

# CITY OF LAPEER CONSTRUCTION SPECIFICATIONS

ENGINEERING REVIEW CHECK LIST: To be completed after site plan approval  
 Check list is to be completed by Developer's engineer

PROJECT NAME: \_\_\_\_\_

DESIGN ENGINEER: \_\_\_\_\_

COMPANY: \_\_\_\_\_

DATE: \_\_\_\_\_

**I. General Review Items, Including General Plan (if applicable)**

YES      NO

1. Engineering plans match the approved site plan or preliminary plat		
2. Plans signed and sealed by a Professional Engineer (each sheet)		
3. Title block information filled in (i.e., project name, location etc.)		
4. Location sketch		
5. North arrow		
6. Legal description of all properties involved in project		
7. An impact study is required for a proposed project if deemed necessary by the City		
8. Two Bench Marks (clearly indicate datum)		
9. Street names and R.O.W. widths (existing or proposed)		
10. All existing and proposed municipal and private utilities (including on-site services) maintaining adequate separation between all utilities		
11. Existing easements shown with recorded information		
12. Location of proposed buildings on property		
13. Location and elevations of ditches, culverts, natural waterways and county drains		
14. Lot numbers and dimensions or tract acreage shown		
15. The applicant shall indicate the presence of flood plains and/or wetlands if they exist		
16. The applicant shall indicate the limits of flood plains and/or wetlands or state that there are no flood plains or wetlands.		
17. Provide plans on 24" x 36" sheets of paper		
18. Plan scale shall be 1" = 50' horizontally as a maximum and 1" = 5' vertically for profiles		
19. Provide location dimensions for all proposed utilities		
20. Provide City of Lapeer standard detail sheets for utilities and road/street construction as applicable		
21. Topographic Survey Plan (show existing ground contour lines) for the site and 100' beyond the property line. Contour lines are to be shown every 2'		
22. Provide profiles for water main, storm and sanitary		
23. Residential developments, the lot number and address shall be shown for each lot		

**II. Sanitary Sewer** (See standard detail sheet for additional information)

**YES NO**

- |   |  |  |
|---|--|--|
| 1. Proposed Sewer Location:   |  |  |
| a. 10' minimum separation between adjacent utilities  |  |  |
| b. Location dimensions shown  |  |  |
| c. 18" vertical separation when crossing other utilities  |  |  |
| d. Sanitary main must be extended across the property frontage or to property line  |  |  |
| 2. Manholes (assign number to each, obtain numbers to be assigned from the DPW):  |  |  |
| a. Size: minimum of 4' diameter   |  |  |
| b. Maximum spacing: 400'  |  |  |
| c. Provide interior drop connections when inverts are over 18" apart (5' diameter manhole)  |  |  |
| d. Sanitary manholes shall be constructed at all changes in grade, size, alignments and at the end of the main  |  |  |
| e. A Sample Manhole is required for all " non-residential" buildings discharging waste into a City of Lapeer sanitary system  |  |  |
| 3. Slope: Sufficient to provide at least 2 fps velocity and as required by 10 state standards   |  |  |
| 4. Profiles: Required for all sanitary sewer mains  |  |  |
| a. Match 0.8 line of pipes in manhole. Outlet pipe shall be 0.10' below lowest invert of incoming pipes   |  |  |
| b. Show all underground utilities crossings (existing or proposed)  |  |  |
| c. Show: size, slope, and type of pipe, sewer inverts and rim elevation   |  |  |
| d. Stationing of the profile shall match stationing of plan view  |  |  |
| 5. Building Service Connections Show:   |  |  |
| a. Location and sizes shown   |  |  |
| b. Materials: Schedule 40 or SDR 26, 6" from main to property line, 4" from the property line to house  |  |  |
| c. Clean-Out required every 80' and at all bends  |  |  |
| d. One lead shown for each unit to be served by public sewer  |  |  |
| e. Sanitary services should be perpendicular to the property line   |  |  |
| 6. State Construction Permit Submittal  |  |  |
| a. Quantities and description of improvements of public sanitary sewer  |  |  |
| b. Basis of design provided with current and future service populations (capacity)  |  |  |
| c. Service district map provided with current and future service areas labeled  |  |  |
| d. Peak hour flow calculations shall be in accordance with 10 state standards   |  |  |
| e. Capacity study as required by Department of Environmental Quality  |  |  |
| f. Permit application completed   |  |  |
| g. Letter of approval from the City of Lapeer   |  |  |
| h. Applicant is responsible for submitting completed permit application package to Department of Environmental Quality  |  |  |
| 7. Minimum 8" diameter required for public sanitary sewer   |  |  |
| 8. 15' minimum easement required for all proposed public sanitary sewers, easement width is determined by pipe size and proposed depth  |  |  |
| a. Where easements are required, it is the responsibility of the Developer to secure all easements for street and utilities. Easements and deeds of grant shall be transferred to the City of Lapeer prior to acceptance of the project. Easements are to be recorded through the Lapeer County Register of Deeds |  |  |
| 9. Granular backfill shown and labeled on plan and profile views where sanitary is within a 1 on 1 influence of pavement, sidewalk and any other existing or future hard surfaces unless approved otherwise   |  |  |
| 10. Sewer main material: Schedule 40, SDR 26 and truss pipe. Sewers greater than 12' deep shall be truss pipe   |  |  |

**II. Sanitary Sewer - continued** (See standard detail sheet for additional information)

YES NO

11. Surface water crossing:

- a. Where sewer main is suspended over a drainage crossing, it shall be supported and protected from damage and freezing and accessible for repair or replacement
- b. Top of all sewer entering or crossing streams or waterways shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer main

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12. Lift stations: (construction of a lift station is subject to approval by the City of Lapeer, see detail sheet for additional information)

- a. Submersible pump lift station with concrete chamber and an exterior valve chamber
- b. Force main: Class 54 Ductile Iron pipe
- c. Telemetry: Compatible with the City of Lapeer Specifications
- d. Lighting: Provide yard lighting to illuminate area


**III. Water Main** (See standard detail sheet for additional information)

1. Proposed Water main location:

- a. 10' minimum separation between adjacent utilities
- b. Location dimensions shall be shown
- c. Water main must be extended across property frontage or to a property line
- d. 18" minimum vertical clearance between water main and other utilities
- e. Water main profile shown on plans-maximum burying depth is 6.5', minimum 5.5'


2. Hydrants:

- a. Spacing - 300'
- b. Type: East Jordan - 5BR
- c. Location: minimum 5' from driveways, 30' from buildings, 3' from back of curb and in a cul-de-sac the hydrant is to be located in the back of the cul-de-sac not in the island area
- d. No parking within 15' of a fire hydrant



3. Gate Valves and Wells:

- a. Location: outside of paved area when feasible
- b. Gate well size: minimum 5' diameter
- c. Show finish grade for gate well rims
- d. Water valves 8" and larger are to be placed in gate wells. Valves less than 8" shall be placed in a valve box


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4. Valve Placement:

- a. At tees, a minimum of two valves are required
- b. At crosses, a minimum of three valves are required
- c. On straight runs, spacing at maximum intervals of 800'


5. Dead ends shall be minimized by making appropriate tie-ins whenever practical

6. For dead-ends, provide hydrant and gate valve

7. Provide 45 degree bends or less for water main (90 degree bends are not allowed )

8. One water service lead shown for each unit on site

9. Water main material: Class 54 Ductile Iron

10. 15' minimum easement required for all proposed public water mains, easement width is determined by pipe size and proposed depth

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- a. Where easements are required, it is the responsibility of the Developer to secure all easements for street and utilities. Easement and deeds of grant shall be transferred to the City of Lapeer prior to acceptance of the project. Easements are to be recorded through the Lapeer County Register of Deeds.

