# THE JERSEY CITY MUNICIPAL UTILITIES AUTHORITY
# JCMUA

## RULES AND REGULATIONS
## GOVERNING THE OPERATION OF THE JERSEY CITY SEWER SYSTEM

The Jersey City Municipal Utilities Authority (hereinafter the "*JCMUA*"), created pursuant to the Municipal Utilities Law, N.J.S.A. 40:14B-1, et seq., being charged with the duty and obligation of improving conditions affecting public health by maintaining in operation a sewerage system for the proper collection and conveyance of sanitary sewage originated in Jersey City and in cities with which the *JCMUA* has conveyance agreements with, **HEREBY ADOPTS** the following rules and regulations to govern the operation of the system, facilities and processes of The *JCMUA*.

ADOPTED BY RESOLUTION No. _____
Dated:

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## ARTICLE I. INTRODUCTION

### SECTION 1.01 HISTORY OF THE *JCMUA*

The *JCMUA* is the successor of the Jersey City Sewerage Authority (*JCSA*) which was created in 1949. The *JCSA* built two sewage treatment plants for treating wastewater prior to discharging into the rivers. These treatment plants served the residents of Jersey City until 1990, when more stringent rules required the treatment system to be upgraded. With a $2I million grant from the United States Environmental Protection Agency, the *JCSA* converted its two treatment plants to pumping stations, constructed a transmission line and began pumping wastewater under the Newark Bay to the Passaic Valley Sewerage Commissioners (PVSC) wastewater treatment plant in Newark.

The *JCSA* was reorganized into the *JCMUA* in 1998. The *JCMUA* took over the responsibility of the Jersey City Water System under a franchise agreement with the City. Previously, a department within the City had operated or been responsible for operation of the Water System. The 2005 Amended and Restated Franchise Agreement provides for *JCMUA* operation of the Water System through December 31, 2027 and mandates that *JCMUA* adopt its own regulations for operation of the Water System during the term of the franchise. The *JCMUA* has contracted the operation of the Water System to a private entity. The City continues to own the Water System.

### SECTION 1.02 MISSION STATEMENT OF THE *JCMUA*

The *JCMUA* pledges to operate and maintain its sewerage system and the City's water facilities in a fashion that will protect the public health and environment of all its constituents. The *JCMUA* will always strive to accomplish this goal in the most competent, economical and compassionate manner possible.

### SECTION 1.03 OFFICE HOURS AND LOCATION

The office of the Jersey City Municipal Utilities Authority is located at 555 Route 440 in Jersey City, New Jersey 07305, and is open for business Monday through Friday from 8:30 a.m. to 4:30 p.m. Regular meetings of the *JCMUA* are ordinarily held the last Thursday of each month at 5:00 p.m. at the *JCMUA* offices. Special meetings can be called by the Chairperson. All meetings are conducted in accordance with the provisions of the Open Public Meetings Act, N.J.S.A. 10:4-6 et seq.

### SECTION 1.04 APPLICABILITY OF RULES AND REGULATIONS

The following sets forth the rates, procedural rules, standard terms and conditions of service, standards technical specifications and other regulations under which sewage service will be supplied by the *JCMUA* to its customers. It establishes regulations for the use of public and private sewers and drains, for the installation, rehabilitation and

connection of building sewers and for the discharge of waters and wastes into the public sewer system in compliance with the regulations of the New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency (EPA). It also provides for a system of charges to customers to compensate the *JCMUA* for the use of its sewer system.

The *JCMUA* reserves the right to change or amend, from time to time, these Rules & Regulations, and the rates for sewer use by resolution of the Board of Commissioners as necessary.

## ARTICLE II. DEFINITIONS

As used in these Rules & Regulations, unless a different meaning clearly appears from the context, the following words shall have the following meanings:

**AASHTO:** American Association of State and Highway Transportation Officials.

**ACI:** American Concrete Institute

**ACOE:** Army Corp of Engineers

**AISC:** American Institute of Steel Construction

**ANSI:** American National Standards Institute

**ASCE:** American Society of Civil Engineers

**ASTM:** American Standard of Tests and Measures

**AWS:** American Welding Society

**AWWA:** American Water Works Association

**Applicant:** A developer, property owner or property owners who have filed an application with the *JCMUA* pursuant to these Rules & Regulations for permission to connect to the sewer system.

**Application for Service:** An application prepared and completed by an Applicant, Customer, or Owner in accordance with the requirements of the *JCMUA*.

**Authority:** The Jersey City Municipal Utilities Authority (*JCMUA*).

**Block:** An area delineated as such on the Tax Map of the City of Jersey City.

**BMP:** Best Management Practices, as defined by the NJDEP for storm water management under Clean Water Rules.

**City:** The City of Jersey City.

**Chief Engineer:** The *JCMUA's* Professional Engineering representative acting either directly or through assistants under him.

**Cleanout:** Shall mean an access point constructed on a lateral installed at 1-ft. behind the curb or property line.

**Combined Sewer System (CSS):** A sewer system which conveys both sanitary and storm flow through the same sewer mains.

**CMP:** Corrugated Metal Pipe shall not be used for sanitary sewer, storm sewer or combined sewer without the expressed written permission of the Chief Engineer.

**Connection:** Any operational or physical change to the sewer collection system or to the plumbing or piping of any building, facility or structure either proposed or existing, which connects directly or indirectly to any portion of the *JCMUA* facilities.

**Deflection:** The allowable amount of pipe shape change of 5% as allowed for Plastic Pipe in N.J.A.C. 7:14A-23 et al.

**Developer:** The legal or beneficial owner or owners of a lot or of any land proposed to be included in a development including the holder of an option to purchase or other person having an enforceable propriety interest in such land.

**Development:** The division of a parcel of land into two or more parcels; the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or other structure; or any change in use of any building or structure.

**DIP:** Ductile Iron Pipe, unless otherwise directed, shall be cement lined with an asphalt coating complying with AWWA standards for water mains and minimum class 52.

**EPA:** United States Environmental Protection Agency.

**Easement:** The right to use the land of another for a specific purpose not inconsistent with the general property rights of the owner.

**Equivalent Dwelling Unit (EDU):** Equal to a residential user using 225 gallons of service per day.

**F.E.M.A.:** Federal Emergency Management Agency, responsible for preparation of flood mapping, disaster mitigation, preparedness, response, and recovery planning.

**Handhole:** Shall mean an 24" diameter access point on a sewer lateral or main. It shall be constructed of material as directed by the Chief Engineer with a frame and cover clear mark "JCMUA".
**HDPE:** High Density Polyethylene Pipe, for gravity applications shall be corrugated double wall smooth interior pipe with couplings or bell and spigot connections, for force mains it shall be SDR 21 minimum heat fused joint.

**House Service Connection:** The pipe and appurtenances between *JCMUA's* sewer main and the individual building cleanout.

**JCMUA:** Jersey City Municipal Utilities Authority.

**Lateral:** Shall mean a pipe of a size smaller than the sewer to convey flow from the building to the sewer main by City of Jersey City Ordinance and *JCMUA* Rules is owned by the property owner from the main to the building.

**Large Development:** Site and/or building footprint improvements in excess of 10,000 sq. ft.

**Lot:** A tract or parcel of land intended for separate use, development or transfer of ownership.

**Main:** ALL *JCMUA*-owned or controlled piping and appurtenances used for the collection of storm water and/or sewerage.

**Manhole:** Shall mean a concrete structure to access a sewer main of adequate size to allow a person to enter safely with a *JCMUA* approved frame and cover.

**Mandrel:** A device to be pulled through pipe to measure the deflection.

**NJMC:** New Jersey Meadowlands Commission.

**NJDEP:** New Jersey Department of Environmental Protection.

**NJDOT:** New Jersey Department of Transportation.

**OSHA:** United States Occupational Safety and Health Administration.

**Professional Engineer:** A person licensed to practice professional engineering in the State of New Jersey.

**Professional Land Surveyor:** A person licensed to practice land surveying in the state of New Jersey.

**PVC Pipe:** Polyvinylchloride pipe for use in conveyance of sanitary waste, stormwater, and/or combined sewage.

**PVSC:** Passaic Valley Sewerage Commission.

**Plat:** A map of a development.

**RCP:** Reinforced concrete pipe.

**Right-of-Way (ROW):** Land subject to use as a street, alley, or for drainage or other public purposes.

**Sanitary Sewer:** All facilities collect and convey appurtenances to domestic, commercial, and industrial waste, but not stormwater or groundwater.

**Sewer Main:** The part of the sewage collection system which is located within the public Right-Of-Way or within a sanitary sewer easement and which is designed to convey the sewage from one or more customers.

**Sewer System:** All facilities and appurtenances connected with the collection system, trunk system and laterals.

**Sketch plan:** The sketch map of a development of sufficient crosswalk accuracy to be used for the purpose of discussion and classification and meeting the requirements of these Rules and Regulations.

**Small Development:** Site and/or building footprint improvements less than 10,000 sq. ft.

**Stormwater:** Runoff generated by a precipitation event or the melting of frozen precipitation.

**Street:** Any street, avenue, boulevard, road, land viaduct, bridge, alley or other way which is an existing state, county or municipal roadway, including the land between the street lines whether improved or unimproved, and may compromise pavement, shoulders, gutters, sidewalks, parking areas and other areas within the street lines.

**TSS:** Total suspended solids, as defined by the NJDEP Best Practices Manual for Stormwater Management.

**TWA:** NJDEP Treatment Works Approval Permit for the construction of combined or sanitary sewer systems and related structures.

**Uni Bell:** Plastic Pipe Manufacturers Association

## ARTICLE III. CONDITIONS REQUIRING JCMUA APPROVAL

The *JCMUA* shall review and approve all site plans or building plans for developments or building change of use that introduce sanitary and/or storm flow and/or groundwater to the Jersey City Sewer System. These developments include, but are not limited to the following:

a) New Construction
b) Sewer Main Installation
c) Parking Lot Construction
d) Temporary Parking Lot Construction
e) Park Construction
f) Athletic Field Construction
g) Storm Water Construction
h) Roadway Construction
i) Construction site dewatering
j) Site Remediation dewatering

*JCMUA* shall review and approval is also required when any change in flow (increase or decrease) that may be introduced into the system. Such situations include, but are not limited to the following:

a) Additions
b) Change of Use
c) Renovations
d) Rehabilitations

## ARTICLE IV. SEWER CONNECTION APPLICATIONS

All applications for sewer connections must be submitted to the *JCMUA* for review and approval. The following sections detail the application requirements for various types of developments. The applications for sewer connection can be found in Appendix I of these Rules and Regulations. They must be submitted with a bank or certified check as payment. Connection and Application fee amounts are outlined in Schedule I of these Rules and Regulations. Connection Fee Rules can be found in Schedule III of these Rules and Regulations.

### SECTION 4.00 DRAWING REQUIREMENTS

1) Two (2) sets of drawings shall be submitted. These drawings shall be signed and bear the raised seal of a NJ Licensed Professional Engineer or Registered Architect.
2) Drawings shall be 24-inches by 36-inches or larger. All drawings shall be to scale of adequate size for easy reading and include a north arrow. Details shall be clear and of appropriate scale.
   a. All drawings shall show lot and block lines and numbers

b. North arrow.
c. Existing utilities including:
    i. Size
    ii. Type of utility (gas, electric, telecom, etc.).
    iii. Direction of flow.
    iv. Inverts.
    v. Valves, hydrants, vents, etc.
    vi. Inlet, manholes, vaults, etc.
d. Street names with traffic striping
e. Existing topography at one (1) foot intervals.
f. Proposed topography at one (1) foot intervals.
g. Proposed and existing structures.
h. Scale: 1 inch = 30 feet minimum.
i. Proposed stormwater detention facilities.
j. Proposed sanitary sewers.
k. Proposed water mains.
l. Proposed roads.
m. All other existing or proposed site conditions.
n. Show all *JCMUA* applicable standard details.
o. Show all *JCMUA* notes.

