exists around existing buildings, they may require fire lanes to be constructed and maintained as detailed in subsections B and C of this section.

**5.12 SIGHT OBSTRUCTION**

The following sight clearance requirements take into account the proportional relationship between speed and stopping distance (see the "Geometric Design of Highway and Streets" 2011).

The sight distance area is a clear-view triangle formed on all intersections by extending two lines of specified length (A) and (B) as detailed within these Standards. The area within the triangle shall be subject to restrictions to maintain a clear view on the intersection approaches.

- A. Sight Distance Triangle
  - 1. Stop or Yield Controlled Intersection:

See Table 5-2



2. Uncontrolled Intersection:

- a. Length as shown below is for both roads as measured from the center of the intersecting streets along the centerlines of both streets and connecting these endpoints to form the hypotenuse of the triangle.

| Speed Limit | Sight Distance (feet) |
|-------------|-----------------------|
| 15 mph      | 80                    |
| 20 mph      | 100                   |
| 25 mph      | 125                   |
| 30 mph      | 150                   |
| 35 mph      | 175                   |
| 40 mph      | 205                   |

The vertical clearance area within the sight distance triangle shall be free from obstructions to a motor vehicle operator’s view between a height of 3 feet and 10 feet above the existing surface of the street.

Sight obstructions that may be excluded from these requirements include: fences in conformance with AMC 22.62, utility poles, regulatory signs, trees trimmed from the base to a height of 8 feet above the sidewalk, and 14 feet above street, places where the contour of the ground is such that there can be no cross visibility at the intersection, saplings or plant species of open growth habits and not in the form of a hedge which are so planted and trimmed as to leave at all seasons a clear and unobstructed cross view, buildings constructed in conformance with the provisions of appropriate zoning regulations and preexisting buildings.

**5.13 SUBGRADE PREPARATION**

The subgrade area of the street right-of-way shall be cleared of brush, weeds, vegetation, grass and debris, per Section 2-01 of the Standard Specifications. All cleared and grubbed material shall be satisfactorily disposed of. All depressions, or ruts, which contain water will be drained.

The subgrade shall then be bladed and dragged to remove inequalities and secure a uniform surface. The existing subgrade will be compacted to a minimum density as defined in the Standard Specifications and as witnessed by the Mayor. Compaction tests may be required to be conducted at the discretion of the Mayor to verify same.

#### **5.14 CRUSHED SURFACING (BASE AND TOP COURSE)**

Two or more courses of Crushed Surfacing Base Course or Crushed Surfacing Top Course shall be placed upon an existing roadway surface, or upon a subgrade properly prepared as outlined above. Crushed surfacing material shall be uniform in quality and substantially free from wood, roots, bark and other extraneous material. It will compact into a dense and unyielding mass, which will be true to line, grade and cross-section.

Base courses and top courses shall be placed in accordance with the approved cross-section. Compaction shall be a minimum of 95 percent of standard density as determined by the compaction control test for granular materials. Base course rock may be composed of larger fractured rock if recommended by the developer's engineer and approved by the Mayor.

#### **5.15 SURFACING REQUIREMENTS**

All streets in the City of Algona will be paved with either Asphalt Concrete or Cement Concrete, in strict compliance with these standards. Low Impact Development alternative surfaces are encouraged and may be approved by the Mayor on a case by case basis.

The pavement design shall meet the requirements in the latest publication of the AASHTO Guide for Design of Pavement Structures. The pavement section shall be designed and stamped by an engineer currently licensed in the State of Washington. Any pavement shall be designed using currently accepted methodology that considers the load bearing capacity of the soils and the traffic carrying capacity requirements of the roadway. Plans shall be accompanied by a pavement thickness design based on soil strength parameters reflecting actual field tests and traffic loading analyses. The analysis shall include the traffic volume and axle loading, the type and thickness of roadway materials and the recommended method of placement.

Soil tests shall be performed by an engineering firm specializing in soils analysis and currently licensed in the State of Washington.

The soils report, signed and stamped by a soils engineer licensed by the State of Washington, shall be based on actual soils tests and submitted with the plans. All depths indicated are a minimum compacted depth.

Construction of materials to create streets paved with Hot Mix Asphalt Concrete (including subbase) shall conform to Sections 5-04 and 9-03.9(3) of the Standard Specifications. Pavement material for asphalt concrete roads will be hot mix asphalt concrete and be constructed at least 3 inches thick (minimum compacted thickness) over the prepared subbase. Additional thickness may be required

depending upon specific site conditions and anticipated traffic loading. Generally, the accepted asphalt hot mix is Hot Mix Asphalt Class 1/2" PG 64-22. Mechanical spreading and finishing will be as described in Section 5-04.3(9) of the Standard Specifications. Compaction will be performed by the equipment and methods presented in Section 5-04.3(10) of the Standard Specifications, and Surface Smoothness shall satisfy the requirement of Section 5-04.3(13) of the Standard Specifications.

Cement concrete streets will be constructed as specified in Section 5-05 of the Standard Specifications. Cement concrete shall be placed over a minimum of 6 inches of compacted crushed surfacing.

Permanent pavement patching will be performed as described in the pavement repair detail listed herein, and in compliance with Section 5-04 of the Standard Specifications.

#### **5.16 TEMPORARY STREET PATCHING**

Temporary restoration of trenches shall be accomplished by using 2-inch Hot Mix Asphalt Concrete Pavement when available or 4-inch medium-curing (MC-250) liquid asphalt (cold mix), 3-inch asphalt treated base (ATB), or steel plates suitable for H-20 traffic loading conditions. Steel plates shall be provided with a cold mix "lip" to accommodate a smooth transition from pavement to steel plate.

All temporary patches shall be maintained by the contractor until such time as the permanent pavement patch is in place. All temporary patch materials shall be loaded and hauled to waste by the Developer, in compliance with applicable governmental regulations.

If the contractor is unable to maintain a patch for whatever reason, the City will patch it at actual cost plus overhead and materials. The property owner/developer/permittee shall be invoiced for any City expenses incurred to comply with this Contractor requirement.

#### **5.17 TRENCH BACKFILL AND RESTORATION**

Trench restoration shall be either by a patch or a patch plus overlay as required by the City. Utility trenches generally parallel to the roadway typically will require a full width overlay unless excepted by the City. When utilities are installed in existing roads, additional restoration may be required if the road does not meet minimum standards.

- A. All trench and pavement cuts shall be made by sawcuts. The cuts shall be a minimum of 1 foot outside the trench width or 1 foot outside any pavement that cracks as a result of the trenching activities.

- B. All trenches shall be backfilled with crushed surfacing materials, control density fill or hot mix asphalt. The trench shall be compacted to 95 percent maximum density, as described in Section 2-03 of the Standard Specifications. The City will be the sole judge of approving materials to be utilized for backfill.

For all street crossings, controlled density fill (CDF) will be placed from 6-inches above the utility to 4-inches below the bottom of asphalt. Compacted crushed rock (5/8-inch minus) will be placed in the top 4 inches (just below the asphalt). Trenches parallel to the road alignment, the fill shall be 100 percent imported crushed rock, either crushed surfacing base course or crushed surfacing top course. All trench backfill materials shall be compacted to 95 percent density.

Backfill compaction shall be performed in 6 inch lifts, unless otherwise approved by the City.

Replacement of the asphalt concrete or concrete cement shall match existing asphalt concrete or concrete cement.

- C. Tack coat shall be applied to the existing pavement and edge of cut and shall be emulsified asphalt grade CSS-1. All joints shall be sealed with a sealant meeting Section 9-04.2 of the Standard Specifications. Tack coat shall be applied as specified in Section 5-04 of the Standard Specifications.
- D. Hot mix asphalt concrete shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the applicable requirements of Section 5-04 of the Standard Specifications, except that longitudinal joints between successive layers of asphalt concrete shall be displaced laterally a minimum of 12 inches unless otherwise approved by the Mayor. Fine and coarse aggregate for asphalt shall be in accordance with Section 9-03.8 of the Standard Specifications. Asphalt concrete over 2-inches thick shall be placed and compacted in equal lifts not to exceed 2 inches each.

All street surfaces, walks or driveways within the street trenching areas affected by the trenching shall be sawcut, or ground and paved to an extent that provides a smooth-riding connection and expeditious drainage flow for the newly paved surface. Feathering the asphalt shall not be allowed.

Surface smoothness shall be per Section 5-04.3(13) of the Standard Specifications. The paving shall be corrected by removal and repaving of the trench only.

- E. All joints shall be sealed with a sealant meeting Section 9-04.2 of the Standard Specifications.
- F. When trenching within the roadway shoulder(s), the shoulder shall be restored to its original or better condition.
- G. The final patch shall be completed as soon as possible and shall be completed within 30 days after first opening the trench. This time frame may be adjusted if delays are caused by inclement paving weather, or other adverse conditions that may exist. However, delaying of final repair is allowable only subject to the Mayor's approval. The Mayor may deem it necessary to complete the work within the 30 days time frame and not allow any time extension. If this occurs, the Contractor shall perform the necessary work as required by the Mayor.

#### **5.18 MATERIAL AND CONSTRUCTION TESTING**

Testing shall be required at the developer's or contractor's expense. The testing shall be ordered by the developer or contractor and the chosen testing lab shall be accredited for performing the various testing methods either by AASHTO R18, AASHTO 150/IEC 17025, or the American Association for Laboratory Accreditation and further approved by the City. Testing shall be done on all materials and construction as specified in the Standard Specifications and with frequency as specified herein.

**TABLE 5-5**

**Testing and Sampling Frequency Guide**

**Earthwork**

| <b>Item</b>             | <b>Location</b>          | <b>Test</b>                                      | <b>Testing Frequency</b>   |
|-------------------------|--------------------------|--|--|
| Undisturbed Native Soil | Structures               | In Place Density <sup>(3)</sup>                  | Two random tests in building footings and two tests on subgrade within                   |
|                         |                          | Moisture Density Relationship (Modified Proctor) | One test and any time material type changes.   |
| Fills and Backfills     | Structures (adjacent to) | In Place Density <sup>(3)</sup>                  | One test per structure Backfills per 2,000 sq. ft. taken 12 inches below finished Grade. |
|                         |                          | Moisture Density Relationship (Modified Proctor) | One test and any time material type changes.   |
| Subgrades               | Site                     | In Place Density <sup>(3)</sup>                  | One test per lift per 2,500 sq. ft.  |
|                         |                          | Moisture Density Relationship (Modified Proctor) | One test and any time material type changes.   |
| Embankments or Borrow   | Any                      | In Place Density <sup>(3)</sup>                  | One test per lift per 500 cubic yards placed.  |

**Trenching**

| <b>Item</b>     | <b>Test</b>   | <b>Testing Frequency</b>   |
|-----------------|---|--|
| Pipe Bedding    | Gradation <sup>(1)</sup>  | One for each material source.  |
| Trench Backfill | Gradation <sup>(1)</sup>  | One for each material source.  |
|                 | In-Place Density <sup>(1)(2)(3)(4)</sup>                        | One every 100 feet of trench and every 2 feet in depth of backfill material.                             |
|                 | Moisture Density Relationship (Modified Proctor) <sup>(3)</sup> | One prior to start of backfilling operations, one every 20 densities and any time material type changes. |

**Aggregate Materials**

| <b>Item</b>                   | <b>Test</b>                | <b>Testing Frequency</b>  |
|-------------------------------|----------------------------|---|
| Crushed Surfacing Base Course | Gradation, SE and Fracture | 1 – 2,000 TN.   |
|                               | Density <sup>(1)</sup>     | One test on every lift on material placed at a frequency of 250 square yards of completed area. |
| Crushed Surfacing Top Course  | Gradation, SE and Fracture | 1 – 2,000 TN.   |
|                               | Density <sup>(1)</sup>     | One test on every lift on material placed at a frequency of 250 square yards of completed area. |

**Hot Mix Asphalt and Asphalt Treated Base**

| <b>Item</b>  | <b>Test</b>                                 | <b>Testing Frequency</b>   |
|--|---|----------------------------|
| Commercial HMA and ATB                                       | Rice Density                                | 1 – project.               |
| HMA Cl. ___ PG ___<br>Project Quantity ≤ 400 tons            | Rice Density                                | 1 – project.               |
| HMA Cl. ___ PG ___<br>Project Quantity > 400 tons ≤ 800 tons | Rice Density, Gradation and Asphalt Content | 1 – project.               |
| HMA Cl. ___ PG ___<br>Project Quantity > 800 tons            | Rice Density, Gradation and Asphalt Content | 1 – 800 TN. <sup>(5)</sup> |
| Commercial HMA, HMA Cl. ___ PG ___, ATB                      | Compaction <sup>(1)</sup>                   | 1 – 80 TN.                 |

**Hot Mix Asphalt Aggregate<sup>(9)</sup>**

| <b>Item</b>    | <b>Test</b>  | <b>Testing Frequency</b> |
|----------------|--------------|--------------------------|
| Aggregate      | SE, Fracture | 1 – 1,600 TN.            |
| Blend Sand     | SE           | 1 – Project.             |
| Mineral Filler | Sp. G and Pl | Certificate.             |

**Asphalt Reinforcement Mesh**

| <b>Item</b>                | <b>Test</b>   | <b>Testing Frequency</b> |
|----------------------------|---------------|--------------------------|
| Asphalt Reinforcement Mesh | Adhesion Test | 1 – 3,000 SF.            |

### PCC Paving<sup>(8)</sup>

| Item                              | Test                                   | Testing Frequency          |
|-----------------------------------|--|----------------------------|
| Course Aggregate <sup>(7)</sup>   | Gradation                              | 1 – 1,000 CY.              |
| Fine Aggregate <sup>(7)</sup>     | Gradation                              | 1 – 1,000 CY.              |
| Combined Aggregate <sup>(7)</sup> | Gradation                              | 1 – 1,000 CY.              |
| Air Content                       | Air                                    | 1 – 500 CY.                |
| Cylinders (28 Day)                | Compressive Strength                   | 1 – 500 CY.                |
| Core                              | Density<br>Thickness                   | 1 – 500 CY.<br>1 – 500 CY. |
| Cement <sup>(6)</sup>             | Chemical and Physical<br>Certification |                            |

### PCC Structures<sup>(8)</sup>

| Item                              | Test                                   | Testing Frequency |
|-----------------------------------|--|-------------------|
| Course Aggregate <sup>(7)</sup>   | Gradation                              | 1 – 1,000 CY.     |
| Fine Aggregate <sup>(7)</sup>     | Gradation                              | 1 – 1,000 CY.     |
| Combined Aggregate <sup>(7)</sup> | Gradation                              | 1 – 1,000 CY.     |
| Consistency                       | Slump                                  | 1 – 50 CY.        |
| Air Content                       | Air                                    | 1 – 50 CY.        |
| Cylinders (28 Day)                | Compressive Strength                   | 1 – 50 CY.        |
| Cement <sup>(6)</sup>             | Chemical and Physical<br>Certification |                   |
| Grout                             | Compressive Strength                   | 1 set/day.        |

- (1) All acceptance tests shall be conducted from in-place samples.
- (2) Additional tests shall be conducted when variations occur due to the Contractor's operations, weather conditions, site conditions, etc.
- (3) All compaction shall be in accordance with the Compaction Control Test of Section 2-03.3(14)D. The nuclear densometer, if properly calibrated, may be used for the required testing frequency and procedures. The densometer shall be calibrated and is recommended for use when the time for complete results becomes critical.
- (4) Depending on soil conditions, it is anticipated that compaction tests will be required at depths of two feet above the pipe and at each additional two feet to the existing surface plus a test at the surface.
- (5) A minimum of three samples, on a random basis, shall be taken and tested.
- (6) Cement may be accepted by the Engineer based on the Manufacturer's Mill Test Report number indicating full conformance to the Specification.
- (7) The frequency for fine, course, and combined concrete aggregate samples for PCC Paving and PCC Structures shall be based on the cubic yard (CY) of concrete.
- (8) Commercial concrete will be accepted with Certificate of Compliance; no testing is required.
- (9) Hot mix asphalt aggregate tests are not required for  $\leq$  400 tons

## 5.19 SIDEWALKS, CURBS AND GUTTERS

### A. Design Standards

Plans for the construction of sidewalks, curbs and gutters are to be submitted as part of the street plans when applicable.



The City has set forth minimum standards as shown in the standard details, which must be met in the design and construction of sidewalks, curbs and gutters. Because these are minimum standards, they may be modified by the Mayor should he feel circumstances require deviation from the minimum design standards.

B. Sidewalks

Sidewalks shall be constructed of Cement Concrete, 4 inches thick (6-inch thick at driveway sections) per Section 8-14 of the Standard Specifications. Sidewalks shall be Class 3000 psi except at driveway approaches when it shall be Class 4000 psi.

Sidewalks shall be constructed in accordance these standards and in accordance with WSDOT Standard Specification and Standard Details. In the event of a conflict the more rigorous standard shall apply. The City shall be at liberty to vary required sidewalk dimensional characteristics and location as shown in the standard details to meet localized or existing conditions. Low Impact Development design may be incorporated into the design of the sidewalk if site conditions are meet the standards required for Low Impact Design.

Alternate designs that incorporate Low Impact Development standards may be approved on a case-by-case basis. For example, sidewalk slopes can be reversed (i.e., away from the street) if part of a city approved low impact development design.

C. Curb and Gutter

Cement concrete curb and gutter shall be used for all street edges unless otherwise approved by the Mayor. All curbs and gutters shall be constructed of Class 3000 psi Cement Concrete and in accordance with Section 8-04 of the Standard Specifications. Curbs shall be of the vertical face type. No rolled curb and gutter will be allowed without specific approval of the Mayor. If rolled curbs are approved, all sidewalks abutting the rolled curb plat shall be a minimum 6-inches thick. Curb cuts may be allowed as an alternative Low Impact Development design.

Extruded curb and gutter per Standard Specifications is allowed only with the specific approval of the Mayor.

Form and subgrade inspection by the City are required before curb and gutter are poured.

Forms, wood or steel, shall be staked securely in place, true to line and grade.

Sufficient support shall be given to the form to prevent movement in any direction, resulting from the weight of the concrete or the concrete placement. Forms shall not be set until the subgrade has been compacted within one inch of the established grade. Forms shall be clean and well oiled prior to setting in place. When set, the top of the form shall not depart from grade more than 1/8 inch when checked with a 10-foot straightedge. The alignment shall not vary more than 1/4 inch in 10 feet. Immediately prior to placing the concrete, forms shall be carefully inspected for proper grading, alignment and rigid construction. Adjustments and repairs as needed shall be completed before placing concrete.

The subgrade shall be properly compacted and brought to specified grade before placing concrete. The subgrade shall be thoroughly dampened immediately prior to the placement of the concrete. Concrete shall be spaded and tamped thoroughly into the forms to provide a dense, compacted concrete free of rock pockets. The exposed surfaces shall be floated, finished and brushed longitudinally with a fiber hair brush approved by the City's inspector and/or engineer.

The face form of the curb shall be stripped at such time in the early curing as will enable inspection and correction of all irregularities that appear thereon.

Forms shall not be removed until the concrete has set sufficiently to retain its true shape. The face of the curb shall be trowled with a tool cut to the exact section of the curb and at the same time maintain the shape, grade and alignment of the curb. The exposed surface of the curb shall be brushed with a fiber hair brush.

Joints shall be cleaned and edged as shown on the drawings. All expansion and contraction joints shall extend entirely through the curb section above the pavement surface. Joint filler in the curb shall be normal to the pavement and in full and constant contact with pavement joint filler.

#### D. ADA Curb Ramps

All sidewalks must be constructed to provide for curb ramps in accordance with the current standards of applicable state law. Details provided herein are minimum and subject to change. It is the Developer's responsibility to verify current ADA requirements and install same per current standards

even if City has approved of construction drawings with non-compliant ADA requirements.

Curb Ramps shall be constructed of Cement Concrete. Form and subgrade inspection by the City are required before curb ramp is poured.

E. Testing

Testing shall be required at the developer's or contractor's expense on all materials and construction as specified in the WSDOT Standard Specifications.

At a minimum, one slump test and two test cylinders shall be taken once per day. All other testing frequencies shall be as specified in Section 5.19.

**5.20 ILLUMINATION**

A. General

Illumination shall be required unless otherwise directed by the Mayor. The illumination shall provide a minimum intensity of 0.4-foot candles within the right-of-way. The design shall be approved by Puget Sound Energy (PSE) and the Mayor.

**5.21 SIGNALS**

A. General

Signalization will be required if warranted as determined by an existing study and/or transportation study performed by the Developer at the request of the Mayor. The developer shall pay the entire cost of signalization if it is warranted, or wait until the City has procured sufficient monies to cause signalization improvements at the intersection(s). All components of the signal shall become the property of the City upon project acceptance.

**5.22 ROADSIDE FEATURES**

A. General

Miscellaneous features included herein shall be developed and constructed to encourage the uniform development and use of roadside features wherever possible.

B. Design Standards

The design and placement of roadside features included herein shall adhere to the specific requirements as listed for each feature.

C. Survey Monuments

1. All existing (or new) survey control monuments and/or markers which are disturbed, lost, or destroyed during surveying or building shall be replaced with the proper monument as outlined below by a land surveyor currently registered (licensed) in the State of Washington at the expense of the responsible contractor, builder or developer.

2. Street type: Minor Arterial; Collector Street

A pre-cast concrete monument with cast iron monument case and cover installed per City of Algona Standards is required.

If the monument case and cover are placed in cement concrete pavement, the pre-cast base will not be necessary.

3. Street type: Local Access

A cast-in-place concrete surface monument with sufficient ferrous metal embedded to allow for detection by a magnetic detection device per City of Algona standards is required.

4. Monument Locations

Appropriate monuments shall be placed:

- a. At all street intersections;
- b. At the PC and PTs of all horizontal curves;
- c. At PI of all horizontal curves of streets where the PI lies within the limits of the traveled roadway;
- d. At all corners, control points and angle points around the perimeter of subdivisions as determined by the City;
- e. At all section corners, quarter corners, and sixteenth corners that fall within the right-of-way.

D. Mailboxes

1. During construction, existing mailboxes shall be accessible for the delivery of mail or, if necessary, moved to a temporary location. Temporary relocation shall be coordinated with the local U.S. Postal Service. The mailboxes shall be reinstalled at the original location or to a new location as may be required by the local Postmaster, as further outlined below and approved by the U.S. Postal Service.
2. Location
  - a. Bottom or base of box shall be 41 inches to 45 inches above the road surface.
  - b. Front of mailbox shall be 0 to 12 inches behind vertical curb face or outside edge of shoulder.
  - c. New developments. Clustered mailboxes will, in all likelihood, be required. Contact the U.S. Postal Service for details. Sidewalks shall be constructed to facilitate same.
  - d. Buck-outs in sidewalks and sidewalk realignment may be required to maintain minimum sidewalk width behind the mailbox.
3. Mailboxes shall be set on posts strong enough to give firm support but not to exceed 4 x 4 inch wood or one 1-1/2-inch-diameter pipe, or material and design with comparable breakaway characteristics. Deviations may be allowed only with the written approval of the City.

E. Guardrails

For purposes of design and location, all guard rails along roadways shall conform to the criteria of the “Washington State Department of Transportation Design Manual” as may be amended or revised.

F. Walls

1. Rock or block walls may be used for erosion protection of cut or fill embankments up to a maximum height of 30 inches. For heights over 30 inches, a structural wall of an acceptable design, stamped by a structural engineer currently licensed in the State of Washington, shall be used and the design shall be approved by the

City of Algona. Design and construction shall be per the Association of Rockery Contractors (ARC) Specifications and/or applicable geotechnical recommendations. Rock walls over 4-feet high shall be subject to inspection by a geotechnical engineer.

2. For rock walls, the rock material shall be as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The rock material shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. The rock density shall be a minimum of 160 pounds per cubic foot.
3. Walls shall be started by excavating a trench having a depth below subgrade of one half of the wall's base course or 1 foot (whichever is greater).
4. For rock walls, rock selection and placement shall be such that there will be minimum voids and, in the exposed face, no open voids over 6 inches across in any direction. The final course shall have a continuous appearance and shall be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the rockery so that the wall will be stable and have a stable appearance. The rocks shall be placed in a manner such that the longitudinal axis of the rock shall be at right angles or perpendicular to the rockery face. The rocks shall have all inclining faces sloping to the back of the rockery. Each course of rocks shall be seated as tightly and evenly as possible on the course beneath. After setting each course of rock, all voids between the rocks shall be chinked on the back with quarry rock to eliminate any void sufficient to pass a 2-inch square probe.
5. Rock wall backfill shall consist of quarry spalls with a maximum size of 6 inches and a minimum size of 4 inches or as specified by a licensed engineer. This material shall be placed to a 12-inch minimum thickness between the entire wall and the cut or fill material. The backfill material shall be placed in lifts to an elevation approximately 6 inches below the top of each course of rocks as they are placed, until the uppermost course is placed. Any backfill material on the bearing surface of one rock course shall be removed before setting the next course.
6. Block walls shall be constructed of interlocking blocks, according to the manufacturer's recommendations.
7. Perforated drainage pipe and filter fabric shall be installed as required by the City.

G. Street Trees and Landscaping Items

Preservation of natural vegetation and healthy, existing mature trees, (particularly conifers) is preferred if available on the site. Otherwise, street trees and/or landscaping items (including irrigation if appropriate) shall be furnished and installed as may be specifically required by the City. If such is required, landscaping shall be of one of the referenced types as specified herein or in the Puget Sound Energy document “Energy Landscaping” available at:

[https://pse.com/safety/Tree-Trimming/Documents/1225\\_energy\\_landscaping.pdf](https://pse.com/safety/Tree-Trimming/Documents/1225_energy_landscaping.pdf)

And/or as otherwise may be approved by the City. These landscaping items, including trees and irrigation, shall be furnished and installed at the City’s sole discretion, direction, and approval. Exact size, spacing, type, location, and quantity to be as specified by the City.

Trees must be planted to the following standards:

- 3 feet back from the face of curb or sidewalk whichever is closer.
- 5 feet from underground utility lines.
- 10 feet from power poles (15 feet recommended).
- 7-1/2 feet from driveways (10 feet recommended).
- 20 feet from street lights or existing trees.

When trees are installed, root barriers shall be installed to extend 4 feet on either side of the tree parallel to the sidewalk or curb. Root barriers shall be constructed of interlocking polyethylene or polypropylene sheets and shall be 18 inches in height.

The following trees are prohibited from the Right-of-Way:

- Acer Macrophyllum (Big Leaf Maple, Oregon Maple).
- Populus Trichocarpa, P. deltoides (Cottonwoods)
- Populus Nigra (Lombardy Poplar)

These species have aggressive roots. The wood of some species is brittle and can break in the wind. Trees planted next to low impact development facilities such as porous pavements should have minimal tree litter. Recommended trees for bioretention areas are referenced in Appendix 1 of the Low Impact Development Technical Guidance Manual for Puget Sound. Trees to be planted in City right-of-way, or right-of-way to be dedicated to the City, shall be approved by the City prior to planting. The City reserves the right to remove any tree not so approved.

## 5.23 PARKING LOTS

Plans shall be submitted for review and approval by the City prior to the work being completed. The Plans and any other submittals shall address storm drainage discharge and on site retention or detention, connection to street and/or sidewalk, access locations, and parking layout. The City shall also check for future street improvement conformity and City zoning regulations.

Where possible, parking areas should be placed near the entrance to the site to reduce long driveways and impervious areas

Parking lot surfacing materials shall satisfy the requirement for a permanent all-weather surface. Asphalt concrete pavement and cement concrete pavement satisfy this requirement and are approved materials. Gravel surfaces are not acceptable or approved surface material types.

Dimensional characteristics for parking lots are in AMC 22.40.060.

## 5.24 UTILITIES

Utilities shall be furnished and installed within the right-of-way beneath new roads, or in existing roadways and rights-of-way so as to provide minimal interference with existing utilities and shall be located as generally shown in the Standard Details listed herein. Where existing utilities are in place, new utilities shall conform to these Standards as nearly as practical and yet be compatible with the existing installations. Exceptions may be approved by the City when necessary to meet special or localized requirements. Utilities shall be sized and designed to serve adjacent and tributary areas. Typically, utilities shall be required to be extended to “far” property lines. Easements shall be procured and provided by the developer to facilitate same. Utilities shall not be “land locked”.

### A. Sanitary Sewers

See Chapter 7

### B. Waterlines

See Chapter 8

### C. Other Utilities

Other utilities (gas, power, telephone, and cable TV) shall be located as follows: underground, either side of road, at plan location and depth compatible with other utilities and storm drains.



If site topography or other site conditions prevent reasonable underground installation utilities shall be on poles (as applicable) set back of ditchline, sidewalk or curb, at locations compatible with driveways, intersections, and other essential road features. To extent practical, utilities should share facilities so that a minimum of poles are needed, and preferably on only one side of road.

Notwithstanding other provisions, underground systems shall be located at least 5 feet away from other utilities (water, sewer, storm) and where they will not otherwise disturb existing survey monumentation.

D. Utility Crossings in Existing Streets

For smaller diameter pipes and wires the crossing shall be made without surface cut of the traveled portion where the street is of oil mat or better. The crossing shall be made by pushing or boring a pipe under the road. Where rock is known or expected in the area of the crossing, the attempt need not be first. Open cutting will be permitted, but prior approval of the City is required.

**5.25 ASPHALT CONCRETE PEDESTRIAN PATHS AND/OR BIKEWAYS**

- a. Minimum Easement or Right-of-Way Width: Fifteen feet minimum unless otherwise approved by Mayor.
- b. Construction Width: Five feet minimum. Greater widths may be required by the City up to 12 feet maximum.
- c. Subgrade: Prepared per Section 2.06 of the Standard Specifications.
- d. Gravel backfill for foundations (Class A) shall be used as required.
- e. Crushed rock base course shall conform to Section 9-03.9(3) of the Standard Specifications at a depth of one and one-half inch minimum. Greater depths may be required by the Mayor based on use and local ground conditions.
- f. Crushed rock top course shall conform to Section 9-03.9(3) of the Standard Specifications at a minimum depth of one and one-half inch. Greater depths may be required by the Mayor based on use and local ground conditions.

- g. Paving course shall be two-inches hot mix asphalt concrete. Greater depths may be required by the Mayor based on use and local ground conditions.

## CHAPTER 6

### STORM DRAINAGE STANDARDS

#### 6.1 GENERAL

The standards established by this chapter are intended to represent the **minimum** standards for the design and construction of storm drainage facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. Storm drainage revisions, additions, modification, or changes shall be made in compliance with City standards, ordinances, and Best Management Practices as identified in the Washington State Department of Ecology Stormwater Management Manual for Western Washington (2012) herein after referred to as “Stormwater Manual.” Adequate provisions shall be made for storm drainage, storm sewers, and associated appurtenances sufficient to transmit maximum runoff from the 25-year 24-hour event. All storm drainage facilities shall be designed by a professional engineer licensed in the State of Washington and shall comply with Stormwater Manual.

If warranted based on the condition and capacity of the existing storm drainage infrastructure (or lack thereof) and, impacts caused by the proposed development, off-site improvements may be required, at the City Engineer’s discretion, to mitigate impacts caused by the proposed development.

#### 6.2 DESIGN STANDARDS

On-site detention or infiltration systems shall be provided to ensure that post development stormwater discharge is in accordance with the Stormwater Manual. The design of storm drainage and detention systems shall depend on their type and local site conditions. The design elements of storm drainage systems shall conform to City Standards as set forth herein. The following design considerations shall apply:

- A. Plans shall show in tabular format:
  - 1. Site area;
  - 2. Existing impervious area;
  - 3. Existing impervious area to be converted to pervious;
  - 4. Proposed new pervious area;
  - 5. Net new impervious area.
  
- B. All runoff shall be captured prior to leaving the property so that neighbors are not impacted by new construction, reconstruction, or fill and grade

activities. Perimeter drains shall be installed as required to contain runoff and convey it to the City's storm drainage system.

- C. Storm drain detention systems shall be, at a minimum, designed and constructed in strict compliance with the Stormwater Manual and any amendments thereto. Local prevailing conditions may warrant higher standards as determined by the Mayor. Plans for storm drainage shall indicate where the stormwater will be treated, detained, and discharged or infiltrated. The drainage calculations must include a downstream analysis in accordance with the Stormwater Manual. The City Engineer may require that the downstream analysis be continued to incorporate sensitive areas such as steep slopes. Provisions shall be made for detainage and/or retainage of stormwater in order to control the amount of storm runoff to the standards in the Stormwater Manual.
- D. Maximum catch basin spacing shall be 200 feet on road grades up to 3 percent, 400 feet when the road grade is 3 percent or greater. No surface water (unless otherwise approved in writing by the City Engineer) shall cross any roadway. In addition, catch basins shall be placed whenever the length of surface drainage exceeds 300 feet on road grade, extending either direction from crest or sag on vertical curves. Vaned grates shall be employed on street grades exceeding 6 percent slope.
- E. Where storm drains run outside an existing public right-of-way, permanent easements will be required for public or private maintenance as may be required and warranted. Such easement shall be a minimum of 15 feet in width unless otherwise approved or required by the City. A construction (temporary) easement of suitable width shall may also be required.
- F. The Developer and/or Homeowners Association shall enter into a formal, legally binding agreement, as approved by the City Attorney, regarding the landowner's duties and obligations regarding their ownership, operation and maintenance of the system.
- G. All portions of publicly owned and maintained detention and or infiltration facilities shall be in public right-of-way or dedicated land tracts.
- H. All infiltration systems shall be open at the top to allow for maintenance. No underground, open bottom tanks, vaults, pipes or similar structures are allowed for infiltration.

- I. Storm drainage detention ponds shall have a minimum side slope of 3:1 (H:V). The perimeter fence shall be 6 feet high and landscaped so as to hide the fence.

### 6.3 CONVEYANCE

Pipe: Storm drain pipe within a public right-of-way or easement shall be sized to carry the 25-year runoff from the contributing tributary area.

The minimum pipe size shall be 12-inches diameter. Runoff shall be computed and, if the flow requires it, a larger pipe shall be used. Nothing shall preclude the City from requiring the installation of a larger sized main if the City determines a larger size is needed to serve adjacent areas or for future service.

All pipe for storm mains shall be “preapproved” by the City’s Engineer based on localized conditions.

1. Storm drain pipe shall meet the following requirements:
  - A. Plain concrete pipe conforming to the requirements of AASHTO M 86, Class 2.
  - B. Reinforced concrete pipe conforming to the requirements of AASHTO M 170.
  - C. PVC pipe shall conform to ASTM D 3034-73 SDR 35 for 4-inch thru 15-inch-diameter PVC pipe, and shall conform to ASTM F 679 for 18-inch thru 27-inch-diameter PVC pipe, with joints and gaskets conforming to ASTM D 3212 and ASTM F 477.
  - D. Ductile iron pipe conforming to the requirements of ANSI A21.51, and AWWA C 151, thickness class as approved by City Engineer.
  - E. Polyethylene smooth wall pipe per Advanced Drainage Systems (ADS) N-12, bell and spigot, constructed per Standard Specifications 7-04.
  - F. High performance polypropylene smooth wall pipe per ADS, bell and spigot, constructed per Standard Specifications 7-04.

2. Catch Basin Frames and Covers

Frames and covers shall be ductile iron. Castings shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects, which would impair serviceability. Repair of defects by welding, or by the use of “smooth-on” or similar material, will not be permitted. Frames and covers

shall be machine finished or ground on seating surfaces so as to assure non-rocking fit in any position and interchangeability of covers. Type 2 catch basin frames and covers shall be provided with three bolt locking lids. Rings and covers shall be positioned so one of the three locking bolts is located over the manhole steps and shall be adjusted to conform to the final finished surface grade of the street or easement to the satisfaction of the City or agent for the City. Type 2 catch basin frames and covers shall be as manufactured by East Jordan Iron Works, Model 00104028L03, or City approved equal.

#### **6.4 CONNECTIONS**

Connections of storm drain pipe leading from an existing or new street into an existing main storm pipe may only be made with a new structure, such as a catch basin.

#### **6.5 STREET PATCHING AND RESTORATION**

See Sections 5.17, 5.18 and 5.19 for requirements regarding street patching and trench restoration.

#### **6.6 CLEANING AND TESTING**

Upon completion of work, the constructed storm drainage system shall be cleaned and tested in accordance with the Standard Specifications. Videotaping shall be completed in accordance with Section 7.6, Videotaping for Sanitary Sewers.

See Section 4-11 for final acceptance.

If approved by the Public Works Supervisor, water for flushing shall be made available and obtained from the City. However, the City reserves the right to operate all hydrants at times and locations convenient to their schedules and available personnel. Any connection made to the City water system, at any time, shall have an appropriate backflow prevention device.

#### **6.7 INSPECTION**

The Contractor shall request inspection in accordance with Section 4.6. Inspection shall be required for the following items of work:

1. Pipe and bedding installation.
2. Backfill and compaction.
3. Grouting catch basins.

Upon completion of the project all storm sewer installations shall be inspected with television inspection equipment. The Contractor shall provide the City with a copy of the inspection and shall have the City present during the television inspection.





## CHAPTER 7

### SANITARY SEWER STANDARDS

#### 7.1 GENERAL

The standards established by this chapter are intended to represent the **minimum** standards for the design and construction of sanitary sewer facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. Washington State Department of Ecology's Design Standards shall also be employed by the City in its review and approval of system connections, extensions, and/or modifications.

"Off-site" improvements may be warranted based on (1) the existing condition and capacity of the existing sanitary infrastructure and, (2) impacts caused by the proposed development. These off-site improvements (in addition to "on-site" improvements as may be warranted) will be as determined by the City Engineer so as to reasonably mitigate impacts caused by development.

The following design and construction considerations shall apply:

#### 7.2 DESIGN STANDARDS

The design of sanitary sewer systems shall be dependent on local site conditions. The design elements of sanitary sewer systems shall conform to minimum City Standards set forth herein.

- A. Detailed plans shall conform with the requirements of the Plan Checklist presented in the appendices.
- B. Construction of new sewer systems or extensions of existing systems will be allowed only if the existing receiving system is capable of supporting the added hydraulic load. Sewers shall be extended to the far property line(s) to facilitate future extensions of same.
- C. Collection and interceptor sewers shall be designed and constructed for the ultimate development of the tributary areas.
- D. Sewer systems shall be designed and constructed to achieve total containment of sanitary wastes and maximum exclusion of infiltration and inflow.
- E. Computations and other data used for design of the sewer system shall be submitted to the City for approval.

- F. All sewers shall be designed to prevent damage from superimposed loads. Proper allowance for loads on the sewer because of the width and depth of trench should be made. When standard-strength sewer pipe is not sufficient, extra-strength pipe shall be used.
- G. All pipe shall be laid in straight lines and at uniform rate of grade between manholes. Variance from established line and grade shall not be greater than 1/2 inch, provided that such variation does not result in a level of reverse sloping invert; provided, also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter, or 1/2 inch maximum. Any corrections required in line and grade shall be reviewed with the City and/or the City Engineer and shall be made at the expense of the Developer and/or Contractor.
- H. Deflection tests shall be performed on all PVC sewer mains as discussed below.
- I. Prior to final inspection, all pipelines shall be tested, flushed and cleaned and all debris removed. A pipeline "cleaning ball" of the proper diameter for each size of pipe shall be flushed through all pipelines prior to final inspection.
- J. Before sewer lines are accepted, the Contractor/Developer shall perform a complete televised inspection of the sewer pipe and appurtenances and shall provide to the City an audio-visual tape recording of these inspections. All equipment and materials shall be compatible with existing City equipment. It shall be the Contractor/Developer's responsibility to confirm equipment compatibility with the City prior to inspection. The City's Public Works Supervisor and/or his designated representative shall be notified 48 hours prior to any televised inspection.

### **7.3 GENERAL REQUIREMENTS**

- 1. Work shall be performed only by licensed and bonded contractors with a demonstrated experienced in laying public sewer mains of the type being proposed for construction.
- 2. Prior to any work being performed, the Contractor shall contact the Public Works Director to set forth his proposed schedule.
- 3. Contractor shall obtain approval of materials to be used from the City prior to ordering or delivery of materials.

4. Generally, the sewer main shall be laid only in dedicated street right-of-way or easements at least 15-feet wide shown on preliminary plats or which have been exclusively granted to the City. A street is normally not officially recognized until the plat, which created it has been filed (recorded) with the County Auditor.
5. The sewer main shall run parallel to and 6 feet southerly or westerly of street centerline where possible. The sewer main shall maintain a minimum 10-foot horizontal separation from proposed or existing water mains.
6. The maximum distance between manholes shall be 400 feet unless specifically approved otherwise by the City Engineer.
7. The allowable cover (finished grade) for the various types of pipe are:

|                    |  |
|--------------------|--|
| PVC Pipe:          | 4' to 20'  |
| D.I. Pipe (CL 52): | <4' (if allowed)<br>20' & above<br>Slopes of 18 percent or greater |

All pipe shall have a minimum of 36 inches of cover (18 inches in the case of a side sewer on private property).

8. The minimum slope for 8-inch gravity mains shall be 0.5 percent (except the minimum slope for dead end runs shall be 1.0 percent for 8-inch gravity mains) and the minimum slope for 6-inch side sewer laterals shall be 2.0 percent.
9. All side sewer laterals shall be of the same material as the main line.
10. Each side sewer lateral shall be equipped with a 6" x 6" tee, with an approved water-tight cap, located adjacent to, but within, the public right-of-way, to be utilized as a cleanout. A watertight 6-inch capped stub shall be installed which extends vertically from the 6" x 6" tee to within 6 inches of finished grade.
11. Each side sewer lateral shall have an approved water-tight cap at the termination of the stub, it shall be adequately "blocked" to satisfactorily resist the air pressure testing.
12. Each side sewer lateral shall have a 12-foot-long 2" x 4" wood "marker" at the termination of the stub. The "marker" shall extend from the bottom of the trench to above finished grade. Above the ground surface, it shall be

painted “white” with “S/S” and the depth, in feet, stenciled in black letters 2-inch high.

13. Front lot corners shall be staked by a surveyor prior to construction for side sewer tee location(s).
14. Side sewer connections if allowed directly into manholes shall be constructed to match the sewer main crown (outlet) and the manhole channeled accordingly.
15. Manholes, where sewer extension may occur, shall be provided with knock-outs and channeled accordingly.
16. Manholes shall be provided with a 0.10 foot drop across the channel. Prechanneled manholes are not allowed.
17. Locking lids shall be provided for all manholes located outside pavement areas and all manhole lids shall have the word “sewer” cast integrally onto its surface. See Standard Detail.
18. Concrete collars shall be placed around all frames per the Standard Detail for manholes located in non-paved areas.
19. Pipe connections to manholes shall be as follows:  
  
**PVC Pipe:** Cast or grout a watertight manhole coupling (see detail) into manhole wall.  
  
**D.I. Pipe:** Bell and spigot joint or flexible coupling, either shall be 12-inch maximum distance from manhole wall.  
  
**PVC and D.I. pipe, optional:** Core the manhole and connect sewer pipe with a water-tight flexible rubber boot in manhole wall, Kor-N-Seal boot or equal.
20. Provide the City’s Engineer and City Inspector a copy of the cut sheets prior to construction.
21. Pipe trenches shall not be backfilled until pipe and bedding installation have been inspected and approved by the City’s Inspector.
22. Final air testing shall not be accepted until, all other underground utilities have been installed, the lines have been flushed and cleaned and the first lift of asphalt is in place.

23. Manhole rim and invert elevations shall be field verified after construction by the Developer's engineer(s) and the "record" drawings individually stamped by a Washington State licensed professional engineer or surveyor who shall attest to the fact that the information is correct. Acceptance of the project will not be complete until the record drawings have been submitted and approved by the City.
24. All commercial, industrial, or school food establishments shall be equipped with an approved grease interceptor. The grease interceptor shall be located to facilitate inspection and maintenance.

## 7.4 MATERIALS

### A. Sewer Mains, Laterals and Force Mains

Gravity PVC pipe (15-inch diameter and smaller) shall be a minimum Class SDR 35 and be manufactured in accordance with ASTM D3034. The pipe and fittings shall be furnished with bells and spigots, which are integral with the pipe wall. Pipe joints shall use flexible elastomeric gaskets conforming to ASTM D3212. Nominal laying lengths shall be 20 feet and 13 feet.

The ductile iron pipe shall conform to ANSI/AWWA C151/A21.51-91 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 52. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement lined to a minimum thickness of 1/16 inch, and the exterior shall be coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight. Note: Force mains shall be constructed of HDPE (SDR 11). PVC or ductile iron force mains may be approved by the City in special circumstances and if the force main is between 4 and 8 feet deep.

The type of joint shall be mechanical joint or push-on type, employing a single gasket, such as "Tyton," except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.

Restrained joint pipe, where required shall be push-on joint pipe with "Fast Tight" gaskets as furnished by U.S. Pipe or equal for 12-inch-diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for 16-inch and 24-inch-diameter pipes. Mechanical joint pipe with retainer glands (grip rings) as manufactured by "Romac" may also be required at the discretion of the City. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.

All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer's recommendations.

All fittings shall be short-bodied, ductile iron complying with applicable ANSI/AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either mechanical joint or flanged, as indicated on the Plans.

Fittings in areas shown on the Plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG, or ROMAC "Grip Ring," as required and approved by the City Engineer.

All couplings shall be ductile iron mechanical joint sleeves.

The sewer pipe, unless otherwise approved by the Public Works Director and/or City Engineer, shall be laid upgrade from point of connection on the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with an approved temporary plug. Wherever movable shoring (steel box) is used in the ditch, pipe shall be restrained by use of a winch mounted in the downstream manhole and a line of sufficient strength threaded through the pipe and set tight before each move. Any indication that joints are not being held shall be sufficient reason for the City to require restraints, whether or not movable shoring is being used.

All pipe shall be laid in straight lines and at uniform rate of grade between manholes. Variance from established line and grade shall not be greater than 1/2 inch, provided that such variation does not result in a level of reverse sloping invert; provided, also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter, or 1/2 inch maximum. Any corrections required in line and grade shall be reviewed with the City's Public Works Director and/or City Engineer and shall be made at the expense of the Developer.

All extensions, additions and revisions to the sewer system, unless otherwise indicated, shall be made with sewer pipe jointed by means of a

flexible gasket, which shall be fabricated and installed in accordance with the manufacturer's specifications.

All joints shall be made up in strict compliance with the manufacturer's recommendations and all sewer pipe manufacture and handling shall meet or exceed the ASTM and CPAW recommended specifications, current revisions.

Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position, or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed, cleaned, relubricated if required, and replaced before the rejoining is attempted.

Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since most flexible gasketed joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.

Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted. At the end of the work day, the last pipe laid shall be blocked in an effective way to prevent creep during "down time."

For the joining of dissimilar pipes suitable adapter couplings shall be used which have been approved by the City's Public Works Director and/or the Engineer.

All gravity sewer pipe shall be bedded from a depth of 4 inches below the pipe to 8 inches above the pipe and ductile iron gravity sewer pipe shall be bedded from a depth of 4 inches below the pipe to the springline of the pipe. The bedding material shall extend across the full width of the trench and shall be compacted under the haunches of the pipe.

Clay or Controlled Density Fill (CDF) dams shall be installed across the trench and to the full depth of the granular material in all areas of steep slopes, stream crossings and wetland to prevent migration of water along the pipeline.

All backfill shall be placed and compacted in accordance with City, County, or State requirements as may be applicable and copies of the compaction results shall be provided to the City Engineer.

B. Manholes

Manholes shall be of the offset type and shall be precast concrete sections with either a cast in place base, or a precast base made from a 3,000 psi structural concrete. Joints between precast wall sections shall be confined O-ring or as otherwise specified.

For connections to existing systems, a concrete coring machine, suitable for this type of work, shall be utilized in making the connection. The existing manhole shall be rechanneled as required. The new pipe connection shall be plugged (water tight) until the new pipe system has been installed and approved. The Contractor shall be responsible for any existing defects in the existing manhole unless these defects are witnessed by a representative of the City prior to any work being performed to make the connection. The Contractor shall be required to remove any and all deleterious material in the existing manhole and downstream reaches as a result of this work.

The minimum diameter manhole shall be 48 inches to a depth of 20 feet, and 54 inches for depths greater than 20 feet. The City may require an increased manhole diameter for future connections.

1) Manhole Sections

Manhole sections shall be placed and aligned so as to provide vertical sides and vertical alignment of the ladder steps. The completed manhole shall be rigid, true to dimension, and be water tight. Rough, uneven surfaces will not be permitted.

The mortar used between the joints in the precast sections and for laying manhole adjusting bricks shall be composed of epoxy grout. All joints and pick holes shall be wetted and completely filled with grout, smoothed both inside and outside to insure water tightness.

2) Manhole Steps

Manhole steps shall be polypropylene, Lane International Corp. No. P13938 or equal. Ladders (maximum 3-foot length) shall be polypropylene Lane International Corp. or equal, and shall be compatible with steps.



3) Grade Adjustment

Where work is located in public right of way, not less than 18 inches or more than 26 inches shall be provided between the top of the cone or slab and the top of the manhole frame.

4) Channels

Channels shall be field poured and made to conform accurately to the sewer grade and shall be brought together smoothly with well rounded junctions, satisfactory to the City Inspector. The channels shall be field poured after the inlet and outlet pipes have been laid and firmly grouted into place at the proper elevation. Allowances shall be made for a 0.1' drop in elevation across the manhole in the direction of flow. Channel sides shall be carried up vertically from the invert to three-quarters of the diameter of the various pipes. The concrete shelf shall be warped evenly and sloped 3/8 inch per foot to drain. Rough, uneven surfaces will not be permitted. Channels shall be constructed to allow the installation and use of a mechanical plug or flow meter of the appropriate size.

5) Drop Manholes

Drop manholes shall, in all respects, be constructed as a standard manhole with the exception of the drop connection as shown in the details.

6) Lift Holes and Steel Loops

All lift holes shall be completely filled with expanding mortar, smoothed both inside and outside, to insure water tightness. All steel loops shall be removed, flush with the manhole wall. The stubs shall be covered with mortar and smoothed. Rough, uneven surfaces will not be permitted.

7) Frames and Covers:

Frames and covers shall be ductile iron. Castings shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects, which would impair serviceability. Repair of defects by welding, or by the use of "smooth-on" or similar material, will not be permitted. Frames and covers shall be machine finished or ground on seating surfaces so as to assure non-rocking fit in any position and interchangeability of covers. Frames and covers shall be provided with three bolt locking lids. Rings and covers shall be

positioned so one of the three locking bolts is located over the manhole steps and shall be adjusted to conform to the final finished surface grade of the street or easement to the satisfaction of the City or agent for the City. Manhole frames and covers shall be as manufactured by East Jordan Iron Works, Model 00104043L04, or City approved equal.

C. Side Sewer Lateral

A side sewer lateral is considered to be that portion of a sewer line that will be constructed between a main sewer line and a property line or easement limit line.

All applicable specifications given herein for sewer construction shall be held to apply to side sewer laterals.

Side sewers shall be for a single connection only and be a minimum 6-inch-diameter pipe. Side sewers shall be connected to the tee, provided in the sewer main where such is available, utilizing approved fittings or adapters. The side sewer shall rise at a maximum of 45° and a minimum of 2 percent, from the sewer main.

Where there are no basements, the minimum side sewer depth shall be 6 feet below existing curb line and 5 feet below ground at the property line, except where existing improvements, proposed improvements or topography may dictate additional depth. The elevations of the side sewer connections shall be of sufficient depth to serve all existing and potential future basements.

The Contractor shall provide for each 6-inch side sewer service a 12-foot-long 2-inch x 4-inch wooden post, which extends from the invert of the end of the 6-inch pipe to above the existing ground. The exposed area of this post shall be painted white and shall have selected thereon in 2-inch letters (black paint) "S/S" and shall also indicate the depth of the sewer service stub from finished grade.

Where no tee or wye is provided or available, connection shall be made by machine-made tap and saddle, only with specific written authorization of the City. The City shall review the exact location and material, list in its evaluation.

The maximum bend permissible at any one fitting shall not exceed 45°. The maximum bend of any combination of two adjacent fittings shall not exceed 45° unless straight pipe of not less than 3 feet in length is installed

between such adjacent fittings, or unless one of the fittings is a wye branch with a cleanout provided on the straight leg.

D. Private Side Sewers

Private side sewers are the extension of side sewer laterals located outside of the public rights-of-way or easements granted to the City of Algona.

- 1) Side sewer pipe located on private property shall be 4 inches (larger if specifically approved by the City), ductile iron or PVC ASTM D3034 pipe, and shall be installed at a 2 percent minimum grade (1/4-inch fall per foot). Construction on private property may be performed by owner, but requires a permit and approval by the City.
- 2) Pipe shall be bedded with pea gravel or clean free draining sand.
- 3) Six inch sewer pipe is required in the street right-of-way and shall have a 2 percent minimum grade. Construction in street rights-of-way shall be performed by a licensed side sewer contractor and requires a permit.
- 4) Side sewer shall be inspected by the City's Representative/ Inspector prior to backfilling. Side sewer shall be plugged and tested in the presence of the City Inspector by filling with water to obtain 4.5 psi or 10 feet of head. Leakage rate shall not exceed 0.31 gal./hr. for 4-inch pipe and 0.47 gal./hr. for 6-inch pipe, per 100 feet of pipe.
- 5) On private property, minimum cover shall be 18 inches over top of pipe from the point, which is 30 inches out from house and continuing to the connection with the City's sewer system.
- 6) Parallel water and sewer lines shall be 10-feet apart horizontally wherever possible and have a vertical separation of 18 inches if a vertical crossing is necessary.
- 7) No more than 100 feet is allowed between cleanouts. Cleanouts are required for bends equal to or greater than 45°. Cleanout shall be a watertight plugged gasketed tee or wye lateral.
- 8) All pipe joints shall be rubber gasket type.
- 9) Provide "grease trap" of a size and type approved by the City at all such locations as may be deemed necessary by the City.

## 7.5 TESTING GRAVITY SEWERS FOR ACCEPTANCE

The Contractor and/or Developer shall furnish all facilities and personnel for conducting tests under the observation of the City Engineer or City Inspector.

1) Preparation for Testing for Leakage:

The Contractor and/or Developer shall be required, prior to testing, to clean and flush all gravity sewer lines with an approved cleaning ball and clean water. The completed gravity sewer, including side sewer stubs, after completion of backfill and cleaning shall be televised inspected. This will be permitted prior to paving. The sewer shall then be tested by the low pressure air test method and/or an infiltration test but only after all utilities are installed. Except, however, that in certain conditions an exfiltration test may be required by the Mayor.

The first section of pipe not less than 300 feet in length installed by each crew shall be tested, in order to qualify the crew and/or the material. A successful installation of this first section shall be a prerequisite to further pipe installation by the crew. At the Contractor's option, crew and/or material qualification testing may be performed at any time during the construction process after at least 2 feet of backfill has been placed over the pipe.

Before the test is performed, the pipe installation shall be cleaned. The Contractor shall furnish an inflatable diagonally ribbed rubber ball of a size that will inflate to fit snugly into the pipe to be tested. The ball may, at the option of the Contractor, be used without a tag line, or a rope or cord may be fastened to the ball to enable the Contractor to know and control its position at all times. The ball shall be placed in the last cleanout, or manhole on the pipe to be cleaned, and water shall be introduced behind it.

The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris, or a damaged pipe shall stop the ball, the Contractor and/or Developer shall remove the obstruction, and/or repair any damaged pipe. All visible leaks showing flowing water in pipelines or manholes shall be stopped even if the test results fall within the allowable leakage. The cleaning shall be carried out in such a manner to not infiltrate existing facilities. Precautions shall be taken to prevent any damage caused by cleaning and testing. Any damage resulting shall be repaired by the Contractor and/or Developer at his own expense. The manner and time of testing shall be subject to approval of the Public Works Director.

2) Low Pressure Air Test:

After the installation of the side sewer laterals, the sewer pipe shall be tested for leaks through the use of air in the following manner:

Following the pipe cleaning and televised inspection, the pipe installation shall be tested with low pressure air. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.

The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 pounds per square inch greater than the pipe section’s average adjacent groundwater back pressure.

The pipeline shall be considered acceptable if the total time of air loss from any section tested in its entirety between manholes, cleanouts or pipe ends does not exceed the following table:

AIR TESTING PERFORMANCE

| Length of 8-Inch Pipe (ft) | Length of 6-Inch Pipe (ft) |      |      |      |      |      |      |      |      |
|----------------------------|----------------------------|------|------|------|------|------|------|------|------|
|                            | 0                          | 50   | 100  | 150  | 200  | 250  | 300  | 350  | 400  |
| 0                          | 0                          | 0:40 | 1:20 | 1:58 | 2:38 | 3:18 | 3:58 | 4:38 | 5:16 |
| 50                         | 1:10                       | 1:50 | 2:30 | 3:10 | 3:48 | 4:28 | 5:08 | 5:48 | 5:56 |
| 100                        | 2:20                       | 3:00 | 3:40 | 4:20 | 5:00 | 5:38 | 6:14 | 6:12 | 6:08 |
| 150                        | 3:32                       | 4:10 | 4:50 | 5:30 | 6:10 | 6:30 | 6:26 | 6:22 | 6:18 |
| 200                        | 4:42                       | 5:22 | 6:00 | 6:40 | 6:44 | 6:38 | 6:34 | 6:30 | 6:26 |
| 250                        | 5:52                       | 6:32 | 6:48 | 6:58 | 6:50 | 6:44 | 6:40 | 6:36 | 6:32 |
| 300                        | 7:02                       | 7:20 | 7:10 | 7:02 | 6:56 | 6:50 | 6:44 | 6:40 | 6:36 |
| 350                        | 7:34                       | 7:22 | 7:14 | 7:06 | 7:00 | 6:54 | 6:50 | 6:44 | 6:42 |
| 400                        | 7:34                       | 7:24 | 7:16 | 7:08 | 7:02 | 6:58 | 6:52 | 6:48 | 6:44 |

Test time in minutes and seconds

Test times will be provided by the City Engineer upon request for combinations other than 8-inch mains and 6-inch laterals.

If the pipe installation fails to meet these requirements, the Developer and/or Contractor shall determine at his own expense the source or sources of leakage, and he shall repair (if the extent and type of repairs

proposed by the Developer and/or Contractor appear reasonable to the City Engineer) or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of this low pressure air test or the alternative water exfiltration test before being considered for acceptance.

Plugs used to close the sewer pipe for the air test shall be securely braced to prevent the unintentional release of a plug, which can become a high velocity projectile. Gauges, air piping manifolds and valves shall be located at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Air testing apparatus shall be equipped with a pressure release device such as a rupture disk or a pressure relief valve designed to relieve pressure on the pipe under test at 6 psi.

3) Exfiltration Test (if approved by City)

All pipe shall be cleaned before the exfiltration test. Prior to making exfiltration leakage tests, the Developer and/or Contractor may fill the pipe with clear water to permit normal absorption into the pipe walls; provided however, that after so filling the pipe he shall complete the leakage test within 24 hours after filling. When under test, the leakage allowable shall comply with the provisions that follow:

Leakage shall be no more than 0.15 gallons per hour per inch of diameter per 100 feet of sewer pipe, with a minimum test pressure of 6 feet of water column above the crown at the upper end of the pipe or above the active groundwater table, whichever is higher as determined by the City. The length of pipe tested shall be limited so that the pressure on the invert of the lower end of the section tested shall not exceed 16 feet of water column. For each increase in pressure of 2 feet above a basic 6 feet measured above the crown at the lower end of the test station, the allowable leakage shall be increased by 10 percent.

The Developer and/or Contractor shall furnish all equipment, materials, and labor necessary for making test. The equipment shall be to the approval of the City Public Works Director and/or City Engineer. The manner and time of testing shall be subject to approval of the City Engineer. It shall be the Developer's and/or Contractor's responsibility to determine the level of the water table at each manhole. If leakage exceeds the allowable amount, corrective measures shall be taken and the line then be retested to the satisfaction of the City's designated inspector.

4) Deflection Test

Deflection tests shall be performed on all ASTM D3034 PVC gravity sewer mains by pulling a mandrel through the pipe. The allowable deflection test limit shall be 5.0 percent of the base inside diameter in accordance with APWA test procedures and the nominal mandrel size shown in the following table.

| <b>Nominal Pipe Size (in.)</b> | <b>Base Inside Diameter (in.)</b> | <b>Mandrel Size, Diameter (in.)</b> |
|--------------------------------|-----------------------------------|-------------------------------------|
| 6                              | 5.74                              | 5.45                                |
| 8                              | 7.67                              | 7.28                                |
| 10                             | 9.56                              | 9.08                                |
| 12                             | 11.36                             | 10.79                               |

Deflection testing is not required for C-900 PVC or ductile iron pipe or pipe diameters 15 inch and greater.

The sewer lines shall be thoroughly cleaned prior to the deflection test.

5) Testing Force Main

Force main shall be tested using the same procedures as waterlines.

6) Vacuum Testing of Precast Manholes

Vacuum testing (negative air pressure) may be required by the City in areas of high groundwater. Prior to backfilling, each manhole shall be tested using the vacuum testing method specified in ASTM C1244 to ensure that the manhole is watertight. Testing of manholes constructed on existing sewer lines where flow must be maintained will not be required.

Backfilling of the manhole prior to testing is permitted.

The Contractor shall furnish all equipment and labor required, including necessary piping/hoses, pneumatic plugs, test vacuum equipment (vacuum pump and vacuum plate/head), vacuum gauge, and second timer. The vacuum gauge shall have a maximum range of 0 to 30 inches of mercury (Hg) and the vacuum gauge intervals shall be in 1/2-inch increments.

The vacuum test shall be performed by the Contractor in the presence of City personnel. The Contractor shall furnish test reports of each test to the Engineer.

Testing

If a coating or lining has been applied to the interior of the manhole, the vacuum test must not be performed until the coating or lining has been cured according to the manufacturer’s recommendations. In addition, this existing manhole must be structurally sound prior to vacuum testing.

Drop connections shall be installed prior to testing.

The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab, or grade rings.

After cleaning the interior surface of the manhole, the Contractor shall place and inflate pneumatic plugs in all the connecting pipes with the exception of sewer services to isolate the manhole. Complete sewer services entering the manhole shall be a part of the manhole vacuum test.