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**III. Water Main - continued** (See standard detail sheet for additional information)

YES NO

- |   | YES | NO |
|---|-----|----|
| 11. Required on plans:  |     |    |
| a. Total material quantities list   |     |    |
| b. Description of improvements of public water main   |     |    |
| c. City of Lapeer   |     |    |
| d. County section number  |     |    |
| 12. Pipe size, length and type shown on plans   |     |    |
| 13. Granular backfill shown and labeled on plan (or profile) view where water main is within a 1 to 1 influence of pavement, sidewalk or other existing or future hard surfaces   |     |    |
| 14. Length and size of casing and pipe shown at all bore locations  |     |    |
| 15. Water Meters:   |     |    |
| a. All users (homes, businesses, commercial buildings, etc.) shall have approved type meters installed. Meter type to be determined by the Superintendent of the Water/Sewer Department. The meter style will be determined by building use |     |    |
| b. Meters shall be purchased from the City of Lapeer  |     |    |
| c. City of Lapeer does allow a second meter for irrigation lines only. If second meter is used, it is permissible to have two meters off one service line   |     |    |
| d. Compression or flared ball valve is required before and after the meter  |     |    |
| e. A meter by-pass is not permitted   |     |    |
| 16. Water Service:  |     |    |
| a. On new developments, water services are to be constructed at the time of water main construction   |     |    |
| b. Water services are to be constructed through gas, telephone and electrical easements   |     |    |
| c. All water service connections shall include corporation stops, service pipe, curb stops, stainless steel rod and box   |     |    |
| d. Stop box shall be set in the road right-of-way at the property line  |     |    |
| e. Stop box shall not be placed within existing or proposed pavement  |     |    |
| f. Box style is arch pattern with a one-piece lid and stainless steel rod   |     |    |
| g. Water service size shall be 1" minimum   |     |    |
| h. All water service pipes up to 2" shall be type K soft copper to the meter, with compression fittings   |     |    |
| i. All water services greater than 2" shall be Class 54 Ductile Iron pipe   |     |    |
| 17. Plans shall contain the following note "All water system construction shall be constructed in compliance with City of Lapeer Construction Specifications"   |     |    |
| 18. Construction Permit Submittal - Detroit Water and MDEQ - City of Lapeer is connected to Detroit Water, Permit applications are to be submitted to Detroit Water, who will review and forward to MDEQ                                    |     |    |
| a. Material quantities totaled and description of improvements of public water main   |     |    |
| b. Initial and total number of service connections  |     |    |
| c. Initial and total Residential Equivalent Units served by project   |     |    |
| d. Water flow rate for the proposed project based on REU's  |     |    |
| e. Actual flows and pressures of existing system at connection point (s) (to be arranged with DPW)  |     |    |
| f. Permit application completed   |     |    |
| g. Letter of approval from the City of Lapeer   |     |    |
| h. Applicant is responsible for submitting complete permit application package to DWSD  |     |    |
| 19. For all river and drain crossings, show detailed section with elevations  |     |    |

**III. Water Main - continued** (See standard detail sheet for additional information)

YES NO

20. Crossing shall have a minimum of 5.5' of cover,  
(below river, creek and/or drain bottom) pipe shall have flexible  
restrained or river crossing pipe, valves shall be provided on both ends  
of the water crossing with permanent taps for testing

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**IV. Storm Sewer** (See standard detail sheet for additional information)

1. Storm Sewer System Classifications:

a. Platted Subdivisions: City of Lapeer maintains storm sewers located in City  
street right-of-way

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1. The homeowner's association is responsible for maintenance of the rear  
yard storm sewers, detention pond and the inlets and outlets to the  
detention pond

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b. Site Condominiums & Attached Condominiums: The Storm sewer in a  
condominium development is private and the condominium association is  
is responsible for maintenance of all the storm sewer facilities serving  
the development

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c. Apartments, Office, Commercial, Industrial: The storm sewer facilities in these  
developments are private systems and shall be maintained by the  
property owner

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2. Drainage systems shall be designed to protect public health and safety and to facilitate  
efficient and effective maintenance

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3. In all cases storm/sump leads are considered private ownership

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4. A maintenance agreement is to provide the means and assurance that maintenance of  
storm water management and facilities shall be undertaken

a. A maintenance agreement is required for all private storm systems

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b. A maintenance agreement shall include a plan for routine, emergency and  
long-term maintenance of all storm water facilities

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c. The maintenance agreement shall be binding on all subsequent owners of land  
served by the storm water management and facilities, and shall be recorded in  
the office of the Lapeer County Register of Deeds

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5. Provide plan showing drainage districts and furnish calculations - calculations indicating  
proper pipe sizing of the collection system and outlet shall be submitted for review. These  
calculations, as a minimum, shall include the following: Intensity, runoff coefficient, area,  
time of concentration, diameter, slope and length of pipe, velocity and hydraulic gradient

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6. Natural Topography and site drainage shall be preserved and site grading shall be minimized  
to an extent reasonably achievable considering the nature of the development

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7. Unless otherwise approved, storm water run-off shall be conveyed through vegetated buffer  
strips so as to decrease run-off velocity, allow for natural infiltration, allow sediment particles  
to settle, and to remove pollutants

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8. Detention facilities shall not be located within a public right-of-way and must be a minimum  
of 10' from any property line.

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9. All basins shall have an emergency overflow provision - 1' above the design storage  
elevation, which will direct overflows away from nearby structures

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10. Side slopes shall be a maximum of 6:1 grade unless the basin is fenced  
(6' high chain link) in which case the slopes may be increased to a maximum of 4:1

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**IV. Storm Sewer-continued**

YES NO

11. Storm water runoff detention requirement:

- a. All City site developments that propose to increase existing storm water runoff shall provide sufficient on-site detention or retention storage volume
- b. All off-site drainage flowing onto the site shall be included in the drainage calculations for pipe sizing but will not be required to be detained.
- c. A drainage area map will be required for all sites


$I = 175 / ( T+25 )$  T = 20 minutes ( residential areas )  
 T = 15 minutes ( all other developments )

C factors:

- C Area
- 0.20 Lawn/Grass areas
- 0.90 Pavement and Roof area
- 0.35 Overall area of single family development
- 0.55 Overall area of multiple housing development
- 0.80 Overall area of commercial or industrial development

12. Detention basin design criteria:

- a. The volume of storage provided shall be greater than or equal to the amount required for a 10 year storm event as determined by the Oakland County Drain Commissioner's "A Simple Method of Detention Basin Design" and adopted by the Lapeer County Drain Commissioner

\*The Lapeer County Drain Commissioner allows a maximum discharge rate of 0.4 cubic feet per second per acre (cfs/acre)

- b. The applicant will be required to show that the system receiving flow ( storm sewer, ditch, drain, pond, etc...) is capable of handling the flow or the site may be restricted to a lower allowable discharge and/or be required to perform downstream improvements.