3) ALL connection details must be included on the drawings and shall be in conformance with *JCMUA's* standard specifications which can be found in Appendix II.
4) The size and type of pipe of all proposed service laterals as well as the sewer main to which connection is proposed must be indicated.
5) a. All connections of surface parking lot drainage system shall comply with the Jersey City, *JCMUA*, and NJDEP requirements.
    b. ALL connections of parking garage drainage systems must comply with the National Standard Plumbing Code and the requirements of the Jersey City Building Department.
    c. For parking garages oil and water separator shall be included and sized to handle surface loading of garage and easy access for cleaning and maintenance.

6) A separate and distinct connection shall be provided for every building and premise, unless otherwise approved by the *JCMUA*.
7) No new sanitary fixtures shall be installed in a building at an elevation lower than the front curb elevation or street centerline elevation or below 100 year flood elevation (whichever is higher) unless special precautions are incorporated into the building connection to prevent the backup of sewerage because of high flows or a blockage. See Appendix II. In any event, the *JCMUA* will NOT be responsible for any backups or surcharges into fixtures or structures, below the above-mentioned elevations.
8) ALL elevations on site plans must use vertical datum NAVD 1988 and horizontal datum NAD 1983. All plans shall indicate the 100 year flood elevation as per the latest FEMA mapping.

9) The drawings must comply with *JCMUA's* "Standard Requirements for New Sanitary and Storm Sewers and Service Laterals," current revision, which can be found in Appendix III.
10) The drawings must comply with *JCMUA's* "Requirements for Site Plan Applications," current revision, which can be found in Appendix IV. A signed copy of these requirements must be submitted with the application.
11) The developer shall provide proposed surface conditions utilizing NRCS – TR55, CN values with areas for each condition, such that data can be inserted in XPSWMM model for the city to determine development impact on combined sewer system. This shall apply to developments over 10,000 sq. ft. or 8,000 gpd.

**SECTION 4.01 GENERAL**

1) The *JCMUA* will not review or consider any application for service until the Applicant has paid ALL charges required for review of plans and/or permit applications.
2) The accepted application shall oblige the Applicant to pay all other fees (CCTV inspection or others) to the *JCMUA*, as revised from time to time, and to comply with its Rules and Regulations.
3) ALL completed applications for sewer permits/approvals shall be approved on a first-come first-served basis. The obligation of the *JCMUA* to approve completed applications is contingent upon the availability of capacity of the physical facilities as well as in contractual capacities that the *JCMUA* has with the Passaic Valley Sewerage Commissioners.
4) The applicant shall not construct sewer facilities until such time as the *JCMUA* is in receipt of all necessary approvals from the NJDEP or any other municipal, state or federal agency that may be required.
5) The *JCMUA* shall not approve an application that is incomplete or an application for service or services that cannot be rendered as a result of the lack of conveyance or contractual capacity.
6) When an NJDEP TWA Permit has been issued, the NJDEP IVQM-005 Form with approved as-builts should be submitted to the *JCMUA* prior to the release of fees, bonds, or others.

**SECTION 4.02 NEW CONSTRUCTION**

A) Applies to small and large development that meet the following criteria:
   i) Do not require a NJDEP-TWA Permit
   ii) Sanitary sewage flow does not exceed 8,000 gpd.
   iii) No extension on sewer main is required.
   iv) PVSC Sewer Connection Permit is required.
   v) Plans shall be submitted in conformance with Article IV, Section 4.00.

B) Applies to large developments only that meet the criteria of Section 4.02 A:
   i) NJDEP-TWA is required.
   ii) Stormwater management system is required.
      a) Stormwater system design shall consist of the following items:

1) Detention system is capable of containing a 100 year storm runoff.
   A) On site outlet control structure designed in compliance with NJDEP Stormwater Regulations.
   B) Stormwater pipes shall be designed with a minimum velocity of 3.5 fps for a 2 year storm, and capable of passing 100 year Storm flow to the detention basin.
   C) Stormwater discharge from the site, post construction conditions for the 2 year, 10 year, and 100 year events.
   D) The post-construction peak runoff rate for 2 year, 10 year, and 100 year shall be 50%, 75%, 80% respectively of the pre-construction peak rates.

**SECTION 4.03 NEW CONSTRUCTION – SEWER EXTENSION (TWA APPLICATION REQUIRED)**

A. Small Development (Less than 10,890 SF area developed)
   a. The plans must be submitted as stated in ARTICLE IV, Section 4.00
   b. Application and Fees must be submitted as per the Connection Fee Rules
      1. Performance Bond
         i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
         ii. Performance Bond shall be 120% of the total construction cost guaranteeing complete construction within the time period to be specified by the *JCMUA* and further guaranteeing that said construction will be in accordance with these Rules and Regulations of the *JCMUA* and the plans and specifications, Engineer's Report and cost estimates approved by the *JCMUA*
         iii. Engineer's Construction Cost Estimate must be submitted
         iv. Inspection Fees, TWA Review Fee and As-Built Deposits must also be submitted as per SCHEDULE IV.
      2. Indemnification Agreement
         i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
         ii. *JCMUA's* General Counsel, Elnardo Webster, Esq. of the Law Firm of Trenk, DiPasquale, et al., 347 Mt. Pleasant Avenue, West Orange, NJ 07052, 973-243-8600, must be contacted, for the execution of an Indemnity and Hold Harmless Agreement with the *JCMUA*

B. Large Development (Greater than 10,890 SF area developed)
   a. The plans shall be submitted as stated in ARTICLE IV.
   b. Development shall include a detention system satisfying the following criteria:

The on-site flow control structure shall detain a volume of storm water runoff equal to:

i. The volume of storm water discharged from the site so that the rate of runoff from 2, 10 and 100 year events for the post-construction site conditions does not exceed the pre-construction volume and rate of run-off; and

ii. The post-construction peak runoff rate for the 2 year storm event is 50 percent of the pre-construction peak runoff rate and the post-development peak runoff rate for the 10 and 100 year storm shall be 75% and 80% respectively of the pre-construction peak runoff rates.

A storm drainage report and calculations must be submitted to this office for review.

c. Application and Fees must be submitted as per the Connection Fee Rules
    1. Performance Bond
        i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
        ii. Performance Bond must be 120% of the total construction cost guaranteeing complete construction within the time period to be specified by the *JCMUA* and further guaranteeing that said construction will be in accordance with these Rules and Regulations of the *JCMUA* and the plans and specifications, Engineer's Report and cost estimates approved by the *JCMUA*
        iii. Engineer's Construction Cost Estimate must be submitted.
        iv. Inspection Fees, TWA Review Fee and As-Built Deposits must also be submitted as per SCHEDULE IV.
    2. Indemnification Agreement
        i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
        ii. *JCMUA's* General Counsel, Elnardo Webster, Esq. of the Law Firm of Trenk, DiPasquale, et al., 347 Mt. Pleasant Avenue, West Orange, NJ 07052, 973-243-8600, must be contacted, for the execution of an Indemnity and Hold Harmless Agreement with the *JCMUA*.

## SECTION 4.04 MULTIPLE PARCEL DEVELOPMENTS

A. Proposed developments that are composed of multiple parcels or lots and being constructed in phases shall submit an overall site plan for storm water and sanitary sewers.

a. The stormwater management shall be considered to be one (1) system for the entire development, not one (1) parcel at a time.
b. Stormwater detention systems shall be sized and constructed for the entire site.
c. The detention system and stormwater management system shall be constructed in the first phase.
d. In the event that the detention system cannot be constructed in the first phase due to demolition of existing structures, temporary detention shall be constructed, and operated until development or final detention system is completed.
e. All other requirements of Section 4.03-B et al shall be applicable.

**SECTION 4.05 ADDITION/RENOVATION/REHABILITATION**

A. No changes made to the existing service laterals/connections
   a. The plans must be submitted as stated in ARTICLE IV.
   b. A letter must be submitted explaining the scope and use of additions/renovations/rehabilitation work that is being completed and why no changes are being made to the existing service, and no increase in impervious or disturbed are or increase in sanitary or stormwater flows.
   c. Application and Fees must be submitted as per the Connection Fee Rules

B. Changes made to the existing service laterals/connections
   a. The plans must be submitted as stated in ARTICLE IV.
   b. The same rules apply as for "new construction" in SECTION 4.01 or 4.02.
   c. Application and Fees must be submitted as per the Connection Fee Rules

**SECTION 4.06 CONNECTION FEES**

The Applicant shall pay a one-time sewer connection fee and sewer connection fee for each EDU in an amount as established by the *JCMUA's* rate schedule in effect at the time the fee is paid. The Connection Fee shall be applicable to all connections for each single-family unit or EDU.

The Connection Fee rate schedule can be found in Schedule I.
The Connection Fee Rules can be found in Appendix VI.

## ARTICLE V. DESIGN AND CONSTRUCTION

This section provides information on the minimum standards of the *JCMUA*. The Applicant and his/her design engineer shall ensure that the construction of all facilities

are conducted in accordance with these standards. ALL application and connection fees must be paid by form of a bank or certified check.

The authority reserves the right to periodically modify these Rules and Regulations and its Standard Specifications and construction details to address changes in Federal, State, County, Municipal, and Building Code regulations or engineering standards. Accordingly, the Design Engineer must verify prior to design that the standards contained herein have not been modified in any manner, and shall implement and use the Authority's standard construction specifications and details in effect at the time.

All work to be done shall comply with all applicable requirements of Federal, State, County, and local statutes, regulations and codes, and especially the safety provisions contained therein.

## SECTION 5.01 GENERAL

All sanitary sewers shall be designed to carry a peak flow of 2.0 times the average flow for a half full pipe estimated based on a twenty-five years flow projection. Average flow shall be assumed to be 100 gallons per person, per day, and 3 persons shall be assumed per EDU, including infiltration.

Wherever possible for new construction, all sewers must be designed on a "separate system" basis in which all water from roofs, basement sump pumps, groundwater, streets and any other areas are connected to a separate Storm Sewer System to minimize the impact of new development on the *JCMUA's* combined sewers. Where storm water runoff from roofs, streets or any other areas is to be connected to the combined sewer system, the applicant shall undertake appropriate planning, design and construction of offline storage facilities (detention systems) to reduce peak discharges into the combined sewer system so as to maintain, at a minimum, existing storm water flow conditions within the combined sewer system.

If the proposed project includes the construction, connection or extension of a Storm Sewer System, the Applicant shall comply with all applicable requirements of the Residential Site Improvements Standards, N.J.A.C.5-21, et seq., and the NJDEP Tier A Municipal Stormwater General Permit. Any sites engaging in "industrial activity" as defined in N.J.A.C. 7:14A-1.2, the facility must comply with all applicable NJDEP Regulations, and Passaic Valley Sewage Commission (PVSC) Regulations.

Sanitary Sewers and Force Mains shall be designed to flow with a minimum velocity of not less than 2.2 fps (feet per second) at full flow based on Manning formula with n=0.013.

Acceptable materials used in the construction of sewers, service laterals and force mains are listed below:

1. Gravity Sewers

a. Reinforced Concrete
b. Ductile Iron
c. Cast Iron
d. Polyvinyl Chloride (PVC)
e. Vitrified Clay Tile

2. Inverted Siphons and Force Mains
    a. Cement Lined Ductile Iron (CLDP)
    b. Cast Iron (CIP)
    c. High Density Polyethylene

3. Outfalls
    a. Reinforce Concrete Pipe.
    b. Ductile Iron
    c. Reinforced Concrete Box Culvert

The materials must meet the requirements listed below. All references to standard specifications NJDEP, NJDOT, ASTM, ANSI, AWWA, EPA, AWS, AASHTO, ACI, AISC, UniBell and the like, shall be to the latest version thereof.

The *JCMUA* or its Engineers shall not be responsible for the design of the project or any errors or omissions therein; such responsibility shall be solely and completely assumed by the Applicant's engineer, surveyor, architect or other design professional.

