CHAPTER 4
SANITARY SEWER DESIGN REQUIREMENTS

4.01 CHAPTER INCLUDES

A. Criteria for the design of sanitary sewer systems.

B. This chapter addresses the design of the sanitary sewer systems to be located within the public right-of-way or a dedicated public easement. Sanitary sewers located on private property, that are not in a dedicated public easement, shall not be considered part of the publicly maintained sanitary sewer system.

C. On a case-by-case basis the City of La Porte reserves to the right to allow deviations from these design criteria where necessary. These design criteria are not intended to cover repairs to pre-existing facilities especially when such repair work is performed by City of La Porte personnel/forces. These criteria are not intended to cover existing sanitary sewer facilities located in alleys or other areas that do not conform to these criteria.

4.02 DEFINITIONS

A. Public Sanitary Sewer - All sewers that are maintained by the City of La Porte and located in public easements or street rights-of-way, pre-existing sanitary sewer lines that are serving the public at the time of the adoption of these regulations, and new sanitary sewers that are installed in accordance with these standards.

B. Sanitary Sewer Main – A sewer which receives the flow from one or more lateral sewers.

C. Lateral Sewer – A sewer running laterally down a street, alley or easement which receives flow from abutting property.

D. Service Lead – A sewer which branches off of a public sewer and extends to the limits of the public right-of-way. It shall be construed as having reference to a public sewer branching off from a main or lateral sewer to serve one or more houses, single family lots, or other types of small land tracts situated in the same block, but not directly adjacent to the main or lateral sewer. A service lead shall never exceed 60 feet in perpendicular length from the intersecting sewer main or lateral. If the sewer is designed to serve more than two houses, or the equivalent of two single family residences along a street, a lateral sewer as defined above shall be constructed.

4.03 DESIGN REQUIREMENTS

A. Drawings to be Furnished

1. Before any sanitary sewer main or lateral sewer is constructed and before the City will approve any proposed sanitary sewer for construction, plan-and-profile sheets of the proposed sanitary sewer shall be prepared and submitted to the City for approval.
2. These drawings shall become the property of the City of La Porte.
3. Drawings shall include at a minimum layout sheets with contours, plan-and-profile sheets, and details sheets for special items.

B. Details to be Shown on Drawings:

1. The construction drawings shall show at a minimum the exact location of the proposed sanitary sewer in the right-of-way, alley, or public easement with respect to the edge of the particular right-of-way, survey base line, any nearby utilities, 100-year floodplain elevation within the project area, major

landscaping, and other structures (above ground and below ground) within the construction site.

C. Sanitary Sewer Mains and Lateral Sewers

1. Sanitary sewers shall be identified by number, letter, or other identification as shown on the sanitary sewer layout sheet and manholes identified by letter or number.
2. Sanitary sewers in curved easements, easements defined by property lines, and combined easements containing other public utilities must be shown in both plan and profile views.
3. The profile shall show other underground and surface utilities and facilities, both in parallel and at crossings; the size, grade, and type of pipe of the proposed line, the elevations of the proposed line to the hundredths of a foot at manholes, changes of grade and clean outs where allowed; and the proposed finished grade over the sewer with elevations. Where proposed fill or cut is contemplated, the proposed new natural ground line should be shown as a separate line from the pre-existing natural ground line. Bedding and backfill shall comply with City of La Porte standard specifications and standard details where applicable.
4. The construction drawings shall show the existing natural ground line at either the right-of-way or edge of easement when the proposed sanitary sewer is to be placed:

    a. Between the existing pavement and the right-of-way line.
    b. Between existing pavement and an existing or proposed easement.

5. When a sanitary sewer under existing pavement, then the finished elevations of the pavement shall be shown on the construction drawings.