- c. Where orifice restrictors are used, the diameter of the restrictor shall be a minimum of 4" in diameter to minimize clogging
- d. The outlet shall be a pipe rounded to the nearest full pipe size


13. Retention Basin Design Criteria:

- a. The volume of storage provided shall be greater than or equal to the amount required for two consecutive 100 year storm events
- b. A 1' minimum freeboard shall be provided above the design high water level for all basins
- c. Existing ground water elevation shall be provided at the location of all basins
- d. Ownership and maintenance of storm water basin shall be the responsibility of the owner
- e. Calculations indicating proper pipe sizing of the collection system and outlet shall be submitted for review

- 1. These calculations as a minimum shall include the following:  
 intensity, run-off coefficient, area, time of concentration, diameter, slope and length of pipe, velocity and the hydraulic gradient

14. The bottom of the basin shall have a minimum slope of 1% from the perimeter toward the flow line

15. The slope of the flow line to the outlet shall have a minimum grade of 0.5%


**IV. Storm Sewer - continued**

YES NO

- |  | YES | NO |
|--|-----|----|
| 16. The entire basin shall be seeded (MDOT Class A seed) or sodded and the turf fully established before the City approves the basin for operation   |     |    |
| 17. Straw mats or mulch blankets may be required for steeper banks or when storm water enters via sheet flow   |     |    |
| 18. Inlet and outlet pipes to the basin (12" diameter and larger) shall have a bar screen, flared end sections and erosion protection such as rip-rap on a geotextile fabric or other acceptable protection measures   |     |    |
| 19. Methods other than pond storage (underground, roof, inline drain, dished parking lots) shall be approved by the municipality prior to submitting for site plan approval  |     |    |
| a. In general for parking lot storage, the maximum depth of water allowed is 6"  |     |    |
| b. Storage will not be allowed in the entry and exit ways of the building or designated handicapped spaces   |     |    |
| c. For underground storage utilizing a stone bed/pipe system, void space (maximum 40%) in the stone will be allowed to be used as storage up in the stone will be allowed to be used as storage up to the top of the pipe  |     |    |
| 20. Volume below the permanent water level will not be counted toward meeting the volume required for detention  |     |    |
| 21. In general, pumping systems are discouraged. However if it is deemed necessary to construct a pumped system, the applicant shall seek approval from the municipality prior to submitting for site plan approval. The municipality will determine if other options are feasible prior to approval |     |    |
| 22. If a pumped system is approved, requirements for the pump station will be determined by the City such as duplex pumps, back-up power, maintenance responsibility, etc...   |     |    |
| 23. MDEQ approval will be required for systems discharging into regulated wetlands/waterways   |     |    |
| 24. MDOT approval will be required for systems that discharge into MDOT controlled right-of-way or storm sewer systems   |     |    |
| 25. Natural topography and site drainage shall be preserved and site grading shall be minimized to an extent reasonably achievable considering the nature of the development   |     |    |
| 26. For storm sewer profiles:  |     |    |
| a. Provide a minimum of 3' of cover; show hydraulic gradient (HG) when it is above top of pipe; keep HG at least one foot below profile's finish grade   |     |    |
| b. Show all utility crossings, minimum 18" separation (between existing/proposed)  |     |    |
| c. Provide sufficient slope to obtain a minimum of 2.5 fps velocity  |     |    |
| d. Show: size, slope, and type of pipe, sewer inverts and rim elevations at manholes   |     |    |
| e. Stationing of the profile shall match stationing of the plan view and street (where applicable)   |     |    |
| 27. Storm Sewer Location:  |     |    |
| a. 10' separation between adjacent utilities   |     |    |
| b. Location dimensions shown   |     |    |
| 28. Catch Basins:  |     |    |
| a. Provide catch basins (with 2' minimum sumps) at low points  |     |    |
| b. All pavement catch basins shall have edge drain with filter sock (6" diameter) around their perimeter or along the back of curb (minimum length 40 LF total) Additional or continuous edge drain may be required, as directed   |     |    |
| c. 4' minimum diameter   |     |    |
| d. Constructed at all low points in curb and gutter  |     |    |
| e. Maximum distance for storm water to travel to a catch basin shall be 250'   |     |    |







**VI. Street Design-continued**

YES NO

9. Additional borings may be required where the USDA Soil Survey or on-site inspection indicates unstable soils may be present

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10. A profile view shall be provided for all roads (public and private) and shall include the following:

- a. Elevations at top of curb or at centerline, if not curbed
- b. Existing ground elevations at the center of the right-of-way and at other locations, as required for review
- c. Elevations shall be based on NGVD Datum
- d. Station and elevations of all high points, low points, grade breaks, curb returns and necessary information at vertical curves
- e. Top of curb (or Centerline) elevations at each station
- f. Grade in vertical curves must be indicated at 25' intervals


11. Street paving width shall conform to the following requirements:

Type	Minimum B/C to B/C Width (feet)	Minimum ROW Widths (feet)
* See Note " A "		
Collector/Major Street	36	70
Local (residential) Streets	29	60
Boulevards (per lane)	17	N/A
Marginal Access Street	28	N/A
Industrial Street	40	70
Cul-de-sacs (residential)	45 (radius)	60
Cul-de-sacs (industrial)	52 (radius)	80


\* " A " Major thoroughfare in accordance with the standards and specifications established by the City Commission

12. Right-of-way (ROW) width shall be adjusted as required to maintain a minimum of 18' from back of curb (B/C) to right-of-way line

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13. When boulevard sections are used at the entrance, the minimum pavement width for each side shall be 16' plus curb and gutter, and the minimum island width shall be 10' from back of curbs

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- a. The edge of metal in the median shall be offset at least 12' from the edge of lane of the intersecting street
- b. Material placed between the curbs shall be seeded earth


14. All islands and medians shall be curbed in the same manner and in accordance with the same detail for curb and gutter used elsewhere.