Any changes in pipe materials during prior to start of construction, the Developer, Developer's Engineer or Developer's Contractor/Construction Manager shall contact JCMUA for review, comment and approval of change in materials prior to proceeding with construction.

## SECTION 5.02 EXCAVATION AND BACKFILL

A. Character of Material

Any and all fill imported to the site shall be certified as clean fill. An original copy of such certification and laboratory analysis reports shall be provided to the Authority prior to the material being brought to the site.

B. Excavations, Clearances and Trimming

Excavations shall be of sufficient width to permit work to be done competently, in the manner and of the size specified and shown, and limits shall be such as to permit the use of excavation support, unless permission for an alternate procedure is specifically granted. In no case shall excavations be carried more than bedding depth below grade by machine and backfill used to bring the grade to the proper elevation for bottom slabs, footings or pipelines.

In all excavations for sewer system components, boulders, rock, masonry, or other similar materials shall be excavated to a level at least six inches below the outside wall of the pipe at the invert, and carefully backfilled with NJDOT No.57 or No.67 stone or other approved material to 18-inches over the top of the pipe. Rock or boulders shall be removed from sides of trenches to a plane 12 inches beyond the outside wall of the pipe, manholes, etc., unless permission to do otherwise is expressly given.

Where the removal of a boulder creates a void below the pipe bedding, the void shall be backfilled with bedding stone. In cases where the boulder creates a void in the side of a trench, all material above the void shall be removed and backfilled as part of the normal trench backfill operation.

The trench width just above the top of the pipe shall be maintained as narrow as possible and in general shall not exceed the outside diameter of pipe plus two (2) feet.

C. Unauthorized Excavation

If any excavation is caused by the Contractor's error, or wherever the excavation is carried beyond or below the lines and grade given by the Engineer, the Contractor shall, at his own expense, refill all such excavated space with such material and in such manner as may be directed, in order to insure the stability of the various structures. Beneath all structures, the space excavated without Engineer shall be backfilled with 4,000 psi concrete.

D. Sheeting and Bracing

Where necessary, particularly to prevent disturbance, damage, or settlement of adjacent structures, pipelines, utilities, improvements or paving, excavation shall be adequately sheeted and braced. In areas where excavations exceed four (4) feet in depth, the Contractor shall assume full responsibility for the design and installation of sheeting and bracing of excavations such that the sheeting and bracing design meets all the latest requirements of the New Jersey Construction Safety Code and Federal Occupational Safety and Health Act.

Sheeting and bracing shall be furnished and installed, and if ordered by the Engineer, left permanently in place. If sheeting is not ordered to be left in place it shall be removed.

All permanent steel sheet piling and accessories shall be new and conform to the requirements of ASTM A6-99, "Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling." All steel sheet piling shall be interlocking steel sheeting as shown on Contract Drawings and conform to the ASTM Designation A572-99a, "Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel" (GR50).

E. Compacting Foundation

Wherever the development of suitable foundation conditions requires it, the Contractor shall take the proper means of compacting such foundation material. After excavation to grade, the surface shall be compacted, or otherwise consolidated to adequately prepare the bottom for the loads to come upon it, the method depending upon the quality and condition of the material. Where so required to stabilize the surface, screened gravel shall be placed on the surface and shall be compacted into the sub-grade in such thickness as may be required by the Engineer.

F. Additional Excavation

Wherever, in the opinion of the Engineer, the material found at the grades for the slabs, wall footings, or pipe inverts, is not satisfactory, the Contractor shall make any additional excavations as directed by the Engineer, and shall refill the same to two inches above the required grade with selected material.

G. Backfilling

As soon as practicable, after the pipe, masonry, or cast in place concrete has been placed and has acquired a suitable degree of hardness, or cast in place concrete has reached seven (7) day strength, the backfilling shall begin and shall thereafter be prosecuted expeditiously.

All lumber, rubbish, and braces shall be carefully removed from behind walls or other structures, unless ordered left in place by the Engineer. Backfill under the pipe haunches, around the pipe, and up to a cover of at least 18 inches over the top of the pipe shall be placed by hand in 6 inch layers, each layer to be thoroughly compacted by mechanical tampers of an approved type.

All other backfill shall be compacted and tamped in maximum 6 inch to 12 inch lifts to obtain 90 to 95% of relative density. If 90 to 95% relative density is not obtained, the lifts shall be reduced in thickness and the moisture level shall be adjusted. No stones or boulders over three (3) inches shall be allowed to drop in the trench.

All excavated soil within roadways and other paved areas shall be replaced with NJDOT virgin dense aggregate or quarry process stone conforming to I-5 (recycled concrete will not be accepted). Backfill between a horizontal plane 18 inches above the top of the pipe and the finished surface grade shall be placed in successive layers of not over 6 inches compacted thickness. Each layer shall be thoroughly compacted using approved tamping machines.

In rights-of-way, easements, and paper streets, backfill between a plane 18 inches above the top of the pipe and the finished surface grade, the Contractor shall keep settlement to a minimum and shall promptly restore to proper grade any settlement that might occur. Backfill in this zone shall be placed in successive layers of not over one (1) foot

compacted thickness, or as directed by the Engineer. Each layer shall be thoroughly compacted using tamping machines.

All excavated material outside the roadways i.e., easements, shall be stockpiled at the site, outside the roadway. The stockpiled materials shall not interfere with vehicular bicycle or pedestrian traffic, interfere with drainage or cause sight distance problems for vehicular bicycle or pedestrian traffic.

The trench outside the roadway shall be backfilled with only acceptable excavated material. Where in the opinion of the Engineer the excavated material is unsuitable for backfilling, the excavated material shall be disposed of at approved off site locations and the trench backfilled with NJDOT virgin grade aggregate or quarry process (I-5) stone as directed by the Engineer.

All backfill in embankments shall be thoroughly compacted by rollers of approved size and weight or by other approved methods.

H. Disposal of Material

All areas where soil is to be used as backfill shall be tested for potential contaminants based on EPA's total listed priority contaminates plus forty (TLPC +40).

Only excavated material acceptable to the Engineer shall be placed as backfill, outside roadways, i.e. easements and to the lines and grades established by the Design Engineer. All other excess material and all material within roadways shall be disposed of by the Contractor in approved locations outside of the working areas.

Temporary storage of excavated material shall not be on environmentally sensitive areas. Also excess fill shall not be used for the top 6 inches of topsoil. All stockpiles shall be in compliance with the NJDEP requirements and soil erosion and sediment control standards.

The Contractor shall restore all grades to those elevations existing, prior to construction. The Contractor shall be responsible for removal and disposal of all excess excavated material. Approval by the City Engineer must be obtained prior to disposal of excess excavated material to sites within the City.

Prior to disposal of excess material, the Contractor shall notify and obtain approval from the City of Jersey City regarding the location of the disposal site. All permits, surveys, tests, manifests, etc., as required for disposal of material, by the NJDEP or any other agency shall be obtained by the Contractor. Under no circumstances shall material be disposed of in flood plain, wetlands, or any other environmentally sensitive area.

I. Protection and Restoration of Existing Structures & Pipe Lines

The Contractor shall carefully protect all existing structures, both above and underground, including but not limited to poles, curbs, driveways, parking areas, privately owned pavements, signs, sumps, pits, catch basins, manholes, underground tanks, ads building foundations; pipe lines, including gas mains, water mains, hydrants, drain lines, storm sewers, sanitary sewers, service connections, conduits, and miscellaneous underground pipe lines; and shall restore same to a condition equivalent to conditions existing prior to his operation.

The Contractor is specifically directed to the requirements of protecting all trees along the route of the work in an approved manner.

The work of protecting and restoring existing utilities and facilities and including trees where no definite physical interference exists, or where the interference is avoidable, shall be the responsibility of the Contractor.

Ample precautions shall be taken to prevent settlement of existing improvements.

The work will be located so as to avoid interference to the greatest degree practicable, based upon data available as to depth and location of existing utilities and other existing facilities.

The Contractor shall make all efforts required by law and all other reasonable efforts to determine in advance of excavation of operations, the location of all utilities and other subsurface structures and facilities, and shall accurately mark same so that they may be avoided by Contractor's operations.

Where existing utilities or other sub-surface facilities adjacent to the trench or crossing through the trench require temporary support or protection, the work shall be the responsibility of the Contractor.

Where definite physical interference would be unavoidable in the final work and necessitates the removal, alteration, replacement or extension of existing utilities, the Contractor shall make all excavations for such work and shall cooperate with other forces involved in the work.

The labor, pipe and other material necessary for removing, altering, replacing, or extending such utilities, other than for excavation, will, unless otherwise ordered, be coordinated by the Contractor with the respective utility companies or other owners involved. In specific cases, the Contractor may be ordered to perform such work unless otherwise completed by the utility.

The Contractor shall be responsible for protecting all existing Jersey City Municipal Utilities Authority's (*JCMUA's*) Engineer appurtenances including but not limited to catch basin inlets, sanitary/combined/storm manhole covers, and water valve boxes or manhole covers hereafter referred to as utility castings. The Contractor shall accurately mark out the location of all utility castings in advance of milling of the roadway. Care

shall be exercised during the milling/paving operations to avoid damage to the utility castings by the milling/paving machines. Following the milling operation and prior to pavement, the Contractor shall inspect all utility castings within the roadway to assure that they were not hit and displaced during the milling activity and that no millings have entered the utility castings. The Contractor shall be responsible for removing any and all millings from the valve box or other utility castings and shall assure that complete and clear access is available to all valves and other utility appurtenances. In addition, the Contractor shall remove and reinstall/replace to the satisfaction of the *JCMUA*, all utility castings which have been dislodged by the milling or paving operations.

The Contractor shall also be responsible for raising all utility castings located in the roadway to the proposed finished grade in areas where the roadway is scheduled for additional pavement above the existing rim elevations. The work and materials associated with altering, replacing or extending such utility castings shall be the sole responsibility of the Contractor and shall be coordinated by the Contractor with the *JCMUA* Engineer prior to work being undertaken.

The *JCMUA* shall be contacted within 48 hours of final paving to schedule an inspection of all the utility castings within the project area to assure compliance with this specification. All utility castings determined to have been buried, damaged, moved or in any other way affected by the project, shall be reinstalled, replaced or uncovered to the satisfaction of the *JCMUA* within two weeks of notification by the *JCMUA*.

J. Work in Private Easements

Where the work is in easements located within privately owned areas, rear yards, etc., the Contractor shall make every effort to minimize disturbance to the area. All trees shall be boxed or fenced to dripline. Excavated material shall be stored on tarpaulins or other means used to prevent it from being spread on the ground. Backfill shall be completed on the same day. Topsoil shall be removed and stored separately, and upon completion of backfill shall be evenly spread over the disturbed area. If settlement occurs, the Contractor shall bring in additional topsoil of an approved variety to bring the trench up to grade.

All disturbed lawns, trees, shrubs, bushes, planting, fences, walls, driveways, walkways, etc. shall be restored to the satisfaction of the owner. It is required that the Contractor take “before and after” photographs of all such areas. Any disturbance or damage to existing structures and/or any site enhancement, shall be immediately repaired in kind by the Contractor without compensation.

K. Connection to Existing Manholes

Where new connections to existing manholes are required, the Contractor shall core drill a hole in the existing manhole to accept the pipe and a flexible gasket around the pipe with stainless steel appurtenances to hold the gasket in place. The Contractor shall

properly reconstruct the existing manhole channel and benching to accommodate the new sanitary sewer upon testing and acceptance of the sewer.

Where it is determined by the Authority to be unfeasible to core drill an existing manhole, the Contractor shall use a hammer drill to create an adequately sized opening to accept the incoming sewer at the invert specified on the plans. A waterstop as manufactured by Fernco or approved equal shall be provided on the clean end of the new pipe. The waterstop shall be positioned so that it is centered on the manhole wall. Non-shrink grout shall be placed around the waterstop to fill the voids between the manhole walls and the waterstop. The non-shrink grout shall be Five Star Structural Concrete, or approved equal. Prior to placement of the grout, the manhole surface shall be roughened to facilitate adherence of the grout.