The vacuum plate/head shall be placed on top of the manhole lid frame. The vacuum pump shall be connected to the outlet port with the valve open. When a vacuum of 10 inches of mercury has been attained, the vacuum pump shall be shut off. With the outlet valve closed, the time shall be measured for the vacuum to drop to 9 inches. Following are the **minimum** allowable test times for manhole acceptance at the specified vacuum drop:

| Depth of Manhole<br>(feet)                  | Time (Seconds) |              |              |
|---|----------------|--------------|--------------|
|   | 48-Inch Dia.   | 60-Inch Dia. | 72-Inch Dia. |
| 4   | 10             | 13           | 16           |
| 8   | 20             | 26           | 33           |
| 12  | 30             | 39           | 49           |
| 16  | 40             | 52           | 67           |
| 20  | 50             | 65           | 81           |
| 24  | 59             | 78           | 97           |
| 26  | 64             | 85           | 105          |
| 28  | 69             | 91           | 113          |
| 30  | 74             | 98           | 121          |
| Add for each additional<br>2 feet of depth: | 5              | 6.66         | 8            |

Source : ASTM C1244



All pneumatic plugs shall be removed from the manhole after the test.

#### Failure

Any manhole that fails the initial vacuum test must be repaired with an approved non-shrink grout material for manholes. The Contractor shall excavate the manhole and apply non-shrink grout on the interior and exterior of the manhole in the leaking area or the entire surfaces. Any repair between the pipes and the manhole (gasket waterstop area) requires the removal of the pipe by means of coring and the installation of a new pipe with waterstop (grouting the annular opening). Upon completion of the repairs, the manhole shall be retested as described in the above test procedures.

Any manhole that ultimately fails the vacuum test is rejected and shall be entirely removed and replaced with a new manhole. The new manhole shall not be backfilled until it has been tested and passed the above test procedures.

#### Acceptance

The manhole shall have passed the vacuum test if the manhole vacuum does not drop below 9 inches of mercury during the minimum specified test period.

### **7.6 VIDEO TAPING**

After the gravity sewer lines have been cleaned, flushed and manhole channeled, the Developer shall provide a complete televised inspection.

The Developer shall perform a complete televised inspection of the sewer pipe and appurtenances and shall provide to the City, a DVD color audio-visual recording of the inspections together with a written log of the television inspection. The camera shall be a pan and tilt type equipped with adequate light and focusing to allow inspection of sewer main, side sewers and full circumference inspection of main line joints and fittings. The City shall determine if the quality of the televising is acceptable.

Immediately prior to the televised inspection, the Developer shall run water through each sewer line for 5 to 10 minutes to provide water for detection of any adverse grade sections visible by the presence of ponded water. The camera shall be stopped periodically at the ponded areas and the depth of water shall be measured with a ball of known diameter on the pull line. During the inspection,

all tees and other fittings shall be logged as to exact location within 1 percent maximum error in measurement.

The City shall be notified 48 hours prior to any television inspection and this work shall be performed on a schedule to allow the City to witness the inspection.

Any defects in material or installation identified by the television inspection shall be repaired as required by the City at the Developer's expense.

## **7.7 STATE HIGHWAY CROSSINGS**

All state highway and stream crossings shall be completed with a steel casing and HDPE or ductile iron carrier pipe, as approved by the City and prevailing regulatory agencies. The welded steel casing shall be of sufficient diameter, size and strength to enclose the carrier pipe and to withstand maximum loading. Sizing and wall thickness of casing is subject to approval by the City Engineer. Sand backfill or grout fill between the casing and the carrier pipe shall be required. The carrier pipe shall be restrained joint or continuous welded pipe within the casing pipe. In order to prevent the sand from being washed from the casing the ends of the casing shall be bricked and cemented after installation, backfill and testing of the pipe are completed.

## **7.8 STREET PATCHING AND RESTORATION**

See Sections 5.17, 5.18 and 5.19 for requirements regarding street patching and trench restoration.

## **7.9 ADJUSTMENT OF NEW AND EXISTING UTILITY STRUCTURES TO GRADE**

This work consists of constructing and/or adjusting all new and existing utility structures encountered on the project to finished grade.

### **1. Asphalt Concrete Paving Projects**

On asphalt concrete paving projects, the manholes shall not be adjusted until the pavement is completed, at which time the center of each manhole lid shall be relocated from references previously established by the Developer and/or Contractor. The pavement shall be cut as further described and base material removed to permit removal of the cover. The manhole shall then be brought to proper grade.

Prior to commencing adjustment, a plywood and visqueen cover as approved by the City Inspector shall be placed over the manhole base and channel to protect them from debris.

As soon as the street is paved past each manhole, the asphalt concrete mat shall be scored around the location of the manhole, catch basin, meter boxes or valve box. After rolling has been completed and the mat has cooled, it shall be cut along the scored lines, the diameter of which shall not exceed 48 inches or 14 inches from the outside diameter of the ductile iron frame, whichever is smaller. The ductile iron frame shall be brought up to desired grade, which shall conform to surrounding road surface.

Adjustment to desired grade shall be made with the use of concrete or bricks. No cast or ductile iron adjustment rings will be allowed. An approved class or mortar (one part cement to two parts of plaster sand) shall be placed between manhole sections; adjustment rings or bricks and ductile iron frame to completely fill all voids and to provide a watertight seal. No rough or uneven surfaces will be permitted inside or out. Adjustment rings or brick shall be placed and aligned so as to provide vertical sides and vertical alignment of manhole steps and ladder.

Check manhole specifications for minimum and maximum manhole adjustment and step requirements. Special care shall be exercised in all operations in order not to damage the manhole, frames and lids or other existing facilities.

The manholes, catch basins, meter boxes and valve boxes shall be raised to finished pavement grade and the annular spaces filled with cement concrete to within 1-1/2 inches of the finished grade. The remaining 1-1/2 inches shall be filled with hot mix asphalt concrete (PG 64-22) to give a smooth finished appearance. See detail in Project Plans.

After pavement is in place, all joints shall be sealed with hot asphalt cement (AR 4000W). A sand blanket shall be applied to the surface of the AR 4000W hot asphalt cement binder to help alleviate "tracking."

Asphalt concrete patching shall not be carried out during wet ground conditions or when the ambient air temperature is below 50 degrees F. Asphalt concrete mix shall be at required temperature when placed. Before making the asphalt concrete repair, the edges of the existing asphalt concrete pavement and the outer edge of the casting shall be tack coated with hot asphalt cement. The remaining 2 inches shall then be filled with hot mix asphalt concrete and compacted with hand tampers and a patching roller.

The completed patch shall match the existing paved surface for texture, density and uniformity of grade. The joint between the patch and the existing pavement shall then be carefully painted with hot asphalt cement

or asphalt emulsion and shall be immediately covered with dry paving sand before asphalt cement solidifies. All debris such as asphalt pavement, cement bags, etc., shall be removed and disposed of by the Developer and/or his Contractor.

Prior to acceptance of a project, manholes shall be cleaned of all debris and foreign material. All manhole steps and ladders shall be cleaned free of grout. Any damage occurring to the existing facilities due to the Developer's and/or Contractor's operations shall be repaired at his/her own expense.

2. Adjustment of Manholes in Easements

Manholes in easement areas shall be adjusted to insure drainage away from the manhole frame and cover. The manhole frame and cover shall be set approximately 0.1 inch above finished grade. Concrete collars shall be set about the structure, as detailed herein, in all non-paved areas.

3. Adjustment of Valve Box Castings

Adjustment of valve box castings (force main valving) shall be made in the same manner as for manholes.

## 7.10 SANITARY SEWER LIFT STATIONS

Sewage lift station and force main design and construction is subject to City review and approval on a case-by-case basis. It is the City's policy to minimize the number of lift stations that must be operated by the City, as well as to minimize the use of lift stations where other means of serving an area exist or have been provided for in the City's comprehensive plan. The City, at its option, may require submittal and approval of a feasibility study, to include a design report and other materials as may be required for evaluation of the proposal, prior to granting conceptual approval for the use of a lift station.

The lift stations shall be duplex (two pump) sewage lift station within the typical size range for developer constructed stations. At the City's discretion, stations with non-typical service requirements, such as high flows, high head pressures, flow monitoring, multiple pump operation, critical service or unusual site constraints, may be subject to additional or alternative design requirements. All lift stations shall be supplied with a backup power source sufficient to completely power all station electrical demands. Backup power shall be supplied through an automatic transfer switch.

Due to the inherent complexity of lift station design, and the associated health and safety risks, the lift station design shall be prepared by a professional engineer

with demonstrable experience in lift station design. At the request of the City, the Developer shall provide a resume for the proposed lift station designer, listing similar projects designed by that individual, with references and phone numbers. Once the lift station design has been approved by the City, the design engineer shall remain responsible for all construction-related engineering duties, including the coordination of submittals and shop drawings, and the preparation of field change requests, record drawings and O&M materials. Engineering responsibilities shall not be reassigned by the Developer to another individual without the City's approval.

All lift station and force main design shall be reviewed by the City and shall meet City requirements. No lift station construction may begin until the plans and specifications are approved.



## **CHAPTER 8**

### **WATER SYSTEM STANDARDS**

#### **8.1 GENERAL**

The standards established by this chapter are intended to represent the minimum standards for the design and construction of water system facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. Extensions, connections or modifications to the existing system shall be in compliance with the State Department of Health.

Off-site improvements to the existing system may be warranted based on (1) the condition and capacity of the existing water system and (2) impacts caused by the proposed development. These off-site improvements (in addition to “on-site improvements”) shall be completed as determined by the City Engineer to mitigate impacts caused by the development.

#### **8.2 DESIGN STANDARDS**

The design of water system improvements shall depend on their type and local site conditions. The design elements of water system improvements shall conform to City Standards as set forth herein.

- A. Detailed plans shall be submitted for the City’s review which provide the locations, size, and type of the proposed water system and points of connection.
- B. Project plans shall conform to the requirements of the Plan Checklist.
- C. Computations and other data used for design of the water system shall be submitted to the City for approval.
- D. Material and installation specifications shall contain appropriate requirements that have been established by the industry in its technical publications, such as ASTM, AWWA, WPCF, and APWA standards. Requirements shall be set forth in the specifications for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints.
- E. The location of the water mains, valves, hydrants, and principal fittings including modifications shall be staked by the Developer. No deviation shall be made from the required line or grade. The Contractor shall verify

and protect all underground and surface utilities encountered during the progress of this work.

- F. Unless otherwise approved or required by the City Engineer, the water main shall be ductile iron pipe class as shown below. The minimum nominal size for water mains shall be 8 inches, unless otherwise approved/required by City Engineer.

**TABLE 8-1**

**Water Main Thickness**

| <b>Class</b>   | <b>Pipe Diameter</b> |
|----------------|----------------------|
| Class 52       | 4" through 14"       |
| 16" and larger | Class 50             |

EXCEPTION: 6-inch hydrant spools and pipelines located beneath rock or retaining walls shall be Class 53.

- G. All fittings shall be cement-lined ductile iron.
- H. Water mains shall be laid only in dedicated street, rights-of-ways or easements shown on preliminary plats or which have been granted to the City. A street is normally not considered dedicated until the plat which created it has been officially filed with the County Auditor.
- I. All water main distribution pipeline construction shall have a minimum 36-inch cover from finished grade and 42-inch cover over transmission mains. Mains shall generally be located parallel to and 6 feet northerly or easterly of street centerline. Water mains shall be extended to the far property line(s) of the property being served. Off-site extensions may be required to hydraulically loop existing and new systems. Oversizing of water mains may be required to be installed per City’s current Water Comprehensive Plan.
- J. Fire hydrants are generally required approximately every 600 feet in residential areas, and every 300 feet in commercial areas. However, fire hydrants shall be furnished and installed at all locations as specifically mandated by the local fire marshal and/or per the International Building Code and the International Residential Code.
- K. Fire hydrants on dead end streets and roads shall be located within approximately 300 feet from the frontage center of the farthest lot. Distances required herein shall be measured linearly along street or road.



- L. Valves shall be installed at not more than 1,000-foot spacing. Valves shall be installed on all legs of all tees and crosses except fire hydrant tees.
- M. Pipes connecting hydrants to mains shall be at least 6 inch in diameter and be less than 50 feet in length. If the service line is over 50 feet in length the service line shall be 8 inches in diameter.
- Fire hydrants shall stand plumb, be set to meet manufacturer's specification for ground bury line, and have a clear, level area around the hydrant with a radius of no less than 60 inches.
  - Fire hydrants shall be located no closer than 50 feet to the surrounding structures (plus or minus 25 percent), or at a distance as determined by the Fire Marshal and approved by the City Engineer. Fire hydrants shall be located such that no portion of the fire hydrant is within 5 feet of any portion of a driveway (including throat, apron, and wings).
- N. Dead end lines are not permitted except where the Developer can demonstrate to the City's satisfaction that it would be impractical to extend the line at a future date. Water mains on platted cul-de-sacs shall extend to the plat line beyond the cul-de-sac to neighboring property for a convenient future connection, and extended offsite to create a hydraulic loop, or, as minimum, have a 4-inch blowoff assembly installed at the termination point.
- O. Bends shall be included in the design as needed to maintain proper depth and spacing from other utilities. Bends shall be utilized so as not to exceed allowable deflection at pipe joints in accordance with pipe manufacturer's recommendations.
- P. Provide thrust blocking and/or restrained joints at all fittings and bends in accordance with the City standards and conditions.
- Q. Provide anchor blocking at all up-thrust vertical bends in accordance with these standards. Blocking to be designed by Developer's Engineer.
- R. Residential water service pipe shall be a minimum one-inch diameter high density "Poly" pipe, meeting or exceed ASTM D2239, 200 psi with copper tracer wire. The pipe shall be one continuous run from the water main corp stop to the meter setter, no joints are allowed. Larger service lines may be needed if otherwise required by the Uniform Plumbing Code in accordance with fixture units.

### 8.3 CONSTRUCTION REQUIREMENTS

- A. Except as otherwise noted herein, all work shall be accomplished as recommended in applicable American Water Works Association (AWWA) Standards, and according to the recommendations of the manufacturer of the material or equipment concerned.
- B. Prior to final inspection, all pipelines shall be tested and disinfected.
- C. Prior to construction, the Contractor shall notify the City for a preconstruction meeting.
- D. Work shall be performed only by contractors experienced in laying public water mains.
- E. Prior to any work being performed, the Contractor shall contact the Mayor to set forth his proposed work schedule.
- F. Contractor shall obtain approval of materials to be used from Mayor prior to ordering of materials.
- G. During water main installation calcium hypochlorite granules shall be added to each section of new water main in the proportions indicated in the table below. The resulting chlorine concentration within the water main shall not be less than 50 mg/L (see Standard Specifications, Section 7-09.3(24)D).

**TABLE 8-2**

**Calcium Hypochlorite (65% chlorine) Addition Per 100 Feet of Pipe**

| Pipe Diam.<br>(Inches) | Quantity |        |
|------------------------|----------|--------|
|                        | Grams    | Ounces |
| 4                      | 0.67     | 0.02   |
| 6                      | 1.52     | 0.05   |
| 8                      | 2.70     | 0.09   |
| 10                     | 4.22     | 0.15   |
| 12                     | 6.07     | 0.21   |

- H. All closure fittings shall be swabbed with a 5 percent chlorine solution of chlorine immediately prior to installation per AWWA Standard C651.
- I. Specific requirements regarding pressure testing and bacteriological testing are presented below in the Water Pipe Testing & Disinfection Section.

- J. All materials shall be new and undamaged.
- K. Provide bends in field to suit construction and in accordance with pipe manufacturer's recommendations so as not to exceed allowable deflection at pipe joints.
- L. Meter services and meter boxes shall be set to final grade and all adjustments shall be made prior to final pressure testing of the system. Service inlet shall be centered at inlet end of box and faced toward outlet end of box parallel with long sides.
- M. Meter setters shall be Mueller with top entry dual check valve.
- N. All water services shall end within road right-of-way or easements.
- O. All meters shall be installed by the City; the Developer shall pay the current meter installation charge.
- P. Contractor shall furnish and install one water sample station for development in size of 1 to 10 lots. One additional station is required for each additional 50 lots or portions thereof.
- Q. All new construction shall comply with the current Cross-Connection Control requirements.
- R. Cut in connections shall not be made on Fridays, holidays or weekends. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains.
- S. The pipe and fittings shall be inspected for defects before installation. All lumps, blisters and excess coal tar coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, and free from oil and grease before the pipe is laid.
- T. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and pipe forced home and brought to correct line and grade. The pipe shall be secured in place with select backfill tamped under it. Precaution shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug. If water is in the trench when work resumes, the seal shall remain in place

until the trench is pumped completely dry. No pipe shall be laid in water or when trench conditions are unsuitable.

- U. The cutting of pipe for inserting fittings or closure pieces shall be done in a neat and workmanlike manner, without damage to the pipe or cement lining, and so as to leave a smooth end at right angles to the axis of the pipe. When pipe lengths are cut, the outer edge shall be beveled to prevent damage to the gasket during jointing of pipes.
- V. Pipe shall be laid with bell ends facing in the direction of the laying, unless directed otherwise by the City. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations.
- W. For connection of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing, and shall be jointed according to manufacturer's directions. Bolts shall be tightened alternately at top, bottom and sides, so pressure on gasket is even.
- X. For connection of push-on joints, the jointing shall be done according to manufacturer's recommendations, with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be non-toxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.
- Y. Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner per manufacturer's recommendations. All dead ends on new mains shall be closed with dead end M.J. caps.
- Z. Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall. Timber blocking will not be permitted. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test.
- AA. All of the new piping, valves and blocking shall have been installed, disinfected and tested up to the point of cutting into existing lines before the crossover is made. The crossover to the existing system shall be in full readiness, including the cut and sized specials. Forty-eight-hour notice

shall be given the City in advance of the planned “cut-ins.” All sleeves shall be ductile iron.

- BB. Contractor shall notify the Public Works Director and obtain approval from him prior to any water shut-off or turn-on, affecting the water system, a minimum of 48 hours in advance.
- CC. Road restoration shall be per these standards. Developer and Contractor shall become familiar with all City conditions of required permits, and shall adhere to all conditions and requirements.
- DD. Before acceptance of the water system by the City, all pipes, assemblies, and other appurtenances shall be cleaned of all debris and foreign material. After all other work is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections for a new roadway consistent with the original section.

## **8.4 MATERIALS**

- A. Water Mains and Fittings
  - 1. Water mains to be installed unless otherwise approved (or required) in writing by the City Engineer shall be ductile iron pipe for all sizes. The minimum size shall be 8 inches unless a smaller size is specifically approved in writing by the Mayor.
  - 2. The ductile iron pipe shall conform to ANSI/AWWA C151/A21.51-91 and NSF 61 Standards, and current amendments thereto, except the ductile iron pipe shall have thickness as given in the De Class 52 for 4-inch through 14-inch-diameter pipe and Class 50 for 16" and larger. Grade of iron shall be a minimum of 60-42-10. The exterior of the pipe shall be coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight.
  - 3. Type of joint shall be mechanical joint or push-on type, employing a single gasket, such as “Tyton,” except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.

4. Restrained joint pipe, where shown on the Plans shall be push-on joint pipe with “Field Lok” gaskets as furnished by U.S. Pipe, “Fast Tight” gaskets as manufactured by American Cast Iron Pipe or equal for 12-inch diameter and smaller pipe and “TR FLEX” as furnished by U.S. Pipe or equal for 16-inch and 24-inch-diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.
5. All pipe shall be jointed by the manufacturer’s standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer’s recommendations.
6. Joints shall be “made up” in accordance with the manufacturer’s recommendations. Standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.
7. All fittings shall be short-bodied, ductile iron complying with applicable ANSI/AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either mechanical joint or flanged, as indicated on the Plans.
8. Fittings in areas shown on the Plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG, Star Pipe Products, or approved equal.
9. All couplings shall be ductile iron mechanical joint sleeves.

B. Valves

All valves 14 inch and larger shall generally be furnished and installed as butterfly valves. All valves 12 inch and smaller shall generally be furnished and installed as resilient seat gate valves.

1. Resilient-Seated Gate Valves

The gate valves shall be ductile iron body valves, iron disk completely encapsulated with polyurethane rubber and bronze, non-rising stem with “O” ring seals conforming to AWWA C509 or C515. The valves shall open counter-clockwise and be furnished with 2-inch square operating nuts except valves in vaults

shall be furnished with handwheels. All surfaces, interior and exterior shall be fusion bonded epoxy coated, acceptable for potable water.

For applications with working pressure above 175 psi, a valve rated as 250 psi or higher shall be used.

Valves shall be Mueller A-2360 Series, or approved equal.

2. Butterfly Valves

Butterfly valves shall be ductile iron body of the tight closing rubber seat type with rubber seat either bonded to the body or mechanically retained in the body with no fasteners or retaining hardware in the flowstream. The valves shall meet the full requirements of AWWA C504, Class 150B except the valves shall be able to withstand 200 psi differential pressure without leakage. The valves may have rubber seats mechanically affixed to the valve vane. Where threaded fasteners are used, the fasteners shall be retained with a locking wire or equivalent provision to prevent loosening. Rubber seats attached to the valve vane shall be equipped with stainless steel seat ring integral with the body, and the body internal surfaces shall be epoxy coated to prevent tuberculations buildup, which might damage the disc-mounted rubber seat.

No metal-to-metal sealing surfaces shall be permitted. The valves shall be bubble-tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving valve operations after long periods of inactivity. Valve discs shall rotate 90 degrees from the full open position to the tight shut position.

Valves shall be Henry Pratt Company “*Groundhog*,” or Mueller “*Linesal III*.”

3. Tapping Sleeves and Tapping Valves

The tapping sleeves shall be rated for a working pressure of 250 psi minimum and furnished complete with joint accessories. Tapping sleeves shall be constructed in two sections for ease of installation and shall be assembled around the main without interrupting service.

Mechanical joint style sleeves shall be ductile iron and comply with AWWA C110. Mechanical joint sleeves shall be cast by Clow, Dresser, Mueller, Tyler, U.S. Pipe or approved equal.

Tapping valves shall be provided with a standard mechanical joint outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to operation and materials.

The tapping sleeve and valve shall be tested to 100 psi (air) prior to tapping the main.

The installation contractor for the tapping sleeves and valves shall be approved by the City.

4. All Valves

The valves shall be set with stems vertical. The axis of the valve box shall be common with the axis projected off the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.

All valves with operating nuts located more than 4'-0" below finished grade shall be equipped with extension stems to bring the operating nut to within 18 inches of the finished grade.

At the top of the extension stem, there shall be a 2-inch standard operating nut, complete with a centering flange that closely fits the 5-inch pipe encasement of the extension stem. The valve box shall be set in a telescoping fashion around the 5-inch pipe cut to the correct length to allow future adjustment up or down.

Each valve shall be provided with an adjustable two-piece cast iron valve box of 5-inches minimum inside diameter. Valve boxes shall have a top section with an 18-inch minimum length. The valve boxes and covers shall be Olympic Foundry No. 940 or equal.

Valves located in easements or outside of paved areas shall have concrete collars with a minimum size of 2'-0" diameter by 4-inches thick.



5. Pressure Reducing and Relief Valves

When street main pressure exceeds 80 psi, an approved pressure reducing valve with an approved pressure relief device shall be installed in the water service pipe on the service side of the water meter to reduce the pressure to 80 psi or lower, except where the water service pipe supplies water directly to a water-pressure boost system, an elevated water gravity tank, or to pumps provided in connection with a hydropneumatic or elevated gravity water-supply tank system. Pressure at any fixture shall be limited to no more than 80 psi under no-flow conditions.

C. Fire Hydrants

Fire hydrant assemblies shall conform to the standard details listed above.

Fire hydrant service lines shall be installed at right angles to 8-inch minimum diameter supply mains.

Fire hydrants shall stand plumb, be set to meet manufacturer's specification for ground bury line, and have a clear, level area around the hydrant with a radius of no less than 60 inches.

Fire hydrants shall be located no closer than 50 feet to the surrounding structures (plus or minus 25 percent), or at a distance as determined by the Fire Marshal and approved by the City Engineer. Fire hydrants shall be located such that no portion of the fire hydrant is within 5 feet of any portion of a driveway (including throat, apron, and wings).

Fire hydrants shall be provided with two 2-1/2-inch National Standard Thread (NST) hose ports and one 4-1/2-inch NST by 5-inch hose port with a Storz adapter and cap.

The pumper port shall face the street or fire access road and be readily accessible to any fire vehicle for firefighting and pumping operations. There shall be at least 18 inches clear from the face of the pumper port to the edge of pedestrian or traveled ways.

The service line from the supply main to the fire hydrant shall be 6 inches in diameter unless the service line extends over 50 feet in length, in which case the service line shall be 8 inches in diameter.

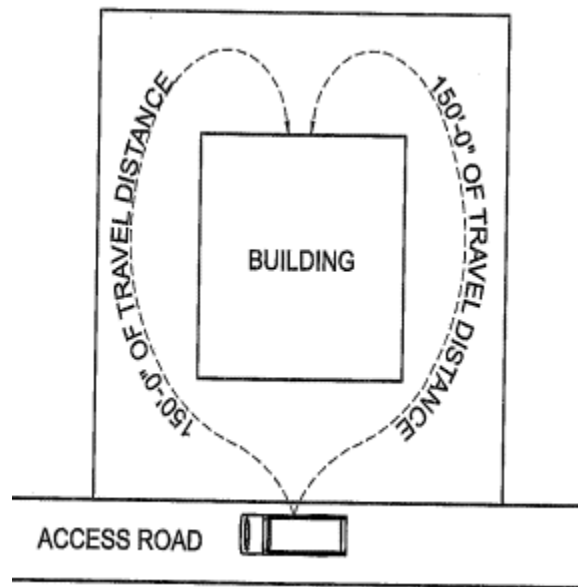
Fire hydrants shall be installed with a maximum spacing of 600 feet along streets in single-family zones and 300 feet in all other zones.

The maximum distance allowed from any part of a single-family residential structure to the closest fire hydrant is 450 feet.

Buildings, other than single-family residences, shall require fire hydrant assemblies when any of the following apply:

- Portions of the building are more than 150 feet in vehicular travel from a fire hydrant assembly
- Buildings more than 10,000 square feet
- Building with a fire flow greater than or equal to 2,500GPM
- Buildings with a portion of the building over 30 feet

These hydrants shall be served by a public water main that loops around the building or complex of buildings and reconnects back to the distribution supply main.



**Small Buildings**

The fire hydrants shall be M&H “Reliant” No. 929, Waterous Pacer, or Mueller Super Centurion. A blue pavement marker shall be furnished and installed in the pavement in front of each hydrant.

The holding spools between the gate valve and fire hydrant shall be made from Class 53 ductile iron pipe, 0.34-inch wall thickness. The hydrant and gate valve shall be anchored in place using holding spools and mechanical joint restraint device. Holding spools with length in excess of 17 feet shall be supplied with an M. J. sleeve and mechanical joint restraint device.

The fire hydrants shall be painted per local fire marshal requirements with two coats of Preservative Brand caterpillar or international yellow paint. After installation, they shall be wire brushed and field painted with two additional coats of similar yellow enamel paint. Distance to the hydrant valve shall be clearly stenciled in black numerals 2 inches in height on the fire hydrant below the pumper port.

Between the time that the fire hydrant is installed and the completed facility is placed in operation, the fire hydrant shall at all times be wrapped in burlap, or covered in some other suitable manner to clearly indicate that the fire hydrant is not in service.

D. Fire Sprinkler Systems

Any contractor offering to design, install, test, and/or provide maintenance of fire sprinkler systems in Washington must be licensed with the State Fire Marshal's Office, Licensing Section.

Fire sprinkler systems shall be required in commercial/industrial and multifamily buildings according to the adopted fire code regulations. Sprinkler systems may be required in single-family residences when determined by the City and the Fire Authority.

Fire sprinkler supply lines for commercial buildings, unless designed by a Fire Protection Engineer, shall be the same diameter as the supplying water main.

Fire sprinkler supply lines for non-single-family buildings shall be connected to a looped water main.

Fire sprinkler supply lines shall be separated from the public water main by a valve located at the point of connection. Unless the fire sprinkler supply line is installed with a wet tap, the cut-in tee shall have three valves installed.

The design of fire sprinkler supply lines for single-family/duplex shall be designed for 13D or P2904 systems.

A Washington State Certified Level "U" contractor shall install underground fire sprinkler supply lines in accordance with WAC 212-80-010. Prior to installation, three sets of underground fire sprinkler supply line plans shall be submitted to the City for approval by the Fire Marshal. Both a State Certified Level "U" contractor and a Fire Protection Engineer shall stamp these plans. A letter from a state certified sprinkler system

designer stating “FOR DESIGN PURPOSES ONLY” may be attached in lieu of a stamp from the Fire Protection Engineer.

A post indicator valve (PIV) shall be installed on the fire sprinkler supply line between the public water main and the building. PIV's shall be located in such a manner as to be easily visible to Fire Department personnel. A wall-mounted PIV may be installed when the exterior wall of the building is of non-combustible construction. A detail containing this information shall be included with the submitted plans.

Fire Department Connections (FDC's) shall be placed within 50 feet of a fire hydrant or as directed by the Fire Marshal. FDC's must be identified and approved by the Fire Marshal.

New water mains shall be constructed with valves on each side of fire line taps.

NFPA 13 and NFPA 13R fire sprinkler systems shall have backflow prevention.

Fire sprinkler service lines shall not be connected to fire hydrant service lines.

Flow-through fire sprinkler systems may be installed for single family residential only. Design shall be according to NFPA 13D. Backflow prevention is not required for flow-through systems.

E. Fire Flows

New developments, redevelopment of existing sites, or changes in land use are required to meet the minimum City fire flow requirements listed below. The developer shall provide information to the City to define the building specific fire flow requirements as listed in IFC Appendix B. If the building specific fire flow requirements are greater than the minimums listed below, facilities shall be designed to meet the greater requirement.

Minimum fire flow requirements within the Algona Water Service areas are:

1. Single-Family Residential: 1,500 gpm @ 2 Hours
2. Commercial/Multi-Family: 2,500 gpm @ 3 Hours
3. Fire flow may be required per IFC Appendix B.

Minimum fire flows outside Algona Water Service areas shall be determined by the water service provider and the Fire Marshal.

If off-site water system improvements are necessary to meet these requirements, the Developer shall be responsible for said improvements.

F. Fire Authority and Hydrant Access

Fire Authority and hydrant access shall meet the following requirements:

Access shall be a minimum of 20-feet wide with a minimum vertical clearance of 13-1/2 feet and capable of supporting 75,000 lbs gross vehicle weight.

For 20 feet wide roadways, turns in the access shall be designed using a minimum inside radius of 28 feet and a minimum outside radius of 48 feet. The VRFA can provide a turning template for any situation beyond this.

Single-family residential driveways greater than 150 feet in length from the face of curb or the edge of the existing asphalt to a location where a single-family home has all portions of the building no more than 150 feet, as measured by an unobstructed route around the exterior of the building, shall have an 18-foot-wide driveway apron and a minimum 20-foot-wide paved surface.

Except as noted otherwise in these standards, access that exceeds 150 feet in length from the face of curb or edge of the existing asphalt of the public road and does not return to a public road shall provide a turnaround within 150 feet of the dead-end. If a hammerhead configuration is utilized for the turnaround, it shall be designed per Figure D103.1 and Table D103.4 in Appendix D of the International Fire Code. If a cul-de-sac is utilized for the turnaround, it shall be designed per the City of Algona Design Standards.

A blue pavement marker shall be furnished and installed in the pavement in front of each hydrant.

G. Blowoffs and Air Relief Assemblies

Two-inch or 4-inch blowoff assemblies shall be installed at the terminus of all dead end water mains. Blowoffs utilized by the Contractor for flushing the water main shall be sufficient size to obtain 2.5 feet per second velocity in the main. Temporary blow-offs shall be removed and replaced with a suitably sized watertight brass plug.

Two-inch air and vacuum release valves shall be installed at principal high points in the system. See detail.

The installation of these items shall include connection piping, gate valve, valve box, and all accessories.

## 8.5 WATER PIPE TESTING AND DISINFECTING

All pipelines shall be tested and disinfected prior to acceptance of work. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Contractor. Feed for the pump shall be from a barrel or other container within the actual amount of “makeup” water, so that it can be measured periodically during the test period.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking.

As soon as the pipe is secured against movement under pressure, it may be filled with water. New water mains are only filled using an approved backflow prevention assembly. The water main is filled from the lower elevation end, so that as the water main is filled the chlorine is contacted and dissolved and the chlorine is spread relatively uniformly through the length of the new water main.

The chlorinated water is allowed to remain in contact with the new system for a minimum of 24-hours. A minimum residual chlorine concentration of 24 mg/L is required at the end of the 24-hour time period. Following this, the line shall be thoroughly flushed and a water sample collected. Residual chlorine levels must be between 0.5 and 1.0 mg/L before a water can be sample collected. After 24 hours, water may be added to the water main for the purposes of pressure testing. Pressure testing must also include testing against valves.

After the pipe is filled and all air expelled, it shall be pumped to a test pressure of 250 psi, and this pressure shall be maintained for a period of not less than 30 minutes to ensure the integrity of the thrust and anchor blocks. **The contractor/developer is cautioned regarding pressure limitations on butterfly valves.** All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrostatic tests shall be performed on every complete section of water main between two valves, and each valve shall withstand the same test pressure as the pipe with no pressure active in the section of pipe beyond the closed valve.

In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at 150 psi *above operational pressures (with a minimum test pressure of 225 psi) in accordance with WSDOT standard (7-09.3(23))* for a period of not less than 1 hour. The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{S * D * \sqrt{P}}{266,400}$$

in which

- L = Allowable leakage, gallons/hour
- S = gross length of pipe tested
- D = Nominal diameter of the pipe in inches
- P = Average test pressure during the leakage test, psi

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Contractor at the Contractor's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be rerun at the Contractor's expense until a satisfactory test is obtained.

If the pressure tests fails and retesting of the water main is required the Contractor shall flush the water main with a water chlorine bleach solution (1 gallon of 5 percent bleach to 1,000 gallons of water). The volume of new water pumped into and through the water main is three times the pipe volume.

After successful pressure testing, and additional chlorine contact if necessary, the water main is thoroughly flushed to remove all super chlorinated water from the new water main. A minimum of 5 pipe volumes is flushed out of the water main. After flushing, samples are collected for bacteriological analysis.

After receipt of a satisfactory bacteriological test the system is flushed at a flow rate sufficient to develop a water velocity in the pipe of 2.5 ft/sec for a minimum of five pipe volumes. Pressure tests and bacteriological tests are completed and must be passed before any new water main is physically connected to the system. **No new water main is connected to the system until a satisfactory bacteriological analysis is obtained.**

All closure fittings shall be swabbed with a 5 percent chlorine solution of chlorine immediately prior to installation per AWWA Standard C651. Additional samples for bacteriological analysis shall be collected and analyzed after the final connections are made.

In all disinfection processes, the Contractor shall take particular care in flushing and wasting the chlorinated water from the mains to assure that the flushed and

chlorinated water does no physical or environmental damage to property, streams, storm sewers or any waterways. The Contractor shall chemically or otherwise treat the chlorinated water to prevent damage to the affected environment, particularly aquatic and fish life of receiving streams.

City forces only will be allowed to operate existing and new tie-in valves. The Contractor's forces are expressly forbidden to operate any valve on any section of line, which has been accepted by the City.

## **8.6 BACKFLOW PREVENTION AND SPRINKLER SYSTEMS**

1. All connections to the public water system shall have backflow prevention as required by WAC 248-54-285.
2. All fire sprinkler systems as mandated/proposed/or required by the local fire marshal and/or City Ordinance that have a fire department connection shall have backflow prevention as required by WAC 248-54-285.
3. Building sprinkler systems may be required based on Building Codes/Fire Marshall requirements.
  - Fire sprinkler supply lines for commercial buildings, unless designed by a Fire Protection Engineer, shall be the same diameter as the supplying water main.
  - Fire sprinkler supply lines for non-single-family buildings shall be connected to a looped water main.
  - Fire sprinkler supply lines shall be separated from the public water main by a valve located at the point of connection. Unless the fire sprinkler supply line is installed with a wet tap, the cut-in tee shall have three valves installed.
  - The design of fire sprinkler supply lines for single-family/duplex shall be designed for 13D or P2904 systems.
  - A Washington State Certified Level "U" contractor shall install underground fire sprinkler supply lines in accordance with WAC 212-80-010. Prior to installation, 3 sets of underground fire sprinkler supply line plans shall be submitted to the City for approval by the Fire Marshal. Both a State Certified Level "U" contractor and a Fire Protection Engineer shall stamp these plans. A letter from a state certified sprinkler system designer stating "FOR DESIGN PURPOSES ONLY" may be attached in lieu of a stamp from the Fire Protection Engineer.



- A post indicator valve (PIV) shall be installed on the fire sprinkler supply line between the public water main and the building. PIV's shall be located in such a manner as to be easily visible to Fire Department personnel. A wall-mounted PIV may be installed when the exterior wall of the building is of non-combustible construction. A detail containing this information shall be included with the submitted plans.
- Fire Department Connections (FDCs) shall be placed within 50 feet of a fire hydrant or as directed by the Fire Marshal. FDCs must be identified and approved by the Fire Marshal.
- New water mains shall be constructed with valves on each side of fire line taps.
- NFPA 13 and NFPA 13R fire sprinkler systems shall have backflow prevention
- Fire sprinkler service lines shall not be connected to fire hydrant service lines.
- Flow-through fire sprinkler systems may be installed for single family residential only. Design shall be according to NFPA 13D. Backflow prevention is not required for flow-through systems.

## **8.7 SERVICE CONNECTIONS**

Individual services to each property shall be installed and connected to the new water mains. New services from existing mains will be installed by the City. The Developer shall be responsible for permitting, traffic control, excavation to expose main, shoring to protect City employees, backfilling trench, and completion of all restoration.

Upon completion of the installation of the water main (before testing and disinfection) services shall be installed by connecting to the water main and extending the service line to the meter setter.

All single family residential shall be provided with a meter setter including a check valve. All other services shall be completed with Washington State-approved backflow prevention located immediately behind and on the property side of the water service box. Irrigation, residential single-family fire meters, duplex, and multi-family residential connections shall require double check valve assemblies (DCVA). All other connections shall require reduced pressure

backflow assemblies (RPBA). Commercial fire sprinkler system, if unmetered shall require reduced pressure detector assemblies (RPDA).

All irrigation using chemical feed, or water features, including decorative ponds, pools and fountains requiring make-up water shall be protected from backflow into the public water supply by a **minimum** of an approved air-gap to be located at the fill point of the pond or water feature. This "air-gap" shall be inspected by the City prior to filling. In all instances, the water supply used for filling purposes shall be protected by a double check valve assembly (DCVA) installed behind the meter for new construction or retrofitted as close as practical on modified systems.

Corporation stops and the single meter shut-off valves shall be Mueller or A.Y. McDonald with the type and style noted on the Standard Details or approved equal. Included as a part of the service connection shall be the furnishing and installation of the meter box complete with lid, set flush with the proposed finished grade of the lot in the designated location near the property line, all as shown on the Standard Details. The angle type of shut-off valve and angle type dual check valve shall be set inside the meter box in a proper position for installation of a future meter by the City.

Service lines between the main and the property line shall be placed at a trench depth sufficient to maintain a 3'-0" cover over the top of the service line for its full length, taking into consideration the final finished grade of the proposed street and the final finished grade of any storm ditches.

Upon completion of each service line as indicated herein, the Developer shall flush the service line to remove the debris that may interfere with the future meter installation, and further verify that the service line has full pressure and flow to the meter box.

## **8.8 1-1/2 INCH AND LARGER METERS**

If extensions require water meters 1-1/2 inches or larger, then such entire meter installation, including valves, piping, vaults or meter boxes, drain lines and meters shall be furnished and installed by the Developer conforming to City standards. Activation of meter is subject to conformance with City requirements and payment of connection fees.

## **8.9 STATE HIGHWAY CROSSINGS**

See Section 7.7.

**8.10 STREET PATCHING AND RESTORATION**

See Sections 5.17, 5.18 and 5.19 for requirements regarding street patching and trench restoration.



## **CHAPTER 9**

### **MISCELLANEOUS UTILITY SERVICES AND ADDITIONAL DEVELOPMENT REQUIREMENTS**

#### **9.1 GENERAL**

The standards established by this chapter are intended to represent the **minimum** standards for the design and construction of additional facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. The following design and construction considerations shall apply.

#### **9.2 UTILITY SERVICES**

All utility lines, including electric, telephone, fire alarm and television cables shall be placed underground prior to paving. Easement for maintenance of all utilities, both on and off-site, shall be provided as applicable to the satisfaction of the City Engineer.

#### **9.3 STREET LIGHTING**

Street lighting shall be provided by the Developer to the guidelines established in these standards. All costs of such, including, but not limited to, design, underground wiring, light standard base and luminaire shall be borne by the developer. The City shall approve of all street lighting plans as furnished by the developer to include size, spacing, height and type of pole/illuminare.

#### **9.4 CABLE TELEVISION**

Service lines (suitable empty conduits placed and capped) for cable television shall be installed underground (location as approved by City Engineer) on all subdivisions regardless of whether or not cable television service is currently available.

#### **9.5 STREET NAME AND TRAFFIC SIGNS**

All street name signs and traffic directional signs shall be designated by the City and provided by the Developer. All costs of providing the signs, to include the installation, labor, materials, and other relevant City costs associated with determining the type, location, and associated work items shall be invoiced to and paid by the developer.

## 9.6 LANDSCAPING

Street landscaping shall be provided by the developer to the guidelines established in these standards and a landscaping plan shall be submitted as part of the plan package for City review and approval.

## 9.7 EROSION CONTROL

The detrimental effects of erosion and sedimentation shall be minimized by conforming with the following general principles:

- A. Soil shall be exposed for the shortest possible time.
- B. Reducing the velocity and controlling the flow of runoff.
- C. Detaining runoff on the site to trap sediment.
- D. Releasing runoff safely to downstream areas.

In applying these principles and accepted Best Management Practices (BMPs) as approved by the Department of Ecology in the latest city approved edition of the Stormwater Management Manual for Western Washington, the Developer and/or Contractor shall provide for erosion control through such BMPs as conducting work in phases; minimizing the disturbance to vegetation; providing mulch and/or temporary cover, sedimentation basins, and/or diversions in critical areas during construction; controlling and conveying runoff; and establishing permanent vegetation and installing erosion control structures as soon as possible.

### 1. Trench Mulching

Where there is danger of backfill material being washed away due to steepness of the slope along the direction of the trench, backfill material shall be compacted and held in place by covering the disturbed area with mulch, jute matting or other accepted BMP practices.

### 2. Cover-Crop Seeding

A cover crop shall be sown in all areas excavated or disturbed during construction that were not paved, landscaped and/or seeded prior to construction. Areas landscaped and/or seeded prior to construction shall be restored to their original or superior condition. Cover-crop seeding shall follow backfilling operations.

The Developer and/or Contractor shall be responsible for protecting all areas from erosion until the cover crop affords such protection. The cover crop shall be reseeded if required and additional measures taken to provide protection from erosion until the cover crop is capable of providing protection.

During winter months, the Contractor may postpone seeding, if conditions are such that the seed will not germinate and grow. The Developer and/or Contractor will not, however, be relieved of the responsibility of protecting all areas until the cover crop has been sown and affords protection from erosion.

The cover crop shall be sown at a rate of 10 to 15 pounds of seed per acre using a hand or power operated mechanical seeder capable of providing a uniform distribution of seed.





## **MISCELLANEOUS FORMS**







**CITY OF ALGONA**  
**AGREEMENT FOR INSPECTION AND MAINTENANCE OF PRIVATELY**  
**MAINTAINED STORM DRAINAGE FACILITIES**

**Declaration of Covenant**

In consideration of approval of the development known as \_\_\_\_\_, relating to real property legally described as follows:

**The undersigned, as owner(s), covenant and agree that:**

1. The owner and subsequent owners of the above described property shall maintain the approved storm drainage system shown on the City approved construction plans or City approved changes thereto in compliance with the Operation and Maintenance Standards in Volume 5 of the 2012 WDOE Stormwater Management Manual for Western Washington.
2. The owner shall, maintain an Operation and Maintenance Schedule, record showing maintenance performed. The Operation and Maintenance records shall be retained by the Owner for a minimum of three years and shall be available to the City for inspection at all reasonable times.
3. The owner shall provide access to the storm drainage system at reasonable times for regular inspection by the City or its authorized representative to ensure that the facility is maintained in proper working condition in accordance with the Operation and Maintenance Schedule.
4. If at any time, in accordance with the Operations and Maintenance Schedule, the City of Algona reasonably determines that maintenance or repair work is required to be done to the existing, approved storm drainage facilities installed on the property the City shall give the current owner 30-days notice that the City intends to perform such maintenance or repairs, or to have them performed by others.

5. If the owner has not completed or is not diligently pursuing the repair or maintenance of the system and it becomes necessary for the City of Algona to perform the work, the current owners will assume responsibility for the cost of such maintenance or repair and will reimburse the City within thirty days of the receipt of the invoice. Overdue payments will require payment of interest at the current legal rate for liquidated judgments, and any costs or fees incurred by the City, should any legal action be required to collect such payments, will be borne by the parties responsible for said reimbursements.

6. If at any time the City of Algona reasonably determines that the existing and approved storm drainage system on the property poses a hazard to life and limb, endangers property, or adversely affects the safety and operations of a public way, due to failure, damage or non-maintenance of the existing on-site storm system, and that the situation is so adverse as to preclude written notice to said owners, the City may take the measures necessary to eliminate the hazardous situation (which will mean repair or clean out of the existing system only to the same standards as originally installed and approved) provided the City has first made a reasonable effort to locate said owner before acting.

The current owners will assume responsibility for the cost of such maintenance or repair; and will reimburse the City within thirty days of receipt of the invoice. Overdue payments will require payment of interest at the current legal rate for liquidated judgments, and any costs or fees incurred by the City, should any be borne by the parties responsible for said reimbursements.

7. The owner shall keep the City of Algona informed at all times as to the name, address and telephone number of the contact person responsible for the performance of maintenance or repair work to the storm drainage facilities.

These covenants are intended to protect the value and desirability of the real property described above, and to benefit all the citizens of the City of Algona. They shall run with the land and be binding on all parties having or acquiring from the current owners or their successors, any right, title or interest therein, and to the benefit of all the citizens of the City of Algona.

8. Lien: The City shall have a lien for costs expended by it for any repairs or maintenance properly chargeable to the owner hereunder, which lien shall be prior in right to the lien of secured parties under deeds of trust, mortgages or real estate contracts, regardless of the date of their recordation, and which shall be recordable and enforceable in the manner provided for materialmen's contractors' liens pursuant to RCW Ch. 60.04 or any successor statute thereto.

9. Attorneys' fees and costs: Should any party institute proceedings to enforce any right hereunder, including filing a lien under paragraph 8, reasonable costs and attorneys' fees thereby incurred shall be awarded to the prevailing party in such proceeding.

\_\_\_\_\_  
City of Algona, Mayor (Signature)    Owner (Signature)

\_\_\_\_\_  
City of Algona, Mayor (Print)    Owner (Print)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State, Zip

\_\_\_\_\_  
Phone:

\_\_\_\_\_  
Date:

STATE OF WASHINGTON

ss. (INDIVIDUAL ACKNOWLEDGMENT)

County of \_\_\_\_\_

I, \_\_\_\_\_, Notary Public in and for the State of Washington, residing at \_\_\_\_\_, do hereby certify that on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, personally appeared before me \_\_\_\_\_ to be known to be the individual described in and who executed the within instrument and acknowledged that \_\_\_\_\_ signed and sealed the same as \_\_\_\_\_ free and voluntary act and deed for the uses and purposes herein mentioned.

**GIVEN UNDER MY HAND AND OFFICIAL SEAL**

this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public in and for the State of  
Washington, residing at \_\_\_\_\_ in  
said County. My commission expires  
\_\_\_\_\_.





**CITY OF ALGONA  
ASSIGNMENT OF FUNDS  
IN LIEU OF MAINTENANCE BOND**

Project Name/Permit No.: \_\_\_\_\_

Developer/Principal: \_\_\_\_\_

In lieu of a maintenance bond, we hereby agree that the sum of \$ \_\_\_\_\_ will be held in savings account number \_\_\_\_\_ in \_\_\_\_\_ in the name of \_\_\_\_\_ to assure maintenance requirements hereunder.

Now, therefore, the conditions of these obligations are such, that the principal shall replace or correct any part or parts of all improvements, installed under Plans approved by the City of Algona \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ discovered by the City of Algona to be defective in material or inefficient or otherwise unsatisfactory in operations, through faulty construction, materials or workmanship, or through any fault of design or detail arising with Contractor or manufacturer within two years of the acceptance of the work (date) and transfer of title. Such parts shall be replaced with parts constructed in accordance with designs and of material satisfactory to the City.

We further agree that up to the full amount of the funds in the above referenced account shall be released to the City of Algona upon written demand by the Mayor of the City. The amount demanded by the Mayor will be a good faith estimate of the actual cost of the repairs.

We further agree that if it is necessary for the City of Algona to take any legal action against any signatory to this agreement to assure compliance with its terms, the City shall be entitled to its reasonable costs and attorney's fees.

It shall be the responsibility of both the principal and the financial institution to inform the City of Algona, in writing, of any change of mailing address. The City will mail only to the last known address of principal and financial institution.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Name of Financial Institution

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State, Zip

\_\_\_\_\_  
City, State, Zip

\_\_\_\_\_  
Phone No.

\_\_\_\_\_  
Phone No.





**WE FURTHER AGREE** that if it is necessary for the City of Algona to take any legal action against any signatory to the Agreement to assure the proper completion of this project, the City of Algona will be entitled to reasonable costs and attorney's fees.

It shall be the responsibility of both the Principal and Surety to inform the City of Algona if they change addresses. Change of address should be mailed to the City of Algona, 402 Warde Street, Algona WA 98001. The City will mail only to the last known address of Principal and Surety.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Name of Financial Institution

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State and Zip Code

\_\_\_\_\_  
City, State and Zip Code

Sample















## CITY OF ALGONA

### DEVELOPER AGREEMENT

THIS AGREEMENT, by and between the City of Algona, a municipal corporation, hereinafter referred to as "City", and \_\_\_\_\_, hereinafter referred to as "Developer":

WITNESSETH: That whereas the City of Algona, a municipal corporation, provides water/sanitary/storm/gas or roadway service within this area, and the above-named Developer is preparing to construct an extension or modification or additions thereto, and said development requires the City's service;

WHEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. Developer agrees to construct the water/sanitary/storm/gas or roadway system, or additions thereto, to be connected to the City's infrastructure, and to maintain such additions until such time as the improvements are accepted by the City, with the agreements conditioned as set forth below. The improvements, extension, or additions thereto, shall be located within that area commonly referred to as \_\_\_\_\_, which property is described in Exhibit "A" attached hereto and referred to hereinafter as "Premises".
2. As a condition precedent to City obligations under this agreement, the Developer shall construct the proposed water/sanitary/storm/gas/or roadway system, or additions thereto, in conformance with the minimum standards as set forth in the City's currently adopted Public Works Standards, as adopted together with any amendments thereto hereinafter made, and further to conform with the City's comprehensive planning documents, which agreement shall include oversizing of mains necessitated by the comprehensive plan.
3. The developer agrees that the construction of any infrastructure items, or additions thereto, shall not commence until the following conditions have been fulfilled:
  - a. The developer shall furnish the City with four (4) sets of detailed plans for the proposed improvements, or additions thereto, at Developer's own expense, prepared by a qualified engineer currently licensed in the State of Washington.
  - b. The above plans shall require the review and approval by the City and its Engineer, and the cost of such review shall be at the Developer's own expense.
  - c. Minimum requirements for all plans, or additions thereto, submitted to the City for review are given on the plan checklist in the Public Works Standards.
  - d. All permits have been received. Permits may include, but are not limited to, Right-of-Way Permit, Fill and Grade Permit, Stormwater Permit (issued by the Department of Ecology for fill and grade activities on sites larger than 1 acre).

- e. Construction requirements in addition to the City standards and details for developer extensions, as adopted, are as follows:
- (1) All streets and/or roadways shall be graded to a minimum of two (2) feet above the crown of utility lines before installation of utility improvements, unless otherwise approved by the City Engineer.
  - (2) All lots shall be fully staked to assist all parties involved in the proper location of utility services.
  - (3) All contractors and subcontractors shall have a current Washington State Contractors License on file with the City.
  - (4) The Developer's proposed improvements, or additions thereto, on Premises shall not be connected to the City system until authorized by the City, and such connection shall be performed only under the supervision and approval of the City.
- f. For the purpose of applying RCW 4.24.115 to this Contract, the Developer and the City agree that the term "damages" applies only to the finding in a judicial proceeding and is exclusive of third party claims for damages preliminary thereto.

The Developer agrees to indemnify and hold harmless the City from all claims for damages by third parties, including costs and reasonable attorney's fees in the defense of claims for damages, arising from performance of the Developer's express or implied obligations under this Agreement. The Developer waives any right of contribution against the City.

It is agreed and mutually negotiated that in any and all claims against the City or any of its agents or employees by any employee of the Developer, any contractor or subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation hereunder shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Developer or any contractor or subcontractor under Workman's Compensation Acts, disability benefits acts or other employees' benefit acts. The City and the Developer agree that all third part claims for damages against the City for which the Developer's insurance carrier does not accept defense of the City may be tendered by the City by the Developer who shall, if so tendered by the City, accept and undertake to defend or settle with the Claimant. The City retains the right to approve claim investigation and counsel assigned to said claim and all investigation and legal work product regarding said claim shall be performed under a fiduciary relationship to the City. In the event that the City agrees or a court finds that the claim arises from the sole negligence of the City, this indemnification shall be void and the City shall be responsible for all damages payable to the third party claimant. In the event that the City and the Developer agree or a court finds that the claim arises from or includes negligence of both the Developer and the City, the Developer shall be responsible for all damages payable by the Developer to the third party claimant under the court findings, and, in

addition thereto, the Developer shall hereunder indemnify the City for all damages paid or payable to the City under the court findings in an amount not to exceed the percentage of total fault attributable to the Developer. For example, where the Developer is 25% negligent, the Developer shall not be required to indemnify the City for any amount in excess of 25% of the claimant's total damages.

- g. In the event the Developer in his operation damages or disrupts existing improvements, the repairs shall be made at the Developer's expense. In the event they are so damaged or the service disrupted and the Developer fails or is unable to immediately restore the service, then the Owners of the improvements may cause the repairs to be made by others and all costs for the same shall be at the Developer's own expense.

Where the construction crosses or is adjacent to existing utilities, the Developer shall exercise extreme care to protect such utilities from damage.

If any damage is done to an existing utility, the Developer shall notify the utility company involved, who will dispatch a crew to repair the damage at the Developer's expense. All costs for the same shall be at the Developer's own expense.

The Developer shall be aware that some existing City owned facilities are known to contain asbestos cement pipe. The Developer shall conduct all work related to existing asbestos cement pipe in strict accordance with current WISHA safety regulations and provisions contained within WAC 296-62-077. All costs related to work in compliance with established rules and regulations shall be the responsibility of the Developer. Demolition of existing asbestos cement pipe, if required, will be permitted only after the proper permits are obtained from the Puget Sound Air Pollution Control Agency. The Developer shall be responsible for all associated fees and permits required for asbestos removal and disposal. Work crews shall be provided with proper protective clothing and equipment. Hand tools shall be used, and the asbestos cement pipe shall be scored and broken in lieu of the sawing or other methods, which release fibers into the atmosphere. Waste asbestos pipe shall be buried in the trench. Asbestos pipe to be abandoned in place shall not be disturbed, except as noted herein, and shall remain in its original position.

The Developer is cautioned that all existing drainage systems, whether open ditch, buried pipe, or drainage structures, are not on record. It shall be the responsibility of the Developer to repair or replace all such systems found during construction, which are damaged by the Developer's construction in a manner, which is satisfactory to the City.

Where the Developer is allowed to use private property adjacent to the work, the property so used shall be returned to its original or superior condition. The Developer shall make all arrangements in advance with such property owners, to insure that no conflicts will ensue after the property is restored as described above. The Developer will be required to furnish the City with a written release from said private property owners, if the City deems it to be necessary to obtain such document.

4. The construction of the Developer's proposed improvements, or additions thereto, shall be supervised by the City in such a manner and at such times as the City deems reasonably necessary to assure that construction of the system will conform with the above-mentioned plans and specifications and minimum City Standards. The Developer herewith agrees to allow such inspections and agrees to cooperate providing reasonable advance notice on his construction schedule during the various construction phases as requested by the City. The Developer further agrees to reimburse the City for all engineering fees and expenses incurred by the City for such supervision.
5. The Developer's proposed improvements, or additions thereto, shall not be accepted for service and use until the same have been fully inspected and approved, and the following requirements have been performed:
  - a. Submit to the City in Auto-CADD format, latest revision, the computer file supplied on a compact disc (CD) accompanied by the two full size plan sets, with all changes from the original design clearly marked to reflect the as-built conditions. The Developer's Engineer shall certify the accuracy of the record drawings and shall affix his seal and signature.
  - b. Payment of all permit fees and equivalent assessment charges and any other applicable City charges required for Premises.
  - c. Payment of all plan check and inspection fees and related fees.
  - d. Prepare, furnish and record with the County the required easements in accordance with City's standard form.
  - e. Furnish the City with an affidavit warranting there are no liens against the improvements constructed on Premises by the Developers, this affidavit shall be in the form prescribed by the City.
  - f. Furnish the City with a Bill of Sale conveying the water/sanitary/storm or roadway system to the City, which shall include a two-year guarantee that the conveyed systems or improvements or additions thereto shall be free of defects in labor and materials. Form shall be as prescribed by the City.
  - g. Payment of all applicable bills, invoices, fees, etc., have been paid in full.
6. In the event any warranty repairs are required, the City agrees, whenever feasible, to provide the Developer with reasonable notice before directly undertaking such repairs. The City reserves the right, however, to effect emergency repairs as deemed necessary by the City. The City shall be reimbursed by the Developer for all costs thereof.

7. Upon performing all requirements, including those as set forth in Paragraph 5 above, the City shall accept the water/sanitary/storm or roadway improvements, and agree therewith to operate and maintain said system.

SUBMITTED this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

BY DEVELOPER: \_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

State of Washington )  
                                  ) ss.  
County of King       )

On this \_\_\_\_ day of \_\_\_\_\_, 20\_\_, before, me the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared \_\_\_\_\_, to me known to be the person who executed the foregoing instrument, and acknowledged the said instrument to be his free and voluntary act and deed, for the uses and purposes therein mentioned, and acknowledged that he/she had the legal authority to execute said agreement on behalf of the "Developer".

WITNESS my hand and official seal affixed the day and year first above written.

(INDIVIDUAL) \_\_\_\_\_  
Notary Public in and for the State  
of Washington, residing at \_\_\_\_\_

**CITY OF ALGONA**  
**DEVELOPER AGREEMENT**  
**EXHIBIT "A"**

PLAT NAME: \_\_\_\_\_

DEVELOPER: \_\_\_\_\_

LEGAL DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

Sample



## EASEMENT FOR UTILITIES

THIS EASEMENT is made on the \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ (“Effective Date”) by \_\_\_\_\_, a Washington corporation (“Grantor”).

1. Grant and Location of Easement. Grantor hereby grants and conveys to the City of Algona, a municipal corporation (“Grantee”), its successors and assigns, a non-exclusive utility easement (“Easement”) with immediate right of entry and continued access over, under, and across the real property legally described on Exhibit A.

2. Purpose of Easement. The purpose of this Easement is for the construction, improvement, maintenance, and repair of underground utilities, including but not limited to an underground water, storm drainage, and sanitary sewer pipes, and other appurtenant structures.

3. Maintenance of Easement. Grantee shall maintain and repair the utility pipes, water mains, and its appurtenant structures so as not to damage the property burdened by this Easement, or any other property.

4. Interference. Grantor may use the surface above the Easement, PROVIDED that its use does not interfere with or cause damage to the utility pipes, water mains, and appurtenant structures, PROVIDED FURTHER that prior to constructing any building or planting any trees within the Easement Grantor shall obtain the written consent of Grantee, which consent shall not be unreasonably withheld. Grantor may construct a fence or other obstruction on Grantor’s property, PROVIDED however that Grantor does not prohibit or impede Grantee’s access to the Easement. Grantor may grant other non-exclusive easement rights in and to the Easement; PROVIDED, however, that no other utility pipe, line, or structure shall be located closer than five (5) feet parallel to the Grantee’s utility pipe, water main, and/or appurtenances; and, PROVIDED FURTHER, that prior to installation of any utility pipe, line, or structure that crosses the Easement, Grantor shall obtain the written consent of Grantee, which consent shall not be unreasonably withheld. If, in exercising any right to use the surface above the Easement or grant other easements, the Easement is disturbed, Grantor shall return the Easement to its condition prior to its disruption, at Grantor’s sole cost and expense.

5. Title. The Grantor warrants that the Grantor has good title to the above property.

6. Successor and Assigns. This agreement shall run with the property and be binding on the parties, their successors, and assigns.

\_\_\_\_\_   
 A Washington corporation

By: \_\_\_\_\_

Its: \_\_\_\_\_

STATE OF WASHINGTON )  
 ) : ss.  
County of Snohomish )

On this day personally appeared before me \_\_\_\_\_ to me known to be the person who executed the within instrument as the \_\_\_\_\_ of \_\_\_\_\_, the corporation that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he/she is authorized to execute the said instrument and that the seal affixed in the corporate seal of said corporation.

GIVEN under my hand and official seal this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_

(Type/Print Name)

Notary Public in and for the State of Washington, residing at \_\_\_\_\_.

My appointment expires: \_\_\_\_\_.

## MAINTENANCE BOND

Algona Subdivision/  
Plat/Permit No: \_\_\_\_\_  
Project Address \_\_\_\_\_

Owner/Developer/  
Contractor ("Principal"):  
Principal Address: \_\_\_\_\_  
Project Name: \_\_\_\_\_

WHEREAS, \_\_\_\_\_, hereinafter referred to as "the Principal," has applied to the City of Algona, hereinafter referred to as "the City," to construct the project known as \_\_\_\_\_ on a site located at \_\_\_\_\_ within the City of Algona, and;

WHEREAS, the City approved the requested action on \_\_\_\_\_ and;

WHEREAS, the approval granted by the City and the provisions of the Algona Municipal Code require certain improvements to be made in connection with construction of the project, the improvements are shown on the approved site plan and/or other required plans and as further defined by the conditions identified in the City file,

WHEREAS, a further condition is that the Principal will maintain and repair the improvements in said project for a period of \_\_\_\_\_ months from their final acceptance by the City.