15. Hour glass and other odd shaped medians are not acceptable

16. Material placed between the curbs shall be seeded earth, crushed limestone or other material approved by the City

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17. The applicant shall remove all unsuitable soil including muck, peat and marl, as well as brush, trees, tree stumps, and similar materials from the full width of the roadway

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18. Street cross-sections shall include curb and gutter and shall meet or exceed the minimum pavement thicknesses shown in detail sheets

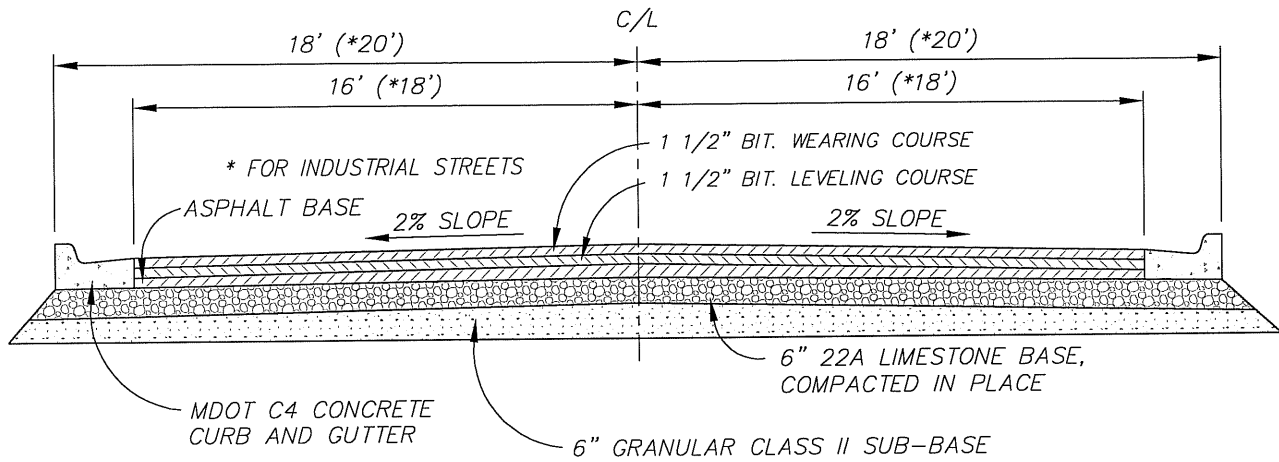
- a. Subsurface soil conditions shall govern exact thickness
- b. Pavement cross-sections shall have granular sub-base, crushed aggregate base and asphalt
- c. No concrete cross-sections will be allowed, unless approved by Street Superintendent
- d. All cross-sections shall be subject to the approval by the City
- e. Phased development shall used the same cross-section throughout the entire project


**VI. Street Design-continued**

YES NO

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|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p>19. In areas that require material to be removed they shall be backfilled with MDOT Class II Granular Material to provide a stable sub-grade for the roadway construction</p>  | <table border="1" style="width: 100px; height: 20px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>20. Minimum curb and gutter radii at intersections shall be as follows, unless otherwise approved by the City: ( minimum radius - Back of Curb)</p> <p style="margin-left: 20px;">a. Major Streets 40'</p> <p style="margin-left: 20px;">b. Local (residential) Streets 30'</p> <p style="margin-left: 20px;">c. Industrial Streets 50' ( and as approved by the City)</p>   | <table border="1" style="width: 100px; height: 60px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>21. Entrance (residential, commercial or industrial) shall be designed to accommodate the larger vehicles anticipated to use the site and stay within their lane</p>   | <table border="1" style="width: 100px; height: 20px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>22. Maximum allowable pavement grade shall be 6% (Local Residential 8% and the minimum allowable) shall be as follows:</p> <p style="margin-left: 20px;">a. Concrete gutter grades = 0.40%</p> <p style="margin-left: 20px;">b. Concrete gutter return at intersections = 1.00%</p> <p style="margin-left: 20px;">c. Pavement surface grade to gutter line = 1.00%</p> <p style="margin-left: 20px;">c. Typical cross - slope = 2.00%</p>  | <table border="1" style="width: 100px; height: 80px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>23. At the intersections of two (2) roadways, the maximum grade shall be 3% for a distance of 100' from the point of intersection</p>  | <table border="1" style="width: 100px; height: 20px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>24. All streets shall be designed for a minimum design speed of 30 mph (posted speed 25mph)</p> <p style="margin-left: 20px;">a. Design criteria (AASHTO and Design Speed) shall be noted on the plans</p>   | <table border="1" style="width: 100px; height: 30px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>25. The minimum sight distance for all roads shall be 300' for streets with design speeds of 30 mph</p> <p style="margin-left: 20px;">a. Higher design speeds shall be designed according to AASHTO (latest edition)</p>   | <table border="1" style="width: 100px; height: 60px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>26. All curbing shall drain to catch basins in the curb</p>  | <table border="1" style="width: 100px; height: 20px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>27. Private roads are to be designed to Public Road Standards</p>  | <table border="1" style="width: 100px; height: 20px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>28. All streets and sites shall be curbed</p>  | <table border="1" style="width: 100px; height: 20px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>29. Whenever a change in the vertical centerline grade of 1% or more occurs, provide a vertical curve</p> <p style="margin-left: 20px;">a. The minimum length of vertical curve shall be 100' and shall be rounded to the nearest 50' thereafter</p> <p style="margin-left: 20px;">b. For a 30 mph design speed, the minimum crest "K" value shall be 30 and the minimum sag "K" value shall be 40</p> <p style="margin-left: 20px;">c. Streets with higher design speeds shall be designed according to AASHTO (latest edition)</p>   | <table border="1" style="width: 100px; height: 120px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>30. For all future public streets, the wearing course of asphalt shall not be constructed for a minimum of 3 years or until the project is 90% built out.</p> <p style="margin-left: 20px;">a. The developer shall be responsible for maintaining the surface of the street until it has been accepted by the City</p> <p style="margin-left: 20px;">b. Center line description is required before the City will accept a street</p> <p style="margin-left: 20px;">c. Upon completion of the initial construction and all punch lists items to the City's satisfaction, the city will begin to perform surface maintenance limited to street sweeping and snowplowing</p> <p style="margin-left: 20px;">d. Prior to construction of the wearing course of asphalt, the city will review the conditions of existing pavement and mark areas to be repaired</p> <p style="margin-left: 20px;">e. The City will formally accept the street when the wearing course and all punch list items have been completed to the satisfaction of the City.</p> <p style="margin-left: 20px;">f. The developer will be required to furnish a surety in an acceptable form (cash,bond,etc.) in the amount determined by the City. This is to cover the cost of the asphalt wearing course and related items prior to the city performing any surface maintenance or issuing of building permits</p> | <table border="1" style="width: 100px; height: 180px; margin: 0 auto;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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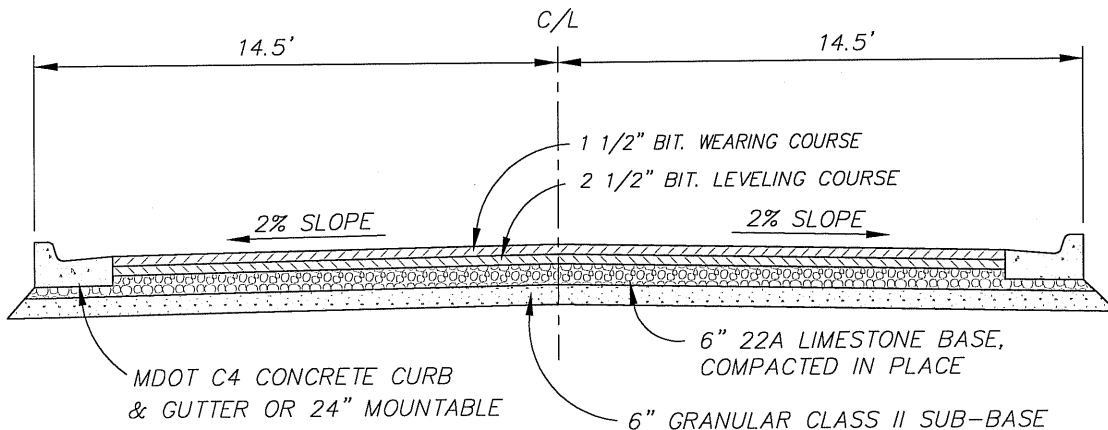