L. Abandonment of Existing Sewers

Where deemed necessary and approved by the Authority in approved plans and specifications, the Contractor shall undertake the abandonment of existing sewers. The abandonment of existing sewers must be coordinated with the Authority and must be approved by the system operator. The cast iron frames, covers and castings on all manholes and drain inlets or appurtenances to be abandoned shall be removed and transported to the Jersey City Municipal Utilities Authority East Side Pumping Station, or as designated by the Authority for future use.

The downstream end of the existing sewer to be abandoned shall be plugged with concrete or capped with a mechanical plug. All structures within a minimum distance of 12-inches from existing grade shall be demolished and removed. All sewers, manholes and drain inlets to be abandoned shall then be filled with pea gravel or sand and capped with a minimum of 4-inches of concrete. The upstream end of the pipes shall then be capped or plugged and the ground surfaces adjacent to all inlets or manholes shall be restored to their original condition.

## SECTION 5.03 REINFORCED CONCRETE PIPE (CLASS III to CLASS V)

A. General

Unless otherwise specified, all pipe shall be best quality reinforced concrete pipe Class III, in 8” – 0” lengths, joints providing requisite flexibility and water-tightness under service conditions. All reinforced concrete pipe shall conform to the Standard Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, ASTM C-76, latest issue. Where required by the Engineer best quality reinforced concrete pipe Class V shall be used.

All circumferential reinforcing steel in circular reinforced concrete pipe shall be of the circular type and use of elliptical steel will not be allowed.

All pipe shall be sound, true and free from cracks or other defects. Interior surfaces shall be smooth and free from ridges. Pipe ends shall be accurately formed, and no pipe shall be used in the work which has cracked, chipped or otherwise defective jointing surfaces. Patching or plastering of defective surfaces will not be permitted.

B. Jointing

Pipe joints between sections of the RCP shall be sealed with a gasket conforming with ASTM C443 or approved equal. The upper half of all pipe joints shall be totally sealed with 1:2 mortar mixture.

The mortar shall consist of one part of Portland cement and two parts of sand by volume, mixed together with sufficient water to produce a stiff, workable mortar. The amount of water shall in no case exceed five and one-half (5-1/2) gallons of water per bag of cement.

Before making a joint, the pipe ends shall be thoroughly cleaned and wet with clean water.

C. Pipe Laying

All pipe shall be carefully examined for dents, cracks, through wall lifting holes, chips on spigot or bell, and other defects, and no pipe known to be defective shall be laid. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment.

Joint surfaces shall be protected from damage and shall be carefully examined before jointing. No damaged joints shall be used in the work.

Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into the pipe after laying. Exposed ends of the sewer shall be provided with temporary plugs or covers.

All pipe shall be carefully laid to true alignment and grade with bell ends upstream. All pipe shall be bedded as required by the Engineer or Authority. Care shall be taken not to excavate below grade. Material excavated below adopted grade shall be replaced with broken stone as provided in Section 503.

Immediately after the pipe is brought to final position, it shall be thoroughly secured and properly bedded, and ample support shall be provided to prevent settlement or disturbance. Pipe shall be protected during construction against possible flotation due to pouring of concrete cradle or in case the trench bottom becomes flooded prior to placing the backfill.

D. Pipe Testing

All concrete pipe shall be tested using the methods discussed in Section 7.03.

## SECTION 5.04 DUCTILE IRON PIPE

A. General

Ductile iron pipe shall be centrifugally cast cement-lined and shall conform with the latest revision of ANSI A21.51 (AWWA C-151) Ductile Iron-Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids. Cement lining shall conform with A21.4 Cement Mortar Lining for Cast Iron Pipe and Fittings and shall receive a standard foundry bituminous seal coat. Pipe exterior shall receive a standard foundry coal tar dip coating. Pipe may be furnished in 18 or 20 foot nominal laying lengths.

Main line joints shall be of the push-on type with a rubber gasket conforming with the latest revision of ANSI A21.11 (AWWA C-111). Pipe plain ends shall be suitable beveled to permit easy entry into the bell. Each joint shall be provided with two bronze wedges. Pipe joints shall be "TR Flex" as manufactured by United States Pipe and Foundry Company, or approved equal, or as required by the Engineer.

Flanged ductile iron pipe shall have ductile iron flanges conforming to ANSI B16.1 Class 125 specifications designed for use with ANSI/AWWA C151/A21.10-82 flanges fittings, with pipe barrel conform to ANSI/AWWA C151/A21.51-81, or latest revisions with the previously mentioned exception. Ductile iron pipe shall be threaded and flanged in the foundry. The flanges shall be of the long hub type; screwed on the pipe barrel; power tightened by machine, and faced and drilled after tightening. No ductile iron pipe of class thickness less than Class 53 shall be threaded and flanged.

Joint restraint on straight pipe lengths, where required by the Engineer, shall be by the use of mechanical joint retainer glands or by specially modified push-on joints with joint restraint provided by ductile iron retainer rings jointed together by corrosion resistant, low alloy, high strength steel tee head bolts and nuts.

B. Pipe Thickness

Pipe thickness design shall be in accordance with the latest revision of ANSI Standard A21.50 Thickness Design of Ductile Iron Pipe, latest edition, with design based upon maximum anticipated working pressure combined with a 50% increase for water hammer and utilizing the maximum anticipated earth loading conditions combined with an H-20m live loading. Minimum bedding condition shall be Condition 2 as outlined in the above Standard. Minimum acceptable pipe thickness is Class 52, or as required by the Engineer.

C. Jointing

Pipe shall be handled with care to avoid damage to the lining and coating. Cutting of pipe where required shall be done only by experienced men using power-driven pipe cutters in such a manner to leave a smooth end, normal to the pipe axis, with cement lining undamaged. Cut ends shall be beveled to prevent damage to gaskets.

Jointing shall be done in strict accordance with manufacturer's recommendations. Pipe ends shall be thoroughly cleaned prior to jointing and only approved lubricants shall be used. Gland bolts for fittings shall be uniformly tightened using torque limiting ratchet wrenches properly set to the foot pound of torque as recommended by the manufacturer.

Pipe shall be properly aligned to line and grade. Where necessary to change direction, pipe may be deflected in the joint in accordance with the manufacturer's recommendations.

Yellow warning tape shall be buried approximately two (2) feet above all force mains.

D. Pipe Laying

All pipe shall be laid to accurate line and grade on a continuously ascending grade from the downstream station, except where shown otherwise on the plans. The minimum cover over the pipe shall be 4 feet.

All pipe shall be carefully examined for defects, and no pipe known to be defective shall be laid. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment.

Joint surfaces shall be protected from damage, and shall be carefully examined before jointing. No damaged joints shall be used in the work.

Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into pipe after laying. Exposed ends of all uncompleted lines shall be provided with plugs or covers at all times when pipe laying is not actually in progress.

All pipe shall be carefully laid to true alignment and grade with the open end of bell facing upgrade. The trench bottom shall be carefully graded to the proper elevation, and the maximum practical solid bearing area shall be provided throughout its entire length, prior to swinging the pipe into place. The pipe shall be laid on a minimum of 6-inches of ¾ inch clean broken stone in accordance with the requirements of the Authority.

Care shall be taken not to excavate below grade. Material excavated below grade shall be replaced by material, which will meet with the approval of the Engineer, without any further payment.

Immediately after the pipe is brought to final position, it shall be thoroughly secured and properly bedded, in accordance with ANSI A21.50 (latest revision), and ample support shall be provided to prevent settlement of disturbances.

Pipe shall be protected during construction against possible flotation due to poring of concrete or in case the trench becomes flooded prior to placing the backfill, either with water, or a wet mud mixture.

E. Pipe Testing

Ductile iron pipe shall be tested using the method described in section 7.03.

## SECTION 5.05 CAST IRON PIPE

Cast iron (pit cast) house connection pipe and fittings shall be extra heavy thickness conforming with the requirements of A.N.S.I. Specifications A74.
Neoprene gasket joints shall conform to A.S.T.M. C-564. Lead and oakum joints shall be made in accordance with A.W.W.A. Standard C-600.

## SECTION 5.06 POLYVINYL CHLORIDE (PVC) PIPE

A. General

All pipe shall be best quality unplasticized polyvinyl chloride sewer pipe, adequate for external loading conditions with joints providing flexibility and water tightness under service conditions. Smooth internal surfaces, producing high carrying capacity obtainable with best standard practice and best workmanship, will be required. Gravity sewer pipe shall be in accordance with ASTM D3034 for sizes 4" through 15", and ASTM F679 for sizes greater than 15" (latest revisions). Pressure sewer pipe shall be in accordance with ASTM D2241. Sewer pipe shall meet the requirements for extra strength sections of the above noted ASTM Specifications (minimum of SDR-35 for gravity pipe and SDR-26 for pressure pipe).

All pipe shall be of uniform dimensions, straight, and true to form, without bulges, dents, cracks, tears, or other defects or exposure to sunlight longer than two (2) months, which will result in a noticeable variation in diameter from that obtained on adjacent unaffected portions of the surface. Each pipe shall not vary in length more than 1.0 inch in a length of 12-1/2 feet (20 feet for pressure pipe) measured as mid-ordinate. Materials properties shall meet the test requirements of ASTM D1784 (latest revisions).

B. Joints

Joints shall be of the bell and 76 spigot type with rubber ring. Joints shall be manufactured in accordance with ASTM 3212 (ASTM D3139 Pressure Pipe), latest revision. The ring groove shall be so designed as to prevent ring displacement. Sizes shall be as required by field conditions. Joints shall be in accordance with recommendations of the manufacturer.

C. Jointing

Pipe shall be carefully jointed in conformity with the best practice and the detailed instructions of the manufacturers. All pipe ends shall be thoroughly cleaned prior to and during the jointing operation. The pipe end shall be thoroughly lubricated in accordance with the recommendation of the manufacturer.

Actual details of required jointing practice will depend upon the particular type adopted, but shall in all cases, involve approved practice and shall be such as to produce the required results, particularly with regard to watertightness.

D. Pipe Laying

The Contractor shall submit calculations and plans including sketches and details of the method of installation of manholes and gravity sewers in areas requiring excavation greater than 8 feet deep. If trench boxes are to be used, the design strength of the boxes shall be checked against the soil loading. The calculations and sketches shall be accompanied by a signed and sealed certificate from a currently licensed N.J. Professional Engineer stating that the method of installation proposed meets all the latest requirements of the New Jersey Construction Safety Code and the Federal Occupational Safety and Health Act.

All pipe shall be carefully examined for dents, excessive deflection, or bowing, and other defects. The minimum pipe cover for PVC pipe shall be 4 feet unless otherwise approved by the Engineer.

No pipe known to be defective shall be laid. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment.

Joint surfaces shall be protected from damage and shall be carefully examined before jointing. No damage joints shall be used in the work.

Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into the pipe after laying. Exposed ends of the sewer shall be provided with temporary plugs or covers.

All pipe shall be carefully laid to true alignment and grade and installed in accordance with ASTM D2321 (latest revisions).

The trench bottom shall be carefully graded to the proper elevation, and the maximum practical solid bearing area shall be provided throughout its entire length, prior to swinging the pipe into place. Requirements for proper bedding shall also include adherence to typical bedding details.

Care shall be taken not to excavate below grade. Material excavated below adopted grade shall be replaced by material, which meets with the approval of the Engineer.

All pipe shall be accurately centered prior to jointing and then thoroughly driven home.

All trenches shall be dewatered prior to laying pipe.

Immediately after the pipe is brought to final position, it shall be thoroughly secured and properly bedded, and ample support shall be provided to prevent settlement or disturbances as detailed in these Specifications.