NOW, THEREFORE, the undersigned PRINCIPAL and the bonding company, \_\_\_\_\_, a corporation authorized to transact surety business in the State of Washington, hereinafter referred to as "the Surety," agree and bind themselves, their heirs, executors, \_\_\_\_\_ (\$ \_\_\_\_\_), lawful money of the United States, according to the following terms and conditions:

1. Failure to Repair and Maintain. If the Principal does not repair and maintain all improvements required by the above-referenced conditions, plans, and file within \_\_\_\_\_ months, then the Surety shall, upon the demand of the City, remit to the City within ten (10) days of receipt of said demand, the amount of this Bond or such lesser amount as may be specific in the demand.

2. Repairs by the City. In the event the Principal fails to make any repairs or maintenance on the improvements within the time specified by the City (generally after fourteen (14) days notice, or less, if the City determines and emergency exists), its

employees and agents shall have the right, at their sole election, to enter onto said property described above for the purpose of making repairs or maintenance. This provision shall not be construed as creating an obligation on the part of the City or its representatives to repair and maintain such improvements. The Principal and Surety agree to reimburse the City for all costs to the City, plus an additional sum equal to fifteen percent (15%) of the City's cost for administrative and enforcement expense.

3. Attorney's Fees. In the event any lawsuit is instituted by the City of Algona, the Principal or the Surety to enforce the terms of this Bond or to determine the rights of any party hereunder, the prevailing party in such litigation shall be entitled to recover from the losing party its cost, including reasonable attorney's fees, incurred as a result of such lawsuit.

4. Release of Bond. This Bond shall remain in full force and effect until the obligations secured hereby have been fully performed, and until release in writing by the City at the request of the Surety of the Principal upon expiration of the period specified in paragraph 1 above.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Bonding Company

\_\_\_\_\_  
Developer/Owner/Phone #

\_\_\_\_\_  
Officer/Title

\_\_\_\_\_  
Address/Phone

\_\_\_\_\_  
Accepted by the City of Algona  
Dated:\_\_\_\_\_

## PERFORMANCE BOND

Algona Subdivision/  
Plat/Permit No: \_\_\_\_\_  
Project Address \_\_\_\_\_

Owner/Developer/  
Contractor ("Principal"):  
Principal Address: \_\_\_\_\_  
Project Name: \_\_\_\_\_

WHEREAS, \_\_\_\_\_, hereinafter referred to as "the Principal," has applied to the City of Algona, hereinafter referred to as "the City," to construct the project known as \_\_\_\_\_ on a site located at \_\_\_\_\_ within the City of Algona, and;

WHEREAS, the City approved the requested action on \_\_\_\_\_ and;

WHEREAS, the approval granted by the City and the provisions of the Algona Municipal Code require certain improvements to be made in connection with construction of the project, the improvements are shown on the approved site plan and/or other required plans and as further defined by the conditions identified in the City file,

NOW, THEREFORE, the undersigned PRINCIPAL and the bonding company, \_\_\_\_\_, a corporation authorized to transact surety business in the State of Washington, hereinafter referred to as "the Surety," agree and bind themselves, their heirs, executors, \_\_\_\_\_, (\$ \_\_\_\_\_), lawful money of the United States, according to the following terms and conditions:

1. Completion of Improvements. If the Principal does not complete all improvements required by the above-referenced conditions, plans, and file within \_\_\_\_\_ weeks/months, then the Surety shall, upon the demand of the City, remit to the city within ten (10) days of receipt of said demand, the amount of this Bond or such lesser amount as may be specific in the demand.

If any improvements are in the City right-of-way, then the Principal will replace and restore such roadway, street, alley, avenue, or other public place to as good as state or condition as at the time of the commencement of said work, and maintain the same in good order, to the satisfaction of the City of Algona Engineering Department or City Engineer, and will comply with all the provisions of any permit and all resolutions or instruments related thereto.

2. Repairs by the City. In the event the Principal fails to complete all of the above-referenced improvements within the time specified by the City, its employees and agents shall have the right, at their sole election, to enter onto said property described above for the purpose of completing the improvements. This provision shall not be construed as creating an obligation on the part of the City or its representatives to complete such improvements. The Principal and Surety agree to reimburse the City for all costs to the City, plus an additional sum equal to fifteen percent (15%) of the City's cost for administrative and enforcement expense.

3. Attorney's Fees. In the event any lawsuit is instituted by the City of Algona, the Principal or the Surety to enforce the terms of this Bond or to determine the rights of any party hereunder, the prevailing party in such litigation shall be entitled to recover from the losing party its cost, including reasonable attorney's fees, incurred as a result of such lawsuit.

4. Release of Bond. This Bond shall remain in full force and effect until the obligations secured hereby have been fully performed and a bond guaranteeing maintenance of all improvements for a period of two (2) years from acceptance has been submitted to the City in an amount of not less than 15 percent (15%) of the cost of the improvements and in a form suitable to the City, and until released in writing by the City at the request of the Surety or the Principal upon expiration of the period specified in paragraph 1 above.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Bonding Company

\_\_\_\_\_  
Developer/Owner/Phone #

\_\_\_\_\_  
Officer/Title

\_\_\_\_\_  
Address/Phone

\_\_\_\_\_  
Accepted by the City of Algona

Dated: \_\_\_\_\_

# CITY OF ALGONA PLAN CHECKLIST

Project: \_\_\_\_\_  
Applicant: \_\_\_\_\_  
Date Submitted: \_\_\_\_\_

Engineer: \_\_\_\_\_  
Phone: \_\_\_\_\_

**GENERAL:** 3 Sets of Plans and documents shall be submitted

- Vicinity Map
- Preliminary Plat Map
- Legend (APWA Standard Symbols)
- North Arrow
- Scale Bar
- Datum-Bench Mark Elevation and Location (on all sheets where elevations are referenced)
- Title Block:
  - Title:
  - Design By: (must be Washington State Licensed Engineer)
  - Drawn By:
  - Date:
  - Checked By:
  - Signature Approval Block (see above example):
  - Sheet Number of Total Sheets:
- Section, Township, and Range (every plan/profile sheet)
- Engineers Stamp (signed and dated)
- Project Title (cover sheet)
- Utility System Map (showing all proposed utilities on one drawing)
- Revision Block
- Horizontal Scale: 1"=50' (or as other wise approved by the City)
- Plan sheets shall be not less than 22" x 34"
- Approval Block (in lower right corner of each drawing)

**APPROVED FOR CONSTRUCTION**

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
City of Algona

These drawings are approved until \_\_\_\_\_, \_\_\_\_\_  
[expiration of preliminary plat or site plan approval]. The City reserves the right to make revisions, additions, deletions, or modifications should construction be delayed beyond this time limitation. The City, by approving these drawings, assumes no liability in regards to their accuracy or omissions.

## **PLAN STANDARD ITEMS**

- Centerline and Stations
- Edge of Pavement and Width
- Right-of-Way and Width
- Proposed Survey Monumentation Locations and Details
- Sidewalk and Width
- Roadway Sections
- Existing Utilities (above and below ground)
- Existing Structures
- Existing Limits of Hard Surfaces, Gravel and Pervious Surfaces
- Adjacent Property Lines, Ownership, Parcel Number, and Street Address
- Identify Street Names, Right-of-Way, Lots
- Identify/Match Existing Sheet Numbers and Stations
- Easements, Width, and Type
- Define Survey Baseline
- Stations for Structures
- Flow Direction Arrows
- Contour map of proposed development showing existing and proposed finished topography (maximum 2-foot contour interval) extending 50' beyond the proposed development boundary.
- All flood plains, wetlands, steep slopes and/or sensitive areas, buffers and their relation to proposed development.

## **PROFILE PORTION STANDARD ITEMS**

- Profile Grades (decimal FT./FT.)
- Existing Ground
- Scale (1"=50' Horizontal, 1"=5' Vertical)
- Stationing
- Vertical Elevation Increments
- Existing Utilities (if available)

### Miscellaneous:

- Detail Sheet
- General Notes

## **EROSION CONTROL GRADING**

Reference: 2012 Washington Department of Ecology, Stormwater Management Manual for Western Washington

- Plans shall show erosion control measures to be installed.
- The plans shall be annotated with Temporary Erosion and Soil Control (TESC) notes per WDOE Stormwater Manual. Notes shall address at a minimum maintenance procedures for TESC facilities, length of time of soil exposure and timing for installation and removal of TESC facilities.



## SANITARY SEWER

References: Washington State Department of Ecology Criteria for Sewage Works Design (2008)

- A plan and profile of the proposed improvements to a scale of 1"=40' horizontal and 1"=5' vertical.
- Property lines, sewer main, manholes, side sewer and paving locations are shown.
- Sewer mains are in proper location, 5 feet south and west of centerline, unless previously approved by Engineer.
- All pipelines shall have a minimum cover of 3 feet. (Side sewer laterals in public rights-of-way shall have a minimum 5 feet at right-of-way line).
- All pipe crossings and parallel pipes have 10-foot horizontal spacing and 18-inches vertical separation from the nearest water main.
- Pipes between manholes are straight in alignment.
- Pipes are design no less than the following minimum grade:

|                         |      |
|-------------------------|------|
| 8-inch gravity main     | 0.5% |
| 6-inch side sewer       | 2.0% |
| 8-inch gravity dead end | 1.0% |
- Steeper slopes may be required depending on topography and tributary flows (at the discretion of the City's Engineer).
- Sewers on 18 percent slope or greater shall be anchored securely with concrete anchors or equal.

|             |                          |
|-------------|--------------------------|
| 18 to 35%   | 36 feet center to center |
| 35 to 50%   | 24 feet center to center |
| 50 and over | 16 feet center to center |
- Manhole spacing has not exceeded 400 feet (unless approved by City Engineer).
- Manholes at all changes in grade, pipe alignment, pipe intersection and termination points. Clean-outs are not acceptable as a substitute.
- Manholes are not located in low points of vertical curves or curb flow lines (gutter sections).
- Drop connection, maximum depth 10 feet. Must be outside drop unless otherwise approved by City of Algona.
- Manholes and cleanouts in paved areas shall not have locking lids. Manhole rings in such areas shall not have bolt tabs.
- Manholes and cleanout located in easement areas and outside of paved areas shall have locking lids and concrete collars. Locking manhole lids shall be three hole countersunk hex bolt type.
- Manholes shall have a 0.10-foot drop across the channel.
- 0.8 depth rule where a smaller sewer joins a larger one. The invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient, or the crowns of the two lines are at matching elevation.
- Invert and rim elevation on plan and profile for all manholes.
- Correct invert elevation at point of connection (field verified).
- Manhole steps and ladders are polypropylene.
- Individual tee connections have been used for side sewer lines (or City approved alternative).
- An inspection tee, to be utilized as a cleanout, has been provided at the property line for all side sewers.
- All public rights-of-way and lot corners are clearly identified.
- Side sewer stubs have been provided for each lot that requires service (no double side sewer connections).
- Existing and finished roadway grades and elevations have been provided if new roadway sections need be constructed.
- Side sewer cleanouts have been placed at no more than 100-foot spacing.

- Commercial, Industrial, or School food establishment shall have grease interceptor(s) installed (Interceptor installed as close as possible to source of grease/fat).
- Road restoration has been designed per County, City and/or State Standards.
- Standard details have been referenced.
- Pipe material designated in each run.
- Pipe length indicated from MH centers. Pipe run length indicated on both plan & profile views.
- Side sewer stationing from nearest downstream MH.
- Pipe bedding/trench detail.

**ADDITIONAL CITY REQUIREMENTS MAY BE MANDATED, ON A CASE BY CASE BASIS DUE TO SITE SPECIFIC CONDITIONS:**

**WATER**

References: Algona Water Comprehensive Plan (available at City Hall).

Plan View:

- System Map Showing Existing and Proposed with line size, valves, and hydrants
- Existing Utility Conflicts
- Fixtures (need horizontal and vertical control):
  - Fire Hydrants (at all intersections)
  - Blow-Off (at end of line)
  - Vacuum and Air Release Valves When Required
- Tees, Crosses, Elbows, Adapters, and Valves Need Coupling Type, Meter Locations
- Valves (two each tee, three each cross)
- Thrust Blocking Required at all Fittings Including In-Line Valves
- Distance from Sewer
- Service to Each Lot (include open tracts)
- All valves 14 inches and larger are butterfly valves
- All valves 12 inches and smaller are resilient seated gate valves
- Water sample stations have been provided, as required
- Minimum service line size between water main and a single residential meter is 1 inch
- All dead end mains closed with MJ caps, plugs, thrust blocks, and/or blowoff assemblies
- Thrust blocks have been provided for all fittings and bends
- Pipes connecting hydrants to mains are at least 6 inches in diameter and not longer than 50 feet
- If the service line extends over 50 feet in length, the service line shall be 8 inches in diameter
- mains are located 5 feet northerly or easterly of street centerline (or City approved location)
- Irrigation system cross connection control

Profile View:

- Existing Utility Crossings
- Show Fixtures (tees, crosses, hydrants)
- Show Valves and Couplers
- Size of Water Main

- Length of Water Main in LF
- Cover Over Pipe (36 inch min. for distribution and 42-inch cover for transmission)
- Grades

#### Miscellaneous

- Detail Sheet
- Water General Notes

### **STORM SEWER**

References: 2012 DOE Stormwater Management Manual for Western Washington, Standard Specifications for Road, Bridge, and Road Construction (Current Version)

- Stormwater Site Plan (Report):
  - Cover Sheet
  - Table of Contents
  - Section 1 - Project Overview
  - Section 2 - Plot Plan including:
    - Location of structures, other impervious surfaces
    - Locations of stormwater runoff control facilities
    - Plot Layout
    - Setback Requirements
    - Existing Site Features
    - Water Quality Sensitive Areas
    - Road Rights-of-Way and Easements
    - Basins (including Off-Site Contributing Areas)
    - Average Slope
    - Overland Flow Paths and Distances
    - Soil Types
    - Spot Water Surface Elevations, Discharges and Velocities for the Design Event
  - Section 3 – Preliminary Conditions Summary
  - Section 4 – Off-Site Analysis
  - Section 5 – Analysis and design of proposed stormwater runoff control facilities, including treatment and source control BMP's and streambank erosion control requirements
  - Section 6 – Special Reports and Studies (if necessary)
  - Section 7 – Temporary Erosion and Sediment Control Plan
- Large Parcel Erosion and Sediment Control Plan:
  - Stabilization and Sediment Trapping
  - Delineate Clearing and Easement Limits
  - Protection of Adjacent Properties
  - Timing and Stabilization of Sediment Trapping Measures
  - Cut and Fill Slopes
  - Controlling Offsite Erosion
  - Stabilization of Temporary Conveyance Channels and Outlets
  - Storm Drain Inlet Protection
  - Underground Utility Construction
  - Construction Access Routes
  - Removal of Temporary BMPs

- Dewatering Construction Sites
- Control of Pollutants other than Sediment on Construction Sites
- Construction Entrance Detail
- Silt Fences and Traps
- Mulching and Vegetation Plan
- Location and Details of Temporary Sediment Ponds
  
- Drawings and Specifications:
  - Vicinity Map
  - Project Boundaries
  - Contours
  - Major Drainage Features
  - Flow Path
  
- Site Map:
  - Existing Topography at Least 50 feet Beyond Site Boundaries
  - Finished Grades
  - Existing Structures within 1,000 feet of Project Boundary
  - Utilities
  - Easements, Both Existing and Proposed
  - Environmentally Sensitive Areas
  - 100-Year Flood Plain Boundary
  - Existing and Proposed Wells within 1,200 feet of Proposed Retention Facility
  - Existing and Proposed Fuel Tanks
  - Existing and Proposed On-Site Sanitary Systems within 100 feet of Detention/Retention Facilities
  - Proposed Structures Including Roads and Parking Surfaces
  - Lot Dimensions and Areas
  - Proposed Drainage Facilities and Sufficient Cross-Sections and Details to Build
  - Fencing and Landscaping
  
- Plan View - Conveyance System:
  - Station and Number at each Manhole/Catch Basin
  - Manhole/Catch Basin Type and Size
  - Manhole/Catch Basin Rim Elevation
  - Flow Direction with Arrow on Pipe/Channel
  - Type and Size of Pipe
  - Length of Pipe in Lineal Feet
  - Scale 1"=50'
  
- Profile View - Conveyance System:
  - Station and Number at each Manhole/Catch Basin
  - Rim Elevation
  - Invert In and Out
  - Length of Pipe in Lineal Feet
  - Grades (FT/FT)
  - Scale 1"=5'

Miscellaneous

- Detail Sheet
- Storm General Notes

## **STREET**

### **Plan View:**

- Flow Direction Arrows at Curb Returns Showing Grade
- Spot Elevations on Curb Returns
- Station PC, PT, PI, and Intersections
- Curve Information Delta, Radius, Length, and Tangent
- BCR and ECR (Begin Curb Radius, End Curb Radius)
- Identify All Field Design Situations
- Typical Sections
- Pavement Marking Details with Station and Offset
- Sidewalks:
  - Driveway Entrances:
    - Station
    - Width, Material
    - Driveway Type
  - Handicap Ramps-Detail and Type
- Landscaping plan

### **Profile View:**

- Vertical Information VPI, BVC, EVC, Low Point, High Point
- Show Grades in Decimal Form with (+ Or -) Slope
- Super Elevated Roadways:
  - Detail-Show Transitions
  - Special Detail Showing Gutter Flowing Adequately

### **Miscellaneous:**

- Detail Sheet
- Street General Notes

## **ILLUMINATION (within ROW)**

- Lighting
  - Station and Offset to Fixtures
  - Pole Type, Including Manufacturer and Model Number
  - Mounting Height, Arm Length, Anchor Bolt Size, and Pattern
  - Power Source:
    - Wire Size, Type, Conduit
    - Line Loss Calculations
  - Luminaire Type, Lamp Wattage
  - Location of Service Disconnects
  - J-Box Location (include station and offset)

### **Miscellaneous:**

- Detail Sheet
- Lighting General Notes

**MISCELLANEOUS**

- Easements and/or Dedication Deeds

Sample







## LIST OF MISCELLANEOUS DETAILS

| TITLE OF DRAWING                               | (File Name)           |
|--|-----------------------|
| <b><u>Roadway Details</u></b>                  |                       |
| Minor Arterial Street Section                  | (ART-SECT)            |
| Collector Street Section                       | (COLLECTOR)           |
| Local Access Street Section                    | (LO-AC-ST)            |
| Alley Section                                  | (ST-4 ALLEY)          |
| Trench – Pavement Restoration                  | (ST5)                 |
| Turn Arrow                                     | (CHAN-1)              |
| Pavement Markings                              | (CHAN-2)              |
| Parking Space Markings                         | (CHAN-3)              |
| Concrete Curbs                                 | (CG-1)                |
| Mailbox  | (ML-1)                |
| Poured Monument in Place                       | (MON-1)               |
| Sidewalk without Planting Strip                | (SW-1)                |
| Cul-de-Sac                                     | (T-5 CULDESAC)        |
| Temporary Cul-de-Sac                           | (T-6 TEMP CULDESAC)   |
| Hammerhead Turnaround                          | (T-7 HAMMERHEAD)      |
| Cement Concrete Driveway without Planter Strip | (T-19B DWAY APPROACH) |
| Parallel Curb Ramp                             | (T-24A PARALLEL CURB) |
| Perpendicular Curb Ramp                        | (T-24B PERP CURB)     |
| Single Direction Curb Ramp                     | (T-24C SINGLE CURB)   |
| Sidewalk Ramp to Shoulder                      | (T-24D SWALK RAMP)    |
| Detectable Warning Surface                     | (T-24F DETECT2)       |
| Sight Distance                                 | (SIGHT-DI)            |
| Rock Wall                                      | (RKWL)                |
| Manhole or Catch Basin (Type 2) Grade Adj      | (MH ADJ)              |
| Valve Box Adjustment                           | (VALV-BOX)            |
| Speed Hump                                     | (SPD-HUMP)            |
| <b><u>Water System Details</u></b>             |                       |
| Water Main Depth Requirements                  | (WA-MAIN)             |
| Water Main Trench Section                      | (WA-MAIN2)            |
| Minimum Utility Spacing                        | (TYP-UTIL)            |
| Thrust Block Detail (1 of 2)                   | (THRU-BLO2)           |
| Thrust Block Detail (2 of 2)                   | (THRU-BLO2)           |
| Example Thrust Block Calculation               | (EXAMPLE CALCULATION) |
| Thrust Restraint for Ductile Iron Pipe         | (DUCT-PIP)            |
| Vertical Anchor Block                          | (ANCH-BLO)            |
| 1" and Smaller Water Service (1 of 2)          | (WAT-SERV)            |
| 1" and Smaller Water Service (2 of 2)          | (WAT-SERV)            |
| 1-1/2" and 2" Water Service (1 of 2)           | (2-WAT)               |
| 2" Blow Off Assembly                           | (BLOW-OFF)            |
| Water Valve Stem Extension                     | (WAT-VALV)            |

|  |              |
|--|--------------|
| Fire Hydrant Installation (Extruded Curb)          | (FIRE-HYD)   |
| Fire Hydrant in Planter Strip (Crb, Gutter Sidwlk) | (FIRE-HYD2)  |
| Fire Hydrant in Sidewalk                           | (FIRE-HYD2)  |
| Fire Hydrant Relocation                            | (FIRE-HYD 3) |
| Fire Hydrant in Cut or Fill                        | (FIRE-HYD4)  |
| Fire Hydrant Guard Post Installation               | (FIRE-HYD 5) |
| Cut-in Connection                                  | (CUT-CONN)   |
| Reduced Pressure Backflow Assembly 3/4" to 2"      | (RPBA)       |
| Reduced Pressure Backflow Assembly > 3"            | (RPBA-2)     |
| Reduced Pressure Backflow Detector Assembly >3"    | (RPBA-2)     |
| Fire Line Connection                               | (FIRELINE)   |
| Air & Vacuum Release Assembly                      | (AIR-RLS)    |
| Water Sampling Station                             | (WAT SAMP)   |
| Individual Double Check Detector Assembly          | (DBL-CHCK)   |
| Meter and Meter Vault Assembly 3" - 10" (1 of 2)   | (3MM)        |
| Meter and Meter Vault Assembly 3" - 10" (2 of 2)   | (3MM)        |
| Double-Check Detector Backflow Prev. Assem.        | (DCD-BPA)    |

### **Sanitary Sewer Details**

|   |                   |
|---|-------------------|
| Flexible Pipe Trench Section                  | (SSTS FLEX)       |
| Typical Precast Manhole                       | (TPMH)            |
| Typical Manhole Plan View                     | (TMHP)            |
| Shallow Precast Manhole                       | (TS-PMH)          |
| Typical Saddle Manhole                        | (TSMH)            |
| Inside Drop Manhole                           | (IDMH)            |
| Force Main Discharge Manhole                  | (FMDMH)           |
| Pressure Line and Force Main Typ. Trench Sect | (PLFM TTS)        |
| New Side Sewer Service                        | (SSD)             |
| Standing Side Sewer                           | (SSS)             |
| Vacuum Relief Assembly                        | (AVRA)            |
| Manhole Frame and Cover                       | (SSMH COVER-ERGO) |
| Manhole Frame and Collar                      | (MHCLAR)          |
| Polypropylene Ladder and Manhole Steps        | (PLMHS)           |

### **Storm Sewer & Miscellaneous Details:**

|   |                 |
|---|-----------------|
| Gravity Sewer Trench Section              |                 |
| Catch Basin, Type I                       | (SW-4)          |
| Catch Basin Type 1L                       | (SW-5)          |
| Catch Basin, Type II                      | (SW-6)          |
| Solid Storm Drain Cover                   | (SW-7)          |
| Vaned Grate                               | (SW-9)          |
| Standard Frame Installation               | (SW-10)         |
| Through Curb Inlet Frame                  | (SW-11)         |
| Through Vertical Curb Inlet Frame & Grate | (SW-12)         |
| Manhole Frame and Cover                   | (STMH CVR ERGO) |
| Trash Rack Debris Barrier                 | (SW-17)         |

|   |             |
|---|-------------|
| Flow Restrictor Tee Type                | (SW-20)     |
| Restrictor Riser                        | (SW-21)     |
| Riprap and Energy Dissipation for Ditch | (DTCH-2)    |
| Pipe Cover – Typical Yard Drain         | (PIPECOVER) |
| Wetland Sign Installation               | (SW-28)     |



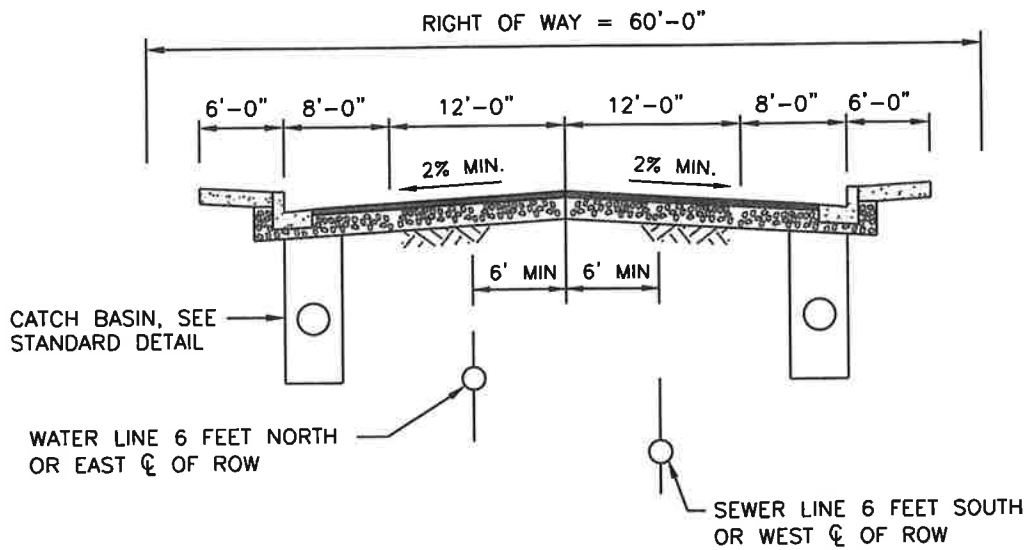
## **MISCELLANEOUS DETAILS**



## **ROADWAY DETAILS**







**NOTES:**

1. TURN LANE CONSTRUCTION AS NEEDED BASED UPON TRAFFIC CAPACITY AND SAFETY NEEDS. CITY MAY REQUIRE CENTER VEGETATION STRIP IN SPECIAL CIRCUMSTANCES.
2. SEE SECTION 5.3 OF PUBLIC WORKS STANDARDS FOR ADDITIONAL REQUIREMENTS.
3. PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED ENGINEER AND AS APPROVED BY THE CITY.



**CITY OF ALGONA**

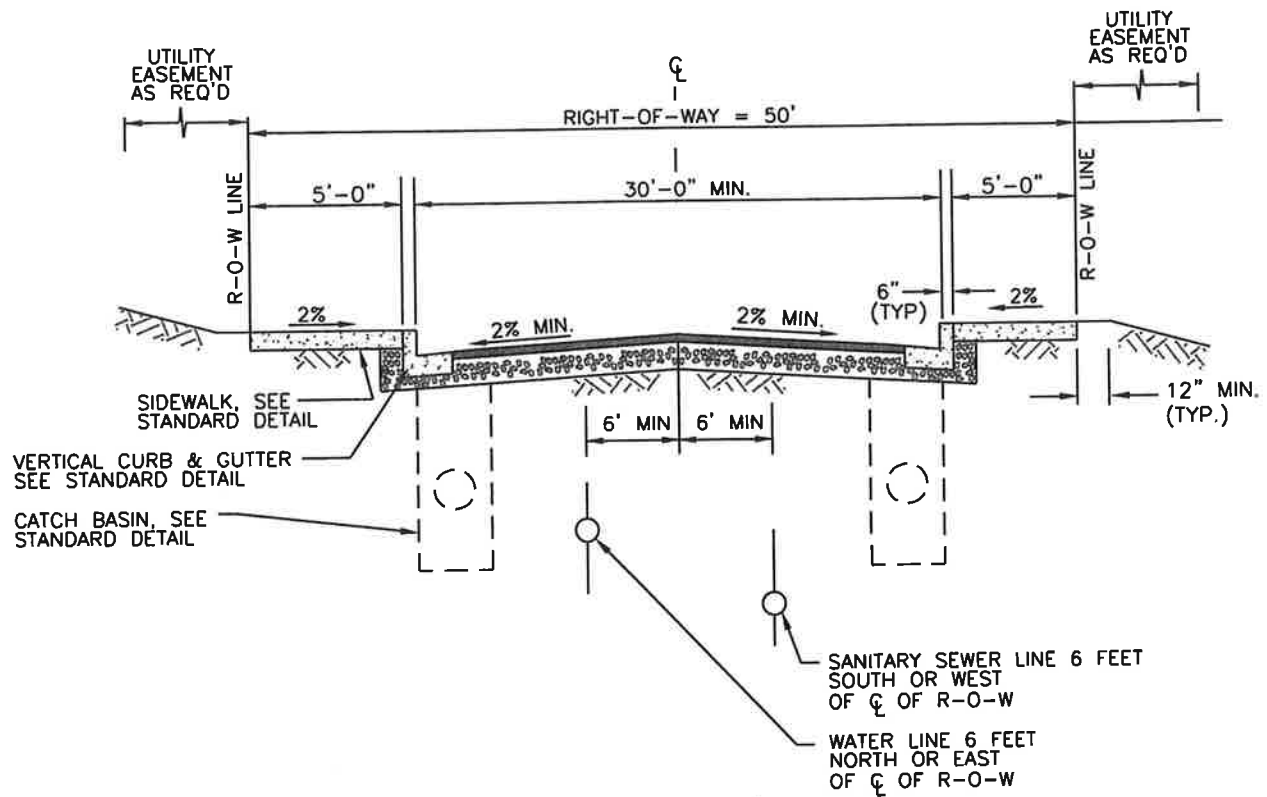
MINOR ARTERIAL  
STREET SECTION

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.

ART-SECT



**NOTES:**

1. FOR ADDITIONAL REQUIREMENTS SEE SECTION 5.3 OF THE PUBLIC WORKS STANDARDS.
2. 10-FOOT UTILITY EASEMENT - TOTAL BOTH SIDES.
3. PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED ENGINEER AND AS APPROVED BY THE CITY.
4. PARKING ONE SIDE ONLY.



**CITY OF ALGONA**

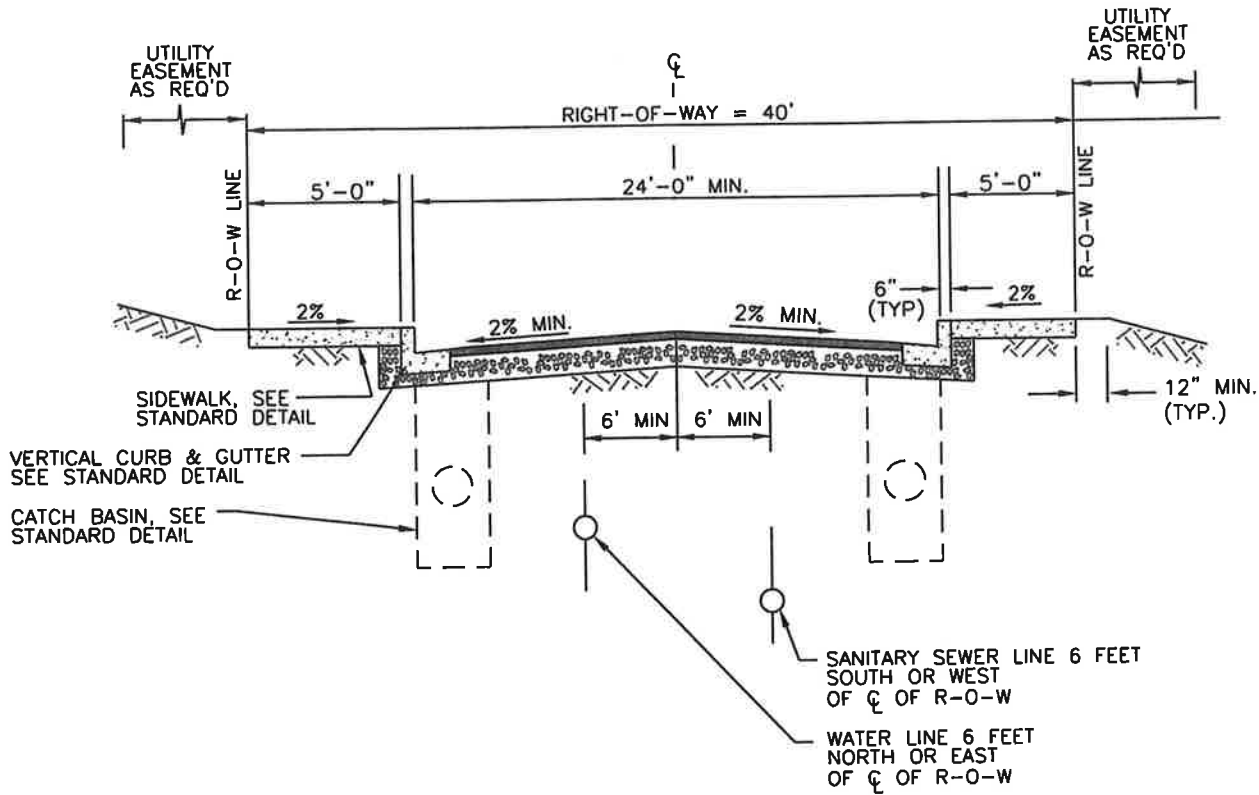
**COLLECTOR STREET SECTION**

APPROVED: \_\_\_\_\_


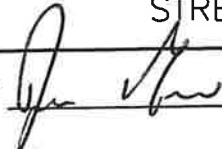
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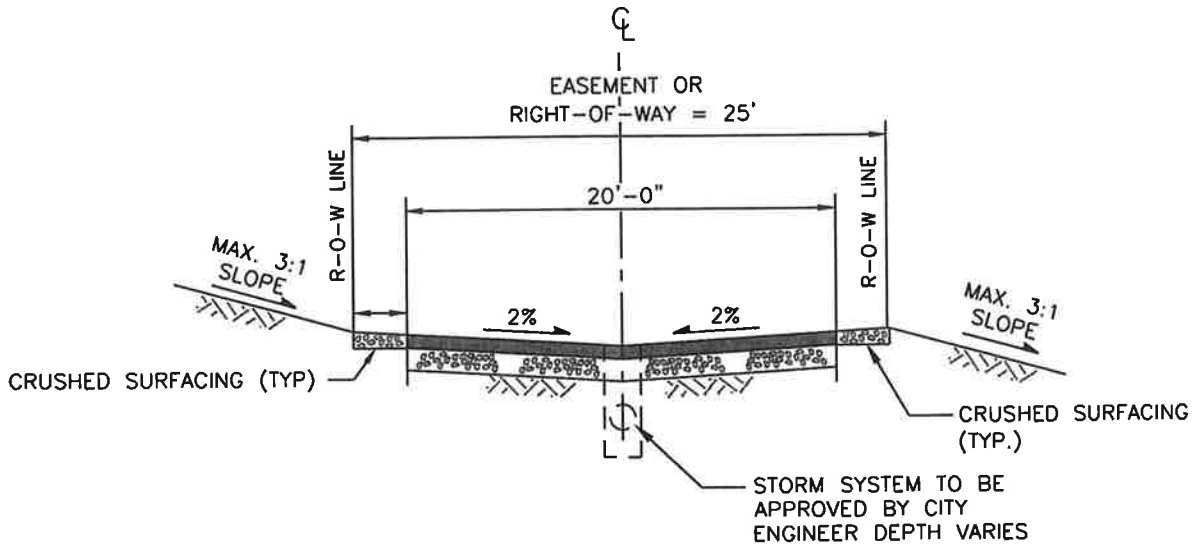
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DWG. NO.  
COLLECTOR




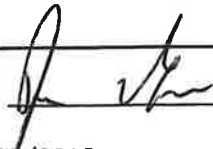
- NOTES:**
1. FOR ADDITIONAL REQUIREMENTS SEE SECTION 5.3 OF THE PUBLIC WORKS STANDARDS.
  2. 10-FOOT UTILITY EASEMENT - TOTAL BOTH SIDES.
  3. PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED ENGINEER AND AS APPROVED BY THE CITY.
  4. NO ON-STREET PARKING.

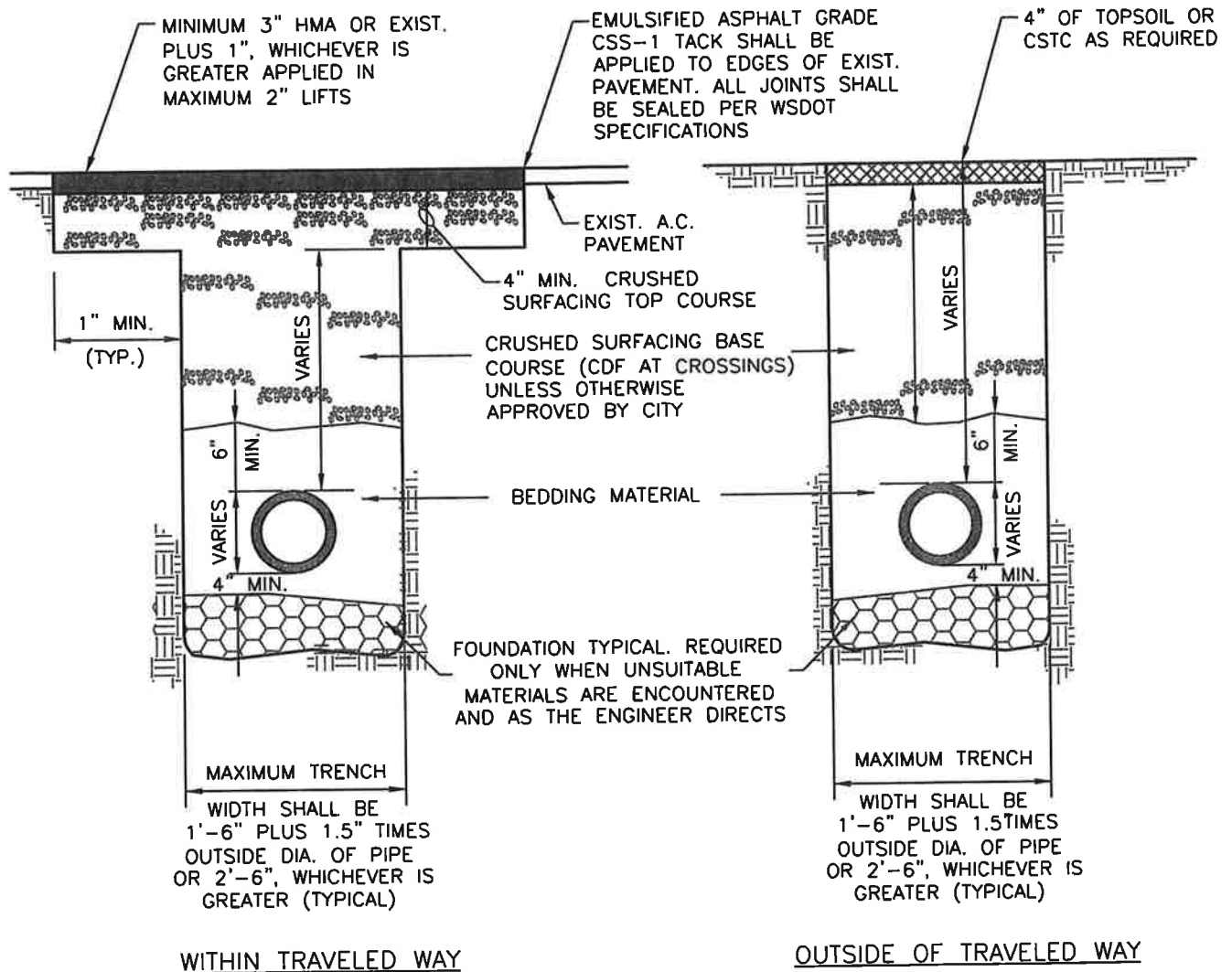
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|---|---|----------------------|
|  | <b>CITY OF ALGONA</b><br>LOCAL ACCESS<br>STREET SECTION   |                      |
|   | APPROVED:  | DWG. NO.<br>LO-AC-ST |
| DATE: 04/06/2015  |   |                      |



**NOTES:**

1. ALLEYS MAY BE ALLOWED ONLY IF APPROVED BY CITY ENGINEER.
2. THE MINIMUM PAVED WIDTH FOR NEW ALLEYS SHALL BE 20 FEET IF GREATER THAN 150 FEET IN LENGTH, AND 15 FEET IF LESS THAN 150 FEET.
3. SEE SECTION 5.3 OF PUBLIC WORKS STANDARDS FOR ADDITIONAL REQUIREMENTS.
4. IF ROAD PROFILE GRADE IS LESS THEN 0.7%, THAN CROSS SLOPE SHALL BE 3%.
5. PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED ENGINEER AND AS APPROVED BY THE CITY.

|   |  |                   |
|---|--|-------------------|
|  | <b>CITY OF ALGONA</b><br>ALLEY SECTION   |                   |
|   | APPROVED:  | DWG. NO.<br>ALLEY |
| DATE: 04/06/2015  |  |                   |



**NOTES:**

1. ALL MATERIALS EXCEPT HMA, CDF AND BEDDING MATERIAL SHALL BE COMPACTED IN 6-INCH MAXIMUM LIFTS TO 95% DENSITY.
2. BEDDING SHALL CONFORM TO THE CITY STANDARDS.
3. COMPACTION: BEDDING SHALL BE COMPACTED TO 95% MAX. AS DETERMINED BY ASTM D1557. BACKFILL SHALL BE COMPACTED TO 90% IN UNPAVED AREA, AND 95% IN PAVED OR SHOULDER AREAS AS DETERMINED BY ASTM D1557. CONTROLLED DENSITY FILL REQUIRED FOR ROAD CROSSINGS.
4. ALL MATERIALS, WORKMANSHIP, AND INSTALLATION SHALL BE IN CONFORMANCE WITH THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION AS AMENDED BY CITY STANDARDS.
5. ALL EDGES SHALL BE NEAT-LINE SAWCUT.
6. HOT MIX ASPHALT SHALL BE HMA CLASS 1/2" PG 64-22.
7. FULL ROAD OVERLAY REQUIRED FOR LONGITUDINAL TRENCHES.



**CITY OF ALGONA**

**TRENCH - PAVEMENT RESTORATION**

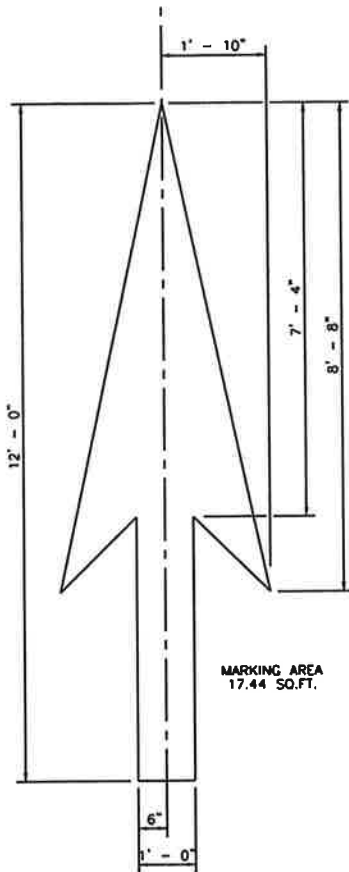
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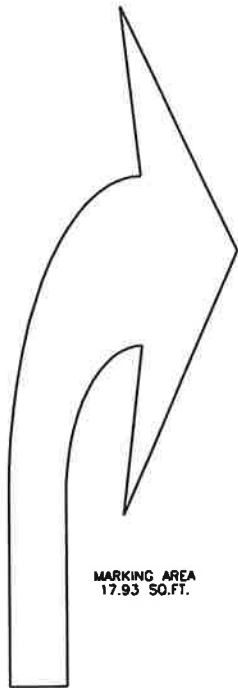
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ST-5

SYMBOL  
& LANE

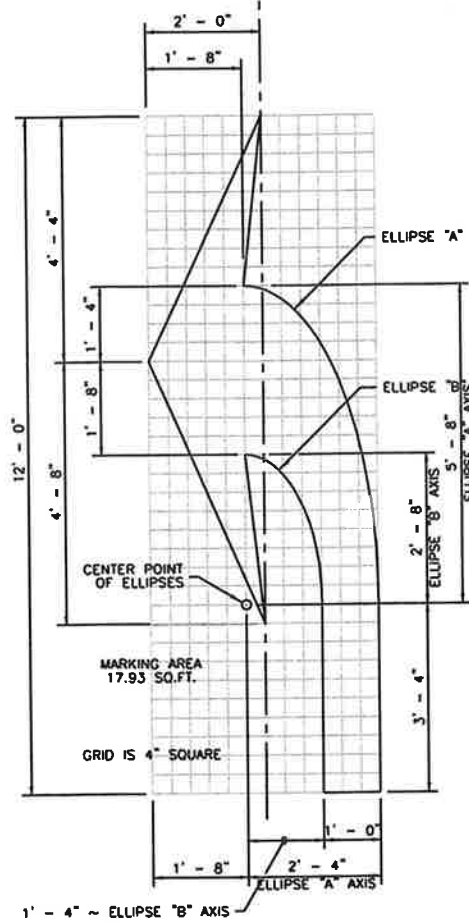


MARKING AREA  
17.44 SQ.FT.



MARKING AREA  
17.93 SQ.FT.

SYMBOL  
& LANE



MARKING AREA  
17.93 SQ.FT.

GRID IS 4" SQUARE

1' - 4" ~ ELLIPSE "B" AXIS



# CITY OF ALGONA

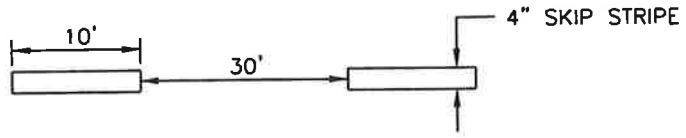
## TURN ARROW DETAILS

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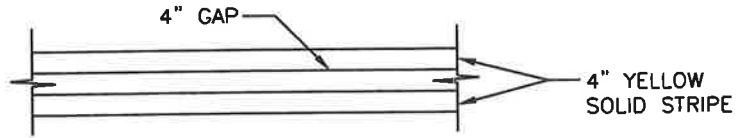
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DWG. NO.  
CHAN-1

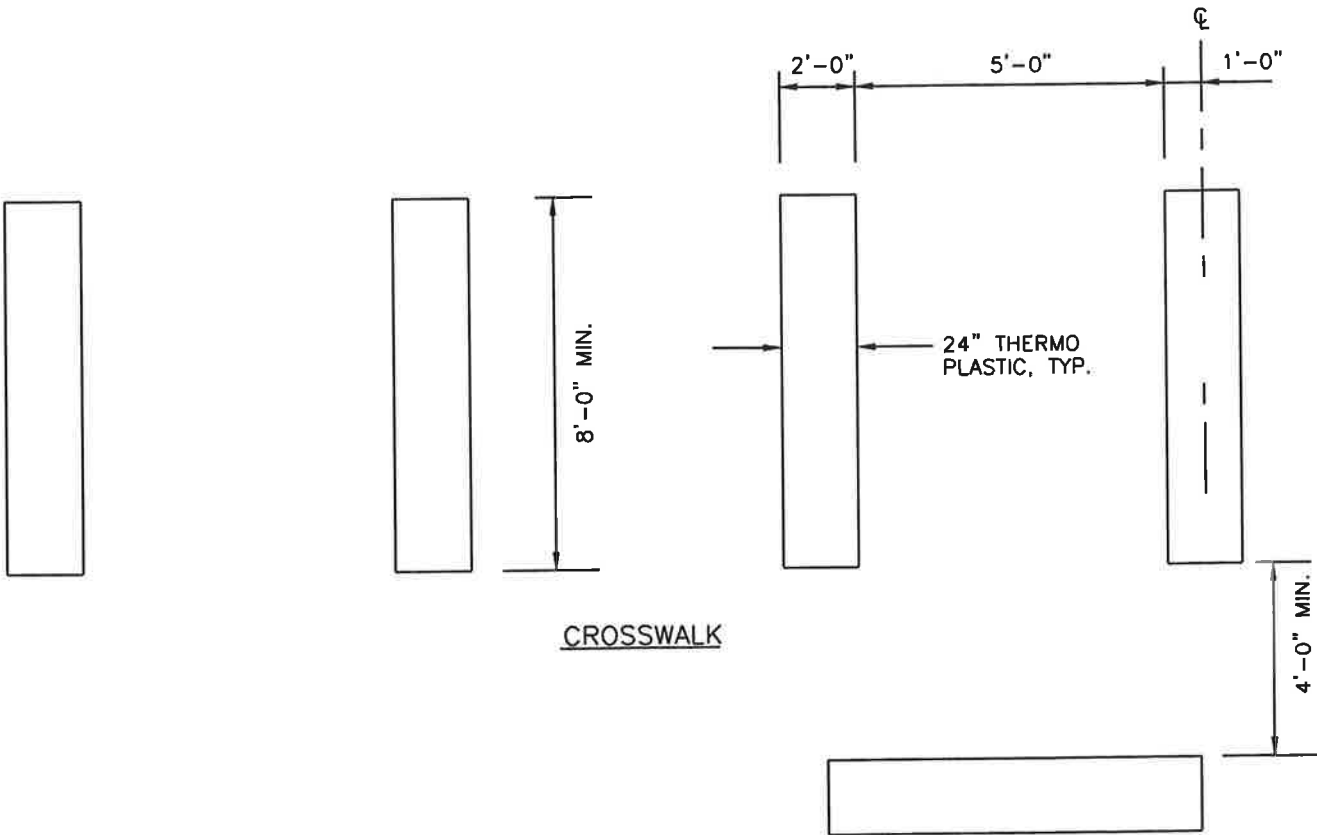
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SKIP CENTERLINE STRIPE



DOUBLE YELLOW CENTERLINE STRIPE



CROSSWALK

STOP BAR



**CITY OF ALGONA**

PAVEMENT MARKINGS

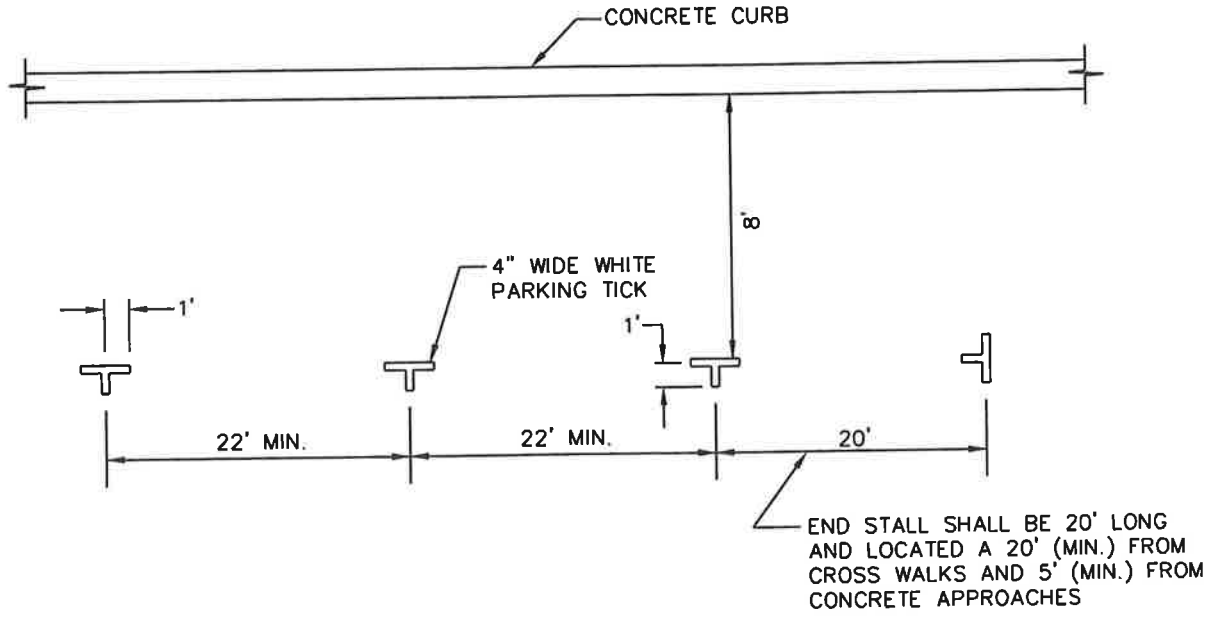
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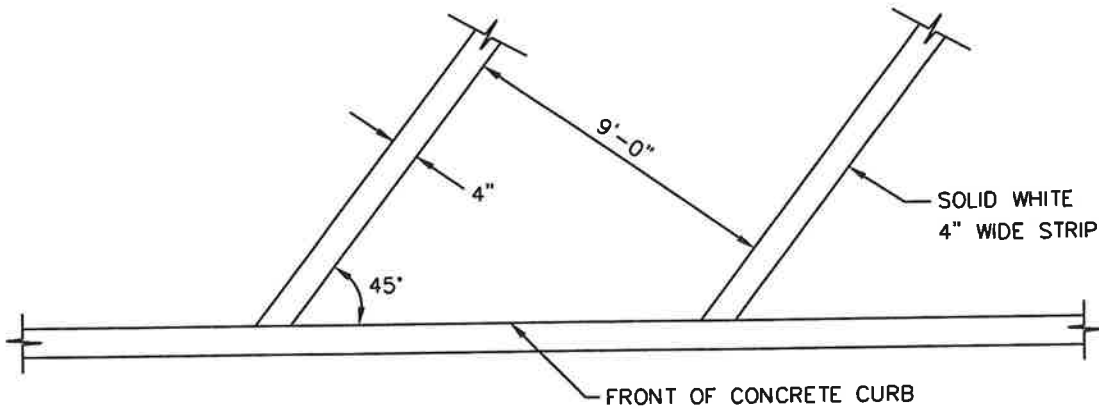
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CHAN-2

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PARALLEL PARKING SPACE MARKING



ANGLE PARKING SPACE MARKING



CITY OF ALGONA

PARKING SPACE MARKINGS

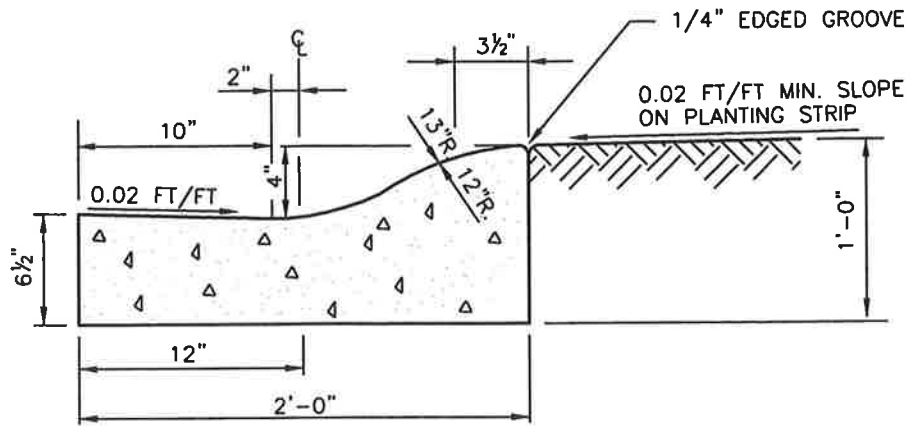
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CHAN-3



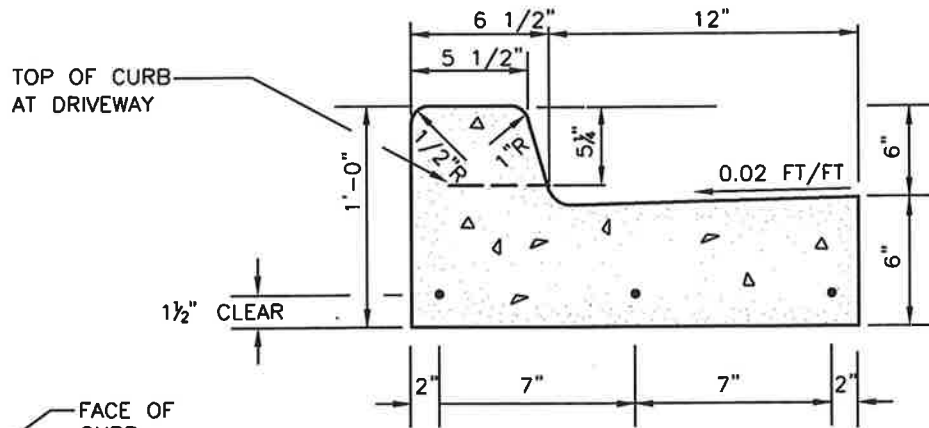
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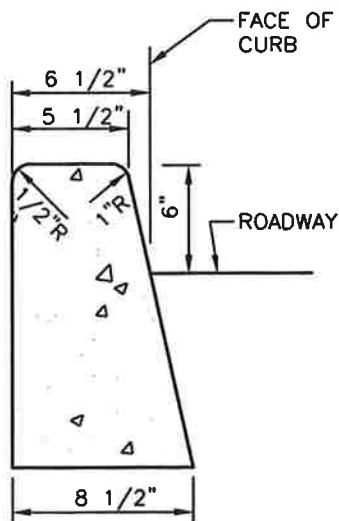
ROLLED CONCRETE CURB AND GUTTER

NOTES:


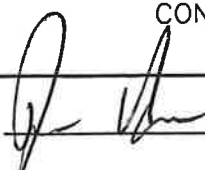
1. THE CURBS, GUTTERS AND SIDEWALKS SHALL HAVE CONTRACTION JOINTS (3/8" x 1 1/2" AT INTERVALS OF NOT GREATER THAN 15'-0".
2. CEMENT CONCRETE SHALL BE 3000 PSI.
3. ROLLED CONCRETE CURBS AND GUTTERS ARE ALLOWED ONLY IF SPECIFICALLY APPROVED BY THE CITY.
4. 3 - #4 BARS REQUIRED AT DRIVEWAYS, 7-INCHES O.C.

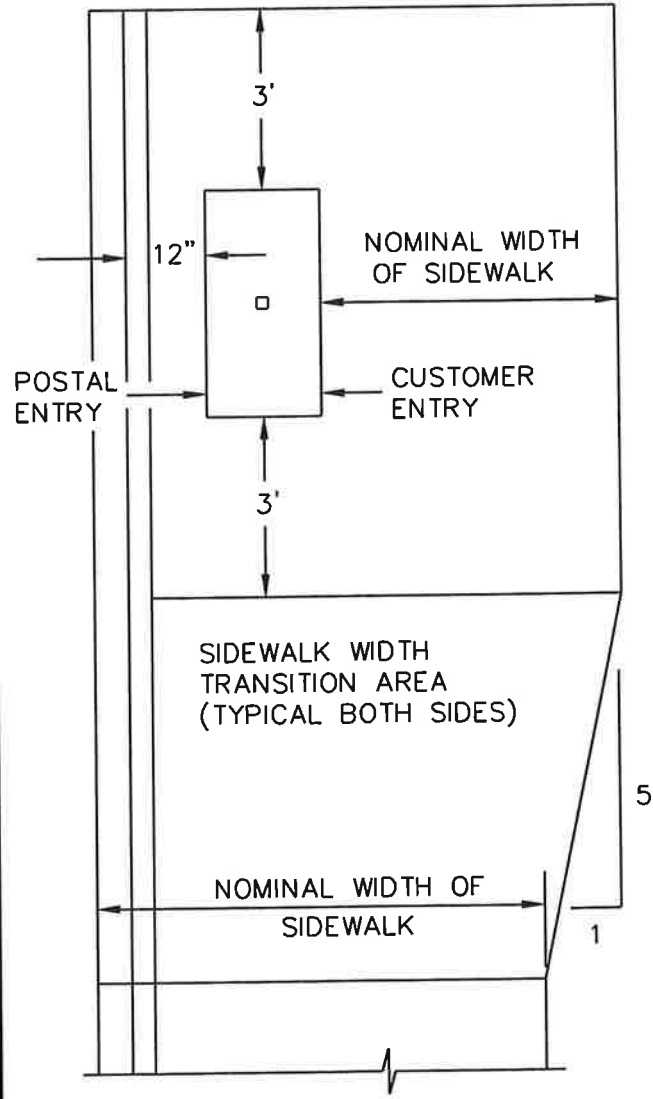
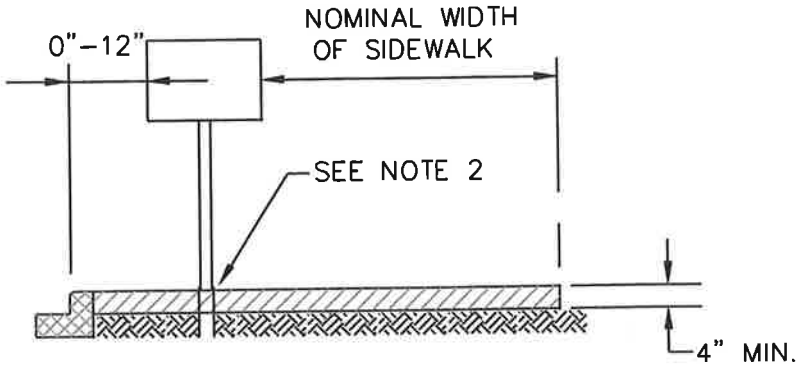


VERTICAL CONCRETE CURB AND GUTTER



CEMENT CONCRETE TRAFFIC CURB


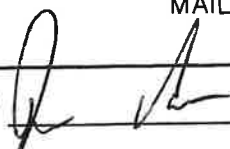
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|--|-----------------|
|  <p><b>CITY OF ALGONA</b></p> <p>CONCRETE CURBS</p> |                 |
| <p>APPROVED: </p>                                  | <p>DWG. NO.</p> |
| <p>DATE: 04/06/2015</p>  | <p>CG-1</p>     |

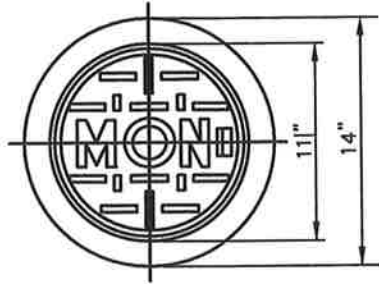


GENERAL NOTES:

1. SEE SECTION 5.25 OF PUBLIC WORKS STANDARDS FOR ADDITIONAL REQUIREMENTS.
2. PROVIDE REINFORCED GALVANIZED SLEEVE PLANTED FIRMLY IN GROUND AND THROUGH SIDEWALL (USE JOINT FILLER AROUND SLEEVE).