NOTE: MAJOR STREETS DESIGN SHALL BE AS APPROVED BY THE CITY

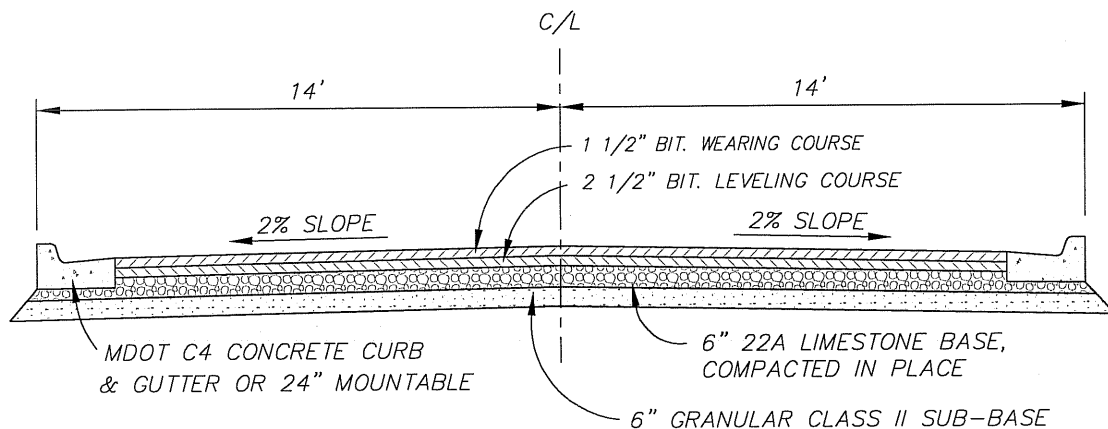
### COLLECTOR / MAJOR STREETS

NOT TO SCALE



### LOCAL (RESIDENTIAL) STREETS

NOT TO SCALE



### ACCESS DRIVES

NOT TO SCALE

MASTER: L8930\ENG STDS\STREET DETAILS



PREPARED BY  
**ROWE INCORPORATED**

128 N. Saginaw St. Lapeer, MI (810)-664-9411

DATE: FEB 2006

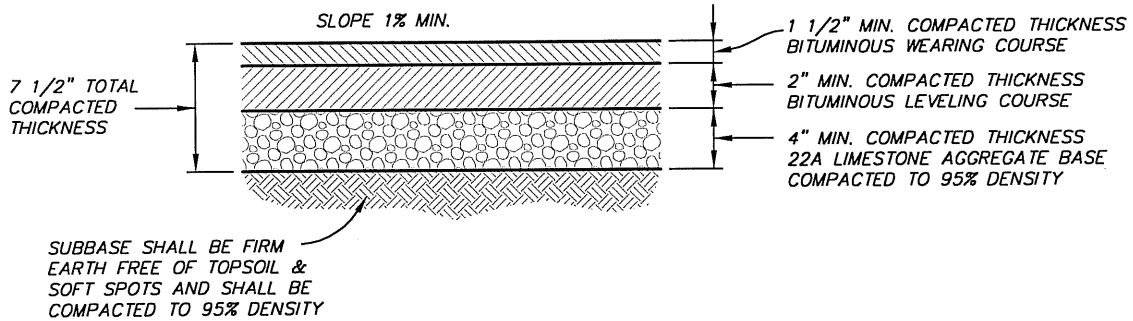
FILE:

PREPARED FOR  
**CITY OF LAPEER**  
SECTION VI - FIGURE 1



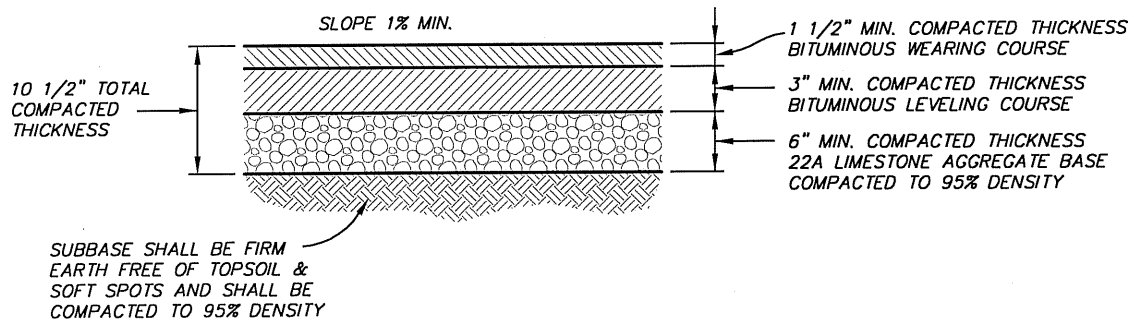
# CLASS 'A'

(LESS THAN 40 STALLS)



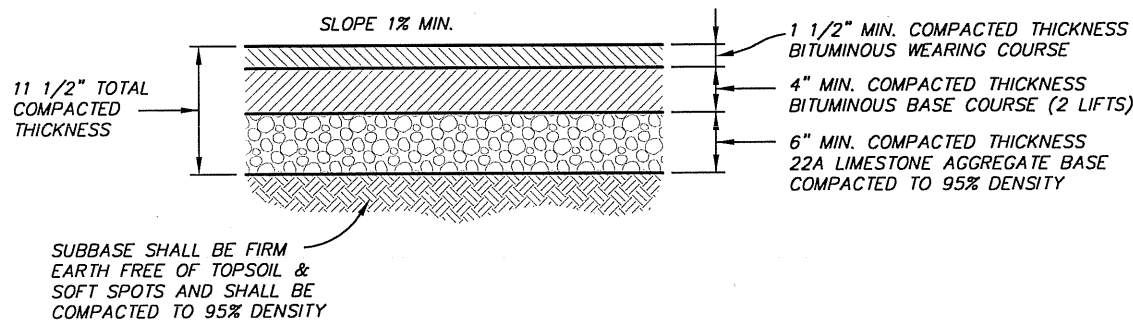
# CLASS 'B'

(MORE THAN 40 STALLS)



# CLASS 'C'

(INDUSTRIAL, HEAVY TRUCKS & SOME COMMERCIAL LOTS)