Pipe shall be protected during construction against possible floatation due to pouring of concrete cradle or in case the trench becomes flooded prior to placing the backfill.

Six inch wide metallic warning tape shall be buried approximately two (2) feet above all PVC pressure pipe. The tape shall be capable of being detected with a non-ferric metal detector.

E. Branch Connections

Branch connections shall be of the type that are manufactured integrally with the main sewer pipe and shall be PVC 45 degrees or 60 degrees wye connections or 90 degree tee connections of a 4 inch or 6 inch diameter. Branch connections shall be best quality unplasticized polyvinyl chloride (PVC) sewer pipe and shall be provided and installed in accordance with applicable specifications sections and details.

F. Bedding and Corporation Notes

1. Bedding and haunch material to springline shall be in ¾ inch clean crushed stone and gravel in accordance with the requirements of the Engineer.

2. After placement of pipe, Contractor shall install haunch material and compact to 90% relative density utilizing equipment as necessary. Note: Hydro-hammers are <u>not</u> to be used 3 feet or less from the top of pipe.

3. After installation of haunch material, the Contractor shall install initial backfill and compact to 90% relative density.

4. If Contractor excavates to greater depth or a wider trench then specified, it shall be his responsibility to install material and compaction as deemed necessary by the Engineer to achieve the required bedding strength.

5. Precautions shall be taken to ensure sufficient material is placed under the pipe haunch (area between bottom and springline of pipe) to provide adequate side support. Take precaution to prevent movement of the pipe during the placement

of the material in this area. All sheeting below the top of the pipe shall be left in place.

Movable trench supports shall be used only in earlier wide trench constructions (wide trenches are classified as trenches whose width at the top of the pipe is greater than 2-1/2 pipe diameters on each side of the pipe) where supports extend below the top of the pipe or on a stable shelf above the pipe with the pipe installed in a narrow, vertical wall sub-ditch. (Uni-bell B-5)

G. Connection to Existing Brick Manholes

Connection of new or replacement gravity sewers at existing brick manholes shall be performed using an elastrometric plastic waterstop. The Contractor shall carefully remove the damaged section of pipe at the manhole wall or create an opening in the manhole wall using saws or other appropriate methods to accept the new gravity sewer. All efforts shall be made to limit the opening in the existing manhole to a diameter that is less than 6" greater than the pipe to be installed. The opening in the wall shall be cleaned and the edges roughened to facilitate the adherence of grout.

The waterstop shall be Model LDCMA as manufactured by Fernco, Inc., approved equal. The waterstop shall be installed on the new pipe section in accordance with the manufacturer's recommendations. The pipe and waterstop shall be positioned in the opening at the required elevation so that the waterstop is centered along the wall's thickness. Non-shrink, non-metallic grout shall be carefully applied between the edges of the wall opening and the pipe so that all gaps are filled and the pipe is securely fastened in place. Grout shall be Five-Star Structural Concrete as manufactured by U.S. Grout Corporation, or approved equal.

H. Connection to Existing Pre-cast Concrete Manholes

Connections of new or replacement gravity sewers at existing pre-cast concrete manholes shall be made by using the cast in place flexible gasket if available, or by core drilling the manhole wall and by the use of a Kor-n-seal gasket or approved equal. The channel and benching in the manhole shall be reconstructed as necessary with non-shrink grout to provide a smooth transition between the new and existing main connection.

I. Pipe Testing

All PVC pipe shall be tested using methods described in section 7.03.

## SECTION 5.07 PIPE BEDDING AND TRENCHING

Trench dimensions, maximum depths and bedding requirements (including cradles and encasement) for sewers, laterals, etc. shall be in accordance with the manufacturer's

recommendations and as a minimum shall conform to the details shown on the Division of Engineering Street Opening Requirements and Trench Detail.

The applicant's application for preliminary review by the Authority shall include trenching dimensions and bedding details including cut reinforcing bar schedules for concrete cradles where applicable.

If proposed facilities or mains are to be constructed on piles for any reason, the Applicant must submit a report that is signed and sealed by a NJ Licensed Professional Engineer analyzing the surrounding surface and subsurface. The report must evaluate the possibility settling in the areas surrounding the proposed structures. The report must determine whether future settling in the surrounding areas will adversely impact the proposed structures and/or roadways, pavement, etc.

## SECTION 5.08 PRE-CAST CONCRETE MANHOLES

A. General

Manholes shall be provided at ends of sewer lines, at interceptions and at changes of grade or alignment. Distances between manholes shall not exceed 200 feet for sewers 15 inches or less in diameter, 300 feet for sewers greater than 15 inches in diameter. Where collector sewers or lateral connections enter manholes at elevations two feet or more above the invert, drop manholes shall be provided and drop pipes shall be built.

B. Description

Pre-cast concrete manholes shall consist of pre-cast reinforced concrete sections, a conical or flat slab top section, and a base section conforming to the requirements of the *JCMUA*, as illustrated on the enclosed standard details, and as specified herein.

C. Materials

Concrete: Precast manhole shall be constructed of 4000psi or stronger concrete with type III or IIIA cements in accordance with ASTM CISO. Aggregate shall be a maximum of 3/8" crushed stone.

Reinforcing Steel: Reinforcing steel shall be $F_Y$ = 60,000psi deformed bar.

Structural Design: Manholes shall be designed to support the sill loading and H-20 loading.

Frames and Covers: The Contractor shall furnish and set level and to the proper grade, Class 30B cast iron manhole frames and covers of the form and dimensions specified by the *JCMUA* conforming to standards.

All castings for manhole frames and covers shall be of tough gray iron, free from cracks, holes and cold shuts. The quality should be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting without flaking the metal.

All castings shall be made accurately to dimensions and shall be machined to provide even bearing surfaces. Covers must fit frames in any position, and if found to rattle under traffic, shall be replaced. Filling to obtain tight covers will not be permitted. No plugging, burning in or filling will be allowed. The frame shall be thoroughly bedded in mortar.

All castings shall be carefully coated inside and out with coal-tar pitch varnish of approved quality.

Exterior of Manhole: Shall be coated with black epoxy bitumastic paint for waterproofing. Lift holes shall be non-through pick-up holes. Interior shall be coated with white epoxy bitumastic paint.

Steps: During the construction of each manhole, Polypropylene steps with a 5/8-inch Grade 60 steel reinforcement shall be set in place on the inside of the manhole beginning two feet above the bottom, and spaced not more than twelve inches center to center.

Steps shall be constructed to the dimensions required by the Jersey City MUA and shall be properly embedded in the wall.

Piezometer: Manholes shall be constructed with piezometer pipe through the wall located immediately above the bench. The piezometer shall be constructed as shown within *JCMUA* Sanitary Sewer Details.

Lifting Holes: Lifting holes shall be non-penetrating with a keyed lock as manufactured by Atlantic Concrete or equal.

Force Main Discharge Manholes: The discharge pipe shall be aimed in to the channel of the manhole to limit splashing to as little as possible. Inside walls shall have HDPE liner plates cast into the wall. Liner plates shall be equal to a "T-lock" as manufactured by American International.

D. Installation

Pre-cast base sections shall be installed on a 12-inch crushed stone foundation mat as indicated on the standard detail drawings. Concrete foundation mats (4000 psi) shall be furnished if required by the Engineer due to adverse field conditions. The bell of the manhole base shall be wiped clean, be free of all dirt and grit, and liberally soaped in preparation for receiving the riser, cone or slab top sections. Prior to snapping the gasket onto the spigot groove of the riser or cone sections, the gasket should be wiped clean and well soaped. Soaping the gasket groove will also make jointing of the pipe sections easier. A screwdriver or hammer handle inserted beneath the gasket and run around the

pipe will ensure even seating. The riser or cone sections with gasket in place should then be lowered into the bell of the manhole base, taking care that no dirt gets into the joint on the gasket. Additional riser or cone section shall be jointed in a similar manner.

Manhole joints shall be mortared inside and outside. The entire exterior of manholes including bottom shall receive two waterproof coatings with an epoxy sealing compound.

E. Watertight Work Required

THE ENTIRE WORK OF CONSTRUCTION MANHOLES MUST BE CARRIED ON IN A MANNER TO INSURE WATERTIGHT WORK, AND ANY LEAKS IN MANHOLES SHALL BE GROUTED, REPAIRED, OR THE ENTIRE WORK SHALL BE REMOVED AND REBUILT.

ATTENTION IS PARTICULARLY CALLED TO THE NECESITY OF KEEPING THE WATER LEVEL BELOW ALL PARTS OF THE BRICK OR CONCRETE FOUNDATION AND WALLS UNTIL THE CEMENT HAS OBTAINED ADEQUATE SET.

F. Watertight Covers

In areas susceptible to flooding or where directed by the Engineer, watertight manhole frames and covers shall be installed, Campbell No. 6548 or approved equal. The Contractor shall cement the rubber gasket in place, lubricate all bolts, and permanently mark the frame and cover for alignment. Where watertight manholes are used, vents stack and branch pipe shall be installed. See vent stack detail.

G. Locking Type Covers

Where directed by the Design Engineer or *JCMUA* Engineer, locking type frames and covers shall be installed, Campbell No. 1486 or approved equal.

H. Manhole Testing

Manholes shall be tested as described in Section 7.03.

## SECTION 5.09 PRE-CAST CONCRETE CATCH BASINS

A. Description

Pre-cast concrete catch basin inlets shall consist of pre-cast reinforced concrete sections, a flat slab top section, and a base section in conformance with the requirements of the *JCMUA* and as detailed in the attached “Standard Construction Details” and specified herein.

B. Other Materials

Frames and Grates – The Contractor shall furnish and set level and to the proper grade, cast iron catch basin inlet frames and grates of the form and dimensions shown on the standard detail drawings. All grates shall be bicycle type grates.

All castings for catch basin inlet frames and grates shall be of tough gray iron conforming to ASTM Specification A48-83, Class 30B (A.A.S.H.T.O. M105-82), free from cracks, holes and cold shuts. The quality shall be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting without flaking the metal. All castings shall be heavy duty and shall be capable of safely withstanding A.A.S.H.T.O. HS20-44 Highway Loading.

All castings shall be made accurately to dimensions and shall be machined to provide even bearing surfaces. Grates must fit frames in any position, and if found to rattle under traffic, shall be replaced. Filling to obtain tight grates will not be permitted. No plugging, burning in or filling will be allowed. The frame shall be thoroughly bedded in mortar.

All castings shall be carefully coated inside and out with coal-tar pitch varnish of approved quality.

Steps – During the construction of each catch basin inlet, polypropylene steps with a 1/2-inch Grade 60 steel reinforcement shall be set in place on the inside of the catch basin inlet beginning 2 feet above the bottom and spaced 12-inches center to center, as shown on the standard detail drawings. Steps shall be constructed to the dimensions required by the Owner and shall be properly embedded in the inlet wall.

C. Installation

Pre-cast base sections shall be installed on a 12-inch NJDOT No. 57 foundation mat. Concrete foundation mats (4,000 psi) shall be furnished, if required by the Engineer due to adverse field conditions. The bell of the catch basin inlet shall be wiped clean, be free of all dirt and grit, and be liberally soaped in preparation for receiving the riser or top slab section. The riser or top slab sections should then be lowered into the bell of the catch basin inlet base, taking care that no dirt gets into the joint. Additional riser sections or top slab sections shall be jointed in a similar manner. All catch basin inlet joints shall be mortared inside and outside. All catch basin inlets that have flows tributary to the Authority's combined sewer system shall be constructed with a 2-foot deep sediment sump and a Standard Type Catch Basin Trap as manufactured by Campbell Foundry of Harrison, New Jersey.

D. General Requirements

All pre-cast catch basin inlets shall be designed and manufactured to meet the requirements of "Pre-Cast Concrete Water and Wastewater Structures," ASTM Spec, C-

913 and shall conform with the requirements of the NJDOT Standard Specifications. The minimum compressive strength for all concrete sections shall be 4000 psi.