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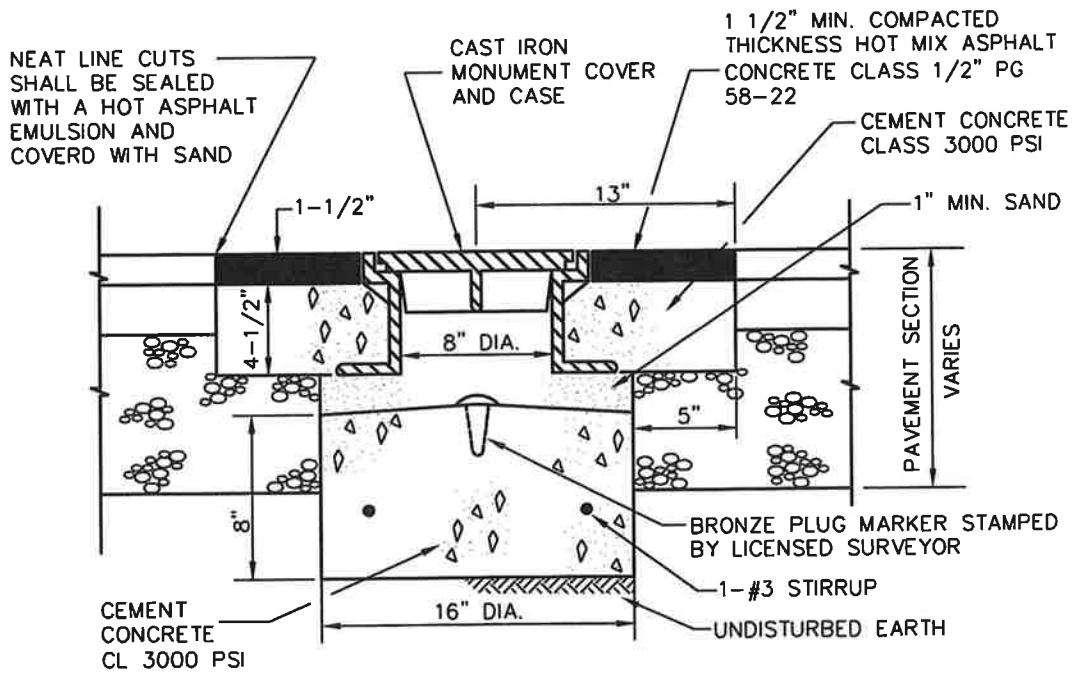
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|  <h2 style="margin: 0;">CITY OF ALGONA</h2> |                 |
| <p>MAILBOX DETAIL</p>  |                 |
| <p>APPROVED: </p>                         | <p>DWG. NO.</p> |
| <p>DATE: 04/06/2015</p>  | <p>ML-1</p>     |



MONUMENT COVER

NOTES:

1. MACHINE BEARING FACES OF COVER AND CASE TO INSURE POSITIVE FIT.
2. MATERIAL SHALL CONFORM TO THE CURRENT VERSION OF THE "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION" PREPARED BY THE WASHINGTON STATE DEPT. OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER.
3. SEE SECTION 5.23 OF THE PUBLIC WORKS STANDARDS.
4. MONUMENT BASE SHALL BE SQUARE 4"x4" TOP; 6"x6" BOTTOM; 24" LENTH.



POURED MONUMENT IN PLACE



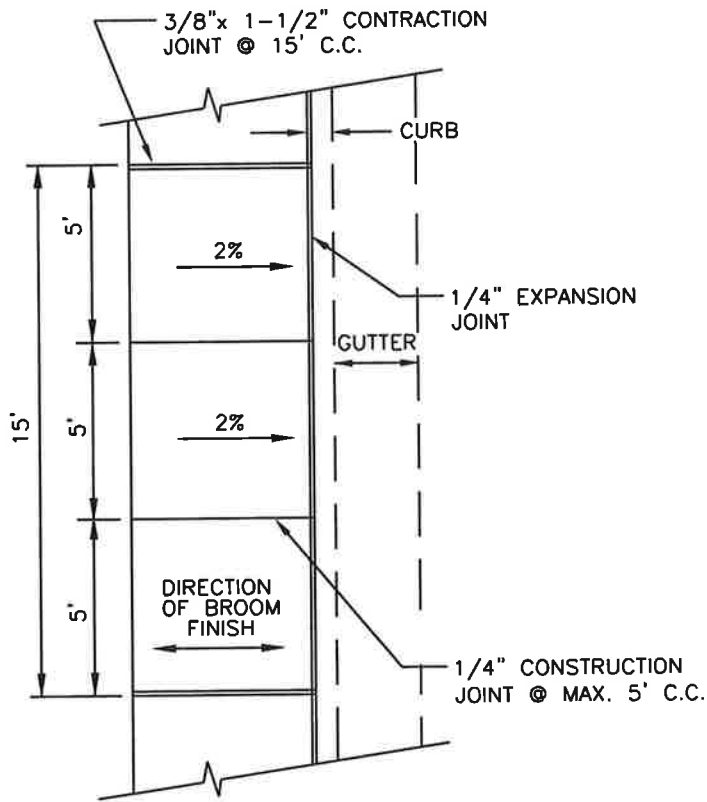
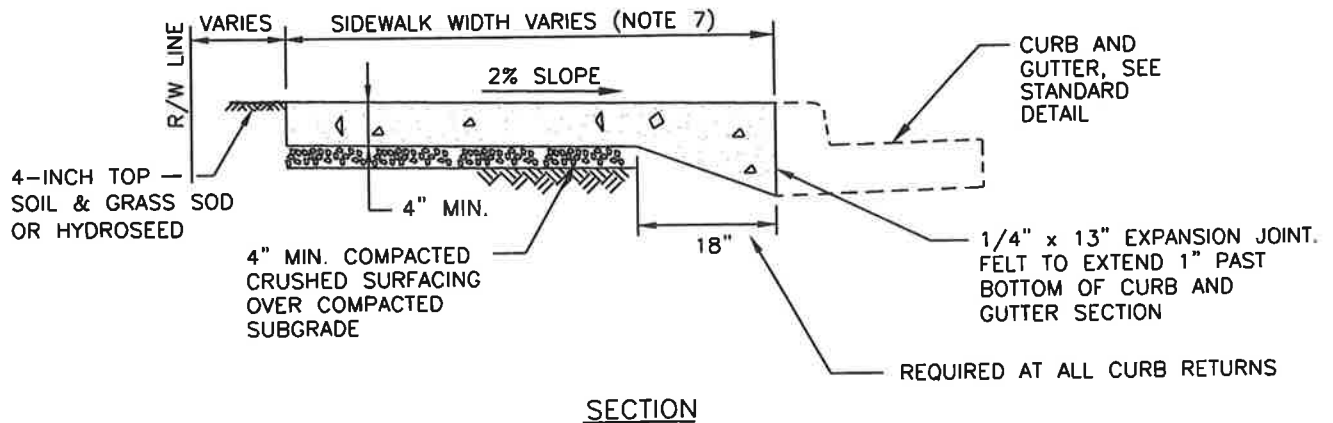
**CITY OF ALGONA**  
POURED MONUMENT IN PLACE

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.  
MON-1

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**NOTES:**

1. THRU JOINTS AND CONTRACTION JOINTS SHALL BE AS SHOWN ABOVE. THRU JOINTS SHALL ALSO BE PLACED IN THE SIDEWALK SECTION AT DRIVE- WAY AND ALLEY RETURNS. ALL JOINTS SHALL BE CLEAN AND EDGED WITH AN EDGE HAVING 1/4" RADIUS. JOINTS SHALL BE FLUSH WITH THE FINISHED SURFACE.
2. ALL UTILITY POLES, METER BOXES, ETC. IN IN SIDEWALK AREAS SHALL HAVE 3/8" JOINT MATERIAL (FULL DEPTH) PLACED AROUND THEM BEFORE PLACING CONCRETE.
3. PREMOLDED JOINT FILLER SHALL BE ASPHALT SATURATED FELT OR PAPER, FULL DEPTH OF SIDEWALK.
4. FORMS SHALL BE EITHER WOOD OR STEEL AND SHALL MEET ALL REQUIREMENTS OF THESE SPECIFICATIONS.
5. CONCRETE SHALL BE CLASS 3000 PSI.
6. FOR SIDEWALKS GREATER THAN 8' IN WIDTH, ADDITIONAL EXPANSION AND CONSTRUCTION JOINTS WILL BE REQUIRED.
7. MIN. WIDTH OF 6' FOR ARTERIALS AND 5' FOR ALL OTHER APPLICATIONS.



**CITY OF ALGONA**

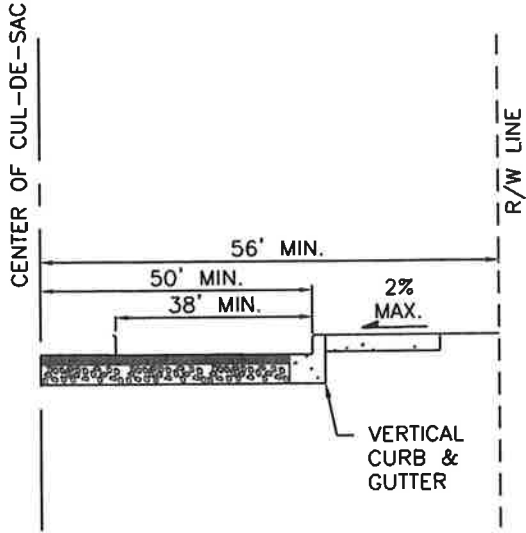
**SIDEWALK WITHOUT PLANTING STRIP**

APPROVED: 

DATE: 04/06/2015

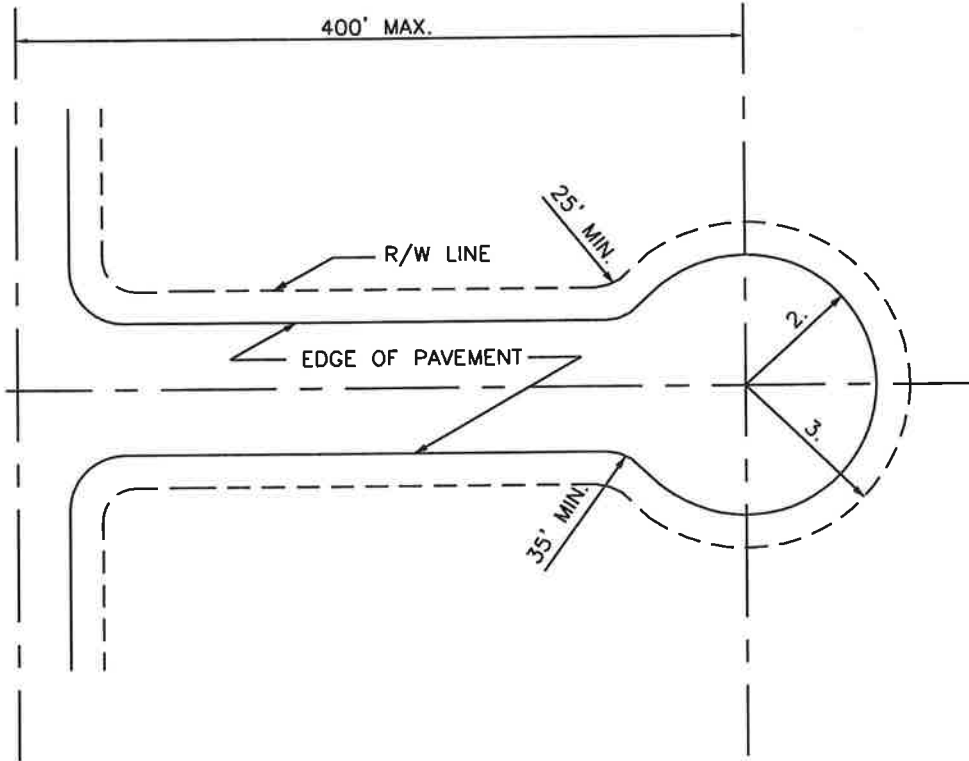
DWG. NO.

SW-1



**NOTES:**

1. SEE SEC. 5.10 OF THE PUBLIC WORKS STANDARDS.
2. R=50'
3. R=56'



**CITY OF ALGONA**

CUL-DE-SAC

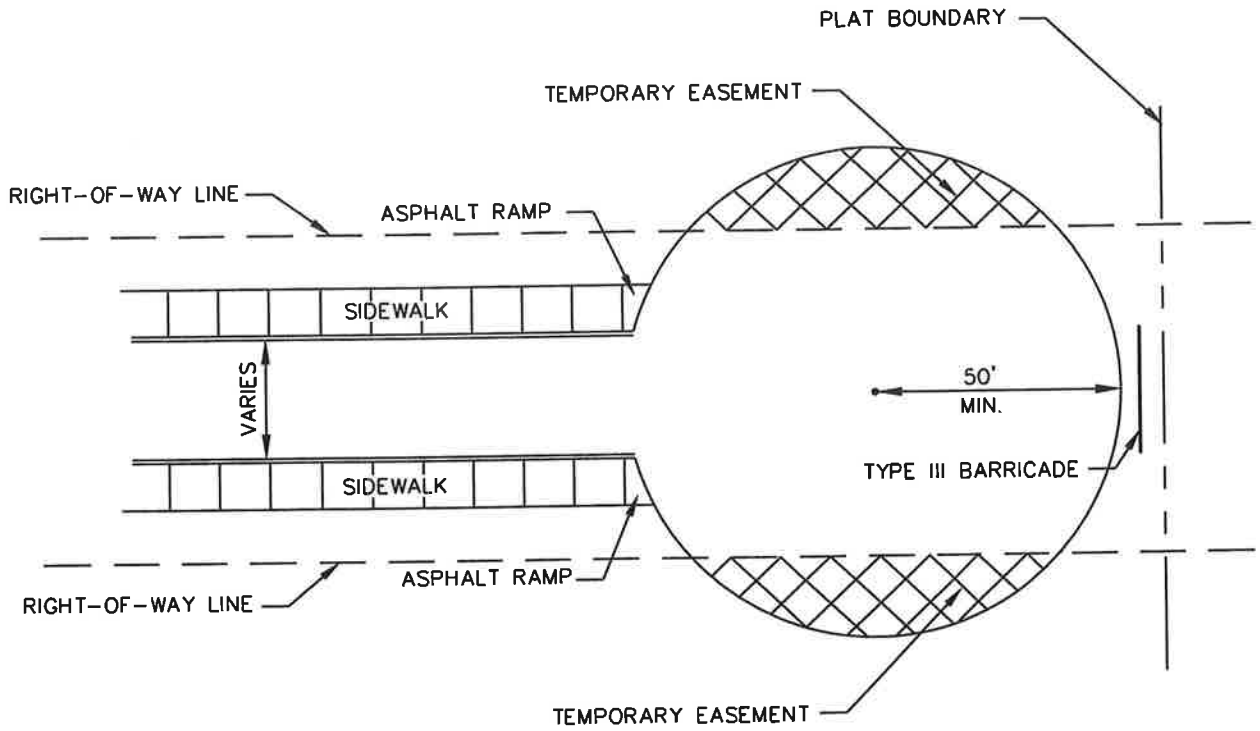
APPROVED:

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DATE: 04/06/2015

DWG. NO.  
T-5  
CULDESAC

L:\ALGONA\15432 PW Standards\Roads\T-6 temp culdesac.dwg, 4/14/2015 5:50:36 PM, mnage!



**NOTES:**

1. SEE SEC. 5.3 OF THE PUBLIC WORKS STANDARDS.
2. BARRICADE REQUIRED AT END OF BULB.



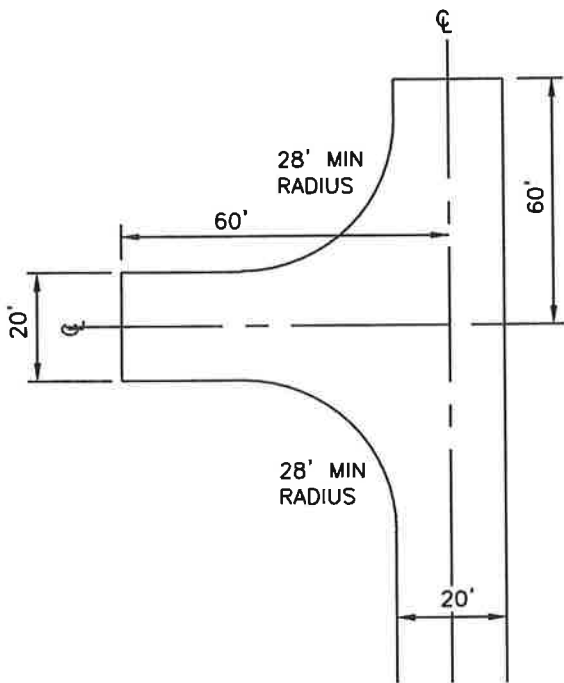
# CITY OF ALGONA

## TEMPORARY CUL-DE-SAC

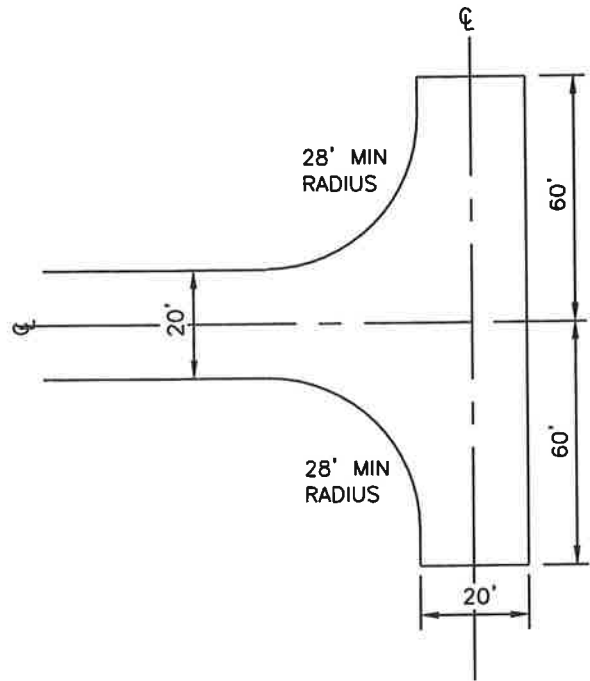
APPROVED:

DATE: 04/06/2015

DWG. NO.  
T-6 TEMP  
CULDESAC



**OFFSET HAMMERHEAD**



**HAMMERHEAD**

**NOTES:**

1. THIS TURNAROUND SHALL ONLY BE UTILIZED IF SPECIFICALLY APPROVED IN WRITING BY THE CITY.
2. ALL DIMENSIONS ARE MINIMUM REQUIREMENTS.
3. OTHER SHAPED TURNAROUNDS ARE AN ACCEPTABLE ALTERNATIVE TO THOSE SHOWN, PROVIDED THE DESIGN MEETS THE MINIMUM DIMENSION REQUIREMENTS SHOWN ABOVE.
4. THE TURNAROUND SHALL BE MARKED AS A FIRE LANE.
5. MINIMUM ROAD WIDTH SHOWN DOES NOT INCLUDE ANY SHOULDER DIMENSIONS OR CURB DIMENSIONS IF REQUIRED.

**FIRE ACCESS CRITERIA:**

- A. ALL LEGS OF THE TURNAROUND SHALL BE A MINIMUM OF 20 FEET OF UNOBSTRUCTED WIDTH.
- B. THE TURNAROUND SHALL BE MARKED AS A FIRE LANE.
- C. THE TURNAROUND SHALL MEET THE SAME GRADE AND SURFACING STANDARDS APPLIED TO FIRE ACCESS ROADS.
- D. THE MAXIMUM CROSS SLOPE ON TURNAROUND SHALL NOT EXCEED SIX PERCENT.
- E. ALTERNATIVE DESIGNS THAT DO NOT MEET THE CRITERIA ESTABLISHED IN THIS SECTION MAY BE APPROVED BY THE CITY.



**CITY OF ALGONA**

**HAMMERHEAD TURNAROUND**

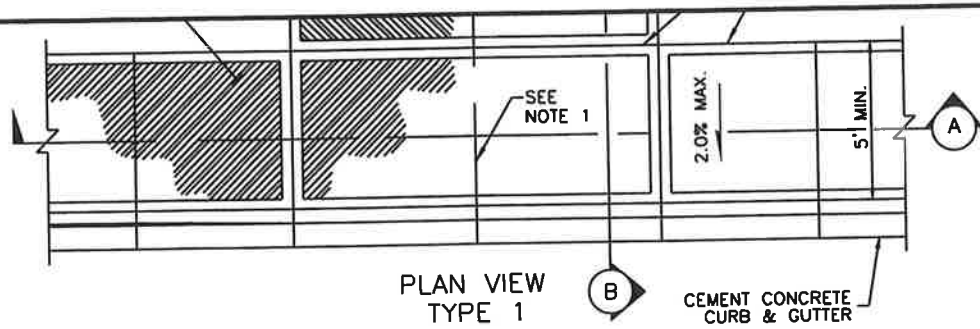
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DATE: 04/06/2015

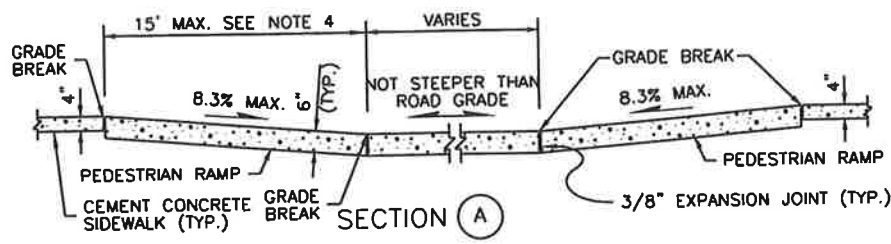
DWG. NO.

**T-7  
HAMMERHEAD**

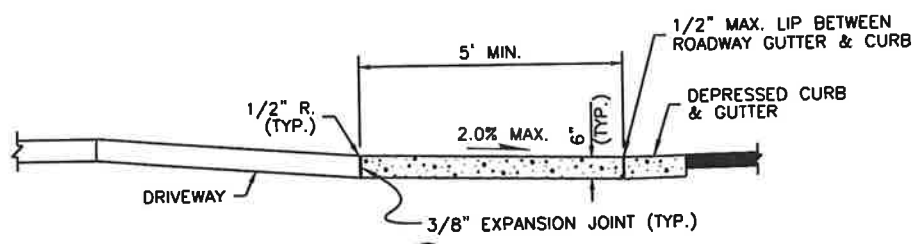
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PLAN VIEW  
TYPE 1



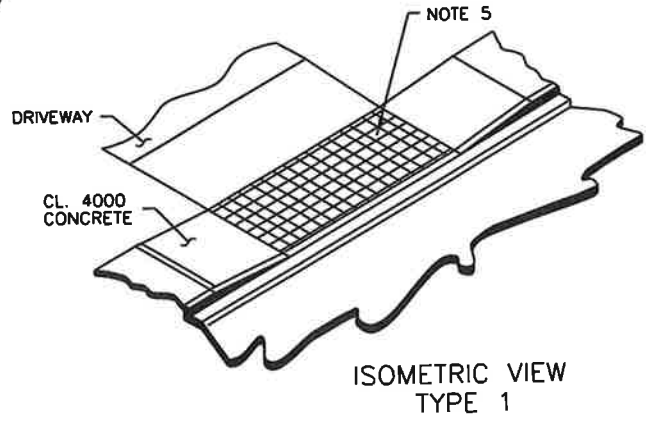
SECTION A



SECTION B

**NOTES:**

1. WHEN THE DRIVEWAY WIDTH EXCEEDS 15 FEET, CONSTRUCT A FULL DEPTH EXPANSION JOINT WITH 3/8" JOINT FILLER ALONG THE DRIVEWAY CENTERLINE. CONSTRUCT EXPANSION JOINTS PARALLEL WITH THE CENTERLINE AS REQUIRED AT 15 FEET MAXIMUM SPACING WHEN DRIVEWAY WIDTHS EXCEED 30 FEET.
2. AVOID PLACING DRAINAGE STRUCTURES, JUNCTION BOXES OR OTHER OBSTRUCTIONS IN FRONT OF DRIVEWAY ENTRANCES.
3. WHERE "GRADE BREAK" IS CALLED OUT, THE ENTIRE LENGTH OF THE LINE BETWEEN THE TWO ADJACENT SURFACE PLANES SHALL BE FLUSH.
4. THE CURB RAMP MAXIMUM RUNNING SLOPE SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15 FEET TO AVOID CHASING THE SLOPE INDEFINITELY WHEN CONNECTING TO STEEP GRADES. WHEN APPLYING THE 15 FOOT MAX. LENGTH, THE RUNNING SLOPE OF THE CURB RAMP SHALL BE AS FLAT AS FEASIBLE.
5. WELDED WIRE FABRIC (6"x6" WIDxWID WWF) REQUIRED FOR ALL DRIVEWAY APPROACHES, FABRIC PLACED AT MID-DEPTH IN CONCRETE.
6. CONCRETE DRIVEWAY SHALL BE CLASS 4000 PSI.



ISOMETRIC VIEW  
TYPE 1

**LEGEND**



**CITY OF ALGONA**

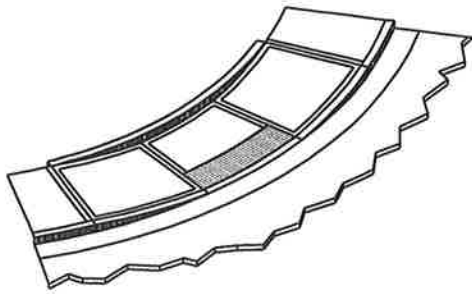
CEMENT CONCRETE DRIVEWAY  
WITHOUT PLANTER STRIP

APPROVED: *[Signature]*

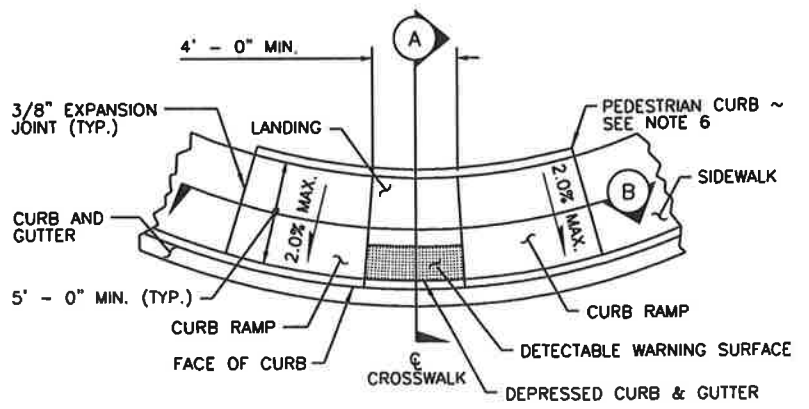
DATE: 04/06/2015

DWG. NO.  
T-19B DWAY  
APPROACH

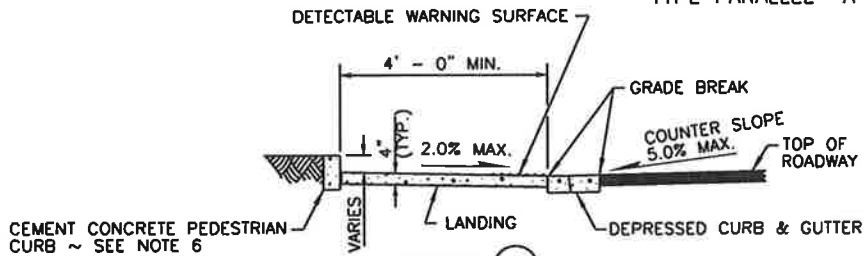




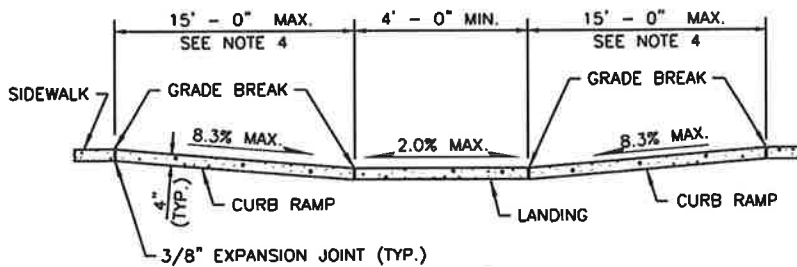
ISOMETRIC VIEW  
TYPE PARALLEL A



PLAN VIEW  
TYPE PARALLEL A



SECTION (A)



SECTION (B)

**NOTES**

1. CURB RAMP LOCATION SHALL BE PLACED WITHIN THE WIDTH OF THE ASSOCIATED CROSSWALK.
2. WHERE "GRADE BREAK" IS CALLED OUT, THE ENTIRE LENGTH OF THE GRADE BREAK BETWEEN THE TWO ADJACENT SURFACE PLANES SHALL BE FLUSH.
3. DO NOT PLACE GRATINGS, JUNCTION BOXES, ACCESS COVERS, OR OTHER APPURTENANCES IN FRONT OF THE CURB RAMP OR ON ANY PART OF THE CURB RAMP OR LANDING.
4. THE CURB RAMP MAXIMUM RUNNING SLOPE SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15 FEET TO AVOID CHASING THE SLOPE INDEFINITELY WHEN CONNECTING TO STEEP GRADES. WHEN APPLYING THE 15-FOOT MAX. LENGTH, THE RUNNING SLOPE OF THE CURB RAMP SHALL BE AS FLAT AS FEASIBLE.
5. CURB RAMP, LANDING, AND FLARES SHALL RECEIVE BROOM FINISH.
6. PEDESTRIAN CURB MAY BE OMITTED IF THE GROUND SURFACE AT THE BACK OF THE CURB RAMP AND/OR LANDING WILL BE AT THE SAME ELEVATION AS THE CURB RAMP OR LANDING AND THERE WILL BE NO MATERIAL TO RETAIN.
7. SUBGRADE AND FORM INSPECTION BY THE CITY SHALL BE REQUIRED PRIOR TO POURING CONCRETE.

**LEGEND**

↔ SLOPE IN EITHER DIRECTION



**CITY OF ALGONA**

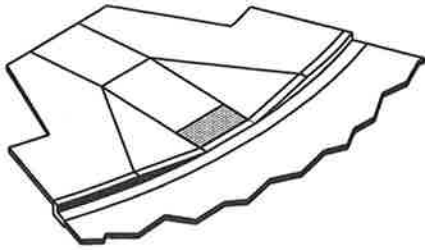
PARALLEL CURB RAMP

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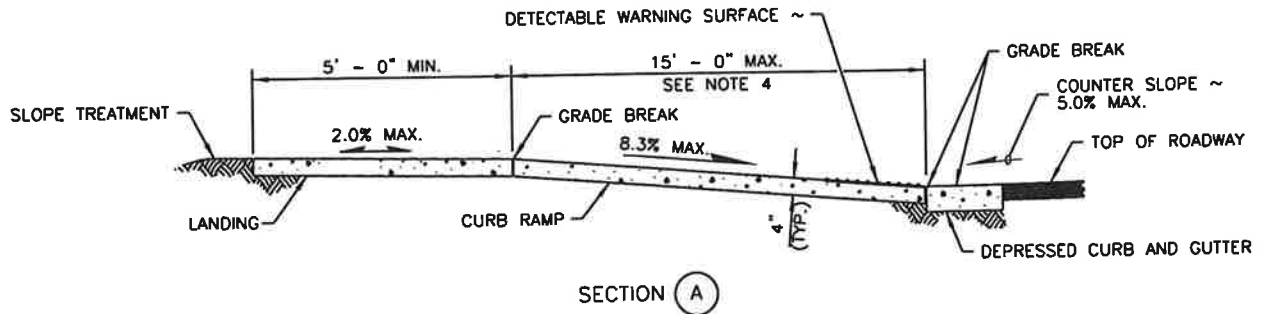
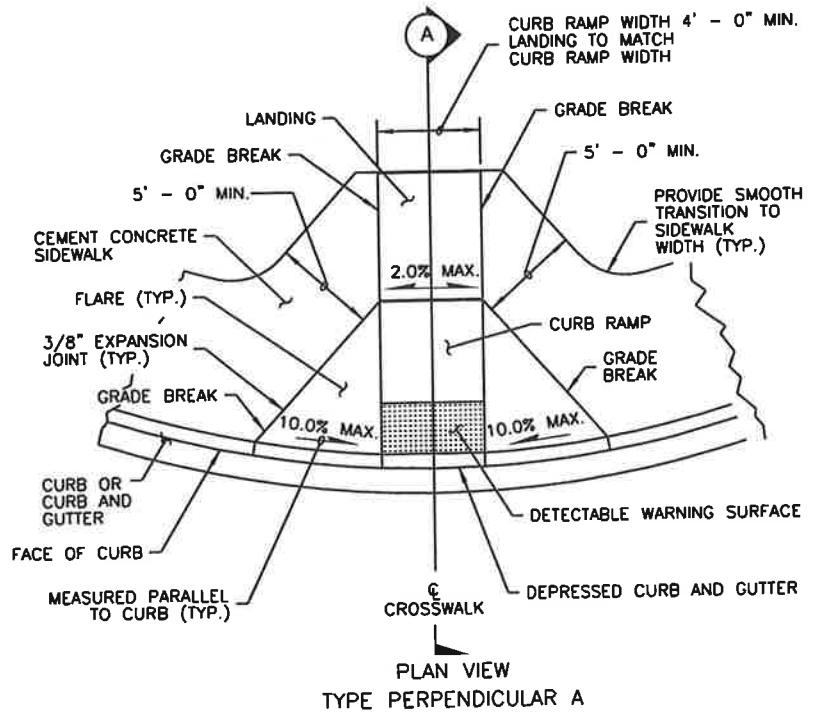
DATE: 04/06/2015

DWG. NO.

T-24A PARALLEL CURB



ISOMETRIC VIEW  
TYPE PERPENDICULAR A



**NOTES**

1. PROVIDE A SEPARATE CURB RAMP FOR EACH MARKED OR UNMARKED CROSSWALK. CURB RAMP LOCATION SHALL BE PLACED WITHIN THE WIDTH OF THE ASSOCIATED CROSSWALK.
2. WHERE "GRADE BREAK" IS CALLED OUT, THE ENTIRE LENGTH OF THE GRADE BREAK BETWEEN THE TWO ADJACENT SURFACE PLANES SHALL BE FLUSH.
3. DO NOT PLACE GRATINGS, JUNCTION BOXES, ACCESS COVERS, OR OTHER APPURTENANCES IN FRONT OF THE CURB RAMP OR ON ANY PART OF THE CURB RAMP OR LANDING.
4. THE CURB RAMP MAXIMUM RUNNING SLOPE SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15- FEET TO AVOID CHASING THE SLOPE INDEFINITELY WHEN CONNECTING TO STEEP GRADES. WHEN APPLYING THE 15-FOOT MAXIMUM LENGTH, THE RUNNING SLOPE OF THE CURB RAMP SHALL AS FLAT AS FEASIBLE.
5. CURB RAMP, LANDING, AND FLARES SHALL RECEIVE BROOM FINISH.
6. SUBGRADE AND FORM INSPECTION BY THE CITY SHALL BE REQUIRED PRIOR TO POURING CONCRETE.

**LEGEND**



SLOPE IN EITHER DIRECTION



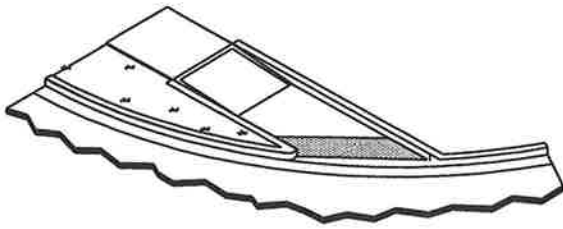
**CITY OF ALGONA**

PERPENDICULAR CURB RAMP

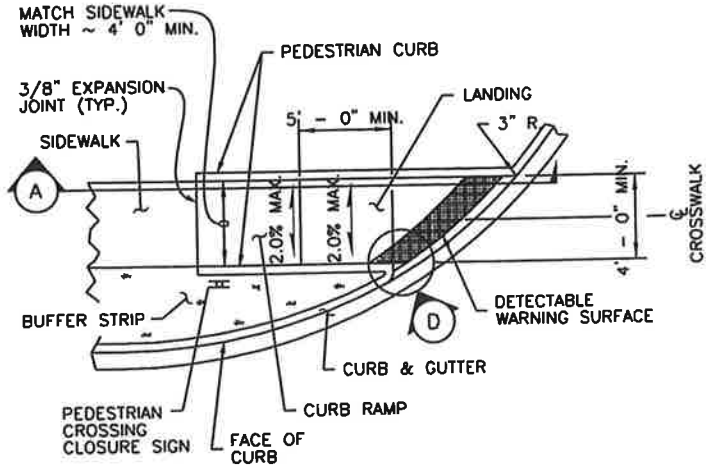
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DATE: 04/06/2015

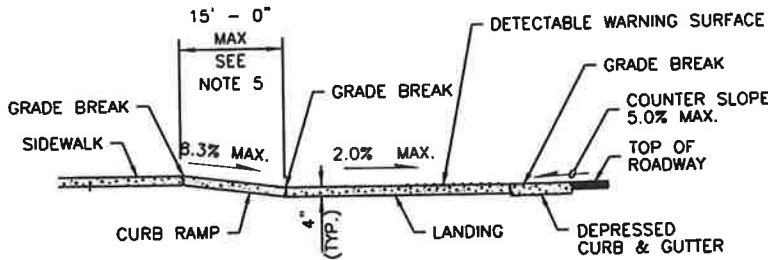
DWG. NO.  
T-24B PERP  
CURB



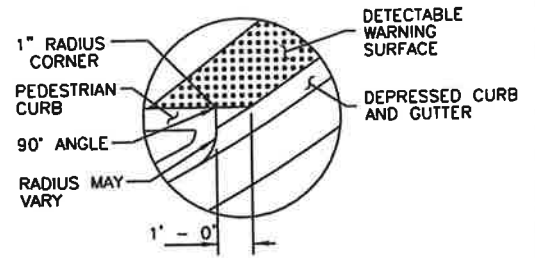
ISOMETRIC VIEW  
TYPE SINGLE DIRECTION



PLAN VIEW  
TYPE SINGLE DIRECTION



SECTION (A)



DETAIL (D)

**NOTES**

1. THIS PLAN IS TO BE USED WHERE PEDESTRIAN CROSSING IN ONE DIRECTION IS NOT PERMITTED.
2. CURB RAMP LOCATION SHALL BE PLACED WITHIN THE WIDTH OF THE ASSOCIATED CROSSWALK, OR AS SHOWN IN THE CONTRACT PLANS.
3. WHERE "GRADE BREAK" IS CALLED OUT, THE ENTIRE LENGTH OF THE GRADE BREAK BETWEEN THE TWO ADJACENT SURFACE PLANES SHALL BE FLUSH.
4. DO NOT PLACE GRATINGS, JUNCTION BOXES, ACCESS COVERS OR OTHER APPURTENANCES IN FRONT OF THE CURB RAMP OR ON ANY PART OF THE CURB RAMP OR LANDING.
5. CURB RAMP MAXIMUM RUNNING SLOPE SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15 FEET TO AVOID CHASING THE SLOPE INDEFINITELY WHEN CONNECTING TO STEEP GRADES. WHEN APPLYING THE 15 FOOT MAXIMUM LENGTH, THE RUNNING SLOPE OF THE CURB RAMP SHALL BE AS FLAT AS FEASIBLE.
6. CURB RAMPS AND LANDINGS SHALL RECEIVE BROOM FINISH.
7. PEDESTRIAN CURB MAY BE OMITTED IF THE GROUND SURFACE AT THE BACK OF THE CURB RAMP AND/OR LANDING WILL BE AT THE SAME ELEVATION AS THE CURB RAMP OR LANDING AND THERE WILL BE NO MATERIAL TO RETAIN.
8. SUBGRADE AND FORM INSPECTION BY THE CITY SHALL BE REQUIRED PRIOR TO POURING CONCRETE.

**LEGEND**

SLOPE IN EITHER DIRECTION



**CITY OF ALGONA**

**SINGLE DIRECTION CURB RAMP**

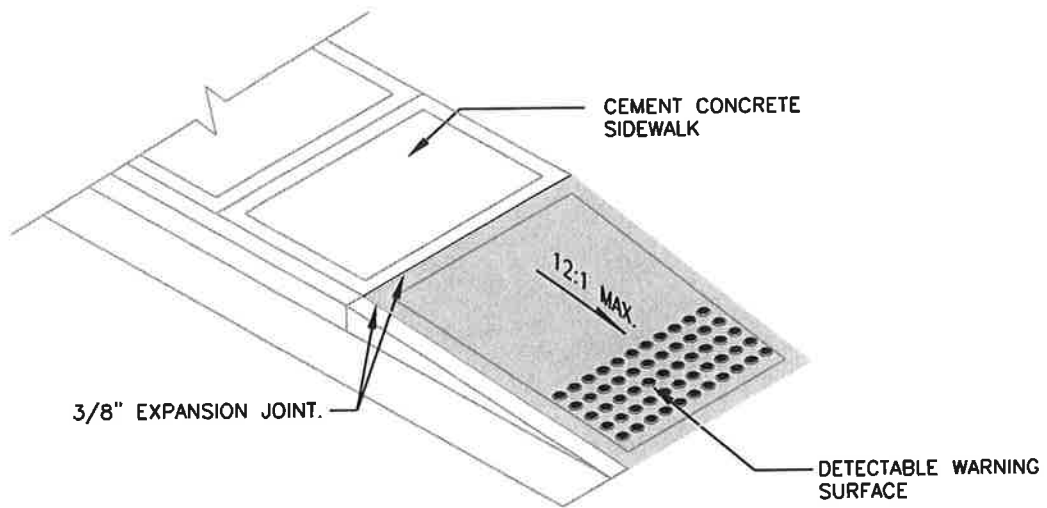
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DATE: 04/06/2015

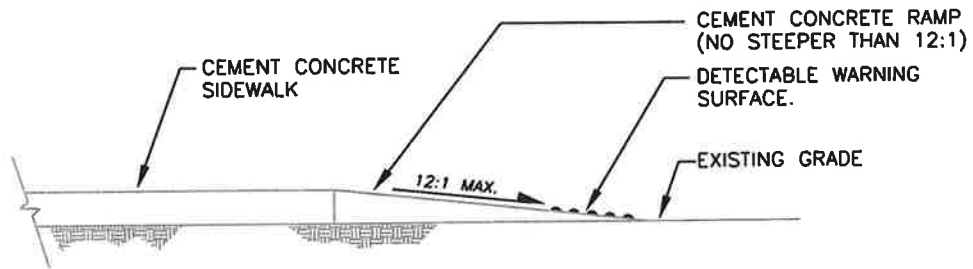
DWG. NO.  
T-24C SINGLE  
CURB

L:\ALGONA\15432 PW Standards\Roads\T-24d swalk ramp.dwg, 4/7/2015 4:22:42 PM, mnagel

**PLAN VIEW**



**ISOMETRIC VIEW**



**ELEVATION VIEW**



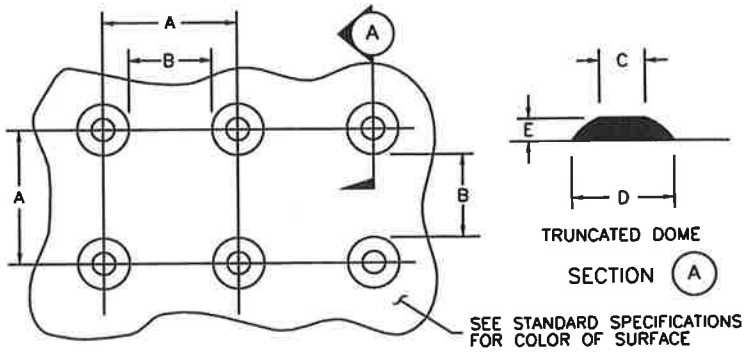
**CITY OF ALGONA**

**SIDEWALK RAMP TO SHOULDER**

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

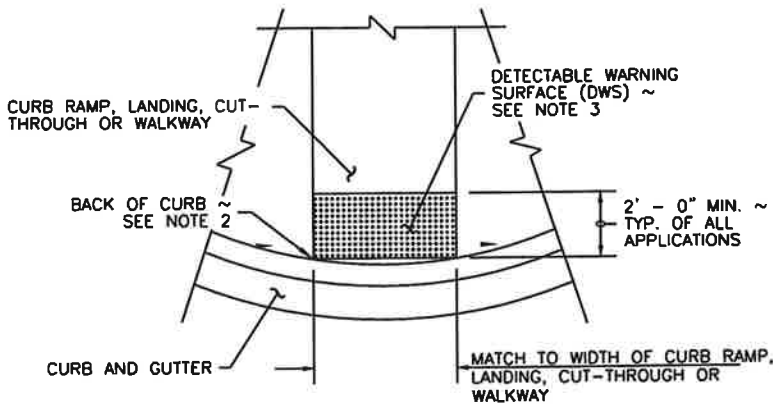
DWG. NO.  
T-24D SWALK  
RAMP



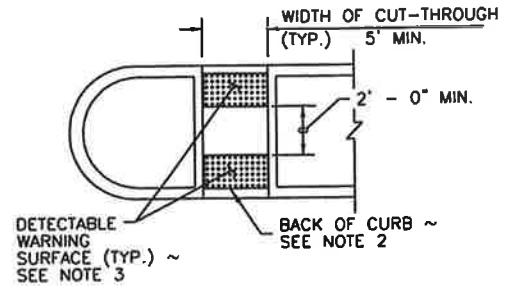
TRUNCATED DOME SPACING  
SEE NOTE 3

|   | MIN.  | MAX.  |
|---|-------|-------|
| A | 1.60" | 2.40" |
| B | 0.65" | --    |
| C | 0.45" | 0.90" |
| D | 0.9"  | 1.40" |
| E | 0.2"  | 0.2"  |

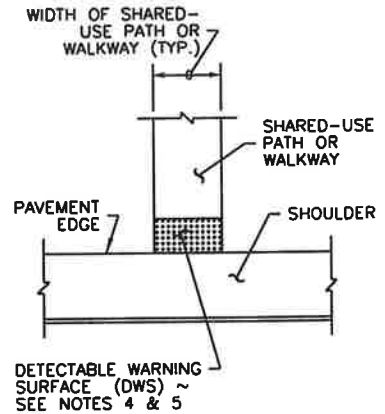
TRUNCATED DOME DETAILS



DETECTABLE WARNING SURFACE DETAIL



MEDIAN CUT-THROUGH



SHARED-USE PATH CONNECTION

NOTES

1. THE DETECTABLE WARNING SURFACE (DWS) SHALL EXTEND THE FULL WIDTH OF THE CURB RAMP (EXCLUSIVE OF FLARES) OR THE LANDING.
2. THE DETECTABLE WARNING SURFACE SHALL BE PLACED AT THE BACK OF CURB, AND NEED NOT FOLLOW THE RADIUS.
3. THE ROWS OF TRUNCATED DOMES SHALL BE ALIGNED TO BE PERPENDICULAR TO THE GRADE BREAK AT THE BACK OF CURB.
4. THE ROWS OF TRUNCATED DOMES SHALL BE ALIGNED TO BE PARALLEL TO THE DIRECTION OF TRAVEL.
5. IF CURB AND GUTTER ARE NOT PRESENT, SUCH AS A SHARED-USE PATH CONNECTION, THE DETECTABLE WARNING SURFACE SHALL BE PLACED AT THE PAVEMENT EDGE.
6. WHEN THE GRADE BREAK BETWEEN THE CURB RAMP AND THE LANDING IS LESS THAN OR EQUAL TO 5 FT. FROM THE BACK OF CURB AT ALL POINTS, PLACE THE DETECTABLE WARNING SURFACE ON THE BOTTOM OF THE CURB RAMP.



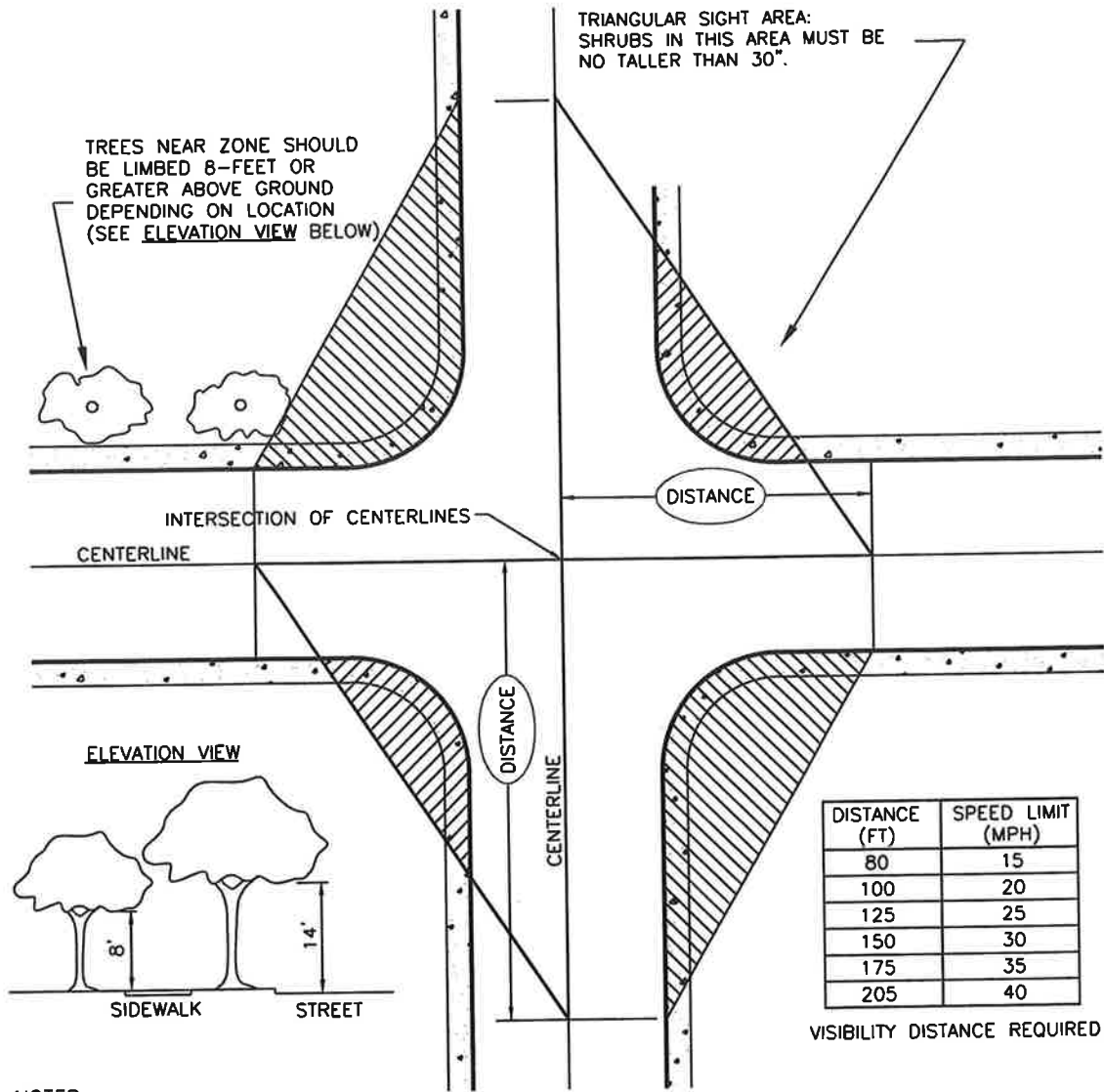
CITY OF ALGONA

DETECTABLE WARNING SURFACE

APPROVED:

DATE: 04/06/2015

DWG. NO.  
T-24F  
DETECT2



**NOTES:**

1. TREES SHALL NOT BE PLACED IN SUCH A WAY THAT THEY IMPEDE THE SAFE FLOW OF TRAFFIC BY BLOCKING THE VIEW OF TRAFFIC SIGNS, AND/OR IMPEDE PEDESTRIANS AND VEHICLES.
2. A DISTANCE ADJUSTMENT FACTOR SHALL BE APPLIED WHEN SLOPE EXCEEDS 6%.
3. DISTANCE AS MEASURED ALONG THE CENTERLINE OF THE ROAD PER THE SPEED LIMIT ON EACH ROAD.

**NOTES FOR EXISTING VEGETATION:**

1. OVERGROWN VEGETATION IMPEDES THE SAFE FLOW OF TRAFFIC WHEN IT BLOCKS THE VIEW OF TRAFFIC SIGNS, PEDESTRIANS AND OTHER VEHICLES. IF EXISTING VEGETATION IS BLOCKING VISIBILITY IN THE STREET OR AN INTERSECTION, IT IS THE RESPONSIBILITY OF THE ADJACENT PROPERTY OWNER OR RESIDENT TO TRIM THE VEGETATION.
2. TO ENSURE SAFE PASSAGE FOR EVERYONE, TREE LIMBS OVER STREETS MUST BE LIMBED UP 14 FEET. LIMBS OVER SIDEWALKS MUST BE LIMBED UP 8 FEET.

SOURCE:  
A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 2011



**CITY OF ALGONA**

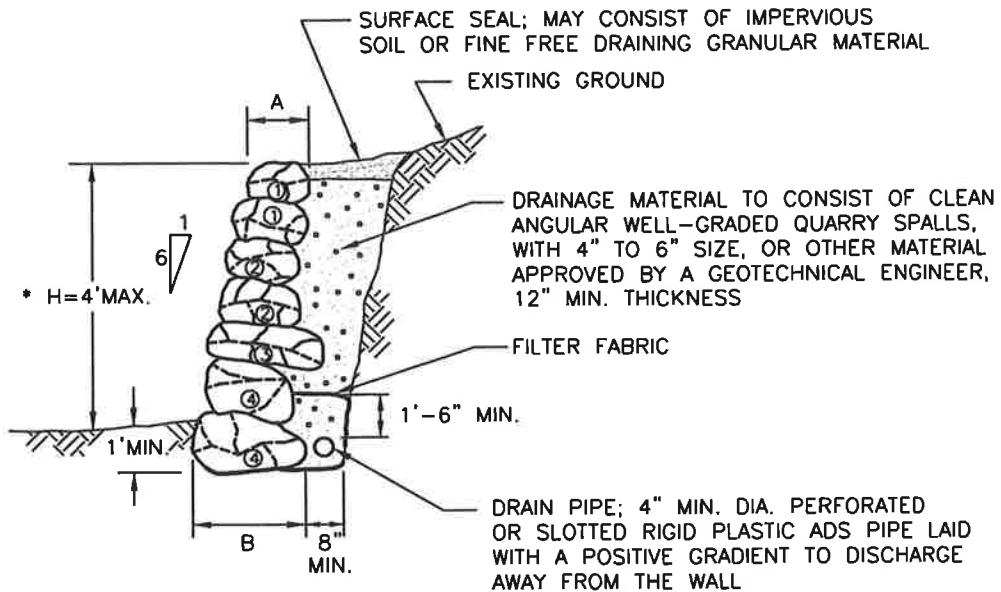
SIGHT DISTANCE  
UNCONTROLLED INTERSECTION

APPROVED: \_\_\_\_\_

*[Signature]*

DATE: 04/06/2015

DWG. NO.  
SIGHT-DI





**SECTION**

| SIZE  | APPROXIMATE WEIGHT - LBS. | APPROXIMATE DIAMETER |
|-------|---------------------------|----------------------|
| 1 MAN | 50-200                    | 12" - 18"            |
| 2 MAN | 200-700                   | 18" - 28"            |
| 3 MAN | 700-2000                  | 28" - 36"            |
| 4 MAN | 2000-4000                 | 36" - 48"            |

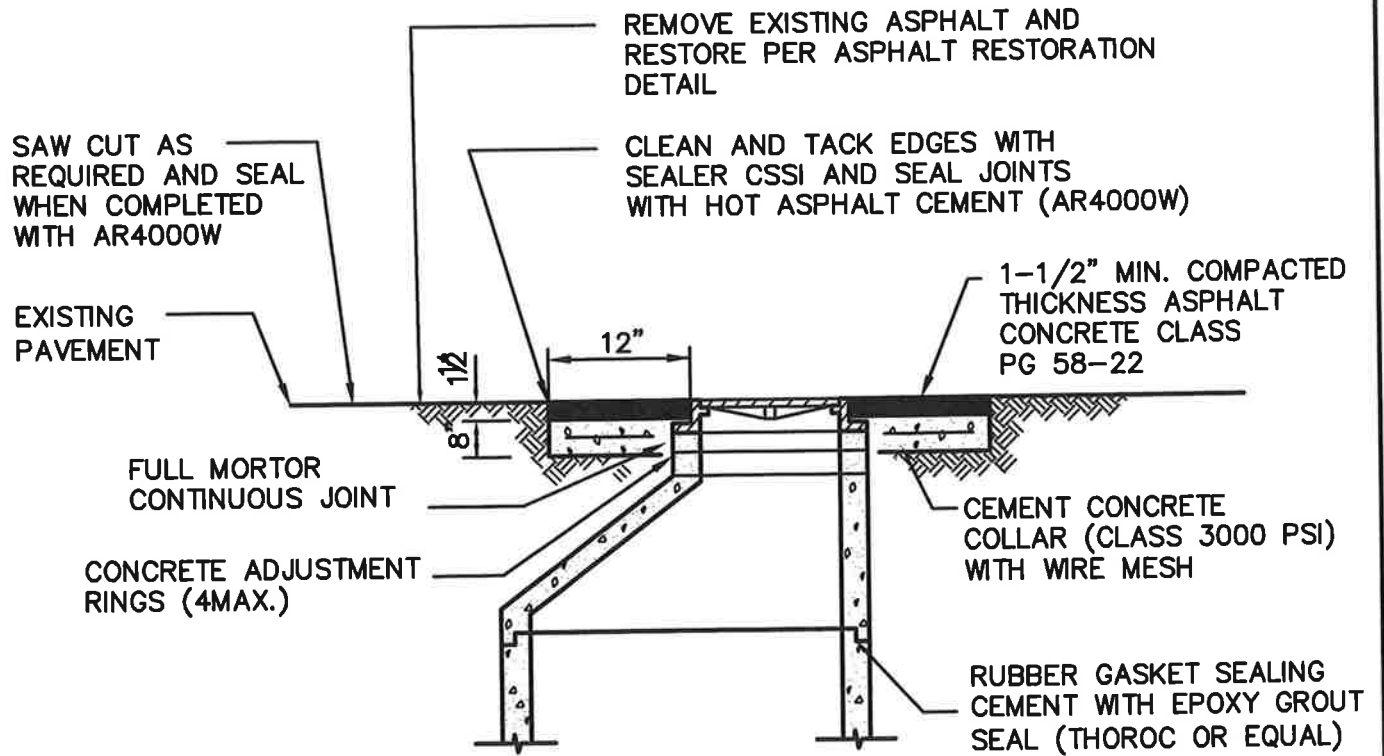
\* **NOTE:**  
 4' MIN. HIGH CYCLONE FENCE REQUIRED ABOVE WALL WHEN WALL HEIGHT IS 3' OR GREATER

**NOTE:**

WALLS OVER 30 INCHES HIGH SHALL BE DESIGNED BY AN ENGINEER LICENSED IN THE STATE OF WASHINGTON

|  |                  |
|--|------------------|
|  <p><b>CITY OF ALGONA</b></p> <p>ROCK WALL DETAIL</p> |                  |
| APPROVED:    | DWG. NO.<br>RKWL |
| DATE: 04/06/2015   |                  |

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**NOTE:**

CEMENT CONCRETE COLLAR TO BE 12 INCHES IN THICKNESS ON DESIGNATED TRUCK ROUTES



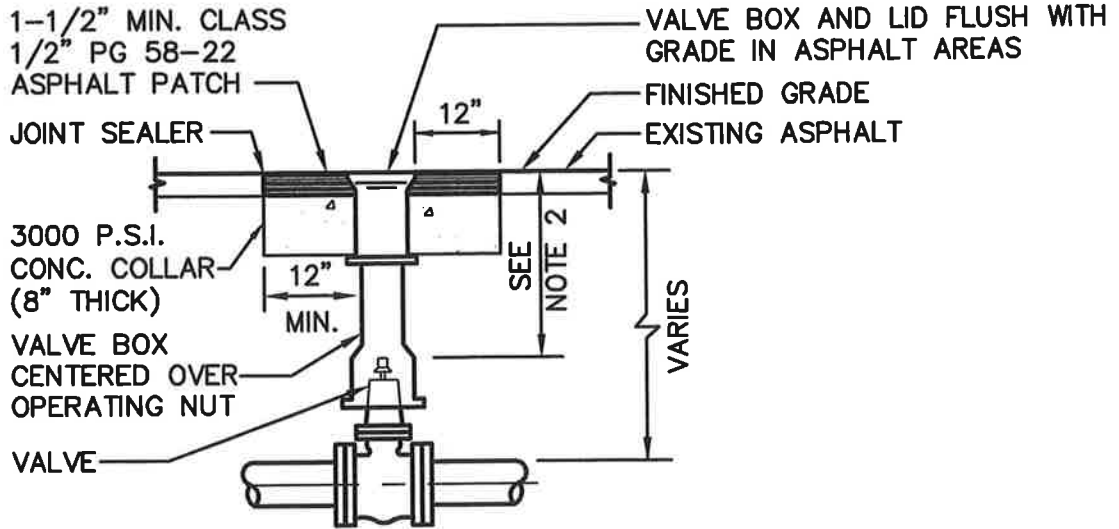
**CITY OF ALGONA  
MH, TYPE II CATCH BASIN  
GRADE ADJUSTMENT DETAIL**

APPROVED:

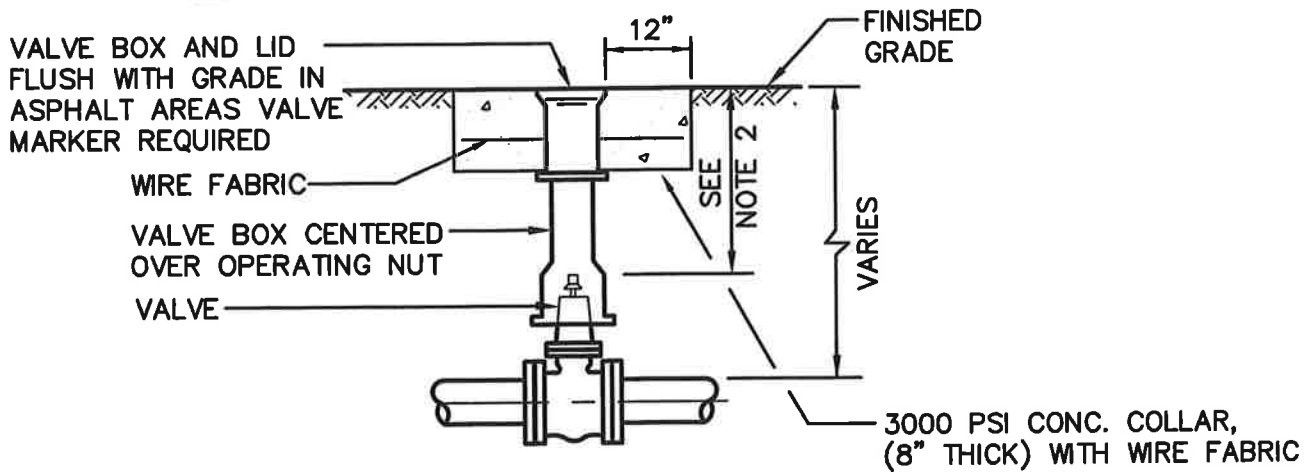
DATE: 04/06/2015

DWG. NO.  
MH ADJ





### **VALVE BOX IN ASPHALT AREA**



### **VALVE BOX IN UNIMPROVED AREA**

**NOTES:**

1. EACH VALVE SHALL BE PROVIDED WITH AN ADJUSTABLE CAST IRON VALVE BOX OF 5 INCHES (5") INSIDE DIAMETER. VALVE BOXES SHALL HAVE A TOP SECTION WITH AN EIGHTEEN INCH (18") MIN. LENGTH. THE VALVE BOX SHALL BE OLYMPIC FOUNDRY No. 940, EAST JORDAN IRON WORKS OR APPROVED EQUAL. VALVE BOX EARS SHALL BE PLACED IN LINE WITH PIPE IT SERVES.
2. 15" MINIMUM, 36" MAXIMUM FOR OPERATOR NUT. EXTENSION MAY BE REQUIRED.