FILE: L8930\ENG STANDARDS\STREET DETAILS



PREPARED BY  
**ROWE INCORPORATED**

128 N. Saginaw St. Lapeer, MI (810)-664-9411

DATE: SEPT 2005

FILE:

CITY OF LAPEER  
SECTION VII - FIGURE 1



**VIII. Driveways and Sidewalks - continued**

YES NO

- 29. If existing curb is involved, the curb shall be removed and the sidewalk ramped to meet the pavement
  - a. No horizontal curb cuts shall be used unless approved in advance by the City
- 30. Integrated curb and sidewalk shall not be used, except for commercial site plans
- 31. Sidewalks shall have the following thicknesses:
  - a. Thru Commercial and industrial drives 8" w/6" x 6" x # 6 steel mesh
  - b. Thru residential drives\* 6"
  - c. Sidewalk ramps 6"
  - d. All others 4"

\* Plus one (1) flag each side of driveway
- 32. Sidewalks and driveway shall be air-entrained concrete with a minimum compressive strength of 3,500 psi
- 33. Sidewalk shall be treated with one coat of a curing compound membrane
- 34. Sidewalk and driveway base shall be 4" of Class II sand, compacted to 95% maximum density
- 35. Shoulders shall be graded gently away from the sidewalk and be either seeded, mulched, or sod




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**IX. Outdoor Lighting**

YES NO

- 1. All parking lots shall be illuminated
- 2. Lighting intensities shall average 1foot candle measured at the surface for parking areas
- 3. Service drives shall have a lower intensity averaging 0.5 foot candles
- 4. All outdoor lighting shall be shielded to reduce glare and be arranged to reflect light away from all residential areas, adjacent properties and public right-of-ways
- 5. At the property line, 0.1foot candles shall be the maximum amount of light
- 6. Ground lighting (up-lighting) used for the purpose of illuminating signs, landscaping and architectural details shall be shielded away from public view, directed solely at the object to be lit and screened with landscaping as necessary
- 7. A photometric plan (lighting grid) is required upon request to review the appropriateness of the proposed lighting layout and intensity
- 8. Light pole height shall be as approved by the City and will be based on the appropriateness for that particular area
- 9. All fixtures shall be high pressure sodium lamps or metal halide
- 10. Photocells or other approved equipment are required on all fixtures
- 11. All wiring shall be UL listed for wet locations
- 12. No wiring shall be exposed
- 13. In residential developments substantial completion of all street lighting shall be constructed once 50% of build out has occurred
- 14. The developer may be required to furnish a surety in an acceptable form (cash,bond,etc.) in the amount determined by the City.
- 15. Commercial and industrial - all sides of the building that have entries or exits are required to be lighted
- 16. Light poles and light fixtures are to be approved by the city in writing before they are purchased and installed. Make note of this requirement on the lighting plan

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REVISIONS

INFORMATION

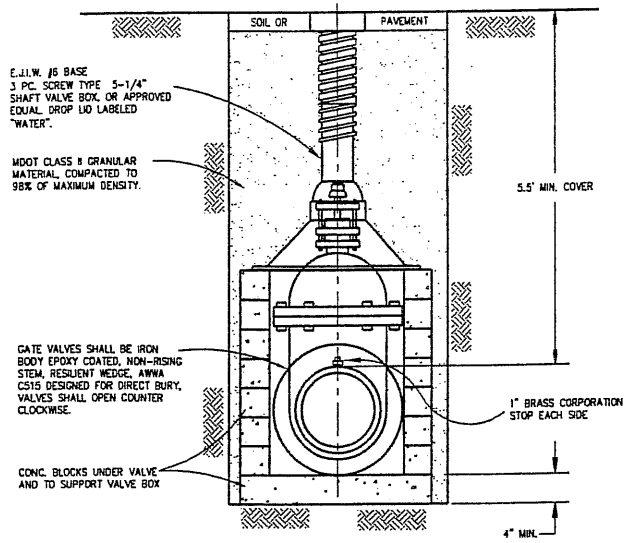
DATE

1) Approved by City Commission:

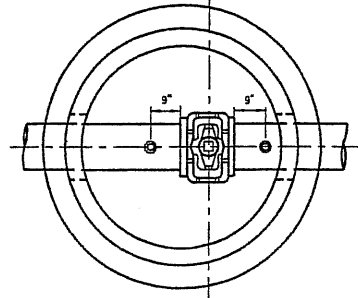
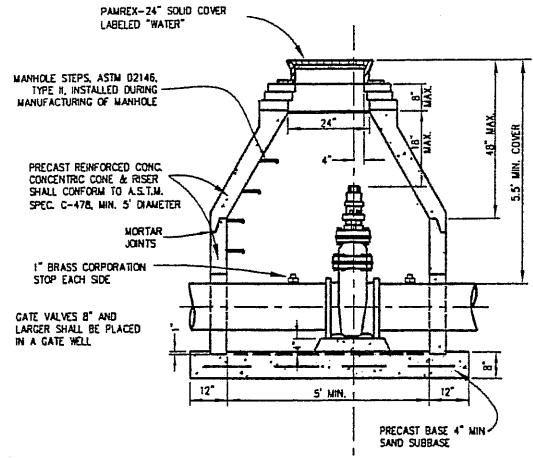
9/5/2006

This document was approved by reference.

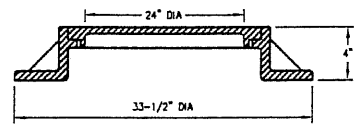
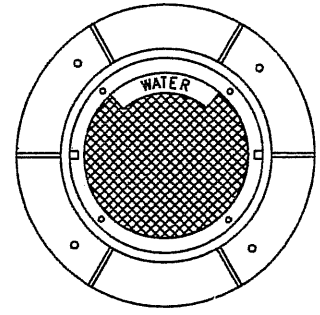
- a. Construction Specifications are to be revised annually with an informational memo to Commission on changes.