Joints of the catch basin inlet sections shall be formed entirely of concrete and when assembled, shall be self-centering and make a uniform tight joint. All inside surfaces of the bell or outside surfaces of the spigot, or both, shall be parallel within 1 degree and have an angle of not more than 2 degrees with the longitudinal axis of the pipe. Joints shall be mortared on exterior and interior surfaces.

The Contractor must submit shop prints prior to placing orders.

E. "Solids Restricting" Type Inlet Frame and Grate

Storm drain inlets shall meet or exceed NJDEP Design Standards under NJPDE's Permit No. NJ0141852 (latest revision), which requires that the curb opening be divided by bars or other means into individual clear spaces. Each such clear opening shall have an area of no more than seven (7.0) square inches and the smallest dimension of the opening shall not be greater than two (2.0) inches. The Authority may provide relief and approval an alternate inlet opening at low points if required for adequate hydraulic performance.

Catch basin frames and grates shall be supplied with a "Solids Restricting" type catch basin curb piece as manufactured by Campbell Foundry Company of Harrison, New Jersey. Curb pieces shall be either Campbell Foundry Eco Curb Piece, Type "E". Model 25481362 for use with a 6 inch high curb or Model 25481382 for use with an 8 inch high curb, as modified, if necessary, to meet the above referenced clear opening requirements. The "Solids Restricting" type catch basin curb piece shall be used in conjunction with a Heavy Duty Club Type Inlet Frame and Bicycle Type Grate, Campbell Foundry Company Model #2617, or approved equal, unless specified otherwise.

## SECTION 5.10 SEWER CLEANOUTS

All clean outs shall be left a minimum of 24" above finished grade during initial construction. Prior to final testing of all clean outs, installation of the clean out protection box, as shown on the construction details In Appendix II, will be required and installed to final grade. Clean outs are required for all newly constructed individual sewer connections (Both storm and Sanitary). The *JCMUA* reserves the right to have bull tee cleanouts constructed when, in the opinion of the Chief Engineer, it is warranted.

## SECTION 5.11 INVERTED SIPHONS

Inverted siphons, if permitted, shall not have less than two barrels at a minimum of 8" diameter. Provision shall be made for rodding and for flushing. Velocity shall not be less than 3 feet per second and flow control gates in chambers shall be provided. These are special conditions and further standards will be provided by the Authority. When a siphon is approved, it should be constructed of ductile iron pipe.

## SECTION 5.12 SEWER PIPE SERVICE CONNECTIONS AND SADDLES

A. General

Break in connections and protruding plumbers taps shall not be allowed for sewer main extensions or where existing combined/sanitary sewers are to be replaced. Connections made to existing combined/sanitary sewers for individual residential and/or existing buildings can be constructed as a "break-in" connection in accordance with the Authority's standard details. The maximum protrusion of the service lateral into the existing sewer main is 1 inch. The Contractor shall be fully responsible for excavation and reinstallation of the connection should internal inspection by the Authority or others note that the connection protrudes more than the maximum amount allowed.
The cost correction of the installation shall be borne completely by the Contractor and shall not be the responsibility of the Authority or the Customer.

In areas wherein the Contractor damages the existing combined/sanitary sewer main, the Contractor shall immediately notify the Authority and undertake under their direction the repair of the sewer main. The length of the new sewer pipe required shall be suitable to accomplish the repair as hereinafter described. The existing combined/sanitary sewer, and branch connection if applicable, shall be removed as necessary to completely repair the effected area. Where the proposed branch connection is within (3) feet of a pipe joint on the sewer main, and the main is of a suitable size, the portion of the new main installed shall be connected to the existing sewer main by use of a fully flexible coupling. After securely fastening the coupling to the pipes, it shall be fully encased in concrete. Special care shall exercise by the Contractor to fully support the pipe to assure a consistent invert at the transition. Where the sewer main is of a size wherein flexible connectors are not available, the transition between the new and existing pipes shall be constructed as a cast-in-place transition collar in accordance with the Authority's standard details.

B. Lateral Connections

Sewer service laterals that are ¼ or smaller in diameter than the sewer on the combined sewer main being connected to shall be constructed in conformance with Section 5.12-A, C, D, and E.

Where the sewer service lateral is greater than ¼ in diameter of the receiving sewer main, the connection shall be made to the nearest existing manhole or when the nearest manhole is more than 50 feet upstream or downstream of property lines, the tap shall be connected to the main with a manhole constructed 5 feet upstream of the point of connection on the lateral.

C. Taping and Saddles

For existing combined/sanitary sewers less than 24 inches in diameter the service connection for individual residential and/or existing buildings can be completed by the use of a properly installed sewer pipe saddle or other approved method, such as a "Kor-n-Tee". The sewer pipe saddles or service adaptor shall be designed to provide an infiltration-free connection between service laterals and existing gravity sewers. Sewer pipe saddles shall Sealite Model UH, EH, CH or CH8 as manufactured by the General Engineering Company of Frederick, MD 21705-0609, or equal for connecting SDR 35-PVC laterals to existing sewers. Sealite Model US, ES or CS, or equal shall be used for connecting laterals that are made of a material other than SDR 35-PVC. Kor-n-Tee shall be manufactured by NPC Inc. or approved equal.

The sewer pipe saddles shall consist of a cast iron saddle body with a captive rubber o-ring flange gasket and a stainless steel strap for attaching the assembly to the existing sewer pipe. The inner diameter of the cast iron saddle body shall be correctly contoured for the size and kind of pipe on which it is to be installed.

The saddle body shall be ASTM A-48 Class 30 cast iron and shall be furnished with a tubular rubber flange gasket cemented into a groove within the saddle body. The gasket shall be resilient enough to seal against minor pipe irregularities yet sturdy enough to resist expansion due to temperature and earth movement. The tubular rubber flange gasket shall conform to ASTM C-361-77.

The sewer pipe saddle is to be installed by positioning it over a core-drilled hole, sized in accordance with the recommendations of the saddle manufacturer. The cast iron saddle body shall be secured to the sewer pipe with the use of a Type 304 stainless steel strap, Type 304 stainless steel t-bolt and Type 18-8 stainless steel nut. The steel strap shall be a minimum of 24 gage and shall be provided with a Type 303 stainless steel swivel pin so designed to permit the band to seat properly on the outside of the sewer pipe. The manufacturer of the sewer saddle shall supply all bands, nuts and bolts used to attach the saddle.

D. Pipe

Saddles used for connecting SDR-35-PVC laterals to the existing sewers shall be furnished with an ASTM D3034, SDR-35 PVC gasketed adapter. The adapter shall be installed by the saddle manufacturer and attached to the saddle with a suitable epoxy.

Where laterals of a material other than SDR-35-PVC are to be used, an appropriately sized Fernco electrometric coupling, or equal, with a stainless steel shear ring and clamping bands, shall be furnished for attaching the lateral to the saddle spigot. The 5psi of internal pressure when installed.

E. Finishes

All cast iron surfaces shall be coated with asphaltum paint.

## SECTION 5.13 EROSION CONTROL

The developer/applicant shall be responsible for obtaining all soil erosion and sediment control permits from the Hudson Essex Passaic District office. Erosion control procedures, inclusive of mulching, shall be utilized in all project areas. Erosion control measures shall be taken, as required, staring immediately after site and access clearing, continuing during sewer construction, site demolition, and until the site has been satisfactorily restored.

The Contractor shall continuously control erosion during construction. Critical Areas shall be protected at all times by temporary seeding, mulching, or sodding, or the slope lengths shall be reduced by the installation of diversions or other means. Where topography permits, debris basins shall be constructed at points of water concentration from Critical Areas. Earth berms or diversions shall be constructed to intercept and divert runoff water away from Critical Areas. Diversion outlets shall be stabilized by paving or other means acceptable to the Engineer, if required.

Structures proposed for erosion control shall be designed by the Contractor and approved by the Engineer and constructed in accordance with the Engineering Practice Standards for diversions, waterways, and debris basins as defined by "Standards for Soil Erosion and Sediment Control in New Jersey," prepared by the New Jersey State Soil Conservation Committee.

In critical areas, particularly along steep slopes and wetlands, site clearing shall be delayed until absolutely necessary for the continuance of construction.

## SECTION 5.14 SEDIMENT CONTROL

Sediment shall be settled or filtered out of all surface or subsurface water encountered during construction before such water enters any surface waters. Dewatering operations shall direct pumpage as far from stream banks as possible. Care should be taken not to damage or kill vegetation by excessive watering or silt accumulation in the discharge area. Settling basins or sediment traps shall be constructed and used where necessary to protect vegetation and to achieve environmental objectives.

Construction staging areas, and areas for stockpiling material, shall be selected so as to be consistent with environmental objectives and constraints. All such areas shall be located so as to avoid erosion and siltation. Locations of staging areas used for stockpiling shall be approved by the Owner and modified as required by other authorities.

## SECTION 5.15 DATUM

All elevations and coordinates on site plans must use vertical datum NAVD 1988 and horizontal datum NAD 1983.

## SECTION 5.16 GREASE TRAPS/INTERCEPTORS

Grease traps/interceptors shall be constructed of Concrete, stainless steel, or PVC. Grease traps shall have two chambers influent and effluent flow. The influent chamber shall be maintained such that grease is allowed to rises to the top and wastewater passes through an orifice into the effluent chamber. Shall be two access covers one into each section of the chamber. When the grease trap is constructed of stainless steel or PVC an anti-floatation slab shall be placed around the chamber with tie down straps.

Grease traps/interceptors shall be constructed such that it can support the appropriate loading for roadway or sidewalk or interior building uses.

Grease traps/interceptors shall be operated and maintained in conformance with PVSC Rules and regulation sections 405 and 406.

Grease traps/interceptors shall be sized based on fixture count for apartment buildings, traps maybe size based on 2006 National Plumbing Code Chapter 6 et al and Plumbing and Drainage Institute Standard G101 as stated in national plumbing code or by the following method:

Grease Interceptor Sizing Formula

GI = SC * FF * RT * SF

GI = grease interceptor volume, gallons
SC = seating capacity (# of seats)
RT = retention time, hours = 2.5
SF = storage factor, dimensionless = 1.5
FF = flow factor criteria in gallons/meal-hour determined using following criteria:

| Restaurant Operation Condition | Flow factor |
|---|---|
| Deep frying and dishwasher | 3.0 |
| No deep frying, dishwasher | 2.5 |
| Deep frying, disposable serving ware | 2.5 |
| No deep frying, reusable serving ware, no dishwasher | 2.0 |
| No deep frying, disposable serving ware | 1.5 |
| No cooking of any type, disposable serving ware | 0.5 |

Grease Trap Sizing Formula

GT = CS * 0.4
GT = minimum grease trap rating in gallons per minute
CS = capacity in gallons of fixtures or sink to be discharged to the grease trap

Oil/Water Separator Sizing Criteria

Separator capacity = Six cubic feet for the first 100 square feet of floor space draining to separator plus 1 cubic foot for each 100 square feet thereafter.

## SECTION 5.17 PUMP STATIONS

A. Wetwell

Wetwell shall conform in volume requirement of NJDEP Standards. The structure shall be either cast in place concrete or precast concrete. The top slab shall be designed to support AASHTO H20 loading.

Access shall be through a single leaf or double leaf stainless steel hatch. The hatch shall be equipped with lift cylinders, safety locks to prevent closure. The hatch shall be equipped with locking mechanism with recessed key. The hatch shall be approved by the JCMUA.

B. Piping

Piping in Pump Station wet well, dry well and for a distance of eight (8) ft below the exterior face of the structure shall be bitomastic cement-lined ductile iron class SG pipe. Pipe inside the wet well and dry well shall be flanged pipe. At 24-inch outside the structure shall be a mechanical joint with retainer gland. When the piping is less than 3" in diameter, the pipe shall be 307 stainless steel – SCH 40 pipe, meeting the same flanging requirements.