D. Plan and Profile Required for Sewer Mains

1. Sanitary sewer overall layout sheets for single family residential subdivisions should use a standard engineering scale large enough to show the entire project on 1 no more than 2 standard 24"x36" sheets. In all cases, the following information must be shown on the layout.

    a. All easements containing or buffering sanitary sewers. These easements shall be labeled both as to width and type, and shall be labeled with the corresponding recordation information including but not limited to the corresponding file number for the easement.
    b. Sanitary sewer sizes are shown at points of size change
    c. All manhole locations.
    d. The sanitary sewer alignment shall accurately reflect in the plan and profile sheets the location of the sanitary sewer as shown on the detailed plan view.
    e. Service leads that cross street pavement or serve adjacent property are to be shown on the overall layout.
    f. The number, size, and layout of the lots depicted on both the overall sanitary sewer layout sheet and the individual plan-and-profile sheets shall match the number and size of the lots depicted on the final plat after recordation.
    g. The size and direction of flow for existing and proposed sanitary sewers shall be shown on the overall sanitary sewer layout sheet.
    h. The location of the proposed sanitary sewer within either the public right-of-way or a dedicated public easement.

i. The overall sanitary sewer layout sheet shall show the area, in acres or in number of lots plus any acreage outside the project area, which the proposed sewer is designed to serve. Include a vicinity map which references the project or lots to nearby major thoroughfares.

2. Commercial sanitary sewer layouts shall follow the same overall layout sheet format.
3. Horizontal and vertical scales for the detailed plan-and-profile views shall be confined to standard engineering scales.
4. The plan view shall show, at a minimum, all of the following information for the project area:

   a. Topographical features.
   b. Stationing for the proposed sewers.
   c. All existing utilities including gas, power, telephone, fiber optic, cable etc.
   d. Any significant landscaping or other structures which might impact construction or construction-related activities.
   e. The width and type of existing and/or proposed easements.
   f. Proposed service leads.
   g. The limits of any proposed bore and jack, microtunnel, or auger operations.
   h. Locations where pressure pipe is to be installed for water line crossings.
   i. The proposed sanitary sewer with pipe diameter, length, material type, and grade clearly labeled.

5. The profile view shall show, at a minimum, all of the following information for the project area:

   a. Underground and surface utilities/facilities which are either parallel to the proposed sanitary sewer or cross the proposed sanitary sewer within the construction site.
   b. The proposed sanitary sewer's diameter, grade, length, and material type for each section between manholes. This shall be labeled on every applicable page and identified as "proposed."
   c. The flowline elevation for every sanitary sewer at every manhole.
   d. The top of rim elevation of affected existing and proposed manholes.
   e. The flowline elevation at each sheet break.
   f. The type of pipe bedding and backfill shall comply with City of La Porte standard specifications and standard details where applicable.
   g. The finished grade for proposed and existing pavement. Where cut and fill are proposed, the proposed new natural ground line should be shown as a separate line from the existing natural ground line.
   h. The existing natural ground line at the centerline of the sanitary sewer when a sewer is to be placed between the edge of pavement and the public right-of-way. In the cases where roadside ditches exist, the centerline elevations of the roadside ditch shall be shown.
   i. The existing ground line at the centerline of the proposed sanitary sewer where a sanitary sewer is to be placed within an existing easement. Show any proposed cut and fill as described above.
   j. The limits of any proposed bore and jack, microtunnel, or auger operations.
   k. Locations and limits of where pressure pipe is to be installed for water line crossings.

l. The location of special backfill and any proposed stacks shall be identified by stations indicated on the design plans.

m. Avoid vertical breaks in profiles. Use alternate scale for all profile sheets if all of proposed sanitary sewer cannot be shown on any one profile section for the station run indicated in plan view for that sheet.

6. All construction drawings for new sanitary sewers shall show the proposed location, by stations and offsets, of all service leads, and service connection risers.