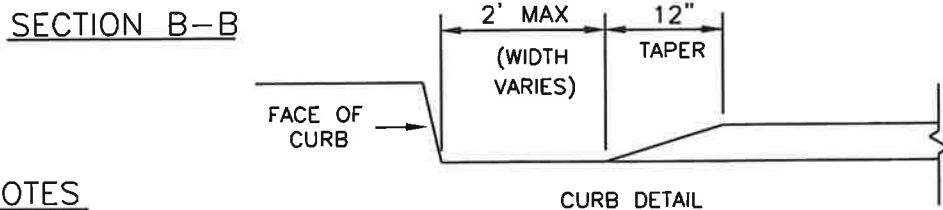
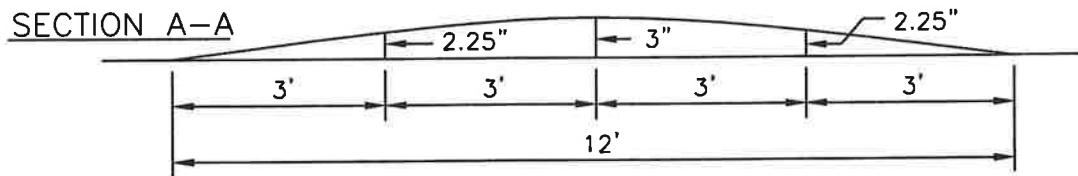
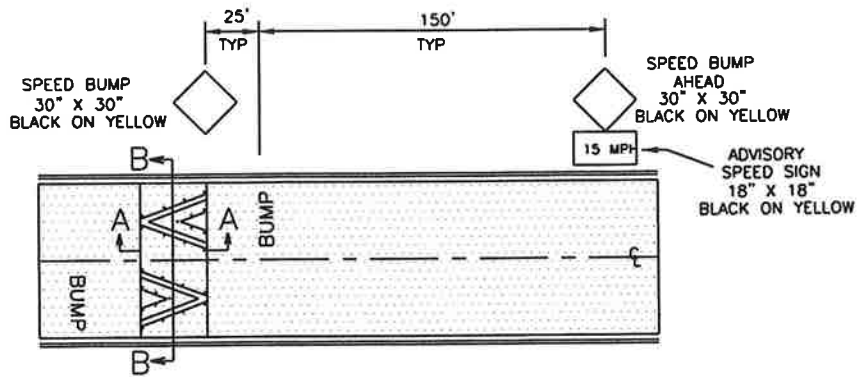
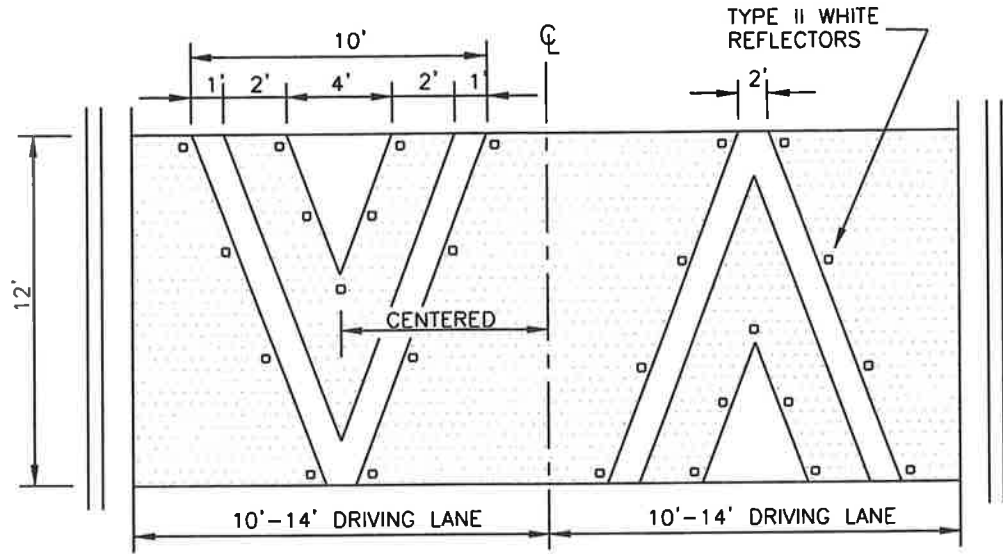
**CITY OF ALGONA**

VALVE BOX ADJUSTMENT

APPROVED: \_\_\_\_\_


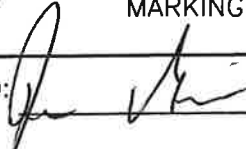
DATE: 04/06/2015

DWG. NO.  
VALV-BOX



**NOTES**

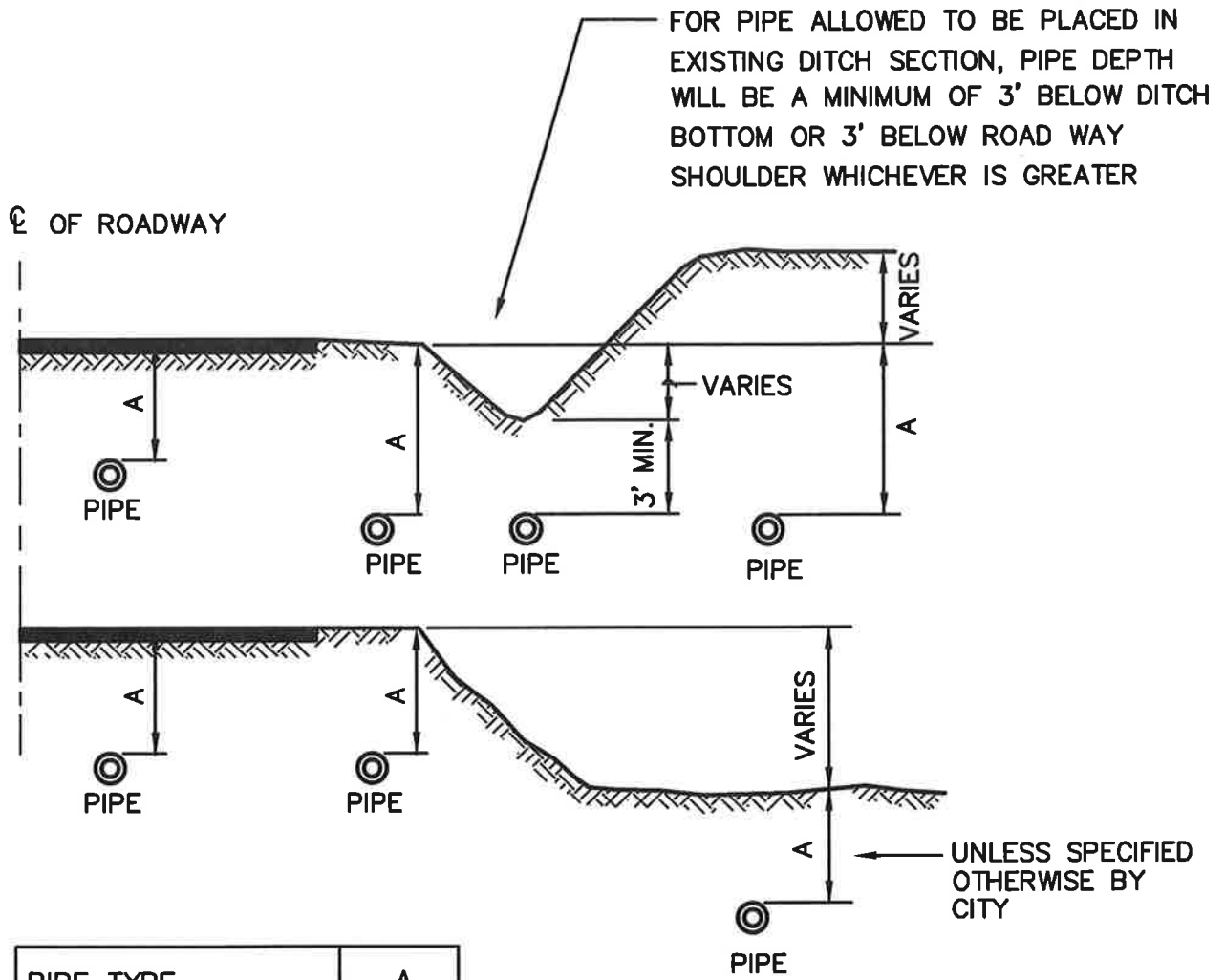
1. SIGN AND LEGEND LOCATION SHALL BE VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
2. LEGEND AND V MARKINGS TO BE THERMOPLASTIC.

|  |   |                      |
|--|---|----------------------|
|             | <b>CITY OF ALGONA</b>                             |                      |
|  | SPEED HUMP: DESIGN, PAVEMENT MARKING, AND SIGNING |                      |
| APPROVED:  | DATE: 04/06/2015                                  | DWG. NO.<br>SPD-HUMP |

## **WATER SYSTEM DETAILS**


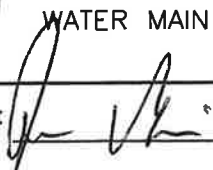


L:\ALGONA\15432 r\W Standards\Water\WA-MAIN.dwg, 4/9/2015 4:23:48 PM, mngael



|              |     |
|--------------|-----|
| PIPE TYPE    | A   |
| TRANSMISSION | 42" |
| DISTRIBUTION | 36" |

\* MINIMUM DEPTH

|  |                     |
|--|---------------------|
|  <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">WATER MAIN DEPTH REQUIREMENTS</p> |                     |
| APPROVED:    | DWG. NO.<br>WA-MAIN |
| DATE: 04/06/2015   |                     |

FINISHED GRADE

BACKFILL MATERIAL  
CONSISTING OF:  
CRUSHED SURFACING, OR  
CDF AS DIRECTED BY THE  
CITY

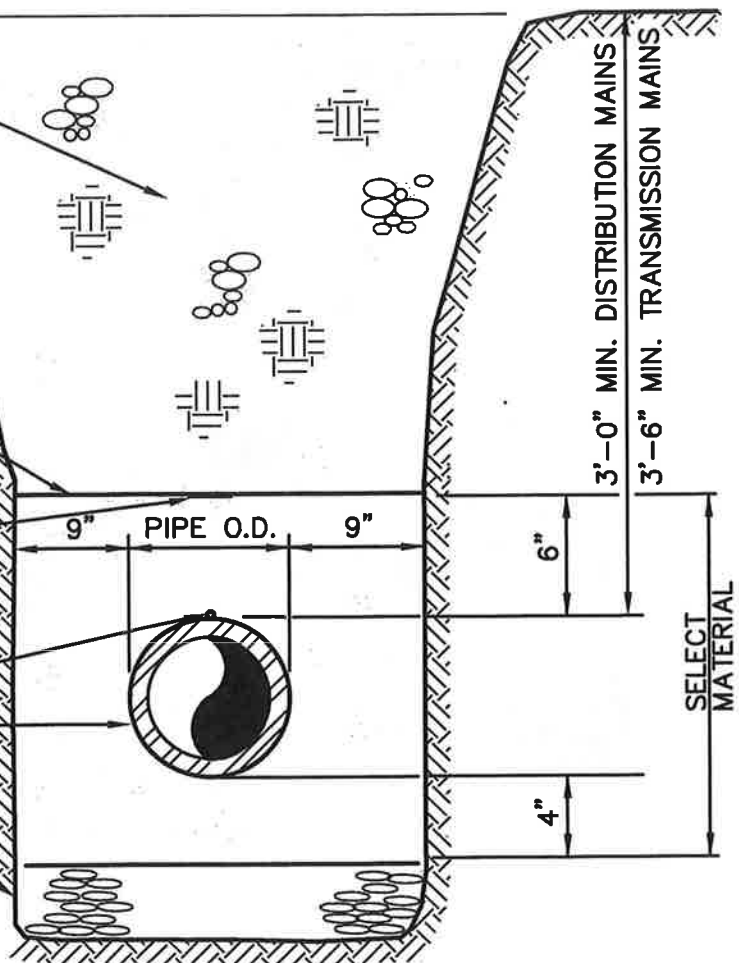
ALL BACKFILL SHALL BE  
COMPACTED TO 95%  
MODIFIED PROCTOR,  
ASTM D1557.

BACKFILL SHALL BE  
HAND TAMPED TO THIS  
LEVEL ABOVE PIPE.

3" MIN WIDTH FLOURESCENT  
IDENTIFICATION TAPE TO  
RUN CONTINUOUS WITH  
PIPE.

#12 COPPER TRACE WIRE  
W/THHN INSULATION  
DUCTILE IRON WATER  
MAIN

FOUNDATION GRAVEL  
AS REQUIRED



**NOTE:**

BACKFILL MATERIAL AND COMPACTION  
SHALL BE IN CONFORMANCE WITH THE  
CITY'S STANDARDS AND/OR STATE OR  
COUNTY PERMIT REQUIREMENTS.

SELECT MATERIAL SHALL BE CRUSHED  
SURFACING OR GRAVEL BACKFILL FOR  
PIPE ZONE BEDDING.



**CITY OF ALGONA**

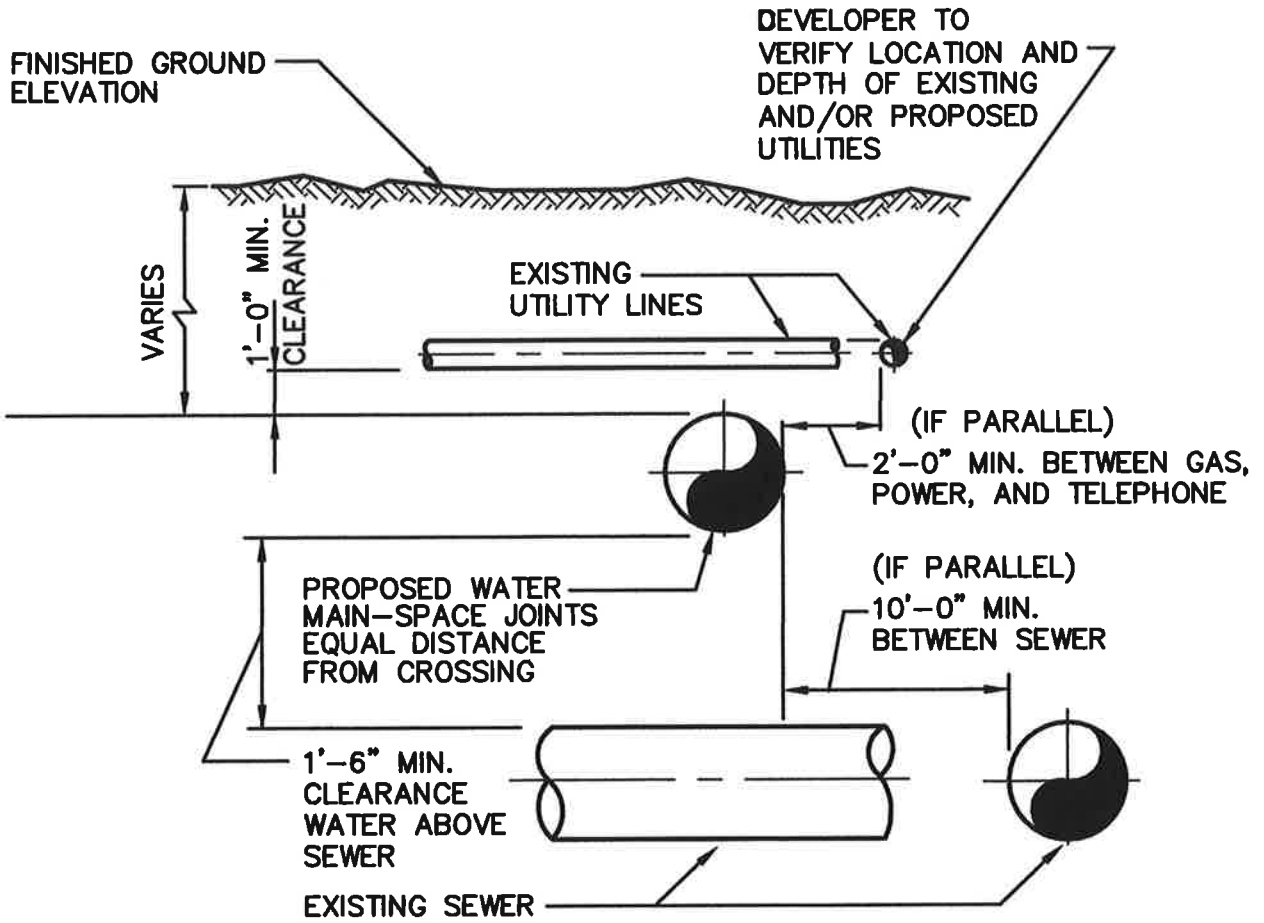
WATER MAIN TRENCH SECTION

APPROVED:

DATE: 04/06/2015

DWG. NO.

WA-MAIN2



**NOTES:**

1. CDF ENCASUREMENT SHALL BE UTILIZED, IF APPROVED BY THE CITY, AT LOCALIZED UTILITY CROSSING IF MINIMUM PIPE SEPARATION (ELEVATION) CANNOT BE MAINTAINED OR ACHIEVED.



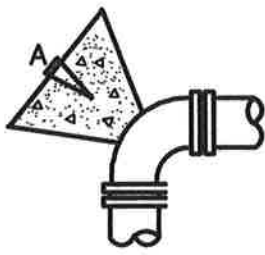
**CITY OF ALGONA**

MINIMUM UTILITY SPACING

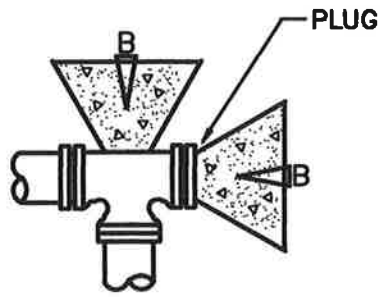
APPROVED: *[Signature]*

DATE: 04/06/2015

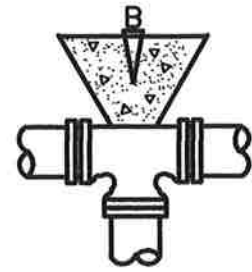
DWG. NO.  
TYP-UTIL



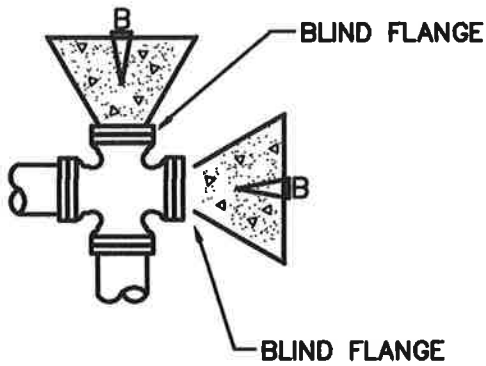
**90° BEND**



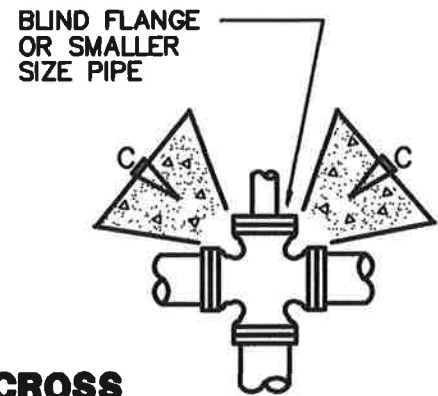
**TEE**



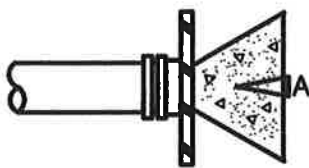
**TEE**



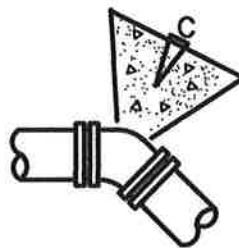
**CAPPED CROSS**



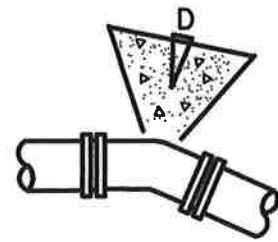
**CROSS**



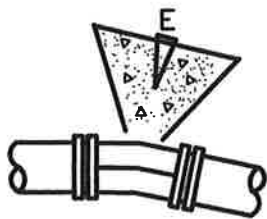
**CAP**



**45° BEND**



**22 1/2° BEND**



**11 1/4° BEND**



CITY OF ALGONA

THRUST BLOCK DETAIL (1 OF 2)

APPROVED: *[Signature]*  
DATE: 04/06/2015

DWG. NO.  
THRU-BLO2



# THRUST BLOCK – TABLE

## MIN. BEARING AREA AGAINST UNDISTURBED SOIL SQUARE FEET

| PIPE SIZE | A(FT <sup>2</sup> ) | B(FT <sup>2</sup> ) | C(FT <sup>2</sup> ) | D(FT <sup>2</sup> ) | E(FT <sup>2</sup> ) |
|-----------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 4"        | 3                   | 1                   | 1                   | 1                   | 1                   |
| 6"        | 4                   | 4                   | 2                   | 1                   | 1                   |
| 8"        | 7                   | 6                   | 4                   | 2                   | 1                   |
| 10"       | 11                  | 10                  | 6                   | 3                   | 2                   |
| 12'       | 16                  | 14                  | 9                   | 5                   | 3                   |
| 14"       | 22                  | 19                  | 12                  | 6                   | 3                   |
| 16"       | 29                  | 25                  | 16                  | 8                   | 4                   |
| 18"       | 36                  | 31                  | 20                  | 10                  | 5                   |

**NOTES:**

1. BEARING AREA OF CONCRETE THRUST-BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2,000 POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING. WRAP ALL FITTINGS IN 6 MIL PLASTIC PRIOR TO POURING BLOCK. NO CONCRETE SHALL BE PLACED NEAR BOLTS.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. SEE EXAMPLE CALCULATION



**CITY OF ALGONA**

THRUST BLOCK DETAIL (2 OF 2)

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.  
THRU-BLO2

### Example Thrust Block Calculation

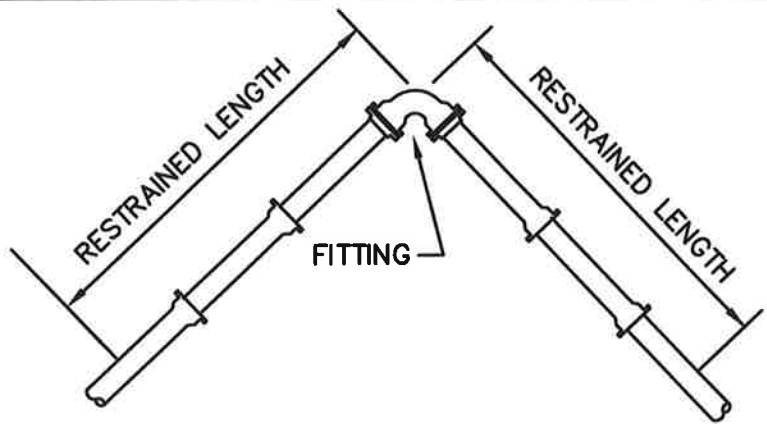
|                  |                 | <b>Thrust at Fitting in Pounds</b> |                 |                 |                   |                    |
|------------------|-----------------|------------------------------------|-----------------|-----------------|-------------------|--------------------|
| <b>Pipe Diam</b> | <b>Pressure</b> | <b>Tee and Dead End</b>            | <b>90° bend</b> | <b>45° bend</b> | <b>22.5° bend</b> | <b>11.25° bend</b> |
| 4                | 200             | 2,513                              | 3,554           | 1,924           | 981               | 493                |
| 6                | 200             | 5,655                              | 7,997           | 4,328           | 2,206             | 1,109              |
| 8                | 200             | 10,053                             | 14,217          | 7,694           | 3,923             | 1,971              |
| 10               | 200             | 15,708                             | 22,214          | 12,022          | 6,129             | 3,079              |
| 12               | 200             | 22,619                             | 31,989          | 17,312          | 8,826             | 4,434              |
| 16               | 200             | 40,212                             | 56,869          | 30,777          | 15,690            | 7,883              |

| <b>Soil Type</b>                 | <b>Safe Soil Bearing Pressure (LBS/SF)</b> | <b>Comment</b>         |
|----------------------------------|--|------------------------|
| Muck, Peat                       | 0  | Use Restrained Joint   |
| Soft Clay                        | 1,000                                      | Typical Soil in Algona |
| Sand                             | 2,000                                      |                        |
| Sand & Gravel                    | 3,000                                      |                        |
| Sand & Gravel Cemented with Clay | 4,000                                      |                        |

Example:

For 8-inch pipe determine thrust block size needed for 250 psi at a 90-degree bend


1. Multiply Thrust at fitting by ratio of pressure to 200 psi  
 $14,217 * 250/200 = 17,772 \text{ lbs}$
2. Determine Volume of Thrust Block. Assume 150 lbs/CF concrete  
 $17,772/150 = 118.5 \text{ CF concrete}$   
 $= 4.4 \text{ CY concrete}$
3. Determine Bearing Area of Thrust Block in soft clay  
 $17,772 \text{ lbs} / 1,000 \text{ lbs/SF} = 17.8 \text{ SF bearing area}$



| PIPE SIZE | 90° BEND                  | 45° BEND | 22 1/2° BEND | 11 1/4° BEND | TEE OR DEAD END CAP |
|-----------|---------------------------|----------|--------------|--------------|---------------------|
|           | RESTRAINED LENGTH IN FEET |          |              |              |                     |
| 4"        | 40                        | 17       | 8            | 4            | 30                  |
| 6"        | 55                        | 23       | 11           | 6            | 39                  |
| 8"        | 73                        | 31       | 15           | 8            | 53                  |
| 10"       | 88                        | 37       | 18           | 9            | 67                  |
| 12"       | 103                       | 43       | 21           | 10           | 82                  |
| 16"       | 133                       | 55       | 27           | 13           | 110                 |
| 18"       | 145                       | 60       | 29           | 15           | 124                 |


**NOTES:**

- ① RESTRAINED LENGTHS SHOWN ARE MINIMUM AND FOR LINEAL FEET REQUIRED ON EACH SIDE OF FITTING INDICATED.
- ② FOOTAGES ARE BASED ON 250 PSI PRESSURE AND 42 INCHES COVER. IF PRESSURE IS GREATER OR COVER IS LESS, THE RESTRAINED LENGTH SHALL BE INCREASED ACCORDINGLY



## CITY OF ALGONA

THRUST RESTRAINT FOR DUCTILE IRON PIPE

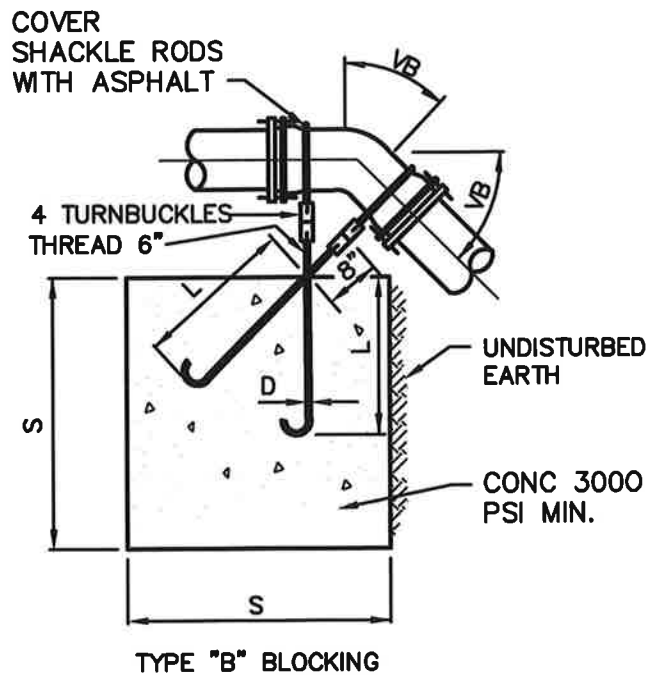
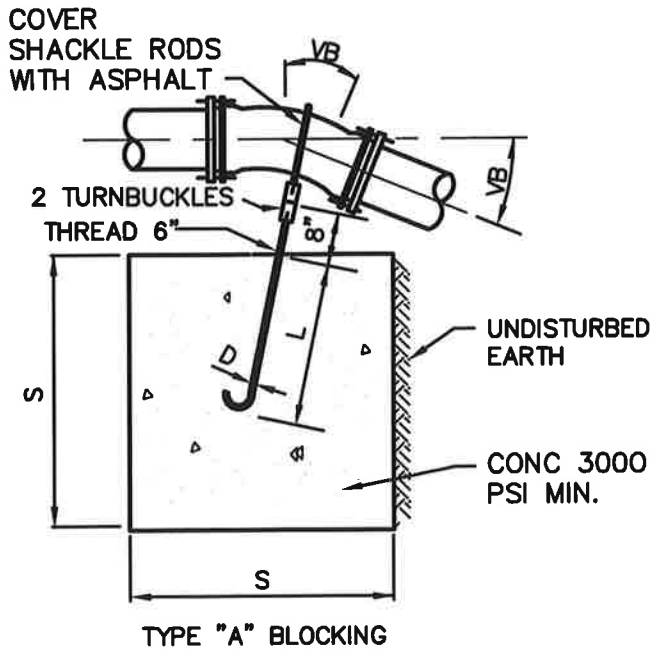
APPROVED: 

DATE: 04/06/2015

DWG. NO.  
DUCT-PIP

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| TYPE "A" BLOCKING                      |                   |                       |                                  |     |        |     |
|--|-------------------|-----------------------|----------------------------------|-----|--------|-----|
| FOR 11 1/4°-22 1/2°-30° VERTICAL BENDS |                   |                       |                                  |     |        |     |
| PIPE SIZE NOMINAL DIAMETER-- INCHES    | TEST PRESSURE PSI | VB                    |                                  | S   | D      | L   |
|  |                   | VERTICAL BEND DEGREES | No. OF CU. FT. OF CONC. BLOCKING |     |        |     |
| 4"                                     | 300               | 11 1/4                | 8                                | 2   | 5/8"   | 1.5 |
|  |                   | 22 1/2                | 11                               | 2.2 |        | 2.0 |
|  |                   | 30                    | 17                               | 2.6 |        |     |
| 6"                                     | 300               | 11 1/4                | 11                               | 2.2 | 5/8"   | 2.0 |
|  |                   | 22 1/2                | 25                               | 2.9 |        |     |
|  |                   | 30                    | 41                               | 3.5 |        |     |
| 8"                                     | 300               | 11 1/4                | 16                               | 2.5 | 5/8"   | 2.0 |
|  |                   | 22 1/2                | 47                               | 3.6 |        |     |
|  |                   | 30                    | 70                               | 4.1 |        |     |
| 12"                                    | 250               | 11 1/4                | 32                               | 3.2 | 5/8"   | 2.0 |
|  |                   | 22 1/2                | 88                               | 4.5 | 7/8"   | 3.0 |
|  |                   | 30                    | 132                              | 5.1 |        |     |
| 16"                                    | 225               | 11 1/4                | 70                               | 4.1 | 7/8"   | 3.0 |
|  |                   | 22 1/2                | 184                              | 5.7 | 1 1/8" | 4.0 |
|  |                   | 30                    | 275                              | 6.5 | 1 1/4" |     |
| 20"                                    | 200               | 11 1/4                | 91                               | 4.5 | 7/8"   | 3.0 |
|  |                   | 22 1/2                | 225                              | 6.1 | 1 1/4" | 4.0 |
|  |                   | 30                    | 330                              | 6.9 | 1 3/8" | 4.5 |
| 24"                                    | 200               | 11 1/4                | 128                              | 5.0 | 1"     | 3.5 |
|  |                   | 22 1/2                | 320                              | 6.8 | 1 3/8" | 4.5 |
|  |                   | 30                    | 480                              | 7.9 | 1 7/8" | 5.5 |
| TYPE "B" BLOCKING                      |                   |                       |                                  |     |        |     |
| FOR - 45° VERTICAL BENDS               |                   |                       |                                  |     |        |     |
|  |                   | VB                    |                                  | S   | D      | L   |
| 4"                                     | 300               | 45                    | 30                               | 3.1 | 5/8"   | 2.0 |
| 6"                                     |                   |                       | 68                               | 4.1 |        |     |
| 8"                                     |                   |                       | 123                              | 5.0 |        |     |
| 12"                                    | 250               |                       | 232                              | 6.1 | 3/4"   | 2.5 |
| 16"                                    | 225               |                       | 478                              | 7.8 | 1 1/8" | 4.0 |
| 20"                                    | 200               |                       | 560                              | 8.2 | 1 1/4" |     |
| 24"                                    |                   |                       | 820                              | 9.4 | 1 3/8" | 4.5 |



THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARD. APPROPRIATELY SIZED ANCHOR BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS ARE REQUIRED



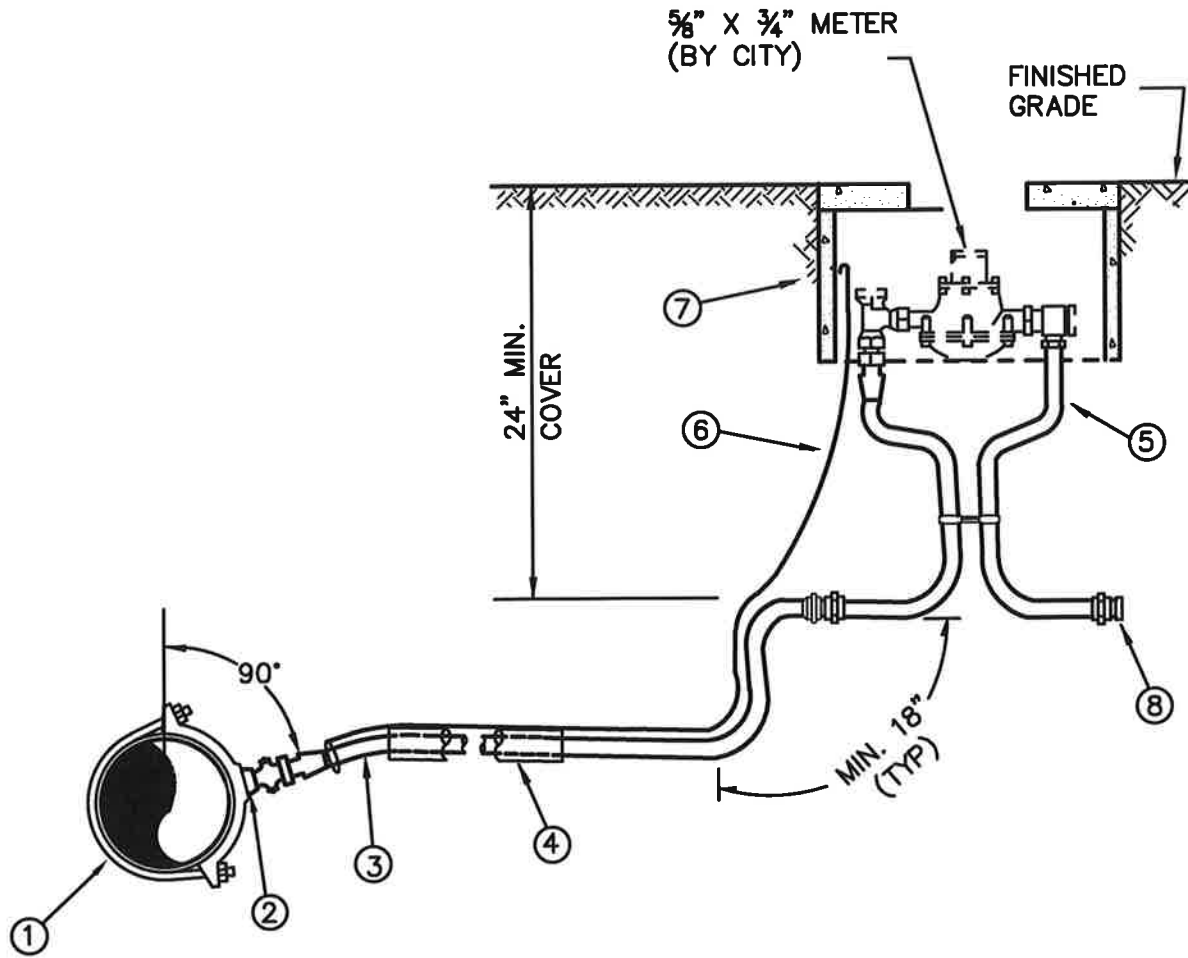
CITY OF ALGONA

VERTICAL ANCHOR BLOCK

APPROVED: *[Signature]*

DATE: 04/06/2015

DWG. NO.  
ANCH-BLO



**NOTES:**

METER LOCATION TO BE IN  
PLANTER STRIP IF EXISTING OR  
BACK OR SIDEWALK.



**CITY OF ALGONA**

1" AND SMALLER WATER SERVICE

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.  
WAT-SERV

## LEGEND

- ① SERVICE SADDLE – SINGLE STRAP FOR PIPE DIAMETERS LESS THAN 10" (ROMAC 101S OR EQUAL) AND DOUBLE STRAP FOR PIPE DIAMETERS 10" AND GREATER (ROMAC 202S OR EQUAL).
- ② 1" BALL STYLE CORP STOP MIP X PEP JOINT (MUELLER B-25029 OR EQUAL)
- ③ 1" HIGH MOLECULAR (200 PSI, SDR 7) "POLY" PIPE (LENGTH AS REQUIRED)
- ④ INSTALL SERVICE LINE IN 2" PVC GUARD PIPE (SCH-80) WHEN BORING UNDER ROADWAY (3' MINIMUM BEYOND AND BENEATH PAVEMENT SECTION) OR AT UTILITY CROSSINGS AS DIRECTED BY CITY.
- ⑤ COPPER SETTER WITH ANGLE BALL VALVE AND ANGLE DOUBLE CHECK VALVE (MUELLER B2404R-2N OR EQUAL)
- ⑥ #10 GAUGE COPPER WIRE w/ THHN BLUE PLASTIC INSULATION FROM MAINLINE TAP TO METER BOX AND EXPOSE 6" MINIMUM IN BOX (RUN INSIDE 2" PVC GUARD CONDUIT WHERE APPLICABLE). MINIMUM OF 1 WRAP AROUND SERVICE LINE EVERY 5' FEET.
- ⑦ METER BOX – FOGTITE NO.9 WITH HINGED LID DRILLED FOR TRPL HOLE FOR TOUCH READ METERS, H2O LOADING. (SET FLUSH WITH FINISHED GRADE)
- ⑧ PROVIDE APPROVED WATERTIGHT PLUG UNTIL CONNECTION TO PRIVATE SYSTEM IS MADE.

1" AND SMALLER WATER SERVICE



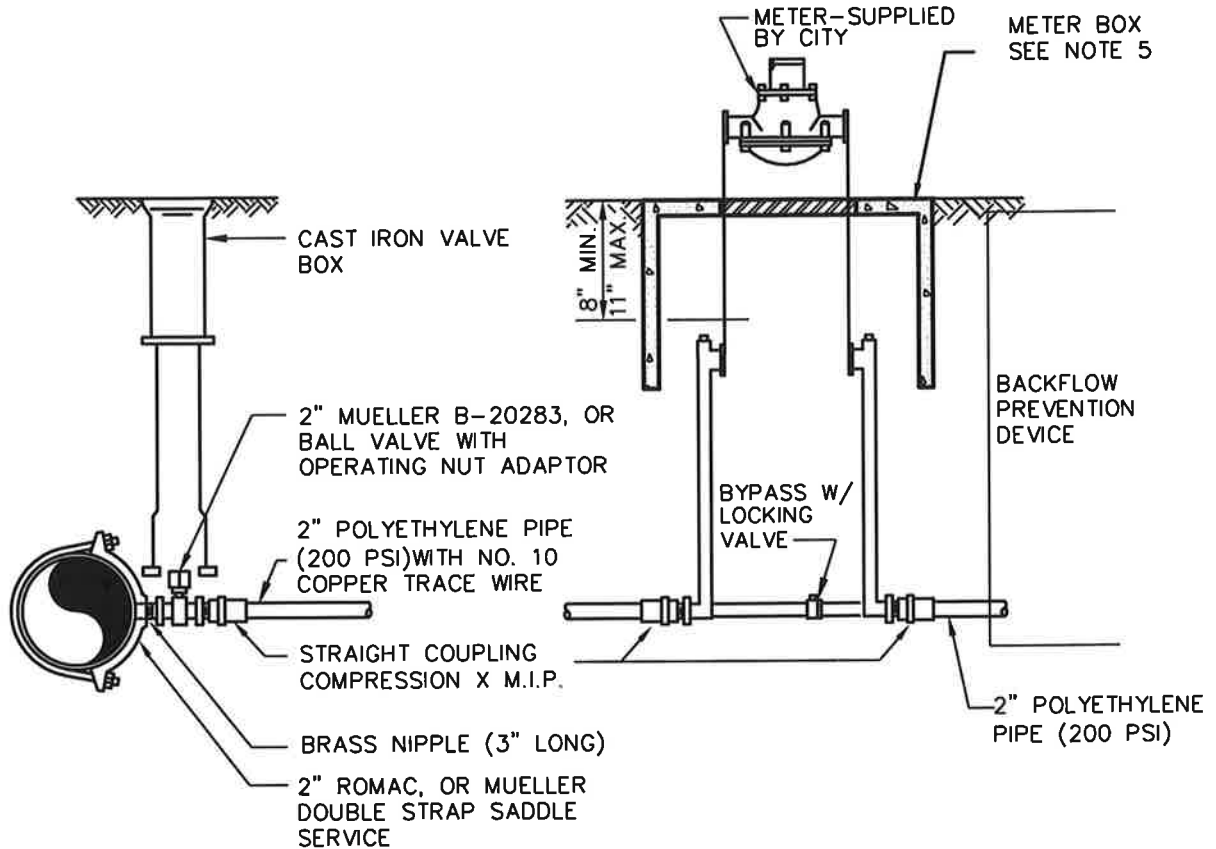
CITY OF ALGONA

1" AND SMALLER WATER SERVICE

APPROVED:

DATE: 04/06/2015

DWG. NO.  
WAT-SERV



**NOTES:**

1. NO SPLICES IN 2" COPPER PIPE ALLOWED.
2. SERVICE FROM METER BOX TO STRUCTURE BY PROPERTY OWNER.
3. INDIVIDUAL SERVICES REQUIRED FOR EACH STRUCTURE.
4. 2-INCH METER SETTER (WITH ADAPTERS IF 1 1/2-INCH METER USED), FORD 70 SERIES OR MUELLER H-1427 WITH BALL VALVE AND CHECK VALVE.
5. METER BOX - FOGTITE NO.2 WITH STEEL LID AND DRILLED FOR TRPL HOLE FOR TOUCH READ. BOX SHALL BE H-20 LOAD RATED WHERE REQUIRED.
6. ESMT PROVIDED TO CITY TO AND AROUND METERS LOCATED OUTSIDE R/W.
7. ALL SERVICES SHALL HAVE WASHINGTON STATE APPROVED RPBA FOR BACKFLOW PREVENTION. CONFIRM LOCATION OF ASSEMBLY WITH CITY. INITIAL AND ANNUAL TEXTING REQUIRED. MULTIFAMILY ALLOWED TO USE DCVA IN LIEU OF RPBA.



**CITY OF ALGONA**

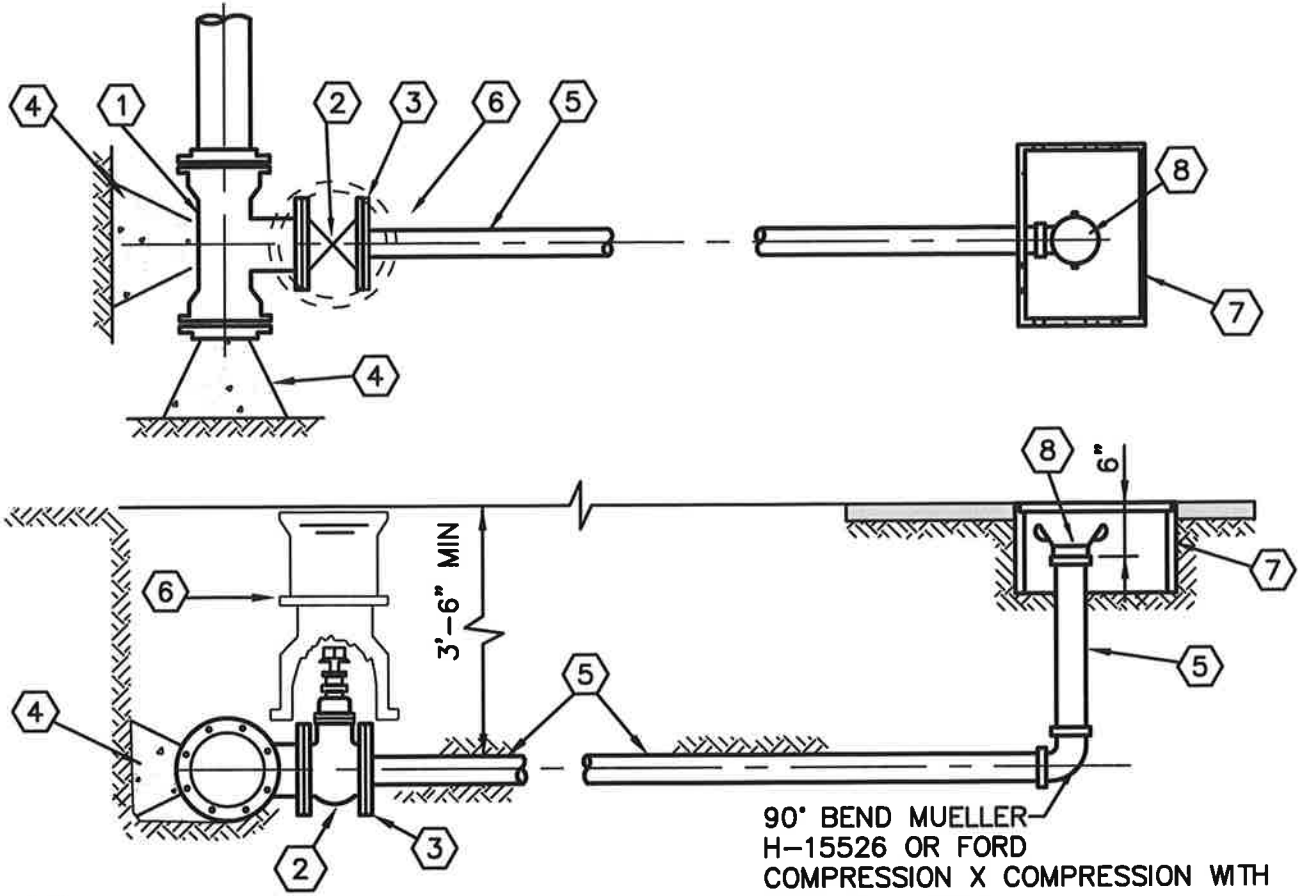
1 1/2" & 2" WATER SERVICE

APPROVED:

DATE: 04/06/2015

DWG. NO.

2-WAT





90° BEND MUELLER  
H-15526 OR FORD  
COMPRESSION X COMPRESSION WITH  
1/8" WEEP HOLE

- ① MJ X MJ X 4" FL D.I. TEE.
- ② 4" AWWA RESILIENT SEAT GATE VALVE, FL X FL, WITH OPERATING NUT.
- ③ 4" BLIND FLANGE, TAPPED FOR 2". MAINS LARGER THAN 8" REQUIRE 4-INCH BLOW-OFF OR HYDRANT.
- ④ CONCRETE THRUST BLOCK.
- ⑤ 2" TYPE K COPPER PIPE.
- ⑥ CAST IRON VALVE BOX PER VALV-BOX
- ⑦ METER BOX - FOGTITE NO. 2. BOX SHALL BE H-20 LOAD RATED.
- ⑧ ALUMINUM CAM-LOCK AND CAP. DRILL 1/8" HOLE IN CAP. (PLASTIC CAM LOCK FITTING NOT ALLOWED)

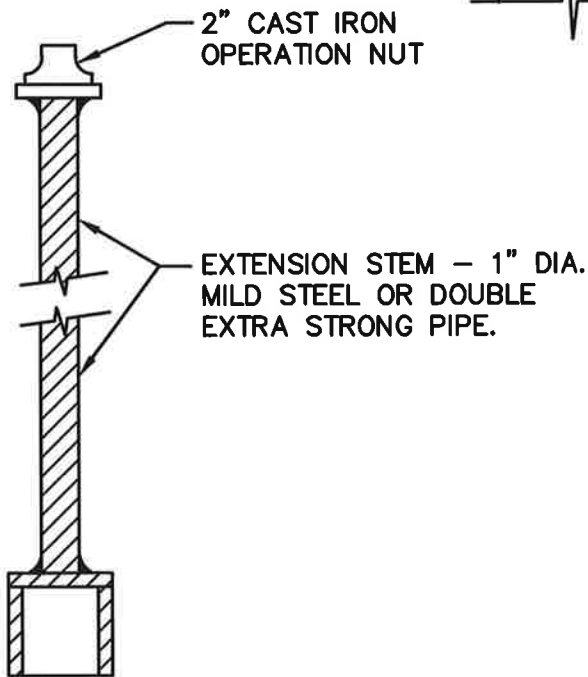
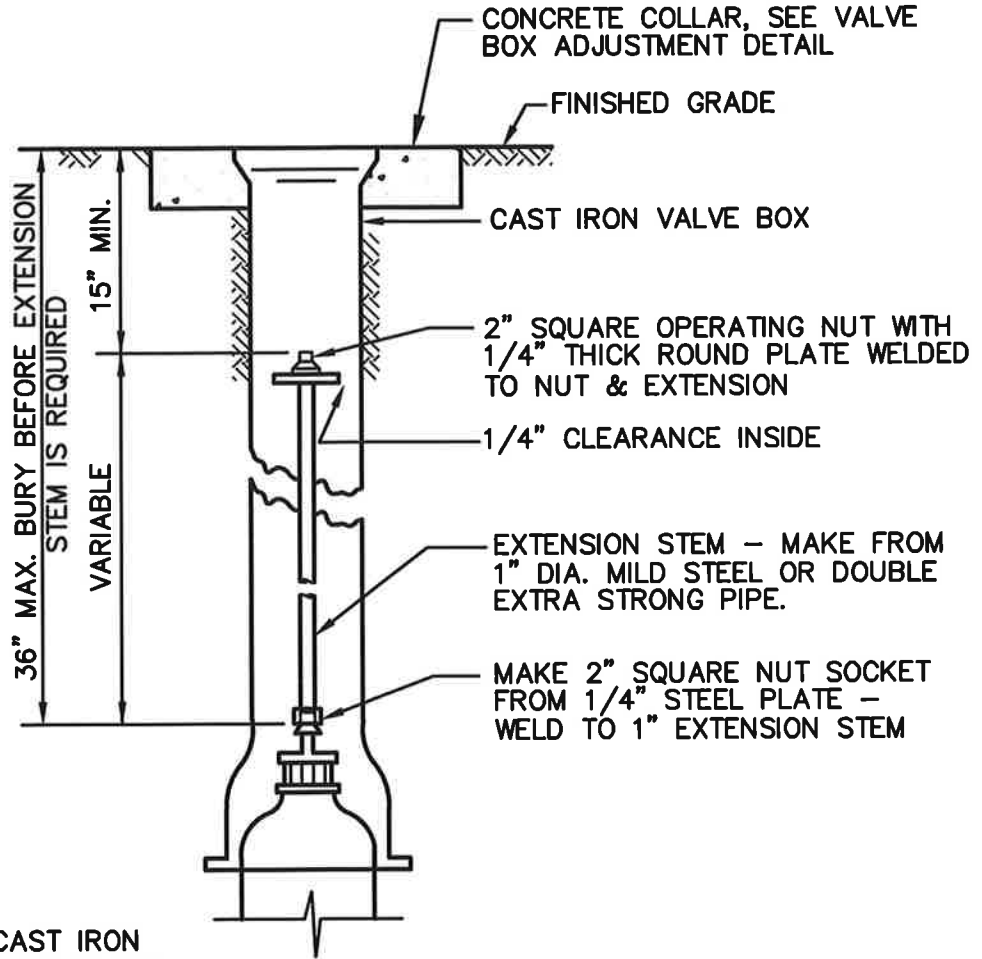
**NOTES**


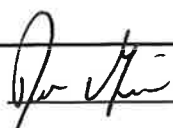
1. INSTALL DIELECTRIC COMPOUNDS FOR SEPARATION AT DISSIMILAR METALS.