**VALVE & VALVE BOX DETAIL**

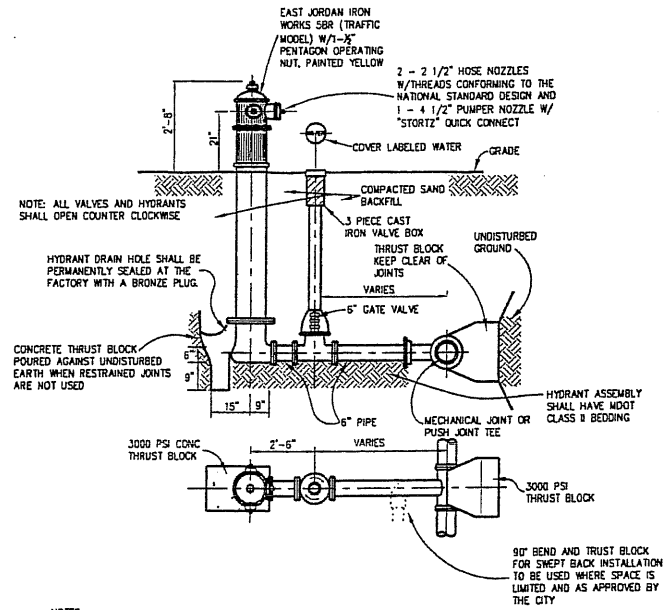


**GATE VALVE & WELL**



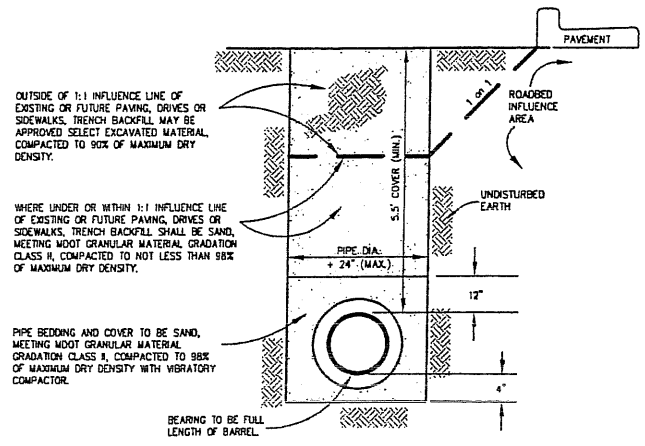
PANREX COVER AND FRAME BY CERTAINTEC CAN BE OBTAINED FROM ETHNA SUPPLY COMPANY. MODEL PANREX-24" LABELED WATER.

**STANDARD GATEWELL COVER DETAIL**

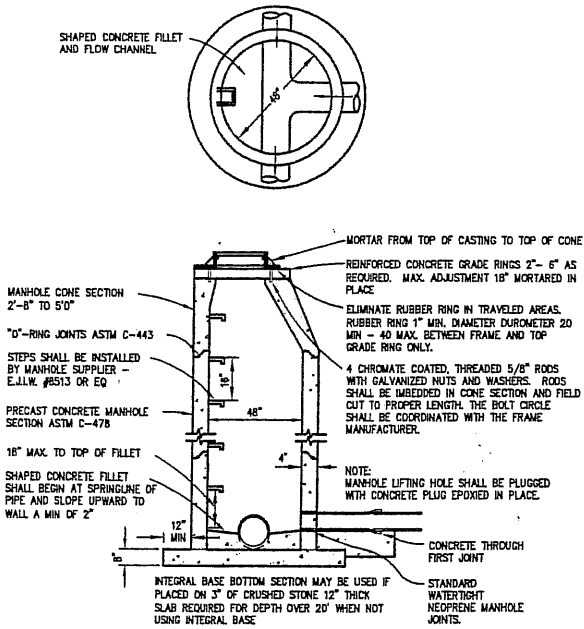


- NOTES:**
1. THE PUMPER CONNECTION SHALL FACE THE STREET
  2. SET THE HYDRANT GRADE LINE AT PROPOSED GRADE OR AS FIELD DIRECTED.
  3. SET THE VALVE BOX COVER FLUSH WITH THE EXISTING GRADE LEVEL.
  4. ALL JOINTS SHALL BE RESTRAINED BY A METHOD APPROVED BY THE CITY WATER DEPARTMENT; FIELD LOCK GASKETS, ANCHORING COUPLINGS, RODS, OR THRUST BLOCKS ARE ACCEPTABLE RESTRAINT METHODS.
  5. THE CONTRACTOR MAY USE CONCRETE BRICK AND DRY MIX CONCRETE FOR THRUST BLOCKS.
  6. 90° HYDRANT TEES ARE APPROVED WHERE SPACE REQUIREMENTS ARE LIMITED.
  7. HYDRANTS SHALL BE FACTORY PAINTED IN ACCORDANCE WITH ANWMA CS02. ALL HYDRANTS AND BARRELS SHALL BE PAINTED YELLOW.