E. Service Lead Construction for Residential and Commercial Developments

1. Space the location of service leads so as to limit the number of service lead taps to the lateral sewer or sewer main. Service leads should be spaced at every other property line between two adjoining residential lots unless there is an odd number of lots. The City reserves the right to direct the engineer to relocate any proposed service lead upon reviewing any submitted plans. A single 6-inch service lead located at the property line between two adjoining residential lots would serve two single-family residences with a wye placed at the end of the service lead. The wyes shall be located at the private property line.

   a. Near side double sewer service leads shall not exceed 5 feet in length, shall terminate at the property line, and shall be located within the public right-of-way or public easement.

   b. In cases where the sanitary trunk main is further than 5 feet from edge of the right-of-way, a single 6-inch service shall be run from the sewer main to the edge of the right-of-way whereupon a wye shall be placed as described above in Article 4.02, Section E, Clause 1 if 2 lots or parcels are to be served. This shall apply to residential sanitary service leads and not to commercial service taps.

2. Any far side service lead of more than 60 feet perpendicular to the street right-of-way shall, at the City's discretion, be treated as a lateral sewer.

3. Service leads for single-family developments should not connect to the manhole, and may be granted approval on a case by case basis. Commercial or industrial service leads expected to discharge more than 5000 gallons-per-day shall discharge directly into a proposed or existing sanitary sewer manhole. Where the flowline of the service lead is 36 inches or greater above the flow line of the manhole, provide a standard drop manhole.

   a. Service leads shall be provided to serve each lot or parcel within a proposed residential, commercial or industrial development. The detail for a typical near-side and far-side service leads shall be included with the construction drawings.

   b. Service leads shall be a minimum of 6 inches in diameter where two or more lots or parcels are served. If the perpendicular length of a service lead exceeds 60 feet, the minimum diameter shall be 8 inches and a manhole shall be utilized for connection to the public sewer. Such 8 inch leads may, at the discretion of the City, be reviewed upon submittal of the construction drawings as a lateral sewer line.

   c. In such cases where a service lead is proposed to run diagonally across the street, prior approval from the City Engineer must be obtained.

   d. Service leads with a diameter of 6 inches shall utilize full body fittings be they extruded or factory-fabricated for connection to a

proposed public sewer or an approved saddle-type connector for connection to an existing public sewer.

e. PVC saddle-type connectors with gasket and stainless steel straps shall be installed with the stub oriented 45 degrees from the springline. Tees may be oriented the in the same manner.

f. The service lead shall be placed so as to minimize the use of bends as site conditions permit.

g. For existing residential lots (which are not served in accordance with these guidelines) that need a service lead, if the distance to the nearest existing sanitary sewer is less than 60 feet, the service lead may be a 4 inch service tap if only one lot or parcel is to be served. Commercial and industrial lots and parcels shall have a minimum 6 inch service tap under the same conditions.

h. The location where the service lead or its wye meets the property line shall be shown on the plans and as-builts, and marked in the field with a riser out of the ground. There shall be a riser placed where the service lead meets the property line so that the service lead stub-out can be recovered at the time that the connection to the service lead is made. All service leads shall be extended to the property line and be turned up (elbowed) to rise up above ground level a minimum of 2 feet. The end of the riser shall be sealed with a glued cap.

i. All service leads shall be installed at the time of the construction of the sanitary sewer in new residential subdivisions.

F. General Requirements

1. A licensed plumber shall be responsible for connecting private residential sanitary sewer service to the public sanitary sewer system, to wyes and/or tees or to lateral sewers as indicated on the plans. Said licensed plumber shall be responsible for a properly installed and watertight private residential service connection.
2. Commercial service connections to the public sanitary sewer shall be made by the City of La Porte.
3. Materials and construction shall conform to the City of La Porte Standard Specifications and Standard Details where applicable.
4. All constructed sanitary sewer lines shall be air tested for leaks and a mandrel pulled for structural defects. All sanitary sewer testing shall comply with or exceed the procedures and qualifications listed in Texas Administrative Code, Chapter 317, Section 317.2(a)(4)(B). A post construction video survey shall be performed and video tapes provided to the City of La Porte before being accepted by the city for maintenance.
5. All public sanitary sewers and service leads shall have bedding and backfill that shall comply with or exceed City of La Porte Standard Specifications and Details. Those sanitary sewers that are bore and jacked, microtunneled, augured, or encased in a steel pipe may require special bedding and backfill.