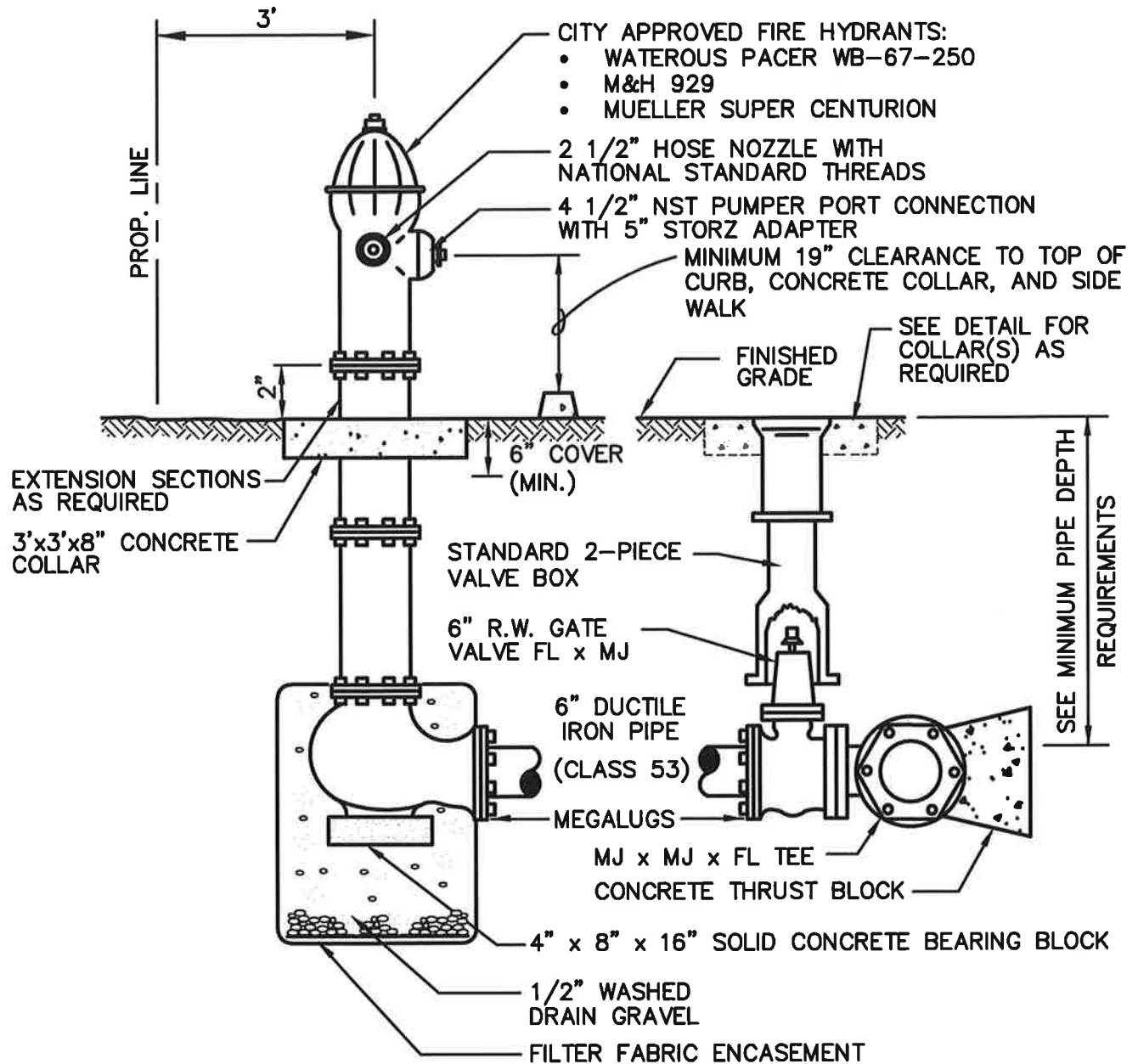
|  |                      |
|--|----------------------|
|  <p><b>CITY OF ALGONA</b></p> <p>2" BLOW-OFF ASSEMBLY</p> |                      |
| APPROVED:    | DWG. NO.<br>BLOW-OFF |
| DATE: 04/06/2015   |                      |



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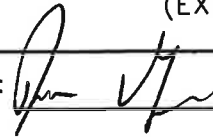


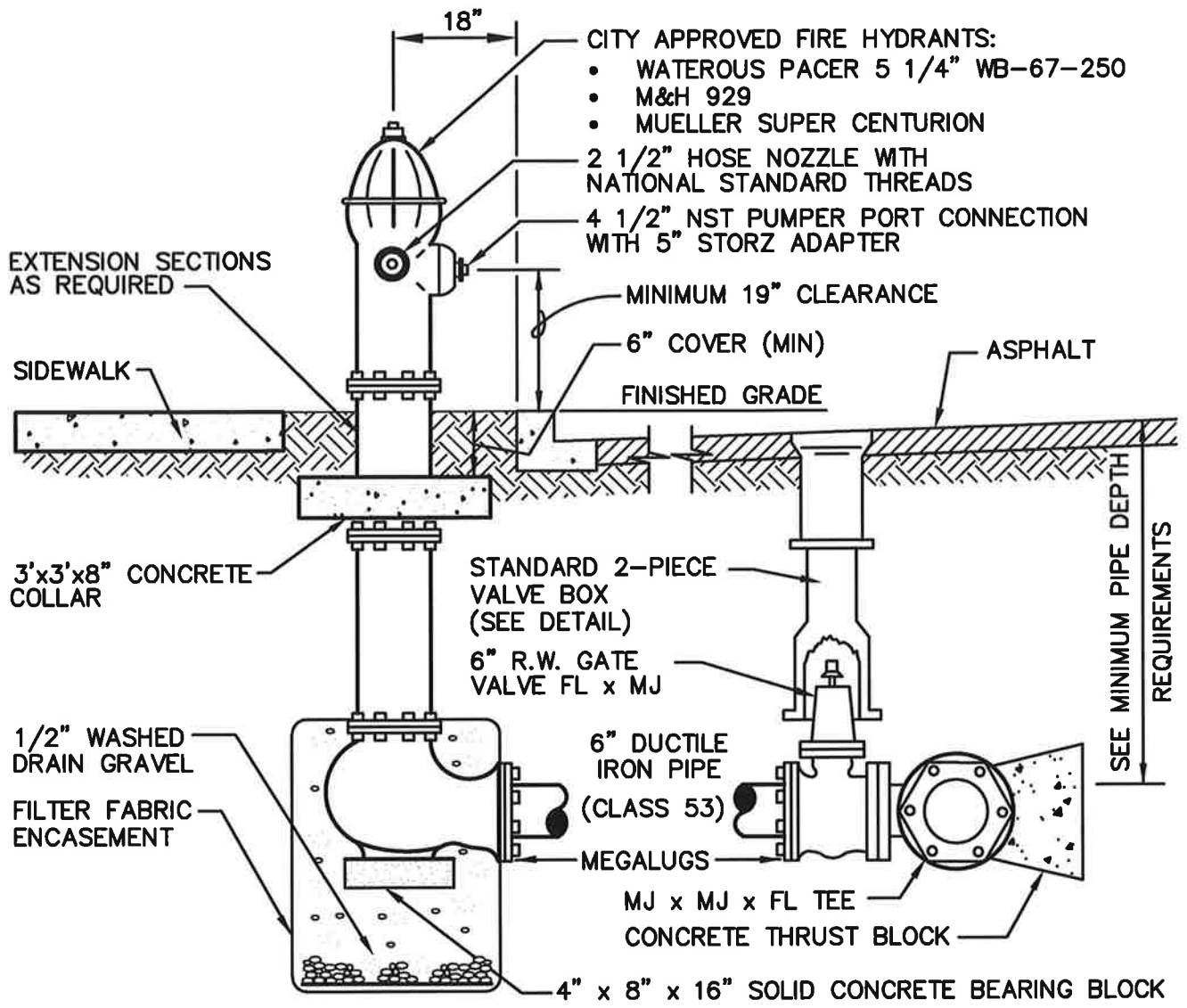
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|--|----------|
|             |          |
| <b>CITY OF ALGONA</b>  |          |
| WATER VALVE STEM EXTENSION   |          |
| APPROVED:  | DWG. NO. |
| DATE: 04/06/2015   | WAT-VALV |



**NOTES:**

1. FIRE HYDRANTS TO BE PAINTED WITH RUSTOLEUM ENAMEL SAFETY YELLOW.
2. INSTALL BLUE LANE REFLECTOR IN PAVEMNT.

|  |  |
|--|--|
|             | <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">FIRE HYDRANT INSTALLATION<br/>(EXTRUDED CURB)</p> |
| APPROVED:  | DWG. NO.<br>FIRE-HYD   |
| DATE: 04/06/2015   |  |



- CITY APPROVED FIRE HYDRANTS:
- WATEROUS PACER 5 1/4" WB-67-250
  - M&H 929
  - MUELLER SUPER CENTURION
- 2 1/2" HOSE NOZZLE WITH NATIONAL STANDARD THREADS
- 4 1/2" NST PUMPER PORT CONNECTION WITH 5" STORZ ADAPTER

EXTENSION SECTIONS AS REQUIRED

SIDEWALK

MINIMUM 19" CLEARANCE

6" COVER (MIN)

ASPHALT

FINISHED GRADE

3'x3'x8" CONCRETE COLLAR

STANDARD 2-PIECE VALVE BOX (SEE DETAIL)

6" R.W. GATE VALVE FL x MJ

SEE MINIMUM PIPE DEPTH REQUIREMENTS

1/2" WASHED DRAIN GRAVEL

FILTER FABRIC ENCASMENT

6" DUCTILE IRON PIPE (CLASS 53)

MEGALUGS


MJ x MJ x FL TEE

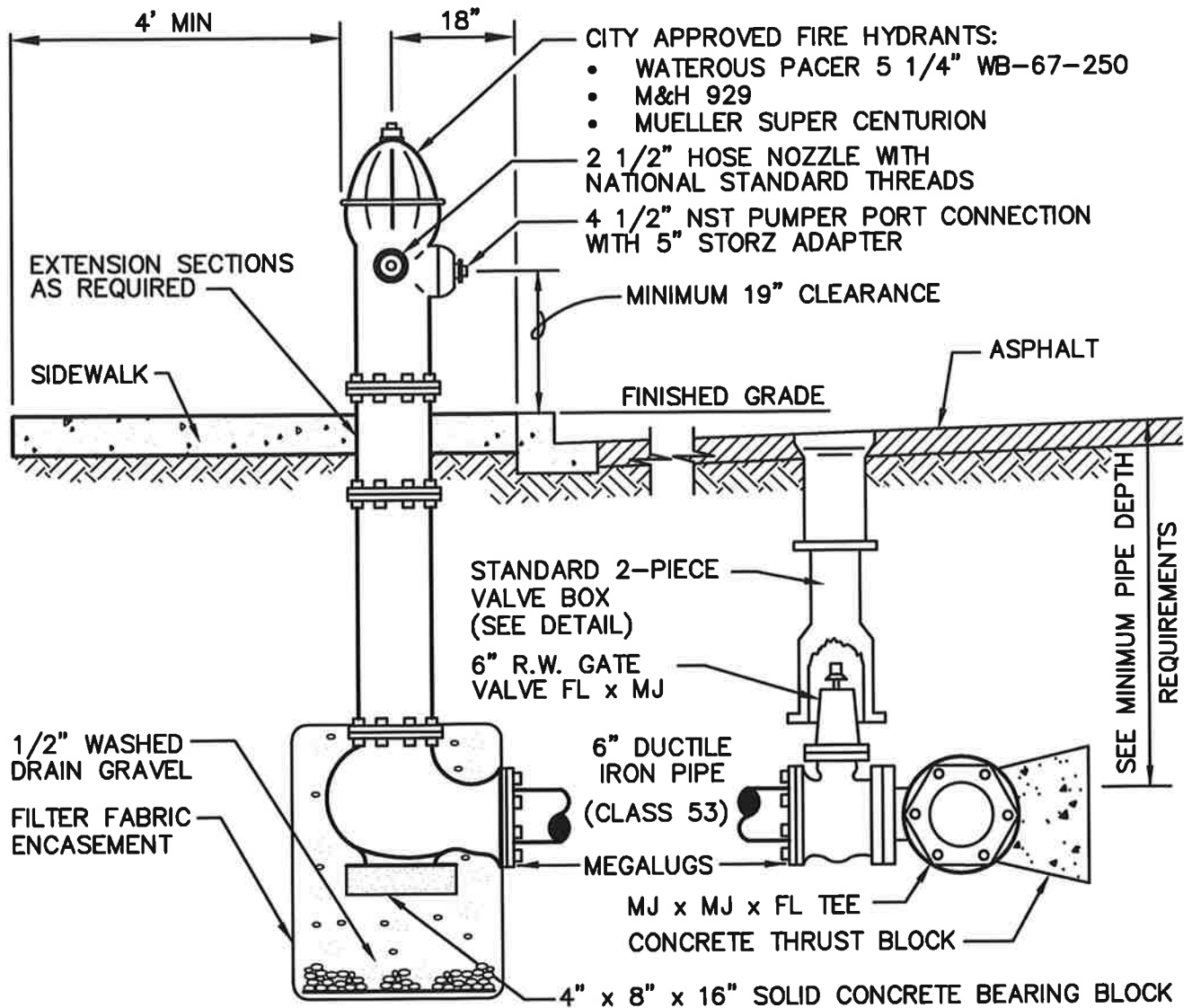
CONCRETE THRUST BLOCK

4" x 8" x 16" SOLID CONCRETE BEARING BLOCK

**NOTES:**

1. FIRE HYDRANTS TO BE PAINTED WITH RUSTOLEUM ENAMEL SAFETY YELLOW.
2. INSTALL BLUE LANE REFLECTOR IN PAVEMNT.

|   |   |                               |
|---|---|-------------------------------|
|  | <h2>CITY OF ALGONA</h2> <p>FIRE HYDRANT IN PLANTER STRIP<br/>(CURB, GUTTER, SIDEWALK)</p> |                               |
|   | <p>APPROVED: <i>[Signature]</i></p> <p>DATE: 04/06/2015</p>                               | <p>DWG. NO.<br/>FIRE-HYD2</p> |



**NOTES:**

1. FIRE HYDRANTS TO BE PAINTED WITH RUSTOLEUM ENAMEL SAFETY YELLOW.
2. INSTALL BLUE LANE REFLECTOR IN PAVEMNT.



**CITY OF ALGONA**

FIRE HYDRANT IN SIDEWALK  
(CURB, GUTTER, SIDEWALK)

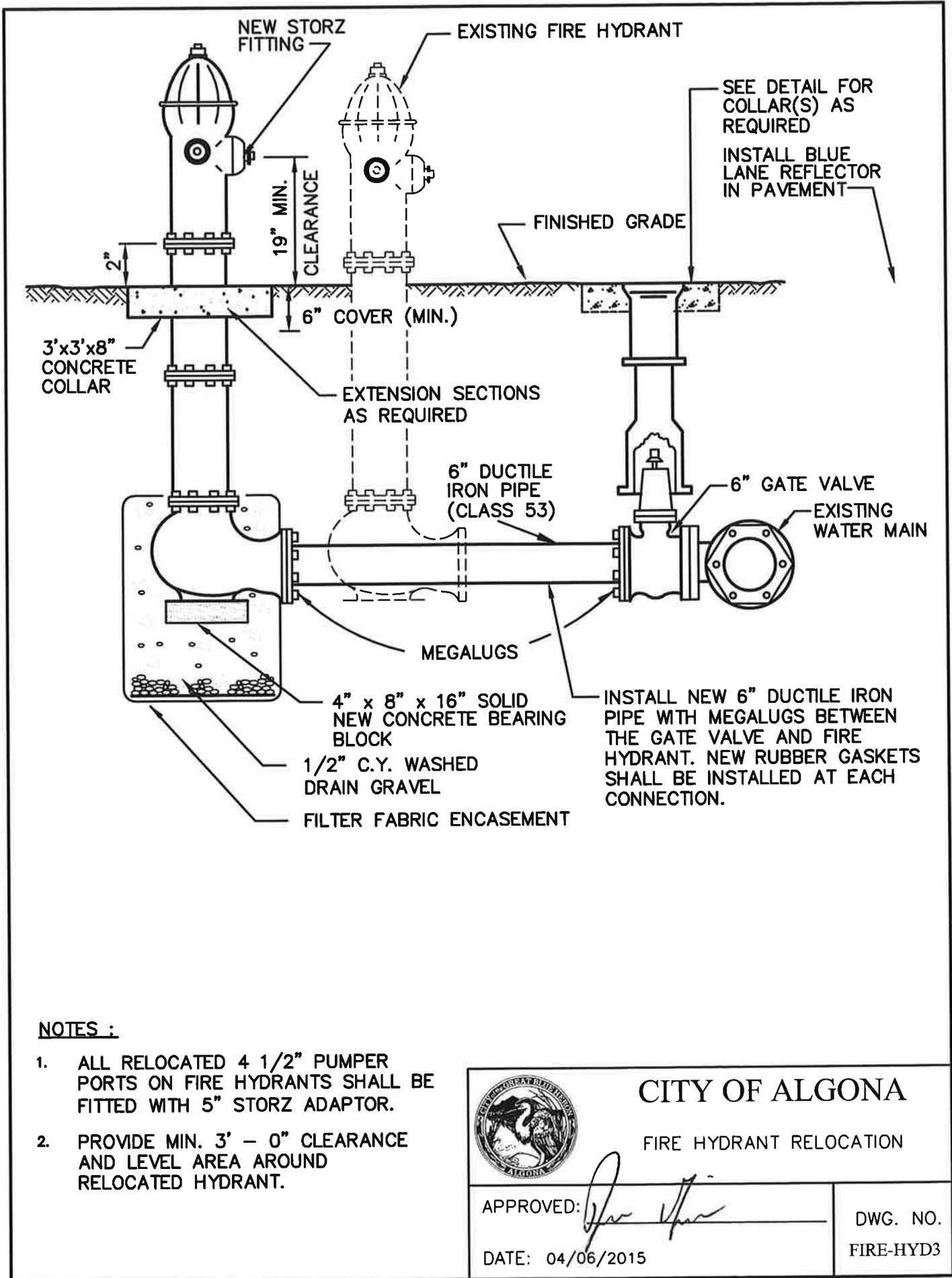
APPROVED:

*[Signature]*

DATE: 04/06/2015



DWG. NO.

FIRE-HYD2

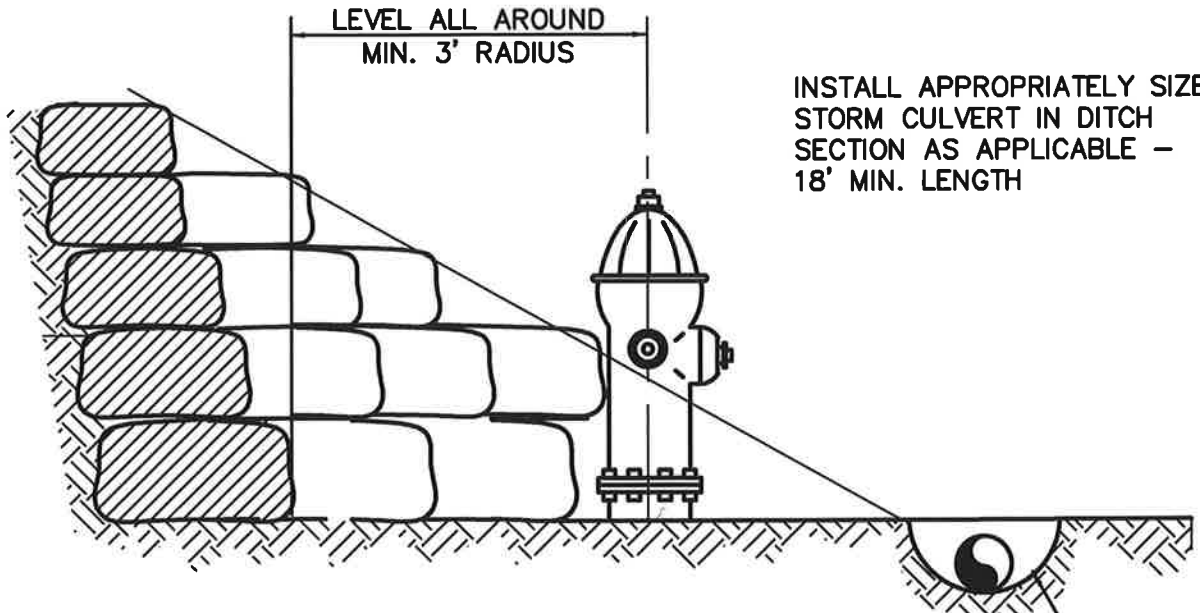


**NOTES :**

1. ALL RELOCATED 4 1/2" PUMPER PORTS ON FIRE HYDRANTS SHALL BE FITTED WITH 5" STORZ ADAPTOR.
2. PROVIDE MIN. 3' - 0" CLEARANCE AND LEVEL AREA AROUND RELOCATED HYDRANT.

|  |  |
|--|--|
|             | <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">FIRE HYDRANT RELOCATION</p> |
| APPROVED:  | DWG. NO.<br><b>FIRE-HYD3</b>   |
| DATE: 04/06/2015   |  |

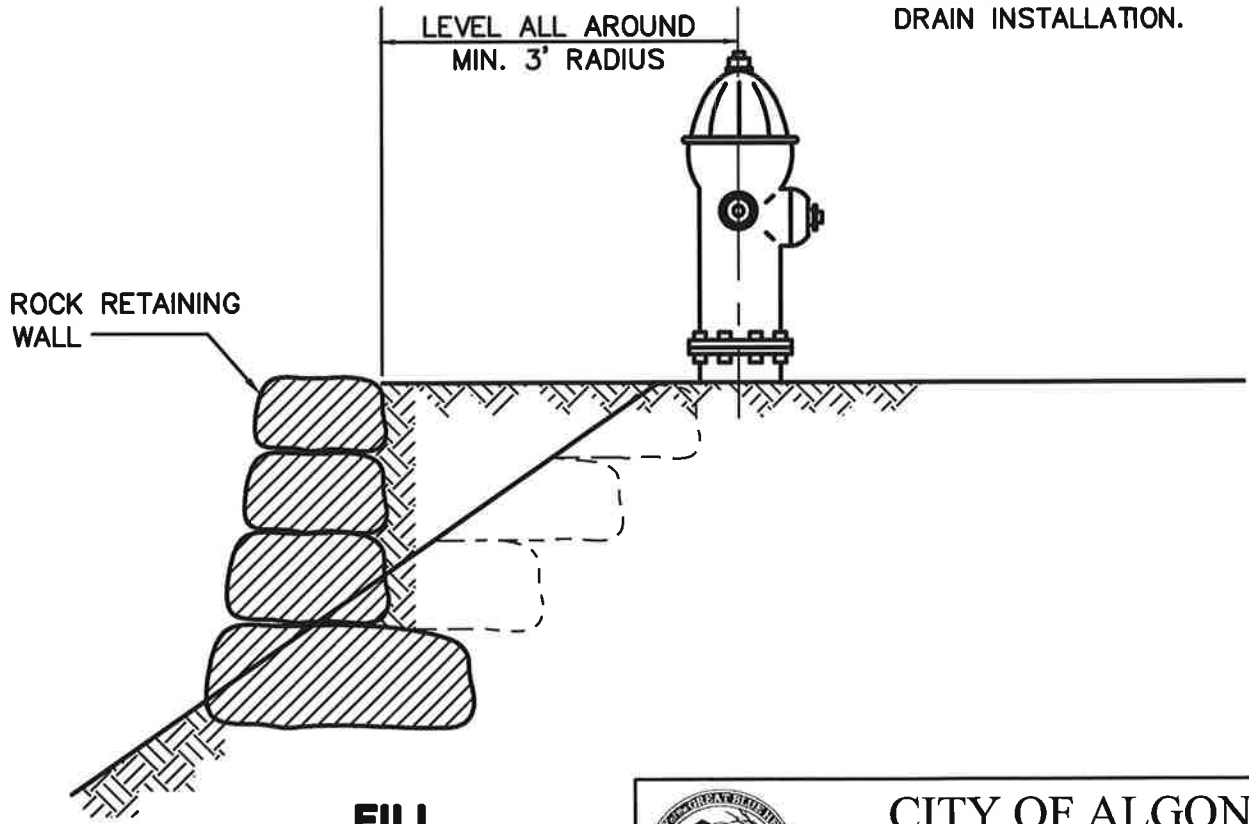
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**CUT**

INSTALL APPROPRIATELY SIZED STORM CULVERT IN DITCH SECTION AS APPLICABLE - 18' MIN. LENGTH

REFER TO CITY STANDARDS FOR STORM DRAIN INSTALLATION.



**FILL**



**CITY OF ALGONA**

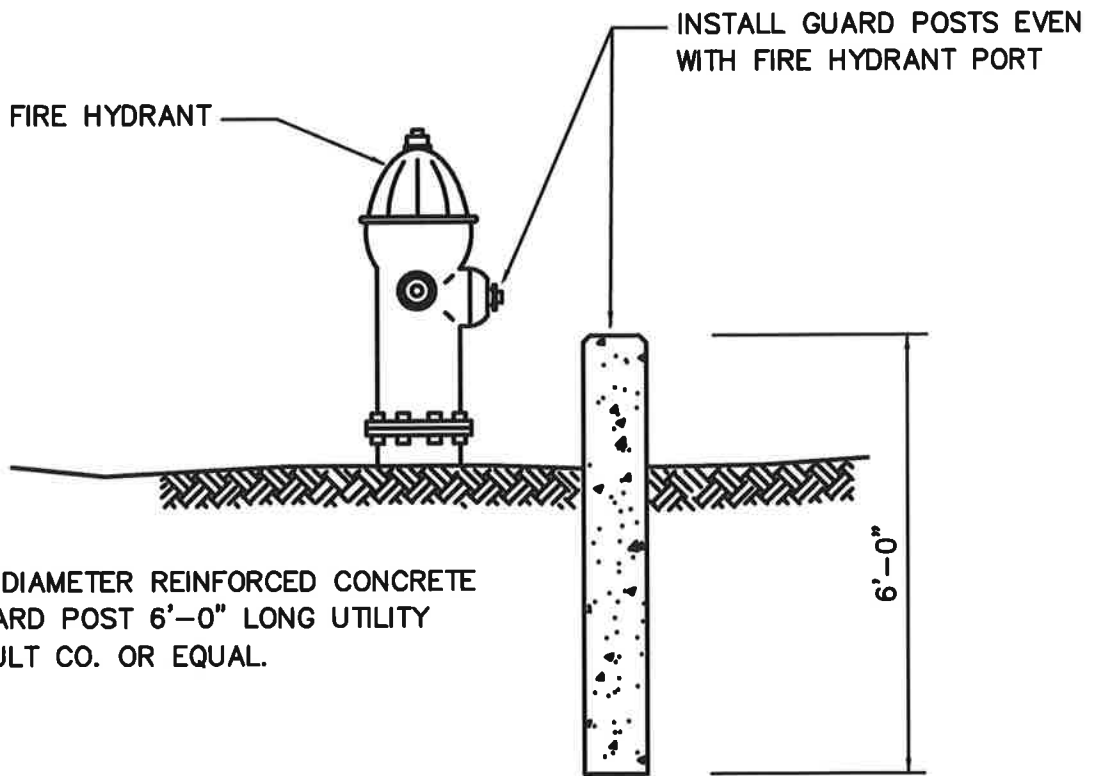
FIRE HYDRANT IN CUT OR FILL

APPROVED:

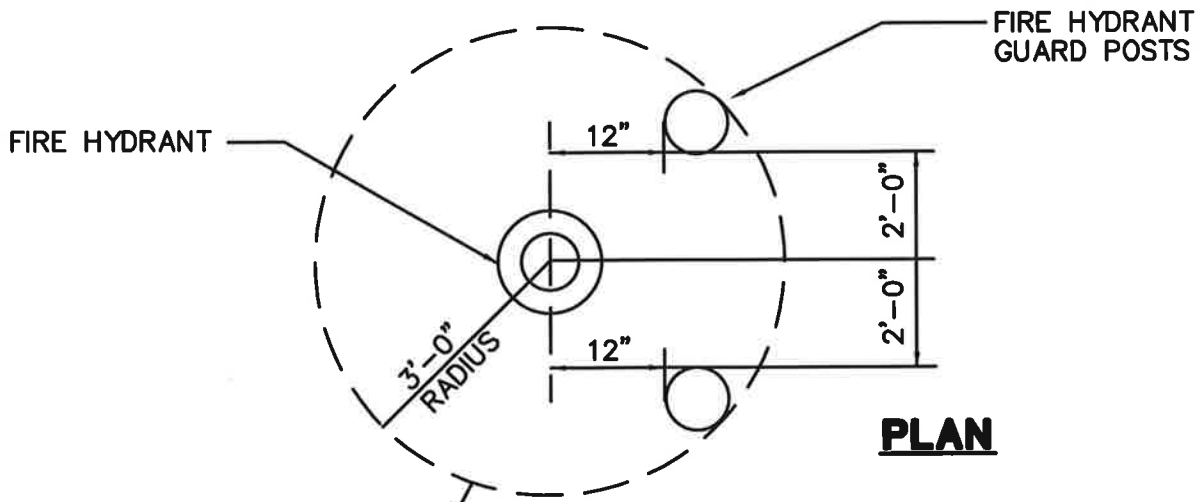
DATE: 04/06/2015

DWG. NO.

FIRE-HYD4





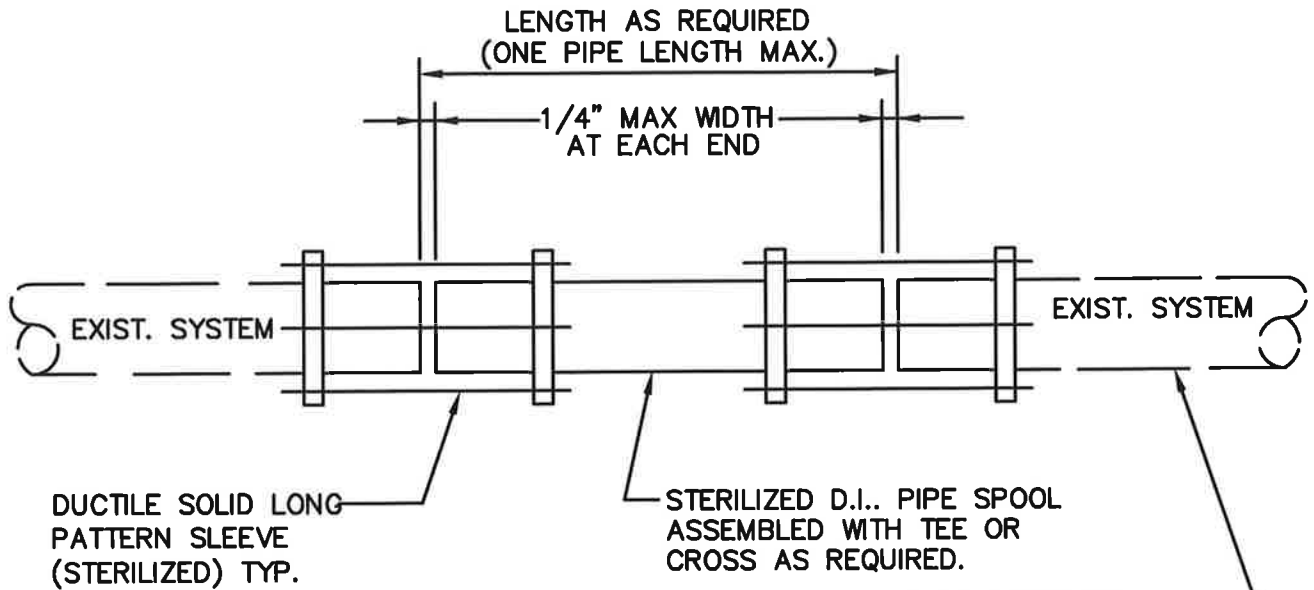
**ELEVATION**



**PLAN**

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|   |  |                       |
|---|--|-----------------------|
|  | <b>CITY OF ALGONA</b><br>FIRE HYDRANT GUARD POST<br>INSTALLATION                               |                       |
|   | APPROVED:  | DWG. NO.<br>FIRE-HYD5 |
| DATE: 04/06/2015  |  |                       |



DISCHARGE PRESSURE PRIOR TO REMOVAL OF THRUST BLOCK AND CONNECTION TO EXIST. SYSTEM.

**NOTE:**

1. NO DEFLECTION SHALL BE ALLOWED AT EITHER COUPLING.
2. CUT-IN CONNECTIONS ON NON-D.I. PIPE SHALL USE EXTENDED RANGE COUPLING (ROMAC XR501 COUPLING OR EQUAL)
3. IN-LINE VALVE(S) IN EXISTING SYSTEM MAY BE REQUIRED AT THE SOLE DISCRETION OF THE CITY AT ALL NEW INTERTIE LOCATIONS. (NOTE: VALVE(S) ARE NOT SHOWN ABOVE FOR CLARITY)



**CITY OF ALGONA**

CUT IN CONNECTION

APPROVED:

DATE: 04/06/2015

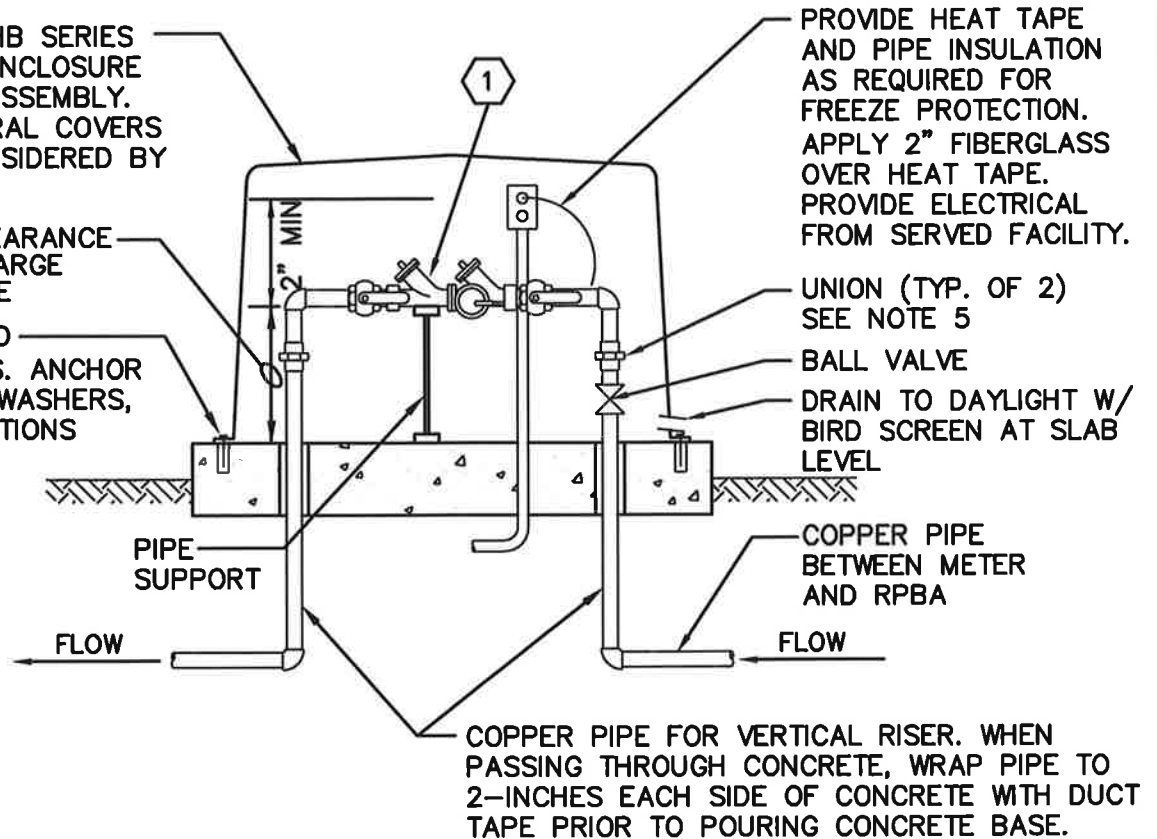
DWG. NO.  
CUT-CONN



"HOT BOX" HB SERIES INSULATED ENCLOSURE SIZED FOR ASSEMBLY. ARCHITECTURAL COVERS WILL BE CONSIDERED BY CITY.

12" MIN. CLEARANCE FROM DISCHARGE TO CONCRETE

BOLT TO PAD W/ 3/8" S.S. ANCHOR BOLTS AND WASHERS, MIN. 4 LOCATIONS



PROVIDE HEAT TAPE AND PIPE INSULATION AS REQUIRED FOR FREEZE PROTECTION. APPLY 2" FIBERGLASS OVER HEAT TAPE. PROVIDE ELECTRICAL FROM SERVED FACILITY.

UNION (TYP. OF 2) SEE NOTE 5

BALL VALVE

DRAIN TO DAYLIGHT W/ BIRD SCREEN AT SLAB LEVEL

COPPER PIPE BETWEEN METER AND RPBA

COPPER PIPE FOR VERTICAL RISER. WHEN PASSING THROUGH CONCRETE, WRAP PIPE TO 2-INCHES EACH SIDE OF CONCRETE WITH DUCT TAPE PRIOR TO POURING CONCRETE BASE.


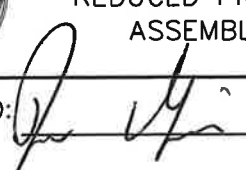
**REDUCED PRESSURE BACKFLOW DEVICE (<3")**

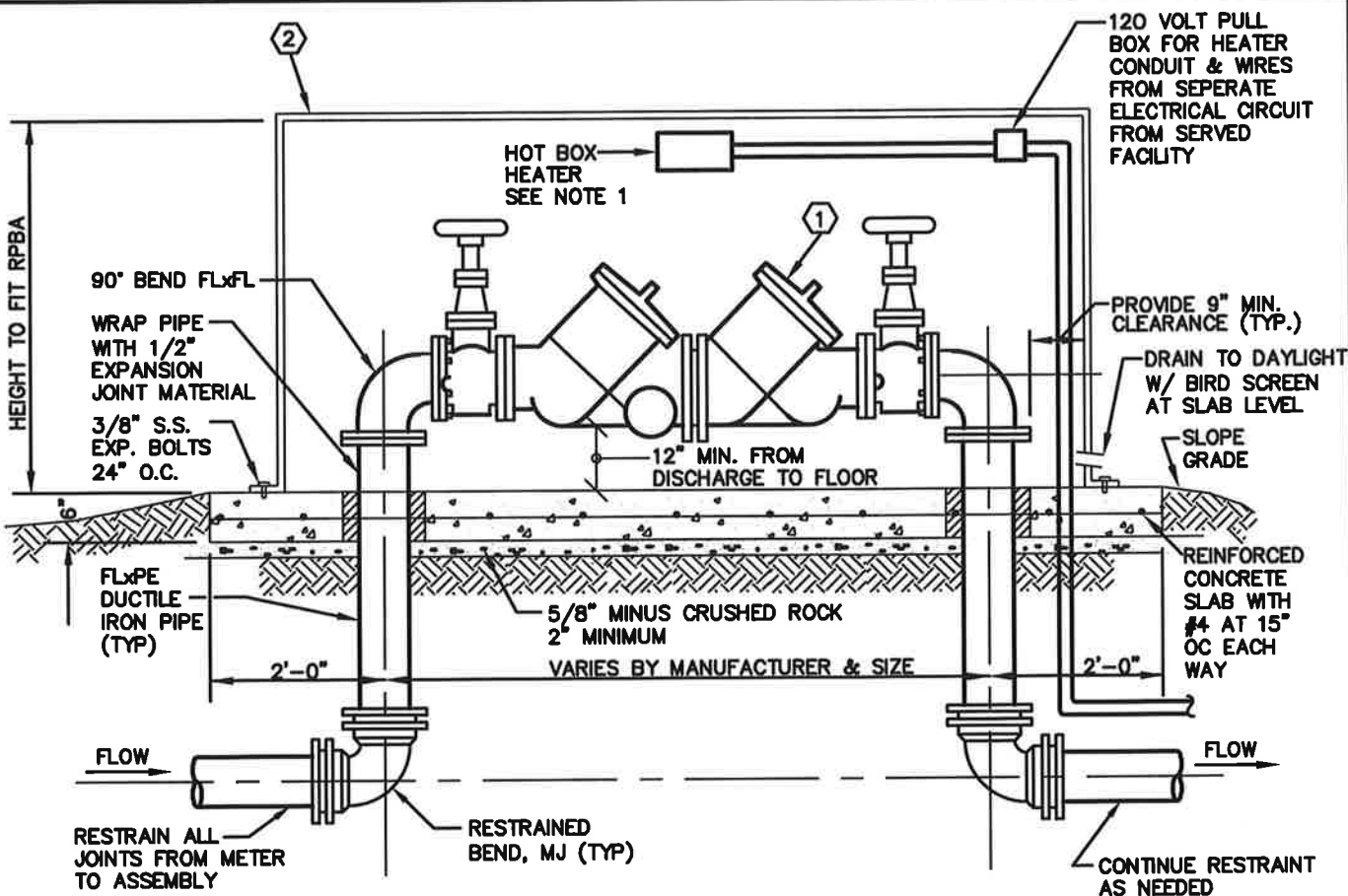
NOT TO SCALE

1 WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) WITH TEST COCK PROTECTION AND BRONZE BODY BALL VALVE AT EACH END.

**NOTES:**

1. CONCRETE TO BE 2500 PSI (MINIMUM) MIX WITH AIR ENTRAINMENT.
2. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND MANUFACTURER STANDARDS.
3. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
4. RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
5. DIELECTRIC UNIONS SHALL BE USED TO SEPARATE DISSIMILAR MATERIALS.
6. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND RPBA.


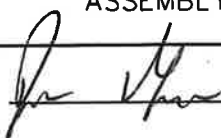
|   |   |                          |
|---|---|--------------------------|
|  | <p><b>CITY OF ALGONA</b></p> <p>REDUCED PRESSURE BACKFLOW ASSEMBLY 3/4" TO 2"</p>   |                          |
|   | <p>APPROVED: </p> <p>DATE: 04/06/2015</p> | <p>DWG. NO.<br/>RPBA</p> |

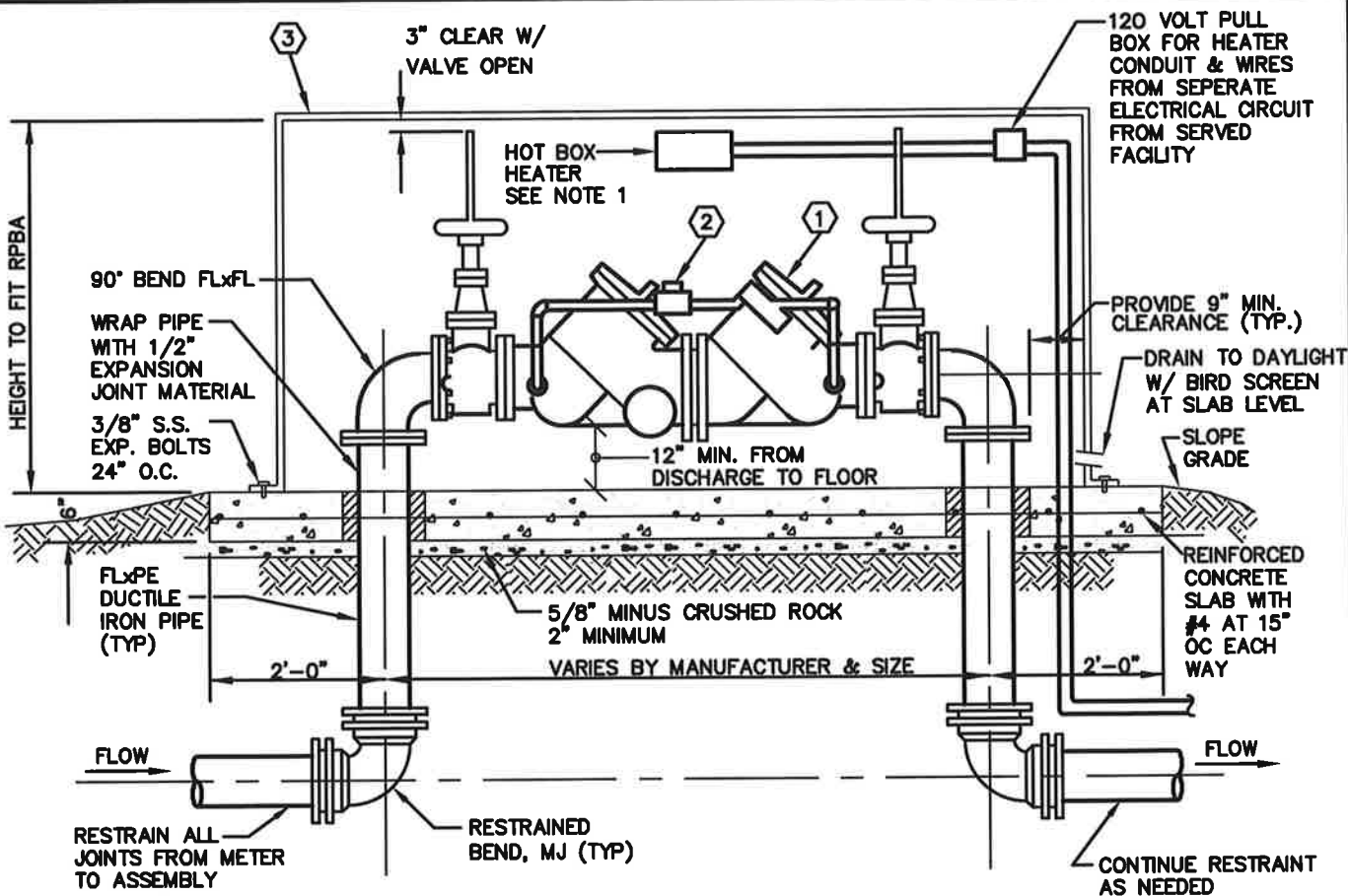


- ① WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) WITH RESILIENT SEAT GATE VALVE EACH END
- ② ALUMINUM "HOT BOX" MODELS 4 THROUGH 10 FOR RESPECTIVE SIZE RPBA SHALL BE MODIFIED TO FIT ABOVE HEIGHT REQUIREMENTS. VALVE STEM SHALL NOT EXTEND OUTSIDE OF BOX.

**NOTES:**

1. "HOT BOX" TO BE LOCATED OUTDOORS AND ACCESSIBLE TO CITY. ALTERNATE LOCATION REQUIRES CITY APPROVAL
2. HEATERS AND WIRING SHALL BE RATED AT 2,000 WATT FOR 8" AND UNDER; 3,000 WATT FOR 10".
3. CONCRETE TO BE 2500 PSI (MINIMUM) MIX WITH AIR ENTRAINMENT.
4. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND MANUFACTURER STANDARDS.
5. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
6. RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
7. DRAIN TO DAYLIGHT WITH BIRD SCREEN LOCATED AT SLAB LEVEL (SIZED PER MANUFACTURERS RECOMMENDATION).
8. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND RPBA.

|  |  |
|--|--|
|             | <p><b>CITY OF ALGONA</b></p> <p>REDUCED PRESSURE BACKFLOW<br/>ASSEMBLY 3" AND LARGER</p> |
| APPROVED:  | DWG. NO.<br>RPBA-2   |
| DATE: 04/06/2015   |  |



- ① WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) WITH OS&Y RESILIENT SEAT GATE VALVE EACH END AND LOW FLOW METER ASSEMBLY.
- ② LOW FLOW BYPASS METER, INCLUDING 5/8"x3/4" SENSUS RADIO READ WATER METER WITH SENSUS AMR AND MXU RADIO UNIT, WASHINGTON STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA) AND 2 BRONZE BODY ISOLATION BALL VALVES, BRASS OR TYPE K COPPER PIPING.
- ③ ALUMINUM "HOT BOX" MODELS 4 THROUGH 10 FOR RESPECTIVE SIZE RPBA SHALL BE MODIFIED TO FIT ABOVE HEIGHT REQUIREMENTS. VALVE STEM SHALL NOT EXTEND OUTSIDE OF BOX.

**NOTES:**

1. HEATERS AND WIRING SHALL BE RATED AT 2,000 WATT FOR 8" AND UNDER; 3,000 WATT FOR 10".
2. CONCRETE TO BE 2500 PSI (MINIMUM) MIX WITH AIR ENTRAINMENT.
3. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND MANUFACTURER STANDARDS.
4. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
5. RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
6. DRAIN TO DAYLIGHT WITH BIRD SCREEN LOCATED AT SLAB LEVEL (SIZED PER MANUFACTURERS RECOMMENDATION).
7. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND RPBA.



**CITY OF ALGONA**

REDUCED PRESSURE BACKFLOW  
DETECTOR ASSEMBLY 3" AND LARGER

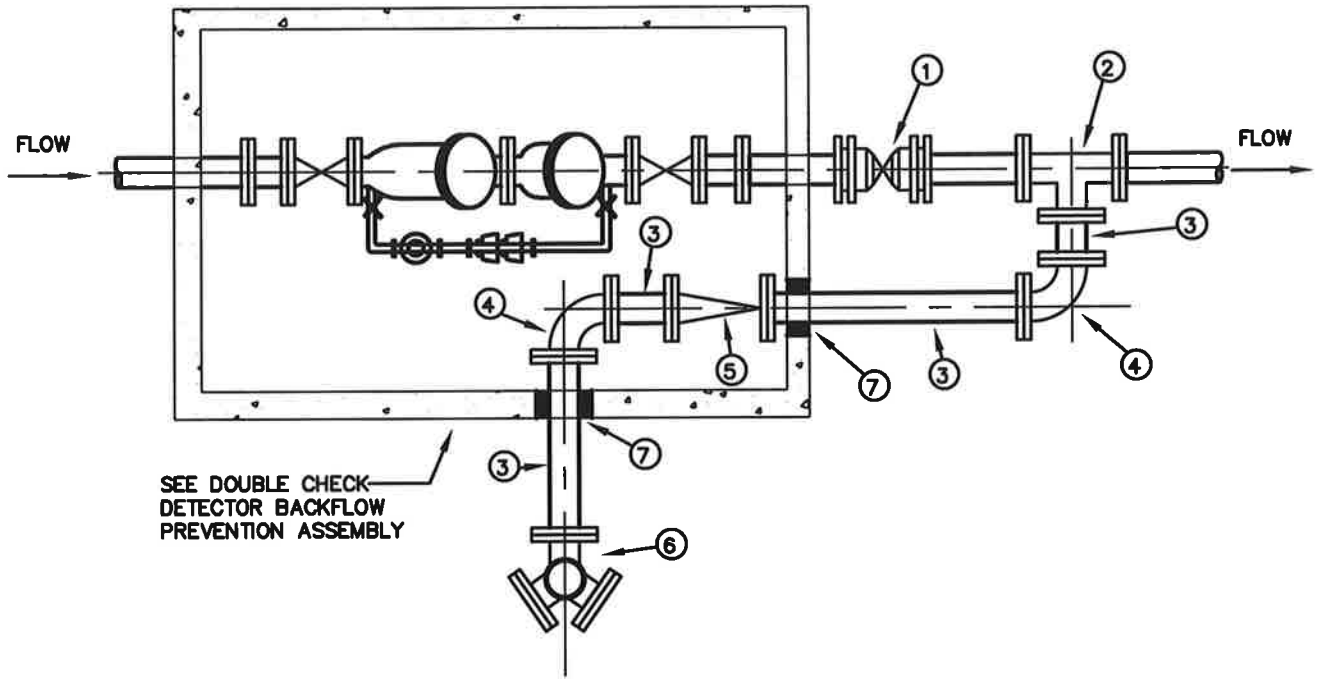
APPROVED:

*[Signature]*

DATE: 04/06/2015

DWG. NO.

RPBA-2



| NO. | DESCRIPTION   |
|-----|---|
| 1   | POST INDICATOR VALVE, MJ WITH MEGALUGS  |
| 2   | 4" TEE, MJ WITH MEGALUGS OR FLANGE  |
| 3   | 4" DUCTILE IRON PIPE, CLASS 52  |
| 4   | 4" x 90° BENDS, MJ WITH MEGALUGS OR FLANGE  |
| 5   | 4" FLAPPER CHECK VALVE, MJ WITH MEGALUGS OR FLANGE  |
| 6   | FIRE DEPARTMENT CONNECTION, MJ WITH MEGALUGS OR FLANGE. CONNECTION TO COMPLY WITH FIRE DEPARTMENT REQUIREMENTS. |
| 7   | WATERTIGHT GROUT  |



# CITY OF ALGONA

## FIRE LINE CONNECTION

APPROVED:

DATE: 04/06/2015

DWG. NO.  
FIRELINE

4"x4" CONC. MARKER POST PAINTED BLUE WITH BLACK STENCILED DISTANCE & DIRECTION TO VALVE

PAINT BLUE THAT PORTION ABOVE GROUND

17" x 28" CONC. METER BOX WITH 3/8" STEEL DIAMOND PLATE COVER, FOG-TITE METER SEAL CO. NO.2

2" BEEHIVE STRAINER

2" OPEN PATTERN RETURN BEND

CONCRETE COLLAR, SEE VALVE BOX ADJUSTMENT DETAIL

FINISHED GRADE

2'-0"

CAST IRON VALVE BOX

2" GATE VALVE

2"x90° ELL UNION

2" GALV. IRON PIPE SLOPE

FILTER FABRIC

18" MAX

BACKFILL W/ SAWDUST

2, 2" x 90° EL GALV. WITH WEEP HOLE IN ONE, 2" SWING JOINT

1/4 CU. WASHED ROCK

2" MIPxCTS ADAPTOR (TYP)

2" PIPE TYPE K COPPER

2" NIPPLE & UNIONS

FOUNDATION ROCK

DOUBLE STRAP SERVICE CLAMP

DUCTILE IRON WATER MAIN


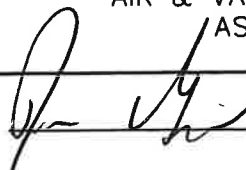
2" AIR & VACUUM RELEASE VALVE, "APCO" OR OWNER APPROVED EQUAL

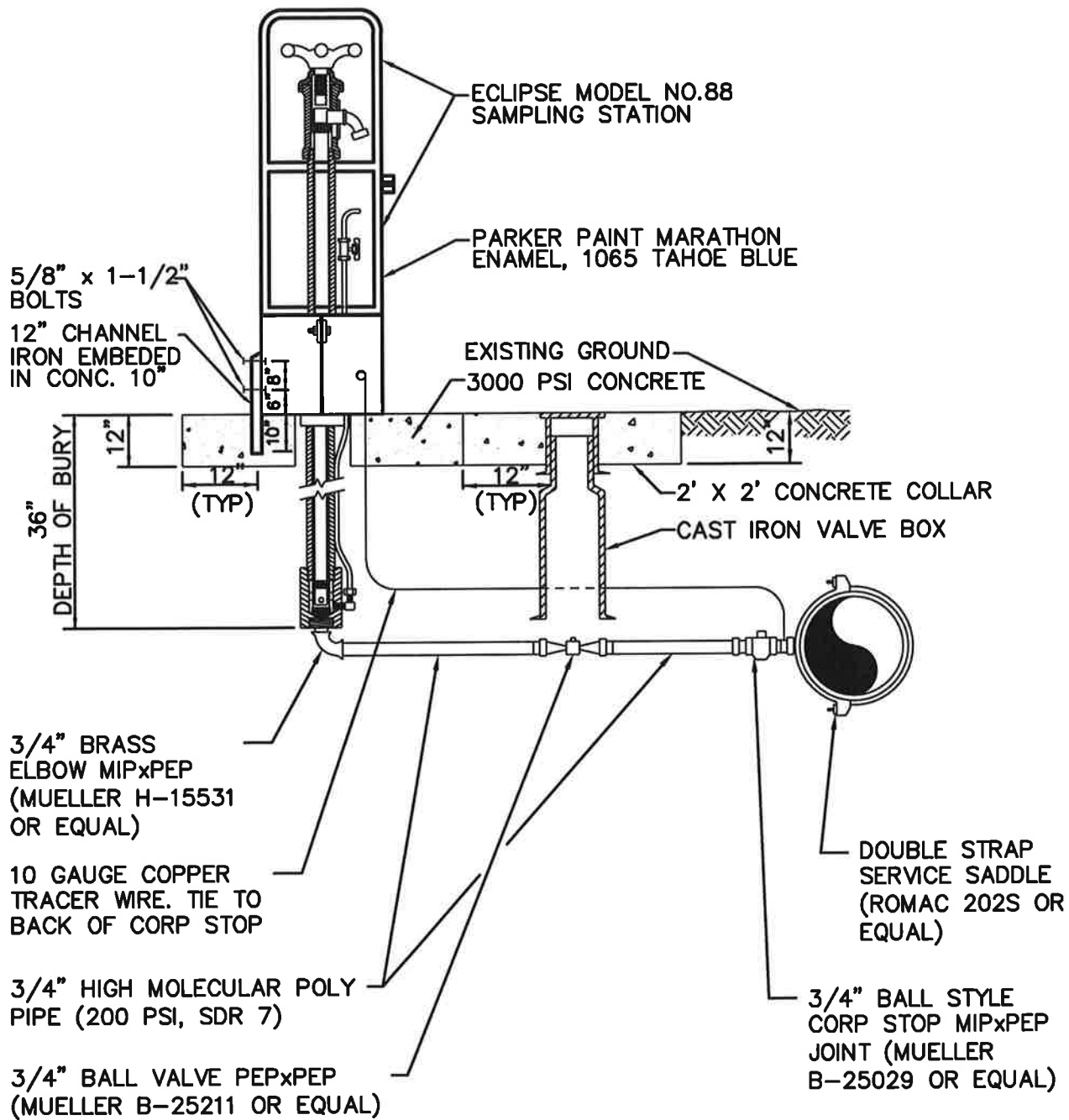
UNDISTURBED EARTH

**NOTES:**


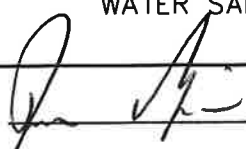
1. GATE VALVE: AWWA RESILIENT SEAL, THRD x THRD WITH OPERATING NUT
2. ALL PIPING BETWEEN DOUBLE STRAP SADDLE AND INLET SIDE OF COMBINATION AIR & VAC ASSEMBLY SHALL BE TYPE K COPPER
3. TAP MAIN AT SYSTEM HIGH POINT. LOCATION TO BE APPROVED BY THE CITY
4. PAINT PORTION ABOVE GROUND WITH TWO COATS RUSTOLEUM ENAMEL SAFETY YELLOW

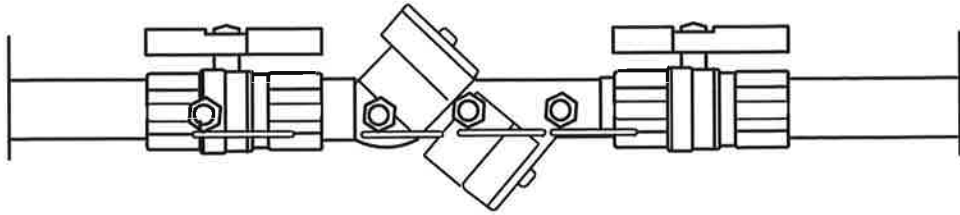
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|  |                             |
|--|-----------------------------|
|  <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">AIR &amp; VACUUM RELEASE ASSEMBLY</p> |                             |
| <p>APPROVED: </p> <p>DATE: 04/06/2015</p>  | <p>DWG. NO.<br/>AIR-RLS</p> |

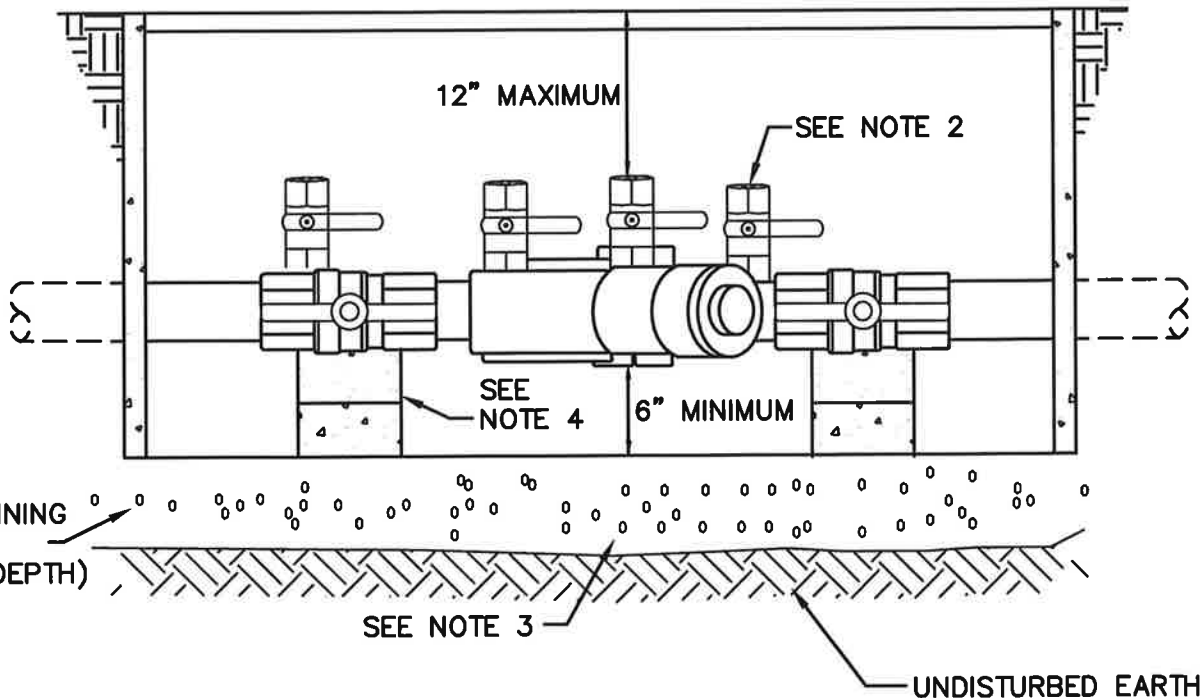


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|   |                      |
|---|----------------------|
|  <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">WATER SAMPLING STATION</p> |                      |
| APPROVED:   | DWG. NO.<br>WAT-SAMP |
| DATE: 04/06/2015  |                      |



**PLAN VIEW**



**NOTES:**

1. MINIMUM BOX SIZE 3/4" - 1" ASSEMBLIES, 10"x13"  
1 1/4" - 2" ASSEMBLIES, 14"x20"
2. ASSEMBLY MUST BE INSTALLED WITH TEST COCKS FACING UP OR TO ONE SIDE. INSTALL WATERTIGHT PLUGS IN ALL TEST COCKS.
3. SUFFICIENT DRAINAGE MUST BE PROVIDED TO PREVENT ASSEMBLY FROM BEING SUBMERGED.
4. PROVIDE SUPPORT BLOCKS AS MAY BE REQUIRED.
5. PROVIDE A STRAINER WITH BLOW OUT VALVE AHEAD OF DEVICE IF REQUIRED BY CITY.
6. THOROUGHLY FLUSH THE LINE, PRIOR TO THE INSTALLATION OF THE DCVA.
7. PROTECT DEVICE FROM FREEZING BY INSTALLING IN BELOW GROUND STRUCTURE OR PER "HOT BOX" SHOWN IN REDUCED PRESSURE BACKFLOW DEVICE DETAIL.



**CITY OF ALGONA**

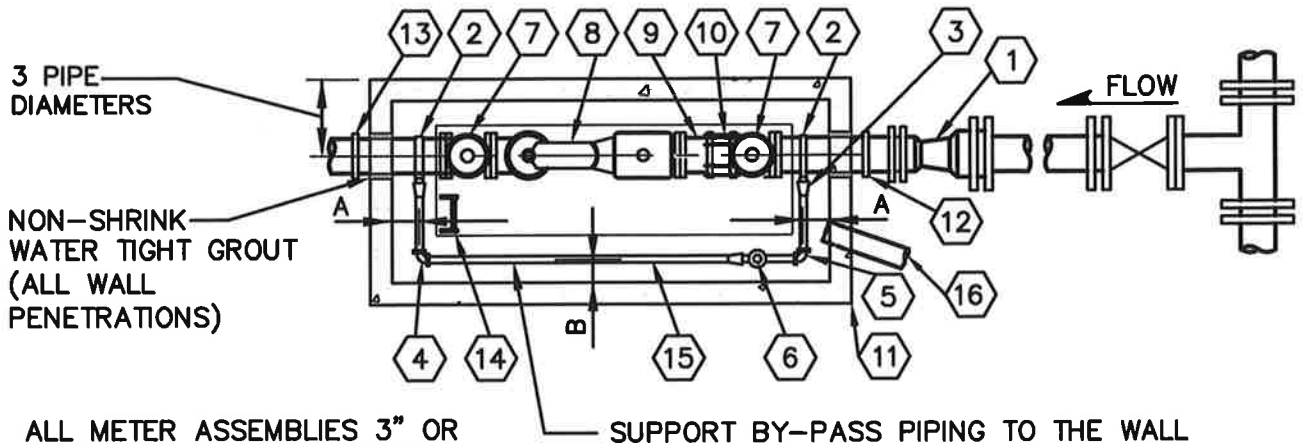
"INDIVIDUAL" DOUBLE CHECK  
DETECTOR ASSEMBLY

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.

DBL-CHCK



ALL METER ASSEMBLIES 3" OR LARGER SHALL BE REVIEWED AND APPROVED BY CITY.

### PLAN

- ① REDUCER, M.J.
- ② SINGLE STRAP SERVICE CLAMP, ROMAC 101 WITH IPS TAP, OR EQUAL (1 1/2" OR 2" BYPASS, 4-INCH AND LARGER BYPASS REQUIRES D.I. TEE).
- ③ FITTINGS AS REQUIRED.
- ④ BEND CPLG COPPER TO COPPER MUELLER H-15525, OR EQUAL.
- ⑤ BEND CPLG, COPPER TO OUTSIDE I.P. THREAD MUELLER H-15530, OR EQUAL.
- ⑥ BALL VALVE WITH PADLOCK WING OR LOCK CAP, FORD B21-444W OR B21-666 WITH LOCK CAP OR B21-777 WITH LOCK CAP. SIZED TO LINE.
- ⑦ RESILIENT SEAT GATE VALVE, FL X FL SIZED TO METER.
- ⑧ 3" TO 10" SENSUS METER FOR IRRIGATION SERVICES AND 3" TO 10" COMPOUND METER IF FOR DOMESTIC SERVICE. READ IN CUBIC FEET WITH MXU RADIO UNIT AS SPECIFIED BY CITY SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
- ⑨ D.I. PIPE SPOOL FL X PE LENGTH TO FIT.
- ⑩ FL CPLG. ADAPT.
- ⑪ PRECAST CONCRETE VAULT, UTILITY VAULT OR EQUAL, SEE PAGE 2 FOR SIZING AND REQUIREMENTS.
- ⑫ MEGA-LUG FOLLOWER INSTALLED ON INFLOW SIDE OF VAULT WITH CONCRETE THRUST BLOCK OR SHACKLE TO THRUST BLOCK TO PREVENT MOVEMENT IF METER IS REMOVED. (BLOCK NOT SHOWN)
- ⑬ DIELECTRIC CPLG. TO BUILDING SERVICE. SIZE AS REQUIRED.
- ⑭ GALV. STEEL OR ALUMINUM LADDER. SECURE TO VAULT LID AND FLOOR. COORDINATE LOCATION FOR ACCESS.
- ⑮ BY-PASS (SIZE BY TABLE BELOW).
- ⑯ 4" PVC TO CATCH BASIN OR DAYLIGHT. WHERE GRAVITY DRAIN IS NOT FEASIBLE, PROVIDE SUMP, ELECTRICAL SERVICE AND PUMP WITH DISCHARGE TO SURFACE DRAIN. PUMP SHALL BE 1/2 HP ZOELLER M-53, WITH CHECK VALVE ON DISCHARGE LINE.
- ⑰ ALL PIPES AND FITTINGS 4-INCH OR LARGER SHALL BE DI., CL 52.

| METER SIZE | MAIN-LINE | BYPASS    | A   | B  |
|------------|-----------|-----------|-----|----|
| 3"         | 4" DI.    | 2" COPPER | 9"  | 4" |
| 3"         | 4" DI.    | 2" COPPER | 9"  | 4" |
| 4"         | 6" DI.    | 4" DI.    | 9"  | 4" |
| 6"         | 8" DI.    | 4" DI.    | 14" | 6" |
| 8"         | 10" DI.   | 8" DI.    | 16" | 6" |

**NOTES:**  
SEE PAGE 2 FOR ELEVATION AND NOTES.  
PAGE 1 OF 2



## CITY OF ALGONA

METER AND METER VAULT  
ASSEMBLY 3" THROUGH 10"

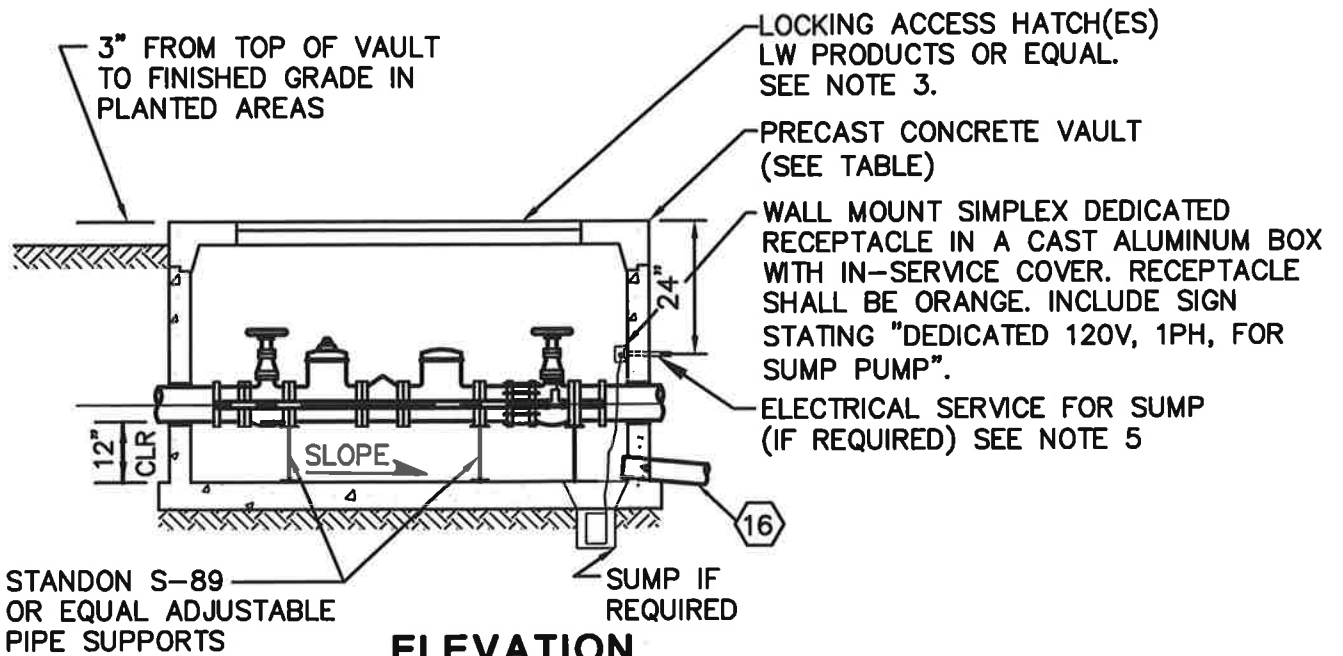
APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.