C. Pumps

Pumps shall be ABS Piranha submersible or approved equal. The pumps shall be capable of passing a 2" solid and have cutting heads to masicate all sewage solids. Pump shall be equipped with Motor High Temp, Motor Overload, seal failure and capable of working under water. All pumps to be turned over to JCMUA shall be approved by the Senior Engineer. Pumps shall be sized based on NJDEP Requirements.

D. Trash Basket

As manufactured by Holiday or approved equal.

E. Ventilation

F. Controls

- Transducer – Submersible; approved by JCMUA
- Flow Metering – Provide a Venturi flow meter, chart recorder
- SCADA - shall work with JCMUA's system without modification to existing system.

G. Electrical

- Generator – shall be diesel and approved by JCMUA. The generator shall be sized to power entire station
- Fuel Systems – self contained and under generator tank with secondary containment

H. Water Supply

Shall comply with Jersey City Water Standards

I. Miscellaneous

## ARTICLE VI. CONSTRUCTION REQUIREMENTS

### SECTION 6.01 WORKING HOURS

The Contractor should generally limit construction operations and activities between the hours of 7:00 a.m. to 4 p.m. unless law establishes stricter limitations. No pile driving, pulling or other noisy operations or operations entailing the use of vibratory hammers or compactors will be permitted, other than between the hours of 8:00 a.m. to 4:00 p.m.

The Contractor must also have all work completed (including backfilling, plating and cleanup) on all County and NJDOT roadways by 3:00 p.m. each afternoon.

### SECTION 6.02 ROAD OPENING

Road opening permits must be obtained from the Jersey City City Engineer's office prior to undertaking any construction in or along the Jersey City public Right-of-Way. Backfill and resurfacing of County and NJDOT roadways shall be as per the requirements of the County and the NJDOT. The Contractor is specifically alerted to include the requirement for traffic control, working hour restrictions, and provisions of uniformed Municipal Policemen when working within the municipality, County and NJDOT Right-of-Ways.

### SECTION 6.03 ENVIRONMENTAL PROTECTION

The Contractor is to minimize environmental impact due to his/her operations during all phases of his work. This shall include, but is not limited to, prohibition of the following construction procedures.

1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, or any unspecified locations.

2. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, wetlands or surface waters.

3. Pumping of silt-laden water from trenches or other excavations into catch basins, surface waters, stream corridors or wetlands.

4. Damaging vegetation adjacent to or outside of the access road or the right of way.

5. Disposal of trees, brush and other debris in any stream corridors, wetlands, surface waters or at unspecified locations.

6. Permanent or unspecified alteration of any flow line of any stream.

7. Open burning of project debris.

8. Use of chemicals for dust control.

9. Use of asphaltic mulch binder.

10. Discharge of test waters with high chemical disinfectant or other pollutant concentrations.

The Contractor shall protect, to the dripline, all trees not designated by the Engineer, the City of Jersey City or the Authority to be removed.

The Contractor is directed to the appropriate sections of the Specifications for additional information regarding environmental work and protection.

## SECTION 6.04 LABOR, SAFETY, HEALTH AND SECURITY REGULATION

The Contractor is to refer to the appropriate portions of Information for Bidders regarding Regulations.

The Contractor is to provide adequate signs, barricades, red lights and uniformed guards and take all necessary precautions for the protection of the workers, the work and the safety of the public. All traffic control shall be in accordance with the requirements of the latest edition of the USDOT "Manual of Uniform Traffic Control Devices". All barricades and obstructions are to be protected at night by suitable signal lights which are to be lit from sunset to sunrise. Barricades are to be of substantial construction and painted such as to increase their visibility at night. Suitable warning signs are to be so placed and illuminated at night as to show in advance where construction, barricades or detours exist.

The Contractor is to keep on proper lights each night between the hours of sunset and sunrise at and upon all portions of his work; upon all ranges or other stakes in connection

with the work, when deemed necessary by the Owner, the Authority, or by the proper authorities, or when required by the liability insurance coverers, and is to be responsible for all injuries and damages resulting from neglect or failure in this respect. Night lighting must be so sized, concentrated and located so as to cast sufficient illumination around new construction and excavations. All excavations and obstructions must be properly marked, lighted and provided with railing and other guards.

The Contractor is to maintain sufficient guards by day and night to prevent accidents of any kind or character whatsoever, and will be liable for any damage, which may arise from any negligence on his part or that of his agents and employees.

If, at any time, in the opinion of the Owner, the Engineer, the City, the Authority, the work is not properly lighted, barricaded, and in all respects safe in respect to public travel, persons on or about the work, or public or private property, the Owner will have the right, but not the obligation, to order such safeguards to be erected and such precautions to be taken as he deems advisable, and the Contractor is to promptly comply with such orders. If, under the circumstances, the Contractor does not, or cannot, immediately put the same into proper and approved condition, or if the Contractor or his representative is not upon the grounds so that he can be immediately notified of this insufficiency of safety precautions in accordance with the procedures for notification of the Contractor specified under "Emergency Telephone", then the Owner may put the work into such a condition that it shall be, in his opinion, in all respects safe and the Contractor is to pay all expenses of such labor and materials as may have been used for this purpose by him or by the Owner. Such action of the Owner, or his failure to take such action, will in no way relieve the Contractor of the entire responsibility for any cost, loss or damage by any party sustained on account of the insufficiency of the safety precautions taken by him, by the Owner acting under authority of this Section.

## SECTION 6.05 SANITATION

Sanitary conveniences, properly screened from public observation, for the use of all persons employed on the work and beginning with the first persons engaged in preliminary operations, are to be provided and maintained by the Contractor in sufficient numbers, in such a manner and at such locations as will be approved. Sanitary facilities are to be completely self-contained, chemically treated and regularly serviced.

## SECTION 6.06 FIRE SAFETY

The Contractor is held responsible and is to maintain conditions, which promote fire safety in his operations at all times. Materials that could constitute a fire hazard such as gasoline, paints, wood and paper products are to be safely stored.

## SECTION 6.07 MATERIALS

Unless otherwise specified, only new materials are to be incorporated into the work. All materials furnished by the Contractor to be incorporated into the work may be subjected to the inspection and approval of the Engineer. No material is to be processed, fabricated or delivered to the work without the prior approval of the Engineer, except at the risk of the Contractor.

The Contractor is to submit, to the Design Engineer and Engineer, data relating to materials he proposes to furnish for the work. Such data are to be in sufficient detail to enable the Engineers to identify the particular product in question and to form an opinion as to its conformity to the Authority Rules and Regulations. This data must be submitted for review and approval as soon as possible and prior to the ordering of any materials for construction.

Facilities and labor for the handling and inspection of all materials are to be furnished by the Contractor. Defective materials must immediately be removed from the site of the work.

If the Engineer so requires, either prior to beginning, or during the progress of the work, the Contractor is to submit samples of materials for such specific tests as may be necessary to demonstrate that the materials conform to the Specifications. Such samples are to be furnished, taken, stored, packed and shipped as directed, at the expense of the Contractor, Except as otherwise noted, the Owner will make arrangements for and pay for tests.

All samples are to be packed so as to reach their destination in good condition and are to be so labeled as to indicate the materials represented, the name of the building or work and location for which the material is intended, and the name of the Contractor submitting the sample. To ensure consideration of samples, the Contractor is to notify the Engineer by letter that the samples have been shipped and is to properly describe the samples in the letter. In no case is the letter of notification to be enclosed with the samples.

The Contractor is to submit data and samples, or to place his orders, sufficiently early to permit consideration, inspection, testing, and approval before the materials are necessary for incorporation in the work. Any delay resulting from his failure to do so is not to be used as the basis of a claim against the Owner, the Design Engineer, the Authority, or the Authority's Consulting Engineer.

When required, the Contractor is to furnish to the Engineer, in quadruplicate, sworn copies of manufacturer's shop or mill tests, or reports from independent testing laboratories relative to material data.

In accordance with the "Buy American" provision in Public Law 95-217 (Section 215 of the Public Law 92-500 as amended) N.J. Public Contracts Law 40A:11-18, and implementing EPA regulations and guidelines, the Contractor agrees that preference will

be given to domestic construction material by the Contractor, subcontractor, material suppliers, and equipment suppliers in the performance of this contract.

The Contractor is to certify that the purchased products and materials are in accordance with the above referenced "Buy American" clause and, in addition, is to provide all information required to justify the use of any foreign made product.

## SECTION 6.08 CUTTING AND PATCHING

The Contractor is to do all necessary cutting and patching of the work that may be required to properly receive the work of the various trades or as may be required by the Specifications to complete the structures. He is to restore all such cut or patched work to a condition, which receives the approval of the Engineer. Cutting of structures that may endanger the work, adjacent property, workers or the public is not to be done.

## SECTION 6.09 DELIVERY AND STORAGE

The Contractor is to deliver equipment and materials to the site and store them in original containers suitably sheltered from the elements, but readily accessible for inspection until installed. He is to store all items subject to moisture damage (such as controls and electrical equipment) in dry, heated spaces. All excavated materials, construction equipment and materials to be incorporated in the new work are to be so placed as not to damage the work and so placed that free access may be had at any time to all parts of the work and to all public utility installations in the vicinity of the work. If insufficient area is available, the Contractor is to provide off-site areas at his own expense. Materials are to be kept neatly piled and compacted and conveniently stored so as to inconvenience, as little as possible, public travel and adjoining tenants.

## SECTION 6.10 ASBESTOS-CONTAINING MATERIAL AND HAZARDOUS MATERIAL

The Contractor shall not supply, provide or bring onto the construction site any asbestos containing material or hazardous material (either in kind, as a component of equipment to be used or furnished under the Contract, or as a component of another material to be used or furnished under the Contract) without the express advance, written consent of the Owner. The term, 'hazardous material" shall have the meaning ascribed in Federal Standard No. 313B in effect on the date of the Contract.

The Contractor shall submit to the Authority and the Owner (with a copy to the Engineers) a Material Safety Data Sheet (Department of Labor Form OSHA-20) together with a complete written description of the intended usage for any such material for which the Owner's consent is required, at least thirty (30) days before the delivery of such material.

Such consent shall not be given if materials or equipment not containing asbestos or hazardous material are available, and the Contractor shall not be entitled to any

adjustment in time or compensation for providing non-asbestos containing and non-hazardous materials.

## ARTICLE VII. INSPECTION OF SEWER SYSTEM

### SECTION 7.01 GENERAL

All construction of sewerage systems shall be under the Jurisdiction of the Engineer for the Authority, either directly or through consultants or inspectors. The Engineer shall have the authority to stop work in the event of discovery of non-compliance.
Construction or testing of sewerage systems shall be performed during the regular JCMUA working hours.
The applicant shall give 48 hours notice to the Authority prior to construction or testing of sewers at all times during the construction period for the project. Should any sewer construction be performed wherein a qualified inspector is absent due to the applicant's failure to provide the proper notification, the Authority may require said work to be uncovered at the applicant's expense. Failure to do so may result in non-acceptance of the work.
The applicant shall also furnish the name of occupant, the street address and lot and block number of every connection made to an approved section of sewer main during the month.
No house service connections shall be made to a street main, whether tested or not, unless under the supervision and inspection of the engineer or agent for the Authority.
When a section of sewer main has been satisfactorily tested, then all individual house connections must also be satisfactorily tested.
A temporary, leak-proof, masonry bulkhead type plug shall be installed in the downstream (outlet) side of the manhole furthest downstream in any sewer main or branch under construction and shall remain in tact and unloosened until written permission is received from the Authority Engineer to remove same.
This permission will not be granted until each section of the sewer has been cleaned and flushed in a manner acceptable to the Authority's Engineer.
The applicant's engineer must certify to the Authority and to the State that the project has been constructed according to the approved plans and specifications. NJDEP requires that such certification be given prior to its issuance of a permit to operate new sewerage facilities.