   a. Portland cement, Type I, ASTM C150.
   b. Clean, durable sand, with less than 0.5% clay lumps, ASTM C142; with less than 0.5% lightweight pieces, ASTM C123; with organic impurities, ASTM C40, not showing a color darker than standard color and a plasticity index of less than 6 when tested in accordance with ASTM D423 and ASTM D424.
   c. Compact to 95% Standard Proctor Density (ASTM D2922-78 and ASTM D3017-78) in lifts of 8 inches thick. Actual testing may be required as deemed necessary by the City of La Porte.

d. The cement-sand mixture shall consist of at least 1½ sacks of cement per cubic yard of sand. The cement-sand mixture shall have a minimum unconfined compressive strength of 100 psi in 28 days when compacted to 95% of Standard Proctor Density (ASTM D2922-78 and ASTM D3017-78), without additional moisture control, cured and tested in accordance with ASTL C31.

6. Backfill excavated areas and trenches under or within one foot of existing or proposed pavement with cement-stabilized sand. There shall be cement-stabilized sand from the top of the pipe up to a maximum of one foot below the paving subgrade.
7. The proposed location of any backfill other than cement stabilized sand backfill shall be shown by stations in the drawings in both plan and profile views.
8. Public sanitary sewers and force mains shall be located in either the public right-of-way or public easements. Side lot and back lot easements are discouraged and should be avoided. Side lot and back lot easements may be granted special approval only when a sanitary sewer located in the street right-of-way is impossible from an economic and engineering standpoint.

   a. Street Right-of-way

      (1) Sanitary sewers with a depth of up to ten feet (10' measured from finished grade), shall be placed within the right-of-way at least 5 feet from the right-of-way line. Said sanitary sewer should also be 5 feet from the paved area when achievable. All sanitary sewers that are deeper than 10 feet shall be centered in an exclusive public easement parallel to and adjoining the street right-of-way. Where the City of La Porte deems the need, the Professional Engineer of Record may be required to provide additional public easement adjoining the street right-of-way to accommodate either horizontal or vertical clearances.

   b. Easements

      (1) The maximum depth of a sewer in a side lot or back lot easement shall be 8 feet where and if the use of side or back lot easements are approved.
      (2) Easements shall have a minimum of 2 access points for maintenance purposes.

   c. Lateral Location of Sewer in Right-of-Way/Easement

      (1) The location of the sanitary sewer within a dedicated public easement shall be along the centerline of the proposed public easement or as close to the centerline as can be designed. In those instances where the public easement is adjacent to the public right-of-way, the lateral location of the sanitary sewer shall be at the discretion of the Design Engineer with City approval.

9. The final determination as to that portion of a street, alley, or public easement to be occupied by a proposed sanitary sewer rests with the City. The City will take into consideration existing, planned and proposed facilities such as manholes, pavement, pipes/conduits, along with existing trees and shrubs, historical

features, wetlands or other unique surface conditions when arriving at a decision.