3MM





### ELEVATION

SEE DETAIL V-W16A FOR CALLOUTS

| METER SIZE | MAIN-LINE | MINIMUM I/S VAULT DIM.<br>L x W x H |       |       | UTILITY VAULT CO APPROVED MODEL | MIN. HATCH OPENING |
|------------|-----------|-------------------------------------|-------|-------|---------------------------------|--------------------|
| 3"         | 4" DI.    | 8'-4"                               | 4'-4" | 6'-2" | 4484-LA                         | 3' x 6'            |
| 4"         | 4" DI.    | 8'-4"                               | 4'-4" | 6'-2" | 4484-LA                         | 3' x 6'            |
| 6"         | 6" DI.    | 10'-6"                              | 5'-0" | 6'-2" | 5106-LA                         | 3' x 6'            |
| 8"         | 8" DI.    | 12'-0"                              | 6'-0" | 6'-6" | 612-LA                          | 3' x 6'            |
| 10"        | 10" DI.   | 14'-0"                              | 8'-0" | 6'-6" | 814-LA                          | 3' x 6'            |

#### NOTES:

- WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW PREVENTOR REQUIRED. SEE RPBA-2. CONFIRM INSTALLATION WITH CITY. INITIAL AND ANNUAL TEST REQUIRED.
- METER SHALL BE INSTALLED SUCH THAT IT CAN BE READ WITHOUT ENTERING VAULT WITH ACCESS HATCH OPEN.
- COORDINATE ORIENTATION OF HATCH(ES) TO PROVIDE CLEAR VERTICAL ACCESS TO METER ASSEMBLY, AND WITH LADDER LOCATION. VERIFY WITH CITY.
- DRAIN DRAIN HATCH(ES) TO VAULT FLOOR WITH PVC PIPE AND FITTINGS.
- 3/4" (MINIMUM) PVC SCH-40 CONDUIT. WIRING SHALL BE COMPLETELY SEALED 120V, UNDER GROUND. CONTRACTOR TO SEAL CONDUIT PENETRATION WITH NON-SHRINK GROUT. (NOT REQUIRED IF GRAVITY VAULT DRAIN PROVIDED).
- ESMT TO BE PROVIDED TO CITY AROUND METERS LOCATED OUTSIDE RIGHT-OF-WAY.
- SEE PAGE 1 FOR PLAN AND NOTES.



### CITY OF ALGONA

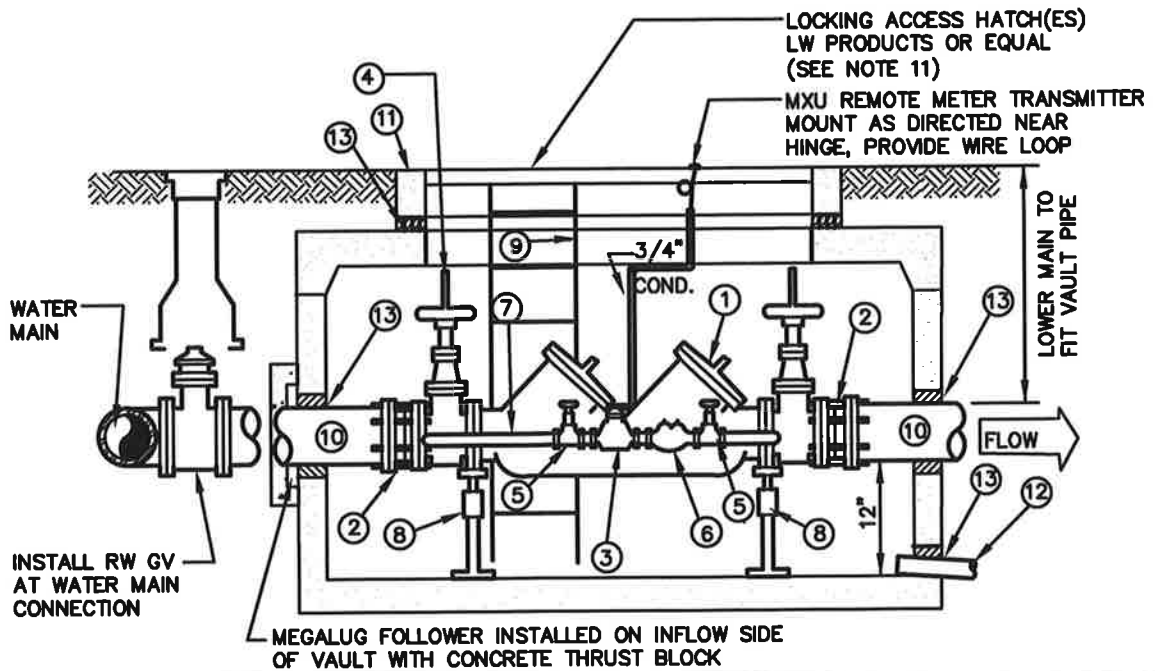
METER AND METER VAULT ASSEMBLY 3" THROUGH 10"

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.


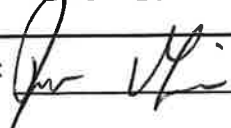
3MM



| NO. | DESCRIPTION   |
|-----|---|
| 1   | STATE APPROVED DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) BACKFLOW PREVENTION ASSEMBLY WITH O.S.&Y. R.W. GATE VALVE  |
| 2   | ROMAC STYLE 'FCA 501' FLANGED COUPLING ADAPTER  |
| 3   | 5/8" x 3/4" SENSUS CUBIC FEET READING METER COMPLETE WITH SPUD NUT  |
| 4   | LOCATE CENTER OF VALVE 15" FROM CENTER OF VAULT TO ALLOW STEMS TO EXTEND INTO ACCESS OPENING WHEN APPLICABLE  |
| 5   | 3/4" SHUTOFF VALVE; BRASS GATE VALVE  |
| 6   | STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY (DCVA)  |
| 7   | BRASS OR TYPE K COPPER, DETECTOR CHECK PIPING (BY PASS LINE)  |
| 8   | 2 EA. GALVANIZED ADJUSTABLE STANCHIONS (LOCATE AT ENDS OF DOUBLE CHECK ASSEMBLY)  |
| 9   | GALVANIZED STEEL LADDER, LOCATE AS DIRECTED BY DISTRICT, SECURE TO VAULT.   |
| 10  | PIPE SPOOL, CL. 52 D.I., PLAIN END  |
| 11  | "UTILITY VAULT" OR APPROVED EQUAL<br>4" DCDC, USE 575 LA (4'-2" x 6'-6" x 4'-0" INSIDE)<br>6" DCDC, 4484 LA (4'-4" x 8'-4" x 6'-2" INSIDE)<br>6" DCDC, 5106 LA (5'-0" x 10'-6" x 4'-4" INSIDE)<br>8" DCDC, 5106 LA (5'-0" x 10'-6" x 6'-2" OR 4'-4" INSIDE)<br>10" DCDC, 5106 LA (3 HATCH) (5'-0" x 10'-6" x 6'-2" OR 4'-4")<br>ORIENTATION AND LOCATION OF HATCHES TO PROVIDE CLEAR ACCESS TO VALVES AND DETECTOR CHECK ASSEMBLY |
| 12  | 6" PVC DRAIN, DISCHARGE TO DAYLIGHT OR TO CATCH BASIN. MINIMUM SLOPE 1% UNLESS OTHERWISE APPROVED. ADD SCREENS AT BOTH ENDS.  |
| 13  | WATERTIGHT GROUT, INLET AND OUTLET PIPE, DRAIN PIPE AND ACCESS OPENING  |

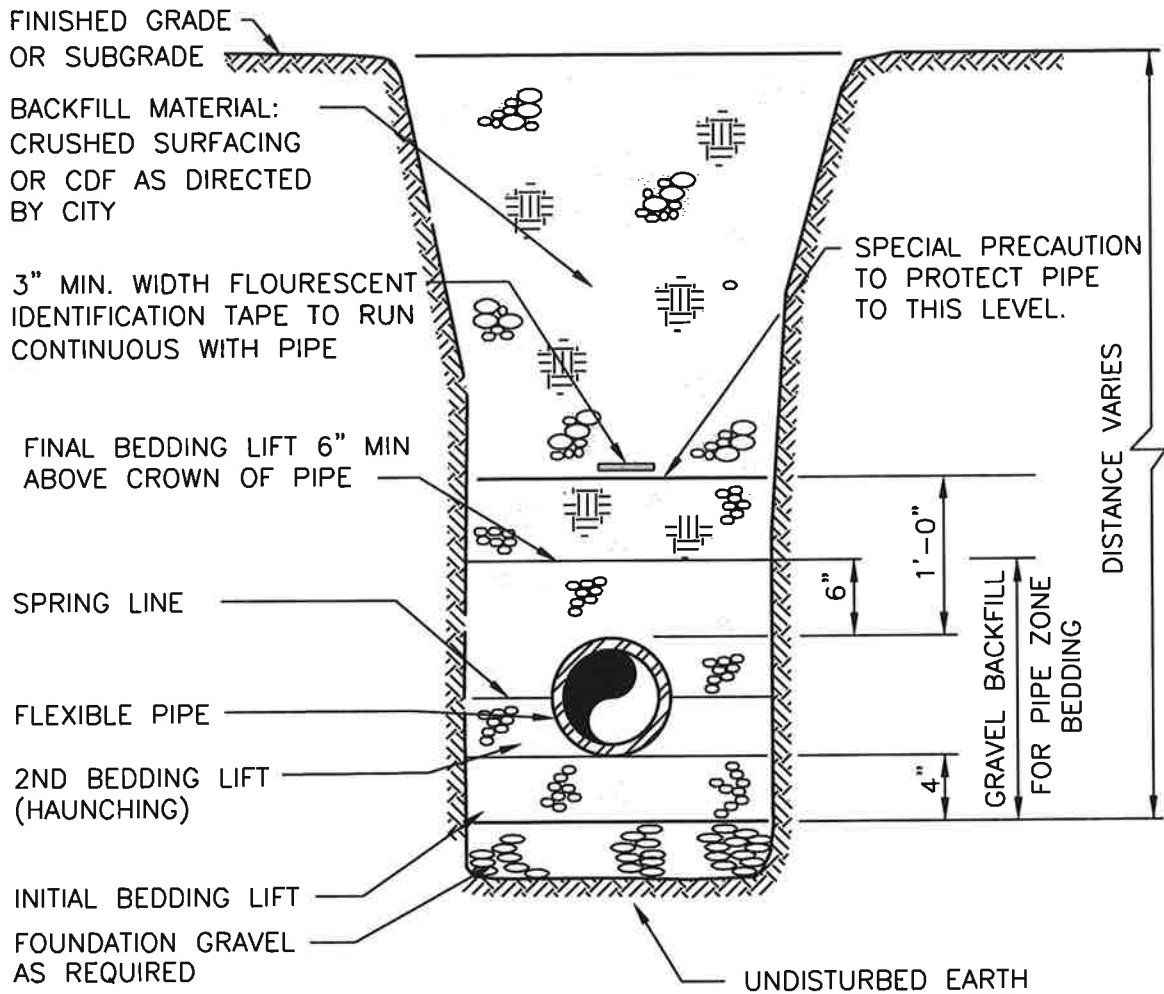
**NOTE:**

AFTER PRESSURE TEST AND PURITY SAMPLES ARE RECEIVED, A CERTIFIED BACKFLOW TECHNICIAN SHALL SUPPLY DISTRICT WITH A WRITTEN TEST REPORT ON EACH BACKFLOW ASSEMBLY.

|   |  |                     |
|---|--|---------------------|
|  | <h2>CITY OF ALGONA</h2> <p>DOUBLE-CHECK DETECTOR<br/>BACKFLOW PREVENTION ASSEMBLY</p>          |                     |
|   | APPROVED:  | DWG. NO.<br>DCD-BPA |
| DATE: 04/06/2015  |  |                     |

## **SANITARY SEWER DETAILS**







**NOTE:**

BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH CITY STANDARDS AND/OR THE STATE OR COUNTY PERMIT REQUIREMENTS (AS MAY BE APPLICABLE);

**MINIMUM REQUIREMENTS:**

ALL GRANULAR BACKFILL SHALL BE COMPACTED TO 95% MODIFIED PROCTOR, ASTM D1557

|   |  |                        |
|---|--|------------------------|
|  | <h2>CITY OF ALGONA</h2> <p>TRENCH SECTION FOR FLEXIBLE PIPE</p>                                |                        |
|   | APPROVED:  | DWG. NO.<br>SSTS FLEXP |
| DATE: 04/06/2015  |  |                        |

MANHOLE FRAME & COVER WITH "SEWER"  
 CAST ON COVER WITH 3" HIGH RAISED  
 LETTERS (NON-SKID PATTERN) AS  
 MANUFACTURED BY EAST JORDAN  
 IRONWORKS, ERGO 24. 3 HOLE LOCKING  
 FRAME AND COVER. ONE (1) BOLT HOLE  
 TO BE CENTERED OVER LADDER

FIRST STEP  
 14" MIN.  
 18" MAX.

INFRA RISER AS MANUFAC-  
 TURED BY EAST JORDAN IRON  
 WORKS FOR PAVED AREAS

GROUT BETWEEN RINGS

POLYPROPYLENE MANHOLE  
 STEPS NO. P-13938 LOCATED  
 AT 12" O.C.

GROUT LIFT HOLES  
 INSIDE AND OUTSIDE

MANHOLE DIAMETER  
 48": STANDARD  
 54": DEPTH ≥ 20 FT

POLYPROPYLENE LADDER  
 (3' MAXIMUM LENGTH)

SEE NOTE 1

CHANNEL  
 3/4 PIPE DIA

SLOPE SHELF  
 TO CHANNEL  
 AT 3/8"/FT

GROUT FILL

SEE NOTE 3  
 SEE NOTE 4

FINISHED GRADE

4" X 24" PRECAST CONC.  
 ADJUSTMENT RINGS 2  
 RINGS REQUIRED 4 RINGS  
 MAXIMUM PLASTER INSIDE  
 AND OUTSIDE FACE WITH  
 1/2" THICK GROUT

48" TO 24" OFFSET CONE  
 SEE NOTE 6

48" OR 54" (INSIDE DIAMETER)  
 PRECAST MANHOLE

RUBBER GASKET SEALING  
 RING (TYP)  
 SEE NOTE 6

RUBBER GASKET SEALING  
 RING (TYP)

SHORT PIPE SECTION AT  
 MANHOLE (5' MIN)

FOUNDATION GRAVEL  
 8-INCH MINIMUM

UNDISTURBED EARTH

**NOTES:**

1. FOR PIPE CONNECTIONS TO MANHOLES, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10' (SLOPE=3/8"/FT) (48" MANHOLE) UNLESS OTHERWISE APPROVED BY THE CITY.
3. LARGER MANHOLES WILL BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER BASED ON PIPE SIZE, NUMBER AND ORIENTATION OF PIPE(S).
4. INSTALL CONCRETE COLLAR IN UNPAVED AREAS. SEE DETAIL.
5. PRE-CHANNELED MANHOLES ARE NOT ACCEPTABLE.
6. THE INSIDE AND OUTSIDE OF ALL JOINTS SHALL BE THOROUGHLY COATED WITH EPOXY GROUT (OR EQUAL) TO BE APPLIED ACCORDING TO MANUFACTURERS SPECIFICATIONS.



**CITY OF ALGONA**

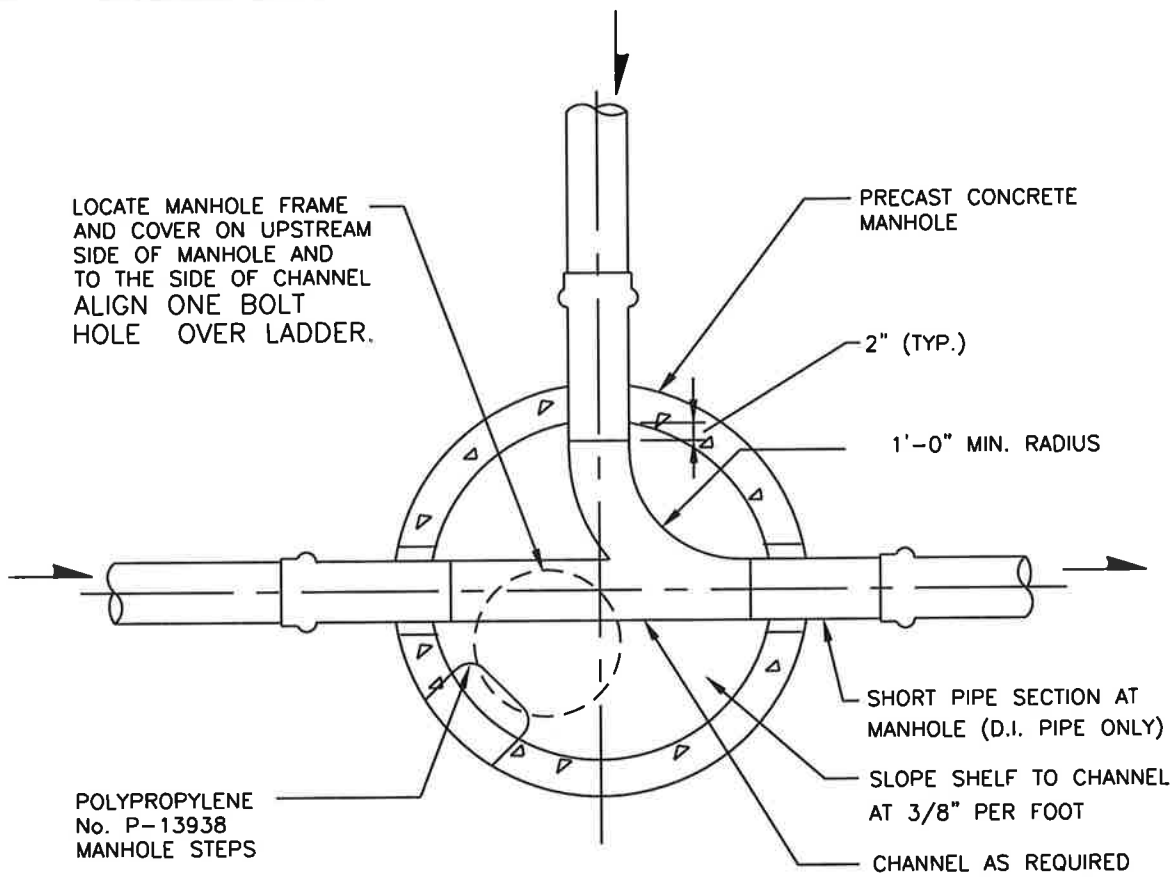
TYPICAL PRECAST MANHOLE

APPROVED: *[Signature]*

DATE: 04/06/2015


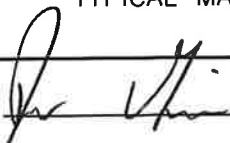
DWG. NO.

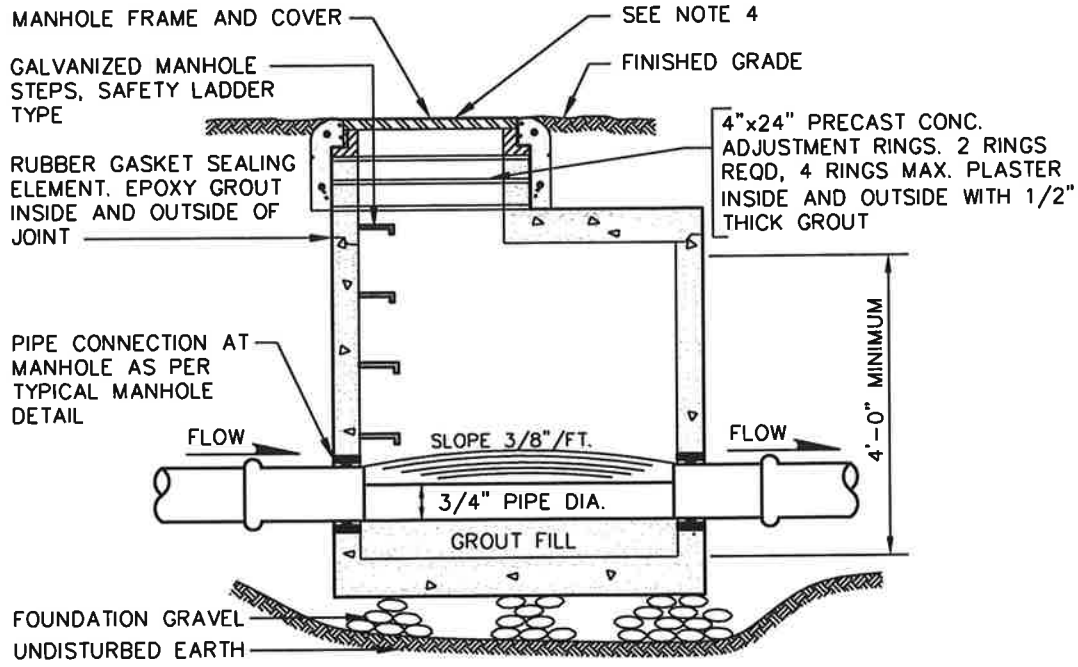
TPMH



**NOTES:**


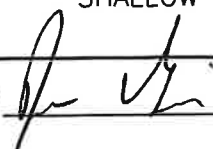
1. FOR PIPE CONNECTIONS TO MANHOLES, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.
2. ALL CONNECTIONS TO EXISTING MANHOLES SHALL BE MADE WITH A CONCRETE CORING MACHINE UNLESS OTHERWISE APPROVED BY THE CITY.

|   |   |                          |
|---|---|--------------------------|
|  | <h2>CITY OF ALGONA</h2> <p>TYPICAL MANHOLE PLAN VIEW</p>  |                          |
|   | <p>APPROVED: </p> <p>DATE: 04/06/2015</p> | <p>DWG. NO.<br/>TMHP</p> |



**NOTES:**

1. FOR PIPE CONNECTIONS TO MANHOLES CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL. ALL CONNECTIONS TO EXISTING MANHOLES SHALL BE MADE WITH A CONCRETE CORING MACHINE UNLESS OTHERWISE APPROVED BY THE CITY.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10'.
3. PRE-CHANNELED MANHOLES ARE NOT ACCEPTABLE.
4. CONSTRUCT CONCRETE COLLAR IN UNPAVED AREAS PER DETAIL.
5. THE INSIDE AND OUTSIDE OF ALL JOINTS SHALL BE THOROUGHLY COATED WITH EPOXY GROUT (OR EQUAL) TO BE APPLIED ACCORDING TO MANUFACTURERS SPECIFICATIONS.

|   |                 |
|---|-----------------|
|  <p><b>CITY OF ALGONA</b></p> <p>SHALLOW PRECAST MANHOLE</p> |                 |
| <p>APPROVED: </p>   | <p>DWG. NO.</p> |
| <p>DATE: 04/06/2015</p>   | <p>TS-PMH</p>   |



MANHOLE FRAME & COVER WITH "SEWERS"  
 CAST ON COVER WITH 3" HIGH RAISED  
 LETTERS (NON-SKID PATTERN) AS  
 MANUFACTURED BY EAST JORDAN IRON  
 WORKS, ERGO 24. 3 HOLE LOCKING  
 FRAME AND COVER. ONE (1) BOLT HOLE TO  
 BE CENTERED OVER LADDER

FIRST STEP  
 14" MIN.  
 18" MAX.

GROUT BETWEEN RINGS

POLYPROPYLENE MANHOLE  
 STEPS NO. P-13938 LOCATED  
 AT 12" O.C.

GROUT LIFT HOLES  
 INSIDE AND OUTSIDE

POLYPROPYLENE LADDER  
 (3' MAXIMUM LENGTH)

CUT OUT EXISTING PIPE,  
 MAKE SMOOTH INVERT &  
 CHANNEL AFTER NEW LINE  
 IS ACCEPTED.

CAST IN PLACE  
 CHANNEL & SHELF,  
 3500# PSI CONCRETE

12" MINIMUM

SEE NOTE 3

FINISHED GRADE

4" X 24" PRECAST CONC.  
 ADJUSTMENT RINGS  
 2 RINGS REQUIRED  
 4 RINGS MAXIMUM  
 PLASTER INSIDE AND  
 OUTSIDE FACE WITH 1/2"  
 THICK GROUT

SEE NOTE 6

48" TO 24" OFFSET CONE

PRECAST MANHOLE

RUBBER GASKET SEALING  
 RING (TYP)

SEE NOTE 6

SEE NOTE 6

SHORT PIPE SECTION  
 AT MANHOLE (5' MIN.)


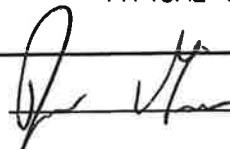
SEE NOTE 5

FOUNDATION GRAVEL  
 8-IN MINIMUM

UNDISTURBED EARTH

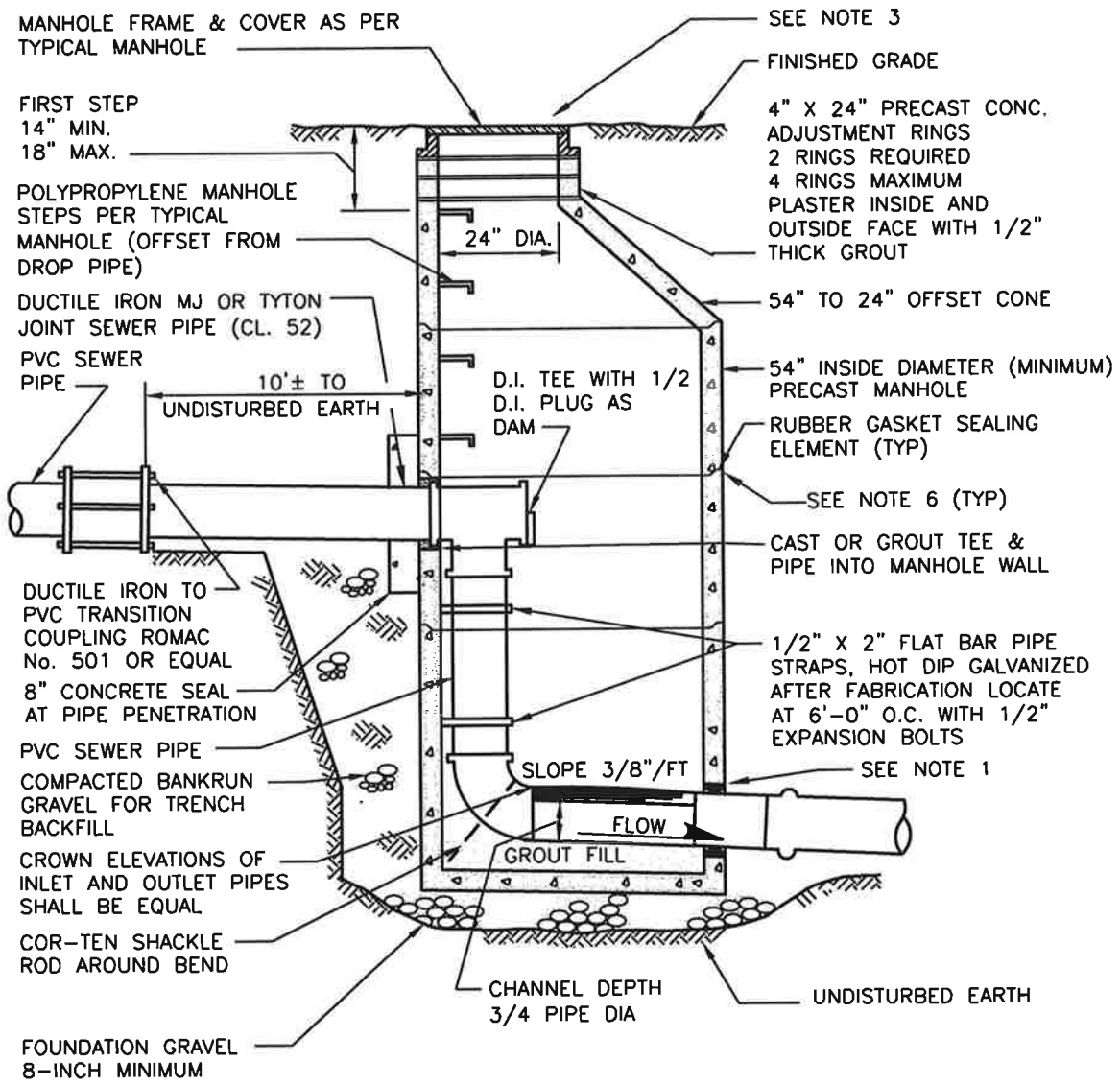
**NOTES:**

1. FOR PIPE CONNECTIONS TO MANHOLES, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10' (SLOPE=3/8"/FT) (48" MANHOLE) UNLESS OTHERWISE APPROVED BY CITY INSPECTOR.
3. LARGER MANHOLES WILL BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER BASED ON PIPE SIZE, NUMBER AND ORIENTATION OF PIPE(S).
4. INSTALL CONCRETE COLLAR IN UNPAVED AREAS. SEE DETAIL.
5. PRE-CHANNELED MANHOLES ARE NOT ACCEPTABLE.
6. THE INSIDE AND OUTSIDE OF ALL JOINTS SHALL BE THOROUGHLY COATED WITH EPOXY GROUT (THOROC OR EQUAL) TO BE APPLIED ACCORDING TO MANUFACTURERS SPECIFICATIONS.

|   |                             |
|---|-----------------------------|
|  <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">TYPICAL SADDLE MANHOLE</p> |                             |
| <p>APPROVED: </p> <p>DATE: 04/06/2015</p>   | <p>DWG. NO.</p> <p>TSMH</p> |

L:\ALGONA\15432 PW Standards\Sewer\TSMH.dwg, 4/13/2015 5:27:55 PM, rmgel

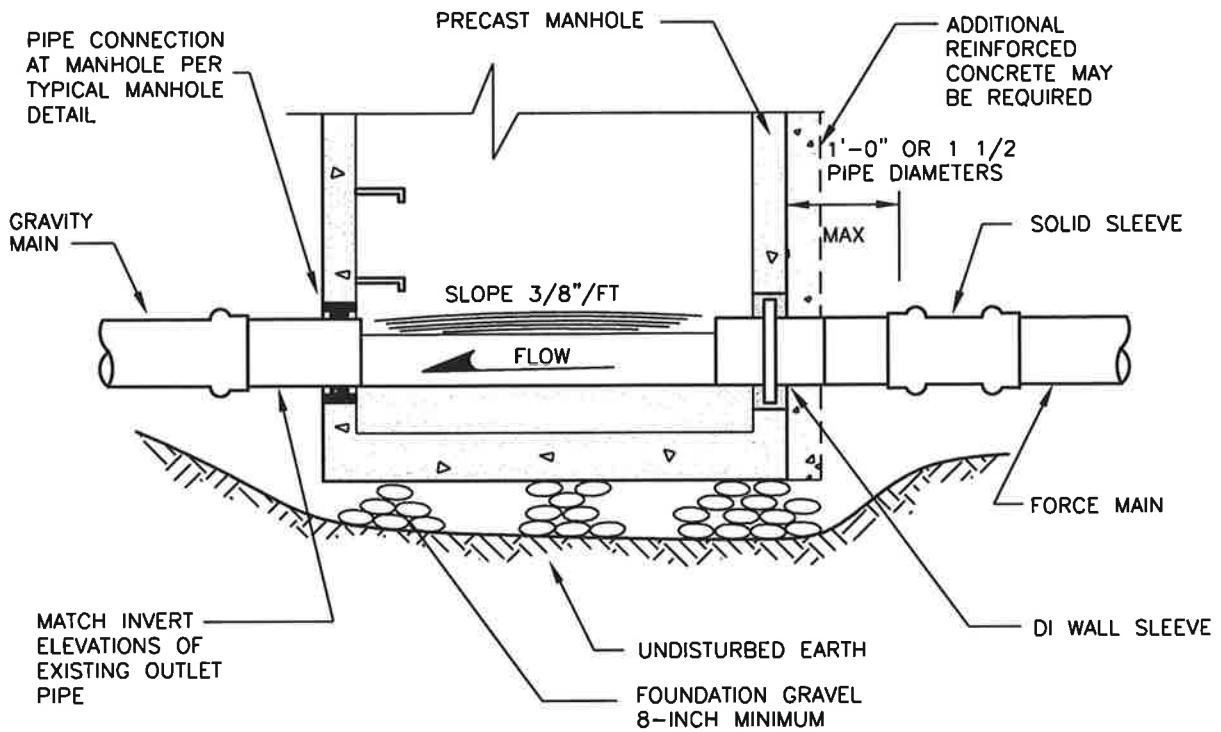
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**NOTES:**


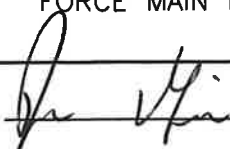
1. FOR PIPE CONNECTIONS, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10' (SLOPE=3/8"/FT) UNLESS OTHERWISE APPROVED BY CITY INSPECTOR.
3. LARGER MANHOLES WILL BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER BASED ON PIPE SIZE, NUMBER AND ORIENTATION OF PIPE(S).
4. INSTALL CONCRETE COLLAR IN UNPAVED AREAS. SEE DETAIL.
5. PRE-CHANNELED MANHOLE ARE NOT ACCEPTABLE.
6. THE INSIDE AND OUTSIDE OF ALL JOINTS SHALL BE THOROUGHLY COATED WITH EPOXY GROUT (THOROC OR EQUAL) TO BE APPLIED ACCORDING TO MANUFACTURERS SPECIFICATIONS.

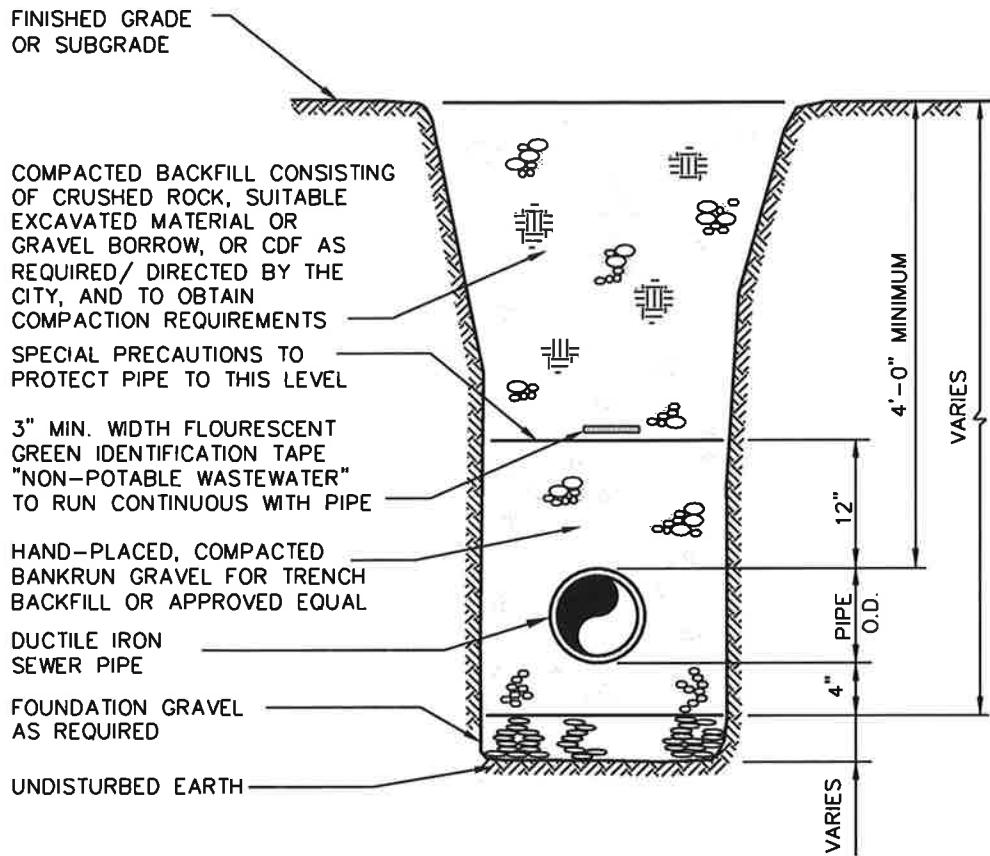
|  |                  |
|--|------------------|
| <span style="font-size: 24pt; font-weight: bold; margin-left: 20px;">CITY OF ALGONA</span> |                  |
| <span style="font-size: 18pt;">INSIDE DROP MANHOLE</span>                                  |                  |
| APPROVED:  | DWG. NO.<br>IDMH |
| DATE: 04/06/2015   |                  |



**NOTES:**

1. FOR PIPE CONNECTIONS TO MANHOLES, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10' (MIN), UNLESS OTHERWISE APPROVED.
3. ALIGN FORCE MAIN DISCHARGE WITH OUTLET PIPE.

|  |   |
|--|---|
|             | <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">FORCE MAIN DISCHARGE MANHOLE</p> |
| APPROVED:  | DWG. NO.<br>FMDMH   |
| DATE: 04/06/2015   |   |



NOTES:

1. BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH THE CITY STANDARDS AND/OR THE STATE OR COUNTY PERMIT REQUIREMENTS, (AS MAY BE APPLICABLE)
2. FORCE MAIN MAY BE HDPE OR PVC OF THE SIZE AND CLASS APPROVED BY CITY IF CONDITIONS WARRANT SAME (AND AS REQUIRED AND DIRECTED BY CITY). WHEN HDPE OR PVC IS APPROVED, BEDDING SHALL EXTEND FROM 4" BELOW PIPE TO 4" ABOVE PIPE.



**CITY OF ALGONA**

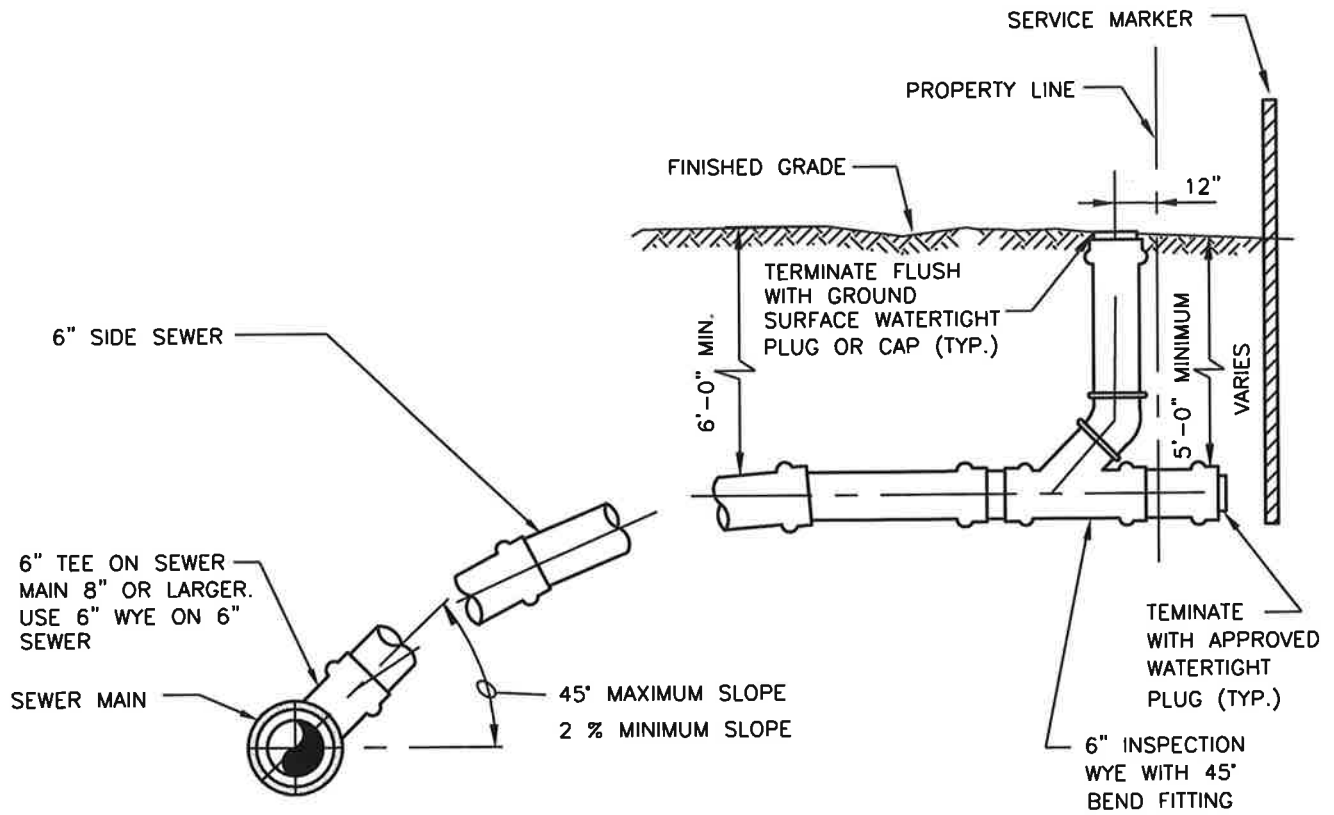
PRESSURE LINE AND FORCE MAIN  
TYPICAL TRENCH SECTION

APPROVED: \_\_\_\_\_

*[Signature]*


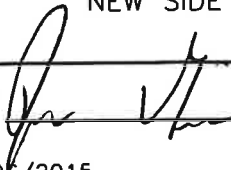
DATE: 04/06/2015

DWG. NO.  
PLFMTTS

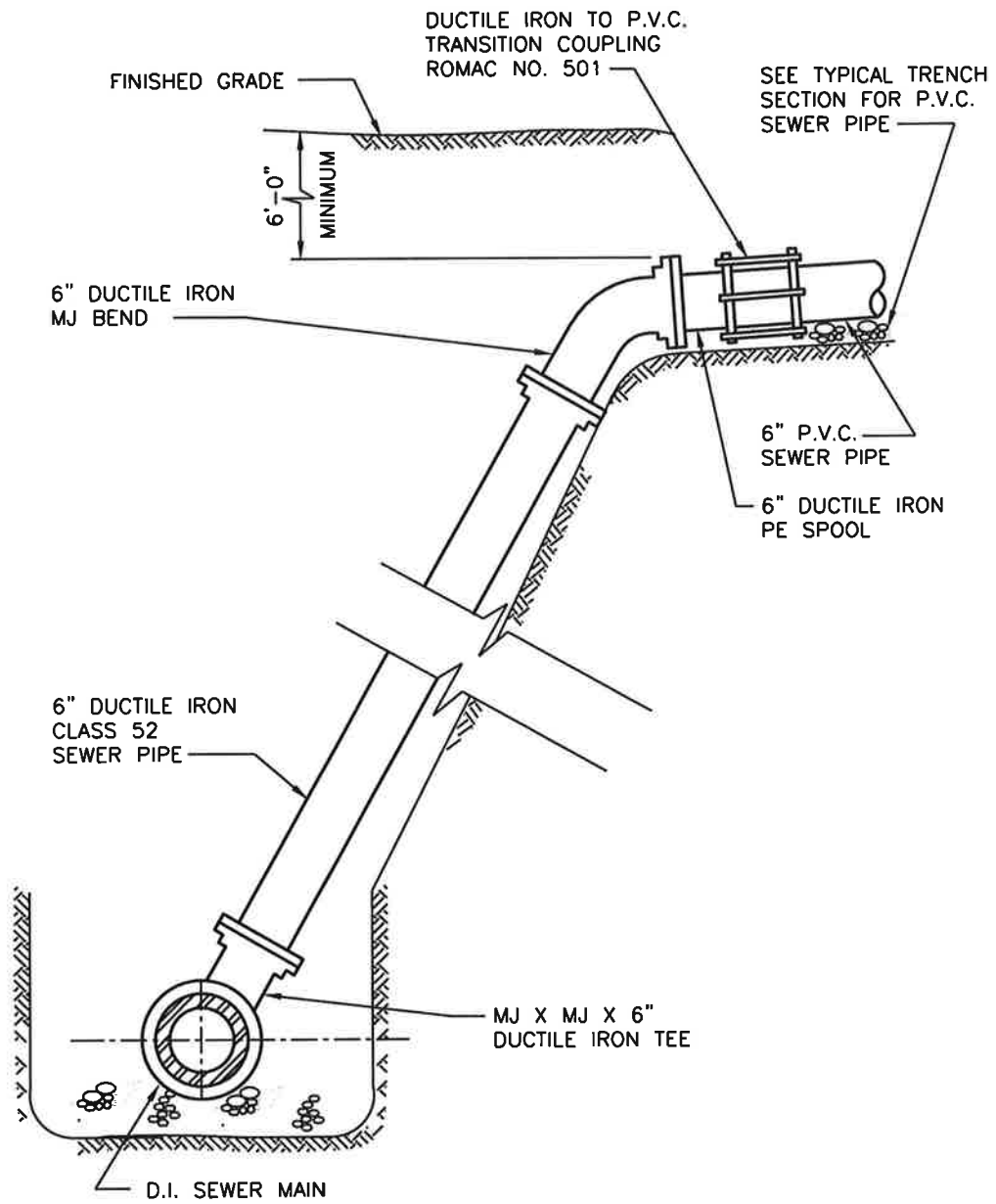


**NOTE:**

1. PAINT PORTION OF SERVICE MARKER THAT IS ABOVE FINISHED GRADE WITH WHITE PAINT. STENCIL WITH BLACK LETTERS "S/S" USING 3" HIGH LETTERS. LOCATE SERVICE MARKER AT END OF EACH SERVICE. STENCIL TOTAL LENGTH OF 2x4.
2. TAP EXISTING SEWER MAIN WITH APPROVED CITY SADDLE. INSTALL NEW SIDE SEWER TEE ON NEW MAIN LINES.
3. WHEN TAPPED SERVICE IS PERMITTED, CONTRACTOR SHALL PROVIDE SEWER MAIN COUPON TO CITY STAFF.
4. PROVIDE PEA GRAVEL PIPE BEDDING SEE TRENCH SECTION DETAIL.

|  |   |
|--|---|
|             | <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">NEW SIDE SEWER SERVICE</p> |
| APPROVED:  | DWG. NO.<br>SSD   |
| DATE: 04/06/2015   |   |

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**NOTE:**

SEE TYPICAL TRENCH SECTION FOR DUCTILE IRON SEWER PIPE FLEXIBLE OR RIGID PIPE AS APPROPRIATE



# CITY OF ALGONA

STANDING SIDE SEWER

APPROVED: \_\_\_\_\_

DATE: 04/06/2015

DWG. NO.

SSS

MANHOLE FRAME & COVER WITH "SEWERS"  
 CAST ON COVER WITH 3" HIGH RAISED  
 LETTERS (NON-SKID PATTERN) AS  
 MANUFACTURED BY EAST JORDAN IRON  
 WORKS, ERGO24. 3 HOLE LOCKING FRAME  
 AND COVER. ONE (1) BOLT HOLE TO BE  
 CENTERED OVER LADDER

FIRST STEP  
 14" MIN.  
 18" MAX.

GROUT BETWEEN RINGS

POLYPROPYLENE MANHOLE  
 STEPS NO. P-13938 LOCATED  
 AT 12" O.C.

GROUT LIFT HOLES  
 INSIDE AND OUTSIDE

TAG AIR AND VACUUM  
 UNIT NON POTABLE  
 TRANSMISSION LINE

2" GATE VALVE  
 TH X TH

POLYPROPYLENE LADDER

6" COMPANION BLIND  
 FLANGE TAPPED FOR  
 2" AIR & VACUUM UNIT

SLOPE TO DRAIN

MJ TEE SIZE AS REQ'D  
 WITH 6" FLANGE ON BRANCH

2" 90° BASE ELL W/  
 2" PIPE SUPPORT

FINISHED GRADE

4" X 24" PRECAST CONC.  
 ADJUSTMENT RINGS  
 2 RINGS REQUIRED  
 4 RINGS MAXIMUM  
 PLASTER INSIDE AND  
 OUTSIDE FACE WITH 1/2"  
 THICK GROUT

48" DIA. X 8" THICK  
 CONCRETE SLAB

48" MIN. INSIDE DIAMETER  
 PRECAST MANHOLE

RUBBER GASKET SEALING  
 ELEMENT

COMBINATION SEWAGE AIR AND  
 VACUUM VALVE. TAG VALVE  
 "NON-POTABLE TRANSMISSION  
 LINE". SEE NOTE 3

UNION FOR REMOVAL

SEE NOTE 1

TO STORM  
 DRAINAGE

6" DIAMETER PVC DRAIN  
 PIPE TO DAYLIGHT  
 @ 2% SLOPE



FOUNDATION GRAVEL (8" MIN)

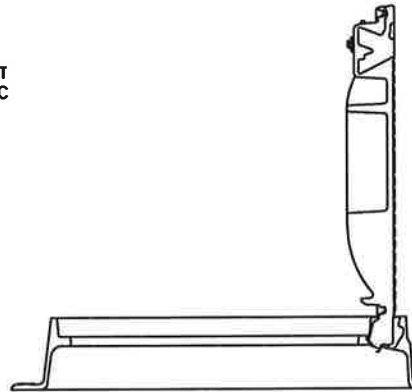
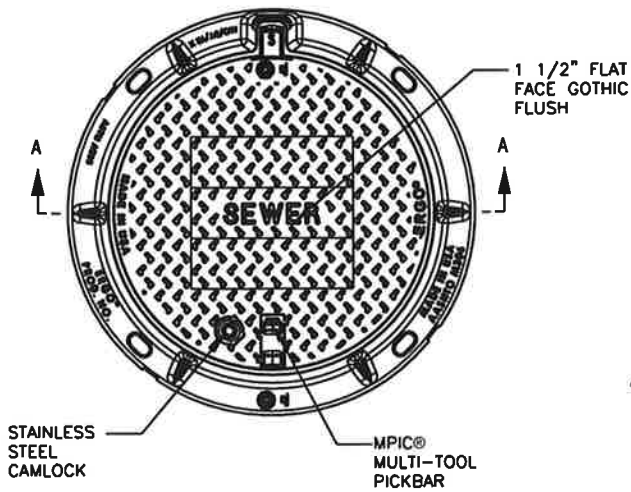
UNDISTURBED EARTH

**NOTES:**

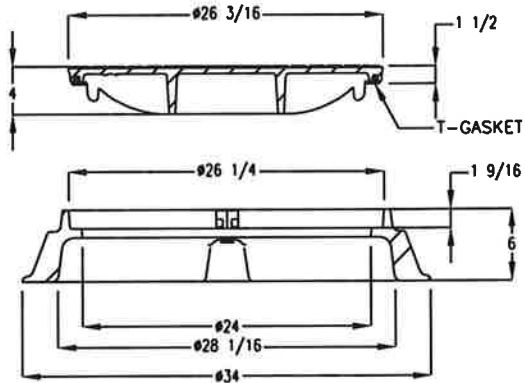
1. FOR PIPE CONNECTIONS TO STORM DRAINAGE MANHOLES, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10', UNLESS OTHERWISE APPROVED.
3. "APCO, CRISPIN OR VALMATIC" HEAVY-DUTY COMBINATION AIR AND VACUUM VALVE W/ STAINLESS STEEL INTERNALS & EPOXY COATING. SEATS SHALL BE SUPPLIED FOR THE FOLLOWING WORKING PRESSURES: 20 PSI, 20-150 PSI W/ FLUSHING ATTACHMENTS.
4. PROVIDE ADEQUATE VERTICAL CLEARANCE TO REMOVE VALVE COMPONENTS W/O DISASSEMBLY.

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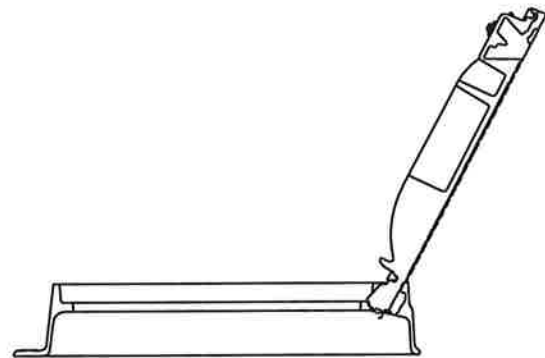
|   |                          |
|---|--------------------------|
|  <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">VACUUM RELIEF ASSEMBLY</p> |                          |
| <p>APPROVED: </p> <p>DATE: 04/06/2015</p>   | <p>DWG. NO.<br/>AVRA</p> |



SAFETY LOCK ● 90°





SECTION A-A



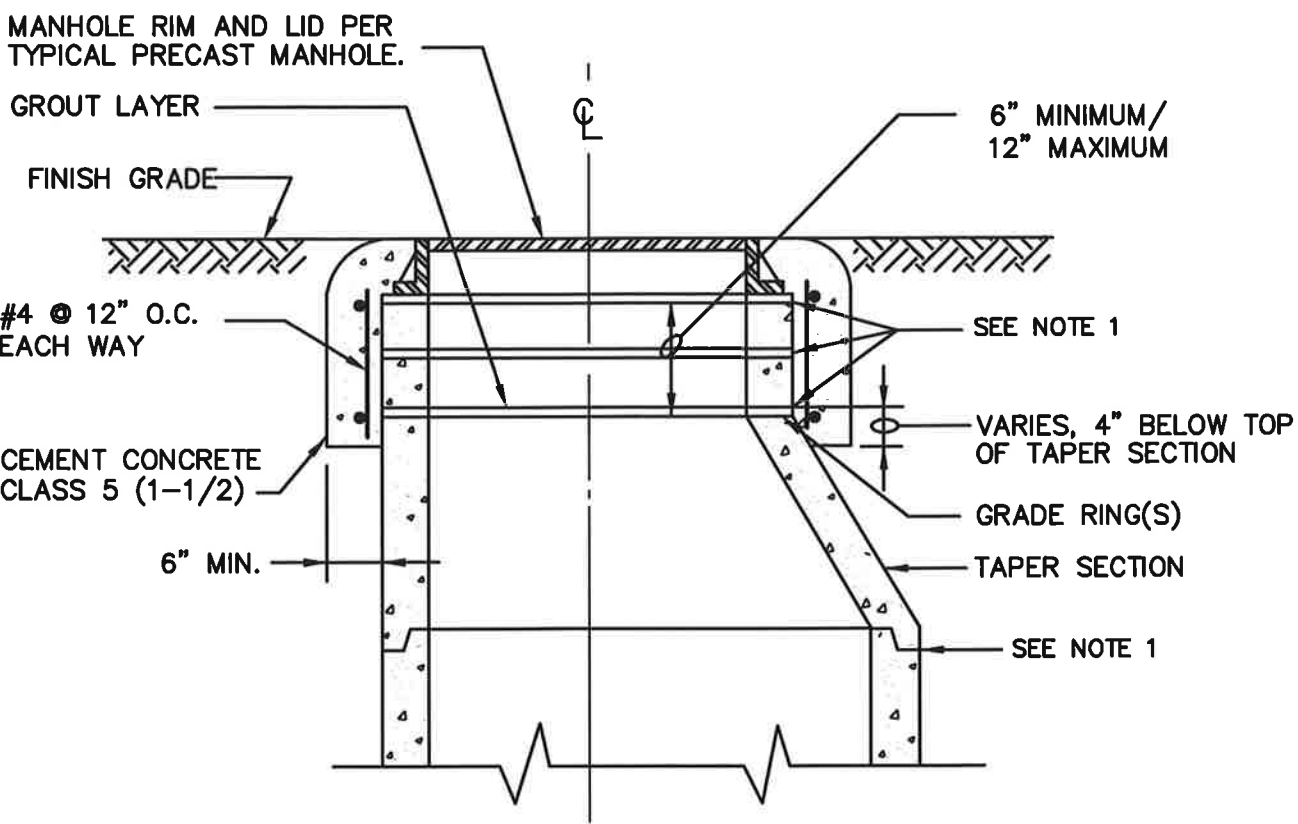
FULLY OPENED ● 120°

EAST JORDAN IRON WORKS  
MODEL NO. 00104043L04

|   |  |                                  |
|---|--|----------------------------------|
|  | <h2>CITY OF ALGONA</h2> <p>MANHOLE FRAME AND COVER</p>   |                                  |
|   | APPROVED: <br>DATE: 04/06/2015 | DWG. NO.<br>SSMH COVER<br>- ERGO |



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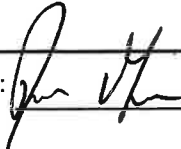


SECTION

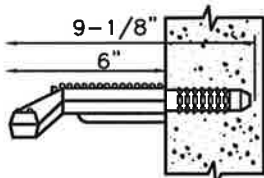
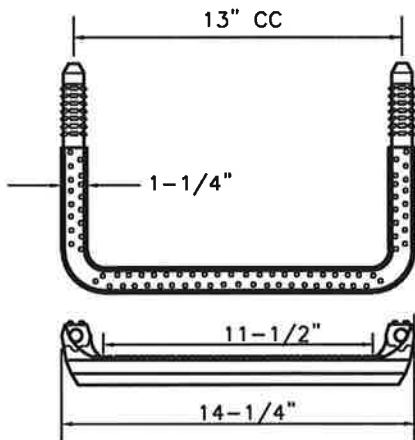
NOTE:  
CONSTRUCT CONCENTRIC CONCRETE COLLARS AROUND ALL MANHOLE FRAMES LOCATED OUTSIDE OF PAVEMENT AREAS

MANHOLE FRAME COLLAR

NOTE:  
1. THE INSIDE AND OUTSIDE OF ALL JOINTS SHALL BE THOROUGHLY COATED WITH EPOXY GROUT (THOROC OR EQUAL) TO BE APPLIED ACCORDING TO MANUFACTURERS SPECIFICATIONS.

|   |  |                    |
|---|--|--------------------|
|  | <b>CITY OF ALGONA</b><br><b>MANHOLE FRAME COLLAR</b>   |                    |
|   | APPROVED:  | DWG. NO.<br>MHCLAR |
| DATE: 04/06/2015  |  |                    |

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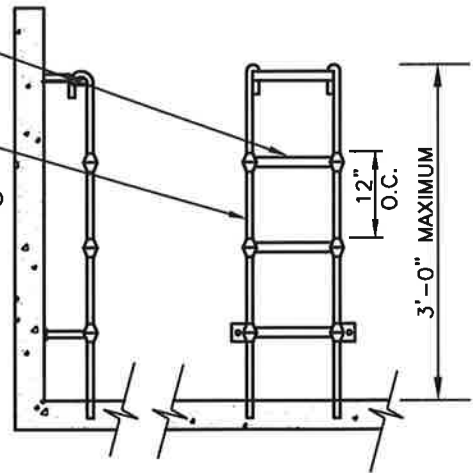
POLYPROPYLENE STEP, LANE NO. P-13938 OR EQUAL

**POLYPROPYLENE**  
**MANHOLE STEPS**

RUNG  
1/2" GRADE 60





RAIL  
9/16" ROUND  
BAR



LADDER SHALL CONFORM TO  
POLYPROPYLENE ASTM D-4101  
1/2" GRADE 60 REINFORCING  
BAR A-615 9/16" COLD DRAWN  
BAR C-1018

**POLYPROPYLENE LADDER**

|  |                           |
|--|---------------------------|
|  <p><b>CITY OF ALGONA</b></p> <p>POLYPROPELENE LADDER AND<br/>MANHOLE STEPS</p> |                           |
| <p>APPROVED: </p>  | <p>DWG. NO.<br/>PLMHS</p> |
| <p>DATE: 04/06/2015</p>  |                           |

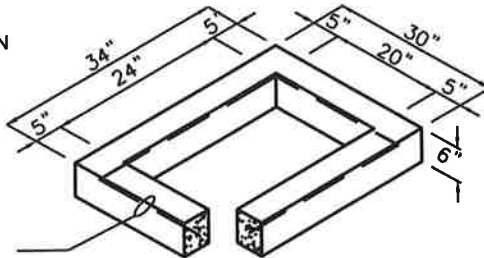
## **STORM SEWER & MISCELLANEOUS DETAILS**



FRAME AND GRATE

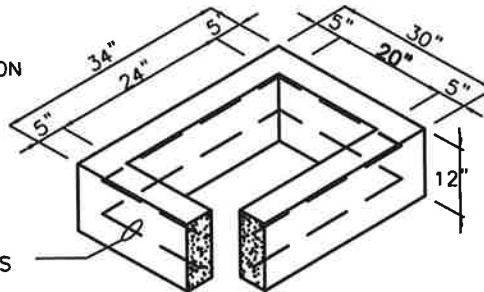


6" RISER SECTION



1 #3 BAR HOOP

12" RISER SECTION

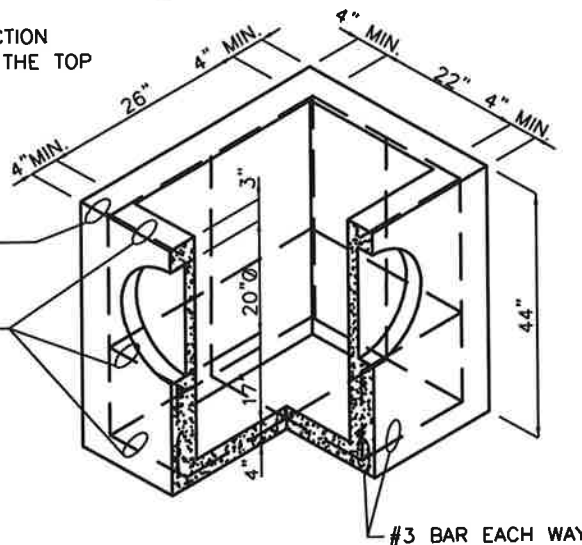


2 #3 BAR HOOPS

PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP OF THE BASE)

#3 BAR EACH CORNER

#3 BAR EACH SIDE



**NOTES:**

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 7-05 WSDOT/APWA STANDARD SPECIFICATIONS, UNLESS OTHERWISE SHOWN ON PLANS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIA. PLUS CATCH BASIN WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES, WITH MAX. DIA. OF 20". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2"/FT.
9. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
10. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
11. FOR CATCH BASINS IN PARKING LOTS REFER TO WSDOT/APWA STANDARD DWG. B1-b.
12. EDGE OF RISER OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.