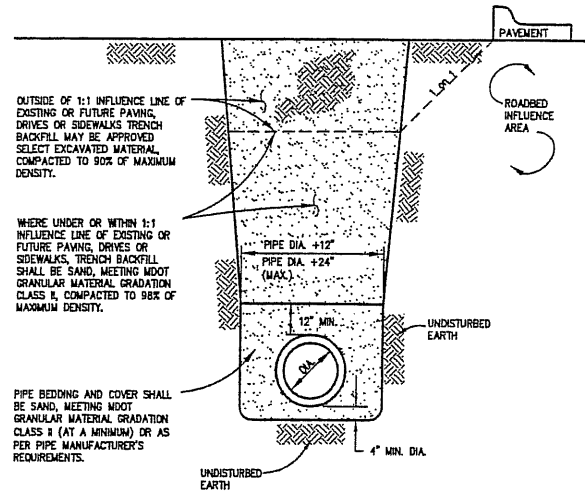
**FIRE HYDRANT DETAIL**



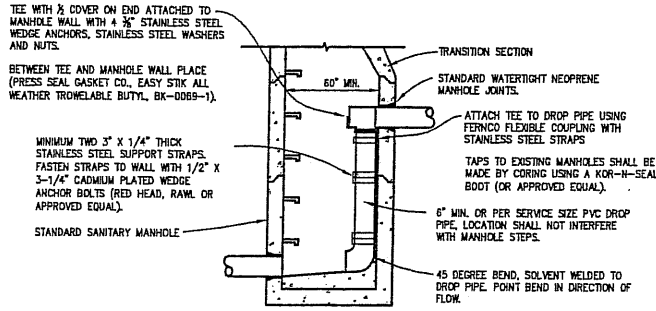
**PIPE BEDDING DETAIL**



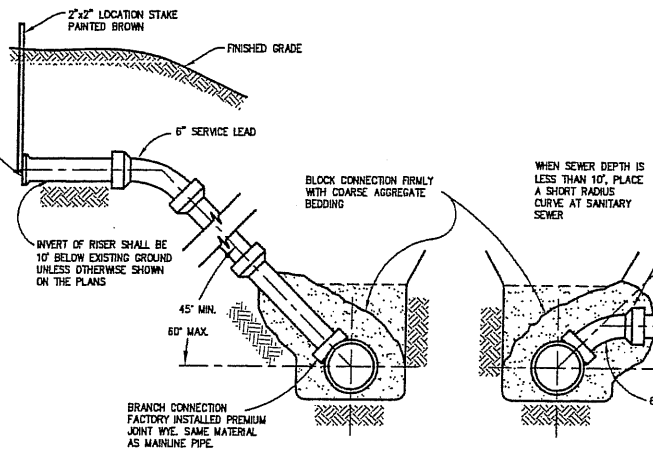
STANDARD SANITARY MANHOLE DETAIL



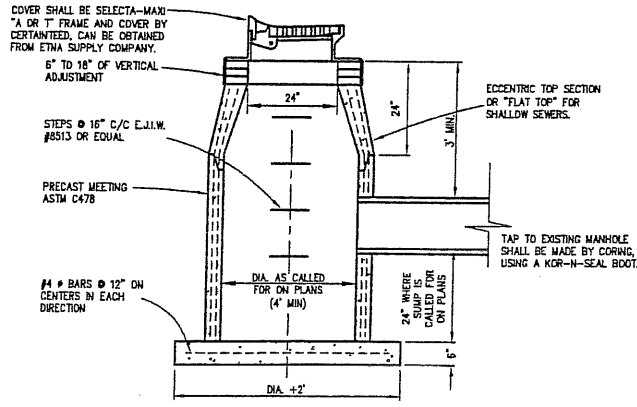
STANDARD SEWER PIPE BEDDING



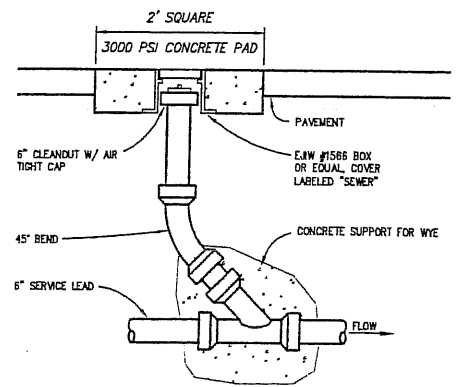
INTERNAL DROP MANHOLE CONNECTION



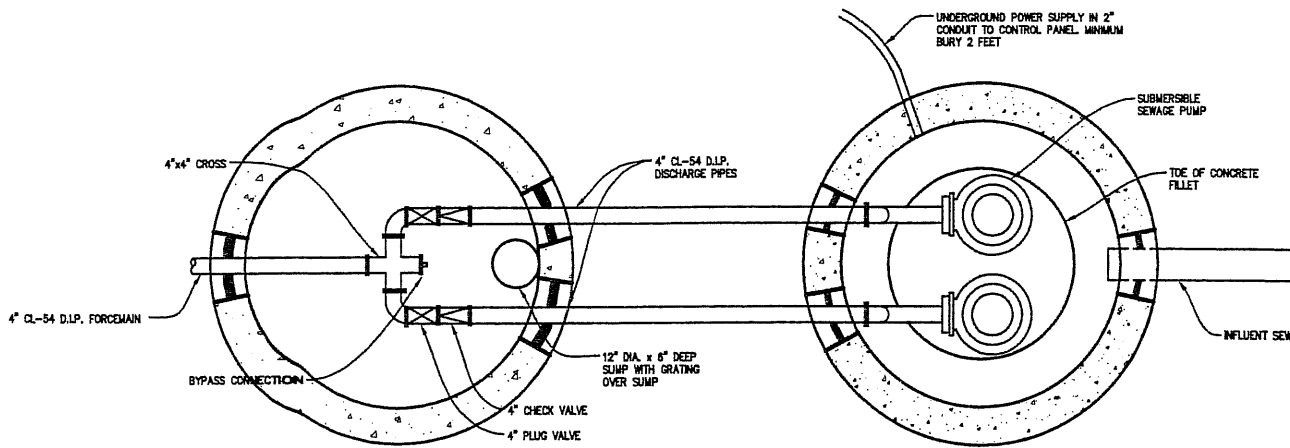
SANITARY SERVICE CONNECTION



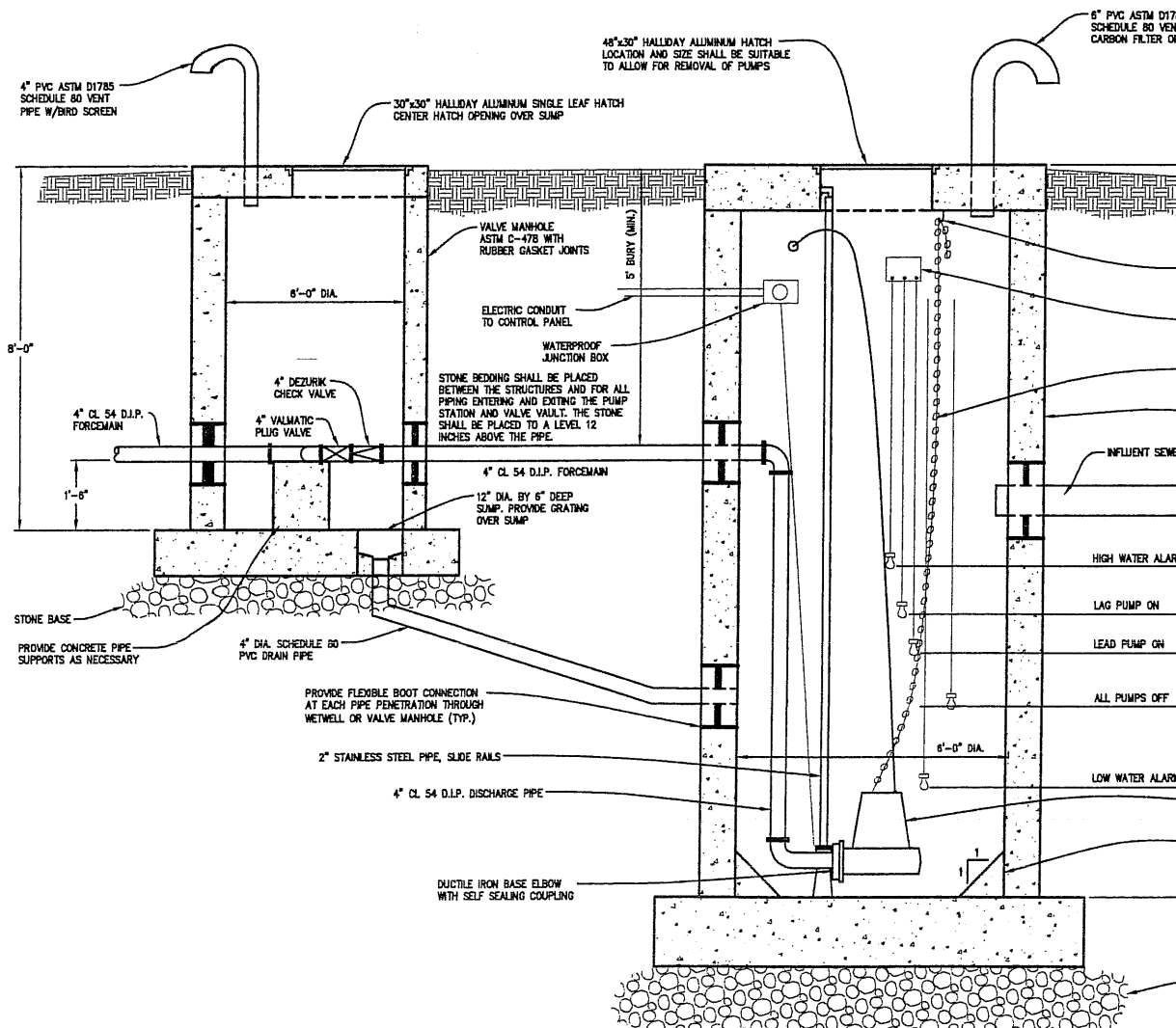
DRAINAGE STRUCTURE DETAIL



CLEANOUT RISER IN PAVED AREA



PLAN VIEW - PUMP STATION



CROSS-SECTION - PUMP STATION