10. The drawings of the sanitary sewer shall show the location of any existing pipe or duct that might interfere with the construction of the sanitary sewer and call to the attention of the City any known obstacles that might be encountered in constructing the sanitary sewer in any location under consideration. The Professional Engineer of Record shall determine the existence of pipes, ducts, obstacles and other utilities (i.e. gas, telephone, electric, fiber optic, cable, etc.) from a visual survey on the ground plus research of the public records and private records when available.
11. Sanitary sewers within the City of La Porte's jurisdiction shall be designed and installed at such a size and depth as to allow for orderly expansion of the system, so as to avoid duplication in the future, and shall conform with the Comprehensive Wastewater Collection and Treatment Plan (1984) for the City of La Porte (as amended where applicable).
12. Sanitary sewers shall be separated from water lines by a minimum of 10 feet of horizontal clearance. See Chapter 3 Water System Design Criteria for water and sanitary sewer crossing design criteria.
13. Sanitary sewers shall be separated from storm sewer lines by a minimum of 4 feet of horizontal clearance and the storm sewer line shall be above the sanitary line where possible.
14. For sanitary sewers crossing utilities other than water or storm sewer (i.e. cable, gas, fiber optic, power, etc.), a minimum of 6 inches of horizontal clearance shall be maintained as measured from outside wall to outside wall.

G. Line Size

1. The minimum pipe diameter for a public sanitary sewer main or lateral sewer other than a service lead shall be 6 inches.
2. Service leads 6 inches in diameter shall not serve more than the equivalent of 2 single family lots or other equivalent types of small land tracts.
3. Service leads for single family residential lots shall have a minimum grade of 0.70% for a 6 inch line. The average daily flow for the design of sanitary sewers shall be based on a minimum of 1350 gallons per day per acre (GPD/AC) of residential land, 6534 GPD/AC of commercial land and 9450 GPD/AC of industrial land.
4. For commercial service leads such as street bores, the required size of the line shall be established from the plumbing drawings. Commercial, industrial, and office areas shall be designed for an average daily flow that can be anticipated from the contributing area.
5. Commercial sewer service leads shall be 6 inch pipe or larger. A single 6 inch commercial service connection shall not serve more than one commercial lot or parcel. Four inch service leads for commercial developments shall not be allowed.
6. Sewer mains and lateral sewers shall meet at a manhole. Sewer mains and lateral sewers shall end in a manhole and may end in a cleanout with special permission and approval from the City Engineer.
7. The City shall have final review and approval authority as to the size and depths required for sanitary sewer mains and lateral sewers.

H. Line Depth

1. The sanitary sewer should be laid with the top of the pipe a minimum of 3 feet below the surface of the natural ground or finished grade.
2. Sanitary sewers laid in street rights-of-way with a curb and gutter section shall have a minimum cover of 3 feet from the top of the pipe to the flowline

elevation of the gutter in the street at all locations. The Professional Engineer of Record shall account for any anticipated future sanitary sewer extension whereas the future sanitary sewer extension shall have a minimum 3 feet of cover from the top of the pipe to the flowline of the gutter of the street. The Professional Engineer of Record shall adjust the depth of the proposed pipe accordingly. The City of La Porte reserves the right to require greater depth where the need is perceived by the City.

3. Sanitary sewers laid in street rights-of-way with crowned roads and roadside ditches shall have a minimum depth of 6 feet from the crown of the road to the top of the pipe and an absolute minimum cover of 2 feet below the flowline of a roadside ditch when non-rigid pipes of low hoop strength are used. The City of La Porte shall have final determination on any deviation from these criteria.
4. Where the cover over the pipe is less than 2 feet, the sanitary sewer shall be laid with Class 150 pressure pipe, steel pipe or ductile iron pipe. Class 150 pressure pipe must be laid with cement stabilized sand backfill in accordance with the Standard Details. Ductile iron pipe may be used but shall be lined with either a polyethylene or polyurethane coating with manufacturer recommendation and applied by the pipe manufacturer. The minimum liner thickness shall be 40 mil. Other rigid pipe or pressure pipe will be considered for approval on a case-by-case basis by the City Engineer.
5. Maximum depth for 8-12 inch diameter collection lines shall be 20 feet from average ground surface to sanitary sewer invert. Depths greater than 20 feet shall require the use of Class 150 pressure pipe with cement stabilized sand backfill in accordance with the Standard Details. Ductile iron pipe may be used but shall be lined with either a polyethylene or polyurethane coating with manufacturer recommendation and applied by the pipe manufacturer. The minimum liner thickness shall be 40 mil.