### SECTION 7.02 INSPECTION DURING CONSTRUCTION

All sewer projects are subject to inspection by JCMUA personnel at any time during construction.

### SECTION 7.03 TESTING OF COMPLETED SEWER SYSTEM

All sewers constructed within Jersey City by Contractors not contracted to the Jersey City Municipal Utilities Authority (*JCMUA*) shall comply with the following testing/inspection procedures:

1. CCTV inspection of all pipes, including, but not limited to vitrified clay pipe (VCP), reinforced concrete pipe (RCP), polyvinyl chloride pipe (PVC), ductile iron pipe (DIP), high density polyethylene pipe (HDPE) with a copy of the video showing distances, date, operators, names, and a letter signed and sealed by the NJPE certifying tape (where applicable when *JCMUA* has not received an inspection fee to conduct a CCTV inspection).

2. The testing shall be witnessed by a representative of the *JCMUA*. In the event that the developer/Contractor is testing without the *JCMUA* representative present and has written permission from the *JCMUA* Chief Engineer. All test data and results shall be signed and sealed by a New Jersey Licensed Professional Engineer from a certified independent testing company.

3. Air pressure testing for the following pipe types: PVC, DIP, VCP, HDPE, and RCP adhering to the procedure as follows (ASTM F1417-92) or (ASTM 924 for RCP):
    a. All laterals shall be installed.
    b. Trench is backfilled.
    c. Pipe is cleaned and has been flushed.
    d. Stabilized base asphalt pavement is in place.
    e. Pipes entering manholes are plugged at the inside face of manhole laterals, are plugged at ends and clean outs (where applicable) are plugged at top.
    f. Pipe is pressurized to 3.5 psig with an allowable maximum pressure drop of 0.5 psig over the time period as shown in the table below.

| **Pipe Size** | **Time** |
|---|---|
| 8” | 3 min. 47 sec. |
| 12” | 5 min. 40 sec. |
| 15” | 7 min. 5 sec. |
| 18” | 8 min. 30 sec. |
| 24” | 10 min. 0 sec. |

For pipes with 24-inch diameter, or where laterals are included in main being tested, see the test time calculation procedure in section six (6).

In cases where a connection to a manhole is a drop configuration, plugs shall be placed in both upper and lower pipes of the drop, and the assembly shall be tested as a part of the pipeline.

4. Testing of Reinforced Concrete Pipe and Vitrified Clay Pipe:
    a. Pipe shall be backfilled; stabilized base asphalt pavement shall be in place.

b. All laterals and clean outs installed and plugged at ends.
c. Both ends of pipe shall be plugged.
d. The pipe shall be filled with water to a level of 24-inches above crown of pipe or 12-inches above groundwater whichever provides greater head pressure. Filling with water and bleeding of air shall be at the upstream end of the pipe.
e. The test shall be held for 24 hours with an allowable leakage rate of one hundred (100) gallons per inch diameter per mile, as per NJDEP regulations.

5. Manholes shall be vacuum tested for infiltration in accordance with ASTM C1244. All pipes in this structure shall be plugged at the inside face of the manhole.
   a. A vacuum shall be pulled on the manhole equal to 10-inches Hg. Vacuum shall be turned off and all valves closed.
   b. The vacuum shall be held as shown in the following table:

| **Manhole Diameter** | **Time** |
|---|---|
| 48” | 60 sec. |
| 60” | 75 sec. |
| 72” | 90 sec. |
| >72” | +15 sec./12 diameter |

6. Determining test time for large diameter pipe (>24”) or when laterals are included in the main being tested:

   $\mathbf{T} = 0.085 * \mathbf{DK}/\mathbf{Q}$

   *(for mains only)*

   $\mathbf{T} = 0.085[(\mathbf{D}^2 * \mathbf{L}) + (\mathbf{d}_L * \mathbf{L}_T) / (\mathbf{D} * \mathbf{L}) + (\mathbf{d}_L * \mathbf{L}_T)] * (1.0 / 0.0015)$

   ***(****for sewer mains & laterals)*

   Where:

   **T** = shortest time to drop 1.0 psig

   **K** = 0.000419 **DL**

   *(must not be less than 1.0)*

   $\mathbf{K} = 0.000419[(\mathbf{D} * \mathbf{L}) + (\mathbf{d}_L * \mathbf{L})]$

   *(in cases where the laterals are included in the testing)*

   **Q** = 0.0015 cubic feet/minute/square feet of internal surface area

   **D** = *pipe* nominal diameter *(inches)*

   $\mathbf{d}_L$ **=** lateral diameter *(inches)*

   **L** = length of pipe reach tested

   *(the time to drop 0.5 psig shall be equal to half of **T** as calculated)*

   $\mathbf{L}_T$ **=** total length of laterals included in test

7. Deflection testing for PVC, HDPE, and other:
   A. A 7½ % deflection mandrel shall be pulled through the entire pipe length by hand, without mechanical assistance.

8. All sanitary, storm, or combined sewer shall also be visually inspected by Lamping Method.

9. Attached is a test form to be submitted to the *JCMUA*.

## ARTICLE VIII. ACCEPTANCE OF NEW SEWER SYSTEM

Prior to acceptance by the JCMUA, the Applicant's Engineer will certify to the JCMUA, and the State, where necessary, that all plans and specifications were prepared in accordance with the JCMUA's Rules and Regulations and with the requirements of the NJDEP, that actual construction costs were not significantly different from the originally submitted cost estimates and that the construction has been in conformance with the approved plans and specifications.

It should be noted that the sewer lateral from the first clean-out at the street onto a private property belongs to the property owner. The property owner has the sole responsibility of maintenance and repair of that section of sewer lateral.

### SECTION 8.01 RECORD DRAWINGS AND MANUALS

Upon completion of construction and prior to JCMUA acceptance of the new sewer system, complete As-Built Drawings and/or Manuals must be submitted to the JCMUA. They must be signed and sealed by a New Jersey Licensed Professional Engineer or Land Surveyor. They must meet all the requirements of the JCMUA's "Submission of Record Drawings for Extension of Water/Sewer Mains and other Water/Wastewater Facilities," current revision, which can be found in Appendix V.

The applicant shall also provide for each connection to this system data including depth at clean out, length of lateral from cleanout to main, stationing, upstream and downstream manhole data and location by triangulation of all cleanout and tee-wye.

This submission MUST include a digital rendering using a current version of the AutoCAD format.

Prior to receiving water meter approval, the Developer/Owner/Contractor/Engineer shall have submitted and received approval of as-builts both electronic (AUTO CAD) and paper for sanitary sewer, storm sewers and water main from JCMUA. Additionally, when applicable, the WQM-005 for sewers and construction certification shall be submitted to JCMUA prior to issuance and release of water meters.

**SECTION 8.02 EASEMENTS**

After construction and before final acceptance by the Authority, the applicant shall furnish one (1) reproducible and two (2) prints (blue and white) of maps together with metes and bounds descriptions for each easement to be deeded to the Authority. Maps shall be sealed by a licensed land surveyor. The applicant shall also provide the Authority with a properly executed Deed of Conveyance for the easements to be conveyed to the Authority in form recordable in the office of the Hudson County Clerk.

**SECTION 8.03 CERTIFICATIONS AND PERMITS**

The applicant must provide the JCMUA with all applicable certifications/permits from any municipal, state or federal agency that may be required.

**SECTION 8.04 MAINTENANCE BOND**

Upon completion of the new sewer system, the applicant must post a Maintenance Bond for an amount equal to 15% of the Total Construction Cost. The Maintenance Bond must guarantee satisfactory performance of the system for a period of 730 Calendar Days.

**SECTION 8.05 SEWER SYSTEM ACCEPTANCE**

Upon receipt and approval of the above listed items in Section 7.01 through Section 7.04, the Authority will:

A. Release the applicant from the Performance Bond.
    a. Replaced with the Maintenance Bond listed above.

B. Accept the title to **all** lands, easements, structures, appurtenances and improvements.

C. Assume the operation and maintenance of the system thereafter.

## ARTICLE IX. WASTE DISCHARGE REQUIREMENTS

**SECTION 9.01 INDUSTRIAL WASTES**

All industrial users must apply to the Passaic Valley Sewerage Commission in Newark, NJ to obtain an industrial permit, if required, prior to final approval by the JCMUA. If the user is exempt from said permit, a copy of the correspondence stating such exemption must be submitted.

**SECTION 9.02 RESIDENTIAL AND COMMERCIAL WASTES**

All residential and commercial discharges must comply with Passaic Valley Sewerage Commission's Pretreatment Regulations. The JCMUA also reserves the right to enforce these standards by separately adopted JCMUA resolution.

**SECTION 9.03 PROHIBITED WASTES**

No person shall discharge or cause to be discharged any storm water, surface water, ground water, roof runoff, subsurface drainage or discharge from a sump pump into any sanitary interceptor sewer. No person shall discharge or cause to be discharged any prohibited waste as outlined by PVSC regulations.

**SECTION 9.04 GREASE**

No person shall discharge Grease, Fats, and oils directly to any storm water, sanitary sewer, combined sewer without a Grease trap.

Grease traps shall be required on all establishments handling, managing, preparing, disposing of: food products, food, animal food, grease or renderings, animal waste or plant material.

Food handling shall be considered as: preparation of foods, packing of foods, distribution of packaged foods, on-site cooking/baking/frying/or other method, washing of utensils used in context of food. These types of establishments shall include: coffee shops, fast food, ethnic food restaurants, diners, bakeries, factories, bodegas, delicatessens, supermarkets, rendering plants, oil processing and all other similar businesses.

The trap shall be constructed such that greases and oils are collected and removed from the sanitary flow before entering combined sewer system or sanitary sewer.

Food establishments shall submit to JCMUA, monthly invoices for grease trap cleaning and grease/oil as removed by grease/oil handling firm.

Traps shall be constructed of durable materials capable of sanitary service without leakage. Trap arrangement shall be installed in conformance with National Plumbing Code, Jersey City Plumbing requirements, Passaic Valley Sewerage Commission requirements and NJDEP.

Where the JCMUA is required to clean sewers to remove grease blockage due to grease and/or oils being discharged by a business into the system without a grease trap in place, the business owner shall be billed the costs related to the cleaning. Those costs shall include: all labor (3 workers), 1 Superintendent, 1 jet vacuum truck, 1 superintendent truck. The Laborers' arrival at Westside Plant shall be billed at a minimum of two (2) hours, up to the total time taken, to the nearest hour after work is completed, including emptying of truck at the East Side Plant and returning to the West Side Plant. Minimum rate per Laborer is $35.00/hour; per Superintendent is $60.00/hour. Vacuum Truck is billed at $150.00/hour and Superintendent truck at $15.00/hour. The Superintendent shall

be billed from the time call is received to the time the Superintendent returns to the West Side Plant.

## ARTICLE X. USE OF SEWER SYSTEM

### SECTION 10.01 USE BY JCMUA

During any construction and before final acceptance, the JCMUA shall have the right to use any portion of the system completed without waiving their right to order correction of any defects upon final completion.

### SECTION 10.02 UNAUTHORIZED USE

Discharge of any non-approved commercial, residential or industrial waste into the system is strictly prohibited

## ARTICLE XI. COMPLIANCE WITH RULES AND REGULATIONS

### SECTION 11.01 GENERAL

The applicant MUST comply with ALL of the Rules and Regulations as set forth herein. Failure to do so will result in a stop work order directive by the JCMUA.

The applicant shall exercise ALL construction constraints to be required to conform to the New Jersey Department of Environmental Protection (NJDEP).

### SECTION 11.02 NONCOMPLIANCE

The JCMUA reserves the right to refuse to any applicant the privilege of connecting o the Authority's system, or to compel discontinuance of use of a sewer, or to compel the pretreatment of wastes as per PVSC regulations at any time, in order to prevent discharge of wastes into the sewerage system which are deemed to be harmful to the system, treatment process or operating personnel.