**CITY OF ALGONA**

CATCH BASIN - TYPE 1

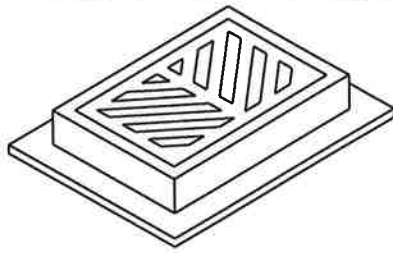
APPROVED:

DATE: 04/06/2015

DWG. NO.

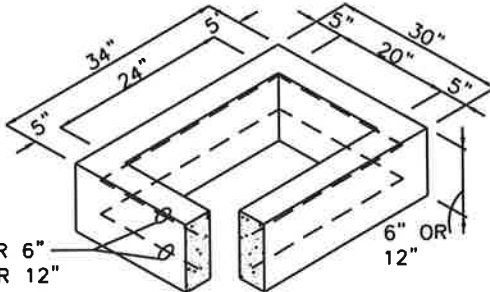
SW-4

FRAME AND GRATE



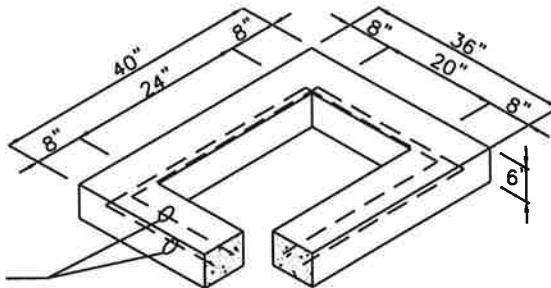
RISER SECTION

- 1 #3 BAR HOOP FOR 6"
- 2 #3 BAR HOOP FOR 12"



6" REDUCING SECTION

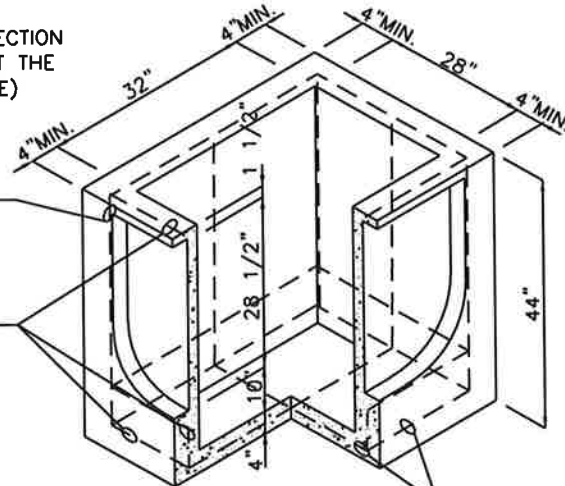
- 2 #3 BAR HOOP



PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP OF THE BASE)

#3 BAR EACH CORNER


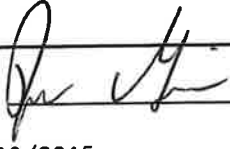
#3 BAR EACH SIDE



#3 BAR EACH WAY

NOTES:

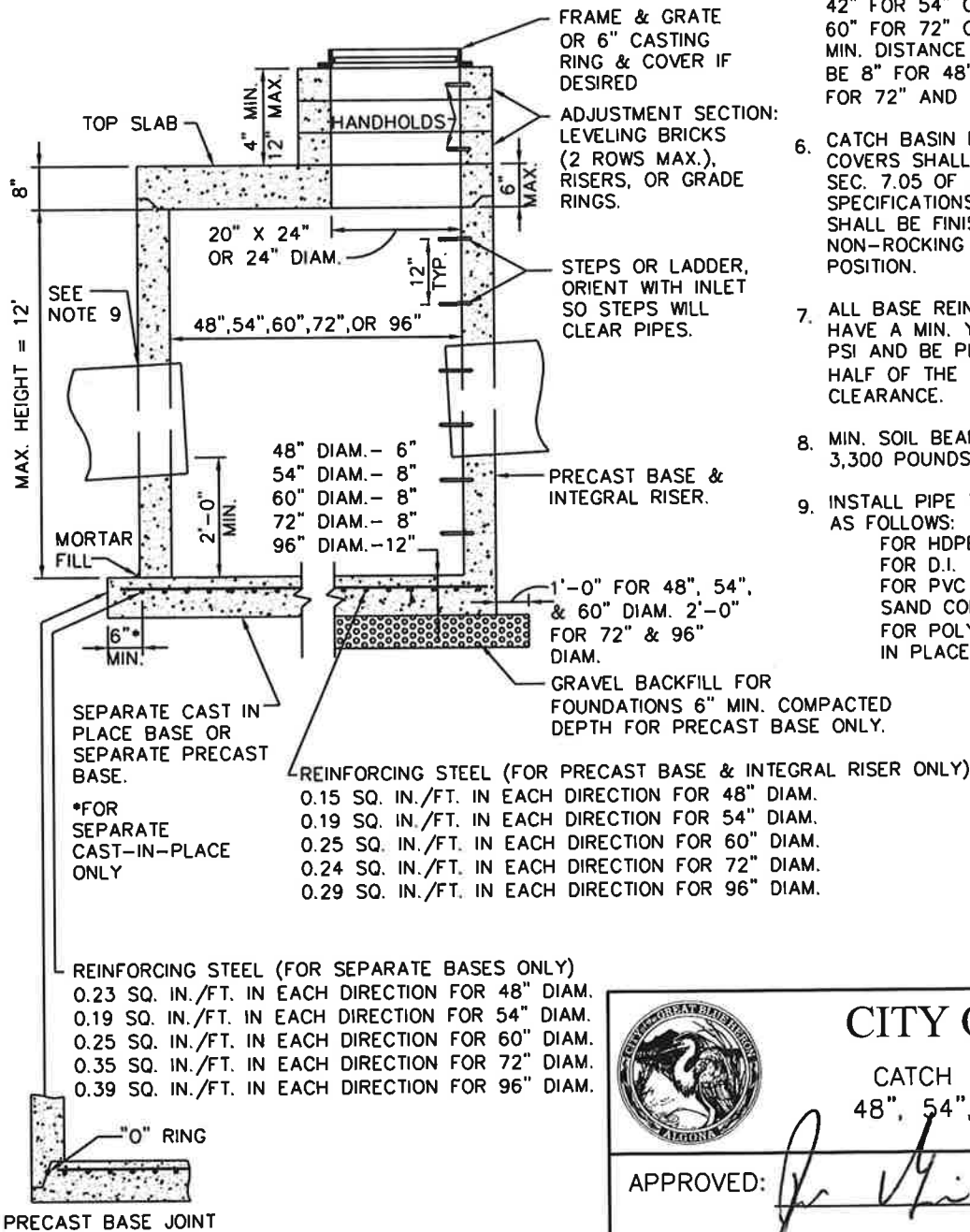
1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 28". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2"/FT.
8. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-62ID. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
9. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
10. MAX. DEPTH FROM FINISHED GRADE TO PIPE INVERT SHALL BE 5'-0".
11. EDGE OF REDUCING SECTION OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.

|  |  |
|--|--|
|             | <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">CATCH BASIN - TYPE 1L</p> |
| APPROVED:  | DWG. NO.<br>SW-5   |
| DATE: 04/06/2015   |  |

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**NOTES:**

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M199) AND ASTM C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN CATCH BASIN SHALL HAVE 6" MIN. CLEARANCE. CATCH BASIN DETAILS. HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND TOP TO THE FINISHED GRADE. ALL STEPS AND HANDHOLDS SHALL BE MADE OF POLY PROPYLENE.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36" FOR 48" CATCH BASIN, 42" FOR 54" C.B., 48" FOR 60" C.B., 60" FOR 72" C.B., 84" FOR 96" C.B. MIN. DISTANCE BETWEEN HOLES SHALL BE 8" FOR 48", 54", AND 60" C.B.; 12" FOR 72" AND 96" C.B.
6. CATCH BASIN FRAMES AND GRATES OR COVERS SHALL BE IN ACCORDANCE WITH SEC. 7.05 OF THE STANDARD SPECIFICATIONS. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
7. ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
8. MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT.
9. INSTALL PIPE TO MANHOLE CONNECTION AS FOLLOWS:  
 FOR HDPE USE KOR-N-SEAL  
 FOR D.I. USE KOR-N-SEAL  
 FOR PVC USE KOR-N-SEAL OR SAND COLLAR.  
 FOR POLYETHYLENE (ADS) GROUT IN PLACE.



**CITY OF ALGONA**

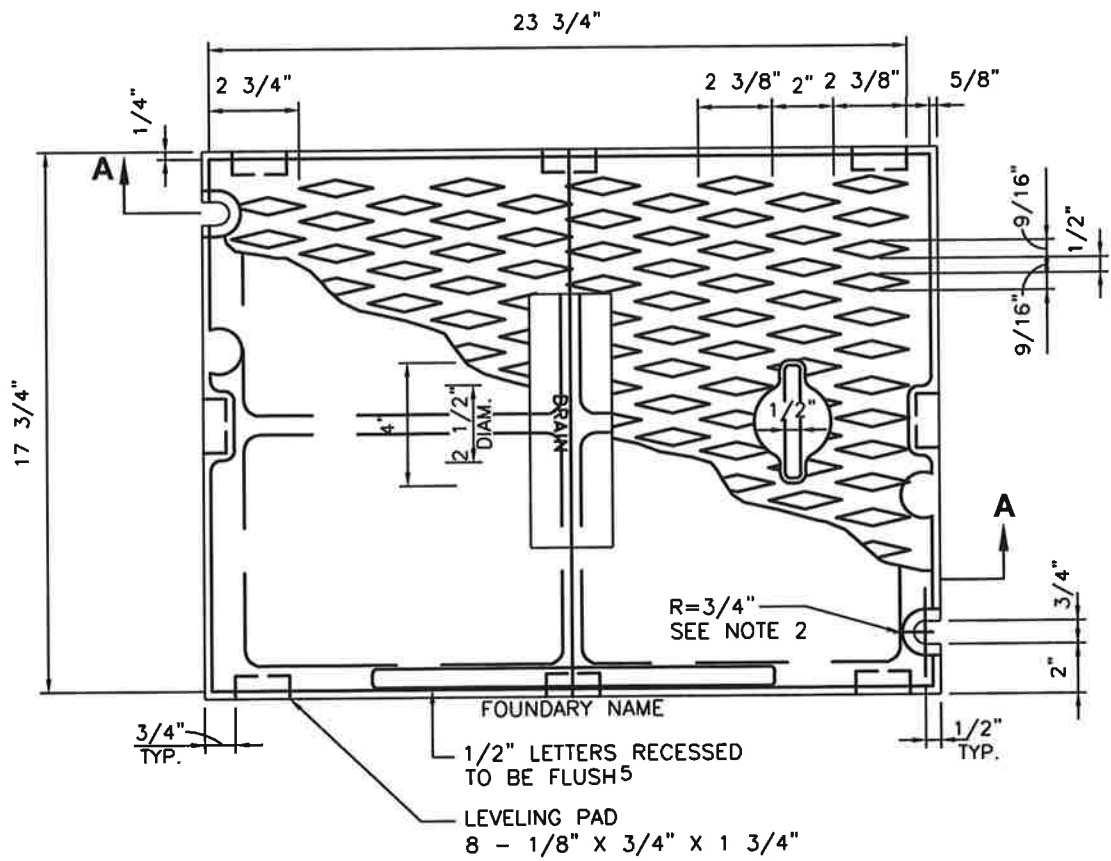
CATCH BASIN - TYPE 2  
 48", 54", 60", 72", & 96"

APPROVED: *[Signature]*

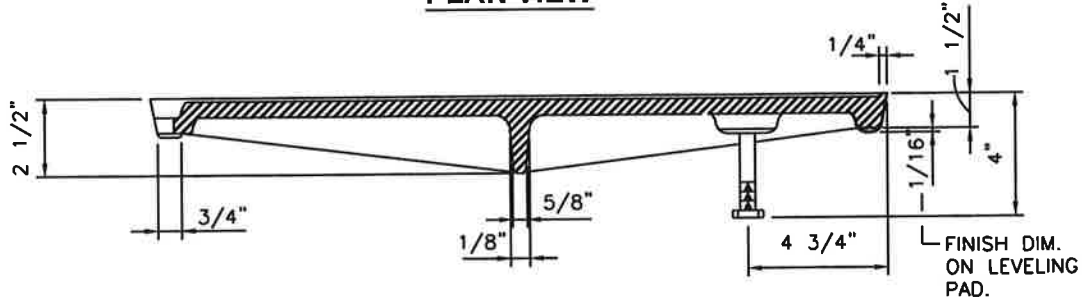
DATE: 04/06/2015

DWG. NO.

SW-6




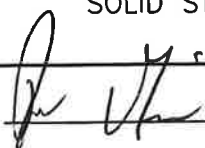
**PLAN VIEW**



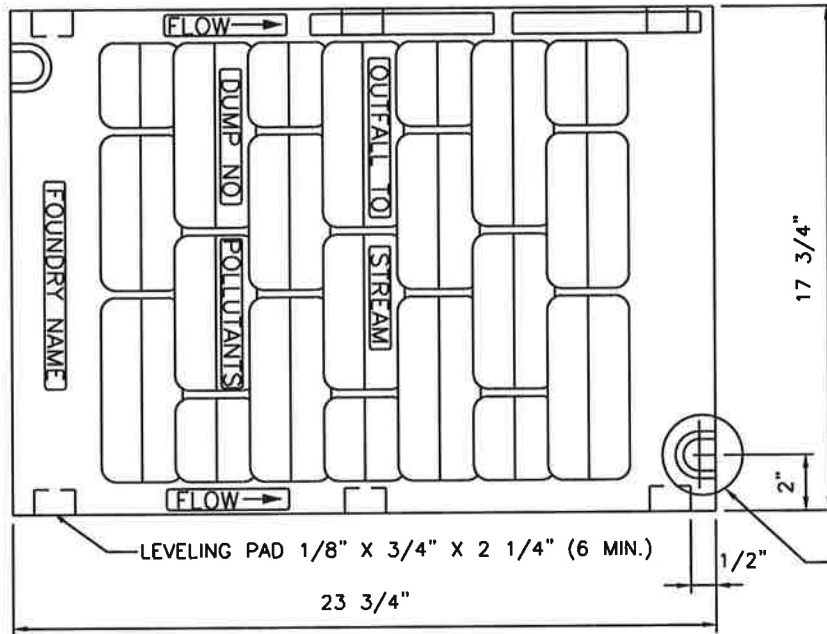
**SECTION A-A**

**NOTES:**

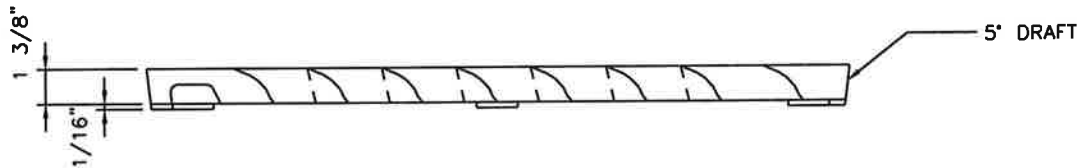
1. USE WITH FRAME DRILLED AND TAPPED FOR LOCKING BOLTS.
2. USE WITH TWO LOCKING BOLTS 5/8"-11 NC STAINLESS STEEL TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) BOLTS, 2" LONG.
3. COVER MATERIAL IS CAST IRON PER ASTM A48 CLASS 30.
4. SHALL CONFORM TO SEC. 7.05 OF THE STANDARD SPECIFICATIONS.
5. COVER SHALL HAVE THE WORD "DRAIN" IN 2-INCH RAISED LETTERS.

|   |   |                          |
|---|---|--------------------------|
|  | <p><b>CITY OF ALGONA</b></p> <p>SOLID STORM DRAIN COVER</p>   |                          |
|   | <p>APPROVED: </p> <p>DATE: 04/06/2015</p> | <p>DWG. NO.<br/>SW-7</p> |






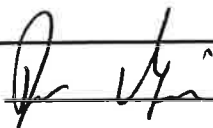
**PLAN**

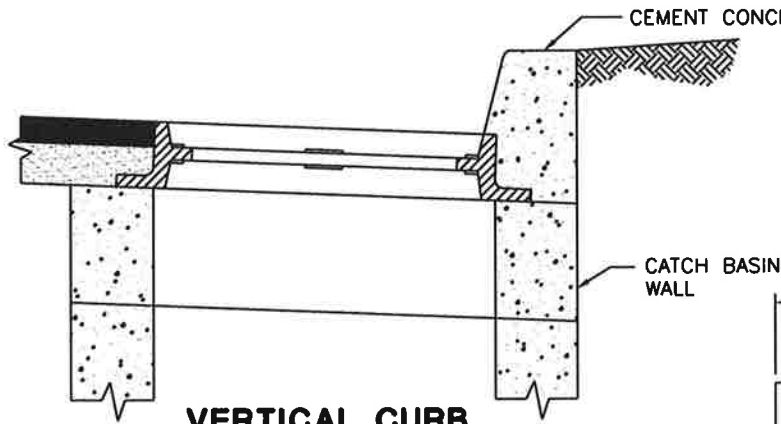


**ELEVATION**

**NOTES:**

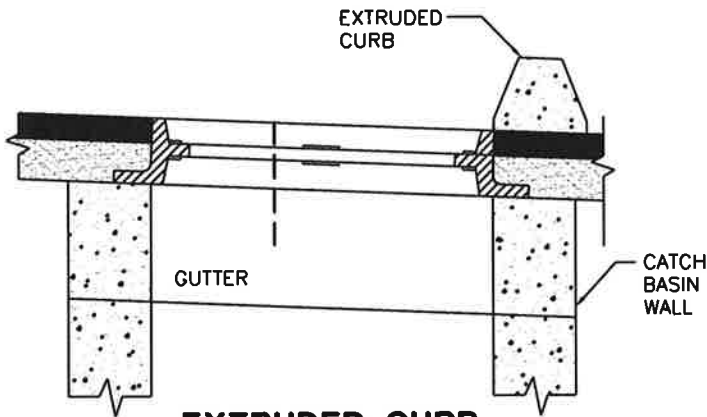
1. SELF-LOCK VANED GRATE MANUFACTURER SUBJECT TO APPROVAL BY ENGINEER.
2. USE WITH TWO LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) BOLTS, 2" LONG. NOTE SLOT DETAIL. PROVIDE WHERE REQUIRED. ALL LIDS OUTSIDE OF ROADWAY TO BE LOCKED.
3. MATERIAL IS DUCTILE IRON ASTM A536 GRADE 80-55-06.
4. "OUTFALL TO STREAM DUMP NO POLLUTANTS" IN RAISED LETTERS SHALL BE LOCATED ON GRATE AS SHOWN, OR ON BORDER AREA.
5. SHALL CONFORM TO SEC. 7.05 OF THE STANDARD SPECIFICATIONS.
6. WELDING IS NOT PERMITTED.
7. EDGES SHALL HAVE 0.125" RADIUS, 0.125" CHAMBER OR COMPLETE DEBURRING.
8. USE A BI-DIRECTIONAL VANED GRATE IN SAG VERTICAL CURVES.

|  |  |
|--|--|
|             | <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">VANED GRATE</p> |
| APPROVED:  | DWG. NO.<br>SW-9   |
| DATE: 04/06/2015   |  |

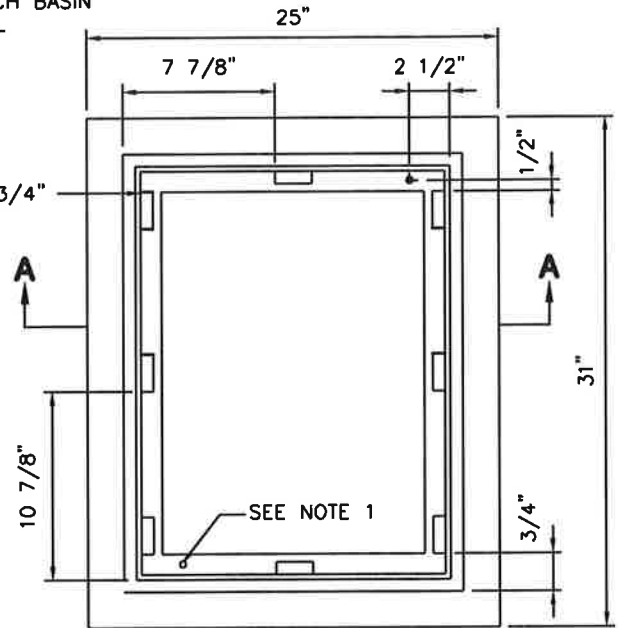


**VERTICAL CURB**

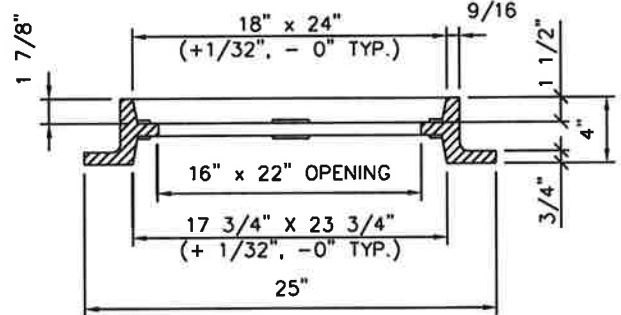
LEVEL PAD 16 - 3/4"  
X 2 1/4" X 1/8"



**EXTRUDED CURB**



**PLAN**


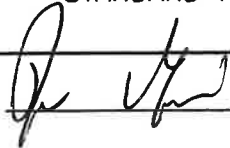


**SECTION A-A**

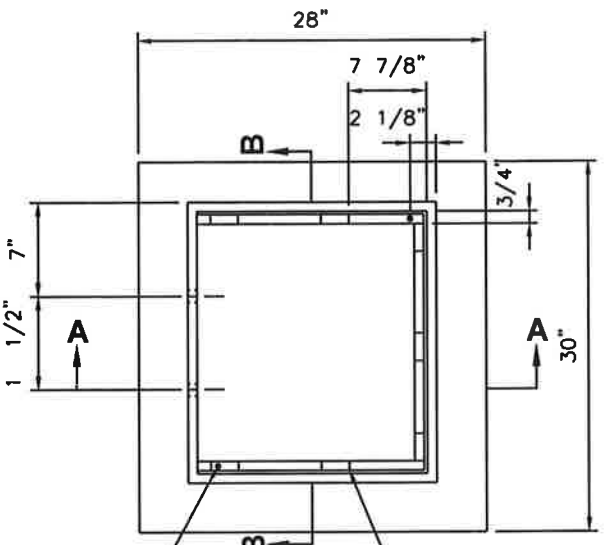
**NOTES:**

1. DRILL AND TAP FOR, AND PROVIDE, TWO LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) BOLTS, 2" LONG, WHERE REQUIRED. ALL LIDS TO BE LOCKED OUTSIDE OF ROADWAY.
2. FRAME MATERIAL IS CAST IRON PER ASTM A48 CLASS 30 OR BETTER.
3. SET FRAME TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.

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|---|---|
|                    | <p><b>CITY OF ALGONA</b></p> <p>STANDARD FRAME INSTALLATION</p> |
| <p>APPROVED: </p> | <p>DWG. NO.<br/>SW-10</p>                                       |
| <p>DATE: 04/06/2015</p>   |   |

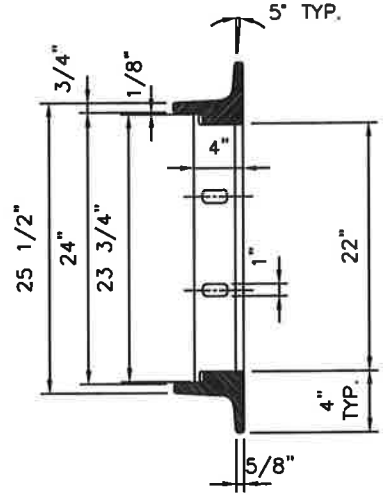
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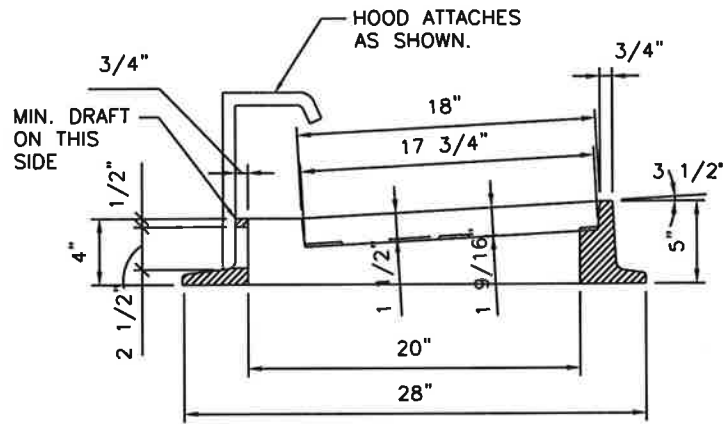
DRILL & TAP TWO 5/8"-11NC HOLES THRU FRAME

LEVELING PAD 7-1/8" X 3/4" X 2 1/4" (TYP.)

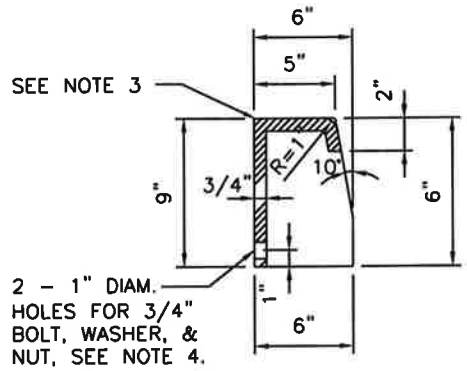
**PLAN**



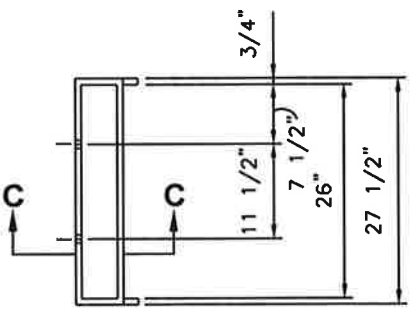
**SECTION B-B**



**SECTION A-A**




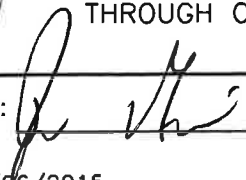
**SECTION C-C**

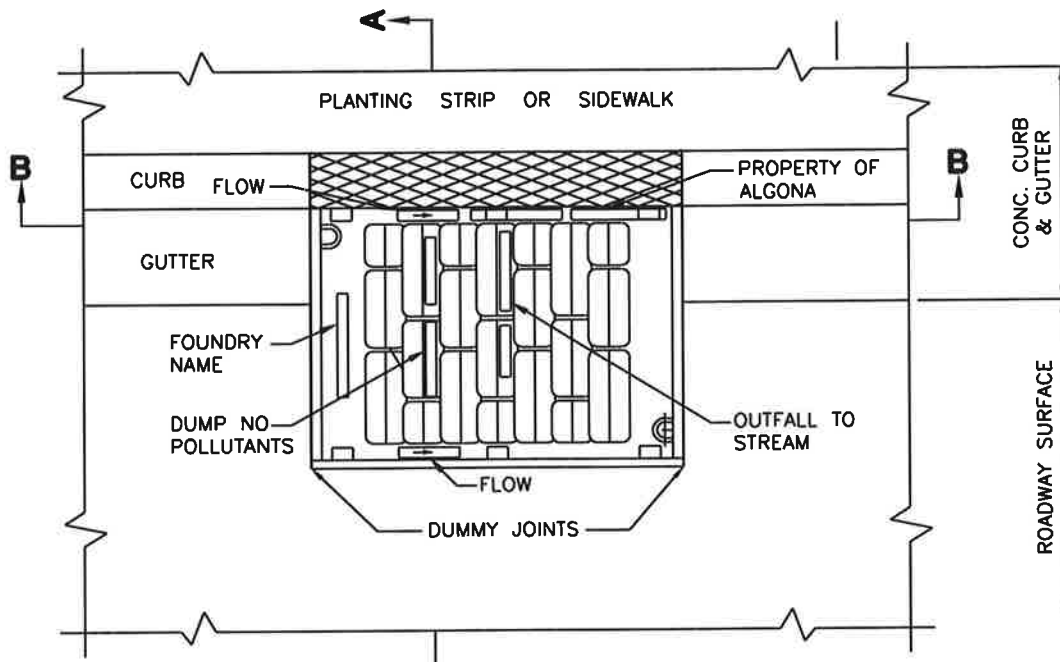


**HOOD DETAIL**

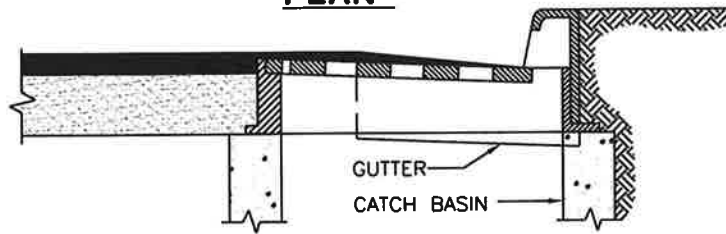
**NOTES:**

1. MATERIAL SHALL CONFORM TO SECTION 9-05.15(2) OF THE STANDARD SPECIFICATIONS.
2. PATTERN ON TOP SURFACE OF HOOD SHALL BE 3/16" NON-SKID DIAMOND.
3. BOLT, WASHER, AND NUT SHALL BE GALVANIZED OR CORROSION RESISTANT.

|  |                              |
|--|------------------------------|
|  <p><b>CITY OF ALGONA</b></p> <p>THROUGH CURB INLET FRAME</p> |                              |
| <p>APPROVED: </p> <p>DATE: 04/06/2015</p>                    | <p>DWG. NO.</p> <p>SW-11</p> |



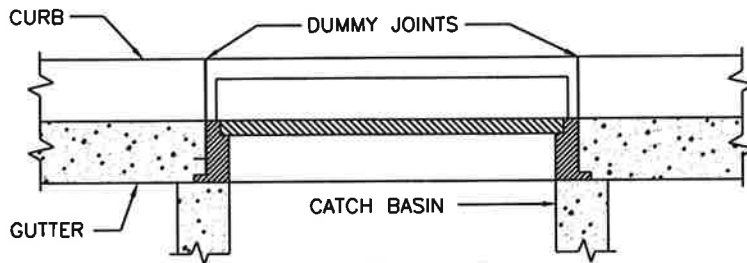
**PLAN**



**SECTION A-A**

**NOTES:**

1. SET TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
2. THROUGH CURB INLET TO BE USED IN SAG CURVES.



**SECTION B-B**



**CITY OF ALGONA**

**THROUGH VERTICAL CURB INLET  
FRAME & GRATE**

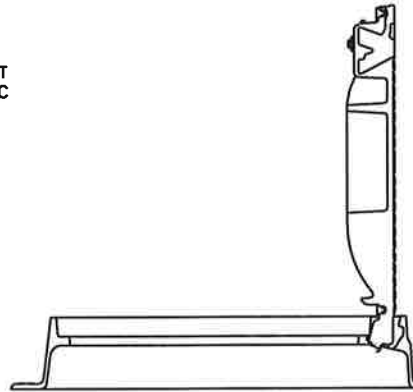
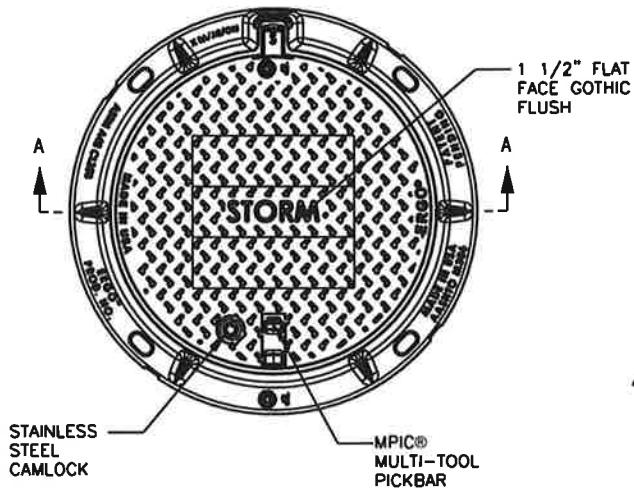
APPROVED:

DATE: 04/06/2015

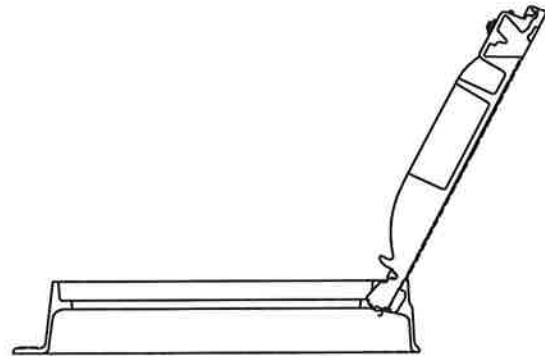
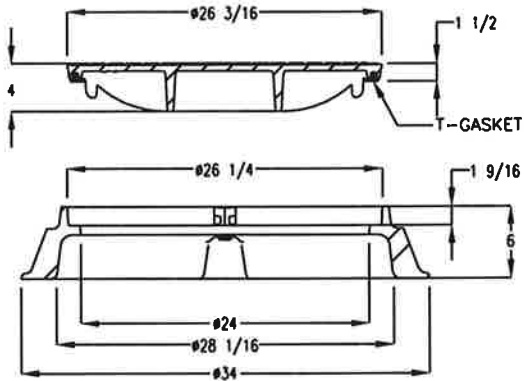
DWG. NO.

SW-12

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SAFETY LOCK ● 90°



FULLY OPENED ● 120°

ERGO ASSEMBLY  
MODEL NO. 00104028L02



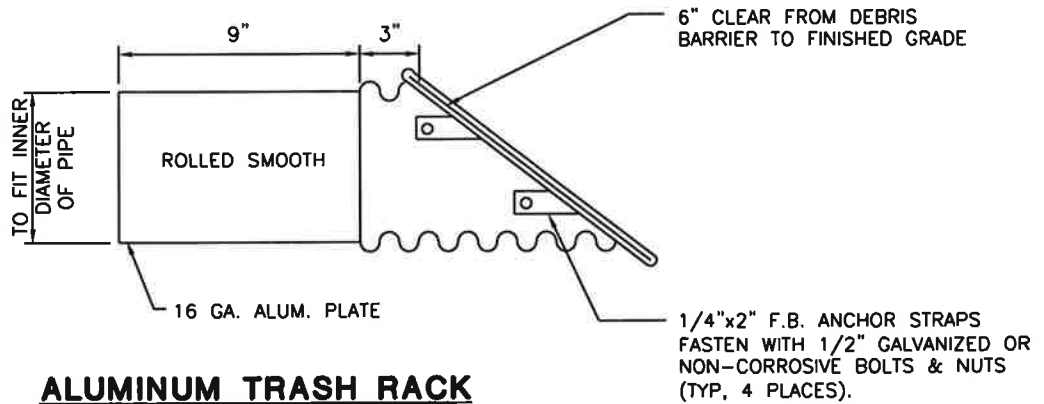
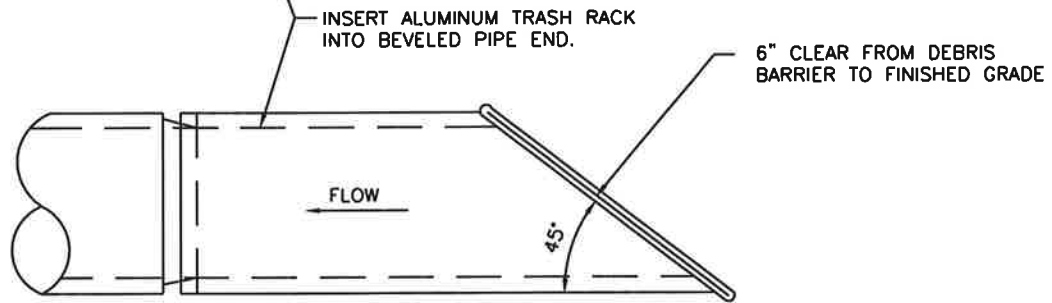
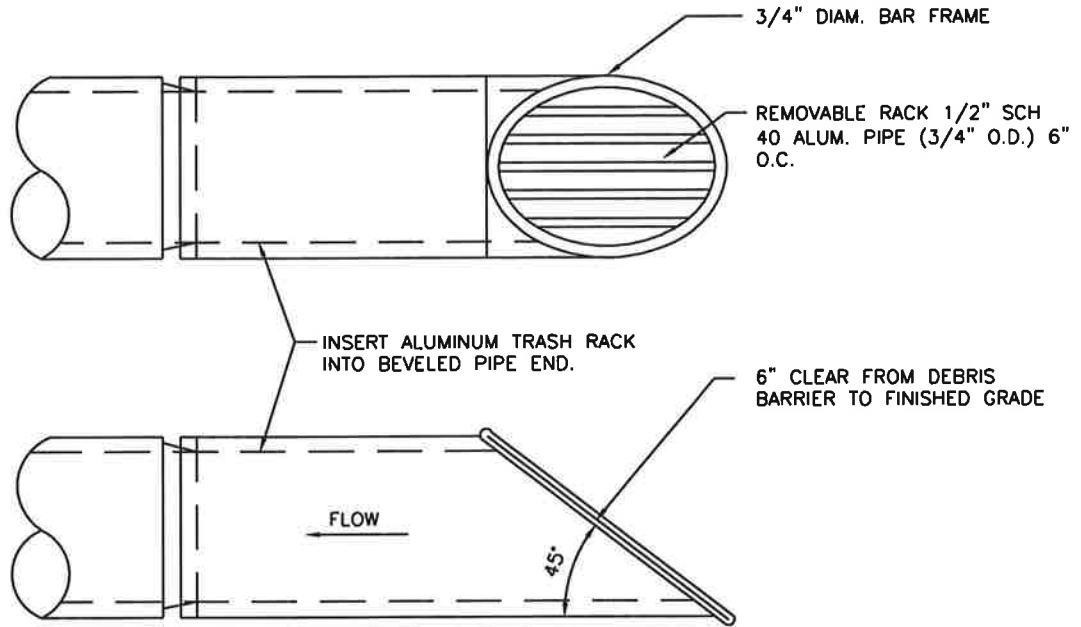
CITY OF ALGONA

MANHOLE FRAME AND COVER

APPROVED:

DATE: 04/06/2015

DWG. NO.  
STMH CVR -  
ERGO



**ALUMINUM TRASH RACK**

**NOTES:**

1. ALL STEEL PARTS MUST BE GALVANIZED & ASPHALT COATED (TREATMENT 1 OR BETTER).
2. CONTRACTOR TO VERIFY DIMENSIONS.



**CITY OF ALGONA**

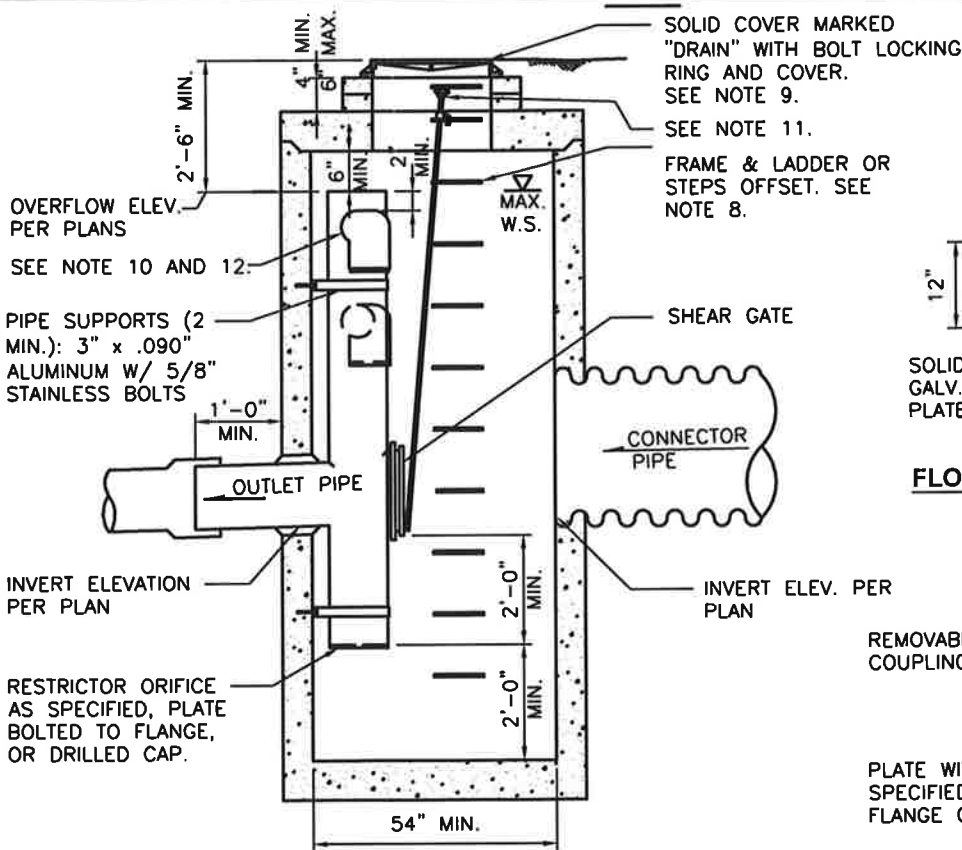
TRASH RACK  
DEBRIS BARRIER

APPROVED:

DATE: 04/06/2015

DWG. NO.

SW-17



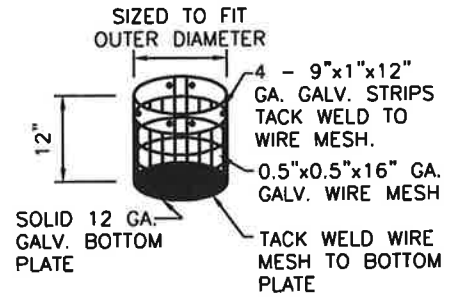
**CATCH BASIN TYPE 2**

DIAM. AS REQUIRED

**NOTES:**

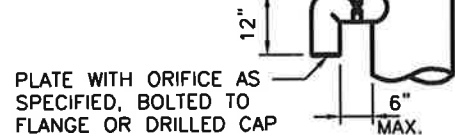
1. PIPE SIZES, INVERT ELEVATIONS, ORIFICE SIZES, OVERFLOW ELEVATIONS AND SLOPES; PER PLANS.
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS.
3. EXCEPT AS SHOWN OR NOTED, UNITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS FOR CATCH BASIN TYPE 2, 54" MIN. DIAM.
4. PIPE SUPPORTS AND RESTRICTOR SHALL BE OF SAME MATERIAL, AND BE ANCHORED AT 3' MAX. SPACING BY 5/8" DIAM. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED 2" IN WALL.
5. THE RESTRICTOR SHALL BE FABRICATED FROM .060" ALUMINUM, PVC, CPE, OR HDPE PIPE PER THESE ENGINEERING STANDARDS.
6. OUTLET SHALL BE CONNECTED TO CULVERT OR SEWER PIPE WITH SUITABLE COUPLER OR GROUTED INTO THE BELL OF CONCRETE PIPE.
7. THE VERTICAL RISER STEM OF THE RESTRICTOR SHALL BE THE SAME DIAM. AS THE HORIZONTAL OUTLET PIPE, WITH AN 8" MIN. DIAM.
8. FRAME AND LADDER OR STEPS OFFSET SO THAT:
  - A. SHEAR GATE IS VISIBLE FROM TOP.
  - B. CLIMB DOWN SPACE IS CLEAR OF RISER AND SHEAR GATE.
  - C. FRAME IS CLEAR OF CURB. ALL STEPS AND HANDHOLD SHALL BE MADE OF POLY PROPYLENE.
9. FOR POND APPLICATIONS SOLID COVER AND MANHOLE CONCRETE LID SHALL BE REPLACED WITH DEBRIS CAGE.
10. MULTI-ORIFICE ELBOWS MAY BE LOCATED AS SHOWN OR ALL ON ONE SIDE OF RISER TO ASSURE LADDER CLEARANCE.
11. SHEAR GATE HANDLE SHALL BE ATTACHED TO LADDER/ STEP LOCATED WITHIN 24" ACCESS SECTION.
12. IF NOTCHED WEIR IS USED IN LIEU OF ELBOW, BAFFLE SHALL NOT OBSTRUCT ACCESS TO THE STRUCTURE.

**NOTE:**  
ATTACH SCREEN TO CMP CROSS W/ 6 1" METAL SCREWS-2 PER STRAP, OR USE STAINLESS STEEL PIPE CLAMP.

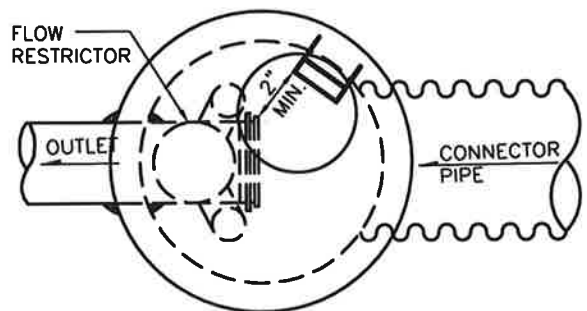


**FLOW CONTROL SCREEN**



REMOVABLE WATER-TIGHT COUPLING



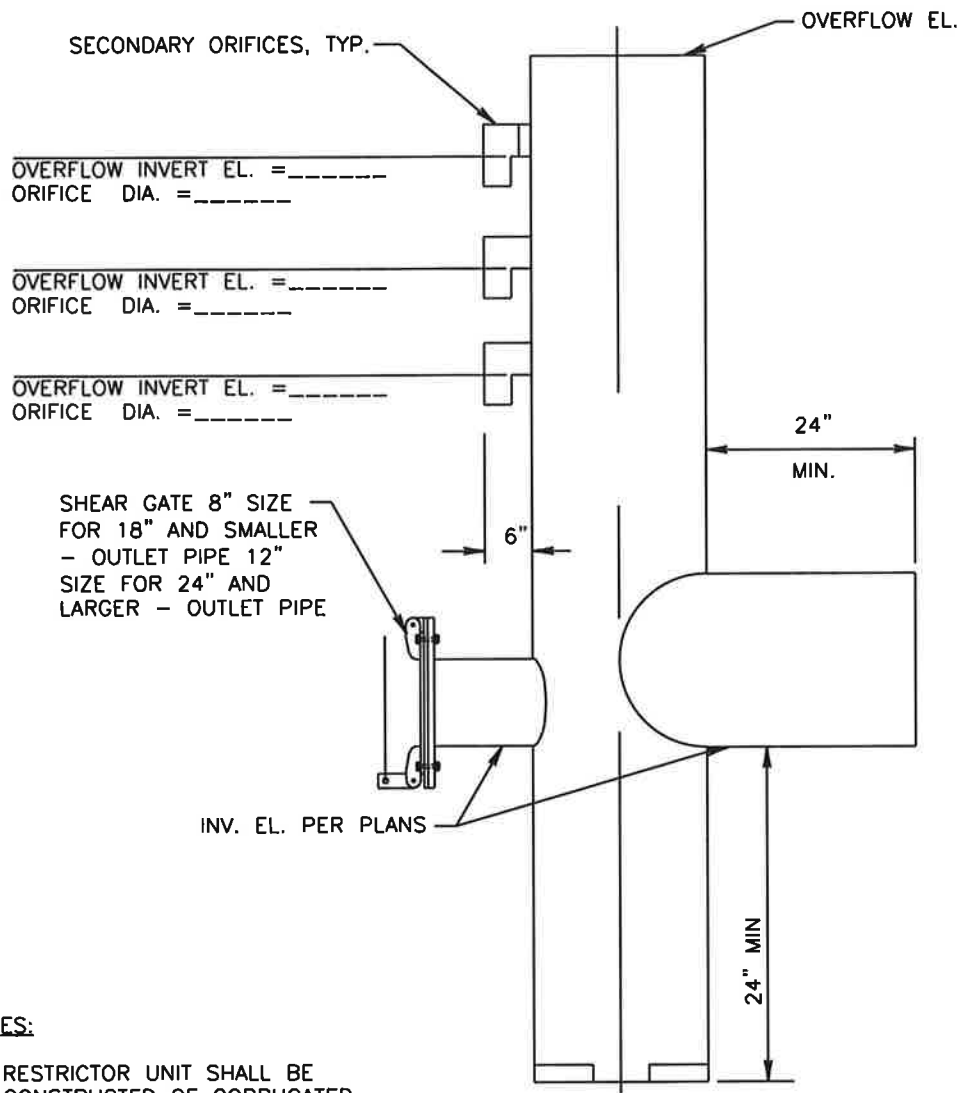
**ELBOW DETAIL**



**PLAN**

|  |   |
|--|---|
|             | <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">FLOW RESTRICTOR<br/>TEE TYPE</p> |
| APPROVED:  | DWG. NO.<br>SW-20   |
| DATE: 04/06/2015   |   |

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**NOTES:**

1. RESTRICTOR UNIT SHALL BE CONSTRUCTED OF CORRUGATED POLYETHYLENE PIPE AASHTO M294 TYPE S, POLYVINYL CHLORIDE (PVC) ASTM D-3034 SCHEDULE 40, OR ALUMINIZED CMP.
2. FOR PVC APPLICATIONS, ALL CONNECTIONS SHALL BE MADE USING STANDARD FITTINGS, NO WELDING SHALL BE USED.



# CITY OF ALGONA

## RESTRICTOR RISER

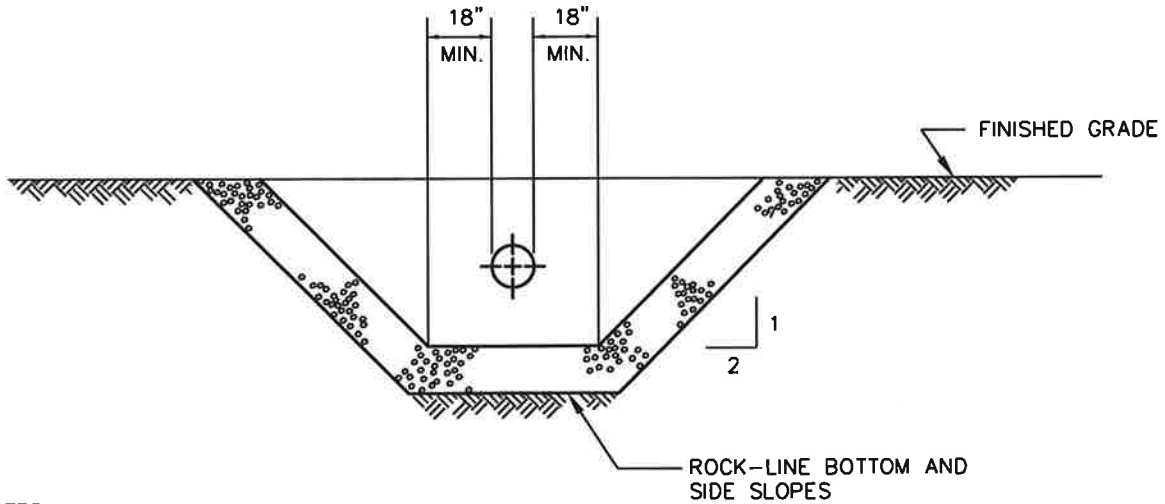
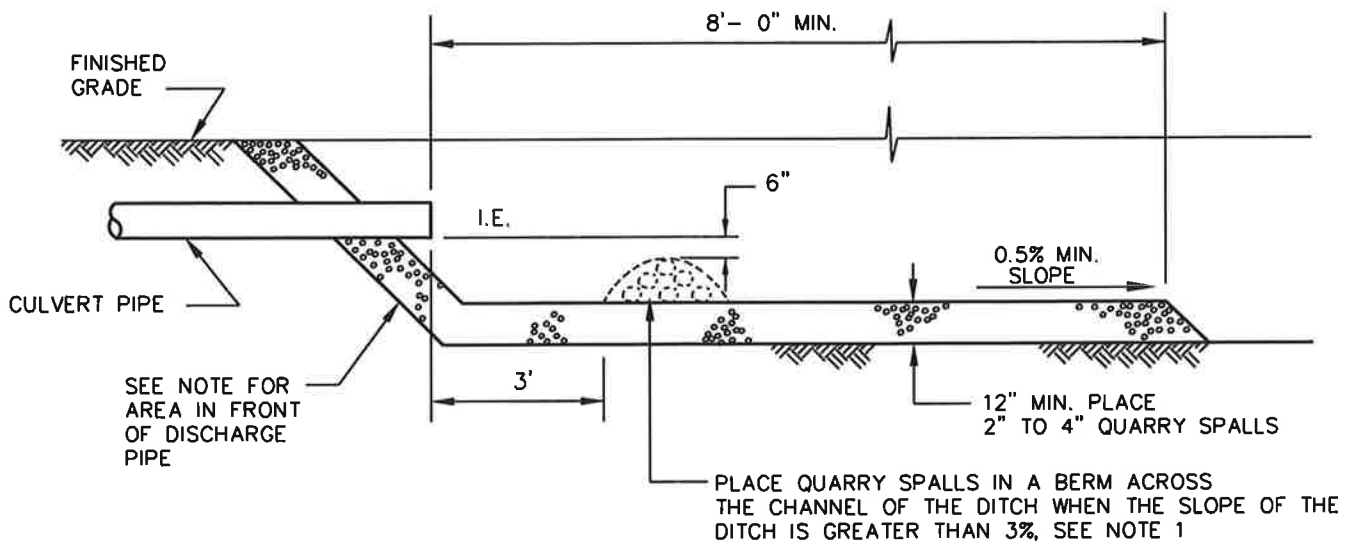
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DATE: 04/06/2015

DWG. NO.

SW-21





**NOTES:**

1. PLACE QUARRY SPALLS IN FRONT OF CULVERT DISCHARGE, ENGINEER SHALL SIZE QUARRY SPALL BERM



**CITY OF ALGONA**

RIPRAP AND ENERGY DISSIPATION FOR DITCH

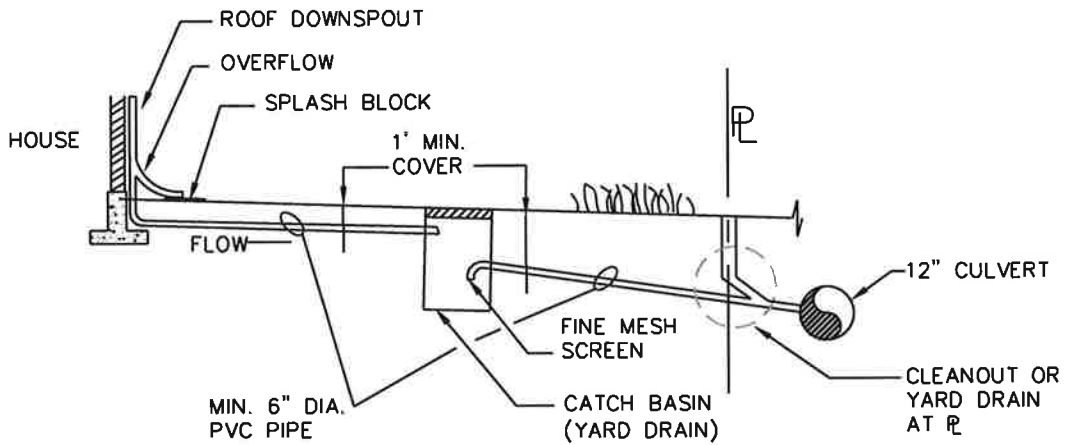
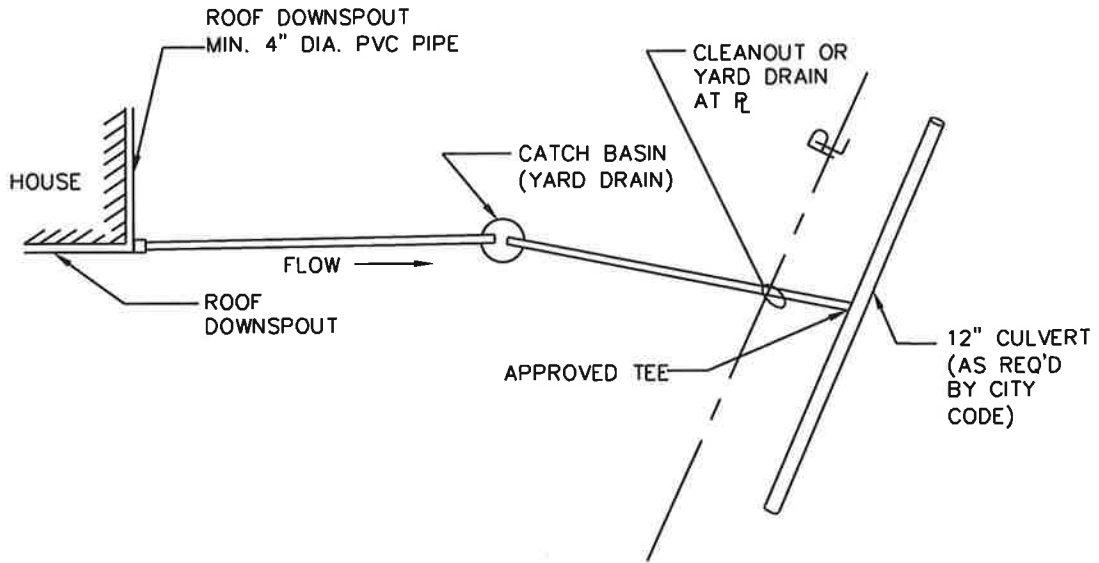
APPROVED:

DATE: 04/06/2015

DWG. NO.

DTCH-2

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# CITY OF ALGONA

PIPE COVER - TYPICAL  
YARD DRAIN

APPROVED:

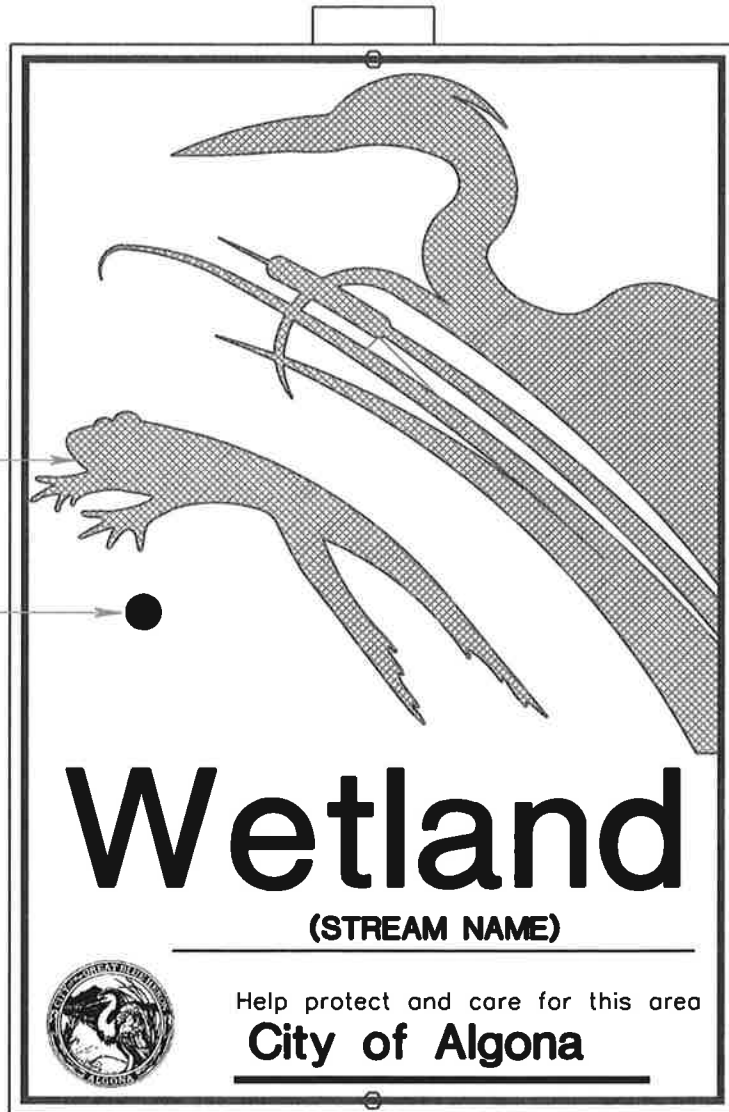
DATE: 04/06/2015

DWG. NO.  
PIPECOVER

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FOREGROUND  
COLOR: TEAL

BACKGROUND  
COLOR: BEIGE





SIGN SIZE: 24"x36"

8'-4X4 CEDAR OR  
PRESSURE-TREATED  
POST SET 3' IN GROUND  
OR 2X2 UNISTRUT  
(SEE STREET DETAILS)

NOTES:

1. ATTACH SIGN TO POST WITH TWO (2) 5/16 GALVANIZED LAG BOLTS WITH WASHERS.
2. THE WETLAND SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE SENSITIVE AREA BUFFER, SETBACK AREA OR SETBACK TRACT AND THE BUILDING SETBACK AREA.
3. SIGN SHALL BE STATIONED IN A PROMINENT LOCATION, I.E.: AT THE CLOSEST POINT TO THE PROPOSED DEVELOPMENT. SIGN MAY ALSO BE ATTACHED TO FENCES.

|  |                   |
|--|-------------------|
|  <h2 style="margin: 0;">CITY OF ALGONA</h2> <p style="margin: 0;">WETLAND SIGN INSTALLATION</p> |                   |
| APPROVED:    | DWG. NO.<br>SW-28 |
| DATE: 04/06/2015   |                   |