I. Line Grades

1. The following table lists the minimum grade for 6-inch to 39-inch diameter public sanitary sewers. The recommended velocity for a sanitary sewer flowing full shall be 2.0 feet per second (fps). The maximum recommended grade shall be calculated by the Professional Engineer of Record for a maximum velocity of 4.5 fps based on a Manning equation for full flow with the Manning's "n" equal to 0.013.

Table 4.1
MINIMUM GRADES FOR SANITARY SEWERS

PIPE SIZE	MINIMUM GRADE (PERCENT)
6	0.50
8	0.33
10	0.25
12	0.20
15	0.15
18	0.11
21	0.09
24	0.08
27	0.06
30	0.055
33	0.05
36	0.045
39	0.04

2. For sanitary sewers larger than 39 inches in diameter, the Professional Engineer of Record shall determine the appropriate grade utilizing a full pipe maximum velocity of 4.5 fps and minimum velocity of 2.0 fps.

J. Gravity sanitary sewers shall be lain in straight alignment with uniform grade between manholes. Changes in grade without the use of manholes at the grade change shall not be allowed. Deflection in sanitary sewer pipe runs shall never exceed manufacturer's recommendation. The use of bends to achieve deflections in alignment are encouraged in lieu of pipe deflections. All construction plans showing alignment change by use of deflections are subject to review by the City Engineer.

K. Manholes

1. Type: Manholes shall be either precast concrete manholes in accordance with standard details or the Professional Engineer of Record may submit a cast-in-place manhole design for review and approval by the City. All concrete manholes shall be coated with a coal tar epoxy to a thickness of 10 mil. or thicker. Fiberglass manholes with precast, gasketed, concrete bottoms are allowed outside paved areas where the manhole depth is designed to be 8 feet deep or less. It shall be the responsibility of the Professional Engineer of Record to ensure that the precast manholes conform to the latest ASTM requirements. Manhole covers shall have the City of La Porte logo on them. All manholes shall be installed with stainless steel or polyethylene manhole inserts with 1/8 inch vents and strap handles.
2. Location: Manholes shall be placed at changes in alignment, changes in grade, changes in size of sanitary sewers, at the intersection of sanitary sewers, junction points, and either at street, alley, or easement intersections.

   a. Sanitary sewers laid in public easements shall have a manhole in each street right-of-way outside the paved section of the street crossed by the sanitary sewer regardless of the manhole spacings mentioned in these criteria.
   b. The maximum distance between manholes shall be determined from the following table for 6 inch to 39 inch pipe diameters. Spacings for manholes on sewer mains with diameters larger than 39 inches shall be recommended on an individual basis by the Professional Engineer of Record subject to City of La Porte approval.

Table 4.2
MAXIMUM DISTANCE BETWEEN SANITARY SEWER MANHOLES

PIPE DIAMETER IN INCHES	MANHOLE MAXIMUM SPACING IN FEET
6-15	400
18-39	800
>39	Per PE of Record subject to City of La Porte Approval

   c. Place manholes at the dead-end of sewer mains and lateral sewers. A clean out may be used with special permission and approval of the City Engineer.
   d. Manhole covers shall be cast iron, traffic bearing type ring and cover.

e. Criteria for Manhole Junctures

(1) Connections between public sanitary sewers and the manhole shall adhere to the following criteria.

(a) The elevation of the flowline of the discharging sanitary sewer shall match the elevation of the flowline of the receiving sanitary sewer for both equal and unequal pipe diameters.

(b) Drop manholes are allowed. A drop connection or drop manhole is required when the difference in elevation between the effluent flowline and the influent flowline is greater than 36 inches; or where a service line is proposed to tie onto a sanitary sewer trunk main of 18 inches in diameter or larger.

L. Manholes should be located as to minimize or eliminate the inflow of stormwater into the sanitary sewer. The top of manhole rim shall be set a minimum of 6 inches above the surrounding finished grade when the manhole is not in a paved roadway. Sealed manholes are required on all newly constructed manholes within the 100-year flood plain. Vented manholes are required a minimum of every 800 feet when not located in the 100-year floodplain. Under no circumstances shall the elevation of the top of rim of a sanitary sewer manhole be below the 100-year base flood elevation for the area it is being built in.

M. Manholes shall be constructed in accordance with the Standard Details where applicable. All manholes shall include rubber seals precast into the manhole for pipe inserts or 3M Scotch Seal 5600 and Oakum at all pipe connections (no Fosroc or cement) or approved equal. Precast manholes shall incorporate a boot-type connector for sanitary sewer diameters up to 24 inches. For sanitary sewer diameters greater than 24 inches, utilize either the boot-type connector if available or an integral gasket.

N. Steps in manholes shall not be allowed.

O. All manhole adjustments shall be made with precast concrete rings when an additional precast vertical section is too large.

P. All manholes shall be tested by the construction contractor and results provided to the City of La Porte before being accepted by the city for maintenance. The City of La Porte reserves the right to require retesting of manholes if there is reason to question the results. All manhole testing shall comply with or exceed the procedures and qualifications listed in Texas Administrative Code, Chapter 317, Section 317.2(c)(5)(H).

Q. Lift Stations

1. Lift station design and construction drawings as well as design requirements and pertinent data shall be sealed by a Professional Engineer registered in the State of Texas and submitted with the construction drawings for review by the City.
2. Lift Stations should be considered only when a gravity system cannot be achieved from both an engineering and an economic standpoint. Lift stations should only be considered with prior approval from the City of La Porte or where the lift station is designed to be temporary in nature.
3. Lift station controls shall be enclosed and fenced in such a way to deter unauthorized operation, vandalism and/or terrorism.

a. Controls and equipment shall be approved by the City. Pumps shall be submersible type manufactured by Hydromatic, or Flygt, or approved equal. Pump controls shall be manufactured by E.G. Controls or Consolidated Electric, or approved equal.

4. Wet Wells

a. Provide adequate clearance between pumps so as to easily facilitate retrieval of a pump.
b. Wet well working volume shall be sized to allow for the recommended minimum pump cycle time of 10 minutes for each pump.

5. Lift station site – Minimum size of 20 feet by 20 feet. Vehicular ingress and egress access to the site shall be provided.
6. The lift station's control panel shall sit a minimum of 2 feet above the nearest base flood elevation.
7. The top of concrete of the lift station's wet well shall sit a minimum of 2 feet above the nearest base flood elevation.
8. Pumps shall be sized to operate at optimum efficiency. Minimum acceptable efficiency at the operating point shall be 60%.
9. Emergency operations should be considered. Provide fittings and a blind flange that will be readily accessible for emergency bypass pump.

R. Design Analysis

1. Calculations of design flows for the overall development project shall be provided to the City of La Porte.

4.04 QUALITY ASSURANCE

A. Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and licensed under the disciplines required by the drawing. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings. If more than one Professional Engineer was responsible for the development of the design/construction drawings, then the appropriate Professional Engineer should seal the drawings he is responsible for.

4.05 UNSEWERED BUILDING SITES AND SEPTIC TANKS

A. It is the responsibility of the land owner to file a Citizen Developer Request (CDR) form with the City to ensure that a site has sanitary sewer service available.
B. For unsewered building sites and building sites with no sanitary sewer availability, the owner/developer will execute a utility extension agreement with the city. The owner/developer must pay for all materials and affect installation and testing before the city will accept the sewer for maintenance.
C. If a lot or parcel is within 200 feet of an existing sanitary sewer then the site shall tie-on to the existing sanitary sewer. Such building shall comply with Section 74 Article 3 of the City of La Porte Code of Ordinances.